NAVFAC
Naval Facilities Engineering Command
NAVFAC MID-ATLANTIC

eProjects WORK ORDER NO.
1590892/1639558/1639600

HURRICANE FLORENCE RECOVERY TRAINING AND STORAGE FACILITIES AT MCB CAMP LEJEUNE, NORTH CAROLINA

RTA
3 MARCH 2020

PREPARED BY:

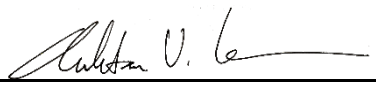
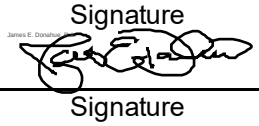
JACOBS
1100 N. Glebe Road
Suite 500
Arlington, Virginia 22201

(A/E Contract N40085-18-D-8728)

REQUEST FOR PROPOSAL PREPARED BY:

Jacobs

Civil	Architectural
Structural	Interior Design
Mechanical/Plumbing	Electrical/Communication
Fire Protection	Cyber Security
Cost Estimating	AT/FP

Anhtan Le, AIA, LEED AP		**3 March 2020**
Submitted By	Signature	Date
Design Manager	Signature	Date
James E. Donahue, RA		**13 March 2020**
Design Production Director	Signature	Date

RFP TABLE OF CONTENTS

This Request for Proposal (RFP) consists of six parts:
Part 1: contains typical contractual forms, procedures, bidding instructions, bond information, clauses and wage decisions.

Part 2: contains general contract administrative and execution requirements including, but not limited to safety, design criteria & process, quality control, security, schedule, invoicing, temporary facilities, and design and construction oversight processes.

Part 3: lists the project requirements, specific scope items, and expected quality level above and beyond those outlined in Part 4.

Part 4: contains Performance Specifications and minimum quality requirements.

Part 5: contains prescriptive specifications.

Part 6: contains background project information, references, and other project-specific requirements.

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PART 3 STATEMENT OF WORK/PROJECT PROGRAM

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1. Project Description
2. Project Objectives
3. Site Analysis
4. Building Requirements
5. Room Requirements
6. Engineering Systems Requirements

B. P1512F: MCCSSS LOG OPS SCHOOL

B.1 LOG OPS SCHOOL

1. Project Description
2. Project Objectives
3. Site Analysis
4. Building Requirements
5. Room Requirements
6. Engineering Systems Requirements

B.2 P1512F: JOINT RECEPTION CENTER

1. Project Description
2. Project Objectives
3. Site Analysis
4. Building Requirements
5. Room Requirements
6. Engineering Systems Requirements

B.3 P1512F: RENOVATE M107

1. Project Description
2. Project Objectives
3. Site Analysis
4. Building Requirements
5. Room Requirements
6. Engineering Systems Requirements

C. P1527F: LOGCOM CSP WAREHOUSE REPLACEMENT

1. Project Description
2. Project Objectives
3. Site Analysis
4. Building Requirements
5. Room Requirements
6. Engineering Systems Requirements

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B10 Superstructure
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D30 HVAC
D40 Fire Protection
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GENERAL

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2. Investigation and Remediation Waste Management Plan
3. USMC Finding of No Significant Impact for the Environmental Assessment for Demolition of Historic Properties
4. Camp Lejeune Mechanical Design Guidance
5. Camp Lejeune Specifications

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07 52 00	Modified Bituminous Membrane
07 61 15.00 20	Aluminum Stand Seam
08 33 23	Roll Up Doors
08 91 00	Wall Louvers
09 67 23.13	Epoxy Flooring
10 14 00.20	Interior Signage
10 14 00.20a	MCBLNC Signs Standards Graphics
10 22 13	Wire Mesh Partitions
11 24 24	Roof Fall Protection
28 31 76	Interior Fire Alarm and Mass Notification System
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6. Water and Electrical Meter Information
7. MCB Electrical Policies & Criteria
8. Mass Notification to Basewide
9. Life Cycle Cost Analysis Report (Will be Provided by the Government)
10. Performance Assessment Plan
11. Permits Record of Decision (PROD)
12. Best Value Determination Guidelines (Enclosure 1)
13. Best Value Determination Guidelines (Enclosure 2)
14. Project Sign Details
15. Open Burning of Vegetative Debris

P1338F – MEF SIMULATION TRAINING BUILDING

Attachment No. Description

1. Demolition Drawings
2. Existing Site and Building Photographs
3. As-Built Drawings for Demolition Buildings
4. Site Utility Drawings for Demolition
5. Hazardous Materials Report
6. Site Utility Maps
7. Site OSP Telecom Pathways Map
8. Site Bubble Diagrams
9. Topographic Drawings
10. Geotechnical Report
11. Hydrant Flow Tests
12. NEPA DM
13. Site Approval Form
14. DD-1354 Transfer and Acceptance of DoD Real Property
15. Disposal of DoN Real Property Form
16. FF&E and A/V Cost Forms

P1512F – LOG OPS SCHOOL

GENERAL

Attachment No. Description

1. Demolition Drawings
2. Existing Site and Building Photographs
3. As-Built Drawings for Demolition Buildings
4. Site Utility Drawings for Demolition
5. P1512F LOG OPS School Preliminary Construction Phasing Plan
6. Hazardous Materials Reports
7. Site OSP Telecom Pathways Map
8. P1512F A/V Requirements
9. NEPA DM
10. Disposal of DoN Real Property Form
11. Industrial Equipment to Relocate from M107 to the new LOG OPS School
12. FF&E and A/V Cost Forms (LOG OPS School, JRC, M107)

LOG OPS SCHOOL

Attachment No. Description

1. Existing Site and Building Photographs
2. Site Utility Drawings for Demolition
3. Site Bubble Diagram
4. Geotechnical Report
5. Hydrant Flow Tests
6. DD-1354 Transfer and Acceptance of DoD Real Property

P1512F – JOINT RECEPTION CENTER

Attachment No. Description

1. Existing Site and Building Photographs
2. Site Utility Drawings for Demolition
3. Electrical Manhole Location Map
4. Site Bubble Diagrams
5. Geotechnical Report
6. Hydrant Flow Tests
7. DD-1354 Transfer and Acceptance of DoD Real Property
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P1512F – RENOVATE M107

Attachment No. Description

1. Existing Site and Building Photographs
2. Site Utility Drawings for Demolition
3. As-Built Drawings
4. Site Bubble Diagrams
5. Hydrant Flow Tests
6. DD-1354 Transfer and Acceptance of DoD Real Property
7. Tenant Diagrams (Government Provided Information)

P1527F – LOGCOM CSP WAREHOUSE

Attachment No. **Description**

1. Demolition Drawings
2. Existing Site and Building Photographs
3. As-Built Drawings for Demolition Buildings
4. Site Utility Drawings for Demolition
5. Hazardous Materials Report
6. Building 1601 IR Plume and LUCs Maps
7. Site OSP Telecom Pathways Map
8. Site Bubble Diagrams
9. Geotechnical Report
10. Hydrant Flow Tests
11. NEPA DM
12. DD-1354 Transfer and Acceptance of DoD Real Property
13. Disposal of DoN Real Property Form
14. FF&E and A/V Cost Forms

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PART 1 – PROPOSAL FORMS & DOCUMENTS

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ATTACHMENT F – PRICE PROPOSAL FORM

1.1 CONTRACT LINE ITEMS

The terms Offeror and Bidder and versions thereof (offer/bid) have the same definition as used within this contract.

Provide the CLIN lump sum price for the following items:

CLIN 0001 – P1338F 2ND MEF SIMULATION TRAINING CENTER BASE PRICE: Price includes the following:

Price for the Total Amount for CLIN 0001 for shall provide the full project scope, excluding other Base Bids (CLIN 0002, 0003), complete and in-place in accordance with the Design Build RFP even if not specifically listed below.

0001: P1338F 2ND MEF Simulation Training Center:
Price for provision of all work for P1338F complete.

Basis of Bid for CLIN 0001 shall be the Total Amount for CLIN 0001, but not including the work indicated or specified to be provided under any other CLIN.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0001AA	All work complete in accordance with the RFP for CLIN 0001 including 0001AB, and 0001AC.	1	LS	$_____
0001AB	Complete work for the facility inside the 5 foot line	1	LS	$_____
0001AC	Complete work for the site work outside the 5 foot line	1	LS	$_____
0001AD	Design	1	LS	$_____

Total CLIN 0001 (0001AA+0001AD): $_____

CLIN 0002 – P1512F MCCSSS LOG OPS SCHOOL: Price includes the following:

Price for the Total Amount for CLIN 002, P1512F MCCSSS LOG OPS SCHOOL shall provide the full project scope, excluding other Base Bids (CLIN 0001, 0003), complete and in place in accordance with the Design Build RFP even if not specifically listed below.

0002: P1512F MCCSSS LOG OPS SCHOOL Price for provision of all work for P1512F complete.

Basis of Bid for CLIN 0002 shall be the Total Amount for CLIN 0002, but not including the work indicated or specified to be provided under any other CLIN.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0002AA	All work complete in accordance with the RFP for CLIN 0002 including 0002AB, 0002AC, 0002AD and 0002AE.	1	LS	$_____
0002AB	Complete work for the facility inside the 5 foot line	1	LS	$_____
0002AC	Complete work for P1512F Joint Reception Center inside the 5 foot line	1	LS	$_____
0002AD	Complete work for P1512F M107 Renovation to the 5 foot line	1	LS	$_____
0002AE	Complete work for the site work outside the 5 foot line	1	LS	$_____
0002AF	Design	1	LS	$_____

Total CLIN 0002 (0002AA + 0002AF): $_____

CLIN 0003 – P-1527F LOG COM CSP Warehouse BASE PRICE: Price includes the following:

Price for the Total Amount for CLIN 0003 for P-1527F LOG COM CSP Warehouse shall provide the full project scope, excluding other Base Bids (CLIN 0001, 0002), complete and in-place in accordance with the Design Build RFP even if not specifically listed below

0003: P-1527F LOG COM CSP Warehouse:
Price for provision of all work for P1527F complete.

Basis of Bid for CLIN 0003 shall be the Total Amount for CLIN 0003, but not including the work indicated or specified to be provided under any other CLIN.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0003AA	All work complete in accordance with the RFP for CLIN 0003 including 0003AB and 0003AC.	1	LS	$_____
0003AB	Complete work for the facility inside the 5 foot line	1	LS	$_____
0003AC	Complete work for the site work outside the 5 foot line	1	LS	$_____
0003AD	Design	1	LS	$_____

Total CLIN 0003 (0003AA + 0003AD): $_____

Refer to paragraph 1.3 for Planned Modification Bid notes.

CLIN 0004– PLANNED MODIFICATION FOR P1338F – Price includes the following:

Price to procure and supervise installation of the Furniture, Fixtures, and Equipment (FF&E) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT FF&E ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT FF&E ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0006 (GOVT FF&E ESTIMATE + HAR AMOUNT)
0004	FF&E	$		$_____	$_____

CLIN 0005– PLANNED MODIFICATION FOR P1338F – Price includes the following:

Price to procure and supervise installation of the Audio/Visual System (AV) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT AV ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT FF&E ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0006 (GOVT FF&E ESTIMATE + HAR AMOUNT)
0005	AV	$		$_____	$_____

CLIN 0006– PLANNED MODIFICATION FOR P1338F – Price includes the following:

Price to procure and supervise installation of the Electronic Security System (ESS) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT ESS ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT ESS ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0007 (GOVT ESS ESTIMATE + HAR AMOUNT)
0006	ESS	$		$_____	$_____

CLIN 0007 – OPTION 1 for P1338F, Demolition and Disposal:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0007	Demolition and disposal of Building Foundations (outside footprint)	1	LS	$_____

CLIN 0008 – OPTION 2 for P1338F, Demolition and Disposal:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0008	Demolition and disposal of Buildings, Complete (Outside Footprint)	1	LS	$_____

CLIN 0009 – OPTION 3 for P1338F, Parking areas to be gravel:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0009	Gravel parking areas	1	LS	$_____

CLIN 0010 – OPTION 4 for P1338F:

NOT USED

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0010	Not Used			$_____

CLIN 0011 – OPTION 5 for P1338F, Tilt-up Construction vs Brick Wall Cavity:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0011	Tilt-up Construction	1	LS	$_____

CLIN 0012 – OPTION 6 for P1338F, Terrazzo Flooring for all corridors and main entry:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0012	Terrazzo Flooring	1	LS	$_____

CLIN 0013– PLANNED MODIFICATION FOR P1512F – Price includes the following:

Price to procure and supervise installation of the Furniture, Fixtures, and Equipment (FF&E) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT FF&E ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT FF&E ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0006 (GOVT FF&E ESTIMATE + HAR AMOUNT)
0013	FF&E	$		$_____	$_____

CLIN 0014– PLANNED MODIFICATION FOR P1512F – Price includes the following:

Price to procure and supervise installation of the Audio/Visual Equipment (AV) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT FF&E ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT FF&E ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0006 (GOVT FF&E ESTIMATE + HAR AMOUNT)
0014	AV	$		$_____	$_____

CLIN 0015– PLANNED MODIFICATION FOR P1512F – Price includes the following:

Price to procure and supervise installation of the Electronic Security System (ESS) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT ESS ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT ESS ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0007 (GOVT ESS ESTIMATE + HAR AMOUNT)
0015	ESS	$		$_____	$_____

CLIN 0016 – OPTION 1 for P1512F, Demolition and Disposal:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0016	Demolition and disposal of Building Foundations (outside footprint)	1	LS	$_____

CLIN 0017 – OPTION 2 for P1512F, Demolition and Disposal:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0017	Demolition and disposal of Buildings, Complete (Outside Footprint)	1	LS	$_____

CLIN 0018 – OPTION 3 for P1512F, Parking areas to be gravel:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0018	Gravel parking areas	1	LS	$_____

CLIN 0019 – OPTION 4 for P1512F:

NOT USED

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0019	Not Used			$_____

CLIN 0020 – OPTION 5 for P1512F, Tilt-up Construction vs Brick Wall Cavity:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0020	Tilt-up Construction	1	LS	$_____

CLIN 0021 – OPTION 6 for P1512F, Repair M107 Roof in lieu of Replace:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0021	Repair M107 Roof in lieu of Replace	1	LS	$_____

CLIN 0022 – OPTION 7 for P1512F, M107 Sloped Roof:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0022	M107 Sloped Roof	1	LS	$_____

CLIN 0023 – OPTION 8 for P1512F, Additional pavement for Troop Formations:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0023	Additional pavement for Troop Formations (2 ea)	1	LS	$_____

CLIN 0024 – OPTION 9 for P1512F, Terrazzo flooring at all corridors and Main Entry:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0024	Terrazzo Flooring	1	LS	$_____

CLIN 0025– PLANNED MODIFICATION FOR P1527F – Price includes the following:

Price to procure and supervise installation of the Furniture, Fixtures, and Equipment (FF&E) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT FF&E ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT FF&E ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0006 (GOVT FF&E ESTIMATE + HAR AMOUNT)
0025	FF&E	$		$_____	$_____

CLIN 0026– PLANNED MODIFICATION FOR P1527F – Price includes the following:

Price to procure and supervise installation of the Audio/Visual Equipment (AV) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT AV ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT FF&E ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0006 (GOVT FF&E ESTIMATE + HAR AMOUNT)
0026	AV	$		$_____	$_____

CLIN 0027– PLANNED MODIFICATION FOR P1527F – Price includes the following:

Price to procure and supervise installation of the Electronic Security System (ESS) complete in accordance with the RFP and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT ESS ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOVT ESS ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0007 (GOVT ESS ESTIMATE + HAR AMOUNT)
0027	ESS	$		$_____	$_____

CLIN 0028 – OPTION 1 for P1527F, Demolition and Disposal:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0028	Demolition and disposal of Building Foundations (outside footprint)	1	LS	$_____

CLIN 0029 – OPTION 2 for P1527F, Demolition and Disposal:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0029	Demolition and disposal of Buildings, Complete (Outside Footprint)	1	LS	$_____

CLIN 0030 – OPTION 3 for P1527F, Parking areas to be gravel:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0030	Gravel parking areas	1	LS	$_____

CLIN 0031 – OPTION 4 for P1527F, Metal Panel Exterior Cladding vs Brick Cavity Wall:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0031	Exterior Metal Cladding	1	LS	$_____

CLIN 0032 – OPTION 5 for P1527F, Tilt-up Construction vs Brick Wall Cavity:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0032	Tilt-up Construction	1	LS	$_____

CLIN 0033 – OPTION 6 for P1527F, Membrane Roofing vs Low slope Metal Roofing:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0033	Membrane Roofing vs Low slope Metal Roofing	1	LS	$_____

CLIN 0034 – OPTION 7 for P1527F, Reduce Overall Wall Height & Add Pallet Racks:

Price for Total Amount to provide the full option scope complete and in place in accordance with the RFP even if not specifically listed below. Refer to paragraph 1.2 for explanation of option.

	DESCRIPTION	ESTIMATED QUANTITY	UNIT	TOTAL PRICE
0034	Reduce Overall Wall Height & Add Pallet Racks	1	LS	$_____

1.2 Explanation of CLIN Items

CLIN 0001

Total amount of Base Amount CLIN 0001 shall provide the full project scope, excluding Bid Options defined below, complete in place in accordance with the RFP even if not specifically listed. Explanation of specific work items as defined as follows:

CLIN 0001: P1338F 2ND MEF SIMULATION TRAINING CENTER - includes all P1338F Base Bid Work and includes, but is not limited to, the design and construction of the building and site utilities; providing construction permitting fees, and all incidental and related work.

0001AA: All work complete in accordance with the RFP for CLIN 0001 including 0001AB, and 0001AC.

0001AB: Facility and work inside the 5 foot line, excluding design costs, includes labor, materials, and equipment for construction of the facility and all incidental and related work.

0001AC: Site work outside the 5 foot line, excluding design costs, includes labor, materials, and equipment for grading and drainage, paving, utilities, and all incidental and related work.

0001AD: Design includes provision of all work associated with the site and building design including but not limited to architecture, structural, geotechnical, interior design, civil, mechanical, electrical, and all incidental and related work.

CLIN 0002

Total amount of Base Amount CLIN 0002 shall provide the full project scope, excluding Bid Options defined below, complete in place in accordance with the RFP even if not specifically listed. Explanation of specific work items as defined as follows:

CLIN 0002: P1512F MCCSSS LOG OPS SCHOOL - includes all P1512F Base Bid Work and includes, but is not limited to, the design and construction of the building and site utilities; providing construction permitting fees, and all incidental and related work.

0002AA: All work complete in accordance with the RFP for CLIN 0002 and including the work indicated or specified under 0002AB through 0002AE.

0002AB: Facility and work inside the 5 foot line, excluding design costs, includes labor, materials, and equipment for construction of the facility and all incidental and related work.

0002AC: P1512F Joint Reception Center and work inside the 5 foot line, excluding design costs, includes labor, materials, and equipment for construction of the facility and all incidental and related work.

0002AD: P1512F M107 Renovation and work inside the 5 foot line, excluding design costs, includes labor, materials, and equipment for construction of the facility and all incidental and related work.

0002AE: Site work outside the 5 foot line, excluding design costs, includes labor, materials, and equipment for grading and drainage, paving, utilities, and all incidental and related work.

0002AF: Design includes provision of all work associated with the site and building design including but not limited to architecture, structural, geotechnical, interior design, civil, mechanical, electrical, and all incidental and related work.

CLIN 0003

Total amount of Base Amount CLIN 0003 shall provide the full project scope, excluding Bid Options defined below, complete in place in accordance with the RFP even if not specifically listed. Explanation of specific work items as defined as follows:

CLIN 0003: P-1527F LOG COM CSP Warehouse - includes all P1527F Base Bid Work and includes, but is not limited to, the design and construction of the building and site utilities; providing construction permitting fees, and all incidental and related work.

0003AA: All work complete in accordance with the RFP for CLIN 0003 and including the work indicated or specified under 0003AB through 0003AC.

0003AB: Facility and work inside the 5 foot line, excluding design costs, includes labor, materials, and equipment for construction of the facility and all incidental and related work.

0003AC: Site work outside the 5 foot line, excluding design costs, includes labor, materials, and equipment for grading and drainage, paving, utilities, and all incidental and related work.

0003AD: Design includes provision of all work associated with the site and building design including but not limited to architecture, structural, geotechnical, interior design, civil, mechanical, electrical, and all incidental and related work.

CLIN 0004 – Planned Modification for P1338F

Price to procure and supervise installation of the Furniture, Fixtures, and Equipment (FF&E) complete in accordance with the RFP.

CLIN 0005 – Planned Modification for P1338F

Price to procure and supervise installation of the Audio/Visual Equipment (AV) complete in accordance with the RFP.

CLIN 0006 – Planned Modification for P1338F

Price for provision, installation, testing, and associated training for the Electronic Security System (ESS) complete in accordance with the RFP as necessary for the facility. The ESS includes, but is not limited to, Intrusion Detection System (IDS), Access Control System (ACS), and Closed Circuit Television (CCTV),

boundary switches, electronic latches, motion sensors, electronic entry control, and security monitoring and control workstations. ESS design, design submittals, pathways and electrical power are excluded from this item and shall be priced in the base bid CLIN 0001.

CLIN 0007 – Planned Option 1 for P1338F

Delete the work for the demolition and disposal of building foundations outside of the P1338F II Simulator Training Facility footprint complete in accordance with the RFP.

CLIN 0008 – Planned Option 2 for P1338F

Delete the work for the demolition and disposal of building (including foundations) outside of the P1338F II Simulator Training Facility footprint complete in accordance with the RFP.

CLIN 0009 – Planned Option 3 for P1338F

Delete the work for the asphalt surface course at parking areas for P1338F II Simulator Training Facility. Price for parking areas to be gravel complete in accordance with the RFP.

CLIN 0010 – Planned Option 4 for P1338F

Not used.

CLIN 0011 – Planned Option 5 for P1338F

Delete the work for brick cavity wall assembly over CMU backup. Price for tilt-up wall concrete panel construction complete in accordance with the RFP.

CLIN 0012 – Planned Option 6 for P1338F

Delete the flooring finishes in the corridors and Main Entry (identified in RFP Part 3, Chapter 5 Room Requirements). Price as terrazzo flooring complete in accordance with the RFP.

CLIN 0013 – Planned Modification for P1512F

Price to procure and supervise installation of the Furniture, Fixtures, and Equipment (FF&E) complete in accordance with the RFP.

CLIN 0014 – Planned Modification for P1512F

Price to procure and supervise installation of the Audio/Visual Equipment (AV) complete in accordance with the RFP.

CLIN 0015 – Planned Modification for P1512F

Price for provision, installation, testing, and associated training for the Electronic Security System (ESS) complete in accordance with the RFP as necessary for the facility. The ESS includes, but is not limited to, Intrusion Detection System (IDS), Access Control System (ACS), and Closed Circuit Television (CCTV), boundary switches, electronic latches, motion sensors, electronic entry control, and security monitoring and control workstations. ESS design, design submittals, pathways and electrical power are excluded from this item and shall be priced in the base bid CLIN 0002.

CLIN 0016 – Planned Option 1 for P1512F

Delete the work for the demolition and disposal of building foundations outside of the P1512F LOG OPS School, Joint Reception Facility and M107 Renovation building footprint(s) complete in accordance with the RFP.

CLIN 0017 – Planned Option 2 for P1512F

Delete the work for the demolition and disposal of building (including foundations) outside of the P1512F LOG OPS School, Joint Reception Facility and M107 Renovation building footprint(s) complete in accordance with the RFP.

CLIN 0018 – Planned Option 3 for P1512F

Delete the work for the asphalt surface course at parking areas for P1512F. Price for parking areas to be gravel complete in accordance with the RFP.

CLIN 0019 – Planned Option 4 for P1512F

Not Used.

CLIN 0020 – Planned Option 5 for P1512F

Delete the work for brick cavity wall assembly over CMU backup. Price for tilt-up wall concrete panel construction complete in accordance with the RFP.

CLIN 0021 – Planned Option 6 for P1512F

Delete the work for roof replacement of M107 Renovation included in CLIN 002AD. Price for repairing M107 roof complete in accordance with the RFP.

CLIN 0022 – Planned Option 7 for P1512F

Delete the work for roof replacement of M107 Renovation included in CLIN 002AD. Price for adding a High Slope Roof to M107 roof complete in accordance with the RFP.

CLIN 0023 – Planned Option 8 for P1512F

Price for providing the additional pavement for Troop Formations between existing BEQ Buildings M445 and M446 and between M445 and M450 complete in accordance with the RFP.

CLIN 0024 – Planned Option 9 for P1512F

Delete the flooring finishes in the corridors and Main Entry (identified in RFP Part 3, Chapter 5 Room Requirements. Price as terrazzo flooring complete in accordance with the RFP.

CLIN 0025 – Planned Modification for P1527F

Price to procure and supervise installation of the Furniture, Fixtures, and Equipment (FF&E) complete in accordance with the RFP.

CLIN 0026 – Planned Modification for P1527F

Price to procure and supervise installation of the Audio/Visual Equipment (AV) complete in accordance with the RFP.

CLIN 0027 – Planned Modification for P1527F

Price for provision, installation, testing, and associated training for the Electronic Security System (ESS) complete in accordance with the RFP as necessary for the facility. The ESS includes, but is not limited to, Intrusion Detection System (IDS), Access Control System (ACS), and Closed Circuit Television (CCTV), boundary switches, electronic latches, motion sensors, electronic entry control, and security monitoring and control workstations. ESS design, design submittals, pathways and electrical power are excluded from this item and shall be priced in the base bid CLIN 0003.

CLIN 0028 – Planned Option 1 for P1527F

Delete the work for the demolition and disposal of building foundations outside of the P1527F LOGCOM Warehouse Facility footprint complete in accordance with the RFP.

CLIN 0029 – Planned Option 2 for P1527F

Delete the work for the demolition and disposal of building (including foundations) outside of the P1527F LOGCOM Warehouse Facility footprint complete in accordance with the RFP.

CLIN 0030 – Planned Option 3 for P1527F

Delete the work for the asphalt surface course at parking areas for P1527F LOGCOM Warehouse Facility. Price for parking areas to be gravel complete in accordance with the RFP.

CLIN 0031 – Planned Option 4 for P1527F

Delete the work for brick cavity wall assembly. Price for metal wall panel exterior cladding complete in accordance with the RFP.

CLIN 0032 – Planned Option 5 for P1527F

Delete the work for brick cavity wall assembly over CMU backup. Price for tilt-up wall concrete panel construction complete in accordance with the RFP.

CLIN 0033 – Planned Option 6 for P1527F

Delete the work for low sloped metal roofing. Price for membrane roofing complete in accordance with the RFP.

CLIN 0034 – Planned Option 7 for P1527F

Price to reduce the overall wall height by 5’-4” and add additional pallet racks complete in accordance with the RFP.

PART 2 – GENERAL REQUIREMENTS

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SECTION 01 14 00

WORK RESTRICTIONS
11/11

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRCUTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel; G

1.2 SPECIAL SCHEDULING REQUIREMENTS

a. The nearby buildings and utilities will remain in operation during the entire construction period. Conduct operations so as to cause the least possible interference with normal operations of the activity.

b. Permission to interrupt any activity roads, railroads, or utility service must be requiested in writing a minimum of 15 calendar days prior to the desired date of interruption.

c. The work under this contract requires special attention to the scheduling and conduct of the work in connection with existing operations. Identify on the construction schedule each factor which constitutes a potential interruption to operations..

d. Government Telecommunications Contractor Access: The Government Telecommunications Contractor must be allowed access to the facility towards the end of construction (finishes 90 percent complete, rough-in 100 percent complete, Inside Plant (ISP)/Outside Plant (OSP) infrastructure in place) to provide equipment in the telecommunications rooms and make final connections. The Contractor will be required to coordinate their efforts with the Government Telecommunications Contractor to facilitate joint use of building spaces during the final phases of construction and work the coordination effort into the construction schedule. Requirements for Government Telecommunications are specified in Part 4, D50 ELECTRICAL and G40 SITE ELECTRICAL UTILITIES.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

1.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. To minimize traffic congestion, delivery of materials must be outside of peak traffic hours (6:30 to 8:00

a.m. and 3:30 to 5:00 p.m.) unless otherwise approved by the Contracting Officer. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

1.3.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.3.1.2 Installation Access

Starting March 31, 2019, NCAS/RAPID GATE/MCESS passes will no longer be accepted at Base gates. DBIDS will replace the RAPID GATES passes currently used. This applies to Contractors, vendors, and suppliers requiring access to Navy Installations. Also applies to Designers, Architects and Engineers
performing A/E services at Navy installations. All current Contractors, vendors, suppliers, and A/E's working on projects will need to transition to the new DBIDS system by April 1, 2019. Individuals currently using an NCACS credential for installation access are required to switch to a DBIDS credential no later than April 2019. New and current user of NCACS must visit MCB Camp Lejeune, North Carolina Visitor Control Center Security Office to obtain a DBIDS credential.

Obtain access to Navy installations through participation in the Defense Biometrics Identification System (DBIDS). Requirements for Contractor employee registration, and transition for employees currently under Navy Commercial Access Control System (NCACS), are available at https://www.cnic.navy.mil/om/dbids.html. No fees are associated with obtaining a DBIDS credential.

Participation in the DBIDS is not mandatory, and Contractor personnel may apply for One-Day Passes at the Base Visitor Control Office to access an installation.

1.3.1.2.1 Registration for DBIDS

Registration for DBIDS is available at https://www.cnic.navy.mil/om/dbids.html. Procedure includes:

a. Present a letter or official award document (i.e. DD Form 1155 or SF 1442) from the Contracting Officer, that provides the purpose for access, to the base Visitor Control Center representative.

b. Present valid identification, such as a passport or Real ID Act-compliant state driver's license.

c. Provide completed SECNAV FORM 5512/1 to the base Visitor Control Center representative to obtain a background check. This form is available for download at https://www.cnic.navy.mil/om/dbids.html.

d. Upon successful completion of the background check, the Government will complete the DBIDS enrollment process, which includes Contractor employee photo, finger prints, base restriction and several other assessments.

e. Upon successful completion of the enrollment process, the Contractor employee will be issued a DBIDS credential, and will be allowed to proceed to worksite.

1.3.1.2.2 DBIDS Eligibility Requirements

Throughout the length of the contract, the Contractor employee must continue to meet background screen standards. Periodic background screenings are conducted to verify continued DBIDS participation and installation access privileges. DBIDS access privileges will be immediately suspended or revoked if at any time a Contractor employee becomes ineligible.

An adjudication process may be initiated when a background screen failure results in disqualification from participation in the DBIDS, and Contractor employee does not agree with the reason for disqualification. The Government is the final authority.

1.3.1.2.3 DBIDS Notification Requirements

a. Immediately report instances of lost or stolen badges to the Contracting Officer.

b. Immediately collect DBIDS credentials and notify the Contracting Officer in writing under the following circumstances:

(1) An employee has departed the company without having properly returned or surrendered their DBIDS credentials.

(2) There is a reasonable basis to conclude that an employee, or former employee, might pose a risk, compromise, or threat to the safety or security of the Installation or anyone therein.

1.3.1.2.4 One-Day Passes

Personnel applying for One-Day passes at the Base Visitor Control Office are subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government is not responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the DBIDS.

1.3.1.3 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

1.3.2 Entry to Radiologically Controlled Areas

Contractor personnel must not, under any circumstances, enter a radiologically controlled area or cross any posted radiological boundary. This paragraph applies to all phases of contract work. Radiation areas are posted with signs consistent with OSHA requirements. Ensure that employees are familiar with the radiation signs and symbols. All personnel entering the shipyard for the first time are required to receive radiological indoctrination training.

Should contract workers encounter radiological postings or boundaries which appear to limit their ability to access or carry out their intended work, they must notify their contract administrator for resolution of the problem.

1.3.2.1 Radioactive Materials and Equipment

All testing equipment, containing a radioactive source, must be operated in accordance with an approved radioactive equipment plan. This plan must be submitted to the Contracting Officer and approved by the Radiation Officer (Code 105.5), prior to bringing the equipment into the shipyard. This plan must include:

a. The name and type of equipment.

b. The type and size of radiation source.

c. The dates and locations of the equipment's usage.

d. The radiological controls that the Contractor will use while operating the equipment.

A different radioactive equipment plan will be required for each different type of equipment, type of radioactive source, or size of radioactive source. A data sheet of for each piece of new radioactive equipment must be submitted to the Contracting Officer to forward to the shipyard's Radiation Safety Officer. The data sheet must contain the following information:

a. Name of equipment.

b. Name and address of equipment manufacturer.

c. Type and size of radiation source.

d. The location of the installed radioactive equipment (i.e. building no., floor, code/shop area).

1.3.3 Working Hours

Regular working hours must consist of an 8 1/2 hour period established by the Contracting Officer, between 7 a.m. and 3:30 p.m., Monday through Friday, and 7 a.m. to 11 p.m. on Saturday, excluding Government holidays. Operational hours for all buildings is 6:00 a.m. thru Midnight with the exception of Building P1338F Which operates 24 hours 7 days a week.

1.3.4 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Contracting Officer. Make utility cutovers after normal working hours or on Saturdays, Sundays, and Government holidays unless directed otherwise.

1.3.5 Utility Cutovers and Interruptions

a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in paragraph WORK OUTSIDE REGULAR HOURS.

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, compressed air, and steam are considered utility cutovers pursuant to the paragraph WORK OUTSIDE REGULAR HOURS. Such interruptions are further limited to four hours. This time limit includes time for deactivation and reactivation.

d. Operation of Station Utilities: The Contractor must not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor must notify the Contracting Officer giving reasonable advance notice when such operation is required.

e. Connection to Existing Sanitary Sewer Line: Provide positive verification that the existing line conveys sanitary sewer; verify line is not incorrectly connected to a storm drain. Obtain Installation's Sanitary Sewer Connection Permit 2 weeks prior to connection and in accordance with Section 33 30 00 SANITARY SEWERAGE.

1.3.5.1 Location of Underground Utilities

Obtain digging permits prior to start of excavation by contacting the Contracting Officer 15 calendar days in advance. Scan the construction site with electromagnetic or sonic equipment, and mark the surface of the ground or paved surface where existing underground utilities or utilities encased in pier structures are discovered. Verify the elevations of existing piping, utilities, and any type of underground or encased obstruction not indicated to be specified or removed but indicated or discovered during scanning in locations to be traversed by piping, ducts, and other work to be conducted or installed.

Notification Prior to Excavation: Notify the Contracting Officer at least 15 days prior to starting excavation work.

1.4 SECURITY REQUIREMENTS

Contract Clause "FAR 52.204-2, Security Requirements and Alternate II," "FAC 5252.236-9301, Special Working Conditions and Entry to Work Area," and the following apply::

1.4.1 Business Access Security Requirements, Camp Lejeune, NC

1.4.1.1 Business Access Definition

Contractor/subcontractor employees requiring installation access to MCB,

Camp Lejeune or MCAS New River, N.C. must obtain a Business Access Identification Badge for that particular installation. Regularly scheduled delivery personnel, to include FEDEX, UPS, pick-up and deliveries, should also follow the Business Access guidelines described below. Personnel requiring Business Access Identification Badges must submit all documentation listed below. Badges are not required if the contracted position requires the employee to obtain a Common Access Card (CAC) which will be identified separately within the Government contract.

1.4.1.2 Installation Security Access Requirements

Accomplish the security requirements below within 10 days after award or prior to performance under the contract.

1.4.1.3 Business Access Identification Badge Requirement

In order to obtain a Business Access Identification Badge for access to MCB, Camp Lejeune, and satellite activities, or MCAS New River, NC, all personnel providing services under this contract will be required to present the documentation below to the following offices, as applicable:

a. MCB, Camp Lejeune, NC and its satellite activities. Report as follows:

1. Identification Card Center, 60 Molly Pitcher Road for badge (910-451-8444).

b. MCAS New River, NC. Report as follows:

1. S-4 (Facilities Office), Bldg AS-211 (1st Deck) for registrationon contractor's list (910-449-6310).

2. Pass and Identification Office, Bldg AS-187 (1st Deck) for badge and vehicle decal (910-449-7695).

1.4.1.4 Documentation

a. Photo ID:

Valid state or federal issued picture identification card. Acceptable documents include state drivers license, DMV issued photo identification, or alien registration card.

b. Proof of Employee Citizenship or Legal Alien Status:

Acceptable documents include birth certificate, Social Security Cards, Immigration and Naturalization Service (INS) forms and passports.

c. Proof of Criminal Records Check:

Proof of a criminal records check from the county or state where the employee has resided for the previous two years (or length of legal residence for foreign nationals in the U.S. for less than two years). Criminal background records checks must be from a credible source. Many credible sources exist, but some examples include the County Courthouse, Infolink Screening Services, Inc. (www.infolinkscreening.com), IntegraScan Criminal Records Checks (www.integrascan.com), Intelius Employee Screening (www.Intelius.com), and Castle Branch www.castlebranch.com).

Subsequent to the initial criminal background records checks, local criminal records checks will be conducted annually prior to renewal of badges for reevaluation.

d. Letter Provided By Contracting Officer Indicating Contract:

Letter provided by Contracting Officer indicating contract, contract period and prime contractor. Proof of employment on a valid Government contract (e.g., a letter on company letterhead from the prime contractor including contract number and term).

1.4.1.5 Denial of Access

Installation access will be denied if it is determined that an employee:

a. Is on the National Terrorist Watch List

b. Is illegally present in the United States.

c. Is subject to an outstanding warrant.

d. Has knowingly submitted an employment questionnaire with false or fraudulent information.

e. Has been issued a debarment order and is currently banned from military installations.

f. Is a Rarsegistered Sexual Offender, or has any Felony Conviction within the past two years.

1.4.1.6 Appeal Process

All appeals should be directed to the Base Inspector's Office for any individual that has been denied access to the Base.

1.4.1.7 Display and Disposition of Badges

Contractors/subcontractors will prominently display their badges on their person at all times. Upon completion/termination of this contract or an individual's employment, collect and turn in to the Pass & ID Office all badges. If the Contractor fails to obtain the employee's badge, the Pass & ID Office must be notified within 24 hours. During the contract performance period contractors will immediately report instances of lost or stolen badges to the issuing pass and identification office.

1.4.1.8 Contractor and Subcontractor Vehicle Requirements

Each vehicle to be used in contract performance must show the Contractor's or subcontractor's name so that it is clearly visible and must always display a valid state license plate and safety inspection sticker. To obtain a vehicle decal, which will be valid for one year or contract period, whichever is shorter, Contractor or subcontractor vehicle operators must provide to the Vehicle Registration Office, 60 Molly Pitcher Road for vehicle decal (910-451-1158):

a. An installation sponsor request forwarded to provost Marshall office.

b. A valid form of Federal or state government I.D.

c. If driving a motor vehicle, a valid driver's license, vehicle registration and proof of insurance.

Upon completion/termination of this contract or an individual's employment, the Contractor must collect and turn in to Vehicle Registration all Government vehicle decals. If any are not collected, notify the Vehicle Registration Office within 24 hours.

1.4.1.9 Security Checks

Contractor personnel and vehicles must only be present in locations relevant to contract performance. All Contractor personnel entering the base must conform to all Government regulations and are subject to such checks as may be deemed necessary to ensure that violations do not occur. Employees will not be permitted on base when such a check reveals that their presence would be detrimental to the security of the base. Subject to security regulations, the Government will allow access to an area for servicing equipment and/or performing required services. Upon request, submit to the Contracting Officer questionnaires and other forms as may be required for security purposes.

1.4.2 Marine Corps Base (MCB) Camp Lejeune, North Carolina

No employee or representative of the Contractor will be admitted to the work site unless he furnishes satisfactory proof that he is a citizen of the United States or is specifically authorized admittance by the OICC.

a. Identification Badges - A list of all employees to be engaged in the performance of work shall be furnished to the Security Department in conformance with Section 1.4.1.3 Business Access Identification Badge Requirement. In the event employees are hired or discharged, a corrected list of employees shall be furnished reflecting the change in personnel and documentation at least five (5) days in advance of needing to access the worksite. Identification badges for the Contractor and his employees shall be furnished by the Security Department, Marine Corps Base Camp Lejeune, North Carolina. Immediately report instances of lost or stolen badges to the Contracting Officer. Upon completion of the contract and/or termination of the service of any employee, the Contractor shall return the badges to the Security Pass Office. Compliance with this requirement is mandatory and certification thereof to the Contracting Officer is required prior to submitting final invoices. Failure to return badges will hold up Contractor's final payment.

b. Vehicles and Equipment - In addition to other conditions and requirements set forth herein before, vehicles and equipment admitted to the Marine Corps Base Camp Lejeune, North Carolina will be required to meet standards established by the Station Safety Department prior to any use of such equipment on Station. The vehicular and/or equipment conditions shall satisfactorily meet the following provisions:

    1. Steering mechanism must be satisfactory and safe condition.

    2. Horns and warning devices must be operable.

    3. Windshield wipers must be satisfactory in place, clean and unbroken.

4. Rearview mirrors must be satisfactory in place, clean and unbroken.

5. General body conditions: Body must be satisfactory tight including fenders, bumpers, doors and latches thereto, and other parts which might become dislocated during travel.

6. Lights: All lights required by the type of vehicle/equipment in use shall be functional with satisfactory bulbs and lenses.

7. Exhaust Systems: Exhaust systems shall be completely functional with no leaks.

8. Fuel system must be free of leaks and show no evidence of loss of fuel and/or fumes.

9. Brakes: All brakes shall be functional and give evidence of the ability to halt the loaded vehicles within safe distances.

10. Tires need not be new but shall contain sufficient tread to indicate safety at operating speed with vehicle loaded.

11. Electric Wiring: All wiring shall be completed insulated as required and in cases considered appropriate waterproofing of wiring shall be required.

12. Motors shall be reasonably clean from excess grease, dust, and dirt, and if required shall be steam cleaned to the satisfaction of the inspection personnel.

13. Where applicable, inspection will include other such items as gauges, thermometers, controls, relief valves, piping, mechanical locks, limit switches, connectors, and other safety related devices associated with vehicles and equipment admitted to the Station.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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SECTION 01 20 00.05 20

PRICE AND PAYMENT PROCEDURES FOR DESIGN-BUILD
01/12

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 1110-1-8	(2016) Construction Equipment Ownership and Operating Expense Schedule

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Earned Value Report; G

1.3 EARNED VALUE REPORT

1.3.1 Data Required

This contract requires the use of a cost-loaded Network Analysis Schedule (NAS). The information required for the Schedule of Prices will be entered as an integral part of the Network Analysis Schedule. Within 15 calendar days of notice of award, prepare and deliver to the Contracting Officer an Earned Value Report (construction contract) as directed by the Contracting Officer. Provide a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices. Costs must be summarized and totals provided for each construction category.

1.3.2 Schedule Instructions

Payments will not be made until the Earned Value Report from cost-loaded NAS has been submitted to and accepted by the Contracting Officer. For design phase progress payment(s), the Schedule of Prices or Earned Value Report from the Cost Loaded CPM must include detailed design activities and general (summarized) approach for the construction phase(s) of the project. The Schedule of Prices or Earned Value Report must be fully developed with detailed construction line items as design progresses. The complete design and construction Schedule of Prices or Earned Value Report must be submitted and accepted prior to starting construction work.

For Fast-Tracked or Critical Path Submittals of construction projects, the Earned Value Report must include detailed design and construction line items for each fast-tracked/ critical path phase(s), submitted to and accepted by the Contracting Officer during the Post Award Kickoff Meetings and confirmed prior to starting construction work in that phase. Additionally, the Earned Value Report must be separated as follows:

a. Primary Facility/s Cost Breakdown:

Defined as work on the primary facility/s out to the 5 foot line. Work out to the 5 foot line includes construction encompassed within a theoretical line 5 foot from the face of exterior walls and includes attendant construction, such as pad mounted HVAC equipment, that may extend beyond the 5 foot line.

Provide a cost breakout for all Primary Facility features that support Low Impact Development (LID), such as vegetated roof and rainwater harvesting features. The sum of the Primary Facility Cost above - a. and these Primary Facility LID sub-items - (1) must equal the total Primary Facility cost. Provide a subtotal cost of all Primary Facility LID sub-items on the Earned Value Report at design complete and project closeout.

b. Supporting Facilities Cost Breakdown:

Defined as site work, including incidental work, outside the 5 foot line.

Provide a cost breakout for all Supporting Facilities features that support LID, such as bioswales, permeable paving, infiltration basins, tree box filters, etc.. The sum of the Supporting Facilities Cost above - b. and these Supporting Facilities LID sub-items - (1) must equal the total Supporting Facilities cost. Provide a subtotal cost of all Supporting Facilities LID sub-items on the Earned Value Report at design complete and project closeout.

1.3.3 Real Property Assets

Provide the Draft and Interim DD Form 1354, Transfer and Acceptance of Military Real Property filled in with the appropriate Real Property Unique Identifiers (RPUID) and related construction Category Codes. Provide the Draft DD Form 1354 that uses the appropriate division of the RPUIDs/ Category Codes to represent the designed real property assets that apply to this contract and include all associated cost. The Contractor must meet with the Contracting Officer and the Real Property Accounting Officer during the Post Award Kickoff Meeting and the Project Closeout Meetings to modify and include any necessary changes to the DD Form 1354. The Contractor shall provide the Interim DD Form 1354 that uses the appropriate division of the RPUIDs/ Category Codes to represent the final constructed facility and include all associated cost. Coordinate the Contractor's Price and Payment structure with the structure of the RPUIDs / Category Codes.

Divide detailed asset breakdown into the RPUIDs and related construction Category Codes and populate associated costs which represent all aspects of the work. Where assets diverge into multiple RPUID/ Category Codes, divide the asset and provide the proportion of the assets in each RPUID/ Category Code. Assets and related RPUID/ Category Codes may be modified by the Contracting Officer as necessary during the course of the work. Coordinate identification and proportion of these assets with the Government Real Property Accounting Officer.

Cost data accumulated under this section are required in the preparation of DD Form 1354. Coordinate with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES in paragraph titled "DD Form 1354".

1.3.4 Schedule Requirements for HVAC TAB

The field work requirements of TAB work required by RFP Part 4 D30, HVAC must be broken down in the Earned Value Report from the cost-loaded NAS by separate line items which reflect measurable deliverables. Specific payment percentages for each line item will be determined on a case by case basis for each contract. The line items are as follows:

a. Approval of Design Review Report: The TABS Agency is required to conduct a review of the project plans and specifications to identify any feature, or the lack thereof, that would preclude successful testing and balancing of the project HVAC systems. The resulting findings shall be submitted to the Government to allow correction of the design. The progress payment will be issued after review and approval of the report.

b. Approval of the pre-field engineering report: The TABS Agency submits a report which outlines the scope of field work. The report must contain details of what systems will be tested, procedures to be used, sample report forms for reporting test results and a quality control checklist of work items that must be completed before TABS field work commences.

c. Season I field work: Incremental payments are issued as the TABS field work progresses. The TABS Agency mobilizes to the project site and executes the field work as outlined in the pre-field engineering report. The HVAC water and air systems are balanced and operational data must be collected for one seasonal condition (either summer or winter depending on project timing).

d. Approval of Season I report: On completion of the Season I field work, the data is compiled into a report and submitted to the Government. The report is reviewed, and approved, after ensuring compliance with the pre-field engineering report scope of work.

e. Completion of Season I field QA check: Contract QC and Government representatives meet the TABS Agency at the jobsite to retest portions of the systems reported in the Season I report. The purpose of these tests are to validate the accuracy and completeness of the previously submitted Season I report.

f. Approval of Season II report: The TABS Agency completes all Season II field work, which is normally comprised mainly of taking heat transfer temperature readings, in the season opposite of that under which Season I performance data was compiled. This data must be compiled into a report and submitted to the Government. On completion of submittal review to ensure compliance with the pre-field engineering report scope, progress payment is issued. Progress payment is less than that issued for the Season I report since most of the water and air balancing work effort is completed under Season I.

1.4 CONTRACT MODIFICATIONS

In conjunction with the Contract Clause "DFARS 252.236-7000, Modification

Proposals-Price Breakdown," and where actual ownership and operating costs of construction equipment cannot be determined from Contractor accounting records, equipment use rates will be based upon the applicable provisions of the EP 1110-1-8.

1.5 CONTRACTOR'S INVOICE AND CONTRACT PERFORMANCE STATEMENT

1.5.1 Content of Invoice

Requests for payment will be processed in accordance with the Contract. Clause FAR 52.232-27, Prompt Payment Construction Contracts and FAR 52.232-5, Payments Under Fixed-Price Construction Contracts. The Requests for payment must include the documents listed below:

a. The Contractor's invoice, on NAVFAC Form 7300/30 furnished by the Government, showing in summary form, the basis for arriving at the amount of the invoice. Form 7300/30 must include certification by Quality Control (QC) Manager as required by the contract.

b. The Earned Value Report from the cost-loaded NAS, showing in detail: the estimated cost, percentage of completion, and value of completed performance for each of the construction categories stated in this contract. Use NAVFAC Form 4330/110 on NAVFAC contracts when a Monthly Estimate for Voucher is required.

c. Updated Project Schedule and reports required by the contract

d. Contractor Safety Self Evaluation Checklist

e. Other supporting documents as requested

f. Updated copy of submittal register.

g. Invoices not completed in accordance with contract requirements will be returned to the Contractor for correction of the deficiencies.

h. Subcontractor and supplier payment certification.

i. Materials on Site.

j. Affidavit to accompany invoice (LANTDIV NORVA Form 4-4235/4 (Rev.5/81)).

1.5.2 Submission of Invoices

If DFARS Clause 252.232-7006 is included in the contract, the documents listed in paragraph CONTENT OF INVOICE above must be provided in their entirety as an attachment in Wide Area Work Flow (WAWF) for each invoice submitted. The maximum size of each WAWF attachment is two megabytes, but there are no limits on the number of attachments. If a document cannot be attached in WAWF due to system or size restriction it must be provided as instructed by the Contracting Officer. All other paper invoices must be forwarded with specific marking on the envelope. This marking must be in the front lower left hand corner, in large letters, "INVOICES - ENCLOSED."

Monthly invoices and supporting forms for work performed through the anniversary award date of the contract must be submitted to the Contracting Officer within 5 calendar days of the date of invoice For example, contract award date is the 7th of the month, the date of each

monthly invoice must be the 7th and the invoice must be submitted by the 12th of the month.

1.5.3 Final Invoice

a. A final invoice must be accompanied by the certification required by DFARS 252.247.7023 TRANSPORTATION OF SUPPLIES BY SEA, and the Contractor's Final Release. If the Contractor is incorporated, the Final Release must contain the corporate seal. An officer of the corporation must sign and the corporate secretary must certify the Final Release.

b. For final invoices being submitted via WAWF, the original Contractor's Final Release Form and required certification of Transportation of Supplies by Sea must be provided directly to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original Final Release Form and required certification of Transportation of Supplies by Sea has been confirmed by the Contracting Officer, the Contractor must then submit final invoice and attach a copy of the Final Release Form and required certification of Transportation of Supplies by Sea in WAWF.

c. Final invoices not accompanied by the Contractor's Final Release and required certification of Transportation of Supplies by Sea will be considered incomplete and will be returned to the Contractor.

1.6 PAYMENTS TO THE CONTRACTOR

Payments will be made on submission of itemized requests by the Contractor which comply with the requirements of this section, and will be subject to reduction for overpayments or increase for underpayments made on previous payments to the Contractor.

1.6.1 Obligation of Government Payments

The obligation of the Government to make payments required under the provisions of this contract will, at the discretion of the Contracting Officer, be subject to reductions and/or suspensions permitted under the FAR and agency regulations including the following in accordance with "FAR 32.503-6:

a. Reasonable deductions due to defects in material or workmanship;

b. Claims which the Government may have against the Contractor under or in connection with this contract;

c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor; and

d. Failure to provide up to date record drawings not current as stated in Contract Clause "FAC 5252.236-9310, Record Drawings."

1.6.2 Payment for Onsite and Offsite Materials

Progress payments may be made to the contractor for materials delivered on the site, for materials stored off construction sites, or materials that are in transit to the construction sites under the following conditions:

a. FAR 52.232-5(b) Payments Under Fixed Price Construction Contracts.

b. Materials delivered on the site but not installed, including completed preparatory work, and off-site materials to be considered for progress payment must be major high cost, long lead, special order, or specialty items, not susceptible to deterioration or physical damage in storage or in transit to the construction site. Examples of materials acceptable for payment consideration include, but are not limited to, structural steel, non-magnetic steel, non-magnetic aggregate, equipment, machinery, large pipe and fittings, precast/prestressed concrete products, plastic lumber (e.g., fender piles/curbs) and high-voltage electrical cable. Materials not acceptable for payment include consumable materials such as nails, fasteners, conduits, gypsum board, glass, insulation, and wall coverings.

c. Materials to be considered for progress payment prior to installation must be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval in accordance with Earned Value Report requirement of this contract. Requests for progress payment consideration for such items must be supported by documents establishing their value and that the title requirements of the clause at FAR 52.232-5 have been met.

d. Materials are adequately insured and protected from theft and exposure.

e. Provide a written consent from the surety company with each payment request for offsite materials.

f. Materials to be considered for progress payments prior to installation must be stored either in Hawaii, Guam, Puerto Rico, or the Continental United States. Other locations are subject to written approval of the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 30 00.05 20

ADMINISTRATIVE REQUIREMENTS FOR DESIGN-BUILD
03/13

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Insurance

1.2 MINIMUM INSURANCE REQUIREMENTS

Procure and maintain during the entire period of performance under this contract the following minimum insurance coverage:

a. Comprehensive general liability: $500,000 per occurrence

b. Automobile liability: $200,000 per person, $500,000 per occurrence for bodily injury, $20,000 per occurrence for property damage

c. Workmen's compensation as required by Federal and State workers' compensation and occupational disease laws.

d. Employer's liability coverage of $100,000, except in States where workers compensation may not be written by private carriers,

e. Others as required by the State.

Refer to Section 01 33 00.05 20, CONSTRUCTION SUBMITTAL PROCEDURES for typical preconstruction submittals similar to insurance.

1.3 CONTRACTOR PERSONNEL REQUIREMENTS

1.3.1 Subcontractor Special Requirements

1.3.1.1 Asbestos Containing Material

All contract requirements of PART 4, F20 SELECTIVE BUILDING DEMOLITION, assigned to the Private Qualified Person (PQP) must be accomplished directly by a first tier subcontractor.

1.3.1.2 HVAC TAB

All contract requirements of TAB work required by PART 4 D30, HVAC, must be accomplished directly by a first tier subcontractor. No TAB work required by PART 4, D30, HVAC, is allowed to be accomplished by a second tier subcontractor.

1.3.1.3 Qualified Testing Organization

All contract requirements of work required to be performed by a Qualified Testing Organization in PART 4, D50 ELECTRICAL and G40 SITE ELECTRICAL UTILITIES, must be accomplished directly by a first tier subcontractor. No work to be performed by a Qualified Testing Organization, required by PART 4, D50 and G40 is allowed to be accomplished by a second tier subcontractor.

1.4 SUPERVISION

Have at least one qualified supervisor capable of reading, writing, and conversing fluently in the English language on the job site during working hours. In addition, the Quality Control (QC) representative must also have fluent English communication skills.

1.5 SUPERVISION

Provide at least one (1) qualified Project Manager and one (1) on-site Project Superintendent per construction site (not including demolition only sites)capable of reading, writing, and conversing fluently in English. The Project Manager must have a minimum 10 years experience as a Project Manager or Superintendent on projects like this contract or similar in size and complexity. The Project Superintendent must have a minimum of 10 years experience as a Superintendent on projects similar in size and complexity.

The Project Manager in this context shall mean the individual with the responsibility for the overall management of the project and the Project Superintendent shall mean the individual with the responsibility for quality and production. Both the Project Manager and Project Superintendent are subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to insure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is allowed to be made the subject of claim for extension of time for excess costs or damages by the Contractor.

Approval of Project Manager and on-site Project Superintendent is required prior to start of construction. Provide resumes for the proposed Project Manager and on-site Project Superintendent describing their experience with references and qualifications to the Contracting Officer for approval. The Contracting Officer reserves the right to interview the proposed Project Manager and on-site Project Superintendent at any time in order to verify the submitted qualifications.

1.6 AMERICAN PREFERENCE POLICY

This policy precludes the award of construction contract estimated by the Government to exceed $1,000,000 to a foreign contractor; unless the lowest responsive bid of a U.S. contractor exceeds the lowest responsible and responsive bid of a foreign contractor by greater than 20 percent. To qualify as a U.S. contractor, the firm (or if a joint venture, all members of he joint venture) must be incorporated in the U.S. and comply with the following: (a) the corporate headquarters must be in the U.S,; (b) the

firm must have filed corporate franchise and employment tax returns (if required) in the U.S. for a minimum of 2 years, must have filed state and federal income tax returns (if required) for a minimum of 2 corporate years, and paid any taxes determined to be due as a result of such filings; and (c) the firm must employ U.S. citizens in key management positions.

1.7 CLEANUP

Leave premises "broom clean." Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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SECTION 01 30 01.00 22

DESIGN, PROCUREMENT, AND INSTALLATION OF FURNITURE, FIXTURES, AND EQUIPMENT
09/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

UNIFIED FACILITIES CRITERIA (UFC)

UFC 3-120-10 (16 May 2018) Interior Design

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRCUTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Preliminary (Pre-Final) FF&E Package; G, ID NAVFAC Interior Design

Final FF&E Package; G, ID NAVFAC Interior Design

Best Value Determinations

SD-04 Samples

Final FF&E Mock-Up; G, ID NAVFAC Interior Design

SD-07 Certificates

Contractor's Interior Designer's Qualifications; G, ID NAVFAC Interior Design

SD-11 Closeout Submittals

Interior Photography; G, ID NAVFAC Interior Design

1.3 GENERAL REQUIREMENTS

The Furnishings, Fixtures, and Equipment (FF&E) Packages may include, but are not limited to; systems and modular furniture, workstations, seating, storage, filing, visual display items, accessories, artwork, command graphics, training and conference furniture, soft window treatments (draperies, valances, and cornices), shop equipment, fitness equipment, Child Development Center furniture/furnishings, appliances, portable

weapons cabinets and dorm and quarters furnishings and other miscellaneous items to support facility functions. The FF&E Package must be fully integrated with the building systems and finishes. FF&E may also include specialty items for which the customer activity is be responsible for specifying.

The Interior Design Services for the design and specification of the FF&E Package must be included in the Construction Base Bid Construction Line Item Number (CLIN). This project contract/task order Contract Pricing Schedule contains separate CLINs for the Construction Base Bid and FF&E Planned Modification CLIN(s). The purchase and installation of the FF&E Package will be funded separately as the FF&E Planned Modification CLIN . The Government FF&E Package budget and A/V Package budget identified on the Contract Pricing Schedule does include the Contractor's Handling and Administration Rate (HAR). This Government FF&E estimate and A/V estimate must not be altered by Contractors during the bid process.

All FF&E items are subject to the Buy American Act.

1.4 INTERIOR DESIGN SERVICES

1.4.1 Qualifications and Affiliations

Per UFC 3-120-10, The Interior Designer of Record, hereafter referred to as the Contractor's Interior Designer, must have attained National Council for Interior Design Qualification (NCIDQ) certification or state licensure, certification or registration. The Contractor's Interior Designer, Design Firm owners, and any Specialists must NOT have any affiliation with any furniture, fixture, or equipment products, any furniture dealership or any manufacturers in order to avoid any potential organizational conflict of interest. Provide documentation of the Contractor's Interior Designer's qualifications and significant interior design experience on similar type projects to the Government. NAVFAC reserves the right to approve/disapprove the Contractor's Interior Designer.

1.4.2 Concept FF&E Package

Concept FF&E package, prepared by the A/E's Interior Designer, indicating the salient characteristics of all required FF&E items and CADD drawings, will be provided to the Contractor. The Contractor must provide the services of a Certified Interior Designer, other than the A/E's Interior Designer, to function as the Contractor's Interior Designer, to prepare and provide the Final, Best Valued FF&E Package and procurement data based on the Concept FF&E package.

All fixed and movable furnishings selections must be closely coordinated with the final construction documents and interior finishes. The Contractor's Interior Designer is required to validate all FF&E requirements with the Activity, make any necessary changes to the FF&E and interior building finishes. Per UFC 3-120-10, the (FF&E) includes the design, selection, specification, color coordination, and procurement documentation of the required items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility. The FF&E package must be fully integrated with the design, construction, and schedule of all building finishes and all building systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architecture, etc. All outlets, switches, fire extinguishers, thermostats, etc. must be fully accessible. All sprinkler heads, ADA, etc. clearances must be

accommodated.

The Contractor's Interior Designer must also attend walk-throughs, coordinate mock-ups, and attend any and all required meetings to accomplish this task. The Contractor's Interior Designer and equipment specialists must be responsible for designing and providing specifications for procurement of all FF&E, to include delivery and installation, for the facilities built under this contract as directed by the NAVFAC Interior Designer. FF&E specifications must be based on Navy Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The utilization of the current Navy BPA list is required for BVD Analysis Request for Pricing. The current Navy BPA list is available at:

http://www.wbdg.org/ffc/navy-navfac/collateral-equipment

1.4.3 Audio Visual (A/V) and/or other Specialty Furniture or Equipment

A Concept A/V package, prepared by the A/E's A/V Specialist, indicating the salient characteristics of all required A/V items and CADD drawings, will be provided to the Contractor. When A/V, or other specialty furniture or equipment, i.e. shop equipment, kitchen equipment, fitness equipment, high density storage, etc., is required in the project, the Contractor must obtain the services of equipment specialists to provide design and specifications for the specialty equipment. A Certified Technology Specialist-Design (CTS-D) is required for the design and preparation of A/V packages. The Equipment Specialist must validate all A/V requirements with the Activity, make any necessary changes, and provide separate Best Value Determinations (BVDs) for this equipment,. This Final package must be in accordance with the general interior design requirements in UFC 3-120-10 and as required for all areas as developed during the client FF&E and A/V programming.

The A/V package must be prepared by the Contractor's ID and A/V Certified Technology Specialist-Design (CTS-D) as a separate package. The design, procurement, and installation of the A/V package must comply with all of the same requirements as those defined for the FF&E package in this specification section. Additionally provide A/V floor plans indicating equipment locations and A/V riser diagrams for all A/V systems, and coordinate equipment locations and power requirements with power plans. The A/V and specialty packages must be fully integrated into the design, construction, and schedule of all building finishes and all building systems (HVAC, Pluming, Fire Protection, Communications, Electrical, Data, Architecture, etc.) All outlets, switches, thermostats, fire extinguishers, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc. clearances must be accommodated.

1.5 FURNISHINGS, FIXTURES, AND EQUIPMENT (FF&E) SUBMITTALS FOR THE INTERIOR DESIGN SERVICES

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the Activity requirements and complete coordination with the facility design and the Structural Interior Design (SID).

a. The Activity will supply the Contractor's Interior Designer with a complete list of all existing FF&E, to include sizes, utility requirements, weight, etc., to be relocated to the new facility

b. The Contractor's Interior Designer must be responsible for inventorying existing FF&E to be relocated to the new facility and incorporating the existing FF&E into the FF&E plan.

c. For all projects, including fast track projects, the Contractor must be responsible for sufficiently scheduling all FF&E and any revisions to SID submittals early enough to obtain the required government approvals, and meet all ordering and installation lead times to complete the project by the contract completion date.

These are minimum requirements and the Contractor must be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/ and FF&E coordination.

1.5.1 FF&E Requirements (Interior Design Orientation) Meeting

This meeting must occur at NAVFAC LANT, located in Norfolk, VA prior to the FF&E "Over the Shoulder" Review and the development of the FF&E package. The NAVFAC Interior Designer will provide the Contractor's Interior Designer a sample format of the FF&E submittal, review the Best Value Determination (BVD) process, discuss the number of Best Value Determinations required and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider. Minutes of this meeting must be submitted to the NAVFAC Interior Designer within 7 business days.

NAVFAC Interior Design Collateral Equipment Policy and templates may be accessed at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

1.5.2 FF&E "Over the Shoulder" Review

Prior to the FF&E Concept Presentation and Best Value Determination (BVD) Analysis, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review to present preliminary FF&E options. These can be presented in a "loose" format for preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting must be held at NAVFAC LANT, located in Norfolk, VA.

1.5.3 FF&E Concept Presentation

The Contractor's Interior Designer must present the NAVFAC approved Preliminary (Pre-final) FF&E package to the Activity, located at MCB VCamp Lejeune, for approval. This presentation must include loose format samples and catalog cuts. Sample boards are not required.

1.5.4 Best Value Determination(BVD) Analysis "Over the Shoulder Review"

Prior to issuing the Best Value Determination (BVD) Analysis, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review of the solicitation package and request a copy of the most current Navy BPA vendor list. The "over-the-shoulder" review meeting must be held at NAVFAC LANT, located in Norfolk, VA. The Contractor's Interior Designer must provide a copy of the BVD Analysis Request for Pricing cover letter to the Contractor for review and comment prior to the BVD Analysis "Over the Shoulder Review" meeting.

BVD Analysis Solicitation must include the following:

a. Copy of the BVD Analysis Request for Pricing cover letter.

b. BVD Analysis Request for Pricing Spreadsheet/Questionnaire with "basis of design" item product numbers, photos & descriptions.

c. Technical Specification to establish minimum acceptable FF&E requirements.

d. Project Specific Room/Furniture Typicals.

e. Furniture Plans with Legends coded to the BVD Analysis RFP (PDF format).

1.5.5 BVD Submittal and "Over the Shoulder Review"

The Contractor's Interior Designer must submit one (1) copy of the Preliminary BVA BVD package to the NAVFAC Interior Designer and one (1) copy to IDD/Base Property for Marine Corps projects. An electronic copy must be sent to the NAVFAC Contracting Officer. The "over-the-shoulder" review meeting must be held at NAVFAC LANT, located in Norfolk, VA to review the results of the solicitation and determine a best value recommendation. The BVD Submittal must be in a 3-ring binder and must include the following items for review and approval:

a. Cover Title Page (project name, project #, location, submittal date, submittal title)

b. Table of Contents.

c. Point of Contact List.

d. Narrative of Interior Designer Objectives.

e. BVD Analysis Request for Pricing Spreadsheet/Questionnaire completed by all bidders and completed Questionnaire.

f. Copy of all information sent to bidders and documentation that all required sources were contacted.

g. Back-up Information submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meets all requirements). Provide in CD format and include within each binder.

h. Response(s) from UNICOR.

i. BVD Analysis Pricing Evaluation Spreadsheet comparing bidder quotes/responses.

j. Contractor's Interior Designer recommendation for the Best Value vendor and justifications.

1.5.6 BVD Analysis FF&E Mock-Up

The Contractor's Interior Designer must coordinate a mock-up for best value review of IDENTIFY LIKELY REQUIRED TYPICAL WORKSTATIONS AND OTHER FF&E AS DETERMINED BY NAVFAC by at least the top three (3) BPA vendors

submitting the highest rated FF&E proposals, as determined by NAVFAC. The reviewers must include the NAVFAC Interior Designer, Contracting Officer, IDD/Base Property, and the Activity.

1.5.7 Preliminary FF&E Submittal

The Preliminary FF&E submittal must be presented to the Activity and NAVFAC in loose format at a meeting to occur at NAVFAC, located in Norfolk, VA.. Five (5) submittals will be required; (1) for the NAVFAC Project Manager, (3) for the FEAD/ROICC and IDD/Base Property, and (1) for the Activity.

Submit the following in a 3-ring binder (with the exception of the 16x20 color boards for the Activity only) for review and approval:

a. Cover Title Page (project name and number, submittal date and title).

b. Table of Contents.

c. Point of Contact List (includes contact info for recommended Best Value BPA Holder(s) vendors and subcontractors).

d. Preliminary FF&E list (Cost Summary) to include shipping, freight, handling, professional installation, project management, HAR and applicable sales tax.

e. Preliminary Procurement Data Spec Sheets for each product indicating general appearance as well as proposed finish and fabric selections.

f. Furniture placement plans coded to the FF&E list and Procurement Data Spec Sheets.

g. Technical Specifications used in bid request for all furniture, fixtures and equipment etc..

h. 16x20 inch color boards of furniture and finishes specified for Activity presentation to indicate overall design intent (1 copy required for Activity only).

i. Final Finish/Fabric Selections and Samples attached to boards in 8" x 10" binder format using edge-reinforced, heavy-duty plastic sheet protectors for each board/sheet.

j. Copy of Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the best value. Code BOM line items to FF&E Cost Summary Item Codes.

k. 8x10 color photographs of the color boards.

1.5.8 Final FF&E Mock-Up

The Contractor and the Contractor's Interior Designer must coordinate an on-site mock-up and review of IDENTIFY LIKELY REQUIRED TYPICAL WORKSTATIONS AND OTHER FF&E AS DETERMINED BY NAVFAC with the selected, best-valued BPA vendor(s). Building finishes and fixtures must be installed in the affected area(s) to the greatest extent practicable in order to assess building systems/fixture coordination. The reviewers must include the NAVFAC Interior Designer and Construction Manager, The Contractor's Interior Designer, IDD, Base Property, and the Activity. The

BPA vendor(s) must be available on-site to respond to questions. The mock-up exercise must be completed prior to the submittal of the Final FF&E submittal and award of the modification for turnkey furniture procurement.

1.5.9 Final FF&E Submittal

The Final FF&E submittal must be due 10 months prior to BOD following the receipt of review comments on the preliminary FF&E submittal and must include furniture, furnishings, artwork, and equipment and must be in the format described below or the format provided by the NAVFAC Interior Designer and the UFC 3-120-10 Interior Design.

These are minimum requirements and the Contractor must be prepared to provide any additional meetings and submittals that may be necessary to support the Interior Design effort and FF&E coordination.

The Final FF&E Submittal must be submitted in a 3-ring binder for review and approval. The number of final submittals required must be:

Five (5) total; One each for the NAVFAC Project Manager and the Activity. Three to be shared between the FEAD/ROICC and IDD/Base Property.

The Final FF&E Submittal and must include the following:

a. Cover Title Page with project name, project #, submittal date, submittal title identified on binder cover and spine.

b. Table of Contents.

c. Point of Contact List which includes contact info for recommended Best Value BPA Holder(s) vendors and subcontractors.

d. Final FF&E list (Cost Summary) to include shipping, handling, freight, professional installation, project management, HAR and any applicable sales tax.

e. Final Procurement Data Spec Sheets for each product indicating final finish and fabric selections.

f. Final Finish Selections and Memo Samples for the FF&E submitted in 8 x 10 binder format, using heavy-duty plastic sheet protectors.

g. Copy of Final Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes.

h. Best Value Determination Guidelines sheets; completed and signed by the Contactor's Interior Designer.

i. Final Furniture Placement Plans coded to the FF&E list, Procurement Data Sheets and specifications.

j. CD copy of the final FF&E binder.

1.5.10 Punch List:

See section 2.1.13 Punch List.

1.5.11 FF&E and Interior Finish Construction Submittals

Submit any revisions or deviations caused by discontinued items or NAVFAC required changes to the Contracting Officer for approval by the NAVFAC Interior Designer. All submittal due dates for the FF&E, A/V, and specialty equipment must be reflected in the Contractor's construction schedule. Changes to the FF&E schedule must be submitted to the government Interior Designer for approval. The Final FF&E package must be submitted no later than 9 months prior to the contract completion date.

1.6 BEST VALUE DETERMINATION (BVD)

For purposes of this specification, the term, "procurement", is defined as any one purchase to a specific vendor for items in a FF&E package. In order to provide a complete FF&E package, multiple vendors, and therefore multiple BVDs, from BPAs, GSA and/or Open Market may be required. It is mandatory for the Navy to use the Navy Furniture Spiral III BPAs as one of the first sources of supply for the acquisition of office, dormitory and quarters furniture. The Navy must also comply with Mandatory Sources guidance.

Reference: NAVFAC Interior Design Policy: Best Value Determinations and NAVFAC Interior Design Policy: Navy Blanket Purchase Agreements.

Per Federal Acquisition Regulation 8.002, customers shall satisfy requirements for supplies (in this case furniture), from or through the sources listed below in descending order of priority:

a. Inventories of the requiring activity

b. Excess from other agencies

c. Federal Prison Industries/UNICOR

d. Supplies which are on the Procurement List maintained by The Committee for Purchase from People Who Are Blind or Severely Disabled (Ability One)

e. Wholesale supply sources, such as stock programs

If the Interior Designer is unable to satisfy the furniture requirement from one of the above Mandatory Sources then the Navy Furniture BPAs shall be used to meet the requirement.

The Mandatory Sources section of the Best Value Determination Guidelines - Micro-Purchase Threshold (MPT), currently ($10,000 - Simplified Acquisition Threshold (SAT), currently $250,000 and/or Best Value Determination Guidelines - Greater than SAT form(s), completed and signed by the Interior Designer, will serve as documentation to the Contracting Officer and Contract Specialist that the effort to utilize the Mandatory Sources has been satisfied.

The Navy Furniture BPAs are not mandatory for OCONUS (to include Hawaii and Guam). The NAVSUP policy memo, NAVSUP Enterprise Acquisition Policy Regarding Furniture Procurement Outside the United States, 1May2015, gives activities exercising NAVSUP contracting authority outside the United States exemption from the mandatory use policy and are authorized to purchase furniture, for use outside the United States, from local sources.

A Best Value Determination (BVD) is required by FAR 8.404 when placing procurement orders against Federal Supply Schedules for the selection of furniture and furnishings. Best Value is defined in FAR 2.101 as ensuring that the order to be placed under a Federal Supply Schedule results in the lowest overall cost alternative (considering price, special features, administrative costs and client's needs) to meet the government's needs.

a. A (BVD) must be performed on a minimum of three manufacturers for orders exceeding a total procurement of the MPT from an individual manufacturer. Multiple BVDs may be required in order to complete the final FF&E and A/V packages.

b. The required quantity of BVD's to be performed will be determined by the NAVFAC Interior Designer during the design phase and is dependent on the appropriate Navy BPA category(s) to be utilized and specific project requirements.

c. Documentation must be provided to the Government with the final FF&E package. Specific Documentation is indicated in the Preliminary BVA Submittal and "Over the Shoulder Review." The BVD Statement must be completed and signed by the contractor's interior designer.

The Contractor's Interior Designer is responsible for the following written BVD justifications:

1.6.1 Total procurement greater than the SAT

The Interior Designer must always review products and pricing from all mandatory sources per FAR 8.002. The Interior Designer must prepare and distribute a BVD Request for Pricing Package to all BPA holders in the applicable category or SIN and Region for FF&E procurements greater than the SAT. FPI/UNICOR must always be solicited via email if they hold a BPA in the applicable SIN; documentation is required. The Interior Designer must confirm the pricing with the vendor and the vendor must provide a written quote or documentation. Allow a minimum of 30 calendar days for responses if the project schedule permits. The BVD form Best Value Determination Guidelines - Greater than the SAT (Attachment 9) must be completed and submitted to the Contracting Officer and Contract Specialist for all FF&E procurements greater than the SAT (FAR 2.101). Manufacturer's quotes and a summary of all proposals must be attached.

1.6.2 UNICOR

Federal Prison Industries (UNICOR) must be considered as part of all BVDs. This must be done by sending an e-mail with the requirements and evaluation criteria. If they are not comparable in one or more areas of price, quality, and time of delivery, the designer can specify product under Navy BPA or GSA schedule.

1.6.3 Evaluation Factors

The Best Value determination Determination must address issues such as:

a. Space planning; human factors data related to anthropometrics (reach, clearance, adjustability), space, and acoustics.

b. Ergonomics.

c. Product quality (including construction and materials); sustainability features, product warranties; history of the product and/or manufacturer.

d. Ability to service products through dealers or others within a certain geographical range of the project.

e. Price (including freight).

f. Aesthetics.

g. Appropriateness; and lighting, power and telecommunications systems management and/or coordination as related to the facility (when applicable); and other project specific factors as identified and/or required.

h. Emphasis must be to create a fully integrated design solution by providing quality products to meet the functional needs of the customer. Customer preferences must be considered. The focus must be on the best overall value. Use the NAVFAC Best Value Determination forms provided by the NAVFAC Interior Designer.

PART 2 FF&E TURNKEY EFFORT

2.1 FF&E PLANNED MODIFICATION

FF&E Planned Modification: As a planned modification, provide procurement and installation coordination of the complete and usable Final FF&E package. The FF&E Package must include shipping, freight, handling, installation and the Contractor's FF&E Handling and Administration Rate (HAR) percentage as applied to the final FF&E total cost.

a. The Audio Visual (AV) Equipment will be identified as a separate line item, priced separately from the FF&E and funded as a planned modification. The A/V Package must include shipping, freight, handling, installation, applicable state sales tax, and the Contractor's A/V Handling and Administration Rate (HAR) percentage as applied to the final A/V total cost (excluding taxes).

2.1.1 Authorization

The Government will provide separate funding for procurement and installation coordination of the FF&E and A/V packages. Construction funds will not be used. Upon receipt of required funding, the Contractor must be authorized by the Contracting Officer, as a planned modification to the construction contract, to procure and install all Final FF&E utilizing Navy Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The Contractor will be expected to procure and coordinate the installation of the approved Final FF&E package exactly as specified. The amount of the modification will be the actual cost of these items from the Federal Government price schedules (Navy BPAs and/or GSA), including any freight and installation charges from the furniture supplier as well as the Contractor's HAR and any applicable state sales tax. The HAR includes all of the Contractor's effort related to storage, coordination, handling, administration of subcontractors including but not limited to the use of elevators,, and all other associated costs and profit for the procurement and installationof FF&E.

The Government will indicate the FF&E estimates based on the Concept Design in the contract solicitation Price Proposal Form (Bid Schedule). These Government estimates must not be altered by Contractors during the bid process.

Contractors must propose a Handling and Administration Rate (HAR) only. The Contractor will propose the FF&E HAR in the contract solicitation. The Contractor's proposed HAR may not exceed 5 percent of the total FF&E costs, as noted on the bid schedule. The HAR must not include costs associated with the Interior Design Services required in the Interior Design Services.

All supplies under the FF&E Planned Modification CLIN are subject to the rules and regulations governing the acquisition of foreign supplies, e.g., Buy American Act (BAA) (FAR 25.1). This also includes all supplies procured through Government Supply Sources, such as Navy Furniture BPAs and GSA Schedules. GSA solicitations are required to meet the Trade Agreement Act (TAA) Designated Countries (FAR 25.4), as part of the BAA. The Construction Contractor is responsible for ensuring the FF&E is in compliance with the BAA/TAA.

2.1.2 Procurement and Installation

The Contractor must coordinate the building completion date with the installation dealer(s) specified in the FF&E Package. The Contractor must anticipate possible manufacturer price increases if order placement is delayed. It is recommended to order the FF&E product once the planned modification is awarded and funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with the contract completion date. Any costs incurred due to manufacturer price increases will be the burden of the Contractor.

2.1.3 Use of Blanket Purchase Agreements (BPA) and GSA Schedules

The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer(s) and other information to use when accessing the Federal Government supply sources.

2.1.4 Deposits

The Contractor should anticipate providing a deposit of between 30 percent and 50 percent of the FF&E costs when placing the orders with the manufacturer's dealerships.

The Contractor must also anticipate possible manufacturer price increases. Recommend ordering FF&E product once Funds are received to avoid incurring additional cost. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates. Any cost incurred due to manufacturer price increases will be the burden of the Contractor.

2.1.5 Davis Bacon Wages

Davis Bacon wages do not apply to the FF&E installer from the Government supply sources. The workforce for the FF&E installation and delivery must be separate and distinct from the labor workforce performing under the construction contract.

2.1.6 Taxes

2.1.6.1 Exemptions

Exemptions for certain State or local taxes may be available to the Construction Contractor and/or its subcontractors. The Construction Contractor must take maximum advantage of all exemptions, including obtaining a resale permit from State and Local taxation authorities whether available directly to the Construction Contractor or based on an exemption afforded the Government. The responsibility for paying applicable taxes rests with the Construction Contractor. Applicable state and local taxes to the FF&E package must be included with the subcontractor's quote, if required by the state or locality.

2.1.6.2 Construction Contract Requirements

As prescribed in FAR 29.401-3, the Contracting Officer must insert FAR clause 52.229-3, Federal, State and Local Taxes, in the construction contract. In accordance with this clause:

1. The contract price includes all applicable Federal, State, and local taxes and duties; and

2. The Government must, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Construction Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

2.1.7 Performance and Payment Bonds

1. No Bond Requirement for FF&E at Time of Construction Contract Award FAR 28.102-1(a) requires that performance and payment bonds be included in all construction contracts exceeding the SAT, except under the conditions listed. Since the FF&E Planned Modification CLIN is not part of the original contract award, the Construction Contractor must not be required to secure bond for the FF&E at the time the basic contract is awarded.

2. Additional Bond at FF&E Planned Modification CLIN Award FAR 28.102-2(d) requires the Government to secure additional bond from the Construction Contractor for any contract price increases. An increase to the original contract bond is required at the time of the FF&E Planned Modification CLIN award to protect the Government against the Construction Contractor not providing FF&E ordered and to ensure that the FF&E vendor(s) receive payment if the Construction Contractor goes out of business. The increased cost of the Government required bond must come from the FF&E funding source and is not a part of the Construction Contractor's HAR.

3. Bonds Required by the Construction Contractor If the Construction Contractor requires bonding from the FF&E subcontractor(s), the cost must be covered in the Construction Contractor's HAR.

2.1.8 Unique Item Identification (IUID) and Valuation

Item Unique Identification (IUID) and valuation is a system of marking and valuing items delivered to DoD that enhances logistics, contracting, and financial business transactions. The IUID policy is mandatory for all DoD

contracts that require the delivery of items. An item is a single article or a single unit formed by a grouping of subassemblies, components or constituent parts. In accordance with DFARS 211.274-2, IUID is required for all delivered items for which the Government's unit acquisition cost is $5,000 or more. Items identified by the requiring activity to be serially managed, mission essential, controlled inventory or for other reasons requiring permanent identification, must be marked with a unique item identifier.

2.1.8.1 IUID

The two main steps involved in IUID requirements are:

1. Item marking and

2. Delivery of data about items as a part of the acceptance and delivery process.

2.1.8.2 Data Matrix Requirements

Item marking requires that qualifying items contain a data matrix either directly inscribed on the individual item or on a permanent label or data plate attached to the item. Delivery of data is executed by submitting to the IUID Registry information such as: description of the item, its value, and the date of acceptance by the government. The IUID Registry is the repository established to capture and store all IUID data.

2.1.8.3 Government's Unit Acquisition Cost

In accordance with DFARS 211.274-3, Construction Contractors must be required to identify the Government's unit acquisition cost for all items delivered even if none of the criteria for placing a unique item identification mark applies.

PART 3 EXECUTION

3.1 INSTALLATION

The FF&E package includes the installation of all furniture and furnishings as specified in the FF&E package. The FF&E installation dealer(s) specified in the FF&E package must receive, store as required, transport to the project site, off load, inside deliver, unpack, assemble, place/install, clean, and dispose of all the trash for all furniture and furnishings. It is the Contractor's responsibility to coordinate the building completion, occupancy, and furniture installation dates with the installation dealer(s) specified in the FF&E package. Any costs associated with or delaying furniture shipments is the responsibility of the Contractor.

The Contractor must provide and coordinate all Building Systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architectural, etc. with the furniture plans and furniture installation. All outlets, switches, thermostats, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc., clearances must be accommodated.

3.2 INSTALLATION WARRANTY

All movable furnishings must be installed in accordance with the

manufacturer's instructions and warranty requirements. All movable furnishings must be level and aligned. All doors, drawers and accessories must be level and aligned to open, close and otherwise operate smoothly and securely.

All furniture must be installed by the furniture manufacturer's dealer of record and not the Contractor. The Government reserves the right to approve/disapprove the Contractor's FF&E installers. In addition, installation dealer(s) must be located within a 100 mile radius of the project site unless approved by the Government Interior Designer. The Contractor must repair, to the Government's satisfaction, any/all damage to any facility finish that is a result of the furniture installation and correct all punch list items for the furniture/furnishings. The Contractor must obtain services of equipment specialists to install the electrical equipment, to include but not limited to televisions, Video Teleconference Equipment, ceiling mounted projectors, and mission essential electronic equipment included in the FF&E package.

3.3 ORDERING DOCUMENTATION

After award of the FF&E and A/V packages, of all ordering documentation, including but not limited to, quotes, purchase orders, factory order numbers (FO), and warranty information for all products, must be provided to the Contracting Officer at the final FF&E walk-thru.

3.4 POST AWARD CHANGES

3.4.1 Requests for Price Changes

After award of the FF&E Planned Modification, any requests to change the FF&E items in that modification must be submitted in writing for approval by the Contracting Officer before purchase/installation. The FF&E Planned Modification has been priced, negotiated, and awarded based on specific line items as detailed in the approved Final FF&E Submittal. These items have been agreed to considering color, specific type and quality of material, price, usable life, etc. The Government will expect and require the Construction Contractor to provide exactly those items

3.4.2 Requests for Item Changes

Should changes become necessary, careful consideration is required to ensure that equivalent quality, price and other aspects of the item is maintained, otherwise price adjustments must be negotiated. BVD documentation is required for each item to be substituted if the extended cost for the item exceeds the MPT. If multiple items from the same SIN must be substituted, all can be included in the same BVD. Unexpired vendor quotes from the original FF&E Request for Pricing may be used in the new BVD, provided that they are the same SIN and all quotes are from the same procurement category, i.e. BPA, GSA or Open Market. The Contracting Officer must obtain approval from the NAVFAC Interior Designer/Collateral Equipment Manager, in consultation with the client, for any changes to the FF&E.

3.4.3 Validation of Pricing

The Construction Contractor must validate pricing prior to contract modification. Cost increases due to authorized BPA/GSA schedule price increases must be allowed prior to the contract modification to purchase the FF&E. Reimbursement for cost increases after contract modification

will not be considered.

3.4.4 Progress Payments

Per FAR 52.232-5, Payments under Fixed-Price Construction Contracts, the Contracting Officer may authorize a progress payment on the FF&E ordered as material delivered to the Contractor, at locations other than the site if:

1. Consideration is specifically authorized by this contract; and

2. The Construction Contractor furnishes satisfactory evidence, including a copy of the order acknowledgment and proof of payment, that it has acquired title to such material, the material is stored in a secure, climate controlled location, and that the material will be used to perform this contract.

3.5 PUNCH LIST

The Contractor, his Interior Designer (and A/V consultant or other specialty consultants, if applicable) must attend at least two punch list site visits with the installation dealer(s), NAVFAC Interior Designer and the Base Representative/Activity Contact. The first site visit must identify all punch list items (at installation dealer's 98 percent completion) and the second (at 100 percent completion) will confirm that all punch list items have been resolved.

3.6 INTERIOR PHOTOGRAPHY SUBMITTAL

Upon completion of the FF&E installation, the Contractor must provide professional Interior Photography of the completed interior. The photographer must be in the business of specializing in architectural and interior photography. The submittal must be a minimum of 6 photos. "Before" and "After" photos are required for all renovation projects. Permission for publishing and using the photos by NAVFAC is required. Images to be submitted on a CD as a JPEG or PDF with a resolution of no less than 300 dpi as well as 8" x 10" matte photographs. The photographs must be taken prior to occupancy and staged with accessories as needed. Additional lighting may be needed to ensure quality images.

3.7 BEST VALUE DETERMINATION

A best value determination has been performed on the final FF&E package. A best value determination is required by FAR 8.404 when placing orders against Federal Supply Schedules for the selection of furniture and furnishings. Best Value is defined in FAR 2.101 as ensuring that the order to be placed under a Federal Supply Schedule results in the lowest overall cost alternative (considering price, special features, administrative costs and client's needs) to meet the government's needs.

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SECTION 01 31 19.05 20

POST AWARD MEETINGS
09/15

PART 1 GENERAL

1.1 SUMMARY

This document includes post-award requirements for project kickoff and subsequent design and preconstruction meetings.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Design Submittal Packaging Proposal; G

Design Baseline NAS; G

Construction Baseline NAS; G

Performance Assessment Plan (PAP); G

Design Presentation Concept Site and Floor Plans; G

CDW Facilitator Experience Resume; G

CDW Preliminary Concept Design; G

CDW Cost Estimate; G

Concept Design Workshop Report; G

1.3 POST AWARD KICKOFF MEETING

The Post Award Kickoff (PAK) meeting is made up of Contract Administration, Design Presentation, Partnering, and Scheduling. If mutually beneficial to the Contractor and the Government, these four elements may be addressed in a single multi day meeting, but most often multiple scheduled meetings are required. Schedule a separate meetings to accomplish the Concept Design Workshops(CDW).

1.3.1 PAK Meeting Schedule and Location

Within 30 calendar days after contract award, and prior to commencing work, meet with the Contracting Officer for the PAK meeting(s). The meeting will be located at a specific time and place to be determined by the Contracting Officer.

1.3.2 PAK Meeting Outcomes

The meeting(s) outcomes are:

a. Integrate the Contractor and all client representatives into the project team.

b. Achieve consensus from the project team on any issues and concerns with the Contractor's technical proposal and the User's functional requirements. Confirm the design is within the project budget.

c. Establish and explain policies and procedures for completion of a successful project.

d. Establish clear lines of communication and points of contact for Government and Contractor team members.

e. Establish project design schedule, design submittal packaging, and preliminary construction schedule in accordance with Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULE (NAS). Discuss design milestones and events that will be included in the Quality Control Communication Plan.

f. Establish clear expectations and schedules for facility turnover, providing DD Form 1354 asset management records, eOMSI submittals, Guiding Principle Validation, Third Party Certification (if applicable), and training of Government maintenance personnel.

g. Establish procedure for design packages reviews, Contractor's resolution to comments, and Government's role in review of packages.

h. Establish clear expectations for the Concept Design Workshop.

i. Establish clear expectations for Design Model presentations for projects implementing Building Information Management/Modeling (BIM).

1.3.3 PAK Meeting Contractor Attendees

The following Contractor key personnel must attend the PAK: Principal, Project Manager, Project Scheduler, Design principals, Lead Designer-of-Record (DOR), Design Staff responsible for each architectural/engineering discipline when facility design is discussed Superintendent, QC Manager,and the DQC Manager. Optional attendees include: Assistant Project Manager, major subcontractors and specialized supplemental QC personnel.

1.3.4 Contract Administration

Contract administration roles and responsibilities will be addressed.

1.3.5 Concept Design Workshop (CDW)

Provide a CONCEPT DESIGN WORKSHOP that meets the following requirements;

1.3.5.1 CDW General Requirements

a. Methodology. Conduct a CDW for this project. This effort will examine project functions and requirements, quality and life safety costs, analyze alternate design concepts, expose and resolve project issues,

and develop the final conceptual design.

b. Facilitator. Provide a Facilitator who is experienced in conducting Concept Design Workshops. Submit a CDW Facilitator Experience Resume to the Contracting Officer describing his experience. He or she will be responsible for leading the team in a timely manner, making sure that issues are pursued and resolved to the maximum extent possible, documenting meetings, organizing the design concept documents for on-site approval, and providing the Concept Design Workshop Report.

c. Contractor's Design Team. The primary functions of the Design Team will be to investigate, develop and present alternate design solutions. The entire Design Team must participate in all phases of the Concept Design Workshop effort and provide assistance to the Facilitator in development of the Concept Design Workshop Report, including most of the required documentation.

d. Concept Design Workshop Report. Produced almost entirely on-site, the Concept Design Workshop Report must summarize the final conceptual design.

e. Award Amount. At each contract stage, the Contractor must verify that the concept is within the contract award amount.

f. Schedule. The involvement of USMC installation personnel in design development is key to the success of this contract. The Hurricane Florence MILCON Program will require large amount of time and coordination from installation personnel. The Contractor shall coordinate directly with the Contracting Officer's Representative to ensure CDWs are scheduled to accommodate and maximize Government involvement. The Government intends to hold the first CDW as soon as possible after contract award and the PAK meeting. The Government reserves the right to shift the start of the first CDW up to 90 days after award in an effort to ensure stakeholder availability. Additional CDWs must follow a minimum of 30 calendar days after the previous CDW. A minimum of 2 CDWs shall be conducted, but based on number of projects, additional CDWs shall be considered in order to support involvement from Government stakeholders from all disciplines.

1.3.5.2 CDW Procedures

a. Preliminary Work.

The Contractor's Design Team must complete the following prior to the on-site workshop:

(1) Review the contract documents and references explaining the project scope and history.

(2) Prepare and submit, at least 14 days in advance of the CDW, 6 hard copies and 2 electronic copies of a CDW Preliminary Concept Design (Concept #1), a Basis of Design, and a statement that the concept provided is within the award amount.

(3) Make arrangements for and provide an appropriate conference room convenient to the project site and Users for use by the Design Team and government participants during the workshop.

(4) Incorporate government comments in a revised Concept #1 and

produce at least 30 copies of the revised Concept #1 documents for distribution at the workshop.

(5) Facilitator conducts meeting with NAVFAC representatives before the CDW to review preparations, relationships, and the status of work to be accomplished.

b. On-Site Workshop.

The Design Team must accomplish the following items during the on-site phase of the CDW. (Typically conducted in four to six working days, minimizing breaks so as to maintain momentum. The Design Team should expect longer than normal workdays.)

(1) On the first day of the workshop, meet with the using activity, Station and other Government representatives. The Facilitator will describe the CDW process and review the workshop agenda. The user(s) will provide a functional presentation. This is to reiterate to all participants the User(s) needs and desires. The intent is to make the design solution and issue resolution function-oriented.

(2) Present the revised Concept #1 and respond to questions.

(3) Participate in a comment/creative session to generate ideas to improve this project in the areas of function, quality and total life cycle cost, issue resolution and sustainable design within the award amount. It is often helpful to request User comments in writing so they may be considered, responded to, and presented at subsequent presentations.

(4) Create a new concept design. Design concepts must include drawings, sketches, and other graphics as necessary to fully describe the concept. Prepare at least 20 copies for distribution at all presentations.

(5) Repeat applicable steps as necessary. Usually, three concepts are required. The final concept must be within the contract award amount.

(6) The final concept must include the following:

(a) Site Plan: Show the layout of the proposed facility in relation to major landmarks. Show all buildings, access roads, parking, pedestrian walkways, roads, sidewalks, landscaping, and major utilities. Indicate major dimensions and orientation. Provide a building code analysis, relating the proposed building site, size, and construction type to maximum allowable limits of the International Building Code.

(b) Building Floor Plans: Provide floor plans depicting functional utilization of spaces and furniture and equipment layout. Show room sizes or dimensions. Provide a Life Safety Code analysis with the floor plan to identify required life safety and egress features.

(c) Perspective Sketches: Provide at least one sketch to show a perspective of major buildings. The sketch should not be elaborate but must show the proposed form and massing, colors to

be used, and an indication of materials used.

(d) Mechanical Plans: Provide plans as necessary to show the essential work and intent of the design. Suggestions include equipment layouts, zones, etc.

(e) Electrical Plans: Provide plans as necessary to show the essential work and intent of the design. Suggestions include special light fixture types, locations, switching, power outlets and panelboard location. Provide electrical distribution single line diagram.

(f) Cost Estimate: Provide a CDW Cost Estimate and statement that the concept presented can be constructed within the award amount.

(g) Basis of Design: Describe the intent of the design by discipline. Address material quality, energy efficiency and life cycle costs.

(h) Sustainable Design: Demonstrate ability to achieve identified Guiding Principle sustainability goals and also Third Party Certification sustainability goals, if applicable. Provide Preliminary Sustainable Notebook, refer to Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD for requirements.

(i) System Safety Engineering

(7) Prepare 20 copies of the final concept (drawings, basis of design and statement that the concept is within the award amount) for distribution at the final presentation.

(8) Dependent upon the project, the Concept Design Workshop Report is provided by the Facilitator, includes all items included in the final concept design and the following:

(a) Endorsements: Include a copy of the signature/endorsement sheet.

(b) Comments: Include comments and resolutions concerning the final concept design.

(c) Executive Summary: Summarize the workshop, including how the various concepts differed and were improved during the workshop.

(d) Special Design Features: Identify and describe unique project needs and features, e.g., pile foundations, physical security, intrusion detection systems, access control, construction in humid climates, pollution abatement, tempest, HEMP, etc.

(e) Architectural Compatibility Statement: Identify architectural style, materials, and color scheme; and indicate their compatibility with installation planning and design concepts established in the Base Exterior Architectural Plan.

(f) Environmental Summary: Provide a summary of environmental issues, listing completed actions and items requiring further coordination, waivers or permits.

(g) Supporting Project Documentation: Include data to support the

development of the concept design, layout, and special features. Items should include: project scope discussion, minutes of meetings, function analysis work sheets, and economic and technical analyses if alternatives evaluated.

(9) Except for final comments, responses and endorsements, the final report should be completed (electronically) on site, before the final presentation. Present up to 10 hard copies of the report at the conclusion of the workshop.

(10) Conduct a "front-to-back" comprehensive presentation of the final concept. Obtain user signatures on a conceptual design endorsement sheet, signifying approval of the concept design, subject to the final comments and their resolutions agreed to at the final presentation meeting.

1.3.5.3 Concept Design Workshop Report

Within 14 calendar days of completion of the on-site Concept Design Workshop, the Design Team must submit to the NAVFAC Project Manager an electronic copy of the Concept Design Workshop Report as one file in .PDF format.

1.3.5.4 CDW Meeting Attendees

The following Contractor key personnel must attend the CDW: Project Manager, Project Scheduler, Cost Estimator, Lead Designer of Record, Design Staff representing each architectural/engineering discipline and Major Subcontractors when facility design is discussed.

1.3.6 Partnering

To most effectively accomplish this contract, the Government requires the formation of a cohesive partnership within the Project Team whose members are from the Government, Contractor and its Subcontractors. Key Personnel from the Supported Command, End User (who will occupy the facility), NAVFAC (Echelon III and/or IV), Navy Region/Installation, Contractor and Subcontractors and the Designer of Record will be invited to participate in the Partnering process. The Partnership will draw on the strength of each organization in an effort to achieve a project without any safety mishaps, conforming to the Contract, within budget and on schedule.

Information on the Partnering Process and a list of Key and Optional personnel who should attend the Partnering meeting are available from the Contracting Officer.

1.3.6.1 Formal Partnering

a. The Contractor must host the Partnering sessions with Key personnel of the Project Team, including Contractor's personnel and Government personnel. The Contractor pays all costs associated with the Partnering effort including the Facilitator, meeting room and other incidental items.

b. Before a Partnering session, the contractor must coordinate with the Facilitator all requirements for incidental items (audio-visual equipment, easels, flipchart paper, colored markers, note paper, pens/pencils, colored flash cards, etc.) and have these items available at the Partnering session. The contractor must copy

documents for distribution to all attendees. The participants must bear their own costs for meals, lodging and transportation associated with Partnering.

c. The Facilitator must be experienced in conducting Partnering Workshops and acceptable to both the Government and Contractor. The Facilitator is responsible for leading the team in a timely manner and making sure that issues are identified and resolved. A list of Partnering Facilitators is available from the Contracting Officer.

d. The Initial Partnering Session must be a duration of one day minimum. It must be located at a place off the construction site as agreed to by the Contracting Officer and the Contractor. It may take place concurrently with the Pre Construction Meeting.

e. The Follow-on Partnering Session(s) generally lasts a half day or less. They must be scheduled at three to six month intervals or when needed. Participants are encouraged to utilize electronic means to expedite meetings. Meetings may be held at a location off Base, at the project site, or in a Government Facility on Base. Follow-on meetings may be held concurrently with other scheduled meetings. Attendees need only be those required to resolve current issues. The same Facilitator used in the Initial Partnering session is recommended to achieve best results and for continuity.

1.3.6.2 Executive Partnering

a. The Contractor must attend a Partnering session with Key personnel of the Project Team, including Contractor's Principle, Design Principle, Government personnel, Navy leadership and Marine Corps leadership.

b. This meeting will include team members for all Hurricane Florence MILCON Contractors. The participants must bear their own costs for meals, lodging and transportation associated with Partnering.

c. The Government will provide a location in the vicinity of Camp Lejeune, NC, and a facilitator.

d. The Executive Partnering Session shall be a one day duration and occur within 120 days of award.

1.3.7 Performance Assessment Plan (PAP)

The Performance Assessment Plan (PAP) will be used to document design innovation and budget management, provide performance feedback to the Contractor, and as a basis for interim and final evaluations in the Construction Contractor Appraisal Support System (CPARS) on-line database.

It is the intent of the Government to establish the PAP based on tangible, measurable indicators of outstanding contractor performance, and on commitments made in the Contractor's proposal. The initial PAP may be found on the NAVFAC Design-Build Request for Proposal Website in RFP PART 6 Attachments. Review and finalize the initial PAP during the Partnering Session. During the initial Partnering Session, the Government, the Contractor, the Designer-of-Record, and the Client will establish the PAP. Following the establishment of the PAP, the Contractor will present it, with his input, for update and discussion at projects meetings which

discuss project performance. Submit an updated PAP on a monthly basis with the invoice for that period as a minimum.

1.3.8 Design Baseline NAS and Construction Baseline NAS

Provide in accordance with Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS).

1.4 DESIGN QUALITY ASSURANCE MEETINGS

After Government Quality Assurance (QA) of each Design Submittal has been completed, meet with the Government for a one-day conference to discuss review comments for the specific design submittal.

Provide consolidated copies of all Government comments with annotations of Contractor's action beside them. Notify the Contracting Officer in writing within five (5) days after receipt of Government's comments if the Contractor disagrees with comments technically or interprets comments to exceed the requirements of the contract.

1.4.1 Design QA Meeting Attendees

The following Contractor key personnel must attend the design QA meetings: Project Manager, QC Manager, and Contractor's Design Staff (architect and engineering disciplines related to topics to be discussed).

1.4.2 Design QA Meeting Location

Meetings shall be located at the office of the Contracting Officer's QA Team or may be conducted at other locations or by other electronic means if mutually acceptable to all parties.

1.4.3 Minimum Design QA Meeting Agenda

Address all Government comments that are unresolved and present clarification or supporting information requested by the Contracting Officer's QA team during the previous meeting.

1.5 PRECONSTRUCTION MEETING

Meet with the Contracting Officer at each construction site to discuss construction items of concern to the Government and the Contractor such as outages, storage, trailer location, disposal of construction debris, and safety, at a location to be determined by the Contracting Officer. Conduct the Preconstruction meeting prior to mobilization and commencement of any construction work at the site and at a date mutually agreed upon with the Contracting Officer.

Discuss Cybersecurity of building control system requirements and submittals to facilitate the Designer of Record (DOR) selections and edits to Section25 50 00.00 20 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS.

1.6 RECURRING MEETINGS

1.6.1 Quality Control and Production Meetings

Quality Control and Production Meetings in accordance with Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL.

1.6.2 Safety Meetings

Safety Meetings in accordance with Section 01 35 26.05 20 GOVERNMENT SAFETY REQUIREMENTS FOR DESIGN-BUILD.

1.6.3 eOMSI Meetings

Refer to Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATIONS AND MAINTENANCE INFORMATION (eOMSI) for requirements.

1.6.4 Sustainability Documentation Progress Meetings

Most sustainability documentation progress meetings may be combined with other design, construction, and project closeout meetings; however additional meetings are required post-design and post-construction. Refer to Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD for meeting requirements.

1.7 FACILITY TURNOVER PLANNING MEETINGS (NAVFAC RED ZONE - NRZ)

Meet with the Government to identify strategies to ensure that eachproject is carried to expeditious closure and turnover to the Client. Start the turnover process at the PAK meeting with a discussion of the NAVFAC Red Zone (NRZ) process and convene at regularly scheduled NRZ Meetings. Include the following in the facility Turnover effort:

1.7.1 NRZ Checklist

a. Contracting Officer's Technical Representative (COTR) will provide the Contractor a copy of the NRZ Checklist template prior to 75 percent completion.

b. Prior to 75 percent completion add/delete critical activities to the NRZ Checklist template as necessary to match the project scope, and schedule critical activities and insert planned completion dates in the NRZ checklist for each critical activity. Present the NRZ Checklist to COTR and review during a regularly scheduled QC Meeting.

1.7.2 Meetings

a. Upon Government acceptance of the NRZ Checklist, the Project Superintendent is required to lead regular NRZ Meetings beginning at approximately 75 percent project completion, or three to six months prior to Beneficial Occupancy Date (BOD), whichever comes first.

b. The Contracting Officer will determine the frequency of the meetings, which is expected to increase as the project completion draws nearer.

c. Using the NRZ Checklist as a Plan of Action and Milestones (POAM) and basis for discussion, review upcoming critical activities and strategies to ensure work is completed on time.

d. Coordinate with the COTR any upcoming activities that require Government involvement.

e. Maintain the NRZ Checklist by documenting the actual completion dates as work is completed and update the NRZ Checklist with revised planned completion dates as necessary to match progress. Distribute copies of

the current NRZ Checklist to attendees at each NRZ Meeting.

f. Assign responsibility and schedule for the provision of all information necessary to complete the Final eOMSI Data and Documents Submittals for facility turnover.

g. Assign responsibility and schedule for the provision of all documentation necessary to achieve Guiding Principle Validation and also Third Party Certification, if applicable.

h. Schedule and coordinate the facility training of Government maintenance personnel in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.7.3 Facility Turnover NRZ Meeting Attendees

The following key personnel must attend the Facility Turnover Meetings as needed to accomplish meeting requirements: Contractor QC Manager, Design Quality Control Manager, Superintendent, Major Subcontractors, Designer-of-Record, Contracting Officer's Representative, Project Sponsor, Representative(s) of NAVFAC, the Facility Owner/ Real Property Accounting Officer, Public Works Facility Maintenance Specialist, and the Client.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 31 23.13 20

ELECTRONIC CONSTRUCTION AND FACILITY SUPPORT CONTRACT MANAGEMENT SYSTEM
05/17

PART 1 GENERAL

1.1 CONTRACT ADMINISTRATION

Utilize the Naval Facilities Engineering Command's (NAVFAC's) Electronic Construction and Facility Support Contract Management System (eCMS) for the transfer, sharing and management of electronic technical submittals and documents. The web-based eCMS is the designated means of transferring technical documents between the Contractor and the Government. Paper media or e-mail submission, including originals or copies, of the documents identified in Table 1 are not permitted, except where eCMS is unavailable, non-functional or specifically requested in addition to electronic submission. Contact the Contracting Officer's Representative (COR) regarding availability of eCMS training and reference materials.

1.2 USER PRIVILEGES

The Contractor will be provided access to eCMS. All technical submittals and documents must be transmitted to the Government via the COR. Project roles and system roles will be established to control each user's menu, application, and software privileges, including the ability to create, edit, or delete objects.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contractor's Personnel;

1.4 SYSTEM REQUIREMENTS AND CONNECTIVITY

1.4.1 General

The eCMS requires a web-browser (platform-neutral) and Internet connection. Obtain from an approved vendor an External Certification Authority (ECA), Primary Key Infrastructure (PKI) certificate, or other similar digital identification to support two-factor authentication and access to eCMS. Provide and maintain computer hardware and software for the eCMS access throughout the duration of the contract for all Contractor-designated users. Provide connectivity, speed, bandwidth, and access to the Internet to ensure adequate functionality. Neither upgrading of the Contractor's computer system nor delays associated from the usage of the eCMS will be justification or grounds for a time extension or cost adjustment to the Contract.

1.4.2 Contractor Personnel List

Within 20 calendar days of contract award, provide to the Contracting Officer a list of Contractor's personnel who will have the responsibility for the transfer, sharing and management of electronic design, technical submittals and documents and will require access to the eCMS. Project personnel roles to be filled in the eCMS include the Contractor's Project Manager, Designer of Record, Superintendent, Quality Control (QC) Manager, and Site Safety and Health Officer (SSHO). Personnel must be capable of electronic document management. Notify the COR immediately of any personnel changes to the project. The Contracting Officer reserves the right to perform a security check on all potential users. Provide the following information:

First Name
Last Name
E-mail Address
Office Address
Project Role (e.g. Project Manager, QC Manager, Superintendent)

1.4.3 Field Administration

Within 30 days of Contract Award, provide a tablet computer with a Common Access Card (CAC) reader at each project job site for Government use only. The tablet computer must have a web-browser, built-in camera, and cellular data connectivity. Provide tablet computer with a rugged case suitable for use in a construction environment. The tablet computer must be fully charged and made available at all times for Government use to facilitate the input of construction data at the job site. After completion of the work, reset the tablet computer to factory default settings. The tablet computer remains the property of the Contractor and must be removed from the site. There are restrictions on use of WIFI on military bases. Cellular data connectivity and availability, and use of WIFI requires coordination with and approval by the Contracting Officer.

1.5 SECURITY CLASSIFICATION

In accordance with Department of Navy guidance, all military construction contract data are unclassified, unless specified otherwise by a properly designated Original Classification Authority (OCA) and in accordance with an established Security Classification Guide (SCG). Refer to the project's OCA when questions arise about the proper classification of information.

The eCMS and tablet computer must only be used for the transaction of unclassified information associated with construction projects. In conformance with the Freedom of Information Act (FOIA), Department of Defense Manual 5200.01-V4: DoD Information Security Program: Controlled Unclassified Information (CUI), and DoD requirements, any unclassified project documentation uploaded into the eCMS must be designated either "U - UNCLASSIFIED" (U) or "FOUO - UNCLASSIFIED-FOR OFFICIAL USE ONLY" (FOUO).

1.6 ECMS UTILIZATION

Establish, maintain, and update data and documentation in the eCMS throughout the duration of the contract.

Personally Identifiable Information (PII) transmittal is not permitted in the eCMS.

1.6.1 Information Security Classification/Identification

The eCMS must be used for the transmittal of the following documents. This requirement supersedes conflicting requirements in other sections, however, submittal review times in Section 01 33 00 SUBMITTAL PROCEDURES remain applicable. Table 1 - Project Documentation Types provides the appropriate U and FOUO designations for various types of project documents. Construction documents requiring FOUO status must be marked accordingly. Apply the appropriate markings before any document is uploaded into eCMS. Markings are not required on U documents.

Table 1 also identifies which eCMS application is to be used in the transmittal of data (these are subject to change based on the latest software configuration). If a designated application is not functional within 4 hours of initial attempt, defer to the Submittal application and submit the required data as an uploaded portable document (e.g. PDF), word processor, spreadsheet, drawing, or other appropriate format. Hard copy or e-mail submission of these items is acceptable only if eCMS is documented to be not available or not functional. After uploading documents to the Submittal application, transmit the submittals and attachments to the COR via the Transmittal application. For Submittals, select the following:

Preparation by = Contractor personnel assigned to prepare the submittal
Approval by = Contracting Officer Representative (COR)
Returned by = Design Lead/Manager
Forwarded to = Contractor project manager

Table 1 - Project Documentation Types

SUBJECT/NAME	CLASS	REMARKS	ECMS APPLICATION
As-Built Drawings	U	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals and Transmittals
Building Information Modeling (BIM)	U	1. Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager 2. Design reviews will be performed in existing "Dr Checks"	Submittals and Transmittals
Construction Permits	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals

SUBJECT/NAME	CLASS	REMARKS	ECMS APPLICATION
Construction Schedules (Activities and Milestones)	U	After the schedule submittal is approved by the COR, import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Submittals, Transmittals and Scheduling App
Construction Schedules (Cost-Loaded)	FOUO	After the schedule submittal is approved by the COR, import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Submittals, Transmittals and Scheduling App
Construction Schedules (3-Week Lookahead)	U	Import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Scheduling App
DD 1354 Transfer of Real Property	U		Submittals and Transmittals
Daily Production Reports	FOUO	Provide weather conditions, crew size, man-hours, equipment, and materials information	Daily Report
Daily Quality Control (QC) Reports	FOUO	Provide QC Phase, Definable Features of Work Identify visitors	Daily Report
Designs and Specifications	U	1. Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager 2. Design reviews will be performed in existing "Dr Checks"	Submittals and Transmittals
Environmental Notice of Violation (NOV), Corrective Action Plan	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals
Environmental Protection Plan (EPP)	FOUO		Submittals and Transmittals

SUBJECT/NAME	CLASS	REMARKS	ECMS APPLICATION
Invoice (Supporting Documentation)	FOUO	Applies to supporting documentation only. Invoices are submitted in Wide-Area Workflow (WAWF)	Submittals and Transmittals
Jobsite Documentation, Bulletin Board, Labor Laws, SDS	U		Submittals and Transmittals
Meeting Minutes	FOUO		Meeting Minutes
Operations & Maintenance Support Information (OMSI/eOMSI), Facility Data Worksheet	U	1. Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager 2. Design reviews will be performed in existing "Dr Checks"	Submittals and Transmittals
Photographs	U	Subject to base/installation restrictions	Submittals and Transmittals
QCM Initial Phase Checklists	FOUO		Checklists (Site Management)
QCM Preparatory Phase Checklists	FOUO		Checklists (Site Management)
Quality Control Plans	FOUO		Submittals and Transmittals
QC Certifications	U		Submittals and Transmittals
QC Punch List	U		Punch Lists (Testing Logs)
Red-Zone Checklist	U		Checklists (Site Management)
Rework Items List	FOUO		Punch Lists (Testing Logs)
Request for Information (RFI) Post-Award	FOUO		RFIs

SUBJECT/NAME	CLASS	REMARKS	ECMS APPLICATION
Safety Plan	FOUO		Daily Report
Safety - Activity Hazard Analyses (AHA)	FOUO		Daily Report
Safety - Mishap Reports	FOUO		Daily Report
SCIF/SAPF Accreditation Support Documents	FOUO	Note: Some Construction Security plans may be classified as Secret. Classified information must not be uploaded into eCMS. Refer to the Site Security Manager, as applicable.	Submittals and Transmittals
Shop Drawings	U	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals and Transmittals
Storm Water Pollution Prevention (Notice of Intent - Notice of Termination)	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals
Submittals and Submittal Log	U		Submittals and Transmittals
Testing Plans, Logs, and Reports	FOUO		Submittals and Transmittals
Training/Reference Materials	U		Submittals and Transmittals
Training Records (Personnel)	FOUO		Submittals and Transmittals
Utility Outage/Tie-In Request/Approval	FOUO		Submittals and Transmittals
Warranties/BOD Letter	FOUO		Submittals and Transmittals

SUBJECT/NAME	CLASS	REMARKS	ECMS APPLICATION
Quality Assurance Reports	FOUO		Checklists (Government initiated)
Non-Compliance Notices	FOUO		Non-Compliance Notices (Government initiated)
Other Government-prepared documents	FOUO		GOV ONLY
All Othere Documents	FOUO	Refer to FOIA guidelines and contact the FOIA official to determine whether exemptions exist	As applicable

1.6.2 Markings on FOUO documents

a. Only FOUO documents being electronically uploaded into the eCMS (.docx, .xlsx, .pptx, .pdf, .jpg, .zip, and others as appropriate), and associated paper documents described in the paragraph CONTRACT ADMINISTRATION require FOUO markings as indicated in the subparagraphs below.

b. FOUO documents that are originally created within the eCMS application using the web-based forms (RFIs, Daily Reports, and others as appropriate) will be automatically watermarked by the eCMS software, and these do not require additional markings.

c. FOUO documents must be marked "UNCLASSIFIED//FOR OFFICIAL USE ONLY" at the bottom of the outside of the front cover (if there is one), the title page, the first page, and the outside of the back cover (if there is one).

d. FOUO documents must be marked on the internal pages of the document as "UNCLASSIFIED//FOR OFFICIAL USE ONLY"' at top and bottom.

e. Where Installations require digital photographs to be designated FOUO, place the markings on the face of the photograph.

f. For visual documentation, other than photographs and audio documentation, mark with either visual or audio statements as appropriate at both the beginning and end of the file.

1.7 QUALITY ASSURANCE

Requested Government response dates on Transmittals and Submittals must be in accordance with the terms and conditions of the Contract. Requesting response dates earlier than the required review and response time, without concurrence by the Government COR, may be cause for rejection.

Incomplete submittals will be rejected without further review and must be resubmitted. Required Government response dates for resubmittals must reflect the date of resubmittal, not the original submittal date.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 32 17.00 20

COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS)
05/18

PART 1 GENERAL

1.1 DEFINITIONS

The cost-loaded Network Analysis Schedule (NAS) is a tool to manage the project, both for Contractor and Government activities. The NAS is also used to report progress, evaluate time extensions, and provide the basis for progress payments.

For consistency, when scheduling software terminology is used in this section, the terms in Primavera's scheduling programs are used.

1.2 SCHEDULE REQUIREMENTS PRIOR TO THE START OF WORK

1.2.1 Preliminary Scheduling Meeting

Before preparation of the Project Baseline Schedule, and prior to the start of work, meet with the Contracting Officer to discuss the proposed schedule and the requirements of this section.

1.2.2 Project Baseline Schedule

1.2.2.1 Baseline NAS

Submit and present the Baseline NAS at the Post-Award Kickoff (PAK) Meeting. The Baseline NAS must include detailed design activities, general (summarized) approach for the construction phase(s) of the project and required milestone activities. Separate schedules are required for each project site as well as an overall package schedule. If the project is being Fast-Tracked or allows Early Start of construction, the Baseline NAS must include all fast-tracked design construction phases, including the required or proposed critical path design submittals within each phase that will occur during the duration of the project. The most current updated design schedule must accompany each design submittal.

The acceptance of a Baseline NAS is a condition precedent to processing Contractor's pay request(s) for design activities/items of work. Government review comments on the Contractor's schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents. Only bonds may be paid prior to acceptance of the Baseline NAS. The acceptance of a Baseline NAS is a condition precedent to:

a. The Contractor starting work on the demolition or construction stage(s) of the contract.

b. Processing Contractor's invoices(s) for construction activities/items of work.

c. Review of any schedule updates.

1.2.2.2 Construction Baseline NAS

Develop the Construction Baseline Schedule, as design progresses, with

detailed construction activities. If design must be completed and accepted prior to construction, submit the complete design and construction network analysis schedule and obtain acceptance prior to starting construction work. If the project is Fast-Tracked, each construction stage must be detailed and built upon the previous Fast-Tracked Baseline Schedule (including any interim updates) and accepted prior to starting that stage of the construction work. Payment for completed work is dependent on an accepted, detailed schedule for that portion of work.

Submittal of the Construction Baseline NAS, and subsequent schedule updates, is understood to be the Contractor's certification that the submitted schedule meets all of the requirements of the Contract Documents, represents the Contractor's plan on how the work must be accomplished, and accurately reflects the work that has been accomplished and how it was sequenced (as-built logic).

1.3 THREE-WEEK LOOK AHEAD SCHEDULE

1.3.1 Weekly CQC Coordination and Production Meeting

Deliver three hard copies and one electronic file of the 3-Week Look Ahead Schedule to the Contracting Officer no later than 8 a.m. each Monday, for review during the weekly CQC Coordination or Production Meeting.

1.3.2 Look Ahead Schedule Requirements

Prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Project Network Analysis Schedule. Requirements include:

a. Key the work plans mapped to NAS activity numbers and updated each week to show the planned work for the current and following two-week period.

b. Include upcoming outages, closures, field evaluation tests, preparatory meetings, and initial meetings.

c. Identify critical path activities on the Three-Week Look Ahead Schedule.

d. The detail work plans are to be bar chart type schedules, derived from but maintained separately from the Project NAS on an electronic spreadsheet program and printed on 8-1/2 by 11 inch sheets as directed by the Contracting Officer.

e. Activities must not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work.

1.4 MONTHLY NETWORK ANALYSIS

1.4.1 Monthly Network Analysis Updates

Meet with Government representatives at monthly intervals to review and agree on the information presented in the updated project schedule. The submission of an acceptable, updated schedule to the Government is a condition precedent to the processing of the Contractor's invoice. Submit an acceptable, updated schedule to the Government regardless of whether a

Contractor's invoice is submitted for the given period. The Contractor and Government must consent to agree on unit quantities of work completed equating to a percentage of payment for each activity progressed during the update period. Monthly update schedules must incorporate as-built events as they occurred and provide ongoing status of anticipated finish dates. As-built events must correspond to contemporaneous records including but not limited to submittals, daily production reports and quality control reports.

Provide the following with each Schedule submittal:

a. Time-Scaled Logic Diagram.

b. Reports listed in paragraph REQUIRED TABULAR REPORTS.

c. Data disks containing the project schedule. Include the back-up native .xer program files.

1.4.2 As-Built Schedule

As a condition precedent to the release of retention and making final payment, submit an "As-Built Schedule," as the last schedule update showing all activities at 100 percent completion. This schedule must reflect the exact manner in which the project was actually constructed.

1.5 CORRESPONDENCE AND TEST REPORTS

Reference Schedule activity IDs that are being addressed in each correspondence (e.g., letters, Requests for Information (RFIs), e-mails, meeting minute items, Production and QC Daily Reports, material delivery tickets, photographs) and test report (e.g., concrete, soil compaction, weld, pressure).

1.6 ADDITIONAL SCHEDULING REQUIREMENTS

References to additional scheduling requirements, including systems to be inspected, tested and commissioned, that are located throughout the remainder of the Contract Documents, are subject to the requirements of this section.

1.7 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Designated Project Scheduler; G

Baseline NAS; G

Construction Baseline NAS; G

SD-07 Certificates

Monthly Network Analysis Updates; G

SD-11 Closeout Submittals

As-Built Schedule; G

1.8 SOFTWARE

Prepare and maintain project schedules using Primavera P6 software in a version compatible with Government's current version. Importing data into P6 using data conversion techniques or third party software is cause for rejection of the submitted schedule.

1.9 DESIGNATED PROJECT SCHEDULER

Submit to the Contracting Officer for approval an individual who will serve as the Designated Project Scheduler. Include a copy of the candidate's resume with qualifications. The Contracting Officer may remove the Designated Project Scheduler, and require replacement, if the scheduler does not effectively fulfill their duties in accordance with the contract requirements. Payment request will not be processed without an approved Designated Project Scheduler.

1.9.1 Qualifications

The Designated Project Scheduler must have prepared and maintained at least three previous construction schedules, of similar size and complexity to this contract, using Primavera P6.

1.9.2 Duties

Duties of the Designated Project Scheduler:

a. Prepare Baseline NAS.

b. Prepare monthly schedule updates.

c. Prepare tabular reports.

d. Prepare Time Impact Analysis (TIA) as necessary.

e. Provide certification that NAS and TIA submittals conform to the contract requirements.

f. Participate with the Prime Contractor and Government Representative in a monthly meeting at the job site in-person, and scheduled with sufficient time to support the Monthly Network Analysis Updates process, to discuss project status, schedule updates, critical activities, potential delays, and contract modifications impacting the schedule.

1.10 NETWORK SYSTEM FORMAT

The system must include time-scaled logic diagrams and specified reports.

Prepare the schedule in accordance with the following Primavera P6 settings and parameters. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of schedule submission.

1.10.1 Diagrams

Provide 11 by 17 inch hard-copy of Time-scaled Logic Diagram in color and landscape-oriented. Clearly show activities on the longest path. Include the following information for each activity and include accompanying Gantt chart:

a. Activity ID

b. Activity Name

c. Original Duration in Work Days

d. Remaining duration in Work Days

e. Physical Percent Complete

f. Start Date

g. Finish Date

h. Total Float

1.10.2 Schedule Activity Properties and Level of Detail

1.10.2.1 Design-Build Schedules

Logically incorporate design and construction for the entire project in a single schedule. Unless otherwise indicated, the Contractor may begin construction when design is signed, stamped and submitted to the Government via the Contractor's quality control organization. If Government approval is required for any portion of a final signed and sealed design package prior to construction, include that review time in the schedule.

1.10.2.2 Activity Identification and Organization

a. Identify design and construction activities planned for the project and other activities that could impact project completion if delayed in the NAS.

b. Identify administrative type activity/milestones, including all pre-construction submittal and permit requirements prior to demolition or construction stage.

c. Include times for procurement, Contractor quality control and construction, acceptance testing and training in the schedule.

d. Include the Government approval time required for the submittals that require Government Approval prior to construction, as indicated in Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

e. Create separate activities for each Phase, Area, Floor Level and Location the activity is occurring.

f. Do not use construction category activity to represent non-work type reference (e.g. Serial Letter, Request for Information) in NAS. Place Non-work reference within the P6 activity details notebook.

Activity categories included in the schedule are specified below.

1.10.2.3 Activity Logic

a. With the exception of the Contract Award and Contract Completion Date (CCD) milestone activities, activity must not be open-ended; each activity must have predecessor and successor ties.

b. Activities must not have open start or open finish (dangling) logic.

c. Do not use lead or lag logic without Contracting Officer prior approval.

d. Minimize redundant logic ties.

e. Once an activity exists on the schedule it must not be deleted or renamed to change the scope of the activity and must not be removed from the schedule logic without approval from the Contracting Officer.

(1) While an activity cannot be deleted, where said activity is no longer applicable to the schedule, but must remain within the logic stream for historical record, change the activity to a milestone and clearly label "NO LONGER REQUIRED" after the activity name. Redistribute accordingly any remaining budget associated with that activity.

(2) Document any such change in the milestone's "Notebook," including a date and explanation for the change.

(3) The ID number for a "NO LONGER REQUIRED" activity must not be re-used for another activity.

1.10.2.4 Critical and Near Critical Activity Baseline Limitation

For P6 settings, critical activities are defined as being on the Longest Path. "Near Critical" is defined as having total float, of up to 14 days more, than the greatest float value found on the Longest Path. Longest Path (Critical) and Near Critical Activities must not make up more than 20 percent of all activity within the Baseline Schedule.

1.10.2.5 Assigned Calendars

All NAS activity must be assigned calendars that reflect required and anticipated non-work days.

1.10.2.6 Activity Categories

1.10.2.6.1 Design Activities

Design activities must include design decision points and design submittal packages, including critical path submittals for Fast Tracked Phases. Review times for design development packages must be included in the schedule. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES FOR DESIGN-BUILD, for specific requirements.

1.10.2.6.2 Pre-construction Activities

Examples of pre-construction activities include, but are not limited to,

bond approval, permits, pre-construction submittals and approvals. Include pre-construction activities that are required to be completed prior to the Contractor starting the demolition or construction stage of work.

1.10.2.6.3 Procurement Activities

Examples of procurement activities include, but are not limited to: Material/equipment submittal preparation, submittal and approval of material/equipment; material/equipment fabrication and delivery, and material/equipment on-site. As a minimum, separate procurement activities must be provided for critical items, long lead items, items requiring Government approval and material/equipment procurement for which payment will be requested in advance of installation. Show each delivery with relationship tie to the Construction Activity specifically for the delivery.

1.10.2.6.4 Government Activities

Government and other agency activities that could impact progress must be clearly identified. Government activities include, but are not limited to; Government approved submittal reviews, Government conducted inspections/tests, environmental permit approvals by State regulators, utility outages, Design Start, Construction Start (including Design/Construction Start for each Fast-Track Phase, and delivery of Government Furnished Material/Equipment.

1.10.2.6.5 Construction Quality Management (CQM) Activities

The Preparatory and Initial Phase meetings for each Definable Feature of Work identified in the Contractor's Quality Control Plan must be included in the Three-Week Look Ahead Schedule. Preparatory and Initial phase meetings are not required in the NAS, but can be represented by a start milestone linked to successor parent Construction Activity. The Follow-up Phase must be represented by the Construction Activities themselves in the NAS.

1.10.2.6.6 Construction Activities

No on-site construction activity may have a duration in excess of 20 working days. Contractor activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days, unless otherwise defined in this contract.

1.10.2.6.7 Turnover and Closeout Activities

Include activities or milestones for items on the NAVFAC Red Zone Checklist/POAM that are applicable to this project. As a minimum, include required Contractor testing, required Government acceptance inspections on equipment, Pre-Final Inspection, Punch List Completion, Final Inspection and Acceptance. Add an unconstrained start milestone for the initial NAVFAC Red Zone - Facility Turnover Planning Meeting at approximately 75 percent construction contract completion or six months prior to Contract Completion Date (CCD), whichever is sooner.

1.10.2.6.8 Testing of HVAC - DALT, TAB, and PVT Activities

Include in the baseline schedule, activities and milestones associated with Government acceptance of Duct Air Leakage Test (DALT), Testing,

Adjusting, and Balancing (TAB) and Performance Verification Test (PVT) as required and in accordance with Section 23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC and Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

a. Identify the general area or location(s) for Government Acceptance Testing of DALT, TAB and PVT.

b. Incorporate into the baseline schedule, time periods required for advance notification of work, and Government submittal review in accordance with Section 23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC, paragraph DALT AND TAB SUBMITTAL AND WORK SCHEDULE.

c. Include the following as schedule activities or milestones:

(1) Pre-DALT/TAB/PVT Meeting

(2) TAB Design Review Report, Government review

(3) TAB Pre-Field Engineering Report, Government review

(4) DALT Field Work

(5) DALT Field Acceptance Testing

(6) Certified Final DALT Report, Government review

(7) Control Contractors PVT Plan, Government review

(8) Equipment Suppliers PVT Plan, Government review

(9) Season I TAB Field Work

(10) Season I Certified Final TAB Report, Government review

(11) Endurance Testing, Government review

(12) PVT Field Work

(13) PVT Report, Government review

(14) Season I TAB Field Acceptance Testing

(15) Season II TAB Field Work

(16) Season II Certified Final TAB Report, Government review

(17) Season II TAB Field Acceptance Testing

(18) Post-Occupancy Endurance Testing Government review

(19) Post-Occupancy PVT Field Work

1.10.2.6.9 Commissioning Activities

Include in the baseline schedule activities and milestones associated with Commissioning.

a. Identify the general area or location(s) of systems for Commissioning

Inspection and Testing

b. Incorporate into the baseline schedule time periods for Government submittal review

1.10.2.7 Contract Milestones and Constraints

1.10.2.7.1 Project Start Date Milestones

Include as the first activity on the schedule a start milestone titled "Contract Award," which must have a Mandatory Start constraint equal to the Contract Award Date.

1.10.2.7.2 NAVFAC Red Zone - Facility Turnover Planning Meeting Milestones

See paragraph TURNOVER AND CLOSEOUT ACTIVITIES above.

1.10.2.7.3 Substantial Completion Milestone

Include an unconstrained finish milestone on the schedule titled "Substantial Completion." Substantial Completion is defined as the point in time the Government would consider the project ready for beneficial occupancy wherein by mutual agreement of the Government and Contractor, Government use of the facility is allowed while construction access continues in order to complete remaining items (e.g. punch list and other close out submittals). Include a separate Substantial Completion Milestone for each phase if the contract requires construction to be completed in phases.

1.10.2.7.4 DD-1354 Finish Milestone

Add unconstrained finish milestone, titled "DD-1354" and scheduled 30 calendar days prior to Substantial Completion, whenever a Form DD-1354 is required in accordance with Section 01 20 00.00 20 PRICE AND PAYMENT PROCEDURES.

1.10.2.7.5 Projected Completion Milestone

Include an unconstrained finish milestone on the schedule titled "Projected Completion." Projected Completion is defined as the point in time all contract requirements are complete and verified by the Government with a successful Final Inspection in accordance with Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL. This milestone must have the Contract Completion Date (CCD) milestone as its only successor.

1.10.2.7.6 Contract Completion Date (CCD) Milestone

Last schedule entry must be an unconstrained finish milestone titled "Contract Completion (CCD: DD-MM-YY)." DD-MM-YYYY is the current contract completion date at data date, day-month-year corresponding to P6 Must Finish Date. NAS milestone updates of Project Completion finish date for longest path must reflect calculated float as positive or negative based on CCD. Calculation of schedule updates must be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float is calculated on the longest path. If the finish of the "Projected Completion" milestone falls before the contract completion date, the float calculation must reflect positive float on the longest path.

1.10.2.8 Work Breakdown Structure & Activity Code

At a minimum, establish a Work Breakdown Structure (WBS) and provide activity codes identified as follows:

1.10.2.8.1 Work Breakdown Structure (WBS)

Group all activities and milestones within appropriate WBS categories including, at a minimum, the following:

a. Project Milestones:

    (1) Management Milestones

    (2) Project Administrative Meetings

    (3) Permits

b. Pre-Construction Phase:

    (1) Submittals and Reviews

    (2) Procurement

    (3) Mobilization

c. Construction Phase: Create multiple sub-sections in accordance with project specific categories of work including in WBS descending order as follows:

    (1) General Area

        (a) Type of Work Item

            1. Location

d. Commissioning & Testing:

    (1) Specific area/locations of commissioning

    (2) Final Testing

    (3) Training

d. Project Closeout: Include activity items such as Punchlist, Demobilization, O&M, As-built Drawings, Training, and As-built NAS.

e. Modifications: Create sub-category of Conformed and Non-Conformed under Modification WBS. Create multiple sub-sections as the project progresses identified by issue and Fragnet placed in Conformed for modifications issued prior data date, or Non-Conformed for issues not modified to contract prior data date.

f. Removed Activity: Activity "removed" by remaining within logic sequence and changing to Finish Milestone. Actualize finish date to date activity removed from schedule and provide reason(s) for removal explained in Activity Notebook.

1.10.2.8.2 Responsibility Code

All activities in the project schedule must be identified with the party responsible for completing the task. Activities must not belong to more than one responsible party.

1.10.2.8.3 Activity Category Code

Provide user defined "CAT" codes for Project Level activity codes. Use the following codes:

a. Assign "Procure" to Procurement type activity

b. Assign "Construct" Construction type activity

c. Assign "Close Out" to dedicated Commissioning, Testing & Close Out type activity.

d. Assign "Other" to other activity not otherwise designated.

1.10.2.8.4 Construction Specification Institute (CSI) Masterformat Code

Identify all activities in the project schedule with its respective Specification Section number. Activities must not belong to more than one Section number. If an activity does not have an applicable CSI Code (e.g. Mobilize), the code must be "0000".

1.10.2.8.5 Drawing Code

Identify all activities in the project schedule with its respective Drawing Code. The Drawing Code is the Sheet Number on the primary project drawing which indicates work to be performed. If an activity does not have an applicable Drawing Code (e.g. Mobilize), the code must be "0000".

1.10.2.9 Anticipated Weather Lost Work Days

Use the National Oceanic and Atmospheric Administration's (NOAA) Summary of Monthly Normals report to obtain the historical average number of days each month with precipitation, using a nominal 30-year, greater than 0.10 inch precipitation amount parameter, as indicated on the Station Report for the NOAA location closest to the project site as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal Holidays as non-work days.

Assign the Weather Calendar to any activity that could be impacted by adverse weather. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs and the adverse weather delayed activities are critical to contract completion. A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.

1.10.2.10 Anticipated Restricted Delays

Unless otherwise noted or defined in Section 01 14 00.05 20 WORK

RESTRICTIONS FOR DESIGN-BUILD, allow in the schedule one lost workday for every two months of project duration for instances where base access is not permitted or where work areas are temporarily not accessible for security reasons which causes a delay in the work. Use Anticipated Restricted Delays as basis for establishing a "Security Calendar" showing the number of anticipated non-workdays for each month due to anticipated restrictions, in addition to anticipated adverse weather, Saturdays, Sundays and all Federal Holidays as non-work days. Assign the Security Calendar to any activity that could be impacted by restriction delays. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual lost work days if the number of actual restriction delay days exceeds the number of anticipated for the month in which the delay occurs and the restriction delayed activities are critical to contract completion. A lost workday due to restriction delay is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.

1.10.2.11 Cost Loading

The Project Network Analysis Schedule (NAS) must be cost-loaded and will provide the basis for progress payments. Earned Value Reports must be derived from and correspond to cost loaded NAS. Use the Critical Path Method (CPM) and the Precedence Diagram Method (PDM) to satisfy time and cost applications.

1.10.2.11.1 Cost Loading Activities

Assign Material and Equipment Costs, for which payment will be requested in advance of installation, to their respective procurement activity (i.e., the material/equipment on-site activity). Assign cost for material/equipment, paid for after installation; labor; and construction equipment to their respective Construction Activities. Provide breakdown of definable features of work for cost loaded activities comprising Mobilization and De-Mobilization (Lump sum not allowed). The value of commissioning, testing and closeout WBS section may not be less than 10 percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project.

1.10.2.11.2 Partial Payment

Breakdown unit of measure and cost must be defined within P6 Activity Detail Expenses for partial payment of any cost loaded activity. Lump sum cost loaded activity will not be partially paid.

1.10.3 Schedule Software Settings and Restrictions

a. Activity Constraints: Date/time constraint(s), other than those required by the contract, are not allowed unless accepted by the Contracting Officer. Identify any constraints proposed and provide an explanation for the purpose of the constraint in the Narrative Report as described in paragraph REQUIRED TABULAR REPORTS.

b. Default Progress Data Disallowed: Actual Start and Actual Finish dates on the CPM schedule must match the dates on the Contractor Quality Control and Production Reports.

c. Software Settings: Handle schedule calculations and Out-of-Sequence

progress (if applicable) through Retained Logic, not Progress Override. Show all activity durations and float values in days. Show activity progress using Remaining Duration. Set default activity type to "Task Dependent".

d. At a minimum, include the following settings and parameters in P6 Schedule preparation:

(1) General: Define or establish Calendars and Activity Codes at the "Project" level, not the "Global" level.

(2) Admin Drop-Down Menu, Admin Preferences, Time Periods Tab:

(a) Set time periods for P6 to 8.0 Hours/Day, 40.0 Hours/Week, 172.0 Hours/Month and 2000.0 Hours/Year.

(b) Use assigned calendar to specify the number of work hours for each time period: Must be checked.

(3) Admin Drop-Down Menu, Admin Preferences, Earned Value Tab:

(a) Earned Value Calculation: Use "Budgeted values with current dates".

(4) Project Level, Dates Tab:

(a) Set "Must Finish By" date to "Contract Completion Date", and set "Must Finish By" time to 05:00pm.

(5) Project Level, Defaults Tab:

(a) Duration Type: Set to "Fixed Duration & Units".

(b) Percent Complete Type: Set to "Physical".

(c) Activity Type: Set to "Task Dependent".

(d) Calendar: Set to "Standard 5 Day Workweek". Calendar must reflect Saturday, Sunday and all Federal holidays as non-work days. Alternative calendars may be used with Contracting Officer approval.

(6) Project Level, Calculations Tab:

(a) Activity percent complete based on activity steps: Must be Checked.

(b) Reset Remaining Duration and Units to Original: Must be Checked.

(c) Subtract Actual from At Completion: Must be Checked.

(d) Recalculate Actual units and Cost when duration percent complete changes: Must be Checked.

(e) Link Actual to Date and Actual This Period Units and Cost: Must be Checked.

(f) Price/Unit: Set to "$1/h".

(g) Update units when costs change on resource assignments: Must be Unchecked.

(7) Project Level, Settings Tab:

(a) Define Critical Activities: Check "Longest Path".

(8) Work Breakdown Structure Level, Earned Value Tab:

(a) Technique for Computing Performance Percent Complete: "Activity percent complete" is selected.

(b) Technique for Computing Estimate to Complete (ETC): "PF = 1" is selected.

1.10.4 Required Tabular Reports

Include the following reports with the Baseline, Monthly Update and any other required schedule submittals:

a. Log Report: P6 Scheduling/Leveling Report.

b. Narrative Report: Identify and justify:

(1) Progress made in each area of the project;

(2) Longest Path;

(3) Date/time constraint(s), other than those required by the contract

(4) Listing of all changes made between the previous schedule and current updated schedule include: added or deleted activities, original and remaining durations for activities that have not started, logic (sequence constraint lag/lead), milestones, planned sequence of operations, longest path, calendars or calendar assignments, and cost loading;

(5) Any decrease in previously reported activity Earned Amount;

(6) Pending items and status thereof, including permits, changes orders, and time extensions;

(7) Status of Contract Completion Date and interim milestones;

(8) Current and anticipated delays (describe cause of delay and corrective actions(s) and mitigation measures to minimize);

(9) Description of current and potential future schedule problem areas.

Each entry in the narrative report must cite the respective Activity ID and Activity Name, the date and reason for the change, and description of the change.

c. Earned Value Report: Derive from and correspond to P6 cost loaded schedule. List all activities having a budget amount cost loaded. Compile total earnings on the project from notice to proceed to current progress payment request. Show current budget, previous physical percent complete, to-date physical percent complete, previous

earned value, to-date earned value and cost to complete on the report for each activity.

d. Schedule Variance Control (SVC) Diagram: With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates and 2) Earned Value to-date. Revise Cash Flow S-Curves when the contract is modified, or as directed by the Contracting Officer.

e. Daily Reported Production Activity: Submit on a monthly basis, in electronic spreadsheet (format provided by the Government), summary of daily reported production activity for the reporting month in the update schedule. Use the following columns for reporting:

(1) Date

(2) Activity ID

(3) Work Description

(4) Contractor

(5) Billable Hours

1.11 CONTRACT MODIFICATION

1.11.1 Time Impact Analysis (TIA)

Submit a Time Impact Analysis with each cost and time proposal for a proposed change. TIA must illustrate the influence of each change or delay on the Contract Completion Date or milestones. No time extensions will be granted nor delay damages paid unless a delay occurs which consumes all available Project Float, and extends the Projected Completion beyond the Contract Completion Date.

a. Each TIA must be in both narrative and schedule form. The narrative must define the scope and conditions of the change; provide start and finish dates of impact, successor and predecessor activity to impact period, responsible party; describe how it originated, and how it impacts the schedule. The schedule submission must consist of three native files:

(1) Fragnet used to define the scope of the changed condition

(2) Most recent accepted schedule update as of the time of the proposal or claim submission that has been updated to show all activity progress as of the time of the impact start date.

(3) The impacted schedule that has the fragnet inserted in the updated schedule and the schedule "run" so that the new completion date is determined.

b. For claimed as-built project delay, the inserted fragnet TIA method must be modified to account for as-built events known to occur after the data date of schedule update used.

c. All TIAs must include any mitigation, and must determine the apportionment of the overall delay assignable to each individual

delay. Apportionment must provide identification of delay type and classification of delay by compensable and non-compensable events. The associated narrative must clearly describe analysis methodology used, and the findings in a chronological listing beginning with the earliest delay event.

(1) Identify and classify types of delay defined as follows:

(a) Force majeure delay (e.g. weather delay): Any delay event caused by something or someone other than the Government or the Contractor, or the risk of which has not been assigned solely to the Government or the Contractor. If the force majeure delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, classified as a non-compensable event.

(b) A Contractor-delay: Any delay event caused by the Contractor, or the risk of which has been assigned solely to the Contractor. If the contractor-delay is on the longest path, in absence of other types of concurrent delays, Contractor is not granted extension of contract time, and classified as a non-compensable event. Where absent other types of delays, and having impact to project completion, Contractor must provide to Contracting Officer a Corrective Action Plan identifying plan to mitigate delay.

(c) A Government-delay: Any delay event caused by the Government, or the risk of which has been assigned solely to the Government. If the Government-delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, and classified as a compensable event.

(2) Functional theory must be used to analyze concurrent delays, where: separate delay issues delay project completion, do not necessarily occur at same time, rather occur within same monthly schedule update period at minimum, or within same as-built period under review. If a combination of functionally concurrent delay types occurs, it is considered Concurrent Delay, which is defined in the following combinations:

(a) Government-delay concurrent with contractor-delay: excusable time extension, classified non-compensable event.

(b) Government-delay concurrent with force majeure delay: excusable time extension, classified non-compensable event.

(c) Contractor-delay concurrent with force majeure delay: excusable time extension, classified non-compensable event.

(3) Pacing delay reacting to another delay (parent delay) equally or more critical than paced activity must be identified prior to pacing. Contracting Officer will notify Contractor prior to pacing. Contractor must notify Contracting Officer prior to pacing. Notification must include identification of parent delay issue, estimated parent delay time period, paced activity(s) identity, and pacing reason(s). Pacing Concurrency is defined as follows:

(a) Government-delay concurrent with contractor-pacing: excusable time extension, classified compensable event.

(b) Contractor-delay concurrent with Government-pacing: inexcusable time extension, classified non-compensable event

d. Submit Data disks containing the narrative and the source schedule files used in the time impact analysis.

e. All as-built and known planned activity must be included in NAS. Add cost loading or change Contract Completion Date to NAS in accordance to conformed contract modifications issued prior to Data Date of NAS update.

1.11.2 No Reservation of Rights

All direct costs, indirect cost, and time extensions will be negotiated and made full, equitable and final at the time of modification issuance.

1.12 PROJECT FLOAT

Project Float is the length of time between the Contractor's Projected Completion Milestone and the Contract Completion Date Milestone. Project Float available in the schedule will not be for the exclusive use of either the Government or the Contractor.

The use of Resource Leveling or other techniques used for the purpose of artificially adjusting activity durations to consume float and influence critical path is prohibited.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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SECTION 01 33 00.05 20

CONSTRUCTION SUBMITTAL PROCEDURES
05/14

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

This section covers construction submittals that are not included in the design submittals. Submit design submittals in accordance with 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES. When using Unified Facility Guide Specifications (UFGS) sections that reference Section 01 33 00 SUBMITTAL PROCEDURES, change reference to this section, Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

1.2 SUBMITTAL DESCRIPTIONS (SD)

Submittal requirements are specified in UFGS in Part 2, GENERAL REQUIREMENTS; in references in Part 4 PERFORMANCE TECHNICAL SPECIFICATIONS; and in UFGS in Part 5, PRESCRIPTIVE SPECIFICATIONS. Submittals that are identified by SD numbers use descriptions of items included in submittal packages and titles as follows:

SD-01 Preconstruction Submittals

Certificates of insurance.

Surety bonds.

List of proposed subcontractors.

List of proposed products.

Construction progress schedule.

Network Analysis Schedule (NAS)

Submittal register.

Schedule of prices or earned value report.

Health and safety plan.

Work plan.

Quality control plans.

Environmental protection plan.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

Manufacturer's data certifying and demonstrating that specific product, process, and/or conditions complies with applicable Guiding Principle GP) or Third Party Certification (TPC) criteria.

SD-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuing work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

Factory test reports.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings, As-built drawings, DD Form 1354, Guiding Principles Validation or Sustainability Third Party Certification (TPC), Sustainability Notebook (including all of components) and eOMSI submittals. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.3 SUBMITTALS

The use of a "G" following a submittal indicates that an approval action is required, either by the Government or by the Contractor's Designer of Record (DOR) or QC Specialist.

The use of an "S" following a submittal indicates separate but simultaneous submittal is required as part of federally mandated sustainability requirements. Refer to Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD for "S" submittal requirements.

Submit the following in accordance with the requirements of this section.

SD-01 Preconstruction Submittals

Submittal Register Format; G

1.3.1 Submittal Register

The submittal register must be prepared during the initial design stages of the project and indicate each design and construction submittal. Maintain an electronic version of the submittal register as work progresses. The DOR must assist the DQC in preparing the submittal register by determining all project submittals that require DOR approval. The Contractor proposed submittal register format must include all types of information pertinent to the submittal process and be approved by the Contracting Officer prior to the first submission.

1.4 CONSTRUCTION QUALITY CONTROL

1.4.1 Contractor Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that submittals are in compliance with the contract requirements.

a. In RFP PART 4 PERFORMANCE TECHNICAL SPECIFICATIONS (PTS), there are UFGS specification sections required to be submitted as part of the design submittal. Unless specified otherwise in this section, the Contractor's DOR is the approving authority for submittals listed in these specifications with a "G" designation, unless the DOR delegates to Contractor Quality Control approval. RFP Part 4 PTS sections also include submittals identified for DOR approval that are not denoted with a "G" designation, these submittals cannot be delegated for Contractor Quality Control approval.

b. If RFP PART 5 PRESCRIPTIVE SPECIFICATIONS are utilized in this RFP, the Contractor's DOR is the approving authority for submittals listed with a "G" designation, unless the DOR delegates to Contractor Quality Control approval.

c. DOR must approve construction submittals that are incorporated in the design submittal prior to being submitted to the Government for design submittal approval. Indicate approval of these construction submittals on the accompanying submittal transmittal forms and the submittal register for each design submittal package. In addition, the DOR professional stamp on the final design submittal indicates approval of construction submittals combined with the design submittal.

d. Submittal items identified in RFP PARTS 2, 4, and 5 that are not identified with a "G" designation or not designated for DOR approval (in RFP Part 4) are for Contractor Quality Control approval.

e. Construction submittals that are approved by the DOR or certified by the QC are not required to be submitted to the Government for

surveillance, except when the RFP requires the design and construction submittals to be combined in Section 01 33 10.05 20, DESIGN SUBMITTAL PROCEDURES or where specified in the paragraph SUBMITTALS RESERVED FOR GOVERNMENT SURVEILLANCE of this section.

f. In addition to other approvals that may be required, provide review and approval of Guiding Principles Validation and TPC Submittals by Design-Build team's Sustainability or TPC Professional. Provide this approval prior to including in any Government-reviewed submittal.

1.4.2 Submittals Reserved for Government Surveillance

Surveillance submittals are approved by the Contractor in accordance with paragraph CONTRACTOR REVIEWING, CERTIFYING, AND APPROVING AUTHORITY, but provide the Government the opportunity to oversee critical project issues.

If during the Government surveillance of construction submittals, items are brought to the Contractor's attention as non-compliant, the Contractor must correct the submittal and construction to comply with the requirements of the RFP. Stamp surveillance submittals "APPROVED" by the DOR or QC Specialist and "FOR SURVEILLANCE ONLY." Submit the following Government surveillance submittals, prior to starting work for construction submittal items, and after the completion of the work for reports submittals items.

a. Submit fire protection related submittals pertaining to spray-applied fire proofing and fire stopping, exterior fire alarm reporting systems, interior fire alarm and detection systems, and fire suppression systems including fire pumps and standpipe systems.

b. Submit geotechnical related submittals pertaining to the soils investigations (reports and soils analysis), foundations (shallow and deep), pavements structure design, test pile and production pile testing and installation.

c. Submit conveying related submittals pertaining to elevators, escalators, weight handling equipment, lifts, and conveyors.

d. Submit roofing submittals pertaining to materials and systems used to make up the roof system.

e. Submit HVAC Testing, Adjusting, and Balancing required submittals.

f. Submit telecommunications shop drawings, as described in Part 4, D50 ELECTRICAL, for coordination with the G6 Government personnel.

g. Submit Performance Verification and Acceptance Testing submittals listed in the PTS and referenced UFGS.

h. Submit all Interim Special Inspection Reports on a bi-weekly basis until work requiring special inspections is complete.

i. Submit all Structural Observation Reports and the Final Report of Special Inspections.

j. Submit Final Guiding Principle Validation and TPC sustainability documentation.

k. Submit the exterior enclosure barrier drawings.

l. Submit building enclosure testing results for air tightness and the infrared thermography results if air barrier deficiencies are identified. Describe actions taken to correct building enclosure deficiencies at each location.

1.4.3 Submittals Reserved for Government Approval

The Government is the approving authority for submittals with a "G" designation in RFP Part 2 GENERAL REQUIREMENTS specification sections. Comply with additional Government approval requirements for Environmental submittals, as specified in RFP Part 2, Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS and Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

In addition to the Government approvals required by RFP Part 2, GENERAL REQUIREMENTS, the following submittals must be certified by the QC Manager and the DOR, and approved by the Contracting Officer.

a. Substations

b. Transformers

c. Medium Voltage Switchgear

d. Medium Voltage Cable

e. 400-Hz Converters

f. Emergency Generators

g. Automatic Transfer Switches

h. Uninterruptible Power Supplies

i. Electronic Security Systems

j. Section 23 09 13 and Section 23 09 23.02

k. Section 23 05 93

l. Submit fire protection related submittals pertaining to spray-applied fire proofing and fire stopping, exterior fire alarm reporting systems, interior fire alarm and detection systems, and fire suppression systems including fire pumps and standpipe systems.

Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSEM: All Submittals. Provide an information copy of all submittals to Base Telephone through the Contracting Officer. Base Telephone will coordinate their review and approval through the OICC

SEction 33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP): All submittals. Provide an information copy of all submittals to Base Telephone through the Contracting Officer. Base Telephone will coordinate their review and approval through the OICC

1.4.3.1 Scheduling for Government Approved Submittals

Except as specified otherwise, allow review period, beginning when Government receives submittal from the QC organization, of 21 calendar days for return of submittal to the Contractor. Period of review for submittals with Contracting Officer approval begins when Government receives submittal from QC organization. Period of review for each resubmittal is the same as for initial submittal.

1.4.3.2 Government Approval Defined

Submittals marked "approved" indicate a quality assurance (QA) review has been performed. Government review or approval of any portion of the submittal does not relieve the Contractor from responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained within each submittal accurately conforms with the requirements of the contract documents. Furthermore, Government review or approval of a submittal is not to be construed as a complete check.

1.4.4 Constraints

a. Submittals must be complete for each definable feature of work; submit components of definable feature interrelated as a system at the same time.

b. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.4.5 Design Change and Variation

The Contractor must limit change and variation to items that will be advantageous to the Government. Submit proof that the change or variation is needed and provide the same or better level of quality as the design that the Government originally reviewed or approved. Design change is considered prior to Government approval of the final design and variation is considered after Government approval of final design.

1.4.5.1 Design Changes

Design changes must meet the minimum requirements of the solicitation and the accepted proposal. Any changes to the design from what was previously reviewed by the Government during any phase of the design process prior to Government approval of the Final Design must be approved by the DOR and Government before the design change may be incorporated into the design documents. Design changes must be requested in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

1.4.5.2 Variations

Variations from contract requirements including the solicitation, the accepted proposal, and the final design, require Government approval. Variations must be approved by the DOR prior to submitting written request to the Government for approval.

a. Considering Variations

Discuss the proposed variation with the Contracting Officer after consulting with the DOR prior to submission to help ensure functional and quality requirements are met and minimize potential rejections and re-submittals. When contemplating a variation which results in lower cost, consider submitting the variation as a Value Engineering Change Proposal (VECP) in accordance with FAR 52.248-3. Specifically point out variations from contract requirements in transmittal letters as applicable. Failure to receive prior Government approval for deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

b. Submitting Variations

When submitting a variation, deliver the written request to the Contracting Officer in the form of a Request for Information (RFI) to include documentation illustrating the nature and features of the variation including any necessary technical submittals and why the variation is desirable and beneficial to Government. Request must also include any savings to the government and documented approval from the DOR.

The Contracting Officer will indicate an approval or disapproval of the variation request; and if not approved as submitted, will indicate the Government's reasons therefor. Any work done before such approval is received is performed at the Contractor's risk.

c. Warranting Variations Are Compatible

When proposing a variation for approval, the Contractor, including its Designer(s) of Record, warrants that the contract documents have been reviewed to establish that the variation, if incorporated, is compatible with the design intent and operational requirements.

1.4.6 Contractor's Responsibilities

Ensure no work has begun until submittals for that work have been "approved" or "approved as noted."

1.4.7 QC Organization Responsibilities

Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

a. When approving authority is Contracting Officer, QC organization will certify submittals, assure proper signatures, and forward to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number (insert contract number here), is in compliance with the contract documents, can be installed in the allocated spaces, and is submitted for Government approval.

RFP Part Two Submittals:

Certified by QC Manager _____, Date _____
(QC Manager)

RFP Part Four and Part Five Submittals:

Certified by DOR _____, Date _____

Certified by QC Manager _____, Date _____"

(1) Sign certifying statement or approval statement. The person signing certifying statements must be QC organization member designated in the approved QC plan. The signatures must be in original ink. Stamped signatures are not acceptable.

(2) Update submittal register database as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.

(3) Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

b. When the Approving Authority is the Designer of Record, the DOR must approve, professionally stamp, sign, and date submittals. DOR stamp on construction submittals or submission of design documents that include construction submittals indicates DOR approval for construction. QC organization must certify submittals, assure proper signatures, and forward to Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number (insert contract number here), is in compliance with the contract requirements, can be installed in the allocated spaces, and is submitted for DOR approval.

RFP Part Four and Part Five Submittals:

Approved by DOR _____, Date _____

Certified by QC Manager _____, Date _____"

(1) Sign certifying statement or approval statement. The person signing certifying statements must be QC organization member designated in the approved QC plan. The signatures must be in original ink. Stamped signatures are not acceptable.

(2) Update submittal register database as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by Contracting Officer.

(3) Send copies of final DOR or QC Specialist approved and signed submittals that are identified in this section for Government surveillance to the Contracting Officer. Stamp copies "For Surveillance Only."

1.4.8 Government's Responsibilities

When approving authority is the Contracting Officer, the Government will:

a. Note date on which submittal was received from QC Manager, on each submittal.

b. Review submittals for compliance with contract documents.

1.4.8.1 Government Actions

Submittals will be returned with one of the following notations:

a. Submittals marked "approved" or "approved as submitted" authorize Contractor to proceed with work covered.

b. A submittal marked "not reviewed" will be returned with an explanation of the reason it was not reviewed.

c. Submittals marked "approved as noted" or "approval except as noted; resubmission not required" authorize Contractor to proceed with work as noted provided Contractor takes no exception to the notations.

d. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and must be resubmitted with appropriate changes. No work is allowed to proceed for this item until resubmittal is approved.

e. Submittals required for surveillance will be returned only if corrective actions are required.

1.5 FORMAT OF SUBMITTALS

1.5.1 Transmittal Form

Transmit submittals with transmittal form prescribed by Contracting Officer and standard for the project.

1.5.1.1 Combined Design and Construction Submittal Notification

Indicate on the design submissions transmittal form, which construction submittals have been combined with the design documents. Coordinate transmittal form list of combined design and construction submittals with submittal register to indicate DOR approval of all combined submittals.

1.5.1.2 Sustainable Design and Construction Submittals

On all projects, provide sustainability submittals in accordance with requirements of this document, specification Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD and FC 1-300-09N, "Navy and Marine Corps Design Procedures". Specific submittal requirements are also identified in technical sections of the specifications. Separate out data demonstrating compliance with construction sustainability requirements and submit separately but concurrently.

1.5.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy

of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Date of the drawings and revisions.

d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other subcontractor associated with the submittal.

e. Section number of the specification section by which submittal is required.

f. Submittal description (SD) number of each component of submittal.

g. When a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission.

h. Product identification and location in project.

1.5.3 Format for SD- 02 Shop Drawings

a. Shop drawings are not to be less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless other form is required. Drawings are to be suitable for reproduction and be of a quality to produce clear, distinct lines and letters with dark lines on a white background.

b. Present 8 1/2 by 11 inches sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS of this section.

d. Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location adjacent to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

e. Reserve a blank space, no smaller than 4 inches the right-hand side of each sheet for the Government disposition stamp.

f. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

g. Include the nameplate data, size and capacity on drawings. Also include applicable federal, military, industry and technical society publication references.

1.5.4 Format of SD - 03 Product Data and SD - 08 Manufacturer's Instructions

a. Present product data submittals for each section as a complete bound volume. Include table of contents, listing page and catalog item numbers for product data.

b. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

c. Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project, with information and format as required for submission of SD-07 Certificates.

d. Provide product data in metric dimensions. Where product data are included in preprinted catalogs with English units only, submit metric dimensions on separate sheet.

e. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry and technical society publication references. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.

f. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC) submit proof of such compliance. The label or listing by the specified organization is acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

g. Collect required data submittals for each specific material, product, unit of work, or system into a single submittal and marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of construction effort.

h. Submit manufacturer's instructions prior to installation.

1.5.5 Format of SD - 04 Samples

Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

a. Sample of Equipment or Device: Full size.

b. Sample of Materials Less than 2 by 3 inches: Built up to 8 1/2 by 11

inches.

c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

e. Sample of Non-Solid Materials: 1.6 pints. Examples of non-solid materials are sand and paint.

f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.

g. Sample Panel: 4 by 4 feet.

h. Sample Installation: 100 square feet.

i. Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

j. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at time of use. Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean-up of project.

When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.5.6 Format of SD - 05 Design Data and SD - 07 Certificates

Provide design data and certificates on 8 1/2 by 11 inches paper. Provide a bound volume for submittals containing numerous pages.

1.5.7 Format of SD-06 Test Reports and SD - 09 Manufacturer's Field Reports

Provide reports on 8 1/2 by 11 inches paper in a complete bound volume. Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

1.5.8 Format of SD - 10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.5.9 Format of SD - 01 Preconstruction Submittals and SD - 11 Closeout Submittals

When submittal includes a document, which is to be used in project or

become part of project record, other than as a submittal, do not apply Contractor's approval stamp to document, but to a separate sheet accompanying document.

Provide all dimensions in administrative submittals in English .

1.6 QUANTITY OF SUBMITTALS

1.6.1 Quantity of Submittals Reserved for Government Approval

Submit by mail four copies of submittals of shop drawings requiring review and approval by Contracting Officer.

1.6.2 Quantity of Submittals Reserved for Government Surveillance

Submit by mailthree copies of submittals specified for surveillance to the Contracting Officer. Submit two additional copies of elevator submittals directly to the NAVFAC Elevator Specialist responsible for the NAVFAC elevator certification of the project.

1.6.3 Electronic Submittals

Where practicable, in lieu of hard copy copies, construction submittals may be transmitted electronically with approval from the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 33 10.05 20

DESIGN SUBMITTAL PROCEDURES
05/17

PART 1 GENERAL

1.1 SUMMARY

This section includes requirements for Contractor-originated design documents and design submittals.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. The latest version of the publication at time of RFP issuance must be used.

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014; with Change 4 2018) Navy and Marine Corps Design Procedures
UFC 1-200-01	(2019) DoD Building Code (General Building Requirements)
UFC 1-300-08	(2009, with Change 2) Criteria for Transfer and Acceptance of DoD Real Property
UFC 4-010-06	(2016; with Change 1) Cybersecurity of Facility-Related Control Systems

1.3 UFC 1-200-02

UFC 1-200-01 requires compliance with UFC 1-200-02, "High Performance and Sustainable Building Requirements".

1.4 GENERAL DESIGN REQUIREMENTS

Contractor-originated design documents must provide a project design that complies with the Request For Proposal (RFP), FC 1-300-09N, UFC 1-200-01, the Core UFCs, and other UFC's listed above.

1.5 SUBMITTALS

Submit design submittals, including shop drawings used as design drawings, to the Government for approval. The use of a "G" following a submittal indicates that a Government approval action is required. Submit the following in accordance with this section and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

Submittals with an "S" are for inclusion in the Sustainability Notebook in conformance to Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD for "S" submittal requirements. Submit the following in accordance with this section and Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Consolidated RFP Documents; G

Submittal Register; G

SD-04 Samples

Final framed rendering and copies; G

SD-05 Design Data

Design Drawings; G

Specifications; G

Basis of Design; G

Design Calculations Submittals; G

Sustainability Notebook; G

Project Rendering; G

BIM Project Execution Plan (PxP); G

Design Model; G

Visual Review Report; G

Clash Detection Report; G

Historic Preservation and Planning Commission Submission; G

SD-11 Closeout Submittals

Record Documents; G

Final Sustainability Notebook; G; S

DD Form 1354; G

Final Record Model; G

1.6 DESIGN QUALITY CONTROL

1.6.1 Contractor Reviewing and Certifying Authority

The QC organization is responsible for reviewing and certifying that design submittals are in compliance with the contract requirements.

1.6.2 Government Approving Authority

The Contracting Officer is the approving authority for design submittals.

1.6.3 Designer of Record Certifying Authority

The Designer of Record (DOR), as registered and defined in FC 1-300-09N, is the design certifying authority. The DOR accepts responsibility for design of work in each respective design discipline, by stamping and approving final construction drawings submitted to the Government approval authority.

1.6.4 Contractor Construction Actions

Upon submission of sealed and signed design documents certified by the DOR, Design Quality Control (DQC) Manager and the Quality Control (QC) Managers, the Contractor may proceed with material and equipment purchases, fabrication and construction of any elements covered by that submittal.

1.6.4.1 Exception to Contractor Construction Actions

The Government will approve the following final submittals before the Contractor shall be allowed to proceed with construction:

a. Any design submittal that includes or will be impacted by a design change to the contract. Final Government approval of the design change is required before construction can begin on the work included in that design submittal.

1.6.5 Contractor's Responsibilities

a. Designate a lead licensed architect or engineer to be in responsible charge to coordinate the design effort of the entire project. This lead architect or engineer must coordinate all design segments of the project to assure consistency of design between design disciplines.

b. With the Designer of Record, verify site information provided in the RFP. In addition, provide additional field investigations and verification of existing site conditions as may be required to support the development of design and construction of the project.

c. Indicate on the transmittal form accompanying submittal which design submittals are being submitted as shop drawings.

d. Advise Contracting Officer of variations, as required by paragraph VARIATIONS.

e. Provide an updated, cumulative submittal register with each design package that identifies the design and construction submittals required by that design package and previous submittals.

f. Refer to Section 01 33 29.05 20, SUSTAINABILITY REPORTING FOR DESIGN-BUILD for Contractor's responsibilities for Guiding Principle Validation [and Third Party Certification].

g. Refer to Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI) for Contractor's eOMSI responsibilities.

1.6.6 QC Organization Responsibilities

a. The QC Manager must certify design submittals for compliance with the

contract documents. The DOR stamp on drawings indicates approval from the DOR.

b. QC organization must certify submittals forwarded by the Designer of Record (DOR) to the Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with Contract Number (insert contract number here), is in compliance with the contract documents, and is submitted for Government approval.

Certified by Design Quality Control (DQC) Manager
_____, Date _____
Certified by QC Manager_____,
Date _____"

c. Sign certifying statement. The persons signing certifying statements must be the QC organization members designated in the approved QC plan. The signatures must be in original ink. Stamped signatures are not acceptable.

d. Update submittal register as submittal actions occur and maintain the submittal register at project site until final approval of all work by Contracting Officer.

e. Retain a copy of approved submittals at project site.

1.6.7 Government Responsibilities

The Government will:

a. Note date on which submittal was received from QC manager, on each submittal.

b. Perform a quality assurance (QA) review of submittals. Government will notify Contractor when comments for that design package are posted and ready for Contractor evaluation and resolution.

c. Upon submittal of final design package and resolution of comments by the Contractor, the Government will sign final design package, when approved, and return electronic copy of signed design documents to the Contractor.

d. Upon Government receipt and acceptance of the Designer of Record signed and stamped final design submission for all work, a no-cost unilateral modification will be issued to incorporate the final design into the contract.

1.6.7.1 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals may be marked "approved." Submittals marked "approved" indicate a quality assurance (QA) review has been performed. Government review or approval of any portion of the proposal or final design does not relieve the Contractor from responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the

Contractor is responsible for ensuring information contained within each submittal accurately conforms with the requirements of the contract documents. Furthermore, Government review or approval of a submittal is not to be construed as a complete check.

b. Submittals marked "not reviewed" indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and certified by Contractor, or is not complete. Submittal will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

c. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and must be resubmitted with appropriate changes. If work has been started on the unacceptable portion of the design submittal, the Contractor must propose corrective action. No further work is allowed to proceed until the issue is resolved in a manner satisfactory to the Government.

1.7 DESIGN DOCUMENTS

Provide design documents that include basis of design, design drawings, and design specifications, reports, and submittal register in accordance with FC 1-300-09N, Navy and Marine Corps Design Procedures.

The Contractor is encouraged to make product, material, and system selections during the project design and indicate these choices on the design documents. Accomplish this by submitting design drawings and specifications that include proprietary submittal information such as manufacturers name, product names, model numbers, product data, manufactures information, provided optional features, appropriate connections, fabrication, layout, and product specific drawings. Adherence to RFP submittal requirements and provision of DOR approved construction submittal information on the design submittals - eliminates the need for follow-on traditional construction submittals after the final design is approved.

The Contractor is required to submit proprietary information to describe the construction submittal information in the design documents for all products, materials, and systems submittals listed below:

a. All building enclosure components.

b. All roof components.

c. Major mechanical and electrical equipment such as chillers , transformers,generators,and Boilers.

d. Interior finishes.

Refer to Section 01 33 00.05 20, CONSTRUCTION SUBMITTAL PROCEDURES for requirements pertaining to Contractor proposed design changes or variations.

1.8 DESIGN DRAWINGS

Prepare, organize, and present design drawings in accordance with the requirements of FC 1-300-09N, Navy and Marine Corps Design Procedures.

Submit all CAD files for the final drawings on CD-ROM or DVD disks in AutoCAD 2013 format. Drawing files must be full files, uncompressed and unzipped.

1.8.1 Design Drawings Used as Shop Drawings

Design drawings may be prepared more like shop drawings to minimize construction submittals after final design is approved. If the Contractor chooses or is required to include the construction submittal information on the design documents, indicate proprietary information on the design drawings as necessary to describe the products, materials, or systems that are to be used on the project. Construction submittal information included directly in the design drawings must be approved by the DOR. All design documents must be professionally signed in accordance with FC 1-300-09N, Navy and Marine Corps Design Procedures.

1.8.2 Drawing Format For Design Drawings Used as Shop Drawings

The Contractor-originated drawings will be used as the basis for the record drawings. Shop drawings included as design documents must comply with the same drawing requirements such as drawing form, sheet size, layering, lettering, and title block used in design drawings.

1.8.3 Identification of Design Drawings Used as Shop Drawings

The Contractor's transmittal letter and submittal register must indicate which design drawings are being submitted as shop drawings.

1.8.4 Naval Facilities (NAVFAC) Engineering Command Drawing Numbers

Number the final Contractor-originated design drawings consecutively with NAVFAC drawing numbers. Determine the total number of sheets required for the complete set of drawings before requesting the NAVFAC drawing numbers from the Contracting Officer.

1.8.5 Seals and Signatures on Documents

All final Contractor-originated design drawings must be signed, dated, and bear the seal of the registered architect or the registered engineer of the respective discipline in accordance with FC 1-300-09N. This seal must be the seal of the Designer of Record for that drawing, and who is professionally registered for work in that discipline. A principal or authorized licensed or certified employee must electronically sign and date final drawings and cover sheet, in accordance with FC 1-300-09N. The design drawing coversheets must be sealed and signed by the lead licensed architect or engineer of the project design team. Indicate the Contractor's company name and address on the drawing coversheets of each design submittal. Application of the electronic seal and signature accepts responsibility for the work shown thereon.

1.8.6 Units of Measure

Utilize English Inch-Pound units of measure on the design documents

1.9 BUILDING INFORMATION MANAGEMENT/MODELING (BIM)

Include BIM submittals as required by and complying with FC 1-300-09N:

a. BIM Project Execution Plan (PxP)

b. Design Model

c. Visual Review Report

d. Clash Detection Report

e. Record Model (With Record Documents)

1.10 SPECIFICATIONS

Provide a Contractor-originated design specification that in conjunction with the drawings, demonstrates compliance with requirements of the RFP. The specified products, materials, systems, and equipment that are approved by the DOR; submitted to the Government by the Contractor; and reviewed by the Contracting Officer must be used to construct the project. UFGS sections contained in RFP Part 2 become a part of the Contractor-originated Division 01 specification without modification. Specification Sections contained in RFP Part 5 become a part of the Contractor-originated specification without modification.

1.10.1 Specifications Components and Format

The Contractor must prepare design specifications that include a UFGS specification for each product, material, or system on the project. If the Contractor chooses or is required above to combine design and construction submittal information on the design documents, provide a UFGS specification and also proprietary information such as catalog cuts and manufacturers data that demonstrates compliance with the RFP. Organize the specifications using Construction Specification Institute (CSI) Masterformat™ unless the Contracting Officer requires a Uniformat organization. Navy's use of system specifications takes precedence over CSI Masterformat component breakdown and related component specifications. Provide project specifications to include the following:

a. Provide the specification cover sheet with the professional seal and signature of the lead licensed architect or engineer of the project design team. Indicate the Contractor's company name and address on the specification coversheet.

b. Table of contents for entire specification.

c. Individual UFGS specification sections for each product, material, and system required by the RFP. Edit UFGS sections in accordance with RFP Part 4, PTS Section Z-10, Design Submittals.

d. If proprietary information is provided or required, include a coversheets for the product, material, or system information that is being proprietarily specified. This information is to follow the related UFGS specification.

e. If proprietary information is provided or required, include highlighted and annotated Catalog Cuts, Manufacturer's Product Data, Tests, Certificates, Manufactures information and letters for each

product, material, or system that is being proprietary specified.

f. Coordinated submittal register for all products, materials and systems with each design submittal. Provide a cumulative register that identifies the design and construction submittals required by each design package along with previous design submittals. The DOR must assist in developing the submittal register by determining which submittal items are required to be approved by the DOR. Complete all fields in the final submittal register in order to obtain Government approval of the final design. Submittal register to include separate but simultaneous delivery and approval of design or data required to fulfill sustainability requirements by Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD.

1.10.2 Specifications Section Source Priority

Choose UFGS sections that describe the products, materials, and systems that are used on the project. Use current UFGS sections that are available on the Whole Building Design Guide website (available at this website: http://www.wbdg.org/ffc/dod) and give priority to the Unified Tri-Service UFGS sections (no spec number suffix) and UFGS that are prepared by NAVFAC (.00 20 suffix). Only use a UFGS section prepared by another DoD Component (.00 10, and .00 30 suffix), if an applicable NAVFAC prepared specification section does not exist. Do not use Army (.00 10 suffix) and NASA (.00 40 suffix) electrical and mechanical specifications. If no applicable UFGS technical specification exists to meet your project requirements, consult with the NAVFAC Component for guidance and create a new UFGS specification in accordance with UFC 1-300-02, Unified Facilities Guide Specifications (UFGS) Format Standard.

1.10.3 Fire Protection Specifications

Specifications pertaining to spray-applied fire proofing and fire stopping, exterior fire alarm reporting systems, interior fire alarm and detection systems, and fire suppression systems, including fire pumps and standpipe systems must be either prepared by, or reviewed and approved by the Fire Protection DOR.

1.10.4 Identification of Manufacturer's Product Data Used with Specifications

Provide complete and legible catalog cut sheets, product data, installation instructions, operation and maintenance instructions, warranty, and certifications for products and equipment for which final material and equipment choices have been made. Indicate, by prominent notation, each product that is being submitted including optional manufacturer's features, and indicate where the product data shows compliance with the RFP.

Coordinate with Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI) for Contractor's eOMSI responsibilities.

1.10.5 Specification Software

Submit the final specification source files in SpecsIntact.

1.11 BASIS OF DESIGN

Prepare, organize, and present basis of design in accordance with the requirements of FC 1-300-09N. The basis of design must be a presentation of facts at the Concept Design Workshop to demonstrate the concept of the project is fully understood and the design is based on sound engineering principles. Provide design analyses for each discipline and include the following:

a. Basis of design that includes:

(1) An introductory description of the project concepts that addresses the salient points of the design;

(2) An orderly and comprehensive documentation of criteria and rationale for system selection; and

(3) The identification of any necessary licenses and permits that are anticipated to be required as a part of the design or construction process. The "Permits Record of Decision" (PROD) form provided must be used for recording permits.

b. Code and criteria search must identify all applicable codes and criteria and highlight specific requirements within these codes and criteria for critical issues in the facility design.

c. Calculations as specified and as needed to support this design.

d. Sustainability Notebook: Analysis and calculations relative to sustainable design requirements. Refer to Section 01 33 29.05 20, SUSTAINABILITY REPORTING FOR DESIGN-BUILD and FC 1-300-09N for requirements.

e. Completed Draft and Final High Performance and Sustainable Building (HPSB) Checklist, also known as the NAVFAC Sustainable and Energy Data Record Card (NSEDRC). Template can be found at: http://www.wbdg.org/ffc/navy-navfac/sustainable-development-program/required-track

f. Provide an exterior enclosure vapor pressure analysis, hygrothermal analysis, and written/graphic descriptions for each unique wall and roof assembly used as part of exterior enclosure barriers.

g. Section titled "Antiterrorism" that documents the antiterrorism features

h. Fall Protection Analysis

i. Draft and Interim DD Form 1354 that document the real property assets of the project. Refer to RECORD DOCUMENTS paragraphs in this section for requirements.

j. eOMSI Facility Data Workbook (FDW)

k. BIM PxP

m. Section titled "Cybersecurity" that documents the cybersecurity design and construction of facility-related control system requirements.

1.11.1 Basis of Design Format

The basis of design for each design discipline must include a cover page indicating the project title and locations, contract number, table of contents, tabbed separations for quick reference, and bound in separate volumes for each design discipline.

1.11.2 Design Calculations

Place the signature and seal of the designer responsible for the work on the cover page of the calculations for the respective design discipline.

1.11.3 Historic Preservation and Planning Commission Submission

Prepare the presentation materials required to obtain approval from the Historic Preservation and Planning Commissions having jurisdiction over the site location. The submission of the materials to the agencies will be accomplished by the Government. Consult with the NAVFAC Region Historic Preservation Officer and prepare a submittal in accordance with the 36 CFR 800.11, DOCUMENT STANDARDS. The Contractor is responsible for preparing the submittal package, presenting the project in public meeting, if called upon by the Government; and to modify the submittal and contract documents to incorporate the comments of the agencies having jurisdiction to obtain project approval.

1.11.4 Fall Protection Analysis

Eliminate fall hazards in the facility or if not feasible provide control measures to protect personnel conducting maintenance work after completion of the project. Identify fall hazards in the Basis of Design with the Design Development and Prefinal submittals. The analysis must describe how fall hazards are considered, eliminated, prevented or controlled to prevent maintenance personnel from exposure to fall hazards while performing work at heights. Refer to RFP Part 2, Section 01 35 26.05 20, GOVERNMENT SAFETY REQUIREMENTS FOR DESIGN-BUILD for fall hazard protection requirements.

1.11.5 Cybersecurity Basis of Design

Provide a single submittal indicating criteria and describe requirements for integrating cybersecurity in the design and construction of the facility-related control systems in accordance with UFC 4-010-06. The basis of design must describe specific guidance for control systems with the assigned Confidentiality, Integrity and Availability (C-I-A) impact ratings and shall list the security controls with recommendations and justifications for future tailoring of the security control set.

1.12 PROJECT RENDERING

Provide a full color photo-realistic architectural rendering of the primary facade or facades of the facility. Depict the final, approved facility design and accurately illustrate the proposed final constructed facility including but not limited to, massing, fenestration pattern, material selections, colors, textures, landscaping, paving, and to the extent directed - the surrounding context.

Renderings created using traditional casein painted techniques or computer generated renderings are acceptable. Develop computer generated renderings using a current rendering engine suitable to produce

photo-realistic images. Renderings created solely in BIM or CAD authoring software are not acceptable.

Renderings must include realistic advanced lighting characteristics (natural and synthetic) and true ambient lighting and shading characteristics. Provide images that are sharp in detail and resolution through proper anti-aliasing techniques. Material maps must be comprised of advanced techniques and practices to ensure materials are an exact representation of the facility product/finish selections.

1.12.1 Preliminary Rendering Planning

Provide planning PDF drawings of the facility to exhibit the proposed rendering appearance. Submit not less than 3 alternative views for review and approval to determine the most advantageous view. The Preliminary rendering submittal must display the following characteristics of the final rendering;

a. Selection of primary facade(s)

b. Point of view (aerial, eye-level, elevated, etc.)

c. Close-up or wide angle

d. Extent of surrounding context

Adjust view and resubmit if an alternative to the submitted views is required for the rendering planning approval. Submit rendering planning submittal during the Preliminary Design Submittal.

1.12.2 Prefinal Rendering

Submit an electronic copy of the prefinal rendering to indicate compliance with planning decisions, establish level of detail and rendering elements to be employed such as people, cars, vegetation/trees. Indicate proposed colors, textures, foreground and background. Use processes and printing equipment that will be used on the final rendering. Submit Prefinal rendering submittal for approval with the Prefinal Design Submittal.

1.12.3 Final Rendering

Provide the final rendering submission that complies with the following requirements:

a. The rendering must be a full vignette and fully developed. Approximate finished size must be a minimum of 24 by 30 inches with a 16 by 20 inches minimum inside mat dimension.

b. Provide final original color rendering, three full size high resolution reproductions of the original rendering, and two sets of the digital master images on DVD media. Original and reproductions must be mounted on acid free heavy illustration board and double-matted with complimentary colored, acid free mat boards. Frame rendering(s) with contemporary polished metal frames and single strength, non-glare glass. Print the Project name, location, Architect/Engineer firm's name on the matting. On the back of the renderings and reproductions, indicated the project name, the location, the contract number, and the date of reproduction.

c. Match the exterior color scheme approved for the facility.

d. Provide photo-realistic quality rendering elements such as people, cars, vegetation/trees, etc.

e. Provide digitally reproductions of the rendering using a minimum 600 dpi resolution for print reproduction on 24 by 36 inch stock with no loss of fidelity, quality or detail from the master image.

f. Provide each set of digital master images in both TIF and JPEG formats. Save JPEG images using the highest quality setting (minimum compression). Provide the following as a minimum;

(1) One set including the unit insignia(s) for the tenant activity, the service insignia (Navy, Marine Corps, Army, or Air Force), the name of the facility, name of installation, and the names of the contractor and design professional.

(2) One set including the image only, without any identifying information other than that which may be depicted as a part of the building signage within the rendering.

g. Submit the final rendering for approval 30 days after the Final Design Submittal approval. Ship the rendering, the digital copies and the digital files in resilient packaging to ensure damage free delivery. Deliver to: OICC Florence

1.13 RECORD DOCUMENTS

1.13.1 Record Drawings

The as-built modifications must be accomplished by electronic drafting methods on the Contractor-originated. DWG design drawings to create a complete set of record drawings. In addition to the requirements of FAC 5252.236-9310, RECORD DRAWINGS, survey the horizontal and vertical location of all provided underground utilities to within 0.1 feet relative to the station datum. All pipe utilities must be surveyed at each fitting and every 100 LF of run length. Electrical and communication duct bank, direct buried conduit, and direct buried conductor must be surveyed every 100 LF and at each change of direction. Record locations and elevations on the Record Drawings.

a. For each record drawing, provide CAD drawing identical to signed Contractor-originated PDF drawing, that incorporates modifications to the as-built conditions. In addition, copy initials and dates from the Contracting Officer approved .PDF documents to the title block of the record CAD.DWG drawings. The RFP reference or definitive drawings are not required for inclusion in the record set of drawings.

b. After all as-built conditions are recorded on the CAD.DWG files, produce a PDF file of each individual record drawing in conformance with FC 1-300-09N. Electronic signatures are not required on record drawings.

c. Provide a searchable electronic copy of the photo documentation used in the QC Daily Reports. Refer to Section 01 45 00.05 20, DESIGN AND CONSTRUCTION QUALITY CONTROL.

1.13.2 Source Documents

Provide the specifications, basis of design, reports, surveys, record model, calculations, and any other contracted documents on the CD-ROM or DVD disk with the record drawings.

1.13.3 DD Form 1354

Prepare a Draft and Interim DD Form 1354, TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY, in accordance with UFC 1-300-08. Coordinate the identification of quantities of appropriate asset construction categories with the Contracting Officer and the RPAO.

a. The Government will provide the Initial Draft DD Form 1354, Transfer and Acceptance of Military Real Property filled in with the appropriate Real Property Unique Identifiers (RPUID) and related construction Category Codes to summarize the designed real property assets that apply to this contract. Modify and include any necessary changes to the DD Form 1354 when meeting with the Contracting Officer and the Real Property Accounting Officer during the Pre Construction Meeting and the Project Closeout Meetings. The Contractor must provide the Interim DD Form 1354 that uses the appropriate division of the RPUIDs/ Category Codes to represent the final constructed facility and include all associated cost.

    (1) Coordinate the Contractor's Price and Payment structure with the structure of the RPUIDs/ Category Codes.

    (2) Divide detailed asset breakdown into the RPUIDs and related construction Category Codes and populate associated costs which represent all aspects of the work. Where assets diverge into multiple RPUID/Category Codes, divide the asset and provide the proportion of the assets in each RPUID/ Category Code. Assets and related RPUID/ Category Codes may be modified by the Contracting Officer as necessary during course of the work.

    (3) Coordinate identification and proportion of these assets with the Government Real Property Accounting Officer.

    (4) Cost data accumulated under this section are required in the preparation of DD Form 1354.

b. After award of the contract but prior to commencement of any work, meet with the Contracting Officer to discuss and develop a clear understanding relative to the administration of the Draft and Interim DD Form 1354 Submittal.

c. Draft DD Form 1354. DOR must determine quantities of applicable real property assets broken out by construction categories and submit a "Draft DD Form 1354" for Government approval as a part of the Basis of Design included with the Prefinal Design submittal. "Draft DD Form 1354" must include all quantities and units of measure, but does not require cost breakdown. The Real Property Accountable Officer (RPAO) will provide the first draft of the DD1354 to the contractor with RPUIDs and CCNS on it.

d. Interim DD Form 1354. Coordinate with the DOR and update the Draft DD Form 1354 submission to include any additional assets, improvements, or alterations that occurred during construction. Use the Draft DD

Form 1354 and the Section 01 20 00.05 20, PRICE AND PAYMENT PROCEDURES to identify costs. Submit Interim DD Form 1354 to the Government for approval 30 days prior to the Beneficial Occupancy Date (BOD). Attach completed NAVFAC High Performance and Sustainable Building (HPSB) Checklist to DD1354, in accordance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. If modifications to the Interim DD Form 1354 are required by the Government, the corrected version must be submitted prior to the BOD.

Submit the completed Checklist for Form DD1354 of Government-Furnished and Contractor-Furnished/Contractor Installed items. Attach this list to the Interim DD Form 1354. Instructions for completing the form and a blank checklist may be obtained from UFC 1-300-08.

Coordinate with Section 01 20 00.05 20, PRICE AND PAYMENT PROCEDURES for construction categories and associated category codes. The Contractor's Schedule of Prices must allocate the total cost of construction to the appropriate category codes.

When documenting demolition work, the DD Form 1354 must list the quantitative data associated with this work as a negative value to show the cost should be deleted from the Navy asset data store. Coordinate with the Installation Real Property POC to assist in determining the negative value for demolition work.

There are two ways to account for the demolition portion of the project and to document the reduction of real property: (1) attach an Authorization for Demolition form 18 (Service-specific) to the DD Form 1354 to document category codes and quantities of demolished real property. These should be listed separately from constructed/transferred item numbers; or, (2) indicate, as additional DD Form 1354 item numbers, all demolished real property facility numbers and category codes using negative numbers (shown in parenthesis) for units of measure, and in block 18 indicate N/A for costs. Disposal cost within the footprint of the project is added into total construction cost of new facility prompting the demolition.

Within 5 days of the completion of demolition, the contractor responsible will submit a completed NAVFAC disposal form to the NAVFAC Construction Manager and Real Property Accountability Officer (RPAO). For assistance in completing the form, contact the RPAO, Amanda Dawsey, amanda.dawsey@usmc.mil. FORM attached.

1.13.4 Record Model

Provide Record Model in accordance with FC 1-300-09N.

PART 2 PRODUCTS

2.1 CONSOLIDATED RFP DOCUMENTS

Within 21 calendar days after contract award, provide one electronic and 4 hard copies of consolidated RFP documents incorporating the Contractor's Proposal and all RFP amendments and revisions that are contained in the contract award. Identify the changes to the RFP with the "Red-lining" or "Track Changes" feature of SpecsIntact or MS Word to highlight the pre-award modifications to the contract. Identify the amendment source at each addition and deletion by annotation, such as footnote or reference in parenthesis.

2.2 DESIGN SUBMITTALS

Complete the Contractor-originated design submittals as defined by this contract, and coordinate with the approved design network analysis schedule.

Refer to Section 01 33 29.05 20, SUSTAINABILITY REPORTING FOR DESIGN-BUILD for sustainable design submittals.

2.2.1 Design Submittal Packages

The Government prefers to review for Quality Assurance (QA) as few submittal packages as possible. Site and Building Design Submittal Packages are required, however Critical Path Design Submittals are acceptable if they are substantiated as having an impact to the critical path in the Government approved Network Analysis Schedule. A Critical Path submittal must include all design analyses, drawings, specifications and product data required to fully describe the project element for Government review.

Examples of project elements that may be submitted as Critical Path Design Submittal Packages are: Master Plan Design, Demolition Design, Foundation Design, Structural Design, Building Enclosure Design, Remaining Work Design, Furniture/Equipment Design, long lead items, or any other construction activity or project element that can be organized into a submittal package that can be reviewed and approved by the Government without being contingent upon subsequent design submittals.

2.2.1.1 Site Design

The Site Design typically includes the following components:

a. Master Site Plan

b. Demolition

c. Site work

d. Geotechnical

2.2.1.2 Building Design

The Building Design typically includes the following components:

a. Foundation

b. Structural

c. Building Enclosures

d. Remaining Work

e. Furniture/Equipment

2.2.2 Required Design Submittals

Provide the following Design Submittal packages. Provide comprehensive, multi-discipline design packages that include design documentation for

project elements, fully developed to the design stage indicated, and in accordance with FC 1-300-09N, except where specified otherwise.

a. Concept Design presented at Concept Design Workshop

b. Design Development in-progress, - Government Progress QA. 21 calendar day Government review time.

c. Prefinal (100 percent) Design - Government Progress QA. 21 calendar day Government review time.

d. Final Design - Government QA. 21 calendar day Government review time for submittals requiring Government approval prior to construction.

2.2.3 Critical Path Design Submittals

Provide Critical Path Design Submittals that include design documents for the project elements involved. Include and provide full documentation that would normally have been provided in earlier submittal stages, such as Design Development Phase.

a. 100 percent (Prefinal) Design - Government Progress QA. 21 calendar day Government review time.

b. Final Design - Government QA. 21 calendar day Government review time for submittals requiring Government approval prior to construction.

2.2.4 Review Copies of Design Submittal Packages

a. Provide bound copies of each design submittal package for review to the following reviewers. Addresses for mailing will be furnished at the PAK meeting.

(1) 8 paper copies to the NAVFAC component and 1 electronic copies of the Final submittals.

(2) 8 paper copies to IDD.

(3) 3 paper copies to the OICC and 1 electronic copy of the Final submittals.

b. Provide the same quantities of copies for resubmittals, as required for each design submittal.

2.2.5 Design Submittal Review Schedule

Use the time frames for Government submittal review identified in the RFP. For construction scheduling purposes add additional time to the identified minimum review time periods to allow for the following scheduling conditions:

(1) Submittals received after noon will be logged in on the following business day.

(2) Federal holidays, including the period between Christmas and New Year's Day, will be considered non-working days for Government personnel in reviewing design submittals and attending design related meetings.

(4) Postpone delivery when heightened security restricts access to the Base. Coordinate heightened security requirements in advance with the CM.

(5) Period of review for a resubmittal is the same as the initial submittal. Review time for resubmittals caused by non-conformance, do not result in a change in contract duration or cost.

2.2.6 Distribution of Approved Final Design Drawings and Specification to Government Representatives

Submit within 14 calendar days of receiving the Government Approved Final Design Documents, which includes any Critical Path Final Design Document Packages, electronic and hardcopy(s) of these final documents to Government representatives for use during the construction of the project. If Critical Path Submittal Packages are used, provide coversheets and index to identify each sheet and how this Critical Path Submittal Package fits into the overall project. Provide the number and type of copies of the final design documents to the following Government representative by mail:

a. Two electronic and Eight hard copy(s) to the Project Manager (OICC Florence)

b. Two electronic and two hard copy(s) to IDD

c. Two electronic and Two hard copy(s) to the Construction Manager

d. One electronic and one hard copy(s) to the Contracting Officer

e. One electronic and one hard copy(s) to the Public Works Officer

2.3 IDENTIFICATION OF DESIGN SUBMITTALS

Provide a title sheet to clearly identify each submittal, the completion status, and the date. The title sheet must use the standard format indicated in the FC 1-300-09N for title sheets. The title sheet must be unique to a particular design submittal. Submit the project title sheet with design status and date for the design submittals.

2.3.1 Critical Path Submittal Title Sheet

Identify Critical Path submittals as such and include a title sheet indicating the type of critical path submittal, the level of completion of the individual drawings, and which drawings are approved for construction.

2.3.2 Construction Document Validation

All CAD design documents used to construct the facility must bear a visible and legible AutoCAD generated plotstamp in the lower right-hand margin of each drawing. The plotstamp information on the jobsite construction documents must match the plotstamp information contained on the following development stages of the design documents:

a. The Final Critical Path Submittal or the Final Design Submittal professionally signed by the DOR and submitted for Government approval.

b. The Final Critical Path Submittal or the Final Design Submittal drawings that have been approved by the Government. This development stage may be combined with "c." below, if issued at the same time.

c. The Final Critical Path or Final Design drawings that have been included in the contract by modification.

d. The Final Critical Path or Final Design drawings which include subsequent revisions to the design documents that have been included in the contract by modifications.

Issue new drawings for construction which bear the current plotstamp once a new development stage of the design documents has been accomplished. Design documents which do not bear a plotstamp that matches the corresponding plotstamp exhibited on the design documents described above, are not allowed to be used for the construction of the project. The plotstamp must bear the date and time of the plot, at a minimum. Maintain a plotstamp record at the jobsite that lists the applicable plotstamp information for each drawing through each stage of development described above.

PART 3 EXECUTION

3.1 CONTRACTOR'S RESOLUTION OF COMMENTS

Provide written responses to all written comments by the Government. Resubmittal of an unacceptable design submittal must be a complete package that includes all the required, specified components of that design submittal. When required by the Government, Contractor resubmittal of design package, due to nonconformance to the contract, is not a delay in the contract.

3.2 DESIGN CHANGE AND VARIATIONS

A design change is when the design is revised from what was reviewed by the Government during any phase of the design process prior to Government approval of the Final Design. A variation is any portion of the design that differs from the requirements of the solicitation, accepted proposal, or final design after Government approval of the Final Design. Design changes and variations require Government approval and only variations that are advantageous to the Government will be considered. Refer to Section 01 33 00.05 20, CONSTRUCTION SUBMITTAL PROCEDURES for further explanation and requirements of design change and variation.

The Contractor must immediately notify the Government of all potential design changes and variations via a Request for Information (RFI) to the Contracting Officer. Design changes or variations that the Contractor asserts will require a contract modification to adjust the cost/price or schedule are not allowed to be incorporated in the design during any phase of the design process without prior documented approval from the Contracting Officer. Contractors will not receive compensation for any unauthorized design changes or variations which have been included in the Government approved Final Design. Include the following information in the design change and variation RFIs:

a. Indicate the RFP Parts, sections, and paragraphs affected by this design change or variation,

b. The scope of work of the design change or variation,

c. The reason for the proposed change,

d. Explanations of how the variation is advantageous to the Government.

d. Indicate which upcoming design submittal will be affected by the subject design change,

e. Explanation of contract cost/price and schedule impacts or provide an affirmative statement indicating that the design change or variation will not have an impact on the contract cost/price or schedule.

f. Coordination measures proposed to incorporate the design change or variation into the construction.

g. Upon request by the Contracting Officer, submit a cost proposal prepared using the Uniformat Work Breakdown Structure for all design changes and variations that have cost or schedule impacts. Submit a proposal that provides cost breakdown of each Uniformat system or subsystem that is applicable to the design change or variation. Utilize the units of measure indicated in the Uniformat Structure at the NAVFAC DB RFP website, http://www.wbdg.org/ndbm/uniformat.php.

3.3 THE CONTRACT AND ORDER OF PRECEDENCE

3.3.1 Contract Components

The contract consists of the solicitation, the approved proposal, and the final design.

3.3.2 Order of Precedence

In the event of conflict or inconsistency between any of the below described portions of the conformed contract, precedence must be given in the following order:

a. Any portions of the proposal or final design that exceed the requirements of the solicitation.

(1) Any portion of the proposal that exceeds the final design.

(2) Any portion of the final design that exceeds the proposal.

(3) Where portions within either the proposal or the final design conflict, the portion that most exceeds the requirements of the solicitation has precedence.

b. The requirements of the solicitation, in descending order of precedence:

(1) Standard Form 1442, Price Schedule, and Davis Bacon Wage Rates.

(2) Part 1 - Contract Clauses.

(3) Part 2 - General Requirements.

(4) Part 3 - Project Program Requirements.

(5) Part 6 - Attachments (excluding Concept Drawings)

(6) Part 5 - Prescriptive Specifications exclusive of performance specifications.

(7) Part 4 - Performance Specifications exclusive of prescriptive specifications.

(8) Part 6 - Attachments (Concept Drawings).

c. Within Part 3 - Project Program Requirements Section 5.0 ROOM REQUIREMENTS provides detailed requirements on a room by room basis that further defines requirements that are in addition to the ENGINEERING SYSTEMS REQUIREMENTS SECTION.

3.3.2.1 Government Review or Approval

Government review or approval of any portion of the proposal or final design does not relieve the Contractor from responsibility for errors or omissions with respect thereto.

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

????

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 14 00	SD-01 Preconstruction Submittals															
			List of Contact Personnel	1.3.1.1	G													
		01 20 00.05 20	SD-01 Preconstruction Submittals															
			Earned Value Report	1.3	G													
		01 30 00.05 20	SD-01 Preconstruction Submittals															
			Insurance	1.2														
		01 30 01.00 22	SD-02 Shop Drawings															
			Preliminary (Pre-Final) FF&E	1.5.3	G ID													
			Package															
			Final FF&E Package	1.5.11	G ID													
			Best Value Determinations	1.4.3														
			SD-04 Samples															
			Final FF&E Mock-Up	1.5.8	G ID													
			SD-07 Certificates															
			Contractor's Interior Designer's	1.4.1	G ID													
			Qualifications															
			SD-11 Closeout Submittals															
			Interior Photography	3.6	G ID													
		01 31 19.05 20	SD-01 Preconstruction Submittals															
			Design Submittal Packaging	1.3.2	G													
			Design Baseline NAS	1.3.8	G													
			Construction Baseline NAS	1.3.8	G													
			Performance Assessment Plan	1.3.7	G													
			(PAP)															
			Design Presentation		G													

SUBMITTAL REGISTER

CONTRACT NO.

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CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		01 31 19.05 20	CDW Facilitator Experience	1.3.5.1	G													
			Resume															
			CDW Preliminary Concept	1.3.5.2	G													
			Design															
			CDW Cost Estimate	1.3.5.2	G													
			Concept Design Workshop	1.3.5.3	G													
			Report															
		01 31 23.13 20	SD-01 Preconstruction Submittals															
			List of Contractor's Personnel	1.4.2														
		01 32 17.00 20	SD-01 Preconstruction Submittals															
			Designated Project Scheduler	1.9	G													
			Baseline NAS	1.2.2.1	G													
			Construction Baseline NAS	1.2.2.2	G													
			SD-07 Certificates															
			Monthly Network Analysis	1.4.1	G													
			Updates															
			SD-11 Closeout Submittals															
			As-Built Schedule	1.4.2	G													
		01 33 00.05 20	SD-01 Preconstruction Submittals															
			Submittal Register	1.3.1	G													
		01 33 10.05 20	SD-01 Preconstruction Submittals															
			Consolidated RFP Documents	2.1	G													
			Submittal Register	1.6.5	G													
			SD-04 Samples															
			rendering	1.12.3	G													
			SD-05 Design Data															

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		01 33 10.05 20	Design Drawings	1.8	G													
			Specifications	1.10	G													
			Basis of Design	1.11	G													
			Design Calculations Submittals		G													
			Sustainability Notebook	1.11	G													
			Project Rendering	1.12	G													
			BIM Project Execution Plan (PxP)	1.9	G													
			Design Model	1.9	G													
			Visual Review Report	1.9	G													
			Clash Detection Report	1.9	G													
			Historic Preservation and	1.11.3	G													
			Planning Commission Submission															
			SD-11 Closeout Submittals															
			Record Documents	1.13	G													
			Sustainability Notebook	1.11	G													
			DD Form 1354	1.13.3	G													
			Record Model	1.9	G													
		01 33 29.05 20	SD-01 Preconstruction Submittals															
			Preliminary High Performance	1.5.3.1	G													
			and Sustainable Building Checklist															
			Sustainability Action Plan	1.4.1														
			Preliminary Sustainability	1.5.3.1	G													
			eNotebook															
			SD-05 Design Data															
			Final Design High Performance	1.5.3.1	G													
			and Sustainable Building Checklist															

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		01 33 29.05 20	Final Design Sustainability	1.5.3.1	G														
			eNotebook																
			SD-11 Closeout Submittals																
			Final High Performance and	1.5.3.1	G														
			Sustainable Building Checklist																
			Final Sustainability eNotebook	1.5.3.1	G														
			Amended Final Sustainability	1.5.3.1	G														
			eNotebook																
			Amended Final High	1.5.3.1	G														
			Performance and Sustainable																
			Building Checklist																
			Third Party Certification or	3.2	G														
			Validation																
		01 35 26.05 20	SD-01 Preconstruction Submittals																
			APP - Pre-Design Submittal	1.7.1.1	G														
			APP - Pre-Construction Submittal	1.7.1.2	G														
			SD-06 Test Reports																
			Monthly Exposure Reports	1.4															
			Notifications and Reports	1.12															
			Accident Reports	1.12.2	G														
			LHE Inspection Reports	1.12.3															
			SD-07 Certificates																
			Crane Operators/Riggers	1.6.1.5															
			Standard Lift Plan	1.7.3.2	G														
			Critical Lift Plan	1.7.3.3	G														
			Activity Hazard Analysis (AHA)	1.8															

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		01 35 26.05 20	Confined Space Entry Permit	1.9.1														
			Hot Work Permit	1.9.1														
			Certificate of Compliance	1.12.4														
			License Certificates	1.14														
		01 45 00.05 20	SD-01 Preconstruction Submittals															
			Design Quality Control (DQC)	1.3.3	G													
			Plan															
			Construction Quality Control	1.3.3	G													
			(CQC) Plan															
			Indoor Air Quality (IAQ)	1.9	G													
			Management Plan															
			SD-05 Design Data															
			Design Quality Control	1.4.2	G													
			Documentation															
			SD-07 Certificates															
			Preliminary Inspections and Final	1.4.4.1	G													
			Acceptance Testing															
			Final Life Safety/Fire Protection	1.4.4.1	G													
			Certification															
		01 45 35.05 20	SD-01 Preconstruction Submittals															
			Statement of Special Inspections	1.3.12	G													
			Structural Observations	1.3.14	G													
			SIOR	1.6.1	G													
			Special Inspections Project	1.6.1	G													
			Manual															

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		01 45 35.05 20	Special Inspections Agency's	1.6.1														
			Written Practices															
			NDT Procedures and Equipment	1.6.1														
			Calibration Records															
			SD-06 Test Reports															
			Daily Reports	1.6.1														
			Biweekly Reports	1.6.1														
			SD-07 Certificates															
			Certified Fabrication Plant	1.2.1														
			Steel Truss Plant Quality	1.2.1														
			Assurance															
			AC472 Accreditation	1.2.1														
			Steel Joist Institute Membership	1.2.1														
			Certified Plant	1.2.1														
			Special Inspector of Record	1.3.8	G													
			Special Inspector	1.3.5	G													
			Technicians	1.6.1														
			SD-11 Closeout Submittals															
			Interim Final Report of Special	1.6.1														
			Inspections															
			Comprehensive Final Report of	1.6.1	G													
			Special Inspections															
			Final Report of Structural	1.6.4	G													
			Observations															
		01 50 00.05 20	SD-01 Preconstruction Submittals															
			Traffic Control Plan	1.9.1.1	G													

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		01 50 00.05 20	Construction Site Plan	1.4	G													
			SD-03 Product Data															
			Backflow Preventers	2.1														
			SD-07 Certificates															
			Backflow Preventers Certificate	1.5														
		01 57 19	SD-01 Preconstruction Submittals															
			Preconstruction Survey	1.6.1														
			Solid Waste Management Permit; G															
			Regulatory Notifications; G															
			Environmental Protection Plan; G															
			Stormwater Notice of Intent	3.2.1.2														
			Dirt and Dust Control Plan; G															
			Employee Training Records; G															
			Environmental Manager Qualifications; G															
			SD-06 Test Reports															
			Inspection Reports	3.2.1.3														
			Solid Waste Management Report; G															
			SD-07 Certificates															
			Employee Training Records; G															
			ECATTS Certificate Of Completion; G															
			Erosion and Sediment Control Inspector	1.6.5														

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		01 57 19	SD-11 Closeout Submittals															
			Stormwater Pollution Prevention															
			Plan Compliance Notebook; G															
			Stormwater Notice of Termination	3.2.1.5														
			Waste Determination															
			Documentation; G															
			Disposal Documentation for															
			Hazardous and Regulated Waste;															
			G															
			Assembled Employee Training															
			Records; G															
			Solid Waste Management Permit;															
			G															
			Solid Waste Management Report;															
			G															
			Contractor Hazardous Material															
			Inventory Log; G															
			Hazardous Waste/Debris															
			Management; G															
			Regulatory Notifications; G															
			Sales Documentation; G															
			As-Built Topographic Survey	3.2.1.5														
			Vapor Intrusion Mitigation System															
			As-Built Drawings; G															
			O&M/Pm Documentation; G															
		01 60 00.00 22	SD-07 Certificates															

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		01 60 00.00 22	Certificate of State Licensed	1.2.1	G														
			Applicator																
			SD-11 Closeout Submittals																
			Field Pesticide/Herbicide		G														
			Management Record Form																
		01 74 19.05 20	SD-01 Preconstruction Submittals																
			Waste Management Plan	3.1	G														
			SD-11 Closeout Submittals																
			Records	3.2	S														
		01 78 00	SD-03 Product Data																
			Warranty Management Plan	1.6.1															
			Warranty Tags	1.6.4															
			Final Cleaning	3.4															
			Spare Parts Data	1.5															
			SD-08 Manufacturer’s Instructions																
			Instructions	1.6.1															
			SD-10 Operation and Maintenance																
			Data																
			Operation and Maintenance	3.3	G														
			Manuals																
			SD-11 Closeout Submittals																
			As-Built Drawings	3.1	G														
			Record Drawings	3.2	G														
			As-Built Record of Equipment	1.6.1															
			and Materials																
			Final Approved Shop Drawings																

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		01 78 00	Construction Contract Specifications																
			Certification of EPA Designated Items	2.1	G														
			Certification Of USDA Designated Items	2.2	G														
			Interim DD FORM 1354	3.5	G														
			Checklist for DD FORM 1354	3.5	G														
			High Performance and Sustainable Building (HPSB) Checklist	3.5	G														
		01 78 23	SD-10 Operation and Maintenance Data																
			O&M Database		G														
			Training Plan	3.1.1	G														
			Training Outline	3.1.3	G														
			Training Content	3.1.2	G														
			SD-11 Closeout Submittals																
			Training Video Recording	3.1.4	G														
			Validation of Training Completion	3.1.6	G														
		01 78 24.00 20	SD-11 Closeout Submittals																
			eOMSI, Progress Submittal	1.4.1	G														
			eOMSI, Prefinal Submittal	1.4.2	G														
			eOMSI, Final Submittal	1.4.3	G														
		01 78 30.00 22	SD-11 Closeout Submittals																
			GIS Data Deliverables	1.3.6	G														

SECTION 01 33 29.05 20

SUSTAINABILITY REPORTING FOR DESIGN-BUILD
02/17

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1	(2014; ERTA 1-2 2015; ERTA 3-4 2017) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
ASHRAE 90.1 - IP	(2016; ERTA 1-8 2017; INT 1-5 2017) Energy Standard for Buildings Except Low-Rise Residential Buildings

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) (WHITE HOUSE)

HPSB Guiding Principles	(2016) Guiding Principles for Sustainable Federal Buildings and Determining Compliance with the Guiding Principles for Sustainable Federal Buildings

U.S. DEPARTMENT OF AGRICULTURE (USDA)

FSRIA 9002	Farm Security and Rural Investment Act Section 9002 (USDA Biopreferred Program)

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014; with Change 2) Navy and Marine Corps Design Procedures

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star	(1992; R 2006) Energy Star Energy Efficiency Labeling System (FEMP)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

SNAP	(2016) EPA's Significant New Alternatives Policy Program

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 433.300	Subpart C - Green Building Certification for Federal Buildings
40 CFR 247	Comprehensive Procurement Guideline for

1.2 SUMMARY

This specification includes general requirements and procedures for projects to be designed, constructed, and documented per the federally mandated High Performance and Sustainable Building or "HPSB Guiding Principles" (GP), Third Party Certification (TPC) requirements, UFC 1-200-02 High Performance and Sustainable Building Requirements, and other requirements identified in this specification.

1.3 SUBMITTALS

Submittals requirements are specified in the technical sections using Submittal Description (SD) numbers and titles. Submittals requiring Government approval use a "G" or submittal designator in the UFGS sections. In addition, submit the GPV and TPC-required sustainability documentation in this specification as "S" submittals. Submittals not having a "G" designation are for Contractor Quality Control approval.

Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with the requirements of this Section.

Government approval is required for submittals in RFP Part 2 with a "G" designation Additional construction submittals reserved for Government approval are listed in the Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES. Submittals with a "G" designation found in the sections used by the Contractor to create construction specification, require DOR approval. DOR approved submittals are also listed in the "Construction Submittals" paragraph in each RFP PART 4, Performance Technical Specifications. Provide required certification or validation submittals in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES, Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES, FC 1-300-09N, Navy and Marine Corps Design Procedures, and as identified below.

SD-01 Preconstruction Submittals

Preliminary High Performance and Sustainable Building Checklist; G

Sustainability Action Plan

Preliminary Sustainability eNotebook; G

SD-05 Design Data

Final Design High Performance and Sustainable Building Checklist; G

Final Design Sustainability eNotebook; G

SD-11 Closeout Submittals

Final High Performance and Sustainable Building Checklist; G

Final Sustainability eNotebook; G

Amended Final Sustainability eNotebook; G

Amended Final High Performance and Sustainable Building Checklist; G

Third Party Certification or Validation; G

1.4 GUIDING PRINCIPLES VALIDATION (GPV)

Provide sustainability documentation to verify achievement of HPSB Guiding Principles Validation (GPV).

Provide the following for GPV:

a. Refer to Attachment 1, HPSB Checklist at the end of this specification section. (Multiple checklists indicate multiple buildings that require HPSB tracking.)

b. Obtain approval of the HPSB Checklist from the Contracting Officer at the Post Award Kick-Off Meetings. Contracting Officer's approval establishes identified HPSB Guiding Principles Requirements as the project's sustainability goals.

   No variations or substitutions to the HPSB Checklist are allowed without written consent from the Contracting Officer. Immediately bring to the attention of the Contracting Officer any project changes that impact meeting the approved HPSB Guiding Principles Requirements for this project and Contractor must demonstrate that change will not incur additional construction cost or increase the life cycle cost.

c. Provide all work, including "S" submittals, required to incorporate the applicable HPSB Guiding Principles Requirements indicated on the HPSB Checklist and in this contract.

d. Provide Sustainable Action Plan.

e. Provide design and construction related documentation for the project Sustainability eNotebook, and keep updated with regularly-scheduled construction meetings. Include design and construction related documentation containing the following components;

   (1) HPSB Checklist

   (2) Sustainability Action Plan

   (3) Documentation illustrating HPSB Guiding Principle Requirements compliance (including "S" submittals)

1.4.1 Sustainability Action Plan

Include the following information in the Sustainability Action Plan;

a. Planned method to achieve each GP requirement.

b. For each designated HPSB Guiding Principles Requirement that is not achieved, provide narrative explaining how mission or activity precludes achieving specific sustainability requirement or goal. Provide analysis of particular requirement and level to which project is able to comply. Final government approved narrative(s) must be included in the HPSB Checklist submittal.

c. Name and contact information for: Contractor's POC ensuring sustainability goals are accomplished and documentation is assembled.

d. Include the Indoor Air Quality plan with the Sustainability Action Plan.

1.4.2 Costs

Bear all costs associated with designing, constructing and demonstrating that project complies with approved HPSB Guiding Principles Requirements.

1.4.3 Calculations

Provide all design data, calculations, product data, labels and certifications required in this specification to demonstrate compliance with the HPSB Guiding Principles Requirements.

1.4.4 Third Party Certification (TPC) Documentation

1.4.4.1 TPC Registration Required

Register and achieve Third Party Certification (TPC), by meeting all TPC and project requirements of the UFCs . An equivalent TPC organization must demonstrate equivalency for Government consideration and meet the requirements of 10 CFR 433.300, prior to use on the project. Third Party Certification is met when Government receives TPC organization certificate or validation

Third Party Certification or validation requirements are in addition to all requirements under header above GUIDING PRINCIPLES VALIDATION (GPV).

Register project with TPC organization using the following format and content:

a. Project Title First Line: US Army, US Air Force, US Navy or US Marine Corps, Building Name (if known)

b. Project Title Second Line: MILCON P#, DD1391 Project Name

c. Project Address: UIC (Installation code), Category code, RPUID (Real Property Unique Identifier) Number

d. Project Owner Organization: US Army, US Air Force, US Navy or US Marine Corps

e. Primary Contact, Owner: Agency Project Manager

f. Building Owner Organization: US Navy or US Marine Corps

g. Additional Contact, Building Owner: Public Works Officer or Designee

1.4.4.2 TPC Management and Certification

The TPC Certification or validation requires the following:

a. Refer to Attachment 2, TPC Checklist at the end of this specification section. (Multiple checklists indicate multiple buildings that require TPC.)

b. Obtain approval of the TPC Checklist from the Contracting Officer at the Post Award Kick-Off Meetings. Contracting Officer's approval

establishes identified TPC Requirements as part of the project's sustainability goals.

No variations or substitutions to the TPC Checklist are allowed without written consent from the Contracting Officer. Immediately bring to the attention of the Contracting Officer any project changes that impact meeting the approved TPC Requirements for this project. Demonstrate that change will not: incur additional construction cost; increase the life cycle cost; or impact achieving required TPC certification or validation level.

c. Complete all design and construction work to incorporate the applicable TPC Requirements.

d. Maintain the design and construction related information, and provide replacement pages, in the Sustainability eNotebook pertaining to additions and changes to the approved sustainability requirements. Maintain the Sustainability eNotebook in electronic format. Refer to explanation in the paragraph SUSTAINABILITY eNOTEBOOK. Provide the following components in the Sustainability eNotebook, in addition to the GPV components listed above:

(1) TPC Checklist

(2) Completed TPC Online forms for each identified prerequisite and credit. Upload onto the TPC Online documentation website.

(3) Copy of all correspondence with the TPC organization. Provide proof of TPC registration.

(4) Documentation illustrating compliance with TPC requirements and additional documentation as requested by the Third Party certifier.

(5) TPC Award Certificate or validation

e. Provide the following information in the Sustainability Action Plan. Provide this TPC information in addition to the Sustainability Action Plan items above:

(1) Planned method to achieve each TPC requirement.

(2) For each of the TPC credit that is attempted but not achieved, provide narrative explaining how mission or activity precludes achieving specific sustainability requirement or goal. Provide analysis of particular requirement and level to which project is able to comply.

(3) Provide names and contact information for: Contractor sustainability POC and other names of sustainability professionals on the Contractor's Staff responsible for ensuring TPC sustainability goals are accomplished and documentation is assembled.

f. Bear all costs associated with designing, constructing, and demonstrating that project complies with approved TPC requirements, including but not limited to:

(1) Registration, review, certification or validation and plaque fees.

(2) Online (or offline with secure facilities) TPC management and documentation.

(3) Obtaining TPC certification or validation based on Government-approved sustainability goals.

(4) Design and construction work required to incorporate TPC prerequisites and credits.

(5) Submittals required to demonstrate compliance with Government approved TPC checklists.

g. Provide all design data, calculations, product data, and certifications required in this specification to demonstrate compliance with the TPC Requirements.

h. Provide all online (or offline, with secure facilities) TPC management and documentation.

i. Provide all required responses to TPC.

j. Provide TPC Plaque and Certificates or validation. Use the following format to create the Plaque, Certificate, and Letter of Congratulations. Forward to parties designated by Contracting Officer:

(1) Plaque:

Name: Final Building Name. If unknown, use the Form DD1391 Project Name.

(2) Certificate or Validation:

Project title, first line: P-(X); (1391 Project Name). Project title, second line: UIC (installation code)

(3) Letter of Congratulation (when provided):

Address letter to the Facility's Installation Commander Name. Address the letter to an individual person.

k. Once Final Certification is achieved, turn over Administrative rights to online TPC to the Public Works Office or designee, provided by the Contracting Officer.

1.5 SUSTAINABILITY SUBMITTALS

Provide updated HPSB Checklist and other documentation in the Sustainability eNotebook to indicate compliance with the sustainability requirements of the project.

1.5.1 High Performance Sustainable Building (HPSB) Checklist

Provide documentation that provides proof of and supports compliance with the completed HPSB Checklist. Prepopulated HPSB checklist may be obtained from the Government Project Manager.

1.5.1.1 HPSB Checklist Submittals

Submit updated HPSB Checklist with each Sustainability eNotebook

submittal. Attach final HPSB Checklist to draft final DD1354 Real Property Record Submittal.

1.5.2 "S" Submittals for Sustainability Documentation

Submit the GPV and TPC sustainability documentation required in this specification as "S" submittals in all affected UFGS Sections. Highlight GPV and TPC compliance data in "S" submittal.

1.5.3 Sustainability eNotebook

Prepare and maintain a comprehensive Sustainability eNotebook to document compliance with the sustainability requirements identified in the approved HPSB and TPC Checklists. Sustainability eNotebook must contain all required data to support full compliance with the HPSB Guiding Principles Requirements, including HPSB checklist, Sustainable Action Plan, calculations, labels, certifications and TPC requirements. Sustainability eNotebook is in the form of an Adobe PDF file; bookmarked at each HPSB Guiding Principles Requirement, TPC requirement,and sub-bookmarked at each document. Match format to HPSB Guiding Principles numbering system indicated herein. Maintain up to date information, spreadsheets, templates, etc. with each current submittals. For TPC projects, provide a second Table of contents using TPC numbering system, for maintaining documentation unique to TPC.

Contracting Officer may deduct from the monthly progress payment accordingly if Sustainability eNotebook information is not current, until information is updated and on track per project goals.

1.5.3.1 Sustainability eNotebook Submittal Schedule

Provide Sustainability eNotebook Submittals at the following milestones of the project:

a. Preliminary Sustainability eNotebook

Submit preliminary Sustainability eNotebook for approval at the Pre-construction conference. Include Preliminary High Performance and Sustainable Building Checklist and TPC checklist.

b. Final Design Sustainability eNotebook

Submit updated Sustainability eNotebook no later than 60 days after final design complete submission. Identify any outstanding issues in writing, relating to achieving the sustainability goals of the project and incomplete documentation requirements. Obtain DOR approval and submit electronic copies of the Final Design Sustainability eNotebook on DVDs to the Government. Include Final Design High Performance and Sustainable Building Checklist.

c. Construction Progress Meetings.

Update GP and TPC documentation in the Sustainability eNotebook and TPC Online tool for each meeting.

d. Final Sustainability eNotebook

Submit updated Sustainability eNotebook at Beneficial Occupancy Date (BOD). Final progress payment retainage may be held by Contracting

Officer until Final Sustainability construction phase documentation is complete. Obtain DOR approval and submit electronic copies of the Final Sustainability eNotebook on DVDs to the Government. Include Final High Performance and Sustainable Building Checklist.

e. Amended Final Sustainability eNotebook

Amend and resubmit the Amended Final Sustainability eNotebook to include post-occupancy corrections, updates, and requirements. Include Amended Final High Performance and Sustainable Building Checklist. Final progress payment retainage may be held by Contracting Officer until amended final sustainability documentation is complete. Submit final electronic copies of the Amended Final Sustainability eNotebook Submittal on DVDs to the Government no longer than 30 days after the GP,TPC designated data collection period.

1.6 DOCUMENTATION REQUIREMENTS

a. Incorporate each of the following HPSB Guiding Principles requirements into project and provide documentation that proves compliance with each listed requirement. Items below are organized by HPSB Guiding Principles. For life-cycle cost analysis requirements, one document with all analyses is acceptable, with Contracting Officer approval.

b. For each of the following paragraphs that require the use of products listed on Government-required websites, provide documentation of the process used to select products, or process used to determine why listed products do not meet project performance requirements.

1.6.1 Integrated Design Process

For the submittal documentation below, Follow the steps of design optimization, as applicable, in ASHRAE 189.1 Section F1.1.1 (Charrette Process), with the exception that subparagraph b. does not apply.

1.6.1.1 Design Submittal Documentation

a. Provide listing the sustainability integrated design team, and a description of their roles in all stages of a project's planning and delivery:

(1) Include Contractor's Sustainability Coordinators; Architecture and Engineering disciplines involved on the project, and the DOR in charge of the overall project and each discipline; Construction Subcontractors and the company representatives that align with each architectural and engineering discipline, Planning, Public Works, Environmental Specialist and other appropriate installation personnel.

(2) Describe their roles and responsibilities and plan-of-action for how each team member will be involved to achieve the project sustainability requirements, and how the Contractor will coordinate with Government personnel.

(3) Maintain the list and descriptions up-to-date throughout the project.

b. Provide narratives that:

(1) Indicate performance goals for siting, energy, water, materials, and indoor environmental quality along with other comprehensive design goals and ensures incorporation of these goals throughout the design and lifecycle of the building.

(2) Demonstrate integration of the goals into design and construction.

(3) Demonstrate collaboration with other providers, such as Commissioning Authority and Third Party Certification.

1.6.2 Commissioning (Cx)

Develop and incorporate Commissioning requirements into the documents as required by Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

1.6.3 Optimize Energy Performance

For Commercial and Multi-Family High-Rise Residential Buildings, meet the requirements of ASHRAE 90.1 - IP, and achieve at least 30 percent energy efficiency below baseline, when life cycle cost effective.

Reduce measured building energy use by at least 30 percent compared to building energy use in 2003 or a year thereafter with metered energy use data.

1.6.3.1 Design Submittal Documentation

a. Narrative that provides a summary of:

(1) The decision making process leading to the selection of at least three energy-efficient solutions (for each individual building energy system) to be analyzed; and the selected design solution(s)

(2) The specific energy standard and version utilized; and the software used in the analysis

(3) The calculated energy consumption and energy use intensity (EUI in kBTU/sf/yr) of the baseline building and the proposed design alternatives

b. A minimum of the following energy modeling files and summaries for the baseline and proposed alternatives:

(1) Input, schedules and libraries; and output

(2) Calculated energy use by energy type

(3) Calculated energy use by building system

c. The life-cycle cost-analysis input and out files for the baseline and the proposed alternatives

1.6.3.2 Construction Submittal Documentation

Provide revised energy modeling for actual system constructed.

1.6.4 Energy Efficient Products

Provide only energy-using products that are Energy Star rated, or have Federal Energy Management Program (FEMP) recommended efficiency. Where Energy Star or FEMP recommendations have not been established, provide most efficient product available. Provide only energy using product that meets FEMP requirements for low standby power consumption. Energy efficient products can be found at: http://www1.eere.energy.gov/femp/ and http://www.energystar.gov/.

For construction submittal documentation, provide proof that product is labeled energy efficient and complies with the cited requirements.

1.6.5 Building-level Power Metering

Provide building-level meters for electricity, natural gas (and steam where applicable) use.

For design submittal documentation, provide design drawings that highlight meter locations on the site.

1.6.6 Indoor Water Use

a. Meet the requirements of ASHRAE 189.1 Section 6.3.2 (Building Water Use Reduction), which incorporates USEPA WaterSense-labeled products. Water closet replacements in renovations may have a flush value of up to 1.6 GPF (6.1 LPF) to accommodate existing plumbing capacity.

b. Meet the requirements of ASHRAE 189.1 Section 6.4.2 (Building Water Use Reduction).

c. Meet the requirements of ASHRAE 189.1 Section 6.4.3 (Special Water Features).

1.6.6.1 Construction Submittal Documentation

Provide proof that fixtures are labeled EPA WaterSense or Energy Star, for products available with EPA WaterSense or Energy Star labeling; for all other fixtures, proof they comply with the cited efficiency requirements.

1.6.7 Indoor Water Metering

Provide building-level meters for potable water use.

For design submittal documentation, provide design drawings that highlight meter locations on the site.

1.6.8 Outdoor Water Use

Potable water use is prohibited for irrigating new landscaping, other than for plant establishment. When non-potable water is life cycle cost effective and is used for new, permanent irrigation, provide the following:

1.6.8.1 Design Submittal Documentation

a. Provide design drawings and analysis that identify the non-potable water source used and demonstrate the non-potable water source is appropriate for landscape irrigation.

b. Provide life cycle cost analysis (LCCA).

1.6.9 Outdoor Water Meters

Provide building-level meters for potable water used for existing irrigation systems using potable water and serving more than 25,000 square feet of landscape, when life-cycle cost effective.

1.6.9.1 Design Submittal Documentation

a. Provide design drawings that highlight meter locations on the site.

b. Provide life cycle cost analysis (LCCA).

1.6.10 Alternative Water

Use alternative sources of water to replace potable water usage, when life-cycle cost effective and to the extent permitted by local laws and regulations.

1.6.10.1 Design Submittal Documentation

a. Provide design drawings and calculations that demonstrate the alternative water sources used, potable water savings as compared to non-alternative water sourcing, and projected annual potable water savings.

b. Provide life cycle cost analysis (LCCA).

1.6.11 Stormwater Management

Develop and incorporate stormwater requirements into the documents. Submit design and construction documentation required by UFC 3-210-10 and Agency processes, as proof of this tracking requirement.

1.6.12 Ventilation and Thermal Comfort

Meet the requirements of UFC 3-410-01.

1.6.12.1 Design Submittal Documentation

a. Provide design drawings and calculations that demonstrate HVAC systems and the building envelope have been designed to meet the requirements.

1.6.13 Moisture Control

Meet the requirements of ASHRAE 189.1 Section 10.3.1.5 (Moisture Control), UFC 3-410-01, Chapter 3, Sections 3-2 and 3-3 (Ventilation Air), and UFC 3-101-01 Chapter 3 (Building Envelope Requirements).

1.6.13.1 Design Submittal Documentation

a. Provide drawings of building envelope details and HVAC humidity controls.

b. Provide plan for construction material storage and protection, humidity controls during construction, and operation and maintenance plan for ongoing building moisture control.

1.6.14 Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)

Meet the requirements of Table 3-1 at the end of this specification.

For Construction submittal documentation, provide certifications or labels that demonstrate compliance with cited requirements, based on the attached TABLE 3-1.

1.6.15 Indoor Air Quality During Construction

Prior to construction, create indoor air quality plan. Develop and implement an IAQ construction management plan during construction and flush building air before occupancy.

For new construction and for renovation of unoccupied existing buildings, meet the requirements of ASHRAE 189.1 Section 10.3.1.4 (Indoor Air Quality (IAQ) Construction Management), with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent.

Provide documentation showing that after construction ends and prior to occupancy, HVAC filters were replaced and building air was flushed out in accordance with the cited standard.

1.6.16 Recycled Content

Comply with 40 CFR 247. Refer to: https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program for assistance identifying products cited in 40 CFR 247. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation, and must meet performance requirements.

1.6.16.1 Construction Submittal Documentation

a. Provide manufacturers' documents stating the recycled content by material, or written justification for claiming one of the exceptions allowed on the cited website.

b. Substitutions: Submit for Government approval for proposed alternative products or systems that provide equivalent performance and appearance and have greater contribution to project recycled content requirements. For all such proposed substitutions, submit with the Sustainability Action Plan accompanied by product data demonstrating equivalence.

1.6.17 Bio-Based Products

Provide products and materials composed of the highest percentage of bio-based materials (including rapidly renewable resources and certified sustainably harvested products), consistent with FSRIA 9002 USDA BioPreferred Program, to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the end user. Use only supplies and materials of a type and quality that conform to applicable specifications and standards. Comply with FSRIA 9002 USDA BioPreferred Program. Refer to www.biopreferred.gov for the product categories and BioPreferred Catalog.

For construction submittal documentation, provide USDA BioPreferred label for each product; for bio-based products used on project but not listed

with Biopreferred program, provide bio-based content and percentage.

1.6.18 Ozone Depleting Substances

Meet the requirements of ASHRAE 189.1 Section 9.3.3 Refrigerants for no CFC-based refrigerants in heating ventilation, air conditioning and refrigeration systems (except for fire suppression system requirements, covered elsewhere in this specification). Use products from U.S. EPA Significant New Alternatives Policy (SNAP) (http://www.epa.gov/snap) or meet the criteria of SNAP.

1.6.18.1 Construction Submittal Documentation

a. Provide SDS sheets for all refrigerants.

b. Provide label for each product meeting the cited standards.

1.6.19 Waste Material Management (Recycling – Design)

Meet the requirements of ASHRAE 189.1 Section 9.3.4.1 (Storage and Collection of Recyclables – Recyclables), where markets or onsite recycling exist.

For design submittal documentation, provide drawing showing an appropriately sized and placed storage area has been dedicated for recyclables.

1.6.20 Waste Material Management (Recycling – Construction)

Divert construction debris from landfill disposal where markets or on-site recycling exists, where markets or on-site recycling exists.

Submit in accordance with Section 01 74 19.05 20 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT FOR DESIGN-BUILD.

1.6.21 Address Climate Change Risk

When project scope includes Government-provided projections of climate-change or floodplain risk, provide building design solutions responsive to the scope.

For design submittal documentation, provide narrative of decisions for design associated with scoped requirements.

1.6.22 Validation and Certification Restrictions

The purchase of renewable energy credits (RECs) specifically to meet project sustainability goals is prohibited.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SUSTAINABILITY COORDINATION

3.1.1 Coordinating Sustainability Documentation Progress

Provide sustainability focus and coordination at the following meetings to achieve sustainability goals. In addition to requirement below, the following meetings requirements are further described in other parts of the RFP documents. The designated TPC accredited sustainability professional responsible for GP and TPC documentation must participate in these meetings to coordinate documentation completion.

3.1.1.1 Design Review Meetings

Review progress towards meeting Sustainability requirements in the Sustainability Action Plan,and completeness of Sustainability eNotebook, and TPC Online submission at the following meetings:

a. Post Award Kick-Off Meeting: Refer to Section 01 31 19.05 20 POST AWARD MEETINGS. Discuss the following: TPC and HPSB Checklists, Sustainability Action Plan, Design submittal and Construction submittal requirements and schedule, individuals responsible for achieving each Guiding Principle Requirement and TPC prerequisite and credit.

b. Design Quality Assurance Meetings: Refer to Section 01 31 19.05 20 POST AWARD MEETINGS for requirements. Discuss progress toward accomplishing Sustainability goals and obtaining sustainability documentation at each design submittal review. Refer to RFP Part 2 Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES for designated design submittals.

c. Design Complete Review Meetings (No later than 60 days after final design complete submission): Review HPSB Checklist, Sustainability eNotebook, and TPC submission for completeness and identify any outstanding issues relating to final score and documentation requirements.

3.1.1.2 Construction Progress Meetings

Review GP and TPC sustainability requirements with project team including contractor and sub-contractor representatives. Demonstrate HPSB Checklist and TPC documentation is being collected and updated to the Sustainability eNotebook and TPC Online tool.

a. Facility Turnover Meetings: Refer to Section 01 31 19.05 20 POST AWARD MEETINGS for further requirements. Review HPSB Checklist, Sustainability eNotebook, and TPC Online submission for completeness and identify any outstanding issues relating to final documentation requirements.

b. Final Sustainability eNotebook Review

3.2 THIRD PARTY CERTIFICATION OR VALIDATION

Finalize the sustainability certification or validation process and obtain the TPC Certification Plaque and Certificates or validation, indicating completion of the projects sustainability goals.

Provide and hang Plaque in accordance with contract documents. Provide one original framed copy of the certificate or validation, mounted in 1 inch deep metal frames, with double matt, and wire hangers, in location approved by Contracting Officer. Provide one original certificate or validation, and deliver to Contractor Officer, unless otherwise instructed. Provide and hang Plaque in a prominent interior location approved by the Contracting Officer.

3.2.1 Third Party Certification Plaque and Certificates

Provide one original framed copy of the certificate, mounted in 1 inch deep metal frames, with double matt, and wire hangers, in location approved by Contracting Officer. Provide original certificates, and deliver to Contractor Officer, unless otherwise instructed. Provide and hang Plaque in a prominent interior location approved by the Contracting Officer.

3.3 TABLE 3-1 VOLATILE ORGANIC COMPOUNDS (VOC) (LOW EMITTING MATERIALS) REQUIREMENTS

Refer to following table for compliance criteria for paragraph titled "Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)", based on ASHRAE 189.1 section 8.4.2 (Materials).

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

UFGS 01 33 29.05 20, Paragraph "Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)" Submittal Requirements (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY
Adhesives and Sealants	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Adhesives (carpet, resilient, wood flooring; panel; primers) Sealants (acoustical; firestop; HVAC Air duct; primers) Caulks	**SCAQMD Rule 1168** (Use "other" category for HVAC duct sealant) (for firestop adhesive, UFC 3-600-01 overrides conflicting requirements)
			Aerosol adhesives	**Section 3 of Green Seal Standard GS-36** (except: cleaners, solvent cements, and primers used with plastic piping and conduit in plumbing, fire suppression, and electrical systems; HVAC air duct sealants when the application space air temp is less than 40 F (4.5 C).
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Flat and nonflat topcoats, primers, undercoaters, and anti-corrosive coatings	**Green Seal Standard GS-11**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

UFGS 01 33 29.05 20, Paragraph "Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)" Submittal Requirements (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Concrete/masonry sealers (waterproofing concrete/masonry sealers), concrete curing compounds, dry fog coatings, faux finishing coatings, fire resistive coatings, floor coatings, graphic arts (sign) coatings, industrial maintenance coatings, mastic texture coatings, metallic pigmented coatings, multicolor coatings, pretreatment wash primers, reactive penetrating sealers, recycled coatings, shellacs (clear and opaque), specialty primers, stains, wood coatings (clear wood finishes), wood preservatives, and zinc primers	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings** or **SCAQMD Rule 1113**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

UFGS 01 33 29.05 20, Paragraph "Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)" Submittal Requirements (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Basement specialty coatings, high-temperature coatings, low solids coatings, stone consolidants, swimming-pool coatings, tub- and tile-refining coatings, and waterproofing membranes	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings**
Floor Covering Materials	For carpet, all locations: **CDPH/EHLB/Standard Method V1.1 (California Section 01350)** or label for **Section 9** of **CDPH/EHLB/Standard Method V1.1 (California Section 01350)**		none	none

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

UFGS 01 33 29.05 20, Paragraph "Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)" Submittal Requirements (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY
Composite Wood, Wood Structural Panel, and Agrifiber Products particleboard medium density fiberboard (MDF) wheatboard strawboard panel substrates door cores **no added urea-formaldehyde resins** including laminating adhesives for composite wood and agrifiber assemblies	Third-party certification (approved by CARB) of **California Air Resource Board's (CARB) regulation**, Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products		none	none
	CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use "office" or "classroom" space limits for all applications) (except: Structural panel components such as plywood, particle board, wafer board, and oriented strand board identified as "EXPOSURE 1," "EXTERIOR," or "HUD-APPROVED" are considered acceptable for interior use.)			

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

UFGS 01 33 29.05 20, Paragraph "Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)" Submittal Requirements (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	MATERIAL CATEGORY
Office Furniture Systems and Seating installed prior to occupancy	**ANSI/BIFMA X7.1 ANSI/BIFMA X7.1:** (95 percent of installed office furniture system workstations and seating units) **Section 7.6.2 of ANSI/BIFMA e3** (50 percent of office furniture system workstations and seating units)		none	none
Ceiling and Wall Systems ceiling and wall insulation acoustical ceiling panels tackable wall panels gypsum wall board and panels wall coverings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)		none	none

-- End of Section --

NAVFAC HIGH PERFORMANCE AND SUSTAINABLE BUILDING CHECKLIST -- GOALS

PROJECT INFORMATION

Work Order No.: 1590892 FY _____ MILCON P No. / Customer Reference No.: P1338F

Project Title: II MEF Simulation/Training Center Replacement

Location UIC/Name: M67001 - MCB Camp LeJeune NC

NAVFAC Project Manager: Abelkader Labidi Project Design Level: RFP

Facility Area: _____ U/M: _____ Category Code: _____ Facility #: _____

AE Contract # & T.O. N40085-18-D-8728; T.O. #001 AE Firm Sustainability Coordinator: Grant Hughes

AE Firm Name: JACOBS

Project Phase: ☐ Design Start / PDA ☐ Solicitation Documents Complete

Construction Contract Award Date (P): _____ BOD (P): _____

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

Use this form to collect Design Goals information to be recorded on the Sustainable and Energy Tab in eProjects

NOTE: 1. Mark "N/A" only when at least one of the listed justifications is applicable, and mark those justifications. Otherwise, mark "Yes."
2. If project is for more than one building for which tracking is required, complete a separate form for each building.

PRELIMINARY PROJECT INFORMATION

1 How many buildings are included in this project? 1

2 Does at least one building meet one of the following: 1) new construction (new building **or** addition to existing);
- OR - 2) Renovation in an existing building, with construction cost greater than $3M? ☑ Yes ☐ No

3 Identify the building to be tracked in this tab: II MEF Simulat

DESIGN DEVELOPMENT - DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

2 Commissioning Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Systems commissioned

II. Optimize Energy Performance

3. Energy Efficiency Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Energy Savings Below Baseline % 30.00 *Target Savings - AE2 to determine

(ii) Energy Standard

- [ ] ASHRAE 90.1-2004 (03JAN07-09AUG12)
- [ ] ASHRAE 90.1-2007 (10AUG12-08JUL14)
- [ ] ASHRAE 90.1-2010 (09JUL14-05NOV16)
- [ ] ASHRAE 90.1-2013 (06NOV16+)
- [ ] IECC
- [x] OTHER: ASHRAE 90.1-2016

C. Energy Efficient Products

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

4. Renewable Energy

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [x] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

A. Renewable energy technology types

- [ ] Geothermal
- [ ] Ground Source Heat Pumps
- [ ] Solar Photovoltaic
- [ ] Solar Thermal - domestic hot water
- [ ] Solar Thermal - space conditioning
- [ ] Daylighting (quantified passive)
- [ ] Mechanical (i.e., direct water pumping)
- [ ] Micro-hydro
- [ ] Concentrating (sterling)
- [ ] Wind

(i) Annual % of total load _____

(ii) System size (kwatts) _____

B. Solar Hot Water Percentage - 30% target

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [x] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

(i) Annual % of total load _____

(ii) System size (kBTU/Year) _____

5. Metering (Measurement)

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year _____

Life Cycle Cost Analysis to determine

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year _____ AE2 to determine

B. Indoor Water Meter

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

8. Outdoor Water Use

A. Outdoor Water Meter

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☑ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Water-efficient landscape

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Reduce landscape potable water use

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent potable water use is reduced 100.0

9. Alternative Water Use

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Methods Proposed:

☐ Air Handler Condensate Capture ☐ Reclaimed Water

☐ Grey Water ☐ Treated Wastewater

☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Thermal Comfort

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

12. Daylighting and Lighting Controls

A. Daylight

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☑ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Automatic dimming controls

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

13. Indoor Air Quality

A. Moisture Control

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Low-Emitting Materials

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

C. Indoor Air Quality during Construction

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

14. Occupant Health and Wellness

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Ozone depleting Compounds

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

16. Waste Management

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

17. Waste Diversion - 60% target

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent diverted 75

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

THIRD PARTY CERTIFICATION INFORMATION

Does at least one building meet one of the following: ☑ Yes ☐ No

1) New construction with construction cost greater than $3M? - **OR** -

2) In an existing building larger than 5,000 SF, renovation with construction cost greater than $3M and 50% estimated replacement cost (ERC)?

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

- ☐ USGBC LEED Certified
- ☐ USGBC LEED Silver
- ☐ USGBC LEED Gold
- ☐ USGBC LEED Platinum
- ☐ USGBC "Guiding Principles Assessment"
- ☐ OTHER
- ☐ GBI Green Globes 1 Globe
- ☐ GBI Green Globes 2 Globe
- ☐ GBI Green Globes 3 Globe
- ☐ GBI Green Globes 4 Globe
- ☐ GBI "Guiding Principles Compliance"

i. Third Party Certification Rating system - Other

AE2 to determine TPC Rating System

NAVFAC HIGH PERFORMANCE AND SUSTAINABLE BUILDING CHECKLIST -- GOALS

PROJECT INFORMATION

Work Order No.: 1639558 FY ____ MILCON P No. / Customer Reference No.: P1512F

Project Title: MCCSSS Log Ops School - Joint Reception Center

Location UIC/Name: M67001 - MCB Camp LeJeune NC

NAVFAC Project Manager: Abelkader Labidi Project Design Level: RFP

Facility Area: ____ U/M: ____ Category Code: ____ Facility #: ____

AE Contract # & T.O. N40085-18-D-8728; T.O. #001 AE Firm Sustainability Coordinator: Grant Hughes

AE Firm Name: JACOBS

Project Phase: ☐ Design Start / PDA ☐ Solicitation Documents Complete

Construction Contract Award Date (P): ____ BOD (P): ____

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

Use this form to collect Design Goals information to be recorded on the Sustainable and Energy Tab in eProjects

NOTE: 1. Mark "N/A" only when at least one of the listed justifications is applicable, and mark those justifications. Otherwise, mark "Yes."
2. If project is for more than one building for which tracking is required, complete a separate form for each building.

PRELIMINARY PROJECT INFORMATION

1 How many buildings are included in this project? 1

2 Does at least one building meet one of the following: 1) new construction (new building **or** addition to existing);
- OR - 2) Renovation in an existing building, with construction cost greater than $3M? ☑ Yes ☐ No

3 Identify the building to be tracked in this tab: II MEF Simulat

DESIGN DEVELOPMENT - DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

2 Commissioning Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Systems commissioned

II. Optimize Energy Performance

3. Energy Efficiency Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Energy Savings Below Baseline % 30.00 *Target Savings - AE2 to determine

(ii) Energy Standard

- [ ] ASHRAE 90.1-2004 (03JAN07-09AUG12)
- [ ] ASHRAE 90.1-2007 (10AUG12-08JUL14)
- [ ] ASHRAE 90.1-2010 (09JUL14-05NOV16)
- [ ] ASHRAE 90.1-2013 (06NOV16+)
- [ ] IECC
- [x] OTHER: ASHRAE 90.1-2016

C. Energy Efficient Products

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

4. Renewable Energy

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [x] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

A. Renewable energy technology types

- [ ] Geothermal
- [ ] Ground Source Heat Pumps
- [ ] Solar Photovoltaic
- [ ] Solar Thermal - domestic hot water
- [ ] Solar Thermal - space conditioning
- [ ] Daylighting (quantified passive)
- [ ] Mechanical (i.e., direct water pumping)
- [ ] Micro-hydro
- [ ] Concentrating (sterling)
- [ ] Wind

(i) Annual % of total load _____

(ii) System size (kwatts) _____

B. Solar Hot Water Percentage - 30% target

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [x] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

(i) Annual % of total load _____

(ii) System size (kBTU/Year) _____

5. Metering (Measurement)

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year _____

Life Cycle Cost Analysis to determine

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year _____ AE2 to determine

B. Indoor Water Meter

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

8. Outdoor Water Use

A. Outdoor Water Meter

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☑ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Water-efficient landscape

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Reduce landscape potable water use

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent potable water use is reduced 100.0

9. Alternative Water Use

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Methods Proposed:

☐ Air Handler Condensate Capture ☐ Reclaimed Water

☐ Grey Water ☐ Treated Wastewater

☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Thermal Comfort

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

12. Daylighting and Lighting Controls

A. Daylight

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Automatic dimming controls

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

13. Indoor Air Quality

A. Moisture Control

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Low-Emitting Materials

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

C. Indoor Air Quality during Construction

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

14. Occupant Health and Wellness

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Ozone depleting Compounds

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

16. Waste Management

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

17. Waste Diversion - 60% target

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent diverted 75

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

THIRD PARTY CERTIFICATION INFORMATION

Does at least one building meet one of the following: ☑ Yes ☐ No

1) New construction with construction cost greater than $3M? - **OR** -

2) In an existing building larger than 5,000 SF, renovation with construction cost greater than $3M and 50% estimated replacement cost (ERC)?

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

- ☐ USGBC LEED Certified
- ☐ USGBC LEED Silver
- ☐ USGBC LEED Gold
- ☐ USGBC LEED Platinum
- ☐ USGBC "Guiding Principles Assessment"
- ☐ OTHER
- ☐ GBI Green Globes 1 Globe
- ☐ GBI Green Globes 2 Globe
- ☐ GBI Green Globes 3 Globe
- ☐ GBI Green Globes 4 Globe
- ☐ GBI "Guiding Principles Compliance"

i. Third Party Certification Rating system - Other

AE2 to determine TPC Rating System

NAVFAC HIGH PERFORMANCE AND SUSTAINABLE BUILDING CHECKLIST -- GOALS

PROJECT INFORMATION

Work Order No.: 1639558 FY ____ MILCON P No. / Customer Reference No.: P1512F

Project Title: MCCSSS Log Ops School - Log Ops School

Location UIC/Name: M67001 - MCB Camp LeJeune NC

NAVFAC Project Manager: Abelkader Labidi Project Design Level: RFP

Facility Area: ____ U/M: ____ Category Code: ____ Facility #: ____

AE Contract # & T.O. N40085-18-D-8728; T.O. #001 AE Firm Sustainability Coordinator: Grant Hughes

AE Firm Name: JACOBS

Project Phase: ☐ Design Start / PDA ☐ Solicitation Documents Complete

Construction Contract Award Date (P): ____ BOD (P): ____

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

Use this form to collect Design Goals information to be recorded on the Sustainable and Energy Tab in eProjects

NOTE: 1. Mark "N/A" only when at least one of the listed justifications is applicable, and mark those justifications. Otherwise, mark "Yes."
2. If project is for more than one building for which tracking is required, complete a separate form for each building.

PRELIMINARY PROJECT INFORMATION

1 How many buildings are included in this project? 1

2 Does at least one building meet one of the following: 1) new construction (new building **or** addition to existing);
- OR - 2) Renovation in an existing building, with construction cost greater than $3M? ☑ Yes ☐ No

3 Identify the building to be tracked in this tab: II MEF Simulat

DESIGN DEVELOPMENT - DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

2 Commissioning Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Systems commissioned

II. Optimize Energy Performance

3. Energy Efficiency Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Energy Savings Below Baseline % 30.00 *Target Savings - AE2 to determine

(ii) Energy Standard

- [ ] ASHRAE 90.1-2004 (03JAN07-09AUG12)
- [ ] ASHRAE 90.1-2007 (10AUG12-08JUL14)
- [ ] ASHRAE 90.1-2010 (09JUL14-05NOV16)
- [ ] ASHRAE 90.1-2013 (06NOV16+)
- [ ] IECC
- [x] OTHER: ASHRAE 90.1-2016

C. Energy Efficient Products

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

4. Renewable Energy

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [x] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

A. Renewable energy technology types

- [ ] Geothermal
- [ ] Ground Source Heat Pumps
- [ ] Solar Photovoltaic
- [ ] Solar Thermal - domestic hot water
- [ ] Solar Thermal - space conditioning
- [ ] Daylighting (quantified passive)
- [ ] Mechanical (i.e., direct water pumping)
- [ ] Micro-hydro
- [ ] Concentrating (sterling)
- [ ] Wind

(i) Annual % of total load _____

(ii) System size (kwatts) _____

B. Solar Hot Water Percentage - 30% target

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [x] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

(i) Annual % of total load _____

(ii) System size (kBTU/Year) _____

5. Metering (Measurement)

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year _____

Life Cycle Cost Analysis to determine

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year _____ AE2 to determine

B. Indoor Water Meter

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

8. Outdoor Water Use

A. Outdoor Water Meter

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☑ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Water-efficient landscape

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Reduce landscape potable water use

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent potable water use is reduced 100.0

9. Alternative Water Use

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Methods Proposed:

☐ Air Handler Condensate Capture ☐ Reclaimed Water

☐ Grey Water ☐ Treated Wastewater

☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Thermal Comfort

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

12. Daylighting and Lighting Controls

A. Daylight

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Automatic dimming controls

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

13. Indoor Air Quality

A. Moisture Control

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Low-Emitting Materials

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

C. Indoor Air Quality during Construction

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

14. Occupant Health and Wellness

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Ozone depleting Compounds

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

16. Waste Management

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

17. Waste Diversion - 60% target

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent diverted 75

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

THIRD PARTY CERTIFICATION INFORMATION

Does at least one building meet one of the following: ☑ Yes ☐ No

1) New construction with construction cost greater than $3M? - **OR** -

2) In an existing building larger than 5,000 SF, renovation with construction cost greater than $3M and 50% estimated replacement cost (ERC)?

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

- ☐ USGBC LEED Certified
- ☐ USGBC LEED Silver
- ☐ USGBC LEED Gold
- ☐ USGBC LEED Platinum
- ☐ USGBC "Guiding Principles Assessment"
- ☐ OTHER
- ☐ GBI Green Globes 1 Globe
- ☐ GBI Green Globes 2 Globe
- ☐ GBI Green Globes 3 Globe
- ☐ GBI Green Globes 4 Globe
- ☐ GBI "Guiding Principles Compliance"

i. Third Party Certification Rating system - Other

AE2 to determine TPC Rating System

NAVFAC HIGH PERFORMANCE AND SUSTAINABLE BUILDING CHECKLIST -- GOALS

PROJECT INFORMATION

Work Order No.: 1639558 FY _____ MILCON P No. / Customer Reference No.: P1512F

Project Title: MCCSSS M107 Renovation

Location UIC/Name: M67001 - MCB Camp LeJeune NC

NAVFAC Project Manager: Abelkader Labidi Project Design Level: RFP

Facility Area: _____ U/M: _____ Category Code: _____ Facility #: _____

AE Contract # & T.O. N40085-18-D-8728; T.O. #001 AE Firm Sustainability Coordinator: Grant Hughes

AE Firm Name: JACOBS

Project Phase: ☐ Design Start / PDA ☐ Solicitation Documents Complete

Construction Contract Award Date (P): _____ BOD (P): _____

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

Use this form to collect Design Goals information to be recorded on the Sustainable and Energy Tab in eProjects

NOTE: 1. Mark "N/A" only when at least one of the listed justifications is applicable, and mark those justifications. Otherwise, mark "Yes."
2. If project is for more than one building for which tracking is required, complete a separate form for each building.

PRELIMINARY PROJECT INFORMATION

1 How many buildings are included in this project? 1

2 Does at least one building meet one of the following: 1) new construction (new building **or** addition to existing);
- OR - 2) Renovation in an existing building, with construction cost greater than $3M? ☑ Yes ☐ No

3 Identify the building to be tracked in this tab: II MEF Simulat

DESIGN DEVELOPMENT - DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

2 Commissioning Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Systems commissioned

II. Optimize Energy Performance

3. Energy Efficiency Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Energy Savings Below Baseline % 30.00 *Target Savings - AE2 to determine

(ii) Energy Standard

- [ ] ASHRAE 90.1-2004 (03JAN07-09AUG12)
- [ ] ASHRAE 90.1-2007 (10AUG12-08JUL14)
- [ ] ASHRAE 90.1-2010 (09JUL14-05NOV16)
- [ ] ASHRAE 90.1-2013 (06NOV16+)
- [ ] IECC
- [x] OTHER: ASHRAE 90.1-2016

C. Energy Efficient Products

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

4. Renewable Energy

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [x] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

A. Renewable energy technology types

- [ ] Geothermal
- [ ] Ground Source Heat Pumps
- [ ] Solar Photovoltaic
- [ ] Solar Thermal - domestic hot water
- [ ] Solar Thermal - space conditioning
- [ ] Daylighting (quantified passive)
- [ ] Mechanical (i.e., direct water pumping)
- [ ] Micro-hydro
- [ ] Concentrating (sterling)
- [ ] Wind

(i) Annual % of total load _____

(ii) System size (kwatts) _____

B. Solar Hot Water Percentage - 30% target

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [x] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

(i) Annual % of total load _____

(ii) System size (kBTU/Year) _____

5. Metering (Measurement)

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year _____

Life Cycle Cost Analysis to determine

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year _____ AE2 to determine

B. Indoor Water Meter

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

8. Outdoor Water Use

A. Outdoor Water Meter

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☑ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Water-efficient landscape

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Reduce landscape potable water use

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent potable water use is reduced 100.0

9. Alternative Water Use

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Methods Proposed:

☐ Air Handler Condensate Capture ☐ Reclaimed Water

☐ Grey Water ☐ Treated Wastewater

☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Thermal Comfort

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

12. Daylighting and Lighting Controls

A. Daylight

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Automatic dimming controls

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

13. Indoor Air Quality

A. Moisture Control

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Low-Emitting Materials

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

C. Indoor Air Quality during Construction

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

14. Occupant Health and Wellness

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Ozone depleting Compounds

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

16. Waste Management

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

17. Waste Diversion - 60% target

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent diverted 75

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

THIRD PARTY CERTIFICATION INFORMATION

Does at least one building meet one of the following: ☑ Yes ☐ No

1) New construction with construction cost greater than $3M? - **OR** -

2) In an existing building larger than 5,000 SF, renovation with construction cost greater than $3M and 50% estimated replacement cost (ERC)?

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

- ☐ USGBC LEED Certified
- ☐ USGBC LEED Silver
- ☐ USGBC LEED Gold
- ☐ USGBC LEED Platinum
- ☐ USGBC "Guiding Principles Assessment"
- ☐ OTHER
- ☐ GBI Green Globes 1 Globe
- ☐ GBI Green Globes 2 Globe
- ☐ GBI Green Globes 3 Globe
- ☐ GBI Green Globes 4 Globe
- ☐ GBI "Guiding Principles Compliance"

i. Third Party Certification Rating system - Other

AE2 to determine TPC Rating System

NAVFAC HIGH PERFORMANCE AND SUSTAINABLE BUILDING CHECKLIST -- GOALS

PROJECT INFORMATION

Work Order No.: 1639600 FY _____ MILCON P No. / Customer Reference No.: P1527F

Project Title: LOGCOM CSP Warehouse Replacement

Location UIC/Name: M67001 - MCB Camp LeJeune NC

NAVFAC Project Manager: Abelkader Labidi Project Design Level: RFP

Facility Area: _____ U/M: _____ Category Code: _____ Facility #: _____

AE Contract # & T.O. N40085-18-D-8728; T.O. #001 AE Firm Sustainability Coordinator: Grant Hughes

AE Firm Name: JACOBS

Project Phase: ☐ Design Start / PDA ☐ Solicitation Documents Complete

Construction Contract Award Date (P): _____ BOD (P): _____

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

Use this form to collect Design Goals information to be recorded on the Sustainable and Energy Tab in eProjects

NOTE: 1. Mark "N/A" only when at least one of the listed justifications is applicable, and mark those justifications. Otherwise, mark "Yes."
2. If project is for more than one building for which tracking is required, complete a separate form for each building.

PRELIMINARY PROJECT INFORMATION

1 How many buildings are included in this project? 1

2 Does at least one building meet one of the following: 1) new construction (new building **or** addition to existing);
- OR - 2) Renovation in an existing building, with construction cost greater than $3M? ☑ Yes ☐ No

3 Identify the building to be tracked in this tab: II MEF Simulat

DESIGN DEVELOPMENT - DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

2 Commissioning Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Systems commissioned

II. Optimize Energy Performance

3. Energy Efficiency Goals — In Compliance ☑ Yes ☐ N/A

N/A due to
☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

(i) Energy Savings Below Baseline % 30.00 *Target Savings - AE2 to determine

(ii) Energy Standard

- [ ] ASHRAE 90.1-2004 (03JAN07-09AUG12)
- [ ] ASHRAE 90.1-2007 (10AUG12-08JUL14)
- [ ] ASHRAE 90.1-2010 (09JUL14-05NOV16)
- [ ] ASHRAE 90.1-2013 (06NOV16+)
- [ ] IECC
- [x] OTHER: ASHRAE 90.1-2016

C. Energy Efficient Products

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

4. Renewable Energy

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [x] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

A. Renewable energy technology types

- [ ] Geothermal
- [ ] Ground Source Heat Pumps
- [ ] Solar Photovoltaic
- [ ] Solar Thermal - domestic hot water
- [ ] Solar Thermal - space conditioning
- [ ] Daylighting (quantified passive)
- [ ] Mechanical (i.e., direct water pumping)
- [ ] Micro-hydro
- [ ] Concentrating (sterling)
- [ ] Wind

(i) Annual % of total load _____

(ii) System size (kwatts) _____

B. Solar Hot Water Percentage - 30% target

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [x] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

(i) Annual % of total load _____

(ii) System size (kBTU/Year) _____

5. Metering (Measurement)

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year _____

Life Cycle Cost Analysis to determine

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year _____ AE2 to determine

B. Indoor Water Meter

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

8. Outdoor Water Use

A. Outdoor Water Meter

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☑ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Water-efficient landscape

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Reduce landscape potable water use

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent potable water use is reduced 100.0

9. Alternative Water Use

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Methods Proposed:

☐ Air Handler Condensate Capture ☐ Reclaimed Water

☐ Grey Water ☐ Treated Wastewater

☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Thermal Comfort

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

12. Daylighting and Lighting Controls

A. Daylight

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Automatic dimming controls

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

13. Indoor Air Quality

A. Moisture Control

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

B. Low-Emitting Materials

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

C. Indoor Air Quality during Construction

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue
☐ Not LCCE ☐ Renovation only: not part of scope
☐ Installation/region issue

14. Occupant Health and Wellness

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Ozone depleting Compounds

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

16. Waste Management

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

17. Waste Diversion - 60% target

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent diverted 75

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

THIRD PARTY CERTIFICATION INFORMATION

Does at least one building meet one of the following: ☑ Yes ☐ No

1) New construction with construction cost greater than $3M? - **OR** -

2) In an existing building larger than 5,000 SF, renovation with construction cost greater than $3M and 50% estimated replacement cost (ERC)?

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

- ☐ USGBC LEED Certified
- ☐ USGBC LEED Silver
- ☐ USGBC LEED Gold
- ☐ USGBC LEED Platinum
- ☐ USGBC "Guiding Principles Assessment"
- ☐ OTHER
- ☐ GBI Green Globes 1 Globe
- ☐ GBI Green Globes 2 Globe
- ☐ GBI Green Globes 3 Globe
- ☐ GBI Green Globes 4 Globe
- ☐ GBI "Guiding Principles Compliance"

i. Third Party Certification Rating system - Other

AE2 to determine TPC Rating System

SECTION 01 35 13.05 20

SPECIAL PROJECT PROCEDURES FOR DESIGN-BUILD
11/07

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 COMPREHENSIVE WORK APPROVAL PERMIT APPLICATION (CWAP)

Submit a CWAP through NAVFAC for all work to be done on NSFIH. Sample CWAP is included in Part 6 of this RFP.

3.2 HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO) COMPLIANCE APPROVAL FOR EQUIPMENT IN THE RESTRICTED AREA

Submit for HERO Compliance at theSafety Office. All equipment to be used within the restricted area must be certified for HERO Compliance prior to use on this project.

3.3 WORK APPROVAL PERMIT

Work to be completed within explosive areas requires a Work Approval Permit that the Contractor files with the Indian Head Safety Office Inspector. The Inspector and the NSASP CM will coordinate with the Contractor and the explosive building managers to schedule a time for the Contractor's work to be completed. The Contractor must provide a schedule of work with the permit.

-- End of Section --

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SECTION 01 35 26.05 20

GOVERNMENT SAFETY REQUIREMENTS FOR DESIGN-BUILD
12/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSP A10.44	(2014) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
ASSP A1264.1	(2017) Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace, Floor, Wall and Roof Openings; Stairs and Guardrail/Handrail Systems
ASSP Z244.1	(2016) The Control of Hazardous Energy Lockout, Tagout and Alternative Methods
ASSP Z359.0	(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSP Z359.1	(2016) The Fall Protection Code
ASSP Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSP Z359.12	(2009) Connecting Components for Personal Fall Arrest Systems
ASSP Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSP Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSP Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSP Z359.2	(2017) Minimum Requirements for a Comprehensive Managed Fall Protection Program
ASSP Z359.3	(2017) Safety Requirements for Lanyards and Positioning Lanyards

ASSP Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSP Z359.6	(2016) Specifications and Design Requirements for Active Fall Protection Systems
ASSP Z359.7	(2011) Qualification and Verification Testing of Fall Protection Products

ASME INTERNATIONAL (ASME)

ASME B30.20	(2013; INT Oct 2010 - May 2012) Below-the-Hook Lifting Devices
ASME B30.22	(2016) Articulating Boom Cranes
ASME B30.26	(2015; INT Jun 2010 - Jun 2014) Rigging Hardware
ASME B30.3	(2016) Tower Cranes
ASME B30.5	(2014) Mobile and Locomotive Cranes
ASME B30.8	(2015) Floating Cranes and Floating Derricks
ASME B30.9	(2014; INT Feb 2011 - Nov 2013) Slings

ASTM INTERNATIONAL (ASTM)

ASTM F855	(2015) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

HUMAN FACTORS AND ERGONOMICS SOCIETY

ANSI/HFES 100	(2007) Human Factors Engineering of Computer Workstations

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2003) Guide for Protective Grounding of Power Lines
IEEE C2	(2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 1	(2018) Fire Code
NFPA 10	(2018; TIA 18-1) Standard for Portable Fire Extinguishers
NFPA 241	(2013; Errata 2015) Standard for

	Safeguarding Construction, Alteration, and Demolition Operations
NFPA 51B	(2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14; TIA 17-15; TIA 17-16; TIA 17-17) National Electrical Code
NFPA 70E	(2018; TIA 18-1; TIA 81-2) Standard for Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.1400	Cranes and Derricks in Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.500	Fall Protection
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSP Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be

responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

1.2.7 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

1.2.8 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

1.2.9 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.10 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.11 Medical Treatment

Medical Treatment is treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

1.2.12 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

1.2.13 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.14 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

1.2.15 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the requirements of EM 385-1-1 Appendix Q, and ASSP Z359.0, with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

1.2.16 Recordable Injuries or Illnesses

Recordable Injuries or Illnesses are any work-related injury or illness that results in:

a. Death, regardless of the time between the injury and death, or the length of the illness;

b. Days away from work (any time lost after day of injury/illness onset);

c. Restricted work;

d. Transfer to another job;

e. Medical treatment beyond first aid;

f. Loss of consciousness; or

g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (a) through (f) above.

1.2.17 USACE Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

1.2.18 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment;

two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over). Document any mishap that meets the criteria described in the Contractor Significant Incident Report (CSIR).

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

APP - Pre-Design Submittal; G

APP - Pre-Construction Submittal; G

SD-06 Test Reports

Monthly Exposure Reports

Notifications and Reports

Accident Reports; G

LHE Inspection Reports

SD-07 Certificates

Crane Operators/Riggers

Standard Lift Plan; G

Critical Lift Plan ; G

Activity Hazard Analysis (AHA)

Confined Space Entry Permit

Hot Work Permit

Certificate of Compliance

License Certificates

1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher.

1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and the following federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.6.1.2 Contractor Quality Control (QC) Manager:

The Contractor Quality Control Manager cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties.

1.6.1.3 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the the Contracting Officer for information in consultation with the Safety Office.

1.6.1.3.1 Competent Person for Confined Space Entry

Provide a Confined Space (CP) Competent Person who meets the requirements of EM 385-1-1, Appendix Q, and herein. The CP for Confined Space Entry must supervise the entry into each confined space.

1.6.1.3.2 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

1.6.1.3.3 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04, 21.B.03, and herein.

1.6.1.4 Qualified Trainer Requirements

Individuals qualified to instruct the 40 hour contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards, Lockout/Tagout, Fall Protection, Confined Space Entry for Construction; Excavation, Trenching and Soil Mechanics, and Scaffolds in accordance with 29 CFR 1926.450, Subpart L.

Instructors are required to:

a. Prepare class presentations that cover construction-related safety requirements.

b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.

c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.

e. Request, review and incorporate student feedback into a continuous course improvement program.

1.6.1.5 Crane Operators/Riggers

Provide Operators meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators. In addition, for mobile

cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualification.

1.6.2 Personnel Duties

1.6.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.

b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.

c. Use OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors. Post and maintain the Form 300 on the site Safety Bulletin Board.

d. Maintain applicable safety reference material on the job site.

e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.

f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.

g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.

h. Ensure subcontractor compliance with safety and health requirements.

i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).

j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.

k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.6.3 Meetings

1.6.3.1 Prework Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the Prework Conference. This includes the project superintendent, Site Safety and Occupational Health officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays.

c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the scheduling the Prework Conference. Work is not permitted to begin until an APP is established that is acceptable to the Contracting Officer.

1.6.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors on the project location. The SSHO, supervisors, foremen, or CDSOs must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.7 ACCIDENT PREVENTION PLAN (APP)

1.7.1 Plans and Submissions

1.7.1.1 APP - Pre-Design Submittal

Provide a site-specific Accident Prevention Plan (APP), including Activity Hazard Analyses (AHA), in accordance with the US Army Corps of Engineers Safety and Health Manual EM 385-1-1 Appendix A, paragraph 3.k for the design team to follow during site visits and investigations. For subsequent visits, update the form if there are changes in the personnel who will be attending, or the tasks to be performed. Submit the APP for review and acceptance by the Government at least 15 calendar days prior to the start of the design field work. Field work may not begin until the pre-design APP is accepted by the Contracting Officer.

If the design scope includes borings or other subsurface investigations, as part of the APP identify the type of field investigation and

verification techniques, such as visual, local utility locating service scanning and third party/subcontractor scanning, potholing, or hand digging within two feet of a known utility. Mark underground utilities before starting any ground-disturbing actions. Notify the Contracting Officer 15 days prior to the start of soil borings or sub-surface investigations.

Prior to the start of construction incorporate the Pre-Design APP into the Pre-Construction APP so that one site specific APP exists for the project and submit to the Contracting Officer for acceptance

1.7.1.2 APP - Pre-Construction Submittal

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CHP). The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by

ASSP A10.34), and the environment.

1.7.2 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used. Specify the duties of each position.

b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

1.7.3 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

1.7.3.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan in accordance with EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

1.7.3.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of 3 months.

1.7.3.3 Critical Lift Plan - Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer 30 calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

In addition to the requirements of EM 385-1-1, Section 16.H.02, the critical lift plan must include the following:

a. For lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400 and EM 385-1-1, Section 16.T.

b. For barge mounted mobile cranes, provide a Naval Architecture Analysis and include an LHE Manufacturer's Floating Service Load Chart in accordance with the criteria from the selected standard in EM 385-1-1, Section 16.L.02. The Floating Service Load Chart must provide a table of rated load versus boom angle and radius. The Floating Service Load Chart must also provide the maximum allowable machine list and trim associated with the tabular loads and radii provided. If the Manufacturer's Floating Service Load Chart is not available, a floating service load chart may be developed and provided by a qualified Registered Professional Engineer (RPE), competent in the field of floating cranes. The Load Chart must be in accordance with the criteria from the selected standard in EM 385-1-1, Section 16.L; provide a table of rated load versus boom angle and radius; provide the maximum allowable machine list and machine trim associated with the tabular loads and radii provided; and be stamped by a RPE qualified and competent in the field of floating cranes. The RPE, competent in the field of floating cranes must stamp and certify (sign) that the Naval Architectural Analysis (NAA) meets the requirements of EM 385-1-1, Section 16.L.03.

c. Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

1.7.3.4 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and ASSP Z359.2, be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.7.3.5 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSP Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue;

methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

1.7.3.6 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSP Z244.1, and ASSP A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

1.7.3.7 Excavation Plan

Identify the safety and health aspects of excavation, and provide and prepare the plan in accordance with EM 385-1-1, Section 25.A and Section 31 00 00 EARTHWORK.

1.7.3.8 Occupant Protection Plan

Identify the safety and health aspects of lead-based paint removal, prepared in accordance with Section 02 83 00 LEAD REMEDIATION.

1.7.3.9 Asbestos Hazard Abatement Plan

Identify the safety and health aspects of asbestos work, and prepare in accordance with Section 02 82 00 ASBESTOS REMEDIATION.

1.7.3.10 Site Safety and Health Plan

Identify the safety and health aspects, and prepare in accordance with Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES.

1.7.3.11 PCB Plan

Identify the safety and health aspects of Polychlorinated Biphenyls work, and prepare in accordance with Sections 02 84 33 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs) and 02 61 23 REMOVAL AND DISPOSAL OF PCB CONTAMINATED SOILS.

1.7.3.12 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION and referenced sources. Include engineering survey as applicable.

1.8 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and

the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1, Section 1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.8.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.8.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.9 DISPLAY OF SAFETY INFORMATION

1.9.1 Safety Bulletin Board

Within one calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.06. Additional items required to be posted include:

a. Confined space entry permit.

b. Hot work permit.

1.9.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

a. Date deficiency identified;

b. Description of deficiency;

c. Name of person responsible for correcting deficiency;

d. Projected resolution date;

e. Date actually resolved.

1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

1.11 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.12 NOTIFICATIONS and REPORTS

1.12.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, load handling equipment (LHE) or rigging mishaps, or any property damage. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

1.12.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). The Contracting Officer will provide copies of any required or special forms.

b. Near Misses: For Navy Projects, complete the applicable documentation in NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). Near miss reports are considered positive

and proactive Contractor safety management actions.

c. Conduct an accident investigation for any load handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident. Complete the LHE Accident Report (Crane and Rigging Gear) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the Contracting Officer. The Contracting Officer will provide a blank copy of the accident report form.

1.12.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.12.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.H.03 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

1.13 HOT WORK

1.13.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e. welding or cutting) or operating other flame-producing/spark producing devices, from the Fire Division. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

1.13.2 Work Around Flammable Materials

Obtain services from a NFPA Certified Marine Chemist for "HOT WORK" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, or vaults) that have the potential for flammable or explosive atmospheres.

Whenever these materials, except beryllium and chromium (VI), are

encountered in indoor operations, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in EM 385-1-1, Section 06.H

1.14 RADIATION SAFETY REQUIREMENTS

Submit License Certificates, employee training records, and Leak Test Reports for radiation materials and equipment to the Contracting Officer and Radiation Safety Office (RSO), and Contracting Oversight Technician (COT) for all specialized and licensed material and equipment proposed for use on the construction project. Maintain on-site records whenever licensed radiological materials or ionizing equipment are on government property.

Protect workers from radiation exposure in accordance with 10 CFR 20, ensuring any personnel exposures are maintained As Low As Reasonably Achievable.

1.14.1 Radiography Operation Planning Work Sheet

Submit a Gamma and X-Ray Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. For portable machine sources of ionizing radiation, including moisture density and XRF, use and submit the Portable Gauge Operations Planning Worksheet instead. The Contracting Officer and COT will review the submitted worksheet and provide questions and comments.

Contractors must use primary dosimeters process by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

1.14.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer and COT for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. For gamma radiography materials and equipment, a Government escort is required for any travels on the Installation. The Navy COT or authorized representative will meet the Contractor at a designated location outside the installation, ensure safety of the materials being transported, and will escort the Contractor to the job site and return upon completion of the work. For portable machine sources of ionizing radiation, including moisture density and XRF, the Navy COT or Government authorized representative will meet the Contractor at the job site.

Provide a copy of all calibration records, and utilization records to the COT for radiological operations performed on the site.

1.14.3 Loss or Release and Unplanned Personnel Exposure

Loss or release of radioactive materials, and unplanned personnel exposures must be reported immediately to the Contracting Officer, RSO, and Base Security Department Emergency Number.

1.14.4 Site Demarcation and Barricade

Properly demark and barricade an area surrounding radiological operations

to preclude personnel entrance, in accordance with EM 385-1-1, Nuclear Regulatory Commission, and Applicable State regulations and license requirements, and in accordance with requirements established in the accepted Radiography Operation Planning Work Sheet.

Do not close or obstruct streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

1.14.5 Security of Material and Equipment

Properly secure the radiological material and ionizing radiation equipment at all times, including keeping the devices in a properly marked and locked container, and secondarily locking the container to a secure point in the Contractor's vehicle or other approved storage location during transportation and while not in use. While in use, maintain a continuous visual observation on the radiological material and ionizing radiation equipment. In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, make no assumptions as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside the building or area to prevent exiting while external radiographic operations are in process.

1.14.6 Transportation of Material

Comply with 49 CFR 173 for Transportation of Regulated Amounts of Radioactive Material. Notify Local Fire authorities and the site Radiation Safety officer (RSO) of any Radioactive Material use.

1.14.7 Schedule for Exposure or Unshielding

Actual exposure of the radiographic film or unshielding the source must not be initiated until after 5 p.m. on weekdays.

1.14.8 Transmitter Requirements

Adhere to the base policy concerning the use of transmitters, such as radios and cell phones. Obey Emissions control (EMCON) restrictions.

1.15 CONFINED SPACE ENTRY REQUIREMENTS.

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.15.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures. Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

1.15.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

1.15.3 Sewer Wet Wells

Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

1.15.4 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.16 DIVE SAFETY REQUIREMENTS

Develop a Dive Operations Plan, AHA, emergency management plan, and personnel list that includes qualifications, for each separate diving operation. Submit these documents to the District Dive Coordinator (DDC) for review and acceptance at least 15 working days prior to commencement of diving operations. These documents must be at the diving location at all times. Provide each of these documents as a part of the project file.

1.17 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

a. Hard Hat

b. Long Pants

c. Appropriate Safety Shoes

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during construction operations, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4, "Changes" and FAR 52.236-2, "Differing Site Conditions."

3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages at least 15 days in advance. At a minimum, the written request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, and a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1, Section 11.A.02 (Isolation). Some examples of energy isolation devices and procedures are highlighted in EM 385-1-1, Section 12.D. In accordance with EM 385-1-1, Section 12.A.01, where outages involve Government or Utility personnel, coordinate with the Government on all activities involving the control of hazardous energy.

These activities include, but are not limited to, a review of HECP and HEC procedures, as well as applicable Activity Hazard Analyses (AHAS). In accordance with EM 385-1-1, Section 11.A.02 and NFPA 70E, work on energized electrical circuits must not be performed without prior government authorization. Government permission is considered through the permit process and submission of a detailed AHA. Energized work permits are considered only when de-energizing introduces additional or increased hazard or when de-energizing is infeasible.

3.3 OUTAGE COORDINATION MEETING

After the utility outage request is approved and prior to beginning work on the utility system requiring shut-down, conduct a pre-outage coordination meeting in accordance with EM 385-1-1, Section 12.A. This meeting must include the Prime Contractor, the Prime and subcontractors performing the work, the Contracting Officer, and the Installation Representative. All parties must fully coordinate HEC activities with one another. During the coordination meeting, all parties must discuss and coordinate on the scope of work, HEC procedures (specifically, the lock-out/tag-out procedures for worker and utility protection), the AHA, assurance of trade personnel qualifications, identification of competent persons, and compliance with HECP training in accordance with EM 385-1-1, Section 12.C. Clarify when personal protective equipment is required during switching operations, inspection, and verification.

3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, ASSP A10.44, NFPA 70E, and paragraph HAZARDOUS ENERGY CONTROL PROGRAM (HECP).

3.4.1 Safety Preparatory Inspection Coordination Meeting with the Government or Utility

For electrical distribution equipment that is to be operated by Government or Utility personnel, the Prime Contractor and the subcontractor performing the work must attend the safety preparatory inspection coordination meeting, which will also be attended by the Contracting Officer's Representative, and required by EM 385-1-1, Section 12.A.02. The meeting will occur immediately preceding the start of work and following the completion of the outage coordination meeting. Both the safety preparatory inspection coordination meeting and the outage coordination meeting must occur prior to conducting the outage and commencing with lockout/tagout procedures.

3.4.2 Lockout/Tagout Isolation

Where the Government or Utility performs equipment isolation and lockout/tagout, the Contractor must place their own locks and tags on each energy-isolating device and proceed in accordance with the HECP. Before any work begins, both the Contractor and the Government or Utility must perform energy isolation verification testing while wearing required PPE detailed in the Contractor's AHA and required by EM 385-1-1, Sections 05.I and 11.B. Install personal protective grounds, with tags, to eliminate the potential for induced voltage in accordance with EM 385-1-1, Section 12.E.06.

3.4.3 Lockout/Tagout Removal

Upon completion of work, conduct lockout/tagout removal procedure in accordance with the HECP. In accordance with EM 385-1-1, Section 12.E.08, each lock and tag must be removed from each energy isolating device by the authorized individual or systems operator who applied the device. Provide formal notification to the Government (by completing the Government form if provided by Contracting Officer's Representative), confirming that steps of de-energization and lockout/tagout removal procedure have been conducted and certified through inspection and verification. Government or Utility locks and tags used to support the Contractor's work will not be removed until the authorized Government employee receives the formal notification.

3.5 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSP Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.5.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ASSP Z359.2 in the AHA.

3.5.2 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M,ASSP Z359.0, ASSP Z359.1, ASSP Z359.2, ASSP Z359.3, ASSP Z359.4, ASSP Z359.6, ASSP Z359.7, ASSP Z359.11, ASSP Z359.12, ASSP Z359.13, ASSP Z359.14, and ASSP Z359.15.

3.5.2.1 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Sections 21.O through 21.O.06. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.5.2.2 Personal Fall Protection Harnesses

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap hooks and carabiners must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

3.5.3 Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 6 feet of an edge, on a roof having a slope less than or equal to 4:12 (vertical to horizontal), protect personnel from falling by use of personal fall arrest/restraint systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not authorized. Provide in accordance with 29 CFR 1926.500.

(2) For work greater than 6 feet from an edge, erect and install warning lines in accordance with 29 CFR 1926.500 and EM 385-1-1, Section L.

b. Steep-Sloped Roofs: Work on a roof having a slope greater than 4:1 (vertical to horizontal) requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also applies to residential or housing type construction.

3.5.4 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.5.5 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

3.5.6 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must comply with the requirements of EM 385-1-1, ASSP Z359.2, and ASSP Z359.4.

3.5.7 Fall Prevention During Design Phase

During design phase the Contractor must consider and eliminate fall hazards anticipated during the operation and maintenance evolutions of the facility. If it is not feasible to eliminate or prevent the need to work at heights with the subsequent exposure to fall hazards, control measures must be included in the design to protect personnel conducting maintenance work after completion of the project. In addition to the detailed requirements included in the provisions of this contract, the design work must incorporate the requirements of 29 CFR 1910 and ASSP Z359.0, ASSP Z359.1, ASSP Z359.2, ASSP Z359.3, ASSP Z359.4, ASSP A1264.1, and NFPA 1.

3.6 ERGONOMICS CONSIDERATIONS DURING DESIGN PHASE

Design Facilities, processes, job tasks, tools and materials to reduce or eliminate work-related musculoskeletal (WMSD) injuries and risk factors in the workplace. Ensure that facility maintenance access is designed to reduce WMSD risk factors to the lowest level possible. In addition to the detailed requirements included in the provisions of this contract, the design work must incorporate the requirements of MIL-STD-1472, DoD-HDBK 743 and ANSI/HFES 100.

3.7 WORK PLATFORMS

3.7.1 Scaffolding

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Comply with the following requirements:

a. Scaffold platforms greater than 20 feet in height must be accessed by use of a scaffold stair system.

b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than 20 feet maximum in height.

c. An adequate gate is required.

d. Employees performing scaffold erection and dismantling must be qualified.

e. Scaffold must be capable of supporting at least four times the maximum intended load, and provide appropriate fall protection as delineated in the accepted fall protection and prevention plan.

f. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.

g. Special care must be given to ensure scaffold systems are not overloaded.

h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the smallest dimension of the scaffold base.

i. Scaffolding other than suspended types must bear on base plates upon wood mudsills (2 in x 10 in x 8 in minimum) or other adequate firm foundation.

j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet.

k. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.7.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.8 EQUIPMENT

3.8.1 Material Handling Equipment (MHE)

a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.

c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.8.2 Load Handling Equipment (LHE)

a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.

b. Notify the Contracting Officer 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated.Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards.

c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.

e. Under no circumstance must a Contractor make a lift at or above 90 percent of the cranes rated capacity in any configuration.

f. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.

g. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.

h. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

i. All employees must keep clear of loads about to be lifted and of suspended loads.

j. Use cribbing when performing lifts on outriggers.

k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

l. A physical barricade must be positioned to prevent personnel access

where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.

m. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.

n. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.

o. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

p. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

3.8.3 Machinery and Mechanized Equipment

a. Proof of qualifications for operator must be kept on the project site for review.

b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.8.4 USE OF EXPLOSIVES

Explosives must not be used or brought to the project site without prior written approval from the Contracting Officer. Such approval does not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, must be only where directed and in approved storage facilities. These facilities must be kept locked at all times except for inspection, delivery, and withdrawal of explosives.

3.9 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

3.9.1 Utility Locations

Provide a third party, independent, private utility locating company to positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility

department.

3.9.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system.

3.9.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the Contractor from meeting this requirement.

3.10 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

3.10.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

3.10.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State, Local requirements applicable to where work is being performed.

3.10.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.10.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.10.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system and signed by the electrical CP or QP.

-- End of Section --

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SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS
02/19

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g. ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AACE INTERNATIONAL (AACE)
1265 Suncrest Towne Centre Drive
Morgantown, WV 26505-1876 USA
Ph: 304-296-8444
Fax: 304-291-5728
Internet: https://web.aacei.org/

ACOUSTICAL SOCIETY OF AMERICA (ASA)
1305 Walt Whitman Road, Suite 300
Melville, NY 11747-4300
Ph: 516-576-2360
Fax: 631-923-2875
E-mail: asa@acousticalsociety.org
Internet: https://acousticalsociety.org/

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC. (AIA/NAS)
1000 Wilson Blvd, Suite 1700
Arlington, VA 22209-3928
Ph: 703-358-1000
E-mail: aia@aia-aerospace.org
Internet: https://www.aia-aerospace.org/

AIR BARRIER ASSOCIATION OF AMERICA (ABAA)
1600 Boston-Providence Hwy
Walpole, MA 02081
Ph: 1-866-956-5888
Fax: 1-866-956-5819
Internet: https://www.airbarrier.org/

AIR CONDITIONING CONTRACTORS OF AMERICA (ACCA)
2800 Shirlington Road, Suite 300
Arlington, VA 22206

Ph: 703-575-4477
Internet: https://www.acca.org/

AIR DUCT COUNCIL (ADC)
1901 N. Roselle Road, Suite 800
Schaumburg, IL 60195
Ph: 847-706-6750
Fax: 847-706-6751
E-mail: info@flexibleduct.org
Internet: https://flexibleduct.org/

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA)
30 West University Drive
Arlington Heights, IL 60004-1893
Ph: 847-394-0150
Fax: 847-253-0088
E-mail: communications@amca.org
Internet: http://www.amca.org

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)
2111 Wilson Blvd, Suite 400
Arlington, VA 22201
Ph: 703-524-8800
Internet: http://www.ahrinet.org

ALLIANCE FOR TELECOMMUNICATIONS INDUSTRY SOLUTIONS (ATIS)
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Washington, D.C. 20005
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E-mail: nbutler@atis.org
Internet: http://www.atis.org

ALUMINUM ASSOCIATION (AA)
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E-Mail: info@aluminum.org
Internet: https://www.aluminum.org/

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Internet: https://aamanet.org/

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Fax: 828-214-6299
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Internet: http://aarst-nrpp.com/wp/

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Washington, DC 20001

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Fax: 202-624-5806
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Internet: https://www.transportation.org/

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Ph: 919-549-8141
Fax: 919-549-8933
Internet: https://www.aatcc.org/

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Internet: https://www.abma.com/

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Ph: 281-877-6000
Fax: 281-877-5976
E-Mail: ABS-WorldHQ@eagle.org
Internet: https://ww2.eagle.org/

AMERICAN COMPOSITES MANUFACTURER'S ASSOCIATION (ACMA)
2000 N. 15th St, Suite 250
Arlington, VA 22201
Ph: 703-525-0511
Fax: 703-525-0743
Internet: https://acmanet.org

AMERICAN CONCRETE INSTITUTE (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331-3439
Ph: 248-848-3700
Fax: 248-848-3701
Internet: https://www.concrete.org/

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)
8445 Freeport Parkway, Suite 350
Irving, TX 75063-2595
Ph: 972-506-7216
Fax: 972-506-7682
E-mail: info@concrete-pipe.org
Internet: https://www.concretepipe.org/

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)
1330 Kemper Meadow Drive
Cincinnati, OH 45240
Ph: 513-742-2020
Fax: 513-742-3355
Internet: https://www.acgih.org/

AMERICAN FOREST FOUNDATION (AFF)
American Tree Farm System
2000 M Street, NW, Suite 550
Washington, DC 20036
Ph: 202-765-3660
Fax: 202-827-7924
Email: info@forestfoundation.org
Internet: https://www.treefarmsystem.org

AMERICAN FOREST AND PAPER ASSOCIATION (AF&PA)
American Wood Council
Public Policy Office
1101 K Street NW, Suite 700
Washington, DC 20005
Ph: 800-890-7732 or 202-463-2766
Fax: 412-741-0609
E-mail: publications@awc.org
Internet: https://www.awc.org/

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400 North Capitol Street, NW
Suite 450
Washington, D.C. 20001
Ph: 202-824-7000
Internet: https://www.aga.org/

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E-mail: tech@agma.org
Internet: https://www.agma.org/

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Internet: http://domensino.com/AHA/

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)
3141 Fairview Park Dr, Suite 777
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Fax: 312-670-5403
Steel Solutions Center: 866-275-2472
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Internet: https://www.aisc.org/

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Internet: http://www.aitc-glulam.org

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Fax: 414-272-1734
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Internet: https://www.ashrae.org/

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Internet: https://www.awc.org/

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Internet: https://www.aabc.com/

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Internet: http://www.aami.org

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Fax: 205-257-2540
Internet: https://aeic.org/

ASSOCIATION OF HOME APPLIANCE MANUFACTURERS (AHAM)
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Ph: 202-872-5955
E-mail: info@aham.org

Internet: http://www.aham.org

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2111 Eisenhower Avenue, Suite 500
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E-mail: memberservices@apsp.org
Internet: https://apsp.org/

ASSOCIATION OF THE WALL AND CEILING INDUSTRY (AWCI)
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Falls Church, VA 22046
Ph: 703-538-1600
Fax: 703-534-8307
Internet: https://www.awci.org/

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
E-mail: service@astm.org
Internet: https://www.astm.org/

BACNET INTERNATIONAL (BTL)
BACnet Testing Laboratories
1827 Powers Ferry Road
Building 14, Suite 100
Atlanta, GA 30339
Ph: 770-971-6003
Fax: 678-229-2777
E-mail: info@bacnetinternational.org
Internet: https://www.bacnetlabs.org/

BAY AREA AIR QUALITY MANAGEMENT DISTRICT (BAAQMD)
375 Beale Street, Suite 600
San Francisco, CA 94105
Ph: 415-749-4900
Fax: 415-928-8560
Internet: http://www.baaqmd.gov/

BIFMA INTERNATIONAL (BIFMA)
678 Front Ave. NW, Suite 150
Grand Rapids, MI 49504-5368
Ph: 616-285-3963
E-mail: email@bifma.org
Internet: https://www.bifma.org/

BIOCYCLE, JOURNAL OF COMPOSTING AND RECYCLING (BIOCYCLE)
Ph: 610-967-4135
Internet: https://www.biocycle.net/

BRITISH STANDARDS INSTITUTE (BSI)
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E-mail: cservices@bsigroup.com
Internet: https://www.bsigroup.com/

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)
355 Lexington Avenue, 15th Floor
New York, NY 10017
Ph: 212-297-2122
Fax: 212-370-9047
Internet: https://www.buildershardware.com/

CALIFORNIA AIR RESOURCES BOARD (CARB)
1001 I Street
Sacramento, CA 95814
Ph: 800-242-4450
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CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)
PO Box 997377, MS 0500
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Ph: 916-558-1784
Internet: https://www.cdph.ca.gov/

CALIFORNIA ENERGY COMMISSION (CEC)
Media and Public Communications Office
1516 Ninth Street, MS-29
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Ph: 916-654-5106
E-mail: appliances@energy.ca.gov
Internet: https://www.energy.ca.gov/

CARPET AND RUG INSTITUTE (CRI)
P.O. Box 2048
Dalton, GA 30722-2048
Ph: 706-278-3176
Fax: 706-278-8835
Internet: https://carpet-rug.org/

CAST IRON SOIL PIPE INSTITUTE (CISPI)
2401 Fieldcrest Drive
Mundelein, IL 60060
Ph: 224-864-2910
Internet: https://www.cispi.org/

CEILINGS AND INTERIOR SYSTEMS CONSTRUCTION ASSOCIATION (CISCA)
1010 Jorie Blvd, Suite 30
Oak Brook, IL 60523
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Internet: https://www.state.gov/

U.S. DEPARTMENT OF TRANSPORTATION (DOT)
1200 New Jersey Ave., SE
Washington, DC 20590
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Internet: https://www.transportation.gov/

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
1200 Pennsylvania Avenue, N.W.
Washington, DC 20004
Ph: 202-564-4700
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Internet: http://www.navfac.navy.mil

U.S. NAVAL SEA SYSTEMS COMMAND (NAVSEA)
Commander Naval Sea Systems Command
1333 Isaac Hull Ave., SE

Washington Navy Yard, DC 20376
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Internet: https://www.navsea.navy.mil/

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UL Directories available through IHS at https://ihsmarkit.com/

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994 Old Eagle School Road
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Wayne, PA 19087-1866
Ph: 610-971-4850
E-mail: info@viscma.com
Internet: http://www.viscma.com

WALLCOVERINGS ASSOCIATION (WA)
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Chicago, IL 60611
Ph: 312-321-5166
E-mail: info@wallcoverings.org
Internet: https://www.wallcoverings.org

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WATER QUALITY ASSOCIATION (WQA)
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Fax: 630-505-9637
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Internet: https://www.wdma.com/

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internet: https://www.woolmark.com/

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION 01 45 00.05 20

DESIGN AND CONSTRUCTION QUALITY CONTROL
06/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 52.2	(2012) Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

ASTM INTERNATIONAL (ASTM)

ASTM D6245	(2012) Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
ASTM D6345	(2010) Standard Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 008	(2007) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Design Quality Control (DQC) Plan; G

Submit a DQC Plan prior to the Post Award Kickoff Meeting.

Construction Quality Control (CQC) Plan; G

Submit a Construction QC Plan prior to start of construction.

Indoor Air Quality (IAQ) Management Plan; G

SD-05 Design Data

Design Quality Control Documentation; G

SD-07 Certificates

Preliminary Inspections and Final Acceptance Testing; G

Final Life Safety/Fire Protection Certification; G

1.3 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program that is administered by a Design and Construction Quality Control organization, using Quality Control (Design and Construction) Plans, meetings, a Coordination and Mutual Understanding Meeting, three phases of control, submittal review and approval, testing, completion inspections, and QC certifications, independent Special Inspections in accordance with Section 01 45 35.05 20 SPECIAL INSPECTIONS FOR DESIGN-BUILD, and documentation necessary to provide design, materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program must cover on-site and off-site work. No construction work or testing may be performed unless the QC Manager is on the work site.

1.3.1 QC Plan Meeting

Prior to submission of the QC Plan, the QC Manager may request a meeting with the Contracting Officer to discuss the QC Plan requirements of this Contract.

The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission and to agree on the Contractor's list of Definable Features of Work (DFOWs).

1.3.2 Mutual Understanding Meeting

The purpose of this meeting is to develop a mutual understanding of the QC Plans, including documentation, administration, requirements and procedures, coordination of activities to be performed, and the coordination of the contractor's management, production and QC personnel. At the meeting, the contractor will explain in detail how the three phases of quality control will be implemented for each DFOW.

1.3.3 Design and Construction Quality Control Plans

The contractor must provide a project specific Design Quality Control (DQC) Plan and Construction Quality Control (CQC) Plan, for review and approval by the Contracting Officer. The Contractor must perform no design until the DQC Plan is approved and no construction until the CQC Plan is approved. The Contractor's plans must include the following:

a. The QC organization for this contract, including member resumes.

b. A letter from an officer of the company designating the QC Manager, Alternate QC Manager, DQC Manager, and their authority.

c. QC Manager and DQC Manager qualifications in resume format.

d. Names of the individuals, including their respective firm names, who will be serving as the DOR in their respective design discipline.

e. List of DFOW including list of design submittal packaging. DFOW is a task that is separate and distinct from other tasks and has control requirements and work crews unique to the task.

f. For the CQC Plan, a plan to implement the "Three Phases of Control" for each DFOW.

g. For the CQC Plan, a testing Plan, log and list of personnel and accredited laboratories that will perform tests. Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation with the testing plan.

h. Submittal Register including design submittals, listing personnel who will review submittals and noting submittals for Contracting Officer review.

i. Procedures for submitting and reviewing design changes/ variations prior to submission to the Contracting Officer.

j. As part of the Contractor's DQC plan, a statement of Life Safety and Fire Protection Features Inspections and Testing must be prepared by the Fire Protection Designer of Record (DOR). Examples of life safety and fire protection features include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as fire rated walls/partitions, through -penetration firestop systems, spray-applied fire proofing of structural components, fire alarm and detection systems, fire suppression and standpipe systems, means of egress components, emergency and exit lighting fixtures. The plan must include a listing of the individuals, approved agencies or firms that will be retained for conducting the required inspections and tests accompanied by a description of individual inspector's experience and a copy of all required certifications. Additional copies of this plan must be submitted to the NAVFAC Fire Protection Engineer and the Installation Fire Chief. This plan must include the following:

   (1) Comprehensive list of systems, components or features to be inspected and tested.

   (2) Description of performance verification testing activities for each system or component.

   (3) Procedures and schedules for functional performance tests of all systems requiring functional testing.

k. For the DQC plan, submit a formal Communication Plan that indicates

the frequency of design meetings and what information is covered in those meetings, key design decision points tied to the Network Analysis Schedule and how the DOR plans to include the Government in those decisions, peer review procedures, interdisciplinary coordination, design review procedures, comment resolution, etc.

The Communication Plan must emphasize key decisions and possible problems the Contractor and Government may encounter during the design phase of the project. Provide a plan to discuss design alternatives and design coordination with the stakeholders at the key decision points as they arise on the project. Identify individual stakeholders and suggested communication methods that will be employed to expedite and facilitate each anticipated critical decision. Communication methods may include: Concept Design Workshop, over-the-shoulder review meetings, presentation at client's office, lifecycle cost analysis presentation, technical phone conversation, and formal review meeting. The design portion of the Communication Plan must be written by the DQC Manager and confirmed during the Post Award Kick off Partnering. Update the Communication Plan at every Partnering meeting.

l. For the DQC Plan, procedures for insuring the design documents are submitted in accordance with FC 1-300-09N, Navy and Marine Corps Design Procedures and other procedures to ensure disciplines have been properly coordinated to eliminate conflicts.

m. For the DQC Plan, provide Quality Control Documentation procedures such as QC review sets and QC comments to demonstrate that cross checking of all engineering disciple's design drawings and specifications has taken place. The QC review documentation must exhibit a checking process of the design documents for completeness, accuracy, and constructability.

n. For the DQC Plan, a list of design subcontractors and the scope of the work which each firm will accomplish.

1.3.4 Special Inspections

Perform all required Special Inspections and structural observations per Section 01 45 35.05 20 SPECIAL INSPECTIONS FOR DESIGN-BUILD, the Statement of Special Inspections and the Schedule of Special Inspections.

1.4 QC ORGANIZATION

The QC Manager must manage the QC organization and must report to an officer of the firm and must not be subordinate to the Project Superintendent or the Project Manager.

1.4.1 QC and Alternate QC Manager

QC and Alternate QC Manager qualifications:

a. Complete the course entitled "Construction Quality Management (CQM) for Contractors" and maintain a current certificate. The QC Manager that does not have a current certification must obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for

class schedule information.

b. Familiar with requirements of USACE EM 385-1-1, and experience in the areas of hazard identification and safety compliance.

c. Ten years of combined experience as a Superintendent, QC Manager, Project Manager, or Project Engineer on similar size and type construction contracts, and at least two years' experience as a QC Manager on similiar size and type construction contracts..

QC and Alternate QC Manager responsibilities:

a. Participate in the Post Award Kick-off, Partnering, Preconstruction, Design Development, and Coordination and Mutual Understanding Meetings.

b. Implement the "Three Phase of Control" plan for each DFOW and notify the Contracting Officer at least 3 business days in advance of each Preparatory and Initial Phase meeting. Submit respective checklists to the Contracting Officer the next business day.

c. Ensure that no construction begins before the DOR has finalized the design for that segment of work, and construction submittals are approved as required.

d. Inspect all work and rework, using International Conference of Building Officials certified QC specialists as applicable, to ensure its compliance with contract requirements. Maintain a rework log.

e. Immediately stop any segment of work, which does not comply with the contract requirements and direct the removal and replacement of any defective work.

f. Remove any individual from the site who fails to perform their work in a skillful, safe and workmanlike manner or whose work does not comply with the contract plans and specifications.

g. Prepare daily QC Reports.

h. Provide daily photographic documentation to support the work reported in the Daily Reports. Maintain a file of CD/ DVD disks at the job site that assemble the photographs supporting the daily reports. Organize the supporting photographs into searchable files organized by date and under each date organize the photographs in folders for each definable features of work. Indicate on the disk label and disk holder the date range of pictures contained on each disk. Provide a date stamp on each picture and title each picture with a description of location and viewed components. Provide .jpeg color photograph files that are 300 DPI - printable at 8 inch by 10 inch size.

Photograph construction related to existing work to be covered by contract modifications and required rework as follows;

(1) View of as-is conditions prior to modification / rework.

(2) View of as-is conditions with existing exterior enclosure and interior finishes removed before modification / new work begins.

(3) View of new / modified construction prior to being covered by exterior enclosure and interior finishes.

(4) View of completed new / modified construction.

i. Ensure that Contractor Production Reports are prepared daily.

j. Hold weekly QC meetings with the DQC Manager, DOR (or representative), Superintendent and the Contracting Officer; participation must be suitable for the phase of work. Distribute minutes of these meetings.

k. Ensure that design and construction submittals are reviewed and approved, as required by the contract, prior to allowing material on site and work to proceed with these items. Maintain a submittal register.

l. Update As-built drawings daily, maintaining up-to-date set on site.

m. Maintain a testing plan and log. Ensure that all testing is performed in accordance with the contract. Review all test reports and notify the Contracting Officer of all deficiencies, along with a proposal for corrective action.

n. Maintain rework log on site, noting dates deficiency identified, and date corrected.

o. Certify and sign statement on each invoice that all work to be paid under the invoice has been completed in accordance with contract requirements.

p. Perform Punch-out and participate in Pre-final and Final acceptance Inspections. Submit list of deficiencies to the Contracting Officer for each inspection. Correct all deficiencies prior to the Final inspection. Notify Contracting Officer prior to final inspection to establish a schedule date acceptable by the Contracting Officer.

q. Ensure that all required keys, operation and maintenance manuals, warranty certificates, and the As-built drawings are correct and complete, in accordance with the contract, and submitted to the Contracting Officer.

r. Assure that all applicable tests, and observations required by the contract are performed.

s. Coordinate all factory and on-site testing, Testing Laboratory personnel, QC Specialists, and any other inspection and testing personnel required by this Contract.

t. Notify the Contracting Officer of any proposed changes to the QC plan.

u. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.

v. Update the Performance Assessment Plan as described in Section 01 31 19.05 20 POST AWARD MEETINGS and discuss monthly at a QC meeting.

w. Coordinate training of Government maintenance personnel with the eOMSI Preparer to assure training materials and training classes are accurate and provide instruction and documentation on critical elements of the products, materials, and systems in the constructed facility. Verify that the Government's operating personnel were

trained.

x. Coordinate scheduled work with Special Inspections required by Section 01 45 35.05 20 SPECIAL INSPECTIONS FOR DESIGN-BUILD, the Statement of Special Inspections and the Schedule of Special Inspections.

y. Supervise all Special Inspectors required by the contract documents and the IBC.

z. Verify the qualifications of all of the Special Inspectors.

aa. Verify the qualifications of fabricators.

bb. Maintain a 3- ring binder for the Special Inspector's daily and biweekly reports. This file must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the DOR.

1.4.2 DQC Manager

The DQC Manager must be a member of the QC organization, must coordinate actions with the QC Manager , and must not be subordinate to the Project Superintendent or the Project Manager.

DQC Manager qualifications:

a. A minimum of 5 years' experience as a design Architect or Engineer on similar size and type designs / or design-build contracts. Provide education, experience, and management capabilities on similar size and type contracts.

b. Be a registered professional engineer or architect with an active registration. Provide proof of registration as part of the resume submittal package.

c. Complete the US Army Corps of Engineers (USACE) course entitled "Construction Quality Management (CQM) for Contractors."

DQC Manager responsibilities:

a. Be responsible for the design integrity, professional design standards, and all design services required.

b. Be a member of the Designer of Record's (DOR) firm, but may not be the DOR or the person stamping and approving final construction drawings or approving submittals.

c. Be responsible for development of the design portion of the QC Plan, incorporation and maintenance of the approved Design Schedule, and the preparation of DQC Reports and minutes of all design meetings.

d. Participate in the Post Award Kick-Off, all design planning meetings, design presentations, partnering, and QC meetings.

e. Implement the DQC plan and must remain on staff involved with the project until completion of the project.

f. Be cognizant of and assure that all design documents on the project have been developed in accordance with the Contract.

g. Provide Design Quality Control Documentation (DQCD) which indicates design coordination of the engineering disciplines. Submit DQCD with the pre-final and final design submittals as required in Section 01 33 10.05 20, DESIGN SUBMITTAL PROCEDURES.

h. Develop the submittal register. Coordinate with each DOR to determine what items need to be submitted, and who needs to approve.

i. Provide QC certification for design compliance.

j. Certify and sign statement on each invoice that all work to be paid to the DOR under the invoice has been completed in accordance with the contract requirements.

k. Prepare weekly DQC Reports that document the work the design team accomplished that week.

l. Coordinate all training requirements with the QC and in accordance with 01 78 23 OPERATION AND MAINTENANCE DATA.

1.4.3 Designer of Record (DOR) Qualifications

The DOR must be a registered design professional, retained by the prime contractor, responsible for the overall design and review of submittal documents prepared by others. The DOR is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in the state in which the design professional works. The DOR cannot serve as the DQC.

1.4.4 QC Specialists

QC Specialists must assist and report to the QC Manager and may perform production related duties but must be allowed sufficient time to perform their assigned quality control duties. QC Specialists are required to attend the Coordination and Mutual Understanding Meeting, QC meetings and be physically present at the construction site to perform the three phases of control and prepare documentation for each definable feature of work in their area of responsibility at the frequency specified below.

1.4.4.1 Fire Protection QC Specialist

The Fire Protection QC Specialist (FPQC) must be a U.S. registered Professional Engineer and must be an integral part of the Prime Contractor's Quality Control Organization. This FPQC must have no business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this project. The Fire Protection Designer of Record may serve as the lead Fire Protection QC Specialist, provided the following qualifications are met.

a. Qualifications/Experience: The FPQC must have obtained their professional registration by successfully completing the Fire Protection Engineering discipline examination. This FPQC must have a minimum of 5 years full time and exclusive experience in every aspect of facility design and construction as it relates to fire protection, which includes, but is not limited to, building code analysis, life safety code analysis, design of automatic detection and suppression

systems, passive fire protection design, water supply analysis, and a multi-discipline coordination reviews, and construction surveillance.

b. Area of Responsibility: The FPQC is responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The FPQC must be responsible for assuring that life safety and fire protection features are provided in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression and standpipe systems, emergency and exit lighting fixtures, etc.

c. Construction Surveillance: The FPQC is responsible for reviewing and implementing the QC Plan developed by the Fire Protection DOR. The FPQC must visit the construction site as necessary to ensure life safety and fire protection systems are being constructed, applied, and installed in accordance with the approved design documents, approved construction submittals, and manufacturer's requirements. Frequency and duration of the field visits are dependent upon particular system components, system complexity, and phase of construction. At a minimum, field visits must occur just prior to installation of suspended ceiling systems to inspect the integrity of passive fire protection features and fire suppression system piping, and required performance verification testing of all life safety and fire protection systems identified below and in Part 4.

(1) Preliminary Inspections and Final Acceptance Testing: FPQC must personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPQC must submit a signed certificate to the QC Manager that systems are ready for final inspection and testing. The Naval Facilities Engineering Command Fire Protection Engineer will witness formal tests and approve all systems before they are accepted. The QC Manager must submit the request for formal inspection at least 15 days prior to the date the inspection is to take place. The QC Manager must provide 10 days advance notice to the Contracting Officer and the activity Fire Inspection Office of scheduled final inspections.

d. QC Documentation and Certifications: The following documentation and certification must be prepared by the FPQC. Additional copies must be submitted to the NAVFAC Fire Protection Engineer and the Installation Fire Chief.

(1) Field visit reports. Submit reports documenting all field visits and summarizing all findings.

(2) Inspection and Test reports and certificates. Submit in accordance with the applicable codes, standards, and this RFP.

(3) Final Life Safety/Fire Protection Certification. Provide FPQC certification that all life safety and fire protection systems have been inspected and in the FPQC's professional judgment, have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification must summarize all life safety and fire protection features, and

must bear the professional seal of the fire protection engineer.

1.4.4.2 Building Envelope QC Specialists

Qualification / Experience in Area of Responsibility	Area of Responsibility	Frequency
Roofing Manufacturer's Technical Representative / 5 years minimum with roofing system used.	Installation and testing of roofing.	Once a week during installation, two times a Once a week during flashing installation and full time during roof testing.

1.4.4.3 Special Inspector

The Special Inspector (SI) must be an independent third party hired directly by the Prime Contractor. The SI must not be a company employee of the Contractor or any Sub-Contractor performing the work to be inspected. The qualifications of the SI are defined in Section 01 45 35.05 20 SPECIAL INSPECTIONS FOR DESIGN-BUILD.

1.4.4.4 Electrical and Telecommunications Systems QC Specialists

Provide ICC IBC Special inspections Certification from the following specialists:

Qualification / Experience in Area of Responsibility	Area of Responsibility	Frequency
Electrical Inspector Crew supervision for 10 years minimum. Master Electrician licensed in NC.	Electrical Systems, All Division 26 sections, and Division 33 Elec. Sections	Full time during installation and testing all systems.
Telecommunications Systems Installation Specialist 10 years minimum experience in Telecommunications systems installation.	Telecommunications systems, All Division 27, 28 sections Division 33 Outside Plant (OSP) Work.	Full time during systems installation and testing.

Q

1.5 TESTING

1.5.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a

laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing must meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

1.5.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology at http://ts.nist.gov/ts/htdocs/210/214/214.htm , the American Association of State Highway and Transportation Officials (AASHTO) program at http://www.amrl.net/amrlsitefinity/default/aap.aspx , International Accreditation Services, Inc. (IAS) at http://www.iasonline.org, U. S. Army Corps of Engineers Materials Testing Center (MTC) at http://gsl.erdc.usace.army.mil/SL/MTC/, the American Association for Laboratory Accreditation (A2LA) program at http://www.a2la.org/, the Washington Association of Building Officials (WABO) at http://www.wabo.org/ (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) at http://wacel.org/fmi/xsl/wacel/index.xsl (Approval authority by WACEL is limited to projects within Facilities Engineering Command (FEC) Washington geographical area).

1.5.3 Capability Check

The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.

1.5.4 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the Contracting Officer immediately. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the Contracting Officer via the QC Manager. Furnish a summary report of field tests at the end of each month, in accordance with paragraph INFORMATION FOR THE CONTRACTING OFFICER.

1.5.5 Test Reports and Monthly Summary Report of Tests

Furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the Contracting Officer. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month. Provide a copy of the signed test reports and certifications to the OMSI preparer for inclusion into the OMSI documentation.

1.6 THREE PHASES OF CONTROL

The Three Phases of Control must adequately cover both on-site and off-site work and must include the following for each DFOW.

1.6.1 Preparatory Phase

Notify the Contracting Officer at least two work days in advance of each preparatory phase meeting. The meeting must be conducted by the QC Manager and attended by the Project Superintendent, QC Specialists, and the foreman responsible for the DFOW. The Special Inspector must also attend if required by Special Inspections, as outlined in the Statement of Special Inspections and Schedule of Special Inspections. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman must attend the preparatory phase meeting. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections;

b. Review the Contract drawings;

c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;

d. Review the testing plan and ensure that provisions have been made to provide the required QC testing;

e. Review Special Inspections required by Section 01 45 35.05 20 SPECIAL INSPECTIONS FOR DESIGN-BUILD, the Statement of Special Inspections and the Schedule of Special Inspections.

f. Examine the work area to ensure that the required preliminary work has been completed;

g. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data;

h. Discuss the specific controls used in construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW; and

i. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted.

1.6.2 Initial Phase

Notify the Contracting Officer at least two work days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the Project Superintendent, QC Specialists, and the foreman responsible for that DFOW. The Special Inspector must also attend if required by Special Inspections, as outlined in the Statement of Special Inspections and Schedule of Special Inspections. Observe the initial segment of the DFOW to ensure that the work complies

with Contract requirements. Document the results of the initial phase in the daily CQC Report and in Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

a. Establish the quality of workmanship required;

b. Resolve conflicts;

c. Ensure that testing is performed by the approved laboratory, and

d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

e. Ensure manufacturer's representative has performed necessary inspections, if required.

f. Coordinate scheduled work with Special Inspections required by the Section 01 45 35.05 20 SPECIAL INSPECTIONS FOR DESIGN-BUILD, the Statement of Special Inspections and the Schedule of Special Inspections.

1.6.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

a. Ensure the work is in compliance with Contract requirements;

b. Maintain the quality of workmanship required;

c. Ensure that testing is performed by the approved laboratory; and

d. Ensure that rework items are being corrected.

e. Coordinate scheduled work with Special Inspections required by the Section 01 45 35.05 20 SPECIAL INSPECTIONS FOR DESIGN-BUILD, the Statement of Special Inspections and the Schedule of Special Inspections.

1.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases must be conducted on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

1.6.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

1.7 COMPLETION INSPECTIONS

The Contractor must perform the necessary punch-out, pre-final, and final inspections, compile punch lists, and correct deficiencies.

1.7.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager and the CA must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications and Contract. Include in the punch list any remaining items on the "Rework Items List", which were not corrected prior to the Punch-Out Inspection. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the Contracting Officer. The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Contracting Officer that the facility is ready for the Government "Pre-Final Inspection".

1.7.2 Pre-Final Inspection

The Government and QC Manager will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the QC Manager as a result of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the Client can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work or any particular increment thereof, if the project is divided into increments by separate completion dates.

1.7.3 Final Acceptance Inspection

Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, the CA, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other FEAD/ROICC personnel, and personnel representing the Client. Failure of the Contractor to have all contract work acceptably complete for this inspection will because for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause entitled "Inspection of Construction."

1.8 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

1.9 CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN

Submit an IAQ Management Plan within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. Revise and resubmit Plan as required by the Contracting Officer. Make copies of the final plan available to all workers on site. Include provisions in the Plan to meet the requirements specified below and to ensure safe, healthy air for construction workers and building occupants.

1.9.1 Requirements During Construction

Provide for evaluation of indoor Carbon Dioxide concentrations in accordance with ASTM D6245. Provide for evaluation of volatile organic compounds (VOCs) in indoor air in accordance with ASTM D6345. Use filters with a Minimum Efficiency Reporting Value (MERV) of 8 in permanently installed air handlers during construction.

1.9.1.1 Control Measures

Meet or exceed the requirements of ANSI/SMACNA 008, Chapter 3, to help minimize contamination of the building from construction activities. The five requirements of this manual which must be adhered to are described below:

a. HVAC protection: Isolate return side of HVAC system from surrounding environment to prevent construction dust and debris from entering the duct work and spaces.

b. Source control: Use low emitting paints and other finishes, sealants, adhesives, and other materials as specified. When available, cleaning products must have a low VOC content and be non-toxic to minimize building contamination. Utilize cleaning techniques that minimize dust generation. Cycle equipment off when not needed. Prohibit idling motor vehicles where emissions could be drawn into building. Designate receiving/storage areas for incoming material that minimize IAQ impacts.

c. Pathway interruption: When pollutants are generated use strategies such as 100 percent outside air ventilation or erection of physical barriers between work and non-work areas to prevent contamination.

d. Housekeeping: Clean frequently to remove construction dust and debris. Promptly clean up spills. Remove accumulated water and keep work areas dry to discourage the growth of mold and bacteria. Take extra measures when hazardous materials are involved.

e. Scheduling: Control the sequence of construction to minimize the absorption of VOCs by other building materials.

1.9.1.2 Moisture Contamination

a. Remove accumulated water and keep work dry.

b. Use dehumidification to remove moist, humid air from a work area.

c. Do not use combustion heaters or generators inside the building.

d. Protect porous materials from exposure to moisture.

e. Remove and replace items which remain damp for more than a few hours.

1.9.2 Requirements after Construction

After construction ends and prior to occupancy, conduct a building flush-out or test the indoor air contaminant levels. Flush-out must be a minimum two-weeks with MERV-13 filtration media as determined by ASHRAE 52.2at 100 percent outside air. Air contamination testing must be

consistent with EPA's current Compendium of Methods for the Determination of Air Pollutants in Indoor Air. After building flush-out or testing and prior to occupancy, replace filtration media. Filtration media must have a MERV of 13 as determined by ASHRAE 52.2.

1.10 Commissioning

Refer to Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING for commissioning requirements.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 45 35.05 20

SPECIAL INSPECTIONS FOR DESIGN-BUILD
09/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2018) International Building Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01	(2019; with Change 3) Structural Engineering

1.2 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections and Chapter 17 of ICC IBC.

Special Inspections are to be performed by an independent third party and are intended to ensure that the work of the prime contractor is in accordance with the Contract Documents and applicable building codes. Special inspections do not take the place of the three phases of control inspections performed by the Contractor's QC Manager or any testing and inspections required by other sections of the specifications.

1.2.1 Fabricator Special Inspections

Special Inspections of fabricator's work performed in the fabricator's shop is required to be inspected in accordance with the Statement of Special Inspections and the Schedule of Special Inspections unless the fabricator is certified by the approved agency to perform such work without Special Inspections. Submit the following certifications to the Contracting Officer for information to allow work performed in the fabricator's shop to not be subjected to Special Inspections.

American Institute of Steel Construction (AISC) Certified Fabrication Plant, Category STD.

Truss Plate Institute (TPI) steel truss plant quality assurance program certification.International Accreditation Service, AC472 Accreditation

Steel Joist Institute Membership

Precast Concrete Institute (PCI) Certified Plant, Group C

At the completion of fabrication, submit a certificate of compliance, to be included with the final report of Special Inspections, stating that the materials supplied and work performed by the fabricator are in accordance

the construction documents.

1.2.2 Defective Work

Check work as it progresses. Failure to detect any defective work or materials must in no way prevent later rejection if defective work or materials are discovered, nor obligate the Contracting Officer to accept such work.

1.3 DEFINITIONS

1.3.1 Continuous Special Inspections

Continuous Special Inspections are the constant monitoring of specific tasks by a special inspector. These inspections must be carried out continuously over the duration of the particular tasks.

1.3.2 Periodic Special Inspections

Periodic Special Inspections are Special Inspections by the special inspector who is intermittently present where the work to be inspected has been or is being performed.

1.3.3 Perform

Perform these Special Inspections tasks for each welded joint or member.

1.3.4 Observe

Observe these Special Inspections items on a random daily basis. Operations need not be delayed pending these inspections.

1.3.5 Special Inspector (SI)

A qualified person retained by the contractor and approved by the Contracting Officer as having the competence necessary to inspect a particular type of construction requiring Special Inspections. The SI must be an independent third party hired directly by the Prime Contractor.

1.3.6 Associate Special Inspector (ASI)

A qualified person who assists the SI in performing Special Inspections but must perform inspection under the direct supervision of the SI and cannot perform inspections without the SI on site.

1.3.7 Third Party

A third party inspector must not be company employee of the Contractor or any Sub-Contractor performing the work to be inspected.

1.3.8 Special Inspector of Record (SIOR)

A licensed engineer in responsible charge of supervision of all special inspectors for the project and approved by the Contracting officer. The SIOR must be an independent third party hired directly by the Prime Contractor.

1.3.9 Contracting Officer

The Government official having overall authority for administrative contracting actions. Certain contracting actions may be delegated to the Contracting Officer's Representative (COR).

1.3.10 Contractor's Quality Control (QC) Manager

An individual retained by the prime contractor and qualified in accordance with the requirements of UFGS 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL having the overall responsibility for the contractor's QC organization.

1.3.11 Designer of Record (DOR)

A registered design professional, retained by the prime contractor, responsible for the overall design and review of submittal documents prepared by others. The DOR is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in state in which the design professional works. The DOR is also referred to as the Engineer of Record (EOR) in design code documents.

1.3.12 Statement of Special Inspections (SSI)

A document developed by the DOR identifying the material, systems, components and work required to have Special Inspections.

1.3.13 Schedule of Special Inspections

A schedule which lists each of the required Special Inspections, the extent to which each special inspection is to be performed, and the required frequency (periodic or continuous)for each in accordance with ICC IBC Chapter 17.

1.3.14 Structural Observations

Specific structural observations performed by the DOR for high wind and seismic loading.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Statement of Special Inspections; G

Structural Observations; G

SIOR Letter of Acceptance; G

Special Inspections Project Manual; G

Special Inspections Agency's Written Practices

NDT Procedures and Equipment Calibration Records

SD-06 Test Reports

Special Inspections Daily Reports

Special Inspections Biweekly Reports

SD-07 Certificates

AISC Certified Fabrication Plant

TPI Steel Truss Plant Quality Assurance

AC472 Accreditation

Steel Joist Institute Membership

PCI Certified Plant

Special Inspector of Record Qualifications; G

Special Inspector Qualifications; G

Qualification Records for NDT Technicians

SD-11 Closeout Submittal

Interim Final Report of Special Inspections

Comprehensive Final Report of Special Inspections; G

Final Report of Structural Observations; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

Submit qualifications for each special inspector and the special inspector of record.

Certifying Associations

Certifying Associations	
AABC	Associated Air Balance Council
ACI	American Concrete Institute
AWCI	Association of the Wall and Ceiling Industry
AWS	American Welding Society

Certifying Associations	
FM	Factory Mutual
ICC	International Code Council
NDT	Nondestructive Testing
NICET	National Institute for Certification in Engineering Technologies
PCI	Precast/Prestressed Concrete Institute
PTI	Post-Tensioning Institute
UL	Underwriters Laboratories

1.5.1 Steel Construction and High Strength Bolting

1.5.1.1 Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience, or

b. Registered Professional Engineer with related experience

1.5.1.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.2 Welding Structural Steel

1.5.2.1 Special Inspector

a. ICC Structural Welding Special Inspector certificate with one year of related experience, or

b. AWS Certified Welding Inspector

1.5.2.2 Associate Special Inspector

a. AWS Certified Associate Welding Inspector

1.5.3 Nondestructive Testing of Welds

1.5.3.1 Special Inspector

a. NDT Level III Certificate

1.5.3.2 Associate Special Inspector

a. NDT Level II Certificate plus one year of related experience

1.5.4 Cold Formed Steel Framing

1.5.4.1 Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with

one year of related experience, or

b. ICC Commercial Building Inspector with one year of experience, or

c. ICC Residential Building Inspector with one year of experience, or

d. Registered Professional Engineer with related experience

1.5.4.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.5 Concrete Construction

1.5.5.1 Special Inspector

a. ICC Reinforced Concrete Special Inspector Certificate with one year of related experience, or

b. ACI Concrete Construction Special Inspector, or

c. NICET Concrete Technician Level III Certificate in Construction Materials Testing, or

d. Registered Professional Engineer with related experience

1.5.5.2 Associate Special Inspector

a. ACI Concrete Construction Special Inspector in Training, or

b. Engineer-In-Training with one year of related experience

1.5.6 Prestressed Concrete Construction

1.5.6.1 Special Inspector

a. ICC Pre-stressed Special Inspector Certificate with one year of related experience, or

b. PCI Quality Control Technician/ Inspector Level II Certificate with one year of related experience, or

c. Registered Professional Engineer with related experience

1.5.6.2 Associate Special Inspector

a. PCI Quality Control Technician/ Inspector Level I Certificate with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.7 Masonry Construction

1.5.7.1 Special Inspector

a. ICC Structural Masonry Special Inspector Certificate with one year of related experience, or

b. Registered Professional Engineer with related experience

1.5.7.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.8 Verification of Site Soil Condition, Fill Placement and Load-Bearing Requirements

1.5.8.1 Special Inspector

a. ICC Soils Special Inspector Certificate with one year of related experience, or

b. NICET Soils Technician Level II Certificate in Construction Material Testing, or

c. NICET Geotechnical Engineering Technician Level II Construction or Generalist Certificate, or

d. Geologist-In-Training with one year of related experience, or

e. Registered Professional Engineer with related experience

1.5.8.2 Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. NICET Geotechnical Engineering Technician Level I Construction or Generalist Certificate with one year of related experience, or

c. Engineer-In-Training with one year of related experience

1.5.9 Deep Foundations

1.5.9.1 Special Inspector

a. NICET Soils Technician Level II Certificate in Construction Material Testing, or

b. NICET Geotechnical Engineering Technician Level II Construction or Generalist Certificate, or

c. Geologist-In-Training with one year of related experience, or

d. Registered Professional Engineer with related experience

1.5.9.2 Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. NICET Geotechnical Engineering Technician Level I Construction or Generalist Certificate with one year of related experience, or

c. Engineer-In-Training with one year of related experience

1.5.10 Sprayed Fire Resistant Material

1.5.10.1 Special Inspector

a. ICC Spray-applied Fireproofing Special Inspector Certificate, or

b. ICC Fire Inspector I Certificate with one year of related experience, or

c. Registered Professional Engineer with related experience

1.5.10.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.11 Mastic and Intumescent Fire Resistant Coatings

1.5.11.1 Special Inspector

a. ICC Spray-applied Fireproofing Special Inspector Certificate, or

b. ICC Fire Inspector I Certificate with one year of related experience, or

c. Registered Professional Engineer with related experience

1.5.11.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.12 Fire-Resistant Penetrations and Joints

1.5.12.1 Special Inspector

a. Passed the UL Firestop Exam with one year of related experience, or

b. Passed the FM Firestop Exam with one year of related experience, or

c. Registered Professional Engineer with related experience

1.5.12.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.13 Smoke Control

1.5.13.1 Primary Inspector

a. AABC Technician Certification with one year of related experience, or

b. Registered Professional Engineer with related experience

1.5.13.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.14 Special Inspector of Record (SIOR)

Registered Professional Engineer

1.6 RESPONSIBILITIES

1.6.1 Special Inspector of Record (SIOR)

a. Supervise all Special Inspectors required by the contract documents and the ICC IBC.

b. Submit a letter to the Contracting Officer attesting to acceptance of the duties of SIOR, signed and sealed by the SIOR.

c. Verify the qualifications of all of the Special Inspectors.

d. Verify the qualifications of fabricators.

e. Submit Special Inspections agency's written practices for the monitoring and control of the agency's operations to include the following:

(1) The agency's procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualifications and certification of inspection personnel.

(2) The agency's inspection procedures, including general inspection, material controls, and visual welding inspection.

f. Submit qualification records for nondestructive testing (NDT) technicians designated for the project.

g. Submit NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project.

h. Prepare a Special Inspections Project Manual, which will cover the following:

(1) Roles and responsibilities of the following individuals during Special Inspections: SIOR, SI, General Contractor, Subcontractors, QC Manager, and DOR.

(2) Organizational chart and/or communication plan, indicating lines of communication.

(3) Contractor’s internal plan for scheduling inspections. Address items such as timeliness of inspection requests, who to contact for inspection requests, and availability of alternate inspectors.

(4) Indicate the government reporting procedures.

(5) Propose forms or templates to be used by SI and SIOR to document inspections.

(6) Indicate procedures for tracking nonconforming work and verification that corrective work is complete.

(7) Indicate how the SIOR and/or SI will participate in weekly QC meetings.

(8) Indicate how Special Inspections of shop fabricated items will be handled when the fabricator’s shop is not certified per paragraph

FABRICATOR SPECIAL INSPECTIONS.

(9) Include a section in the manual that covers each specific item requiring Special Inspections that is indicated on the Schedule of Special Inspections. Provide names and qualifications of each special inspector who will be performing the Special Inspections for each specific item. Provide detail on how the Special Inspections are to be carried out for each item so that the expectations are clear for the General Contractor and the Subcontractor performing the work.

Make a copy of the Special Inspections Project Manual available on the job site during construction. Submit a copy of the Special Inspections Project Manual for approval.

i. Attend coordination and mutual understanding meeting where the information in the Special Inspections Project Manual will be reviewed to verify that all parties have a clear understanding of the Special Inspections provisions and the individual duties and responsibilities of each party.

j. Maintain a 3- ring binder for the Special Inspector's daily and biweekly reports and the SI Project Manual. This file must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the DOR.

k. Submit a copy of the Special Inspector’s daily reports to the QC Manager.

l. Discrepancies that are observed during Special Inspections must be reported to the QC Manager for correction. If discrepancies are not corrected before the special inspector leaves the site the observed discrepancies must be documented in the daily report.

m. Submit a biweekly Special Inspections report to the Contracting Officer until all work requiring Special Inspections is complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:

(1) A brief summary of the work performed during the reporting time frame.

(2) Changes and/or discrepancies with the drawings, specifications that were observed during the reporting period.

(3) Discrepancies which were resolved or corrected.

(4) A list of nonconforming items requiring resolution.

(5) All applicable test results including nondestructive testing reports.

n. At the completion of each Definable Feature of Work (DFOW) requiring Special Inspections, submit an interim final report of Special Inspections to the Contracting Officer that documents the Special Inspections completed for that DFOW and corrections of all discrepancies noted in the daily reports. The interim final report of Special Inspections must be signed, dated and bear the seal of the SIOR.

o. At the completion of the project submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project and corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed, dated and bear the seal of the SIOR.

1.6.2 Quality Control Manager

a. Maintain a rework items list that includes discrepancies noted on the Special Inspectors daily report.

b. Several of the responsibilities for the Quality Control Manager listed in section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL are identical to those of the Special Inspector of Record listed herein. Those responsibilities default to the Special Inspector of Record.

1.6.3 Special Inspectors

a. Inspect all elements of the project for which the special inspector is qualified to inspect and are identified in the Schedule of Special Inspections.

b. Attend preparatory phase meetings related to the Definable Feature of Work (DFOW) for which the special inspector is qualified to inspect.

c. Submit Special Inspections agency’s written practices for the monitoring and control of the agency’s operations to include the following:

(1) The agency’s procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualifications and certification of inspection personnel.

(2) The agency’s inspection procedures, including general inspection, material controls, and visual welding inspection.

d. Submit qualification records for nondestructive testing (NDT) technicians designated for the project.

e. Submit NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project.

f. Submit a copy of the daily reports to the QC Manager.

g. Discrepancies that are observed during Special Inspections must be reported to the QC Manager for correction. If discrepancies are not corrected before the special inspector leaves the site the observed discrepancies must be documented in the daily report.

h. Submit a biweekly Special Inspection Report until all inspections are complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:

(1) A brief summary of the work performed during the reporting time frame.

(2) Changes and/or discrepancies with the drawings, specifications

that were observed during the reporting period.

(3) Discrepancies which were resolved or corrected.

(4) A list of nonconforming items requiring resolution.

(5) All applicable test result including nondestructive testing reports.

i. At the completion of each Definable Feature of Work (DFOW) requiring Special Inspections, submit an interim final report of Special Inspections to the Contracting Officer that documents the Special Inspections completed for that DFOW. Identify the inspector responsible for each item inspected and corrections of all discrepancies noted in the daily reports. The interim final report of Special Inspections must be signed, dated and indicate the certification of the special inspector qualifying them to conduct the inspection.

j. At the completion of the project submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project and corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed, dated and indicate the certification of the special inspector qualifying them to conduct the inspection

k. Submit daily reports to the SIOR.

1.6.4 Designer of Record

a. Develop the Statement of Special Inspections and the Schedule of Special Inspections as defined in Chapter 17 of ICC IBC. Submit the Statement of Special Inspections and the Schedule of Special Inspections for approval by the Contracting Officer.

The Statement of Special Inspection must include the following information:

(1) List of Architectural Designated Seismic Systems.

(2) List of Mechanical Designated Seismic Systems.

(3) List of the Electrical Designated Seismic Systems.

(4) Define the periodic walk-down inspections required by UFC 3-301-01.

(5) List of elements that are part of the progressive collapse resistance system.

Develop Schedule of Special Inspection using the template located on the Whole Building Design Guide website at: http://wbdg.org/ccb/NAVGRAPH/graphtoc.pdf.

b. Prior to the start of structural observations submit a written statement identifying the frequency and delineation wind/seismic force resisting system requiring structural observations.

c. At the conclusion of the structural observations submit a final report of structural observations indicating that the structural observation site visits have been made and identify any reported deficiencies

which, to the best of the structural observer’s knowledge, have not been resolved.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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SECTION 01 50 00.05 20

TEMPORARY FACILITIES AND CONTROLS FOR DESIGN-BUILD
11/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2017) Reduced-Pressure Principle Backflow Prevention Assembly

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies
FCCCHR Manual	(10th Edition) Manual of Cross-Connection Control

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14; TIA 17-15; TIA 17-16; TIA 17-17) National Electrical Code

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2015) Manual on Uniform Traffic Control Devices

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Traffic Control Plan; G

Construction Site Plan; G

SD-03 Product Data

Backflow Preventers

SD-07 Certificates

Backflow Preventers Certificate of Full Approval

1.3 EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be used by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. These non-construction products contain the highest practicable percentage of recycled or recovered materials and can be recycled when no longer needed.

1.4 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes used for this contract. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.5 BACKFLOW PREVENTERS CERTIFICATE

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval is not acceptable.

1.5.1 Backflow Prevention Training Certificate

The Contractor must submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

1.6 TEMPORARY UTILITIES

1.6.1 CONTRACTOR UTILITIES

The Contractor shall provide his own utilities.

1.6.2 UTILITIES AT SPECIAL LOCATIONS

Reasonable amounts of utilities will be made available to the Contractor at the prevailing Government rates. These rates may be obtained upon

application to the Commanding Officer. A refundable security deposit to the Resident Officer in Charge of Construction must be made prior to application for services. The Contractor is responsible for making connections, providing transformers and meters, making disconnections and removing all temporary utilities upon project completion; and for providing backflow preventer devices on connections to domestic water lines. Final taps and tie-ins to the Government utility grid will be made by Base Maintenance who will also provide and seal a 120 or 208 volt, three-wire kWh meter. Tap-in cost, if any, is the responsibility of the Contractor. Tampering or movement of a sealed meter without notification to base maintenance is grounds for discontinuance of electrical service. The Contractor is responsible for providing larger meters required if not available from the Government. The Contractor is responsible for the cost of utility services required until the date of Government acceptance. Under no circumstances will taps to base fire hydrants be allowed for obtaining domestic water.

1.6.3 LOCATION OF UNDERGROUND UTILITIES

See specification section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS paragraph "Location of Underground Utilities".
Location and Protection of underground utilities shall be the responsibility of the Contractor. Where existing-to-remain piping, utilities, and underground obstructions of any type are indicted in locations to be traversed by new piping, ducts, and other excavations the elevations of the existing utilities and obstructions shall be determined before the new work is completed.

a. In addition, the Contractor will be responsible for obtaining the services of a professional utility locator prior to digging. Contractor will provide documentation that the site has been surveyed and checked for underground utilities. All utilities must be located, including but not limited to power, water, sewer, storm drains, fiber optics, T.V. cable, telephone, and intrusion detection wiring. A set of known utility drawings will be available in the ROICC office for review to assist the locator.

b. It is mandatory that the Contractor also contact the Base Telephone Office (451-2531) prior to accomplishing any digging at Camp Lejeune. A telephone office representative will assist in locating telephone lines.

c. It is mandatory that the Contractor also contact Charter Communications, cable TV service prior to accomplishing any digging at Camp Lejeune, to ensure that all buried cable lines are identified. Contact Mr. Olin Criswell at 353-8677 for assistance.

d. It is mandatory that the contractor also contact the North Carolina One-Call Center to coordinate the location of underground natural gas infrastructure. North Carolina 811, Inc. can be reached at 811 on a touch-tone phone in the state of North Carolina or toll-free at 1.800.632.4949 if calling from out of state. Work requests may also be submitted online at www.nc811.org.

1.6.4 DAMAGE TO UNDERGROUND UTILTIES

Immediate notice shall be delivered to the Contracting Officer of any damage. The Contractor shall make temporary repairs immediately, and shall provide permanent repairs as soon as practicable. For any additional work

required by reason of conflict between the new and existing work, an adjustment in contract price will be made in accordance with Contract clause entitled "Differing Site Conditions", if appropriate.

1.7 BACKFLOW TESTER CERTIFICATION

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with any company participating in any other phase of this Contract.

1.8 WEATHER PROTECTION

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday.

1.8.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

1.8.1.1 Condition of Readiness

Unless directed otherwise, comply with:

a. Condition FOUR (Sustained winds of 58 mph or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers all scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 3.3 feet high. Remove all debris, trash, or objects that could become missile hazards. Review requirements pertaining to "Condition THREE" and continue action as necessary to attain "Condition FOUR" readiness. Contact Contracting Officer for Condition of Readiness (COR) updates and completion of required actions.

b. Condition THREE (Sustained winds of 58 mph or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition TWO" readiness. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Reinforce or remove formwork and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and COR updates and completion of required actions.

c. Condition TWO (Sustained winds of 58 mph or greater expected within 24 hours): Secure the jobsite, and leave Government premises.

d. Condition ONE (Sustained winds of 58 mph or greater expected within 12 hours): Contractor access to the jobsite and Government premises is prohibited.

1.9 STATION OPERATION AFFECT ON CONTRACTOR OPERATIONS

1.9.1 Special Restrictions Regarding Access of Vehicles and Parking

1.9.1.1 Interruption of Vehicular Traffic

If during the performance of work, it becomes necessary to modify vehicular traffic patterns at any locations, notify the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD. Make all notifications and obtain any permits required for modification to traffic movements outside Station's jurisdiction. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic. Do not use foil-backed material for temporary pavement marking because of its potential to conduct electricity during accidents involving downed power lines.

1.10 STORAGE AREAS

Contractor is responsible for security of his property. The Contract Clause entitled "FAR 52.236-10, Operations and Storage Areas" and the following apply:

1.10.1 Storage in Existing Buildings

The Contractor will be working around existing buildings; the storage of material will not be allowed in the buildings. Provide 8 foot high security fence with a lockable gate around the storage area. Remove at the completion of work.

1.11 TEMPORARY SANITARY FACILITIES

Provide adequate sanitary conveniences of a type approved for the use of persons employed on the work, properly secluded from public observation, and maintained in such a manner as required and approved by the Contracting Officer. Maintain these conveniences at all times without nuisance. Upon completion of the work, remove the conveniences from the premises, leaving the premises clean and free from nuisance. Dispose of sewage through connection to a municipal, district, or station sanitary sewage system. Where such systems are not available, use chemical toilets or comparably effective units, and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Include provisions for pest control and elimination of odors.

1.12 TEMPORARY BUILDINGS

Temporary facilities (including trailers) must be in like new condition and must be maintained throughout the project. Locate these facilities where directed and within the indicated operations area. Failure to maintain storage trailers or buildings to these standards will result in the removal of non-complying units at the Contractor's expense. A sign

not smaller than 24 by 24 inches must be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers must be anchored to resist high winds and must meet applicable state of local standards for anchoring mobile trailers. Storage of material/debris under such facilities is prohibited. Contractor is responsible for the security of the stored property.

1.12.1 Maintenance of Temporary Facilities

Suitably paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.

1.12.2 Quality Control Manager Records and Field Office

Provide on the jobsite an office for the exclusive use of the QC Manager. Provide a door with a cylinder lock and windows with locking hardware. File quality control records in the office and make available at all times to the Government.

PART 2 PRODUCTS

2.1 BACKFLOW PREVENTERS

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged bronze, or brass mounted gate valve and strainer, 304 stainless steel or bronze, internal parts. The particular make, model/design, and size of backflow preventers to be installed must be included in the latest edition of the List of Approved Backflow Prevention Assemblies issued by the FCCCHR List and must be accompanied by a Certificate of Full Approval from FCCCHR List.

2.2 PROJECT SIGN

Prior to initiating any work on site, provide one project identification sign per site at the location coordinated with the Contracting Officer. Construct the sign in accordance with project sign detail attached at the end of this section. Maintain sign throughout the life of the project. Upon completion of the project, remove the sign from the site. Provide color rendering of the project. Reproduce the rendering on the signboard or enclose a copy of the rendering under a water-proof, transparent cover, and caulk for weather protection. Provide rendering in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

2.2.1 Project Identification Signboard (Navy)

A project identification signboard must be provided in accordance with attached Plates 2MC, 3, 4, and 5. The signboard is to be placed at a conspicuous location on the job site where directed by the Contracting Officer.

a. The field of the sign must consist of a minimum of 4 by 8 foot sheet of exterior plywood.

b. The entire signboard and supports must be painted. The lettering and sign work must be performed by a skilled sign painter using paint known in the trade as bulletin colors. The colors, lettering sizes, and lettering styles must be as indicated.

c. NAVFAC logo must be a sticker/decal with either transparent or white background or paint the logo by stencil onto the sign. The weather resistant sticker/decal film must be rated for a minimum of 2-year exterior vertical exposure. NAVFAC Logo is available at: http://www.navfac.navy.mil/about_us/logos_and_seals.html

d. Sign paint colors

(1) Blue = To match dark blue color in the NAVFAC logo.

(2) White = To match Brilliant White color in the NAVFAC logo.

e. Final signboard artwork (rendering) may be either mounted under plexiglas as indicated in attached Plates 2, or at the Contractor's option may be electrostatically printed on self-adhering, weather resistant, glossy vinyl film and mounted to signboard. Provide film that is capable of full color reproduction of the building rendering and is rated for a minimum of 2 years exterior vertical exposure.

PART 3 EXECUTION

3.1 TEMPORARY PHYSICAL CONTROLS

3.1.1 Access Controls

3.1.1.1 Temporary Barricades

Contractor must provide for barricading around all work areas to prevent public access.

3.1.1.2 Fencing

Fencing must be provided along the construction site at all open excavations and tunnels to control access by unauthorized people. Fencing must be installed to be able to restrain a force of at least 250 pounds against it.

3.1.1.3 Signs

Place warning signs at the construction area perimeter designating the presence of construction hazards requiring unauthorized persons to keep out. Signs must be placed on all sides of the project, with at least one sign every 300 feet. All points of entry must have signs designating the construction site as a hard hat area.

3.1.1.4 Traffic Work

All work around/involving roadways, to include roadway excavations and utility crossings,must be conducted in accordance with Manual of Traffic Control Devices. Contractors must provide and ensure appropriate road closure and detour signs are established as necessary for motor traffic management. All road closures must be coordinated with the Contracting Officer in advance. Self-illuminated (lighted) barricades must be provided during hours of darkness. Brightly-colored (orange) vests are required for all personnel working in roadways. Road closures require a road closure plan showing the location of signage.

3.2 TEMPORARY WIRING

Provide temporary wiring in accordance with NFPA 241 and NFPA 70, Assured Equipment Grounding Conductor Program. Program must include frequent inspection of all equipment and apparatus.

3.3 REDUCED PRESSURE BACKFLOW PREVENTERS

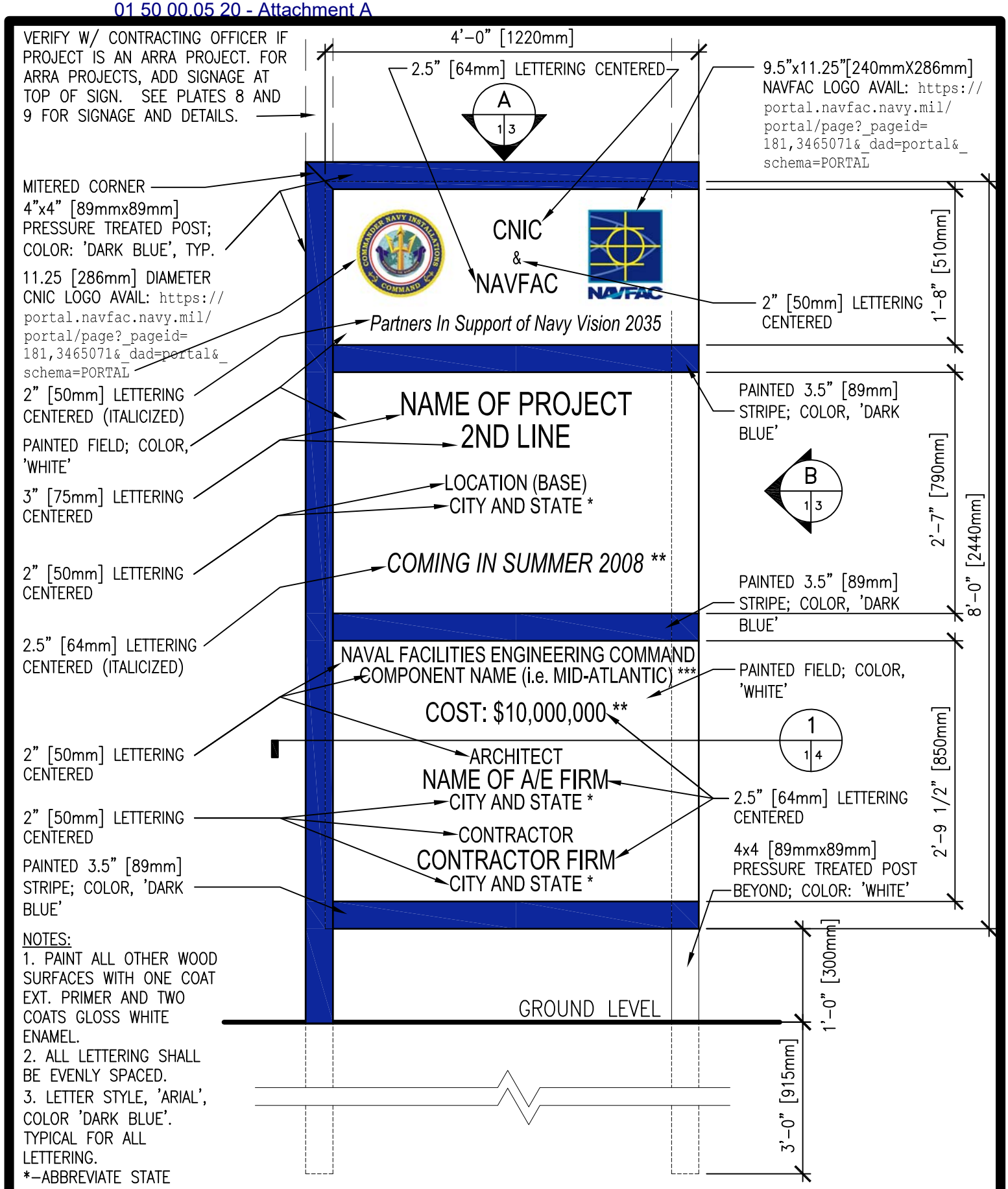
Provide an approved reduced pressure backflow prevention assembly at each location where the Contractor taps into the Government potable water supply.

A certified tester(s) must perform testing of backflow preventer(s) for proper installation and operation and provide subsequent tagging. Backflow preventer tests must be performed using test equipment, procedures, and certification forms conforming to those outlined in the latest edition of the Manual of Cross-Connection Control published by the FCCCHR Manual. Test and tag each reduced pressure backflow preventer upon initial installation (prior to continued water use) and monthly thereafter. Tag must contain the following information: make, model, serial number, dates of tests, results, maintenance performed, and signature of tester. Record test results on certification forms conforming to requirements cited earlier in this paragraph.

3.4 GRASS CUTTING

Cut grass (or annual weeds) within the construction and storage sites as needed to maintain the site in a neat and orderly appearance.

-- End of Section --



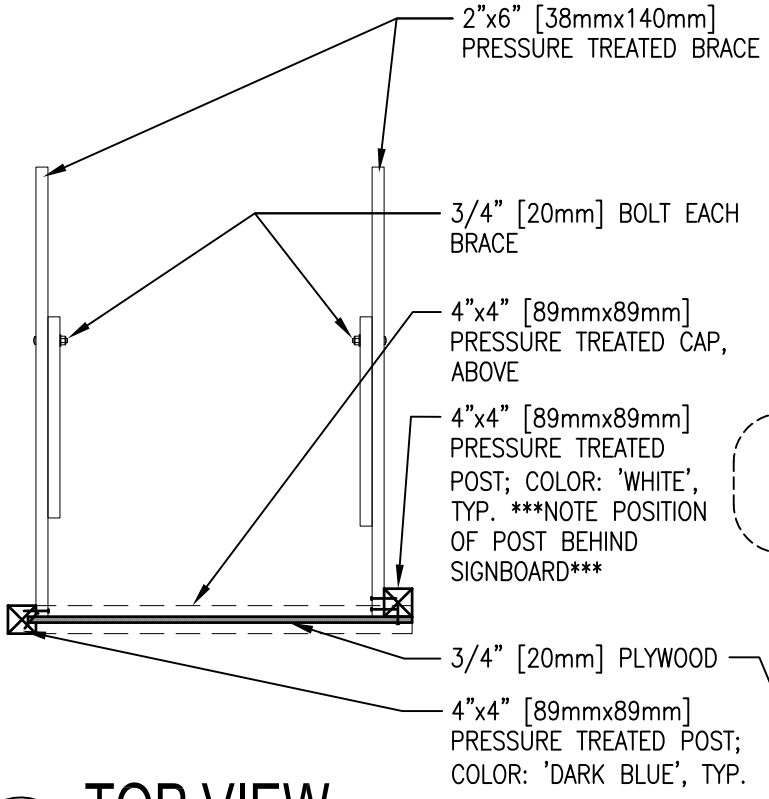
NOTES:
1. PAINT ALL OTHER WOOD SURFACES WITH ONE COAT EXT. PRIMER AND TWO COATS GLOSS WHITE ENAMEL.
2. ALL LETTERING SHALL BE EVENLY SPACED.
3. LETTER STYLE, 'ARIAL', COLOR 'DARK BLUE'. TYPICAL FOR ALL LETTERING.

*–ABBREVIATE STATE
**–CONFIRM USE WITH CONTRACTING OFFICER
***–VERIFY NAME WITH CONTRACTING OFFICER.

PROJECT IDENTIFICATION SIGNBOARD

SCALE: 3/4" = 1'-0"

PLATE 1

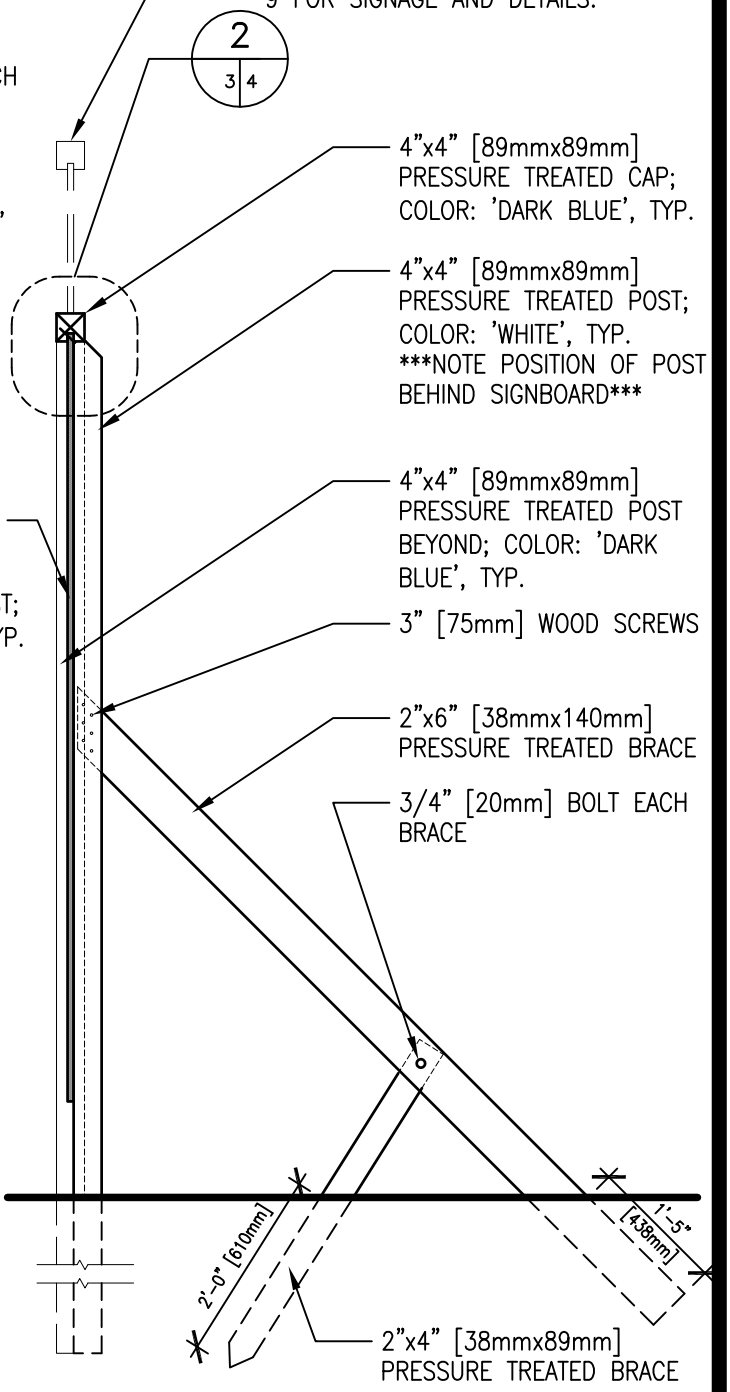


A 1,2 | 3

TOP VIEW

SCALE: 1/2" = 1'-0"

NOTES:
1. POSTS AND BRACES SHALL BE PRESSURE TREATED.
2. ALL FASTENERS SHALL BE ZINC COATED.
3. BRACING IS REQUIRED IN ALL SOIL CONDITIONS AND HIGH WIND ENVIRONMENTS.



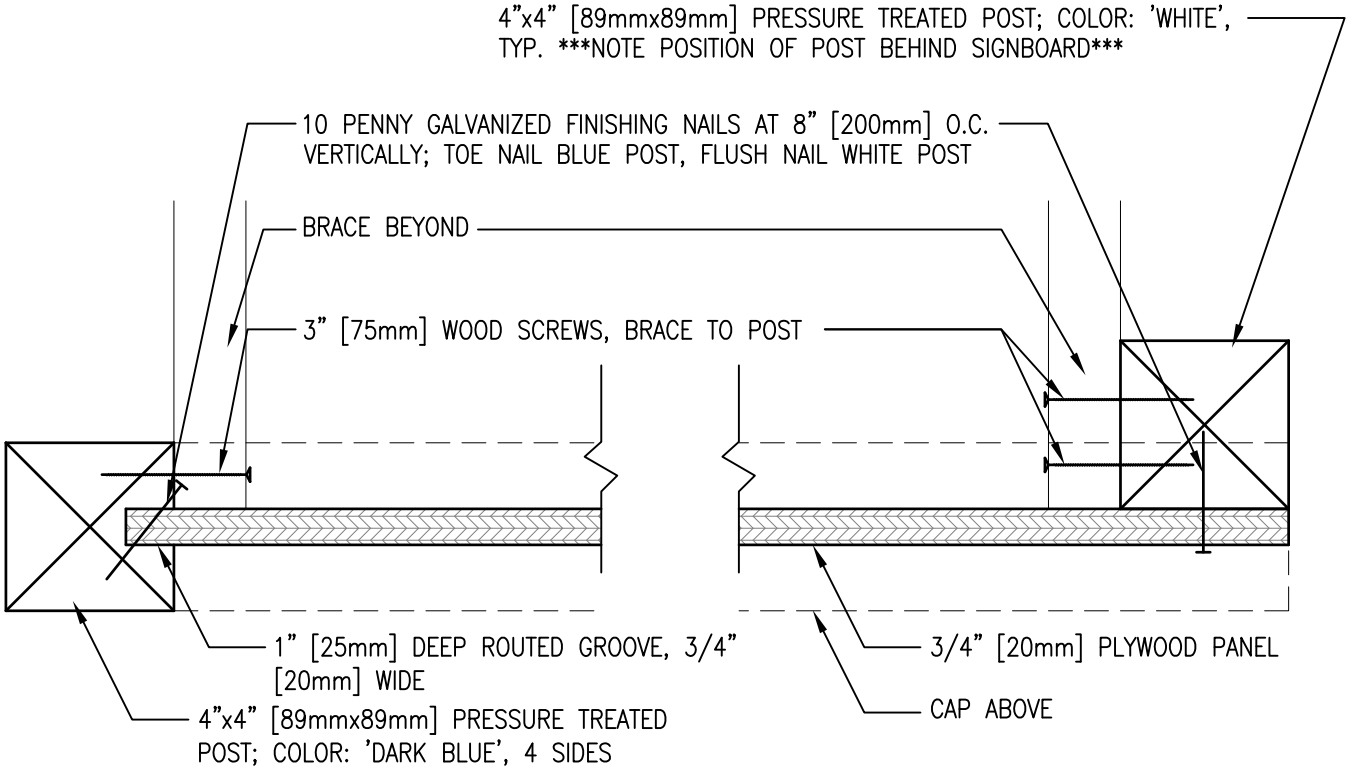
B 1,2 | 3

SIDE VIEW

SCALE: 1/2" = 1'-0"

PROJECT IDENTIFICATION SIGNBOARD SUPPORT DETAILS

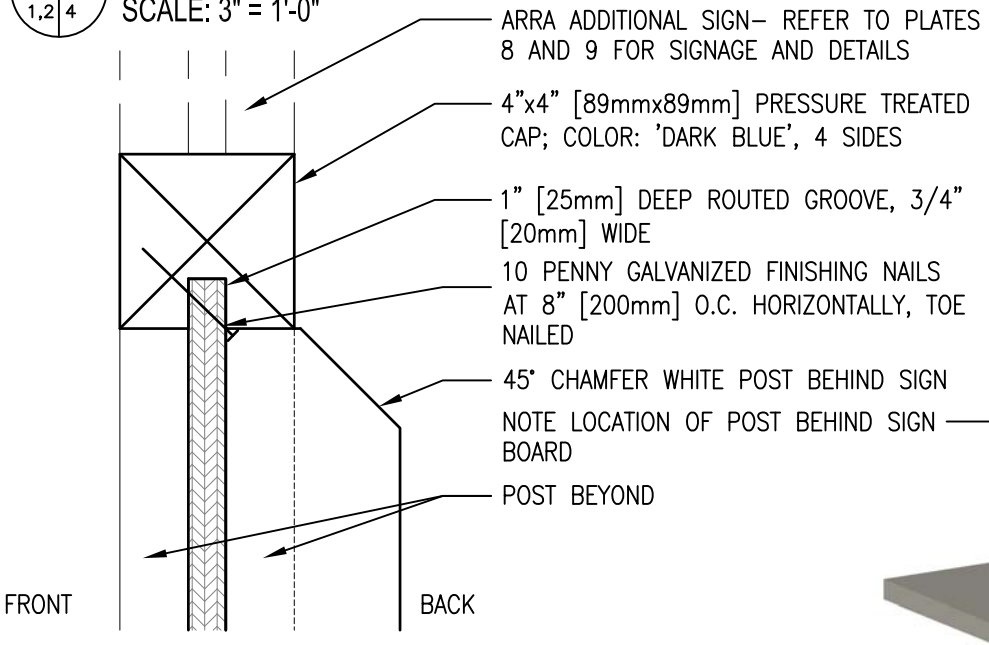
PLATE 3



1 PLAN SECTION

1,2 | 4

SCALE: 3" = 1'-0"





2 SECTION AT TOP

1,2 | 4

SCALE: 3" = 1'-0"

3 ISO VIEW

2 | 4

SCALE: NONE

PROJECT IDENTIFICATION SIGNBOARD SECTIONS

PLATE 4

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SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS
11/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 261.7	Residues of Hazardous Waste in Empty Containers
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 262.31	Standards Applicable to Generators of Hazardous Waste-Labeling
40 CFR 262.34	Standards Applicable to Generators of Hazardous Waste-Accumulation Time
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 273	Standards for Universal Waste Management
40 CFR 273.2	Standards for Universal Waste Management - Batteries
40 CFR 273.4	Standards for Universal Waste Management - Mercury Containing Equipment
40 CFR 273.5	Standards for Universal Waste Management - Lamps
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 50	National Primary and Secondary Ambient Air Quality Standards
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 64	Compliance Assurance Monitoring
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response

	Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of Class I ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of Class II ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

1.2.2 Contractor Generated Hazardous Waste

Contractor generated hazardous waste is materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents, excess pesticides, and contaminated pesticide equipment rinse water.

1.2.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

1.2.4 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

1.2.5 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes debris that exhibits a characteristic of hazardous waste in accordance

with 40 CFR 261.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that: Is regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.120; or during end use, treatment, handling, packaging, storage, transportation, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D. Designation of a material by this definition, when separately regulated or controlled by other sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs).

1.2.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste and exhibit a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D.

1.2.9 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.2.10 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.11 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

1.2.12 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, POLs and may be appropriately tested and discarded in a manner which is in compliance with other state and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land

filled provided that: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount); it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable extent possible. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, perform a hazardous waste determination prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.13 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.14 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.15 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

1.2.15.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

1.2.15.2 Green Waste

Green waste is the vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

1.2.15.3 Material not regulated as solid waste

Material not regulated as solid waste is nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.15.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 263.

1.2.15.5 Recyclables

Recyclables are materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable, wiring, insulated/non-insulated copper wire cable, wire rope, and structural components. It also includes commercial-grade refrigeration equipment with Freon removed, household appliances where the basic material content is metal, clean polyethylene terephthalate bottles, cooking oil, used fuel oil, textiles, high-grade paper products and corrugated cardboard, stackable pallets in good condition, clean crating material, and clean rubber/vehicle tires. Metal meeting the definition of lead contaminated or lead based paint contaminated may be included as recyclable if sold to a scrap metal company. Paint cans that meet the definition of empty containers in accordance with 40 CFR 261.7 may be included as recyclable if sold to a scrap metal company.

1.2.15.6 Surplus Soil

Surplus soil is existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars, and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included and must be managed in accordance with paragraph HAZARDOUS MATERIAL MANAGEMENT.

1.2.15.7 Scrap Metal

This includes scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe, and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

1.2.15.8 Wood

Wood is dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included. Treated wood includes, but is not limited to, lumber, utility poles, crossties, and other wood products with chemical treatment.

1.2.16 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, creeks or "waters of the United States". Surface discharges are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.2.17 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

1.2.17.1 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

1.2.18 Waters of the United States

Waters of the United States means Federally jurisdictional waters, including wetlands, that are subject to regulation under Section 404 of the Clean Water Act or navigable waters, as defined under the Rivers and Harbors Act.

1.2.19 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

1.2.20 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.3 SUBMITTALS

Government approval is required for all submittals. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey
Solid Waste Management Permit; G
Regulatory Notifications; G
Environmental Protection Plan; G
Stormwater Notice of Intent (for NPDES coverage under the general permit for construction activities); G
Dirt and Dust Control Plan; G
Employee Training Records; G
Environmental Manager Qualifications; G

SD-06 Test Reports

Inspection Reports
Solid Waste Management Report; G

SD-07 Certificates

Employee Training Records; G

ECATTS Certificate Of Completion; G
Erosion and Sediment Control Inspector Qualifications

SD-11 Closeout Submittals

Stormwater Pollution Prevention Plan Compliance Notebook; G
Stormwater Notice of Termination (for NPDES coverage under the general permit for construction activities; G
Waste Determination Documentation; G
Disposal Documentation for Hazardous and Regulated Waste; G
Assembled Employee Training Records; G
Solid Waste Management Permit; G
Solid Waste Management Report; G
Contractor Hazardous Material Inventory Log; G
Hazardous Waste/Debris Management; G
Regulatory Notifications; G
Sales Documentation; G
As-Built Topographic Survey
Vapor Intrusion Mitigation System As-Built Drawings; G
O&M/Pm Documentation; G

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Project-specific environmental constraints have been identified and should be incorporated into all design aspects and appropriate deliverables. Refer to supplemental documents in Part 6, specifically the Decision Memorandum(s) and Contractors Environmental Guide (available online at http://www.lejeune.marines.mil/Portals/27/Documents/EMD/Contractor_Environmental_Guide Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.4.1 Training in Environmental Compliance Assessment Training and Tracking System (ECATTS)

1.4.1.1 Personnel Requirements

The Environmental Manager is responsible for environmental compliance on projects. The Environmental Manager must complete applicable ECATTS training modules (installation specific or general) prior to starting respective portions of on-site work under this Contract. If personnel changes occur for any of these positions after starting work, replacement personnel must complete applicable ECATTS training within 14 days of assignment to the project.

1.4.1.2 Certification

Submit an ECATTS certificate of completion for personnel who have completed the required ECATTS training. This training is web-based and can be accessed from any computer with Internet access using the following instructions.

Register for NAVFAC ECATTS by logging on to https://environmentaltraining.ecatts.com/. Obtain the password for registration from the Contracting Officer.

1.4.1.3 Refresher Training

This training has been structured to allow contractor personnel to receive credit under this contract and to carry forward credit to future contracts. Ensure the Environmental Manager review their training plans for new modules or updated training requirements prior to beginning work. Some training modules are tailored for specific state regulatory requirements; therefore, Contractors working in multiple states will be required to retake modules tailored to the state where the contract work is being performed.

1.4.2 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets of the environmental programs and operational controls identified by the EMS. Support Government personnel when environmental compliance and EMS audits are conducted by escorting auditors at the Project site, answering questions, and providing proof of records being maintained. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and preventative actions. In addition, employees must be aware of their roles and responsibilities under the installation EMS and of how these EMS roles and responsibilities affect work performed under the contract.

Coordinate with the installation's EMS coordinator to identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The Installation Environmental Office will retain associated environmental compliance records. Make EMS Awareness training completion certificates available to Government auditors during EMS audits and include the certificates in the Employee Training Records. See paragraph EMPLOYEE TRAINING RECORDS.

1.5 SPECIAL ENVIRONMENTAL REQUIREMENTS

Comply with the special environmental requirements listed here and attached at the end of this section.

1.6 QUALITY ASSURANCE

1.6.1 Preconstruction Survey and Protection of Features

This paragraph supplements the Contract Clause PROTECTION OF EXISTING

VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. The Contractor and the Contracting Officer will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

1.6.2 Regulatory Notifications

Provide regulatory notification requirements in accordance with federal, state and local regulations. In cases where the Government will also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of regulatory notifications to the Contracting Officer at least 15 days prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all-inclusive): demolition, renovation, NPDES defined site work, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint),and construction within an environmental land use controlled (LUC) or land use restricted (LUR) area..

1.6.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP). Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

1.6.4 Environmental Manager

Appoint in writing an Environmental Manager for each project site. The Environmental Manager is directly responsible for coordinating contractor compliance with federal, state, local, and installation requirements. The Environmental Manager must ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the EPP; ensure environmental permits are obtained, maintained, and closed out; ensure compliance with Stormwater Program requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; ensure appropriate documentation for new air emission sources that need to be added to the Installation's Title V Air Quality Permit is provided to the Installation's Air Quality

Program Manager in a timely manner; ensure POL containing storage tank installations and/or removals are coordinated with the Installation's POL program manager;and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however, the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out. Submit Environmental Manager Qualifications to the Contracting Officer.

1.6.5 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with federal, state and local regulatory requirements for RCRA Large Quantity Generator. Provide a Position Description for each employee, by subcontractor, based on the Davis-Bacon Wage Rate designation or other equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet EPA and state requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Contact additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area. Provide copy of the Erosion and Sediment Control Inspector Certification as required by the state of North Carolina.

1.6.6 Non-Compliance Notifications

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with federal, state or local environmental laws or regulations, permits, and other elements of the Contractor's EPP. After receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. FAR 52.242-14 Suspension of Work provides that a suspension, delay, or interruption of work due to the fault or negligence of the Contractor allows for no adjustments to the contract for time extensions or equitable

adjustments. In addition to a suspension of work, the Contracting Officer may use additional authorities under the contract or law..

1.7 ENVIRONMENTAL PROTECTION PLAN

The purpose of the EPP is to present an overview of known or potential environmental issues that must be considered and addressed during construction. Incorporate construction related objectives and targets from the installation's EMS into the EPP. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Contracting Officer or Contracting Officer Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Project Specific environmental constraints have been identified and should be incorporated into all design aspects and appropriate deliverables. Refer to supplemental documents in Part 6, specifically the Decision Memorandum(s) and Contractors Environmental Guide (available online at http://www.lejeune.marines.mil/Portals/27/Documents/EMD/Contractor_Environmental_Guide Submit the EPP within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction, identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.7.1 General Overview and Purpose

1.7.1.1 Descriptions

A brief description of each specific plan required by environmental permit or elsewhere in this Contract such as stormwater pollution prevention plan, spill control plan, solid waste management plan, wastewater management plan, air pollution control plan, contaminant prevention plan, a historical, archaeological, cultural resources, biological resources and wetlands plan, traffic control plan Hazardous, Toxic and Radioactive Waste (HTRW) Plan Non-Hazardous Solid Waste Disposal Plan borrowing material plan, Explosive safety (3R Training), chemical soil vapor mitigation, and management of contaminated soil/groundwater..

1.7.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

1.7.1.3 Procedures

A copy of any standard or project-specific operating procedures that will

be used to effectively manage and protect the environment on the project site.

1.7.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.7.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.7.2 General Site Information

1.7.2.1 Drawings

Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, jurisdictional wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

1.7.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control plan.

1.7.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental Manager and stating that person is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

1.7.3 Management of Natural Resources

a. Land resources
b. Tree protection
c. Replacement of damaged landscape features
d. Temporary construction
e. Stream crossings
f. Fish and wildlife resources (including known threatened and endangered species)
g. Wetland areas

1.7.4 Protection of Historical and Archaeological Resources

a. Objectives
b. Methods

1.7.5 Stormwater Management and Control

a. Ground cover

b. Erodible soils
c. Temporary measures
    (1) Structural Practices
    (2) Temporary and permanent stabilization
d. Effective selection, implementation and maintenance of Stormwater Control Measures (SCMs).

1.7.6 Protection of the Environment from Waste Derived from Contractor Operations

Control and disposal of solid and sanitary waste. Control and disposal of hazardous waste.

This item consists of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan. The Contracting Officer will provide a copy of the Installation Hazardous Waste Management Plan. As a minimum, include the following:

a. List of the types of hazardous wastes expected to be generated

b. Procedures to ensure a written waste determination is made for appropriate wastes that are to be generated

c. Sampling/analysis plan, including laboratory method(s) that will be used for waste determinations and copies of relevant laboratory certifications

d. Methods and proposed locations for hazardous waste accumulation/storage (that is, in tanks or containers)

e. Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted)

f. Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268)

g. Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and similar

h. Used oil management procedures in accordance with 40 CFR 279; Hazardous waste minimization procedures

i. Plans for the disposal of hazardous waste by permitted facilities; and Procedures to be employed to ensure required employee training records are maintained.

1.7.7 Prevention of Releases to the Environment

a. Procedures to prevent releases to the environment

b. Notifications in the event of a release to the environment

c. Controls for managing existing contamination from known Environmental Restoration and petroleum remediation sites.

1.7.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits including monitoring well installation and abandonment records. The EPP will not be approved until the permits have been obtained.

1.7.9 Clean Air Act Compliance

1.7.9.1 Haul Route

Submit truck and material haul routes along with a Dirt and Dust Control Plan for controlling dirt, debris, and dust on Installation roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

1.7.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Determine requirements based on any current installation permits and the impacts of the project. Provide a list of all fixed or mobile equipment, machinery or operations that could generate air emissions during the project to the Installation Environmental Office (Air Program Manager).

1.7.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between emergency and non-emergency operation.

1.7.9.4 Refrigerants

Identify management practices to ensure that heating, ventilation, and air conditioning (HVAC) work involving refrigerants complies with 40 CFR 82 requirements. Technicians must be certified, maintain copies of certification on site, use certified equipment and log work that requires the addition or removal of refrigerant. Any refrigerant reclaimed is the property of the Government, coordinate with the Installation Environmental Office to determine the appropriate turn in location.

1.7.9.5 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions). Log hours of operations and track quantities of materials used.

1.7.9.6 Compliant Materials

Provide the Government a list of and SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter or limit use of specific materials as needed to meet installation permit requirements for emissions.

1.7.10 Controls for Handling Existing Contamination, Including Munitions, if Applicable.

a. Known site conditions, including types of contaminants and media impacted.

b. Personnel Training Requirements

c. Disposal procedures

d. Notification requirements and procedures, particularly if working in an area with Land Use Controls mandated under CERCLA or RCRA regulations.

1.8 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with FAR 52.236-7 Permits and Responsibilities. Notify the Government of all general use permitted equipment the Contractor plans to use on site. This paragraph supplements the Contractor's responsibility under FAR 52.236-7 Permits and Responsibilities.

1.9 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT SUBMITTALS in this section.

1.10 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance from the receiving location or as applicable; submit one copy of the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

1.10.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

1.11 FACILITY HAZARDOUS WASTE GENERATOR STATUS

MCAS Cherry Point is designated as a Large Quantity Generator. Meet the regulatory requirements of this generator designation for any work conducted within the boundaries of this Installation. Comply with provisions of federal, state, and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of construction derived wastes.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Installation Environmental Office regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility.

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work that is consistent with the requirements of the Installation Environmental Office or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

3.1.1 Flow Ways

Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as specified and permitted.

3.1.2 Vegetation

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage.

Protect existing trees that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Contracting Officer and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with any required permits including, but not limited to, Clean

Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Installation Environmental Office for any release of contaminated water.

3.2.1 Construction General Permit

Provide a Construction General Permit as required by 40 CFR 122.26 or the State of North Carolina General Permit. Under the terms and conditions of the permit, install, inspect, maintain BMPs, prepare stormwater erosion and sediment control inspection reports, and submit SWPPP inspection reports. Maintain construction operations and management in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

3.2.1.1 Stormwater Pollution Prevention Plan

Submit a project-specific Stormwater Pollution Prevention Plan (SWPPP) to the Contracting Officer for approval, prior to the commencement of work. The SWPPP must meet the requirements of 40 CFR 122.26 and the North Carolina State General Permit for stormwater discharges from construction sites.

Include the following:

a. Comply with terms of the state general permit for stormwater discharges from construction activities. Prepare SWPPP in accordance with state requirements. Use EPA guide Developing your Stormwater Pollution Prevention Plan located at https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp to prepare the SWPPP.

b. Select applicable BMPs from EPA Fact Sheets located at https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater# or in accordance with applicable state or local requirements.

c. Include a completed copy of the Notice of Intent, BMP Inspection Report Template, and Stormwater Notice of Termination, except for the effective date.

d. Comply with additional requirements provided in Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS

3.2.1.2 Stormwater Notice of Intent for Construction Activities

Prepare and submit the Notice of Intent for NPDES coverage under the

general permit for construction activities to the Contracting Officer for review and approval.

Submit the approved NOI and appropriate permit fees onto the appropriate federal or state agency for approval. No land disturbing activities may commence without permit coverage. Maintain an approved copy of the SWPPP at the onsite construction office, and continually update as regulations require, reflecting current site conditions.

Comply with the additional requirements in Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.2.1.3 Inspection Reports

Submit "Inspection Reports" to the Contracting Officer in accordance with the State of North Carolina Construction General Permit. Provide Inspection Reports in accordance with 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.2.1.4 Stormwater Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Construction General Permit. Include a copy of the permit Notice of Intent, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports and related corrective action records, copies of correspondence with the North Carolina State Permitting Agency, and a copy of the permit Notice of Termination in the binder. At project completion, the notebook becomes property of the Government. Provide the compliance notebook to the Contracting Officer.

3.2.1.5 Stormwater Notice of Termination for Construction Activities

Submit a Notice of Termination to the Contracting Officer for approval once construction is complete and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Once approved, submit the Notice of Termination to the appropriate state or federal agency. Prepare as-built topographic survey information required by the permitting agency for certification of the stormwater management system, and provide to the Contracting Officer.

3.2.2 Erosion and Sediment Control Measures

Provide erosion and sediment control measures in accordance with state and local laws and regulations. Preserve vegetation to the maximum extent practicable.

Erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports.

3.2.2.1 Erosion Control

Prevent erosion by mulching, Compost Blankets, Geotextiles, temporary slope drains,. Stabilize slopes by chemical stabilization, sodding, or such combination of these methods necessary for effective erosion control. Use of hay bales is prohibited.

Provide seeding in accordance with Section 32 92 19 SEEDING.

3.2.2.2 Sediment Control Practices

Implement sediment control practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement sediment control practices prior to soil disturbance and prior to creating areas with concentrated flow, during the construction process to minimize erosion and sediment laden runoff. Include the following devices: silt fence, temporary diversion dikes, storm drain inlet protection, Location and details of installation and construction are indicated on the drawings.

3.2.3 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects.

3.2.4 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Move or relocate the Contractor facilities only when approved by the Government. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

3.2.5 Municipal Separate Storm Sewer System (MS4) Management

Comply with the Installation's MS4 permit requirements. Comply with requirements of Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.3 SURFACE AND GROUNDWATER

3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure must be constantly controlled to maintain compliance with existing state water quality standards and designated uses of the surface water body. Comply with the State of North Carolina water quality standards and anti-degradation provisions and the Clean Water Act Section 404. Do not discharge excavation ground water to the sanitary sewer, storm drains, or to surface waters without prior specific authorization in writing from the Installation Environmental Office. Discharge of hazardous substances will not be permitted under any circumstances. Use sediment control BMPs to prevent construction site runoff from directly entering any storm drain or surface waters.

If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization for any contaminated groundwater release in advance from the Installation Environmental Officer and the federal or state authority, as applicable. Discharge of hazardous substances will not be permitted under any

circumstances.

3.3.2 Waters of the United States

Do not enter, disturb, destroy, or allow discharge of contaminants into waters of the United States. The protection of waters of the United States shown on the drawings in accordance with paragraph LICENSES AND PERMITS is the Contractor's responsibility. Authorization to enter specific waters of the United States identified does not relieve the Contractor from any obligation to protect other waters of the United States within, adjacent to, or in the vicinity of the construction site and associated boundaries.

3.4 PROTECTION OF CULTURAL RESOURCES

3.4.1 Archaeological Resources

If, during excavation or other construction activities, any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, activities that may damage or alter such resources will be suspended. Resources covered by this paragraph include, but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources. The Government retains ownership and control over archaeological resources.

3.5 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with 40 CFR 64 and state air emission and performance laws and standards.

3.5.1 Preconstruction Air Permits

Notify the Air Program Manager, through the Contracting Officer, at least 6 months prior to bringing equipment, assembled or unassembled, onto the Installation, so that air permits can be secured. Necessary permitting time must be considered in regard to construction activities. Clean Air Act (CAA) permits must be obtained prior to bringing equipment, assembled or unassembled, onto the Installation.

Confirm that these permits have been obtained.

3.5.2 Oil or Dual-fuel Boilers and Furnaces

Provide product data and details for new, replacement, or relocated fuel fired boilers, heaters, or furnaces to the Installation Environmental Office (Air Program Manager) through the Contracting Officer. Data to be reported include: equipment purpose (water heater, building heat, process), manufacturer, model number, serial number, fuel type (oil type, gas type) size (MMBTU heat input). Provide in accordance with paragraph PRECONSTRUCTION AIR PERMITS.

3.5.3 Burning

Burning is prohibited on the Government premises.

3.5.4 Class I and II ODS Prohibition

Class I and II ODS are Government property and must be returned to the Government for appropriate management. Coordinate with the Installation Environmental Office to determine the appropriate location for turn in of all reclaimed refrigerant.

3.5.5 Accidental Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported immediately to the Contracting Officer.

3.5.6 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Maintain copies of certifications at the employees' places of business; technicians must carry certification wallet cards, as provided by environmental law.

3.5.7 Dust Control

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

3.5.7.1 Particulates

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials (such as from asphaltic batch plants) must be controlled at all times, including weekends, holidays, and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates that would exceed 40 CFR 50, state, and local air pollution standards or that would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with state and local visibility regulations.

3.5.7.2 Abrasive Blasting

Blasting operations cannot be performed without prior approval of the Installation Air Program Manager. The use of silica sand is prohibited in

sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other debris. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.

3.5.8 Odors

Control odors from construction activities. The odors must be in compliance with state regulations and local ordinances and may not constitute a health hazard.

3.6 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/hazardous waste minimization in the Hazardous Waste Management Section of the EPP. Obtain a copy of the installation's Pollution Prevention/Hazardous Waste Minimization Plan for reference material when preparing this part of the EPP. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the anticipated types of the hazardous materials to be used in the construction when requesting information.

3.6.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or recycling. To the extent practicable, all scrap metal must be sent for reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

3.6.2 Nonhazardous Solid Waste Diversion Report

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Construction and Demolition (C&D) Debris Disposed	(_____) cubic yards or tons, as appropriate
C&D Debris Recycled	(_____) cubic yards or tons, as appropriate
Total C&D Debris Generated	(_____) cubic yards or tons, as appropriate

Construction and Demolition (C&D) Debris Disposed	(_____) cubic yards or tons, as appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	(_____) cubic yards or tons, as appropriate

3.7 WASTE MANAGEMENT AND DISPOSAL

3.7.1 Waste Determination Documentation

Complete a Waste Determination form (provided at the pre-construction conference) for Contractor-derived wastes to be generated. All potentially hazardous solid waste streams that are not subject to a specific exclusion or exemption from the hazardous waste regulations (e.g. scrap metal, domestic sewage) or subject to special rules (lead-acid batteries and precious metals) must be characterized in accordance with the requirements of 40 CFR 261 or corresponding applicable state or local regulations. Base waste determination on user knowledge of the processes and materials used, and analytical data when necessary. Consult with the Installation environmental staff for guidance on specific requirements. Attach support documentation to the Waste Determination form. As a minimum, provide a Waste Determination form for the following waste (this listing is not inclusive): oil- and latex -based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and containers of the original materials.

3.7.2 Solid Waste Management

3.7.2.1 Solid Waste Management Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind the firm may be submitted. The sales documentation Contractor certification must include the receiver's tax identification number and business, EPA or state registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do not have to be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.7.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option.

Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.7.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Contracting Officer.

3.7.3.1 Hazardous Waste/Debris Management

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with federal, state, and local regulations, including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities is identified as being generated by the Government. Prior to removal of any hazardous waste from Government property, hazardous waste manifests must be signed by personnel from the Installation Environmental Office. Do not bring hazardous waste onto Government property. Provide the Contracting Officer with a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D.

3.7.3.2 Waste Storage/Satellite Accumulation/90 Day Storage Areas

Accumulate hazardous waste at satellite accumulation points and in compliance with 40 CFR 262.34 and applicable state or local regulations. Individual waste streams will be limited to 55 gallons of accumulation (or 1 quart for acutely hazardous wastes). If the Contractor expects to generate hazardous waste at a rate and quantity that makes satellite accumulation impractical, the Contractor may request a temporary 90 day accumulation point be established. Submit a request in writing to the Contracting Officer and provide the following information (Attach Site Plan to the Request):

Contract Number	(_____)
Contractor	(_____)
Haz/Waste or Regulated Waste POC	(_____)
Phone Number	(_____)

Contract Number	(_____)
Type of Waste	(_____)
Source of Waste	(_____)
Emergency POC	(_____)
Phone Number	(_____)
Location of the Site	(_____)

Attach a Waste Determination form for the expected waste streams. Allow 10 working days for processing this request. Additional compliance requirements (e.g. training and contingency planning) that may be required are the responsibility of the Contractor. Barricade the designated area where waste is being stored and post a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.7.3.3 Hazardous Waste Disposal

3.7.3.3.1 Responsibilities for Contractor's Disposal

Provide hazardous waste manifest to the Installations Environmental Office for review, approval, and signature prior to shipping waste off Government property.

3.7.3.3.1.1 Services

Provide service necessary for the final treatment or disposal of the hazardous material or waste in accordance with 40 CFR 260, local, and state, laws and regulations, and the terms and conditions of the Contract within 60 days after the materials have been generated. These services include necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal or transportation, include manifesting or complete waste profile sheets, equipment, and compile documentation).

3.7.3.3.1.2 Samples

Obtain a representative sample of the material generated for each job done to provide waste stream determination.

3.7.3.3.1.3 Analysis

Analyze each sample taken and provide analytical results to the Contracting Officer. See paragraph WASTE DETERMINATION DOCUMENTATION.

3.7.3.3.1.4 Labeling

Determine the Department of Transportation's (DOT's) proper shipping names for waste (each container requiring disposal) and demonstrate to the Contracting Officer how this determination is developed and supported by the sampling and analysis requirements contained herein. Label all containers of hazardous waste with the words "Hazardous Waste" or other words to describe the contents of the container in accordance with 40 CFR 262.31 and applicable state or local regulations.

3.7.3.4 Universal Waste Management

Manage the following categories of universal waste in accordance with federal, state, and local requirements and installation instructions:

a. Batteries as described in 40 CFR 273.2
b. Lamps as described in 40 CFR 273.5
c. Mercury-containing equipment as described in 40 CFR 273.4
d. Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed.

3.7.3.5 Electronics End-of-Life Management

Recycle or dispose of electronics waste, including, but not limited to, used electronic devices such computers, monitors, hard-copy devices, televisions, mobile devices, in accordance with 40 CFR 260-262, state, and local requirements, and installation instructions.

3.7.3.6 Disposal Documentation for Hazardous and Regulated Waste

Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

Submit a copy of the applicable EPA and or state permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifests must be reviewed, signed, and approved by the Contracting Officer before the Contractor may ship waste. To obtain specific disposal instructions, coordinate with the Installation Environmental Office. Refer to Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for the Installation Point of Contact information.

3.7.4 Releases/Spills of Oil and Hazardous Substances

3.7.4.1 Response and Notifications

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated in accordance with 40 CFR 300. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Installation Fire Department, the Installation Command Duty Officer, the Installation Environmental Office, the Contracting Officer and the state or local authority.

Submit verbal and written notifications as required by the federal (40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within 20 days. Spill

response must be in accordance with 40 CFR 300 and applicable state and local regulations. Contain and clean up these spills without cost to the Government.

3.7.4.2 Clean Up

Clean up hazardous and non-hazardous waste spills. Reimburse the Government for costs incurred including sample analysis materials, clothing, equipment, and labor if the Government will initiate its own spill cleanup procedures, for Contractor- responsible spills, when: Spill cleanup procedures have not begun within one hour of spill discovery/occurrence; or, in the Government's judgment, spill cleanup is inadequate and the spill remains a threat to human health or the environment.

3.7.5 Mercury Materials

Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Do not recycle a mercury spill cleanup; manage it as a hazardous waste for disposal.

3.7.6 Wastewater

3.7.6.1 Disposal of wastewater must be as specified below.

3.7.6.1.1 Treatment

Do not allow wastewater from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, and forms to enter water ways or to be discharged prior to being treated to remove pollutants. Dispose of the construction- related waste water off-Government property in accordance with 40 CFR 403, state, regional, and local laws and regulations.

3.7.6.1.2 Surface Discharge

For discharge of ground water, Surface discharge in accordance with federal, state, and local laws and regulations. Surface discharge in accordance with the requirements of the NPDES or state STORMWATER DISCHARGES FROM CONSTRUCTION SITES permit.

3.7.6.1.3 Land Application

Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing must be land- applied in accordance with federal, state, and local laws and regulations for land application.

3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan, in accordance with Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto Government property that does not directly relate to requirements for the performance of this contract. Submit an SDS and

estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on the installation. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261.

3.8.1 Contractor Hazardous Material Inventory Log

Submit the "Contractor Hazardous Material Inventory Log"(found at: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic), which provides information required by (EPCRA Sections 312 and 313) along with corresponding SDS, to the Contracting Officer at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Keep copies of the SDSs for hazardous materials onsite. At the end of the project, provide the Contracting Officer with copies of the SDSs, and the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used.

The Contracting Officer may request documentation for any spills or releases, environmental reports, or off-site transfers.

3.9 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

3.10 CONTROL AND MANAGEMENT OF ASBESTOS-CONTAINING MATERIAL (ACM)

Manage and dispose of asbestos- containing waste in accordance with 40 CFR 61. Refer to Section 02 82 00 ASBESTOS REMEDIATION. Manifest asbestos-containing waste and provide the manifest to the Contracting Officer. Notifications to the state and Installation Asbestos Program Manager are required before starting any asbestos work.

3.11 CONTROL AND MANAGEMENT OF LEAD-BASED PAINT (LBP)

Manage and dispose of lead-contaminated waste in accordance with 40 CFR 745 and Section 02 83 00 LEAD REMEDIATION. Manifest any lead-contaminated waste and provide the manifest to the Contracting Officer.

3.12 CONTROL AND MANAGEMENT OF POLYCHLORINATED BIPHENYLS (PCBS)

Manage and dispose of PCB-contaminated waste in accordance with 40 CFR 761 and Section 02 84 33 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBS).

3.13 CONTROL AND MANAGEMENT OF LIGHTING BALLAST AND LAMPS CONTAINING PCBS

Manage and dispose of contaminated waste in accordance with 40 CFR 761.

3.14 MILITARY MUNITIONS

In the event military munitions, as defined in 40 CFR 260, are discovered or uncovered, immediately stop work in that area and immediately inform the Contracting Officer.

3.14.1 Emergency Unexploded Ordinance (UXO) Response

In the event UXOs, as defined in 40 CFR 260, are encountered during construction activities, stop work immediately and have all personnel clear the immediate area. Immediately report the situation to the ROICC or Contracting Representative, who will then report the item to Range Control and Explosive Ordnance Disposal (EOD).

3.14.2 UXO Safety Awareness Training

Complete 3R (Recognize, Retreat, Report) UXO Safety Awareness Training prior to working in known contaminated areas at MCB Camp Lejeune. Refer to the website http://www.lejeune.marines.mil/OfficesStaff/EnvironmentalMgmt/TrainingVideo.aspx for the training and the latest edition of the Camp Lejeune Contractor Environmental Guide for guidance and information.

3.15 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA 40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided. Storage of oil, including fuel, on the project site is not allowed. Fuel must be brought to the project site each day that work is performed.

3.15.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of at the Contractor's expense. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

3.16 INADVERTENT DISCOVERY OF PETROLEUM-CONTAMINATED SOIL OR HAZARDOUS WASTES

If petroleum-contaminated soil, or suspected hazardous waste is found during construction that was not identified in the Contract documents,

immediately notify the Contracting Officer and notify base FESD by calling 911 or (910) 451-3333.. Do not disturb this material until authorized by the Contracting Officer.

3.17 CHLORDANE

Evaluate excess soils and concrete foundation debris generated during the demolition of housing units or other wooden structures for the presence of chlordane or other pesticides prior to reuse or final disposal.

3.18 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives are not permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 6 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of North Carolina rules.

3.19 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade parking area and similar temporarily used areas to conform with surrounding contours.

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SECTION 01 57 19.01 20

SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS
08/18

PART 1 GENERAL

1.1 MID-ATLANTIC

Comply with the following state, regional, and local requirements which supplement Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

1.1.1 North Carolina

1.1.1.1 MCB Camp Lejeune

1.1.1.1.1 Removal of Waste

Remove and dispose of rubbish and debris from Government property. Provide 24-hour advance written notice to the Contracting Office of Contractor's intention to dispose rubbish and debris off base. Disposal at sites or landfills not holding a valid state of North Carolina permit is specifically prohibited. The prohibition also applies to sites where a permit my have been applied for but not yet obtained. If construction debris has been disposed off-base outside the parameter of this paragraph at a site without state permits or not in accordance with regulatory requirements, remove, transport, and relocate the debris to a state-approved site at Contractor expense. Pay any required fines, penalties, or fees related to the illegal disposal of construction debris. Metal will not be accepted at the Base Sanitary Landfill.

1.1.1.1.2 Surplus Soils Disposal for Camp Lejeune and MCAS New River

Transport all surplus soil to one of the designated locations on government property. No surplus material will leave government property without approval of installation Environmental Program Manager and the Contracting Officer. Deliver and properly manage any surplus soil that cannot be reused on its originating site to one of the following locations:

a. Area managed by G-3/5 for reuse on training areas for various maintenance activities:

3.5-acre storage, within TLZ Condor off Verona Loop Road, approximate coordinates 34°38'07.3"N 77°26'41.7"W.

Coordinate with G-3/5, Mr. Dave Lynch or Mr. Bill Van Pelt, MCI EAST-MCB CAMLEJ at (910) 451-5772/8799, to determine capacity available at the storage location, prior to delivery.

This site operates Monday through Thursday between 0730 and 1500.

b. Area managed by PWD for use as daily cover:

Base landfill, located on Piney Green Road, approximate coordinates 34°41'26.9"N 77°19'27.4"W.

Contractor shall provide temporary silt fencing around designated stockpile areas as needed.

Coordinate with landfill POC: Joe Powers at (910) 451-4998.

This site operates Monday through Thursday between 0730 and 1500 and on Friday between 0700 and 1400.

Contact POCs listed above 7 to 10 days in advance to coordinate delivery of material at the storage locations.

Prior to transportation to one of the designated locations, screen all surplus soil to remove all objects greater than 3 inches and deleterious material. Deleterious material consists of organic debris such as roots, stumps, timber, and construction debris. Construction debris shall include, but is not limited to wood, plastic, glass, concrete, brick, and metal. Dispose of deleterious material and objects larger than 3 inches in accordance with Section 01 57 19 Temporary Environmental Controls.

Provide all plant, material, and labor for placement and management of the surplus material at the designated locations. Grade surplus material to a flat condition and slope to provide positive drainage daily. Submit the following verification documents to the Contracting Officer for review and approval:

1) Photographic documentation that surplus soil has been properly placed. Photograph will include time and date of image.
2) Certification statement indicating volume, in cubic yards (CY), of material delivered and confirming material is free of contaminants.

NOTE: Soil contaminated with debris or chemicals cannot be disposed at the stockpile locations. If contaminated soils are suspected or confirmed through presence of UXO, odors, or visual staining, affected soils must be properly tested, manifested, and disposed of in accordance with RCRA regulations. Contact Base EMD, ER Program Manager, for more information.

1.1.1.1.3 Hazardous Materials

1. Contractors may ONLY use the Camp Lejeune Sanitary Landfill for the disposal of asbestos containing materials, building products with tightly adhered lead containing paint, and non-contaminated clean dirt and clean gravel. The hours of operation are 0730-1530.

2. Delivery of acceptable materials (identified above) shall be by appointment only. Appointments made by phone at 910-451-5011 or 910-451-2946. ALL other contractor generated material shall be weighed through the Base Landfill scales before being removed from the Base. Contractors utilizing the base scales will require Contracting Officer assisted pre-registration with the Landfill Manager.

3. The Contracting Officer will register the contract via E-mail, with the Base Landfill. All haul vehicles will maintain a secure vehicle placard as a condition to utilize the scale. E-mail the contract information to the Landfill Clerk, including the name on the Prime Contractor, contract

number, job name/description, completion date and whether or not any of the above materials will be delivered to the Landfill.

4. As of May 01 2014 the above supersedes any other statements/specifications pertaining to the delivery of materials to the Base Landfill.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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SECTION 01 60 00.00 22

REQUIREMENTS FOR PESTICIDE AND HERBICIDE COORDINATION
08/19

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRCUTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-07 Certificates

Certificate of State Licensed Applicator; G

SD-11 Closeout Submittals

Completed Field Pesticide/Herbicide Management Record Form; G

1.2 QUALITY ASSURANCE

1.2.1 Certificate of State Licensed Applicator

A State licensed applicator is required and must be licensed in the state in which the project is located. Submit a copy of the certificate(s) to the Base Pest Management Coordinator (PMC) through the Contracting Officer..

PART 2 PRODUCTS

2.1 PESTICIDE/HERBICIDE LIST

Comply with Base Regulations and use only approved pesticides/herbicides listed on the current "Base Approved Pesticide/herbicide List". Use the approved list that is current at the time of application. Contact the Contracting Officer to obtain the current approved list.

PART 3 EXECUTION

3.1 COORDINATION WITH BASE PEST MANAGEMENT COORDINATOR (PMC)

Coordinate with the PMC before proceeding with any pesticide/herbicide application. The Point of Contact information for the Base Pest Management Coordinator can be obtained from the Contracting Officer.

3.2 Field Pesticide/Herbicide Management Record Form

Following the pesticide/herbicide application, complete the attached Field Pesticide/Herbicide Management Record Form and submit to the Base Pest Management Coordinator (PMC) through the Contracting Officer. Submit the completed form(s) within 15 days after application.

-- End of Section --

SECTION 01 74 19.05 20

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT FOR DESIGN-BUILD
03/15

PART 1 GENERAL

1.1 GOVERNMENT POLICY

Military installations are required to direct at least 60 percent of their non-hazardous solid wastes (including waste from construction and demolition operations) from the waste stream. This guide specification requires the reduction of the amount of construction and demolition waste requiring landfill disposal or incineration, and to promote more efficient use of construction materials during construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G

SD-11 Closeout Submittals

Records; S

1.3 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures. Except as otherwise specified in other sections of the specifications, disposal must be in accordance with the following:

1.3.1 Recycle

Recycle waste materials not suitable for reuse, but are recyclable. Recycle all fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.3.2 Waste

Dispose of materials with no practical use or economic benefit to waste-to-energy plants where available. As the last choice, dispose of materials at a landfill or incinerator.

1.3.3 Return

Set aside and protect mis-delivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PLAN

Submit a waste management plan within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting and prior to initiating any site preparation work. The plan must demonstrate how the project waste diversion goal is met and plan must include the following:

a. Name of individuals on the Contractor's staff responsible for waste prevention and management.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be help to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of wastes.

e. Characterization, including estimate types and quantities, of the waste to be generated.

f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.

h. List of specific waste materials that will be salvaged for resale, salvaged and reused, or recycled. Identify recycling facilities that will be used. Provide percentage of non-hazardous construction and demolition waste materials that have been diverted from the waste stream.

i. Identification of materials that cannot be recycled/reused with an explanation or justification.

j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.

k. Description of the means of transportation of the recyclable materials

(whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration or landfill cost avoidance.

m. Actions that will be taken to divert at least the required amount of non-hazardous solid wastes (including waste from construction and demolition operations) from the waste stream. Report actual diversion rates during construction and demolition.

n. Identification of base, local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity.

3.2 RECORDS

Maintained records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Report with monthly invoicing the tons diverted, the tons sent to the landfill, cost for each, and the monthly diversion rate. Make the records available to the Contracting Officer during construction, and a copy of the records must be delivered to the Contracting Officer upon completion of the construction.

-- End of Section --

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SECTION 01 78 00

CLOSEOUT SUBMITTALS
08/11

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E1971	(2005; R 2011) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings

GREEN SEAL (GS)

GS-37	(2017) Cleaning Products for Industrial and Institutional Use

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014; with Change 4) Navy and Marine Corps Design Procedures
UFC 1-300-08	(2009, with Change 2) Criteria for Transfer and Acceptance of DoD Real Property

1.2 DEFINITIONS

1.2.1 As-Built Drawings

As-built drawings are developed and maintained by the Contractor and depict actual conditions, including deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to Contractor submitted Requests for Information; direction from the Contracting Officer; designs which are the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site. These files serve as the basis for the creation of the record drawings.

1.2.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

1.3 SOURCE DRAWING FILES

Request the full set of electronic drawings, in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

1.3.1 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse shall be at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CAD drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished Source drawing files, the signed and sealed construction documents govern. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction drawings and data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Management Plan

Warranty Tags

Final Cleaning

Spare Parts Data

SD-08 Manufacturer's Instructions

Posted Instructions

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

SD-11 Closeout Submittals

As-Built Drawings; G

Record Drawings; G

As-Built Record of Equipment and Materials

Final Approved Shop Drawings

Construction Contract Specifications

Certification of EPA Designated Items; G

Certification Of USDA Designated Items; G

Interim DD FORM 1354; G

Checklist for DD FORM 1354; G

High Performance and Sustainable Building (HPSB) Checklist; G

1.5 SPARE PARTS DATA

Submit two copies of the Spare Parts Data list.

a. Indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.

1.6 WARRANTY MANAGEMENT

1.6.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to FAR 52.246-21 Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit one set of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of project acceptance and continue for the full product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Include within the warranty management plan , but not limited to, the following:

a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

c. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

d. As-Built Record of Equipment and Materials list for each warranted equipment, item, feature of construction or system indicating:

(1) Name of item.
(2) Model and serial numbers.
(3) Location where installed.
(4) Name and phone numbers of manufacturers or suppliers.
(5) Names, addresses and telephone numbers of sources of spare parts.
(6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
(7) Cross-reference to warranty certificates as applicable.
(8) Starting point and duration of warranty period.
(9) Summary of maintenance procedures required to continue the warranty in force.
(10) Cross-reference to specific pertinent Operation and Maintenance manuals.
(11) Organization, names and phone numbers of persons to call for warranty service.
(12) Typical response time and repair time expected for various warranted equipment.

e. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

f. Procedure and status of tagging of all equipment covered by extended warranties.

g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.6.2 Performance Bond

The Performance Bond must remain effective throughout the construction period .

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.6.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty will be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.6.4 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	

Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time priority code	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

PART 2 PRODUCTS

2.1 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items and FAR 52-223-17 Affirmative Procurement of EPA designated items in Service and Construction Contracts.. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

1) The product does not meet appropriate performance standards;
2) The product is not available within a reasonable time frame;
3) The product is not available competitively (from two or more sources);
4) The product is only available at an unreasonable price (compared with a comparable non-recycled content product)."

Record each product used in the project that has a requirement or option of containing recycled content in accordance with SECTION 01 33 29 SUSTAINABILITY REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, exemptions (1, 2, 3, or 4, as indicated), and comments. Recycled content values may be determined by weight or volume percent, but must be consistent throughout.

2.2 CERTIFICATION OF USDA DESIGNATED ITEMS

Submit the Certification of USDA Designated Items as required by FAR 52-223-1 Bio-based Product Certifications and FAR 52.223-2 Affirmative Procurement of Biobased Products Under Service and Construction Contracts. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current USDA standards for

biobased materials content. The following exemptions may apply to the non-procurement of biobased content materials:

1) The product does not meet appropriate performance standards;
2) The product is not available within a reasonable time frame;
3) The product is not available competitively (from two or more sources);
4) The product is only available at an unreasonable price (compared with a comparable bio-based content product)."

Record each product used in the project that has a requirement or option of containing biobased content in accordance with SECTION 01 33 29 SUSTAINABILITY REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, total value of biobased content, exemptions (1, 2, 3, or 4, as indicated), and comments. Biobased content values may be determined by weight or volume percent, but must be consistent throughout.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF contract drawings for As-Built Drawings. At a minimum of 30 days prior to Beneficial Occupancy Date (BOD), certify both sets of as-built drawings as correct, sign, and submit the As-Built Drawings for Contracting Officer approval.

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

a. Use base colors of red, green, and blue. Color code for changes as follows:

   (1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

   (2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

   (3) Additions (Green) - Added items, lettering in notes and leaders.

b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.

c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.

g. For deletions, cross out all features, data and captions that relate to that revision.

h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

i. Indicate one of the following when attaching a print or sketch to a markup print:

1) Add an entire drawing to contract drawings

2) Change the contract drawing to show

3) Provided for reference only to further detail the initial design.

j. Incorporate all shop and fabrication drawings into the markup drawings.

3.1.2 As-Built Drawings Content

Show on the as-built drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

b. The location and dimensions of any changes within the building structure.

c. Layout and schematic drawings of electrical circuits and piping.

d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

e. Changes in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment, and foundations.

f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

g. Changes or Revisions which result from the final inspection.

h. Where contract drawings or specifications present options, show only

the option selected for construction on the working as-built markup drawings.

i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

k. Changes in location of equipment and architectural features.

j. Modifications (include within change order price the cost to change working as-built markup drawings to reflect modifications) and compliance with FC 1-300-09N procedures.

l. Actual location of anchors, construction and control joints, etc., in concrete.

m. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

n. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 RECORD DRAWINGS

Prepare and provide Record Drawings in accordance with FC 1-300-09N. Provide 2 copies of Record Drawings on two separate CDs or DVDs 30 days after BOD.

3.3 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23 OPERATION AND MAINTENANCE MANUALS DATA. Provide four electronic copies of the Operation and Maintenance Manual files. Submit to the Contracting Officer for approval within 60 calendar days of the Beneficial Occupancy Date (BOD). Update and resubmit files for final approval at BOD.

3.4 CLEANUP

Provide final cleaning in accordance with ASTM E1971 and submit two copies of the listing of completed final clean-up items. Leave premises "broom clean." Comply with GS-37 for general purpose cleaning and bathroom cleaning. Use only nonhazardous cleaning materials, including natural cleaning materials, in the final cleanup. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment and comply with the Indoor Air Quality (IAQ) Management Plan. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from project in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, and 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.5 REAL PROPERTY RECORD

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete, update draft DD FORM 1354 attached to this section, and submit an accounting of all installed property with Interim DD FORM 1354. Include any additional assets, improvements, and alterations from the Draft DD FORM 1354. Contact the Contracting Officer for any project specific information necessary to complete the DD FORM 1354. Refer to UFC 1-300-08 for instruction on completing the DD FORM 1354. Attach the Real Property receiving Component's completed High Performance and Sustainable Building (HPSB) Checklist for each applicable building to the completed DD 1354, in accordance with Section 01 33 29 SUSTAINABILITY REPORTING. For convenience, a blank fillable PDF DD FORM 1354 may be obtained at the following link: www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd1354.pdf

Submit the completed Checklist for DD FORM 1354 of Installed Building Equipment items. Attach this list to the updated DD FORM 1354.

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA
08/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E1971	(2005; R 2011) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

O&M Database ; G

Training Plan ; G

Training Outline ; G

Training Content ; G

SD-11 Closeout Submittals

Training Video Recording ; G

Validation of Training Completion ; G

1.3 OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data for the provided equipment, product, or system, defining the importance of system interactions, troubleshooting, and long-term preventive operation and maintenance. Compile, prepare, and aggregate O&M data to include clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

1.3.1 Package Quality

Documents must be fully legible. Operation and Maintenance data must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions.

1.3.2 Package Content

Provide data package content in accordance with paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES. Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission, except as follows. Use Data Package 3 for commissioned items without a specified data package requirement in the individual technical sections. Provide a Data Package 3 instead of Data Package 1 or 2, as specified in the individual technical section, for items that are commissioned.

1.3.3 Changes to Submittals

Provide manufacturer-originated changes or revisions to submitted data if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

1.3.4 Commissioning Authority Review and Approval

Submit the commissioned systems and equipment submittals to the Government's Commissioning Authority (CxA) to review for completeness and applicability. Obtain validation from the CxA that the systems and equipment provided meet the requirements of the Contract documents and design intent, particularly as they relate to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. The CxA communicates deficiencies to the Contracting Officer. Submit the O&M manuals to the Contracting Officer upon a successful review of the corrections, and with the CxA recommendation for approval and acceptance of these O&M manuals. This work is in addition to the normal review procedures for O&M data.

1.4 OPERATION AND MAINTENANCE MANUAL FILE FORMAT

Assemble data packages into electronic Operation and Maintenance Manuals. Assemble each manual into a composite electronically indexed file using the most current version of Adobe Acrobat or similar software capable of producing PDF file format. Provide compact disks (CD) or data digital versatile disk (DVD) as appropriate, so that each one contains operation, maintenance and record files, project record documents, and training videos. Include a complete electronically linked operation and maintenance directory.

1.4.1 Organization

Bookmark Product and Drawing Information documents using the current version of CSI Masterformat numbering system, and arrange submittals using the specification sections as a structure. Use CSI Masterformat and UFGS numbers along with descriptive bookmarked titles that explain the content of the information that is being bookmarked.

1.4.2 CD or DVD Label and Disk Holder or Case

Provide the following information on the disk label and disk holder or case:

a. Building Number

b. Project Title

c. Activity and Location

d. Construction Contract Number

e. Prepared For: (Contracting Agency)

f. Prepared By: (Name, title, phone number and email address)

g. Include the disk content on the disk label

h. Date

i. Virus scanning program used

1.5 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

The following are a detailed description of the data package items listed in paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES.

1.5.1 Operating Instructions

Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.5.1.1 Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for operating conditions. List all residual hazards identified in the Activity Hazard Analysis provided under Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard.

1.5.1.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.5.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.5.1.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

1.5.1.5 Emergency Operations

Provide Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Provide Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.5.1.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.5.1.7 Environmental Conditions

Provide a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.5.1.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.5.1.9 Additional Requirements for HVAC Control Systems

Provide Data Package 5 and the following for control systems:

a. Narrative description on how to perform and apply functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.

b. Full as-built sequence of operations.

c. Copies of checkout tests and calibrations performed by the Contractor (not Cx tests).

d. Full points list. Provide a listing of rooms with the following information for each room:

(1) Floor

(2) Room number

(3) Room name

(4) Air handler unit ID

(5) Reference drawing number

(6) Air terminal unit tag ID

(7) Heating or cooling valve tag ID

(8) Minimum cfm

(9) Maximum cfm

e. Full print out of all schedules and set points after testing and acceptance of the system.

f. Full as-built print out of software program.

g. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.5.2 Preventive Maintenance

Provide the following information for preventive and scheduled maintenance to minimize repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.5.2.1 Lubrication Data

Include the following preventive maintenance lubrication data, in addition to instructions for lubrication required under paragraph OPERATOR SERVICE REQUIREMENTS:

a. A table showing recommended lubricants for specific temperature ranges and applications.

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.

c. A Lubrication Schedule showing service interval frequency.

1.5.2.2 Preventive Maintenance Plan, Schedule, and Procedures

Provide manufacturer's schedule for routine preventive maintenance, inspections, condition monitoring (predictive tests) and adjustments required to ensure proper and economical operation and to minimize repairs. Provide instructions stating when the systems should be retested. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

a. Define the anticipated time required to perform each of each test (work-hours), test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize repairs.

b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the

system after acceptance.

1.5.2.3 Cleaning Recommendations

Provide environmentally preferable cleaning recommendations in accordance with ASTM E1971.

1.5.3 Repair

Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.5.3.1 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.5.3.2 Wiring Diagrams and Control Diagrams

Provide point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.5.3.3 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.5.3.4 Removal and Replacement Instructions

Provide step-by-step procedures and a list of required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Use a combination of text and illustrations.

1.5.3.5 Spare Parts and Supply Lists

Provide lists of spare parts and supplies required for repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

1.5.3.6 Repair Work-Hours

Provide manufacturer's projection of repair work-hours including requirements by type of craft. Identify, and tabulate separately, repair that requires the equipment manufacturer to complete or to participate.

1.5.4 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.5.4.1 Product Submittal Data

Provide a copy of SD-03 Product Data submittals documented with the required approval.

1.5.4.2 Manufacturer's Instructions

Provide a copy of SD-08 Manufacturer's Instructions submittals documented with the required approval.

1.5.4.3 O&M Submittal Data

Provide a copy of SD-10 Operation and Maintenance Data submittals documented with the required approval.

1.5.4.4 Parts Identification

Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing must show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Group the parts shown in the listings by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog.

1.5.4.5 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components of the system. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.5.4.6 Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. For each warranty listed, indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.5.4.7 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.5.4.8 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

1.5.4.9 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

1.5.4.10 Field Test Reports

Provide a copy of Field Test Reports (SD-06) submittals documented with the required approval.

1.5.4.11 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.6 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. The information required in each type of data package follows:

1.6.1 Data Package 1

a. Safety precautions and hazards

b. Cleaning recommendations

c. Maintenance and repair procedures

d. Warranty information

e. Extended warranty information

f. Contractor information

g. Spare parts and supply list

1.6.2 Data Package 2

a. Safety precautions and hazards

b. Normal operations

c. Environmental conditions

d. Lubrication data

e. Preventive maintenance plan, schedule, and procedures

f. Cleaning recommendations

g. Maintenance and repair procedures

h. Removal and replacement instructions

i. Spare parts and supply list

j. Parts identification

k. Warranty information

l. Extended warranty information

m. Contractor information

1.6.3 Data Package 3

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Environmental conditions

g. Operating log

h. Lubrication data

i. Preventive maintenance plan, schedule, and procedures

j. Cleaning recommendations

k. Troubleshooting guides and diagnostic techniques

l. Wiring diagrams and control diagrams

m. Maintenance and repair procedures

n. Removal and replacement instructions

o. Spare parts and supply list

p. Product submittal data

q. O&M submittal data

r. Parts identification

s. Warranty information

t. Extended warranty information

u. Testing equipment and special tool information

v. Testing and performance data

w. Contractor information

x. Field test reports

1.6.4 Data Package 4

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Operator service requirements

g. Environmental conditions

h. Operating log

i. Lubrication data

j. Preventive maintenance plan, schedule, and procedures

k. Cleaning recommendations

l. Troubleshooting guides and diagnostic techniques

m. Wiring diagrams and control diagrams

n. Repair procedures

o. Removal and replacement instructions

p. Spare parts and supply list

q. Repair work-hours

r. Product submittal data

s. O&M submittal data

t. Parts identification

u. Warranty information

v. Extended warranty information

w. Personnel training requirements

x. Testing equipment and special tool information

y. Testing and performance data

z. Contractor information

aa. Field test reports

1.6.5 Data Package 5

a. Safety precautions and hazards

b. Operator prestart

c. Start-up, shutdown, and post-shutdown procedures

d. Normal operations

e. Environmental conditions

f. Preventive maintenance plan, schedule, and procedures

g. Troubleshooting guides and diagnostic techniques

h. Wiring and control diagrams

i. Maintenance and repair procedures

j. Removal and replacement instructions

k. Spare parts and supply list

l. Product submittal data

m. Manufacturer's instructions

n. O&M submittal data

o. Parts identification

p. Testing equipment and special tool information

q. Warranty information

r. Extended warranty information

s. Testing and performance data

t. Contractor information

u. Field test reports

v. Additional requirements for HVAC control systems

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TRAINING

Prior to acceptance of the facility by the Contracting Officer for Beneficial Occupancy, provide comprehensive training for the systems and equipment specified in the technical specifications. The training must be targeted for the Facilities Management Specialist, building maintenance personnel, and applicable building occupants. Instructors must be well-versed in the particular systems that they are presenting. Address aspects of the eOMSI Manual, as submitted in Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI). Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

3.1.1 Training Plan

Submit a written training plan to the Contracting Officer for approval at least 60 calendar days prior to the scheduled training. Training plan must be approved by the Government's Commisioning Authority (CxA) prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and CxA. Include within the plan the following elements:

a. Equipment included in training

b. Intended audience

c. Location of training

d. Dates of training

e. Objectives

f. Outline of the information to be presented and subjects covered including description

g. Start and finish times and duration of training on each subject

h. Methods (e.g. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)

i. Instructor names and instructor qualifications for each subject

j. List of texts and other materials to be furnished by the Contractor that are required to support training

k. Description of proposed software to be used for video recording of training sessions.

3.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The CxA is responsible for

overseeing and approving the content and adequacy of the training. Provide a brief summary of the FACILITY INFORMATION manual, and a more detailed presentation of the PRODUCT AND DRAWING MANUAL, specified in Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI). Spend 95 percent of the instruction time during the presentation on the OPERATION AND MAINTENANCE DATA. Include the following for each system training presentation:

a. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.

b. Relevant health and safety issues.

c. Discussion of how the feature or system is environmentally responsive. Advise adjustments and optimizing methods for energy conservation.

d. Design intent.

e. Use of O&M Manual Files.

f. Review of control drawings and schematics.

g. Interactions with other systems.

h. Special maintenance and replacement sources.

i. Tenant interaction issues.

3.1.3 Training Outline

Provide the eOMSI Manual files as specified in Section 01 78 24.00 20, FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI), and a written course outline listing the major and minor topics to be discussed by the instructor on each day of the course to each trainee in the course. Provide the course outline 14 calendar days prior to the training.

3.1.4 Training Video Recording

Record classroom training session(s) on video. Provide to the Contracting Officer two copies of the training session(s) in DVD video recording format. Capture within the recording, in video and audio, the instructors' training presentations including question and answer periods with the attendees. The recording camera(s) must be attended by a person during the recording sessions to assure proper size of exhibits and projections during the recording are visible and readable when viewed as training.

3.1.5 Unresolved Questions from Attendees

If, at the end of the training course, there are questions from attendees that remain unresolved, the instructor must send the answers, in writing, to the Contracting Officer for transmittal to the attendees, and the training video must be modified to include the appropriate clarifications.

3.1.6 Validation of Training Completion

Ensure that each attendee at each training session signs a class roster daily to confirm Government participation in the training. At the completion of training, submit a signed validation letter that includes a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and copies of the signed class rosters. Provide two copies of the validation to the Contracting Officer, and one copy to the Operation and Maintenance Manual Preparer for inclusion into the Manual's documentation.

3.1.7 Quality Control Coordination

Coordinate this training with the CxA in accordance with Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL FOR DESIGN-BUILD.

-- End of Section --

SECTION 01 78 24.00 20

FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI)
02/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014; with Change 4) Navy and Marine Corps Design Procedures

1.2 DEFINITIONS AND ABBREVIATIONS

1.2.1 eOMSI Manual

Manual (PDF file) provided by the Contractor that includes, but is not limited to, product information, a facility description with photos, and a list of primary facility systems.

1.2.2 eOMSI Facility Data Workbook (FDW)

A Microsoft Excel file containing required facility information populated by the Contractor.

1.2.3 Systems

The words "system", "systems", and "equipment", when used in this document refer to as-built systems and equipment.

1.2.4 Computer Assisted Design and Drafting (CADD)

Electronic Computer Assisted Design and Drafting graphic software program that is used to create facility design contract documents and Record Drawings.

1.2.5 KTR

An abbreviation for "Contractor."

1.3 EOMSI MEETINGS

1.3.1 Post-Award Kickoff Meeting

Be prepared to discuss the following during this meeting:

a. eOMSI Manual and eOMSI Facility Data Workbook Development Meetings

b. Processes and methods of gathering eOMSI Manual and eOMSI Facility Data Workbook information during construction.

c. The eOMSI Submittals schedule. Include the eOMSI submittal schedule

on the Baseline Construction Schedule in accordance with Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULE (NAS).

d. Electronic eOMSI Facility Data Workbook file for Contractor's use and completion.

1.3.2 eOMSI Manual and Facility Data Workbook Coordination Meeting

Facilitate a meeting after the Post-Award Kickoff Meeting prior to the submission of the eOMSI Progress Submittal. Meeting attendance must include the Contractor's eOMSI Manual and Facility Data Workbook Preparer, Designer of Record (DOR), and Quality Control Manager, the Commissioning Authority (CxA), and the Government's Design Manager (DM), Contracting Officer's Representative, and NAVFAC Public Works (PW) Facilities Management Division (FMD). Include any Mechanical, Electrical, and Fire Protection Sub-Contractors.

The purpose of this meeting is to reach a mutual understanding of the scope of work concerning the contract requirements for eOMSI and coordinate the efforts necessary by both the Government and Contractor to ensure an accurate collection, preparation and timely Government review of eOMSI.

1.3.3 Facility Turnover Meeting

Include eOMSI in NAVFAC Red Zone (NRZ) facility turnover meetings as specified in Section 01 30 00, ADMINISTRATIVE REQUIREMENTS.Section 01 31 19.05 20, POST AWARD MEETINGS.

1.4 SUBMITTAL SCHEDULING

1.4.1 eOMSI, Progress Submittal

Submit the Progress submittal when construction is approximately 50 percent complete, to the Contracting Officer for approval. Provide eOMSI Manual Files (Bookmarked PDF) and eOMSI Facility Data Workbook (Excel). Include the elements and portions of system construction completed up to this point.

The purpose of this submittal is to verify progress is in accordance with contract requirements as discussed during the eOMSI Coordination Meeting. Field verify a portion of the eOMSI information in accordance with paragraph FIELD VERIFICATION.

1.4.2 eOMSI, Prefinal Submittal

Submit the 100 percent submittal of the eOMSI Prefinal Submittal to the Contracting Officer for approval within 90 calendar days of the Beneficial Occupancy Date (BOD). This submittal must provide a complete, working document that can be used to operate and maintain the facility. Any portion of the submittal that is incomplete or inaccurate requires the entire submittal to be returned for correction. Any discrepancies discovered during the Government's review of eOMSI Progress submittal must be corrected prior to the Prefinal submission.

The eOMSI Prefinal Submittal must include eOMSI Manual Files (Bookmarked PDF) and eOMSI Facility Data Workbook (Excel).

1.4.3 eOMSI, Final Submittal

Submit completed eOMSI Manual Files (Bookmarked PDF) and eOMSI Facility Data Workbook (Excel). The Final submittal is due at BOD. Any discrepancies discovered during the Government's review of the Prefinal eOMSI submittal, including the Field Verification, must be corrected prior to the Final eOMSI submission.

1.5 UNITS OF MEASURE

Provide eOMSI utilizing the units of measurerequired by the RFP for the facility. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

eOMSI, Progress Submittal; G

eOMSI, Prefinal Submittal; G

eOMSI, Final Submittal; G

PART 2 PRODUCTS

2.1 eOMSI FILES FORMAT

Format eOMSI manuals and files in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. Include a complete electronically linked operation and maintenance directory. Provide four electronic copies of the eOMSI Manuals to the Contracting Officer for approval.

Provide eOMSI Facility Data Workbook on compact disks (CD) or data digital versatile disk (DVD) disks in (EXCEL) format. Scan eOMSI Manual Files and eOMSI Facility Data Workbook for viruses, malware, and spyware using a commercially available scanning program that is routinely updated to identify and remove current virus threats.

2.1.1 eOMSI Manual Organization

Organize the eOMSI Manuals into two parts: 1) Product and Drawing Information, and 2) Facility Information. Bookmark the PDF files for easy access to the information.

a. Bookmark Product and Drawing Information documents in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

b. Bookmark Facility Information to at least one level lower than the major system.

2.1.2 eOMSI Manual CD or DVD Disk Label and Disk Holder or Case

Provide disks in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

2.2 eOMSI MANUAL

2.2.1 Product and Drawing Information

Provide an organized record of the facility products, materials, equipment, and minimum information necessary to operate the facility. Provide Product and Drawing Information for the systems in the final constructed facility.

2.2.1.1 O&M Data

As a minimum, provide the approved O&M Data, submitted in the technical specification sections, in accordance with paragraph TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES in Section 01 78 23 OPERATION AND MAINTENANCE DATA.

2.2.1.2 Record Drawings

Provide an electronic, PDF copy of the Record Drawings, prepared in accordance with FC 1-300-09N and 01 78 00 CLOSEOUT SUBMITTALS. Bookmark drawings using the sheet title and sheet number.

Include Record Drawings as part of the Red-Zone specified in Section 01 30 00 ADMINISTRATIVE REQUIREMENTS.

2.2.1.3 Utility Record Drawings

Using Record Source Drawings, show and document details of the actual installation of the utility systems; annotate and highlight the eOMSI information. Provide Utility Record Drawings in PDF format. Provide the following drawings at a large enough scale to differentiate designated isolation units from surrounding valves and switches.

a. Utility Schematic Diagrams - Provide a one line schematic diagram for each utility system such as power, water, wastewater, and gas/fuel. Schematic diagram must show from the point where the utility line is connected to the mainline up to the five-foot connection point to the facility. Indicate location or area designation for route of transmission or distribution lines; locations of duct banks, manholes/ handholes or poles; isolation units such as valves and switches; and utility facilities such as pump stations, lift stations, and substations.

b. Enlarged Connection and Cutoff Plans - Provide enlarged floor plans that provide information between the five foot utility connection point and where utilities connect to facility distribution. Enlarge floor plans/ elevations of the rooms where the utility enters the building and indicate on these plans locations of the main interior and exterior connection and cutoff points for the utilities. Also enlarge floor plans / elevations of the rooms where equipment is located. Include enough information to enable someone unfamiliar with the facility to locate the connection and cutoff points. Indicate designations such as room number, panel number, circuit breaker, or valve number, of each utility and equipment connection and cutoff

point, and what that connection and cutoff point controls.

2.2.2 Facility Information

Provide the following in Facility Information:

2.2.2.1 General Facility and System Description

Describe the function of the facility. Detail the overall dimensions of the facility, number of floors, foundation type, expected number of occupants, and facility Category Code. List and generally describe all the facility systems and any special building features (for example, HVAC Controls, Sprinkler Systems, Cranes, Elevators, and Generators). Include photographs marked up and labeled to show key operating components and the overall facility appearance.

2.2.2.2 Basis of Design

Include the Basis of Design that shows the basic design scope of work, assumptions and the original intentions of the Designer of Record (DOR). Identify the site utility design goals, objectives, design load limits, assumptions, and system features that are critical to the operation and maintenance of the systems.

2.2.2.3 Floor Plans

Provide uncluttered, legible 11 by 17 inches floor plans. Include room numbers, type or function of spaces, and overall facility dimensions on the floor plans. Do not include items such as construction instructions, references, or frame numbers.

2.2.2.4 Floor Coverings, Wall Surfaces, and Ceiling Surfaces

Provide a table that lists by room number (including hallways and common spaces), the type, and area of finish, manufacturer's product name, identifying number, and color. Include a facility summary of the total area for each type of space and floor, wall, or ceiling finish in the table.

2.2.2.5 Windows

Provide a table that lists by room number (including hallways and common spaces), the type of window, window size, number of each size and type, special features, manufacturer's product name, identifying number, and color. The table must include a facility summary of the total number for each type and size of window.

2.2.2.6 Roofing

Provide the total area of each type of roof surface and system. Provide the name of the roofing product and system; manufacturer's, supplier's, and installer's names, addresses, and phone numbers; manufacturer's product name, identifying number, and color. For each type of roof, provide a recommended inspection, maintenance and repair schedule that details checkpoints, frequencies, and prohibited practices. List roof structural load limits.

2.2.2.7 HVAC Filters

Provide a table that lists the quantity, type, size, and location of each HVAC filter, manufacturer's product name, and identifying number.

2.2.2.8 Plumbing Fixtures

Provide a table that lists by room number, the number and type of plumbing and bathroom plumbing fixtures (for example, sinks, water closets, urinals, showers and drinking fountains).

2.2.2.9 Lighting Fixtures

Provide a table that lists by room number (including hallways and common spaces), the type of lighting fixture, ballast, number of lighting fixtures, type of lamps and number of lamps, and the manufacturer's product name and the identifying number. The table must include a facility summary of the total number of fixtures of each type and number of lamps of each type.

2.2.2.10 Equipment Listing

Provide a table that lists the major equipment shown on the design equipment schedules. Show the item descriptions, locations, model numbers; and the names, addresses, and telephone numbers of the manufacturers, suppliers, contractors, and subcontractors.

2.2.2.11 System Flow Diagrams

Provide a flow diagram indicating system liquid, air or gas flow during normal operations. Integrate the system components into the diagram. A compilation of non-integrated, flow diagrams for the individual system components are not acceptable.

2.2.2.12 Valve List

Provide a list of all valves associated with the system. Show valve type, identification number, function, location and normal operating position.

2.2.2.13 Riser Diagrams

Provide riser diagrams and settings of equipment.

2.3 eOMSI FACILITY DATA WORKBOOK

Download the eOMSI Facility Data Workbook at the following location: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic Complete the KTR Facility Data File tab based on the selection of Mastersystems, Systems, and Subsystems installed. The following tabs are included in the eOMSI Facility Data File Workbook and serve the purpose stated:

a. Instructions Tab: Instructions for completing Model & Facility Data Matrix Tab and KTR Facility Data File Tab. If a discrepancy exists between what is required in this section and the Workbook, the instructions within the workbook take precedence.

b. Model & Facility Data Matrix Tab: - The Matrix lists Required Facility Asset Fields for each SYSTEM and SUBSYSTEM. The Designer of Record

selects SYSTEMS and SUBSYSTEMS that are within the project scope, which the Contractor needs to include and populate in KTR Facility Data File tab. The "Required Facility Asset Field Position Numbers," one through seventeen, are pre-populated, and are not editable.

c. Required Facility Asset Fields Tab: Defines the 17 Required Facility Asset Field Position Numbers used in Model and Facility Data Matrix and KTR Facility Data File tabs.

d. KTR Sample Facility Data File Tab: Sample KTR eOMSI facility data file. This tab provides an example of the mandatory fields of equipment installed by the Contractor, and populated in the KTR eOMSI Facility Data File Tab, along with their descriptions.

e. KTR Facility Data File Tab: Required eOMSI facility data file deliverable provided to the Government. Provide a separate and unique new row for each facility component or piece of equipment installed.

PART 3 EXECUTION

3.1 FIELD VERIFICATION

Field verify eOMSI Facility Data Workbook information with Contractor and Government personnel. Include the following personnel in this meeting: Contractor's eOMSI Manual and Facility Data Workbook Preparer and Quality Control Manager, Commissioning Authority, and the Government's Contracting Officer's Representative and NAVFAC PW FMD. Request, and provide, an eOMSI Field Verification Meeting no sooner than 14 calendar days after submission of the Progress eOMSI submittal, and another, no sooner than 14 calendar days after submission of the Prefinal eOMSI submittal. During this meeting, the Government and Contractor will verify that the eOMSI Facility Data Workbook is complete and accurate.

Field verify that at least 5 Subsystems under each of the Mastersystems are accurate, for a total of 25 Subsystems. For each of these items, verify that the required facility asset field, as defined in the "Model & Facility Data Matrix" tab, contains the specified data and it is accurate (i.e. item description, manufacturer, model no., serial no.). 100 percent accuracy of eOMSI information is required for successful field verification. If data discrepancies are discovered amongst the 25 Subsystems verified, resubmit an updated eOMSI FDW, and request a make-up field verification meeting. At the make-up field verification meeting 25 new Subsystems and their associated required facility asset fields will be field verified; the 25 new Subsystems must be 100% accurate. Any discrepancies discovered must be corrected prior to next eOMSI Facility Data Workbook Submittal.

(1) D10 - CONVEYING
(2) D20 - PLUMBING
(3) D30 - HVAC
(4) D40 - FIRE PROTECTION
(5) D50 - ELECTRICAL

3.2 eOMSI TRAINING

Provide training on eOMSI Manuals and Facility Data Workbook in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

-- End of Section --

SECTION 01 78 30.00 22

GIS DATA DELIVERABLES

11/18

PART 1 GENERAL

1.1 OBJECTIVE

The primary objective of this section is to provide detailed specifications for collection and delivery of geospatial data commonly referred to as Geographic Information System (GIS) data. Additionally, this section shall provide guidance to ensure that all GIS data delivered is compatible and will add value to the Marine Corps Base (MCB) Camp Lejeune Installation Geospatial Information and Services (IGI&S) GEOdatabase.

Failure to comply with the specifications outlined in this document will result in non-acceptance of data deliverables.

1.1.1 Point of Contact for MCB Camp Lejeune

The Points of Contact (POC) for assistance in preparation of GIS deliverables are:

Resident Officer In Charge Of Construction
Construction Manager (CM)
1005 Michael Drive
Camp Lejeune, NC 28547-2521
(910) 451-2581

Public Works Division
GIS Data Manager
1005 Michael Road
Camp Lejeune, NC 28547-2521
(910) 451-5507 ext 3264

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

GIS Data Deliverables; G

1.3 GOVERNMENT GEOSPATIAL DATA AND SCHEMA

1. The IGI&S repository model schema is based on the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) GEOFidelis Data Model with recurring business driven modifications and or adaptations.

   a. Data will be created and delivered by developing an ARCGIS Personal GEODatabase using ArcGIS 10.1 or higher if a higher version is being utilized by the Government at the time the deliverable is being developed.

   b. Request the existing GIS Data, Schema and Domain Properties by means of a Data Request Package (DRP). Receipt of request will include Geospatial Database table structure, schema, Domain

configuration, Attribute text format, i.e., case size as well as Meta Data information.

c. The DRP should be submitted prior to the start of data collection efforts and again every 6 months for the duration of the contract. Ensure that all GIS data has been created and delivered utilizing the most up to date IGI&S GEODatabase schema.

d. Verify the ArcGIS and schema version, via the CM or PM, at the commencement of this contract. All GIS DATA DELIVERABLES will be created in accordance with the current version and these specifications.

2. Submit a request for a Geospatial DRP to the CM or the Project Manager.

a. Request to be completely filled out and include all the information as instructed on the data request form.

b. Request only GIS data and or schema for feature classes that are relevant to the contract and within the boundary of project area.

c. Attach Scope of Work, which is defined by this GIS DATA DELIVERABLES section for each project request.

d. Return the DRP to the CM or Project Manager for sponsorship and submittal to the Installation Geospatial Information & Services (IGI&S) Office.

e. Incomplete forms may delay receipt of the requested GIS data and Schema.

1.3.1 Global Positioning System (GPS) and Spatial Reference Properties

GPS data shall be completed in accordance with the GPS Data Collection and Documentation Standards, Version 4 (or higher version if available at the time of this project) as prepared by Geographic Information Coordinating Council (GICC) Statewide Mapping Advisory Committee (SMAC) and adopted by the North Carolina Geographic Information Coordinating Council.

1. Prior to GPS efforts, ALL underground utilities are to be located utilizing a utility locating service in order to verify and obtain accurate feature locations.

2. Only bench marks included in the North Carolina Geodetic Survey Base Station Network are to be used for GPS data collection.

3. Mission planning is essential. Utilize the best Position Dilution of Precision (PDOP) values for data accuracy.

4. Utility data, as identified in paragraph "ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES" will be collected utilizing Survey Grade GPS data collection methods.

5. Infrastructure data, as identified in paragraph "ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES" will be collected utilizing Sub-Foot or better GPS data collection methods.

a. Spatial accuracy requirements for Survey and Sub-Foot grade data collection are as follows:

i. Sub-Foot requirements:

1) All points shall be within + 12 inches

2) 95 percent accuracy rate for all points.

ii. Survey Grade requirements:

1) All points shall be within + 1 centimeter

2) 98 percent accuracy rate for all points

6. Make every effort to capture feature locations without using offsets. All Offsets will be noted in the Final Report for each feature.

7. Excessive offsets included in the Final Data, which will be referenced in the Final Report, will be reviewed for quality control.

a. Resubmittal of data will be required if PDOP planning was not observed per this specification.

The following GEODatabase Coordinate Systems and Spatial Reference Properties should be utilized for Camp Lejeune:

1. Transverse Mercator (UTM) Zone 18N

a. GRS 1980 spheroid

b. North American Datum 1983 (NAD83) horizontal datum

c. North American Vertical Datum 1988 (NAVD88) vertical datum.

2. Domain precision of 1000 which will result in a database accuracy of 1/1000 m

1.3.2 Demolished and Abandoned in Place (AIP) Features

Reference all Demolished and or AIP features in the data delivered. Should the current feature data class attributes and or domains not reference AIP or demolished features, the Contractor will be responsible for appropriately delivering these features by creating an associated "Demolished" or AIP feature class for all point and polyline data, i.e., CLJN.CL.WastewaterUtilitySegment and CLJN.CL.WateUtilNode_wHydrant, etc.

1. Utilize a blank schema for the associated feature class.

2. Rename associated feature class and add DEMO or AIP as a prefix, i.e., DEMO.CLJN.CL.WastewaterUtilitySegment, AIP.CLJN.CL.WastewaterUtilitySegment.

3. All demolished and or AIP features should provide existing spatial and non-spatial data which may be copied from existing data.

4. Update attributes appropriately to include the following:

a. Contract Number.

b. Drawing Number.

c. isDemolished.

d. dateDemolished or dateAIP.

e. Status.

1.3.3 Creating a New Feature Class

Should a new feature class be required that is not readily available in the current GIS schema provided by the Government. Contact the CM or Project Manager for guidence and schema format.

1.3.4 GIS Topology Rules

All data must be created using GIS topology rules for polygons, points and lines, such as, but not limited to the following examples:

1. Polygons, Polylines and points rules; please reference illustrating topology rules in ArcGIS at www.esri.com.

2. Polygons must not have slivers.

3. All utility or infrastructure system data, which is, but is not limited to, transportation system and electrical, water, steam distribution, and wastewater collection, etc., will be created using GIS spatial connectivity rules which specify that vertex, edge and endpoints be snapped to features within the system.

4. Features will be snapped to the appropriate item.

5. Data will be created to represent the real world, for example, water, sewer, and transportations systems, etc. will be drawn and or created in the direction of flow.

6. Utility and transportation systems will be created from source to sink, etc.

7. Abandoned In Place (AIP) utility lines will be located and updated in the current feature data set and identified as AIP in the attribute tableor provide in a feature data set as specified in paragraph "Demolished and Abandoned in Place (AIP) Features" with CM approval.

1.3.5 Creation of Geographic Data Documentation (METADATA)

For each digital file delivered containing geographic information, provide documentation consistent with the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM).

Metadata generation tools included in the ArcGIS suite of software (or equivalent technology) will be used in the production of the required metadata in XML format. Regardless of the tools used for metadata creation, must ensure that the metadata is delivered in XML format and can be easily imported into the IGI&S GEODatabase.

(NOTE: The metadata should be formatted from the Government perspective, not the Contractor project perspective. Therefore such items as Point of Contact (POC) should be the POC currently associated with the data and NOT the Contractor's Project Manager. Use language and format consistent with

existing metadata.)

1.3.6 GIS Submittals Guidelines

All GIS Submittals will be submitted to the CM or PM and then analyzed by Government GIS personnel prior to final approval. Failure to comply with the specifications outlined in this document will result in non-acceptance of data deliverables.

1. Prior to any database development, provide the Government with a technical approach document, in PDF format, for review and approval. The Technical Approach document will describe in detail the Contractor's technical approach to designing and developing the database.

2. All attributes will be populated in accordance with the "ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES" and will be obtained via contract specifications, plans and record drawings.

3. Reasearch may be required to be conducted to collect data and make copies of reports and studies as necessary to verify existing and/or record drawing data. Record drawing data and closed contracts can be located in the Technical Records Section in the Public Works Department which is located at 1005 Michael Street, MCB Camp Lejeune.

4. Raw GPS data and collection data files will be included with every phase of delivery.

5. Actual spatial and non-spatial conditions in the field always supersede drawings. Locate and field verify all features to ensure attribute data and location is correctly recorded.

6. Submit a preliminary review of data at 25 percent contract completion to ensure specifications compliance.

7. Deliver digital geographic maps, GPS collection files and related data. All working text and documents and personal geodatabase will be included for review in the draft and final delivery of data.

    a. All maps of GIS DATA DELIVERABLES will be ANSI C size and include a project title, contract number, scale, legend, standard symbology, attributes, i.e., building numbers, road names, segment diameters, etc. Also provide a PDF copy of all maps.

8. When required, provide a technical consultant to meet on site.

9. Do not deliver blank unused schema or feature class data with no attributes. Deliver only data pertinent to the contract that adds value to the GEODatabase per this section.

10. When projects are constructed in phases, deliver GIS Data at the end of each phase for all Phased Projects and Construction projects.

11. It is the Contractor's responsibility to perform quality assurance for all data and related materials required in the section prior to submitting product to the Government.

12. The data will be analyzed for discrepancies in subject content, correct format in accordance with this statement of work, and

compatibility with the existing GIS system as well as all other specifications in this section.

1.3.7 Formats, Versions and Guidelines

All data deliverables will be in the following formats and/or versions.

1. GIS data will be provided in an ArcGIS 10.1 or higher if a higher version is being used by the Government at the time of this project. Verify the ArcGIS version, via the CM or PM at the commencement of this contract.

2. Microsoft Windows 7 operating system, unless otherwise approved by the Government.

3. All reports and maps will be delivered as a hard copy and in a searchable Adobe Portable Document Format (PDF).

4. All text, spreadsheet, database files, reports, and maps will be delivered on Digital Versatile Disc read - only memory (DVD-ROM).

5. Verify required version(s) of software and schema, via the CM or PM.

6. Map submittals will accompany each geospatial deliverable.

    a. Include ANSI C map for each project/area.

    b. Data should be labeled and attributed per specification.

    c. All maps should include the date, a legend, scale, contract title, and number.

    d. Each map should be exported on a .pdf and delivered electronically with the project.

1.3.8 Final Report Requirements with additional Guidelines

Follow the following:

1. Specific procedures and list of equipment, software and versions that were utilized for the GPS data collection and creation of geospatial data.

2. Submit all GPS data files.

3. Provide the date(s) the IGI&S schema and geospatial data was received.

4. Provide details on any offsets to include justification as to why offsets were utilized and on which features and or points offsets were used.

5. Describe all modifications to the geodatabase to include the name of all new features classes, i.e., new, demolished or AIP.

6. Provide the source that was utilized for required attributes.

    a. Include an ANSI C size copy of all design drawings that were referenced in the attribute data. This information should be included in all phases of delivery to include draft and final

reviews.

b. Provide the overall utility site plan drawing(s)with each submittal.

c. Provide a separate map for communication which includes infrastructure in PDF format.

7. Specify Deliverable "Draft #" or "Final Submittal" when data is submitted to the CM or PM for review.

8. Provide the name and contact information for the GIS Technical Point of Contact who can answer questions regarding the data deliverable.

9. GIS DATA DELIVERABLES must be provided in a format that does not require translation or pre/post processing prior to being loaded into the IGI&S GEODatabase.

10. Provide any miscellaneous information that is deemed significant.

11. Provide the current version of the GIS DATA DELIVERABLES specification utilized for this contract submittal.

1.3.9 Ownership

All digital files, final hardcopy products, GPS raw data, source data acquired for this project, and related materials, including that furnished by the Government, will become the property of the Government and will not be issued, posted, distributed, or published by the Contractor. All documentation will be delivered in the final delivery.

Note: No endorsement of software or hardware is implied.

1.4 ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES

GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

1.4.1 **CLJN.CL.Common**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table, or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.Sign
A structure that conveys directional, warning, or other information.

a) numberOfSigns
b) assemblyOffset
c) SignText

d) SignType - Directional, Standard Identifier, Safety Warnings, Regulatory, etc.
e) SymbolCode - Utilize manual for Uniform Traffic Control Devices Code as issued by the Federal Highway Administration
f) GisFeatureCollectionMethod - Survey Grade GPS, Digitized, etc.
g) Contract Number
h) SdsFeatureDescription
i) signAssemblyType - Pedestal Pole, Wood 4x4, etc.

1.4.2 **CLJN.CL.EMERGENCY_SERVICES**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table, or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.RoadCenterline
The center of the road area

a) roadClass - Major Roads/Local Roads/etc.
b) trackOrLaneCount
c) speedLimit
d) isPaved - YES / NO
e) oneWayDirection
f) fullStreetName
g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
h) contractNumber
i) isTankTrail - YES / NO
j) isLighted - Yes / No
k) routeMinTravelledWayWidth
l) routeMinTravelledWayWidthUOM
m) routeTotalUsableWidth
n) routeTotalUsableWidthUOM
o) supportedByBridgeSpan - Yes / No

1.4.3 **CLJN.CL.REAL.PROPERTY**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.AccessControl
A structure manned or unmanned intended to control access to an area

a) controlType - gate, barricade, tire shedder, etc.
b) contractNumber
c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.

d) isRangeAccess - YES / NO
e) gateType -
f) Facility Number
g) sdsFeatureDescription - Location

CLJN.CL.AlternativeEnergyPoint
Locations used for the production of alternative energy sources, such as wind turbines, photovoltaic, etc.

a) alternativeEnergyType - Photovoltaic, Natural Gas, etc.
b) contractNumber
c) designDrawingNumber
d) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
e) isPortable - YES / NO
f) wattage
g) operationalStatus - inservice, abandoned, etc.
h) panelType
i) sdsFeatureName
j) sdsFeatureDescription
k) wattage - Total per unit
l) hasInverter - YES / NO
m) isPartOfElectricalNetwork - YES / NO
n) photovoltaicPanelInstallation

CLJN.CL.AlternativeEnergyArea
Locations used for the production of alternative energy sources

a) operationalStatus - inservice, abandoned, etc.
b) isPortable - YES / NO
c) panelType
d) wattage - total for area
e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
f) contractNumber
g) sdsFeatureName - Facility Number
h) hasInverter - YES / NO
i) isPartOfElectricalNetwork - YES / NO

CLJN.CL.BoatRamp
A partially submerged hard surfaced structure on a shoreline for launching or retrieving vessels or vehicles

a) boatRampIDPK - Facility Number
b) dateConstructed
c) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
d) contractNumber
e) sdsFeatureName
f) sdsFeatureDescription - Location
g) numberofLaunchLanes

CLJN.CL.Bridge
A structure used by vehicles that allows passage over or under an obstacle such as a river, chasm, mountain, road or railroad

a) isFixed - YES / NO
b) TransportationSystemType - Pedestrian, Road, Railway, etc.

c) FacilityNumber
d) verticalConstructionMaterial - Brick, Concrete, etc.
e) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
f) contractNumber
g) sdsFeatureDescription - Road Name if applicable
h) OperationalStatus - closed, operational, etc.

CLJN.CL.Building
A roofed, floored and walled structure that is completely enclosed

a) facilityNumber
b) builtDate
c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
d) contractNumber
e) sdsFeatureDescription - General Description of Building's Purpose
f) floorCount
g) material - Exterior material such as Brick, Concrete, etc.
h) operationalStatus - inService, abandoned, etc.

CLJN.CL.BuildingFloorPlan
A linear representation of floor plans for buildings, provided in one feature per floor

a) buildingFloorLevel
b) buildingIDFK - Structure Number
c) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
d) contractNumber
e) sdsFeatureDescription Renovation Date

CLJN.CL.Disposal_RealProperty
Real property demolished structures

a) sdsFeatureDescription
b) sdsFeatureName
c) facilityNumber
d) contractNumber
e) disposalDate

CLJN.CL.DocksAndWharfs
A manmade water-land interface structure often for access to boats or ships

a) PurposeType - Fishing, Mooring, etc.
b) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
c) contractNumber
d) Facility Number - Structure Number
e) sdsFeatureDescription - Pier, boat ramp, dock, etc.
f) natureOfConstruction - concrete, earthen, steel

CLJN.CL.Fence
A freestanding structure designed to restrict or prevent movement across a boundary

a) facilityIDFK - Structure Number
b) fenceType - metal, wood, etc.
c) fenceUse - agriculture, boundary, etc.
d) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
e) contractNumber
f) sdsFeatureName - Fence or Gate
g) sdsFeatureDescription

CLJN.CL.Marina
Any facility or area for the exchange of people or materials from land to water such as a port, harbor, marina, launch area or small craft facility

a) marinaIDPK - Structure Number
b) marinaType
c) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
d) contractNumber
e) sdsFeatureName
f) createdDate - Construction Date
g) categoryOfCraftFacility - boat launch or landed, etc.

CLJN.CL.NavigationalAid
A visual or electronic device, on the ground or airborne, which provides point-to-point guidance information or position data to aircraft in flight

a) navigationalAidIDPK - Structure Number
b) navaidType - TACAN, Radar station, Beacon, etc.
c) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
d) contractNumber
e) sdsFeatureName - Type of navigational aid

CLJN.CL.PavementSectionAirfield
A pavement section is a portion of a pavement branch that differs in some aspect from other sections such that further segmentation is required to uniquely identify that section)

a) pavementSectionType - apron, roadway, etc.
b) isLighted - YES / NO
c) operationalStatus - inService, abandoned, etc.
d) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
e) builtDate
f) contractNumber
g) runwayClassification - class A, class B, rotatory, etc.
h) sdsFeatureName
i) sdsFeatureDescription - MCBCL, MCASNR, Geiger, Stone Bay, etc.

CLJN.CL.PavementSectionParkingArea
A vehicle parking area is an area used for parking vehicles not including residential streets and driveways.

a) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
b) operationalStatus - inService, abandoned, etc.

c) pavementSectionType - parking, slab, driveway, etc.
d) sdsFeatureDescription - Dumpster, Driveway, Transformer, Parking, etc.
e) sdsFeatureName - Pad, Slab, Parking, etc.
f) facilityNumber
g) builtDate
h) contractNumber
i) isLighted

CLJN.CL.PavementSectionRoadway
The surface area that comprise a road area, upon which vehicles drive and park.

a) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
b) operationalStatus - inService, abandoned, etc.
c) pavementSectionType - curb, roadway, etc.
d) facCode - Surfaced or Unsurfaced
e) divided - Yes / No
f) featureCode
g) oneWay - Yes / No
h) routeSurfaceComposition - concrete, asphalt, etc.
i) builtDate
j) contractNumber
k) isLighted - Yes / No
l) isTankTrail - Yes / No

CLJN.CL.PavementSectionSidewalk
The paved pedestrian walkway prepared to facilitate travel on foot. It may or may not be adjacent to a street/road.

a) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
b) operationalStatus - inService, abandoned, etc.
c) pavementSectionType - Sidewalks
d) sdsFeatureDescription - Named Area
e) routeSurfaceComposition - Concrete, Asphalt, etc.
f) builtDate
g) contractNumber
h) installationCode - M67001
i) isLighted - Yes / No

CLJN.CL.RailTrack
A track is the main designation for describing a physical linear portion of the network

a) contractNumber
b) facilityNumber
c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
d) NetworkSubtype - railroadTrack, craneTrack
e) operationalStatus - inservice, abandoned, etc.
f) sdsFeatureName - Start & finish Points
g) sdsFeatureDescription - Provide Street Name Cross cover

CLJN.CL.RecreationArea

An area defined for recreational purposes

a) facilityNumber
b) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
c) contractNumber
d) sdsFeatureName - Type of recreation field
e) sdsFeatureDescription - Type of recreation feature
f) areaType - biking, boating, picnic, Hunting, etc.

CLJN.CL.RecreationTrail
A location providing physical activities which are mentally relaxing, such as running/walking, biking, or hiking

a) recreationTrailIDPK - Facility or Structure Number
b) trailType - Multi-use, horse riding, etc.
c) isPaved - YES / NO
d) dateConstructed
e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
f) contractNumber
g) sdsFeatureName - Trail Name
h) sdsFeatureDescription - Area, Location or parallel street

CLJN.CL.StructureArea
A facility classified as other than a building or linear asset

a) facilityNumber - Structure Number
b) builtDate
c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
d) contractNumber
e) sdsFeatureName - Name of structure according to contract
f) sdsFeatureDescription - Description of item
g) heightAboveSurfaceLevel
h) heightAboveSurfaceLevelUOM - foot, inch, meter, etc.

CLJN.CL.StructurePoint
Example: Flag poles; Point of Information Signs (POI) etc

a) facilityNumber - Structure Number
b) builtDate
c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
d) contractNumber
e) sdsFeatureName - POI, Sign, Flagpole, bleacher, etc.
f) sdsFeatureDescription - Specific type of feature

CLJN.CL.Tower
A vertical projection, higher than its diameter, generally used for observation, storage, or electronic transmission

a) towerUseType - communication, observation, etc.
b) heightMax
c) heightUOM - foot, inch, meter, etc.
d) contractNumber
e) towerType - Observation Tower, Guard Tower, etc.

f) facilityNumber - Structure number
g) sdsFeatureDescription
h) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
i) towerMaterial - wood, concrete, steel, etc.

CLJN.CL.TrafficControlLight
A feature used to represent traffic lights

a) contractNumber
b) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
c) sdsFeatureName - Traffic Control Light, Traffic Signal control box, etc.
d) sdsFeatureDescription - Location such as streets that intersect

CLJN.CL.Wall
A linear feature used for separation of facilities, ornamental decoration, or structural reinforcement (retaining wall

a) wallType - brick, timber, stone, concrete, etc.
b) wallHeight
c) wallHeightUOM - foot, inch, meter, etc.
d) dateConstructed
e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
f) contractNumber
g) sdsFeatureName
h) sdsFeatureDescription - Dumpster enclosure, Utility Enclosure, Blast Protection, etc.

1.4.4 **CLJN.CL.REAL_PROPERTY_RESTRICTED**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.Well
A shaft dug or drilled into the Earth for the purpose of extracting fluids from the subsurface, collecting environmental samples, injecting fluids into the subsurface or extracting contamination or other impurities from the subsurface

a) facilityNumber - Structure Number
b) wellPurpose - extraction, injection, etc.
c) wellResource - WATER
d) operationalStatus - inservice, abandoned, etc.
e) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
f) contractNumber
g) sdsFeatureName - potable or nonpotable
h) sdsFeatureDescription - operational status source

i) ProjectID - Name of Plant this well services
j) wellType - artesian, drilled, etc.
k) operationalStatus - inservice, abandoned, removed, etc

1.4.5 **CLJN.CL.COMMUNICATIONS_RESTRICTED**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System GPS and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.CommCartographicFeatureArea
Graphic features that aid in visually associating CommAnnotation features to the appropriate communication infrastructure feature.

a) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
b) sdsFeatureName
c) sdsFeatureDescription
d) commProjectName - Contract Number
e) operationalStatus - In service, Removed, Abandon in Place, etc.

CLJN.CL.CommCartographicFeatureLine
Graphic features that aid in visually associating CommAnnotation features to the appropriate communication infrastructure feature.

a) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
b) sdsFeatureName
c) sdsFeatureDescription
d) commProjectName - Contract Number
e) operationalStatus - In service, Removed, Abandon in Place, etc.

CLJN.CL.CommCartographicFeaturePoint
Graphic features that aid in visually associating CommAnnotation features to the appropriate communication infrastructure feature.

a) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
b) sdsFeatureName
c) sdsFeatureDescription
d) commProjectName - Contract Number
e) operationalStatus - In service, Removed, Abandon in Place, etc.

CLJN.CL.CommUtilityNode
A subdivision of a communications network, particularly an asset that participates in the transmission of a signal but that is not a cable.

a) commUtilityNodeIDPK - Structure Number
b) commNodeType - connection or two or more sheaths, Devise Used to detect & measure various environmental conditions,

Devise converts electrical signal in to sound, etc.
c) operatingSpectrum
d) transmissionPower
e) powerUOM
f) operationalStatus - In service, Removed, Abandon in Place, etc.
g) commProjectName - Contract Number
h) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
i) sdsFeatureName - MNS - Big Voice, MNS - Little Voice, MSN - Control Station, etc.
j) sdsFeatureDescription - MNS - Big Voice, Field Antenna, Antenna Communication, etc.

CLJN.CL.CommUtilitySegment
A subdivision of a communications network, particularly a cable for the transmission of a signal.

a) cableMaterial - Fiber Optical, PB, CU, Steel, ABS, etc.
b) cableSheathing - PE, XLPE, Cross Ply, etc.
c) availableFibers -
d) usedFibers
e) numberOfMultiModeFibers
f) numberOfPairs
g) numberOfSingleModeFibers
h) installationTypeCode - Underground, above ground, etc.
i) operationalStatus - In service, Removed, Abandon in Place, etc.
j) cableInstaller -
k) cableRoute -
l) cableCount -
m) numberOfStrands -
n) wireGauge -
o) commProjectName - Contract Number
p) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
q) sdsFeatureName - Non-direct Buried Lines, Direct Buried Lines, etc.
r) sdsFeatureDescription - communications line, etc.

CLJN.CL.UtilityFeature_cDuctBank
One or more ducts routed in parallel between two nodes.

a) networkType - A network used for the transmission of a signal.
b) networkSubType - The communication network subtype.
c) utilityFeatureType - One or more ducts routed in parallel between two nodes. (L), etc.
d) diameter
e) diameterUOM - Inches, Feet, meters, etc.
f) ductDepth
g) ductDepthUOM - Inches, Feet, meters, etc.
h) interDuctDiameter
i) interDuctDiameterUOM - Inches, Feet, meters, etc.
j) isEncased - Yes or No
k) numberOfDucts
l) numberOfInserts
m) operationalStatus - In service, Removed, Abandon in Place, etc.

n) commProjectName - Contract Number
o) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.

CLJN.CL.UtilityFeature_cManhole
An enclosed structure (manhole, or handhole)

a) utilityFeatureIDPK - MH Number - See project Manager
b) networkType - Network used for transmission of signal,
c) networkSubType - Communication network subtype
d) utilityFeatureType - Manhole, hand hole, etc.
e) cManholeType - T, R2A, L, j4, JC9C, etc.
f) cManholeMaterial - steel, plastic, aluminum, fiberglass, etc.
g) isHandhole - Yes or No
h) widthValue
i) widthUOM - Inches, Feet, meters, etc.
j) lengthValue
k) lengthUOM - Inches, Feet, meters, etc.
l) heightValue
m) heightUOM - Inches, Feet, meters, etc.
n) diameter
o) diameterUOM - Inches, Feet, meters, etc.
p) cManholeDepth
q) cManholeDepthUOM - Inches, Feet, meters, etc.
r) operationalStatus - In service, Removed, Abandon in Place, etc.
s) commProjectName - Contract Number
t) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.

CLJN.CL.UtilityFeature_cPedestal
An above-ground enclosed structure that provides access to buried plant and a place to house splices, terminals, etc.

a) networkType - A network used for the transmission of a signal.
b) networkSubType - The communication network subtype.
c) utilityFeatureType - above-ground enclosed structure that provides access to buried plant and a place to house splices, terminal, etc.
d) pedestalType - rectangular box type, etc.
e) operationalStatus - In service, Removed, Abandon in Place, etc.
f) commProjectName - Add Contract Number
g) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
h) sdsFeatureDescription

CLJN.CL.UtilityFeature_cVault
An enclosed structure in a facility used for cable entrance.

a) utilityFeatureType
b) networkType - A network used for the transmission of a signal.
c) networkSubType - The communication network subtype.
d) heightValue
e) heightUOM - Inches, Feet, meters, etc.
f) widthValue
g) widthUOM - Inches, Feet, meters, etc.

h) vaultDepth
i) vaultDepthUOM - Inches, Feet, meters, etc.
j) diameter
k) diameterUOM - Inches, Feet, meters, etc.
l) operationalStatus - In service, Removed, Abandon in Place, etc.
m) commProjectName - Contract Number
n) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
o) sdsFeatureDescription

1.4.6 **CLJN.CL.UTILITIES_ELECTRICAL**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.ElecUtilNode_eExteriorLight
Exterior lighting is supplied by local distribution systems and is generally the only service for which the electric utility installs, operates and maintains utilization equipment

a) electricalUtilityNodeIDPK
b) exteriorLightType - streetLight, parkingLotLight, etc.
c) electricalNodeType - eExteriorLight
d) operationalStatus - inservice, abandoned, etc.
e) bulbType LED, INCA, etc.
f) circuitID - This available from CM or PM
g) hasSensor - YES / NO
h) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
i) contractNumber
j) dateInService
k) sdsFeatureName
l) Voltage
m) Wattage

CLJN.CL.ElecUtilNode_eGenerator
Generator is a power source for providing electricity. Generators may be primary or standby power sources

a) FacilityNumber - structure number
b) electricalNodeType - eGenerator
c) operationalStatus - inservice, abandoned, etc.
d) voltage
e) kvaRate
f) circuitID - List is available from CM or PM
g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
h) contractNumber
i) dateInService
j) sdsFeatureName - Manufacturer
k) generatorType - Primary, backup, emergency, etc.

CLJN.CL.ElecUtilNode_eMeterPoint
A electrical meter point represents the location of the metering device

a) electricalNodeType - Description
b) operationalStatus - inservice, abandoned, etc.
c) circuitID - List is available from CM or PM
d) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
e) contractNumber
f) dateInService
g) sdsFeatureName
h) sdsFeatureDescription -
i) mountingType
j) utilityOwner
k) voltage - 208Y-120V, 480Y-277V, etc.

CLJN.CL.ElecUtilNode_eSwitch
Electrical Switches are installed at strategic locations throughout distribution feeder circuits

a) electricalNodeType
b) switchPosition - closed, open, etc.
c) operationalStatus - inservice, abandoned, etc.
d) electricalSwitchType - switches
e) circuitID - List is available from CM or PM
f) numberOfPhases single, three, two
g) switchPosition - Open, closed, etc.
h) voltage - 208Y-120V, 480Y-277V, etc.
i) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
j) contractNumber

CLJN.CL.ElecUtilNode_eTransformer
The Transformer feature class captures information about distribution and power transformers

a) electricalNodeType - Transformer
b) transformerType - stepdown, step up, etc.
c) mountingType - pool or pad
d) numberOfPhases - 1, 2, 3, etc.
e) primaryVoltage - 208Y-120V, 480Y-277V, etc.
f) secondaryVoltage - 208Y-120V, 480Y-277V, etc.
g) totalKVA
h) circuitID - List is available from CM or PM
i) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
j) contractNumber
k) sdsFeatureName - Manufacturer
l) operationalStatus - inservice, abandoned, etc.

CLJN.CL.ElecUtilNode_eVoltageRegulator
Voltage regulators vary the ac supply or source voltage to the customer to maintain the voltage within desired limits

a) electricalNodeType - VoltageRegulator
b) operationalStatus - inservice, abandoned, etc.
c) primaryVoltage - 208Y-120V, 480Y-277V, etc.
d) secondaryVoltage - 208Y-120V, 480Y-277V, etc.

e) numberOfPhases - 1, 2, 3,
f) circuitID - This available from CM or PM
g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
h) contractNumber

CLJN.CL.UtilFeat_eSupportStructure
A structure that supports electric devices

a) utilityFeatureType - Utility, Guy, Poles, etc.
b) networkType - electrical
c) heightValue -
d) heightUOM - foot, inch, meter, etc.
e) utilityOwner
f) operationalStatus - inservice, abandoned, etc.
g) cableCircuitName - List is available from CM or PM
h) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
i) contractNumber
j) sdsFeatureName - Utility Pole, etc
k) sdsFeatureDescription - Number of circuits attached to pole

CLJN.CL.UtilFeat_eUndergroundStructure
Underground Structure is a simple junction feature that includes vaults and manholes that house and protect electrical equipment

a) utilityFeatureIDPK - Structure Number
b) utilityFeatureType - Underground, surface structure, etc
c) networkType - electrical
d) operationalStatus - inservice, abandoned, etc.
e) electricalJunctionType - Manhole, Junction Box, Handhole, etc.
f) numberOfCables -
g) rimElevation -
h) rimElevationUOM - foot, inch, meter, etc.
i) cableCircuitName - List is available from CM or PM
j) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
k) contractNumber

CLJN.CL.ElecUtilSegment
A subdivision of an electrical distribution network, particularly a line for the transmission of electricity

a) electricalSegmentType - OH Primary, UG Primary, OH Secondary, UG Secondary, etc.
b) cableMaterial - AL, copper, etc.
c) location - aboveground, underground, etc.
e) voltage - 208Y-120V, 480Y-277V, etc.
f) utilityOwner -
g) operationalStatus - inservice, abandoned, etc.
h) insulationMaterial - polyCross, none, etc.
i) conductorSize -
j) neutralSize -
k) numberOfConduct -
l) numberOfNeutral -
m) numberOfPhases - 1, 2, 3, etc.
n) circuitID - List is available from CM or PM
o) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.

p) contractNumber -
q) dateInService -
r) sdsFeatureName - Electrical Distribution, exterior lighting, etc.
s) sdsFeatureDescription - Armless mount, cross arm, etc.

CLJN.CL.UtilFeat_eElecFacilitySite
Polygon feature class to define boundaries of electrical facility stations

a) utilityFeatureType - Electrical Facility station
b) operationalStatus - inservice, abandoned, etc.
c) numberOfCircuits
d) numberOfSpareBays
e) numberOfTransformers
f) voltageIn - 208Y-120V, 480Y-277V, etc.
g) utilityOwner
h) gisFeatureCollectionMethod - - CAD, Survey Grade GPS, etc.
i) contractNumber
j) equipmentInstallationDate
k) sdsFeatureDescription - Location of substation
l) facilityIDFK - structure number

1.4.7 **CLJN.CL.UTILITIES_POL**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System GPS and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.POLUtilNode_oDispenser
A fuel dispenser is a machine at a fueling station that is used to pump fuel into vehicles or AGE equipment

a) polNodeType - Fuel dispenser
b) networkSubType - automotive_diesel, jpts, etc.
c) operationalStatus - inservice, abandoned, etc.
d) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
e) contractNumber
f) dateInService
g) sdsFeatureName - Fuel Dispenser
h) sdsFeatureDescription - Type of fuel, unleaded, ethanol, diesel, etc.

CLJN.CL.UtilFeat_oPumpingFacility
A structure, typically a building, containing pumps, filters, and controls as part of a larger fuel handling system

a) utilityFeatureIDPK
b) utilityFeatureType - off-loading pumping facility
c) networkSubType automotive_diesel, jpts, etc.
d) operationalStatus - inservice, abandoned, etc.
e) gisFeatureCollectionMethod - - CAD, Survey Grade GPS, etc.

f) contractNumber
g) equipmentInstallationDate
h) sdsFeatureDescription -

1.4.8 **CLJN.CL.UTILITIES_STORMWATER**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System GPS and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.Impoundment_Stormwater
An accumulation of storm water that is impounded by a dam or weir

a) permitID - Permit Number
b) impoundmentType - minimumPool, topOfFloodControl, etc.
c) waterSurfaceElevation
d) waterSurfaceElevationUOM - foot, inch, meter, etc.
e) dateConstructed
f) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
g) contractNumber
h) operationalStatus - inservice, abandoned, etc.
i) stormwaterTreatmentType - Infiltration Basin, Constructed Wetlands, etc.
j) utilityOwner

CLJN.CL.StormwaterUtilityNode_swInlet
The location at which stormwater is collected/received into the stormwater network

a) stormwaterUtilityNodeIDPK - Structure ID
b) stormwaterNodeType - swInlet description
c) networkSubType - stormWater
d) stormwaterInletType - Inlet, Headwall, etc.
e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
f) contractNumber
g) equipmentInstallationDate
h) sdsFeatureDescription -
i) operationalStatus inservice, abandoned, etc.

CLJN.CL.StormwaterUtilitySegment
A subdivision of a stormwater network, particularly a pipeline or drainage ditch for the transport of stormwater, between the source, holding facilities, and/or treatment facilities

a) diameter
b) diameterUOM - inch
c) pipeMaterial - cement, plastic, etc.
d) isLined - YES / NO
e) downstreamInvertElevation
f) upstreamInvertElevation
g) gisFeatureCollectionMethod - - CAD, Survey Grade GPS, etc.

h) contractNumber
i) equipmentInstallationDate
j) sdsFeatureName - Stormwater pipe, Open Ditch, etc.
k) sdsFeatureDescription
l) operationalStatus - inservice, abandoned, etc.
m) stormwaterPipeStyle
n) stormwaterSegmentType - open ditch, closed under other feature type, etc.

CLJN.CL.StorUtilNode_swManhole
A storm water manhole is an underground concrete structure with a top opening used for collecting and routing storm water runoff through underground pipes

a) stormwaterNodeType
b) stormwaterUtilityNodeIDPK - Structure Number
c) numberOfPipes
d) operationalStatus - inservice, abandoned, etc.
e) stormwaterBasinIDFK - Basin id
f) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
g) contractNumber
h) equipmentInstallationDate
i) sdsFeatureName
j) sdsFeatureDescription

1.4.9 **CLJN.CL.UTILITIES_THERMAL**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System GPS and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.GeothermalWell
A geothermal well is part of a central heating and/or cooling system that pumps heat to or from the ground

a) geothermalWellIDPK - Well ID
b) pipeMaterial - AL, stainless_steel, etc.
c) geothermalWellCasingMaterial
d) thermalInsulationMaterial - MINERAL_FIBER, ARMAFLEX, etc.
e) geothermalWellDepth
f) geothermalWellDepthUOM - foot, inch, meter, etc.
g) downholePipeDiameter
h) downholePipeDiameterUOM - foot, inch, meter, etc.
i) hasBentoniteSeal - YES / NO
j) hasPump - YES / NO
k) operationalStatus - inservice, abandoned, etc.
l) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
m) contractNumber
n) designDrawingNumber
o) equipmentInstallationDate
p) sdsFeatureDescription - Associated Building Number
q) geothermalPipeType

r) xLocation
s) xLocationUOM - foot, inch, meter, etc.
t) yLocation
u) yLocationUOM - foot, inch, meter, etc.

CLJN.CL.TherUtilNode
The Thermal Fitting Type bend, cap, tee, etc. subclass represents the joint between two lines

a) thermalUtilityNodeIDPK
b) thermalNodeType - tFittingType bend, cap, tee, etc.
c) diameter
d) diameterUOM - foot, inch, meter, etc.
e) operationalStatus - inservice, abandoned, etc.
f) fittingType - bend, cap, tee, etc.
g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
h) contractNumber
i) dateInService
j) sdsFeatureName
k) sdsFeatureDescription
l) depth
m) depthUOM - foot, inch, meter, etc.
n) facilityNumber
o) fittingType - bend, cap, tee, etc.
p) projectID
q) utilityOwner

CLJN.CL.TherUtilSegment
A subdivision of a thermal distribution network, particularly a pipeline for the transmission of chilled water, refrigerant, hot water, or steam

a) thermalSegmentType - tMainLine, tServiceLine
b) networkSubType
c) operationalStatus - inservice, abandoned, etc.
d) material - AL, stainless_steel, etc.
e) pipeLocation - aboveground, underground, etc.
f) diameter
g) diameterUOM - foot, inch, meter, etc.
h) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
i) contractNumber
j) dateInService
k) sdsFeatureName
l) sdsFeatureDescription
m) cathodicProtection - YES / NO
n) depth
o) depthUOM - foot, inch, meter, etc.
p) facilityNumber
q) pipeType - circular, box, etc.
r) projectID
s) utilityOwner

CLJN.CL.TherUtilNode_tProdStruc
Thermal production structures are facilities which produce steam, high-temperature water, low-temperature water, dual-temperature water or chilled water

a) thermalNodeType - facility which produce steam, etc.
b) Capacity
c) CapacityUOM - foot, inch, meter, etc.
d) operationalStatus - inservice, abandoned, etc.
e) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
f) contractNumber
g) dateInService
h) sdsFeatureName
i) sdsFeatureDescription
j) facilityNumber
k) utilityOwner

CLJN.CL.TherUtilNode_tSystemValve
A thermal system valve is a device installed in a pipeline to isolate flow

a) thermalNodeType
b) systemValveType - gate, ball, etc.
c) diameter
d) diameterUOM - foot, inch, meter, etc.
e) operationalStatus - inservice, abandoned, etc.
f) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
g) contractNumber
h) dateInService
i) depth
j) depthUOM - foot, inch, meter, etc.
k) utilityOwner
l) valveMaterial - AL, stainless_steel, etc.

CLJN.CL.UtilFeat_tUGEnclosureAccess
A point feature class for locating the access point to a thermal manhole junction

a) utilityFeatureType - SCADA, UGEnclosureAccess point, etc.
b) networkSubType - steamSupply, steamReturn, etc.
c) networktype -
d) operationalStatus - inservice, abandoned, etc.
e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
f) contractNumber
g) diameter
h) diameterUOM - inch, feet, meter, etc.
i) sdsFeatureName - steam pit, etc.

1.4.10 **CLJN.CL.UTILITIES_WASTEWATER**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System GPS and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.UtilFeat_sPretreatmentDevice

A wastewater pretreatment device is a piece of equipment that removes contaminants before they enter the waste system, etc.

a) utilityFeatureIDPK - Structure Number
b) utilityFeatureType - Pretreatment Device see existing data
c) operationalStatus - inservice, abandoned, etc.
d) pretreatmentDeviceType - OWS, Trap, etc.
e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
f) contractNumber
g) equipmentInstallationDate
h) sdsFeatureDescription - detailed description

CLJN.CL.UtilityFeature_sPumpStation
This is a collection of waste water Pump Station is a facility, which indications total capacity for the station

a) utilityFeatureIDPK - Structure Number
b) utilityFeaturetype - Pump station, etc.
c) networkType - wastewater network subtype….
d) numberOfPumps -
e) totalDesignCapacity -
f) designCapacityUOM -
g) totalRatedFlow
h) ratedFlowUOM - GPM, CF_SEC, etc.
i) operationalStatus - inservice, abandoned, etc.
j) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
k) contractNumber
l) equipmentInstallationDate
m) sdsFeatureName
n) sdsFeatureDescription

CLJN.CL.UtilityFeature_sSCADASensor
The SCADA sensor is a feature that is used to remotely measure the status of network components

a) utilityFeatureIDPK - Structure Number
b) utilityFeatureType - SCADA
c) networkType - wastewater
d) operationalStatus - inservice, abandoned, etc.
e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
f) contractNumber
g) equipmentInstallationDate
h) sdsFeatureName
i) sdsFeatureDescription - Antenna Radio to Location

CLJN.CL.UtilityFeature_sSepticTank
A wastewater septic tank is a small-scale anaerobic digester and leach field designed to treat wastewater from an individual facility, and is not connected to the wastewater collection system

a) utilityFeatureIDPK - Structure Number
b) utilityFeatureType - septic tank
c) storageTankProduct - domestic wastewater
d) volume
e) volumeUOM - usGallon, cubicMeter, etc.
f) isRegulated - YES / NO

g) operationalStatus - inservice, abandoned, etc.
h) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
i) contractNumber
j) equipmentInstallationDate
k) sdsFeatureName - Septic Tank
l) sdsFeatureDescription - Location area name

CLJN.CL.WastUtilNode_sCleanOut
A clean out is an access point in a lateral used for maintenance purposes

a) wastewaterNodeType - Cleanout
b) material - PVC, etc.
c) diameter
d) diameterUOM - inch, meter, etc.
e) operationalStatus - inservice, abandoned, etc.
f) mediaID - GIS Collection Method - - CAD, Survey Grade GPS, etc.
g) contractNumber
h) utilityOwner

CLJN.CL.WastUtilNode_sFitting
The wastewater fitting that represents the join between two lines

a) fittingType - Bend, Cap, Tee, etc.
b) sdsFeatureDescription - Ben, Cap, Tee, Wye, etc.
c) diameter
d) diameterUOM - foot, inch, meter, etc.
e) operationalStatus - inservice, abandoned, etc.
f) material - PVC, precast, stainless steel, etc.
g) mediaID - GIS Collection Method - - CAD, Survey Grade GPS, etc.
h) contractNumber
i) fittingType - bend, cap, tee, etc.
j) utilityOwner

CLJN.CL.WastUtilNode_sManhole
The wastewater manhole represents an access point between two or more lines

a) wastewaterNodeType - sManhole
b) operationalStatus - inservice, abandoned, etc.
c) numberOfPipes
d) pipeMaterial - precast brick, etc.
e) diameter
f) diameterUOM - inch, etc.
g) rimElevation
h) rimElevationUOM - foot, inch, meter, etc.
i) mediaID - GIS Collection Method - - CAD, Survey Grade GPS, etc.
j) contractNumber
k) dateInService
l) sdsFeatureName - Manhole, Valve box, etc.
m) manholeMaterial - precast brick, etc.
n) utilityOwner

CLJN.CL.WastUtilNode_sPump
A wastewater pump is a piece of equipment that adds energy to a fluid being conveyed through a pipe or other closed conduit

a) facilityNumber
b) numberOfPumps
c) operationalStatus - inservice, abandoned, etc.
d) wastewaterNodeType - sPump
e) ratedFlow
f) ratedFlowUOM - GPM, CF_SEC, etc.
g) pumpHorsepower
h) contractNumber
i) dateInService
j) mediaID - GIS Collection Method - - CAD, Survey Grade GPS, etc.
k) sdsFeatureName - Wastwater Pump, Lift Station, etc.
l) utilityOwner

CLJN.CL.WastUtilNode_sSystemValve
A system valve is a facility that is fitted to a pipeline or orifice in which the closure member is either rotated or moved transversely or longitudinally in the waterway so as to control or stop the flow

a) wastewaterNodeType - sSystemValve
b) valveMaterial - stainless_steel, etc.
c) diameter
d) diameterUOM - inch, meter, etc.
e) operationalStatus - inservice, abandoned, etc.
f) valveType - gate, butterfly, check, etc.
g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
h) contractNumber
i) dateInService
j) utilityOwner

CLJN.CL.WastUtilNode_sTreatmentPlant
A facility designed to treat wastewater using physical, chemical and/or biological processes prior to discharge into receiving waters

a) wastewaterNodeType - facility designed to treat wastewater
b) Capacity
c) CapacityUOM - gallons, meter, etc.
d) ContractNumber
e) operationalStatus - inservice, abandoned, etc.
f) facilityNumber - Structure Number
g) mediaID - GIS Collection Method - - CAD, Survey Grade GPS, etc.
h) dateInService
i) sdsFeatureName

CLJN.CL.WastUtilSegment
Wastewater Line - A pipeline for the transport of sewage or industrial waste between the source, holding facilities, and/or treatment facilities

a) wastewaterSegmentType - Gravity, Force Main, Service etc.
b) utilityOwner - CLJN / ONWASA
c) operationalStatus - inservice, abandoned, etc.
d) pipeMaterial - PVC, VC, etc.
e) isLined - YES / NO
f) diameter
g) diameterUOM -foot, inch, meter, etc.
h) mediaID - GIS Collection Method - - CAD, Survey Grade GPS, etc.
i) contractNumber
j) dateInService
k) sdsFeatureName -
l) invertElevationDownstream
m) invertElevationUpstream
n) invertElevationUOM - foot, inch, meter, etc.
o) slope

1.4.11 **CLJN.CL.UTILITIES_WATER**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

GPS and collect the following attributes:

CLJN.CL.UtilFeat_wUGEnclosureAccess
A point feature class for locating the access point to a water manhole junction

a) utilityFeatureIDPK - Manhole Number
b) numberOfPipes
c) groundElevation
d) elevationUOM - inch, foot, meter, etc.
e) operationalStatus - inservice, abandoned, etc.
f) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
g) contractNumber
h) equipmentInstallationDate
i) sdsFeatureName - Manhole
j) utilityFeatureType - wUGEnclosureAccess
k) waterServiceAreaIDFK - Holcomb, Hadnot Pt, Onslow Beach, etc.

CLJN.CL.WaterUtilNode_wFittingType bend, cap, tee, etc.
The water fitting class represents the joint between two lines in the water network

a) waterNodeType - fitting class represents transition between two lines
b) diameter -
c) diameterUOM - inch, meter, etc.
d) operationalStatus -inservice, abandoned, etc.
e) fittingType - reducer, bend, cap, tee, etc.
f) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
g) contractNumber
h) dateInServicen

CLJN.CL.WaterUtiNode_wHydrant
A water distribution point that enables fire fighters to attach fire hoses

a) waterNodeType - wHydrant
b) networkSubType - fireProtectionwater
c) operationalStatus - inservice, abandoned, etc.
d) connectionType - fireconnect, firehydrant
e) facilityNumber - Structure number if connection is to structure
f) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
g) contractNumber
h) dateInService

CLJN.CL.WaterUtilNode_wMeterPoint
A water meter point represents the location of the metering device

a) waterNodeType - meterPoint
b) operationalStatus - inservice, abandoned, etc.
c) projectID - area name
d) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
e) contractNumber
f) diameter
g) diameterUOM - foot, inch, meter, etc.
h) dateInService

CLJN.CL.WateUtilNode_wReliefValve
A valve used to relieve pressure

a) operationalStatus
b) sdsFeatureDescription
c) sdsFeatureName - Air Release Valve
d) contractNumber
e) dateInService
f) diameter
g) diameterUOM
h) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
i) projectID
j) utilityOwner

CLJN.CL.WaterUtilNode_wSystemValve
A valve used to regulate pressure, isolate, throttle flow, prevent backflow

a) waterNodeType - wSystemValve
b) diameter
c) diameterUOM - foot, inch, meter, etc.
d) operationalStatus - inservice, abandoned, etc.
e) valveType - gate, ball, etc.
f) projectID - MCASNR, MCBCLJN, Geiger, etc
g) mediaID - GIS Collection Method -- CAD, Survey Grade GPS, etc.
h) contractNumber
i) dateInService

j) valveType - Gate Valve, Post Indicator Valve, etc.

CLJN.CL.WaterUtilSegment
A subdivision of a water distribution network, particularly a distribution pipeline

a) networkSubType - potable water, raw water, Service, Fire etc.
b) material - PVC, Ductile Iron, Cement, etc,
c) diameter
d) diameterUOM - inch
e) utilityOwner - MBCCLJN, Onwasa, etc.
f) operationalStatus -inservice, abandoned, etc.
g) projectID
h) mediaID - GIS Collection Method /- CAD, Survey Grade GPS, etc.
i) contractNumber
j) dateInService
k) sdsFeatureName - Main, Service, Fire, AIP, Raw, etc.
l) invertElevationDownstream
m) invertElevationUpstream

CLJN.CL.WateUtilNode_wProdStructure
Water production structures are facilities which produce raw or treated water

a) waterNodeType - produce treated water, etc.
b) facilityNumber - Structure Number
c) capacity
d) capacityUOM - gallons per day, etc
e) operationalStatus - inservice, abandoned, etc.
f) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
g) contractNumber
h) dateInService
i) sdsFeatureName - Water Treatment Plant, Location
j) sdsFeatureDescription - Describe Plant purpose

CLJN.CL.WateUtilNode_wStorageStructure
Water storage structures are facilities that store large volumes of water - Water Tank)

a) facilityNumber - structure number
b) waterNodeType - water Storage Structure
c) storageTankProduct - treatedWater, rawWater, etc.
d) volume
e) volumeUOM - gallons, etc.
f) tankType - Elevated, Under Ground, Above Ground, etc.
g) operationalStatus - inservice, abandoned, etc.
h) width
i) widthUOM - foot, etc.
j) groundElevation
k) invertElevation
l) overflowElevation
m) surfaceElevation
n) elevationUOM - foot, etc.
o) projectID - Named Area of Location, Hadnot Point, etc.
p) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.

q) contractNumber
r) dateInService
s) storageTypeProduct - Raw water or Potable Water

1.4.12 Non-Compliance

Failure to follow the specification outlined in this document will result in non-acceptance of data deliverable.

Note: Geospatial data delivery does not replace record drawing requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

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SECTION 01 91 00.15 22

TOTAL BUILDING COMMISSIONING FOR PROJECT P-1512
11/19

PART 1 GENERAL

1.1 SUMMARY

The Government has employed an independent Commissioning Firm that has employed or has contracted Lead and Technical Commissioning Specialists. This Section specifies the commissioning scope of work for the entire Commissioning Team

Commissioning responsibilities assigned in this Section to Lead and Technical Commissioning Specialists are for informational purposes.

1.2 COMMISSIONING LIMITATIONS

Commissioning requirements specified in this Section are prohibited from fulfilling requirements specified in other Sections. Requirements specified in other Sections are prohibited from fulfilling requirements specified in this Section.

All commissioning submittals must be submitted and reviewed in accordance with paragraph SUBMITTALS. Commissioning utilities including, but not limited to, tracking utilities and software for commissioning activities are prohibited from taking the place of these requirements.

1.3 SYSTEMS TO BE COMMISSIONED

Systems specified in the following paragraphs must be commissioned whether or not specified systems are required to be commissioned by any reference for pursuing Sustainability TPC.

Specified equipment and system counts are totals that include all buildings in this project.

1.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category

a. Up to three chilled water plants each featuring up to two air-cooled chillers with packaged controls, up to two variable speed distribution pumps, and variable-primary distribution.

b. Up to three hot water plants each featuring up to two fuel-fired condensing boilers each with an integral circulating pump and packaged controls, one boiler master control panel, up to two variable speed distribution pumps, and variable-primary distribution.

c. Up to 24 air handling units each featuring a variable-air-volume supply air fan, a chilled water coil, a hot water coil, air-side energy recovery, and packaged controls.

d. Up to 360 variable-air-volume air terminal units each featuring a hydronic heating coil.

e. Up to 54 fan coil units each featuring a chilled water coil and a hot water coil.

f. Up to 16 computer room air-conditioning units each featuring packaged controls.

g. Up to 20 unit heaters.

h. Up to three supply air fans.

i. Up to 27 exhaust air fans.

j. Up to three Building Automation Systems.

1.3.2 Plumbing Systems Category

a. Up to 275 fixtures.

b. Up to three domestic heating hot water systems each featuring up to two fuel-fired condensing water heaters each with packaged controls, up to one recirculating pump, and up to one temperature mixing valve.

c. Up to 10 emergency eyewash stations.

1.3.3 Utility Systems Category

a. Up to three energy monitoring and control system.

b. Up to three water utility metering system.

1.3.4 Electrical Type I Systems Category

a. Power - all grounding systems.

b. Power - all industrial control systems.

c. Power - all main distribution panels.

d. Power - all main transformers.

e. Power - all panelboards.

f. Power - all step-down transformers.

g. Power - all transient voltage surge protective devices.

1.3.5 Electrical Type II Systems Category

a. Cable television - all systems.

b. Communications - all public address systems.

c. Communications - all telecommunications entrance backbone and distribution systems.

d. Communications - all audio-visual-type intercommunication systems.

e. Emergency power - up to one system featuring up to one single operation generator set and automatic transfer switches.

f. Emergency power off control - all systems.

g. Lighting - all emergency egress systems.

h. Lighting - all exit systems.

i. Lighting - all interior systems.

1.3.6 Building Envelope Systems, Components, and Assemblies Category

a. Air tightness / pressurization verification of building envelope, components, and assemblies.

b. Thermal integrity verification of building envelope, components, and assemblies.

c. Moisture integrity verification of building envelope, components, and assemblies.

d. All roofing including low sloped roofs and steep sloped roofs.

1.3.7 Integrated Systems Category

a. Testing of integrated systems is not required for this project.

1.4 COMPLEX SYSTEMS

Complex systems are defined as the following systems categories as listed under paragraph SYSTEMS TO BE COMMISSIONED with appropriate qualifiers and are subject to more stringent requirements as specified in this Section.

a. All equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category."

b. All equipment and systems listed under item entitled "Plumbing Systems Category" featuring on-board factory packaged controls. Refer to the following paragraph for definition of equipment featuring on-board factory packaged controls.

c. All equipment and systems listed under item entitled "Utility Systems Category."

Equipment featuring on-board factory packaged controls is defined as equipment that is a complex system as defined in paragraph COMPLEX SYSTEMS which features a controller issuing sophisticated logic-based commands to its internal components to accomplish the intent of Plans and Specifications. This equipment may function as either a stand-alone piece of commissioned equipment or may function as part of a commissioned system. This controller may be equipment mounted or may be remote mounted and may or may not interface with a building control system. Examples of equipment meeting and not meeting this definition are provided in the following paragraphs.

a. Equipment meeting this definition includes chillers, boilers provided with or without master controllers, packaged pumping systems, dedicated outside air systems, packaged rooftop units, computer room air conditioners, and air terminal units.

b. Equipment not meeting this definition includes unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

c. Equipment not meeting this definition, but requiring demonstration of minimum safe motor speed either prior to or during Functional Performance Testing includes variable frequency drives.

1.5 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1	(2014) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

GREEN BUILDING INITIATIVE (GBI)

GBI GP Compliance	(2016) GBI Guiding Principles Compliance Program for New Construction (DOD Version)

1.6 SUBMITTALS

Commissioning submittals are not required to be submitted by the Installing Contractor.

1.7 COMMISSIONING TEAM

The Commissioning Team is defined as the entity that must perform all commissioning activities specified in this Section for systems listed under paragraph SYSTEMS TO BE COMMISSIONED. The Commissioning Team is composed of the Lead Commissioning Specialist, Technical Commissioning Specialists, Designers of Record, Installing Contractors, Equipment Suppliers, and the Contracting Officer's Technical Representative.

1.7.1 Lead Commissioning Specialist

The Lead Commissioning Specialist (CxC) is defined as the entity that must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, coordinating all aspects of the commissioning process; managing all Technical Commissioning Specialists; and submitting all Commissioning Plans, schedules, reports, and documentation directly to the Contracting Officer's Technical Representative as modified in this Section.

1.7.2 Technical Commissioning Specialists

Technical Commissioning Specialists are defined as entities that must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, performing reviews, witnessing that all system components have been installed, that each control device operates, that each equipment piece operates, that complete systems operate, and that interactive systems operate in accordance with Plans and Specifications.

Technical Commissioning Specialists must perform assigned responsibilities for equipment and systems listed under systems categories assigned to them

in this Section. Technical Commissioning Specialists are prohibited from performing responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

1.7.3 Designers of Record

Designers of Record are defined as the entities that must act as design professionals responsible for design of their respective system that is subject to commissioning. Designers of Record must perform all commissioning responsibilities assigned in this Section as directed by the General Contractor.

1.7.4 Installing Contractors

Installing Contractors are defined as the General Contractor's Superintendent or Project Manager; Quality Control Representative; and Mechanical, Controls, Plumbing, Electrical, Test and Balance, Fire Protection, and Building Envelope Sub-Contractors who provide, install, or construct systems in whole or in part for this contract. The General Contractor must provide a Lead Commissioning Representative to manage all Designers of Record, Sub-Contractor Commissioning Representatives, and Equipment Suppliers to accomplish all responsibilities assigned in this Section. Each Sub-Contractor must provide a Commissioning Representative to coordinate and perform all commissioning responsibilities for commissioned equipment and systems provided as part of their respective contract as directed by the General Contractor. Submission of commissioning related certifications or qualifications for the Lead Commissioning Representative and Installing Contractor Representatives is not required.

Installing Contractors must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment and systems provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration as modified in this Section.

1.7.5 Equipment Suppliers

Equipment Suppliers (ES) are defined as factory authorized start-up technicians or factory representatives knowledgeable with start-up, demonstration, and testing of commissioned equipment featuring on-board factory packaged controls provided as part of their respective contract. Each Equipment Supplier must coordinate and perform all commissioning responsibilities assigned in this Section as directed by the General Contractor. Submission of commissioning related certifications or qualifications for Equipment Suppliers is not required. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

Equipment Suppliers must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration as modified in this Section.

1.7.6 Installing Contractors and Equipment Suppliers Coordination

Installing Contractors and Equipment Suppliers must coordinate and share demonstration and testing responsibilities specified in this Section for commissioned equipment featuring on-board factory packaged controls. Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of demonstration and testing for these types of systems. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

1.7.7 Contracting Officer's Technical Representative

The Contracting Officer's Technical Representative (COTR) represents the Government for all elements of the commissioning process. The COTR will serve as the single point of contact with the Lead Commissioning Specialist, will receive all commissioning submittals, may attend meetings, and may, but is not required to, witness field inspections and testing specified in this Section.

1.8 COMMUNICATIONS

1.8.1 Communications with the Contracting Officer's Technical Representative

Communication with the Contracting Officer's Technical Representative must be through the Lead Commissioning Specialist who acts as the single direct point of contact for all aspects of the commissioning process.

1.8.2 Communications between the Commissioning Team

Communications between the Commissioning Team including, but not limited to, verbal communications, schedule information, and exchange of information specified in this Section, must occur directly between the Commissioning Team without requiring interaction of the Contracting Officer's Technical Representative.

1.9 PHASING

This project is not phased.

1.10 ASHRAE 189.1 COMMISSIONING COMPLIANCE

ASHRAE 189.1 commissioning compliance is required for this project.

1.10.1 General Requirements

All commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, commissioning activities listed in references contained in ASHRAE 189.1's paragraphs as modified in this Section, and commissioning activities specified in this Section must be performed. All commissioning activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers.

Commissioning activities listed in ASHRAE 189.1's paragraphs that also have requirements specified in this Section are listed only where requirements are specified in this Section and these commissioning activities are not repeated under ASHRAE 189.1's paragraphs.

1.10.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all commissioning activities specified in the preceding item entitled "General Requirements" and must perform all commissioning activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in the Standard or listed in any of its references.

1.11 SUSTAINABILITY THIRD PARTY CERTIFICATION (TPC)

Sustainability Third Party Certification (TPC) is required for this project.

1.11.1 General Requirements

All commissioning activities listed in all references for pursuing Sustainability TPC as modified in this Section and commissioning activities specified in this Section must be performed. All commissioning activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers and whether or not activity is included as total points toward Sustainability TPC.

Commissioning activities listed in all references for pursuing Sustainability TPC that also have requirements specified in this Section are listed only where requirements are specified in this Section and these commissioning activities are not repeated under references for pursuing Sustainability TPC.

1.11.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all commissioning activities specified in the preceding item entitled "General Requirements," perform commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, perform commissioning activities listed in all of its references as modified in this Section, and perform commissioning activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in the reference for pursuing Sustainability TPC or listed in any of its references.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 DESIGN PHASE

3.1.1 Design Phase ASHRAE 189.1 Commissioning Compliance

3.1.1.1 General Requirements

Activities must include, but not be limited to, design phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6

as modified in this Section, design phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and design phase commissioning activities specified in this Section.

3.1.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under item entitled "Design Phase ASHRAE 189.1 Commissioning Compliance."

3.1.2 Design Phase Sustainability Third Party Certification (TPC)

3.1.2.1 General Requirements

Activities must include, but not be limited to, design phase commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, design phase commissioning activities listed in all of its references as modified in this Section, and design phase commissioning activities specified in this Section.

3.1.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Design Phase Sustainability Third Party Certification (TPC)."

3.1.3 Design Phase Commissioning Coordination Meeting

3.1.3.1 General Requirements

A Design Phase Commissioning Coordination meeting must be conducted no later than 30 calendar days prior to the first Plans and Specifications submission or no later than 30 calendar days after approval of Commissioning Firm certifications and all Commissioning Specialist certifications, whichever occurs last. Meeting topics must include, but not be limited to, the commissioning process, contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, and logistics as specified in this Section. Meeting must be conducted by conference call.

3.1.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.1.3.3 Designers of Record, Installing Contractors, and Others Responsibilities

Designers of Record and Installing Contractors must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may also attend this meeting.

3.1.4 Design Phase Commissioning Plan

3.1.4.1 General Requirements

The Design Phase Commissioning Plan must be prepared and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Plan purpose.

b. Commissioning scope.

c. Commissioning process outline.

d. List of all commissioned equipment and systems.

e. Building information.

f. Contact information for the Lead Commissioning Specialist, Technical Commissioning Specialists, Designers of Record, and Contracting Officer's Technical Representative.

g. Criteria listing including Unified Facilities Criteria and Building Codes and Standards.

h. Description of Commissioning Team members.

i. Roles and responsibilities.

j. Lines of communication.

k. Documentation requirements.

l. Owner's Project Requirements.

m. Description of the Basis of Design.

n. Description of Plans and Specifications reviews performed by Technical Commissioning Specialists.

o. Description of Plans and Specifications reviews performed by the Contracting Officer's Technical Representative.

p. Examples and descriptions of Site Observation Reports and Issues Log.

q. Listing and description of Design Phase and Construction Phase Commissioning meetings.

r. Identification of commissioning activities for incorporation into the Project Construction Schedule.

s. Listing of submittals required by Technical Commissioning Specialists.

t. Examples and description of the development of Pre-Functional Checklists, Functional Performance Test Checklists, and Integrated Systems Test Checklists.

u. Description of Pre-Functional Checks, Functional Performance Testing,

and Integrated Systems Testing.

v. Description of Endurance Testing.

w. Description of Ductwork Air Leak Test (DALT) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

x. Description of Performance Verification Test (PVT) field acceptance testing specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

y. Description of Test and Balance (TAB) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

z. Listing of Operation and Maintenance Manual requirements.

aa. Description of Systems Manuals.

bb. Description of training requirements.

cc. Description of Final Commissioning Report.

3.1.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Design Phase Commissioning Plan no later than 45 calendar days after approval of Commissioning Specialists certifications.

File one copy of Approved Design Phase Commissioning Plan in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Design Phase Commissioning Plan.

3.1.5 Design Phase Issues Log

3.1.5.1 General Requirements

The Design Phase Issues Log must be prepared and maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Design Phase Issues Log must include the name of Commissioning Team member identifying the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Design Phase Issues Log must be prepared in an electronic format that can be used throughout the Design Phase such that it can be provided to the Government upon request.

3.1.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Design Phase Issues Log and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.1.6 Commissioning Design Reviews

3.1.6.1 General Requirements

Commissioning Design Reviews must be performed and must include reviews

and back-checks of the Owner's Project Requirements (OPR), the Basis of Design and Design (BOD), and Plans and Specifications in accordance with Sustainability TPC rating system requirements and requirements specified in this Section. The number and schedule of design reviews must be in accordance with Sustainability TPC requirements and must include, but not be limited to, review of first Plans and Specifications submission and back-checks of all subsequent submissions. Plans and Specifications submissions are specified in the following paragraphs.

a. Design Development Plans and Specifications submission.

b. 100-Percent Pre-Final Plans and Specifications submission.

c. Final Plans and Specifications submission.

Commissioning Design Reviews must assess completeness and clarity of the OPR, verify requirements stated in the OPR are addressed in the BOD, and verify the Design Plans and Specifications are prepared in accordance with the BOD and applicable Unified Facilities Criteria (UFC). All issues, including those that would negatively impact building system operation and maintenance, must be identified and be provided with proposed corrective actions. The OPR and BOD are for review purposes only and are not contractually enforceable.

3.1.6.2 Commissioning Design Review Reports

A Commissioning Design Review Report must be prepared for each review and back-check of Plans and Specifications and must include each issue listed individually and its corresponding proposed corrective action. Issues must be separated into categories corresponding to systems categories listed under paragraph SYSTEMS TO BE COMMISSIONED.

Updated Commissioning Design Review Reports must be prepared to include resolution of outstanding issues reached during Commissioning Design Review meetings.

3.1.6.3 Commissioning Design Review Meetings

A Commissioning Design Review meeting must be conducted no later than 14 calendar days after preparation of each Commissioning Design Review Report to discuss proposed corrective actions and to resolve outstanding issues. The Contracting Officer's Technical Representative may attend these meetings. Meeting must be conducted by conference call.

3.1.6.4 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist activities must include, but not be limited to, activities specified in the following paragraphs.

a. Prepare and provide Commissioning Design Review Reports to Designers of Record.

b. Conduct Commissioning Design Review meetings.

c. Update Commissioning Design Review Reports.

d. Prepare and submit Updated Commissioning Design Review Reports no later than 14 calendar days after each Commissioning Design Review meeting.

3.1.6.5 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists activities must include, but not be limited to, performing reviews and back-checks of Plans and Specifications and attending Commissioning Design Review meetings for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.1.6.6 Designers of Record Responsibilities

Designers of Record activities must include, but not be limited to, providing written responses to Commissioning Design Review Reports and attending Commissioning Design Review meetings.

3.2 CONSTRUCTION PHASE

3.2.1 Construction Phase ASHRAE 189.1 Commissioning Compliance

3.2.1.1 General Requirements

Activities must include, but not be limited to, construction phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, construction phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and construction phase commissioning activities specified in this Section.

3.2.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under the item entitled "Construction Phase ASHRAE 189.1 Commissioning Compliance."

3.2.2 Construction Phase Sustainability Third Party Certification (TPC)

3.2.2.1 General Requirements

Activities must include, but not be limited to, commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, commissioning activities listed in all of its references as modified in this Section, and commissioning activities specified in this Section.

3.2.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Construction Phase Sustainability Third Party Certification (TPC)."

3.2.3 Construction Phase Sequencing

3.2.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Heating, ventilation, and air-conditioning (HVAC) systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All equipment and systems have been completed, cleaned, flushed, disinfected, calibrated, tested, and operate in accordance with Plans and Specifications.

b. All Ductwork Air Leakage Testing (DALT) field work, Test and Balance (TAB) field work, Pre-Final TAB Reports, and related prerequisites have been completed, submitted, and approved in accordance with Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

c. All testing of building envelope, components, and assemblies for air tightness / pressurization verification, thermal integrity verification, and moisture integrity verification have been completed, submitted, and approved.

d. All Pre-Functional Checklists have been completed, submitted, and approved.

e. Certified Certificates of Readiness for respective system has been completed, submitted, and approved.

All completed Final Functional Performance Test Checklists for commissioned equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be submitted and approved prior to the Government performing any Performance Verification Testing specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

3.2.3.2 Electrical Systems

Electrical systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Electrical Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All electrical, power generation, and lighting equipment and systems have been completed, calibrated, tested, and operate in accordance with Plans and Specifications.

b. Building Envelope is enclosed according to contract documents with final construction completed.

c. All ceiling tiles, floor coverings, and window coverings are in place.

d. All lamps have completed a minimum 100-hour burn-in period.

e. All furniture is in place.

f. Certified Certificates of Readiness for respective system has been

completed, submitted, and approved.

3.2.4 Construction Phase Scheduling

3.2.4.1 General Requirements

Commissioning activities and other related activities for inclusion into the Project Construction Schedule must include, but not be limited to, activities specified in the following paragraphs.

a. Perform Construction Phase Commissioning Coordination meeting.

b. Submittal and approval of Construction Phase Interim Commissioning Plan.

c. Submittal and approval of Construction Phase Final Commissioning Plan.

d. Submittal and approval of completed Pre-Functional Checklists.

e. Perform testing of building envelope, components, and assemblies for air tightness / pressurization verification, thermal integrity verification, and moisture integrity verification.

f. Submittal and approval of proposed Functional Performance Test Checklists.

g. Submittal and approval of final Functional Performance Test Checklists.

j. Perform Construction Phase Site Observations.

k. Participate in Construction Phase Endurance Testing.

l. Witness Construction Phase Functional Performance Testing.

m. Corrections of deficiencies discovered during Construction Phase Functional Performance Testing.

n. Re-witness Construction Phase Functional Performance Testing.

r. Provide all Systems Manuals contents.

s. Submittal and approval of completed Systems Manuals.

t. Perform training.

u. Submittal and approval of Final Commissioning Report.

v. Perform Post-Construction Phase Site Observations.

w. Participate in Post-Construction Phase Endurance Testing.

x. Witness Post-Construction Phase Functional Performance Testing.

y. Corrections of deficiencies discovered during Post-Construction Phase Functional Performance Testing.

z. Re-witness Post-Construction Phase Functional Performance Testing.

3.2.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must request a current Project Construction Schedule from Installing Contractors no later than at the Construction Phase Commissioning Coordination Meeting and must prepare and provide to Installing Contractors a list of commissioning activities for inclusion into the Project Construction Schedule. The Lead Commissioning Specialist must associate each commissioning activity to a single construction activity such that if the date of the construction activity changes, the associated commissioning activity changes accordingly.

3.2.4.3 Installing Contractors Responsibilities

Installing Contractors must provide a current Project Construction Schedule to the Lead Commissioning Specialist upon receiving request. Installing Contractors must incorporate the list of commissioning activities into the Project Construction Schedule and must link each commissioning activity to the associated construction activity identified by the Lead Commissioning Specialist such that if the date of the construction activity changes, the associated commissioning activity changes accordingly.

Installing Contractors must provide updated Project Construction Schedules to the Lead Commissioning Specialist at least on a monthly basis.

3.2.5 Construction Phase Commissioning Coordination Meeting

3.2.5.1 General Requirements

A Construction Phase Commissioning Coordination meeting must be conducted no later than 14 calendar days after approval of Commissioning Firm and Commissioning Specialists certifications to discuss topics that include, but not be limited to, the commissioning process, contract requirements, lines of communication, roles and responsibilities, commissioning activities for inclusion into the Project Construction Schedule, documentation requirements, Inspections and Testing, and logistics specified in this Section. Meeting must be conducted by conference call.

3.2.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.2.5.3 Installing Contractors, Designers of Record, and Other Commissioning Team Member Responsibilities

Installing Contractors and Designers of Record must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend this meeting.

3.2.6 Construction Phase Commissioning Progress Meetings

3.2.6.1 General Requirements

Construction Phase Commissioning Progress meetings must be conducted to discuss topics that include, but not be limited to, unresolved commissioning issues, status of items specified to be provided to the Lead Commissioning Specialist, and upcoming commissioning activities. Two Construction Phase Commissioning Progress meetings must be conducted for

each systems category unless modified in the following paragraphs. Meetings must be conducted by conference call.

a. Heating, Ventilation, and Air-Conditioning (HVAC) Systems: Six meetings.

b. Building Envelope Systems, Components, and Assemblies: Three meetings.

Construction Phase Commissioning Progress meetings are prohibited from being combined with conducting Construction Phase Commissioning Coordination meeting, conducting Site Observations, witnessing Functional Performance Testing, or witnessing Integrated Systems Testing.

3.2.6.2 Technical Commissioning Specialists Responsibilities

Each Technical Commissioning Specialist must, at a minimum, conduct meetings and prepare meeting minutes complete with Attendance Roster for systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for systems categories assigned to other Technical Commissioning Specialists.

3.2.6.3 Installing Contractors and Others Responsibilities

Installing Contractors must attend these meetings. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend these meetings.

3.2.7 Construction Phase Interim Commissioning Plan

3.2.7.1 General Requirements

The Construction Phase Interim Commissioning Plan must be prepared and must be an update to the Design Phase Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Design Phase Commissioning Plan.

b. Basis of Design.

c. Contact information for the entire Commissioning Team.

3.2.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Construction Phase Interim Commissioning Plan no later than 30 calendar days after the Construction Phase Commissioning Coordination meeting and no later than 14 calendar days prior to performing construction of the building envelope.

3.2.8 Construction Phase Final Commissioning Plan

3.2.8.1 General Requirements

The Construction Phase Final Commissioning Plan must be prepared and must be an update to the Construction Phase Interim Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Construction Phase Interim Commissioning Plan.

b. All Pre-Functional Checklists.

c. All approved final Functional Performance Test Checklists.

3.2.8.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the Construction Phase Final Commissioning Plan no later than 30 calendar days prior to performing any Functional Performance Testing.

b. File one copy of Approved Construction Phase Final Commissioning Plan in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Construction Phase Final Commissioning Plan.

3.2.9 Construction Phase Issues Log

3.2.9.1 General Requirements

The Construction Phase Issues Log must be prepared and maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Construction Phase Issues Log must include the name of Commissioning Team member identifying the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Construction Phase Issues Log must be a continuation of the Design Phase Issues Log and must be prepared in an electronic format that can be used throughout the Construction Phase such that it can be provided to the Government upon request.

3.2.9.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Construction Phase Issues Log and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.2.10 Pre-Functional Checklists

3.2.10.1 General Requirements

Pre-Functional Checklists must be prepared for all commissioned equipment and contents must include, but not be limited to, contents for physical inspections that demonstrate construction, installation and start-up of equipment and systems is complete. Refer to item entitled "Pre-Functional Checklists" in item entitled "Inspections and Testing" for more information.

Download example Pre-Functional Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING at the following location: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic Checklists must contain the same level of detail shown in examples, but are not required to match the format of examples.

3.2.10.2 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors. Blank Pre-Functional Checklists are not required to be submitted to the Government.

3.2.10.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must prepare Pre-Functional Checklists for all equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.11 Functional Performance Test (FPT) Checklists

Functional Performance Test (FPT) Checklists must be prepared for all commissioned equipment and systems demonstrating performance is in accordance with Plans and Specifications. A single final FPT Checklist must be prepared for each system except that a single final FPT Checklist may be prepared for use with multiple systems that have identical features, unless modified in this Section. FPT Checklist contents must include, but not be limited to, step-by-step actions and expected results, unless modified in this Section. Refer to item entitled "Functional Performance Testing and Integrated Systems Testing" for more information.

3.2.11.1 Complex Systems Requirements

FPT Checklists must be prepared for all complex systems as defined in paragraph COMPLEX SYSTEMS demonstrating performance is in accordance with Plans and Specifications. A single FPT Checklist must be prepared for each system except that a single FPT Checklist may be prepared for use with multiple systems that have identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps. Refer to item entitled "Functional Performance Testing and Integrated Systems Testing" and item entitled "Sample Strategy" for more information.

Contents must include, but not be limited to, contents specified in the following paragraphs and shown in example FPT Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING available for download at the following location:
http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic
FPT Checklists must contain the same level of detail specified below and as shown in examples, but are not required to match the format of examples.

a. Notable system features including information about such attributes as system sizing and controls to facilitate understanding of system operation.

b. Conclusions and recommendations based on control system feature, point-to-point, actuator, and system operation observations. Conclusions must clearly indicate if system does or does not perform in accordance with requirements of Plans and Specifications. Recommendation must clearly indicate that the system should or should not be accepted by the Government.

c. Test conditions including date, beginning and ending time, and

beginning and ending outdoor air conditions.

d. Identification of the equipment involved in the test.

e. Attendees present throughout the entire system test.

f. Control system feature identification including control point description, embedded/visible type, adjustable/monitoring type, actual value, and setpoint value/alarm range.

g. Point-to-point observations including demonstrating system flow meters and sensors have been calibrated and are correctly displayed on the Operator workstation.

h. Actuator operation observations demonstrating actuator responses to commands from the control system.

i. Variable frequency drive observations demonstrating minimum safe motor speed.

j. System operation observations for system-based testing demonstrating each control sequence, operation mode, and alarm condition resulting from control setpoint manipulation. System operation observations must include, but not be limited to, observations specified in the following paragraphs.

(1) Introduction identifying testing methodology.

(2) As-found conditions prior to system manipulation.

(3) Clear list of test items (step numbers).

(4) Design control sequences or interlocks segmented by unique functions.

(5) Intended test procedures following each segmented sequence or interlock identifying the system manipulation required to initiate system response.

(6) Expected system responses.

(7) Space for comments for each test item.

(8) Pass or fail indication for each test.

Performance Verification Tests prepared by the Controls Contractor as specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC are prohibited from being used in whole or in part to meet requirements specified in this Section.

3.2.11.2 Building Envelope Systems, Components, and Assemblies Requirements

FPT Checklists must be prepared for thermal integrity verification and moisture integrity verification of building envelope, components, and assemblies listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED. FPT Checklists must demonstrate performance is in accordance with Plans and Specifications. A single final FPT Checklist must be prepared for each unique type of construction.

3.2.11.3 Proposed FPT Checklist Meeting and Draft FPT Checklist Meeting

For all complex systems as defined in paragraph COMPLEX SYSTEMS, a Proposed FPT Checklist Meeting and a Draft FPT Checklist Meeting must be conducted for detailed discussions of procedures intended to demonstrate performance is in accordance with Plans and Specifications. Meetings must be conducted by conference call.

3.2.11.4 Lead and Technical Commissioning Specialists Responsibilities

For all systems other than complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead Commissioning Specialist must submit Final Functional Performance Test Checklists for all systems in each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal for each systems category no later than 30 calendar days prior to performing FPT testing of any system in the respective systems category.

For all complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead and Technical Commissioning Specialists must prepare and submit Final Functional Performance Test Checklists in the sequence specified in the following paragraphs. Technical Commissioning Specialists must perform respective responsibilities for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing respective responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Technical Commissioning Specialists must prepare Proposed Functional Performance Test Checklists.

b. The Lead Commissioning Specialist must submit Proposed Functional Performance Test Checklists for all complex systems as a single submittal no later than 60 calendar days prior to testing of any complex system.

c. Technical Commissioning Specialists must conduct the Proposed Functional Performance Test Checklist Meeting attended by the Contracting Officer's Technical Representative.

d. Technical Commissioning Specialists must prepare Draft Functional Performance Test Checklists to incorporate input from the Contracting Officer's Technical Representative.

e. The Lead Commissioning Specialist must provide Draft Functional Performance Test Checklists to Installing Contractors and Equipment Suppliers no later than seven calendar days prior to the Draft Functional Performance Test Checklist Meeting.

f. Technical Commissioning Specialists must conduct the Draft Functional Performance Test Checklist Meeting attended by Installing Contractors and Equipment Suppliers. The Contracting Officer's Technical Representative may attend this meeting.

g. Technical Commissioning Specialists must prepare Final Functional Performance Test Checklists to incorporate input from Installing Contractors.

h. The Lead Commissioning Specialist must submit Final Functional

Performance Test Checklists for all complex systems as a single submittal no later than seven calendar days after meeting to discuss Draft Functional Performance Test Checklists and no later than 30 calendar days prior to testing of any complex system.

3.2.11.5 Installing Contractors and Equipment Suppliers Responsibilities

Installing Contractors and Equipment Suppliers must attend Draft Functional Performance Test Checklist Meeting.

3.2.12 Construction Submittal Reviews

3.2.12.1 General Requirements

Construction Submittal Reviews must be performed for all commissioned equipment and systems to the extent necessary to verify that equipment and systems are in compliance with commissioning aspects of UFC's referenced by the Design-Build contract, Owner's Project Requirements (OPR), Basis of Design (BOD), and Plans and Specifications as modified in this Section. Reviews must be performed coincident with Designers of Record and reviews must include, but not be limited to, review of shop drawings, equipment submittals, test plans, procedures, and reports.

The OPR and BOD are for review purposes only and are not contractually enforceable.

3.2.12.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of shop drawings, equipment submittals, test plans, procedures, and reports that must be reviewed to Installing Contractors.

b. Prepare and provide Construction Submittal review comments to Installing Contractors. Construction Submittal review comments are not required to be submitted to the Government.

3.2.12.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform reviews of Construction Submittals for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.12.4 Installing Contractors Responsibilities

Installing Contractors must provide all requested Construction Submittals, BOD, and requested supplemental information to the Lead Commissioning Specialist.

3.2.13 Construction Phase Site Observations

3.2.13.1 General Requirements

Construction Phase Site Observations must be performed as specified in the

following paragraphs to verify and document commissioning aspects of equipment and systems as modified in this Section. Two Construction Phase Site Observations must be conducted for each systems category unless modified in the following paragraphs.

Construction Phase Site Observations are prohibited from being combined with witnessing Functional Performance Testing or witnessing Integrated Systems Testing, but may be combined with Pre-Functional Checklist Verificaitons unless indicated otherwise. Purposes of Site Observations specified in the following paragraphs for each systems category may be combined into a single Site Observation.

3.2.13.2 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

b. At least one Site Observation to verify and document HVAC pipe pressure testing.

c. At least one Site Observation to verify and document HVAC pump installation.

3.2.13.3 Plumbing Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least one Site Observation to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

b. At least one Site Observation to verify and document Plumbing pipe pressure testing.

c. At least one Site Observation to verify and document Plumbing pump installation.

3.2.13.4 Electrical Type I Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least six Site Observations to verify and document commissioning aspects and to witness testing performed by independent testing organizations of commissioned equipment and systems listed under this systems category and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Technical Commissioning Specialists. Independent testing organizations typically use tests readily available from testing associations such as the InterNational Electrical Testing Association (NETA).

3.2.13.5 Electrical Type II Systems

Site Observations must be performed for the purposes specified in the

following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

3.2.13.6 Building Envelope Systems, Components, and Assemblies

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document in-progress building envelope construction prior to covering critical building envelope components and prior to pressure testing of building envelope, components, and assemblies.

b. At least two Site Observation to verify, document, and witness pressure testing, infrared thermography testing, and fog testing performed by independent testing agencies and specified in Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

c. At least two Site Observation to verify, document, and witness inspections, measurements, and testing performed by independent testing agencies and specified in Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM.

3.2.13.7 Summary Meetings

A Summary Meeting must be conducted at the conclusion of each Site Observation for the purpose of discussing issues discovered during each Site Observation. Meeting must be conducted on-site with all attendees present.

3.2.13.8 Site Observation Reports

A Site Observation Report must be prepared for each Site Observation for the purpose of documenting issues discovered during each Site Observation.

Site Observation Reports for all equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include results of testing performed by independent testing organizations that were witnessed by Technical Commissioning Specialists and test results that were not witnessed by Technical Commissioning Specialists.

3.2.13.9 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide list of equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that require on-site verification and documentation by Technical Commissioning Specialists to Installing Contractors.

The Lead Commissioning Specialist must submit Construction Phase Site Observation Reports complete with Summary Meeting Attendance Roster no later than seven calendar days after Site Observation.

3.2.13.10 Technical Commissioning Specialists Responsibilities

Each Technical Commissioning Specialist must be responsible to perform Site Observations, conduct Summary Meetings, and prepare Construction Phase Site Observation Reports for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.13.11 Installing Contractors Responsibilities

Installing Contractors must provide Technical Commissioning Specialists access to construction and systems for Site Observations and must attend Summary Meetings.

Installing Contractors must schedule testing to occur in the presence of Technical Commissioning Specialists as specified in the following paragraphs.

a. All equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Technical Commissioning Specialists. Results of testing of equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be provided to the Lead Commissioning Specialist that were witnessed by Technical Commissioning Specialists and that were not witnessed by Technical Commissioning Specialists.

b. Pressure testing, infrared thermography testing, and fog testing specified in Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS and inspections, measurements, and testing specified in Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM for equipment and systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED. Results of all tests, inspections, and measurements must be provided to the Lead Commissioning Specialist that were witnessed by Technical Commissioning Specialists and that were not witnessed by Technical Commissioning Specialists.

3.2.14 Inspections and Testing

3.2.14.1 Pre-Functional Checks

Pre-Functional Checks must be performed prior to performing Functional Performance Testing or Integrated Systems Testing of respective system and activities must include, but not be limited to, activities specified in the following paragraphs.

a. Complete Pre-Functional Checklists.

b. Perform Construction Phase Endurance Testing.

3.2.14.1.1 Pre-Functional Checklist Verifications

Pre-Functional Checklist Verifications must be performed using Pre-Functional Checklists from the approved Construction Phase Final

Commissioning Plan by conducting on-site spot-checks to verify accuracy after receipt of completed Pre-Functional Checklists from Installing Contractors. Verifications may be combined with Construction Phase Site Observations.

3.2.14.1.1.1 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors.

The Lead Commissioning Specialist must submit all completed Pre-Functional Checklists and all associated equipment start-up reports for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than seven calendar days after receipt of all completed checklists for equipment and systems listed under the respective systems category from Installing Contractors.

3.2.14.1.1.2 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform Pre-Functional Checklist Verifications and then must indicate acceptance of all Pre-Functional Checklist items for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.1.1.3 Installing Contractors Responsibilities

Installing Contractors must complete one Pre-Functional Checklist for each piece of equipment and system. Initial each Pre-Functional Checklist item for their area of responsibility indicating the item's construction, installation, and start-up as applicable has been verified to be complete and is ready for testing.

Installing Contractors must submit completed and initialed Pre-Functional Checklists and all associated equipment start-up reports to the Lead Commissioning Specialist no later than seven calendar days after completion of inspection of all checklist items for each piece of equipment and system.

3.2.14.2 Construction Phase Endurance Testing

3.2.14.2.1 General Requirements

Construction Phase Endurance Testing (trending of control system control points) for complex systems as defined in paragraph COMPLEX SYSTEMS must be performed as specified in the following paragraphs. Systems must be operating as normally anticipated during occupancy throughout Endurance Testing.

3.2.14.2.2 Hardware

Hardware must have sufficient buffer capacity to trend all data throughout Endurance Testing. Trend data uploading during the course of Endurance Testing to ensure all trend data is retained is encouraged. Lost trend data will require retesting of all control points for affected systems.

3.2.14.2.3 Results Format

Results format of trend data must be provided in a graphical format complete with clear indication of value(s) for y-axis, value for x-axis, and legend identifying each trended control point. The number of control points contained on a single graph must be such that all control points can be clearly visible. Control points must be logically grouped such that related points appear on a single graph. In addition, a separate comma separated value (CSV) file of raw trend data for each trended system must be provided. Each trended control point in CSV file must be clearly identified.

For control points recorded based on change of value, change of value for recording data must be clearly identified for each control point.

3.2.14.2.4 Construction Phase Endurance Testing Reports

A Construction Phase Endurance Testing Report must be prepared and contents must include, but not be limited to, an executive summary, review comments, trend results in graphical format, and raw trend data for all trend results for each trended system.

3.2.14.2.5 Start, Duration, and Recording Frequency

Starting date and time must be identical for all control points specified to be trended for each system subject to Endurance Testing regardless of specified duration and regardless of specified frequency. Duration of all Endurance Testing must be no less than seven consecutive calendar days.

Recording frequency of data for all control points specified to be trended for each system subject to Endurance Testing must be 15-minutes as modified in this Section. The recording frequency of data for specific control point types must occur at the frequency specified in the following paragraphs.

3.2.14.2.5.1 Control Points Trended at One Minute Intervals

a. Temperature for supply air, return air, mixed air, supply water, and return water.

b. Temperature entering and leaving all heat transfer devices such as coils, energy recovery wheels, and heat pipes.

c. Temperature for outside air, supply air, return air and exhaust air entering and leaving energy recovery device.

d. Flow for supply air, return air, outside air, chilled water, and HVAC heating hot water.

e. Flow for exhaust air associated with energy recovery.

f. Relative humidity for outside air and return air.

g. Relative humidity for outside air, supply air, return air and exhaust air entering and leaving energy recovery device.

h. Command and status for control dampers and control valves.

i. Speed for fans and pumps.

j. Pressure for fans and pumps.

3.2.14.2.5.2 Control Points Trended at 15 Minute Intervals

a. Temperature and relative humidity for zones.

b. Temperature and relative humidity for outside air not associated with energy recovery.

c. Pressure relative to the outside for facility.

3.2.14.2.5.3 Control Points Trended at Change of Position or State

a. Command and status for equipment such as chillers, boilers, pumps, compressors, air handling units, dedicated outside air systems.

b. Operation state for occupied, unoccupied, warm-up, cool-down, timed override, cooling, heating, alarm, and lead-lag duty status change.

c. Command and position for two-position control air dampers.

3.2.14.2.6 Trended Control Points

Trended control points for each system must demonstrate performance is in accordance with Plans and Specifications. Trended control points must include, but not be limited to, control points listed in Plans and Specifications' points lists.

Trended control points for selected systems, at a minimum, must include control points specified in the following paragraphs. These control points must be trended as applicable to this contract in addition to control points necessary to demonstrate systems perform in accordance with requirements of Plans and Specifications and control points listed in Plans and Specifications' points lists.

3.2.14.2.6.1 Air-Cooled Chiller Chilled Water System

a. Chiller(s) command and status.

b. Chiller isolation valve(s) command and status.

c. Chilled water pump(s) actual speed.

d. Chilled water pump(s) setpoint and actual differential pressure.

e. Minimum flow bypass control valve command.

f. Minimum system flow setpoint and actual flow.

g. Chilled water supply setpoint and actual temperature.

h. Chilled water return actual temperature.

i. Chilled water actual flow.

j. Outside air actual dry-bulb temperature.

3.2.14.2.6.2 HVAC Heating Hot Water System with Boiler

a. Boiler(s) command and status.

b. Boiler(s) isolation valve command and status.

c. HVAC heating hot water pump(s) actual speed.

d. HVAC heating hot water pump(s) setpoint and actual differential pressure.

e. Minimum flow bypass control valve command.

f. Minimum system setpoint and actual flow.

g. HVAC heating hot water supply setpoint and actual temperature.

h. HVAC heating hot water return actual temperature.

i. HVAC heating hot water actual flow.

j. Outside air actual dry-bulb temperature.

3.2.14.2.6.3 Dedicated Outside Air System (DOAS)

a. Outside air actual dry-bulb temperature.

b. Outside air actual relative humidity.

c. Outside air isolation damper command and status.

d. Outside air setpoint and actual airflow.

e. Energy recovery wheel command, status, and actual speed.

f. Energy recovery wheel's OA bypass control damper command and status.

g. Energy recovery wheel's defrost cycle command and status.

h. Energy recovery wheel's OA discharge air actual dry-bulb temperature.

i. Energy recovery wheel's OA discharge air actual relative humidity.

j. Preheat coil leaving air setpoint and actual temperature.

k. Preheat coil control actuator command.

l. Cooling coil leaving air setpoint and actual temperature.

m. Cooling coil control valve command.

n. Supply air fan actual speed.

o. Reheat coil control valve command.

p. Discharge air setpoint and actual temperature.

q. Supply air fan setpoint and actual static pressure.

r. Facility setpoint and actual relative pressure.

s. Return air actual dry-bulb temperature.

t. Return air actual relative humidity.

u. Energy recovery wheel's EA bypass control damper command and status.

v. Energy recovery wheel's EA discharge air actual dry-bulb temperature.

w. Energy recovery wheel's EA discharge air actual relative humidity.

x. Exhaust air fan actual speed.

y. Exhaust air isolation damper command and status.

3.2.14.2.6.4 Supply Air Terminal Units

a. Zone setpoint and actual dry-bulb temperature.

b. Zone actual relative humidity.

c. Control damper command.

d. Heating coil valve command.

e. Airflow actual value.

f. Leaving air actual temperature.

3.2.14.2.7 Sample Strategy

Sample strategy must be as specified in the following paragraphs.

a. 100-Percent trending for central plant equipment such as chilled water and HVAC heating hot water systems, air handling unit systems including all associated fans except for remote exhaust air fans, dedicated outside air systems including all associated fans except for remote exhaust air fans, and renewable energy system.

b. 20-Percent sample trending for equipment with identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

3.2.14.2.8 Unsuccessful Trending and Re-Trending

3.2.14.2.8.1 100-Percent Samples

Trending results must be failed for equipment or systems for which 100-percent sample size are trended if one or more of the trended control points results in discovery of a deficiency.

Re-trending must be required to the extent necessary to confirm that deficiencies have been corrected.

3.2.14.2.8.2 Less than 100-Percent Samples

Trending results must be failed for equipment or systems for which less than 100-percent sample size are trended if one or more of the trended

control points results in discovery of a deficiency.

a. Re-trending must be required for only items which experienced initial failures if the failure rate is 5-percent or less, meaning that 5-percent or less of the equipment or systems had at least one deficiency.

b. Re-trending must be required for items which experienced initial failures to the extent necessary to confirm that the deficiencies have been corrected if the failure rate is higher than 5-percent, meaning that more than 5-percent of equipment or systems trended had at least one deficiency. In addition, re-trending of another random sample of the same size as the initial sample for the first time. If the second random sample set has any failures, those failed items must be re-trended and all remaining equipment and systems must be trended to complete 100-percent testing of that system type.

3.2.14.2.8.3 Re-Trending Costs

Re-trending costs must be reimbursed to the Government. These costs must include salary associated with additional reviews of trend results for the Lead Commissioning Specialist, Technical Commissioning Specialists, and Government personnel.

3.2.14.2.9 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of systems that must be trended, control points that must be trended, and reminder of trend results format specified in this Section to Installing Contractors.

b. Provide action plan for correcting failed trend results to Installing Contractors.

c. Provide list of systems that must be re-trended due to failure of trend results or having been provided in an incorrect trend results format to Installing Contractors.

d. Prepare and submit Construction Phase Endurance Testing Reports as a single submittal no later than 14 calendar days after preparation of all Endurance Testing Reports. In addition, submit one electronic copy of raw trend data.

3.2.14.2.10 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these activities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Select systems that must be trended for samples of less than 100-percent.

b. Prepare list of systems and control points that must be trended.

c. Perform review of all trend results and provide approval or failure disposition.

d. Prepare list of systems that must be re-trended due to failure of trend results or having been provided in an incorrect trend results format.

e. Prepare action plan for correcting failed trend results.

3.2.14.2.11 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Provide hardware suitable to obtain trend data for systems and control points identified by Technical Commissioning Specialists.

b. Provide hardware suitable to interface with and obtain trend data from equipment identified by the Lead Commissioning Specialist to require trending that features on-board factory packaged controls. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

c. Provide list of equipment and control points that must be trended to Equipment Suppliers who provided equipment featuring on-board factory packaged controls as part of their contract.

d. Collect trend data in the format specified in this Section for specified systems and control points and provide to the Lead Commissioning Specialist.

e. Provide action plan for correcting failed trend results to Equipment Suppliers who provided equipment featuring on-board factory packaged controls as part of their contract.

f. Implement action plan for correcting failed trend results.

g. Re-collect and provide trend data in the format specified in this Section for trend results determined to have failed or determined to have been provided in an incorrect trend results format to the Lead Commissioning Specialist

3.2.14.2.12 Equipment Suppliers Responsibilities

Equipment Suppliers must, at a minimum, perform activities specified in the following paragraphs.

a. Provide Installing Contractor access, but not interface equipment, to equipment featuring on-board factory packaged controls provided as part of their contract. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

b. Provide descriptions to Installing Contractors in clearly understood language (not proprietary code) for all trended control points.

c. Implement action plan for correcting failed trend results for equipment featuring on-board factory packaged controls provided as part of their contract.

3.2.14.3 Certified Certificates of Readiness and Certificates of Readiness

3.2.14.3.1 General Requirements

A single Certified Certificate of Readiness must be prepared for each system subject to Functional Performance Testing or subject to Integrated Systems Testing by reviewing, signing, and dating Certificates of Readiness to indicate each system is complete and ready for testing. Testing of any equipment or system is prohibited until after its Certified Certificate of Readiness has been submitted and approved.

A single Certificate of Readiness must be prepared for each system subject to Functional Performance Testing or subject to Integrated Systems Testing. Certificate of Readiness contents must include, but not be limited to, contents specified in the following paragraphs to the extent applicable to the specific system being tested.

a. Cover sheet with spaces for signatures and dates by the Lead Commissioning Specialist and by Installing Contractors to indicate each system is complete and ready for testing.

c. Equipment and system start-up reports.

d. Control system start-up reports.

e. Diagnostic test reports.

g. Completed Pre-Functional Checklists.

3.2.14.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must sign, date, and submit Certified Certificates of Readiness no later than 14 calendar days prior to testing of respective system.

3.2.14.3.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform reviews of Certificates of Readiness for accuracy to ensure systems are complete and ready for testing for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.3.4 Installing Contractors Responsibilities

Installing Contractors must prepare, sign, and date Certificates of Readiness indicating systems are complete and ready for testing and provide to the Lead Commissioning Specialist.

3.2.14.4 Functional Performance Testing and Integrated Systems Testing

3.2.14.4.1 General Requirements

Functional Performance Testing and Integrated Systems Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team

participant is not present or if deficiencies discovered during testing prevent successful completion. Testing of any equipment or system is prohibited until after its Certified Certificate of Readiness has been submitted and approved.

All necessary materials and system modifications to simulate actual conditions as close as is practically possible must be provided. Complete all testing by returning affected equipment and systems to pre-test conditions.

3.2.14.4.2 Complex Systems and Integrated Systems Category Requirements

Testing of complex systems as defined in paragraph COMPLEX SYSTEMS and testing of systems listed under item entitled "Integrated Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be performed as specified in the following paragraphs.

3.2.14.4.2.1 Equipment Featuring On-Board Factory Packaged Controls

Testing of equipment featuring on-board factory packaged controls must include, but not be limited to, testing specified in the following paragraphs.

a. Equipment enabling and disabling.

b. Equipment standard and optional control points necessary to accomplish functionality whether or not control points are specified in Plans and Specifications.

c. Equipment standard and optional alarms critical to safe operation whether or not optional alarms are specified in Plans and Specifications.

d. All control points added by Controls Contractor in addition to on-board factory packaged controls whether or not control points are specified in Plans and Specifications.

3.2.14.4.2.2 Test Setup and Condition Simulation

Test setup must include all necessary materials and system modifications to simulate flows, pressures, temperatures, and other conditions necessary to perform testing according to specified conditions must be provided.

Condition simulation must be accomplished by temporarily changing control system setpoints. Condition simulation by over-writing control system inputs (actual) values is prohibited unless approved in advance of test by the Contracting Officer's Technical Representative.

3.2.14.4.2.3 Condition Simulation Methods

Condition simulation methods for equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that are acceptable are specified in the following paragraphs.

a. When varying static pressures inside ductwork cannot be simulated within the duct, and where a sensor signals the controls system to initiate sequences at various duct static pressures, it is acceptable to simulate the various pressures with a Pneumatic Squeeze-Bulb Type

Signaling Device with gauge temporarily attached to the sensing tube leading to the transmitter. It is not acceptable to reset the various setpoints, nor to simulate an electric analog signal unless approved as specified in the preceding paragraphs.

b. Dirty filter pressure drops can be simulated using sheets of cardboard at filter face.

c. Freeze-stat safeties can be simulated by packing portion of sensor with ice.

d. High outside air temperatures can be simulated with a hair blower.

e. High entering cooling coil temperatures can be used to simulate entering cooling coil conditions.

f. Do not use signal generators to simulate sensor signals unless approved by the Contracting Officer's Technical Representative, as noted above, for special cases.

g. Control setpoints can be altered. For example, to see the air conditioning compressor lockout work at an outside air temperature below lockout setpoint, when the outside air temperature is above lockout setpoint, temporarily change the lockout setpoint to be minus 0 degrees above the current outside air temperature. Caution: Setpoints are not to be raised or lowered to a point such that damage to the components, systems, or the building structure and/or contents will occur.

h. Test duct mounted smoke detectors in accordance with the manufacturer's recommendations. Perform testing with air system at minimum airflow condition in ductwork.

i. Test current sensing relays used for fan and pump status signals to control system to indicate unit failure and run status by resetting the setpoint on the relay to simulate a lost belt or unit failure while the unit is running. Confirm that the failure alarm was generated and received at the control system. After the test is performed, return the setpoint to its original setpoint or a setpoint as indicated by the Contracting Officer's Technical Representative.

3.2.14.4.3 Sample Strategy

3.2.14.4.3.1 General Requirements

100-Percent testing of all systems unless modified in the following paragraphs. Sample strategy for testing must be equally applied to each building in this project.

Sample strategy must be applied to total equipment and system counts specified for system categories under paragraph SYSTEMS TO BE COMMISSIONED.

3.2.14.4.3.2 Complex Systems

Sample strategy for all complex systems as defined in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for central plant equipment such as chilled water and HVAC heating hot water systems, air handling unit systems

including all associated fans except for remote exhaust air fans, dedicated outside air systems including all associated fans except for remote exhaust air fans, and renewable energy system.

b. 20-Percent sample testing for equipment with identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps. Sample must include at least one complete item such as one complete unitary air-conditioner.

3.2.14.4.3.3 Plumbing Systems

Sample strategy for all systems listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except plumbing systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for central plant equipment such as natural gas systems, domestic cold water systems, domestic heating hot water systems, and process water systems.

b. 20-Percent sample testing for equipment with identical features such as fixtures, irrigation systems, emergency eyewash stations, and vacuum systems. Sample must include at least one complete item such as one complete fixture.

3.2.14.4.3.4 Electrical Type II Systems

Sample strategy for all systems listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except electrical systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for equipment such as emergency power systems featuring single operation generator sets, automatic transfer switches, and uninterruptible power supplies (not local uninterruptible power supplies), emergency response systems, and frequency converters.

b. 20-Percent sample testing for equipment with identical features such as lighting systems, daylighting control systems, and fenestration control systems. Sample must include at least one complete item such as lighting in one space.

3.2.14.4.3.5 Building Envelope Systems, Components, and Assemblies

Sample strategy for all systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED must be as specified in the following paragraphs.

a. 20-Percent sample testing of surface area for each unique type of construction for thermal integrity verification of entire of the building envelope, components, and assemblies.

b. 20-Percent sample testing of surface area for each unique type of construction for moisture integrity verification of the building envelope, components, and assemblies.

3.2.14.4.4 Unsuccessful Testing and Re-Testing Costs

3.2.14.4.4.1 Unsuccessful Testing of 100-Percent Sample

Testing must be failed for equipment or systems for which 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency that cannot be resolved within five minutes during testing.

Re-testing must be witnessed to the extent necessary to confirm that deficiencies have been corrected without negatively impacting the performance of the rest of the system.

3.2.14.4.4.2 Unsuccessful Testing of Less than 100-Percent Sample

Testing must be failed for equipment or systems for which less than 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency, regardless of whether the deficiency is corrected during the sample test.

a. Re-testing must be witnessed of only items which experienced initial failures if the failure rate is 5-percent or less, meaning that 5-percent or less of the equipment or systems had at least one deficiency.

b. Re-testing must be witnessed of items which experienced initial failures to the extent necessary to confirm that the deficiencies have been corrected if the failure rate is higher than 5-percent, meaning that more than 5-percent of equipment or systems tested had at least one deficiency. In addition, testing of another random sample must be witnessed for the same size as the initial sample for the first time. If the second random sample set has any failures, those failed items must be retested and all remaining equipment and systems must be tested to complete 100-percent testing of that system type.

3.2.14.4.4.3 Re-Testing Costs

Re-testing costs must be reimbursed to the Government. These costs must include salary, travel costs, and per diem for Government personnel and all Commissioning Team participants. Reimbursement responsibilities are specified in the following paragraphs.

a. Commissioning Team participants who were not present must equally share reimbursement costs.

b. Installing Contractors and Equipment Suppliers who were responsible for discovered deficiencies resulting in test failures must equally share reimbursement costs.

3.2.14.4.5 Commissioning Team Participants

Participants of Functional Performance Testing and Integrated Systems Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

3.2.14.4.5.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Controls Commissioning Representative (CC).

d. Installing Contractors' TAB Commissioning Representative (TAB).

e. Installing Contractors' Mechanical Commissioning Representative (MC).

f. Equipment Supplier (ES).

3.2.14.4.5.2 Plumbing Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Plumbing Commissioning Representative (PC).

d. Equipment Supplier (ES).

e. Installing Contractors' Controls Commissioning Representative (CC).

3.2.14.4.5.3 Utility Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Utility Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Controls Commissioning Representative (CC).

d. Installing Contractors' TAB Commissioning Representative (TAB).

e. Installing Contractors' Mechanical Commissioning Representative (MC).

f. Installing Contractors' Electrical Commissioning Representative (EC).

g. Equipment Supplier (ES).

3.2.14.4.5.4 Electrical Type II Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Electrical Technical Commissioning Specialist (CxE).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Electrical Commissioning Representative (EC).

d. Equipment Supplier (ES).

3.2.14.4.5.5 Building Envelope Systems, Components, and Assemblies

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Building Envelope Technical Commissioning Specialist (CxB).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Building Envelope Commissioning Representative (BC).

d. Equipment Supplier (ES).

3.2.14.4.6 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Testing to select which systems must be tested for samples of less than 100-percent.

b. Coordinate logistics with Installing Contractors.

c. Submit completed Final Functional Performance Test Checklists for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.2.14.4.7 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must witness, re-witness, and document all testing for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.4.8 Installing Contractors Responsibilities

Installing Contractors must provide all necessary materials and perform all aspects of testing including modifications to simulate actual conditions for all equipment and systems related to their contract.

3.2.14.4.9 Equipment Suppliers Responsibilities

Equipment Suppliers must perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

3.2.14.4.10 Installing Contractors and Equipment Supplier Coordination

Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract.

3.2.15 Systems Manuals

3.2.15.1 General Requirements

Systems Manuals must be prepared for all commissioned equipment and systems and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Final Owner's Project Requirements.

b. Final Basis of Design.

c. Recommended maintenance schedules when schedules are not provided in Operation and Maintenance manuals.

d. Recommended re-testing schedule.

e. Blank copy of all approved final Functional Performance Test Checklists.

g. Complete equipment warranty information.

h. Recommended schedule for sensor and actuator calibration.

Systems Manual contents for all complex systems as defined in paragraph COMPLEX SYSTEMS, in addition to contents specified in the preceding paragraphs, must include, but not be limited to, contents specified in the following paragraphs.

a. As-built system single line diagrams.

b. As-built sequences of operation and controls drawings.

c. As-built control system setpoints.

3.2.15.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of contents required for all Systems Manuals to Installing Contractors.

b. Prepare and submit all Systems Manuals as a single submittal no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

3.2.15.3 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, provide required contents for all Systems Manuals to the Lead Commissioning Specialist.

3.2.16 Training

3.2.16.1 Training Plans

Training Plans must be prepared for all commissioned equipment and systems and contents must include, but not be limited to, contents specified in the following paragraphs.

a. List of those who should receive training by position or name.

b. List of systems that require training organized by Specification Section.

c. Training content.

d. Level of instruction required.

e. Level of required instructor expertise.

f. Trainer name and trainer contact information.

g. Identification of whether training is conduced on-site or in a classroom setting.

h. Schedule and location of training.

i. Criteria for determining whether provided training is acceptable.

j. Blank Training Attendance Rosters.

3.2.16.2 Training

Training must be performed in accordance with Training Plans and in accordance with requirements specified in respective Technical Sections.

3.2.16.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit all Training Plans as a single submittal no later than 30 calendar days prior to the occurrence of any training session.

b. Provide approved Training Plans to Installing Contractors.

c. Submit all completed Training Attendance Rosters as a single submittal no later than 14 calendar days after completion of all training

sessions.

3.2.16.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Perform training as specified in the preceding paragraphs.

b. Require all training attendees to sign Training Attendance Rosters.

c. Provide completed Training Attendance Rosters no later than seven calendar days after completion of all training sessions to the Lead Commissioning Specialist.

3.2.17 Final Commissioning Report

3.2.17.1 General Requirements

The Final Commissioning Report must be prepared and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Executive summary describing the overall commissioning process.

b. Results of the commissioning process.

c. Issues Log.

d. Commissioning Design Review Reports.

e. Approved Construction Phase Final Commissioning Plan.

f. Approved Pre-Final Test and Balance Reports.

g. Completed Pre-Functional Checklists.

h. Endurance Testing Reports.

i. Completed Functional Performance Test Checklists.

k. Approved Training Plans.

l. Completed Training Attendance Rosters.

m. Identification of all deficiencies complete with corrective actions taken.

n. Indication that systems meet requirements of the Owner's Project Requirements and Plans and Specifications.

o. List of any testing that must be performed during the Post-Construction (Warranty) Phase.

3.2.17.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the Final Commissioning Report no later than 14

calendar days after successful completion of all Functional Performance Testing and all Integrated Systems Testing.

b. File one copy of Approved Final Commissioning Report in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Final Commissioning Report.

3.3 POST-CONSTRUCTION (WARRANTY) PHASE

3.3.1 Post-Construction Phase ASHRAE 189.1 Commissioning Compliance

3.3.1.1 General Requirements

Activities must include, but not be limited to, post-construction phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, post-construction phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and post-construction phase commissioning activities specified in this Section.

3.3.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under item entitled "Post-Construction Phase ASHRAE 189.1 Commissioning Compliance."

3.3.2 Post-Construction Phase Sustainability Third Party Certification (TPC)

3.3.2.1 General Requirements

Activities must include, but not be limited to, post-construction phase commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, post-construction phase commissioning activities listed in all of its references as modified in this Section, and post-construction phase commissioning activities specified in this Section.

3.3.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Post-Construction Phase Sustainability Third Party Certification (TPC)."

3.3.3 Post-Construction Phase Issues Log

3.3.3.1 General Requirements

The Post-Construction Phase Issues Log must be maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Post-Construction Phase Issues Log must include the name of Commissioning Team member identifying

the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Post-Construction Phase Issues Log must be a continuation of the Construction Phase Issues Log and must be prepared in an electronic format that can be used throughout the Post-Construction Phase such that it can be provided to the Government upon request.

3.3.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Post Construction Phase Issues Log and must submit one electronic copy no later than 14 calendar days after completion of any Post-Construction Phase commissioning activity.

3.3.4 Post-Construction Phase Site Observations

3.3.4.1 General Requirements

Post-Construction Phase Site Observations must be performed between eight and 10 months after Beneficial Occupancy to verify and document that all commissioned equipment and systems are operating in accordance with the Owner's Project Requirements.

Post-Construction Phase Site Observations are prohibited from being combined with witnessing Post-Construction Phase Functional Performance Testing or witnessing Post-Construction Phase Integrated Systems Testing.

3.3.4.2 Site Observation Reports

Site Observation Reports must be prepared for each Site Observation for the purpose of documenting issues discovered during Site Observation.

3.3.4.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Site Observation to schedule attendance of Operations and Maintenance staff and occupants and to make provisions for access to all commissioned equipment and systems.

b. Submit Post-Construction Phase Site Observation Reports no later than 14 calendar days after Site Observation.

3.3.4.4 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Interview Operations and Maintenance staff.

b. Interview occupants.

c. Determine status of unresolved commissioning issues.

d. Compare current operations to operations identified throughout the commissioning process.

e. Prepare Post-Construction Phase Site Observation Reports.

3.3.5 Inspections and Testing

3.3.5.1 Post-Construction Phase Endurance Testing

3.3.5.1.1 General Requirements

Post-Construction Phase Endurance Testing (trending of control system control points) requirements and activities for each complex system as defined in paragraph COMPLEX SYSTEMS must be performed if all requirements and activities for respective system could not be fully or successfully completed during Construction Phase Endurance Testing.

Post-Construction Phase Endurance Testing requirements and activities must include, but not be limited to, requirements and activities specified for Construction Phase Endurance Testing as modified in the following paragraphs. Systems must be operating as normally anticipated during occupancy throughout Endurance Testing.

3.3.5.1.2 Post-Construction Phase Endurance Testing Reports

A Post-Construction Phase Endurance Testing Report must be prepared and contents must include, but not be limited to, an executive summary, Technical Commissioning Specialists’ review comments, trend results in graphical format, and raw trend data for all trend results for each trended system.

3.3.5.1.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing and specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Endurance Testing to make provisions for access to all commissioned equipment and systems.

b. Coordinate logistics of trend data collection with Installing Contractors.

c. Prepare and submit Post-Construction Phase Endurance Testing Reports as a single submittal no later than 14 calendar days after preparation of all Endurance Testing Reports. In addition, submit one electronic copy of raw trend data.

3.3.5.1.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing and specified in the following paragraphs.

a. Setup trend hardware during one site visit and retrieve trend data and trend hardware as applicable during an additional site visit.

3.3.5.1.5 Equipment Suppliers Responsibilities

Equipment Suppliers must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing.

3.3.5.2 Certified Certificates of Readiness and Certificates of Readiness

Certified Certificates of Readiness and Certificates of Readiness are not required for any Post-Construction Phase activity.

3.3.5.3 Post-Construction Phase Functional Performance Testing and Integrated Systems Testing

3.3.5.3.1 General Requirements

Functional Performance Testing and Integrated Systems Testing must be performed for all commissioned equipment and systems that could not be fully or successfully tested during the Construction Phase. Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team participant is not present or if deficiencies discovered during testing prevent successful completion.

Functional Performance Testing and Integrated Systems Testing requirements and activities must include, but not be limited to, requirements and activities specified for Construction Phase Functional Performance Testing and Integrated Systems Testing as modified in paragraphs under paragraph POST-CONSTRUCTION (WARRANTY) PHASE.

3.3.5.3.2 Commissioning Team Participants

Participants of Functional Performance Testing and Integrated Systems Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

a. Lead Commissioning Specialist.

b. Technical Commissioning Specialists.

c. Installing Contractors.

d. Equipment Suppliers.

3.3.5.3.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to witnessing Functional Performance Testing and Integrated Systems Testing to make provisions for access to all commissioned equipment and systems.

b. Coordinate logistics with Installing Contractors.

c. Submit completed Final Functional Performance Test Checklists for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.3.6 Updated Systems Manuals

3.3.6.1 General Requirements

Updated Systems Manuals must be prepared and must be an update to Systems Manuals prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase commissioning activities.

3.3.6.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit all Updated Systems Manuals as a single submittal no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

3.3.7 Updated Final Commissioning Report

3.3.7.1 General Requirements

The Updated Final Commissioning Report must be prepared and must be an update to the Final Commissioning Report prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase commissioning activities.

3.3.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Updated Final Commissioning Report no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

File one copy of Approved Updated Final Commissioning Report in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Updated Final Commissioning Report.

-- End of Section --

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PART 1 GENERAL

1.1 SUMMARY

The Government has employed an independent Commissioning Firm that has employed or has contracted Lead and Technical Commissioning Specialists. This Section specifies the commissioning scope of work for the entire Commissioning Team

Commissioning responsibilities assigned in this Section to Lead and Technical Commissioning Specialists are for informational purposes.

1.2 COMMISSIONING LIMITATIONS

Commissioning requirements specified in this Section are prohibited from fulfilling requirements specified in other Sections. Requirements specified in other Sections are prohibited from fulfilling requirements specified in this Section.

All commissioning submittals must be submitted and reviewed in accordance with paragraph SUBMITTALS. Commissioning utilities including, but not limited to, tracking utilities and software for commissioning activities are prohibited from taking the place of these requirements.

1.3 SYSTEMS TO BE COMMISSIONED

Systems specified in the following paragraphs must be commissioned whether or not specified systems are required to be commissioned by any reference for pursuing Sustainability TPC.

Specified equipment and system counts are totals that include all buildings in this project.

1.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category

a. Up to one chilled water plant featuring up to two air-cooled chillers with packaged controls, up to two variable speed distribution pumps, and variable-primary distribution.

b. Up to one hot water plant featuring up to two fuel-fired condensing boilers each with an integral circulating pump and packaged controls, one boiler master control panel, up to two variable speed distribution pumps, and variable-primary distribution.

c. Up to two air handling units each featuring a variable-air-volume supply air fan, a chilled water coil, a hot water coil, air-side energy recovery, and packaged controls.

d. Up to 30 variable-air-volume air terminal units each featuring a hydronic heating coil.

e. Up to 10 fan coil units each featuring a chilled water coil and a hot water coil.

f. Up to eight computer room air-conditioning units each featuring packaged controls.

g. Up to eight unit heaters.

h. Up to one supply air fan.

i. Up to eight exhaust air fans.

j. Up to one Building Automation System.

1.3.2 Plumbing Systems Category

a. Up to 25 fixtures.

b. Up to one domestic heating hot water system featuring up to two fuel-fired condensing water heaters each with packaged controls, up to one recirculating pump, and up to one temperature mixing valve.

c. Up to three emergency eyewash stations.

d. Up to one compressed air system featuring packaged controls.

1.3.3 Utility Systems Category

a. Up to one energy monitoring and control system.

b. Up to one water utility metering system.

1.3.4 Electrical Type I Systems Category

a. Power - all grounding systems.

b. Power - all industrial control systems.

c. Power - all main distribution panels.

d. Power - all main transformers.

e. Power - all panelboards.

f. Power - all step-down transformers.

g. Power - all transient voltage surge protective devices.

1.3.5 Electrical Type II Systems Category

a. Cable television - all systems.

b. Communications - all public address systems.

c. Communications - all telecommunications entrance backbone and distribution systems.

d. Emergency power - up to one system featuring up to one single operation generator set and automatic transfer switches.

e. Emergency power off control - all systems.

f. Lighting - all emergency egress systems.

g. Lighting - all exit systems.

h. Lighting - all interior systems.

1.3.6 Building Envelope Systems, Components, and Assemblies Category

a. Air tightness / pressurization verification of building envelope, components, and assemblies.

b. Thermal integrity verification of building envelope, components, and assemblies.

c. Moisture integrity verification of building envelope, components, and assemblies.

d. All roofing including low sloped roofs and steep sloped roofs.

1.3.7 Integrated Systems Category

a. Testing of integrated systems is not required for this project.

1.4 COMPLEX SYSTEMS

Complex systems are defined as the following systems categories as listed under paragraph SYSTEMS TO BE COMMISSIONED with appropriate qualifiers and are subject to more stringent requirements as specified in this Section.

a. All equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category."

b. All equipment and systems listed under item entitled "Plumbing Systems Category" featuring on-board factory packaged controls. Refer to the following paragraph for definition of equipment featuring on-board factory packaged controls.

c. All equipment and systems listed under item entitled "Utility Systems Category."

Equipment featuring on-board factory packaged controls is defined as equipment that is a complex system as defined in paragraph COMPLEX SYSTEMS which features a controller issuing sophisticated logic-based commands to its internal components to accomplish the intent of Plans and Specifications. This equipment may function as either a stand-alone piece of commissioned equipment or may function as part of a commissioned system. This controller may be equipment mounted or may be remote mounted and may or may not interface with a building control system. Examples of equipment meeting and not meeting this definition are provided in the following paragraphs.

a. Equipment meeting this definition includes chillers, boilers provided with or without master controllers, packaged pumping systems, dedicated outside air systems, packaged rooftop units, computer room air conditioners, and air terminal units.

b. Equipment not meeting this definition includes unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

c. Equipment not meeting this definition, but requiring demonstration of minimum safe motor speed either prior to or during Functional Performance Testing includes variable frequency drives.

1.5 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1	(2014) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

GREEN BUILDING INITIATIVE (GBI)

GBI GP Compliance	(2016) GBI Guiding Principles Compliance Program for New Construction (DOD Version)

1.6 SUBMITTALS

Commissioning submittals are not required to be submitted by the Installing Contractor.

1.7 COMMISSIONING TEAM

The Commissioning Team is defined as the entity that must perform all commissioning activities specified in this Section for systems listed under paragraph SYSTEMS TO BE COMMISSIONED. The Commissioning Team is composed of the Lead Commissioning Specialist, Technical Commissioning Specialists, Designers of Record, Installing Contractors, Equipment Suppliers, and the Contracting Officer's Technical Representative.

1.7.1 Lead Commissioning Specialist

The Lead Commissioning Specialist (CxC) is defined as the entity that must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, coordinating all aspects of the commissioning process; managing all Technical Commissioning Specialists; and submitting all Commissioning Plans, schedules, reports, and documentation directly to the Contracting Officer's Technical Representative as modified in this Section.

1.7.2 Technical Commissioning Specialists

Technical Commissioning Specialists are defined as entities that must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, performing reviews, witnessing that all system components have been installed, that each control device operates, that each equipment piece operates, that complete systems operate, and that interactive systems operate in accordance with Plans and Specifications.

Technical Commissioning Specialists must perform assigned responsibilities for equipment and systems listed under systems categories assigned to them

in this Section. Technical Commissioning Specialists are prohibited from performing responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

1.7.3 Designers of Record

Designers of Record are defined as the entities that must act as design professionals responsible for design of their respective system that is subject to commissioning. Designers of Record must perform all commissioning responsibilities assigned in this Section as directed by the General Contractor.

1.7.4 Installing Contractors

Installing Contractors are defined as the General Contractor's Superintendent or Project Manager; Quality Control Representative; and Mechanical, Controls, Plumbing, Electrical, Test and Balance, Fire Protection, and Building Envelope Sub-Contractors who provide, install, or construct systems in whole or in part for this contract. The General Contractor must provide a Lead Commissioning Representative to manage all Designers of Record, Sub-Contractor Commissioning Representatives, and Equipment Suppliers to accomplish all responsibilities assigned in this Section. Each Sub-Contractor must provide a Commissioning Representative to coordinate and perform all commissioning responsibilities for commissioned equipment and systems provided as part of their respective contract as directed by the General Contractor. Submission of commissioning related certifications or qualifications for the Lead Commissioning Representative and Installing Contractor Representatives is not required.

Installing Contractors must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment and systems provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration as modified in this Section.

1.7.5 Equipment Suppliers

Equipment Suppliers (ES) are defined as factory authorized start-up technicians or factory representatives knowledgeable with start-up, demonstration, and testing of commissioned equipment featuring on-board factory packaged controls provided as part of their respective contract. Each Equipment Supplier must coordinate and perform all commissioning responsibilities assigned in this Section as directed by the General Contractor. Submission of commissioning related certifications or qualifications for Equipment Suppliers is not required. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

Equipment Suppliers must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration as modified in this Section.

1.7.6 Installing Contractors and Equipment Suppliers Coordination

Installing Contractors and Equipment Suppliers must coordinate and share demonstration and testing responsibilities specified in this Section for commissioned equipment featuring on-board factory packaged controls. Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of demonstration and testing for these types of systems. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

1.7.7 Contracting Officer's Technical Representative

The Contracting Officer's Technical Representative (COTR) represents the Government for all elements of the commissioning process. The COTR will serve as the single point of contact with the Lead Commissioning Specialist, will receive all commissioning submittals, may attend meetings, and may, but is not required to, witness field inspections and testing specified in this Section.

1.8 COMMUNICATIONS

1.8.1 Communications with the Contracting Officer's Technical Representative

Communication with the Contracting Officer's Technical Representative must be through the Lead Commissioning Specialist who acts as the single direct point of contact for all aspects of the commissioning process.

1.8.2 Communications between the Commissioning Team

Communications between the Commissioning Team including, but not limited to, verbal communications, schedule information, and exchange of information specified in this Section, must occur directly between the Commissioning Team without requiring interaction of the Contracting Officer's Technical Representative.

1.9 PHASING

This project is not phased.

1.10 ASHRAE 189.1 COMMISSIONING COMPLIANCE

ASHRAE 189.1 commissioning compliance is required for this project.

1.10.1 General Requirements

All commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, commissioning activities listed in references contained in ASHRAE 189.1's paragraphs as modified in this Section, and commissioning activities specified in this Section must be performed. All commissioning activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers.

Commissioning activities listed in ASHRAE 189.1's paragraphs that also have requirements specified in this Section are listed only where requirements are specified in this Section and these commissioning activities are not repeated under ASHRAE 189.1's paragraphs.

1.10.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all commissioning activities specified in the preceding item entitled "General Requirements" and must perform all commissioning activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in the Standard or listed in any of its references.

1.11 SUSTAINABILITY THIRD PARTY CERTIFICATION (TPC)

Sustainability Third Party Certification (TPC) is required for this project.

1.11.1 General Requirements

All commissioning activities listed in all references for pursuing Sustainability TPC as modified in this Section and commissioning activities specified in this Section must be performed. All commissioning activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers and whether or not activity is included as total points toward Sustainability TPC.

Commissioning activities listed in all references for pursuing Sustainability TPC that also have requirements specified in this Section are listed only where requirements are specified in this Section and these commissioning activities are not repeated under references for pursuing Sustainability TPC.

1.11.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all commissioning activities specified in the preceding item entitled "General Requirements," perform commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, perform commissioning activities listed in all of its references as modified in this Section, and perform commissioning activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in the reference for pursuing Sustainability TPC or listed in any of its references.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 DESIGN PHASE

3.1.1 Design Phase ASHRAE 189.1 Commissioning Compliance

3.1.1.1 General Requirements

Activities must include, but not be limited to, design phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6

as modified in this Section, design phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and design phase commissioning activities specified in this Section.

3.1.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under item entitled "Design Phase ASHRAE 189.1 Commissioning Compliance."

3.1.2 Design Phase Sustainability Third Party Certification (TPC)

3.1.2.1 General Requirements

Activities must include, but not be limited to, design phase commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, design phase commissioning activities listed in all of its references as modified in this Section, and design phase commissioning activities specified in this Section.

3.1.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Design Phase Sustainability Third Party Certification (TPC)."

3.1.3 Design Phase Commissioning Coordination Meeting

3.1.3.1 General Requirements

A Design Phase Commissioning Coordination meeting must be conducted no later than 30 calendar days prior to the first Plans and Specifications submission or no later than 30 calendar days after approval of Commissioning Firm certifications and all Commissioning Specialist certifications, whichever occurs last. Meeting topics must include, but not be limited to, the commissioning process, contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, and logistics as specified in this Section. Meeting must be conducted by conference call.

3.1.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.1.3.3 Designers of Record, Installing Contractors, and Others Responsibilities

Designers of Record and Installing Contractors must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may also attend this meeting.

3.1.4 Design Phase Commissioning Plan

3.1.4.1 General Requirements

The Design Phase Commissioning Plan must be prepared and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Plan purpose.

b. Commissioning scope.

c. Commissioning process outline.

d. List of all commissioned equipment and systems.

e. Building information.

f. Contact information for the Lead Commissioning Specialist, Technical Commissioning Specialists, Designers of Record, and Contracting Officer's Technical Representative.

g. Criteria listing including Unified Facilities Criteria and Building Codes and Standards.

h. Description of Commissioning Team members.

i. Roles and responsibilities.

j. Lines of communication.

k. Documentation requirements.

l. Owner's Project Requirements.

m. Description of the Basis of Design.

n. Description of Plans and Specifications reviews performed by Technical Commissioning Specialists.

o. Description of Plans and Specifications reviews performed by the Contracting Officer's Technical Representative.

p. Examples and descriptions of Site Observation Reports and Issues Log.

q. Listing and description of Design Phase and Construction Phase Commissioning meetings.

r. Identification of commissioning activities for incorporation into the Project Construction Schedule.

s. Listing of submittals required by Technical Commissioning Specialists.

t. Examples and description of the development of Pre-Functional Checklists, Functional Performance Test Checklists, and Integrated Systems Test Checklists.

u. Description of Pre-Functional Checks, Functional Performance Testing,

and Integrated Systems Testing.

v. Description of Endurance Testing.

w. Description of Ductwork Air Leak Test (DALT) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

x. Description of Performance Verification Test (PVT) field acceptance testing specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

y. Description of Test and Balance (TAB) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

z. Listing of Operation and Maintenance Manual requirements.

aa. Description of Systems Manuals.

bb. Description of training requirements.

cc. Description of Final Commissioning Report.

3.1.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Design Phase Commissioning Plan no later than 45 calendar days after approval of Commissioning Specialists certifications.

File one copy of Approved Design Phase Commissioning Plan in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Design Phase Commissioning Plan.

3.1.5 Design Phase Issues Log

3.1.5.1 General Requirements

The Design Phase Issues Log must be prepared and maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Design Phase Issues Log must include the name of Commissioning Team member identifying the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Design Phase Issues Log must be prepared in an electronic format that can be used throughout the Design Phase such that it can be provided to the Government upon request.

3.1.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Design Phase Issues Log and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.1.6 Commissioning Design Reviews

3.1.6.1 General Requirements

Commissioning Design Reviews must be performed and must include reviews

and back-checks of the Owner's Project Requirements (OPR), the Basis of Design and Design (BOD), and Plans and Specifications in accordance with Sustainability TPC rating system requirements and requirements specified in this Section. The number and schedule of design reviews must be in accordance with Sustainability TPC requirements and must include, but not be limited to, review of first Plans and Specifications submission and back-checks of all subsequent submissions. Plans and Specifications submissions are specified in the following paragraphs.

a. Design Development Plans and Specifications submission.

b. 100-Percent Pre-Final Plans and Specifications submission.

c. Final Plans and Specifications submission.

Commissioning Design Reviews must assess completeness and clarity of the OPR, verify requirements stated in the OPR are addressed in the BOD, and verify the Design Plans and Specifications are prepared in accordance with the BOD and applicable Unified Facilities Criteria (UFC). All issues, including those that would negatively impact building system operation and maintenance, must be identified and be provided with proposed corrective actions. The OPR and BOD are for review purposes only and are not contractually enforceable.

3.1.6.2 Commissioning Design Review Reports

A Commissioning Design Review Report must be prepared for each review and back-check of Plans and Specifications and must include each issue listed individually and its corresponding proposed corrective action. Issues must be separated into categories corresponding to systems categories listed under paragraph SYSTEMS TO BE COMMISSIONED.

Updated Commissioning Design Review Reports must be prepared to include resolution of outstanding issues reached during Commissioning Design Review meetings.

3.1.6.3 Commissioning Design Review Meetings

A Commissioning Design Review meeting must be conducted no later than 14 calendar days after preparation of each Commissioning Design Review Report to discuss proposed corrective actions and to resolve outstanding issues. The Contracting Officer's Technical Representative may attend these meetings. Meeting must be conducted by conference call.

3.1.6.4 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist activities must include, but not be limited to, activities specified in the following paragraphs.

a. Prepare and provide Commissioning Design Review Reports to Designers of Record.

b. Conduct Commissioning Design Review meetings.

c. Update Commissioning Design Review Reports.

d. Prepare and submit Updated Commissioning Design Review Reports no later than 14 calendar days after each Commissioning Design Review meeting.

3.1.6.5 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists activities must include, but not be limited to, performing reviews and back-checks of Plans and Specifications and attending Commissioning Design Review meetings for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.1.6.6 Designers of Record Responsibilities

Designers of Record activities must include, but not be limited to, providing written responses to Commissioning Design Review Reports and attending Commissioning Design Review meetings.

3.2 CONSTRUCTION PHASE

3.2.1 Construction Phase ASHRAE 189.1 Commissioning Compliance

3.2.1.1 General Requirements

Activities must include, but not be limited to, construction phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, construction phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and construction phase commissioning activities specified in this Section.

3.2.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under the item entitled "Construction Phase ASHRAE 189.1 Commissioning Compliance."

3.2.2 Construction Phase Sustainability Third Party Certification (TPC)

3.2.2.1 General Requirements

Activities must include, but not be limited to, commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, commissioning activities listed in all of its references as modified in this Section, and commissioning activities specified in this Section.

3.2.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Construction Phase Sustainability Third Party Certification (TPC)."

3.2.3 Construction Phase Sequencing

3.2.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Heating, ventilation, and air-conditioning (HVAC) systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All equipment and systems have been completed, cleaned, flushed, disinfected, calibrated, tested, and operate in accordance with Plans and Specifications.

b. All Ductwork Air Leakage Testing (DALT) field work, Test and Balance (TAB) field work, Pre-Final TAB Reports, and related prerequisites have been completed, submitted, and approved in accordance with Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

c. All testing of building envelope, components, and assemblies for air tightness / pressurization verification, thermal integrity verification, and moisture integrity verification have been completed, submitted, and approved.

d. All Pre-Functional Checklists have been completed, submitted, and approved.

e. Certified Certificates of Readiness for respective system has been completed, submitted, and approved.

All completed Final Functional Performance Test Checklists for commissioned equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be submitted and approved prior to the Government performing any Performance Verification Testing specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

3.2.3.2 Electrical Systems

Electrical systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Electrical Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All electrical, power generation, and lighting equipment and systems have been completed, calibrated, tested, and operate in accordance with Plans and Specifications.

b. Building Envelope is enclosed according to contract documents with final construction completed.

c. All ceiling tiles, floor coverings, and window coverings are in place.

d. All lamps have completed a minimum 100-hour burn-in period.

e. All furniture is in place.

f. Certified Certificates of Readiness for respective system has been

completed, submitted, and approved.

3.2.4 Construction Phase Scheduling

3.2.4.1 General Requirements

Commissioning activities and other related activities for inclusion into the Project Construction Schedule must include, but not be limited to, activities specified in the following paragraphs.

a. Perform Construction Phase Commissioning Coordination meeting.

b. Submittal and approval of Construction Phase Interim Commissioning Plan.

c. Submittal and approval of Construction Phase Final Commissioning Plan.

d. Submittal and approval of completed Pre-Functional Checklists.

e. Perform testing of building envelope, components, and assemblies for air tightness / pressurization verification, thermal integrity verification, and moisture integrity verification.

f. Submittal and approval of proposed Functional Performance Test Checklists.

g. Submittal and approval of final Functional Performance Test Checklists.

j. Perform Construction Phase Site Observations.

k. Participate in Construction Phase Endurance Testing.

l. Witness Construction Phase Functional Performance Testing.

m. Corrections of deficiencies discovered during Construction Phase Functional Performance Testing.

n. Re-witness Construction Phase Functional Performance Testing.

r. Provide all Systems Manuals contents.

s. Submittal and approval of completed Systems Manuals.

t. Perform training.

u. Submittal and approval of Final Commissioning Report.

v. Perform Post-Construction Phase Site Observations.

w. Participate in Post-Construction Phase Endurance Testing.

x. Witness Post-Construction Phase Functional Performance Testing.

y. Corrections of deficiencies discovered during Post-Construction Phase Functional Performance Testing.

z. Re-witness Post-Construction Phase Functional Performance Testing.

3.2.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must request a current Project Construction Schedule from Installing Contractors no later than at the Construction Phase Commissioning Coordination Meeting and must prepare and provide to Installing Contractors a list of commissioning activities for inclusion into the Project Construction Schedule. The Lead Commissioning Specialist must associate each commissioning activity to a single construction activity such that if the date of the construction activity changes, the associated commissioning activity changes accordingly.

3.2.4.3 Installing Contractors Responsibilities

Installing Contractors must provide a current Project Construction Schedule to the Lead Commissioning Specialist upon receiving request. Installing Contractors must incorporate the list of commissioning activities into the Project Construction Schedule and must link each commissioning activity to the associated construction activity identified by the Lead Commissioning Specialist such that if the date of the construction activity changes, the associated commissioning activity changes accordingly.

Installing Contractors must provide updated Project Construction Schedules to the Lead Commissioning Specialist at least on a monthly basis.

3.2.5 Construction Phase Commissioning Coordination Meeting

3.2.5.1 General Requirements

A Construction Phase Commissioning Coordination meeting must be conducted no later than 14 calendar days after approval of Commissioning Firm and Commissioning Specialists certifications to discuss topics that include, but not be limited to, the commissioning process, contract requirements, lines of communication, roles and responsibilities, commissioning activities for inclusion into the Project Construction Schedule, documentation requirements, Inspections and Testing, and logistics specified in this Section. Meeting must be conducted by conference call.

3.2.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.2.5.3 Installing Contractors, Designers of Record, and Other Commissioning Team Member Responsibilities

Installing Contractors and Designers of Record must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend this meeting.

3.2.6 Construction Phase Commissioning Progress Meetings

3.2.6.1 General Requirements

Construction Phase Commissioning Progress meetings must be conducted to discuss topics that include, but not be limited to, unresolved commissioning issues, status of items specified to be provided to the Lead Commissioning Specialist, and upcoming commissioning activities. Two Construction Phase Commissioning Progress meetings must be conducted for

each systems category unless modified in the following paragraphs. Meetings must be conducted by conference call.

a. Heating, Ventilation, and Air-Conditioning (HVAC) Systems: Six meetings.

b. Building Envelope Systems, Components, and Assemblies: Three meetings.

Construction Phase Commissioning Progress meetings are prohibited from being combined with conducting Construction Phase Commissioning Coordination meeting, conducting Site Observations, witnessing Functional Performance Testing, or witnessing Integrated Systems Testing.

3.2.6.2 Technical Commissioning Specialists Responsibilities

Each Technical Commissioning Specialist must, at a minimum, conduct meetings and prepare meeting minutes complete with Attendance Roster for systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for systems categories assigned to other Technical Commissioning Specialists.

3.2.6.3 Installing Contractors and Others Responsibilities

Installing Contractors must attend these meetings. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend these meetings.

3.2.7 Construction Phase Interim Commissioning Plan

3.2.7.1 General Requirements

The Construction Phase Interim Commissioning Plan must be prepared and must be an update to the Design Phase Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Design Phase Commissioning Plan.

b. Basis of Design.

c. Contact information for the entire Commissioning Team.

3.2.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Construction Phase Interim Commissioning Plan no later than 30 calendar days after the Construction Phase Commissioning Coordination meeting and no later than 14 calendar days prior to performing construction of the building envelope.

3.2.8 Construction Phase Final Commissioning Plan

3.2.8.1 General Requirements

The Construction Phase Final Commissioning Plan must be prepared and must be an update to the Construction Phase Interim Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Construction Phase Interim Commissioning Plan.

b. All Pre-Functional Checklists.

c. All approved final Functional Performance Test Checklists.

3.2.8.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the Construction Phase Final Commissioning Plan no later than 30 calendar days prior to performing any Functional Performance Testing.

b. File one copy of Approved Construction Phase Final Commissioning Plan in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Construction Phase Final Commissioning Plan.

3.2.9 Construction Phase Issues Log

3.2.9.1 General Requirements

The Construction Phase Issues Log must be prepared and maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Construction Phase Issues Log must include the name of Commissioning Team member identifying the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Construction Phase Issues Log must be a continuation of the Design Phase Issues Log and must be prepared in an electronic format that can be used throughout the Construction Phase such that it can be provided to the Government upon request.

3.2.9.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Construction Phase Issues Log and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.2.10 Pre-Functional Checklists

3.2.10.1 General Requirements

Pre-Functional Checklists must be prepared for all commissioned equipment and contents must include, but not be limited to, contents for physical inspections that demonstrate construction, installation and start-up of equipment and systems is complete. Refer to item entitled "Pre-Functional Checklists" in item entitled "Inspections and Testing" for more information.

Download example Pre-Functional Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING at the following location: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic Checklists must contain the same level of detail shown in examples, but are not required to match the format of examples.

3.2.10.2 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors. Blank Pre-Functional Checklists are not required to be submitted to the Government.

3.2.10.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must prepare Pre-Functional Checklists for all equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.11 Functional Performance Test (FPT) Checklists

Functional Performance Test (FPT) Checklists must be prepared for all commissioned equipment and systems demonstrating performance is in accordance with Plans and Specifications. A single final FPT Checklist must be prepared for each system except that a single final FPT Checklist may be prepared for use with multiple systems that have identical features, unless modified in this Section. FPT Checklist contents must include, but not be limited to, step-by-step actions and expected results, unless modified in this Section. Refer to item entitled "Functional Performance Testing and Integrated Systems Testing" for more information.

3.2.11.1 Complex Systems Requirements

FPT Checklists must be prepared for all complex systems as defined in paragraph COMPLEX SYSTEMS demonstrating performance is in accordance with Plans and Specifications. A single FPT Checklist must be prepared for each system except that a single FPT Checklist may be prepared for use with multiple systems that have identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps. Refer to item entitled "Functional Performance Testing and Integrated Systems Testing" and item entitled "Sample Strategy" for more information.

Contents must include, but not be limited to, contents specified in the following paragraphs and shown in example FPT Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING available for download at the following location:
http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic
FPT Checklists must contain the same level of detail specified below and as shown in examples, but are not required to match the format of examples.

a. Notable system features including information about such attributes as system sizing and controls to facilitate understanding of system operation.

b. Conclusions and recommendations based on control system feature, point-to-point, actuator, and system operation observations. Conclusions must clearly indicate if system does or does not perform in accordance with requirements of Plans and Specifications. Recommendation must clearly indicate that the system should or should not be accepted by the Government.

c. Test conditions including date, beginning and ending time, and

beginning and ending outdoor air conditions.

d. Identification of the equipment involved in the test.

e. Attendees present throughout the entire system test.

f. Control system feature identification including control point description, embedded/visible type, adjustable/monitoring type, actual value, and setpoint value/alarm range.

g. Point-to-point observations including demonstrating system flow meters and sensors have been calibrated and are correctly displayed on the Operator workstation.

h. Actuator operation observations demonstrating actuator responses to commands from the control system.

i. Variable frequency drive observations demonstrating minimum safe motor speed.

j. System operation observations for system-based testing demonstrating each control sequence, operation mode, and alarm condition resulting from control setpoint manipulation. System operation observations must include, but not be limited to, observations specified in the following paragraphs.

(1) Introduction identifying testing methodology.

(2) As-found conditions prior to system manipulation.

(3) Clear list of test items (step numbers).

(4) Design control sequences or interlocks segmented by unique functions.

(5) Intended test procedures following each segmented sequence or interlock identifying the system manipulation required to initiate system response.

(6) Expected system responses.

(7) Space for comments for each test item.

(8) Pass or fail indication for each test.

Performance Verification Tests prepared by the Controls Contractor as specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC are prohibited from being used in whole or in part to meet requirements specified in this Section.

3.2.11.2 Building Envelope Systems, Components, and Assemblies Requirements

FPT Checklists must be prepared for thermal integrity verification and moisture integrity verification of building envelope, components, and assemblies listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED. FPT Checklists must demonstrate performance is in accordance with Plans and Specifications. A single final FPT Checklist must be prepared for each unique type of construction.

3.2.11.3 Proposed FPT Checklist Meeting and Draft FPT Checklist Meeting

For all complex systems as defined in paragraph COMPLEX SYSTEMS, a Proposed FPT Checklist Meeting and a Draft FPT Checklist Meeting must be conducted for detailed discussions of procedures intended to demonstrate performance is in accordance with Plans and Specifications. Meetings must be conducted by conference call.

3.2.11.4 Lead and Technical Commissioning Specialists Responsibilities

For all systems other than complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead Commissioning Specialist must submit Final Functional Performance Test Checklists for all systems in each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal for each systems category no later than 30 calendar days prior to performing FPT testing of any system in the respective systems category.

For all complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead and Technical Commissioning Specialists must prepare and submit Final Functional Performance Test Checklists in the sequence specified in the following paragraphs. Technical Commissioning Specialists must perform respective responsibilities for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing respective responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Technical Commissioning Specialists must prepare Proposed Functional Performance Test Checklists.

b. The Lead Commissioning Specialist must submit Proposed Functional Performance Test Checklists for all complex systems as a single submittal no later than 60 calendar days prior to testing of any complex system.

c. Technical Commissioning Specialists must conduct the Proposed Functional Performance Test Checklist Meeting attended by the Contracting Officer's Technical Representative.

d. Technical Commissioning Specialists must prepare Draft Functional Performance Test Checklists to incorporate input from the Contracting Officer's Technical Representative.

e. The Lead Commissioning Specialist must provide Draft Functional Performance Test Checklists to Installing Contractors and Equipment Suppliers no later than seven calendar days prior to the Draft Functional Performance Test Checklist Meeting.

f. Technical Commissioning Specialists must conduct the Draft Functional Performance Test Checklist Meeting attended by Installing Contractors and Equipment Suppliers. The Contracting Officer's Technical Representative may attend this meeting.

g. Technical Commissioning Specialists must prepare Final Functional Performance Test Checklists to incorporate input from Installing Contractors.

h. The Lead Commissioning Specialist must submit Final Functional

Performance Test Checklists for all complex systems as a single submittal no later than seven calendar days after meeting to discuss Draft Functional Performance Test Checklists and no later than 30 calendar days prior to testing of any complex system.

3.2.11.5 Installing Contractors and Equipment Suppliers Responsibilities

Installing Contractors and Equipment Suppliers must attend Draft Functional Performance Test Checklist Meeting.

3.2.12 Construction Submittal Reviews

3.2.12.1 General Requirements

Construction Submittal Reviews must be performed for all commissioned equipment and systems to the extent necessary to verify that equipment and systems are in compliance with commissioning aspects of UFC's referenced by the Design-Build contract, Owner's Project Requirements (OPR), Basis of Design (BOD), and Plans and Specifications as modified in this Section. Reviews must be performed coincident with Designers of Record and reviews must include, but not be limited to, review of shop drawings, equipment submittals, test plans, procedures, and reports.

The OPR and BOD are for review purposes only and are not contractually enforceable.

3.2.12.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of shop drawings, equipment submittals, test plans, procedures, and reports that must be reviewed to Installing Contractors.

b. Prepare and provide Construction Submittal review comments to Installing Contractors. Construction Submittal review comments are not required to be submitted to the Government.

3.2.12.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform reviews of Construction Submittals for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.12.4 Installing Contractors Responsibilities

Installing Contractors must provide all requested Construction Submittals, BOD, and requested supplemental information to the Lead Commissioning Specialist.

3.2.13 Construction Phase Site Observations

3.2.13.1 General Requirements

Construction Phase Site Observations must be performed as specified in the

following paragraphs to verify and document commissioning aspects of equipment and systems as modified in this Section. Two Construction Phase Site Observations must be conducted for each systems category unless modified in the following paragraphs.

Construction Phase Site Observations are prohibited from being combined with witnessing Functional Performance Testing or witnessing Integrated Systems Testing, but may be combined with Pre-Functional Checklist Verificaitons unless indicated otherwise. Purposes of Site Observations specified in the following paragraphs for each systems category may be combined into a single Site Observation.

3.2.13.2 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

b. At least one Site Observation to verify and document HVAC pipe pressure testing.

c. At least one Site Observation to verify and document HVAC pump installation.

3.2.13.3 Plumbing Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least one Site Observation to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

b. At least one Site Observation to verify and document Plumbing pipe pressure testing.

c. At least one Site Observation to verify and document Plumbing pump installation.

3.2.13.4 Electrical Type I Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects and to witness testing performed by independent testing organizations of commissioned equipment and systems listed under this systems category and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Technical Commissioning Specialists. Independent testing organizations typically use tests readily available from testing associations such as the InterNational Electrical Testing Association (NETA).

3.2.13.5 Electrical Type II Systems

Site Observations must be performed for the purposes specified in the

following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

3.2.13.6 Building Envelope Systems, Components, and Assemblies

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document in-progress building envelope construction prior to covering critical building envelope components and prior to pressure testing of building envelope, components, and assemblies.

b. At least one Site Observation to verify, document, and witness pressure testing, infrared thermography testing, and fog testing performed by independent testing agencies and specified in Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

c. At least one Site Observation to verify, document, and witness inspections, measurements, and testing performed by independent testing agencies and specified in Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM.

3.2.13.7 Summary Meetings

A Summary Meeting must be conducted at the conclusion of each Site Observation for the purpose of discussing issues discovered during each Site Observation. Meeting must be conducted on-site with all attendees present.

3.2.13.8 Site Observation Reports

A Site Observation Report must be prepared for each Site Observation for the purpose of documenting issues discovered during each Site Observation.

Site Observation Reports for all equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include results of testing performed by independent testing organizations that were witnessed by Technical Commissioning Specialists and test results that were not witnessed by Technical Commissioning Specialists.

3.2.13.9 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide list of equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that require on-site verification and documentation by Technical Commissioning Specialists to Installing Contractors.

The Lead Commissioning Specialist must submit Construction Phase Site Observation Reports complete with Summary Meeting Attendance Roster no later than seven calendar days after Site Observation.

3.2.13.10 Technical Commissioning Specialists Responsibilities

Each Technical Commissioning Specialist must be responsible to perform Site Observations, conduct Summary Meetings, and prepare Construction Phase Site Observation Reports for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.13.11 Installing Contractors Responsibilities

Installing Contractors must provide Technical Commissioning Specialists access to construction and systems for Site Observations and must attend Summary Meetings.

Installing Contractors must schedule testing to occur in the presence of Technical Commissioning Specialists as specified in the following paragraphs.

a. All equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Technical Commissioning Specialists. Results of testing of equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be provided to the Lead Commissioning Specialist that were witnessed by Technical Commissioning Specialists and that were not witnessed by Technical Commissioning Specialists.

b. Pressure testing, infrared thermography testing, and fog testing specified in Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS and inspections, measurements, and testing specified in Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM for equipment and systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED. Results of all tests, inspections, and measurements must be provided to the Lead Commissioning Specialist that were witnessed by Technical Commissioning Specialists and that were not witnessed by Technical Commissioning Specialists.

3.2.14 Inspections and Testing

3.2.14.1 Pre-Functional Checks

Pre-Functional Checks must be performed prior to performing Functional Performance Testing or Integrated Systems Testing of respective system and activities must include, but not be limited to, activities specified in the following paragraphs.

a. Complete Pre-Functional Checklists.

b. Perform Construction Phase Endurance Testing.

3.2.14.1.1 Pre-Functional Checklist Verifications

Pre-Functional Checklist Verifications must be performed using Pre-Functional Checklists from the approved Construction Phase Final

Commissioning Plan by conducting on-site spot-checks to verify accuracy after receipt of completed Pre-Functional Checklists from Installing Contractors. Verifications may be combined with Construction Phase Site Observations.

3.2.14.1.1.1 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors.

The Lead Commissioning Specialist must submit all completed Pre-Functional Checklists and all associated equipment start-up reports for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than seven calendar days after receipt of all completed checklists for equipment and systems listed under the respective systems category from Installing Contractors.

3.2.14.1.1.2 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform Pre-Functional Checklist Verifications and then must indicate acceptance of all Pre-Functional Checklist items for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.1.1.3 Installing Contractors Responsibilities

Installing Contractors must complete one Pre-Functional Checklist for each piece of equipment and system. Initial each Pre-Functional Checklist item for their area of responsibility indicating the item's construction, installation, and start-up as applicable has been verified to be complete and is ready for testing.

Installing Contractors must submit completed and initialed Pre-Functional Checklists and all associated equipment start-up reports to the Lead Commissioning Specialist no later than seven calendar days after completion of inspection of all checklist items for each piece of equipment and system.

3.2.14.2 Construction Phase Endurance Testing

3.2.14.2.1 General Requirements

Construction Phase Endurance Testing (trending of control system control points) for complex systems as defined in paragraph COMPLEX SYSTEMS must be performed as specified in the following paragraphs. Systems must be operating as normally anticipated during occupancy throughout Endurance Testing.

3.2.14.2.2 Hardware

Hardware must have sufficient buffer capacity to trend all data throughout Endurance Testing. Trend data uploading during the course of Endurance Testing to ensure all trend data is retained is encouraged. Lost trend data will require retesting of all control points for affected systems.

3.2.14.2.3 Results Format

Results format of trend data must be provided in a graphical format complete with clear indication of value(s) for y-axis, value for x-axis, and legend identifying each trended control point. The number of control points contained on a single graph must be such that all control points can be clearly visible. Control points must be logically grouped such that related points appear on a single graph. In addition, a separate comma separated value (CSV) file of raw trend data for each trended system must be provided. Each trended control point in CSV file must be clearly identified.

For control points recorded based on change of value, change of value for recording data must be clearly identified for each control point.

3.2.14.2.4 Construction Phase Endurance Testing Reports

A Construction Phase Endurance Testing Report must be prepared and contents must include, but not be limited to, an executive summary, review comments, trend results in graphical format, and raw trend data for all trend results for each trended system.

3.2.14.2.5 Start, Duration, and Recording Frequency

Starting date and time must be identical for all control points specified to be trended for each system subject to Endurance Testing regardless of specified duration and regardless of specified frequency. Duration of all Endurance Testing must be no less than seven consecutive calendar days.

Recording frequency of data for all control points specified to be trended for each system subject to Endurance Testing must be 15-minutes as modified in this Section. The recording frequency of data for specific control point types must occur at the frequency specified in the following paragraphs.

3.2.14.2.5.1 Control Points Trended at One Minute Intervals

a. Temperature for supply air, return air, mixed air, supply water, and return water.

b. Temperature entering and leaving all heat transfer devices such as coils, energy recovery wheels, and heat pipes.

c. Temperature for outside air, supply air, return air and exhaust air entering and leaving energy recovery device.

d. Flow for supply air, return air, outside air, chilled water, and HVAC heating hot water.

e. Flow for exhaust air associated with energy recovery.

f. Relative humidity for outside air and return air.

g. Relative humidity for outside air, supply air, return air and exhaust air entering and leaving energy recovery device.

h. Command and status for control dampers and control valves.

i. Speed for fans and pumps.

j. Pressure for fans and pumps.

3.2.14.2.5.2 Control Points Trended at 15 Minute Intervals

a. Temperature and relative humidity for zones.

b. Temperature and relative humidity for outside air not associated with energy recovery.

c. Pressure relative to the outside for facility.

3.2.14.2.5.3 Control Points Trended at Change of Position or State

a. Command and status for equipment such as chillers, boilers, pumps, compressors, air handling units, dedicated outside air systems.

b. Operation state for occupied, unoccupied, warm-up, cool-down, timed override, cooling, heating, alarm, and lead-lag duty status change.

c. Command and position for two-position control air dampers.

3.2.14.2.6 Trended Control Points

Trended control points for each system must demonstrate performance is in accordance with Plans and Specifications. Trended control points must include, but not be limited to, control points listed in Plans and Specifications' points lists.

Trended control points for selected systems, at a minimum, must include control points specified in the following paragraphs. These control points must be trended as applicable to this contract in addition to control points necessary to demonstrate systems perform in accordance with requirements of Plans and Specifications and control points listed in Plans and Specifications' points lists.

3.2.14.2.6.1 Air-Cooled Chiller Chilled Water System

a. Chiller(s) command and status.

b. Chiller isolation valve(s) command and status.

c. Chilled water pump(s) actual speed.

d. Chilled water pump(s) setpoint and actual differential pressure.

e. Minimum flow bypass control valve command.

f. Minimum system flow setpoint and actual flow.

g. Chilled water supply setpoint and actual temperature.

h. Chilled water return actual temperature.

i. Chilled water actual flow.

j. Outside air actual dry-bulb temperature.

3.2.14.2.6.2 HVAC Heating Hot Water System with Boiler

a. Boiler(s) command and status.

b. Boiler(s) isolation valve command and status.

c. HVAC heating hot water pump(s) actual speed.

d. HVAC heating hot water pump(s) setpoint and actual differential pressure.

e. Minimum flow bypass control valve command.

f. Minimum system setpoint and actual flow.

g. HVAC heating hot water supply setpoint and actual temperature.

h. HVAC heating hot water return actual temperature.

i. HVAC heating hot water actual flow.

j. Outside air actual dry-bulb temperature.

3.2.14.2.6.3 Dedicated Outside Air System (DOAS)

a. Outside air actual dry-bulb temperature.

b. Outside air actual relative humidity.

c. Outside air isolation damper command and status.

d. Outside air setpoint and actual airflow.

e. Energy recovery wheel command, status, and actual speed.

f. Energy recovery wheel's OA bypass control damper command and status.

g. Energy recovery wheel's defrost cycle command and status.

h. Energy recovery wheel's OA discharge air actual dry-bulb temperature.

i. Energy recovery wheel's OA discharge air actual relative humidity.

j. Preheat coil leaving air setpoint and actual temperature.

k. Preheat coil control actuator command.

l. Cooling coil leaving air setpoint and actual temperature.

m. Cooling coil control valve command.

n. Supply air fan actual speed.

o. Reheat coil control valve command.

p. Discharge air setpoint and actual temperature.

q. Supply air fan setpoint and actual static pressure.

r. Facility setpoint and actual relative pressure.

s. Return air actual dry-bulb temperature.

t. Return air actual relative humidity.

u. Energy recovery wheel's EA bypass control damper command and status.

v. Energy recovery wheel's EA discharge air actual dry-bulb temperature.

w. Energy recovery wheel's EA discharge air actual relative humidity.

x. Exhaust air fan actual speed.

y. Exhaust air isolation damper command and status.

3.2.14.2.6.4 Supply Air Terminal Units

a. Zone setpoint and actual dry-bulb temperature.

b. Zone actual relative humidity.

c. Control damper command.

d. Heating coil valve command.

e. Airflow actual value.

f. Leaving air actual temperature.

3.2.14.2.7 Sample Strategy

Sample strategy must be as specified in the following paragraphs.

a. 100-Percent trending for central plant equipment such as chilled water and HVAC heating hot water systems, air handling unit systems including all associated fans except for remote exhaust air fans, dedicated outside air systems including all associated fans except for remote exhaust air fans, and renewable energy system.

b. 20-Percent sample trending for equipment with identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

3.2.14.2.8 Unsuccessful Trending and Re-Trending

3.2.14.2.8.1 100-Percent Samples

Trending results must be failed for equipment or systems for which 100-percent sample size are trended if one or more of the trended control points results in discovery of a deficiency.

Re-trending must be required to the extent necessary to confirm that deficiencies have been corrected.

3.2.14.2.8.2 Less than 100-Percent Samples

Trending results must be failed for equipment or systems for which less than 100-percent sample size are trended if one or more of the trended

control points results in discovery of a deficiency.

a. Re-trending must be required for only items which experienced initial failures if the failure rate is 5-percent or less, meaning that 5-percent or less of the equipment or systems had at least one deficiency.

b. Re-trending must be required for items which experienced initial failures to the extent necessary to confirm that the deficiencies have been corrected if the failure rate is higher than 5-percent, meaning that more than 5-percent of equipment or systems trended had at least one deficiency. In addition, re-trending of another random sample of the same size as the initial sample for the first time. If the second random sample set has any failures, those failed items must be re-trended and all remaining equipment and systems must be trended to complete 100-percent testing of that system type.

3.2.14.2.8.3 Re-Trending Costs

Re-trending costs must be reimbursed to the Government. These costs must include salary associated with additional reviews of trend results for the Lead Commissioning Specialist, Technical Commissioning Specialists, and Government personnel.

3.2.14.2.9 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of systems that must be trended, control points that must be trended, and reminder of trend results format specified in this Section to Installing Contractors.

b. Provide action plan for correcting failed trend results to Installing Contractors.

c. Provide list of systems that must be re-trended due to failure of trend results or having been provided in an incorrect trend results format to Installing Contractors.

d. Prepare and submit Construction Phase Endurance Testing Reports as a single submittal no later than 14 calendar days after preparation of all Endurance Testing Reports. In addition, submit one electronic copy of raw trend data.

3.2.14.2.10 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these activities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Select systems that must be trended for samples of less than 100-percent.

b. Prepare list of systems and control points that must be trended.

c. Perform review of all trend results and provide approval or failure disposition.

d. Prepare list of systems that must be re-trended due to failure of trend results or having been provided in an incorrect trend results format.

e. Prepare action plan for correcting failed trend results.

3.2.14.2.11 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Provide hardware suitable to obtain trend data for systems and control points identified by Technical Commissioning Specialists.

b. Provide hardware suitable to interface with and obtain trend data from equipment identified by the Lead Commissioning Specialist to require trending that features on-board factory packaged controls. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

c. Provide list of equipment and control points that must be trended to Equipment Suppliers who provided equipment featuring on-board factory packaged controls as part of their contract.

d. Collect trend data in the format specified in this Section for specified systems and control points and provide to the Lead Commissioning Specialist.

e. Provide action plan for correcting failed trend results to Equipment Suppliers who provided equipment featuring on-board factory packaged controls as part of their contract.

f. Implement action plan for correcting failed trend results.

g. Re-collect and provide trend data in the format specified in this Section for trend results determined to have failed or determined to have been provided in an incorrect trend results format to the Lead Commissioning Specialist

3.2.14.2.12 Equipment Suppliers Responsibilities

Equipment Suppliers must, at a minimum, perform activities specified in the following paragraphs.

a. Provide Installing Contractor access, but not interface equipment, to equipment featuring on-board factory packaged controls provided as part of their contract. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

b. Provide descriptions to Installing Contractors in clearly understood language (not proprietary code) for all trended control points.

c. Implement action plan for correcting failed trend results for equipment featuring on-board factory packaged controls provided as part of their contract.

3.2.14.3 Certified Certificates of Readiness and Certificates of Readiness

3.2.14.3.1 General Requirements

A single Certified Certificate of Readiness must be prepared for each system subject to Functional Performance Testing or subject to Integrated Systems Testing by reviewing, signing, and dating Certificates of Readiness to indicate each system is complete and ready for testing. Testing of any equipment or system is prohibited until after its Certified Certificate of Readiness has been submitted and approved.

A single Certificate of Readiness must be prepared for each system subject to Functional Performance Testing or subject to Integrated Systems Testing. Certificate of Readiness contents must include, but not be limited to, contents specified in the following paragraphs to the extent applicable to the specific system being tested.

a. Cover sheet with spaces for signatures and dates by the Lead Commissioning Specialist and by Installing Contractors to indicate each system is complete and ready for testing.

c. Equipment and system start-up reports.

d. Control system start-up reports.

e. Diagnostic test reports.

g. Completed Pre-Functional Checklists.

3.2.14.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must sign, date, and submit Certified Certificates of Readiness no later than 14 calendar days prior to testing of respective system.

3.2.14.3.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform reviews of Certificates of Readiness for accuracy to ensure systems are complete and ready for testing for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.3.4 Installing Contractors Responsibilities

Installing Contractors must prepare, sign, and date Certificates of Readiness indicating systems are complete and ready for testing and provide to the Lead Commissioning Specialist.

3.2.14.4 Functional Performance Testing and Integrated Systems Testing

3.2.14.4.1 General Requirements

Functional Performance Testing and Integrated Systems Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team

participant is not present or if deficiencies discovered during testing prevent successful completion. Testing of any equipment or system is prohibited until after its Certified Certificate of Readiness has been submitted and approved.

All necessary materials and system modifications to simulate actual conditions as close as is practically possible must be provided. Complete all testing by returning affected equipment and systems to pre-test conditions.

3.2.14.4.2 Complex Systems and Integrated Systems Category Requirements

Testing of complex systems as defined in paragraph COMPLEX SYSTEMS and testing of systems listed under item entitled "Integrated Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be performed as specified in the following paragraphs.

3.2.14.4.2.1 Equipment Featuring On-Board Factory Packaged Controls

Testing of equipment featuring on-board factory packaged controls must include, but not be limited to, testing specified in the following paragraphs.

a. Equipment enabling and disabling.

b. Equipment standard and optional control points necessary to accomplish functionality whether or not control points are specified in Plans and Specifications.

c. Equipment standard and optional alarms critical to safe operation whether or not optional alarms are specified in Plans and Specifications.

d. All control points added by Controls Contractor in addition to on-board factory packaged controls whether or not control points are specified in Plans and Specifications.

3.2.14.4.2.2 Test Setup and Condition Simulation

Test setup must include all necessary materials and system modifications to simulate flows, pressures, temperatures, and other conditions necessary to perform testing according to specified conditions must be provided.

Condition simulation must be accomplished by temporarily changing control system setpoints. Condition simulation by over-writing control system inputs (actual) values is prohibited unless approved in advance of test by the Contracting Officer's Technical Representative.

3.2.14.4.2.3 Condition Simulation Methods

Condition simulation methods for equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that are acceptable are specified in the following paragraphs.

a. When varying static pressures inside ductwork cannot be simulated within the duct, and where a sensor signals the controls system to initiate sequences at various duct static pressures, it is acceptable to simulate the various pressures with a Pneumatic Squeeze-Bulb Type

Signaling Device with gauge temporarily attached to the sensing tube leading to the transmitter. It is not acceptable to reset the various setpoints, nor to simulate an electric analog signal unless approved as specified in the preceding paragraphs.

b. Dirty filter pressure drops can be simulated using sheets of cardboard at filter face.

c. Freeze-stat safeties can be simulated by packing portion of sensor with ice.

d. High outside air temperatures can be simulated with a hair blower.

e. High entering cooling coil temperatures can be used to simulate entering cooling coil conditions.

f. Do not use signal generators to simulate sensor signals unless approved by the Contracting Officer's Technical Representative, as noted above, for special cases.

g. Control setpoints can be altered. For example, to see the air conditioning compressor lockout work at an outside air temperature below lockout setpoint, when the outside air temperature is above lockout setpoint, temporarily change the lockout setpoint to be minus 0 degrees above the current outside air temperature. Caution: Setpoints are not to be raised or lowered to a point such that damage to the components, systems, or the building structure and/or contents will occur.

h. Test duct mounted smoke detectors in accordance with the manufacturer's recommendations. Perform testing with air system at minimum airflow condition in ductwork.

i. Test current sensing relays used for fan and pump status signals to control system to indicate unit failure and run status by resetting the setpoint on the relay to simulate a lost belt or unit failure while the unit is running. Confirm that the failure alarm was generated and received at the control system. After the test is performed, return the setpoint to its original setpoint or a setpoint as indicated by the Contracting Officer's Technical Representative.

3.2.14.4.3 Sample Strategy

3.2.14.4.3.1 General Requirements

100-Percent testing of all systems unless modified in the following paragraphs. Sample strategy for testing must be equally applied to each building in this project.

Sample strategy must be applied to total equipment and system counts specified for system categories under paragraph SYSTEMS TO BE COMMISSIONED.

3.2.14.4.3.2 Complex Systems

Sample strategy for all complex systems as defined in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for central plant equipment such as chilled water and HVAC heating hot water systems, air handling unit systems

including all associated fans except for remote exhaust air fans, dedicated outside air systems including all associated fans except for remote exhaust air fans, and renewable energy system.

b. 20-Percent sample testing for equipment with identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps. Sample must include at least one complete item such as one complete unitary air-conditioner.

3.2.14.4.3.3 Plumbing Systems

Sample strategy for all systems listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except plumbing systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for central plant equipment such as natural gas systems, domestic cold water systems, domestic heating hot water systems, and process water systems.

b. 20-Percent sample testing for equipment with identical features such as fixtures, irrigation systems, emergency eyewash stations, and vacuum systems. Sample must include at least one complete item such as one complete fixture.

3.2.14.4.3.4 Electrical Type II Systems

Sample strategy for all systems listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except electrical systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for equipment such as emergency power systems featuring single operation generator sets, automatic transfer switches, and uninterruptible power supplies (not local uninterruptible power supplies), emergency response systems, and frequency converters.

b. 20-Percent sample testing for equipment with identical features such as lighting systems, daylighting control systems, and fenestration control systems. Sample must include at least one complete item such as lighting in one space.

3.2.14.4.3.5 Building Envelope Systems, Components, and Assemblies

Sample strategy for all systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED must be as specified in the following paragraphs.

a. 20-Percent sample testing of surface area for each unique type of construction for thermal integrity verification of entire of the building envelope, components, and assemblies.

b. 20-Percent sample testing of surface area for each unique type of construction for moisture integrity verification of the building envelope, components, and assemblies.

3.2.14.4.4 Unsuccessful Testing and Re-Testing Costs

3.2.14.4.4.1 Unsuccessful Testing of 100-Percent Sample

Testing must be failed for equipment or systems for which 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency that cannot be resolved within five minutes during testing.

Re-testing must be witnessed to the extent necessary to confirm that deficiencies have been corrected without negatively impacting the performance of the rest of the system.

3.2.14.4.4.2 Unsuccessful Testing of Less than 100-Percent Sample

Testing must be failed for equipment or systems for which less than 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency, regardless of whether the deficiency is corrected during the sample test.

a. Re-testing must be witnessed of only items which experienced initial failures if the failure rate is 5-percent or less, meaning that 5-percent or less of the equipment or systems had at least one deficiency.

b. Re-testing must be witnessed of items which experienced initial failures to the extent necessary to confirm that the deficiencies have been corrected if the failure rate is higher than 5-percent, meaning that more than 5-percent of equipment or systems tested had at least one deficiency. In addition, testing of another random sample must be witnessed for the same size as the initial sample for the first time. If the second random sample set has any failures, those failed items must be retested and all remaining equipment and systems must be tested to complete 100-percent testing of that system type.

3.2.14.4.4.3 Re-Testing Costs

Re-testing costs must be reimbursed to the Government. These costs must include salary, travel costs, and per diem for Government personnel and all Commissioning Team participants. Reimbursement responsibilities are specified in the following paragraphs.

a. Commissioning Team participants who were not present must equally share reimbursement costs.

b. Installing Contractors and Equipment Suppliers who were responsible for discovered deficiencies resulting in test failures must equally share reimbursement costs.

3.2.14.4.5 Commissioning Team Participants

Participants of Functional Performance Testing and Integrated Systems Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

3.2.14.4.5.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Controls Commissioning Representative (CC).

d. Installing Contractors' TAB Commissioning Representative (TAB).

e. Installing Contractors' Mechanical Commissioning Representative (MC).

f. Equipment Supplier (ES).

3.2.14.4.5.2 Plumbing Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Plumbing Commissioning Representative (PC).

d. Equipment Supplier (ES).

e. Installing Contractors' Controls Commissioning Representative (CC).

3.2.14.4.5.3 Utility Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Utility Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Controls Commissioning Representative (CC).

d. Installing Contractors' TAB Commissioning Representative (TAB).

e. Installing Contractors' Mechanical Commissioning Representative (MC).

f. Installing Contractors' Electrical Commissioning Representative (EC).

g. Equipment Supplier (ES).

3.2.14.4.5.4 Electrical Type II Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Electrical Technical Commissioning Specialist (CxE).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Electrical Commissioning Representative (EC).

d. Equipment Supplier (ES).

3.2.14.4.5.5 Building Envelope Systems, Components, and Assemblies

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Building Envelope Technical Commissioning Specialist (CxB).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Building Envelope Commissioning Representative (BC).

d. Equipment Supplier (ES).

3.2.14.4.6 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Testing to select which systems must be tested for samples of less than 100-percent.

b. Coordinate logistics with Installing Contractors.

c. Submit completed Final Functional Performance Test Checklists for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.2.14.4.7 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must witness, re-witness, and document all testing for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.4.8 Installing Contractors Responsibilities

Installing Contractors must provide all necessary materials and perform all aspects of testing including modifications to simulate actual conditions for all equipment and systems related to their contract.

3.2.14.4.9 Equipment Suppliers Responsibilities

Equipment Suppliers must perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

3.2.14.4.10 Installing Contractors and Equipment Supplier Coordination

Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract.

3.2.15 Systems Manuals

3.2.15.1 General Requirements

Systems Manuals must be prepared for all commissioned equipment and systems and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Final Owner's Project Requirements.

b. Final Basis of Design.

c. Recommended maintenance schedules when schedules are not provided in Operation and Maintenance manuals.

d. Recommended re-testing schedule.

e. Blank copy of all approved final Functional Performance Test Checklists.

g. Complete equipment warranty information.

h. Recommended schedule for sensor and actuator calibration.

Systems Manual contents for all complex systems as defined in paragraph COMPLEX SYSTEMS, in addition to contents specified in the preceding paragraphs, must include, but not be limited to, contents specified in the following paragraphs.

a. As-built system single line diagrams.

b. As-built sequences of operation and controls drawings.

c. As-built control system setpoints.

3.2.15.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of contents required for all Systems Manuals to Installing Contractors.

b. Prepare and submit all Systems Manuals as a single submittal no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

3.2.15.3 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, provide required contents for all Systems Manuals to the Lead Commissioning Specialist.

3.2.16 Training

3.2.16.1 Training Plans

Training Plans must be prepared for all commissioned equipment and systems and contents must include, but not be limited to, contents specified in the following paragraphs.

a. List of those who should receive training by position or name.

b. List of systems that require training organized by Specification Section.

c. Training content.

d. Level of instruction required.

e. Level of required instructor expertise.

f. Trainer name and trainer contact information.

g. Identification of whether training is conduced on-site or in a classroom setting.

h. Schedule and location of training.

i. Criteria for determining whether provided training is acceptable.

j. Blank Training Attendance Rosters.

3.2.16.2 Training

Training must be performed in accordance with Training Plans and in accordance with requirements specified in respective Technical Sections.

3.2.16.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit all Training Plans as a single submittal no later than 30 calendar days prior to the occurrence of any training session.

b. Provide approved Training Plans to Installing Contractors.

c. Submit all completed Training Attendance Rosters as a single submittal no later than 14 calendar days after completion of all training

sessions.

3.2.16.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Perform training as specified in the preceding paragraphs.

b. Require all training attendees to sign Training Attendance Rosters.

c. Provide completed Training Attendance Rosters no later than seven calendar days after completion of all training sessions to the Lead Commissioning Specialist.

3.2.17 Final Commissioning Report

3.2.17.1 General Requirements

The Final Commissioning Report must be prepared and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Executive summary describing the overall commissioning process.

b. Results of the commissioning process.

c. Issues Log.

d. Commissioning Design Review Reports.

e. Approved Construction Phase Final Commissioning Plan.

f. Approved Pre-Final Test and Balance Reports.

g. Completed Pre-Functional Checklists.

h. Endurance Testing Reports.

i. Completed Functional Performance Test Checklists.

k. Approved Training Plans.

l. Completed Training Attendance Rosters.

m. Identification of all deficiencies complete with corrective actions taken.

n. Indication that systems meet requirements of the Owner's Project Requirements and Plans and Specifications.

o. List of any testing that must be performed during the Post-Construction (Warranty) Phase.

3.2.17.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the Final Commissioning Report no later than 14

calendar days after successful completion of all Functional Performance Testing and all Integrated Systems Testing.

b. File one copy of Approved Final Commissioning Report in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Final Commissioning Report.

3.3 POST-CONSTRUCTION (WARRANTY) PHASE

3.3.1 Post-Construction Phase ASHRAE 189.1 Commissioning Compliance

3.3.1.1 General Requirements

Activities must include, but not be limited to, post-construction phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, post-construction phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and post-construction phase commissioning activities specified in this Section.

3.3.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under item entitled "Post-Construction Phase ASHRAE 189.1 Commissioning Compliance."

3.3.2 Post-Construction Phase Sustainability Third Party Certification (TPC)

3.3.2.1 General Requirements

Activities must include, but not be limited to, post-construction phase commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, post-construction phase commissioning activities listed in all of its references as modified in this Section, and post-construction phase commissioning activities specified in this Section.

3.3.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Post-Construction Phase Sustainability Third Party Certification (TPC)."

3.3.3 Post-Construction Phase Issues Log

3.3.3.1 General Requirements

The Post-Construction Phase Issues Log must be maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Post-Construction Phase Issues Log must include the name of Commissioning Team member identifying

the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Post-Construction Phase Issues Log must be a continuation of the Construction Phase Issues Log and must be prepared in an electronic format that can be used throughout the Post-Construction Phase such that it can be provided to the Government upon request.

3.3.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Post Construction Phase Issues Log and must submit one electronic copy no later than 14 calendar days after completion of any Post-Construction Phase commissioning activity.

3.3.4 Post-Construction Phase Site Observations

3.3.4.1 General Requirements

Post-Construction Phase Site Observations must be performed between eight and 10 months after Beneficial Occupancy to verify and document that all commissioned equipment and systems are operating in accordance with the Owner's Project Requirements.

Post-Construction Phase Site Observations are prohibited from being combined with witnessing Post-Construction Phase Functional Performance Testing or witnessing Post-Construction Phase Integrated Systems Testing.

3.3.4.2 Site Observation Reports

Site Observation Reports must be prepared for each Site Observation for the purpose of documenting issues discovered during Site Observation.

3.3.4.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Site Observation to schedule attendance of Operations and Maintenance staff and occupants and to make provisions for access to all commissioned equipment and systems.

b. Submit Post-Construction Phase Site Observation Reports no later than 14 calendar days after Site Observation.

3.3.4.4 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Interview Operations and Maintenance staff.

b. Interview occupants.

c. Determine status of unresolved commissioning issues.

d. Compare current operations to operations identified throughout the commissioning process.

e. Prepare Post-Construction Phase Site Observation Reports.

3.3.5 Inspections and Testing

3.3.5.1 Post-Construction Phase Endurance Testing

3.3.5.1.1 General Requirements

Post-Construction Phase Endurance Testing (trending of control system control points) requirements and activities for each complex system as defined in paragraph COMPLEX SYSTEMS must be performed if all requirements and activities for respective system could not be fully or successfully completed during Construction Phase Endurance Testing.

Post-Construction Phase Endurance Testing requirements and activities must include, but not be limited to, requirements and activities specified for Construction Phase Endurance Testing as modified in the following paragraphs. Systems must be operating as normally anticipated during occupancy throughout Endurance Testing.

3.3.5.1.2 Post-Construction Phase Endurance Testing Reports

A Post-Construction Phase Endurance Testing Report must be prepared and contents must include, but not be limited to, an executive summary, Technical Commissioning Specialists’ review comments, trend results in graphical format, and raw trend data for all trend results for each trended system.

3.3.5.1.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing and specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Endurance Testing to make provisions for access to all commissioned equipment and systems.

b. Coordinate logistics of trend data collection with Installing Contractors.

c. Prepare and submit Post-Construction Phase Endurance Testing Reports as a single submittal no later than 14 calendar days after preparation of all Endurance Testing Reports. In addition, submit one electronic copy of raw trend data.

3.3.5.1.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing and specified in the following paragraphs.

a. Setup trend hardware during one site visit and retrieve trend data and trend hardware as applicable during an additional site visit.

3.3.5.1.5 Equipment Suppliers Responsibilities

Equipment Suppliers must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing.

3.3.5.2 Certified Certificates of Readiness and Certificates of Readiness

Certified Certificates of Readiness and Certificates of Readiness are not required for any Post-Construction Phase activity.

3.3.5.3 Post-Construction Phase Functional Performance Testing and Integrated Systems Testing

3.3.5.3.1 General Requirements

Functional Performance Testing and Integrated Systems Testing must be performed for all commissioned equipment and systems that could not be fully or successfully tested during the Construction Phase. Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team participant is not present or if deficiencies discovered during testing prevent successful completion.

Functional Performance Testing and Integrated Systems Testing requirements and activities must include, but not be limited to, requirements and activities specified for Construction Phase Functional Performance Testing and Integrated Systems Testing as modified in paragraphs under paragraph POST-CONSTRUCTION (WARRANTY) PHASE.

3.3.5.3.2 Commissioning Team Participants

Participants of Functional Performance Testing and Integrated Systems Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

a. Lead Commissioning Specialist.

b. Technical Commissioning Specialists.

c. Installing Contractors.

d. Equipment Suppliers.

3.3.5.3.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to witnessing Functional Performance Testing and Integrated Systems Testing to make provisions for access to all commissioned equipment and systems.

b. Coordinate logistics with Installing Contractors.

c. Submit completed Final Functional Performance Test Checklists for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.3.6 Updated Systems Manuals

3.3.6.1 General Requirements

Updated Systems Manuals must be prepared and must be an update to Systems Manuals prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase commissioning activities.

3.3.6.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit all Updated Systems Manuals as a single submittal no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

3.3.7 Updated Final Commissioning Report

3.3.7.1 General Requirements

The Updated Final Commissioning Report must be prepared and must be an update to the Final Commissioning Report prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase commissioning activities.

3.3.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Updated Final Commissioning Report no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

File one copy of Approved Updated Final Commissioning Report in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Updated Final Commissioning Report.

-- End of Section --

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TOTAL BUILDING COMMISSIONING FOR PROJECT P-1338
11/19

PART 1 GENERAL

1.1 SUMMARY

The Government has employed an independent Commissioning Firm that has employed or has contracted Lead and Technical Commissioning Specialists. This Section specifies the commissioning scope of work for the entire Commissioning Team

Commissioning responsibilities assigned in this Section to Lead and Technical Commissioning Specialists are for informational purposes.

1.2 COMMISSIONING LIMITATIONS

Commissioning requirements specified in this Section are prohibited from fulfilling requirements specified in other Sections. Requirements specified in other Sections are prohibited from fulfilling requirements specified in this Section.

All commissioning submittals must be submitted and reviewed in accordance with paragraph SUBMITTALS. Commissioning utilities including, but not limited to, tracking utilities and software for commissioning activities are prohibited from taking the place of these requirements.

1.3 SYSTEMS TO BE COMMISSIONED

Systems specified in the following paragraphs must be commissioned whether or not specified systems are required to be commissioned by any reference for pursuing Sustainability TPC.

Specified equipment and system counts are totals that include all buildings in this project.

1.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category

a. Up to one chilled water plant featuring up to two air-cooled chillers with packaged controls, up to two variable speed distribution pumps, and variable-primary distribution.

b. Up to one hot water plant featuring up to two fuel-fired condensing boilers each with an integral circulating pump and packaged controls, one boiler master control panel, up to two variable speed distribution pumps, and variable-primary distribution.

c. Up to nine air handling units each featuring a variable-air-volume supply air fan, a chilled water coil, a hot water coil, air-side energy recovery, and packaged controls.

d. Up to 135 variable-air-volume air terminal units each featuring a hydronic heating coil.

e. Up to eight computer room air-conditioning units each featuring packaged controls.

f. Up to six unit heaters.

g. Up to one supply air fan.

h. Up to eight exhaust air fans.

i. Up to one Building Automation System.

1.3.2 Plumbing Systems Category

a. Up to 100 fixtures.

b. Up to one domestic heating hot water system featuring up to two fuel-fired condensing water heaters each with packaged controls, up to one recirculating pump, and up to one temperature mixing valve.

c. Up to three emergency eyewash stations.

1.3.3 Utility Systems Category

a. Up to one energy monitoring and control system.

b. Up to one water utility metering system.

1.3.4 Electrical Type I Systems Category

a. Power - all grounding systems.

b. Power - all industrial control systems.

c. Power - all main distribution panels.

d. Power - all main transformers.

e. Power - all panelboards.

f. Power - all step-down transformers.

g. Power - all transient voltage surge protective devices.

1.3.5 Electrical Type II Systems Category

a. Cable television - all systems.

b. Communications - all public address systems.

c. Communications - all telecommunications entrance backbone and distribution systems.

d. Communications - all audio-visual-type intercommunication systems.

e. Emergency power - up to one system featuring up to one single operation generator set, automatic transfer switches, and up to one uninterruptible power supply.

f. Emergency power off control - all systems.

g. Lighting - all emergency egress systems.

h. Lighting - all exit systems.

i. Lighting - all interior systems.

j. Security - all access control systems.

k. Security - all electronic security systems.

1.3.6 Building Envelope Systems, Components, and Assemblies Category

a. Air tightness / pressurization verification of building envelope, components, and assemblies.

b. Thermal integrity verification of building envelope, components, and assemblies.

c. Moisture integrity verification of building envelope, components, and assemblies.

d. All roofing including low sloped roofs and steep sloped roofs.

1.3.7 Integrated Systems Category

a. Testing of integrated systems is not required for this project.

1.4 COMPLEX SYSTEMS

Complex systems are defined as the following systems categories as listed under paragraph SYSTEMS TO BE COMMISSIONED with appropriate qualifiers and are subject to more stringent requirements as specified in this Section.

a. All equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category."

b. All equipment and systems listed under item entitled "Plumbing Systems Category" featuring on-board factory packaged controls. Refer to the following paragraph for definition of equipment featuring on-board factory packaged controls.

c. All equipment and systems listed under item entitled "Utility Systems Category."

Equipment featuring on-board factory packaged controls is defined as equipment that is a complex system as defined in paragraph COMPLEX SYSTEMS which features a controller issuing sophisticated logic-based commands to its internal components to accomplish the intent of Plans and Specifications. This equipment may function as either a stand-alone piece of commissioned equipment or may function as part of a commissioned system. This controller may be equipment mounted or may be remote mounted and may or may not interface with a building control system. Examples of equipment meeting and not meeting this definition are provided in the following paragraphs.

a. Equipment meeting this definition includes chillers, boilers provided with or without master controllers, packaged pumping systems, dedicated outside air systems, packaged rooftop units, computer room air conditioners, and air terminal units.

b. Equipment not meeting this definition includes unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

c. Equipment not meeting this definition, but requiring demonstration of minimum safe motor speed either prior to or during Functional Performance Testing includes variable frequency drives.

1.5 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1	(2014) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

GREEN BUILDING INITIATIVE (GBI)

GBI GP Compliance	(2016) GBI Guiding Principles Compliance Program for New Construction (DOD Version)

1.6 SUBMITTALS

Commissioning submittals are not required to be submitted by the Installing Contractor.

1.7 COMMISSIONING TEAM

The Commissioning Team is defined as the entity that must perform all commissioning activities specified in this Section for systems listed under paragraph SYSTEMS TO BE COMMISSIONED. The Commissioning Team is composed of the Lead Commissioning Specialist, Technical Commissioning Specialists, Designers of Record, Installing Contractors, Equipment Suppliers, and the Contracting Officer's Technical Representative.

1.7.1 Lead Commissioning Specialist

The Lead Commissioning Specialist (CxC) is defined as the entity that must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, coordinating all aspects of the commissioning process; managing all Technical Commissioning Specialists; and submitting all Commissioning Plans, schedules, reports, and documentation directly to the Contracting Officer's Technical Representative as modified in this Section.

1.7.2 Technical Commissioning Specialists

Technical Commissioning Specialists are defined as entities that must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, performing reviews, witnessing that all system components have been installed, that each control device operates, that each equipment piece operates, that complete systems operate, and that interactive systems operate in accordance with Plans and Specifications.

Technical Commissioning Specialists must perform assigned responsibilities for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

1.7.3 Designers of Record

Designers of Record are defined as the entities that must act as design professionals responsible for design of their respective system that is subject to commissioning. Designers of Record must perform all commissioning responsibilities assigned in this Section as directed by the General Contractor.

1.7.4 Installing Contractors

Installing Contractors are defined as the General Contractor's Superintendent or Project Manager; Quality Control Representative; and Mechanical, Controls, Plumbing, Electrical, Test and Balance, Fire Protection, and Building Envelope Sub-Contractors who provide, install, or construct systems in whole or in part for this contract. The General Contractor must provide a Lead Commissioning Representative to manage all Designers of Record, Sub-Contractor Commissioning Representatives, and Equipment Suppliers to accomplish all responsibilities assigned in this Section. Each Sub-Contractor must provide a Commissioning Representative to coordinate and perform all commissioning responsibilities for commissioned equipment and systems provided as part of their respective contract as directed by the General Contractor. Submission of commissioning related certifications or qualifications for the Lead Commissioning Representative and Installing Contractor Representatives is not required.

Installing Contractors must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment and systems provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration as modified in this Section.

1.7.5 Equipment Suppliers

Equipment Suppliers (ES) are defined as factory authorized start-up technicians or factory representatives knowledgeable with start-up, demonstration, and testing of commissioned equipment featuring on-board factory packaged controls provided as part of their respective contract. Each Equipment Supplier must coordinate and perform all commissioning responsibilities assigned in this Section as directed by the General Contractor. Submission of commissioning related certifications or qualifications for Equipment Suppliers is not required. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

Equipment Suppliers must perform all commissioning responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration as modified in this Section.

1.7.6 Installing Contractors and Equipment Suppliers Coordination

Installing Contractors and Equipment Suppliers must coordinate and share demonstration and testing responsibilities specified in this Section for commissioned equipment featuring on-board factory packaged controls. Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of demonstration and testing for these types of systems. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

1.7.7 Contracting Officer's Technical Representative

The Contracting Officer's Technical Representative (COTR) represents the Government for all elements of the commissioning process. The COTR will serve as the single point of contact with the Lead Commissioning Specialist, will receive all commissioning submittals, may attend meetings, and may, but is not required to, witness field inspections and testing specified in this Section.

1.8 COMMUNICATIONS

1.8.1 Communications with the Contracting Officer's Technical Representative

Communication with the Contracting Officer's Technical Representative must be through the Lead Commissioning Specialist who acts as the single direct point of contact for all aspects of the commissioning process.

1.8.2 Communications between the Commissioning Team

Communications between the Commissioning Team including, but not limited to, verbal communications, schedule information, and exchange of information specified in this Section, must occur directly between the Commissioning Team without requiring interaction of the Contracting Officer's Technical Representative.

1.9 PHASING

This project is not phased.

1.10 ASHRAE 189.1 COMMISSIONING COMPLIANCE

ASHRAE 189.1 commissioning compliance is required for this project.

1.10.1 General Requirements

All commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, commissioning activities listed in references contained in ASHRAE 189.1's paragraphs as modified in this Section, and commissioning activities specified in this Section must be performed. All commissioning activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers.

Commissioning activities listed in ASHRAE 189.1's paragraphs that also have requirements specified in this Section are listed only where requirements are specified in this Section and these commissioning activities are not repeated under ASHRAE 189.1's paragraphs.

1.10.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all commissioning activities specified in the preceding item entitled "General Requirements" and must perform all commissioning activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in the Standard or listed in any of its references.

1.11 SUSTAINABILITY THIRD PARTY CERTIFICATION (TPC)

Sustainability Third Party Certification (TPC) is required for this project.

1.11.1 General Requirements

All commissioning activities listed in all references for pursuing Sustainability TPC as modified in this Section and commissioning activities specified in this Section must be performed. All commissioning activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers and whether or not activity is included as total points toward Sustainability TPC.

Commissioning activities listed in all references for pursuing Sustainability TPC that also have requirements specified in this Section are listed only where requirements are specified in this Section and these commissioning activities are not repeated under references for pursuing Sustainability TPC.

1.11.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all commissioning activities specified in the preceding item entitled "General Requirements," perform commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, perform commissioning activities listed in all of its references as modified in this Section, and perform commissioning activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in the reference for pursuing Sustainability TPC or listed in any of its references.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 DESIGN PHASE

3.1.1 Design Phase ASHRAE 189.1 Commissioning Compliance

3.1.1.1 General Requirements

Activities must include, but not be limited to, design phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6

as modified in this Section, design phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and design phase commissioning activities specified in this Section.

3.1.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under item entitled "Design Phase ASHRAE 189.1 Commissioning Compliance."

3.1.2 Design Phase Sustainability Third Party Certification (TPC)

3.1.2.1 General Requirements

Activities must include, but not be limited to, design phase commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, design phase commissioning activities listed in all of its references as modified in this Section, and design phase commissioning activities specified in this Section.

3.1.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Design Phase Sustainability Third Party Certification (TPC)."

3.1.3 Design Phase Commissioning Coordination Meeting

3.1.3.1 General Requirements

A Design Phase Commissioning Coordination meeting must be conducted no later than 30 calendar days prior to the first Plans and Specifications submission or no later than 30 calendar days after approval of Commissioning Firm certifications and all Commissioning Specialist certifications, whichever occurs last. Meeting topics must include, but not be limited to, the commissioning process, contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, and logistics as specified in this Section. Meeting must be conducted by conference call.

3.1.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.1.3.3 Designers of Record, Installing Contractors, and Others Responsibilities

Designers of Record and Installing Contractors must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may also attend this meeting.

3.1.4 Design Phase Commissioning Plan

3.1.4.1 General Requirements

The Design Phase Commissioning Plan must be prepared and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Plan purpose.

b. Commissioning scope.

c. Commissioning process outline.

d. List of all commissioned equipment and systems.

e. Building information.

f. Contact information for the Lead Commissioning Specialist, Technical Commissioning Specialists, Designers of Record, and Contracting Officer's Technical Representative.

g. Criteria listing including Unified Facilities Criteria and Building Codes and Standards.

h. Description of Commissioning Team members.

i. Roles and responsibilities.

j. Lines of communication.

k. Documentation requirements.

l. Owner's Project Requirements.

m. Description of the Basis of Design.

n. Description of Plans and Specifications reviews performed by Technical Commissioning Specialists.

o. Description of Plans and Specifications reviews performed by the Contracting Officer's Technical Representative.

p. Examples and descriptions of Site Observation Reports and Issues Log.

q. Listing and description of Design Phase and Construction Phase Commissioning meetings.

r. Identification of commissioning activities for incorporation into the Project Construction Schedule.

s. Listing of submittals required by Technical Commissioning Specialists.

t. Examples and description of the development of Pre-Functional Checklists, Functional Performance Test Checklists, and Integrated Systems Test Checklists.

u. Description of Pre-Functional Checks, Functional Performance Testing,

and Integrated Systems Testing.

v. Description of Endurance Testing.

w. Description of Ductwork Air Leak Test (DALT) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

x. Description of Performance Verification Test (PVT) field acceptance testing specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

y. Description of Test and Balance (TAB) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

z. Listing of Operation and Maintenance Manual requirements.

aa. Description of Systems Manuals.

bb. Description of training requirements.

cc. Description of Final Commissioning Report.

3.1.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Design Phase Commissioning Plan no later than 45 calendar days after approval of Commissioning Specialists certifications.

File one copy of Approved Design Phase Commissioning Plan in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Design Phase Commissioning Plan.

3.1.5 Design Phase Issues Log

3.1.5.1 General Requirements

The Design Phase Issues Log must be prepared and maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Design Phase Issues Log must include the name of Commissioning Team member identifying the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Design Phase Issues Log must be prepared in an electronic format that can be used throughout the Design Phase such that it can be provided to the Government upon request.

3.1.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Design Phase Issues Log and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.1.6 Commissioning Design Reviews

3.1.6.1 General Requirements

Commissioning Design Reviews must be performed and must include reviews

and back-checks of the Owner's Project Requirements (OPR), the Basis of Design and Design (BOD), and Plans and Specifications in accordance with Sustainability TPC rating system requirements and requirements specified in this Section. The number and schedule of design reviews must be in accordance with Sustainability TPC requirements and must include, but not be limited to, review of first Plans and Specifications submission and back-checks of all subsequent submissions. Plans and Specifications submissions are specified in the following paragraphs.

a. Design Development Plans and Specifications submission.

b. 100-Percent Pre-Final Plans and Specifications submission.

c. Final Plans and Specifications submission.

Commissioning Design Reviews must assess completeness and clarity of the OPR, verify requirements stated in the OPR are addressed in the BOD, and verify the Design Plans and Specifications are prepared in accordance with the BOD and applicable Unified Facilities Criteria (UFC). All issues, including those that would negatively impact building system operation and maintenance, must be identified and be provided with proposed corrective actions. The OPR and BOD are for review purposes only and are not contractually enforceable.

3.1.6.2 Commissioning Design Review Reports

A Commissioning Design Review Report must be prepared for each review and back-check of Plans and Specifications and must include each issue listed individually and its corresponding proposed corrective action. Issues must be separated into categories corresponding to systems categories listed under paragraph SYSTEMS TO BE COMMISSIONED.

Updated Commissioning Design Review Reports must be prepared to include resolution of outstanding issues reached during Commissioning Design Review meetings.

3.1.6.3 Commissioning Design Review Meetings

A Commissioning Design Review meeting must be conducted no later than 14 calendar days after preparation of each Commissioning Design Review Report to discuss proposed corrective actions and to resolve outstanding issues. The Contracting Officer's Technical Representative may attend these meetings. Meeting must be conducted by conference call.

3.1.6.4 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist activities must include, but not be limited to, activities specified in the following paragraphs.

a. Prepare and provide Commissioning Design Review Reports to Designers of Record.

b. Conduct Commissioning Design Review meetings.

c. Update Commissioning Design Review Reports.

d. Prepare and submit Updated Commissioning Design Review Reports no later than 14 calendar days after each Commissioning Design Review meeting.

3.1.6.5 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists activities must include, but not be limited to, performing reviews and back-checks of Plans and Specifications and attending Commissioning Design Review meetings for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.1.6.6 Designers of Record Responsibilities

Designers of Record activities must include, but not be limited to, providing written responses to Commissioning Design Review Reports and attending Commissioning Design Review meetings.

3.2 CONSTRUCTION PHASE

3.2.1 Construction Phase ASHRAE 189.1 Commissioning Compliance

3.2.1.1 General Requirements

Activities must include, but not be limited to, construction phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, construction phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and construction phase commissioning activities specified in this Section.

3.2.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under the item entitled "Construction Phase ASHRAE 189.1 Commissioning Compliance."

3.2.2 Construction Phase Sustainability Third Party Certification (TPC)

3.2.2.1 General Requirements

Activities must include, but not be limited to, commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, commissioning activities listed in all of its references as modified in this Section, and commissioning activities specified in this Section.

3.2.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Construction Phase Sustainability Third Party Certification (TPC)."

3.2.3 Construction Phase Sequencing

3.2.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Heating, ventilation, and air-conditioning (HVAC) systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All equipment and systems have been completed, cleaned, flushed, disinfected, calibrated, tested, and operate in accordance with Plans and Specifications.

b. All Ductwork Air Leakage Testing (DALT) field work, Test and Balance (TAB) field work, Pre-Final TAB Reports, and related prerequisites have been completed, submitted, and approved in accordance with Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

c. All testing of building envelope, components, and assemblies for air tightness / pressurization verification, thermal integrity verification, and moisture integrity verification have been completed, submitted, and approved.

d. All Pre-Functional Checklists have been completed, submitted, and approved.

e. Certified Certificates of Readiness for respective system has been completed, submitted, and approved.

All completed Final Functional Performance Test Checklists for commissioned equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be submitted and approved prior to the Government performing any Performance Verification Testing specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

3.2.3.2 Electrical Systems

Electrical systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Electrical Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All electrical, power generation, and lighting equipment and systems have been completed, calibrated, tested, and operate in accordance with Plans and Specifications.

b. Building Envelope is enclosed according to contract documents with final construction completed.

c. All ceiling tiles, floor coverings, and window coverings are in place.

d. All lamps have completed a minimum 100-hour burn-in period.

e. All furniture is in place.

f. Certified Certificates of Readiness for respective system has been

completed, submitted, and approved.

3.2.4 Construction Phase Scheduling

3.2.4.1 General Requirements

Commissioning activities and other related activities for inclusion into the Project Construction Schedule must include, but not be limited to, activities specified in the following paragraphs.

a. Perform Construction Phase Commissioning Coordination meeting.

b. Submittal and approval of Construction Phase Interim Commissioning Plan.

c. Submittal and approval of Construction Phase Final Commissioning Plan.

d. Submittal and approval of completed Pre-Functional Checklists.

e. Perform testing of building envelope, components, and assemblies for air tightness / pressurization verification, thermal integrity verification, and moisture integrity verification.

f. Submittal and approval of proposed Functional Performance Test Checklists.

g. Submittal and approval of final Functional Performance Test Checklists.

j. Perform Construction Phase Site Observations.

k. Participate in Construction Phase Endurance Testing.

l. Witness Construction Phase Functional Performance Testing.

m. Corrections of deficiencies discovered during Construction Phase Functional Performance Testing.

n. Re-witness Construction Phase Functional Performance Testing.

r. Provide all Systems Manuals contents.

s. Submittal and approval of completed Systems Manuals.

t. Perform training.

u. Submittal and approval of Final Commissioning Report.

v. Perform Post-Construction Phase Site Observations.

w. Participate in Post-Construction Phase Endurance Testing.

x. Witness Post-Construction Phase Functional Performance Testing.

y. Corrections of deficiencies discovered during Post-Construction Phase Functional Performance Testing.

z. Re-witness Post-Construction Phase Functional Performance Testing.

3.2.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must request a current Project Construction Schedule from Installing Contractors no later than at the Construction Phase Commissioning Coordination Meeting and must prepare and provide to Installing Contractors a list of commissioning activities for inclusion into the Project Construction Schedule. The Lead Commissioning Specialist must associate each commissioning activity to a single construction activity such that if the date of the construction activity changes, the associated commissioning activity changes accordingly.

3.2.4.3 Installing Contractors Responsibilities

Installing Contractors must provide a current Project Construction Schedule to the Lead Commissioning Specialist upon receiving request. Installing Contractors must incorporate the list of commissioning activities into the Project Construction Schedule and must link each commissioning activity to the associated construction activity identified by the Lead Commissioning Specialist such that if the date of the construction activity changes, the associated commissioning activity changes accordingly.

Installing Contractors must provide updated Project Construction Schedules to the Lead Commissioning Specialist at least on a monthly basis.

3.2.5 Construction Phase Commissioning Coordination Meeting

3.2.5.1 General Requirements

A Construction Phase Commissioning Coordination meeting must be conducted no later than 14 calendar days after approval of Commissioning Firm and Commissioning Specialists certifications to discuss topics that include, but not be limited to, the commissioning process, contract requirements, lines of communication, roles and responsibilities, commissioning activities for inclusion into the Project Construction Schedule, documentation requirements, Inspections and Testing, and logistics specified in this Section. Meeting must be conducted by conference call.

3.2.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.2.5.3 Installing Contractors, Designers of Record, and Other Commissioning Team Member Responsibilities

Installing Contractors and Designers of Record must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend this meeting.

3.2.6 Construction Phase Commissioning Progress Meetings

3.2.6.1 General Requirements

Construction Phase Commissioning Progress meetings must be conducted to discuss topics that include, but not be limited to, unresolved commissioning issues, status of items specified to be provided to the Lead Commissioning Specialist, and upcoming commissioning activities. Two Construction Phase Commissioning Progress meetings must be conducted for

each systems category unless modified in the following paragraphs. Meetings must be conducted by conference call.

a. Heating, Ventilation, and Air-Conditioning (HVAC) Systems: Six meetings.

b. Building Envelope Systems, Components, and Assemblies: Three meetings.

Construction Phase Commissioning Progress meetings are prohibited from being combined with conducting Construction Phase Commissioning Coordination meeting, conducting Site Observations, witnessing Functional Performance Testing, or witnessing Integrated Systems Testing.

3.2.6.2 Technical Commissioning Specialists Responsibilities

Each Technical Commissioning Specialist must, at a minimum, conduct meetings and prepare meeting minutes complete with Attendance Roster for systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for systems categories assigned to other Technical Commissioning Specialists.

3.2.6.3 Installing Contractors and Others Responsibilities

Installing Contractors must attend these meetings. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend these meetings.

3.2.7 Construction Phase Interim Commissioning Plan

3.2.7.1 General Requirements

The Construction Phase Interim Commissioning Plan must be prepared and must be an update to the Design Phase Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Design Phase Commissioning Plan.

b. Basis of Design.

c. Contact information for the entire Commissioning Team.

3.2.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Construction Phase Interim Commissioning Plan no later than 30 calendar days after the Construction Phase Commissioning Coordination meeting and no later than 14 calendar days prior to performing construction of the building envelope.

3.2.8 Construction Phase Final Commissioning Plan

3.2.8.1 General Requirements

The Construction Phase Final Commissioning Plan must be prepared and must be an update to the Construction Phase Interim Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Construction Phase Interim Commissioning Plan.

b. All Pre-Functional Checklists.

c. All approved final Functional Performance Test Checklists.

3.2.8.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the Construction Phase Final Commissioning Plan no later than 30 calendar days prior to performing any Functional Performance Testing.

b. File one copy of Approved Construction Phase Final Commissioning Plan in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Construction Phase Final Commissioning Plan.

3.2.9 Construction Phase Issues Log

3.2.9.1 General Requirements

The Construction Phase Issues Log must be prepared and maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Construction Phase Issues Log must include the name of Commissioning Team member identifying the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Construction Phase Issues Log must be a continuation of the Design Phase Issues Log and must be prepared in an electronic format that can be used throughout the Construction Phase such that it can be provided to the Government upon request.

3.2.9.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Construction Phase Issues Log and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.2.10 Pre-Functional Checklists

3.2.10.1 General Requirements

Pre-Functional Checklists must be prepared for all commissioned equipment and contents must include, but not be limited to, contents for physical inspections that demonstrate construction, installation and start-up of equipment and systems is complete. Refer to item entitled "Pre-Functional Checklists" in item entitled "Inspections and Testing" for more information.

Download example Pre-Functional Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING at the following location: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic Checklists must contain the same level of detail shown in examples, but are not required to match the format of examples.

3.2.10.2 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors. Blank Pre-Functional Checklists are not required to be submitted to the Government.

3.2.10.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must prepare Pre-Functional Checklists for all equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.11 Functional Performance Test (FPT) Checklists

Functional Performance Test (FPT) Checklists must be prepared for all commissioned equipment and systems demonstrating performance is in accordance with Plans and Specifications. A single final FPT Checklist must be prepared for each system except that a single final FPT Checklist may be prepared for use with multiple systems that have identical features, unless modified in this Section. FPT Checklist contents must include, but not be limited to, step-by-step actions and expected results, unless modified in this Section. Refer to item entitled "Functional Performance Testing and Integrated Systems Testing" for more information.

3.2.11.1 Complex Systems Requirements

FPT Checklists must be prepared for all complex systems as defined in paragraph COMPLEX SYSTEMS demonstrating performance is in accordance with Plans and Specifications. A single FPT Checklist must be prepared for each system except that a single FPT Checklist may be prepared for use with multiple systems that have identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps. Refer to item entitled "Functional Performance Testing and Integrated Systems Testing" and item entitled "Sample Strategy" for more information.

Contents must include, but not be limited to, contents specified in the following paragraphs and shown in example FPT Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING available for download at the following location:
http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic
FPT Checklists must contain the same level of detail specified below and as shown in examples, but are not required to match the format of examples.

a. Notable system features including information about such attributes as system sizing and controls to facilitate understanding of system operation.

b. Conclusions and recommendations based on control system feature, point-to-point, actuator, and system operation observations. Conclusions must clearly indicate if system does or does not perform in accordance with requirements of Plans and Specifications. Recommendation must clearly indicate that the system should or should not be accepted by the Government.

c. Test conditions including date, beginning and ending time, and

beginning and ending outdoor air conditions.

d. Identification of the equipment involved in the test.

e. Attendees present throughout the entire system test.

f. Control system feature identification including control point description, embedded/visible type, adjustable/monitoring type, actual value, and setpoint value/alarm range.

g. Point-to-point observations including demonstrating system flow meters and sensors have been calibrated and are correctly displayed on the Operator workstation.

h. Actuator operation observations demonstrating actuator responses to commands from the control system.

i. Variable frequency drive observations demonstrating minimum safe motor speed.

j. System operation observations for system-based testing demonstrating each control sequence, operation mode, and alarm condition resulting from control setpoint manipulation. System operation observations must include, but not be limited to, observations specified in the following paragraphs.

(1) Introduction identifying testing methodology.

(2) As-found conditions prior to system manipulation.

(3) Clear list of test items (step numbers).

(4) Design control sequences or interlocks segmented by unique functions.

(5) Intended test procedures following each segmented sequence or interlock identifying the system manipulation required to initiate system response.

(6) Expected system responses.

(7) Space for comments for each test item.

(8) Pass or fail indication for each test.

Performance Verification Tests prepared by the Controls Contractor as specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC are prohibited from being used in whole or in part to meet requirements specified in this Section.

3.2.11.2 Building Envelope Systems, Components, and Assemblies Requirements

FPT Checklists must be prepared for thermal integrity verification and moisture integrity verification of building envelope, components, and assemblies listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED. FPT Checklists must demonstrate performance is in accordance with Plans and Specifications. A single final FPT Checklist must be prepared for each unique type of construction.

3.2.11.3 Proposed FPT Checklist Meeting and Draft FPT Checklist Meeting

For all complex systems as defined in paragraph COMPLEX SYSTEMS, a Proposed FPT Checklist Meeting and a Draft FPT Checklist Meeting must be conducted for detailed discussions of procedures intended to demonstrate performance is in accordance with Plans and Specifications. Meetings must be conducted by conference call.

3.2.11.4 Lead and Technical Commissioning Specialists Responsibilities

For all systems other than complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead Commissioning Specialist must submit Final Functional Performance Test Checklists for all systems in each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal for each systems category no later than 30 calendar days prior to performing FPT testing of any system in the respective systems category.

For all complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead and Technical Commissioning Specialists must prepare and submit Final Functional Performance Test Checklists in the sequence specified in the following paragraphs. Technical Commissioning Specialists must perform respective responsibilities for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing respective responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Technical Commissioning Specialists must prepare Proposed Functional Performance Test Checklists.

b. The Lead Commissioning Specialist must submit Proposed Functional Performance Test Checklists for all complex systems as a single submittal no later than 60 calendar days prior to testing of any complex system.

c. Technical Commissioning Specialists must conduct the Proposed Functional Performance Test Checklist Meeting attended by the Contracting Officer's Technical Representative.

d. Technical Commissioning Specialists must prepare Draft Functional Performance Test Checklists to incorporate input from the Contracting Officer's Technical Representative.

e. The Lead Commissioning Specialist must provide Draft Functional Performance Test Checklists to Installing Contractors and Equipment Suppliers no later than seven calendar days prior to the Draft Functional Performance Test Checklist Meeting.

f. Technical Commissioning Specialists must conduct the Draft Functional Performance Test Checklist Meeting attended by Installing Contractors and Equipment Suppliers. The Contracting Officer's Technical Representative may attend this meeting.

g. Technical Commissioning Specialists must prepare Final Functional Performance Test Checklists to incorporate input from Installing Contractors.

h. The Lead Commissioning Specialist must submit Final Functional

Performance Test Checklists for all complex systems as a single submittal no later than seven calendar days after meeting to discuss Draft Functional Performance Test Checklists and no later than 30 calendar days prior to testing of any complex system.

3.2.11.5 Installing Contractors and Equipment Suppliers Responsibilities

Installing Contractors and Equipment Suppliers must attend Draft Functional Performance Test Checklist Meeting.

3.2.12 Construction Submittal Reviews

3.2.12.1 General Requirements

Construction Submittal Reviews must be performed for all commissioned equipment and systems to the extent necessary to verify that equipment and systems are in compliance with commissioning aspects of UFC's referenced by the Design-Build contract, Owner's Project Requirements (OPR), Basis of Design (BOD), and Plans and Specifications as modified in this Section. Reviews must be performed coincident with Designers of Record and reviews must include, but not be limited to, review of shop drawings, equipment submittals, test plans, procedures, and reports.

The OPR and BOD are for review purposes only and are not contractually enforceable.

3.2.12.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of shop drawings, equipment submittals, test plans, procedures, and reports that must be reviewed to Installing Contractors.

b. Prepare and provide Construction Submittal review comments to Installing Contractors. Construction Submittal review comments are not required to be submitted to the Government.

3.2.12.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform reviews of Construction Submittals for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.12.4 Installing Contractors Responsibilities

Installing Contractors must provide all requested Construction Submittals, BOD, and requested supplemental information to the Lead Commissioning Specialist.

3.2.13 Construction Phase Site Observations

3.2.13.1 General Requirements

Construction Phase Site Observations must be performed as specified in the

following paragraphs to verify and document commissioning aspects of equipment and systems as modified in this Section. Two Construction Phase Site Observations must be conducted for each systems category unless modified in the following paragraphs.

Construction Phase Site Observations are prohibited from being combined with witnessing Functional Performance Testing or witnessing Integrated Systems Testing, but may be combined with Pre-Functional Checklist Verificaitons unless indicated otherwise. Purposes of Site Observations specified in the following paragraphs for each systems category may be combined into a single Site Observation.

3.2.13.2 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

b. At least one Site Observation to verify and document HVAC pipe pressure testing.

c. At least one Site Observation to verify and document HVAC pump installation.

3.2.13.3 Plumbing Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least one Site Observation to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

b. At least one Site Observation to verify and document Plumbing pipe pressure testing.

c. At least one Site Observation to verify and document Plumbing pump installation.

3.2.13.4 Electrical Type I Systems

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects and to witness testing performed by independent testing organizations of commissioned equipment and systems listed under this systems category and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Technical Commissioning Specialists. Independent testing organizations typically use tests readily available from testing associations such as the InterNational Electrical Testing Association (NETA).

3.2.13.5 Electrical Type II Systems

Site Observations must be performed for the purposes specified in the

following paragraphs.

a. At least two Site Observations to verify and document commissioning aspects of commissioned equipment and systems listed under this systems category.

3.2.13.6 Building Envelope Systems, Components, and Assemblies

Site Observations must be performed for the purposes specified in the following paragraphs.

a. At least two Site Observations to verify and document in-progress building envelope construction prior to covering critical building envelope components and prior to pressure testing of building envelope, components, and assemblies.

b. At least one Site Observation to verify, document, and witness pressure testing, infrared thermography testing, and fog testing performed by independent testing agencies and specified in Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

c. At least one Site Observation to verify, document, and witness inspections, measurements, and testing performed by independent testing agencies and specified in Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM.

3.2.13.7 Summary Meetings

A Summary Meeting must be conducted at the conclusion of each Site Observation for the purpose of discussing issues discovered during each Site Observation. Meeting must be conducted on-site with all attendees present.

3.2.13.8 Site Observation Reports

A Site Observation Report must be prepared for each Site Observation for the purpose of documenting issues discovered during each Site Observation.

Site Observation Reports for all equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include results of testing performed by independent testing organizations that were witnessed by Technical Commissioning Specialists and test results that were not witnessed by Technical Commissioning Specialists.

3.2.13.9 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide list of equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that require on-site verification and documentation by Technical Commissioning Specialists to Installing Contractors.

The Lead Commissioning Specialist must submit Construction Phase Site Observation Reports complete with Summary Meeting Attendance Roster no later than seven calendar days after Site Observation.

3.2.13.10 Technical Commissioning Specialists Responsibilities

Each Technical Commissioning Specialist must be responsible to perform Site Observations, conduct Summary Meetings, and prepare Construction Phase Site Observation Reports for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.13.11 Installing Contractors Responsibilities

Installing Contractors must provide Technical Commissioning Specialists access to construction and systems for Site Observations and must attend Summary Meetings.

Installing Contractors must schedule testing to occur in the presence of Technical Commissioning Specialists as specified in the following paragraphs.

a. All equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Technical Commissioning Specialists. Results of testing of equipment and systems listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be provided to the Lead Commissioning Specialist that were witnessed by Technical Commissioning Specialists and that were not witnessed by Technical Commissioning Specialists.

b. Pressure testing, infrared thermography testing, and fog testing specified in Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS and inspections, measurements, and testing specified in Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM for equipment and systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED. Results of all tests, inspections, and measurements must be provided to the Lead Commissioning Specialist that were witnessed by Technical Commissioning Specialists and that were not witnessed by Technical Commissioning Specialists.

3.2.14 Inspections and Testing

3.2.14.1 Pre-Functional Checks

Pre-Functional Checks must be performed prior to performing Functional Performance Testing or Integrated Systems Testing of respective system and activities must include, but not be limited to, activities specified in the following paragraphs.

a. Complete Pre-Functional Checklists.

b. Perform Construction Phase Endurance Testing.

3.2.14.1.1 Pre-Functional Checklist Verifications

Pre-Functional Checklist Verifications must be performed using Pre-Functional Checklists from the approved Construction Phase Final

Commissioning Plan by conducting on-site spot-checks to verify accuracy after receipt of completed Pre-Functional Checklists from Installing Contractors. Verifications may be combined with Construction Phase Site Observations.

3.2.14.1.1.1 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors.

The Lead Commissioning Specialist must submit all completed Pre-Functional Checklists and all associated equipment start-up reports for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than seven calendar days after receipt of all completed checklists for equipment and systems listed under the respective systems category from Installing Contractors.

3.2.14.1.1.2 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform Pre-Functional Checklist Verifications and then must indicate acceptance of all Pre-Functional Checklist items for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.1.1.3 Installing Contractors Responsibilities

Installing Contractors must complete one Pre-Functional Checklist for each piece of equipment and system. Initial each Pre-Functional Checklist item for their area of responsibility indicating the item's construction, installation, and start-up as applicable has been verified to be complete and is ready for testing.

Installing Contractors must submit completed and initialed Pre-Functional Checklists and all associated equipment start-up reports to the Lead Commissioning Specialist no later than seven calendar days after completion of inspection of all checklist items for each piece of equipment and system.

3.2.14.2 Construction Phase Endurance Testing

3.2.14.2.1 General Requirements

Construction Phase Endurance Testing (trending of control system control points) for complex systems as defined in paragraph COMPLEX SYSTEMS must be performed as specified in the following paragraphs. Systems must be operating as normally anticipated during occupancy throughout Endurance Testing.

3.2.14.2.2 Hardware

Hardware must have sufficient buffer capacity to trend all data throughout Endurance Testing. Trend data uploading during the course of Endurance Testing to ensure all trend data is retained is encouraged. Lost trend data will require retesting of all control points for affected systems.

3.2.14.2.3 Results Format

Results format of trend data must be provided in a graphical format complete with clear indication of value(s) for y-axis, value for x-axis, and legend identifying each trended control point. The number of control points contained on a single graph must be such that all control points can be clearly visible. Control points must be logically grouped such that related points appear on a single graph. In addition, a separate comma separated value (CSV) file of raw trend data for each trended system must be provided. Each trended control point in CSV file must be clearly identified.

For control points recorded based on change of value, change of value for recording data must be clearly identified for each control point.

3.2.14.2.4 Construction Phase Endurance Testing Reports

A Construction Phase Endurance Testing Report must be prepared and contents must include, but not be limited to, an executive summary, review comments, trend results in graphical format, and raw trend data for all trend results for each trended system.

3.2.14.2.5 Start, Duration, and Recording Frequency

Starting date and time must be identical for all control points specified to be trended for each system subject to Endurance Testing regardless of specified duration and regardless of specified frequency. Duration of all Endurance Testing must be no less than seven consecutive calendar days.

Recording frequency of data for all control points specified to be trended for each system subject to Endurance Testing must be 15-minutes as modified in this Section. The recording frequency of data for specific control point types must occur at the frequency specified in the following paragraphs.

3.2.14.2.5.1 Control Points Trended at One Minute Intervals

a. Temperature for supply air, return air, mixed air, supply water, and return water.

b. Temperature entering and leaving all heat transfer devices such as coils, energy recovery wheels, and heat pipes.

c. Temperature for outside air, supply air, return air and exhaust air entering and leaving energy recovery device.

d. Flow for supply air, return air, outside air, chilled water, and HVAC heating hot water.

e. Flow for exhaust air associated with energy recovery.

f. Relative humidity for outside air and return air.

g. Relative humidity for outside air, supply air, return air and exhaust air entering and leaving energy recovery device.

h. Command and status for control dampers and control valves.

i. Speed for fans and pumps.

j. Pressure for fans and pumps.

3.2.14.2.5.2 Control Points Trended at 15 Minute Intervals

a. Temperature and relative humidity for zones.

b. Temperature and relative humidity for outside air not associated with energy recovery.

c. Pressure relative to the outside for facility.

3.2.14.2.5.3 Control Points Trended at Change of Position or State

a. Command and status for equipment such as chillers, boilers, pumps, compressors, air handling units, dedicated outside air systems.

b. Operation state for occupied, unoccupied, warm-up, cool-down, timed override, cooling, heating, alarm, and lead-lag duty status change.

c. Command and position for two-position control air dampers.

3.2.14.2.6 Trended Control Points

Trended control points for each system must demonstrate performance is in accordance with Plans and Specifications. Trended control points must include, but not be limited to, control points listed in Plans and Specifications' points lists.

Trended control points for selected systems, at a minimum, must include control points specified in the following paragraphs. These control points must be trended as applicable to this contract in addition to control points necessary to demonstrate systems perform in accordance with requirements of Plans and Specifications and control points listed in Plans and Specifications' points lists.

3.2.14.2.6.1 Air-Cooled Chiller Chilled Water System

a. Chiller(s) command and status.

b. Chiller isolation valve(s) command and status.

c. Chilled water pump(s) actual speed.

d. Chilled water pump(s) setpoint and actual differential pressure.

e. Minimum flow bypass control valve command.

f. Minimum system flow setpoint and actual flow.

g. Chilled water supply setpoint and actual temperature.

h. Chilled water return actual temperature.

i. Chilled water actual flow.

j. Outside air actual dry-bulb temperature.

3.2.14.2.6.2 HVAC Heating Hot Water System with Boiler

a. Boiler(s) command and status.

b. Boiler(s) isolation valve command and status.

c. HVAC heating hot water pump(s) actual speed.

d. HVAC heating hot water pump(s) setpoint and actual differential pressure.

e. Minimum flow bypass control valve command.

f. Minimum system setpoint and actual flow.

g. HVAC heating hot water supply setpoint and actual temperature.

h. HVAC heating hot water return actual temperature.

i. HVAC heating hot water actual flow.

j. Outside air actual dry-bulb temperature.

3.2.14.2.6.3 Dedicated Outside Air System (DOAS)

a. Outside air actual dry-bulb temperature.

b. Outside air actual relative humidity.

c. Outside air isolation damper command and status.

d. Outside air setpoint and actual airflow.

e. Energy recovery wheel command, status, and actual speed.

f. Energy recovery wheel's OA bypass control damper command and status.

g. Energy recovery wheel's defrost cycle command and status.

h. Energy recovery wheel's OA discharge air actual dry-bulb temperature.

i. Energy recovery wheel's OA discharge air actual relative humidity.

j. Preheat coil leaving air setpoint and actual temperature.

k. Preheat coil control actuator command.

l. Cooling coil leaving air setpoint and actual temperature.

m. Cooling coil control valve command.

n. Supply air fan actual speed.

o. Reheat coil control valve command.

p. Discharge air setpoint and actual temperature.

q. Supply air fan setpoint and actual static pressure.

r. Facility setpoint and actual relative pressure.

s. Return air actual dry-bulb temperature.

t. Return air actual relative humidity.

u. Energy recovery wheel's EA bypass control damper command and status.

v. Energy recovery wheel's EA discharge air actual dry-bulb temperature.

w. Energy recovery wheel's EA discharge air actual relative humidity.

x. Exhaust air fan actual speed.

y. Exhaust air isolation damper command and status.

3.2.14.2.6.4 Supply Air Terminal Units

a. Zone setpoint and actual dry-bulb temperature.

b. Zone actual relative humidity.

c. Control damper command.

d. Heating coil valve command.

e. Airflow actual value.

f. Leaving air actual temperature.

3.2.14.2.7 Sample Strategy

Sample strategy must be as specified in the following paragraphs.

a. 100-Percent trending for central plant equipment such as chilled water and HVAC heating hot water systems, air handling unit systems including all associated fans except for remote exhaust air fans, dedicated outside air systems including all associated fans except for remote exhaust air fans, and renewable energy system.

b. 20-Percent sample trending for equipment with identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

3.2.14.2.8 Unsuccessful Trending and Re-Trending

3.2.14.2.8.1 100-Percent Samples

Trending results must be failed for equipment or systems for which 100-percent sample size are trended if one or more of the trended control points results in discovery of a deficiency.

Re-trending must be required to the extent necessary to confirm that deficiencies have been corrected.

3.2.14.2.8.2 Less than 100-Percent Samples

Trending results must be failed for equipment or systems for which less than 100-percent sample size are trended if one or more of the trended

control points results in discovery of a deficiency.

a. Re-trending must be required for only items which experienced initial failures if the failure rate is 5-percent or less, meaning that 5-percent or less of the equipment or systems had at least one deficiency.

b. Re-trending must be required for items which experienced initial failures to the extent necessary to confirm that the deficiencies have been corrected if the failure rate is higher than 5-percent, meaning that more than 5-percent of equipment or systems trended had at least one deficiency. In addition, re-trending of another random sample of the same size as the initial sample for the first time. If the second random sample set has any failures, those failed items must be re-trended and all remaining equipment and systems must be trended to complete 100-percent testing of that system type.

3.2.14.2.8.3 Re-Trending Costs

Re-trending costs must be reimbursed to the Government. These costs must include salary associated with additional reviews of trend results for the Lead Commissioning Specialist, Technical Commissioning Specialists, and Government personnel.

3.2.14.2.9 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of systems that must be trended, control points that must be trended, and reminder of trend results format specified in this Section to Installing Contractors.

b. Provide action plan for correcting failed trend results to Installing Contractors.

c. Provide list of systems that must be re-trended due to failure of trend results or having been provided in an incorrect trend results format to Installing Contractors.

d. Prepare and submit Construction Phase Endurance Testing Reports as a single submittal no later than 14 calendar days after preparation of all Endurance Testing Reports. In addition, submit one electronic copy of raw trend data.

3.2.14.2.10 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these activities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Select systems that must be trended for samples of less than 100-percent.

b. Prepare list of systems and control points that must be trended.

c. Perform review of all trend results and provide approval or failure disposition.

d. Prepare list of systems that must be re-trended due to failure of trend results or having been provided in an incorrect trend results format.

e. Prepare action plan for correcting failed trend results.

3.2.14.2.11 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Provide hardware suitable to obtain trend data for systems and control points identified by Technical Commissioning Specialists.

b. Provide hardware suitable to interface with and obtain trend data from equipment identified by the Lead Commissioning Specialist to require trending that features on-board factory packaged controls. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

c. Provide list of equipment and control points that must be trended to Equipment Suppliers who provided equipment featuring on-board factory packaged controls as part of their contract.

d. Collect trend data in the format specified in this Section for specified systems and control points and provide to the Lead Commissioning Specialist.

e. Provide action plan for correcting failed trend results to Equipment Suppliers who provided equipment featuring on-board factory packaged controls as part of their contract.

f. Implement action plan for correcting failed trend results.

g. Re-collect and provide trend data in the format specified in this Section for trend results determined to have failed or determined to have been provided in an incorrect trend results format to the Lead Commissioning Specialist

3.2.14.2.12 Equipment Suppliers Responsibilities

Equipment Suppliers must, at a minimum, perform activities specified in the following paragraphs.

a. Provide Installing Contractor access, but not interface equipment, to equipment featuring on-board factory packaged controls provided as part of their contract. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

b. Provide descriptions to Installing Contractors in clearly understood language (not proprietary code) for all trended control points.

c. Implement action plan for correcting failed trend results for equipment featuring on-board factory packaged controls provided as part of their contract.

3.2.14.3 Certified Certificates of Readiness and Certificates of Readiness

3.2.14.3.1 General Requirements

A single Certified Certificate of Readiness must be prepared for each system subject to Functional Performance Testing or subject to Integrated Systems Testing by reviewing, signing, and dating Certificates of Readiness to indicate each system is complete and ready for testing. Testing of any equipment or system is prohibited until after its Certified Certificate of Readiness has been submitted and approved.

A single Certificate of Readiness must be prepared for each system subject to Functional Performance Testing or subject to Integrated Systems Testing. Certificate of Readiness contents must include, but not be limited to, contents specified in the following paragraphs to the extent applicable to the specific system being tested.

a. Cover sheet with spaces for signatures and dates by the Lead Commissioning Specialist and by Installing Contractors to indicate each system is complete and ready for testing.

c. Equipment and system start-up reports.

d. Control system start-up reports.

e. Diagnostic test reports.

g. Completed Pre-Functional Checklists.

3.2.14.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must sign, date, and submit Certified Certificates of Readiness no later than 14 calendar days prior to testing of respective system.

3.2.14.3.3 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must perform reviews of Certificates of Readiness for accuracy to ensure systems are complete and ready for testing for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.3.4 Installing Contractors Responsibilities

Installing Contractors must prepare, sign, and date Certificates of Readiness indicating systems are complete and ready for testing and provide to the Lead Commissioning Specialist.

3.2.14.4 Functional Performance Testing and Integrated Systems Testing

3.2.14.4.1 General Requirements

Functional Performance Testing and Integrated Systems Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team

participant is not present or if deficiencies discovered during testing prevent successful completion. Testing of any equipment or system is prohibited until after its Certified Certificate of Readiness has been submitted and approved.

All necessary materials and system modifications to simulate actual conditions as close as is practically possible must be provided. Complete all testing by returning affected equipment and systems to pre-test conditions.

3.2.14.4.2 Complex Systems and Integrated Systems Category Requirements

Testing of complex systems as defined in paragraph COMPLEX SYSTEMS and testing of systems listed under item entitled "Integrated Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be performed as specified in the following paragraphs.

3.2.14.4.2.1 Equipment Featuring On-Board Factory Packaged Controls

Testing of equipment featuring on-board factory packaged controls must include, but not be limited to, testing specified in the following paragraphs.

a. Equipment enabling and disabling.

b. Equipment standard and optional control points necessary to accomplish functionality whether or not control points are specified in Plans and Specifications.

c. Equipment standard and optional alarms critical to safe operation whether or not optional alarms are specified in Plans and Specifications.

d. All control points added by Controls Contractor in addition to on-board factory packaged controls whether or not control points are specified in Plans and Specifications.

3.2.14.4.2.2 Test Setup and Condition Simulation

Test setup must include all necessary materials and system modifications to simulate flows, pressures, temperatures, and other conditions necessary to perform testing according to specified conditions must be provided.

Condition simulation must be accomplished by temporarily changing control system setpoints. Condition simulation by over-writing control system inputs (actual) values is prohibited unless approved in advance of test by the Contracting Officer's Technical Representative.

3.2.14.4.2.3 Condition Simulation Methods

Condition simulation methods for equipment and systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that are acceptable are specified in the following paragraphs.

a. When varying static pressures inside ductwork cannot be simulated within the duct, and where a sensor signals the controls system to initiate sequences at various duct static pressures, it is acceptable to simulate the various pressures with a Pneumatic Squeeze-Bulb Type

Signaling Device with gauge temporarily attached to the sensing tube leading to the transmitter. It is not acceptable to reset the various setpoints, nor to simulate an electric analog signal unless approved as specified in the preceding paragraphs.

b. Dirty filter pressure drops can be simulated using sheets of cardboard at filter face.

c. Freeze-stat safeties can be simulated by packing portion of sensor with ice.

d. High outside air temperatures can be simulated with a hair blower.

e. High entering cooling coil temperatures can be used to simulate entering cooling coil conditions.

f. Do not use signal generators to simulate sensor signals unless approved by the Contracting Officer's Technical Representative, as noted above, for special cases.

g. Control setpoints can be altered. For example, to see the air conditioning compressor lockout work at an outside air temperature below lockout setpoint, when the outside air temperature is above lockout setpoint, temporarily change the lockout setpoint to be minus 0 degrees above the current outside air temperature. Caution: Setpoints are not to be raised or lowered to a point such that damage to the components, systems, or the building structure and/or contents will occur.

h. Test duct mounted smoke detectors in accordance with the manufacturer's recommendations. Perform testing with air system at minimum airflow condition in ductwork.

i. Test current sensing relays used for fan and pump status signals to control system to indicate unit failure and run status by resetting the setpoint on the relay to simulate a lost belt or unit failure while the unit is running. Confirm that the failure alarm was generated and received at the control system. After the test is performed, return the setpoint to its original setpoint or a setpoint as indicated by the Contracting Officer's Technical Representative.

3.2.14.4.3 Sample Strategy

3.2.14.4.3.1 General Requirements

100-Percent testing of all systems unless modified in the following paragraphs. Sample strategy for testing must be equally applied to each building in this project.

Sample strategy must be applied to total equipment and system counts specified for system categories under paragraph SYSTEMS TO BE COMMISSIONED.

3.2.14.4.3.2 Complex Systems

Sample strategy for all complex systems as defined in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for central plant equipment such as chilled water and HVAC heating hot water systems, air handling unit systems

including all associated fans except for remote exhaust air fans, dedicated outside air systems including all associated fans except for remote exhaust air fans, and renewable energy system.

b. 20-Percent sample testing for equipment with identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps. Sample must include at least one complete item such as one complete unitary air-conditioner.

3.2.14.4.3.3 Plumbing Systems

Sample strategy for all systems listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except plumbing systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for central plant equipment such as natural gas systems, domestic cold water systems, domestic heating hot water systems, and process water systems.

b. 20-Percent sample testing for equipment with identical features such as fixtures, irrigation systems, emergency eyewash stations, and vacuum systems. Sample must include at least one complete item such as one complete fixture.

3.2.14.4.3.4 Electrical Type II Systems

Sample strategy for all systems listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except electrical systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for equipment such as emergency power systems featuring single operation generator sets, automatic transfer switches, and uninterruptible power supplies (not local uninterruptible power supplies), emergency response systems, and frequency converters.

b. 20-Percent sample testing for equipment with identical features such as lighting systems, daylighting control systems, and fenestration control systems. Sample must include at least one complete item such as lighting in one space.

3.2.14.4.3.5 Building Envelope Systems, Components, and Assemblies

Sample strategy for all systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED must be as specified in the following paragraphs.

a. 20-Percent sample testing of surface area for each unique type of construction for thermal integrity verification of entire of the building envelope, components, and assemblies.

b. 20-Percent sample testing of surface area for each unique type of construction for moisture integrity verification of the building envelope, components, and assemblies.

3.2.14.4.4 Unsuccessful Testing and Re-Testing Costs

3.2.14.4.4.1 Unsuccessful Testing of 100-Percent Sample

Testing must be failed for equipment or systems for which 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency that cannot be resolved within five minutes during testing.

Re-testing must be witnessed to the extent necessary to confirm that deficiencies have been corrected without negatively impacting the performance of the rest of the system.

3.2.14.4.4.2 Unsuccessful Testing of Less than 100-Percent Sample

Testing must be failed for equipment or systems for which less than 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency, regardless of whether the deficiency is corrected during the sample test.

a. Re-testing must be witnessed of only items which experienced initial failures if the failure rate is 5-percent or less, meaning that 5-percent or less of the equipment or systems had at least one deficiency.

b. Re-testing must be witnessed of items which experienced initial failures to the extent necessary to confirm that the deficiencies have been corrected if the failure rate is higher than 5-percent, meaning that more than 5-percent of equipment or systems tested had at least one deficiency. In addition, testing of another random sample must be witnessed for the same size as the initial sample for the first time. If the second random sample set has any failures, those failed items must be retested and all remaining equipment and systems must be tested to complete 100-percent testing of that system type.

3.2.14.4.4.3 Re-Testing Costs

Re-testing costs must be reimbursed to the Government. These costs must include salary, travel costs, and per diem for Government personnel and all Commissioning Team participants. Reimbursement responsibilities are specified in the following paragraphs.

a. Commissioning Team participants who were not present must equally share reimbursement costs.

b. Installing Contractors and Equipment Suppliers who were responsible for discovered deficiencies resulting in test failures must equally share reimbursement costs.

3.2.14.4.5 Commissioning Team Participants

Participants of Functional Performance Testing and Integrated Systems Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

3.2.14.4.5.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Controls Commissioning Representative (CC).

d. Installing Contractors' TAB Commissioning Representative (TAB).

e. Installing Contractors' Mechanical Commissioning Representative (MC).

f. Equipment Supplier (ES).

3.2.14.4.5.2 Plumbing Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Plumbing Commissioning Representative (PC).

d. Equipment Supplier (ES).

e. Installing Contractors' Controls Commissioning Representative (CC).

3.2.14.4.5.3 Utility Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Utility Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Technical Commissioning Specialist (CxM).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Controls Commissioning Representative (CC).

d. Installing Contractors' TAB Commissioning Representative (TAB).

e. Installing Contractors' Mechanical Commissioning Representative (MC).

f. Installing Contractors' Electrical Commissioning Representative (EC).

g. Equipment Supplier (ES).

3.2.14.4.5.4 Electrical Type II Systems

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Electrical Technical Commissioning Specialist (CxE).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Electrical Commissioning Representative (EC).

d. Equipment Supplier (ES).

3.2.14.4.5.5 Building Envelope Systems, Components, and Assemblies

Commissioning Team members participating in Functional Performance Testing of systems listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Building Envelope Technical Commissioning Specialist (CxB).

b. Installing Contractors' Quality Control Personnel (CQC).

c. Installing Contractors' Building Envelope Commissioning Representative (BC).

d. Equipment Supplier (ES).

3.2.14.4.6 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Testing to select which systems must be tested for samples of less than 100-percent.

b. Coordinate logistics with Installing Contractors.

c. Submit completed Final Functional Performance Test Checklists for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.2.14.4.7 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must witness, re-witness, and document all testing for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

3.2.14.4.8 Installing Contractors Responsibilities

Installing Contractors must provide all necessary materials and perform all aspects of testing including modifications to simulate actual conditions for all equipment and systems related to their contract.

3.2.14.4.9 Equipment Suppliers Responsibilities

Equipment Suppliers must perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

3.2.14.4.10 Installing Contractors and Equipment Supplier Coordination

Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract.

3.2.15 Systems Manuals

3.2.15.1 General Requirements

Systems Manuals must be prepared for all commissioned equipment and systems and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Final Owner's Project Requirements.

b. Final Basis of Design.

c. Recommended maintenance schedules when schedules are not provided in Operation and Maintenance manuals.

d. Recommended re-testing schedule.

e. Blank copy of all approved final Functional Performance Test Checklists.

g. Complete equipment warranty information.

h. Recommended schedule for sensor and actuator calibration.

Systems Manual contents for all complex systems as defined in paragraph COMPLEX SYSTEMS, in addition to contents specified in the preceding paragraphs, must include, but not be limited to, contents specified in the following paragraphs.

a. As-built system single line diagrams.

b. As-built sequences of operation and controls drawings.

c. As-built control system setpoints.

3.2.15.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Provide list of contents required for all Systems Manuals to Installing Contractors.

b. Prepare and submit all Systems Manuals as a single submittal no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

3.2.15.3 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, provide required contents for all Systems Manuals to the Lead Commissioning Specialist.

3.2.16 Training

3.2.16.1 Training Plans

Training Plans must be prepared for all commissioned equipment and systems and contents must include, but not be limited to, contents specified in the following paragraphs.

a. List of those who should receive training by position or name.

b. List of systems that require training organized by Specification Section.

c. Training content.

d. Level of instruction required.

e. Level of required instructor expertise.

f. Trainer name and trainer contact information.

g. Identification of whether training is conduced on-site or in a classroom setting.

h. Schedule and location of training.

i. Criteria for determining whether provided training is acceptable.

j. Blank Training Attendance Rosters.

3.2.16.2 Training

Training must be performed in accordance with Training Plans and in accordance with requirements specified in respective Technical Sections.

3.2.16.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit all Training Plans as a single submittal no later than 30 calendar days prior to the occurrence of any training session.

b. Provide approved Training Plans to Installing Contractors.

c. Submit all completed Training Attendance Rosters as a single submittal no later than 14 calendar days after completion of all training

sessions.

3.2.16.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Perform training as specified in the preceding paragraphs.

b. Require all training attendees to sign Training Attendance Rosters.

c. Provide completed Training Attendance Rosters no later than seven calendar days after completion of all training sessions to the Lead Commissioning Specialist.

3.2.17 Final Commissioning Report

3.2.17.1 General Requirements

The Final Commissioning Report must be prepared and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Executive summary describing the overall commissioning process.

b. Results of the commissioning process.

c. Issues Log.

d. Commissioning Design Review Reports.

e. Approved Construction Phase Final Commissioning Plan.

f. Approved Pre-Final Test and Balance Reports.

g. Completed Pre-Functional Checklists.

h. Endurance Testing Reports.

i. Completed Functional Performance Test Checklists.

k. Approved Training Plans.

l. Completed Training Attendance Rosters.

m. Identification of all deficiencies complete with corrective actions taken.

n. Indication that systems meet requirements of the Owner's Project Requirements and Plans and Specifications.

o. List of any testing that must be performed during the Post-Construction (Warranty) Phase.

3.2.17.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the Final Commissioning Report no later than 14

calendar days after successful completion of all Functional Performance Testing and all Integrated Systems Testing.

b. File one copy of Approved Final Commissioning Report in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Final Commissioning Report.

3.3 POST-CONSTRUCTION (WARRANTY) PHASE

3.3.1 Post-Construction Phase ASHRAE 189.1 Commissioning Compliance

3.3.1.1 General Requirements

Activities must include, but not be limited to, post-construction phase commissioning activities listed in ASHRAE 189.1 paragraphs 10.3.1.2.1 through 10.3.1.2.6 as modified in this Section, post-construction phase commissioning activities listed in references contained in ASHRAE 189.1's listed paragraphs as modified in this Section, and post-construction phase commissioning activities specified in this Section.

3.3.1.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform all activities specified under item entitled "Post-Construction Phase ASHRAE 189.1 Commissioning Compliance."

3.3.2 Post-Construction Phase Sustainability Third Party Certification (TPC)

3.3.2.1 General Requirements

Activities must include, but not be limited to, post-construction phase commissioning activities listed in the reference for pursuing Sustainability TPC, GBI GP Compliance, as modified in this Section, post-construction phase commissioning activities listed in all of its references as modified in this Section, and post-construction phase commissioning activities specified in this Section.

3.3.2.2 Lead and Technical Commissioning Specialists Responsibilities

The Lead and Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all documentation of commissioning activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead and Technical Commissioning Specialists must perform all activities specified under item entitled "Post-Construction Phase Sustainability Third Party Certification (TPC)."

3.3.3 Post-Construction Phase Issues Log

3.3.3.1 General Requirements

The Post-Construction Phase Issues Log must be maintained to track all commissioning issues identified by any member of the Commissioning Team. At a minimum for each commissioning issue, the Post-Construction Phase Issues Log must include the name of Commissioning Team member identifying

the issue, identification date, description, proposed resolution, final resolution, and final resolution date. The Post-Construction Phase Issues Log must be a continuation of the Construction Phase Issues Log and must be prepared in an electronic format that can be used throughout the Post-Construction Phase such that it can be provided to the Government upon request.

3.3.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the Post Construction Phase Issues Log and must submit one electronic copy no later than 14 calendar days after completion of any Post-Construction Phase commissioning activity.

3.3.4 Post-Construction Phase Site Observations

3.3.4.1 General Requirements

Post-Construction Phase Site Observations must be performed between eight and 10 months after Beneficial Occupancy to verify and document that all commissioned equipment and systems are operating in accordance with the Owner's Project Requirements.

Post-Construction Phase Site Observations are prohibited from being combined with witnessing Post-Construction Phase Functional Performance Testing or witnessing Post-Construction Phase Integrated Systems Testing.

3.3.4.2 Site Observation Reports

Site Observation Reports must be prepared for each Site Observation for the purpose of documenting issues discovered during Site Observation.

3.3.4.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Site Observation to schedule attendance of Operations and Maintenance staff and occupants and to make provisions for access to all commissioned equipment and systems.

b. Submit Post-Construction Phase Site Observation Reports no later than 14 calendar days after Site Observation.

3.3.4.4 Technical Commissioning Specialists Responsibilities

Technical Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs for equipment and systems listed under systems categories assigned to them in this Section. Technical Commissioning Specialists are prohibited from performing these responsibilities for equipment and systems listed under systems categories assigned to other Technical Commissioning Specialists.

a. Interview Operations and Maintenance staff.

b. Interview occupants.

c. Determine status of unresolved commissioning issues.

d. Compare current operations to operations identified throughout the commissioning process.

e. Prepare Post-Construction Phase Site Observation Reports.

3.3.5 Inspections and Testing

3.3.5.1 Post-Construction Phase Endurance Testing

3.3.5.1.1 General Requirements

Post-Construction Phase Endurance Testing (trending of control system control points) requirements and activities for each complex system as defined in paragraph COMPLEX SYSTEMS must be performed if all requirements and activities for respective system could not be fully or successfully completed during Construction Phase Endurance Testing.

Post-Construction Phase Endurance Testing requirements and activities must include, but not be limited to, requirements and activities specified for Construction Phase Endurance Testing as modified in the following paragraphs. Systems must be operating as normally anticipated during occupancy throughout Endurance Testing.

3.3.5.1.2 Post-Construction Phase Endurance Testing Reports

A Post-Construction Phase Endurance Testing Report must be prepared and contents must include, but not be limited to, an executive summary, Technical Commissioning Specialists’ review comments, trend results in graphical format, and raw trend data for all trend results for each trended system.

3.3.5.1.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing and specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Endurance Testing to make provisions for access to all commissioned equipment and systems.

b. Coordinate logistics of trend data collection with Installing Contractors.

c. Prepare and submit Post-Construction Phase Endurance Testing Reports as a single submittal no later than 14 calendar days after preparation of all Endurance Testing Reports. In addition, submit one electronic copy of raw trend data.

3.3.5.1.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing and specified in the following paragraphs.

a. Setup trend hardware during one site visit and retrieve trend data and trend hardware as applicable during an additional site visit.

3.3.5.1.5 Equipment Suppliers Responsibilities

Equipment Suppliers must, at a minimum, perform all activities assigned for Construction Phase Endurance Testing.

3.3.5.2 Certified Certificates of Readiness and Certificates of Readiness

Certified Certificates of Readiness and Certificates of Readiness are not required for any Post-Construction Phase activity.

3.3.5.3 Post-Construction Phase Functional Performance Testing and Integrated Systems Testing

3.3.5.3.1 General Requirements

Functional Performance Testing and Integrated Systems Testing must be performed for all commissioned equipment and systems that could not be fully or successfully tested during the Construction Phase. Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team participant is not present or if deficiencies discovered during testing prevent successful completion.

Functional Performance Testing and Integrated Systems Testing requirements and activities must include, but not be limited to, requirements and activities specified for Construction Phase Functional Performance Testing and Integrated Systems Testing as modified in paragraphs under paragraph POST-CONSTRUCTION (WARRANTY) PHASE.

3.3.5.3.2 Commissioning Team Participants

Participants of Functional Performance Testing and Integrated Systems Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

a. Lead Commissioning Specialist.

b. Technical Commissioning Specialists.

c. Installing Contractors.

d. Equipment Suppliers.

3.3.5.3.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to witnessing Functional Performance Testing and Integrated Systems Testing to make provisions for access to all commissioned equipment and systems.

b. Coordinate logistics with Installing Contractors.

c. Submit completed Final Functional Performance Test Checklists for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.3.6 Updated Systems Manuals

3.3.6.1 General Requirements

Updated Systems Manuals must be prepared and must be an update to Systems Manuals prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase commissioning activities.

3.3.6.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit all Updated Systems Manuals as a single submittal no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

3.3.7 Updated Final Commissioning Report

3.3.7.1 General Requirements

The Updated Final Commissioning Report must be prepared and must be an update to the Final Commissioning Report prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase commissioning activities.

3.3.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the Updated Final Commissioning Report no later than 30 calendar days after completion of all Functional Performance Testing and all Integrated Systems Testing.

File one copy of Approved Updated Final Commissioning Report in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Updated Final Commissioning Report.

-- End of Section --

PART 3 – STATEMENT OF WORK/PROJECT PROGRAM

A. P1338F: II MEF SIMULATION/TRAINING CENTER REPLACEMENT

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A10 Foundations
A20 Basement Construction
B10 Superstructure
B20 Exterior Closure
B30 Roofing
C10 Interior Construction
C20 Stairs
C30 Interior Finishes
D10 Conveying Systems
D20 Plumbing
D30 HVAC
D40 Fire Protection Systems
D50 Electrical

E10 Equipment
E20 Furnishings
F10 Special Construction
F20 Selective Building Demolition
G10 Site Preparations
G20 Site Improvements
G30 Site/Civil Mechanical Utilities
G40 Site Electrical Utilities

B. P1512F: MCCSSS LOG OPS SCHOOL

B.1 LOG OPS SCHOOL

1. PROJECT DESCRIPTION

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2. PROJECT OBJECTIVES

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3. SITE ANALYSIS

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4. BUILDING REQUIREMENTS

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5. ROOM REQUIREMENTS

5.1 Finish and FF&E Schedule
5.2 Additional Room Requirements

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 Foundations
A20 Basement Construction
B10 Superstructure
B20 Exterior Closure

B30 Roofing
C10 Interior Construction
C20 Stairs
C30 Interior Finishes
D10 Conveying Systems
D20 Plumbing
D30 HVAC
D40 Fire Protection Systems
D50 Electrical
E10 Equipment
E20 Furnishings
F10 Special Construction
F20 Selective Building Demolition
G10 Site Preparations
G20 Site Improvements
G30 Site/Civil Mechanical Utilities
G40 Site Electrical Utilities

B.2 P1512F: JOINT RECEPTION CENTER

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3. SITE ANALYSIS

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3.2 Existing Infrastructure Network
3.3 Site Development Requirements

4. BUILDING REQUIREMENTS

4.1 Space Tabulation
4.2 Space Relationships
4.3 Exterior Character

5. ROOM REQUIREMENTS

5.1 Finish and FF&E Schedule
5.2 Additional Room Requirements

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 Foundations
A20 Basement Construction
B10 Superstructure
B20 Exterior Closure
B30 Roofing
C10 Interior Construction
C20 Stairs
C30 Interior Finishes
D10 Conveying Systems
D20 Plumbing
D30 HVAC
D40 Fire Protection Systems
D50 Electrical
E10 Equipment
E20 Furnishings
F10 Special Construction
F20 Selective Building Demolition
G10 Site Preparations
G20 Site Improvements
G30 Site/Civil Mechanical Utilities
G40 Site Electrical Utilities

B.3 P1512F: RENOVATE M107

1. PROJECT DESCRIPTION

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2. PROJECT OBJECTIVES

2.1 Mission Statement
2.2 Facility Functions
2.3 Project Specific Priorities
2.4 Appropriate Design
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2.6 Adaptability and Flexibility

3. SITE ANALYSIS

3.1 Existing Site Conditions
3.2 Existing Infrastructure Network
3.3 Landscaping

3.4 Site Utilities
3.5 Signage
3.6 Site Development Requirements

4. BUILDING REQUIREMENTS

4.1 Space Tabulation
4.2 Space Relationships
4.3 Exterior Character

5. ROOM REQUIREMENTS

5.1 Finish and FF&E Schedule
5.2 Additional Room Requirements

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 Foundations
A20 Basement Construction
B10 Superstructure
B20 Exterior Closure
B30 Roofing
C10 Interior Construction
C20 Stairs
C30 Interior Finishes
D10 Conveying Systems
D20 Plumbing
D30 HVAC
D40 Fire Protection Systems
D50 Electrical
E10 Equipment
E20 Furnishings
F10 Special Construction
F20 Selective Building Demolition
G10 Site Preparations
G20 Site Improvements
G30 Site/Civil Mechanical Utilities
G40 Site Electrical Utilities

C. P1527F: LOGCOM CSP WAREHOUSE REPLACEMENT

1. PROJECT DESCRIPTION

1.1 Overview
1.2 Project Components
1.3 Project Purpose
1.4 Most Relevant Codes and Standards

2. PROJECT OBJECTIVES

2.1 Mission Statement
2.2 Facility Functions

2.3 Project Specific Priorities
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3. SITE ANALYSIS

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4. BUILDING REQUIREMENTS

4.1 Space Tabulation
4.2 Space Relationships
4.3 Exterior Character

5. ROOM REQUIREMENTS

5.1 Finish and FF&E Schedule
5.2 Additional Room Requirements

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 Foundations
A20 Basement Construction
B10 Superstructure
B20 Exterior Closure
B30 Roofing
C10 Interior Construction
C20 Stairs
C30 Interior Finishes
D10 Conveying Systems
D20 Plumbing
D30 HVAC
D40 Fire Protection Systems
D50 Electrical
E10 Equipment
E20 Furnishings
F10 Special Construction
F20 Selective Building Demolition
G10 Site Preparations
G20 Site Improvements
G30 Site/Civil Mechanical Utilities
G40 Site Electrical Utilities

1.0 PROJECT DESCRIPTION – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

1.1. Overview

Hurricane Florence impacted Marine Corps Base (MCB) Camp Lejeune and Marine Corps Air Station (MCAS) New River with periods of strong winds, heavy rains, flooding of urban and low-lying areas, flash floods, and coastal storm surges. As a result, MCB Camp Lejeune, MCAS New River and MCAS Cherry Point experienced damage to approximately 781 buildings and structures. Numerous facilities were either partially damaged or rendered uninhabitable.

This project will replace facilities that sustained severe structural and water intrusion damage, rendering them uninhabitable. The existing facilities were already in poor condition due to age and deterioration and structural integrity issues. The effects of Hurricane Florence exacerbated chronic material conditions with the facilities, impacting mission capability.

The project consists of a one-story training facility to contain the II Marine Expeditionary Force (MEF) Battle Simulation Center and II MEF Combined Arms and Staff Trainer (CAST). The facility will be constructed on a greenfield site that will include parking, outdoor training areas, and a new building with open secret storage space, containing multiple configurable simulation training classrooms, configurable First Integrated Rehearsal Environment (FIRE) classrooms, audio/visual, computer and server room equipment spaces, and spaces for personnel and administrative support. These functions will be relocated from several separate existing buildings and consolidated into the new training facility.

II MEF Simulation Center is currently housed in Buildings 125 and 127, and the II MEF CAST in Building H-13. The existing buildings will be demolished after they are vacated.

1.2. Project Components

The components found within the Scope of Work for this project include, but are not limited to:

- Development of a greenfield site on the northeast corner of McHugh Boulevard and Cross Street
- Stormwater management features to comply with Government LID requirements and state stormwater management permit requirements.
- Site utility connections.
- Parking areas
- Gazebo
- Impervious and pervious outdoor training areas
- One-story building of approximately 53,400 square feet to house a new, consolidated simulation training center
- Classified and unclassified areas
- Ready Room/Auditorium
- Open secret storage space
- Multiple configurable training classrooms

- FIRE training classrooms and equipment support room
- Computer and server room equipment spaces
- Personnel and administrative offices
- Storage/shipping/receiving area
- Demolition of existing Buildings 125, 125A, 127 and H13
- Removal of existing mobile Buildings 125B and 125C.

1.3. Project Purpose

The purpose of this project is to construct a state-of-the-art facility that provides a modern training/education environment that facilitates training from the individual marine through Marine Air Ground Task Force (MAGTF) and Joint Coalition level staffs. This project will provide effective and efficient training opportunities for Commanders in one facility for the first time and is necessary because II MEF has outgrown its existing facilities that are old, dated, and were affected by Hurricane Florence.

The primary driver behind the project is to consolidate the II MEF Simulation Center Buildings 125 and 127, and the CAST facility Building H13 to improve student and staff efficiency and allow for necessary computer and networking connectivity. Its main function will be to provide Marines and Sailors using a wide spectrum of training venues using computer-based simulations that span from first-person simulations, designed for individual and small units; to combined arms integration using current generation Combined Arms Command and Control Training Upgrade System simulations; to staffs ranging from company through MAGTF to include Allied Forces, using current constructive simulation MAGTF Tactical Warfare Simulations (MTWS).

The secondary driver behind the project is that, with an expanding global Department of Defense (DoD) mission in simulation and aided training, II MEF provides instruction to over 100,000 DoD students annually and has outgrown its existing facilities. II MEF simulation enabled exercises are currently supported by multiple, separate training facilities, including the MEF Simulation Center housed in Buildings 125 and 127, and the II MEF CAST in Building H13. These buildings were designed as standalone facilities and were adequate for the expected training needs at the time of their design. Since 2001, the II MEF has rapidly expanded its simulation-based training, and Training and Education Command (TECOM) has fielded several simulation training systems targeted at battalions and below, as well as individuals. Because of this, combined with the increased requirement for computer network infrastructures and ancillary systems to support distributed training and inclusion of sister services and allied partners, the current facilities have become inadequate. The facilities are undersized and include deteriorated temporary facilities that lack weatherproofing, leading to equipment damage. Office space within the facilities has been forfeited to accommodate current activity levels, separating users and resulting in inefficiencies.

1.4. Most Relevant Codes and Standards

The following codes and standards, and those incorporated by reference within the following, are applicable to the project.

This is not a comprehensive list, and the Contractor is responsible for ensuring that the completed project complies with all applicable federal, state, and local codes, standards, and regulations.

MCB Camp Lejeune

- MCB Camp Lejeune, North Carolina Public Works Division, Design Branch Electrical Policies & Criteria, 4 Feb 2020.
- Camp Lejeune Mechanical Design Guidance, 01 Jul 17
- MCB Camp Lejeune Base Exterior Architectural Plan (BEAP), 2010
- Specification 27 10 00 Building Telecommunications Cabling System, 27 Jun 17
- Specification 33 82 00 Telecommunications Outside Plant, 19 Jun 17

Marine Corps Criteria

- Marine Corps Physical Security Program Manual, 28 Sep 09

Facilities Criteria

- FC 1-300-09N, Navy and Marine Corps Design Procedures, with Change 4, 14 Jun 18

Unified Facilities Criteria (UFC)

- UFC 1-200-01, DoD Building Code (General Building Requirements), 08 Oct 19
- UFC 1-200-02, High Performance and Sustainable Building Requirements, with Change 4, 01 Oct 19
- UFC 2-000-05N, Facility Planning Criteria for Navy/Marine Corps Shore Installations
- UFC 3-101-01, Architecture, with Change 5, 25 Sept 19
- UFC 3-120-10, Interior Design, 16 May 18
- UFC 3-201-01, Civil Engineering, with Change 2, 01 Jul 19
- UFC 3-201-02, Landscape Architecture, with Change 1, 01 Nov 19
- UFC 3-210-10, Low Impact Development, with Change 1, 01 Feb 16
- UFC 3-220-01, Geotechnical Engineering, 01 Nov 12
- UFC 3-220-05, Dewatering and Groundwater Control, 16 Jan 04
- UFC 3-230-01, Water Storage and Distribution, with Change 1, 01 Oct 18
- UFC 3-230-02, O&M, Water Supply Systems, 10 Jul 01
- UFC 3-240-01, Wastewater Collection, with Change 2, 01 Jan 19
- UFC 3-240-02, Domestic Wastewater Treatment, with Change 1, 01 Jan 19
- UFC 3-250-01, Pavement Design for Roads and Parking Areas, 14 Nov 16

- UFC 3-250-04, Standard Practice for Concrete Pavements, with Change 2, 07 Jul 09
- UFC 3-250-11, Soil Stabilization for Pavements, 16 Jan 04
- UFC 3-270-01, O&M Manual, Asphalt and Concrete Pavement Maintenance and Repair, 21 Feb 18
- UFC 3-270-08, Pavement Maintenance Management, 16 Jan 04
- UFC 3-301-01, Structural Engineering, 01 Oct 19
- UFC 3-320-06A, Concrete Floor Slabs on Grade Subjected to Heavy Loads, 01 Mar 05.
- UFC 3-401-01, Mechanical Engineering, with Change 1, 01 Oct 15
- UFC 3-410-01, Heating, Ventilating and Air Conditioning Systems, with Change 5, 01 Nov 19
- UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, 18 Jul, 18
- UFC 3-420-01, Plumbing Systems, with Change 10, 26 Oct 15
- UFC 3-450-01, Noise and Vibration Control, 15 May 03
- UFC 3-501-01, Electrical Engineering, 06 Oct 15
- UFC 3-520-01, Interior Electrical Systems, with Change 1, 20 Mar 19
- UFC 3-520-05, Stationary Battery Areas, with Change 2, 03 Sep 19
- UFC 3-530-01, Interior and Exterior Lighting Systems and Controls, with Change 3, 01 Jun 16
- UFC 3-540-01, Engine-Generator Systems for Backup Power Applications, with Change 1, 24 Oct 17
- UFC 3-550-01, Exterior Electrical Power Distribution, with Change 2, 13 Mar 19
- UFC 3-560-01, Electrical Safety, O&M, with Change 1, 21 Feb 18
- UFC 3-575-01, Lightning and Static Electricity Protection Systems, 01 Jul 12
- UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design, with Change 1, 01 Jun 16
- UFC 3-600-01, Fire Protection Engineering for Facilities, with Change 3, 10 May 19
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, 12 Dec 18
- UFC 4-010-06 Cybersecurity of Facility Related Control Systems with Change 1, 18 January 2017
- UFC 4-021-01, Design and O&M: Mass Notification Systems, with Change 1, January 2010
- UFC 4-021-02, Electronic Security Systems, October 2013
- UFC 4-023-03, DoD Design of Buildings to Resist Progressive Collapse, Change 3, 01 Nov 16

Tri-Services Electrical Working Group (TSEWG)

- TSEWG TP-1, Electrical Calculation Examples
- TSEWG TP-2, Capacitors for Power Factor Correction
- TSEWG TP-3, Surge Protector Performance and Evaluation Criteria
- TSEWG TP-4, Stationary Battery and Charger Sizing
- TSEWG TP-5, Interior Transformer Ratings and Installation
- TSEWG TP-6, Low-Voltage Breaker Interrupting Ratings
- TSEWG TP-7, Protection System Design
- TSEWG TP-8, Equipment Enclosures and Hazardous Locations
- TSEWG TP-9, Automatic Transfer Equipment
- TSEWG TP-10, Arc Flash Levels for Fused Voltage Inputs to Electricity Meters
- TSEWG TP-11, UFC 3-500-10N Best Practices
- TSEWG TP-12, UFC 3-500-10N Appendices
- TSEWG TP-13, UFC 3-501-03N Load Demand Analyses
- TSEWG TP-15, Arc Flash Calculations and Detailed Arc Flash Warning Labels
- TSEWG TP-19, Static Uninterruptible Power supply (UPS)

International Code Council (ICC)

- International Building Code (IBC), 2018, as modified by UFC 1-200-01
- International Mechanical Code (IMC), 2018, as modified by UFC criteria
- International Plumbing Code (IPC), 2018, as modified by UFC criteria

2.0 PROJECT OBJECTIVES – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

2.1. Mission Statement

After Hurricane Florence, numerous Camp Lejeune facilities were rendered uninhabitable, including the existing training center, comprised of Buildings 125, 125A, 125B, 125C, 127, and H13. Severe structural, roof truss and water intrusion damage made Building 125 unable to be occupied, especially during high winds or heavy snow load conditions. These facilities, built in the 1940s and 1980s, were already in very poor condition due to their age and deterioration as well as inadequately sized for current operational needs. The hurricane exacerbated chronic material conditions with the facilities, impacting mission capability. Therefore, the existing operations will be replaced with and consolidated into new state-of-the-art facilities that will be constructed on a greenfield site. These facilities will include a new building with more area that will incorporate all training functions under one roof and satisfy the tenant's needs and requirements to adequately conduct their day-to-day operations.

2.2. Facility Function

2.2.1. Overview

The new II MEF combined training facility will house the II MEF Simulation Center and II MEF CAST. The new facility will provide a modern training and education environment that facilitates training from the individual Marine through MAGTF and Joint Coalition level staffs. The new building will improve student and staff efficiency and allow for necessary computer and networking connectivity. Its main function is to train Marines and Sailors using a wide spectrum of training venues using computer-based simulations that span first-person simulations designed for individual and small units; to combined arms integration using current generation Combined Arms Command and Control Training Upgrade System simulations; to staffs ranging from company through MAGTF to include Allied Forces, using the current constructive simulation MTWS. The new facilities will provide reconfigurable spaces that will adapt to numerous training scenarios, whether small unit, Company, Battalion or MAGTF. The new facility will also include administrative functions directly related to the new combined training facility.

2.3. Project Specific Priorities

The specific priorities of this project include:

- Protecting the health, safety, and welfare of those who currently occupy the existing training facilities located in dated, hurricane-damaged, substandard buildings.
- Consolidation of a multitude of training missions under one roof. This includes personnel, equipment, and virtual simulation requirements from various existing facilities.
- Increase efficiencies in scheduling and deployment of these respective training exercises, offering considerable reductions in the cost of servers, various networking requirement, military support staff, and contractor support.
- The main functional aspects of the Simulation Training Center at Building 125, the Deployable Virtual Training Environment (DVTE) at Building 127, and the CAST at

Building H13 will be incorporated and consolidated into a new state-of-the-art training facility.

2.3.1. Sustainable Design and Construction

All NAVFAC projects are subject to sustainable design criteria and are required to meet the requirements of the Guiding Principles for Sustainable Federal Buildings (HPSB). The Guiding Principles are outlined in a cross disciplinary publication addressing requirements for new building construction and modernization of all federally owned facilities. Sustainable principles will be integrated into the design, development and construction of the project in accordance with Executive Order 13834 and other applicable laws and Executive Orders.

Design and construct the project to comply with sustainability requirements identified in Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*. Additional specific sustainability requirements are found in RFP Part 2, Part 3, and Part 4 sections.

Design and construct the project in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements.* The UFC provides design, construction and modernization criteria for projects of all sizes. It outlines performance thresholds in energy and water, addresses criteria of indoor air quality, identifies resiliency concerns, addresses planning and design, and establishes a baseline across all of DOD for documenting sustainability. A major component of the policy established in this UFC is the Sustainable Third-Party Certification requirement for projects that reach specific size and cost thresholds.

Additional, agency-specific requirements can be found in NAVFAC Engineering & Construction Bulletins (ECBs) such as Issue No. 2014-02. ECB 2014-02 describes overall NAVFAC policy and guidance on sustainability and energy requirements.

2.3.2. Stormwater Management – Low Impact Development (LID)

Comply with UFC 3-210-10, *Low Impact Development* and FC 1-300-09N, *Navy and Marine Corps Design Procedures*. Additional specific LID and stormwater management requirements are found in RFP Parts 3 and 4, Section G30. In addition to LID, comply with state and local stormwater regulations.

2.3.3. Energy Efficiency

The level of energy performance the Government seeks may only be achieved through coordinated design of architectural, electrical, and mechanical elements. All energy systems must be designed in compliance with the following unless more stringent requirements are noted otherwise:

- UFC 1-200-02, HPSB Requirements.
- Energy Policy Act (EPAct), 2005
- Energy Independence and Security Act (EISA), 2007
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 189.1 - 2014
- ASHRAE/Illuminating Engineering Society of North America (IESNA) Standard 90.1 - 2013.

Energy consuming equipment and products must meet or exceed Energy Star or Federal Energy Management Program (FEMP) efficiency levels. This includes built-in equipment (e.g., lights; heating, ventilation, and air conditioning (HVAC); water heating; and industrial equipment) and collateral equipment (e.g., office equipment, information technology (IT), and task lighting). For equipment types not rated by Energy Star or FEMP, equipment efficiencies must be in the top 25 percent of similar products. All purchased electronics must be Electronic Product Environmental Assessment Tool (EPEAT)-registered. In addition, provide an energy compliance analysis (ECA), which will demonstrate compliance with all energy-related requirements in UFC 1-200-02. Measure and record existing building utility consumption, and provide design-calculated, estimated energy savings and post-construction documentation and reporting of actual realized energy savings.

2.3.4. Building Commissioning

Provide commissioning to meet requirements identified in Section 01 91 00.15 22 Total Building Commissioning, and UFC 1-200-02 High Performance and Sustainable Building Requirements.

2.3.5. Accessibility Requirements

Provide barrier-free design in accordance with UFC 1-200-01, *General Building Requirements*.

2.3.6. Antiterrorism Force Protection

The primary objective for the Marine Corps Base (MCB) security engineering is to ensure compliance with the Antiterrorism Force Protection (AT/FP) program requirements and applicable Marine Corps physical security measures in MCO 5530.14A, as supplemented by the UFC. The AT/FP program requirements and Marine Corps physical security measures are to safeguard personnel, equipment, and property. A risk analysis and vulnerability assessment (RAVA) has not been performed and a specific Design Basis Threat has not been identified.

The facility is considered inhabited and will be routinely occupied by 11 or more personnel. The facility must be designed in accordance with UFC 4-010-01 Chapter 3, except that parking is not permitted in the minimum 33-foot, unobstructed space around the building. This includes low-occupancy portions of the building, as applicable, due to physical security and operational requirements. The facility must also be designed in accordance with the following requirements:

a) **Antiterrorism Architectural Special Requirements:** Installation Mission Assurance has requested security-conscious layouts and configurations for interior building spaces and building entrances. The goal is to improve antiterrorism safety without adding cost, without hardening the building, and without adversely affecting the usability of the building.

b) **Building Entrance Orientation:** Orient the main building entrance such that vehicles are not able to drive through the main building entrance. Where this is impractical, ensure that the entry storefront does not directly face a main hallway or a mass-gathering space. Lay out entrances to be welcoming and accessible, but also visibly protected and inaccessible to vehicles attempting a forced entry. The main entrance layout must be in compliance with UFC 4-010-01 Chapter 3-12, Standard 11, *Building Entrance Layout*. Where this section conflicts with Standard 11, Standard 11 must take precedence.

c) **Proximity of Densely Populated Areas to Parking:** To mitigate risks to densely populated areas, locate uninhabited, low-occupancy, and mechanical yard areas

adjacent to parking lots. Locate densely populated areas away from parking lots to the maximum extent possible given available site space and building square footage. Keep densely populated areas a minimum of 82 feet away from parking spaces, if sufficient site space is available. Uninhabited and low-occupancy spaces include spaces such as utility rooms, hallways and corridors without seating, and storage areas. Densely populated areas include classrooms, large break rooms, locker rooms, conference rooms, auditoriums, and other areas with a high-personnel density. During the concept development workshop (CDW), include the installation Antiterrorism Officer (Mission Assurance) in discussions for the preferred layout of mass-gathering and densely-populated administrative areas relative to the proposed site plan.

d) **Antiterrorism Landscape Architecture Special Requirements:** Installation Mission Assurance has requested security-conscious landscape features that afford improved protection to the building occupants. The goal is to improve antiterrorism safety without adding cost by using UFC-mandated landscape architecture features to protect vulnerable areas and using excess fill from the project site to provide landscaped berms. A specific design-basis threat for an active shooter or vehicle attack does not apply; therefore, the intent is to complement architectural layouts and civil site features to improve occupant protection within the project scope of work (SOW).

e) **Vehicle Deterrent Landscaping:** As part of a vehicle-deterrent perimeter, landscape features can provide significant physical and psychological deterrents to the risk of a vehicle ramming attack. Landscape features do not need to be rated passive vehicle barriers to afford greater security to the building occupants.

f) **Unobstructed Space:** Trees, plantings, and site furniture may be located within the minimum 33-foot unobstructed space around each building, provided they are compliant with the UFC 4-010-01 and UFC 3-201-02 requirements for landscaping in the minimum 33-foot unobstructed space. To eliminate concealment opportunities, berms in the minimum 33-foot unobstructed space must not exceed a height of 4 feet, 6 inches.

g) **Large-Diameter Trees:** Tree species that will grow to a large (6 inches or greater) diameter at breast height (DBH) provide an aesthetically pleasing and natural barrier to vehicle traffic. It is desirable to position large-diameter trees in the space between the building and parking lots or roads where permissible by code and feasible based on available site space. Provide tree plantings with at least a 4-inch DBH where the trees are integrated into the vehicle-deterrent perimeter. Multiple staggered rows of trees serve as highly-effective vehicle barriers once the trees have grown. Where providing multiple rows of trees, stagger and space the trees to eliminate any corridors exceeding a 5-foot width perpendicular to the adjacent roads or drive aisles. Final tree layout, spacing, and species selection must be approved by the Government Landscape Architect and installation Antiterrorism Officer or their designated representatives.

h) **Concrete Site Features:** Concrete benches and picnic tables are excellent deterrents to vehicles. Concrete planters are not desirable due to landscape maintenance issues and concealment concerns in the minimum 33-foot unobstructed space.

i) **Berms and Ditches:** Berms and ditches provide protection and can be integrated with the landscaping plan (e.g. trees along tops of berms and creeping juniper on the sides).

j) **Elevated Plazas:** For buildings that require elevated entryway access with stairs and accessible ramps, arrange the stairs, ramps, and low retaining walls or sloped soil so that they are positioned near the edge of the vehicle parking lot or adjacent roadways. A

steeper, landscaped, stabilized slope near the edge of the parking lot with a sidewalk in front of it serves as a visible deterrent to illegal parking and approaching vehicles.

k) **Bollards at Building Entrances:** Bollards are an option where other features such as stairs, pedestrian ramps, trees, or berms do not deter direct vehicle access to the main building entrance. Bollards are desirable for sidewalks and plazas leading to the main building entrance provided there is no adverse impact to pedestrian accessibility. A bollard spacing of 4 feet on center will meet Architectural Barriers Act (ABA) and Americans with Disabilities Act (ADA) requirements. Architectural bollards near the building entry are a desirable way to improve protection while improving site lighting (for lighted bollards) and aesthetic appeal. Removable bollards are acceptable and beneficial for future building maintenance. Coordinate with vehicle access control requirements as part of civil site design. Provide the option of either permanent or removable bollards, determined based on customer needs at the CDW and subsequent design review meetings.

l) **Visual Screening Landscaping at Queuing and Entry Areas:** Visual screening affords protection for building occupants and visitors against the potential for vehicular or active shooter threats. Landscaping that provides visual obscuration of building entrances and outdoor queuing or congregation areas is highly desirable to improve protection of personnel in exposed areas.

m) **Antiterrorism Civil Site Design Special Requirements:** Installation Mission Assurance has requested security-conscious site plans that afford improved protection to building occupants. The goal is to improve antiterrorism safety without adding cost by laying out necessary vehicle parking and stormwater features to protect vulnerable areas of the building. A specific design basis threat for an attack vehicle does not apply; therefore, the intent is to complement architectural layouts and landscaping features to improve occupant protection within the project SOW. The minimum 33-foot unobstructed space and vehicle access control requirements defined below are added scope items to manage nuisance parking and maintain the minimum 33-foot unobstructed space for base operational considerations.

n) **Vehicle Access Control:** All projects must include consideration for vehicle access control in the form of lockable swing gates and/or lockable removable bollards along driveways and access roads that lead to service areas around the building within the minimum 33-foot unobstructed space. Other open-plaza areas must be secured with permanent bollards in combination with removable bollards. Portions of buildings that must be secured within a restricted area fence (e.g., motor pools) are excluded from this requirement.

o) **Service Area Access:** Access for service areas around the building includes roads and driveways that lead to utility rooms, loading docks, mechanical yards, other areas in the minimum 33-foot unobstructed space that are used for building maintenance, and for roads that are only used for fire access.

p) **Pedestrian Areas:** Open plazas, hardscaping, and other outdoor pedestrian-congregation areas that are adjacent to a roadway must also feature vehicle access control integrated with permanent landscaping and civil site features as part of a vehicle-deterrent perimeter. Removable and fixed architectural bollards (lighted, where beneficial) are preferred for vehicle access control to open plazas, hardscaping, and other outdoor pedestrian-congregation areas with at least four removable bollards in a row for service access to these pedestrian areas. Provide the option of either permanent

or removable bollards, determined based on customer needs at the CDWand subsequent design review meetings.

q) **Access Control Requirements:** Where bollards are provided, space bollards 4 feet on center starting at each edge of the road or driveway. Where gates are provided, provide single- or double-leaf swing gates with posts that start at the edge of the roadway or behind the curb. Provide receiving posts to secure the gate in the open position. Gates must not encroach on the roadway or driveway while in the open position. Gates and bollards must be high-visibility and meet UFC requirements for signage, high-visibility, reflectivity, and striping to meet traffic safety requirements. Gates and bollards for vehicle access control to service areas and pedestrian-congregation areas need not be crash rated. Refer to UFC 4-022-03, *Security Fences and Gates,* for additional requirements for gates.

r) **Vehicle-Deterrent Perimeter:** Gates and bollards must be integrated with landscaping and civil site features to deter vehicles from bypassing the access control by driving around the barriers and to maintain a vehicle-deterrent perimeter.

s) **Consolidating Access Control:** Access roads to service areas around the building can be secured where the access road begins at the adjacent roadway or parking lot, provided this is integrated with the vehicle-deterrent perimeter, to reduce the total cost of providing vehicle access control to the minimum 33-foot unobstructed space.

t) **Control Vehicle Speed:** Arrange parking lot access roads and drive aisles so that any direct approaches to the building walls or building entrance cannot exceed 25 miles per hour. Speed limit signage alone is not sufficient to constrain vehicle speed. Speed limit control in parking lots and access roads is also desirable to improve pedestrian safety and reduce the risk of vehicle accidents.

u) **Limit Vehicle Approaches to Building:** Arrange access roads and drive aisles so that no vehicles have long, straight approaches directly at the exterior walls of the building, particularly at the building entrance. Keep the long axis of drive aisles parallel with the walls of the building to control the approach direction of a vehicle. Arrange access roads so that personnel do not drive directly facing the building walls or any entrance. For short drive aisles that run perpendicular to the long axis of the parking lot, coordinate with landscape architecture to provide civil site and landscaping features that visually or physically deter vehicle access. Alternatively, locate these perpendicular drive aisles beyond the ends of the building so traffic does not directly face the building walls or any entrance. Loading docks and heavy truck areas need not consider these requirements due to the impracticability of implementing this where building access is a requirement. Provide curb stops in parking spots that are adjacent to the building to discourage vehicle parking in the minimum 33-foot unobstructed space.

v) **Unobstructed Space and Vehicle-Deterrence:** Provide a minimum 33-foot unobstructed space around the building without new parking, existing parking, new roadways, or new drive aisles. Keep existing roadways out of the minimum 33-foot unobstructed space to the maximum extent practicable. Provide berms, drainage swales and ditches, and other civil site features between the building and any adjacent parking lots or roadways as part of a vehicle-deterrent perimeter. Berms can also reduce offsite fill disposal costs, provided that fill is verified to be non-hazardous, non-contaminated. The CDW must address how to integrate unobstructed space and vehicle-deterrence needs within the available site footprint in consultation with the installation Antiterrorism Officer.

w) **Unobstructed Space Preferences:** The installation mission-assurance personnel prefer larger unobstructed spaces where feasible, based on available site space. Unobstructed space need not exceed 82 feet for larger, open sites. This unobstructed space preference is to the mass-gathering portions of each facility that excludes open hangar areas, apparatus bays, and other areas that are specifically designed to be low-occupancy spaces as defined in UFC 4-010-01. Refer to paragraph 2.3.6.c, Proximity of Densely Populated Areas to Parking, for more information.

2.3.7. Facility-Related Control System Cybersecurity

Design, acquire, and execute all facility-related control systems in accordance with UFC 4-010-06, *Cybersecurity of Facility-Related Control Systems*. Design the project using UFGS 25 05 11, *Cybersecurity for Facility-Related Control Systems*. Government Point of Contact to be utilized in SECTION 25 05 11 for Camp LeJeune is James Mahoney, ICS ISSM, email James.D.Mahoney@usmc.mil. Submit Control Correlation Identifiers (CCI) as attachments to SECTION 25 05 11.

The table below identifies the Facility-Related Control Systems which must be included for this facility. Final C-I-A impact levels must be coordinated and approved by the Camp LeJeune ICS ISSM, James Mahoney, James.D.Mahoney@usmc.mil.

Authorizing Official (AO)	System Owner	System Group	System	Existing Authority to Operate (ATO)?	C-I-A Impact Level
USMC AO Dr. Ken Bible	DPW	UMCS	HVAC	Existing ATO in MCCAST (USMC) to be validated by Information System Security Manager (ISSM)	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Lighting	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Advanced Meter Infrastructure (AMI)	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Backup Power Generator Annunciator Panels and Controls	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate

Authorizing Official (AO)	System Owner	System Group	System	Existing Authority to Operate (ATO)?	C-I-A Impact Level
USMC AO Dr. Ken Bible	DPW	BCS	Elevator Control Systems	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Fire Department	FLS	Fire Alarm Reporting System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	FLS	Mass Notification System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Physical Access Control System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Intrusion Detection System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Security Forces	ESS	Closed-Circuit Television (CCTV)	Existing ATO in MCCAST (USMC) to be validated by ISSM.	LOW-LOW-LOW – ISSM to validate

Incorporate these facility-related control system cybersecurity requirements into project facility control systems identified in:

- ESR D20, Plumbing
- ESR D30, HVAC
- ESR D40, Fire Protection, including Cooper Notification, Inc. WAVES Emergency Notification System
- ESR D50, Electrical

2.3.8. Secured Areas

Comply with the Marine Corps physical security measures in MCO 5530.14A as supplemented by the UFC.

2.3.9. Air Quality Management

Ensure that subject buildings are evaluated for asbestos and asbestos-containing materials by a certified professional prior to demolition or renovation.

Ensure that any fugitive dust emissions generated by construction, renovation, or demolition are appropriately controlled.

If the project includes installation of new activities or equipment which generate air emissions, and the sources have not been evaluated for air permitting by MCB Camp Lejeune, contact Air Quality (AQ) program at (910)451-9017. Please note that air emission sources are required to be permitted prior to their installation and operation. Examples of such sources include, but are not limited to: boilers, water heaters, generators, fuel storage tanks, painting and coating operations, woodworking, welding, abrasive blasting, engine testing, refrigerant recovery devices, and parts ovens.

If the project involves any refrigerant handling or manipulation, ensure that appropriate ozone depleting substance (ODS) servicing procedures are followed.

If the project includes removal of currently permitted air emission sources (see Item 3 for examples), contact AQ program at (910)451-9017.

2.4. Appropriate Design

Design the new building and systems in accordance with all Codes, Standards, UFCs, and criteria explicitly and implicitly stated in this Design-Build RFP. Employ integrated design principles.

2.4.1. Building Design – Architecture

The II MEF Simulation Training Building exterior envelope design must follow the architectural design features prescribed in the Camp Lejeune Base Exterior Architectural Plan (BEAP), 2010 for Hadnot Point (Section 4.2). This document establishes key exterior materials, material finishes and colors, and building façade and roofing design elements to be incorporated into the building's exterior design.

Options for the exterior wall design are listed in Part 3, Chapter 6, B20 Exterior Closure ESR. Any of the listed options is allowed for the design of the exterior wall, as long as the design elements for the exterior wall defined in the BEAP are provided. An applicable 4:12 to 6:12 roof slope is defined in the BEAP for Hadnot Point.

The building design floor plan must generally follow the arrangement of spaces indicated in the Blocking Diagram in Part 3, Chapter 4 of this RFP. Locations of break rooms and restrooms may vary from what is shown in the diagrams if the function of the primary training and administrative spaces are maintained due to the nature of the building's classified and non-classified functions.

The massing of the building and roofing placement will be influenced by its final layout and configuration. The building design and design documentation must comply with applicable UFCs listed in Chapter 3, Part 1 and applicable building codes.

2.4.2. Civil/Site

2.4.2.1. General

The II MEF Simulation Training Building site as proposed will be located on what is currently a heavily wooded site on the northeast corner of McHugh Boulevard and Birch Street. A right-turn lane and a left-turn lane must be provided on McHugh Boulevard to provide direct access to the site. The first driveway accessed via the right turn lane on McHugh must line up with the existing driveway across McHugh Boulevard. This current existing driveway has a single entry off of McHugh Boulevard and a right and left turn lane pulling onto McHugh Boulevard. The new building will front McHugh Boulevard, with the loading area and mechanical yard at the rear of the building. A minimum 33-foot AT/FP unobstructed space requirement is applicable for this project. An 8-foot tall ornamental (not chain-link) Restricted Security Fence required for classification of exercises must envelope the building, concrete and grassed training areas, and the staff parking area adjacent to the building to the northwest (min 100 spaces). A dumpster pad and AT/FP compliant enclosure must be provided on the site outside the fenced area.

2.4.2.2. Parking and Access

Parking for the proposed facility is anticipated to be northwest of the site in the heavily wooded area along McHugh Boulevard. Additional student parking will be provided further to the northwest and requires 10 percent greenspace. For truck turning movements, use a WB-50 tractor trailer as the largest vehicle accessing the site. A segregated Military Owned Vehicle (MOV)-only drive aisle must be provided for access to the outdoor training areas. Provide emergency vehicle access, designed with required turning radii for emergency vehicles, immediately adjacent to the building, and provide associated gates. A minimum 12-foot-wide concrete pedestrian access must be provided from the parking areas to the building and from the building to the convenience store on the south side of Birch Street. Where indicated on the conceptual site plan in Part 6, outdoor space must be HS-20 load rated turf pavement to support emergency and tactical training vehicles and a separate turf area for communications tents. Vehicle area must not be hardstand; grounding rods are driven for communications equipment. Benches and picnic areas must be provided around the building to accommodate up to 50 people.

2.4.2.3. Utilities

Civil utilities available to the site include water, sewer, stormwater, and natural gas. Water borders the site on the west side, roughly in line with McHugh Boulevard. Provide fire hydrants inside of the secured fence to meet UFC requirements. Gravity sanitary sewer runs along the southeast side of the site. It is assumed at this time that the depth of the gravity sewer will be sufficient to serve the new facility. A closed storm drainage system must connect several storm drain inlets associated with the site, including parking lot drainage, to an NCDEQ approved stormwater control measure (SCM)and outfall to the northeast. Potential LID Stormwater Management Areas must be provided for the site to meet both NAVFAC LID and North Carolina Department of Environmental Quality (NCDEQ) permit requirements. Please note that pervious pavers and grass pave are not considered pervious area for NCDEQ stormwater permits. Pads for chillers and condensers must be provided on the ground level at an elevation above flood per UFC requirements

Geographic information system (GIS) information indicates electric and communications utilities run along the southwest side of the site along McHugh Boulevard. There is also overhead

power along McHugh Boulevard and Birch Street. Natural gas is adjacent to the site and serves the surrounding facilities.

2.4.3. Environmental/Conservation/Cultural Resources

There are no environmental, conservation or cultural resources identified for this project.

2.4.4. Structural

The structural design objective is to construct an efficient, safe, and durable building constructed from materials and load-bearing systems permitted in the Part 3 ESR narratives and meeting the reference codes and standards. As part of this objective, the structural design must be coordinated with all disciplines and must meet functional requirements.

To help meet the objective, NAVFAC has provided a significant amount of historic geotechnical information and ECS has performed a preliminary geotechnical investigation of this site. Refer to Part 6 for the ECS preliminary information that includes previous investigations provided by NAVFAC. The NAVFAC and ECS geotechnical information is reliable for preliminary information but must be verified by the Contractor. The Contractor is solely responsible for interpreting available geotechnical information. The Contractor is responsible for conducting an independent geotechnical investigation for foundation design.

2.4.5. Fire Protection

2.4.5.1. Building Code and Life Safety Analysis

Provide a complete building code and life safety code analyses in accordance with UFC 3-600-01 and FC 1-300-09N.

2.4.5.2. Fire Alarm and Mass Notification

Design and provide an integrated fire alarm, mass notification system capable of notifying building occupants inside the facility of an emergency event. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must".

2.4.5.3. Fire Protection Sprinkler System

Design and provide a wet pipe fire sprinkler system for complete fire protection coverage throughout the building. Design and install equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must". Base the hydraulic design on the water supply data provided in ESR Section D40 and Part 6.

2.4.5.4. Special Detailed Requirements Based on Use

Protect Electronic Equipment Areas in accordance with Chapter 4-11 of UFC 3-600-01. Refer to the ESR Section D40.

2.4.6. Telecommunications

Provide a complete telecommunications backbone and horizontal distribution system as specified throughout this RFP. Install all equipment, pathways, and cabling per the criteria in PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations, substitute with the word "must".

Provide a main distribution frame (MDF) to house telecommunications equipment and cabling as well as service provider equipment and cabling. Additionally, provide floor or area serving intermediate distribution frames (IDF) to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide exterior underground communications duct bank manhole system from existing duct bank(s) and manhole to the MDF inside each building.

The design and installation must be in accordance with the latest TIA standards, all applicable Unified Facilities Criteria documents, and the latest Local provider and applicable Military Department standards and criteria.

2.5. Workflow Process

The new simulation training center consolidates multiple training missions, supporting a global DoD mission and providing instruction to over 100,000 DoD students annually. A variety of simulation-aided training functions will be incorporated. Therefore, multiple reconfigurable simulation rooms will be provided for maximum flexibility, as well as an auditorium for 100 persons. A single ISMT-E will be provided due to its specific requirements. In addition, administrative, briefing, server, and support spaces will also be housed in this facility.

The facility's main entrance will be the student entrance to the south. A secondary main entrance on the west will be for administrative personnel.

There will be two separate sets of restrooms and breakrooms in the non-classified areas of the facility, one set dedicated to administrative personnel and the other dedicated to students, whether they are participating in classified or non-classified training. Students will also have access to two outside areas, pervious and impervious, for outdoor simulations. These will be accessible to the student restrooms that will include shower facilities.

2.5.1. Hours of Operation

Hours of operation for student instruction are from 0700 to 1700, Monday through Friday. Instructors and other administrative staff will have access to the facility 24 hours per day, 7 days a week.

2.5.2. Staffing/Occupancy

The simulation training center is occupied primarily during daytime hours by students in training spaces and administrative staff in administrative departments.

The occupancy loads specified in the RFP and indicated in the Building Program in Part 3, Chapter 4 are identified for programming purposes. Determine occupancy loads to be used to design building features, such as structural, egress, and plumbing fixtures. The loads used must

be as required in applicable building or life safety codes, based on the spaces provided in the building design.

2.6. Special Design Challenges

The large number of military construction (MILCON) facilities that are to be built at or around the same time as the II MEF Simulation Training Center at Camp Lejeune may create challenges with both material and labor availability. The design of the building and systems selected for exterior envelope materials must take these challenges into account.

2.7. Adaptability and Flexibility

The II MEF Simulation Training Center provides flexibility in allowing the simulation classrooms to be adjoined by utilizing folding panel partitions. The combined enlarged classrooms provide for instructional flexibility.

3.0 SITE ANALYSIS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

3.1. Existing Site Conditions

3.1.1. Site Conditions – Natural Constraints

3.1.1.1. Topography

The proposed site for the II MEF Simulation Training Center building is located in the heavily wooded area northeast of the intersection of McHugh Boulevard and Birch Street. Site elevations range from approximately 24 feet down to 6 feet. There is an existing ditch running along the northeast side of McHugh Boulevard with a high point that sends drainage northwest and southeast. A second ditch on the northeast side of Birch Street combines with the first ditch. This combined ditch then runs to the northeast to combine in a larger drainage draw that ultimately drains to Wallace Creek. Base GIS indicates no portion of this ditch as potential wetlands. Wetlands are located to the north, east and south of the proposed site but not within the project site itself.

3.1.1.2. Vegetation and Landscaping

The majority of the site is heavily wooded. The wooded areas are mostly pine with various understory shrubs such as Wax Myrtle. The cleared portion of the project site is turf and generally fronts McHugh Boulevard.

3.1.1.3. Natural Resources

An existing ditch borders the northeast side of McHugh Boulevard with a high point that sends drainage northwest and southeast. A second ditch on the northeast side of Birch Street combines with the first ditch. This combined ditch then runs to the northeast to combine in a larger drainage draw that ultimately drains to Wallace Creek.

3.1.1.4. Subsurface Investigation

See Part 4 ESR G10 for information regarding requirements to locate all utilities on the site.

3.1.1.5. Earthwork and Site Preparation

See Section 3.3.8 below for information regarding geotechnical earthwork and site preparation and sitework requirements for the site.

3.1.1.6. Unexploded Ordnance (UXO)

There is no known unexploded ordinance within the project limits.

3.1.1.7. Wetlands

Wetlands are expected adjacent to the limits of the proposed project area, though there is not a current delineation. Areas of possible wetlands impacts are noted in the Base GIS system within the southeast and east sides of the project site. The approximate GIS wetlands limits are indicated in the project site plan in Part 6.

3.1.1.8. 100-Year Floodplain

Per the FEMA Flood Insurance Rate Maps (FIRM) the project site is in “Area of Minimal Flood Hazard - Zone X”



Figure 1: 100-Year Floodplain Map

3.1.2. Site Conditions – Man-made Constraints

3.1.2.1. Existing Vehicular Access and Circulation

The proposed site of the P1338 building is currently undeveloped. The site is at the northeast corner of the intersection of McHugh Boulevard and Birch Street.

3.1.2.2. Site Drainage & Stormwater Runoff (hydrology)

The proposed site generally drains west to east. There is an existing ditch running along the northeast side of McHugh Boulevard with a high point that sends drainage northwest and southeast. A second ditch on the northeast side of Birch Street combines with the first ditch. This ditch then runs to the northeast to flow into a larger drainage draw that ultimately drains to Wallace Creek.

3.1.2.3. Site Features

Several power poles are on the southwest side of the site adjacent to McHugh Boulevard. The Camp LeJeune Trail runs parallel to McHugh Boulevard and continues along Birch Street. Electrical and telephone service lines for the site run above ground along Birch Street and McHugh Boulevard. Water and sanitary sewer service also front the site along Birch Street and McHugh Boulevard. Several utility pedestals are located on the western side of the Camp LeJeune Trail.

3.1.2.4. Existing Site and Building Conditions Photographs

Photographs of the existing site and building can be found in Part 6.

3.1.2.5. Hazardous Materials and Substances

See Section 3.3.8 for information regarding geotechnical earthwork and site preparation and sitework requirements for any hazardous materials found on the site.

3.1.2.6. Fencing

The proposed site does not contain any existing fencing.

3.1.2.7. Adjacent Land Use

McHugh Boulevard borders the southwestern portion of the site, while Birch Street borders the southern portion. Northwest, north, east and southeast are undeveloped areas.

3.2. Existing Infrastructure Network

3.2.1. Facility Footprint

3.2.1.1. Building Footprint and Building Characteristics

Not used. No building exists on the existing project site.

3.2.2. Vehicular Access and Circulation

3.2.2.1. General

The Contractor must develop a Traffic Investigation Report for the P1338 site, including the adjacent P1533 (PMO Facility) Building, as shown in Figure 3 below. Traffic Counts [Turning Movement Counts (TMC) and 24-Hour Tube Counts] must be collected at key intersections and driveways of the street network surrounding the site (see KMZ map of count locations in Figure 2). UFC 3-201-01, *Civil Engineering*, Sections 2-9 and 2-10 must be used, along with American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets (GDHS) and Institute of Traffic Engineers (ITE) guides, including ITE LP-674B (Highway Capacity Manual) and Transportation Impact Analyses for Site Development. The Manual on Uniform Traffic Control Devices (MUTCD) and North Carolina Department of Transportation (NCDOT) Roadway Design Manual must also be used. The Contractor must apply the most stringent requirements from the various manuals.

Construction of the P1338 and P1533 building are anticipated to generate traffic volumes for which the Traffic Investigation Report will require mitigation to address the impacts.

Current conditions for traffic flow and circulation need to be confirmed through the traffic count data. Projection of future traffic volumes and conditions must be determined for the build year plus 5 years (e.g., 2020 and 2025). The peak period (1 hour) for the AM and PM must be established. Synchro must be used to determine levels of service (LOS) at intersections and queuing at the driveways into the P1338 and P1533 building sites.

The Contractor must conduct an Origins and Destinations Study to determine traffic circulation to and from the site.

A Traffic Signal Warrant Study must be conducted for each of the driveways into the P1338 and P1533 sites to determine if an additional signal is warranted at any of the driveway locations.

A Speed Study must be conducted on Birch Street, particularly for westbound traffic to the intersection of McHugh Boulevard and Birch Street to address sight distance issues caused by

curvature in the road on the approach to the intersection. To address the sight distance issues, the Contractor must consider traffic calming actions or reduced speed limits based on the results of the study.

Based on the findings of the Traffic Investigation Report, the Contractor must recommend improvements to mitigate challenges in Traffic Operations, Circulation, Safety, and Access during daily operations. An estimate of magnitude of cost must be provided for such improvements after the Contractor completes the Traffic Investigation Report with the required data collection including traffic counts, an Origins and Destinations Study, a Traffic Warrant Study, and a Speed Study. Improvements and cost must be discussed with NAVFAC.

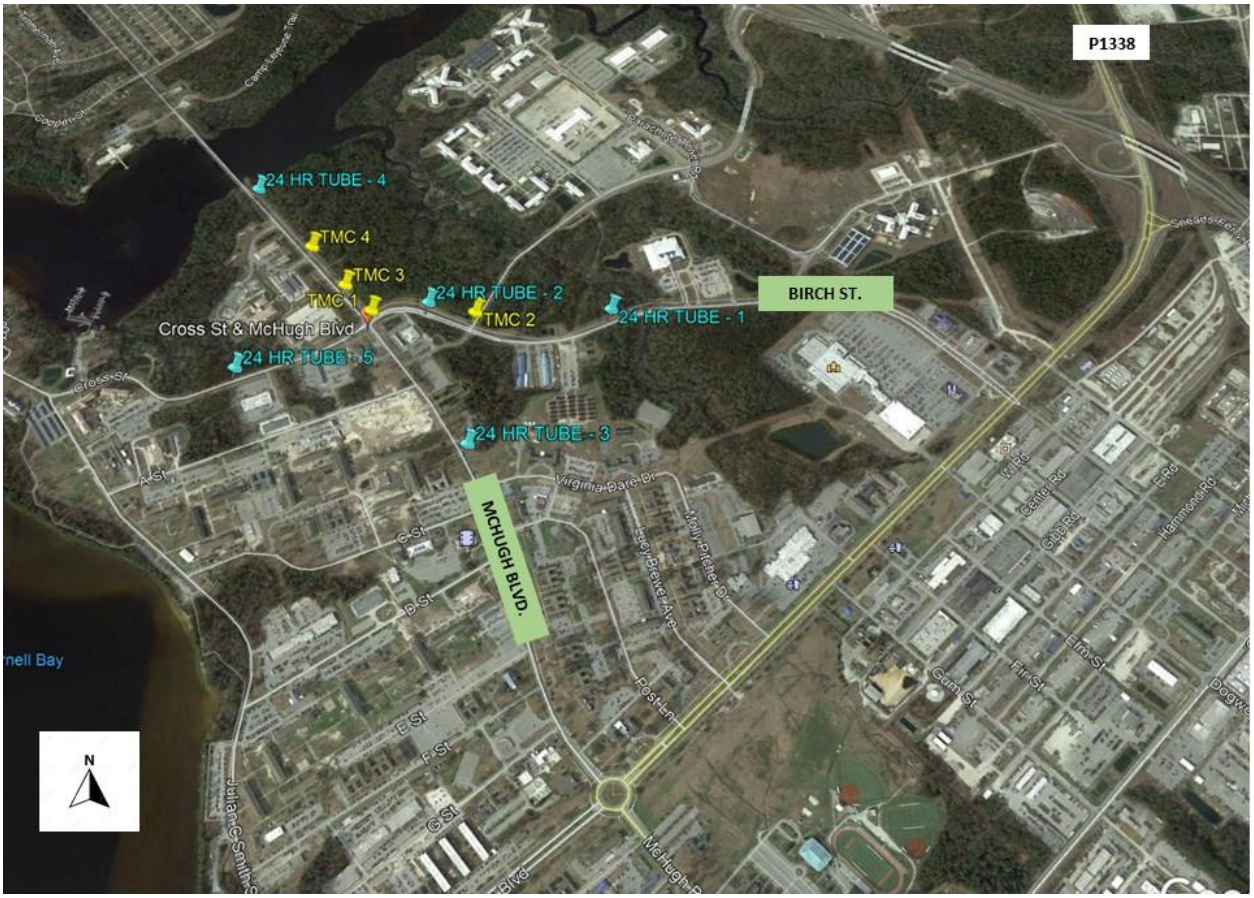


Figure 2: Traffic Count Calculations

3.2.3. Background

3.2.3.1. GENERAL LOCATION OF SITE

The site of the P1338 and P1533 buildings are located at the northeast quadrant of the intersection of Birch Street and McHugh Boulevard, as shown in Figure 3 below.



Figure 3: General Site Location

3.2.3.2. SITE AND SURROUNDING STREET NETWORK

The site view in Figure 4 below shows the location of new P1338 and P1533 buildings relative to the surrounding area and street network. Primary access to the new buildings is anticipated to be from McHugh Boulevard. Currently there are two driveways from McHugh Boulevard planned for both the P1338 and P1533 building sites.

This aerial shows the location of a pedestrian destination in the southeast quadrant of the intersection of Birch Street and McHugh Boulevard. It also shows curvature in the road on the eastern portion of Birch Street as it approaches the intersection. For vehicles heading west on Birch Street toward the intersection, this creates a sight view challenge for drivers not anticipating an upcoming intersection with vehicles and pedestrians around the curve. This sight view challenge creates a potential safety hazard at the intersection.



Figure 4: Site and Surrounding Street Network

3.2.3.3. PEDESTRIAN DESTINATIONS IN VICINITY

The detailed view in Figure 5 below shows the site layout of the pedestrian destination site. As shown in the photo, no sidewalks currently exist on the site. It also indicates the presence of stormwater features between the road and the building.

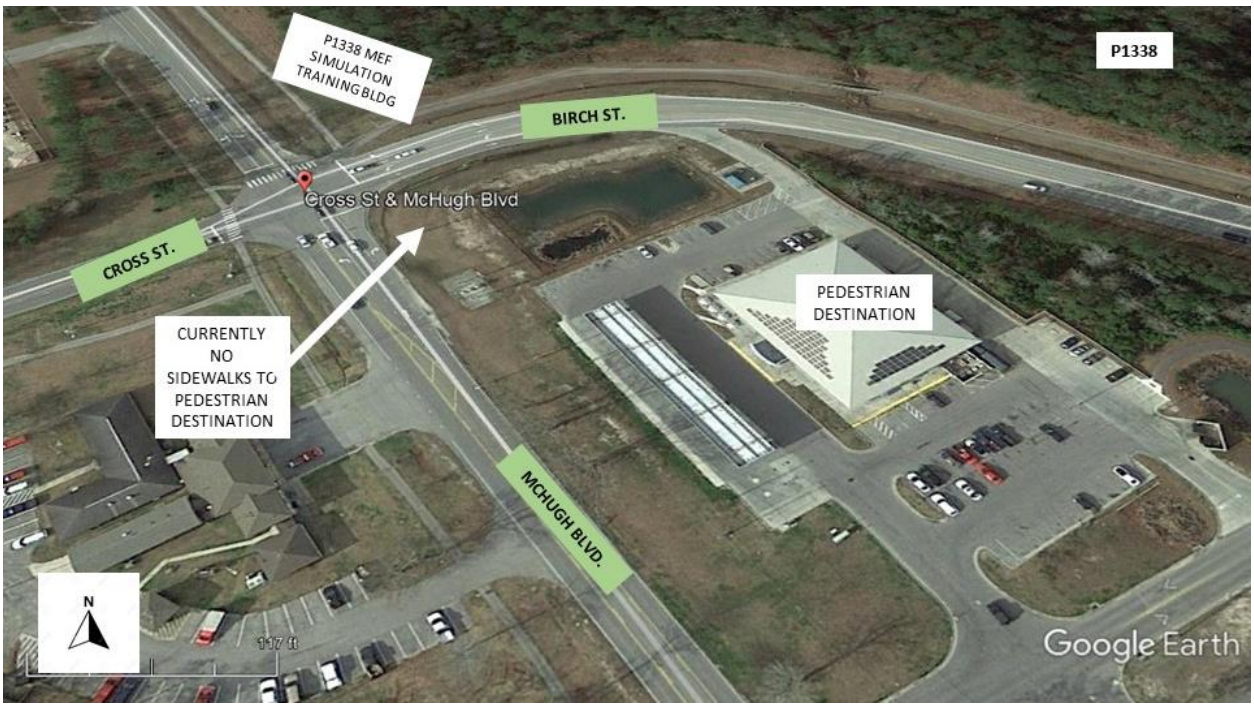


Figure 5: Pedestrian Destinations and Vicinity

3.2.3.4. Parking

A Traffic Signal Warrant Study must be conducted at the intersection of McHugh Boulevard and the ingress/egress driveways to the new P1338 and P1533 building sites. It is anticipated that most of the traffic will be traveling north on McHugh Boulevard when entering the site and turning left onto McHugh Boulevard when exiting the site.

3.2.3.5. Service Access

See parking above. Service access will be addressed by the same ingress/egress driveways as for parking.

3.2.3.6. Pedestrian Access and Circulation (flow, paths, and sidewalks)

To address the sight distance issue on Birch Street approaching the intersection, it is recommended that speeds be reduced, and Advanced Warning Signs posted to make drivers aware of the upcoming intersection signal and potential presence of pedestrians. A Speed Study must be performed to determine actual versus current posted speed and inform the decision to reduce speeds through posted speed limit signs and other potential traffic calming actions (such as redesigning the lane markings).

A primary concern to the building and site planners for this site is the lack of safe pedestrian facilities on all sides of the intersection and to the pedestrian destination in the southeast quadrant of the intersection.

All four legs of the intersection must have Pedestrian Signals installed. All four legs should also have marked crosswalks.

The pedestrian destination currently has no sidewalks leading to it. Although there are pedestrian facilities on the other three legs of the intersection, Human Factors of Traffic Safety suggest that people will not want to take the long way around. Visitors to the new P1338 and P1533 buildings are likely to be tempted to cross at this dangerous intersection to get to the pedestrian destination across the street. A system of pedestrian trails and sidewalks must be provided to improve pedestrian movement between the Catholic Church/Mini-mart to the project site and must comply with ABA.

3.2.4. Landscaping

As described above, the site is almost entirely wooded with long-needled pines. Understory species consist of wax myrtles and ground cover such as Virginia creeper. Trees will be preserved in areas where no development or grading occurs.

3.2.5. Site Utilities

An 8-inch water main runs approximately along Birch Street and along McHugh Boulevard.

An existing sanitary sewer line runs southeast along McHugh Boulevard and continues southeast along Birch Street.

An existing overhead 12.47kV, three phase, three wire, 60 Hertz electrical power line runs along McHugh Boulevard and Birch Street.

There are existing telecommunications and fiber optics utilities running roughly parallel to McHugh Boulevard.

3.2.6. Signage

As described above, the site is almost entirely wooded with no existing building identification signage or building number signage present.

3.3. Site Development Requirements

3.3.1. General Site

Site development must be designed in conformance with UFC 3-201-01. *Civil Engineering*. The bubble diagram site plan, with project limits of 15.0 acres, has been created to convey a potential general site layout and is included in Part 6. The bubble diagrams are the user's preferred general layout; however, the Contractor is responsible for the creation of a complete construction plan set meeting the requirements of this RFP for the construction of the project. The Contractor will be using the documents provided in this RFP to determine their bid.

Wetlands, as noted in the existing GIS information, are present just outside the limits of the project. It is not anticipated, based on the conceptual plan, that any of the existing wetlands will be disturbed as part of this project. In the event that the design results in disturbance of wetlands, the Designer of Record (DOR) must prepare all required permits for work required in tidal and non-tidal wetlands and wetland buffers or in streams designated as ephemeral or perennial. Coordinate with the Contracting Officer and MCB Camp Lejeune environmental staff.

The building must face McHugh Boulevard.

The building will require 100 parking spaces for instructor staff and advanced students. The concept site plan shows a total of 400 spaces.

All parking bay access pavement, drive aisles, dumpster and loading routes, and all pavement anticipated for emergency vehicle access must be rated for HL-93 loading and the section must be based upon the Contractor's geotechnical engineer's calculations and recommendations. See minimum pavement section requirements for bidding in Section 3.3.9.1.

The minimum width of driveway entrances are to be 50'.

A segregated MOV-only drive aisle must be provided for access to the outdoor training areas.

All parking stalls may be light-duty pavement based on the Contractor's geotechnical engineering calculations and recommendations.

All disturbed area not built upon with impervious surfaces must be graded to drain and covered in centipede sod.

Provide an all-weather access road (pavement or gravel) to the chiller.

The existing asphalt path (trail) running parallel to McHugh Boulevard must be relocated and reconnected. The trail must be asphalt and match the existing width.

All-weather access must be maintained along the north side of the parking lot and surrounding the proposed building.

The facility does not require a fenced perimeter. However, an 8-foot tall ornamental (not chain-link) Restricted Security Fence required for classification of exercises must envelope the building, concrete and grassed training areas, and parking area directly adjacent to the building to the northwest.

Provide each covered break area with four picnic tables and AT/FP compliant trash receptacles.

Provide a concrete dumpster pad for two trash and one recycling dumpsters in the 100-stall employee parking lot. The dumpster pad must extend to encompass the front wheels of the pick-up vehicle. The dumpster pad must have a masonry screen wall of building materials similar in nature and color to the proposed facility.

All paved areas must have perimeter concrete curb or curb and gutter. Gutter is required at any point where water will flow parallel to the bottom of curb.

Concrete sidewalk must be provided for pedestrian circulation and must be a minimum of 5 feet in width. Sidewalk must be a minimum of 4-inch thick concrete.

3.3.2. Site Demolition

Demolition of the existing site features will require both above-ground and sub-surface demolition. This site will require select demolition, as certain features will be required to remain as-is or be relocated as part of this project. Contractor must ensure access to the adjacent facilities at all times during demolition and construction.

Several facilities must be demolished after final construction of the proposed project included in this RFP Package. Demolition must not occur until all units within the facilities have relocated to the facilities constructed with this RFP package. The facilities to be demolished are Buildings 125, 125A, 127 and H13. Two prefabricated trailers, Buildings 125B and 125C, must be removed from their current locations.

The demolition of these buildings includes the complete removal of the building, including all shallow foundations, foundation walls, slabs, pits, pile caps, etc. Deep foundations, such as

piles, must be removed to a minimum depth of 48 inches below existing grade. Demolish all utilities serving each building as described further in this section and ESR G10. Site demolition must include the demolition and removal of all pavements and sidewalks specific to serving the building. Main circulation sidewalks or pavements serving facilities to remain must not be disturbed. Following demolition, all graded slopes must conform with UFC 3-201-01, and direct runoff toward existing drainage structures or ditches, with flow patterns matching existing to the extent feasible. Any pavement demolition that terminates at existing pavement must be terminated by saw cutting at the limits of demolition in neat straight lines.

Utility service lines to each building must be removed back to the main and capped. Do not demolish existing pavement to remain to facilitate the removal of a utility service line to be demolished. Where underground utilities to be demolished pass under pavement not to be demolished, cut the utility at each edge of pavement and fill the utility remaining under the pavement with flowable fill and abandon in place. Continue removal of the utility to the main on the far side of the pavement if applicable. If the utility main is within the pavement, cut and cap the service line at the edge of pavement and abandon the utility in place in accordance with applicable State or Federal regulations.

Prior to the demolition of any utility, coordinate with the utility owner to ensure the removal of the service line will not disrupt service to facilities to remain. Some telecom services may pass through buildings scheduled for demolition to buildings scheduled to remain.

For natural gas demolition, notify Piedmont Natural Gas (PNG) when a facility is ready for demolition. Once the facility has been confirmed for demolition PNG will remove and retire the meter. PNG will valve off the lateral at the main and will disconnect both ends of the gas lateral, the meter side and the main side. To depict retirement, PNG will remove the lines 4 to 5 feet from each end. Remove the remaining line left by PNG. Once a meter is retired the lateral cannot be reused for a new facility.

Any structure or pavement not to be demolished that is damaged during construction or demolition must be repaired or replaced at the expense of the Contractor.

Demolition of buildings associated with telecommunications must coordinate with telecommunications services. Demolition of telecommunications pathways must be coordinated with base telephone office.

3.3.3. Utilities

There is an existing 8-inch water main that runs approximately along Birch Street and along McHugh Boulevard. This main will serve as the source for both potable and fire protection water service.

There is an existing 8-inch gravity sanitary sewer line that runs southeast along McHugh Boulevard and then continues southeast along Birch Street. This main will serve as the connection point for the building’s sanitary sewer service.

Connect to a pole located on either McHugh Boulevard and Birch Street for the primary electrical service for the building. Extend primary service underground from the selected pole to the pad-mounted transformer.

Existing telecommunications and fiber optics utilities running roughly parallel to McHugh Boulevard must be relocated to a minimum of 10 feet outside of the proposed building footprint.

PNG will be providing natural gas service to the new facilities. During the design phase, invite PNG representatives to design review meetings, including Michael Lilly – PNG Commercial and

Residential Sales Specialist – Michael.lilly@duke-energy.com 252-808-7292 and Bobby Gurganus – PNG Construction – Bobby.gurganus@duke-energy.com 252-670-9613. Coordinate with PNG to depict the gas line routes on the civil utility site plans. The natural gas lines must be included in the project GIS deliverables. Provide projected loads of natural gas equipment to PNG for gas meter sizing. Notify PNG at least 6 months prior to in-service date to install new laterals and meters.

3.3.4. Signage

Provide building identification signage, building number signage, and wayfinding signage in accordance with the activity's BEAP.

3.3.5. Stormwater Management

Provide a complete stormwater management design that meets or exceeds UFC 3-210-10 *Low Impact Development*, UFC 3-201-01 *Civil Engineering*, and North Carolina Stormwater Management requirements. Provide calculations that demonstrate compliance with all three criteria.

A storm drainage system must be designed and constructed to collect and convey the ten-year peak flow from the building and other new impervious areas into a proposed Stormwater Control Measure (SCM). Subsurface precast concrete structures, such as catch basins and drop inlets, will collect stormwater. Reinforced concrete pipe (RCP) with watertight joints, where appropriate, will convey the stormwater toward the stormwater SCM, which will retain and treat the stormwater before it is discharged toward the nearby waterway. Roof downspouts must tie directly to drainage structures underground. The use of grassed swales, pre-treatment areas, and other low-impact stormwater strategies throughout the site are encouraged, where appropriate.

Provide a stormwater SCM onsite that is designed to meet NCDEQ regulations for stormwater detention and water quality.

While specific SCM devices are not required at Camp Lejeune, preferences based upon historic performance of devices are noted. The DOR should be aware of the challenges of providing functioning devices at the sites. The goal is to provide functioning and compliant devices that are not maintenance intensive nor require specialized or proprietary materials. The DOR should be cautioned in the use of sand filters; Camp Lejeune has had experience with the majority of sand filters being compromised by the development of algae crust on the surface of the filters. A third-party inspector is recommended to be specified for the installation of SCMs. Pre- and post-construction infiltration tests must be conducted for any SCMs that rely upon infiltration. A 3-day drawdown with a factor of safety of 2 must specified for SCMs to ensure continued stormwater compliance. Do not allow the conversion of sediment traps into infiltration SCMs. The sediment trap must be separate from the SCM to protect against premature failure. The use of heavy equipment in the bottom of infiltration devices will not be allowed due to the risk of compaction.

Overland relief for large storm events must be analyzed. Calculations must demonstrate that the 100-year storm routed through proposed stormwater management features will not reach higher than 1 foot below the Finish Floor Elevation of adjacent buildings. Demonstrate that the 100-year storm routed through proposed stormwater management features will not flood critical vehicle or pedestrian pathways.

Additional criteria that must be considered by the Contractor:

- Project involves the disturbance of over 5,000 square feet. Therefore, requirements under Section 438 of the EISA will be enforced. The policy directs all DoD construction projects and redevelopment projects with footprints greater than 5,000 square feet to implement LID techniques to maintain predevelopment hydrology to the extent feasible. Coordinate with Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0869.
- Project involves the disturbance of 1 or more acres of land and will require a state-approved sedimentation and erosion control plan and stormwater permit. For questions regarding stormwater requirements coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application, contact Public Works Division, Design Branch at 451-2213.
- Project involves construction of an additional 10,000 square feet of impervious surface area. Permitting is required through the NCDEQ – Energy, Mineral and Land Resources Division (NCDEMLR) and the design and construction of approved SCMs (Coastal County Rules). Coordinate with Water Quality Manager, EQB at 451-9518 and the Stormwater Manager, ECB at 451-9657.
- If the project affects any existing built upon area (BUA) (impervious area) that is currently covered under an existing state-issued stormwater permit, that permit will need to be modified. Coordinate with Public Works Design Branch at 451-2213.
- If additional new BUA above and beyond the existing amount is proposed, then at a minimum, a high-density SCM is required to treat runoff from the new BUA. If the existing BUA within that drainage area and its runoff cannot be regraded or rerouted, then the proposed SCM must be designed to accommodate all runoff within its drainage area. A full stormwater permit application will be required. Coordinate with Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0896. Coordinate with Public Works Division, Design Branch at 451-2213.
- Per direction from Public Works Division, each project site is considered to be a separate project. Building demolition, regardless of which project the building is demolished under, can be used to offset impervious area increases from new construction if the demolished building and the new building are adjacent to each other. There is no time limit between the demolition completion and new construction starting.

3.3.6. Sediment and Erosion Control

Erosion and sediment control must be designed and installed per the NCDEQ.

To prevent potential erosion and sedimentation from entering the surrounding wetlands, numerous erosion control methods and practices must be used. Place a stone construction entrance at a strategic location within the project limits to serve the site. A sediment basin with skimmer outlets and riser, if required, must be provided in the initial construction phase. This sediment basin must be separate from any proposed stormwater SCMs. The conversion of a sediment trap or basin to a stormwater SCM is not allowed. Basins may be constructed before the site is cleared and temporary swales graded to direct sediment laden stormwater toward the basin. Install a temporary construction fence around the entire limits of disturbance. Silt fence and silt fence outlets must be used around the perimeter of the of the construction sites to prevent sediment from exiting the disturbed areas. Install a double row of silt fence along any wetland buffers. Erosion control measures must be in place and approved by the local erosion control inspector representing NCDEQ before clearing and grading operations begin.

Once stormwater structures are installed and brought to grade, inlet protection must be provided at all inlets to prevent sediment from entering the stormwater system. The site will be paved, and disturbed areas will be stabilized with vegetation near the completion of the project.

Additional criteria that must be considered by the Contractor:

- Ensure sediment does not leave a construction site of any size as a result of land-disturbing activities. Coordinate with Water Quality Manager, EQB at 451-9518 and the Stormwater Manager, ECB at 451-9522.
- Project involves the disturbance of 1 or more acres of land and will require a state-approved sedimentation and erosion control plan and stormwater permit. For questions regarding stormwater requirements, coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application, contact Public Works Division, Design Branch at 451-2213.

3.3.7. Landscaping

Landscaping must comply with BEAP guidelines with regard to street trees, parking lot landscaping, outdoor amenities, and stormwater management. Landscaping proposed near the building must comply with all AT/FP requirements. See also Part 3 – Chapter 6 Section G20 for specific landscape requirements and plant establishment and maintenance requirements.

McHugh Boulevard frontage will provide a minimum 6-foot planting strip with deciduous trees planted at approximately 40 feet on-center, depending upon proposed utility locations. The Camp Lejeune Trail is included on this frontage and will be upgraded to an appropriate width.

Intersection of McHugh Boulevard and Birch Street offers an opportunity to create a neighborhood focal point; this location would be appropriate for a small seating area as the Camp Lejeune Trail turns from McHugh Boulevard to Birch Lane at this location.

Parking areas must be screened using a variety of tree and shrub planting to reduce visual impact from adjacent roadways. A minimum of 15 percent of the surface area of the parking lot must be shaded by deciduous trees within 10 years of installation. A minimum of 5 percent of the parking lot must be pervious planting bed.

Site furnishings must be provided within outdoor seating areas and will be constructed of durable materials with colors in compliance with the BEAP and surrounding examples.

Site grading must be designed to preserve pockets of existing trees to the extent feasible. Preserved trees must be monitored for 1 year after construction activity has ceased; dead or dying trees must be removed and replaced as directed by the Contracting Officer.

Turf areas must be limited to the extent feasible in favor of naturalized planting and groundcover. Turf species in formal lawn areas must be centipede grass; all lawn areas must be sodded.

Trees to remain within the limits of disturbance will be monitored for 1 year after construction and replaced as directed by the Contracting Officer. Turf areas must be graded and sodded for permanent stabilization. Other areas identified as turf must utilize centipede sod.

3.3.8. Permits

- Erosion and sediment control permit – NCDEQ.
- Stormwater management permit – NCDEQ.

- Water extension permit – NCDEQ.
- Sewer extension permit – NCDEQ.
- Wetlands Disturbance – U.S. Army Corps of Engineers (USACE)

3.3.9. Geotechnical Earthwork, Site Preparation, and Sitework Requirements

3.3.9.1. Criteria for Bidding

Base bids on the following criteria:

- Stripping depth of surficial soil material in existing grass surfaced areas: 6 inches.
- Stripping depth of surficial soil materials and root mat in existing wooded areas: 12 inches.
- Grubbing depth in existing wooded areas: 24 inches.
- The stabilized groundwater was observed approximately 5 feet below the surface. The underlying clay layer could create a perched water table 4 feet below current site grades.
- Seasonal high-water table depth: 2 feet.
- Excavated onsite soils will not be suitable for re-use as structural fill.
-
- Provide preloading or surcharging to mitigate excessive consolidation settlement associated with site grading impacts in all areas where finished site grade increases are 2 or more feet above existing site grades.
- Need and depth of predrilling or spudding to facilitate pile installation: 10 feet.
- Provide a preconstruction survey and vibration monitoring during pile installation: Not applicable. Provide specialized site earthwork construction methods and/or equipment: Not applicable.
- Minimum heavy-duty asphalt pavement section: 2-inch NCDOT surface course asphalt, 3-inch NCDOTbase course asphalt, 8-inch NCDOT aggregate base course.
- Minimum light-duty asphalt pavement section: 2-inch NCDOT surface course asphalt, 8-inch NCDOT aggregate base course.
- Minimum sidewalk section: 4-inch – 3,000 psi compressive strength Portland Cement Concrete,
- Minimum dumpster pad/equipment pad section: 8-inch – 5,000 psi compressive strength Portland Cement Concrete, #4 bars at 12 inches on-center each way.

3.3.9.2. Earthwork and Site Preparation Criteria

The Contractor’s geotechnical engineer must monitor site stripping operations on a full-time basis. Stripped surficial soil materials will be properly disposed of per Specification 01.57.19. No soils are to leave MCB Camp LeJeune. Imported topsoil will be provided for the project where needed.

The underlying soils that will be exposed after completion of site stripping and undercutting will have a tendency to become softened and unstable when saturated and worked or subjected to construction equipment. Provide the necessary measures to address these marginal subgrade support conditions throughout design and construction to obtain required soil support while maintaining progress for completion on schedule. Do not allow construction traffic to travel directly on exposed subgrades. Provide geosynthetic reinforced haul roads and staging pads to facilitate construction traffic access across the site and to protect the underlying subgrade from deterioration. The Contractor is responsible for all costs associated with any necessary measures to repair subgrades deteriorated by construction traffic and exposure to water. Determination of unsuitable subgrade conditions and need to implement remedial measures will be made by a NAVFAC geotechnical engineer and subject to the approval of the Contracting Officer.

Provide control of groundwater and surface water encountered during construction. Provide temporary dewatering and positive site drainage to prevent conditions that will cause deterioration of exposed subgrades and open excavations. Do not allow deterioration of exposed subgrades to create interruptions to the progress of construction. Establish storm drainage features at the earliest stages of site development. Install and maintain all necessary temporary water containment facilities, channels, ditches, and diversions for groundwater and surface water control to include all necessary temporary environmental controls. Provide a multiple well point dewatering system for any utility or foundation excavations that extend down to and below the groundwater level.

The site currently contains or may have formerly contained developments such as structures, surface pavements, haul roads, above- and below-ground utilities that will require demolition and removal prior to earthwork operations under this contract. The required removal depth of the existing site features is expected to be highly variable. It is reasonable to anticipate that excavations made in areas of known prior development will encounter additional materials beyond what is specifically indicated on the test boring records that will need to be removed.

Imported select material and backfill and fill material will be required for filling all undercut excavations; grubbing excavations; excavations resulting from the demolition of existing utilities or foundations, including new utility or foundation excavations within the planned building and pavement areas; and for grading fill in pavement and building areas. Provide imported select material for the top 2 feet of fill required beneath all pavements, foundations and slabs. Provide imported backfill and fill material in all other structure and pavement locations. Select material must meet ASTM D2487 classification symbols GW, GP, SW, SP, and SP-SM with not more than 12 percent passing the U.S. No. 200 sieve by ASTM D1140 and plasticity index not greater than zero by ASTM D4318. Backfill and fill material must meet ASTM D2487 classification symbols GW, GP, SW, SP, SP-SM, and SM and have a maximum of 20 percent passing the U.S. No. 200 sieve by ASTM D1140 and maximum liquid limit of 30 and maximum plasticity index of 9 by ASTM D4318.

Excavated existing onsite soils will only be reused as general fill beyond the limits of surface bearing structures (e.g., pavements, buildings, and pipe trenches) and beyond the limits of any undercut excavations, provided the material meets the project requirements. All soil material must exhibit the characteristics required to compact the soil to the density and performance specified for the intended locations. Excavated onsite soils will be amended (e.g., mixed with lime, cement, or blended with imported structural materials) as necessary to facilitate reuse as general fill and backfill and fill material. All fill materials will have a maximum particle diameter of 3 inches and will require moisture conditioning prior to placement and compaction to within

approximately 2 percent of the optimum moisture content as defined by ASTM D698 or ASTM D1557. Choose compaction standard as recommended by Geotechnical Engineer of Record.

The Contractor will be responsible for maintaining erosion control measures, preventing segregation, and moisture conditioning for any excavated onsite soil and aggregate materials and any imported soil and aggregate materials stockpiled onsite.

All excavated materials that cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material Is permitted to leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer. The Contractor is responsible for all costs associated with the management and disposal of surplus excavation spoils.

4.0 BUILDING REQUIREMENTS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

4.1. Space Tabulation

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
Administrative					
Private Office	Director	159	1		
Private Office	Deputy Director	108	1		
Private Office	Site Manager	117	1		
Private Office	OIC	153	1		
Open Office	NCOIC/Supply Clerk	348	2	Assumed 64 NSF per person	
Open Office	Simulator Operator	1,229	19	Assumed 64 NSF per person	
Open Office	Simulations Analyst	1,050	16	Assumed 64 NSF per person	
		3,164	**41**		
Classroom					
FIRE Classroom #1		405			
FIRE Classroom #2		405			
FIRE Classroom #3		405			
FIRE Storage		595			
Simulation Classroom #1		1,110			
Simulation Classroom #2		1,565			
Simulation Classroom #3		1,565			
Simulation Classroom #4		1,565			
Simulation Classroom #5		1,565			
Simulation Classroom #6		1,565			
Simulation Classroom #7		1,565			
Simulation Classroom #8		1,565			
Simulation Classroom #9		1,565			
Simulation Classroom #10		1,565			
Simulation Classroom #11		1,565			
		18,570	**0**		
Exercise Control					
Exercise Control		1,270	30		
Secure VTC		429	8		
		1,699	**38**		
Simulation Control Areas					
Simulation Control Room		1,564		Server room	
Sim Control Secure Comm		358		Vault and servers	
Admin Server		445			
Secure Workstation		147	2		
		2,514	**2**		

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
Training Operations Support					
Storage/Shipping/Receiving		2,033			
Library/File Storage/Plotter		1,026			
Vestibule		333			
Lobby		693			
Entry Workstation		181			
AV Storage		181			
Ready Room/Auditorium		1,675			
Storage		1,114			
Plotter/Laminator		127			
Brief/Debrief #1		295			
Brief/Debrief #2		295			
Brief/Debrief #3		592			
Brief/Debrief #4		592			
		9,137	**0**		
Common Spaces					
Break Room	For Admin	360			
Break Room	For Simulation	685			
Mudroom		194			
Heads (male/female/transgender)	For Simulation	990		4 showers: 2 male/2 female, 1 head/shower: all gender	
Heads/Lockers (male/female/transgender)	For Admin	893		18 lockers: 9 male/9 female, 4 showers: 2 male/2 female, 1 head/locker/shower: all gender	
Mother's Room		77			
Janitor's Closets		149			
Entrance Canopies (3)		295		Half of 590 SF	
		3,643	**0**		

TOTAL PROGRAMMED SPACE	**38,727 NSF**	**81 PN**
MAXIMUM ALLOWABLE GSF (PER 1391)	53,443 GSF	

Table of Utilities

Room Name	Comments	Additional Room Requirements
Utilities		
Mechanical	3,220 SF	
Electrical	620 SF	
Telecom	528 SF	

Corridors must be a minimum of 6 feet wide. However, AE2 will be responsible for determining if greater corridor widths are required by code.

Contractor must provide actual area in both square feet and square meters in proposals.

AE2 must verify with Camp LeJeune if 2 brief/debrief rooms adjacent to Exercise Control will be required. If not, their area must be added to Exercise Control. See Architectural Block Diagram.

4.2. Space Relationships

Refer to the space arrangement shown in the architectural block diagram. The diagram incorporates the spaces defined in the space tabulation. The new training facility will consolidate training programs that are currently held in three separate buildings. The design of the facility must provide spaces with the flexibility for a diverse number of trainings and trainees operating within classified and unclassified training areas. The building's administrative personnel entrance will be separate from the trainees' entrance. Trainees will enter the facility through a lobby with mobile-phone lockers then move to a Brief/Debrief Room. Trainees participating in classified trainings will then move into the Ready Room/Auditorium, an auditorium with sloped floors and a capacity for 100 persons. An Exercise Control Room will be in the middle of the facility, to control all training exercises from a central location.

There will be only two unclassified Simulation Rooms. The other nine Simulation Rooms will be classified. Simulation Rooms will be designed to be column free with acoustical movable partitions between them for maximum flexibility and to provide common training areas for small or large groups. The FIRE area will be in the unclassified part of the building and consists of 3 classrooms of equal size plus a dedicated storage room. In addition to the administrative areas and FIRE, the Library/File Storage/Plotter Room will also be in the unclassified area. Other rooms located in the classified area are Simulation Control (Server Room), Secure Workstation, Simulation Control Secure Communications (Servers), Server Administration, Secure Video Teleconferencing (VTC), Storage Room. Both the Secure Workstation and Simulation Control Secure Communications areas are confined rooms that act as "vaults."

The facility will require pervious and impervious exterior training areas that will require direct access to toilet/locker/shower facilities, which will also be accessible from interior areas. Intended for students, these will be two separate toilet facilities, one for men, the other for women, and each will include two shower stalls. The building's administrative areas will have separate toilet facilities for men and women. Each will include two shower stalls with an adjacent area for lockers. (There will be a total of eight shower stalls in the building, two per toilet facility). There will also be separate Break Rooms, one for students, the other for administrative personnel.

4.3. Exterior Character

The new single-story training center shall comply with the Hadnot Point section of the BEAP. All exterior elevations during design and exterior materials during construction must be approved by the MCB Camp Lejeune Architectural Review Board. All building exterior architectural design will be reviewed and approved by the MCB Camp Lejeune Architectural Review Board.

IMPERVIOUS TRAINING AREA

PERVIOUS TRAINING AREA

FENCE

NON-CLASSIFIED

CLASSIFIED

DIRECTOR

NCOIC/SUPPLY CLERK

MUDROOM/HEADS OPEN TO & FROM OUTSIDE AUDIENCE

PLOTTER/ LAMINATOR

SECURE WORKSTATION (VAULT)

SIM CONTROL SECURE COMM (VAULT) (SERVERS)

CANOPY

STORAGE/ SHIPPING/ RECEVING

MECH.

MECH.

MUDROOM

HEADS/ SHOWERS

JAN

ELEC. ROOM

BREAK ROOM

SECURE VTC

SERVER ADMIN

SIM CONTROL (SERVER ROOM)

SIMULATION (TYPICAL OF 2)

CANOPY

TR

ELEC.

OIC

SIM OPERATOR

SIM ANALYST

JAN

HEADS/ LOCKERS/ SHOWERS

MOTHER'S ROOM

FIRE

FIRE

FIRE STOR.

FIRE

TR

LIBRARY/FILE STORGE/ PLOTTER

2 BRIEF/DEBRIEF

EXERCISE CONTROL

AUDITORIUM/ READY ROOM

STORAGE

SIMULATION

TR

ELEC.

FOLDING PARTITION(TYP)

SIMULATION (TYPICAL OF 6)

POV PARKING

DEPUTY DIR

SITE MGR

ADMIN BREAK ROOM

SIMULATION (TYPICAL OF 2)

BRIEF/ DEBRIEF

LOBBY

BRIEF/ DEBRIEF

AV STORAGE

ENTRY WORKSTATION

VESTIBULE

CANOPY

ENTRY

FENCE

53,148	GSF BUILDING
295	GSF CANOPIES
53,443	GSF TOTAL
53,443	GSF per 1391

LEGEND

- ADMINISTRATIVE
- CLASSROOM
- COMMON SPACES
- EXERCISE CONTROL
- SIMULATION CONTROL AREAS
- TRAINING OPERATIONS SUPPORT
- UTILITIES
- FOLDING PARTITION
- BAY DOOR
- ENTRY

13 FEBRUARY 2020

NAVFAC Naval Facilities Engineering Command

ARCHITECTURAL BLOCK DIAGRAM
II MEF SIMULATION/TRAINING CENTER - P1338

JACOBS

5.0 ROOM REQUIREMENTS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

5.1. FINISH AND FF&E SCHEDULE

The following chart is provided for defining general room finishes and furniture, fixtures, and equipment (FF&E) items for the II MEF Simulation Training Center. Special interior finishes and FF&E items beyond those outlined below are provided in the Additional Room Requirements. The intent of each room requirement sheet is to highlight special, unique, additional, or exceptional room-specific requirements. These tables are not all-inclusive and the requirements listed should be considered as an addition to the typical requirements outlined in the UFCs, ESRs, & PTSs.

FF&E and AV Equipment will be funded separately as a modification to the construction contract, with the exception of fixed furnishings (SID). Infrastructure to support all FF&E and AV is included in the construction contract. Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with Activity at concept Design workshop (CDW).

Refer to ESR D50 for specific electrical and audio visual (AV) requirements. Coordinate with the Base to determine preferred locations of fixed artwork.

FFE to include Automated External Defibrillators as required by National Fire Protection Association's (NFPA) 101 Life Safety Code and Marine Corps Order (MCO) 11000.11A. Access to an AED shall be provided for all Assembly occupancies, fitness centers and high-risk training centers and as required by NFPA 101.

Room Typical guidelines:

1. Private office required to be a minimum 9'-0" wide (10'-0" wide is preferred).
2. Brief/Debrief rooms for 10+ people with no side chairs are required to be a minimum 12'-0" wide.
3. Workstations in open office areas will be a benching / desking system. Powered Cubicle walls will be used minimally.
4. Ceiling heights will be 10'-0" unless notes otherwise. See additional Room Requirements
5. All base to be 6" high

Room	Floor Finish (C3020)	Base Finish (C3020)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
Administrative						
Director Office (Large)	CPT	RB	PNT	ACT	(1) Large Desk (2) Wardrobe/ Filing Cabinet/Other Storage Solution (1) Task Chair (1) Clock	(1) Marker Board (min.)
Deputy Director Office (Small)	CPT	RB	PNT	ACT	(1) Desk (2) Wardrobe/ Filing Cabinet/Other Storage Solution (1) Task Chair (1) Clock	(1) Marker Board (min.)
Site Manager Office (Small)	CPT	RB	PNT	ACT	(1) Desk (2) Wardrobe/ Filing Cabinet/Other Storage Solution (1) Task Chair (1) Clock	(1) Marker Board (min.)
OIC Office (Large)	CPT	RB	PNT	ACT	(1) Large Desk (2) Wardrobe/ Filing Cabinet/Other Storage Solution (1) Task Chair (1) Clock	(1) Marker Board (min.)
NCOIC/ Supply Clerk Open Office	CPT	RB	PNT	ACT	(2) Admin Workstations (2) Storage Solutions (min.) (2) Task Chair (1) Clock	(1) Marker Board (min.) (1) Multi-function Printer (GFGI)
Simulator Operator Open Office	CPT	RB	PNT	ACT	(15-20) Open Office Workstations (15-20) Task Chair (2) Storage Solutions (min.) (1) Clock	(1) Marker Board (min.) (1) Multi-function Printer (GFGI)
Simulations Analyst Open Office	CPT	RB	PNT	ACT	(15-20) Open Office Workstations (15-20) Task Chair (2) Storage Solutions (min.) (1) Clock	(1) Marker Board (min.) (1) Multi-function Printer (GFGI)
Classroom						
FIRE Classroom (3) total	RAF/ ESD LAMINATE	RB	PNT	ACT	(6) Training Tables (6) Task Chairs (1) Clock (AR) Free Standing Movable Partitions	Finishes to be dark. Hard wall Partition separation. Classrooms to be subdivided with Movable Partitions.
FIRE Storage	RAF/ ESD LAMINATE	RB	PNT	ACT	Shelving-TBD Carts-TBD	Adequate space for equipment storage without disassembling
Simulation Classroom (9) total (Classified)	RAF/ ESD LAMINATE	RB	AFP	ACT	(20-40) Training Tables (20-40) Task Chairs (1) Dual Flat screen Mobile Cart (1) Clock	(1) Printer/Room (GFGI) Require dark finishes Classrooms to be subdivided with Movable Partitions. **BID OPTION: Operable Partitions (w/door access)**
Simulation (2) total (Classified / Non-Classified)	RAF/ ESD LAMINATE	RB	AFP	ACT	(20-40) Training Tables (20-40) Task Chairs (1) Dual Flat screen Mobile Cart (1) Clock	(1) Printer/Room (GFGI) Require dark finishes Classrooms to be subdivided with Movable Partitions. **BID OPTION: Operable Partitions (w/door access)**
Exercise Control						
Exercise Control	RAF/ ESD LAMINATE	RB	PNT	ACT	(30 min) Training tables (30 min.) Training Chair Flat screen for Media wall.	VTC Capability Media Wall: Front and Side walls.
Secure VTC	CPT	RB	PNT	ACT	(1) Conference Table (Voice/Data) (10) Conference Chairs	VTC Capability (1) Marker Board

Room	Floor Finish (C3020)	Base Finish (C3020)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
					(10) Side Chairs (1) Video Credenza (1) Flat Screen TV (1) Camera (VTC) (1) Clock	
Simulation Control						
Server Admin	LVT	RB	PNT	ACT	(4) Workstations (4) Task Chairs	
Secure Workstation	LVT	RB	PNT	ACT	(2) Workstations (2) Task Chairs	
Simulation Control Secure Comm	RAF/ CPT	RB	PNT	ACT	Network Lab Benching (2 operator area) (2) Task Chairs	(1) GSA 4 drawer safe (GFGI) Network Racks (GFGI)
Simulation Control Room	RAF/ CPT	RB	PNT	ACT	(4) Network Benching with 4 level (Floor, Desktop, Shoulder, Top of head) (4) Task Chairs	Network Rack (GFGI)
Training Operations Support						
Storage / Shipping / Receiving	SC	RB	PNT	PNT	Shelving (AR) (1) Hand truck	Elevated loading dock (NR) Rollup door Secure cages for computer storage and open floor space for general storage.
Library/File Storage/Plotter	LVT	RB	PNT	ACT	Flat files	Large Media Plotter (GFGI) High Density Filing **BID OPTION: Terrazzo Floor**
Vestibule	SC/WM	RB	PNT	PNT		
Lobby	LVT	RB	MAP	ACT	(200) Cellphone lockers	(1) Command Board Provide modular architectural panels/decorative paneling system for interest. Add a drop Gypsum Ceiling Cloud for visual interest. **BID OPTION: Terrazzo Floor**
Entry Workstation	CPT	RB	PNT	ACT		
AV Storage	LVT	RB	PNT	ACT		(2) VTC Mobile Carts
Ready Room/ Auditorium	CPT	RB	AFP / MAP	ACP	Fixed Seating (w/ tablet arm) Sloped floor preferred (4 Total) Flat screens front and side wall. (1) Smart Podium	VTC Capability Provide modular architectural panels/decorative paneling system with integrated flat screens.
Storage	SC	RB	PNT	ACT		
Plotter / Laminator	LVT	RB	PNT	ACT	(1) Shredder	Large Media Plotter (GFGI) Laminator (GFGI) **BID OPTION: Terrazzo Floor**
Brief/Debrief (2-4)	CPT	RB	AFP	ACT	Conference room furniture (1) Smart Podium (1) Flat Screen.	Markerboard
Common Spaces						
Break Room (Admin)	LVT	RB	PNT	ACT	Tables/chairs (maximize seating), (1) Refrigerator (2) microwaves	
Break Room (Simulation)	LVT	RB	PNT	ACT	Tables/chairs (maximize seating) (1) refrigerator (3) microwaves	
Mudroom	SC	RB	PNT	PNT	Provide lockers	Solid surface countertop
Heads (Men / Women / Transgender)	PFT	PWT	PWT	PNT	Provide lockers	Metal Cove trim to be used between wall tile and floor tile. Showers to have solid surface surround.

Room	Floor Finish (C3020)	Base Finish (C3020)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
						Solid surface countertop with integral sink.
Mother's Room	LVT	RB	PNT	ACT	Under-counter refrigerator and sink	Solid surface countertop
Janitor's Closets	SC	RB	WBE	WBE	Plastic laminate millwork with solid surface countertop	SS 3'-0" high at mop sink
Entrance Canopies (3)						
Mudroom	SC	RB	PNT	PNT		Lockers
Corridors	LVT	RB	PCMU	ACT		**BID OPTION: Terrazzo Floor**
Entry Portico (1/2)						
Utilities						
Telecom / TR	SC	RB	PT GYP	ACT		
Electrical	SC	RB	PT GYP	EXP/PT		
Mechanical	SC	RB	PT GYP	EXP/PT		

Legend

ACP	Acoustical Ceiling Panel
ACT	Acoustical Ceiling Tile
AFP	Acoustical Fabric Panel
CPT	Carpet Tile
ESD	Electro-Static Dissipative
EXP	Exposed
LVT	Luxury Vinyl Tile
MAP	Modular Architectural Panel
PCMU	Polished Concrete Masonry Unit
PNT	Paint
PFT	Porcelain Floor Tile
PWT	Porcelain Wall Tile
RAF	Raised Access Flooring
RB	Rubber Base
SC	Sealed Concrete
SS	Stainless Steel
WAP	Wood Acoustical Panel
WBE	Water-Based Epoxy
WVP	Wood Veneer Panel
WM	Walk-Off Mat

5.2. ADDITIONAL ROOM REQUIREMENTS

The Room data sheets are provided for special rooms in each facility to provide additional information for these rooms; and better define room requirements beyond those provided in the ESR, the Finish and FF&E Schedule located in section 5.1, and other parts of the RFP. If no room data sheet is provided for a space identified in this facility then the general requirements of this RFP, the Finish and FF&E schedule in section 5.1, and the referenced UFCs, Codes, and Standards apply.

P1338 MEF Simulation Training Building

Brief and Debrief Room

Space Characteristics

Function/Adjacencies: Shared area for the Briefing before training and Debriefing of Marines after training including an instructor.

Special Dimensions:
Ideal Plan Dimensions: See Space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC)-45 STC

Access: From entry area of the facility used by trainees. Close to the Ready Room/Auditorium.

Number of Occupants: 6 plus instructor

Other/Special Requirements: Podium
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Conference room furniture

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
C101001	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C101001	Fixed Partitions	SF		If used, CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted.
C102007	Interior Door Hardware			Hinges, stop, acoustical gaskets, kick-plate, hold-open devices.
C103004	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar. Flashing light?
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard over top of CMU.
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C301090	Other Wall Finishes	AR		Epoxy Paint on CMU if used.

Brief and Debrief Room

Space Characteristics

Function/Adjacencies: Shared area for the Briefing before training and Debriefing of Marines after training including an instructor.

Special Dimensions:
Ideal Plan Dimensions: See Space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC)-45 STC

Access: From entry area of the facility used by trainees. Close to the Ready Room/Auditorium.

Number of Occupants: 6 plus instructor

Other/Special Requirements: Podium
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Conference room furniture

Uniformat Section	Description	Qty	Size	Specific Requirements
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C303090	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones, controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide two multi-service recessed floor boxes at conference table.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.

Brief and Debrief Room

Space Characteristics

Function/Adjacencies: Shared area for the Briefing before training and Debriefing of Marines after training including an instructor.

Special Dimensions:
Ideal Plan Dimensions: See Space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC)-45 STC

Access: From entry area of the facility used by trainees. Close to the Ready Room/Auditorium.

Number of Occupants: 6 plus instructor

Other/Special Requirements: Podium
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Conference room furniture

Uniformat Section	Description	Qty	Size	Specific Requirements
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.

P1338 MEF Simulation Training Building

Classified Simulation Room-9 Required

Space Characteristics

Function/Adjacencies: Room to support CLASSIFIED Software based Marine Corps operational trainer simulations workstations on raised floors. Simulation software is controlled from these workstations to locations outside the new facility. Reconfigurable.
Column free, with moveable walls for flexibility for small or large groups.

Bid option: to provide folding partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Classified Corridor System

Number of Occupants: 20-40 PN seated at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Training Tables with dual monitor arms and task chairs. Provide movable room dividers.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	Seal concrete
C101001		SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C101001	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1010	Folding Partitions			BID OPTION: Folding partition between Simulation Rooms as indicated on Block Diagram
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted.
C102007	Interior Door Hardware			Hinges, stop, provide passage hardware. X10 or CR required.

Classified Simulation Room-9 Required

Space Characteristics

Function/Adjacencies: Room to support CLASSIFIED Software based Marine Corps operational trainer simulations workstations on raised floors. Simulation software is controlled from these workstations to locations outside the new facility. Reconfigurable.
Column free, with moveable walls for flexibility for small or large groups.

Bid option: to provide folding partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Classified Corridor System

Number of Occupants: 20-40 PN seated at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Training Tables with dual monitor arms and task chairs. Provide movable room dividers.

Uniformat Section	Description	Qty	Size	Specific Requirements
C103003	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room and on either side of Smartboard/touch screen on main wall of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C103004	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar.
C301003	Gypsum Wallboard Finishes	AR	AR	Cementitious backing units for wall tile installation where metal wall stud, CMU or concrete occurs.
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted impact resistant gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C301006	Acoustic Wall Panels	AR	30" h x 48" each	Wall-mounted acoustical panels
C3020	Raised Access Flooring	AR	24" x 24"	Base Bid-laminate surface. 12"

Classified Simulation Room-9 Required

Space Characteristics

Function/Adjacencies: Room to support CLASSIFIED Software based Marine Corps operational trainer simulations workstations on raised floors. Simulation software is controlled from these workstations to locations outside the new facility. Reconfigurable.
Column free, with moveable walls for flexibility for small or large groups.

Bid option: to provide folding partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Classified Corridor System

Number of Occupants: 20-40 PN seated at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Training Tables with dual monitor arms and task chairs. Provide movable room dividers.

Uniformat Section	Description	Qty	Size	Specific Requirements
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C302007	Wall Base Finishes	AR	AR	Sealed joint at base of wall between CMU and sealed concrete floor surface
C302011	Raised Access Flooring	AR	24" x 24" x 12"H	Finish provided from full line of manufacturers standards.
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C303090	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones, controlled via wall switches and AV podium control.

Classified Simulation Room-9 Required

Space Characteristics

Function/Adjacencies: Room to support CLASSIFIED Software based Marine Corps operational trainer simulations workstations on raised floors. Simulation software is controlled from these workstations to locations outside the new facility. Reconfigurable.
Column free, with moveable walls for flexibility for small or large groups.

Bid option: to provide folding partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Classified Corridor System

Number of Occupants: 20-40 PN seated at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Training Tables with dual monitor arms and task chairs. Provide movable room dividers.

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide two multi-service recessed floor boxes every 25 square feet, or portion thereof. Coordinate requirements and locations with user.
D5020	Lighting and Branch Wiring	60		Provide ceiling mounted duplex receptacles for synchronized simulation clock system. Coordinate receptacle locations with COR.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.
E102009 D503004	AV Equipment/ Television System			Provide CATV outlets at appropriate height for all wall-mounted monitors. Provide laptop interface from monitor location to work console table floor box. HDMI/VGA, Cable, Blue Ray and VCR's located in the Exercise Control Room or Auditorium.

Classified Simulation Room-9 Required

Space Characteristics

Function/Adjacencies: Room to support CLASSIFIED Software based Marine Corps operational trainer simulations workstations on raised floors. Simulation software is controlled from these workstations to locations outside the new facility. Reconfigurable.
Column free, with moveable walls for flexibility for small or large groups.

Bid option: to provide folding partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Classified Corridor System

Number of Occupants: 20-40 PN seated at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Training Tables with dual monitor arms and task chairs. Provide movable room dividers.

Uniformat Section	Description	Qty	Size	Specific Requirements
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1338 MEF Simulation Training Building

Exercise Control Room

Space Characteristics

Function/Adjacencies: A centralized control room for all facilities training and simulation functions. Video wall for Systems control. Heavy electronic equipment and loads.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: Off major corridor system adjacent to the Ready Room/Auditorium.
Number of Occupants: 5

Other/Special Requirements: Systems control TV type of monitoring stations and equipment to be determined. Capability to play video, HDMI,VGA, Cable TV, Blue Ray, and VCRs.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Sit to stand computer workstations, mobile pedestal and task chair. Workstations are shared.

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
C101001	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C101005	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view.
C1020	Wood Doors	1	3' x 7'	Provide solid core, flush door with stain finish, along with steel frame, factory primed, field painted. Coordinate door size and venting with room equipment.
C102007	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C103003	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room and on either side of Smartboard/touch screen on main wall of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C103004	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.

Exercise Control Room

Space Characteristics

Function/Adjacencies: A centralized control room for all facilities training and simulation functions. Video wall for Systems control. Heavy electronic equipment and loads.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: Off major corridor system adjacent to the Ready Room/Auditorium.
Number of Occupants: 5

Other/Special Requirements: Systems control TV type of monitoring stations and equipment to be determined. Capability to play video, HDMI,VGA, Cable TV, Blue Ray, and VCRs.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Sit to stand computer workstations, mobile pedestal and task chair. Workstations are shared.

Uniformat Section	Description	Qty	Size	Specific Requirements
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Raised Access Floor	AR	24 x 24	Carpet tile finish surface
C302005	Carpeting	SF	24 x 24 or Plank	Carpet Tile
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones.

Exercise Control Room

Space Characteristics

Function/Adjacencies: A centralized control room for all facilities training and simulation functions. Video wall for Systems control. Heavy electronic equipment and loads.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: Off major corridor system adjacent to the Ready Room/Auditorium.
Number of Occupants: 5

Other/Special Requirements: Systems control TV type of monitoring stations and equipment to be determined. Capability to play video, HDMI,VGA, Cable TV, Blue Ray, and VCRs.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Sit to stand computer workstations, mobile pedestal and task chair. Workstations are shared.

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide two multi-service recessed floor boxes every 25 square feet, or portion thereof. Coordinate requirements and locations with user.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
D503004	Television System			Provide CATV outlets.
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.
E102009 D503004	AV Equipment/ Television System			Provide video wall. Minimum of two projectors, smart podium with classified and unclassified connections. Provide CATV outlets at appropriate height for all wall-mounted monitors.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (podium and monitor to be funded separately in AV Package).

P1338 MEF Simulation Training Building

FIRE Rooms

Space Characteristics

Function/Adjacencies: A space for 3 FIRE training rooms and a FIRE equipment support room. Noisy fire fight training area with electronic wall displays.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations sheet
Minimum Ceiling Height: 12'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: off the unclassified area corridor system

Number of Occupants: up to 6 persons per each one of the four FIRE rooms

Other/Special Requirements: Noise from one room adds to the realism of combat training.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
C101001	Fixed Partitions	SF		Impact resistant Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C1020	Wood Doors	1	3' x 7'	Provide solid core, flush door with stain finish, along with steel frame, factory primed, field painted. Coordinate door size and venting with room equipment. Door seals
C102007	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C103004	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3020	Raised Access Floor	AR	24 x 24	Base bid – laminate surface 12"
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils

FIRE Rooms

Space Characteristics

Function/Adjacencies: A space for 3 FIRE training rooms and a FIRE equipment support room. Noisy fire fight training area with electronic wall displays.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations sheet
Minimum Ceiling Height: 12'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: off the unclassified area corridor system

Number of Occupants: up to 6 persons per each one of the four FIRE rooms

Other/Special Requirements: Noise from one room adds to the realism of combat training.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones, controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide two multi-service recessed floor boxes every 25 square feet, or portion thereof. Coordinate requirements and locations with user.
D5020	Lighting and Branch Wiring			Provide one L5-30R locking receptacle and one 5-20R receptacle 6" from the locking receptacle at a location selected by the user.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.

FIRE Rooms

Space Characteristics

Function/Adjacencies: A space for 3 FIRE training rooms and a FIRE equipment support room. Noisy fire fight training area with electronic wall displays.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations sheet
Minimum Ceiling Height: 12'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: off the unclassified area corridor system

Number of Occupants: up to 6 persons per each one of the four FIRE rooms

Other/Special Requirements: Noise from one room adds to the realism of combat training.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.
E102009 D503004	AV Equipment/ Television System			Provide CATV outlets at appropriate height for all wall-mounted monitors. Provide laptop interface from monitor location to work console table floor box. HDMI/VGA, Cable, Blue Ray and VCR's located in the Exercise Control Room or Auditorium.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (podium and monitor to be funded separately in AV Package).

P1338 MEF Simulation Training Building

Ready Room/Auditorium

Space Characteristics

Function/Adjacencies: Sloped floor Auditorium to hold student trainees prior to moving to Classified or Unclassified training. Features a video wall and acoustic panels to control noise.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 12'-0" from top level of floor

Acoustics:
Sound Transmission Class (STC) 45
Acoustic panels on walls

Access: near main trainee entry

Number of Occupants: 100 persons in fixed seating

Other/Special Requirements: Electronic podium

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Fixed seating with tablet arms

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	Slope floor
B202001	Exterior Windows			Provide ½" thick solid surface window stool
B202004	Exterior Glazing			Low 'E' Glazing or Spectral glazing, to meet ATFP requirements as required.
C101001	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C101005	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view.
C1020	Wood Doors	1	3' x 7'	Provide solid core, flush door with stain finish, along with steel frame, factory primed, field painted. Coordinate door size and venting with room equipment.
C102007	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.

Ready Room/Auditorium

Space Characteristics

Function/Adjacencies: Sloped floor Auditorium to hold student trainees prior to moving to Classified or Unclassified training. Features a video wall and acoustic panels to control noise.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 12'-0" from top level of floor

Acoustics:
Sound Transmission Class (STC) 45
Acoustic panels on walls

Access: near main trainee entry

Number of Occupants: 100 persons in fixed seating

Other/Special Requirements: Electronic podium

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Fixed seating with tablet arms

Uniformat Section	Description	Qty	Size	Specific Requirements
C103003	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room and on either side of Smartboard/touch screen on main wall of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C103004	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C302005	Carpeting	SF	24 x 24 or Plank	Carpet Tile
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system

Ready Room/Auditorium

Space Characteristics

Function/Adjacencies: Sloped floor Auditorium to hold student trainees prior to moving to Classified or Unclassified training. Features a video wall and acoustic panels to control noise.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 12'-0" from top level of floor

Acoustics:
Sound Transmission Class (STC) 45
Acoustic panels on walls

Access: near main trainee entry

Number of Occupants: 100 persons in fixed seating

Other/Special Requirements: Electronic podium

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Fixed seating with tablet arms

Uniformat Section	Description	Qty	Size	Specific Requirements
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones, controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide two multi-service recessed floor boxes at conference table.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.
D503004	Television System			Provide CATV outlets.
E102009 D503004	AV Equipment/ Television System			Provide Video wall. Min of 2 projectors, smart podium with classified and unclassified connections. Provide CATV outlets at appropriate height for all wall-mounted monitors.

Ready Room/Auditorium

Space Characteristics

Function/Adjacencies: Sloped floor Auditorium to hold student trainees prior to moving to Classified or Unclassified training. Features a video wall and acoustic panels to control noise.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 12'-0" from top level of floor

Acoustics:
Sound Transmission Class (STC) 45
Acoustic panels on walls

Access: near main trainee entry

Number of Occupants: 100 persons in fixed seating

Other/Special Requirements: Electronic podium

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Fixed seating with tablet arms

Uniformat Section	Description	Qty	Size	Specific Requirements
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).
E201002	Window Treatments	AR	AR	Manually operated, double solar shade system with 3% light filtering solar shade, room darkening lining and room darkening side channels, on all exterior windows. (USE FOR EXTERIOR WINDOWS)

P1338 MEF Simulation Training Building

Secure VTC Room

Space Characteristics

Function/Adjacencies: A secure room for data servers; heavy electronic cooling loads

Special Dimensions:
Ideal Plan Dimensions: see room tabulations sheets
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from Simulation control room.

Number of Occupants: N/A electronic equipment room

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
C101001	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C1020	Wood Doors	1	3' x 7'	Provide solid core, flush door with stain finish, along with steel frame, factory primed, field painted. Coordinate door size and venting with room equipment.
C102007	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C103004	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s)
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C302005	Carpeting	SF	24 x 24 or Plank	Carpet Tile
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils

Secure VTC Room

Space Characteristics

Function/Adjacencies: A secure room for data servers; heavy electronic cooling loads

Special Dimensions:
Ideal Plan Dimensions: see room tabulations sheets
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from Simulation control room.

Number of Occupants: N/A electronic equipment room

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones.
D5020	Lighting and Branch Wiring			Provide two multi-service recessed floor boxes under the conference table. Coordinate requirements and locations with user.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.

P1338 MEF Simulation Training Building

Secure Workstation Room - Vault

Space Characteristics

Function/Adjacencies: Secure work area for secure network access and storage. Vault for Secure Equipment. CMU wall construction is preferred.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 12'-0"

Acoustics:
Sound Transmission Class (STC)-50 STC
Impact Insulation Class (HC)

Access: Secure Vault

Number of Occupants: 4

Other/Special Requirements: Secure Vault
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
C101001	Fixed Partitions	SF		If CMU not used: Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C101001	Fixed Partitions	SF		Prefer CMU or concrete wall construction. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted.
C102007	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, X10 hardware, kick-plate, hold-open devices.
C103004	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar. Flashing light
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard over top of CMU.
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.

Secure Workstation Room - Vault

Space Characteristics

Function/Adjacencies: Secure work area for secure network access and storage. Vault for Secure Equipment. CMU wall construction is preferred.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 12'-0"

Acoustics:
Sound Transmission Class (STC)-50 STC
Impact Insulation Class (HC)

Access: Secure Vault

Number of Occupants: 4

Other/Special Requirements: Secure Vault
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
C301090	Other Wall Finishes	AR		Epoxy Paint on CMU walls.
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C303090	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide one multi-service recessed floor box every 25 square feet, or portion thereof. Coordinate requirements and locations with user.

Secure Workstation Room - Vault

Space Characteristics

Function/Adjacencies: Secure work area for secure network access and storage. Vault for Secure Equipment. CMU wall construction is preferred.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 12'-0"

Acoustics:
Sound Transmission Class (STC)-50 STC
Impact Insulation Class (HC)

Access: Secure Vault

Number of Occupants: 4

Other/Special Requirements: Secure Vault
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.

P1338 MEF Simulation Training Building

Simulation Control Room

Space Characteristics

Function/Adjacencies: A classified access room to provide workspace to control Simulation servers.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: From the classified and secure corridor system.

Number of Occupants: 20 operators

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Sit to stand workstations, mobile pedestal and task chair. Workstations are shared.

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
C101001	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C1020	Wood Doors	1	3' x 7'	Provide solid core, flush door with stain finish, along with steel frame, factory primed, field painted. Coordinate door size and venting with room equipment.
C102007	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C103004	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C302005	Carpeting	SF	24 x 24 or Plank	Carpet Tile
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils

Simulation Control Room

Space Characteristics

Function/Adjacencies: A classified access room to provide workspace to control Simulation servers.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: From the classified and secure corridor system.

Number of Occupants: 20 operators

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Sit to stand workstations, mobile pedestal and task chair. Workstations are shared.

Uniformat Section	Description	Qty	Size	Specific Requirements
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D303002	Direct Expansion Systems			Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump unit for the space to back up the base building VAV system.
D501004	Panelboards			Provide a panelboard to serve the telecommunications and server equipment loads.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide two 120V, 20A receptacles, each on a dedicated circuit, at each equipment rack. Circuit to dedicated telecommunications panelboard.
D5020	Lighting and Branch Wiring	4		Provide 208V, 1-phase, 70A connection for government furnished, government installed APC model SRT10KXLT UPSs. Coordinate locations with COR.

Simulation Control Room

Space Characteristics

Function/Adjacencies: A classified access room to provide workspace to control Simulation servers.

Special Dimensions:
Ideal Plan Dimensions: see space tabulations
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: From the classified and secure corridor system.

Number of Occupants: 20 operators

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Sit to stand workstations, mobile pedestal and task chair. Workstations are shared.

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.
D509090	Other Special Systems and Devices			Provide an EPO system to perform EPO functions in accordance with NEC Article 645.
E102009 D503004	AV Equipment/ Television System			

P1338 MEF Simulation Training Building

Simulation Control Secure Comm Room - Vault

Space Characteristics

Function/Adjacencies: A secure room for data servers. heavy electronic cooling loads

Special Dimensions:
Ideal Plan Dimensions: see room tabulations sheets
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from Simulation control room.

Number of Occupants: N/A electronic equipment room

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
C101001	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C1020	Wood Doors	1	3' x 7'	Provide solid core, flush door with stain finish, along with steel frame, factory primed, field painted. Coordinate door size and venting with room equipment.
C102007	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C103004	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s)
C103004	Fire Extinguisher Cabinet	1		Size cabinet for a clean-agent-type fire extinguisher having a minimum rating of 2-A:10-B:C. Locate the fire extinguisher cabinet within the server room adjacent to the primary door.
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Raised Access Floor	AR	24 x 24	Carpet tile finish surface

Simulation Control Secure Comm Room - Vault

Space Characteristics

Function/Adjacencies: A secure room for data servers. heavy electronic cooling loads

Special Dimensions:
Ideal Plan Dimensions: see room tabulations sheets
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from Simulation control room.

Number of Occupants: N/A electronic equipment room

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
C302005	Carpeting	SF	24 x 24 or Plank	Carpet Tile
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D303002	Direct Expansion Systems			Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump unit for the space to back up the base building VAV system.
D501004	Panelboards			Provide a panelboard to serve the telecommunications and server equipment loads only.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting.
D5020	Lighting and Branch Wiring			Provide two 120V, 20A receptacles, each on a dedicated circuit, at each equipment rack. Circuit to dedicated telecommunications panelboard.

Simulation Control Secure Comm Room - Vault

Space Characteristics

Function/Adjacencies: A secure room for data servers. heavy electronic cooling loads

Special Dimensions:
Ideal Plan Dimensions: see room tabulations sheets
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from Simulation control room.

Number of Occupants: N/A electronic equipment room

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
D509090	Other Special Systems and Devices			Provide an EPO system to perform EPO functions in accordance with NEC Article 645.

P1338 MEF Simulation Training Building

Simulation Operator

Space Characteristics

Function/Adjacencies: Administrative office area for Simulation trainers and operators.
Adjacent to Simulation Analyst space of 15-20 analysts.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45 Minimum

Access: From Entry from POV parking for staff members.

Number of Occupants: 19 PN in Open Office at sit stand workstations.

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	
B202001	Exterior Windows			If used.
B202001	Exterior Windows			Provide ½" thick solid surface window stool
B202004	Exterior Glazing			Low 'E' Glazing or Spectral glazing, to meet ATFP requirements as required.
C101001	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C101005	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view.
C1020	Wood Doors	1	3' x 7'	Provide solid core, flush door with stain finish, along with steel frame, factory primed, field painted. Coordinate door size and venting with room equipment.
C102007	Interior Door Hardware			Hinges, stop, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.

Simulation Operator

Space Characteristics

Function/Adjacencies: Administrative office area for Simulation trainers and operators.
Adjacent to Simulation Analyst space of 15-20 analysts.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45 Minimum

Access: From Entry from POV parking for staff members.

Number of Occupants: 19 PN in Open Office at sit stand workstations.

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
C103003	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room and on either side of Smartboard/touch screen on main wall of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C103004	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C302005	Carpeting	SF	24 x 24 or Plank	Carpet Tile
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C303001	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.

Simulation Operator

Space Characteristics

Function/Adjacencies: Administrative office area for Simulation trainers and operators.
Adjacent to Simulation Analyst space of 15-20 analysts.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45 Minimum

Access: From Entry from POV parking for staff members.

Number of Occupants: 19 PN in Open Office at sit stand workstations.

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones, controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.
D5020	Lighting and Branch Wiring			Provide one multi-service recessed floor box every 25 square feet, or portion thereof. Coordinate requirements and locations with user.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
E201002	Window Treatments	AR	AR	If windows are used: Manually operated, double solar shade system with 3% light filtering solar shade, room darkening lining and room darkening side channels, on all exterior windows. (USE FOR EXTERIOR WINDOWS)

P1338 MEF Simulation Training Building

Unclassified Simulation Room - 2 Required

Space Characteristics

Function/Adjacencies: Unclassified Software based simulations control room. Reconfigurable.

Build to the same construction standards for Classified rooms.

Bid option: add retractable partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Non-Classified Corridor System

Number of Occupants: 20-40 PN at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
A103001	Slab on Grade	SF	SF	Sealed concrete
C101001		SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C101001	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C101003	Folding Partitions			BID OPTION: Folding partition between Simulation Rooms as indicated on Block Diagram
C101005	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted.
C102007	Interior Door Hardware			Hinges, stop, provide passage hardware. X10 or CR required.

Unclassified Simulation Room - 2 Required

Space Characteristics

Function/Adjacencies: Unclassified Software based simulations control room. Reconfigurable.

Build to the same construction standards for Classified rooms.

Bid option: add retractable partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Non-Classified Corridor System

Number of Occupants: 20-40 PN at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
C103003	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room and on either side of Smartboard/touch screen on main wall of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C103004	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar.
C301003	Gypsum Wallboard Finishes	AR	AR	Cementitious backing units for wall tile installation where metal wall stud, CMU or concrete occurs.
C301003	Gypsum Wallboard Finishes	AR	AR	Primed and painted impact resistant gypsum wallboard
C301005	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C301006	Acoustic Wall Panels	AR	30" h x 48" each	Wall-mounted acoustical panels
C302011	Raised Access Flooring	AR	24" x 24"	Manufacturers standard line of finishes.

Unclassified Simulation Room - 2 Required

Space Characteristics

Function/Adjacencies: Unclassified Software based simulations control room. Reconfigurable.

Build to the same construction standards for Classified rooms.

Bid option: add retractable partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Non-Classified Corridor System

Number of Occupants: 20-40 PN at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
C302007	Wall Base Finishes	LF	6" high	Rubber cove base in 120' coils
C302007	Wall Base Finishes	AR	AR	Sealed joint at base of wall between CMU and sealed concrete floor surface
C302011	Raised Access Flooring	AR	24" x 24" x 12"H	BASE BID-laminate
C303001	Acoustical Ceiling Tiles & Panels	AR	24" x 24"	Acoustical Ceiling Tile
C303005	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C303090	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C304001	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones, controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide one quad receptacle adjacent to each network access drop set.

Unclassified Simulation Room - 2 Required

Space Characteristics

Function/Adjacencies: Unclassified Software based simulations control room. Reconfigurable.

Build to the same construction standards for Classified rooms.

Bid option: add retractable partition between rooms.

Special Dimensions:
Ideal Plan Dimensions: See Space Tabulation
Minimum Ceiling Height: 12'-0" Minimum

Acoustics:
Sound Transmission Class (STC) 45 Minimum
Impact Insulation Class (HC)

Access: From Non-Classified Corridor System

Number of Occupants: 20-40 PN at tables

Other/Special Requirements: Reconfigurable

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to 5.0 Room Finish and FF&E Requirements

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide two multi-service recessed floor boxes every 25 square feet, or portion thereof. Coordinate requirements and locations with user.
D5020	Lighting and Branch Wiring	60		Provide ceiling mounted duplex receptacles for synchronized simulation clock system. Coordinate receptacle locations with COR.
D503001	Telecommunications Systems			Provide network access drop sets as described in ESR D503001.
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.
E102009 D503004	AV Equipment/ Television System			Provide CATV outlets at appropriate height for all wall-mounted monitors. Provide laptop interface from monitor location to work console table floor box. HDMI/VGA, Cable, Blue Ray and VCR's located in the Exercise Control Room or Auditorium.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

A10 FOUNDATIONS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Provide foundation systems in accordance with UFC 3-301-01. Foundations must be designed to suit subsurface conditions and can transmit all building loads to the ground.

This section addresses both non-structural slabs-on-grade and structured slabs at ground level. For both systems, provide recessed areas as required to accommodate utilities at raised access floors such that the walking surface is one continuous plane throughout each space.

See Section B10, *Superstructure*, for additional loading criteria.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information, including a geotechnical data report prepared specifically for this project and historical subsurface data from other projects in close proximity to the project site, are included in Part 6 – Attachments of this RFP.

The soils information provided in this RFP is for reference only and reflects the soil conditions encountered only at the locations indicated. The Government shall not be responsible for any interpretation or conclusion by the Contractor drawn from the soils information beyond the industry standard of care. Geotechnical engineering reports accompanying the subsurface information are provided only to better convey the encountered data and observed site conditions. Assumptions, analyses and recommendations included in any accompanying report may or may not be applicable to the Offeror's design concept. The Contractor must retain a Geotechnical Engineer to interpret the Government provided information as it relates to the Contractor's design concept prior to submission of the proposal and develop geotechnical requirements to support the design and construction of the project meeting the requirements of this RFP for bidding purposes.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

The Geotechnical Engineer must have a minimum of 5 years of recent relevant experience in the geographic region of the project and must be currently licensed as a professional engineer in the State of North Carolina. In accordance with FAR Subpart 9.5, Organizational and Consultant Conflicts of Interest, the Contractor is prohibited from hiring the Geotechnical Engineer who provided data, reports and any other services on behalf of the Government for this project.

After award, the Contractor's Geotechnical Engineer (Geotechnical Engineer of Record) must provide a site-specific geotechnical study to include in-situ testing, soil borings and supporting laboratory analysis of representative soil samples. The Geotechnical Engineer must prepare a Geotechnical Report providing recommendations for design and construction of foundations, earthwork and site development in accordance with UFC 1-200-01 *DoD Building Code (General Building Requirements)*, UFC 3-220-01 *Geotechnical Engineering*, and FC 1-300-09N *Navy and*

Marine Corps Design Procedures and associated references. Calculations must be provided in the report to support all conclusions and recommendations.

SEISMIC DESIGN

Refer to ESR B10 for seismic design information.

A1010 STANDARD FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Standard Foundation to support the structure(s) associated with this project. "Standard Foundations" are shallow foundations or deep foundations as addressed in IBC Chapter 18. Do not use masonry unit footings, steel grillage footings, timber footings or wood foundations. Treated timber piles are permitted if deemed appropriate by the Designer of Record.

The structure(s) must be entirely supported by either a shallow foundation system or a deep foundation system as determined by the Designer of Record. Provide foundation materials that are compatible with the environmental exposure. When foundation elements are exposed to corrosive or otherwise aggressive soils, provide protection in accordance with ACI 318 requirements.

Calculate foundation ultimate resistance using multiple established methods. Determine allowable foundation capacity using the factors of safety provided in UFC 3-220-01 Tables 2-2 and 2-3. Develop geotechnical engineering design parameters using in-situ tests, laboratory tests and established empirical correlations. Evaluate upper and lower bound soil capacities based on variations in subsurface conditions at the site. Determine the minimum foundation bearing depth for frost protection in accordance with UFC 3-301-01. Provide minimum foundation widths to avoid failure and with consideration given to placement tolerances, ease of construction, etc.

Determine estimated foundation settlement based on comparison of predicted values from multiple established methods based on reaction loads provided by the Structural Designer of Record. Settlement calculations must include dead and live load components, live load reductions used in the analyses, actual or estimated foundation sizes, planned site grading changes, and expected fluctuations in groundwater levels. Estimated differential settlement must include upper and lower bound foundation settlements based on soil properties, different foundation loading, and variations in subsurface conditions across the building footprint.

The presence of weak and compressible soils may result in excessive settlement that could impact the performance of surface bearing structures and supporting facilities such as foundations, slabs, pavements, sidewalks, and utilities. The magnitude and duration of settlement depends on the composition, depth, and thickness of the weak/compressible soils as well as the Contractor’s selected design concept. The Contractor's Geotechnical Engineer is responsible for evaluating potential global settlement due to designed grade increases and final structural loads, and must develop any settlement mitigation procedures (such as preloading, surcharging, fill monitoring programs, and ground improvement systems) needed to maintain global settlements within tolerable limits. Surcharge material, if required, must remain in place for 90 days minimum.

Design must incorporate measures that limit total and differential settlement to levels that prevent structural or aesthetic damage or impairment of the serviceability and function of the facility or structures, including drainage and utilities. The safety factor for liquefaction potential must meet or exceed Table 2-1 in UFC 3-220-01.

Use the following geotechnical tolerances to design shallow foundation systems:

a) Limit slab-on-grade post construction total settlement due to permanent loads to ½ inch maximum;

b) Limit total settlement of column and wall footing foundations to one inch maximum; and

c) Limit differential settlement of adjacent footings to ½ inch maximum and an angular distortion of 1/500 maximum. Angular distortion is defined as the difference in settlement between two points divided by the distance between the points.

Use the following tolerances for designing deep foundation systems:

a) Limit total settlement of individual piles and pile caps to ½ inch maximum under service load conditions as determined by static or dynamic pile load testing.

b) Limit differential settlement of adjacent foundations to ½ inch maximum and to an angular distortion of 1/500 maximum. The angular distortion is defined as the difference in settlement between two points divided by the distance between the points.

c) Limit lateral deflection of deep foundations to ½ inch, with an applied axial load equal to the expected dead load.

Ensure allowable pile stresses not to exceed limitations specified in IBC Section 1810, Deep Foundations. Evaluate and address time dependent pile capacity conditions (i.e. pile setup), group effects, negative skin friction, lateral squeeze, preboring/jetting, installation sequencing, refusal driving conditions, etc. as applicable. Include requirements for completing pre-construction condition surveys, ground vibration monitoring, structural instrumentation, etc. to mitigate risks of ground vibration damage to nearby structures as applicable for the specific project. The Structural Engineer of Record must design and detail the pile foundations in accordance with IBC Section 1810.3. Submit structural calculations and details for the piles to the Government for review and approval during project design development.

Conduct a test pile program overseen by the Geotechnical Engineer of Record and submit a final signed and stamped report to the Government for review and approval. Monitor and record driving during installation and subject to hammer restrikes in accordance with ASTM D4945, “Standard Test Method for High-Strain Dynamic Testing of Piles.” Evaluate the ultimate load capacity of selected test pile restrike(s) using CAPWAP analyses. Additional load test requirements are stated in Part 4 of this RFP. The Contractor is responsible for all foundation testing and monitoring costs.

A1020 SPECIAL FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Special Foundation system to support the structure(s) associated with this project. "Special Foundations" are any foundations that are not specifically "Standard Foundations", or which are a combination of Standard Foundations and a site improvement/ground modification system. Incorporate design of these systems in the project plans and specifications following FC 1-300-09N Chapters 7 and 8 and not as a construction submittal. Examples of site improvement/ground modification systems include surcharge preloading, prefabricated vertical drains, over-excavation and replacement, stone columns, rammed aggregate piers, rigid column inclusions, deep dynamic compaction, low and high mobility grouting, vibroflotation, etc. As most "Special Foundation" techniques or systems typically require the use of specialty contractors, a registered Professional Engineer must establish installation and acceptance criteria and supervise the installation. The Designer of Record must submit justification for use, including acceptable

evidence of previous successful installation in similar conditions, methods and equipment used in their installation, proposed testing and inspection to be used, supporting test data, calculations, and any other information related to the structural properties and load capacity of such system. The allowable stresses and testing requirements for pile-like elements used for ground improvement must comply with IBC Section 1810.

A1030 SLAB ON GRADE

As determined by the Designer of Record to be applicable, provide soil supported concrete slab(s) on ground. Provide a vapor retarder and porous fill layer beneath all slabs. Where slab on ground is below the existing adjacent exterior grade, provide waterproofing on foundation walls or grade beams and a perimeter drainage system to remove ground water from the area immediately adjacent to the building. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

A1030 GROUND FLOOR SLABS – BID ALTERNATE TERRAZZO FLOOR FINISHES

A reinforced vapor barrier equal to or greater than ASTM E 1745 15 mil must be used directly under all ground floor slabs. The vapor barrier must be properly flashed with all joints overlapped and taped. The vapor barrier must NOT be punctured during construction. If punctured, then the vapor barrier must be repaired per manufacturer's specifications. Concrete used for the ground floor slabs will have a minimum 28-day compressive strength of 3,500 psi and maximum water to cement ratio of 0.45 with a 4-inch maximum slump without water reducers. The ground floor slabs will have an overall specified floor flatness (Ff) of 35 and an overall specified floor levelness (Fl) of 25 as determined by ASTM E 1155 with minimum local values of not less than 65% of the specified overall values. The slabs will be allowed to cure for at least 7 days under a wet cure and for at least 60 days under dry cure conditions. The contractor will retain the services of an independent testing laboratory to verify that the concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to the epoxy resin manufacturer's written instructions. Perform relative humidity tests using in-situ probes in accordance with ASTM F 2170 at a frequency recommended by the manufacturer. Proceed with resinous flooring installation only after substrates have a maximum 75% relative humidity level measurement. Perform anhydrous calcium chloride tests in accordance with ASTM F 1869 and pH at a frequency recommended by the manufacturer. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.

A1040 STRUCTURALLY SUPPORTED SLAB

As determined by the Designer of Record to be applicable, provide a structurally supported slab. Provide for structural support of all utilities that may be adversely affected by soil consolidation or expansive soils. Provide stainless steel hangers sized adequately to support the in-service utility. Provide a vapor retarder and porous fill layer beneath all slabs. Where the structurally supported slab is below the existing adjacent exterior grade, provide waterproofing on foundation walls or grade beams and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

--End of Section--

A20 BASEMENT CONSTRUCTION – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

NOT USED

A2010 BASEMENT EXCAVATION

NOT USED

A2020 BASEMENT WALLS

NOT USED

--End of Section—

B10 SUPERSTRUCTURE – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

The superstructure consists of structural elements above the foundation that provide support for vertical loads and resistance to lateral loads.

This section includes the requirements for the superstructure of the building, including floor and roof framing, columns, interior load-bearing walls and the main lateral-force resisting system. Exterior load bearing walls are addressed in Section B20.

Provide the building framing system in accordance with UFC 3-301-01, *Structural Engineering*.

The building must be constructed with concrete, steel, or masonry. Wood construction is prohibited.

All steel deck used on roofs and structural wall panels must be 20 gauge minimum thickness.

A Special Inspector of Record (SIOR) is required for this project. All structural steel deck must be 20-gauge minimum thickness, and applies to roof and wall structural panels.

Pre-engineered building systems are prohibited.

Load bearing light gage framing systems are prohibited.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Risk Category: II

Design for Live Loads in accordance with IBC 2018 as modified by UFC 3-301-01.

Wind load parameters

Wind speed: Comply with UFC 3-301-01

Determine wind exposure category, topographic factor, and other wind design parameters based on ASCE 7.

Wind Load design for this project must use exposure C or D. See ASCE 7-16 for further description of exposures. For this project, exposure B is prohibited

Snow load parameters

Ground snow load: Comply with UFC 3-301-01

Snow load importance factor: 1.00

Snow load design parameters must be based on ASCE 7-16. Except design wind loads must be based on Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Seismic load parameters

A site-specific seismic ground motion study is not required. Use Risk Category II and soil classification D. Determine seismic loading adjusted for site class effects using the ground

motion parameters specified by UFC 3-301-01, *Structural Engineering*. Seismic Design Category (SDC) is B.

B1010 FLOOR CONSTRUCTION

Provide elevated floors and mezzanines consisting of any of the following construction types.

- Non-composite concrete slabs on form deck on steel joists.
- Non-composite or composite concrete slabs on metal decking on steel beams.
- Cast-in-place concrete slabs on removable forms.
- Precast concrete planks or shallow double-tee beams.
- Provide depressed slab or pit for areas requiring access flooring.

Support elevated floors and mezzanines on cast-in place concrete walls, plant or site pre-cast concrete walls (including tilt-up walls), reinforced concrete masonry walls/pilasters, structural steel columns and girders or joist girders. Do not support elevated floors on light gage stud wall construction. Wood framed systems are prohibited.

Provide access platforms constructed of steel grating and supported by structural steel framing.

B1020 ROOF CONSTRUCTION

Provide roof construction consisting of metal decking supported by structural steel framing or open web steel joists and joist girders bearing on load bearing columns or walls. Cast-in-place and precast concrete roof systems are also permitted. Support roof construction on cast-in-place concrete walls, precast concrete walls, reinforced concrete masonry unit walls/pilasters, or structural steel columns. Training rooms and conference rooms must be free of columns and other obstructions. Refer to Architectural sections for roof slopes.

--End of Section--

B20 EXTERIOR ENCLOSURE – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

This system consists of the exterior shell of the facility, which includes all vertical and horizontal exterior closure such as exterior walls, exterior windows, and exterior doors. This system excludes roofing (See Section B30, Roofing). Load bearing exterior walls will be included here, and not in Section B10, Superstructure. Structural frame elements at exterior such as columns, beams, and spandrels are included in Superstructure, with all exterior wall elements supported by columns, beams and spandrels included in this section.. Finishes to the inside face of walls which are not an integral part of the wall construction will be included in Section C30, Interior finishes.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

It is permissible for exterior walls to be load bearing or non-load bearing. Exterior load bearing walls must consist of any of the following construction types and comply with the architectural and functional requirements that follow this list (also refer to B201001 Exterior Closure section for inclusion of load bearing walls in the overall exterior closure design).

1) Reinforced concrete masonry (CMU)
2) Cast-in-place reinforced concrete
3) Site precast concrete (tilt-up)
4) Plant precast concrete

Exterior walls must incorporate the materials directed in the Camp Lejeune, Base Exterior Architectural Plan (BEAP), 2010 – Section 4.2 Hadnot Point.

The primary exterior cladding material of the building must be modular brick per color and finish conforming to the BEAP, along with a water table as prescribed in the BEAP. If thin brick cladding is used, the color and finish of the brick must match as closely as possible to that indicated in the BEAP.

Brick detailing and design of the exterior wall must provide accent banding and design features at windows as prescribed in the BEAP

Provide a cast-in-place, split-face masonry (used with veneer exterior wall closure) or precast concrete water table per the proportions shown in diagrams in the BEAP. If the cast in place option is chosen, the finish of the concrete is required to be a high quality, rubbed finish with a pattern mimicking CMU masonry joints.

Multiple options for providing the exterior wall system composed of the Exterior Closure and the Exterior Wall Backup Construction sections shown below.

B201001 EXTERIOR CLOSURE

The following are options for providing the exterior closure. The Contractor has the option to use these systems if energy code requirements and design aesthetics as prescribed in the BEAP are provided:

1) A brick/masonry veneer cavity wall exterior wall closure.
2) A precast concrete panel veneer exterior wall closure with applied thin brick. This system must be a barrier system with sealed joints.
3) A site precast tilt-up concrete exterior wall closure or cast in place concrete exterior wall closure (load bearing) with applied thin brick cladding. This exterior closure is a barrier system with sealed joints.
4) A plant precast and site assembled precast concrete exterior wall closure (load bearing) with applied thin brick cladding. This exterior closure is a barrier system with sealed joints.

All exterior closure wall options where the exterior wall concrete (precast or cast in place) is exposed to moisture (at the exterior face of the wall or the base of the wall) must be designed with a plant added admixture to prevent moisture migration within the concrete to prevent the failure of applied thin brick systems, and prevent water migration into the interior of the building.

Thin brick placed on the exterior load bearing walls must be attached with systems that will ensure that the brick will not separate from the wall or form efflorescence. In addition, adequate control/construction joints must be incorporated into the concrete wall system to prevent thin brick cracking and adhesion issues.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

The backup systems for masonry and precast concrete veneer systems must be of single wythe reinforced concrete masonry. The backup wall system must be integrated with other exterior wall system requirements as indicated in B201003, Insulation and Air Barriers.

Exterior bearing walls consisting of metal studs as the primary floor or roof supporting structural element are not permitted.

For concrete exterior bearing walls (precast or cast in place) the backup wall system is defined in ESR C10, Interior Construction.

B201003 INSULATION and AIR BARRIERS

Provide continuous insulation, vapor retarder and air barrier to meet or exceed requirements of project's energy savings requirements.

Provide a continuous air barrier to control air leakage into, or out of, conditioned spaces. The building envelope shall include all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, and compartmentalized unconditioned portions of the facility such as garages, and negatively pressurized spaces. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

Confirm air barrier compliance with Air Barrier Performance Test in RFP Part 4.

Provide thermal envelope performance testing through infrared thermography in accordance with RFP Part 4. Coordinate thermal imaging testing with air barrier testing construction schedule

B201004 PARAPETS

Parapets will not be required for this building since sloped roof areas (with gutter/downspouts) are to be provide over the entire building.

B201005 EXTERIOR LOUVERS & SCREENS

Provide exterior louvers and screens, where required, that match the finish of the existing windows and detailed to integrate with the architecture of the building, as appropriate to the design of the building. Provide insect screens at all louvers.

B201006 BALCONY WALLS & HANDRAILS

NOT USED

B201007 EXTERIOR SOFFITS

Provide a pre-finished exterior soffit system and associated rake and eave trim as indicated in the BEAP – Section 4.2 Hadnot Point. Color as defined in the BEAP.

B201009 EXTERIOR PAINTING AND COATINGS

Provide a field applied exterior coating on all items that are not prefinished, and to prefinished items when required to provide a color other than a standard prefinished color.

B201010 EXTERIOR JOINT SEALANTS

Provide exterior application of joint sealants to seal joints and prepare for finish material installation.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Provide fixed, horizontal or vertical fixed type as requited to provide sun control and prevent any direct sunlight hitting work surfaces of offices and classrooms. Sun control devices shall be detailed to integrate with the architectural wall system.

B201012 SCREEN WALL

Provide screen walls where required to screen mechanical units, electrical substations, loading docks, and trash receptacles/dumpsters. Screen walls shall be per the Camp Lejeune, Base Exterior Architectural Plan, 2010, Section 4.2 Hadnot Point. Rooftop mechanical screens are not required since roof mounted mechanical equipment is prohibited.

B2020 EXTERIOR WINDOWS

Windows and other fenestration systems that provide daylighting must be provided in regularly occupied spaces that include offices and classrooms as indicated in UFC 1-200-02 and reference to ASHRAE 189.1 sections.

Due to the location of classrooms other areas away from exterior walls in the II MEF Simulation Training Center block diagram, the design must provide fenestration systems that will comply with the daylighting requirements prescribed in the aforementioned UFC.

Windows must meet the defined prescriptive AT/FP requirements per UFC 4-010-01. If is permissible to use curtain wall systems in lieu of window or storefront systems, if necessary, to meet AT/FP or other design requirements.

The daylighting provided by windows and other fenestration systems must not compromise the visual acuity and comfort within the room.

Provide a sample window installation in a complete exterior wall, as determined by the DOR and approved by the Contracting Officer. If approved, this sample window installation will become a permanent part of the building.

B202001 WINDOWS

Windows must be pre-finished aluminum and fixed.

Provide a mockup of one combination window unit for the project to be used for a field mockup test in compliance with AAMA 502 Method A and Method B.

B202002 STOREFRONTS

Storefronts shall be pre-finished aluminum and, if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

Provide a mockup of one designated storefront system unit for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B.

B202003 CURTAIN WALLS

Curtain walls are a permissible option for fenestration if determined necessary to meet applicable codes and UFC requirements. Curtain walls, if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

The curtain wall system must be a standard architectural type Stick or Unit and Mullion system, with mullions, horizontal rails, and/or non-integral spandrel panels. Fully coordinate curtain wall system components/accessories that are directly incorporated and adjacent to contiguous related work (i.e. wall systems). Ensure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances in the design of the curtain wall system and in coordination of the curtain wall design with adjacent exterior enclosure systems.

The system must incorporate a pressure equalized method to control air and water infiltration. Face sealed systems and water managed systems are not allowed.

System must be a combination of glazed panels and opaque panels as required by the design.

Provide a mockup of one designated Curtain Wall System unit for the project to be used for a field test of compliance with AAMA 503 Method A and Method B.

B202004 EXTERIOR GLAZING

Glazing color and reflectance must be provided and approved by Camp Lejeune’s Architectural Review Board. Glazing must be a heat absorbing insulated laminated glazing unit with the inner most pane being laminated glazing to meet the prescriptive AT/FP requirements of UFC 4-010-01 and code/UFC prescribed wind load requirements.

B202090 OTHER EXTERIOR WINDOWS

NOT USED

B2030 EXTERIOR DOORS

All exterior doors must be weather protected and provided with weatherstripping/sealant and thresholds that stop water penetration and comply with ABA. Provide heavy duty overhead closers at all exterior doors. It is required for main front doors to be double doors. It is required that exterior back doors be 4’-0” wide single doors. AE2 is responsible for code compliance in regard to egress requirements and doors. Government will review and approve AE2 door selection.

B203001 SOLID DOORS

Provide insulated solid steel door assemblies other than at storefront/curtainwall entrances.

Doors must be Extra Heavy-Duty Doors -– ANSI /SDI A250.8, Level 3, physical performance Level A, Model 1.

Provide steel doors fabricated from hot dipped galvanized steel and provide a rust inhibitive factory finished primer coating. Finish coats are to be field painted.

B203002 GLAZED DOORS

Provide exterior aluminum framed glazed doors and entrances systems integrated into storefront/curtain wall system at main entry of the building or at secondary access points that incorporate storefront/curtain wall systems. Doors must be factory-finished aluminum framed door assemblies with heat absorbing insulated laminated glazing, frames, and hardware.

Glazing shall match the storefront/curtain wall system glazing.

Glazing in any hollow metal or glazed exterior door is required to meet the same prescriptive requirement for glazing as required for windows and other fenestration systems.

B203004 OVERHEAD AND ROLL-UP DOORS

Design door and opening for a loading entrance at Shipping/Receiving and all mechanical rooms with exterior access. Provide lockable doors with automatic operation with protected pushbuttons electric controls.

Accomplish door operation by UL Listed electric motor operation with electric controller and an auxiliary hand chain operation. Provide slat profile. Also provide counterbalance, heavy duty springs, wear strips, full perimeter weather-stripping, continuous button pressure safety operation, electric or infrared safety edge, galvanized hardware, and manufactured trims and closures pieces. Protect the wall door jamb opening with guards designed to resist abuse from the type of material and vehicles that are transported through the opening.

For overhead doors that open into inhabited spaces, provide the doors with a tether system or intercepted walls to reduce the likelihood of the overhead doors from translating into the inhabited areas.

Provide insulated overhead roll-up doors. Provide powder coat painted finish with custom colors for the door and accessories to match facility color scheme. Design the galvanized steel overhead roll-up slats and door width to withstanding the design wind loading of ASCE 7 and operate normally.

B203006 BLAST RESISTANT DOORS

NOT USED

B203008 EXTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule. Verify all door hardware requirements with the User.

Provide a programmable CAC enabled electronic locking system at all exterior swinging man doors. The exterior locking system must be capable of locking all doors via a “kill switch” (tied to a central monitoring location), and all doors are to be provided with a manual key override. Exterior door locks must be consistent with prescribed regulations for Open Storage Secret (OSS) spaces.

Door hardware finish must be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

B203090 OTHER EXTERIOR SPECIALTY DOORS

NOT USED

--End of Section—

B30 ROOFING – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

B30 GENERAL SYSTEMS DESCRIPTION

Roof systems shall be watertight. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation.

Submittal Requirements: Components of a minimum roof submittal shall include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Provide a Pre-Design Roofing Conference (if required in RFP Part 4) and Pre-Construction Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

Refer to UFC 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02 *High Performance Sustainable Buildings* for additional roofing requirements such as Energy Star qualified products.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

Provide a SSMR (standing seam metal roof system). The slope and configuration of the roofing is suggested in the Base Exterior Architectural Plan (BEAP), 2010, Section 4.2, Hadnot Point. Refer to Part 3, Chapter 2 for prescribed roof slope.

The roof system shall be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance shall be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or ASTM uplift resistance test procedures. The roof material must be 3004 aluminum, ASTM B209M ASTM B209..

Organic Coatings for the metal roof must be a PVDF coating as specified in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing. All other material and construction for metal roofing are per Part 6 specification section.

The spacing of standing seams shall between 12 inches and 18 inches on center as prescribed in the BEAP.

Sub-purlins for the Structural Metal Roof System shall be galvanized and shop painted.

SSSMRS Warranty Certificate. – Provide warranty requirements as defined in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing.

Specular Gloss of Finished roof surfaces must have a specular gloss value of 10 or less at an angle of 85 degrees or 30 plus or minus the value specified in the project program at 60 degrees when measured in accordance with ASTM D 523.

B301002 LOW SLOPE ROOFING SYSTEMS

NOT USED

B301003 ROOF INSULATION AND FILL

Provide roof insulation values no less than in accordance with UFC 1-200-02 High Performance and Sustainable Buildings and UFC 3-110-03 Roofing.

B301004 FLASHINGS AND TRIM

Provide flashing and trim for the Aluminum Standing Seam Metal roof per specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing in Part 6 of this RFP.

B301005GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited.

B301006 ROOF OPENINGS AND SUPPORTS

NOT USED

B301090 OTHER ROOFING

Provide lightning protection, without penetrating the roofing or flashing components.

--End of Section--

C10 INTERIOR CONSTRUCTION – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Interior construction includes interior partitions, interior doors, and fittings.

Provide durable construction appropriate for the building function. Acoustic properties of materials, as well as durability, shall be considered during material selection.

Provide an acoustical engineer to participate in the design and provide design quality reviews throughout the design. The acoustical engineer must be an active participant in the design of the Simulation and FIRE classrooms, Ready Room/Auditorium, and any other space or portion of the design with special acoustical requirements. The engineer must evaluate and give input on, but not limited to, acoustical partitions carrying Sound Transmission Coefficient (STC) ratings, applied acoustical treatments, integration of audio-video components, and door and frame performance, The acoustical engineer must carry a bachelor's degree in Engineering, Physics, Architecture, or a related field, hold a PE or membership in a recognized acoustical professional organization, and demonstrate a minimum of 7 years of acoustical design/engineering consulting on similar projects

Interior construction of secure rooms must be appropriate for their function. This includes full volume enclosure of the room to make it inaccessible from any direction and compatible door hardware. Project secure areas include Secure VTC Room, Secure Workstation and Simulation Control Secure Communications Room. The latter two rooms are referred to as “vaults.”

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Areas of the Project subject to abuse require that "Impact Resistant" systems be provided.

C1010 PARTITIONS

To the greatest extent possible, provide partitions consisting of metal studs with gypsum board on each side. Concrete masonry partitions may be considered if durability is a primary concern.

Gypsum board for partitions in moist and humid areas and areas with water use on floors (e.g., toilets, locker rooms, and mechanical rooms) must be 5/8-inch, moisture and mold resistant gypsum board panels. ASTM C1396, ASTM D3272 - Rating of 8 to 10, ASTM C473, Water Absorption less than 5 percent. Provide impact-resistant versions of this gypsum board for abuse prone areas.

C101001 FIXED PARTITIONS

Provide fixed interior partitions, except where retractable partitions are specifically required by the "Room Requirements."

UFC defined acoustic requirements in UFC 3-101-01, Section 4.8 and Figure 4-1 is not applicable to this project. Partitions requirements are defined using STC ratings in this RFP.

Sound-rated partition assemblies must meet the interior acoustic requirements for typical spaces as follows or as indicated in Chapter 3, Part 5, Additional Room Requirements:

- Simulation Classrooms STC 45
- Brief/Debrief Rooms STC 45
- Ready Room/Auditorium STC 45
- Mother's Room STC 45
- Heads/Locker Areas STC 45
- Break Rooms STC 45
- Library/File/Storage/Plotter STC 45
- Private Offices STC 45**

  ** Private office STC may be reduced to a lower STC in association with a high CAC acoustical ceiling or increased to STC 50 based on the requirements of the individual user. The requirements for each individual user must be verified during the design process.

- Mechanical Rooms (when wall is adjacent to occupied space) STC 50

C101002 DEMOUNTABLE PARTITIONS

NOT USED

C101003 RETRACTABLE PARTITIONS

Provide retractable partitions to include operable panel partitions (noted as Folding Partition in the Architectural Block Diagram. Sound-rated partition assemblies shall have a minimum STC to match the fixed partition in the room in accordance with ASTM E90 or ASTM E413 for frequency data. Coordinate finishes with Section C30 Interior Finishes.

In the pocketed stored position provide for a partitioned pocket area so the system panels when folded are not exposed in the room.

C101004 INTERIOR GUARDRAILS AND SCREENS

Provide balustrades where required by code. Provide screens where required to prohibit view of a particular area.

C101005 INTERIOR WINDOWS

Provide interior windows systems of aluminum if required by the design in rooms for borrowed light to occupied spaces.

If interior windows are provided at rooms of STC 45 or above, provide a window with laminated glazing to provide acoustical control.

All interior window systems must have a pre-finished coating finish or anodized finish.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide aluminum-framed, glazed storefront system in rooms as required by the design to allow borrowed light into occupied rooms.

If interior glazed storefront is provided, provide acoustically rated glazed systems to match the acoustical rating of the adjacent partition.

All interior storefront systems must have a pre-finished coating finish or anodized finish.

C101007 INTERIOR GLAZING

Interior glazing must be clear or patterned glass that is annealed / tempered based on code requirements. If necessary, provide laminated glazing to obtain STC/NIC requirements.

If necessary, provide laminated glazing for sound control as indicated elsewhere in this section.

Interior glazing when provided in fire rated doors and glazed partitions must utilize fire rated glazing to meet code requirements. Wire glass must not be used in fire-rated doors or partitions.

C1020 INTERIOR DOORS

It is required that 4’-0” wide single doors be included in all simulation classrooms, FIRE, auditorium, exercise control, simulation control and server admin. AE2 is responsible for code compliance in regard to egress requirements and doors. Government will review and approve AE2 door selection.

C102001 STANDARD INTERIOR DOORS

Provide flush interior doors.

Provide wood or hollow metal interior doors in hollow metal frames.

Provide wood doors at all administrative office area rooms, classrooms, heads, lounges/break rooms.

Provide hollow metal doors at all mechanical rooms, electrical rooms, and telecom rooms.

Hollow metal doors must be Level 4 with physical performance level A throughout the facility

Flush wood doors must be WDMA I.S.1A-04, premium grade, extra heavy duty for classrooms, heads, break rooms, auditorium/ready room and heavy duty for all other spaces. Flush wood doors shall be SCLC-5 5-ply structural composite lumber core or FD core, as required by code.

Doors must have Factory Finish of AWI Quality Standards Section 1500, specification for Conversion varnish alkyd urea or catalyzed polyurethane.

Provide vision glazing within doors if it is deemed advantageous to be able to see through the door, either for safety of pedestrian traffic or other functional reasons. If vision glazing within doors is provided, it must have the provision to be blanked off during an active shooter event. This would require an easily activated shade, flap, or other device that would obscure vision through the door lite.

Provide 50 STC sound rated door assemblies for doors leading into Room(s) as indicated in Part 3, Chapter 5 – Additional Room Requirements. The pre-manufactured door assembly shall be per material listed in the Room Requirements and include all hardware and seals necessary to achieve the required rating. Install in accordance with the manufacturer's instructions.

Provide acoustic seals and gasketing to match acoustical rating of the surrounding partition. After installation, test the doors with a flashlight to determine if any gaps in the sound seals allow light to be viewed on the opposite side of the door.

C102002 GLAZED INTERIOR DOORS

Provide Aluminum/Glass glazed interior door or all glass door as a part of an interior glazed partition as indicated in C101006 for spaces that do not require acoustical control.

C102003 FIRE DOORS

Provide interior fire doors, in fire rated partitions as required by Code.

C102004 SLIDING AND FOLDING DOORS

NOT USED

C102005 INTERIOR OVERHEAD DOORS

NOT USED

C102006 INTERIOR GATES

NOT USED

C102007 INTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule in conjunction with the approval of the client and to meet specific requirements outlined in this section or other referenced documents. Verify all door hardware requirements with the User.

Interior door locks must be consistent with prescribed regulations for Open Storage Secret (OSS) spaces. Provide a programmable, CAC-enabled electronic locking system at all areas requiring controlled access.

Provide lock and latch hardware with levers as follows:

- Use Series 1000, Operational Grade 1, Security Grade 2 for corridors, classrooms and labs, suite entrances, toilets, and other high-use interior doors. Use Series 4000, Grade 1 for locations not using Series 1000 hardware.
- Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2.
- Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1, or Grade 2.

Provide cylinders/cores and keying system as indicated in Part 4, C102007 specifications. Other related door hardware requirements for hardware beyond locking devices is as indicated in Part 4, C102007 specifications. Lock cores shall match the BEST system.

Door hardware finish must be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

C102090 OTHER INTERIOR SPECIALTY DOORS

NOT USED

C102091 OTHER INTERIOR PERSONNEL DOORS

NOT USED

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Provide solid plastic (HDPE) toilet partitions in all toilet rooms (Heads) with more than one water closet or urinal.

Provide floor-mounted, overhead-braced toilet partitions.

C103002 TOILET AND BATH ACCESSORIES

Provide toilet and bath accessories:

TOILET & BATHROOMACCESSORY SCHEDULE						
ACCESSORY	SPACE					
	MALE RESTROOMS	FEMALE RESTROOMS	MOTHER'S ROOM	MEN'S & WOMEN'S SHOWERS	HEAD	JANITOR'S CLOSETS
Dual roll toilet tissue dispenser for each water closet (Typical supplies available at base supply)	●	●			●	
Seat cover dispenser for each water closet	●	●				
Coat hooks for each water closet stall	●	●				
ABA Grab bars for toilet (in restrooms with multiple stalls, grab bars required only for ABA water closet stall)	●	●			●	
ABA Grab bars for shower				●		
Paper towel dispenser in each room (Typical supplies available at base supply)	●	●	●		●	
Electric hand dryers with motion sensors in each room; HEPA filtered, Certified hygenic by NSF and HACCP (same quantity as lavatories)	●	●			●	
Full length mirror in each room (refer to note below)	●	●	●	●	●	
Stainless steel convenience shelf on wall near entrance doors in each room. Minimum dimensions: 6" deep by 36" long.	●	●		●	●	
Sanitary napkin disposal for each water closet		●				
Surface mounted double coat hook (2 required in rooms with showers)			●	●	●	
Utility shelf integrated with 5 hooks and 4 broom/mop holders						●
HDPE Shower bench. Minimum 15" deep by 36" long					●	

Note: At heads with counters with integral sinks, provide mirrors the full length of toilet lavatory counters in width and from backsplash to the light cove above in height.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker (dry erase) boards and tack boards as indicated in Chapter 5 "Room Requirements" portion of this RFP.

Marker boards and tack boards must be mounted with the lower edge at 42" above finished floor. Unless otherwise noted, boards must have anodized aluminum trim. Marker boards and

tack boards must have tool trays and one set of tools provided for each room. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards and tack boards.

Glass marker boards must be frameless, opaque back-painted glass type and must attract standard magnets (rare-earth magnets not required) and be constructed of 1/4-inch-thick, shatter resistant, tempered glass, solid in color with non-staining finish, polished edges and eased corners and mounted with stainless steel standoffs. Provide magnetic accessory trays for glass markerboards.

Enclosed tack boards must be heavy gauge aluminum, with tackable interior surface, tempered glass sliding doors and lock. Provide selection from full range of manufacturer's finishes. Provide tack board dimensions as follows: Size: 3'-0" H by 4'-0" L.

Marker boards and tack boards are funded as part of the construction contract.

C103004 IDENTIFYING DEVICES

All necessary interior signage must be incorporated as part of the architectural drawings. Interior signage is not collateral equipment. Interior signage must demonstrate complete coordination with the facility design, SID and FF&E submittals. Provide interior directional signage for facility wayfinding. Provide an identifying device at each interior door. Signs must meet ABA requirements. Refer to UFC 3-120-01, Design: Sign Standards, for more information.

Exterior building signage is required and must be provided. This includes exterior door signs on any mechanical, electrical, and telecommunications room with exterior doors. All exterior signage and their components must be resistant to ultraviolet light and must withstand a marine corrosive environment. This includes any other building signage attached to the building envelope, such as building name or number.

Specific exterior signage requirements follow:

Provide exterior signs at all building primary and secondary entrances stating, "ELECTRONIC DEVICES INCLUDING CELLULAR PHONES PROHIBITED." Applicability must be verified by AE2 with MCB Camp Lejeune.

Provide exterior signs at all building primary and secondary entrances stating, "DO NOT ENTER IF IDS INDICATOR LIGHT IS ON. ALARM WILL SOUND." Applicability must be verified by AE2 with MCB Camp Lejeune.

C103005 LOCKERS

Lockers and cell phone lockers are funded as part of the construction contract.

Lockers – Provide 18-inch-wide by 18-inch-deep by 72-inch-high, single-tier, high-density polyethylene (HDPE) personnel lockers. Provide perforated top and doors for better air flow. Each door must be engraved with a minimum 5/8-inch-tall number in sequential order starting with "101." Provide 6-inch-height, continuous HDPE base, sloped tops, metal garment bar, metal double hook, and latching hardware to accommodate padlocks.

Cell Phone Lockers – Provide 8-inch-deep cell phone lockers in quantity shown in Part 3: Chapter 5 - Room Requirements.

C103006 SHELVING

There is no built-in fixed shelving in this project.

C103007 FIRE EXTINGUISHER CABINETS

Provide semi-recessed fire extinguisher cabinets for fire extinguishers in all finished spaces, including corridors and lobbies, as required by the RFP. Cabinets shall be coordinated with interior finishes. Where cabinets are installed in fire rated partitions, cabinets must be tested and listed in accordance with ANSI/UL-1479 for membrane and penetration firestops. Fire extinguishers required in spaces not typically occupied, such as mechanical, electrical, and telecommunication rooms, may be surface-mounted with a bracket listed for the size and weight of the required fire extinguisher. Installation of all fire extinguisher cabinets and mounting brackets must be in strict compliance with NFPA 1, NFPA 10, and the manufacturer's installation instructions. Refer to ESR Section D40.

C103008 COUNTERS

Provide solid surfacing material for countertops and back splashes in Heads, Break Rooms and Mother’s Room.

Countertops must be priced as a medium particulate to give users some budget with which to work.

C103009 CABINETS

Provide cabinetry, drawers, and millwork items with associated accessories. Cabinetry shall be AWI premium grade plywood construction with concealed hinges and adjustable standards for shelves. All exposed surfaces will be covered with high pressure plastic laminate and interior surfaces must be melamine.Provide cabinetry in administrative break rooms and other rooms as indicated in Part 3, Chapter 5, Room Requirements section of this DB RFP.

C103010 CASEWORK

NOT USED

C103011 CLOSETS

NOT USED

C103012 FIRESTOPPING SYSTEMS

Provide all sleeves, caulking, and flashing for firestopping penetrations.

All firestopping systems shall be performed by one experienced firestop contractor. Experienced firestop contractor is defined as following:

1. FM Research approved in accordance with FM 4991, or
2. Operating as a UL Certified Firestop Contractor, or
3. A contractor completed the manufacturer accredited firestop specialty contractor program. Certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years of experience in the installation of manufacturer’s products in accordance with specified requirements. Submit documentation of this experience. A manufacturer’s willingness to sell its firestopping products to the contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer.

Individual building system subcontractor, such as Mechanical, Electrical, Plumbing, Gypsum wall, etc., is not permitted to install firestopping systems.

A single complete submittal including Shop Drawings, Product Data, UL details must be provided for all firestopping systems throughout entire project.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

The requirement for sprayed fire-resistive materials is determined by the building code analysis prepared by the design/build contractor's Qualified Fire Protection Engineer (QFPE). If required, provide sprayed fire-resistive materials to the building’s framework.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide recessed walk-off floor mats or surface-mounted/loose-lay floor mats at building entrances in sizes as indicated in RFP Part 3, Chapter 5 Room Requirements and RFP Part 6 drawings. Recessed walk-off floor mats are part of the construction contract. Surface-mounted or loose-lay floor mats are part of the of the FF&E package. Provide sealed concrete underneath recessed walk-off floor mats.

Provide recessed walk-off floor mats with a carpet insert (100 percent solution dyed) designed for high-traffic areas. Recessed walk-off floor mats must have T5 aluminum alloy frame with anodized finish. Provide architectural surface pattern with combination of inserts, finish colors, aluminum slots, and aluminum framework. Inserts must include monofilament abrasive fibers, and finish colors must be offered in a broad range of standard neutral and bright colors. Floor mat surfaces must comply with ASHRAE 90.1 and ASHRAE 189.1 requirements.

C103015 ORNAMENTAL METAL WORK

NOT USED

C103090 OTHER INTERIOR SPECIALTIES

NOT USED

--End of Section--

C20 STAIRS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Provide ladders as required by the building code for access to platforms and mezzanines, if necessary, and roof areas. The requirements of this section are included in the RFP in the case that stairs or ladders may be required for operations.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Provide stairs and ladders conforming to UFC 1-200-01, *General Building Requirements*.

C2010 STAIR CONSTRUCTION

C201001 EXTERIOR STAIRS

NOT USED

C201002 FIRE ESCAPE STAIRS

NOT USED

C201090 HANDRAILS, GUARDRAILS, AND ACCESSORIES

Provide painted or galvanized steel handrails, guardrails and ladders, as required by code. Exterior systems must be coated or galvanized to withstand extreme wear and weathering conditions. Provide handrails, guardrails and ladders with smooth, unbroken surfaces throughout the length of the stair or ladder, as required by code.

Provide metal ladders and railings complying with OSHA requirements for access and protection to all mechanical mezzanines, lofts and similar spaces.

--End of Section--

C30 INTERIOR FINISHES – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Interior finishes include wall finishes, floor finishes, wall base finishes, and ceiling finishes.

Provide aesthetically pleasing, functional, durable finishes appropriate to the building function. Acoustic properties of materials, as well as durability and ease of maintenance, must be considered during material selection. Maximize the use of sustainable materials.

All interior finish products must be from manufacturer's standard running line offerings. Manufacturer's submitted materials must be made available for purchase at NO MINIMUMS for not less than 7 years from the date of the original product order. Custom fabrications must not be allowed unless otherwise noted.

Finish selections for this project will require the use of wall, floor, and ceiling material accents to enhance the interior design and architecture of the building. Provide an interior finish design scheme that includes a minimum of two different accent colors, to be used throughout the facility. Refer to Part 3, Chapter 6, ESR E20 for Structural Interior Design (SID) requirements and Part 3, Chapter 5, Room Requirements for required locations. Submit floor pattern and accent wall location drawings, indicating proposed interior finish locations with the Structural Interior Design submittal.

GENERAL SYSTEMS REQUIREMENTS

See Part 3 Chapter 5 Room Requirements for specific requirements on "Interior Finishes."

C30 SSPC QP 1 CERTIFICATION

The Project requires industrial coatings on exposed steel surfaces. All contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council – SSPC) to the requirements of SSPC QP 1 prior to contract award and must remain certified while accomplishing any surface preparation or coating application.

C3010 WALL FINISHES

Provide architectural feature wall consisting of wood veneer panel and wood acoustical panel in key public locations to include Lobby and Auditorium/Ready Room. Acoustical fabric wall panels must be used in the Auditorium/Ready Room and Brief/Debrief rooms.

Add graphic elements to walls in areas that may be subjected to heavy abuse or to create design features using wall coverings, graphic art panels, or modular textured panels.

C301001 CONCRETE MASONRY WALL FINISHES

Interior wall finish materials must be filled and polished ground face concrete masonry units.

C301002 PLASTER WALL FINISHES

NOT USED

C301003 GYPSUM WALLBOARD FINISHES

All interior wall finish materials must be finished and painted gypsum wall board, as indicated in the Part 3 Chapter 5 Room Requirements.

In all locations where concrete or concrete masonry walls exist in conjunction with GWB over metal stud construction within a space, all walls must be finished with GWB. Moisture-resistant gypsum wall board must be used in all wet or humid areas including, but not limited to vestibules, toilet rooms and locker room areas. Gypsum walls, fascia, and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. Refer to Part 4, PTS, C304001 GENERAL REQUIREMENTS for the MPI standards for more information.

Regular and moisture-resistant gypsum wall board must be used in spaces indicated in the Part 3 Chapter 5 Room Requirements.

C301004 PORCELAIN TILE WALL FINISHES

Porcelain Tile

Provide through-body color, rectified porcelain unglazed wall tile, minimum size of 12-inch x 12-inch with manufacturer recommended minimum width grout joints. Tile must be minimum Grade B, per ANSI 137.1 (1988), with a wide range of accent colors available. Accent tile pattern must be provided in another size or color.

Provide coordinating designer decorative accent strips or coordinating accessory tile shapes, minimum Grade D, as an integral part of the wall tile system. Porcelain wall tile must be installed full-height to ceiling on all walls, and on cementitious backer board substrates. Provide grouted-in stainless-steel edge protection strips at all inside and outside corners. Stainless-steel cove transition must be used where wall tile and floor tile meet.

Backer Board: Cementitious, water-durable board surfaced with fiberglass reinforcing mesh

on front and back, long edges wrapped, and complying with ANSI A118.9 and ASTM C 1325.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

Aesthetic Classifications: Provide tile with an aesthetic classification of V2 Similarly colored with variations in texture and/or pattern.

Install tile to full height of wall in a running bond pattern.

C301005 WALL COVERINGS

Corner Guards

Corner Guards must be outside corners in all high-traffic interior exposed corners in corridors, except on walls of CMU construction and must be 3-inch width. They must be surface-mounted in a through-color, recycled, extruded PETG finished aluminum material. Corner guards must extend from top of cove base and extend 8 feet high and be mechanically installed with a concealed continuous aluminum retainer. Double stick tape and adhesive mounted corner guard methods are not acceptable.

Wall Protection

Provide stainless-steel wall protectors at mop sinks in janitor rooms.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Provide sound absorbing acoustical fabric wrapped wall panels reinforced edges in locations as identified in Part 3 Chapter 5 Room Requirements.

Provide wood veneer acoustical wall panels that are factory-assembled, and factory finished. Panels must be perforated and backed with an acoustic textile product for optimum acoustical quality with limited textile visibility when installed. Veneer selection must be selected from an A grade range of stain grade veneer with minimal graining. Species and finish must coordinate with other wood finishes on interior finish schedule. Include all required corner, transition and base components for a quality installation. Refer to Part 4 Section C103009 for veneer quality and graining of wood finish materials.

C301090 OTHER WALL FINISHES

Solid Surfacing Wall Finishes

Provide 100 percent Acrylic Polymer in a solid color or with small-size particulate solid surface material for shower surround and window stools.

Exterior windows will receive a window stool.

100 percent acrylic solid surface at Break Rooms: 1/2-inch solid surface wall panel will extend width of sink to top cabinetry from backsplash to underside of wall cabinets.

100 percent acrylic solid surface at Showers: 1/2-inch solid surface wall panels will extend vertically from top of shower pan. Solid surface material will overlap top of shower pan with an air gap, as required by manufacturer installation instructions. Wall panels in shower areas will extend horizontally beyond the “wet area” to the exterior line of the shower receptor threshold. A solid surface transition will be required where solid surface meets wall tile. Locate wall panel seams at corners only. No material seams will be acceptable, except at corners. All shower seams at corners will be lap joints with solid surface corner trim from floor to ceiling. Chemically fuse seams. Include a matching corner shower shelf in each shower compartment. Full-height solid surface transitions will be provided at adjacent wall surfaces. Substrate behind solid surface shower walls will be equal to cementitious ceramic tile backer board. Solid surface shower receptors will be installed prior to wall system. Shower pan receptors will be a minimum thickness of 1/2-inch thick, with a 3/4-inch thick area at least 12 inches in diameter at the drain. Receptors will be one-piece, factory formed shower pans with integral thresholds. Thresholds will have structural supports every 4 inches on center.

Modular Architectural Panels / Decorative Paneling System

Provide modular architectural paneling wall system consisting of wood veneer acoustical panel in key public locations to include Lobby and Ready Room/Auditorium.

System must utilize ¾ inch thick panels in a rail and spline fastening system with 1/4-inch-wide or 1/2-inch-wide channel reveals, rails, splines and edge trim.

All exposed hardware must be black satin factory finished, anodized aluminum. Panel sizes must be a minimum of 4 x 8 feet.

Water-based Epoxy Coating

Water-based epoxy coating must be used in the Janitor’s Closet as noted in Part 3 Chapter 5 Room Requirements. Coating system must be a 10 to 12 mil thick wall system over adequate wall patching compound/wall prep. Wall coating system must consist of one coat of water-based

epoxy primer, a waterproofing membrane, two coats of water-based epoxy body/bonding coat, and gloss finish/seal coat from a single coating system manufacturer for a uniform, monolithic, slightly textured surface with rounded 1-inch radius inside corners, wall-to-ceiling and floor-to-wall transitions. All plumbing, floor-to-ceiling and wall-to-floor transition details must be a recommended by wall and floor coating manufacturer.

Plywood

Telecomm closets must receive floor-to-ceiling, 3/4-inch plywood, Class A fire-rated, sanded, face-grade plywood on side and back walls.

C3020 FLOOR FINISHES

Provide floor finish materials to meet the following requirements.

C302001 TILE FLOOR FINISHES

Porcelain Tile Floor Finishes

Provide large-format, through-body, rectified porcelain tile in a minimum size of 12-inch x 12-inches with matching 6-inch-high cove tile base with flat top and bottom edge, or with stainless steel coved transition between floor and wall tile in all restrooms. The cove base must have a flat top/bottom edge. Grout joints in a maximum width of 3/16 inch must be provided. Tile must be non-slip, with a light texture. Texture of tile must be analyzed regarding maintenance and selected based on a minimal maintenance program. Provide grouted-in stainless steel metal transition strips at expansion joints, corners (inside and outside), and transition between floor and wall tile.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

C302002 TERRAZZO FLOOR FINISHES – BID OPTION

Resinous (Epoxy) Flooring Requirements: Provide resinous (epoxy) flooring as identified in RFP Part 3, Chapter 5 Room Requirements, and as directed below. See Part 4 PTS for additional requirements.

Moisture Testing: Perform tests recommended by manufacturer and as follows:

a. Perform relative-humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
b. If the relative humidity exceeds 75 percent, then manufacturer approved primer moisture mitigation system must be installed prior to resinous flooring installation. Slab-on-grade substrates without a vapor barrier require a moisture mitigation system.
c. Poured-Epoxy Terrazzo Floor System – A 3/8-inch thick (minimum) epoxy terrazzo floor system in accordance with the “NTMA Epoxy Thin Set Terrazzo Specification” and manufacturer specifications, whichever is more stringent. Terrazzo floor system must include (but not be limited to) moisture vapor primer system, crack isolation membrane, zinc divider strips, aggregates, and epoxy terrazzo topping. Aggregate mixture to include marble and/or granite chips, 15 percent minimum colored glass chips and 20 percent minimum recycled mirror chips. Incorporate a base color, three accent colors, and divider strips in a pattern to create a design of interest. Provide an 800-grit level polished finish. Wall base must be separate, 6-inch-height, top set, precast epoxy terrazzo, flat tile base matching the floor field color. See Part 4, Section A103001 Standard Slab on Grade for additional requirements.

C302003 WOOD FLOORING

NOT USED

C302004 RESILIENT FLOOR FINISHES

Luxury Vinyl Tile Flooring

Provide resilient luxury vinyl tile, in lobby, corridors break rooms, Mother's Room and other high traffic areas for floors with high durability, low maintenance, high slip-resistance requirements. Luxury vinyl tile will be planks or square tiles as indicated in Part 3 Chapter 5 Room Requirements. Luxury vinyl tile must fall under Product Classification Class III, Type B per ASTM F1700 and use Class III printed film that conforms to ASTM F1700. Luxury Vinyl Tile must not contain ortho-phthalates. Luxury Vinyl Tile must have a minimum Coefficient of Friction of >0.5. All products must be from manufacturer's standard running line offering. Custom products or products with a minimum order quantity are prohibited.

20 mil and 30 mil wear layer products will be accepted if they have the following characteristics: factory applied UV-cured polyurethane finish containing anti-scratch particles and anti-scuff qualities, a test result of B1 or B2 on the Martindale Procedure B Test - BS EN 16094:2012 Procedures B (which assesses the scratch performance of the topical factory applied finish treatment that enhances clean ability and durability), passes ASTM F970 for Static Loads resulting in Pounds per Square Inch (PSI) minimum of 1000 PSI (to avoid materials that have the potential to severely indent and/or break with heavy static loads), and must carry a 20 year manufacturer's written warranty.

40 mil wear layer product with a 20-year manufacturer's written warranty is required.

C302005 CARPETING

a. Carpet Requirements

CARPET CHARACTERISTIC	MINIMUM CARPET REQUIREMENTS
Surface Color	Multi-colored and Patterned with no less than three separate dark colored yarns in the weave, (not variation of color within the fiber) in addition to accent colors, to create a multi-hued background with excellent soil and stain masking properties.
	Heathered carpet is not allowed.
Surface Texture	Loop or Textured Loop
Modular	24' x 24 or Plank (except on Raised Access Floor)
Yarn Weight	22 oz. minimum for Type 6 Nylon; 18 oz. minimum for Type 6.6 Nylon
Gauge	1/12
Density	7000 oz./cubic yard minimum for Type 6 Nylon 6000 oz./ cubic yard minimum for Type 6.6 Nylon
Dye Method	Minimum 100% Solution Dyed
Backing	Attached cushion
Fiber	Type 6.6 or Type 6 Commercially Branded nylon

Stain Resistance	Inherent or permanent stain resistance
Texture Appearance Retention Rating (TARR)	Severe > 3.5
Service Life	10 Year Warranty
Environmental	15% Post-Consumer Recycled Content
	NSF 140 Gold Label Service Life

C302006 MASONRY & STONE FLOORING

NOT USED

C302007 WALL BASE FINISHES

Resilient Wall Base

Provide rubber cove wall base, throughout areas with 6-inch resilient flooring and straight rubber for carpeted areas as indicated in Part 3 Chapter 5 Room Requirements.

Tile Base

In areas where wall tile is required, or otherwise specified, tiled floor must have matching 6-inch high cove base or stainless-steel cove transition strips between floor tile and wall tile. In areas where no wall tile is specified, tiled floor must have matching 6-inch high cove base. When tile cove base is used, base must have flat top and bottom edges to join evenly with adjacent tiles. Resilient base must be 120’ coils. Rounded edges are not allowed. Tile cove wall base units must be pre-formed; cut tiles are not allowed.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

Terrazzo Floor Base – BID OPTION

Terrazzo floor base must be 6-inch high, pre-cast with cove. Base must be finished with a smooth vertical surface and smooth top edge to match adjacent floor finish.

C302008 STAIR FINISHES

NOT USED

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

NOT USED

C302010 HARDENERS AND SEALERS

Concrete Floor Requirements

Finish concrete surfaces smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Provide hardener in concrete mixture in accordance with the manufacture requirements. Exposed concrete floors that are not required to have an applied floor finish, must receive a minimum of three coats of the manufacturer's approved sealer.

Provide concrete flooring as identified in RFP Part 3, Chapter 5 Room Requirements, and as directed in the following.

Sealed Concrete: Finish concrete surface smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer’s smoothness requirements, whichever is the most

restrictive. Apply both penetrating and topical sealers on exposed concrete floors that are not required to have an applied floor finish.

a. Water-based, clear, penetrating sealing compound blend of silane and siloxane for salt protection that penetrates into the pores of the concrete. Sealer must limit intrusion of moisture and chlorides into the concrete.
b. Water-based, topical, non-yellowing, clear, acrylic curing and sealing compound meeting the following requirements.
    I. ASTM C 309, Type 1, Class B
    II. ASSHTO M 148, Type 1, Class B
    III. ASTM C 1315, Class A, Section 6.4.1 – non-yellowing
    IV. ASTM C 1315, Section 6.6 – exceed 50 MPa (70 psi) adhesion.

All polished concrete floor surfaces must be moist-cured, integrally colored and polished to a low gloss level, as required in the Part 4 section of this RFP. A Dynamic Coefficient of Friction of 0.42 minimum must be achieved, tested and documented for all polished interior floor surfaces, as determined by ANSI A137.1-2012. An 8’ x 8’ mock-up of the polished concrete floor must be produced using the same process that will be used to produce the final polished concrete floor surfaces.

C302011 RAISED ACCESS FLOORING

Raised flooring must be interchangeable, 24-inch x 24-inch square module panels, capable of supporting design loads with a height of 24 inch minimum from the top of the access floor panels to the concrete slab. Finish must be vinyl tile - on module. Raised flooring locations must be as indicated in Part 3 Chapter 5 Room Requirements. Raised flooring must accommodate data and electrical systems. Majority of Raised Flooring components must be available on GSA Schedule.

C302090 OTHER FLOORING & FLOOR FINISHES

NOT USED

C3030 CEILING FINISHES

Finished surface of ceiling tiles must be selected to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide a feature/accent ceiling for Ready Room/Auditorium. Provide interest to ceiling with soffits, acoustical panels, clouds, curved feature ceilings or wood feature ceilings.

C303001 ACOUSTICAL CEILING TILES & PANELS

Acoustic Ceiling Panels

Suspended Acoustical Panel System: Primary ceiling finish will be 24-inch x 24-inch by 5/8-inch minimum thickness suspended acoustical panel ceiling system, except provide a suspended gypsum board ceiling in entrance lobby. Acoustical panels will have a square edge, closed pore panel surface unless as noted. Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide sustainable panels.

Provide interest to ceilings in gathering spaces or where the opportunity exists where applicable.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Gypsum Wallboard Ceiling Finishes

Provide Regular Gypsum Board and Moisture-Resistant Gypsum Board as indicated in the Part 3 Chapter 5 Room Requirements. Moisture-Resistant gypsum wall board must be used in all wet or humid areas include, but not limited to vestibules, toilet rooms and locker rooms areas.

C303003 PLASTER CEILING FINISHES

NOT USED

C303004 WOOD CEILINGS

NOT USED

C303005 SUSPENSIONS SYSTEMS

Provide 24-inch by 24-inch aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish must be factory applied white baked enamel. Provide manufacturer’s hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106-inch diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16-inch galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/580M, composition 302 or 304, condition annealed stainless steel, 0.106 inches in diameter over high humidity areas such as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, non-staining and ASTM C636). Recycled content must be a minimum of 25%.

C303006 METAL STRIP CEILINGS

NOT USED

C303009 OTHER CEILING & CEILING FINISHES

Ceiling finishes must be as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

C304001 GENERAL REQUIREMENTS

Spray paint all interior exposed surfaces including metal items, such as interior grilles, registers, diffusers, access panels, and panel boxes with a minimum of two coats in color to match adjacent surfaces, unless otherwise indicated. All primer and paint systems must be the manufacturer’s highest premium quality, professional grade. All materials must be moisture and mildew resistant and easily cleaned.

C304002 CONCRETE FINISHES

NOT USED

C304003 CONCRETE MASONRY FINISHES

Provide Concrete Masonry Units from polished ground face concrete masonry as indicated in the Part 3 Chapter 5 Room Requirements.

A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies, equivalent thickness, whose fire endurance has been determined by testing in compliance with ASTM E 119 by means acceptable to authorities having jurisdiction.

B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

D. Field constructed Mock-Ups: Prior to installation of masonry work, erect representative sample wall panels to further verify selections made for color and texture characteristics, under sample submittals of masonry units and mortar and to establish a standard for complete masonry work for qualities of appearance, materials construction and workmanship.

E. Sustainability Characteristics: Normal weight units with at least 40% recycled SCM’s (supplementary cementious materials), medium weights units with at least 40% recycled SCM’s and up to 20% recycled post-industrial aggregate replacement, light weight units with at least 40% recycled SCM’s and up to 50% recycled post-industrial aggregate replacement.

C304004 METAL FINISHES

NOT USED

C304005 INTERIOR WOOD FINISHES

NOT USED

C304006 GYPSUM WALLBOARD FINISHES

Gypsum walls, gypsum wall board ceilings, fascia and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. Include a minimum of two paint selections for accent walls as indicated in Part 3 Chapter 5 Room Requirements.

C304007 SPECIAL COATINGS ON WALLS

NOT USED

--End of Section--

D10 CONVEYING SYSTEMS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

NOT USED

--End of Section--

D20 PLUMBING – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

The plumbing system consists of all fixtures, potable cold and hot water piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 5 feet of the building.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS section D20 and the manufacturer's recommendations. Design and install plumbing systems in accordance with IPC and UFC 3-420-01, *Plumbing Systems*. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Include the hot and cold water systems to list of systems to be commissioned in accordance with UFGS 01 33 29.05 20 Sustainability Requirements for Design Build

Refer to RFP Part 3 – Project Program, Chapter 2 for commissioning requirements.

D2010 PLUMBING FIXTURES

Provide quantity and type of plumbing fixtures required for the use and functions described for this facility. Obtain occupancy from the owner. Refer to Part 3 Chapter 5 Room Requirements Section for additional specific requirements for spaces with plumbing fixtures. Provide handicapped fixtures in accordance with the referenced criteria in the Project Program.

D201001 WATER CLOSETS

Provide floor mounted flush valve water closets with hard-wired automatic flush control with push button backup. Maximum flushing volume is 1.28 gallons.

D201002 URINALS

Provide flush valve urinals with hard-wired automatic flush control with push button backup. Maximum flushing volume is 0.125 gallons.

D201003 LAVATORIES

Provide solid surface lavatories with integral sinks with hard-wired sensing faucet with automatic control and battery backup.

D201004 SINKS

Provide brushed stainless steel undermount sink in the pantry/break areas. Provide swivel faucet.

Provide service sink in the mudroom.

Provide mop sink in janitor's closets.

D201005 SHOWERS

All showers are to be the low flow type, 2.0 gpm. The shower heads to be located at a stationary position pointed away from the shower entrance opening and to keep from spraying toward the shower entrance opening and causing water damage. The shower faucet and spray head are to be a surface mount unit complete with prefabricated stainless steel mount and enclosure panel, temperature compensating shower valve with metal stem handle and integral service stops, and a shower head with flow control on institutional bracket.

D201006 DRINKING FOUNTAINS AND COOLERS

Provide hi low drinking fountains. Each drinking fountain must have a bottle filler.

Provide wall recess or side walls to protect drinking fountains.

D201090 EMERGENCY FIXTURES

Provide emergency shower and eyewash in the with privacy curtain and rail.

Provide tepid water (60F to 100F) with water tempering valve assembly.

Provide alarms and appurtenances for service within NEMA type 4 enclosures.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine the potable water pressure at the building and calculate piping system requirements.

D202001 PIPES AND FITTINGS

Provide Copper piping Type L for above ground and Type K for buried. Press fittings are not allowed.

D202002 VALVES & HYDRANTS

Provide isolation valves at supply to each floor. Provide hose bibbs in mechanical rooms and within 25 feet of all exterior equipment with coils. Provide wall hydrants along the building exterior such that all points along the perimeter can be reached with a 100 foot long hose.

D202003 DOMESTIC WATER EQUIPMENT

Provide backflow preventers of types and at points within domestic water systems as specified by IPC. Locate inside the mechanical room on service entrance lines where not provided exterior to the building.

Perform calculations to determine the water heater capacity to supply hot water to the fixtures.

Provide electric or natural gas water heater for heating of domestic water.

Provide water tempering valve assembly.

Provide domestic hot water recirculation system with high efficiency recirculation pump and recirculation loop with all associated fixtures, equipment, and appurtenances. Provide inline circulator for domestic hot water distribution system. Provide balance valves throughout system to allow for system balance to achieve required maximum wait times per International Energy

Conservation Code. Provide domestic water balance per UFGS 23 05 93.00 22 *Testing, Adjusting, and Balancing for Mechanical Systems*.

If water flow test shows inadequate water pressure, provide domestic water booster system for domestic water distribution system.

Provide water meter on the building main. Water meters must be appropriately sized for the building load. The water meter register must display gallons and must be clearly visible for inspection. The register must be compatible with the Itron 100W encoded radio transmitter (ERT). Refer to Itron's documentation for a compatibility list.

Contact: United Systems & Software, Incorporated

Jody Cline

800.455.3293

jodyc@united-systems.com

The ERT must be an Itron 100W+ with encoded output. The ERT must be installed per Itron installation guidelines. The contractor must supply all necessary mounting material, cabling, etc.

For meters installed inside of facilities (e.g. Mechanical room), the ERT must be mounted on the outside wall of the room.

Meters installed in pits must utilize the appropriate "through the LID" antenna.

The ERT must be proven to be capable of communicating with Itron's Advanced Meter Reading (AMR) and/or Advanced Metering Infrastructure (AMI) technology. Camp Lejeune's current AMR technology includes Mobile Collector Lite (MC Lite). AMR technology consists of Choice Connect version 5, with Cell Collector Units (CCUs). Prior to acceptance, all installations must prove successful communication between the meter endpoint (ERT) and Camp Lejeune's endpoint AMR and/or AMI communication equipment (i.e. MCLite/FC300 handheld and/or CCU).

The contract must submit the following information for each location (meter) included in the project.

Meter: Make, Serial Number, Size, Compound (Y/N)

Register (aka Encoder): Make, Model, Dials, Multiplier, Unit of Measure (i.e. gallons)

ERT: Make, Model, ID, Latitude, Longitude.

D202004 INSULATION & IDENTIFICATION

Provide cellular glass insulation with vapor barrier on domestic hot water supply piping and on domestic cold water supply piping. Provide identification for piping and equipment.

D202005 SPECIALTIES

NOT USED

D202090 OTHER DOMESTIC WATER SUPPLY

Provide piping supports in accordance with the IPC. Provide inspections, disinfection, and testing in accordance with the IPC.

Provide recessed water-outlet boxes for ice and coffee makers.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

D203002 VENT PIPE & FITTINGS

Provide cast iron hubless pipe and fittings, rubber compression gasket joints and stainless steel banding.

D203003 FLOOR DRAINS

Provide floor drains in mechanical rooms, restrooms, break rooms, in proximity to emergency eyewashes and showers and overhead doors and plumbing chase areas.

Provide floor sinks to receive condensate from air handling units.

D203004 SANITARY & VENT EQUIPMENT

NOT USED

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTING

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

D204002 ROOF DRAINS

Provide roof drains that are compatible with the roofing system.

D204004 INSULATION & IDENTIFICATION

Domestic, Storm and Condensate piping.

D204090 OTHER RAIN WATER DRAINAGE SYSTEM

NOT USED

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Obtain natural gas pressures from the local gas utility provider. Contractor must invite the utility provider to the design reviews. Contractor is responsible for any applications and permits, and

must provide the complete natural gas system from the load side of the utility meter to the heating equipment. Provide steel natural gas piping system. Include gas distribution piping from the gas meter to points of usage. Follow Camp Lejeune design standards for piping pressures inside the building.

The Contractor must provide the projected loads to the gas utility provider 6 months prior to in-service date. The Contractor must have the local gas utility provider install piping and appurtenances up to the load side of the meter. Tie the gas meter into the Building Automation System (BAS) and the existing Advanced Metering Infrastructure (AMI) metering system.

Natural Gas Utility Provider Information:

Piedmont Natural Gas

Invite the following to Design Reviews:

i. Michael Lilly- PNG Commercial and Residential Sales Specialist- michael.lilly@duke-energy.com – (252) 808-7292

ii. Bobby Gurganus- PNG Construction- bobby.gurganus@duke-energy.com – (252) 670-9613

D209002 ACID WASTE SYSTEMS

NOT USED

D209003 INTERCEPTORS

NOT USED

D209005 COMPRESSED AIR SYSTEM

NOT USED

D209090 OTHER SPECIAL PLUMBING SYSTEMS

NOT USED

--End of Section--

D30 HVAC – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Provide the following type of high performance system:

Provide a variable air volume (VAV) system with shut-off terminal units and hot water heating coils. The VAV AHU will feature a chilled water-cooling coil and a hot water preheating coil. Ventilation air will be provided via the VAV AHU(s). Provide a total enthalpy fixed plate heat exchanger energy recovery section in the VAV AHU. Chilled water will be generated by an air-cooled chiller, and hot water will be generated by condensing gas boiler[s]. Size the AHU coils, chillers, and boilers for full capacity, in the event of an energy recovery system failure.

The primary air from the VAV AHU will be ducted to the terminal units by medium-pressure galvanized metal ductwork. Supply air from the terminal unit to the zone and return air from the zone to the AHU will be ducted by low-pressure galvanized metal ductwork.

Roof-mounted equipment is not permitted.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections, and accessories required for a complete and usable system. Install all equipment in accordance with the criteria in Performance Technical Specification Section D30 and the manufacturer's recommendations. Where the word "should" or “must” is used in manufacturer’s instructions, substitute the word "must."

Economizer cycles must not be used.

The new facilities must not use rooftop heating, ventilation, and air conditioning (HVAC) equipment. All major HVAC equipment must be located in mechanical rooms. Consider attic and above-ceiling placement of AHU equipment only when absolutely necessary. Stairs are required for any above-ceiling or attic located air-handling equipment (excluding VAV terminals). Attic space may be used for mechanical equipment if there is a 6-foot-wide stairway with double doors for maintenance purposes. Equipment with cooling coils placed above ceilings must have secondary drain pans with approved gravity drainage piping.

Provide corrosion protection for ALL exterior HVAC equipment, including air-handling units (AHUs), heat exchanger coil surfaces, equipment casings, air-cooled water chiller coils, heat pumps, and air conditioning units that are exposed to the weather. Corrosion protection is also required on HVAC equipment within buildings that are subject to the outside weather conditions. Specifically, equipment requiring protection is defined as the first HVAC equipment (unit coils) met by the outside air in the supply air ductwork system. The corrosion protection must meet or exceed the requirements of a 3000-hour salt spray test in accordance with ASTM International (ASTM) B117. The specified capacities on the plans and specifications must be the capacities after the required corrosion protection coatings are applied. Specify manufacturer's standard off

the-shelf anti-corrosion options for "coastal" or "sea coast" installations that meet or exceed the requirements stated above.

Provide radiant barriers in the exterior wall system. Optimize the building envelope and window requirements to exceed ASHRAE 90.1-2013.

Provide premium-efficiency motors, chillers, and boilers, and optimize the HVAC system.

Provide Seal Class A on all ducts to reduce duct losses. Increase thermal insulation on mechanical systems and use radiant barriers to reduce thermal losses.

Provide chemical shot feeders, air separators, and bladder type expansion tanks for hydronic systems. Provide inline centrifugal pumps with inlet suction diffusers, isolation valves, discharge check valves, balancing valves, drain valves, differential pressure gauges, and flexible pipe connectors and coupling guards.

Single-phase fractional horsepower alternating current motors must be high-efficiency types corresponding to the applications listed in National Electrical Manufacturers Association (NEMA) Motors and Generators (MG) 11. Select polyphase motors based on high-efficiency characteristics relative to the applications listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium-induction motors with continuous ratings must meet or exceed energy-efficient ratings per Table 2-10 of NEMA MG 1. Provide controllers for three-phase motors rated 1 horsepower (hp) and above with phase voltage monitors designed to protect motors from phase loss and over-/under-voltage. All motors 1 hp and larger must be premium efficiency. Provide the means to prevent automatic restart by a time-adjustable restart relay. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart. Provide reduced-voltage starters for all motors 25 hp and larger.

Provide minimum 4-inch (100 mm) thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment.

Provide factory painted finishes that are designed for 3000-hour duration test for outside equipment and for equipment bringing in outside air.

Provide a manufacturer approved coating system for coastal environments on mechanical equipment, cooling, heating, and condenser coils on units with more than 5 tons of cooling capacity. The submittals must indicate heat transfer rating of coated coils.

The facility must have a complete air and water balanced HVAC system. Calculations must be provided and show the air and water systems are balanced. Drawings must also show balanced air and water systems.

Provide air conditioning and heating for spaces as indicated and for the following Design conditions:

Outside Conditions

Summer	91	Degrees F dry bulb	Winter	26	Degrees F
	79	Degrees F wet bulb	Dehumidification	140	Grains/lb

Outside Design Conditions for Air Cooled Equipment

Summer	95	Degrees F dry bulb			

Inside Conditions – Heated and Cooled Area (unless otherwise noted in Room Requirements - Chapter 5)

Summer	78	Degrees F dry bulb	Winter	68	Degrees F
	50	%RH			

Heating and Ventilating Conditions – Electrical Rooms, Mech Rooms with Heat producing equipment (Boilers, Water Heaters, etc)

Summer	10	Degrees F dry bulb above ambient	Winter	55	Degrees F

Inside Conditions – Cold Mechanical Rooms (AHUs and pumps)

Summer	N/A	Degrees F dry bulb	Winter	55	Degrees F
	55	Degrees F Dew Point			

Inside Conditions – Communication and IT Rooms

Summer	78	Degrees F dry bulb	Winter	NA	Degrees F
	55	Degrees F Dew Point			

Provide Ventilation rates and systems per ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*. Provide CO2 sensors to limit CO2 concentration to 800ppm in spaces with 25 or more occupants per 1,000 square feet.

Provide carbon monoxide (CO) sensors with audible and visual alarms if CO concentration is greater than 25 ppm in areas where internal combustion engines will be operating.

Noise levels must comply with the requirements in the latest edition of the ASHRAE Applications Handbook. The design must provide noise level control by requiring maximum noise levels as well as noise separation areas for the Mechanical Rooms. The drawings must specify the maximum equipment noise level. Classrooms must not be adjacent to mechanical rooms

Mechanical room(s) and electrical room(s) with heat producing equipment must each be a separate zone, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01

Cold mechanical rooms(s) (AHU's, chilled water pumps) must each be a separate zone, heated and dehumidified.

Provide a separate zone for IT closets, telecom rooms and server rooms. These zones shall be served by dedicated DX split system equipment.

The HVAC system must provide each zone with the choice of heating or cooling year-round unless otherwise indicated. Provide each zone with its own thermostatic range of control.

Zone the HVAC system as follows:

Administrative spaces such administrative areas, offices, shops, maintenance control, quality assurance, ready rooms, conference rooms, flight equipment, training rooms, tool rooms, restrooms, lockers, elevator lobbies, break rooms, corridors, and project rooms must be zoned separately, such that each administrative space greater than 175 square feet (SF) is its own zone, and any spaces less than 175 SF must be grouped into a single zone.

- Provide a dedicated AHU and ductwork to serve the secure portion of the facility.
- Provide a dedicated AHU and ductwork to serve the unsecure portion of the facility.
- Corridors must not be on separate zones. Locate thermostats for corridors in separate occupied spaces.
- Provide a separate zone for the boiler room, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01.
- Provide a separate zone for IT closets, telecom rooms, and server rooms.
- Provide a separate zone for electrical rooms.
- Provide a separate zone for the chilled water pump and AHU rooms, heated and dehumidified only, no ventilation.
- Provide a separate zone for the Warehouse/Storage areas.
- Provide separate zones as indicated on the room information sheets.

For unoccupied mode, provide the following night setback temperatures:

- For winter, 10 degrees F lower than indoor heating design conditions, but no lower than 55 degrees F.
- For summer, 5 degrees F higher than indoor cooling design conditions, but no higher than 85 degrees F.
- Year round, 60 percent RH maximum.

Provide thermostats and temperature sensors with occupant adjustment control of +/- 3 degrees F.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

NOT USED

D301002 GAS SUPPLY SYSTEM

Provide a natural gas supply system for the heating of the facility. Natural gas must be the energy source (at a supply pressure of 5 inches water column [w.c.] minimum to 7 inches w.c. maximum) for all building heating systems. Provide a complete natural gas supply system as detailed in the specification in accordance with National Fire Protection Association (NFPA) 54, the North Carolina Building Code, the North Carolina Mechanical Code, and natural gas supplier requirements. Size natural gas piping to carry 15% more flow than is required by heating loads. Obtain natural gas pressures from the local gas company, Piedmont Natural Gas (PNG). The Contractor is responsible for coordinating with PNG and the Contracting Officer regarding the natural gas requirements for each facility. Provide a complete natural gas system, including any applications and permits. PNG will provide the natural gas to within 5 feet of each facility.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

NOT USED

D301004 HOT WATER SUPPLY SYSTEM

NOT USED

D301005 SOLAR ENERGY SUPPLY SYSTEMS

NOT USED

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility consisting of at least two boilers. Each boiler must be no greater than 399,000 Btu/hr. For loads less than 399,000 Btu/hr provide two boilers with 100% redundancy. For loads greater than 399,000 Btu/hr and two boilers are needed based on size limitations, each boiler must supply no less than 65% of the heating load. Where more than two boilers are required to meet size limitations, size each boiler for 1/N of the total load, where “N” is the total number of boilers. On multiple boiler installations with the largest boiler off line, the remaining boiler(s) must be capable of carrying not less than 65% of the maximum winter design load. The boiler fuel train must be compatible to match the available source at the project site. Use the building block load to size the heating plant.

Refer to Part 3, Chapter 2, Paragraph 2.3.9 Air Quality Management, for air emission permit information. Air Emission permit is required for each combustion device provided.

All combustion sources are subject to the NC Air Toxics Permitting requirements.

D302001 BOILERS

Provide packaged gas-fired condensing type boilers. Provide minimum 90% efficiency boilers with stainless steel heat exchangers. All heating equipment boilers must have the ENERGYSTAR label. Provide a stainless steel, multi-wall insulated boiler stack. The stack must be pre-engineered and pre-manufactured, Underwriters Laboratory (UL) listed, and must meet

NFPA 211. Fuel for boilers must be natural gas. Provide boiler(s) with a condensate neutralization tank/kit.

All vents on gas control valves must be routed outdoors as required by NFPA 54. All gas lines serving gas-fired equipment must be fitted with UL or Factory Mutual approved gas trains suitable for the gas being provided.

D302002 FURNACES

NOT USED

D302003 FUEL-FIRED UNIT HEATERS

NOT USED

D302004 AUXILIARY EQUIPMENT

NOT USED

D302005 EQUIPMENT THERMAL INSULATION

Provide all hot water equipment with cellular glass insulation with vapor barrier jacket or molded fiberglass with vapor barrier jacket.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

HVAC refrigeration and air conditioning compressors must have full 5-year warranties including all parts and labor from the time of Beneficial Occupancy

Provide 2 chillers sized at 50% each to meet the block cooling load. Provide backup power.

Provide rotary screw or scroll air-cooled chillers. Provide high-efficiency air-cooled chillers. Provide constant primary/variable secondary pumping systems. Keep flow through the chiller constant; do not use variable primary flow. A buffer tank must be provided on all systems to provide thermal inertia.

The chillers must be located in an exterior equipment yard area and properly spaced from each other and other equipment away from building perimeter. The air-cooled chiller(s) must be located outside on a 150 mm (6-inch) thick reinforced concrete housekeeping pad. Provide heat tape to ensure freeze protection as low as 10°F on chilled water piping and any other associated appurtenances. Refer to the MCB Camp Lejeune mechanical policy for the requirements for phase and voltage protection requirements for chillers. Provide emergency chiller connections consisting of isolation valves and blind flanges.

Low ambient capability must be provided to allow chillers to operate in temperatures as low as 15°F (-9.4°C).

All coils must have the approved coatings that pass a salt-spray test conducted per ASTM B117 for duration of at least 3,000 hours and provide a minimum of loss of heat transfer due to the thickness of the coating.

Provide the approved quantity, size, spacing, material, and height of bollards around all yard equipment.

Provide blind flanges with butterfly isolation valves at the chiller location for emergency portable chiller connection. Coordinate site plan design to accommodate access needed for an 18-wheeler flatbed to park near the flange location.

Provide chiller controls with BACnet communication protocol.

Provide complete start-up and operational testing of chiller equipment.

Provide insulation and vapor barriers on all chilled water equipment.

Provide complete system flushing and start-up for the entire chilled water system including piping.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for chilled water piping system.

Startup must include operational testing of chiller equipment and full commissioning.

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled DX ductless split system cooling only unit for IT closets, telecom rooms, and server rooms and any other space requiring independent conditioning. If the unit does not have a BACnet system interface, provide a room temperature sensor and a current sensor, tied to the building DDC system, to determine the operating status of the system. Size DX cooling equipment at 120% of IT equipment load. Provide low ambient cooling.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide a dedicated air handler and air distribution system for the secure portion of the building. Provide dedicated air handler and air distribution system for the unsecure portion of the building. Provide man bars, flexible connections and all other security measures required when crossing unsecure/secure boundaries.

Provide shutoff-type terminal units with hot water reheat coils to serve zones. To maximize energy savings on this project: the shutoff-type terminal units must comply with ASHRAE 55 and sized to meet indoor design conditions (temperature, humidity, ventilation, etc.) that are used in the design; do not size shutoff-type terminal units to maintain a minimum of 4 AC/Hr in occupied mode.

Provide insulated, galvanized steel ductwork in concealed locations constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards. For exposed ductwork, provide insulated, double walled, galvanized steel duct.

Provide medium-pressure duct from VAV AHU to shutoff-type terminal unit. Provide round or flat oval primary supply air duct. Size the medium pressure duct according to the static regain method. Provide low-pressure supply air duct from the terminal unit to the zone being served. Provide low-pressure return air duct from the zone to the VAV AHU. Provide a minimum of 6 diameters of rigid straight duct at the inlet to each VAV terminal to maintain a uniform velocity

profile at the valve inlet for airflow measurement accuracy. Flexible duct connection to the primary air inlet of VAV terminal is not permitted.

Provide shutoff-type terminal units typically above lay-in ceilings. Provide terminal units above hard ceilings with lockable access panels.

Provide aluminum grilles, registers, and diffusers. Provide linear slot diffusers including manufacturer insulated plenum.

Provide manual balancing dampers for all main and branch ducts. Incorporate product requirements identified in the UFGS 23 00 00 Manual Balancing Damper Editing Guide, in RFP, Part 6, into project specifications.

Install all metal duct to Seal Class A standard. Insulated flexible duct may be installed in low-pressure supply duct but may not exceed 5 feet in length or provide more than a 45-degree change in direction. Flexible duct may not be installed in return or exhaust air duct.

Provide AMCA 540 and 550 rated louvers.

Size low pressure supply ductwork at 0.08"/100LF and negative pressure return/exhaust at 0.05"/100LF (max).

Provide rigid foil faced board insulation where ducts are exposed in mechanical spaces. Provide pre-manufactured double wall ductwork on building exterior or where ducts are exposed in occupied spaces. Insulate all ductwork.

Mineral fiber blanket wrap must meet the requirements of ASTM C1136, ASTM C1290, ASTM C1338, ASTM E84, UL 723, NFPA 90A, and NFPA 90B.

Rigid mineral fiber must meet the requirements of ASTM C553, ASTM C612, ASTM C1136, ASTM 1393, ASTM E84, and UL 723.

Make duct penetrations of all walls with sheet metal ducts. Flexible duct penetrations of walls are not acceptable.

Coordinate locations of all air devices with ceiling mounted equipment. Maintain minimum of 3'-0" from ceiling mounted smoke detectors.

Provide unvaned radius elbows with a radius equal to 1 ½ times the duct width. Provide all 90-degree mitered square elbows with turning vanes with a radius equal to 2 times the duct width. Provide access doors upstream of all elbows with turning vanes.

Do not hangs duct from other ducts.

Provide canvas duct connectors for all equipment ductwork connections containing fans. Provided grounding across flexible connections with flexible copper grounding straps. Grounding straps must be bolted or soldered to both the equipment and the duct.

Ductwork and air handling equipment must be sealed and protected from dirt and debris during the entire construction duration.

Provide separate chases for ductwork and piping. Do not install ductwork and piping in the same chase.

Route all ductwork perpendicular and parallel to the building structure.

Where sheet metal is visible through the face of air terminals, paint sheet metal with a flat black enamel finish.

Manual Balancing Dampers (Accessible): Round type is not acceptable. Provide pre-manufactured rectangular type with 16 gage galvanized steel channel frame with corner braces. Blades will be opposing type 16 gage with a maximum width of 8". Provide with a 20 gage blade stop on units 12" high and under. Provide with position lock, molded synthetic bearings, and square shaft.

Manual Balancing Dampers (Inaccessible): Provide cable operated remote controlled volume dampers in inaccessible branch ducts feeding diffusers. Dampers must be adjustable through the diffuser face with standard hand tools, providing positive balancing of multiple airflows to maintain design air throw and noise criteria. Radial damper must be direct actuated by a brass plated rotary cable which is fixed at the damper end in an integral support bracket. Rotary cable must have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions. The entire assembly must be furnished as one piece for installation with no linkage adjustment required or miscellaneous small parts. Each unit must be factory tested as a complete assembly prior to shipment (100% testing). Accessible cable end must be secured with a factory furnished nylon clamp, allowing maximum placement flexibility. Positive, direct, two-way damper control must be provided without sleeves, springs, or screw adjustments (that may loosen after ceiling closure).

Motorized dampers frame must be 16 gage (1.6) galvanized steel structural hat channel with tabbed corners for reinforcement for 11 gage (3.05) structural equivalence. Blades must be 14 gage (2.0) equivalent thickness galvanized steel, roll-formed airfoil type for low pressure drop and low noise generation. Blade edge seals must be suitable for -72°F to +275°F and mechanically locked into the blade edge. Adhesive or clip-on type seals are unacceptable. Jamb seals must be flexible metal, compression type to prevent leakage between blade end and damper frame. Blade end overlapping frame is unacceptable. Bearings must be corrosion resistant, permanently lubricated stainless steel sleeve type turning in an extruded hole in the damper frame. Axles must be hexagonal positively locked into the damper blade. Linkage must be concealed out of airstream, within the damper frame to reduce pressure drop and noise. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Dampers must be equipped with factory installed damper position indication switch package. The switch package must include two position indication switches linked directly to the damper blade to provide full open and full closed damper blade position. The switch package must be capable of interfacing with the HVAC control system and provide remote damper blade position status. Factory mounted damper actuators with adjustable memory stops must be furnished and mounted by the damper manufacturer in their factory. Each damper must be cycle tested at the factory prior to shipment.

D304002 STEAM DISTRIBUTION SYSTEMS

NOT USED

D304003 HOT WATER DISTRIBUTION SYSTEMS

For exterior buried Hot Water Distribution Systems see Section G30, *Site Civil/Mechanical Utilities*.

Provide a variable speed pumping system to serve the HVAC hot water equipment throughout the facility. Provide two pumps, each sized at 100% of building load. Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility.

Provide valves and related hot water system appurtenances. Provide a bladder type expansion tank and air/solids separator for the hot water system. Provide a shot type feeder for manual chemical feed to the hot water piping system.

Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with mineral fiber insulation.

Provide system flushing and startup for the hot water piping system.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for hot water piping system.

Provide complete startup and operational testing of all hot water systems.

Hot-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

D304004 CHANGEOVER DISTRIBUTION SYSTEMS

NOT USED

D304005 GLYCOL DISTRIBUTION SYSTEMS

NOT USED

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

For buildings with less than 60 tons of cooling load, provide a constant primary pumping system to serve the HVAC chilled water equipment throughout the facility. For buildings with more than 60 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with a single primary pump per chiller. For buildings with more than 160 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with one primary pump per chiller. In all cases, keep flow through the chiller constant.

For building less than 160 tons, provide two primary pumps or two secondary pumps as appropriate with each pump sized for 100% flow. For buildings with more than 160 tons, provide three secondary pumps, each sized for 50% of maximum building flow. Two pumps must operate as duty pumps and the third must act as standby. Provide a control sequence to rotate pump duty/standby assignments monthly and equalize running hours.

Provide valves and related chilled water system appurtenances. Provide a bladder type expansion tank and air/solids separator in chilled water system. “Triple duty” or “multi-purpose” valves that combine a check valve, throttling valve, and shut-off valve must not be used for the

chilled water system. Provide air vents at all terminal equipment and system high points for air control.

Provide steel and copper chilled water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with cellular glass insulation on all above ground chilled water distribution piping.

Provide air vents at all terminal equipment and system high points for air control. Provide a shot type feeder for manual chemical feed for the chilled water piping system.

Provide thermal mass capability in the chilled water system to insure proper control and longevity of chillers by using inertia tanks. Provide inertia tanks, sized per chiller manufacturer recommendation to ensure stability of operation and temperature setpoint control. Total chilled water system volume must be a minimum of 7 gallons per ton of cooling. Provide an insulated storage tank within the mechanical room in order to meet this requirement.

Provide insulation, vapor barrier, and aluminum jacketing on piping exposed to outdoors. Install heat tracing on piping to ensure freeze protection to 10°F.

Provide system flushing and startup for the chilled water piping system.

Provide complete startup and operational testing of all chilled water systems.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

Provide threaded joints for steel pipe 2" or less and welded or bolted flange for sizes greater.

Provide flanged connections with flexible braided stainless steel connectors at all equipment connections.

Provide pre-manufactured dual containment system consisting of carrier pipe, cellular glass carrier insulation, air space, steel conduit, polyurethane outer insulation, and seamless extruded HDPE casing for direct buried piping. The carrier pipe must be ASTM A53 steel schedule 40 or 80 as scheduled. The product must be rated for corrosion resistance without the need for cathodic protection. Provide with leak detection system.

Chilled-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards. Install exhaust duct according to Seal Class A.

Provide ducted exhaust ventilation rate according to ASHRAE 62.1.

D304008 AIR HANDLING UNITS

Provide separate AHUs for the secure portion and the unsecure portion of the building.

Provide central station VAV AHUs to provide constant temperature primary supply air to all terminal units. Provide hot water preheating coils, chilled water-cooling coils, variable-speed fan

sections, ultraviolet coil disinfection systems, and energy recovery sections. Units must include additional sections as necessary to facilitate ready access to all maintainable components.

The energy recovery section must be a fixed plate total enthalpy heat exchanger with MERV 8 prefilters and MERV 13 filters upstream of the unit in both the outside air and exhaust air streams. If AHU manufacturers are unable to provide these filters in the central station unit, provide ducted filter boxes outside the unit in a location accessible for filter replacement.

Provide the means to measure filtered outdoor airflow to verify proper ventilation.

Provide modular, central station, air handlers with the following:

Unit panels must be 2-inch solid. Exterior surfaces of the unit casing must be factory painted to withstand ASTM B117 90 3,000-hour salt spray requirements.

All interior casing panels must be made of stainless steel.

Casing air leakage must not exceed leak class 9 (CL = 9) per ASHRAE 111.

Panel insulation must provide a minimum thermal resistance (R) value of 13 $ft^2 \cdot h \cdot {}^oF/Btu$ throughout the entire unit.

Access doors must be 2-inch double-wall construction with latching door handles.

Provide factory-mounted, weather-resistant, light emitting diode (LED) fixtures in sections of the unit for maintenance and service visibility.

Provide a fan array for the supply and return. The fans must be direct drive, single-width, single-inlet plenum. The fan blades must be aluminum backward-inclined airfoil. Fan array fans must be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.

The fan and motor assembly must be internally isolated from the unit casing, furnished and installed by the unit manufacturer.

Provide with factory mounted VFD for control of fan speed to modulate the airflow.

Provide 24-inch-long (min.) modular inspection sections with removable doors on both sides of the chilled water coil module.

The coil must have a factory applied flexible epoxy polymer coating (1 mil min. thickness) uniformly applied to all coil surface areas without material bridging between fins.

Provide two sets of spare filters for each AHU.

Provide a factory-installed dial type differential pressure gauge piped to both sides of the filter to indicate status.

A mixing section module must be provided to support the damper assembly for outdoor, return, and/or exhaust air. Dampers must modulate the volume of outdoor, return, or exhaust air. The dampers must be of double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades. The blades must rotate on stainless-steel sleeve bearings. Airfoil dampers must be rated for a maximum leakage complying with ASHRAE 90.1.

Provide an air blender section to mix outside and return air, minimize stratification, and reduce the risk of frozen coils.

Fully modulating 2-way hydronic coils. If the AHU is at the end of the water loop, a 3-way valve arrangement at the final coil connection is acceptable in lieu of a bypass.

Provide a factory installed combination VFD/disconnect for each fan motor. Each VFD/disconnect must be properly sized, factory mounted in a full metal enclosure, wired to the fan motor (s), and commissioned. VFD/disconnects must include a circuit breaker disconnect with a through-the-door interlocking handle designed to rest only in the full ON or OFF state and must be lockable in these states. A concealed defeater mechanism must allow entry into the enclosure when the handle is in the ON position. The VFD package must also include:

- Electronic manual speed control
- Current limited stall prevention
- Auto restart after momentary power loss
- Speed search for starting into rotating motor
- Anti-windmill with DC injection before start
- Phase-to-phase short circuit protection
- Ground fault protection

D304090 OTHER DISTRIBUTION SYSTEMS

Provide inline pumps with variable frequency drives.

Hangers, Clamps, Rollers, and Supports must comply with MSS SP-58 unless otherwise noted. Steel channel strut and angle iron are acceptable materials for field constructed trapeze hanger assemblies where the rated load limit is not exceeded. Provide with MSS type carbon-steel hanger rods, nuts, saddles, and U-bolts.

Provide dielectric pipe unions or grounding and other required measures when crossing the secure/unsecure boundary.

Run all horizontal piping above ceiling unless otherwise noted.

Provide full line size valves and strainers prior to reducing pipe size to make connections to equipment, control valves, or balancing valves.

Automatic flow control valves are not permitted.

Provide extended plugs and labels where piping is insulated. Provide removable insulation over plugs.

Provide manual air vents at all high spots and the ends of all piping loops. Do not use automatic air vents in any place other than mechanical rooms where floor drains are already provided for. Provide 1/2" drain valves at low points in piping. Provide minimum pitch sufficient to insure adequate venting and draining.

Provide permanent flushing isolation valves and tees at both sides of all hydronic equipment. Provide tees with ¾” hose end connection and removable brass cap.

Do not hang pipe from other pipe.

Do not use flexible braided pipe to change direction at equipment connections regardless of manufacturer documentation.

Do not bend pipe or pipe hangers to correct poor alignment.

Route all piping perpendicular and parallel to the building structure.

Maintain a minimum of 3'-6" of ground cover over all underground HVAC piping.

Install piping so that all valves, strainers, unions, traps, flanges, and other appurtenances requiring access are accessible from below.

Install valves so that the valves will remain in service when equipment or piping on the equipment side of the valve are removed.

Provide balancing valves with position indicators and maximum adjustable stops (memory stops).

Provide chain wheel operators for all valves in equipment rooms mounted greater than 7'-0" above floor level; chain must extend to 7'-0" above floor level.

Install unions and/or flanges at each piece of equipment, in bypasses, and in long piping runs (100 feet or more) to permit disassembly for alteration and repairs.

Install all piping without forcing, springing, or bending.

Tap all branch lines from top of piping mains (45 degrees preferred, 90 degrees acceptable).

All valves must be set up and adjusted for smooth and easy operation.

All piping work must be coordinated with all trades involved. Offsets in piping around obstructions must be provided at no additional cost to the government.

Provide stainless steel flexible connections in all piping systems connected to pumps, chillers, cooling towers, and other equipment which require vibration isolation. Flexible connections must be provided as close to the equipment as possible.

Unless otherwise noted, all chilled water and hot water piping must be no less than ¾".

All piping must clear doors and windows.

Provide dielectric fittings at all pipe connections of dissimilar metals.

All piping must be free of dirt, debris, and moisture prior to installation of insulation. Chilled water systems must be disabled, brought to room temperature, and free of external moisture prior to insulation installation.

Install piping in accordance with the latest editions of MSS SP-58 and ASME B31.9. Use MSS type hangers and supports. Provide saddles and base supports. All-thread rod is acceptable for tension support applications only, not compression.

Select thermometers and pressure gages where the operating condition falls within the middle third of the range.

Provide chrome plated escutcheon plates for exposed pipe penetrations in occupied spaces.

Do not route pipe risers in duct shafts. Do not penetrate fire rated shafts with pipe unless the shaft is specifically allocated for that service.

Size all hydronic piping between 1 feet and 4 feet total dynamic head pressure drop per 100' length.

Grooved piping and press fittings are prohibited in all applications.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide gas fired or hot water unit heaters to serve the heating requirements of mechanical and air handler rooms of the facility.

D305003 FAN COIL UNITS

Provide 4-pipe vertical type fan coil units and controls to serve the heating and cooling requirements of the facility. Provide one vertical fan coil unit for each zone and locate it within a mechanical closet. Provide lockable mechanical closet and allow adequate space for maintenance. Provide each fan coil unit with a return filter grille to ease maintenance requirements. If space does not allow for vertical fan coil units, provide horizontal fan coil units in the overhead with a means for removal and maintenance of the units through lockable access panels. Provide auxiliary drain pans with overflow sensors below fan coil unit and appurtenances.

D305004 FIN TUBE RADIATORS

NOT USED

D305005 ELECTRIC HEATING

NOT USED

D305006 PACKAGE UNITS

Provide 100% Outside Air Makeup Air Conditioning Units to precondition outside air prior to distributing to fan-coil units, or terminal units.

D305007 COMPUTER ROOM AIR CONDITIONING (CRAC)

Provide downblast 4-pipe hydronic CRAC units for all spaces utilizing modular raised floor systems with N+1 redundancy for each underfloor supply plenum. Provide floor sinks in slabs below CRAC units. CRAC units must utilize modulating hot water reheat coils for process humidity control.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROL SYSTEM (DDCS)

Provide a complete Direct Digital Control (DDC) system to comply with UFGS 23 09 00.00 22 Instrumentations and Control for HVAC, UFGS 23 09 13.00 22 Instrumentation and Control Devices for HVAC, and UFGS 23 09 23.02 22 BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems for the facility. All Camp Lejeune specific standards and requirements in Division 23 sections in Part 5 of this RFP must be incorporated into the design where applicable.

The DDCS must utilize intelligent distributed controllers, which communicate over a controller network in accordance with ASHRAE Standard 135-2016, BACnet – A Data Communication

Protocol for Building and Control Networks. Provide all necessary hardware, software and control devices to perform the optimal operation of the entire HVAC system and other building systems.

The Energy Management Control System (EMCS) has an existing front-end system managed by DPW. The government is responsible for integration of the building onto the base-wide network and integration of new buildings into the front-end. Contractor point of demarcation is the field point of contact (FPOC) and will be designed using BACnet protocol for future integration. The EMCS building level system must be designed and commissioned to match the existing ATO level of L-M-M. Contractor must use DDC equipment and Meters selected from base ATO approved equipment listing or must provide forty (40) hours testing time and support for DPW cybersecurity testing and hardening at the base's test environment. Only equipment capable of meeting cybersecurity hardening requirements will be accepted for use.

Provide two (2) CAT6 cables from the Supervisory Panel to the telecommunications closet. Incorporate requirements identified in the UFGS 23 09 00.00 22 provided in RFP, Part 5, into project specifications.

Provide meters, monitored by DDC, on the following incoming utilities of the building: Domestic water, natural gas, electricity. Tie the gas meter into the existing Advanced Metering Infrastructure (AMI) metering system. For electrical energy monitoring refer to Section D50, *Electrical,* paragraph entitled, *Service Entrance Equipment.* For potable water meter refer to Section G30, *Site Civil/Mechanical Utilities,* paragraph entitled, *Potable Water Distribution.*

Preferred location for water meter is in the mechanical room.

Provide meters, monitored by DDC, on the following subsystems for steam, gas and water: HVAC and processes.

Provide ASHRAE Standard 135 building controller as the main interface for the building control system.

Provide notebook computer(s) and complete application software with all licenses.

Provide patch panel in the mechanical equipment room for ease of connection and disconnection of equipment.

Provide panels with locks and alarms. The alarms must include both a flashing light and an audible alarm inside the mechanical room. The alarms must also be a networked alarm (e.g. switch connected to controller DI) with alarm events recorded remotely for a period not less than one year.

Provide flow rate meters, monitored by the DDC system, for central, chilled, and hot water flow.

Provide air handlers and all terminal units, including VAV boxes, with discharge/supply temperature sensors.

Provide air handler unit outside air flow monitoring stations.

Provide a DDC option for automatic operation of building circulating pumps whenever outdoor air temperature is below 35 degrees F or when there is a high potential for freeze damage.

Provide control to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Primary and back-up equipment starter circuits must be wired to prevent both pieces of equipment from operating at the same time. Rotate primary and back-up HVAC equipment monthly (adjustable) with a lead/lag control routine.

Provide the following phase monitors for all 3 phase equipment:

1. Phase loss protection
2. Phase reversal protection
3. Phase unbalance protection

Provide the following phase monitors for all 3 phase chillers:

1. Phase unbalance protection
2. Over/under voltage protection
3. Phase loss protection
4. Delay of break timer to delay automatic restarts
5. Non critical fault delay
6. Programmable auto/manual restart
7. Load and line side monitoring
8. Phase reversal
9. Phase unbalance

Provide new DDCS front-end notebook computer loaded with all necessary application software displaying graphic floor plan, equipment graphics, control diagrams, and complete sequence of operations graphic pages. Provide all alarming, trend services, and schedules and other BACnet services and configurations as described in the UFGS 23 09 23.02 22. Provide and incorporate all new control points and sequences by creating new graphics, alarms, trends, schedules, and system reports. In addition, provide each graphic screen of mechanical equipment with links to the applicable as-built written sequence of operation that fully describes every operating routine and as-built DDC wiring diagram.

Non-BACnet compliant or proprietary equipment or systems, including gateways/protocol convertors, are not desired and are to be avoided unless a conflict dictates, at which time Government review and approval will be required.

The Contractor must be responsible for developing construction documents in accordance with United Facilities Criteria (UFC) for the design of standard HVAC control systems including:

1. UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, dated 18 July, 2018
2. UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, with Change 1; 1 October 2013 – Standard 18, Emergency Air Distribution Shutoff

DDC System Design: Submit all design documents to be reviewed and approved by Government. Control system design must include the following:

1. EMCS Control Diagrams showing the configuration of each system and equipment with applicable schematic flow diagram, control/field devices, device tags, input/output designations, and applicable field/interlock wiring in accordance with UFC 3-410-02.
2. EMCS Network Riser Diagram showing the layout of DDC system network, all network hardware, controllers, and notebook computer(s) in the building. The diagram must show the locations of notebook computer(s), network hardware, switches/router/hubs and network routing, distinguishing between different forms of media (i.e. Fiber, Category 5/6, shielded twisted pair, coaxial cable, etc.). Various types of LANs must be identified and distinguished from each other.

3. The Sequence of Operation describing all control processes and operation that are controlled by the control system must be included. The sequence of operation must be clearly shown in a text narrative form in order to demonstrate a clear understanding of how the system is to operate and be specific to the control system equipment used.
4. The DDC System Point Schedules indicating, at a minimum, the control point name, input/output designation, device code/tag, fail mode/position, software functions, alarms and alarm limits in accordance with UFC 3-410-02.
5. Provide control system specification to ensure that all of the components, which are expected to be used in the DDC system installation, are properly specified. In addition, the control system specifications must also specify detailed requirements for testing and commissioning of the DDC system. The control system specifications must also include all training requirements.
6. Provide graphic screens including mechanical floor plan indicating control locations and front-end graphic screens of mechanical equipment controls. The graphics must be submitted during construction stages for review and approval by Government.

DDC System Network Architecture:

1. The primary DDC system network, including DDC system network hardware, supervisory/building controllers (BC), Advanced Application Controllers (AAC) for major mechanical equipment, and DDC system notebook computer(s), must communicate via a dedicated DDC system network backbone using BACnet over IP (BACnet/IP). Using the Government Local Area Network (LAN) for DDC system communication is strictly prohibited.
2. The field controllers such as Advanced Application Controllers (AAC) and Application Specific Controllers (ASC) for small mechanical equipment, terminal units and miscellaneous/unitary equipment must be connected to the associated DDC system network hardware and supervisory/building (BC) controllers, and communicate via secondary DDC system network using BACnet MS/TP.
3. Network controllers, switches and/or routers must be provided to extend DDC system network throughout the facility, where necessary.
4. Non-BACnet-compliant or proprietary equipment or systems including gateways using a proprietary communication protocol are not acceptable and are strictly prohibited. For the existing equipment communicating with the existing control system using a proprietary or non-BACnet communication protocol, provide necessary gateway or network interface directly connected to the new DDC system network using a BACnet communication protocol.

Critical Systems:

1. For the DDC system associated with the critical equipment, provide separate controllers for primary and back-up HVAC units, which provide redundant HVAC service to critical spaces, to ensure that failure of any one controller will not cause the loss of the entire service to the critical space. The equipment must be distributed across multiple controllers in such a manner that no more than one unit must be powered, controlled and monitored using a single controller.

2. Each BC, AAC and network hardware such as Ethernet switch and router must be provided with an Uninterruptible Power Supply (UPS) that can supply electrical power for at least four hours to the attached load. This load must include the power required for HVAC equipment or field/control devices such as damper and control valves, etc.
3. For the HVAC equipment serving critical spaces or configured for redundant operation, a controls scheme for manual operation, which will bypass the automatic control through the DDC system, must be incorporated. Provide a HOA switch, if not provided as part of electrical equipment, so the equipment can be manually started and operated in Hand mode. The control valves and dampers associated with chilled water system and air handling units must be configured with necessary fail position so the equipment can operate manually and provide temporary cooling and/or ventilation if there is a failure in the control system.
4. When switching the redundant units during the rotation, the unit in the next sequence must be enabled or started before the previously enabled or started unit is disabled or stopped. If enabled unit should fail, an alarm must be generated at the DDC system and it must automatically enable the stand-by unit to replace the failed unit. Once the newly started unit is in operation, the failed unit must be disabled.

DDC System Software: Provide new DDCS and notebook computer(s) with new front-end software and other utilities and tools as necessary. All software necessary for the configuration, operation, and maintenance of the installed DDC system must be provided, with licenses residing with the Government. Where new software, including application and tools, is provided, the latest tested, compatible and reliable version of the software available at the time must be installed prior to system testing and personnel training. In general, the front-end software must allow each authorized operator to execute the following functions as a minimum:

1. Security: Provide security function that prevents unauthorized use unless operator is logged on. Access must be limited to operator's assigned functions when user is logged on. Each operator's terminal must provide security for 10 users as a minimum. Each user must have an individual User ID/Name and Password. System user must be allowed individual assignment of only those control functions and menu items to which that user requires access. Each user must also have a set security level, which defines access to displays and individual objects the user may control. System must include minimum of 5 separate and distinct security levels for assignment to operators. Software must be initially configured to allow government personnel responsible for system administration full, unrestricted access. All default access passwords and user authentication identification must be documented and provided to the Government.
2. Schedule: Operators must be able to view scheduled operating hours of each schedulable piece of equipment on a weekly or monthly calendar-based graphical schedule display; to select and adjust each schedule and time period; and to simultaneously schedule related equipment. Operators must be able to schedule holidays and special events directly from the calendar.
3. Alarm: The notebook computer(s) must provide audible, visual, and printed means of alarm indication. System input and status objects must be configurable to alarm on departing from and on returning to normal state. Operator must be able to enable or disable each alarm and to configure alarm limits, alarm limit differentials, alarm states, and alarm reactions for each system object. Alarms must be BACnet alarm objects and must use BACnet alarm services.

4. Trend Log: Operator must be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and must be able to retrieve data for use in spreadsheets and standard database programs. Controller must sample and store trend data and must be able to archive data to the hard disk. Coordinate items to be trended and trend configurations with the facility maintenance personnel. Trends must be BACnet trend objects.
5. Graphical Displays: The notebook computer(s) must display all data associated with project as required. The notebook computer(s) must display all data using two and/or three-dimensional graphic representations of all mechanical equipment. System must be capable of displaying graphic file, text, and dynamic object data together on each display. Information must be labeled with descriptors and must be shown with the appropriate engineering units. All information on any display must be dynamically updated without any action by the user.

Control Damper and Actuators:

1. Control Dampers: Motorized control dampers must have opposed blade dampers for modulating service and parallel blade dampers for 2-position service. Frames must be of five inch by one inch extruded aluminum hat channel with a minimum of 0.125-inch wall thickness. Blades must not exceed six inches wide and must be of heavy gage extruded aluminum airfoil shape to minimize pressure loss across the damper. Damper blades must be injected with CFC free, two part high density polyurethane foam. Each blade must include a thermal isolation gap. Dampers must be rated for minimum 2000 fpm air velocity at 2.5 inches static pressure and damper leakage must not exceeding 0.5 percent of total CFM (4.00 CFM/sq. ft.) based on 2000 fpm and one-inch static pressure when tested per AMCA Publication 500. Damper must be rated for a temperature range of minus 70 to 200°F
2. Provide electric type, direct shaft mount damper actuators with bracket arrangement for location outside of the air stream. Actuators must provide at least 125 percent of the required torque to effectively operate the damper. Actuator drive time for 90 degree rotation must be 150 seconds maximum. Actuators must be normally open, normally closed, or fail in position as required to obtain the operation as required by the application. Normally open and normally closed dampers must return to their normal position in the event of a power failure to the actuator. Provide auxiliary switches or damper position switches, rated as required, to provide specific operation. Provide transformers and accessories as required. Actuators requiring linkages, crank arms, connecting rods, or ball joints are not acceptable.

Control Valves and Actuators:

1. Characterized Control Ball Valves (up to and including 3 Inches): Nickel-plated forged brass body, valve trim must utilize stainless steel ball and stem, fiberglass reinforced Teflon PTFE seats with O-rings, 2 EPDM O-rings packing. A flow characterizing disc, made of Tefzel Teflon must be installed in the inlet of 2-way characterized control ball valves. 3-way valves must utilize flow characterizing discs at both input ports. Standard ball valves without this feature are not acceptable. 2-way valves must have equal port percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.

2. Globe Pattern Control Valves (over 3 inches): Iron body, bronze trim, 316 stainless steel rising stem, bronze plug-type disc, flanged ends, renewable bronze seat and disc, TFE V-ring packing. It must have replaceable plugs and seats of stainless steel or bronze. 2-way valves must have equal percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.
3. Valve Actuator: Provide electric valve actuators, which are two-position or modulating as required by application. Actuators must be of ample capacity to handle the required load under all conditions and as a minimum must close valves against pump shutoff head pressure of 55 psi. Unless otherwise indicated, valves must be arranged to return to the normal (fail-safe) position in the event of a power failure to the actuator.

Air Flow Measuring Stations (AFMS): For all air handling units with outdoor air intake, provide AFMS to continuously monitor the outdoor ventilation air in CFM values.

1. Provide high performance, thermal dispersion type AFMS. Pitot tubes, arrays, Piezo rings and other differential pressure based devices are not acceptable. AFMSs must contain an airflow straightener if required by the AFMS manufacturer's published installation instructions. The straightener must be contained inside a flanged sheet metal casing, with the AFMS located as specified according to the published recommendation of the AFMS manufacturer. In the absence of published documentation, airflow straighteners must be provided if there is any duct obstruction within 5 duct diameters upstream of the AFMS. Air-flow straighteners, where required, must be constructed of 0.125 inch aluminum honeycomb and the depth of the straightener must not be less than 1.5 inches. Sensing probe must be constructed of extruded aluminum or of stainless steel tubes. The operating humidity range must be 0 to 99% RH and direct exposure to water must not damage the sensing elements. AFMSs must have an accuracy of +/- 2% of reading with air velocity range of 0 to 5,000 fpm. The transmitter must have local LCD display, continuously displaying airflow and temperature and be calibrated for the appropriate operating range based on the required operating range.

Water Flow Meters: Provide electromagnetic type flow meters for water service where required by application. The flow meter must have the DC powered electromagnetic coils and electrodes, and measure the induced voltage across the electrodes as a conductive fluid flows through the magnetic fields. The voltage is proportional to the average flow velocity of the fluid and then amplified and processed digitally by the converter to produce the signal for flow rate and totalization. Flow meter must be located to provide the most efficient and accurate reading recommended by the manufacturer.

Commissioning: The controls Contractor must provide the services of a factory-authorized service representative to start control systems and provide the commissioning the coordination and support required during the commissioning process.

D306001 1.2 ELECTRONIC CONTROLS

NOT USED

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air distribution systems, water distribution systems, including domestic hot water systems, and HVAC equipment. TAB must be provided by a tier one contractor. Provide duct air leakage testing and duct pressure testing. The Designer of Record must provide a duct construction and leak testing schedule on the drawings.

Clean entire duct system in accordance with National Air Duct Cleaners Association (NADCA) ACR after duct air leakage testing (DALT), and before test and balance (TAB). Document duct cleaning, prepare a written report, and submit report to the Construction Manager (CM) with signature of the ductwork contracting foreman indicating the test has been completed.

Acceptable Cleanliness Level: Net weight of debris collected on the filter media must not exceed 0.75 mg/100 sq. cm. Coordinate with other trades working in the building. Duct cleaning must be performed only after the building has been sealed and the completion of construction activities resulting in airborne particles has been completed. Examples of activities producing airborne particles include but are not limited to grinding, cutting, sanding, drywall installation, grout work, etc. Should the CM note construction dust contamination or openly unprotected ductwork and/or equipment after the initial cleaning, repeat duct cleaning on entire system after the final instance of airborne particle production within the building envelope at no additional cost.

Provide complete testing and balancing (TAB) of all air and water distribution systems and HVAC equipment after successful completion of the DALT testing and duct cleaning. Include all troubleshooting attempts and measurements within the TAB report. The TAB contractor must offer recommendations where flowrates cannot be kept within tolerance. Coordinate with and support Commissioning Authority effort during entire project duration. All system devices must be accessible during the TAB effort. Flush all strainers and replace air filters prior to TAB. Verify that air vents have been installed at every high point in the hydronic system(s); confirm the absence of air by testing every air vent prior to starting tests.

D307003 HVAC COMMISSIONING

Refer to RFP Part 3 - Project Program, Chapter 2 for Building Commissioning requirements. All mechanical systems will be commissioned as required.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide access to all mechanical equipment rooms through the building exterior walls. Provide roll up doors for mechanical room access. Arrange mechanical equipment so that any piece of equipment can be replaced without removal of other equipment.

All equipment and materials will be free of damage. Bent coil fins will be combed out. Where bent coil fins cannot be straightened, replace with new.

Locate and size 4" thick reinforced concrete housekeeping pads for base mounted equipment in mechanical rooms in accordance with actual equipment purchased. Extend pad beyond equipment for 6" in all directions. Provide with chamfered edges.

D309002 ROLL UP DOOR HEATING

Provide heated curtain fans at roll up doors.

D309003 SECURE AREA HVAC REQUIREMENTS

Ducts and pipes passing from unsecured to secured areas must have man bars and other security measures as required. See the Marine Corps physical security measures in MCO 5530.14A and UFC for specific requirements.

The building will have unsecured areas and areas that will be secured. There will be a vault area that will always be secured. Provide physical security measures when passing from unsecured to secured. Also provide security measures for the vault area.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide fixed plate enthalpy energy recovery in the air handling system.

The HVAC equipment will be powered by a backup generator in case of power loss. Provide chiller with voltage monitor. Stage HVAC equipment restart to minimize step loads on the generator.

--End of Section--

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide access to all mechanical equipment rooms through the building exterior walls. Provide roll up doors for mechanical room access. Arrange mechanical equipment so that any piece of equipment can be replaced without removal of other equipment.

All equipment and materials will be free of damage. Bent coil fins will be combed out. Where bent coil fins cannot be straightened, replace with new.

Locate and size 4" thick reinforced concrete housekeeping pads for base mounted equipment in mechanical rooms in accordance with actual equipment purchased. Extend pad beyond equipment for 6" in all directions. Provide with chamfered edges.

D309002 ROLL UP DOOR HEATING

Provide heated curtain fans at roll up doors.

D309003 SECURE AREA HVAC REQUIREMENTS

Ducts and pipes passing from unsecured to secured areas must have man bars and other security measures as required. See the Marine Corps physical security measures in MCO 5530.14A and UFC for specific requirements.

The building will have unsecured areas, flexible secured areas that will be used for unsecured and secured purposes dependent on facility needs, and areas that will be secured. There will be a vault area that will always be secured. Provide physical security measures when passing from unsecured to flexible secured and from flexible secured to secured. Also provide security measures for the vault area.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide fixed plate enthalpy energy recovery in the air handling system.

The HVAC equipment will be powered by a backup generator in case of power loss. Provide chiller with voltage monitor. Stage HVAC equipment restart to minimize step loads on the generator.

--End of Section--

D40 FIRE PROTECTION – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

Refer to Part 4 Section D40 for performance requirements of the building elements included in the fire protection systems. Comply with the latest editions of UFC 1-200-01, UFC 3-600-01, UFC 4-021- 01 and NFPA codes at the time of contract solicitation.

SYSTEM DESCRIPTION

Provide an integrated fire alarm/ mass notification system and fire suppression system capable of notifying building occupants inside the facility of an emergency event. This scope of work includes the installation of equipment and components and completing all programming necessary to fully control/interface/supervise building systems and transmit all alarm signals to the base reporting system.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. All equipment must be installed per the criteria of PTS section D40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

All Design Documents, (i.e., Fire Protection Design Analysis, Building Code Analysis, Life Safety Analysis, plans, specifications, and calculations) developed for Section D40 must be prepared by, or under the supervision of the design/build contractor's Qualified Fire Protection Engineer (QFPE) as detailed in UFC 3-600-01 and FC 1-300-09N.

The services of a Fire Protection Quality Control Specialist (FPQC) are required. Roles and responsibilities of the FPQC are defined in Specification Section 01 45 00.05 20 (Design and Construction Quality Control). The QFPE and the FPQC must be registered professional engineers who have passed the Fire Protection Engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and have relevant experience. The QFPE may serve as the FPQC.

GENERAL DESIGN AND INSTALLATION REQUIREMENTS

Prior to the start of design, the QFPE must meet with the NAVFAC FPE to discuss and confirm the extent and types of fire protection systems and engineering services required. All work must comply with the requirements of the applicable NFPA standards, including recommended portions of the text and explanatory notes, which must be considered mandatory, and with UFC documents, including UFC 1-200-01, UFC 3-600-01, and UFC 4-021-01. Develop specifications for all fire protection work using the Unified Facilities Guide Specification format (UFGS), except for UFGS Section 28 31 76, *Interior Fire Alarm and Mass Notification System, Addressable*, which is included in Part 6 of this RFP. The designer is responsible for incorporating design elements and deliverables described in the “Editor’s Notes” included with all UFGS sections.

GENERAL INSTALLATION

All work for fire protection systems (Including fire alarm, fire suppression, and firestop systems) must be provided by contractors licensed to perform such work.

Workmanship must be neat and professional. Protect systems from damage during construction. Provide parts and components Listed for their particular service. Provide labels for all valves, addressable devices, panels, and controls. For any device located above a ceiling, provide legible, typed label on the ceiling to identify its purpose and location. With the exception of detection devices at ceiling level, mount all valves, panels, and controls no more than 5 ft above the finished floor. Provide clearance for access, inspection, maintenance, repair, and removal.

All conductors must be installed in conduit (EMT minimum). Pull all conductors splice free and be continuous from device to device. The use of wire nuts, crimped connectors, or twisting of conductors is prohibited. All devices must have screw terminals. Where devices are only provided with pigtails from the manufacturer, pigtails must be landed on terminal strips mounted within the junction box. All terminations must be at a terminal strip or the device screw terminals. Terminal strips are only permitted where direct connection to a device is not possible.

Provide a Knox Box at the building entrance approved by the fire department. Provide an additional Knox Box for any project including a gated and secured perimeter fence. Locate this supplemental Knox Box at the primary vehicle entrance point. Mount the Knox Box at the key pad access pedestal to allow fire department access if a gate/fence will be secured after hours.

DESIGN DRAWINGS/SPECIFICATIONS

Design drawings, specifications, and Basis of Design must be prepared by, or under the direct supervision of, the QFPE. Design submittals must comply with the FC 1-300-09N (Navy and Marine Corps Design Procedures), including but not limited to, Section 4-6 (Fire Protection Investigations and Survey), Section 5-8 (Fire Protection Basis of Design), Section 6-8 (Fire Protection Calculations), and 7-10 (Fire Protection Drawings)..

INSTALLATION SHOP DRAWING REQUIREMENTS

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician who holds a current certification in the field of Fire Protection Engineering Technology with minimum certification in the appropriate subfield as noted below.

- Fire Alarm Systems only (no Mass Notification element) – Level III
- Combination Fire Alarm/Mass Notification Systems – Level IV
- Fire Sprinkler Systems (water only) – Level III

All installation drawings, shop drawings or working plans, calculations, and other required pre-construction documentation must be reviewed by the QFPE prior to submission to government for review. Documents must be signed and sealed or letter attached that is signed and sealed indicating QFPE review of submittal. All plans received without documentation of QFPE review will be rejected and returned without review.

CONTRACTOR INSTALLATION REQUIREMENTS

All fire protection systems installation work must be performed by, or under the supervision of a NICET technician having minimum Level lll certification who must conduct onsite inspections each week that work is performed. Submit licenses and certifications to the Contracting Officer prior to the start of work. Signed weekly inspection reports confirming compliance with the Contract and NFPA standards to the Contracting Officer's Technical Representative each week. Record of Completion forms must be signed by the NICET certified supervising installer for each fire protection system.

COMMISSIONING REQUIREMENTS

Commissioning procedures must comply with NFPA and NAVFAC criteria. All fire and life safety systems must be fully pre-tested by the contractor with the QA/QC manager present. Pre-final acceptance testing must be witnessed by the QFPE. Final acceptance testing must be requested by the QFPE in writing after successful completion of the pre-final acceptance test. The final acceptance test will be witnessed by the NAVFAC FPE for government acceptance. Once the system is accepted, it will be placed in service prior to occupancy. The Contractor is responsible for all cost and time delays caused by system retesting as a result of final acceptance testing failure.

D4010 FIRE ALARM/DETECTION AND MASS NOTIFICATION SYSTEMS

Provide an integrated fire alarm/detection and mass notification system capable of notifying building occupants inside and near the facility in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-18, UFC 4-021-01 and NFPA 72. Provide equipment manufactured by Simplex, Notifier or Fire-Lite. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system that also serves as a mass notification system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements. The fire reporting portion of the system must be compatible with the existing base fire reporting system.

Provide all fire alarm circuits in Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC) unless noted otherwise. All raceways must be factory painted red. Flexible Metallic Conduit (FMC) must not exceed 6 feet and is only be permitted for connections from junction boxes to field devices, Provide a raceway listed for the installation in wet locations, such as Rigid Metallic Conduit (RMC) and Liquidtight Flexible Metal Conduit (LFMC). Wet locations are considered any location within a 5 ft radius of fire suppression equipment, throughout a fire pump room/building, and as defined by NFPA 70.Provide a laminated building floor plan (22” by 34”) mounted at the main entrance of the building, adjacent to the annunciator. Identify the location of the FMCP, LOC, remote power supply panels, and all initiating devices. The drawing must include room numbers.

Provide a steel Document Cabinet with a hinge-mounted door and lock with lock cylinder keyed the same as the FMCP. Mount the Document Cabinet on the wall adjacent to the FMCP.. Prominently label the exterior of the cabinet "SYSTEM RECORD DOCUMENTS". Cabinet must include paper copies and a CD of Fire Alarm As-Built drawings, List of Contact ID descriptions for the fire alarm addressable devices, Sprinkler As-Built drawings, NFPA 72 & NFPA 13

Records of Completion. CD must also include site-specific software and O&M manuals stored in a CD jewel case. Cabinet must be of a minimum size to accommodate all required documents.

Provide a steel Parts Box with a hinge-mounted door and lock with lock cylinder keyed the same is the FMCP. Mount the Parts Box on the wall adjacent to FMCP. Cabinet must be of a minimum size to accommodate all spare parts as defined in the project specifications, plus four fuses for each fused circuit.

FMCP REQUIREMENTS

The fire alarm control unit and mass notification control unit (FMCP) must be capable of handling a minimum of 500 individually identified addressable devices. Provide Class B Notification Appliance Circuits (NACs), Class B Signaling Line Circuits (SLCs), and Class B Initiation Device Circuits (IDCs). Each NAC and SLC must include 25 percent spare capacity based on load and voltage drop. Mount FMCP and associated cabinets such that the top of each cabinet is no more than 6 ft above the finished floor. Provide conduit fill calculations to ensure 40% fill does not exceed limits of NFPA 70.

A lockout code must not be installed in the hardware, firmware, or software of the fire alarm system. Installer and operator codes must remain as the factory default setting.

Provide amplifiers sized for 25% spare power capacity. Battery calculations must be based upon 48 hours of standby time and 15 minutes of alarm time or 60 minutes of alarm time, whichever is greater.

Provide a factory-trained instructor to teach a five-day technical training classroom instruction for at least five Government personnel at Camp Lejeune. The technical training must include classroom instruction as well as hands-on programming, troubleshooting and diagnostics exercises. Provide three laptops for the government’s retention. Laptops must be Windows 10 based and include system software, special connecting cable(s), proprietary equipment necessary for the maintenance, testing and reprogramming of the fire alarm equipment and system. Factory training must occur within six months of system acceptance.

Provide a LCD remote annunciator located at the designated primary entrance. Coordinate final installation location with user and NAVFAC. Provide remote annunciator with control functions the same as the FMCP. Control functions must be accessible only by user code or secured behind a locked panel.

Provide a local operating console (LOC) at the primary entrance vestibule. Coordinate final installation location with user and NAVFAC. Microphone and pre-recorded buttons at LOC must be accessible and not installed behind a locked panel.

Obtain prerecorded mass notification messages from the installation fire alarm technician. Program mass notification pre-recorded message buttons to be non-latching that do not require a full system reset to activate or deactivate. Program pre-recorded message buttons such that a higher priority message will override a lower priority message. Once the higher priority message button is deactivated the lower message that is still activated must begin playing again. Program the system to allow any mass notification message to override the fire message. Upon deactivation of the mass notification message, the fire alarm message must automatic resume. Program live voice microphone paging to override all fire alarm and pre-recorded mass notification message. Microphone activation must not require more than two functions. Post clear instructions for operation (keying the microphone and turning a key switch to activate is an example of two functions).

The government will provide the TRX-401 mass notification transceiver. Provide space, antenna, conduit, cable, pull strings, and equipment as shown on the TRX-401 installation detail provided in Part 6.

Prior to building demolition, contact base fire alarm technicians and allow time for their retrieval of fire alarm and/or mass notification panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

INITIATION DEVICES

Provide a complete and useable fire alarm system including manual stations, system smoke detectors, aspirating smoke detection, duct smoke detectors, audio/visual notification appliances, electrical supervision of all sprinkler system alarm and supervisory devices. Provide an individual monitor module for each fire sprinkler system water flow switch. Provide all initiation devices with a permanent label adhered to the device identifying the addressable point. Handwritten labels are not permitted.

Provide flush-mounted manual pull stations. Provide manual pull stations within 5 feet of all exterior doors, including but not limited to mechanical rooms, electrical rooms, and communication rooms with direct exterior access. Provide double action type manual pull stations with mechanical reset features. Break glass type manual stations are not permitted.

Protect server rooms as specified in Chapter 4-11.3 of UFC 3-600-01 for “Electronic Equipment Areas” and NFPA 75. Provide aspirating smoke detection for electronic equipment areas (server rooms) designed, installed, and programmed for very early warning response. Design and install the air sampling network to monitor total room/zone concentration of smoke. Accomplish the design using a computer program based on sound fluid dynamic principles and is approved by Factory Mutual Engineering (FM) FM APP GUIDE or listed by Underwriters Laboratories (UL) UL Fire Prot Dir for its intended use. This type of design requires that air samples be continuously drawn from the areas being protected. The detector must provide no less than three distinct alarm threshold levels (Alert, Action, Fire) and must alert equipment operators at every level of detection. Alarm Level 1 (Alert) must initiate a local alarm condition at a constantly attended location in the building. Alarm Level 2 (Action) initiates a supervisory condition at the building FMCP, which transmits a supervisory condition to the Installation Fire Department. Level 3 (Alarm) initiates a general building fire alarm condition at the FMCP, which transmits the fire alarm condition to the Installation Fire Department. The detection system must be installed to provide very early warning of fires at the ceiling level within the server room, beneath raised access flooring where the subfloor area contains cables, in the exhaust/return air stream where aisle containment systems are used, and in the return air stream where the above ceiling area is used as a return air plenum. Where server rooms are provided with suspended ceiling systems, locate sampling piping above the suspended ceiling system utilizing flexible capillary tubing attached to an approved manufacturer’s capillary sample port supported by the ceiling. The size of capillary tubing and sample ports must be in accordance with manufacturer’s recommendations and must be verified and confirmed by calculations using the Manufacturer's proprietary computer-based design modeling software.

Server Room electronic equipment power disconnect provisions must comply with Section 411.6 of UFC 3-600-01, NFPA 70, and NFPA 75. Coordinate with ESR Section D50.

Magnetic door hold-open devices must release upon activation any fire alarm initiating device of the building fire alarm system or upon loss of primary power to the FACP. Smoke detectors dedicated to door release are not permitted.

Provide carbon monoxide detectors in accordance with UFC 3-600-01. Detector activation must initiate a distinct message on all notification appliances and transmit an independent dedicated signal to the base reporting system.

NOTIFICATION APPLIANCES

Provide combined fire alarm and mass notification appliances. Provide white notification appliances with factory applied, permanent, red "ALERT" lettering with clear strobe lenses. Provide ceiling-mounted notification appliances in all areas with suspended ceiling systems. Where exterior speakers are required by UFC 4-021-01, provide exterior weatherproof notification speakers “bull horn” style. All conduit penetrations for exterior equipment must enter the junction box or equipment from the bottom to minimize water intrusion. Provide duct seal inside all conduits that penetrate exterior walls per NFPA 70, Section 300.7.

Visual notification appliances are required in all public use areas, common use areas, and employee work areas to include office suites and areas intended to have more than four desks/occupants. Offices that are designed for a single office worker, regardless of the calculated occupant load, do not require a strobe unless the room is designated as an ABA compliant space.

FIRE ALARM REPORTING

All fire alarms, supervisory alarms and trouble conditions indicated at the FMCP must be transmitted to the fire alarm receiving station. Provide point specific transmission via contact ID format with the address, location, and description of the condition as it appears on the FMCP.

Provide a point reporting digital alarm communicator transmitter that is compatible with the Sur-Gard System III Multi-platform Digital Telephone Receiver. Provide two CAT 6 UTP cables inside one-inch conduit from the FMCP to the telephone equipment room. Make connections to telephone equipment per the base’s telephone requirements. See Part 6 for schematic drawing of the FARS and the mass notification equipment.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

The water supply information below is provided for bidding purposes. A hydrant flow test was conducted on 05 August 2019 in proximity to the project site along McHugh Blvd north of Greenway Trail. Refer to Part 6 for the water flow test report and test hydrant locations.

Hydrant flow test summary:

Static pressure: 70 psig (gauge). Residual pressure: 66 psig (gauge).

Measured Flow: 885 gpm

The proposed design point of connection to existing water supply must be approved by the Contracting Officer prior to proceeding with any work.

The QFPE must conduct additional flow tests after contract award prior to any design submissions. Water flow testing must be coordinated through the Contracting Officer. The Contractor is responsible for providing all flow testing equipment. Perform flow testing in accordance with NFPA 291. The QFPE must prepare and submit a flow test report to the

Contracting Officer for review by the NAVFAC FPE. This report must compare the flow test results with the hydrant flow test summary provided above.

Hydraulic calculations must be based upon a waterflow test was performed no more than 6 months prior to submission of the calculations.

Provide a reduced pressure zone backflow preventer. for the incoming sprinkler service. Include a forward flow test connection, with one 2 ½" hose connection for every 250 gpm of anticipated flow of the fire sprinkler system.

Hydraulic calculations for the fire suppression system shall include a 12 psi loss through the backflow preventer.

Sleeve all incoming supply piping and provide thrust rods at floor penetrations. Sleeve all wall penetrations of incoming supply piping.

Provide a UL Listed post indicating valve (PIV) for the underground fire service main. Locate the PIV a minimum distance from the building equal to the height of the building plus fifteen feet. Provide bollards where the PIV could be subject to vehicular damage.

Provide a freestanding pedestal type fire department connection (FDC) at the main vehicle entrance just outside the compound fence line. Provide a 5" Storz connection on a 30-degree galvanized elbow at the FDC. Check valve on FDC must be installed at fire protection system manifold inside the building. Provide ball drip valve on the FDC pipe. Provide bollards where the FDC could be subject to vehicular damage.

D4040 SPRINKLER SYSTEMS

Provide automatic wet pipe sprinkler protection system throughout the facility in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-7 and NFPA 13. Sprinkler system design demand and minimum sprinkler K-factor must be as specified in Table 9-3 and Table 9-4 of UFC 3-600-01.

Provide wet pipe sprinkler systems with pressure relief and air venting in accordance with NFPA 13.

Provide quick-response sprinklers with ordinary temperature rating in areas with finished ceilings. Provide quick-response upright sprinklers with ordinary temperature rating in areas with exposed ceilings. Utilize higher temperature ratings where required by NFPA 13.

Protect server rooms as specified in Chapter 4-11.4 of UFC 3-600-01 for "Electronic Equipment Areas".

For server rooms, provide quick-response having an intermediate temperature rating (175 degrees F). Provide concealed sprinklers with white cover plates in server rooms with finished ceiling systems. Provide upright sprinklers with sprinkler guards in server rooms with unfinished ceilings.

The use of flexible sprinkler hose and mechanical-T outlets are prohibited.

Provide training for the active systems consisting of a minimum of two (2) eight (8)-hour sessions to accommodate all shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

D4090 OTHER FIRE PROTECTION SYSTEMS

PORTABLE FIRE EXTINGUISHERS

Fire extinguishers are required by the FY20 National Defense Authorization Act that contradicts UFC 3-600-01. Provide fire extinguishers as required by NFPA 101 and NFPA 10. Include fire extinguishers in the Furniture, Fixtures & Equipment (FFE) Package. Refer to ESR Section C103007 for fire extinguisher cabinets and brackets. Electronic Monitoring of fire extinguishers and cabinets is not required. Provide clean agent fire extinguishers utilizing FE13 fire extinguishing agent for electronic equipment installations (server rooms). Locate the clean agent fire extinguisher within the server room adjacent to the primary egress door.

CLEAN AGENT FIRE SUPPRESSION SYSTEMS

Clean agent fire suppression systems will not be required for protection of server rooms.

--End of Section--

D50 ELECTRICAL – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SCOPE

The scope of this section is to describe the systems, components, and installations within buildings and extending no more than 5 feet beyond building exterior walls. Exterior systems and components are described in ESR G40 of this RFP.

Provide systems complete in place, tested, and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must."

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floorplan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floorplans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an interior electrical system consisting of, but not limited to, service entrance wiring and equipment, distribution and lighting panelboards, dry type transformers, conduits, feeder and branch circuits, motor control equipment, lighting and branch wiring, communications, security and alarm systems, emergency generator, emergency lighting and power, grounding, lightning protection, and UPS, including accessories and devices as necessary and required for a complete and usable system.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Install interior electrical distribution equipment and components in spaces accessibly only by qualified persons. Provide a main electrical room to house the service entrance switchboard and branch circuit distribution equipment. Provide additional electrical rooms as required throughout the building to minimize branch circuit length to less than 200 feet for 120V circuits and 400 feet for 277V circuits. Provide electrical panels in mechanical rooms, computer rooms, and telecommunications rooms to serve loads within each respective room.

Provide branch circuit panelboards rated at 480Y/277V to serve lighting and large mechanical equipment. Provide dry-type transformers feeding 208Y/120V panelboards to transform the voltage where necessary to serve receptacle loads and small (less than ¾ hp) motor loads.

Provide individual feeders to each panelboard or transformer. A distribution system consisting of cable taps and/or through-feed panels is prohibited.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15 percent spare circuit and load capacity at all levels of the power distribution system, including life-safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

EQUIPMENT ENCLOSURES

Provide enclosures for equipment described in this section at installed locations with the following environmental ratings:

- Indoor, Dry and Clean Locations: NEMA 250, Type 1.
- Outdoor Locations: NEMA 250, Type 4X, stainless steel
- Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
- Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
- Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids; equipment in Mechanical Rooms, Plumbing Rooms, and Elevator Machine Rooms; equipment in unconditioned spaces: NEMA 250, Type 12.
- Hazardous Areas: NEMA 250, Type 7 with cover attached by Type 316 stainless steel bolts.

SUSTAINABILITY

Provide electrical systems and components that support project sustainability and energy goals.

ANTITERRORISM

Provide bracing of electrical equipment which is suspended and weighs more than 31 pounds.

SEISMIC BRACING

Provide bracing of electrical equipment to resist seismic events based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING

Test new electrical equipment in accordance with NETA acceptance testing specifications. Test existing electrical equipment remaining in service in accordance with NETA maintenance testing specifications.

COMMISSIONING

Commission all systems in accordance with RFP Part 3 Chapter 2, Section 01 33 29.05 20 *Sustainability Requirements for Design Build* and UFC 01-200-02 *High Performance and Sustainable Buildings*.

EQUIPMENT IDENTIFICATION

Provide instruction and warning signs, identification labels and nameplates, and markings for equipment, wiring, raceways, boxes, and cabinets. Coordinate naming convention with Camp Lejeune Public Works Department.

Provide multi-line engraved nameplates on the exterior of panelboards, switchboards, switchgear, enclosed switches and breakers, transformers, and packaged equipment enclosures with the following information:

- Device identification
- Device rating (voltage, phase, ampacity, kVA, etc.)
- Power source (source panel and circuit number)

See the following figures for examples of equipment identification.

Figure 1: Transformer Identification Example

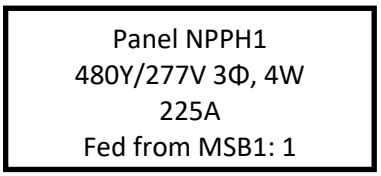


Figure 2: Transformer Identification Example

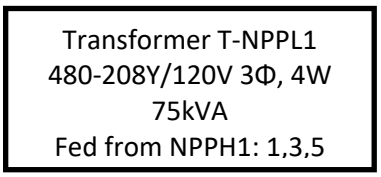


Figure 3: UPS Identification Example

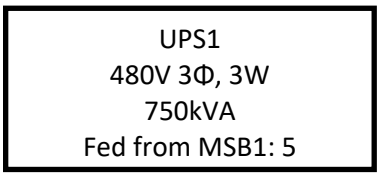
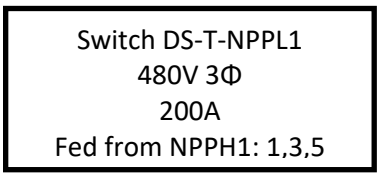


Figure 4: Disconnect Switch Identification Example



CONDUCTOR IDENTIFICATION

Label conductors with source panel circuit number at each junction box and termination point.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

Provide insulated copper conductors in conduit for all feeders. Refer to D502001 for raceway application for feeders.

D501001 MAIN TRANSFORMERS

Main transformer(s) are defined in Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

Provide an underground service into the facility.

Provide a main distribution switchboard as service equipment. Provide the main distribution switchboard with a main circuit breaker, fixed, group-mounted, molded case distribution circuit breakers, and surge protective device (SPD). Fused or bolted pressure switches are prohibited. Provide switchboard with spaces for future use that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide switchboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses.

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide a multi-function digital meter integral to the main switchboard that monitors and records the following values at a minimum:

- Voltage (per phase and 3-phase)
- Current (per phase and 3-phase average)
- Real power (per phase and 3-phase average)
- Reactive power (per phase and 3-phase average)
- Apparent power (per phase and 3-phase average)
- Power factor (3-phase total)
- Frequency
- Total harmonic distortion (voltage and current)

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

Provide enclosed and ventilated dry type transformers to step down secondary voltages for general purpose outlets and other low voltage equipment.

Terminate the transformer secondary at a single overcurrent protection device. Double-lugging the secondary terminals to serve multiple panelboards is prohibited.

Provide transformers with two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards to serve the loads.

Provide panelboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses. Where fed from K-rated transformers, neutral buses must be 200% the capacity of the phase buses.

Provide panelboards with bolt-on circuit breakers. Plug-in circuit breakers may be used in distribution panelboards if provided with an individual positive locking mechanism that requires operation for removal of the breaker. Load centers are prohibited. Fused switch panelboards are prohibited.

Provide panelboards with spaces that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide panelboards with main circuit breakers where they are not located within sight of their upstream overcurrent protective device or disconnecting means and where otherwise required by Code.

Provide panelboards with fully hinged front covers with a hinged door for accessing circuit breaker handles (door-in-door arrangement).

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide enclosed circuit breakers with an enclosure suitable for the environment in which it will be installed.

D501006 MOTOR CONTROLLERS

Provide individual motor starters with disconnect switches, combination motor starters, variable speed drives, and manual motor starters for motor controls as required by mechanical equipment. Provide all circuits and connections for motors.

Provide variable speed drives without external bypass.

Provide variable speed drives with 5% bus reactors.

D501090 OTHER SERVICE AND DISTRIBUTION

SURGE PROTECTIVE DEVICES

Provide transient voltage surge protective devices (SPD) at the main switchboard and at panelboards located in computer rooms serving the computer equipment.

SAFETY DISCONNECT SWITCHES

Provide 600V rated, heavy-duty type fused and non-fused, safety disconnect switches with external operating handle and lock-out, tag-out provisions. Provide switches with an enclosure suitable for the environment in which it will be installed.

D5020 LIGHTING AND BRANCH WIRING

Provide lighting and general-purpose receptacles throughout all spaces.

Provide the necessary special receptacle configurations to serve special equipment.

Provide one duplex receptacle at each television/display monitor. Locate the receptacle behind wall-mounted equipment.

Where equipment or furniture is located on a wall, provide receptacles and/or connections serving that equipment or furniture on the wall. Where equipment or furniture is located away from a wall, provide receptacles and/or connections in multi-service floor boxes. Use of power poles is prohibited. Locate devices such that they are not made inaccessible by furniture panels and supports or fixed equipment after the furniture and equipment is installed.

Provide one multi-service recessed floor box under the table in each conference room. Center the box under the table.

Provide duplex receptacles with USB charging capability where receptacles are required on Auditorium, Briefing Room, Conference Room, and Classroom walls. Provide one wall mounted duplex receptacle with USB charging capability for each table in Break Rooms and Lounges.

Provide one wall mounted duplex receptacle with USB charging capability at the seating area in Lobbies, Waiting Rooms, and Reception areas.

CIRCUITING REQUIREMENTS

Connect no more than six (6) duplex convenience receptacles to a single 20A circuit.

Connect no more than two (2) multi-service floor boxes to a single 20A circuit in Classrooms and Simulator/Training areas.

Provide individual dedicated circuits and receptacles or connections for each instance of equipment rated at 8 full load amps (FLA) and higher and for each of the following equipment:

- Copier
- Printer
- Multi-function device
- Fax machine
- Shredder
- VTC console
- Projector
- Refrigerator
- Coffee maker
- Microwave oven
- Garbage disposer
- Toaster
- Electric water cooler
- Vending machine
- Ice machine
- Washer
- Dryer
- Hand dryer
- Fire alarm control panel
- EPO control panel (multiple dedicated circuits may be required as described elsewhere)
- EMCS control panel
- Telecommunications and/or server equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- Telecommunications and/or server equipment rack (multiple dedicated circuits may be required as described elsewhere)

- AV equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- AV equipment rack (multiple dedicated circuits may be required as described elsewhere)

Provide dedicated circuits for televisions/display monitors. Multiple receptacles that support televisions/display monitors may be circuited to the same dedicated circuit.

WIRING DEVICES

Provide wiring devices connected to the normal power source with either a white body or dark brown body, as determined by the surrounding wall finish. Provide dark brown or black devices where installed on dark surfaces and white devices where installed on light surfaces.

Provide stainless steel face plates for interior wiring devices and empty outlet boxes.

Provide exterior receptacles with thermoplastic enclosures rated as “weatherproof while in use”.

Provide receptacles with USB charging capability with a combination125VAC NEMA 5-20R duplex receptacle and two 5VDC USB ports; one Type A port capable of delivering a maximum 2.4A of charging capacity and one Type C port capable of delivering a maximum of 3.0A of charging capacity (5A total charging capacity).

MULTI-OUTLET RACEWAYS

Provide extruded aluminum with clear anodized finish, dual-compartment, surface-mounted multi-outlet metal raceways with internal divider. Provide separate snap-on covers for each compartment. Provide the power compartment with NEMA 5-20R duplex receptacles at 18” on center. Where more than four (4) receptacles are installed in a raceway, connect adjacent receptacles to alternating circuits Refer to D5030 for communications & AV faceplate requirements.

UNDERFLOOR MODULAR WIRING SYSTEM

Provide a modular power wiring distribution system in spaces with raised access flooring to provide power to desks, tables, work benches, and equipment.

Provide a complete modular underfloor power wiring distribution system comprised of power distribution boxes, home run cables, multi-service recessed floor boxes, and all necessary interconnecting cables and accessories.

Provide pre-fabricated underfloor power distribution system components with plug-and-play modularity for use below Raised Access Flooring systems. Components and conductors must be listed for use in environmental air handling spaces. Provide manufacturer’s dust caps on unused plug-in connectors.

Install underfloor power distribution system components with adequate clearance to allow access to wiring compartments, removal of covers, and access to plug-in connector ports. Arrange the underfloor components such that no plug-in connector ports are obstructed.

Locate power distribution boxes in readily accessible locations below the Raised Access Floor. Identify the location of the distribution boxes on the ceiling grid above the box using a label placed at the intersection of the grid Ts. Provide one (1) spare circuit in each power distribution box.

MULTI-SERVICE RECESSED FLOOR BOXES

Provide multi-service recessed floor boxes with independent wiring compartments capable of accepting duplex receptacles, AV faceplates, and telecommunications faceplates. Provide telecom adaptor plates to accept current Base Telephone standard jack sets per local 27 10 00. Provide the power compartment with two (2) NEMA 5-20R duplex receptacles.

Provide boxes with stamped steel or cast-iron construction, as applicable to the installation location, and provide each compartment with multiple conduit knockouts capable of accepting conduit sizes up to and including 1 1/4” diameter.

Provide die-cast aluminum covers with self-closing cable egress doors. Covers must open 180° and close flush with the finished floor while in use. When closed, covers must comply with requirements for UL scrub water exclusion. Provide black covers in dark floor finishes and natural aluminum covers in light floor finishes.

Where raised access floors are provided, provide multi-service recessed floor boxes that are compatible with the modular wiring system and install floor boxes flush in raised access flooring.

D502001 BRANCH WIRING

Provide insulated copper THHN-2/THWN-2 or XHHW-2 single conductors in raceway for all branch wiring. Type AC and MC cables are prohibited.

Provide solid conductors for #10 AWG and smaller and stranded conductors for #8 AWG and larger. The minimum power and lighting conductor size is #12 AWG.

Provide a neutral conductor with each phase conductor in circuits feeding single phase loads requiring line-to-neutral service. Shared neutral conductors are prohibited.

RACEWAY APPLICATION FOR FEEDERS AND BRANCH WIRING

Provide expansion fittings in raceways crossing building expansion joints and seismic joints to compensate for building expansion and contraction.

The minimum raceway size for interior and above grade exterior applications is ¾” diameter. The minimum raceway size for below grade exterior applications is 1” diameter.

Outdoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed Conduit: GRC.
- Concealed Conduit, Aboveground: IMC.
- Underground Conduit: RNC, Type EPC-40-PVC direct buried.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

Indoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed, Not Subject to Physical or Severe Physical Damage: EMT.
- Exposed and Subject to Physical or Severe Physical Damage: GRC.
- Concealed in Ceilings and Interior Walls and Partitions: EMT.

- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- Connection to Recessed and Semi-Recessed Luminaires: FMC, except use LFMC in damp or wet locations.
- Damp or Wet Locations, Unconditioned Spaces, Spaces Subject to High Humidity: IMC.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting, area lighting, and manual and automatic controls. Controls include manual wall stations, occupancy sensors, vacancy sensors, daylighting controls, automatic lighting shutoff systems, and dimming systems.

LUMINAIRES

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide drivers that provide smooth and continuous dimming from 100% output to 10% output for standard-performance dimming luminaires and 100% output to 1% output for high-performance dimming luminaires. Step dimming drivers are prohibited.

Provide high-performance dimming drivers in conference rooms, classrooms, training rooms, and auditoriums.

Provide vanity luminaires above all mirrors in single-occupancy restrooms.

Provide blue beacon luminaires in classified spaces that are directly accessible from a corridor to alert the occupants of the space of the presence of uncleared persons in the space.

Pendant luminaires may use lenses, baffles or louvers, or perforated housings to shield the downlight component. Do not provide pendant luminaires in continuous lengths exceeding 16 feet.

Provide luminaires with the following minimum luminaire efficacy (LE):

- Recessed 1x4, 2x2, or 2x4 troffer: 90 Lumens per Watt (LPW)
- Surface or recessed downlight: 80 LPW
- Track or accent: 40 LPW
- High Bay/Low Bay: 90 LPW
- Linear Industrial or Strip Light: 80 LPW
- Suspended linear or non-linear ambient: 85 LPW
- Surface linear or non-linear ambient: 80 LPW
- Recessed linear or non-linear ambient: 85 LPW

LIGHTING CONTROLS

Provide devices including, but not limited to, wall stations, occupancy sensors, vacancy sensors, time-based scheduling, architectural dimming controls, and daylight dimming controls.

Devices using wireless radio frequency, Bluetooth, Wi-Fi, or other wireless technologies are prohibited. Obtain written approval from the COR to use devices that have infrared transmitters/receivers.

Provide occupancy and vacancy sensors to provide 100% minor motion coverage of the room or area controlled by the sensor. Where multiple sensors are provided to control a single room or area, provide overlapping minor motion sensor coverage taking into consideration all obstructions to include FF&E, collateral, and other Government furnished equipment that could impede the sensor coverage.

Provide light switches controlling uncleared visitor indicator luminaires with a gray body. Provide the faceplate containing switches controlling uncleared visitor lights with a label reading “Uncleared Visitor Lights” above the switch controlling the uncleared visitor indicator luminaires.

Provide low voltage control stations with momentary push-buttons with pilot light or indicator light to confirm operation.

Do not group public spaces into a single lighting control zone. Lighting control zones must not control luminaires on different floors.

Provide programmable multi-zone, multi-scene, architectural dimming controls in conference rooms, classrooms, training rooms, and auditoriums.

Architectural dimming controls consist of a master control station and additional wall stations used to recall preset lighting “scenes” consisting of multiple zones of lights and/or motorized shades and screens. Provide a minimum of six pre-programmed scenes, plus full on and full off, for each space or room with architectural dimming controls unless noted otherwise. Provide the capability to adjust each lighting zone individually from the master station without overwriting the scene programming.

Provide dimmers, modules, and controls that are capable of smoothly dimming LED lighting sources from 100% to a minimum of 1% of full light output.

Dim luminaires connected to life safety power sources along with the normal lighting in the space. Upon loss of normal power, or upon receiving a signal from the fire alarm system, the designated life safety luminaires must automatically return to full brightness regardless of selected scene or occupancy.

In spaces with moveable partitions, the lighting controls must be capable of operating independently when the partition(s) are closed and in unison when partition(s) are open. Provide partition sensors that automatically initiate combined and individual space operation modes based on the position of the moveable partition. Devices that require occupant input to select combined and individual operation modes are prohibited.

D5030 COMMUNICATIONS AND SECURITY

The following sub-element sections contained in D503001-D503090 identify locations for communications and security systems and equipment. Additional communications requirements can be found in Part 5 Specifications 27 10 00 and 33 82 00.

D503001 TELECOMMUNICATIONS SYSTEMS

Provide a main distribution frame (MDF) to house telecommunications equipment and cabling as well as service provider equipment and cabling. Additionally, provide floor or area serving intermediate distribution frames (IDF) to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide a complete Telecommunications horizontal and backbone distribution system per user requirements, maintainer requirements, latest Local provider and applicable Using Military Department standards and criteria, UFC 3-580-01, ANSI /TIA 568C, 569, 606, 607C, and 758 standards for support of Non-Secret Internet Protocol Router Network (NIPRNet) and Secret Internet Protocol Router Network (SIPRNet). Voice and data communications for building 1338 SIM Training Center Telecommunications systems must include, but not limited to, horizontal and vertical pathways consisting of underground duct bank systems, sleeves, cable tray, conduit, pull boxes, pull cords and outlet boxes, patch panels, equipment racks, cable management, telecommunications ground bus system, fire rated plywood backboards as required to support the user requirements. Voice and data system cabling and outlets will consist of Category 6 or higher rated horizontal UTP cabling and multimode fiber, patch panels, patch cords, 8-pin/8 contact (8P/8C) RJ-45 connectors, SC fiber connectors, copper and fiber backbone cabling, and cross connect equipment.

BACKBONE CABLING

Secondary fiber backbone: Provide (1) 24 strand OS2 single-mode armored type fiber optical and (1) 24 strand OM4 multi-mode fiber optic cable from the MDF to each new Intermediate Distribution Frame (IDF). Provide fiber optic rack-mounted termination cabinets required to support classified, unclassified, and training networks. Provide backbone cabling for communications training networks (i.e. MCEN,JTEN,NCTE, etc.). Coordinate with government for requirements.

Secondary copper backbone: Provide 50 pair CAT 3 cabling from the MDF to each IDF. Provide copper terminal equipment for termination in each IDF; copper terminal equipment selection per the latest Local provider and applicable Using Military Department standards and criteria.

Provide 48 strand multi-mode fiber per enclave (Classified/Unclassified) from CACCTUS IG servers to CACCTUS Switch racks.

HORIZONTAL CABLING

Provide (4) CAT 6 UTP green color for unclassified networks (i.e NIPR, etc.) and CAT6A UTP for simulation networks (i.e. CACCTUS, etc) from rack-mounted patch panels (in each IDF) to each WAO. Provide (2) CAT 6 UTP green color for WAP /DDC / FACP/ Elevators/ TV displays/ Utility Monitoring or metering. Provide (4) CAT 6 UTP red color for classified networks (i.e. SIPR). Provide (1) CAT 5e UTP green color for each synchronized clock / wall phone. Jack colors must be the same as CAT 6 cable colors. Provide a dedicated above ceiling basket-type cable tray system for NIPR/VOIP, SIPR and Training Networks.

Provide the following Telecommunications Work Area Outlets (WAO):

Ready Room/Auditorium

- Provide WAO every 6 feet along each wall.
- Provide WAO sets in multi-service, recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service, recessed floor boxes.

- Each WAO set includes:
  - (MCEN-N/POTS Phone)
  - (MCEN-S/VOSIP)
  - (Exercise NIPR)
  - (Exercise SIPR)

    Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Brief and Debrief Room

- Provide WAO every 6 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO includes:
  - (MCEN-N/POTS Phone)
  - (MCEN-S/VOSIP)
  - (Exercise NIPR)
  - (Exercise SIPR)

    Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Exercise Control Room

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO includes:
  - (MCEN-N/POTS Phone)
  - (MCEN-S/VOSIP)
  - (Exercise NIPR)
  - (Exercise SIPR)

    Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Secure VTC Room

- Provide WAO at location of VTC equipment.

- Provide one WAO on each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
  - (MCEN-N/POTS Phone)
  - (MCEN-S/VOSIP)
  - (Exercise NIPR)
  - (Exercise SIPR)

Classified Simulation Room

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
  - (MCEN-N/POTS Phone)
  - (MCEN-S/VOSIP)
  - (Exercise NIPR)
  - (Exercise SIPR)

    Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Unclassified Simulation Room

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
  - (MCEN-N/POTS Phone)
  - MCEN-S/VOSIP)
  - (Exercise NIPR)
  - (Exercise SIPR)

    Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Simulation Control Secure Comm Room - Vault

- Provide WAO every 4 feet along each wall.
- Each WAO set includes:
  - (MCEN-N/POTS Phone)
  - (MCEN-S/VOSIP)
  - (Exercise NIPR)
  - Exercise SIPR)
- Provide (2) 24 port CAT 6 connection panels, one from unclassified panel and one from classified panel to Sim Control Room connection panel.
- Provide fiber connectivity to Simulation Control Secure Comm Room and TR. Coordinate fiber types and counts with user.

Simulation Operator

- Provide WAO at each workstation.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020.
- Each WAO set includes:
  - (MCEN-N/POTS Phone)
  - (Exercise NIPR)

Secure Workstation Room - Vault

- Provide WAO at each workstation.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020.
- Each WAO set includes:
  - (VOIP/POTS Phone)
  - (MCEN-S/VOSIP)

FIRE Rooms

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
  - (Exercise NIPR)
  - (Exercise SIPR)

    Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

- Provide WAO (MCEN-N/POTS Phone) located both sides of door

Simulation Control Room

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
  - (MCEN-N/POTS Phone)
  - (MCEN-S/VOSIP)
  - (Exercise NIPR)
  - (Exercise SIPR)

    Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)
- Provide two 24 port CAT 6 connection panels, one from unclassified panel and one from classified panel to Simulation Control Secure Comm Room connection panel.
- Provide fiber connectivity to Simulation Control Secure Comm Room and TR. Coordinate fiber types and counts with user.

WORK AREA OUTLET

Provide double-gang steel electrical boxes for voice/data work area outlets. Provide boxes with a minimum dimension of 5-inches square in standard gypsum board walls and 4-11/16 inches square in CMU block walls. Provide a 1-1/4-inch conduit from each double-gang outlet box to the cable tray system. Mount voice/data work area outlet boxes at 18” above finished floor and minimum 6 inches away from any power receptacle. Provide voice/data outlet locations with a 4-position faceplate with four RJ-45 (8P8C) connectors. All work areas will contain a minimum of two communications face plates. Any work area larger than 80 sq. feet will require additional face plates to service any work location in the room within 6 feet of a faceplate. Refer to section 27 10 00 for WAO details. Provide RJ-11 jack at synchronized clock locations.

Provide single gang steel electrical boxes at wall telephone locations with a 1-inch conduit from the outlet box to the cable tray system. Example locations for wall telephones are utility spaces, IDF. Mount wall telephone work area outlet boxes at 48” AFF. Provide wall telephone outlet locations with a 1-position faceplate with metal mounting studs.

INTERMEDIATE DISTRIBUTION FRAME (IDF)

Provide minimum dimensions of 10 feet by 10 feet, or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The IDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. Each IDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-

optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39" separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

Provide a dedicated IDF for training network servers and distribution equipment. Coordinate with government for requirements.

SIMULATION CONTROL SECURE COMM ROOM - VAULT

- Provide (4) 19-inch enclosed equipment racks to house network equipment.

SIMULATION CONTROL ROOM

- Provide (4) 19-inch enclosed equipment racks for CACCTUS equipment per enclave (2 NIPR, 2 SIPR racks), with 8 rackmount computer shelves per rack.
- Provide (2) 19-inch enclosed equipment racks for Unclassified MTWS equipment (Servers), with 8 rackmount computer shelves per rack.
- Provide (2) 19-inch enclosed equipment racks for Classified MTWS equipment (Servers), with 8 rackmount computer shelves per rack.
- Provide (3) 19-inch equipment racks per enclave (Exercise Classified, Unclassified) network and patch panel to simulation rooms.

MAIN DISTRIBUTION FRAME (MDF)

Provide minimum dimensions 10 feet by 10 feet or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The MDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. The MDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39" separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

LABELING AND TESTING

Label and terminate backbone, horizontal cabling, and termination hardware in accordance with the latest Local provider and applicable Using Military Department standards and criteria.

Test UTP Category 6 and 6A cabling in accordance with the minimum standards established in ANSI/TIA-568-C.1 and ANSI/TIA-568-C.2-1.

Test fiber optic cables and terminations in accordance with the minimum standards established in ANSI/TIA-526-7B and ANSI/TIA-526-14B.

Perform tests at both ends of cables.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a Public Address system with speakers in all common spaces and exterior speakers for outside activity spaces.

Interface the Public Address System with the Mass Notification System.

D503003 INTERCOMMUNICATIONS SYSTEMS

NOT USED

D503004 TELEVISION SYSTEMS

Provide RG-6 coaxial cabling and (2) CAT 6 green cables from the closest IDF to each television location. Provide coax cabling that traverses a secure boundary with an RF filter. Terminate coaxial cabling at outlet side, coil coaxial cabling inside IDF. Leave enough cabling to terminate anywhere inside the IDF.

D503005 SECURITY SYSTEMS

An Electronic Security System (ESS) is the integrated electronic system that encompasses one or more of the following subsystems; access control system (ACS), and intrusion detection system (IDS).

Provide ESS for this project meeting the requirements of UFC 4-021-02, *Electronic Security Systems*

Provide an ESS consisting of empty raceways with pull strings, outlet boxes, cover plates, and associated power outlets to enable system installation by the ESS supplier

Provide an electronic security system (ESS) including equipment and supporting infrastructure complete, tested, and operational. Provide ESS that is compatible with the Installation's central monitoring system and monitored within the secure/protected area and at the Installation central monitoring station.

Provide an ACS utilizing credential devices to monitor and control personnel movement into the secure area. The ACS must log and archive all transactions and alert authorities of unauthorized entry attempts. must

Locate equipment containing access control software, authorization data, card-encoded data, personnel identification data, or verification data within the secure area

The IDS system head-end equipment, sensors, cabling, and associated appurtenances will be GFGI. The following infrastructure will be provided support the IDS system:

- Continuous EMT conduit with compression fittings with pull wires and back boxes will be provided between IDS components and head-end equipment locations.
- IDS equipment including, but not limited to motion detectors, door contacts, control panels, and wiring will be GFGI.

Provide an IDS to detect attempts or access by unauthorized personnel into secure/protected area s. Provide point sensors on all windows, doors, and man-passable openings. Provide volumetric sensors within secure/protected areas to detect movement within the area. System must annunciate and archive all alarm within the secure/protected area and at the Installation central monitoring station.

Emergency exit doors must be alarmed 24 hours per day. Alarm condition must result in an audible annunciation that alerts occupants within the secure/protected area of an attempted egress. Locate system sensors and the premise control units (PCU) within the secure area. System must be configured to only allow cleared personnel located within the secure/protected area to initiate changes in access modes or alarm conditions.

Provide 8 hours of emergency uninterruptable backup power. Backup power may be provided by batteries, uninterruptable power supply, generators, or combination thereof.

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

GPS SYSTEM

Provide LMR400 Coaxial cable (or approved equivalent) from the training network server room to GPS Model 8225 antenna. Coordinate with government of location of antenna. Provide mount for GPS.

AUDIO VISUAL SYSTEMS

Provide a complete audio- visual system for each program space described below. System design must be completed by an individual with a CTS-D certification. Refer to E20 for the Best Value Determination process for AV systems.

Ready Room/Auditorium

Provide a wall-mounted videowall display system to support the user's PC/media presentation requirements. The display must support AV inputs from a presentation desk or lectern containing NIPR, SIPR and SIM computers. Provide an integrated VTC system that can enable NIPR and SIPR video calls within the space. Provide ceiling microphones and wall-mounted cameras at both the front and rear of the room to capture the local participants during a video call. Provide in-ceiling speakers for program audio playback and VTC far site audio. Provide a touch panel AV/VTC system controller located at the presenter's station.

Provide the following:

- Capability to mount videowall with the sources coming from the front and side of the room.
- Capability to play video from video equipment (HDMI/VGA, CATV, Blue Ray and VCR's)
- VTC capability on MCEN-S or Exercise SIPR networks
- Capability to push VTC video and sound to Exercise Control Room (EXCON) and pull a VTC camera feed from EXCON as well

Brief and Debrief Room

Provide an audiovisual system with large format display to support the user's PC/media presentation requirements. The system must support AV inputs from the conference table as well as dedicated SIPR and NIPR in-room PCs. Provide in-ceiling speakers for program audio playback. The user must control the AV system from a touch panel controller located at the table. Provide a tabletop touch panel AV system controller. Provide a tabletop conference phone to support audio calls over the facility's VoIP phone system.

Exercise Control Room

Provide a wall-mounted videowall display system to support the user's visual monitoring requirements. Mount the videowall across room front and side walls with the sources coming from the front and middle of the room. The display must support AV inputs from various servers in the server room as well as four computers located at a local control desk. Provide in-ceiling speakers for program audio playback. Provide a touch panel AV system controller located at the control desk. Provide a digital intercom system to support instantaneous commination between

the Exercise Control room and individuals in any of the simulation spaces. The intercom system must consist of speaker/microphone headsets for each user and a central controller allowing on the fly workstation group and sub-grouping controlled through a single control interface.

Provide the following:

- Capability to play video from video equipment (HDMI/VGA, CATV, Blue Ray and VCR's) to remote connections within the training rooms (MTWS and CACCTUS).
- Capability to participate in a VTC in the Ready Room/Auditorium
- Capability to receive video from Auditorium
- Capability to receive cable service and display on section of videowall

Secure VTC Room

Provide an audiovisual system with large format display to support the user's PC/media presentation requirements and conferencing requirements. The system must support AV inputs from the conference table as well as dedicated SIPR and NIPR in-room PCs. Provide an integrated video teleconferencing (VTC) system that can enable NIPR and SIPR video calls within the space. Provide ceiling microphones and a wall-mounted camera to capture the local participants during a video call. Provide in-ceiling speakers for program audio playback and VTC far site audio. Provide a tabletop touch panel AV/VTC system controller. Provide a tabletop conference phone to support audio calls over the facility's VoIP phone system.

Classified Simulation Room

Provide a single, wall-mounted LCD display in each Simulation Room to display SIM data. Provide a video distribution system to transmit video from servers to each display. Provide the capability to receive video from video equipment (HDMI/VGA, CATV, Blue Ray and VCR's) located in Exercise Control or Auditorium.

Unclassified Simulation Room

Provide a single, wall-mounted LCD display in each Simulation Room to display SIM data. Provide a video distribution system to transmit video from servers to each display. Provide the capability to receive video from video equipment (HDMI/VGA, CATV, Blue Ray and VCR's) located in Exercise Control or Auditorium.

Simulation Control Room

Provide three areas (Classified, Unclassified) of shelf tables with four areas of use (floor level, desktop level, shoulder level, and top-of-head level) to house computer monitors, laptop severs, and C2 equipment for each enclave.

FIRE Rooms

Provide the capability to receive video from video equipment (HDMI/VGA, CATV, Blue Ray and VCR's) located in Exercise Control or Auditorium.

Break Rooms

Provide a wall-mounted LCD display for TV programming. Provide a wall-mounted touch panel to control the display in addition to the manufacturer provided handheld remote. The display must include an internal ATSC/NTSC/QAM tuner and built-in speakers. Provide the capability to receive video from Video equipment (HDMI/VGA, CATV, Blue Ray and VCR's) located in Exercise Control or Auditorium.

Lobby

Provide wall-mounted LCD monitor to display PC content from the reception desk. Provide a wall-mounted touch panel behind the reception desk to control the display in addition to the manufacturer provided handheld remote. The display must include an internal ATSC/NTSC/QAM tuner and built-in speakers.

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

Provide General Construction Items (Electrical) including, but not necessarily limited to, all connections, fittings, boxes and associated equipment needed by this and other sections of this RFP as required for a complete and usable system.

Firestop conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors in accordance with Section C10, Interior Construction.

D509002 EMERGENCY LIGHTING AND POWER

Provide power and wiring for emergency lights and exit lights throughout the facility.

EMERGENCY LIGHTING AND EXIT SIGNS

Emergency lighting must be unswitched except where required for energy savings and where control is required to achieve complete darkness to meet the needs of the space (conference/briefing rooms, simulation spaces, auditorium, etc.). Where emergency lighting is switched or dimmed, the designated emergency lighting fixtures must immediately return to full brightness upon loss of normal power or signal from the fire alarm system. Devices necessary to facilitate this function must be UL Listed for the application and for use in emergency circuits.

Provide exit signs with cast aluminum housing and brushed aluminum stencil face(s).

ENGINE GENERATOR

Provide a Level 1 Type 10 diesel engine generator set to provide emergency/life safety, legally required standby, and optional standby power to the entire facility. Provide each service from separate automatic transfer switches in accordance with NEC Articles 700, 701, and 702.

The generator must support all building loads, including the building fire pumps.

Provide generators installed outdoors in vandal-resistant, Level III sound-attenuating, weatherproof steel enclosures that are wind resistant up to 175 mph. Provide the generator housing with multiple removable, lockable panels to provide adequate access to components requiring maintenance. Panels must be removable by one person without tools. Mount instruments, controls, protective devices, and engine muffler within the enclosure.

Diesel fuel engines greater than 50 break horsepower (bhp) must comply with the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI) Engines (17CCR 93115) adopted by the California Air Resource Board (CARB). For additional information go to http:www.sdapcd.org .

UNINTERRUPTIBLE POWER SUPPLY

Provide a facility UPS power system to support the computer room rack loads.

The UPS system must provide a minimum of 15 minutes of reserve time at full load.

Provide an on-line double conversion UPS system with an external maintenance bypass. In on-line double conversion operation, the UPS system must achieve the following minimum efficiencies:

- 95.9% @ 25% nominal load
- 96.5% @ 50% nominal load
- 96.3% @ 75% nominal load
- 96.3% @ 100% nominal load

D509003 GROUNDING SYSTEMS

Provide a complete grounding system for the facility electrical and telecommunications systems.

The grounding system must bond all building systems and equipment in accordance with applicable Codes and standards including but not limited to: medium voltage distribution equipment, generators, metal equipment support structures, outdoor transformers, fencing, building structure, building electrical and mechanical systems, raised access floor systems, lightning protection system, and communications systems to the grounding electrode system.

Provide UL listed copper, tinned copper, or silver-plated copper grounding conductors, lugs, connectors, and ground bars.

Provide a grounding electrode system for each building or structure.

Provide driven ground rods at each building column and bond to the building structure with minimum #4/0 AWG. Interconnect the building structure ground rods with a bare conductor grounding grid. Provide a bare conductor building counterpoise to bond the power system grounding electrodes, building structure grounding grid, building lightning protection grounding electrodes, and adjacent structures' grounding electrode systems. The minimum size of the counterpoise and grounding grid conductors is #4/0.

Provide copper-clad steel ground rods; minimum 3/4 inches by 10 feet in length, driven such that the top of the rod is 24 inches below grade, except in test wells.

Provide exothermic welds for below grade connections, except at test wells. Provide mechanical type connectors for above grade connections, in test wells, and in other locations where welded connections are not required.

Provide ground bars in electrical and telecommunications rooms. In multi-story buildings, provide a common grounding electrode riser to bond the secondary electrical ground bars (EGB) to the electrical main ground bar (EMGB) located in the main electrical room.

Provide a main telecommunications ground bar (TMGB) in the main Communications Equipment Room and bond to the EMGB. Provide secondary telecommunications ground bars (TGB) in each secondary telecommunications room and bond to the TMGB using a common bonding conductor. The common bonding conductor and common grounding electrode must be separate conductors.

Provide minimum 24”x4”x1/4” copper main ground bars minimum 12”x2”x1/4” copper. secondary ground bars. Provide electrical ground bars pre-drilled with a standard NEMA two-hole configuration for the entire length of the bar. Provide telecommunications ground bars pre-drilled with a TIA-607 hole pattern for the entire length of the bar. Provide each ground bar with

a clear 3/16-inch thick polycarbonate or acrylic cover 2 inches larger in each direction of the bar it shields.

Install ground bars at 18 inches above finished floor (AFF) in areas without Raised Access Floor (RAF) or 18 inches above RAF in areas with RAF.

Provide a grounding conductor with all circuits and feeders. Conduits cannot be used as the sole grounding conductor. Where multiple circuits are contained in a conduit, they may share the grounding conductor.

D509004 LIGHTNING PROTECTION

Provide a complete lightning protection system with a UL Lightning Protection Inspection Certificate certified to UL 96A, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.

Conceal LPS down conductors within the building envelope. Provide access panels or other means for inspection of down conductors in accordance with NFPA 780 requirements.

Lightning Protection Systems must not void the roof warranty. Adhesive bases are prohibited on standing seam metal roofs.

D509005 ELECTRIC HEATING

Provide power wiring and connections as required for all electric heating systems and equipment.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide power wiring and connections as required for all systems and equipment including meters and controls. Coordinate connection requirements with switchgear and pad mounted transformer kWh metering.

D509007 BUILDING PHOTOVOLTAIC SYSTEM

NOT USED

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

EMERGENCY POWER OFF (EPO) SYSTEMS

Provide maintained contact, mushroom type, twist to reset EPO buttons with a clear flip-up cover. EPO systems must disconnect power to IT equipment within the room, disconnect power to dedicated HVAC equipment within and serving the room, and perform other operations in accordance with NEC Article 645.

Provide the EPO control panel with two sources of power, one originating from the Life Safety Power source and one from a Normal Power source. The Life Safety Power source is the preferred source. Neither power source is permitted to originate from a source affected by operation of the EPO system.

Provide the EPO control panel as an integrated control and monitoring system with electrically operated contactors. Provide contactor voltage and current ratings consistent with type of load served. Provide the control panel in a surface mounted enclosure with key lock and with door-mounted control and pilot devices. Provide with two spare output relays of each type.

Provide the EPO control panel with the following door-mounted pilot lamps and switches:

- Preferred Power Source Available (Green lamp)
- Alternate Power Source Available (Green lamp)
- Maintenance Bypass Override(Key switch)
- Normal Operation (Green lamp)
- Maintenance Bypass (Amber lamp)
- EPO Activation (Red lamp)
- System Reset (Momentary push button or switch)
- Lamp Test (Momentary push button or switch)

Provide an output signal to Fire Alarm System from each room's EPO system to provide the following status points per room:

- EPO system power available
- EPO activation
- EPO system in maintenance bypass

Placing EPO system in "Maintenance Bypass" allows testing of the EPO system without interrupting power to the IT or space support systems.

Locate the EPO control panel and EPO button adjacent to the entrance to the space. Where more than one entrance is provided, provide an EPO button adjacent to each entry point.

--End of Section--

E10 EQUIPMENT P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

GENERAL SYSTEMS REQUIREMENTS

E1010 COMMERCIAL EQUIPMENT

Obtain the services of equipment specialists to specify audiovisual equipment, as indicated in E102009. Equipment specialists shall not have any affiliation with the product specified.

All specialty equipment will be installed by qualified installers regularly engaged in installing the specialty equipment.

Provide energy using equipment per criteria listed in UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

E101003 VENDING EQUIPMENT

Government to provide and install vending equipment (four units) under separate contract. Users to provide requirements of electrical and plumbing devices to be provided by Contractor to properly support the complete functional operation of the vending equipment. Design the break rooms to provide space, utilities, and cooling to accommodate the vending equipment.

E101005 SECURITY AND VAULT EQUIPMENT

NOT USED

E1020 INSTITUTIONAL EQUIPMENT

E102003 LABORATORY EQUIPMENT

NOT USED

E102009 AUDIOVISUAL EQUIPMENT

Coordinate design requirements with the end user/Command IT personnel, and provide equipment specifications, and procurement and installation of the Audiovisual (AV) equipment. Obtain the services of an audiovisual equipment specialist with CTS-D certification to design and specify the audiovisual equipment.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment must include but is not limited to: intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, interactive wall systems and CCTVs.

AV equipment is funded is funded separately. The AV Equipment is identified on the AV Cost Estimate Worksheet. Refer to E20 for the Best Value Determination process for AV systems.

E1030 VEHICULAR EQUIPMENT

NOT USED

E1040 GOVERNMENT FURNISHED EQUIPMENT

Rough-in and provide connections for Government-furnished equipment such that equipment will operate as intended, including providing miscellaneous items such as plugs, receptacles, wire, cable, conduit, flexible conduit and outlet boxes or fittings. Equipment shall remain in control of the Government until such time as the Contractor is ready to install. Contractor shall provide 30 days advance notice of expected installation date and pick up equipment at the location provided by the Government and transfer to site for installation. Testing requirements of Government Furnished equipment shall be the responsibility of the Contractor and shall follow the same guidelines as though the Contractor had provided the equipment.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide light commercial kitchen equipment design to meet the needs of the end user. All light commercial electric kitchen equipment to be coordinated to provide a functional facility. Project includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the end user requirements and complete coordination with the facility design. Equipment must include, but is not limited to, refrigerator, microwave, coffee maker, and ice maker.

--End of Section--

E20 FURNISHINGS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Furnishings must include fixed furnishings as part of the Structural Interior Design (SID) and the design and documentation of the movable furnishings, the Furniture, Fixtures, and Equipment (FF&E) Package and Audio/Visual (A/V) Equipment Package.

The design and documentation of both must be funded as part of the construction contract. The purchase and installation of the FF&E and A/V Package must be funded separately as part of Collateral Equipment.

The movable furniture and furnishings (FF&E) for this facility may include, but are not limited to movable furniture systems, freestanding furniture, area/accent rugs, artwork, appliances, flat screen TVs (not connected to data), accessories, shop equipment, fire extinguishers, specialty equipment (specified by the Activity) and other miscellaneous items to support facility functions.

FF&E is estimated in the amount of $3,059,638.60 and AV is estimated in the amount of $1,866,146.18. This Government FF&E and AV budgets must not be altered by Contractors during the bid process.

This estimate does NOT include the Contractor’s Handling and Administration Rate (HAR).

Fixed furnishings (items that are fixed to the structure), such as specialty equipment, drying cages, weapon racks, lockers, fixed shelving, fixed display furnishings, marker boards, cork boards, motorized projection screens, blinds/shades, etc. are part of the construction contract.

The Audio Visual (AV) Equipment must be identified as a separate line item, priced separately from the FF&E and funded as a planned modification. The A/V Package must include shipping, freight, handling, installation, applicable state sales tax, and the Contractor's A/V Handling and Administration Rate (HAR) percentage as applied to the final A/V total cost. Refer to Part 3 Section E10 EQUIPMENT and D50 ELECTRICAL of this RFP.

GENERAL SYSTEMS REQUIREMENTS

Design and provide fixed and movable furnishings for all areas as developed during Activity programming and as indicated in the Room Requirements (refer to Part 3 Section 5 of this RFP) and other portions of this RFP to provide a fully usable and complete facility. Design a complete FF&E package and A/V package and prepare supporting plans and procurement data. The design, procurement, and installation of the A/V package must comply with all of the same requirements as those defined for the FF&E package in this specification section. FF&E and A/V items identified in this RFP are to be used as a guideline to assist in establishing the minimum facility requirements and do not relieve the Contractor's Interior Designer and CTS-D from developing a complete and accurate design package that incorporates ALL of the Activity’s FF&E and A/V requirements determined during the design process. Design per specific UFC (i.e. Youth center, BEQ, etc.) and in conjunction with UFC 03-120-10, Interior Design.

The contractor must retain the services of an Interior Designer with a minimum of one of the following credentials: National Council for Interior Design Qualification (NCIDQ) certification or state, locality and/or jurisdiction Interior Design Certification, Registration, or License. This same Interior Designer must prepare both the SID and the FF&E Package, attend and participate, in entirety, all kick-off meetings, existing site visits, design meetings, to include, but not limited to,

design charrettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package.

When A/V is required, or other specialty equipment, i.e. shop, A/V, shop, or specialty equipment., is required in the project, the Contractor must obtain the services of the appropriate Equipment Specialists to specify the specialty equipment.

A Certified Technology Specialist-Design (CTS-D) is required for the design and preparation of A/V packages. The CTS-D must attend and participate, in entirety, all design meetings, to include, but not limited to, design charrettes, concept design workshops, presentations and review meetings to develop the floor plan and the A/V package. The NAVFAC approved Specialist(s) must provide separate Best Value Determinations (BVDs) for this equipment, if required by NAVFAC.

The Contractor's Interior Designer and CTS-D, the Design Firm Owner(s), and any Specialists must not have any affiliation with the products specified. The NAVFAC Contracting Officer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer based upon review/recommendation of the NAVFAC Interior Designer Per UFC 3-120-10, the FF&E includes the design, selection, specification, color coordination and procurement documentation of the required items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility.

FF&E specifications must be based on NAVSUP Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The utilization of the current NAVSUP BPA list is required for BVD Analysis Request for Pricing. The current NAVSUP BPA list is located at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The CTS-D must provide A/V floor plans indicating equipment locations and A/V riser diagrams for all A/V systems and coordinate equipment locations and power requirements with power plans. The Final FF&E and A/V package must utilize the most current generation technology. All fixed and movable furnishings and A/V selections and designs must be closely coordinated with Parts 3 and 4 Sections C10, C30, E10, D50, and all other parts of this RFP. All fixed and movable furnishings and A/V must be fully integrated with the final design, to include all building finishes, and all building systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architecture, etc.) construction and schedule. All outlets, switches, thermostats, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc., clearances must be accommodated. The Contractor's Interior Designer and equipment specialists must be responsible for designing and providing specifications for procurement of all FF&E, A/V and specialty equipment, to include delivery and installation, for the facilities built under this contract as directed by the NAVFAC Interior Designer. The Contractor must be responsible for installing all A/V, communications, data, and power cabling within systems and freestanding furniture raceways and performing connections to the building, as required.

The FF&E and A/V package must be fully integrated into the design and construction schedule for the building. All submittal due dates for the SID, A/V and FF&E must be reflected in the Contractor’s construction schedule. The Contractor and the Contractor’s Interior Designer must strictly adhere the FF&E submittal schedule defined prior to the 35% design development to ensure that the final FF&E package is submitted at least 4 months prior to FF&E funding deadlines and no later than 9 months prior to building completion. Requests to change the SID or FF&E schedule must be submitted to the NAVFAC Interior Designer for review/recommendation and approved by the NAVFAC Contracting Officer.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS

STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process must begin following the award of the RFP. The SID submittal must include Interior Design programming documents, FF&E Floor Plans, and exterior & interior finish/color and material sample boards and binders. Refer to this RFP Part 4 Section Z10 General Performance Technical Specifications and Part 2 UFGS Section 01 33 10.05 20, Design Submittal Procedures.

The Contractor's Interior Designer must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer's Representative within 7 days of each occurrence.

Provide the following SID meetings and submittals:

a. Concept Design Workshop (CDW) (10%-15%) or Initial Design Meeting: The Contractor's Interior Designer must meet with the Activity and IDD/Base Property for Marine Corps projects to develop the Interior Design SID programming documents, which must include a preliminary Furniture, Fixtures, and Equipment Plan and the FF&E Summary List. The Contractor's Interior Designer must conduct in-depth, room-by-room interviews to confirm Activity requirements (SIS, FF&E, AV, etc.) for the new facility(s). These interviews must occur during the CDW and must include building walk-through(s) at the Activity's current location and/or similar facility(s), if possible.

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer must provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces. The Furniture and Equipment Plan, FF&E Summary List, and a preliminary Cost Estimate should be further developed and included in this submittal.

c. SID "Over-the-Shoulder" Review: Prior to the Prefinal (100%) Submittal, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer's Representative for an "over-the-shoulder" review meeting to present a minimum of three options for the interior building finishes/colors/materials. Manufacturer choices and cost range of materials must be pre-approved by the Contractor to prevent any substitutions during the submittal process. Finish option samples for NAVFAC review must be clearly labeled and in a "loose" format for preliminary approval prior to the presentation to the Activity. Options must include manufacturer's label/specifications/data sheets. The over-the-shoulder review meeting must be held via conference call.

d. SID Presentation to Activity: The Contractor's Interior Designer must present a minimum of two (2) NAVFAC Interior Designer-approved options for the interior building finishes/colors/materials to the Activity for approval. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for approval. The meeting must be held NAVFAC MIDLANT, located in Norfolk, VA. Photos documenting the selected finish option and preliminary finish schedule for that option must be emailed to NAVFAC Interior Designer's Representative within 7 business days.

e. Prefinal (100%) Submittal: The Contractor's Interior Designer must submit the Activity-approved interior building finishes/color/material selections. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the

Prefinal SID Binder Submittal must be distributed to the NAVFAC Interior Designer's Representative and ROICC.

These finish options must be documented and submitted for review and approval as follows:

Submittal to NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's Representative:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s) w/ floor patterns and accent wall locations
3. Finish Legend
4. Finish Schedule
5. Pre-Final Finish Selections and Physical Samples (photocopies of samples are not acceptable.)
6. CD copy of submittal in binder

f. Final Submittal: The Contractor's Interior Designer must incorporate the final approved Furniture and Equipment Plan, Finish Schedule, Floor Finish Plan and Finish Legend into the Contractor's final drawing set. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Final SID Binder Submittal must be distributed to the NAVFAC Interior Designer's Representative, ROICC, IDD, and the Activity.

The Final Submittal must include the following:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s)
3. Finish Legend
4. Finish Schedule
5. Final Finish Selections and Samples
6. CD copy of submittal in binder

SID CONSTRUCTION SUBMITTALS

No substitutions must be made to the SID finishes once they have been approved by NAVFAC during the design phase. In the event that revisions may be required due to unforeseen conditions such as discontinued product, such revisions must be submitted to the FEAD/ROICC and NAVFAC Interior Designer's Representative for approval by the NAVFAC Interior Designer before substitutions can be made.

FIXTURES, FURNISHINGS AND EQUIPMENT AND AUDIO VISUAL (FF&E and A/V)

The FF&E and A/V design process must begin at the CDW and develop concurrently with the building design. The submittals shall include fixtures, furnishings, and equipment specifications in accordance with the Activity requirements to produce an optimally functional facility. FF&E are all items that are not fixed to the structure, but are fully integrated with the floor plan, building systems, and finishes. Refer to RFP Part 4 Section Z10 General Performance Technical Specification and Part 2 UFGS Section 01 33 1-.05 20, Design Submittal Procedures.

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the Activity requirements and complete coordination with the facility design and the SID.

These are minimum requirements and the Contractor must be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/FF&E and A/V coordination. The Contractor’s Interior Designer and CTS must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s Representative and Electrical Engineer’s Representative within 7 days of each occurrence.

Provide the following FF&E and A/V meetings and submittals:

a. FF&E and A/V Procurement Requirements Meeting (Interior Design Orientation): This meeting must occur at NAVFAC MIDLANT, located in Norfolk, VA prior to the Design Development (35%-50%) Submittal and the development of the FF&E package. The NAVFAC Interior Designer and NAVFAC Electrical Engineer must provide the Contractor's Interior Designer current sample documents to be used for the FF&E and A/V BVD Analysis solicitation package and submittals, review the Best Value Determination (BVD) process, discuss the number of Best Value Determinations required and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider.

b. FF&E "Over the Shoulder" Review: Prior to the FF&E Concept Presentation and Best Value Determination (BVD) Analysis the Contractor's Interior Designer and CTS must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review to present a minimum of two preliminary FF&E options and to discuss A/V options. These can be presented in a "loose" format for preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA

c. FF&E and A/V Concept Presentation: The Contractor's Interior Designer and CTS must present the NAVFAC approved preliminary FF&E and A/V package to the Activity for approval. This presentation must include loose format samples and catalog cuts. Sample boards are not required. This meeting must occur in conjunction with the SID presentation to the Activity, if possible. NAVFAC OICC, Project Manager, Interior Designer and Electrical Engineer must be invited to this meeting.

d. Best Value Determination (BVD) Analysis "Over the Shoulder Review": Prior to issuing the BVD Analysis solicitation package, the Contractor's Interior Designer and CTS must send an electronic copy and a hard copy in binder format, of the complete FF&E BVD

Analysis solicitation package to the NAVFAC Interior Designer and the complete A/V BVD Analysis solicitation package to the NAVFAC Electrical Engineer for review. The Contractor's Interior Designer and CTS must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review of all required solicitation packages and to review the most current NAVSUP BPA vendor list and discuss GSA Contract Audio Visual vendors. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA.

BVD Analysis Solicitations must include the following:

1. Copy of the BVD Analysis Request for Pricing cover letter – Indicate all revisions to NAVFAC-provided template utilizing “Track Changes.” NAVFAC-approved revisions may be added to this document, but no items may be deleted.
2. BVD Analysis Request for Pricing Spreadsheet/Questionnaire with “basis of design” item product numbers, photos & descriptions
3. Detailed Technical Specifications/Criteria developed for each FF&E and AV item in NAVFAC MIDLANT’s standard format to establish minimum acceptable FF&E requirements for comparable bids.
4. Project Specific Room/Furniture Typicals
5. Furniture and AV Plans with Legends coded to the BVD Analysis RFP (PDF format)
6. Contractor’s subcontract agreement/terms and conditions (if applicable)
7. Contractor’s Interior Designer must request the most current BPA Contract Holder vendor information prior to sending out the bid solicitations.

e. BVD Submittal and "Over the Shoulder" Review - The Contractor's Interior Designer must submit one (1) hard copy in binder format of the BVD package to the NAVFAC Interior Designer’s Representative, NAVFAC Electrical Engineer’s Representative, and one (1) copy to IDD/Base Property for Marine Corps projects. An electronic copy must be sent to the NAVFAC Contracting Officer, the NAVFAC Interior Designer and the NAVFAC Electrical Engineer. Additional back-up information from specific bid packages may be requested on an as-needed basis. The "over-the-shoulder" review meeting will be held via conference call to review the results of the solicitation and determine a best value recommendation. Submit the following in 3-ring binders and include a CD copy in each for review and approval:

   The BVD Submittal must include the following:

   1. Cover Title Page (project name, project #, location, submittal date, submittal title)
   2. Table of Contents
   3. Point of Contact List
   4. Narrative of Interior Designer Objectives
   5. Copy of all information sent to bidders and documentation that all required sources were contacted

6. Technical Specifications used in bid request for all furniture, AV, etc.

7. BVD Analysis Request for Pricing Spreadsheet/Questionnaire completed by each bidder
8. Back-up Information submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meet all requirements.)
9. Responses from UNICOR (FF&E only)
10. Completed BVD Analysis Pricing Evaluation Spreadsheet comparing bidder quotes/responses
11. Contractor's Interior Designer/Electrical Engineer's recommendation for the Best Value vendor and justifications
12. CD copy of the FF&E and A/V BVD Submittal binder(s)

f. The Contractor's Interior Designer must coordinate a mock-up for best value review of FF&E items as required by NAVFAC for at least the top three (3) BPA vendors submitting the highest rated FF&E proposals, as determined by NAVFAC. The reviewers must include the Contractor's Interior Designer, NAVFAC Interior Designer, Contracting Officer, IDD/Base Property, and the Activity.

g. Preliminary FF&E and A/V Submittal(s): The Preliminary submittal(s) must be due at pre-final (100%). It must be presented to the Activity and NAVFAC Interior Designer's Representative and NAVFAC Electrical Engineer's Representative in loose format at a meeting to occur at the Activity. Presentation will consist of loose samples to include all cut sheets and finishes from the recommended vendors. Immediately following this meeting, the Preliminary FF&E and AV submittal binders must be submitted. Five (5) submittals are required:

   One each for the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative, three for the ROICC and IDD/Base Property, and one for the Activity.

   Submit the following in a 3-ring binder for review and approval:

   The Preliminary FF&E and A/V Submittal(s) must include the following:

   1. Cover Title Page (project name, project #, submittal date, and submittal title identified on binder cover and spine)
   2. Table of Contents
   3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s) vendors and subcontractors)
   4. Preliminary FF&E and A/V list(s) (Cost Summary) to include shipping, freight, handling, professional installation, project management, HAR and applicable sales tax
   5. Preliminary Procurement Data Spec Sheets completed for each product. Indicate general appearance as well as proposed finish and fabric selections

6. Furniture and A/V placement plans coded to the FF&E and A/V list(s) and Procurement Data Spec Sheets; include electrical and AV plans for coordination.
7. Pre-Final Finish/Fabric Selections and Samples in 8-inch by 10-inch binder format mounted on heavy-duty card stock in edge-reinforced heavy-duty plastic sheet protectors.
8. Copy of Quote(s) and Bill of Materials (BOM) from the vendor(s) determined to be the best value. Copy BOM line items to Cost Summary Item Codes.9.Indicate and provide explanations for all changes to quantities and/or pricing that occur between accepted vendor proposal and Final Submittal.
10. Copy of Final Quote Summary, broken out by line item of product and related services and applicable taxes, on letterhead from the vendor(s) determined to be the best value.

h. The Contractor and his Interior Designer must coordinate an on-site mock-up and review of FF&E items as required by NAVFAC with the selected, best-valued BPA vendor(s). Building finishes and fixtures must be installed in the affected area(s) to the greatest extent practicable in order to assess building systems/fixture coordination. The reviewers must include the NAVFAC Interior Designer and Construction Manager, the Contractor's Interior Designer, IDD, Base Property, and the Activity. The BPA vendor must be available on-site to respond to questions. The mock-up exercise must be completed prior to the submittal of the Final FF&E submittal and award of the modification for turnkey furniture procurement.

i. Final FF&E and A/V Submittal: The Contractor's Interior Designer must submit the Final FF&E and A/V Package(s) within 30 to 90 calendar days following the receipt of review comments on the preliminary FF&E submittal. **All required documentation revisions of price changes and product reselection due to price increases or discontinued product must be the responsibility of the Contractor's Interior Designer.** Five (5) submittals are required; (1) for the NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative, (3) for the FEAD/ROICC and IDD/Base Property, and (1) for the Activity.

   The Final submittal must include the following:

   1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)
   2. Table of Contents
   3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s), vendors and subcontractors)
   4. Final FF&E and A/V list(s) (Cost Summary) to include shipping, handling, freight, professional installation, project management, HAR and any applicable sales tax.
   5. Final Procurement Data Spec Sheets completed for each product. Indicate final finish and fabric selections. Provide images of item and finishes to be represented.
   6. Final Finish Selections and Memo Samples for the FF&E submitted in 8 x 10 binder format, mounted on heavy-duty card stock, using heavy-duty plastic sheet protectors.

7. Final Furniture and AV Placement Plans coded to the FF&E and AV list(s), Procurement Data Sheets, and specifications; include electrical and AV plans for coordination.
8. Copy of Final Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes.
9. Indicate and provide explanations for all changes to quantities and/or pricing that occur between accepted vendor proposal and Final Submittal.
10. Best Value Determination Guidelines sheets (completed and signed by the Contractor's Interior Designer and CTS-D).
11. Copy of Final Quote Summary, broken out by line item of product and related services and applicable taxes, on letterhead from the vendor(s) determined to be the best value.
12. CD copy of the final FF&E and AV binder(s).

j Punch List: The Contractor's Interior Designer (and A/V consultant or other specialty consultants, if applicable) must attend at least two punch list site visit with the installation dealer(s), NAVFAC Interior Designer and the Base Representative/Activity Contact. The first site visit must identify all punch list items (at installation dealer's 98 percent completion resolved and the second (at 100 percent completion).

FF&E CONSTRUCTION SUBMITTALS

Submit any revisions or deviations caused by discontinued items to the Contracting Officer for approval by the NAVFAC Interior Designer.

SD-10 Operation and Maintenance Data

List Operation and Maintenance Manuals for seating, systems furniture and keyboard trays.

E2010 FIXED FURNISHINGS (SID)

Fixed furnishings (SID) are funded as part of the construction project and are not funded as part of FF&E Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

Develop design as described herein and provide storage shelving, equipment racks, and window treatments. Cross reference C10 Interior Construction, and C30 Interior Finishes, for performance requirements. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

E201001 FIXED ARTWORK

As required, graphics, artwork and/or logo of activity must be included in public and meeting spaces. Coordinate with Activity and NAVFAC MIDLANT Interior Designer's Representative for placement locations.

E201002 WINDOW TREATMENTS

Provide manually operated double-roller sunscreen and room darkening shades at all exterior windows. These fixed window treatments are considered SID and are funded as part of the construction project.

E201003 FIXED SEATING

As required, but not limited to, provide fixed locker room benches, auditorium fixed seating and site furniture, including waste receptacles.

Provide auditorium seating with tablet arms. Arm caps must be molded vinyl. Seatbacks must be molded vinyl. Interior seat and back must be padded and fully upholstered.

E201004 INTERIOR LANDSCAPE (FIXED)

NOT USED

E201006 LOBBY AREA

Design and provide lobby areas consistent with quality commercial design, architecturally significant in scale, and coordinated with the interior finishes for each facility. Lobby areas must reflect the mission of the client and must be designed to accommodate the function and program required for the facilities. Lobby areas must include the following elements: fixed artwork, graphic floor inlay, and decorative lighting. Lobby elements noted above are part of the construction contract.

E2020 MOVABLE FURNISHINGS

The design of the FF&E package is funded as part of the construction contract base bid. The purchase and installation coordination of FF&E is a planned modification to the contract and funded separately as part of Collateral Equipment. The specific process is outlined in PTS E20 in Part 4 of this RFP. If a Collateral Equipment list is provided within this RFP, the costs associated with the purchase and installation of these items are NOT to be included in the base bid. The estimated Collateral Equipment cost is provided for information purposes only. The Contractor only needs to propose the Handling and Administrative Rate (HAR)

Design and provide a FF&E package in accordance with UFC 03-120-10, *Interior Design,* and other portions of this RFP for all areas as developed during Activity programming to provide a fully usable and complete facility. Collateral Equipment may also include specialty items specified by the Activity and the Contractor's Interior Designer is responsible for incorporating these into the FF&E and/or the A/V package. The estimated Collateral Equipment cost(s) are provided for information purposes only. Actual requirements may vary, and it is the responsibility of the Contractor’s Interior Designer and/or Equipment Specialist to determine the specific requirements of the End User during the design phase and design to these requirements.

The FF&E Package must include shipping, freight, handling, and professional installation, project management, applicable sales tax, and HAR.

A Best Value Determination must be performed on a minimum of three manufacturers and UNICOR for orders exceeding the micro-purchase threshold from an individual manufacturer/vendor. Multiple BVDs may be required in order to complete the final FF&E and

A/V package. The required quantity of BVDs to be performed must be determined by the NAVFAC Interior Designer's Representative during the design phase and is dependent on the appropriate NAVSUP BPA category(s) to be utilized and specific project requirements. Documentation must be provided to the Government with the final FF&E package. Specific Documentation is indicated in Part 4 of the RFP. The BVD Statement must be completed and signed by the contractor's interior designer. Sample BVD forms and instructions must be reviewed during the FF&E Procurement Requirements Meeting. Forms can be obtained from the WBDG at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The Contractor, as a planned modification, must be authorized by the Government Contracting Officer to procure all furniture/furnishings in the approved final FF&E and A/V package using predominately negotiated Federal contracts as directed by the Contracting Officer and the NAVFAC Interior Designer and Electrical Engineer. When the modification for turnkey furniture and A/V procurement is exercised, the Contractor's proposed Handling and Administrative Rate (HAR) must not exceed 5% of the total cost of the FF&E, and A/V shipping, freight, handling, project management, and installation. The HAR includes all of the contractor's efforts related to the storage, coordination, handling and administration of subcontractors, deposits, bonds and all other associated costs and profit for the procurement of FF&E and A/V. No other charges, fees, or markups must be authorized. The contractor must establish and submit a fixed percentage figure, for the administration effort of this modification (HAR), with the initial project proposal as part of the contractor's Pricing Schedule.

E202001 MOVABLE ARTWORK

Provide movable artwork as required by Activity/User and NAVFAC Interior Designer's Representative. Movable artwork is part of the FF&E package.

E202002 MODULAR PREFABRICATED FURNITURE

Provide modular freestanding workstations as required. Minimize the use of electrified panel furniture systems. Provide at a minimum, an articulating keyboard tray with left- or right-handed mouse extension for each computer location.

E202003 FREESTANDING FURNITURE AND FILES

Provide ergonomic task seating, lounge, reception and guest seating, storage and filing, tables, as required.

E202004 RUGS & ACCESSORIES

Provide area rugs, lamps, soft window treatments (drapery and hardware) interior landscaping, and other decorative items as required.

E202005 MULTIPLE SEATING (MOVABLE)

NOT USED

E202006 INTERIOR LANDSCAPING (MOVABLE)

Provide interior landscaping (planters, site furnishings, etc.) as required.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, fire extinguishers, clocks, literature racks, microwave ovens, refrigerators, non-plumbed coffee makers, and other appliances as required.

--End of Section--

F10 SPECIAL CONSTRUCTION – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Special Construction systems are not applicable to this project.

GENERAL SYSTEMS REQUIREMENTS

F1010 SPECIAL STRUCTURES

F101001 METAL BUILDING SYSTEMS (PRE-ENGINEERED)

NOT USED

F1020 INTEGRATED CONSTRUCTION

NOT USED

F102001 SPECIAL PURPOSE ROOMS

NOT USED

F1030 SPECIAL CONSTRUCTION SYSTEMS

NOT USED

F1040 SPECIAL FACILITIES

NOT USED

F104001 INTERIOR SWIMMING POOLS

NOT USED

--End of Section--

F20 SELECTIVE BUILDING DEMOLITION – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

A group of individual buildings are to be removed in their entirety as a part of the scope of this RFP. Refer to the list in F2010 Building Elements Demolition.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Perform all off-site work necessary to meet the requirements of the project, local codes, reference standards, technical specifications and performance criteria.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor must submit complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form is in the UFC 3-201-01, *Civil Engineering*. Contractor must determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form must be forwarded to the EFD Environmental Reviewer.

Coordinate and obtain approval from the Contracting Officer for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

F2010 BUILDING ELEMENTS DEMOLITION

This project includes the complete demolition of the following: Buildings 125, 125A, 127, H13 and Prefab trailers 125B and 125C.

F2010 1.1 GENERAL DEMOLITION

Completely remove all shallow foundations, foundation walls, slabs, pits, pile caps, etc. Remove existing deep foundations, such as piles, to a depth of 48 inches below existing grade.

F2010 1.2 UTILITIES

Remove all existing utility service connections including but not limited to water, sanitary sewer, natural gas, electric, and telecom. All service connections must be demolished to the service main and capped per all State and Federal requirements.

Demolish the buildings' associated electrical utility transformers and primary and secondary service feeders and pathways.

Demolish the buildings' associated telecommunications services and pathways.

Utility demolition must be coordinated with on-site personnel for planned outages.

F2010 1.3 DUST CONTROL

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area.

F2010 1.4 TRAFFIC CONTROL

Where pedestrian or vehicle safety is endangered, use traffic barricades to reroute traffic to safe routes.

F2010 1.5 WEATHER PROTECTION

NOT USED

F2010 1.6 BURNING

Where burning is permitted, the Contractor must adhere to federal, state and local regulations. Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

Brief descriptions of the buildings to be demolished follow. Refer to Demolition Site Plans in Part 6 for additional information.

Constructed in the 1940s, Building 125, approximately 250 ft long x 74 ft at its widest, is generally a one-story rectangular masonry structure, but has a second floor component near the center section of the building. The building is supported on shallow foundations (continuous strip footings at the perimeter and individual spread footings at interior columns). The first floor comprises a structured one-way concrete slab and joist system spanning between grade beams and foundation walls. The slab is 2 inches thick, and the joists are 10 inches deep and spaced at 2 feet on center. The second floor comprises a 2 ½ inch thick concrete slab supported by 9 inch deep steel joists (beams) spaced at 2 feet on center. The joists are supported by load bearing walls and concrete girders. The roof comprises a series of structural steel trusses spanning between columns and load bearing walls. Building 125A is a small (< 200 sf) single story masonry shed building adjacent to Building 125. Buildings 125B and 125C are prefabricated mobile structures.

Building 127 is a single-story T-shaped masonry building, approximately 60 ft wide x 137 ft long, of the same vintage and similar construction to 125.

Building H13 is a single-story masonry building built in the late 1980s on shallow foundations. It is approximately 95 ft wide x 140 ft long with a bump-out of approximately 22’-0” x 32’-0” at its entry.

F201002 EXTERIOR CLOSURE

Buildings 125, 125A, 127 and H13 have a masonry exterior closure in red brick.

F201003 ROOFING

Buildings 125 and 127 have high slope roofs with shingles on wood over steel trusses. Building H13 has a flat roof with membrane roofing on insulation over metal decking.

F201004 INTERIOR CONSTRUCTION & FINISHES

Interior construction of these buildings appears to be that of typical office interiors, i.e. gypsum board partitions and acoustical or gypsum board ceilings.

F201005 CONVEYING SYSTEMS

No conveying systems are being demolished.

F201006 MECHANICAL SYSTEMS

Demolish mechanical and plumbing systems. Follow Camp Lejeune Mechanical Design Guidance for proper refrigerant handling.

F201007 ELECTRICAL SYSTEMS

Demolish existing buildings' electrical distribution systems in their entirety, including equipment, luminaires, devices, wiring, and pathways. Contact Tony Beckwith at (910) 451-2790 to coordinate electrical demolition. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

Demolish existing buildings' communications systems in their entirety, including equipment, devices, wiring, and pathways.

Demolish existing buildings' fire alarm systems in their entirety, including equipment, devices, wiring, and pathways. Prior to demolition, contact base fire alarm technicians and allow time for their retrieval of existing fire alarm system panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

F201008 EQUIPMENT & FURNISHINGS

Equipment and furnishings must be removed by the Contractor prior to the removal of the building.

F201090 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

F2020 HAZARDOUS COMPONENT ABATEMENT

A Hazardous Material Survey Report will be provided by the government for each building listed in Section F2010 above. The reports are to be provided after the issuance of this BD RFP but prior to the award of the project.

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

The General Contractor is required to hire as a first tier subcontractor a PQP to ensure compliance with the approved work plans and perform independent inspections, testing and verification of the hazardous components work including asbestos, lead containing paint, and any other hazardous material identified in the Destructive Hazardous Materials Survey Report.

F2020 1.2 FURNISHINGS

All furnishings in the listed buildings will be removed prior demolition.

F2020 1.3 ASBESTOS

Refer to F2020 above.

F2020 1.4 LEAD BASED PAINT

Refer to F2020 above.

F2020 1.5 PAINT RELATED WORK

Refer to F2020 above.

F2020 1.6 MERCURY & LLR COMPONENTS

Refer to F2020 above.

F2020 1.7 PCB'S

Refer to F2020 above.

F2020 1.8 OZONE DEPLETING SUBSTANCES (ODS)

Refer to F2020 above.

F2020 1.9 ANIMAL DROPPINGS

Refer to F2020 above.

F2020 1.10 MOLDS AND SPORES

Refer to F2020 above.

F2020 1.11 DISPOSAL

F202001 SUBSTRUCTURE & SUPERSTRUCTURE

Refer to F2020 above.

F202002 EXTERIOR CLOSURE

Refer to F2020 above.

F202003 ROOFING

Refer to F2020 above.

F202004 INTERIOR CONSTRUCTION & FINISHES

Refer to F2020 above.

F202005 CONVEYING SYSTEMS

No conveying systems are to be demolished

F202006 MECHANICAL SYSTEMS

Refer to F2020 above.

F202007 ELECTRICAL SYSTEMS

Refer to F2020 above.

F202008 EQUIPMENT & FURNISHINGS

Refer to F2020 above.

F202090 OTHER HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

--End of Section--

G10 SITE PREPARATION – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Provide site preparation that supports project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site preparation system consists of site clearing, demolition, salvage, relocation, earthwork, and hazardous waste remediation necessary to ready the site for other work associated with the project.

GENERAL SYSTEM REQUIREMENTS

Develop the project site and perform all off-site work necessary to meet the requirements of the project, antiterrorism criteria, local codes, reference standards, technical specifications and performance criteria.

A topographic survey of the existing site has not been performed for the site. The Contractor is required to perform a topographic survey of the project area in accordance with UFC 1-300-09N, *Design Procedures*, that will be impacted by his work. Include this topographic survey in all design submittals. The concept plan provided in Part 6 are based GIS information field verified to the extent practical. Underground utility sizes and exact locations were not able to be verified. The GIS topographic information has been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. Prior to starting work, physically verify the location of all existing utilities and obtain all additional survey data required to provide a quality final design. The existence, size and/or location of the utilities are not guaranteed by the GIS surveys provided. The Contractor must show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level B. Where critical utility crossings or conflicts are likely, show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level A. Verify the location of all utilities prior to construction.

Prior to beginning excavations, the Contractor must contact the Public Works Office. The Contractor must hire a private utility locating service to locate all Government owned utilities. Contractor will be responsible for obtaining permits, prior to excavation and will be responsible for maintaining utility markings and calling to have utility remarked if utility markings are not preserved. Contractor must add all located underground utilities to the topographic survey and must provide to the Government both a hard copy and in electronic format.

Unless otherwise noted, provide new facilities at the locations indicated on the drawings in Part 6.

Minimize the impact of construction activity on operations and neighboring facilities.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Submit a complete "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer and Environmental Reviewer. Perform work in accordance with the obtained permits.

Jurisdictional tidal and non-tidal wetlands have not been identified on the project site.

Coordinate and obtain the Resident Officer In Charge of Construction's (ROICC) approval for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

Refer to Site Analysis and Building Requirements Sections for additional site preparation functional program information.

Provide site preparation that supports project sustainability goals.

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information is included in Part 6 – Attachments. Refer to Part 3, Section 6, ESR A10 for additional information concerning the Government provided subsurface data and the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

Refer to Part 3, Section 6, ESR A10 for the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL EARTHWORK REQUIREMENTS

Refer to Part 3, Section 3, Site Analysis for base bid requirements concerning earthwork and site preparation.

G1010 SITE CLEARING

G101001 CLEARING

Preserve trees at the perimeter of the project site.

The Camp Lejeune Forest Management Program has first right of refusal for all merchantable timber on Camp Lejeune. If the first right of refusal is not waived, the Government will, by separate Contract, harvest saleable timber from the project site. Design Build Contractor must clear and dispose of remaining timber, limbs, tops, stumps, tree tops, and logging slash debris.

If the first right of refusal is waived, timber on the project site noted for clearing and grubbing will become the property of the Design Build Contractor. Remove all timber from the project site and dispose of it off installation. See G101002 TREE REMOVAL.

Provide MCB Camp Lejeune Forest Management final government approved clearing limits for Timber Management determination on merchantable timber first right of refusal before commencement of site construction work. Provide geospatial data shape file per Part 6 Chapter A MCIEAST Specs for geospatial data deliverables. See GIS DATA DELIVERABLES Section 01 78 30.00 22 in Part 2 – General Requirements.

Adhere to federal, state and local regulations for burning. Design Build Contractor must comply with MCIEAST-MCB CAMLEJBul 5090 (Open Burning of Vegetative Debris). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

G101002 TREE REMOVAL

Remove and dispose of all as required for project construction.

To reduce the incidental take of migratory birds and their nests, trees with active nests should not be cleared. If tree clearing is proposed between April and July, contact the LWRS Biologist for additional guidance.

G101003 STUMP REMOVAL

Remove all stumps under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101004 GRUBBING

Remove all root mat and organic debris under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101005 SELECTIVE THINNING

NOT USED

G101006 DEBRIS DISPOSAL

Dispose of all grubbing and clearing residue, demolished material, rubbish and debris generated by this project by hauling off-site and off station.

Dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G1020 SITE DEMOLITION & RELOCATIONS

This project requires the mass demolition of multiple buildings and service utilities.

G102001 BUILDING MASS DEMOLITION

The buildings to be demolished are Buildings 125, 125A, 127 and H13. Two prefabricated trailers, Buildings 125B and 125C, must be removed from their current locations. Refer to Section F2020, "Hazardous Component Abatement" for requirements regarding removal of hazardous components.

G102002 ABOVE GROUND SITE DEMOLITION

Remove and salvage the existing light poles along McHugh Boulevard.

Remove and dispose all other existing site features that conflict with the construction of the project, including asphalt and concrete pavements.

G102002 1.1 ABOVE GROUND STORAGE TANKS

An aboveground storage tank report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

Remove and dispose of any aboveground storage tanks at existing buildings being demolished.

G102003 UNDERGROUND SITE DEMOLITION

Preserve the following underground site elements: All existing utilities required for the proposed project.

Remove or relocate existing utilities under or within 10 feet (3.0 m) of any new facilities or building additions. Existing utilities include but are not limited to piping, structures and conduits. Remove all appurtenances associated with the utility to be removed so there is no presence of the utility at ground surface..

Remove existing utility structures, not within the building footprint, to 3 feet below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Fill with clean sand.

Abandon utility systems in a manner that conforms to applicable codes and regulations. When piping is abandoned in place, fill abandoned piping with flowable fill.

Do not open cut pavement that is to remain to demolish utilities. Fill piping and/or conduits under pavements with flowable fill.

Remove all utility service connections of demolished buildings back to the main and cap per State and Federal regulations.

G102003 1.1 UNDERGROUND STORAGE TANKS

An underground storage tank report is not provided to support this project.

G102004 BUILDING RELOCATION

Refer to Section F2020, "Hazardous Component Abatement" for requirements related to removal of hazardous components.

G102005 UTILITY RELOCATION

Comply with the requirements of the utility provider concerning the utility relocation of the phone and fiber optic utilities. Comply with NAVFAC requirements and all applicable UFCs concerning other utility relocations..

Relocate overhead electrical service lines and associated poles along McHugh Boulevard and Birch Street to accommodate the proposed site work.

Refer to the Part 3 narratives and Part 6 for additional utility relocation information and GIS utility information that is within the proposed site area respectively.

G102006 FENCING RELOCATION

NOT USED

G102007 SITE CLEANUP

Waste materials will become the property of the Contractor; transport, dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G102090 OTHER SITE DEMOLITION & RELOCATIONS

NOT USED

G1030 SITE EARTHWORK

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, Excavation and Fill, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Grading shall conform with UFC 3-201-01, *Civil Engineering*.

G103002 COMMON EXCAVATION

Perform common excavation with equipment of sufficient size to accomplish the work required. Over excavation of areas to obtain additional satisfactory material for the contractor's use is not permitted.

Preserve natural topographic features to minimize cut and fill requirements. All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer.

G103003 ROCK EXCAVATION

Blasting will not be permitted.

G103004 FILL & BORROW

Provide borrow and select fill from off-base sources.

A grading plan has not been designed, therefore it has not been determined if common fill, backfill and fill material, select fill or top soil is available on site in the required quantities.

On-site soils that are determined as clean fill by the geotechnical engineer via testing must be backfilled and compacted in accordance with the requirements in this section.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

For each borrow site, provide borrow site testing for hazardous materials characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

G103005 COMPACTION

Perform compaction per the Performance Technical Specifications or the Contractor's geotechnical report, whichever is more stringent.

G103006 SOIL STABILIZATION

The following methods of soil stabilization will not be allowed: lime slurry, and pressure grouting.

G103007 SLOPE STABILIZATION

Provide slope stabilization through appropriate grading and site design for a minimum factor of safety of 1.5 or slope that does not exceed the maximum slope per local code requirements.

G103008 SOIL TREATMENT

Treat the area around the entire foundation of each building for termite control in accordance with manufacturer's instructions.

G103009 SHORING

Provide shoring, bracing, and sheeting, etc. as required to prevent undermining of foundations, pavement, utility pipes, structures, and slabs and prevent slippage or movement in embankments or slopes adjacent to excavations to facilitate construction. Shoring will be in accordance with Section 25 A and B of EM 385-1-1. Provide a sheeting and shoring plan if required by local codes and/or OSHA. The plan must be signed and sealed by a professional engineer.

G103010 TEMPORARY DEWATERING

Provide pumps, temporary ditching, and grading required to maintain groundwater levels at the Contractor’s geotechnical engineer’s recommended level below footings and or pavements during construction. Ensure that there are no groundwater conditions that will promote deterioration of the soil or interruptions to the construction progress.

All dewatering effluent must be filtered per NCDEQ erosion and sediment control requirements prior to discharge to minimize sediment to surface waters.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Obtain an Erosion and Sediment Control permit required for the proposed work from NCDEQ. Submit the permit application to the COR for approval prior to submitting to NCDEQ.

G103090 OTHER SITE EARTHWORK

NOT USED

G1040 HAZARDOUS WASTE REMEDIATION

A contaminated soil/groundwater report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

G1040 1.1 CONTAMINATED SOIL AND GROUNDWATER

The project site does require contaminated soil or groundwater work.

Perform contaminated soil or groundwater work in accordance with the specifications and plans provided in Parts 5 and 6.

--End of Section--

G20 SITE IMPROVEMENTS – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

Provide site improvements that support project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site improvements system consists of pavements and pavement related features, landscaping and other exterior site development work related to this project. Provide a pavement design by a licensed Professional Engineer familiar with conditions local to the project site. Site design, including but not limited to design of parking and pedestrian circulation, will include coordination with the Civil Engineer and the Landscape Architect.

GENERAL SYSTEMS REQUIREMENTS

Provide site improvements as required to make a useable facility that meets functional and operational requirements, incorporates all applicable anti-terrorism, force protection and physical security requirements and blends into the existing environment.

Provide accessibility in conformance with applicable ADA/ABA requirements and requirements of UFC 1-200-01 , *General Building Requirements*.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer. Perform work in accordance with the obtained permits.

Provide site improvements that support project sustainability goals.

Minimize the impact of construction activity on operations and neighboring facilities.

Refer to Site Analysis and Building Requirements Sections for additional site improvement functional program information.

G2010 ROADWAYS

Provide roadways and roadway repairs, as required, to allow for safe, convenient and logical circulation, while discouraging through traffic. A segregated MOV-only drive aisle must be provided for access to the outdoor training areas. Emergency vehicle access, designed with required turning radius for emergency vehicles, immediately adjacent to the building and associated gates must be provided. The design of pavements must include the anticipated daily traffic over the life of the project (20-years) as well as the existing soil conditions at the site. See part 3 Site Analysis for pavement section bid criteria.

Provide roadways of bituminous pavement or Portland cement concrete (PCC) where indicated on the drawings in Part 6. Permeable pavement must not be used. Aggregate pavement may be used for access roads to mechanical equipment if approved by NAVFAC.

Provide new roadway and other pavement sections as required by soil conditions and determined by the Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*.

Provide other roadway improvements including traffic signalization, markings, and signage.

G201001 BASES & SUBBASES

The following materials will not be allowed for base or subbase courses: lean concrete, cement stabilized, sand-clay, lime rock, or shell.

G201002 CURBS & GUTTERS

Concrete curb and gutter may be used to tie into adjacent facilities. Concrete curbs and gutters may be used in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent. Where NCDOT do not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of NCDOT for a minimum compressive strength at 28 days of 3500 psi concrete.

G201003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by the NCDOT.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks per UFC 3-201-01.

Provide signage per UFC 3-201-01 and the BEAP.

Provide temporary pavement markings and signage throughout construction to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition.

G201005 GUARDRAILS & BARRIERS

Provide guardrails, wheelstops and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G201006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G201090 OTHER ROADWAYS

NOT USED

G2020 PARKING LOTS

Provide parking for 400 vehicles for the project. The design of pavements must include the anticipated daily traffic over the life of the project (20-years) as well as the existing soil conditions at the site.

Provide parking lots of bituminous pavement or Portland cement concrete (PCC) pavement where indicated on the drawings in Part 6. Aggregate pavement may not be used.

Provide new parking and other pavement sections as required by soil conditions and determined by Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*.

Provide other parking improvements including parking entrances for two-way traffic, signage, concrete dumpster pad, and landscaping.

Provide handicapped parking in accordance with UFC 1-200-01, General Building Requirements.

Provide parking in accordance with UFC 3-201-01, Section 2-9.6 Parking Areas and SDDCTEA Pamphlet 55-17.

See G2050 LANDSCAPING and G205005 PLANTINGS for parking lot landscape requirements.

G202001 BASES & SUBBASES

Crushed concrete meeting NCDOT specifications for gradation for aggregate base or subbase courses may be used.

G202002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent.

G202003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by NCDOT.

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings (pavement, curb and object), signage (regulatory, warning and guidance) and other traffic control devices as required to facilitate proper utilization of the parking areas.

Provide pavement markings including crosswalks Provide parking in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide signage in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide temporary pavement markings and signage to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the MUTCD.

G202005 GUARDRAILS & BARRIERS

Provide guardrails, wheel stops, and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G202006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G202007 MISCELLANEOUS STRUCTURES AND EQUIPMENT

NOT USED

G202090 OTHER PARKING LOTS

NOT USED

G2030 PEDESTRIAN PAVING

Provide a network of Portland cement concrete (PCC) sidewalks, separated from, but connected to vehicular circulation systems, to allow for pedestrian circulation between various new and existing elements of the project. Interface new pedestrian circulation systems with existing pedestrian circulation systems and include input from the Civil Engineer, Architect, and Landscape Architect.

Provide sidewalks of Portland cement concrete pavement with 4 inches thick minimum. Provide concrete sidewalk in accordance with Section G201003 or with the standard NCDOT mix for a minimum compressive strength at 28 days of 3,500 psi. For PCC sidewalks, provide a broomed finish. Reference BEAP for sidewalk widths.

Unless indicated otherwise, provide a transverse slope not to exceed 1/4”/foot. Limit variation in cross section to 0.25 inch in 5 feet.

Existing trail along frontage of McHugh and Birch must be replaced in-kind as required with asphalt.

Provide, as indicated in BEAP 3.2.8 PLAZAS AND COURTYARDS – EXTERIOR USE ARES, entrance plazas and pedestrian spaces to create outdoor meeting spaces and reinforce the arrival sequence from parking lot to building entrance(s). Size and placement must reflect functional needs and the appropriate importance to the setting. Forecourts may serve as outdoor plazas, courtyards or smaller landings and be furnished with benches, trash receptacles, plantings, lighting and distinctive architectural treatment and may include provisions for bicycle parking. Bike racks must be provided to support 5% of the building FTE and can be divided into more than one location. See PART 3 – CHAPTER 2 Antiterrorism Force Protection for additional requirements for plazas and pedestrian areas for a fully coordinated design

G203001 BASES & SUBBASES

Provide as required and per the Contractor’s geotechnical engineering report.

G203002 CURBS & GUTTERS

NOT USED

G203003 PAVED SURFACES

NOT USED

G203004 GUARDRAILS & BARRIERS

NOT USED

G203005 RESURFACING

NOT USED

G203006 OTHER WALKS, STEPS & TERRACES

NOT USED

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

Provide an 8’ tall ornamental (not chain-link) Restricted Security Fence required for classification of exercises. It must envelope the building, concrete and grassed training areas, and staff parking area directly adjacent to the building to the northwest, all accessible by gates.

Provide zinc-coated steel fencing components in accordance with FS RR-F-191/1, Type 1 for the fencing system.

G204002 RETAINING AND FREESTANDING WALLS

Provide retaining walls in areas of significant grade change. Follow the requirements set forth in Part 4, Performance Technical Specifications.

Provide concrete retaining walls with applicable safety protective measures. Retaining walls must match new facility exterior.

Provide retaining walls to permanently resist soil pressures as well as live loads. Provide wall drainage to minimize lateral loading and protect wall materials against degradation.

Retaining walls are required to comply with UFC 3-220-01. The DOR must obtain building permits for retaining walls greater than five feet in height.

G204003 EXTERIOR FURNISHINGS

All site furnishings are required to conform to the Base Exterior Architectural Plan (BEAP). For the picnic area provide picnic tables, trash receptacles, benches, barbecues, recycling receptacles, hot ash receptacles.. Provide a trash and ash receptacle at the designated smoking area.

Design picnic areas to accommodate up to 50 people.

All site furnishings must be anchored to concrete pavement below.

G204004 SECURITY STRUCTURES

Provide concrete curbing at the edges of all parking areas to identify the site perimeter and prevent parking in the 33-foot unobstructed space.

G204005 SIGNAGE

Provide building identification signage, building number signage, and way finding signage in accordance with the Activity's BEAP.

G204006 FOUNTAINS & POOLS

NOT USED

G204007 PLAYING FIELDS

NOT USED

G204008 TERRACE AND PERIMETER WALLS

NOT USED

G204009 FLAGPOLES

NOT USED

G204090 OTHER SITE IMPROVEMENTS

Provide heavy-duty concrete dumpster and utility pads. Provide dumpster enclosures conforming to the Activity's BEAP. BEAP 3.4.10 indicates that dumpster areas should be located on structural concrete pads with adequate radius, approach length, and overhead clearance from trees, utilities, and structures. The dumpster enclosure must be located in the 100-stall employee parking lot. Screening should be provided on three sides by a 7-foot-tall masonry wall to block views of the containers. The dumpster enclosure's materials and style must complement the facility it serves. For each dumpster, install a minimum of two bollards at the rear of the enclosure to protect the rear wall from damage and a minimum of two bollards on each side of the dumpster. The contractor must provide separate vehicular and pedestrian access to the dumpsters within the enclosures.

Provide a heavy-duty concrete pad for an on-site standby generator outside the building so it can be easily taken off line and removed once the base upgrades their power grid at a subsequent date.

Provide a 50,000 square foot open cell concrete paver training space. Outdoor space must be grass-pave to support emergency vehicles and turf areas for communications tents.

Provide a 50,000 square foot grass training space. Outdoor space must be grass-pave to support emergency vehicles and turf areas for communications tents.

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn, groundcover, trees, shrubs, ornamental grasses and organic and inorganic mulches as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with all applicable anti-terrorism, force protection and physical security requirements. The landscape design must reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 5' wide inorganic rock cobble mulch mow strip around the building with weed barrier fabric below rock. Provide concrete edging along mow strip where edging is adjacent to a turf area. Provide landscaping resistant to deer.

Trees, shrubs, and ground covers are acceptable within the AT/FP unobstructed space. Trees must have a 3-inch minimum caliper and branching structure that provides a 3-foot clear zone above the finished grade. Shrubs must be trimmed to provide a 3-foot clear zone above the finished grade and ground covers must not exceed 6-inches in height.

Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species. Areas of the site not covered by buildings or other structures and impervious paving or walkways within the project limits must be considered landscape area and must receive landscape improvements.

Guarantee all landscaping for a period of one year. Provide a one-year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

Provide complete landscaping maintenance, including but not limited to, routine lawn mowing, edging, pruning, pest inspection/treatment, re-mulching of mulch products, watering, weeding, fertilizing, and restaking, throughout the guarantee period.

Provide mechanical equipment screening wall on three sides of new equipment.

Provide shrubs or small growing trees if feasible for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205001 FINE GRADING AND SOIL PREPARATION

Provide 4 inches of topsoil for all lawn areas and fine grade.

G205002 EROSION CONTROL MEASURES

Prevent erosion from occurring by providing erosion control measures as required by state and federal requirements.

Erosion control temporary or permanent seeding must not be considered a permanent turf condition. Provide centipede sod for permanent turf.

G205003 TOPSOIL AND PLANTING BEDS

Provide a planting soil mixture composed of 50% native soil blended with 50% topsoil and other amendments as recommended by the soil testing laboratory around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's rootballs. Set tops of plant rootballs 2 inches above adjacent grades

G205004 SODDING

Sod areas indicated to be turfed in Part 6. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of sodding and provide same guarantee and maintenance as for new landscape areas. Sod species must be Centipede – Eremochioa ophiuroides.

G205005 PLANTINGS

Preserve existing trees to the greatest extent possible.

MATERIAL SELECTION:

Select plant material from Master Plant Lists found within the Base Exterior Architecture Plan (BEAP), NC State Extension and the North Carolina Native Plant Society. Other plants not found on these lists may be used if approved by the reviewing Government Landscape Architect. Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. Final approval of new plant materials rests with the reviewing Government Landscape Architect. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species.

Shade trees must be a minimum size of 3-inch caliper at breast height and 14 to 16 feet tall minimum unless specified for Antiterrorism Force Protection measures where the trees are integrated into the vehicle-deterrent perimeter. See Antiterrorism Large Diameter Trees in PART 3 - CHAPTER 2 PROJECT OBJECTIVES. Flowering trees must be minimum 2-inch caliper and evergreen trees 8-10 feet tall. In general, select trees that have a normal lifespan over 60 years

and a strong branch and limb structure. Trees must be relatively clean and free of potential nuisances such as fruit, berries, sap, thorns and pitch. In addition, trees must not have surface roots which will potentially uplift sidewalks and pavements. For palm trees, identify sizes on plans by brown trunk height (BTH) or clear trunk height (CTH). Unless otherwise approved by the reviewing government landscape architect, provide minimum BTH or CTH of 8 feet.

GENERAL PLANTING GUIDELINES:

All planting must adhere to any fence clear zone requirements for security and AT/FP criteria set forth in this RFP. Plantings must adhere to the Base Exterior Architectural Plan (BEAP). Coordinate with MCB Camp Lejeune for project specific requirements at CDW. Provide small trees and ground cover plantings at building main entrances to accentuate the entrances. Provide plantings to frame the new building and lessen the visual impact of parking areas. Provide planted strip between any sidewalk and any Primary, Secondary and Tertiary streets.

For inorganic granular mulch applications, provide 3- to 5-inch diameter river stone mulch over weed control fabric at mow strips around buildings. For organic mulch applications, provide 3 inches of shredded hardwood mulch over weed control fabric at planting beds except for spreading groundcover planted areas.

Encompass planting beds not used for bioretention filters with concrete edging.

Provide 6-inch-wide (minimum) by 12-inch-deep concrete band edging for each of the following conditions: between rock mulch/cobble area and turf area, between rock mulch/cobble area and planting area, and between turf area and planting area. Contain turf areas adjacent to building walls, site walls, columns, stairs, and other structures by a 6-inch-wide (minimum) concrete header with a minimum separation of concrete header from walls, columns, and other structures of 2 feet to minimize damage to site improvements.

Provide a 6-foot-wide grass sod border around the entire bioretention filter. Grass sod species must be Centipede. Ensure that the bioretention filters are not compromised by sediment deposits during construction. Install bioretention filters only after upstream areas tributary to the bioretention filter location have been fully stabilized.

If used for stormwater management, provide bioretention filters, plants, plant quantities, and soil mix in accordance with the State's Stormwater Design Manual.

TREE PLANTING GUIDELINES:

Preserve existing trees to the greatest extent possible. Provide trees at the minimum rate of one (1) tree per 1,000 square feet of TOTAL LANDSCAPE AREA for this project.

Site trees such that their mature canopy will not negatively affect any building. Include no trees within utility easements. Coordinate tree planting locations with electrical site lighting for a fully coordinated and integrated design that allows tree and lighting to be complimentary. See G4020 SITE LIGHTING Plant trees a minimum of 10 feet from building, edge of sidewalks, curbs, and underground water and sewer lines. Provide root barrier for all trees planted within 8 feet of any utility, wall, curb or pavement.

Stake all trees as required to ensure a stable, true plumb form is established. Protect trees from damage from staking materials. Unless otherwise directed by the Contracting Officer, all staking materials must be removed prior to the end of the contract. Provide a five-foot watering basin around each tree, and also provide a 5-foot diameter mulch ring with a 3-inch layer of organic mulch.

Provide informal street tree plantings that encompass all base streets within the project limits with an average spacing of 30 to 40 feet on center unless noted otherwise.

PARKING LOT GUIDELINES:

A minimum of 10% of any at grade POV parking lot must be landscaped; Reference Section 5 of ASHRAE 189.1.

POV parking lots must have a minimum of one (1) canopy tree every five (5) parking spaces around parking lot perimeter including entrance drives and service areas. Tree plantings along perimeter of lot must follow the Camp Lejeune Base Exterior Architecture Plan (BEAP) for a natural, native appearance. Parking lots must have no more than two tree species unless authorized by Government Landscape Architect.

Provide deciduous shrubs along the parking lot perimeter to create an informal opaque screen.

Interior plantings must consist of a minimum of (1) tree per every 300 square feet of island area. Planting medians must have a minimum inside dimension width of 9 feet. Any parking lot that abuts a service drive or base road for the project must be separated by planted green space with a minimum inside dimension width of 9 feet.

Provide 3 inches of shredded hardwood, pine bark or pine needle mulch at all planting beds.

G205006 PLANTERS

NOT USED

G205007 IRRIGATION SYSTEMS

NOT USED

G205090 OTHER LANDSCAPING

Deliverables must include plans, details and specifications to accurately and completely convey design intent. Plans must identify all plants, turf, hardscapes, site furnishings, buildings and site features and other pertinent landscape elements.

Provide a plant schedule indicating as a minimum, quantity, species, (Latin and Common Name) spacing, and size and condition of each proposed plant as well as mulch materials. Provide the height and width of plant at time of planting for Contracting Officer.

Provide on Landscape Plans a 'Landscape Material Summary' which includes but is not limited to 'Mulches'(by type), Concrete Header, Pavers, and other landscape materials utilized in the project.

Document all field changes to the Landscape Planting drawings including changes in sod area, concrete header lengths, hardwood and stone mulch bed areas, , planting location, and type and number of plant(s). Any field changes made to the Landscape layout must be shown on the Landscape Planting drawings - also revise the data found in the 'Landscape Material Summary' and 'Plant Material Schedule' found on the Landscape Planting drawings.

Specifications must include the minimum following sections for Landscape Architecture:

- 01 78 00, Closeout Submittals
- 12 93 00, Site Furnishings
- 32 05 33, Landscape Establishment

- 32 93 00, Exterior Plants
- 32 92 23, Sodding

The Contractor must provide plant and grounds maintenance during the plant establishment period. The plant establishment period must extend one full year after completion of planting.

Maintenance during planting operation must ensure installed plants are maintained in a healthy growing condition from time of planting through plant establishment period. The typical growth habit of individual plants must be retained.

Maintenance during the establishment period must include as a minimum:

- Straightening and tightening of tree stakes and guying material
- Mowing and edging of turf protecting plant areas from erosion
- Maintaining edging of planter beds and checking for girdling of trees, watering of all plant material and turf, weeding, and removing and replacing unhealthy plants
- Watering of all project trees with slow release watering bags
- Controlling pests, diseases, fungi and rodents
- Removing dead or broken branches by pruning in accordance with ANSI A300 Part 1
- Fourteen (14) days prior to the end of the maintenance period, mow and edge lawn, re-mulch beds (if required depth or coverage of mulch is not met) and water and fertilize all plants
- Removal of all tree staking and slow release watering bags at end of establishment period

Warranties: All trees and plants must be guaranteed for a period of one year after final acceptance of the project, or area/s.

--End of Section--

G30 SITE CIVIL/MECHANICAL UTILITIES – P1338F II MEF SIMULATION/TRAINING CENTER REPLACEMENT

SYSTEM DESCRIPTION

The site civil/mechanical utility systems include water supply systems, sanitary sewer systems, storm drainage systems, heating distribution systems, cooling distribution systems, fuel distribution systems and associated appurtenances which are more than 5 feet outside the building.

The site mechanical utility system consists of all piping and appurtenances for chilled water, hot water, and natural gas, including all accessories and devices as necessary and required for a complete and usable system up to 5 feet outside the building.

GENERAL SYSTEM REQUIREMENTS

Develop the site to provide water, fire protection, sanitary sewer, storm drainage, heating, cooling and fuel distribution services that meet the requirements of each applicable regulatory agency that governs, and issues permits for the construction and operation of these systems. Site design is required to comply with UFC 3-210-10, *Low Impact Developments*, as well as state or local stormwater management regulations and applicable project sustainability goals.

Provide each system complete and ready for operation.

Physically verify the location of existing above and below ground utilities prior to starting work.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil/Mechanical Reviewer. Perform work in accordance with the obtained permits.

Minimize the impact of construction activity on facility operations and neighboring facilities.

Obtain final approvals from the Contracting Officer for all utility connection points associated with this work.

Coordinate with the local utility providers and pay any fees or charges required to connect to their utility.

All disciplines involved in site work design must coordinate utility locations with the Civil Engineer and the Landscape Architect.

Refer to Site Analysis and Building Requirements Sections for additional site civil/mechanical utilities information.

Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS Section G30 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

After installation of the equipment and systems, provide training courses for Government personnel for each of the items listed below, covering items contained in the Operations and Maintenance manuals. Provide one copy of the Operations and Maintenance manuals for each two course attendees. Provide one DVD disc of the training courses to be used as refresher courses and to train additional personnel. Conduct training by the same factory trained engineer that supervised the installation of the system. During training include classroom discussion as well as hands on maintenance, replacement of typical components and repair type maintenance training for parts typically replaced or repaired in the field. Submit training plan 30 calendar days prior to training sessions; include scheduling, content, outline, and training material handouts. Provide training for Cathodic Protection System.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Leakage tests are required.

Perform post-installation TV inspection of new storm sewer mains.

Imported bedding material must be provided for all utility lines and structures. Bedding material must consist of either ASTM C33 fine aggregate, or NCDOT coarse aggregate size No. 57, No. 67, or No. 78. A minimum of 6 inches of bedding must be provided for all utility lines and a minimum of 12 inches of bedding must be provided for all utility structures. Bedding material backfill must be placed to the spring line of the pipe for all concrete and PVC pipe trench excavations. Utility line and utility structure excavations in existing pavement areas must be completely backfilled to the aggregate base/subbase course elevation excavatable flowable fill meeting NCDOT specifications.

G3010 WATER SUPPLY

The new water system is an extension of the existing water system. The existing water system serving the project site is owned and operated, by the federal government, operated and maintained. Provide the new water system and connections to the existing water system in accordance with UFC 3-230-01, *Water Supply: Storage, Distribution, and Transmission*; the utility provider’s requirements; and the state waterworks' regulations; whichever is more stringent.

Notify the government of the additional demand generated by the proposed facility.

Provide connection to the existing water distribution system.

Design the new water system so that water consumption is measured at a minimum, by one meter for each facility. Ensure the meter is easily accessible, but not obvious. Water Meters must comply with Camp Lejeune Water Meter Specifications included in Part 6 of this RFP. Enable meter data to be collected and automatically transferred to a Meter Data Management (MDM) module in CIRCUITS for utility and energy management within an environment protected from cyber- attack.

G301001 WELL SYSTEMS

NOT USED

G301002 POTABLE WATER DISTRIBUTION

Connect the new potable water distribution system to the existing distribution system along McHugh Boulevard and Birch Street.

Provide cathodic protection on metallic pipe lines.

A water meter on each proposed service line is required. Contractor must provide meters selected from the base ATO approved equipment listing.

Provide meter box.

Provide fire hydrants with 5” Stortz x 4.5” HN/NST Fire Hydrant Converter. Paint fire hydrant barrels yellow. Paint fire hydrant bonnets based on its rated flow capacity in accordance with UFC 3-600-01 and NFPA 291. Consult with the project Fire Protection Engineer to obtain hydrant flow capacities for newly installed fire hydrants. For fire hydrants in or adjacent to vehicle pavements, provide bollards to protect the fire hydrant from vehicular collision.

Backflow preventers are required on all service entrance lines. If not specified in ESR D20 and D40, provide reduced pressure backflow preventers aboveground outside the building. Provide a heated enclosure.

G301003 POTABLE WATER STORAGE

NOT USED

G301004 FIRE PROTECTION WATER DISTRIBUTION

See G301002.

G301005 FIRE PROTECTION WATER STORAGE

NOT USED

G301006 NON-POTABLE WATER DISTRIBUTION

NOT USED

G301007 PUMPING STATIONS

NOT USED

G301008 PACKAGED WATER TREATMENT PLANTS

NOT USED

G301090 OTHER WATER SUPPLY

NOT USED

G3020 SANITARY SEWER

The new sanitary sewer system is an extension of the existing sanitary sewer collection system. The existing sanitary sewer collection system serving the project site is owned, operated and maintained by the federal government. Provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with UFC 3-240-01, Wastewater Collection; the utility provider’s requirements; and the state sewerage regulations; whichever is more stringent.

Notify the utility provider of the additional wastewater flow generated by the proposed facility.

Provide connection to the existing sanitary sewer collection system along McHugh Boulevard and Birch Street. In identifying a suitable point of connection, evaluate the capacity of the existing collection system.

G302001 SANITARY SEWER PIPING

Provide cathodic protection on metallic pipe lines.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G302003 LIFT STATIONS AND PUMPING STATIONS

If required, provide in accordance with PTS section G30 1.3.5.5, G301007, G302003.

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

NOT USED

G302005 SEPTIC TANKS

NOT USED

G302006 DRAIN FIELDS

NOT USED

G302090 OTHER SANITARY SEWER

NOT USED

G3030 STORM SEWER

The new storm sewer system is an extension of the existing storm sewer system. The existing storm sewer system serving the project site is owned and operated by the federal government. Provide the new storm sewer system and connections to the existing storm sewer system in accordance with UFC 3-201-01, Civil Engineering; the utility provider's requirements; UFC 3-210-10, Low Impact Development the state stormwater management laws and regulations; and applicable project sustainability goals; whichever is more stringent.

Confirm that the existing outfall has adequate capacity to receive the additional stormwater flow generated by the project.

Vehicle wash areas are not to be provided.

G303001 STORM SEWER PIPING

Storm sewer piping materials are required to be polyvinyl chloride (PVC) for diameters less than 12 inches and reinforced concrete pipe (RCP) for diameters 12 inches and greater. Storm piping must meet NCDOT requirements.

G303002 STORM SEWER STRUCTURES

Storm structures must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303004 CULVERTS

All storm sewer piping materials for culverts are required to be reinforced concrete pipe (RCP).

Designer of Record must ensure that culverts and bridges are designed to safely pass the 100-year event. The following upstream controls limit headwater elevation:

- 100-year water elevation must not be higher than 18 inches below the outer edge of the shoulder at its lowest point in the grade.
- Designer of Record must ensure that upstream wetlands are not adversely impacted by crossing
- There must not be any appreciable change in flow, elevation, or wet/dry cycles of existing wetland.

Culverts must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303005 HEADWALLS

Headwalls must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Obtain Erosion and Sediment Control permit required for the proposed work from NCDEQ.

Submit permit application to the Contracting Officer for approval prior to submitting to NCDEQ.

G303007 STORM WATER MANAGEMENT

Comply with NDCEQ regulations, UFC 3-201-01 Civil Engineering, UFC 3-210-10, Low Impact Development, FC 1-300-09N Navy and Marine Corps Design Procedures; whichever is more stringent. Consider the following LID features: bioretention, filter/buffer strips, grassed swales, bioretention swales, wet swales, infiltration trenches, and rain gardens. The use of rain barrels, cisterns, permeable pavement/pavers, and tree box filters are not allowed for this project.

Evaluate the drainage conditions and submit sealed calculations to the Government for civil and environmental review documenting how design meets UFC 3-210-10, state or local stormwater regulations, and applicable project sustainability goals. Provide a narrative indicating which criteria governs the design and all assumptions. Technical constraints that limit compliance with UFC 3-210-10 must be documented, reviewed and approved by the Government's Civil Reviewer.

If the project footprint exceeds 5,000 SF and does not maintain the predevelopment hydrology to the maximum extent technically feasible (METF), these constraints must be documented on the NAVFAC Sustainable Energy Data Record Card (NSEDRC) and approved by the Government's Civil Reviewer. The NSEDRC can be found at: http://www.wbdg.org/pdfs/navfac_sustainable_energy_data_record_card.pdf .

The Contractor/DOR is required to design/construct on-site water quality stormwater management facilities to meet NC water quality requirements under this RFP without the option of purchasing nutrient credits.

The contractor must obtain all required regulatory permits required for the proposed work. Coordinate all reports, submittals, and permit applications through the Contracting Officer.

The DOR is responsible for acquiring approval from NCDEQ for any BMPs. A Post-Construction certification will need to be provided to NCDEQ by the DOR. UFC 3-201-01 Civil Engineering Requirements will apply to all sites. Additionally, permitting through the United States Army Corps of Engineers will be required for any wetlands or stream disturbance.

See Part 6 for a copy of the LID calculation spreadsheet. This spreadsheet is to be filled out and included with the design calculations for all applicable submittals.

G303090 OTHER STORM SEWER

NOT USED

G3040 HEATING DISTRIBUTION

NOT USED

G304001 OVERHEAD HOT WATER SYSTEMS

NOT USED

G304002 OVERHEAD STEAM SYSTEMS

NOT USED

G304003 UNDERGROUND HOT WATER SYSTEMS

NOT USED

G304004 UNDERGROUND STEAM SYSTEMS

NOT USED

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

NOT USED

G304090 OTHER HEATING DISTRIBUTION

NOT USED

G3050 COOLING DISTRIBUTION

G305001 OVERHEAD COOLING SYSTEMS

NOT USED

G305002 UNDERGROUND COOLING SYSTEMS

NOT USED

G305090 OTHER COOLING DISTRIBUTION

NOT USED

G3060 FUEL DISTRIBUTION

G306001 LIQUID FUEL DISTRIBUTION PIPING

NOT USED

G306003 LIQUID FUEL STORAGE TANKS

NOT USED

G306004 LIQUID FUEL DISPENSING EQUIPMENT

NOT USED

G306006 GAS DISTRIBUTION PIPING (NATURAL GAS)

Coordinate with natural gas supply company for service supply to the building gas meter.

G306007 GAS STORAGE TANKS

NOT USED

G306009 OTHER GAS DISTRIBUTION

NOT USED

G306090 OTHER FUEL DISTRIBUTION

Provide warning and identification tape for underground utilities.

G3090 OTHER SITE MECHANICAL UTILITIES

NOT USED

--End of Section--

G40 SITE ELECTRICAL UTILITIES

SCOPE

The site electrical utility system consists of all power and communications cabling from the existing distribution system point of connection including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet of new (or existing) building location.

Provide site systems complete in place, tested, and approved as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must."

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floorplan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly, diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floorplans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

Electrical contractors must possess a valid North Carolina Public Utility electrical contractor's license and be insured to do such work in the State of North Carolina.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an exterior electrical system consisting of, but not limited to, service entrance wiring and equipment, conduits, feeder and branch circuits, lighting and branch wiring, communications, security and alarm systems, emergency generator, emergency lighting and power, grounding,

and lightning protection, including accessories and devices as necessary and required for a complete and usable system.

Provide each building with a single utility service with radial power distribution.

Select electrical characteristics of the power system to provide a safe, efficient, and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life-safety distribution systems.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited. Assume the available fault current at the point of connection to be an infinite bus.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15 percent spare circuit and load capacity at all levels of the power distribution system, including life-safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide site electrical utilities systems and components that support project sustainability goals.

Provide identification labels for site equipment, structures, and wiring in accordance with the Camp Lejeune GIS numbering convention provided in Part 6, Attachment 8, *Camp Lejeune Electrical Policies & Criteria.*

Make road crossings using directional boring.

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing overhead 12.47kV, three phase, three wire, 60 Hertz electrical power system at PP1 on either McHugh Boulevard or Birch Street. Coordinate connection point with Camp Lejeune Public Works Department. Provide a fused cutout switch on the pole. Transition from overhead to underground distribution at the pole and extend the primary service to the project site underground in concrete encased ductbank to a Pad Mounted Transformer.

G401001 SUBSTATIONS

NOT USED

G401002 TRANSFORMERS

Provide a three-phase pad mounted transformer to feed the facility.

Provide the following features:

- Dead-Front Design with ANSI specific front plate spacing
- 15kV, 200A minimum, load break connectors

- Three 10kV minimum, surge arresters
- Tap changer with two 2.5% taps above rated voltage and two 2.5% taps below rated voltage
- Biodegradable less-flammable liquid-insulated

Provide a pre-cast concrete box pad for transformers. Refer to the box pad detail provided in Part 6, Attachment 8, *Camp Lejeune Electrical Policies & Criteria*.

G401003 SWITCHES, CONTROLS AND DEVICES

Provide sectionalizing cabinets configured with the existing overhead and or underground distribution system.

Provide a pole-top fused cutout switch configured with the existing overhead distribution system at the connection point for service to the building.

G401004 OVERHEAD ELECTRIC CONDUCTORS

NOT USED

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

NOT USED

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a medium voltage and a 600-volt secondary underground electrical power distribution system to meet the connection requirements as indicated in paragraph G4010 *Electrical Distribution*.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks and above-ground junction boxes and above-ground sectionalizer switches.

Underground handholes and manholes are prohibited.

G401008 GROUNDING SYSTEMS

Provide a complete grounding system for the electrical power distribution system.

G401009 METERING

Provide a separate Kilowatt Demand Meter capable of reporting to the existing Camp Lejeune Advanced Metering Infrastructure (AMI) at each Pad Mounted Transformer. The existing AMI is Itron Choice Connect (Fixed Network) version 5.0.

The provided meter must be compatible with the existing Camp Lejeune Itron MCLite and Itron Mobile Advanced Meter Reading (AMR) equipment.

Pre-program meters with Camp Lejeune’s meter program. For programming of meters contact:

Border States Electric Product Manager
Ken Hause
(864) 242-6880 | EXT 11230
khause@borderstates.com

Refer to the Advanced Electric Meter requirements provided in Part 6, Attachment 7, *Water and Electrical Meter Information* for additional features and information.

G401010 CATHODIC PROTECTION SYSTEMS

NOT USED

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

Provide site lighting for exterior and security applications including underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

Provide exterior luminaires, poles, and foundations in accordance with the Camp Lejeune Electrical Policies and the Camp Lejeune Base Exterior Architectural Plan. Provide architectural type luminaires for parking lot, walkway, and outdoor gathering area lighting. Provide cobra head type luminaires for roadway lighting.

Coordinate site lighting with plantings and landscape elements to provide a fully coordinated and integrated design that allows the lighting to be complimentary to the landscape design throughout the project site.

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide an automatic lighting control system for exterior lighting fixtures using lighting contactors, bi-level or dimming drivers, motion sensors, and a centralized photocell. The photocell will automatically turn lights "ON" at dusk and turn "OFF" at sunrise while the motion sensors, in conjunction with the bi-level or dimming drivers, will adjust the lighting levels based on occupancy of the area.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Provide Area and Parking Lighting for parking lots, walkways, and outdoor gathering areas.

G402002 SPECIAL SECURITY LIGHTING SYSTEMS

Provide security lighting along the site perimeter fence line.

G402003 OTHER AREA LIGHTING

Provide area lighting for outdoor training areas.

G402004 LIGHTING POLES

Provide aluminum poles complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide a complete underground distribution system for all site lighting systems.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication and security system including, but not necessarily limited to, Voice and Data Telecommunications Systems, Cable Television (CATV) Systems including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system.

G403001 TELECOMMUNICATIONS SYSTEMS

The connection point for the site telecommunications systems is underground at manhole 15. Extend telecommunications services to the project site underground in a system of manholes and ductbank to the telecommunications equipment room. Provide OSP fiber and copper cabling from existing demarcation point (manhole 15) to the new Main Distribution Frame (MDF). Contractor must coordinate with the base telephone office 30 days prior to demolition of existing telecommunication services. Refer to document (located in part 6 of the RFP) “P1338_Comm OSP Pathways” for additional details.

OSP Pathways and Cabling

Install new site MHE near McHugh Blvd, install min (3) 4" FM site to new site MH (~300'). Install 6 way 4" concrete encased ductbank to tie into existing duct bank at MH15 (~1000'). Install 300 PR OSP copper FM site to MHWC1-2-9 via new and existing ductbank (~2300'). INST 24 FOC FM site to MH15 via new ductbank (~1300'). Leave 50FT. Fiber loop and 30FT. Copper loop at applicable MH locations for Government terminations.

Preserve and protect RORP211-5 and direct buried cabling to FORP211-5.

Preserve and protect HH211-5-4, cabling and ductbank from HH211-5-4 to 1248.

G403002 CABLE TV SYSTEMS (CATV)

Coordinate with local cable television provider for requirements.

G403003 CABLES AND WIRING

Provide cables and wiring for site telecommunications and security systems as indicated in their respective categories.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a system of ductbanks, manholes, and handholes for site telecommunications per section G403001.

G403009 GROUNDING SYSTEMS

Provide a complete grounding system for all site communications and security systems.

G4090 OTHER SITE ELECTRICAL UTILITIES

Provide a minimum 225 kVA transformer and a distribution panel to serve power pedestals located at the outdoor training area. Locate the distribution panel outdoors at a location to be selected by the COR. Provide power service from the outdoor distribution panel and terminate at ten power pedestals; five located on the southwest end of the grass training area and five on the northeast end. Coordinate the exact locations with the COR. Provide a 208Y/120V three-phase, four-wire plus ground, 50A feeder to each power pedestal and terminate. Provide each power pedestal with a heavy-duty NEMA 4X stainless-steel, fused disconnect switch with color-coded quick-connect receptacles (one per conductor). Provide each pedestal enclosure with a weather-protected output pathway that will allow user cabling to exit the enclosure with the door closed.

Provide three data pedestals at the outdoor training area. Locate one pedestal centered in the training area at the building exterior wall and two pedestals centered in the training area. Coordinate the exact locations with the COR. Provide each data pedestal with a NEMA 4X stainless-steel 12 rack-unit enclosure that can accept 19-inch, rack-mountable equipment. Provide fiber and copper patch panels in each enclosure for termination of backbone and user horizontal cabling. Provide one 25-pair CAT 6 cable and one 12-strand, single-mode optical fiber cable from the Simulation Control Room to each pedestal and terminate in the patch panels in each enclosure. Provide each pedestal enclosure with a weather-protected output pathway that will allow user cabling to exit the enclosure with the door closed.

G409007 PHOTOVOLTAIC ENERGY SYSTEM

NOT USED

--End of Section--

1.0 PROJECT DESCRIPTION – P1512F LOG OPS SCHOOL

1.1. Overview

The Log Ops School project is a practical application facility that provides entry and intermediate level training for MOS - Motor Transport in the Marine Corps Combat Service Support School (MCCSSS) at Camp Johnson. The new one-story facility will allow for additional marine training throughput; and provide the MCCSSS with a state-of-the art training facility with properly sized and configured spaces for flexibility in motor transport repair training for a variety of the Marine Corps transport vehicle types. This project is one of several projects that is intended to improve the training and in-processing of Marines within the MCCSSS MOS training programs by providing new facilities to replace damaged buildings related to Hurricane Florence, as well as, demolish many of Camp Johnson's older buildings that were damaged by Hurricane Florence in September 2018.

1.2. Project Components

The components found within the SOW for this project include, but are not limited to:

- A one-story building of just over 148,000 GSF that includes high bay vehicle training spaces, classrooms, classrooms/labs, and administrative offices and support spaces.
- Parking areas for staff and advanced students.
- Pavement maneuvering areas to access classroom bays and for deliveries to the special projects area.
- All-weather roadway for emergency vehicle access.
- Concrete dumpster pad and masonry screen wall for trash and recycling containers.
- Site utility connections.
- Reinforced concrete pads for mechanical equipment and a training aid.
- Stormwater management features to comply with Government LID requirements and state stormwater management permit requirements.
- Sidewalks and site features that tie the facility into the adjacent streets and pedestrian sidewalks of Camp Johnson.
- Rerouting of a trail north of the building site.
- Limited wetlands and stream mitigation for areas of wetlands and classified streams that are within the project site boundary.
- Outdoor covered student break areas.

1.3. Project Purpose

The purpose of the new Log Ops School is to give Camp Lejeune and the Marine Corps a motor transport training facility that will meet the MCCSSS Motor Transport training requirements in an efficient and properly planned facility that is based on the current modes of training and provides properly sized space for the vehicles currently used for training. Advancements in training platforms, increased student throughput, integration of largescale infrastructure training

networks and the growth of vehicle platforms have contributed to the obsolescence of the current training facility housed in Building M107. All of these issues are considered in the new facility's siting and planning and will allow the new facility to address the current and future needs of the Log Ops school.

1.4. Most Relevant Codes and Standards

The following Codes and Standards, and those incorporated by reference within the following, are applicable to the project.

This is not a comprehensive list, and the Contractor is responsible for ensuring that the completed project complies with all applicable local, state and federal codes, standards, and regulations.

MCB Camp Lejeune

- MCB Camp Lejeune, North Carolina Public Works Division, Design Branch Electrical Policies & Criteria, 4 Feb 2020.
- Camp Lejeune Mechanical Design Guidance, 01 Jul 17
- MCB Camp Lejeune, BEAP
- Specification 27 10 00 Building Telecommunications Cabling System, 27 Jun 17
- Specification 33 82 00 Telecommunications Outside Plant, 19 Jun 17

Facilities Criteria

- FC 1-300-09N, *Navy and Marine Corps Design Procedures*, with Change 4, 14 Jun 18

Unified Facilities Criteria (UFC)

- UFC 1-200-01, DoD Building Code (General Building Requirements), 08 Oct 19
- UFC 1-200-02, High Performance and Sustainable Building Requirements, with Change 4, 1 Oct 2019.
- UFC 3-101-01, Architecture, with Change 4, 06 Mar 19
- UFC 3-110-03, Roofing, with Change 3, 06 Mar 19
- UFC 3-120-10, Interior Design, 16 May 18
- UFC 3-201-01, Civil Engineering, with Change 2, 01 Jul 19
- UFC 3-201-02, Landscape Architecture, with Change 1, 01 Nov 19
- UFC 3-210-10, Low Impact Development, with Change 1, 02 Feb 16
- UFC 3-220-01, Geotechnical Engineering, 01 Nov 12
- UFC 3-220-05, Dewatering and Groundwater Control, 16 Jan 04
- UFC 3-230-01, Water Storage and Distribution, with Change 1, 01 Oct 18
- UFC 3-230-02, O&M, Water Supply Systems, 10 Jul 01
- UFC 3-240-01, Wastewater Collection, with Change 2, 01 Jan 19
- UFC 3-240-02, Domestic Wastewater Treatment, with Change 1, 01 Jan 19

- UFC 3-250-01, Pavement Design for Roads and Parking Areas, 14 Nov 16
- UFC 3-250-04, Standard Practice for Concrete Pavements, with Change 2, 07 Jul 09
- UFC 3-250-11, Soil Stabilization for Pavements, 16 Jan 04
- UFC 3-270-01, O&M Manual, Asphalt and Concrete Pavement Maintenance and Repair, 21 Feb 18
- UFC 3-270-08, Pavement Maintenance Management, 16 Jan 04
- UFC 3-301-01, Structural Engineering, 01 Oct 19
- UFC 3-320-06A, Concrete Floor Slabs on Grade Subjected to Heavy Loads, 01 Mar 05.
- UFC 3-401-01, Mechanical Engineering, with Change 1, 01 Oct 15
- UFC 3-410-01, Heating, Ventilating and Air Conditioning Systems, with Change 5, 01 Nov 19
- UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, 18 Jul, 18
- UFC 3-420-01, Plumbing Systems, with Change 10, 26 Oct 15
- UFC 3-420-02FA, Compressed Air, with Change, 01 Dec 07
- UFC 3-450-01, Noise and Vibration Control, 15 May 03
- UFC 3-501-01, Electrical Engineering, 06 Oct 15
- UFC 3-520-01, Interior Electrical Systems, with Change 1, 20 Mar 19
- UFC 3-520-05, Stationary Battery Areas, with Change 2, 03 Sep 19
- UFC 3-530-01, Interior and Exterior Lighting Systems and Controls, with Change 3, 01 Jun 16
- UFC 3-540-01, Engine-Generator Systems for Backup Power Applications, with Change 1, 24 Oct 17
- UFC 3-550-01, Exterior Electrical Power Distribution, with Change 2, 13 Mar 19
- UFC 3-560-01, Electrical Safety, O&M, with Change 1, 21 Feb 18
- UFC 3-575-01, Lightning and Static Electricity Protection Systems, 01 Jul 12
- UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design, Change 1, 01 June 2016
- UFC 3-600-01, Fire Protection Engineering for Facilities, with Change 3, 10 May 19
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, 12 Dec 18
- UFC 4-010-06, Cybersecurity of Facility-Related Control Systems, with Change 1, 18 Jan 17
- UFC 1-021-01, Design and O&M: Mass Notification Systems, with Change 1, January 2010
- UFC 4-021-02, Electronic Security Systems, October 2013

- UFC 4-023-03, DoD Design of Buildings to Resist Progressive Collapse, Change 3, 01 Nov 16

Tri-Services Electrical Working Group (TSEWG)

- TSEWG TP-1 Electrical Calculation Examples
- TSEWG TP-2 Capacitors for Power Factor Correction
- TSEWG TP-3 Surge Protector Performance and Evaluation Criteria
- TSEWG TP-4 Stationary Battery and Charger Sizing
- TSEWG TP-5 Interior Transformer Ratings and Installation
- TSEWG TP-6 Low-Voltage Breaker Interrupting Ratings
- TSEWG TP-7 Protection System Design
- TSEWG TP-8 Equipment Enclosures and Hazardous Locations
- TSEWG TP-9 Automatic Transfer Equipment
- TSEWG TP-10 Arc Flash Levels for Fused Voltage Inputs to Electricity Meters
- TSEWG TP-11 UFC 3-500-10N Best Practices
- TSEWG TP-12 UFC 3-500-10N Appendices
- TSEWG TP-13 UFC 3-501-03N Load Demand Analyses
- TSEWG TP-15 Arc Flash Calculations and Detailed Arc Flash Warning Labels
- TSEWG TP-19 Static Uninterruptible Power supply (UPS)

International Code Council (ICC)

- International Building Code (IBC), 2018 as modified by UFC 1-200-01
- International Existing Building Code (IEBC), 2015
- International Mechanical Code (IMC), 2018 as modified by UFC criteria
- International Plumbing Code (IPC), 2018 as modified by UFC criteria

2.0 PROJECT OBJECTIVES

2.1. Mission Statement

Construct a new practical application instruction building to address the space needs of the MCCSSS's LOG OPS Schools and support the mission of this school to provide entry and intermediate level training for MOS Motor Transport. The goal for the design of this facility is to provide the Marine Corps with a building of exceptional cost-effective design that meets key functional, maintenance and security requirements. The programming goal is to provide the building with the optimal mix of instructional space to meet the training mission requirements, as well as, provide spaces that are flexible as teaching methods and technology evolve.

2.2. Facility Function

The LOG OPS School will function as a vehicle repair and operation teaching facility to allow for an increased throughput of marines trained. The function of the new facility is based on providing a simple consistent arrangement of spaces for housing Marine Corp motor transport vehicles used for training along with their associated classrooms and support spaces. The proposed site is in the far northeast quadrant (east of Company Street B and just south of the Physical Fitness Training Trail) of Camp Johnson. The facility location was chosen to improve function by being in close proximity to the Marines it serves; and will be located within a short walking distance to other key Camp Johnson facilities that include dining facilities, the new Joint Reception Center (JRC), and multiple barracks buildings. The building design will be required to meet design guidelines defined in the Camp Lejeune BEAP and this will allow the building to be a part of a continued modern campus aesthetic at Camp Johnson. The building design is required to meet the requirements of current building and codes and UFCs, resulting in a beneficial and improved experience for the Marines that use it. The following chapter will define the priorities and specific technical requirements that the building design for this key MCCSSS instructional facility.

2.3. Project Specific Priorities

2.3.1. Sustainable Design and Construction

All NAVFAC projects are subject to sustainable design criteria and are required to meet the requirements of the Guiding Principles for Sustainable Federal Buildings (HPSB). The Guiding Principles are outlined in a cross disciplinary publication addressing requirements for new building construction and modernization of all federally owned facilities. Sustainable principles will be integrated into the design, development and construction of the project in accordance with Executive Order 13834 and other applicable laws and Executive Orders.

Design and construct the project to comply with sustainability requirements identified in Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*. Additional specific sustainability requirements are found in RFP Part 2, Part 3, and Part 4 sections.

Design and construct the project in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements.* The UFC provides design, construction and modernization criteria for projects of all sizes. It outlines performance thresholds in energy and water, addresses criteria of indoor air quality, identifies resiliency concerns, addresses planning and design, and establishes a baseline across all of DOD for documenting sustainability. A major

component of the policy established in this UFC is the Sustainable Third-Party Certification requirement for projects that reach specific size and cost thresholds.

Additional, agency-specific requirements can be found in NAVFAC Engineering & Construction Bulletins (ECBs) such as Issue No. 2014-02. ECB 2014-02 describes overall NAVFAC policy and guidance on sustainability and energy requirements.

2.3.2. Stormwater Management - Low Impact Development (LID)

Comply with UFC 3-210-10, *Low Impact Development* and FC 1-300-09N *Navy and Marine Corps Design Procedures*. Additional specific LID and stormwater management requirements are found in RFP Parts 3 and 4, Section G30. In addition to LID, comply with state and local stormwater regulations.

2.3.3. Energy Efficiency

The level of energy performance the Government seeks may only be achieved through coordinated design of architectural, electrical, and mechanical elements of the design. All energy systems must be designed in compliance with the following unless more stringent requirements are noted otherwise:

- UFC 1-200-02, High Performance and Sustainable Building Requirements. Incorporate energy efficiency in accordance with UFC 1-200-02, HPSB requirements
- EPAct 2005
- EISA 2007
- ASHRAE Standard 189.1 - 2014
- ASHRAE/IESNA Standard 90.1-2013.

Energy consuming equipment and products must meet or exceed Energy Star or FEMP efficiency levels. This includes built-in equipment (e.g., lights, HVAC, water heating, and industrial equipment) and collateral equipment (e.g., office equipment, IT, and task lighting). For equipment types not rated by Energy Star or FEMP, equipment efficiencies must be in the top 25 percent of similar products. All purchased electronics must be EPEAT registered. In addition, provide an ECA, which will demonstrate compliance with all energy related requirements in UFC 1-200-02. Measure and record existing building utility consumption, provide design calculated estimated energy savings and post construction documentation and reporting of actual realized energy savings.

2.3.4. Building Commissioning

Provide commissioning to meet requirements identified in Section 01 91 00.15 22 Total Building Commissioning, and UFC 1-200-02 High Performance and Sustainable Building Requirements.

2.3.5. Accessibility Requirements

Provide barrier-free design in accordance with UFC 1-200-01, *General Building Requirements*.

2.3.6. Anti-Terrorism Force Protection

The primary objective for the Marine Corps Base (MCB) security engineering is to ensure compliance with the Antiterrorism Force Protection (AT/FP) program requirements and

applicable Marine Corps physical security measures in MCO 5530.14A, as supplemented by the UFC. The AT/FP program requirements and Marine Corps physical security measures are to safeguard personnel, equipment, and property. A risk analysis and vulnerability assessment (RAVA) has not been performed and a specific Design Basis Threat has not been identified.

The facility is considered Inhabited and will be routinely occupied by 11 or more personnel. The facility must be designed in accordance with the chapter 3 standards of UFC 4-010-01, except that parking is not permitted in the 33-foot unobstructed space around the building. This includes low occupancy portions of the building, as applicable, due to physical security and operational requirements. The facility must also be designed in accordance with the following requirements:

a) **Antiterrorism Architectural Special Requirements** – Installation mission-assurance has requested security-conscious layouts and configurations for the interior layout of the building spaces and entrances to the building. The goal is to improve antiterrorism safety without adding cost, without hardening the building, and without adversely affecting the usability of the building.

b) **Building Entrance Orientation** – Orient the main building entrance such that it does not provide vehicles the capability to drive through the main entry of the building. Where this is impractical, ensure that the entry storefront does not directly face a main hallway or a mass-gathering space. Lay out entrances to be welcoming and accessible, but so that the entrances are visibly protected and inaccessible against a vehicle attempting to force entry. Ensure that building main entrance layouts are also compliant with UFC 4-010-01 Chapter 3-12, Standard 11 “Building Entrance Layout”. Where this section conflicts with Standard 11, Standard 11 must take precedence.

c) **Proximity of Densely Populated Areas to Parking** – To mitigate risks to densely populated areas, locate uninhabited, low-occupancy, and mechanical yard areas adjacent to parking lots. Locate densely populated areas away from parking lots to the maximum extent possible given available site space and building square footage. The preference is to keep densely populated areas 82 feet away from parking spaces, if sufficient site space is available. Uninhabited and low-occupancy spaces include utility rooms, hallways and corridors without seating, and storage areas. Densely populated areas include classrooms, large break rooms, locker rooms, conference rooms, auditoriums, and other areas with a high personnel density. During the CDW, include the installation Antiterrorism Officer (mission-assurance) on discussions for the preferred layout of mass gathering and densely populated administrative areas relative to the proposed site plan.

d) **Antiterrorism Landscape Architecture Special Requirements** – Installation mission-assurance has requested security-conscious landscape features that afford improved protection to the building occupants. The goal is to improve antiterrorism safety without adding cost by utilizing UFC-mandated landscape architecture features to protect vulnerable areas and using excess fill from the project site for landscaped berms. A specific design basis threat for an active shooter or attack vehicle does not apply; therefore, the intent is to complement architectural layouts and civil site features to improve occupant protection within the project scope of work.

e) **Vehicle Deterrent Landscaping** – Landscaping features can provide a significant physical and psychological deterrent to the risk of a vehicle ramming attack as a part of

a vehicle-deterrent perimeter. Landscaping features do not need to be rated passive vehicle barriers to afford greater security to the building occupants.

f) **Unobstructed Space** – Trees, plantings, and site furniture may be located within the 33-foot unobstructed space around each building, provided they are compliant with the UFC 4-010-01 and UFC 3-201-02 requirements for landscaping in the unobstructed space. For berms, ensure berms in the unobstructed space do not exceed a height of 4 feet, 6 inches to eliminate concealment opportunities.

g) **Large Diameter Trees** – Tree species that will grow to a large DBH (greater than 6 inches) provide an aesthetically pleasing and natural barrier to vehicle traffic. It is desirable to position large diameter trees in the space between the building and parking lots or roads where permissible by code and feasible based on available site space. Provide tree plantings with at least 4 inches DBH where the trees are integrated into the vehicle-deterrent perimeter. Multiple staggered rows of trees serve as highly effective vehicle barriers once the trees have grown. Where providing multiple rows of trees stagger and space the trees to eliminate any corridors exceeding a 5-foot width perpendicular to the adjacent roads or drive aisles. Final tree layout, tree spacing, and species must be approved by the Government Landscape Architect and installation Antiterrorism Officer (or their designated representative).

h) **Concrete Site Features** – Concrete benches and picnic tables are excellent deterrents to vehicles. Concrete planters are not desirable due to landscaping maintenance issues and concealment concerns in the unobstructed space.

i) **Berms and Ditches** – Berms and ditches provide protection and can be integrated with the landscaping plan (e.g., trees along tops of berms and creeping juniper on the sides).

j) **Elevated Plazas** – For buildings that require elevated entryway access with stairs and accessible ramps, consider arranging the stairs, ramps, and any low retaining walls or sloped soil so that they are positioned near the edge of the vehicle parking lot and adjacent roadways. A steeper, landscaped, stabilized slope near the edge of the parking lot with a sidewalk in front of it serves as a visible deterrent to illegal parking and approaching vehicles.

k) **Bollards at Building Entrances** – Bollards are an option where other features such as stairs, pedestrian ramps, trees, or berms do not deter direct vehicle access to the main building entrance. Bollards are desirable for sidewalks and plazas leading into the main building entrance provided there is no adverse impact to pedestrian accessibility. A bollard spacing of 4 feet on center will meet ABA/ADA requirements. Architectural bollards near the building entry are a desirable way to improve protection while improving site lighting (for lighted bollards) and appeal. Removable bollards are acceptable and beneficial for future building maintenance. Coordinate with vehicle access control requirements as part of civil site design. Provide the option of either permanent or removable bollards, determined based on customer needs at the CDW and subsequent design review meetings.

l) **Visual Screening Landscaping at Queuing & Entry Areas** –Visual screening affords protection for building occupants and visitors against the potential for vehicular or active shooter threats. Landscaping that provides visual obscuration of building entrances and outdoor queuing or congregation areas is highly desirable to improve protection of personnel in exposed areas.

m) **Anti-Terrorism Civil Site Design Special Requirements** – Installation mission-assurance has requested security-conscious site plans that afford improved protection to the building occupants. The goal is to improve anti-terrorism safety without adding cost by laying out necessary vehicle parking and stormwater features to protect vulnerable areas of the building. A specific design basis threat for an attack vehicle does not apply; therefore, the intent is to complement architectural layouts and landscaping features to improve occupant protection within the project SOW. The unobstructed space and vehicle access control requirements defined below are added scope items to manage nuisance parking and maintain the unobstructed space for base operational considerations.

n) **Vehicle Access Control** – All projects must include consideration for vehicle access control in the form of lockable swing gates and/or lockable removable bollards along driveways and access roads that lead to service areas around the building within the 33-foot unobstructed space. Other open plaza areas must be secured with permanent bollards in combination with removable bollards. Portions of buildings that must be secured within a restricted area fence (e.g. motor pools) are excluded from this requirement.

o) **Service Area Access** – Access for service areas around the building includes roads and driveways that lead to utility rooms, loading docks, mechanical yards, other areas in the unobstructed space that are used for building maintenance, and for roads that are only used for fire access.

p) **Pedestrian Areas** – Open plazas, hardscaping, and other outdoor pedestrian-congregation areas that are adjacent to a roadway must also feature vehicle access control integrated with permanent landscaping and civil site features as part of a vehicle-deterrent perimeter. Removable and fixed architectural bollards (lighted, where beneficial) are preferred for vehicle access control to open plazas, hardscaping, and other outdoor pedestrian-congregation areas with at least four removable bollards in a row for service access to these pedestrian areas. Provide the option of either permanent or removable bollards, determined based on customer needs at the CDW and subsequent design review meetings.

q) **Access Control Requirements** – Where bollards are provided, space bollards 4 feet on center starting at each edge of the road or driveway. Where gates are provided, provide single or double leaf swing gates with posts that start at the edge of the roadway (or behind the curb) and which include receiving posts to secure the gate in the open position. Gates must not encroach on the roadway or driveway while in the open position. Gates and bollards must be high visibility and meet all other UFC requirements for signage, high-visibility, reflectivity, striping, etc., to meet traffic safety requirements. Gates and bollards for vehicle access control to service areas and pedestrian congregation areas need not be crash rated. Refer to UFC 4-022-03 *Security Fences and Gates* for additional requirements for gates.

r) **Vehicle-Deterrent Perimeter** – Gates and bollards must be integrated with landscaping and civil site features to deter vehicles from bypassing the access control by driving around the barriers and to maintain a vehicle-deterrent perimeter.

s) **Consolidating Access Control** – Access roads to service areas around the building can be secured where the access road begins at the adjacent roadway or parking lot,

provided this is integrated with the vehicle-deterrent perimeter, in order to reduce the total cost of providing vehicle access control to the unobstructed space.

t) **Control Vehicle Speed** – Arrange parking lot access roads and drive aisles so that any direct approaches to the building walls or building entrance cannot exceed 25 miles per hour. Speed limit signage alone is not sufficient to constrain vehicle speed. Speed limit control in parking lots and access roads is also desirable to improve pedestrian safety and to reduce the risk of vehicle accidents.

u) **Limit Vehicle Approaches to Building** – Arrange access roads and drive aisles so that no vehicles have long straight approaches directly at the exterior walls of the building, particularly at the building entrance. Keep the long axis of drive aisles parallel with the walls of the building to control the approach direction of a vehicle. Arrange access roads so that personnel do not drive directly facing the building walls or any entrance. For short drive aisles that run perpendicular to the long axis of the parking lot, coordinate with landscape architecture to provide civil site and landscaping features that visually or physically deter vehicle access. Alternatively, locate these perpendicular drive aisles beyond the ends of the building so traffic does not directly face the building walls or any entrance. Loading docks/heavy truck areas need not consider these requirements due to the impracticability of implementing this where building access is a requirement. Provide curb stops in parking spots that are adjacent to the building to discourage vehicle parking in the unobstructed space.

v) **Unobstructed Space & Vehicle-Deterrence** – Provide a minimum 33-foot unobstructed space around the building without new parking, existing parking, new roadways, or new drive aisles. Keep existing drive aisles and roadways out of the unobstructed space to the maximum extent practicable. Provide berms, drainage swales/ditches, and other civil site features between the building and any adjacent parking lots or roadways as part of a vehicle-deterrent perimeter. Berms can also reduce off-site fill disposal costs, provided that fill is verified to be non-hazardous, non-contaminated. The CDW must address how to integrate unobstructed space and vehicle-deterrence needs within the available site footprint in consultation with the installation Antiterrorism Officer.

w) **Unobstructed Space Preferences** – The installation mission-assurance personnel prefer larger unobstructed spaces where feasible based on available site space. Unobstructed space need not exceed 82 feet for larger, open sites. This unobstructed space preference is to the mass-gathering portions of each facility that excludes open hangar areas, apparatus bays, and other areas that are specifically designed to be low occupancy spaces as defined in UFC 4-010-01. Refer to Paragraph C, *Proximity of Densely Populated Areas to Parking*, for more information.

2.3.7. Facility-Related Control System Cybersecurity

Design, acquire and execute all facility related control systems in accordance with UFC 4-010-06 Cybersecurity of Facility-Related Control Systems. Design the project using UFGS 25 05 11, *Cybersecurity of Facility-Related Control Systems*. Government Point of Contact to be utilized in SECTION 25 05 11 is James Mahoney, ICS ISSM for Camp LeJeune, email James.D.Mahoney@usmc.mil. Submit CCIs as attachments to SECTION 25 05 11.

The table below identifies the Facility Related Control Systems which must be included for this facility. Final C-I-A impact levels must be coordinated and approved by the Camp LeJeune ICS ISSM noted above, James Mahoney, James.D.Mahoney@usmc.mil

Authorizing Official	System Owner	System Group	System	Existing Authority to Operate?	C-I-A Impact Level
USMC AO Dr. Ken Bible	DPW	UMCS	HVAC	Existing ATO MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Lighting	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Advanced Meter Infrastructure (AMI)	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Backup Power Generator Annunciator Panels and Controls	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Elevator Control Systems	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Fire Dept	FLS	Fire Alarm Reporting System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	FLS	Mass Notification System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Physical Access Control System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Intrusion Detection System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Security Forces	ESS	CCTV	Existing ATO in eMASS (Navy) or MCCAST (USMC)?? ISSM to validate.	LOW-LOW-LOW – ISSM to validate

Incorporate cybersecurity requirements into project facility control systems identified in:

- ESR D20, Plumbing

- ESR D30, HVAC
- ESR D40 Fire Protection including Cooper Notification, Inc. WAVES Emergency Notification System
- ESR D50, ELECTRICAL

2.3.8. Secured Areas

Comply with the Marine Corps physical security measures in MCO 5530.14A as supplemented by the Unified Facilities Criteria.

2.3.9. Air Quality Management

When demolition or renovation occurs, ensure that subject buildings are evaluated for asbestos and asbestos-containing materials by a certified professional prior to the demolition/renovation. Ensure that any fugitive dust emissions generated by construction, renovation, or demolition are appropriately controlled.
If the project includes installation of new activities or equipment which generate air emissions, and the sources have not been evaluated for air permitting by MCB CAMLEJ, contact AQ program at (910)451-9017. Please note that air emission sources are required to be permitted prior to their installation and operation. Examples of such sources include, but are not limited to: boilers, water heaters, generators, fuel storage tanks, painting and coating operations, woodworking, welding, abrasive blasting, engine testing, refrigerant recovery devices, and parts ovens.
If the project involves any refrigerant handling or manipulation, ensure that appropriate ODS servicing procedures are followed.
If the project includes removal of any currently permitted air emission sources (see Item 3 for examples), contact AQ program at (910)451-9017.

2.4. Appropriate Design

Design the new building and systems in accordance with all Codes, Standards, UFCs, and criteria explicitly and implicitly stated herein. Employ integrated design principles.

2.4.1. Building Design – Architecture

The LOG OPS School building exterior envelope design must follow the architectural design features prescribed in the Camp Lejeune BEAP, 2010 for Camp Johnson (Section 4.13). This document establishes key exterior materials, material finishes/colors and building façade and roofing design elements to be incorporated into the building's exterior design.

Options for the exterior wall design are listed in Part 3, Chapter 6, B20 Exterior Closure ESR. Any of the listed options is allowed for the design of the exterior wall, as long as the design elements for the exterior wall defined in the BEAP are provided.

In lieu of a 4:12 to 6:12 roof slope that is defined in the BEAP for Camp Johnson, provide a minimum 2:12 roof slope for this building's roofs. Slopes of roofs that cover longer spans must limit the slope to prevent having an excessive attic area.

The building design floor plan must generally follow the arrangement of spaces indicated in the Architectural Block Diagram in Part 3, Chapter 4 of this RFP. Locations of break rooms and restrooms may vary from what is shown in the diagrams if the functions of the primary teaching and instructor spaces are maintained.

The massing of the building and roofing placement will be influenced by the continuous high bay space of the vehicle training bays and the adjoining classroom, administration, and corridor spaces that will require a lower building height.

The high bay vehicle training spaces are a continuation of the training and classroom space and are considered occupied spaces that require daylighting per UFC requirements.

The building design and design documentation must comply with applicable UFCs listed in Chapter 3, Part 1 and applicable building codes.

2.4.2. Civil/Site

The site for the LOG OPS School will provide for military training vehicle access into and out of the classroom bay areas (60-foot minimum out from the bay doors). Due to the infrequent nature of bringing vehicles in and out of the classroom bays, striping for staff parking may be placed within the military vehicle maneuvering area. Provide access for WB-62 vehicle to the special projects point in the building for loading and offloading. The WB-62 design vehicle is a semitrailer vehicle with an effective vehicle wheelbase of 62' as defined by AASHTO (American Association of State Highway and Transportation Officials). Due to high groundwater and flooding concerns, do not provide a sunken loading dock. Pedestrian circulation must be designed for the high volume of students and personnel that will be traversing to other common destinations adjacent to the facility, such as the mess hall. Most students are not allowed cars on base and as such, large groups of Marines often travel by foot together, often in formation. These formations will require wider than normal sidewalks.

Provide parking for staff and advanced students (200 spaces total) adjacent to the facility and provide sidewalks where appropriate from the parking to the facility. Any existing parking removed for construction of this facility must be replaced on a space-for-space basis in an area adjacent to the facility originally being served. These spaces can be co-located with the parking that serves the LOG OPS school if the location will also serve the existing facility.

All-weather access roads to the facility for emergency vehicles and for base maintenance access to mechanical rooms and exterior equipment must be provided.

Being in an already developed portion of Camp Johnson, site utilities (water/sewer) are adjacent to the building site and are readily available for connection.

Provide sufficient area for the dumpster/trash/recycling containers that is convenient for both the building occupants and the solid waste pick-up vehicle.

Stormwater management must comply with UFC 3-210-10 for *Low Impact Development*, and all State stormwater permit requirements for both treatment quality and discharge quantity and rate.

This project must meet Guiding Principles compliance and must comply with UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

2.4.3. Environmental/Conservation/Cultural Resources

NEPA work for this project has been completed by NAVFAC.

2.4.4. Structural

The structural design objective is to construct an efficient, safe and durable building constructed from any of the materials and load bearing systems permitted in the Part 3 ESR narratives and

meeting the reference codes and standards. As part of this objective, the structural design must be coordinated with all disciplines and must meet functional requirements.

To help meet the objective, NAVFAC has provided a significant amount of historic geotechnical information and ECS has performed a preliminary geotechnical investigation of this site. Refer to Part 6 for the ECS preliminary information that includes previous investigations provided by NAVFAC. The NAVFAC and ECS geotechnical information is reliable for preliminary information but must be verified by the Contractor. The Contractor is solely responsible for interpreting available geotechnical information. The Contractor is responsible for conducting an independent geotechnical investigation for foundation design.

2.4.5. Fire Protection

2.4.5.1. Building Code and Life Safety Analysis

Provide a complete building code and life safety code analyses in accordance with UFC 3-600-01 and FC 1-300-09N.

2.4.5.2. Fire Alarm and Mass Notification

Design and provide an integrated fire alarm, mass notification system capable of notifying building occupants inside the facility of an emergency event. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must".

2.4.5.3. Fire Protection Sprinkler System

Design and provide a wet pipe fire sprinkler system for complete fire protection coverage throughout the entire building. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must". Base hydraulic design on the water supply data provided in ESR Section D40 and Part 6.

This project includes an electric-motor-driven fire pump with an onsite standby generator and automatic transfer switch to serve as the required alternate power source. Power supply at Camp Lejeune does not qualify as a “reliable power source” as defined in UFC 3-600-01. Refer to ESR Sections D40 and D50 for requirements. A diesel-engine-driven fire pump will not be considered as an acceptable alternative to the specified electric-motor-drive fire pump.

2.4.6. Telecommunications

Provide a complete Telecommunications backbone and horizontal distribution system as specified throughout this RFP. Install all equipment, pathways, and cabling per the criteria per the PTS Sections D50 and G40 and the manufacturer’s recommendations. Where the words “should” or “shall” are used in the manufacturer’s recommendations, substitute with the word “must”.

Provide a MDF to house telecommunications equipment and cabling as well as, service provider equipment and cabling. Additionally, provide floor/area serving IDFs to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide exterior underground communications duct bank manhole system from existing duct bank(s) and manhole to the MDF inside each building.

The design and installation must be in accordance with the latest TIA standards, all applicable Unified Facilities Criteria documents and the latest local provider and applicable Using Military Department standards and criteria.

2.5. Workflow Process

This facility's mission is to provide training for vehicle repair/maintenance that is performed on motor transport vehicles located in high bay training space, with additional instruction provided in a separate set of classrooms that are located adjacent to the high bay spaces. Access to the building for students since they are pedestrians is primarily into the high bay vehicle training spaces; and the students will be given directions for what bay to enter from instructional directions provided in their curriculum processing documents and day to day instruction from instructors. From the high bay space students can access the separate classroom associated with that particular training bay from each bay. Students, if required, are able to go between each high bay space since they must all be interconnected. Several labs and classrooms are located outside of the vehicle training bays and will require access from the primary building corridor located along the north side of the building. Students at times will be given access to the primary corridor when needing to access break rooms/lounges, other classrooms/lab or the Special Projects space as allowed by instructional staff. Students can use the primary corridors to exit the building at the end of their workload/classes if they are located in spaces that face the primary corridor. However, the large majority of students will stay in the high bay training space and the associated classrooms most of the time.

Instructors and managing administrative staff will have access to the main entry and use the primary building corridor north of the classrooms to navigate to the building. Or they can use a secondary entry located at the southeast quadrant of the building to access the building.

2.5.1. Hours of Operation

Hours of operation are from 0700 to 2000, Monday through Friday for student instruction. Instructors and other administrative staff access to the facility is allowed 24 hours per day, 7 days per week.

2.5.2. Staffing/Occupancy

The LOG OPS School is operating as a training facility and will be occupied primarily during daytime hours by students occupying the training spaces (classrooms and high bay training space) and instructional and administrative staff circulating between office areas adjacent to the training spaces and to the training spaces.

The number of occupants specified in the RFP and indicated in the Building Program in Part 3, Chapter 4 are identified for programming purposes. Determine occupancy load to be used to design building features, such as structural, egress, and plumbing fixtures must be as required in applicable building or life safety codes based on the spaces provided in the building design.

2.6. Special Design Challenges

Special design challenges include the following:

- The large number of MILCON facilities that are to be built at or around the same time as the LOG OPS School at Camp Lejeune may create challenges with both material and labor availability. The design of the building and systems selected for exterior envelope materials should consider these challenges.
- Refer to Part 6 for preliminary construction phasing plan. Develop a detail construction phasing plan as part of the design package for government approval before construction.
- Preliminary planning of the building shown in the floor plan diagram in Part 3, Chapter 4 has established space arrangements and the overall building square footage with all of the functions of the building accounted for. However, providing the final building floor plan with adequate circulation and corridor space and adequate indoor mechanical space without reducing the square footage of required programmed occupied spaces could be a challenge moving forward.
- Working with the user to further define and establish the correct amount of interconnectivity and occupant flow between the spaces of the building.
- Providing daylight per UFC requirements to all occupied spaces.

2.7. Adaptability and Flexibility

The LOG OPS School must be adaptable and flexible in its approach to meeting the training mission needs.

3.0 SITE ANALYSIS – P1512F LOG OPS SCHOOL

3.1. Existing Site Conditions

3.1.1. Site Conditions – Natural Constraints

3.1.1.1. Topography

The proposed site for the LOG OPS School on the Camp Johnson portion of MCB Camp Lejeune. The site in the northeast end of Camp Johnson, just east of Company B Street, just north of and wrapping around the east end of BEQ Buildings M457 and M458, and south of, but slightly overlapping an existing physical fitness trail. Site elevations range from approximately 20 feet down to 14 feet. There is a ditch that runs along the south side of the fitness trail that flows to the east. Base GIS indicates part of this ditch and the larger drainage draw that it flows to as potential wetlands. Potential wetlands are also located to the north, east and south of the proposed site. Several of these wetland areas encroach within the anticipated site boundaries.

3.1.1.2. Vegetation / Landscaping

The portion of the site immediately north of Building M457 is cleared, but the remainder of the site, apart from the parking lot and fitness trail, is wooded. The wooded areas are mostly pine with various understory shrubs such as Wax Myrtle. A stand of approximately one dozen large deciduous trees (±24-inch diameter) is located north of the MAT temporary building. The cleared portion of the project site is turf; site signage indicates it is the “Ground Supply School PT Field”. The adjacent parking areas are generally lined with small flowering trees such as Crape Myrtle and the areas surrounding the existing buildings are generally turf.

3.1.1.3. Natural Resources

There is an existing ditch running along the south side of the fitness trail. A second ditch flowing north/south crossed under the trail at the east end of the project site and combines with the first ditch. This combined ditch then runs to the southeast to combine in a larger drainage draw that ultimately drains to Scales Creek. If the stream is determined to be ephemeral or wetlands, mitigation will be required for all portions that are disturbed by construction.

3.1.1.4. Subsurface Investigation

See Part 4 ESR G10 for information regarding requirements to locate all utilities on the site.

3.1.1.5. Earthwork and Site Preparation

See section 3.3.8 below for information regarding Geotechnical Earthwork and Site Prep/Sitework requirements for this site.

3.1.1.6. Unexploded Ordnance (UXO)

There is no known unexploded ordinance within the project limits.

3.1.1.7. Wetlands

Wetlands are expected within the limits of the proposed project area, though there is not a current delineation. Areas of anticipated wetlands are noted in the Base GIS system within the north and east sides of the project site, as well as wetlands associated with the ditch running along the fitness trail. The approximate GIS wetlands limits are indicated in the project bubble diagram in Part 6.

3.1.1.8. 100-Year Floodplain

Per the FEMA Flood Insurance Rate Maps (FIRM) the project site is in “Area of Minimal Flood Hazard - Zone X”

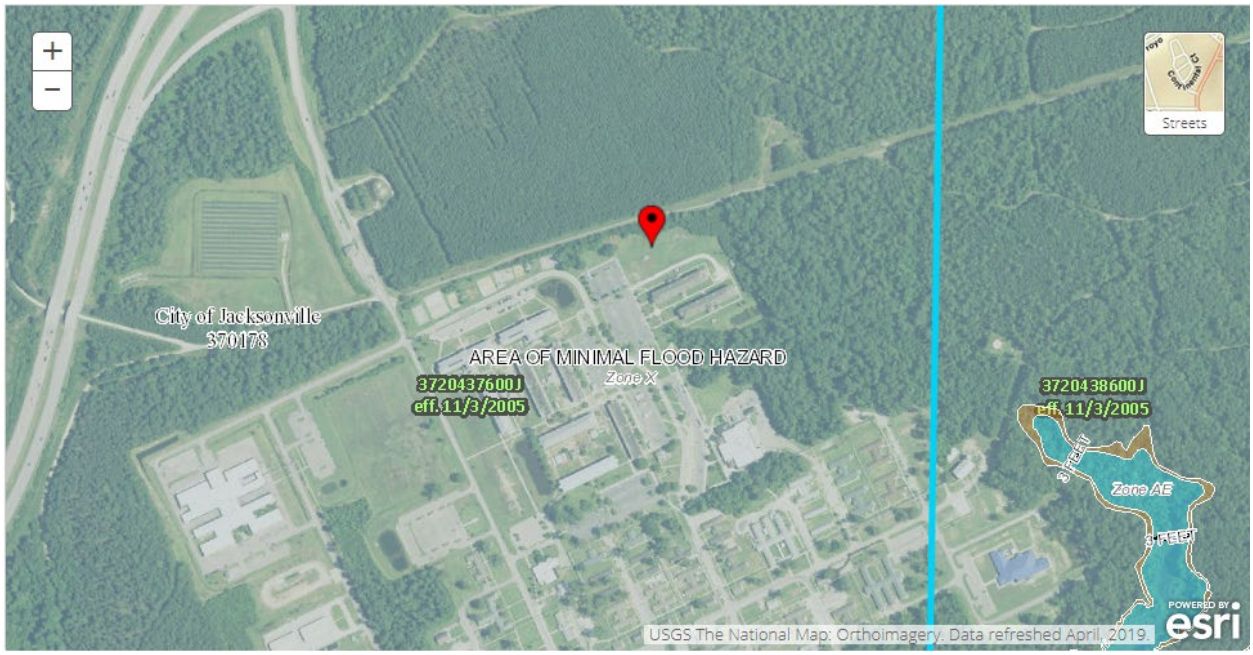


Figure 1: 100-Year Floodplain Map

3.1.2. Site Conditions – Man-made Constraints

3.1.2.1. Existing Vehicular Access and Circulation

There are existing roads and buildings in the vicinity of the location of the new LOG OPS SCHOOL. Company Street B provides direct access to the site from the Entry Control Facility Gate on Montford Landing Road to the west of the site. Several buildings and parking lots exist to the south of the site, including the Student Barracks. The west end of the site adjacent to Company B Street is a parking lot of approximately 75 parking spaces. Additional parking associated with the barracks buildings is south of the temporary MAT Building between Company B Street and Buildings M457 and M458.

3.1.2.2. Site Drainage & Storm Water Runoff (hydrology)

The proposed building site north of the existing fitness trail drains generally to the east to a drainageway that passes under the trail and to a large drainage draw that flows south to Scales Creek. The proposed area for parking generally drains west to east, with some drainage flowing

to the ditch along the fitness path to the north which all drain to the same drainage draw to. The adjacent parking lot and barracks buildings to the west and south collect storm runoff into a closed drainage system that discharges to a stormwater management pond on the southeast corner of Building M458. This pond discharges to a large drainage draw to the south that combines with the draw mentioned above.

3.1.2.3. Site Features

Occupying the parking area west of the proposed parking for this project is a temporary building that houses the MAT group. The Government will have a separate project to remove this temporary building ahead of construction for this project. In addition, there is an asphalt basketball court on the north side of Company B Street just northwest of the parking lot. If the project encroaches over this amenity it must be relocated to the west .

South of the site is Building M457, and its associated parking lot west of the building. There is also a gravel access road along the north face of Building M457 that provides access to the mechanical yard and structure SM457B. This access must be maintained.

In the woods line north of the cleared area north of Building M457 are approximately two dozen concrete “Jersey” barriers and approximately a half-dozen lengths of reinforced concrete pipe (RCP) approximately 24 inches in diameter. Along the east side of the MAT temporary building extending north to the ditch are concrete beams of various lengths and ranging in size from 6 inches by 6 inches to approximately 12 inches by 12 inches, most appear to be between 15 feet and 30 feet in length. Contractor to remove these items from the site.

On the west and south side of the cleared formation area are four light poles. In the southwest corner of the site is a concrete vault structure containing insulated ductile iron pipe and valves that appear to be remnants of the old steam service for the base. Electrical service for the existing barracks enters the site from Company B Street overhead to the east side of the parking lot where it then goes underground to a pad mount transformer to serve the buildings. Water and sanitary sewer service also enter the site from Company B Street generally along the parking lot access lane.

The proposed building site north of the existing fitness trail is primarily wooded with mostly young pine (<+12” Dia). The site will disturb existing wetland areas that will require permitting and mitigation.

3.1.2.4. Existing Site and Building Conditions Photographs

Photographs of the existing site and building can be found in the Part 6.

3.1.2.5. Hazardous Materials and Substances

See section 3.3.8 below for information regarding Geotechnical Earthwork and Site Prep/Sitework requirements for any hazardous materials found on the site.

3.1.2.6. Fencing

There is no fencing on the proposed site.

3.1.2.7. Adjacent Land Use

South of the site are Buildings M457 and M458. These are three-story barracks buildings that house the Marine students. West of Company B Street are several additional barracks buildings. North and east are undeveloped areas.

3.2. Existing Infrastructure Network

3.2.1. Facility Footprint

3.2.1.1. Building Footprint and Building Characteristics

The MAT facility is made up of temporary (mobile) structures arranged to create one larger structure. AE2 to coordinate with NAVFAC regarding their schedule to remove these structures prior to the start of construction for the LOG OPS school.

3.2.2. Vehicular Access and Circulation

3.2.2.1. General

Overall Site Traffic Requirements

The Contractor must develop one Traffic Investigation Report for the entire Camp Johnson site. Traffic Counts (TMC and 24-Hour Tube Counts) must be collected at key entry points and key intersections of the street network of Camp Johnson (see KMZ map of count locations in Figure 2) . Because this is a Controlled Entry Facility, UFC 4-022-01 and Section 2 of the Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15 must be used. In addition, UFC 3-201-01 for Civil Engineering, Sections 2-9 and 2-10 must be used, along with AASHTO GDHS and ITE guides, including ITE LP-674B (Highway Capacity Manual) and *Transportation Impact Analyses for Site Development*. The MUTCD and NCDOT Roadway Design Manual must also be used. The Contractor must apply the most stringent requirements from the various manuals.

The Contractor must also create a Temporary Traffic Control Plan for each phase of construction. The Plan must follow the MUTCD and the NCDOT Work Zone Traffic Control guidelines.

Construction of the three buildings in P1512 are anticipated to redistribute rather than generate new traffic volumes. Therefore, traffic impacts are anticipated to be minimal, with the exception of: driveways to the new buildings; enhanced pedestrian crossing facilities on the existing roads of Company B and Neuse Road; and new Pedestrian Paths between destinations.

Current conditions for traffic flow and circulation need to be confirmed through the Traffic Count Data. Projection of Future Traffic Volumes and Conditions must be determined for the Build Year, plus five years (e.g. 2020 and 2025). Peak Periods (2 hour) for the AM and PM must be established. Synchro must be used to determine Levels of Service (LOS) at intersections and queuing at the Controlled Access Gate. The Contractor must conduct an Origins and Destinations Study to determine traffic circulation to, from, and through the site.

Based on the overall Traffic Investigation Report, the Contractor must take into account the specific operations and access needs around the three buildings in P1512 and are outlined in this RFP.

Based on the findings of the Traffic Investigation Report, the Contractor must recommend improvements to mitigate challenges in Traffic Operations, Circulation, Safety, and Access during daily or intermittent base operations. An estimate of magnitude of cost must be provided for such improvements after the Contractor completes the Traffic Investigation Report with the required data collection including traffic counts and an origins and destinations study. Improvements and cost must be discussed with NAVFAC.

The Contractor must create a Temporary Traffic Control Plan (TTCP) for each phase of construction. The function of the TTCP is to provide for the safe and effective movement of road users (motorists and pedestrians) through and around the construction zone while protecting road users, workers, responders to emergency incidents, and equipment. The TTCP should start in the planning phase and continue through the design, construction, and restoration phases. Components of the TTCP shall include the Advanced Warning Area, the Transition Area, the Activity Area, and the Termination Area. In the Advanced Warning Area, road users are informed about the upcoming work zone. In the Transition Area, road users are redirected out of their normal path, as needed. The Activity Area is comprised of the work space, the traffic space, and the buffer zone. In the Termination Area, road users are returned to their normal driving or walking path.



Figure 2: Traffic Count Locations

Building Specific Traffic Requirements

As shown Figure 3, Access for vehicles to the LOG OPS School anticipated to be primarily from Company Street B directly west of the site (and adjacent to Montford Landing Road where the Entry Control Facility Gate is located). It is not desired for vehicular access to be from Company Street B running south of the site. The portion of Company Street B south of the site is intended to provide significant pedestrian access from the student barracks to the LOG OPS SCHOOL and the Mess Hall. Several formations of students travel back and forth across this portion of Company Street B during the day and can cause significant vehicular delay.

Depending on the final layout of the new building, a short road extension may be needed to the school from the desired exit and entrance to Company Street B.

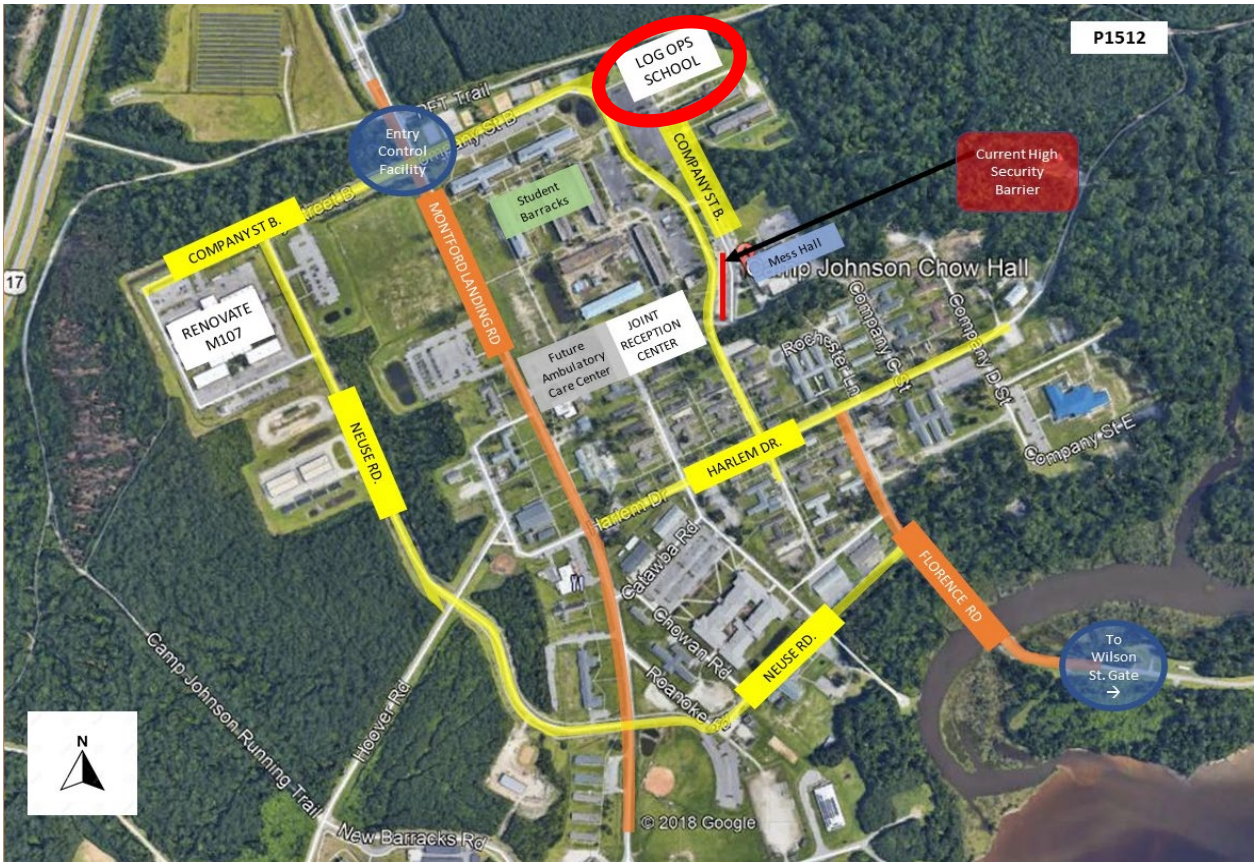


Figure 3: LOG OPS School Location

3.2.2.2. Parking

There are several parking lots south of the site. They are currently underutilized for vehicles, but provide a large space for Student Formations areas several times per day. These parking areas are required for the existing adjacent buildings. An assessment of the parking needs and infrastructure will need to be made in conjunction with ultimate building site layout. If the parking lots are relocated, a gathering space for the Student Formations will need to be found elsewhere and in the vicinity of the Student Barracks.

A majority of students are not allowed to bring personal vehicles to Camp Johnson. Parking lots are for military and civilian staff and advanced students only. Some parking lots are currently used for Solid Waste containers. Specific locations for Solid Waste containers should be determined in locations where there is appropriate access for Solid Waste vehicles.

3.2.2.3. Service Access

The new LOG OPS School will house multiple bays (10-20) for large military vehicles. Appropriate access to these bays will need to be accommodated and circulation to and from the site. In addition, accommodations will need to be made for Solid Waste Trucks and Emergency Vehicles.

3.2.2.4. Pedestrian Access and Circulation (flow, paths, sidewalks, etc.)

One of the most important aspects of the LOG OPS SCHOOL is the pedestrian circulation. Safe access to the LOG OPS SCHOOL and Mess Hall across Company Street B need to be included. Students travel in formations of at least 4 students across and up to 20+ students deep.

Students are not allowed to bring personal vehicles to Camp Johnson and are dependent upon pedestrian travel.

Two types of improvements must be designed for pedestrian access and safety. The first is the presence of Pedestrian Paths between destinations. These must exceed the standards for regular sidewalk and must to be 10-12 feet wide to accommodate the Student Formations.

The second is enhanced pedestrian crossings across Company Street B that allow for efficient and safe movement. The location of the enhanced pedestrian crossing should connect with improved Pedestrian Paths. The location of the pedestrian crossing should be strategically placed to allow convenient movement to the LOG OPS SCHOOL and Mess Hall. Some pedestrian crossings do exist and their locations shall be reevaluated. Rapid Flashing Beacons or other enhancements to enhance visual awareness of pedestrians should be considered.

3.2.3. Landscaping

The wooded areas are mostly pine with various understory shrubs such as Wax Myrtle. A stand of approximately one dozen large deciduous trees (±24-inch diameter) is located north of the MAT temporary building. The cleared portion of the project site is turf. The adjacent parking areas are generally lined with small flowering trees such as Crape Myrtle and the areas surrounding the existing buildings are generally turf.

3.2.4. Site Utilities

Water is available for potable and fire protection needs. The main extends from Company B Street to the barracks Buildings M457 and M458 approximately at the northern parking lot entrance aisle. There is a gravity sanitary sewer manhole at the southwest corner of the cleared PT field.

An overhead primary electrical service line runs along Company Street B and the parking lot west of Buildings M457 and M458.

3.2.5. Signage

Any required signage must comply with Camp Lejeune sign standards and the BEAP.

3.3. Site Development Requirements

3.3.1. General Site

Site development shall be designed in conformance with UFC 3-201-01 “Civil Engineering”. A bubble diagram site plan, with project limits of 15.4 acres, has been created to convey a potential general site layout and is included in Part 6. The bubble diagrams are the user’s preferred general layout; however, the Contractor is responsible for the creation of a complete construction plan set meeting the requirements of this RFP for the construction of the project. The Contractor will be utilizing the documents provided in this RFP to determine their bid as follows:

- Regardless of current use, any existing parking removed with this project must be replaced on a space per space basis in the general area of the buildings currently being served.
- Wetlands, as noted in the existing GIS information, are present within the limits of the project. It is anticipated, based on the conceptual plan, that wetlands will be disturbed as part of this project. It is also anticipated that the project will impact a portion of the classified stream (ditch) system that runs along the existing fitness trail and will require permitting through USACE. Obtain any and all permits for wetlands and stream impacts. Coordinate with the Contracting Officer and MCB Camp Lejeune Base Environmental staff.
- Contractor must maintain adequate drainage for upstream drainage that flows through the site during and after construction.
- The building will require 200 parking spaces for instructor staff and advanced students. Provide a separate VIP parking lot of approximately 20 spaces in the vicinity of the main entrance to the building.
- The vehicle instruction bays require 60 feet of heavy-duty pavement outside of the doors to allow for maneuvering vehicles in and out of the bay. This happens on a very infrequent basis, approximately $\pm$5-10 years when new vehicle types are introduced to the Marine Corps. As such a row of parking can share the pavement outside of the vehicle bays.
- All bay access pavement, drive aisles, dumpster and loading routes, and all pavement anticipated for emergency vehicle access shall be rated for HL-93 loading and the

section must be based upon the Contractor's geotechnical and Designer of Record engineer's calculations and recommendations. The driveway widths are to be a minimum of 30'. See minimum pavement section requirements for bidding in Section 3.3.7.1.

- All parking stalls, not in the bay door access lane, may be light duty pavement based on the Contractor's geotechnical engineer's calculations and recommendations.
- All disturbed area not built upon with impervious surfaces, stormwater management facilities or landscape areas shall be graded to drain and sodded with centipede sod.
- Provide and all-weather access road (pavement or gravel) to the chiller and to any exterior mechanical room access door.
- The existing physical fitness trail is anticipated to be impacted by the construction shall be relocated and reconnected. The trail shall be asphalt and match the existing width and section.
- All weather access must be maintained along the north side of Building M457.
- Provide a 15' wide landscape buffer between the proposed parking area and the access road north of Building M457. Buffer shall be planted with screening shrubs and trees per the BEAP.
- The facility does not require a fenced perimeter.
- Provide each covered break area with 4 picnic tables and AT/FP compliant trash receptacles.
- Provide a concrete dumpster pad for 3 trash dumpsters. The dumpster pad must extend to encompass the front wheels of the pick-up vehicle. The dumpster pad must have a masonry screen wall on three sides and be constructed of building materials similar in color to the proposed facility. Orient dumpster access to facilitate easy collection by solid waste collection vehicles.
- Provide perimeter concrete curb or curb and gutter at parking lot perimeters and locations where anticipated vehicle wheel loads will be within 1 foot of the edge of asphalt pavement. Where curb is provided, an integral concrete gutter is required at any point where water will flow parallel to the bottom of curb.
- Concrete sidewalk shall be provided for pedestrian circulation and shall be a minimum of 10 feet in width unless required to be wider as described above for circulation from the LOG OPS School to other destinations. Demolish all existing sidewalks within the project limits and replace with 10' wide sidewalks.
- Provide a heavy-duty concrete pad and electrical connections and grounding for an existing training apparatus that must be moved from the existing M107 site. Concrete pad size is approximately 15 feet by 25 feet. Final dimensions, thickness, and reinforcement must be designed by the DOR based on contractor obtained geotechnical information.
- Provide a bid option to provide all design, permitting and construction costs associated with adding light-duty asphalt pavement for troop formations between existing BEQ Buildings M445 and M446 and between M445 and M450. For bidding purposes, assume the pavement section is 2-inch NCDOT surface course asphalt, 4-inch NCDOT

aggregate base course and each area is 100 feet by 300 feet. Actual section to be as determined by the Engineer of Record. Bid must include modification of the existing NCDEQ stormwater permit and, if required, new SCM or an expansion/reconfiguration of the existing SCM.

3.3.2. Site Demolition

Demolition of the existing site features will require both above ground and sub-surface demolition. This site will require select demolition, as certain features will be required to remain as is or be relocated as part of this project. Contractor shall ensure access to the adjacent facilities at all times during demolition and construction.

The proposed conceptual site plan anticipates the relocation of the temporary building currently housing the MAT activity in the parking lot at the west side of the site, it is the government's responsibility to relocate this activity and temporary building prior to the start of construction of this project.

Several facilities aboard Camp Johnson must be demolished after final construction of the proposed project, the Joint Reception Facility, and the renovation of Building M107 included in this D/B RFP Package. Demolition must not occur until all units within the facilities have relocated to the facilities constructed with this D/B RFP package. The facilities to be demolished are M90, M90A, M95, M119, M121, M122, M123, M130, M132, M305, M311, M313, M403, M405, M406, M409, M411, M412, M413, M415, M416, M418, M420, and M422. Of these facilities, M305, M413, M418, M420, and M422 are approved for early demolition and may be demolished prior to completion of the new facilities.

The demolition of these buildings includes the complete removal of the building, including shallow foundations, foundation walls, slabs, pits, pile caps, etc. Deep foundations, such as piles, must be removed to a minimum depth of 48 inches below existing grade. Demolish all utilities serving each building as described further in this section and ESR G10. Site demolition will include the demolition and removal of all pavements and sidewalks specific to serving the building. Main circulation sidewalks or pavements serving facilities to remain must not be disturbed. Following demolition, all graded slopes must conform with UFC 3-201-01 and direct runoff towards existing drainage structures or ditches with the flow patterns matching existing to the greatest extent feasible. Any pavement demolition that terminates at existing pavement will be terminated by saw cutting at the limits of demolition in neat straight lines.

Utility service lines to each building must be removed back to the main and capped. Do not demolish existing pavement to remain to facilitate the removal of a utility service line to be demolished. Where underground utilities to be demolished pass under pavement not to be demolished, cut the utility at each edge of pavement and fill the utility remaining under the pavement with flowable fill and abandon in place. Continue removal of the utility to the main on the far side of the pavement if applicable. If the utility main is within the pavement, cut and cap the service line at the edge of pavement and abandon the utility in place in accordance with applicable State or Federal regulations.

Prior to the demolition of any utility, coordinate with the utility owner to ensure the removal of the service line will not disrupt service to facilities to remain. Some telecom services may pass through buildings scheduled for demolition to buildings scheduled to remain.

For natural gas demolition, notify Piedmont Natural Gas (PNG_ when a facility is ready for demolition. Once the facility has been confirmed for demolition, PNG will remove and retire the

meter. PNG will valve off the lateral at the main, and will disconnect both ends of the gas lateral, the meter side and the main side. To depict retirement, PNG will remove the lines 4' to 5' from each end. Remove the remaining line left by PNG. Once a meter is retired the lateral cannot be reused for a new facility.

Any structure or pavement not to be demolished that is damaged during construction or demolition must be repaired or replaced at the expense of the contractor.

Demolition of buildings associated with telecommunications must coordinate with telecommunications services. Demolition of telecommunications pathways must be coordinated with base telephone office.

3.3.3. Utilities

There is an 8-inch water main that runs approximately under the parking lot access aisle from Company B Street to Building M457. This main is the preferred connection point and will serve as the source for both potable and fire protection water service.

There is an existing sanitary sewer manhole east of the existing parking lot northwest of Building M457. This will serve as the connection point for the building's sanitary sewer service.

Connect to the existing overhead primary electrical power system at a pole #4997 near the basketball court and extend the primary service to the pad mounted transformer associated with the Log Ops School.

Existing telecommunications and fiber optics utilities running roughly parallel to the physical fitness trail must be preserved and protected during construction.

PNG will be providing natural gas service to the new facilities. During the design phase, invite PNG representatives to design review meetings, including Michael Lilly – PNG Commercial and Residential Sales Specialist – Michael.lilly@duke-energy.com 252-808-7292 and Bobby Gurganus – PNG Construction – Bobby.gurganus@duke-energy.com 252-670-9613. Coordinate with PNG to depict the gas line routes on the civil utility site plans. The natural gas lines must be included in the project GIS deliverables. Provide projected loads of natural gas equipment to PNG for gas meter sizing. Notify PNG at least 6 months prior to in-service date to install new laterals and meters.

3.3.4. Stormwater Management

Provide a complete stormwater management design that meets or exceeds UFC 3-210-10 Low Impact Development, UFC 3-201-01 Civil Engineering, and North Carolina Stormwater Management requirements. Provide calculations that demonstrate compliance with all three criteria.

A storm drainage system shall be designed and constructed to collect and convey the ten-year peak flow from the building and other new impervious areas into a proposed SCM. Subsurface precast concrete structures such as catch basins and drop inlets will collect stormwater and RCP with watertight joints will convey the stormwater towards the stormwater SCM which will retain and treat the stormwater before it is discharged towards the nearby waterway. Roof downspouts must tie directly to drainage structures underground. The use of grassed swales, pre-treatment areas, and other low impact stormwater strategies throughout the site are encouraged, where appropriate.

A stormwater SCM will be located on site and will be designed to meet the NCDEQ regulations for stormwater detention and water quality.

While specific SCM devices are not required at Camp Lejeune, preferences based upon historic performance of devices are noted. The DOR should be aware of the challenges of providing functioning devices at the sites. The goal is to provide functioning and compliant devices which are not maintenance intensive, nor require specialized or propriety materials. The DOR should be cautioned in the use of sand filters; Camp Lejeune has had experience with the majority of sand filters being compromised by the development of algae crust on the surface of the filters. A third-party inspector is recommended to be specified for the installation of SCMs. A pre- and post-construction infiltration test must be conducted for any SCMs that rely upon infiltration. A 3-day drawdown with a factor of safety of 2 must specified for SCMs to ensure continued stormwater compliance. Do not allow the conversion of sediment traps into infiltration SCMs. The sediment trap must be separate from the SCM to protect against premature failure. The use of heavy equipment in the bottom of infiltration devices will not be allowed due to the risk of compaction.

Overland relief for large storm events shall be analyzed. Calculations must demonstrate that the 100-year storm routed through proposed stormwater management features will not reach higher than 1 foot below the Finish Floor Elevation of adjacent buildings. Demonstrate that the 100-year storm routed through proposed stormwater management features will not flood critical vehicle or pedestrian pathways.

Additional criteria that must be considered by the contractor:

- Project involves the disturbance of over 5,000 square feet. Therefore, Requirements under Section 438 of the EISA will be enforced. The policy directs all DoD construction projects and redevelopment projects with footprints greater than 5,000 square feet to implement Low Impact Development (LID) techniques to maintain predevelopment hydrology to the maximum extent technically feasible. Coordinate with Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0869.
- Project involves the disturbance of 1 or more acres of land and will require a State approved sedimentation/erosion control plan and stormwater permit. For questions regarding stormwater requirements coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application, contact Public Works Division, Design Branch at 451-2213. The purchase of nutrient credits in lieu of on-site stormwater quality treatment measures to meet North Carolina water quality requirements is not permitted.
- Project involves addition/construction of 10,000 square feet of impervious surface area. It requires State permitting through the NCDEMLR and the design and construction of approved SCMs (Coastal County Rules). Coordinate with Water Quality Manager, EQB at 451-9518 and the Storm Water Manager, ECB at 451-9657.
- If the project affects any existing BUA (impervious area) that is currently covered under an existing state issued stormwater permit, that permit will need to be modified. Coordinate with Public Works Design Branch at 451-2213.
- If additional new BUA above and beyond the existing amount is proposed, then at a minimum, a high density SCM is required to treat that runoff from the new BUA. If the existing BUA within that drainage area and its runoff cannot be regraded or rerouted, then the proposed SCM must be designed to accommodate all the runoff within its drainage area. A full stormwater permit application will be required. Coordinate with

Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0896. Coordinate with Public Works Design Branch at 451-2213.

- Per direction from Public Works Division, each project site is considered to be a separate project. Building demolition, regardless of which project the building is demolished under, can be used to offset impervious area increases from new construction, as long as the demolished building and the new building are adjacent to each other. There is no time limit between the demolition completion and new construction starting.

3.3.5. Erosion and Sediment Control

Erosion and sediment control must be designed, permitted, and installed per the NCDEQ. Obtain all required permits for land disturbance prior to the start of construction.

To prevent potential erosion and sedimentation from entering the surrounding wetlands, numerous erosion control methods and practices shall be utilized. A stone construction entrance will be placed at a strategic location, inside the project limits to serve the site. A sediment basin with skimmer outlets and riser, if required, shall be provided in the initial construction phase. This sediment basin must be separate from any proposed stormwater SCMs. The conversion of a sediment trap or basin to a stormwater SCM is not allowed. Basins may be constructed before the site is cleared and temporary swales graded to direct sediment-laden stormwater towards the basin. A temporary construction fence should be installed around the entire limits of disturbance. Silt fence and silt fence outlets will be used around the perimeter of the of the construction sites to prevent sediment from exiting the disturbed areas. A double row of silt fence will be used along any wetland buffers. The site will then be cleared and graded once these erosion control measures are in place and have been approved by the local erosion control inspector representing NCDEQ.

Once stormwater structures are installed and brought to grade, inlet protection will be provided at all inlets to prevent sediment from entering the storm system. The site will be paved and areas will be stabilized with vegetation near the completion of the project.

Additional criteria that must be considered by the contractor:

- Ensure sediment does not leave a construction site of any size as a result of land-disturbing activities. Coordinate with Water Quality Manager, EQB at 451-9518 and the Storm Water Manager, ECB at 451-9522.
- Project involves the disturbance of 1 or more acres of land and will require a State approved sedimentation/erosion control plan and stormwater permit. For questions regarding stormwater requirements coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application contact Public Works Division, Design Branch at 451-2213.

3.3.6. Landscaping

Landscaping must comply with BEAP guidelines with regards to street trees, parking lot landscaping, outdoor amenities and stormwater management. Landscaping proposed near building must comply with all AT/FP requirements. See also Part 3 – Chapter 6 Section G20 for specific landscape requirements and plant establishment and maintenance requirements.

Company Street B will provide a minimum 6-foot planting strip with deciduous trees planted at approximately 40 feet on-center depending upon proposed utility locations. A physical fitness trail on the north side of the site will need to be re-routed around a new turnaround for the loading/mechanical yard area.

Parking areas must be screened using a variety of tree and shrub planting to reduce visual impact from adjacent roadways. A minimum of 15 percent of the surface area of the parking lot must be shaded by deciduous trees within 10 years of installation. A minimum of 5 percent of the parking lot must be pervious planting bed.

Site furnishings must be provided within outdoor seating areas and will be constructed of durable materials with colors in compliance with the BEAP and surrounding examples.

Site grading must be designed to preserve pockets of existing trees to the extent feasible. Preserved trees must be monitored for one year after construction activity has ceased; dead or dying trees must be removed and replaced as directed by the COR.

Turf areas must be limited to the extent feasible in favor of naturalized planting and groundcover. Turf species in formal lawn areas must be centipede grass; all lawn areas must be sodded with Centipede grass (*Eremochloa ophiuroides*).

3.3.7. Permits

- Erosion and sediment control permit – North Carolina Department of Environmental Quality.
- Stormwater management permit - North Carolina Department of Environmental Quality.
- Water extension permit - North Carolina Department of Environmental Quality.
- Sewer extension permit - North Carolina Department of Environmental Quality.
- Wetlands Disturbance - USACE

3.3.8. Geotechnical Earthwork and Site Prep and Sitework Requirements

3.3.8.1. Criteria for Bidding

Base bids on the following criteria:

- Stripping depth of surficial soil material in existing grass surfaced areas; 4 inches.
- Stripping depth of surficial soil materials and root mat in existing wooded areas; 12 inches.
- Stripping depth of asphalt concrete in existing paved areas; 3 inches for asphalt and 6 inches of stone base.
- Grubbing depth in existing wooded areas; 18 inches.
- Depth and extent of buried demolition debris and/or uncontrolled fill materials; 1 foot in the area of the fitness trail.
- Seasonal high-water table depth; 2 feet.
- Excavated onsite soils will not be suitable for reuse as structural fill.

- Requirements for disposal of surplus soil; Dispose of per Specification 01.57.19. No soil is to leave Camp Lejeune.
- Undercut and replacement with imported structural fill to address geotechnical unsuitable soil conditions; 10 percent of the site.
- Provide surcharging to mitigate excessive consolidation settlement associated with site grading impacts in all areas where finished site grade increases are 2 or more feet above existing site grades.
- Need and depth of predrilling/spudding to facilitate pile installation; 10 feet.
- Provide a preconstruction survey and vibration monitoring during pile installation.
- Provide temporary sheeting, shoring, and dewatering of excavations greater than 3 feet.
- Minimum heavy-duty asphalt pavement section; 2-inches NCDOT surface course asphalt, 3-inches NCDOT base course asphalt, 8-inches NCDOT aggregate base course.
- Minimum light-duty asphalt pavement section; 2-inches NCDOT surface course asphalt, 8-inches NCDOT aggregate base course.
- Minimum sidewalk section; 4-inches – 3,000 psi compressive strength Portland Cement Concrete,
- Minimum dumpster pad/equipment pad section; 8-inches – 5,000 psi compressive strength Portland Cement Concrete, #4 bars at 12 inches on-center each way.

3.3.8.2. Earthwork and Site Preparation Criteria

The Contractor's Geotechnical Engineer shall monitor site stripping operations on a full-time basis. Stripped surficial soil materials will be properly disposed of per Specification 01.57.19. No soils are to leave MCB Camp Lejeune. Imported topsoil will be provided for the project where needed.

The underlying soils that will be exposed after completion of site stripping and undercutting will have a tendency to become softened and unstable when saturated and worked or subjected to construction equipment. Provide the necessary measures to address these marginal subgrade support conditions throughout design and construction to obtain required soil support while maintaining progress for completion on schedule. Do not allow construction traffic to travel directly on exposed subgrades. Provide geosynthetic reinforced haul roads and staging pads to facilitate construction traffic access across the site and to protect the underlying subgrade from deterioration. The Contractor is responsible for all costs associated with any necessary measures to repair subgrades deteriorated by construction traffic and exposure to water. Determination of unsuitable subgrade conditions and need to implement remedial measures will be made by a NAVFAC Geotechnical Engineer and subject to the approval of the Contracting Officer.

Provide control of groundwater and surface water encountered during construction. Provide temporary dewatering and positive site drainage to prevent conditions that will cause deterioration of exposed subgrades and open excavations. Do not allow deterioration of exposed subgrades to create interruptions to the progress of construction. Establish storm drainage features at the earliest stages of site development. Install and maintain all necessary

temporary water containment facilities, channels/ditches, and diversions for ground water and surface water control to include all necessary temporary environmental controls. Provide a multiple well point dewatering system for any utility or foundation excavations that extend down to and below the ground water level.

The site currently contains or may have formerly contained developments such as structures, surface pavements, haul roads, above and below ground utilities, etc. that will require demolition and removal prior to earthwork operations under this contract. The required removal depth of the existing site features is expected to be highly varying. It is reasonable to anticipate that excavations made in areas of known prior development will encounter additional materials beyond what is specifically indicated on the test boring records that will need to be removed.

Imported Select Material and Backfill and Fill Material will be required for filling all undercut excavations, grubbing excavations, excavations resulting from the demolition of existing utilities/foundations as well as new utility/ foundation excavations within the planned building and pavement areas, and for grading fill in pavement and building areas. Provide imported Select Material for the top 2 feet of fill required beneath all pavements, foundations and slabs. Provide imported Backfill and Fill Material in all other structure and pavement locations. Select Material must meet ASTM D2487 classification symbols GW, GP, SW, SP, and SP-SM with not more than 12 percent passing the U.S. No. 200 sieve by ASTM D1140 and plasticity index not greater than zero by ASTM D4318. Backfill and Fill Material must meet ASTM D2487 classification symbols GW, GP, SW, SP, SP-SM, and SM and have a maximum of 20 percent passing the U.S. No. 200 sieve by ASTM D1140 and maximum liquid limit of 30 and maximum plasticity index of 9 by ASTM D4318.

Excavated existing on-site soils will only be reused as general fill beyond the limits of surface bearing structures (i.e. pavements, buildings, pipe trenches, etc.) and beyond the limits of any undercut excavations, provided the material meets the project requirements. All soil material must exhibit the characteristics required to compact the soil to the density and performance specified for the intended locations. Excavated on-site soils will be amended (i.e. mixed with lime, cement, or blended with imported structural materials, etc.) as necessary to facilitate reuse as general fill and Backfill and Fill Material. All fill materials will have a maximum particle diameter of 3 inches and will require moisture conditioning prior placement and compaction to within ± 2 percent of the optimum moisture content as defined by ASTM D698 or ASTM D1557. Chose compaction standard as recommended by Geotechnical Engineer of Record.

The Contractor will be responsible for maintaining erosion control measures, preventing segregation, and moisture conditioning for any excavated onsite soil and aggregate materials and any imported soil and aggregate materials stockpiled onsite.

All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer. The Contractor is responsible for all costs associated with the management and disposal of surplus excavation spoils.

4.0 BUILDING REQUIREMENTS – P1512F LOG OPS SCHOOL

4.1. Space Tabulation

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
CO's Office					
Private Office - Large		150	1	4 Person round conference table	
		150	**1**		
Company Office					
Open Office	Clerk (Reception)	128	2	64 NSF workstation each; Collocate with CO's Office	
		128	**2**		
OIC/SNCOIC Office					
Open Office		256	4	64 NSF workstation each; Collocate with POI	
Conference Room (10-person)		200			
		456	**4**		
POI Manager Office					
Open Office		192	3	64 NSF workstation each; Collocate with OIC/SNCOIC	
Conference Room (5-person)		100			
		292	**3**		
Platoon Sgt's Office					
Open Office		192	3	64 NSF workstation each; Part of Instructors' space.	
		192	**3**		
Instructors					
Open Office	Team 1 Instructors	512	8	64 NSF workstation each	
Open Office	Team 2 Instructors	512	8	64 NSF workstation each	
Open Office	Team 3 Instructors	512	8	64 NSF workstation each	
Open Office	Team 4 Instructors	512	8	64 NSF workstation each	
Open Office	Team 5 Instructors	512	8	64 NSF workstation each	
Open Office	Team 6 Instructors	512	8	64 NSF workstation each	
Open Office	Team 7 Instructors	512	8	64 NSF workstation each	
Open Office	Team 8 Instructors	512	8	64 NSF workstation each	
Open Office	Team 9 Instructors	512	8	64 NSF workstation each	
Open Office	Team 10 Instructors	512	8	64 NSF workstation each	
		5,120	**80**		

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
Classrooms / Training					
Classroom (60-person) #1		1,986		Computer training	
Classroom (60-person) #2		1,986		Computer training	
Classroom (60-person) #3		1,986		Computer training	
Classroom (60-person) #4		1,986		Computer training	
Classroom (60-person) #5		1,986		Computer training	
Classroom (60-person) #6		1,986		Computer training	
Classroom (60-person) #7		1,986		Computer training	
Classroom (60-person) #8		1,986		Computer training	
Classroom (72-person)		2,150		Computer training; Dividable	
Fuel Lab/ CR		2,065			
Electric Lab/ CR		2,065			
Vehicle Training Bay #1		10,900		Areas of bays include also the	
Vehicle Training Bay #2		10,900		following functions:	
Vehicle Training Bay #3		10,900		- AFES lab (1,520 NSF)	
Vehicle Training Bay #4		10,900		- HVAC Lab (1,520 NSF)	
Vehicle Training Bay #5		10,900		- Dyno Rooms (two rooms,	
Vehicle Training Bay #6		10,900		800 NSF each)	
Vehicle Training Bay #7		10,900			
Vehicle Training Bay #8		10,900			
		109,368	**0**		
Other					
Break / Vending	For instructors	250			
Break / Vending	For students	250			
Break Room	For Admin	200			
Special Projects Room		3,200		Including HAZMAT and battery storage	
		3,900	**0**		

TOTAL PROGRAMMED SPACE	**119,606 NSF**	**93 PN**
MAXIMUM ALLOWABLE GSF (PER 1391)	148,693 GSF	

Table of Support Spaces

Room Name	Comments	Additional Room Requirements
Support		
Heads (male/female/transgender)	Heads for instructors/admin include showers and lockers as indicated below; heads for students in Training Bays and one other location	
Showers	10 male; 3 female	
Lockers	35 Wall Lockers if not in Instructor head; Lockers for Uniforms/PT gear/Civilian clothes - 56 Male, 14 Female	
Mechanical	Two rooms - 8,755 SF total	
Electrical		
Telecom		
MTS Server	Located above the Heads located in the Vehicle Training Bays	
Fire Pump Room		
Janitor's Closet		
Outdoor Break Area	Two outdoor canopied break areas	

The Contractor shall provide actual area in both square feet and square meters in proposals.

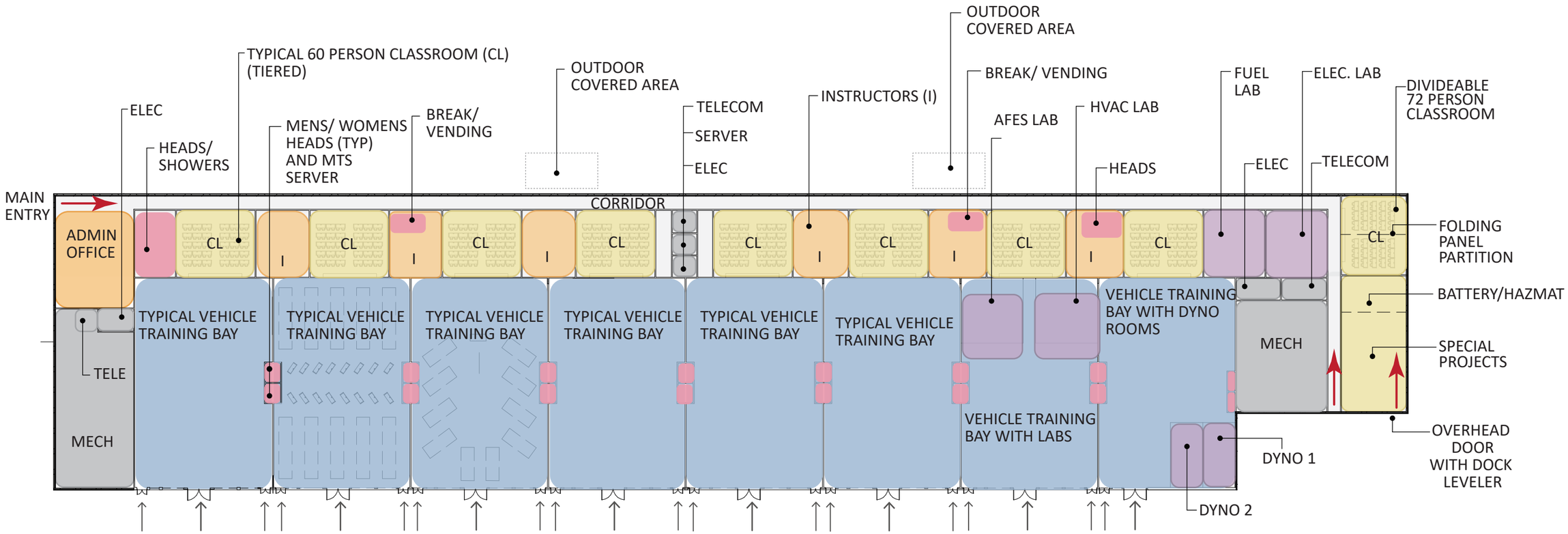
4.2. Space Relationships

Refer to the space arrangement shown in the Architectural Block Diagram at the end of this section. The diagram incorporates the spaces defined in the Space Tabulation. The primary concept incorporated into the building space relationships provides for a continuous linear placement of high bay vehicle training spaces that are directly accessed by a separate classroom and an instructor office space (for each bay). The spaces that remain beyond the continuous cluster of high bay space/ classrooms/instructor space are placed in the east and west portions of the building. All spaces are connected by a primary corridor that runs west to east along the north face of the building from the main building entrance to a secondary building entrance. Each high bay vehicle training space can be accessed directly from the exterior, and access between each high bay must be provided. Per the Architectural Block Diagram the MTS Server is to be located over the heads located in each vehicle training bay with access by stair. This space can be an open area and not enclosed.

The primary formal entrance to the building that is in close proximity to a drop off area with limited parking placed just west of Company Street B is located on the northwest side of the building. It provides access for administrative staff and visitors. The secondary entrance is provided at the southeast area of the building and it provides access for a larger area of parking that accommodates instructors.

4.3. Exterior Character

The exterior character of the Log Ops School as indicated in Part 3, Chapter 2, article 2.4.1 must follow the architectural expression prescribed in the Camp Lejeune BEAP for Camp Johnson (Section 4.13). Building M-79 at Camp Johnson has been pointed out as an exemplary building that follows the BEAP requirements. However, the entire Camp Johnson campus must be considered during design. All building exterior architectural design will be reviewed and approved by the MCBCL Architectural Review Board.



LEGEND

- ADMINISTRATIVE
- CLASSROOMS
- HEADS/ BREAK SHOWERS/LOCKERS
- LABS/DYNO
- MECHANICAL/ELECTRICAL/ TELECOM
- TRAINING BAYS

148,084	GSF BUILDING
400	OUTDOOR COVERED AREA
148,484	TOTAL GSF
148,693	GSF per 1391

NAVFAC Naval Facilities Engineering Command

ARCHITECTURAL BLOCK DIAGRAM
LOG OPS SCHOOL - P1512

JACOBS

5.0 ROOM REQUIREMENTS – P1512F LOG OPS SCHOOL

5.1. FINISH AND FF&E SCHEDULE

The following chart is provided for defining general room finishes and furniture, fixtures, and equipment (FF&E) items for the LOG OPS School. Special interior finishes and FF&E items beyond those outlined below are provided in the Additional Room Requirements. The intent of each room requirement sheet is to highlight special, unique, additional, or exceptional room-specific requirements. These tables are not all-inclusive, and the requirements listed should be considered as an addition to the typical requirements outlined in the UFCs, ESRs, & PTSs.

FF&E and AV Equipment will be funded separately as a modification to the construction contract, with the exception of fixed furnishings (SID). Infrastructure to support all FF&E and AV is included in the construction contract. Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with Activity at concept Design workshop (CDW).

Refer to ESR D50 for specific electrical and audio visual (AV) requirements. Coordinate with the Base to determine preferred locations of fixed artwork.

FFE to include Automated External Defibrillators as required by National Fire Protection Association's (NFPA) 101 Life Safety Code and Marine Corps Order (MCO) 11000.11A. Access to an AED shall be provided for all Assembly occupancies, fitness centers and high-risk training centers and as required by NFPA 101.

Room Typical guidelines:

1. Private office required to be a minimum 9'-0" wide (10'-0" wide is preferred).
2. Workstations in open office areas will be a benching / desking system. Powered Cubicle walls will be used minimally.
3. Ceiling heights will be 10'-0" unless notes otherwise. See additional Room Requirements
4. All base to be 6" high

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
CO's Office						
CO Office	LVT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Conference Table with Seating for 4 (1) Clock	(1) Marker Board (Min)
Company Office						
Open Office	LVT	RB	PT	ACT	(2) Open Office Workstations (2) Task Chairs (2) Storage Solutions (min.) (1) Clock	Co-locate with CO's Office (1) Marker Board (Min)
OIC/SNCOIC Office						
Open Office	LVT	RB	PT	ACT	(4) Open Office Workstations (4) Task Chairs (4) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Conference Room	LVT	RB	PT/AFP	ACT	10 ppls with Conference Room furniture	
POI Manager Office						
Open Office	LVT	RB	PT	ACT	(3) Open Office Workstations (3) Task Chairs (3) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Conference Room	LVT	RB	PT/AFP	ACT	5 ppls with Conference Room furniture	
Platoon SGT's Office						
Open Office	LVT	RB	PT	ACT	(3) Open Office Workstations (3) Task Chairs (3) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Instructors						
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)
Open Office	LVT	RB	PT	ACT	(8) Open Office Workstations (8) Task Chairs (8) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min)

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
Classroom/Training						
Classroom #1 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #2 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #3 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #4 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #5 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #6 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #7 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #8 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (60) Chairs	2 ppls per table
Classroom #9 (Computer training)	RAF/LVT	RB	PT	ACT	Training Tables (6'-0"W min.) (72) Chairs	2 ppls per table - Divideable
Fuel Lab / Classroom	RES-3	IB	PT	ACT	(6) Individual Workbenches (6) Work Stools	
Electric Lab / Classroom	RES-3	IB	PT	ACT	(6) Individual Workbenches (6) Work Stools	
AFES Lab	RES-3	IB	PT	ACT	(8) Individual Workbenches (8) Work Stools	
HVAC Lab	RES-3	IB	PT	ACT	(8) Individual Workbenches (8) Work Stools	
Vehicle Training Bay #1	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Vehicle Training Bay #2	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Vehicle Training Bay #3	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Vehicle Training Bay #4	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Vehicle Training Bay #5	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Vehicle Training Bay #6	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Vehicle Training Bay #7	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Vehicle Training Bay #8	RES-5	IB	WBE	EXP/PT	(1) centrally located supervisor workstation	
Other						
Break / Vending	SC	RB	PT	ACT	Café Tables Stacking Chairs	
Break / Vending	SC	RB	PT	ACT	Café Tables Stacking Chairs	
Break Room	SC	RB	PT	ACT	Café Tables Stacking Chairs	
Corridors	SC	RB	PT	ACT		BID OPTION: Terrazzo Floor
Special Projects Room	RES	IB	WBE	ACT		
Battery Room	RES	IB	WBE	EXP/PT		Located with Special Projects Room
HAZMAT	RES	IB	WBE	EXP/PT		Located with Special Projects Room
Support Spaces						
Heads (male/female/transgender)	PFT	PFB	PWT	WBE		
Showers (non-gender specific)	PFT	PFB	PWT	WBE		
Lockers	PFT	PFB	PWT	WBE	Provide Lockers per C10 ESR	
Mechanical	SC	RB	PT	EXP/PT		
Electrical	SC	RB	PT	EXP/PT		
Telecom	SC	NONE	PT	NONE		
MTS Server Room	RES	-	-	-	Paint guardrail provided around space	Over toilets in Vehicle Training Bays
Fire Pump Room	SC	RB	WBE	WBE		
Janitor's Closet	PFT	PFB	SSP/WBE	WBE		

FINISH LEGEND

ACP - Acoustical Ceiling Panel	PFB - Porcelain Floor Base	PWT - Porcelain Wall Tile	SC - Sealed Concrete
ACT - Acoutical Ceiling Tile	PFT - Porcelain Floor Tile	PCMU - Polished Concrete Masonry Unit	SSP-Stainless Steel Wall Protection
AFP - Acoustical Fabric Panel	PT - Paint	RAF - Raised Access Flooring	WBE - Water-based Epoxy Paint
LVT - Luxury Vinyl Tile	EXP - Exposed to structure	RB - Rubber Base	WM - Walk-Off Mat
RES-5 - Resinous - 5 Part	RES - Standard Resinous	IB - Integral Base	
RES-3 - Resinous - 3 Part			

5.2. ADDITIONAL ROOM REQUIREMENTS

Room data sheets are provided for specific rooms in each facility to provide additional information for these rooms; and better define room requirements beyond those provided in the ESR, the Finish and FF&E Schedule located in section 5.1, and other parts of the RFP. If no room data sheet is provided for a space identified in this facility then the general requirements of the RFP, the Finish and FF&E Schedule in section 5.1, and the referenced UFCs, Codes, and Standards apply.

P1512F-LOG OPS SCOOL

AFES and HVAC Lab

Space Characteristics

Function/Adjacencies: These labs are used as a hands-on training space to teach Marine mechanics the AFES and HVAC systems used on various tactical vehicles. They located as separate spaces within a Vehicle Training Bay space.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0'
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC rating.
Access: From vehicle training bay space
Number of Occupants: 8 and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling) with interior of room. Include sound attenuation in consultation with acoustical engineer.
C1010	Fixed Partitions	SF		Concrete masonry unit partition to underside of roof deck facing the vehicle training bay space.
C1020	Interior Double Doors	EA	(2) 3'x8' double leaf	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide 8" x 38" glazing in one door. Door shall have a minimum STC rating of 40.
C1020	Interior Door Hardware			Provide classroom function hardware. Provide door seals to meet STC rating at double door in this data sheet.
C1030	Marker Boards and Tack Boards		36"h x 48"w	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board. Tool trays and accessory kits shall be provided for each board Top of boards to be mounted at approx. 6'-8" AFF. Provide along full length of two side walls.
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

AFES and HVAC Lab

Space Characteristics

Function/Adjacencies: These labs are used as a hands-on training space to teach Marine mechanics the AFES and HVAC systems used on various tactical vehicles. They located as separate spaces within a Vehicle Training Bay space.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0'
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC rating.
Access: From vehicle training bay space
Number of Occupants: 8 and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard per Room Requirements Finish and FF&E Schedule in Part 3, Chapter 5, Room Requirements and per ESR C30.
C3010	Corner and Wall Guards	AR	Per ESR	Stainless Steel
C3010	Impact Resistant Wall Panels	LF		Impact Resistant PVC wall panels, installed floor to ceiling with matching connectors and trim, as required
C3020	Resinous Floor System	SF	AR	Per Part 3, Chapter 5, Room Requirements Finish Schedule and ESR C30
C3020	Wall Base Finishes	LF	4" high	Integral wall base (resinous system)
C3020	Hardeners and Sealers	AR	AR	Hardened concrete floors per ESR C30.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D201090	Emergency Eyewash and shower			Eyewash IAW UFC 3 420-01
D203003	Floor drain			All Floor drains must have Trap primer
D501004	Panelboards			Provide a minimum of one 208Y/120V panelboard to serve the receptacles and equipment loads in the lab.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.

AFES and HVAC Lab

Space Characteristics

Function/Adjacencies: These labs are used as a hands-on training space to teach Marine mechanics the AFES and HVAC systems used on various tactical vehicles. They located as separate spaces within a Vehicle Training Bay space.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0'
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC rating.
Access: From vehicle training bay space
Number of Occupants: 8 and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide 3 duplex receptacles per student position.
D503001	Telecommunications Systems			Provide NMCI network drops.
E102009 D503004	AV Equipment/ Television Systems			Provide CATV outlets at appropriate height for all wall-mounted monitors.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1512F-LOG OPS SCHOOL

LOG OPS Classroom

Space Characteristics

Function/Adjacencies: These classrooms are for maintenance training classes for Marine mechanics and most are directly associated with and adjacent to a vehicle training bay space.

BID Option: provide tiered raised flooring to improve sight lines to instructor. Provide 7" between tiered floor levels

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC rating.
Access: Off major corridor system and from the Vehicle Training Bay space
Number of Occupants: 60 persons typical with one instructor
Other/Special Requirements:
Sound isolation all adjacent rooms
Instructor Podium in association with teaching wall.
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	base bid: Raised access flooring system with 6" depressed slab
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck. Provide mold/moisture resistant and impact resistant GWB at face of the partition facing the Vehicle Training Bay.
C1010	Retractable Partitions	AR		One classroom not associated with the vehicle training bay space is to be divided into two classrooms.
C1010	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view .
C1020	Interior Wood Doors	EA	3' x 7'	Solid core, flush door with transparent finish, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18"). Vision panels must have provisions to be covered as a part of the door system.
C1020	Interior Door Hardware			Provide classroom function hardware. Provide seals and door bottom to achieve STC 40-45.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room and on either side of Smartboard/touch screen on main wall of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 6'-8" AFF.

LOG OPS Classroom

Space Characteristics

Function/Adjacencies: These classrooms are for maintenance training classes for Marine mechanics and most are directly associated with and adjacent to a vehicle training bay space.

BID Option: provide tiered raised flooring to improve sight lines to instructor. Provide 7" between tiered floor levels

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC rating.
Access: Off major corridor system and from the Vehicle Training Bay space
Number of Occupants: 60 persons typical with one instructor
Other/Special Requirements:
Sound isolation all adjacent rooms
Instructor Podium in association with teaching wall.
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s)
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3010	Acoustic Wall Panels	6	30" h x 48" ea	Wall-mounted acoustical panels
C3020	Floor Finishes	AR	AR	Per Part 3, Chapter 5 Room Requirements Finish and FF&E schedule and ESR C30. Placed on raised access floor.
C3020	Raised Access Floor		24 X 24	Per ESR C30, Interior Finishes
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3030	Acoustical Ceiling Tiles & Panels	AR	24" x 24"	Acoustical Ceiling Tile
C3030	Suspension Systems	AR	AR	9/16" suspended ceiling system

LOG OPS Classroom

Space Characteristics

Function/Adjacencies: These classrooms are for maintenance training classes for Marine mechanics and most are directly associated with and adjacent to a vehicle training bay space.

BID Option: provide tiered raised flooring to improve sight lines to instructor. Provide 7" between tiered floor levels

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC rating.
Access: Off major corridor system and from the Vehicle Training Bay space
Number of Occupants: 60 persons typical with one instructor
Other/Special Requirements:
Sound isolation all adjacent rooms
Instructor Podium in association with teaching wall.
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide (3) duplex receptacles per student position.
D503001	Telecommunications Systems			Provide NMCI network drops.
D503004	Television Systems			Provide CATV outlets.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1512F-LOG OPS SCHOOL

Electric Lab/ Classroom

Space Characteristics

Function/Adjacencies: This lab is used as a hands-on training space to teach Marine mechanics the electrical systems and components used on various tactical vehicles.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC ratings for room types.
Access: from major corridors
Number of Occupants: 6 at workbenches and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Finish and FF&E Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on metal studs to underside of floor/roof deck (or underside of finished ceiling).
C1010	Ceiling finish	AR	24" X 24"	ACT
C1020	Interior Wood Doors	EA	3'x8'	Solid core, flush door with transparent finish, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18"). Vision panels must have provisions to be covered as a part of the door system. Door must have a minimum STC rating of 40.
C1020	Interior Door Hardware			Provide classroom function hardware. Provide door seals to provide STC rating noted at Interior Wood Doors.
C1030	Marker Boards and Tack Boards		36"h x 48"w	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Mount top of board at 6'-8" A.F.F
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

Electric Lab/ Classroom

Space Characteristics

Function/Adjacencies: This lab is used as a hands-on training space to teach Marine mechanics the electrical systems and components used on various tactical vehicles.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC ratings for room types.
Access: from major corridors
Number of Occupants: 6 at workbenches and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Finish and FF&E Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard.
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3010	Impact Resistant Wall Panels	LF		Impact Resistant PVC wall panels, installed floor to ceiling with matching connectors and trim, as required.
C3020	Resinous Floor Finish	SF	AR	Per Part 3, Chapter 5, Room Requirement Finish and FF&E Schedule and ESR C30.
C3020	Wall Base Finish	LF	4" high	Integral resinous base
C3020	Hardeners and Sealers	SF	AR	Hardened and cured concrete floors.
C3040	Interior Coatings	SF	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D501004	Panelboards			Provide a minimum of one 208Y/120V panelboard to serve the receptacles and equipment loads in the lab.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide 3 duplex receptacles per student position.

Electric Lab/ Classroom

Space Characteristics

Function/Adjacencies: This lab is used as a hands-on training space to teach Marine mechanics the electrical systems and components used on various tactical vehicles.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) – Refer to ESR C10 for STC ratings for room types.
Access: from major corridors
Number of Occupants: 6 at workbenches and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Finish and FF&E Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide NMCI network drops.
E102009 D503004	AV Equipment/ Television Systems			Provide CATV outlets at appropriate height for all wall-mounted monitors.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).
E1040	Government-furnished Equipment	1	Existing	Relocate Government-furnished Jib Crane from M107 to support test stands.
E1040	Government-furnished Equipment	2	Existing	Relocate two Government-furnished test systems from M107.

P1512F-LOG OPS SCHOOL

DYNO – Engine and Power Train

Space Characteristics

Function/Adjacencies: These two specialized sound insulated test spaces will contain a GFCI Dyno machine, cranes and associated equipment relocated from M107. This Dyno machine will test student Marine rebuilt engines and power trains from training classes. Provide fuel supply lines to engine test stand and coordinate equipment infrastructure with training officials. Provide epoxy floors for wearability during equipment movement. Provide reinforced foundation for crane in Power Train Room. Provide a built-in counter/desk for the control computer outside of room with view to room interiors. Heat and cool via dedicated outdoor air system (DOAS) to maintain environment. Provide a manual control engine exhaust system in the Dyno room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 25'-0" clear to structure

Acoustics:
Sound Transmission Class (STC) 50
Impact Insulation Class (HC)

Access: via Exterior Overhead door and Interior corridor system

Number of Occupants: 12

Other/Special Requirements: Gypsum Wall Board Soffits,

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
B2030	Exterior Door Hardware			Outside: Weather-stripping, overhead hold-open device, rain deflector, hinges, ABA-compliant pulls, panic bar exit device, keyed lockset. Inside: Overhead hold-open device, hinges, passage hardware, cypher lock, key card access.
C1010	Fixed Partitions	SF		Acoustic CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1010	Interior Windows / Vision Panels		3'x5' min	Ballistic rated glazing to observe engine test
B2030	Exterior roll up door Doors	1	10'x12'	Insulated Roll Up door
C1020	Steel Doors	1	3' x 7'	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide 8" x 38" glazing in one door. Door shall have a minimum STC rating of 50.

DYNO – Engine and Power Train

Space Characteristics

Function/Adjacencies: These two specialized sound insulated test spaces will contain a GFCI Dyno machine, cranes and associated equipment relocated from M107. This Dyno machine will test student Marine rebuilt engines and power trains from training classes. Provide fuel supply lines to engine test stand and coordinate equipment infrastructure with training officials. Provide epoxy floors for wearability during equipment movement. Provide reinforced foundation for crane in Power Train Room. Provide a built-in counter/desk for the control computer outside of room with view to room interiors. Heat and cool via dedicated outdoor air system (DOAS) to maintain environment. Provide a manual control engine exhaust system in the Dyno room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 25'-0" clear to structure

Acoustics:
Sound Transmission Class (STC) 50
Impact Insulation Class (HC)

Access: via Exterior Overhead door and Interior corridor system

Number of Occupants: 12

Other/Special Requirements: Gypsum Wall Board Soffits,

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1020	Interior Double Doors	EA	(2) 3'x8' double leaf	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide 8" x 38" glazing in one door. Door shall have a minimum STC rating of 50. Provide 12" high metal kick plate, both sides.
C1020	Interior Door Hardware			Hinges and stop provide passage hardware.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C1030	Marker Boards and Tack Boards		36"h x 48"w	Tack board. Top of boards to be mounted at approx. 8'-0" AFF.
C1030	Identifying Devices			Signage near convenience phone: Indicate after-hours instructions and a list of twelve emergency and maintenance telephone numbers.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

DYNO – Engine and Power Train

Space Characteristics

Function/Adjacencies: These two specialized sound insulated test spaces will contain a GFCI Dyno machine, cranes and associated equipment relocated from M107. This Dyno machine will test student Marine rebuilt engines and power trains from training classes. Provide fuel supply lines to engine test stand and coordinate equipment infrastructure with training officials. Provide epoxy floors for wearability during equipment movement. Provide reinforced foundation for crane in Power Train Room. Provide a built-in counter/desk for the control computer outside of room with view to room interiors. Heat and cool via dedicated outdoor air system (DOAS) to maintain environment. Provide a manual control engine exhaust system in the Dyno room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 25'-0" clear to structure

Acoustics:
Sound Transmission Class (STC) 50
Impact Insulation Class (HC)

Access: via Exterior Overhead door and Interior corridor system

Number of Occupants: 12

Other/Special Requirements: Gypsum Wall Board Soffits,

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Counters	1	24 SF MIN	24" deep, ½ thick solid surface countertop/built-in desk surface; a minimum of 8'-0" wide. Provide a 12" deep, 1/2" thick standing -height counter surface as well as an ABA compliant area at Check-In Desk location. Provide a fabric covered tack-able surface between standing height counter and desk counter surface. Provide grommets as required for number of computers and equipment.
C2030	Exterior Doors	1	3' x 7'	Provide maximum-duty insulated and painted steel door and frame for life safety. Coordinate door size(s) with room equipment sizes.
C3010	Acoustic Wall Panels	6	30" h x 48" ea	Wall-mounted acoustical panels
C3020	Floor Finishes	AR	AR	Provide 5-part epoxy slip resistant floor system, fuel resistive, with integral base and metal termination bar
C3020	Wall Base Finishes	LF	4" high	Integral epoxy base
C3020	Hardeners and Sealers	AR	AR	Hardened and sealed cured concrete floors.

DYNO – Engine and Power Train

Space Characteristics

Function/Adjacencies: These two specialized sound insulated test spaces will contain a GFCI Dyno machine, cranes and associated equipment relocated from M107. This Dyno machine will test student Marine rebuilt engines and power trains from training classes. Provide fuel supply lines to engine test stand and coordinate equipment infrastructure with training officials. Provide epoxy floors for wearability during equipment movement. Provide reinforced foundation for crane in Power Train Room. Provide a built-in counter/desk for the control computer outside of room with view to room interiors. Heat and cool via dedicated outdoor air system (DOAS) to maintain environment. Provide a manual control engine exhaust system in the Dyno room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 25'-0" clear to structure

Acoustics:
Sound Transmission Class (STC) 50
Impact Insulation Class (HC)

Access: via Exterior Overhead door and Interior corridor system

Number of Occupants: 12

Other/Special Requirements: Gypsum Wall Board Soffits,

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D2010	Emergency shower and Eyewash			Eyewash IAW UFC 3 420-01 Figure D-1 3 GPM
D2020	Hose bibs			Threaded Hose Bibb
D2030	Floor drain			Trench drain at bay door with sand oil/water separator.
D203003	Floor drain			All Floor drains must have Trap primer (See Part 4 C302004 1.1.4 for drain requirements for the flooring.)
D30	Mechanical			Heat and cool space via DOAS. Interlock heating and cooling with on-demand vehicle exhaust system.

DYNO – Engine and Power Train

Space Characteristics

Function/Adjacencies: These two specialized sound insulated test spaces will contain a GFCI Dyno machine, cranes and associated equipment relocated from M107. This Dyno machine will test student Marine rebuilt engines and power trains from training classes. Provide fuel supply lines to engine test stand and coordinate equipment infrastructure with training officials. Provide epoxy floors for wearability during equipment movement. Provide reinforced foundation for crane in Power Train Room. Provide a built-in counter/desk for the control computer outside of room with view to room interiors. Heat and cool via dedicated outdoor air system (DOAS) to maintain environment. Provide a manual control engine exhaust system in the Dyno room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 25'-0" clear to structure

Acoustics:
Sound Transmission Class (STC) 50
Impact Insulation Class (HC)

Access: via Exterior Overhead door and Interior corridor system

Number of Occupants: 12

Other/Special Requirements: Gypsum Wall Board Soffits,

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D30	Mechanical			On-demand vehicle exhaust system.
D501004	Panelboards			Provide a minimum of one 208Y/120V panelboard to serve the receptacles and equipment loads in the lab.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide 3 duplex receptacles per student position.
D503001	Telecommunications Systems			Provide NMCI network drops.

P1512F-LOG OPS SCHOOL

Fuel Lab/ Classroom

Space Characteristics

Function/Adjacencies: This lab is used as a hands-on training space to teach Marine mechanics the fuel systems used on various tactical vehicles.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) - Refer to ESR C10 for STC ratings per room type.
Access: from major corridors
Number of Occupants: 6 at workbenches and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Finish and FF&E Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) over metal studs to underside of floor/roof deck.
C1010	Ceiling finish	AR	24" X 24"	ACT
C1020	Interior Wood Doors	EA	3'x8'	Solid core, flush door with transparent finish, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18"). Vision panels must have provisions to be covered as a part of the door system. Door must have a minimum STC rating of 40.
C1020	Interior Door Hardware			Provide classroom function hardware. Provide door seals to provide STC rating noted at Interior Wood Doors.
C1030	Marker Boards and Tack Boards		36"h x 48"w	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Mount top of board at 6'-8" A.F.F
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

Fuel Lab/ Classroom

Space Characteristics

Function/Adjacencies: This lab is used as a hands-on training space to teach Marine mechanics the fuel systems used on various tactical vehicles.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) - Refer to ESR C10 for STC ratings per room type.
Access: from major corridors
Number of Occupants: 6 at workbenches and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Finish and FF&E Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard.
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3010	Impact Resistant Wall Panels	LF		Impact Resistant wall panels, installed floor to ceiling with matching connectors and trim, as required.
C3020	Resinous Floor Finish	SF	AR	Per Part 3, Chapter 5, Room Requirement, Finish and FF&E Schedule and ESR C30.
C3020	Wall Base Finishes	LF	4" high	Integral resinous base
C3020	Hardeners and Sealers	AR	AR	Hardened and cured concrete floors.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D2010	Emergency shower and Eyewash			Eyewash IAW UFC 3 420-01 Figure D-1 3 GPM
D2020	Hose bibs			Threaded Hose Bibb
D203003	Floor drain			All Floor drains must have Trap primer. Connect drain to an oil water separator.
D501004	Panelboards			Provide a minimum of one 208Y/120V panelboard to serve the receptacles and equipment loads in the lab.

Fuel Lab/ Classroom

Space Characteristics

Function/Adjacencies: This lab is used as a hands-on training space to teach Marine mechanics the fuel systems used on various tactical vehicles.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) - Refer to ESR C10 for STC ratings per room type.
Access: from major corridors
Number of Occupants: 6 at workbenches and instructor
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Finish and FF&E Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide 3 duplex receptacles per student position.
D503001	Telecommunications Systems			Provide NMCI network drops.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).
E1040	Fuel Test Systems	2		Relocate Government-furnished test systems from M107.

P1512F-LOG OPS SCHOOL

Special Projects

Space Characteristics

Function/Adjacencies: This space is a used for storage of supplies and supplies that are issued to Marine trainees. It is a one stop shop for all student supplies such as seals, hoses, clamps and administrative supplies. It is required to be located adjacent to a site located unloading area with a loading platform and accessed from the exterior by an overhead door. This area also is to have a separate room for HAZMAT storage that includes cleaning supplies and nitrogen cylinders. It also included a separate Battery Room to store lead acid and gel cell type batteries.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) 45
Access: From major corridors and from exterior
Number of Occupants: 2 -5
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Storage shelving for supplies, task chairs at counter for issuing supplies

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
B2030	Overhead Door	1		Provide 10' wide by 9' high overhead doors
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Provide impact resistant GWB in all rooms of suite up to
C1010	Ceiling finish	AR	24 X 24	Acoustical Ceiling Tile
C1020	Interior Doors	EA	3'x7'	Solid core, flush door with transparent finish, along with hollow metal steel frame, factory primed, field painted from main corridor to Special Project space. Provide vision panels if required; integral to door frame (approx. 6" x 18"). Vision panels must have provisions to be covered as a part of the door system.
C1020	Interior Doors	EA	3'x7'	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. For Hazmat and Battery Room Storage.
C1020	Interior Door Hardware			Provide storage room function hardware.

Special Projects

Space Characteristics

Function/Adjacencies: This space is a used for storage of supplies and supplies that are issued to Marine trainees. It is a one stop shop for all student supplies such as seals, hoses, clamps and administrative supplies. It is required to be located adjacent to a site located unloading area with a loading platform and accessed from the exterior by an overhead door. This area also is to have a separate room for HAZMAT storage that includes cleaning supplies and nitrogen cylinders. It also included a separate Battery Room to store lead acid and gel cell type batteries.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) 45
Access: From major corridors and from exterior
Number of Occupants: 2 -5
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Storage shelving for supplies, task chairs at counter for issuing supplies

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Marker Boards and Tack Boards		36"h x 48"w	Tack board. Top of boards to be mounted at approx. 6'-8" AFF.
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C1030	Counters			Provide a 10' wide x 30" deep x 36" high solid surface counter with a transaction counter of 42" and 1'-6" wide in the special projects space for the issuing of supplies. The counter and cabinetry to be situated as required for issuing of supplies.
C10	Cabinets			Provide a plastic laminate clad millwork partition to support both counters. Provide toe kicks on the transaction side. Provide a tack surface between the transaction counter and the normal height counter. Provide open shelved base cabinets beyond open space for desk, pencil drawers, and grommets to coordinate with computer equipment.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard. Provide acoustic panels for sound attenuation.
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.

Special Projects

Space Characteristics

Function/Adjacencies: This space is a used for storage of supplies and supplies that are issued to Marine trainees. It is a one stop shop for all student supplies such as seals, hoses, clamps and administrative supplies. It is required to be located adjacent to a site located unloading area with a loading platform and accessed from the exterior by an overhead door. This area also is to have a separate room for HAZMAT storage that includes cleaning supplies and nitrogen cylinders. It also included a separate Battery Room to store lead acid and gel cell type batteries.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) 45
Access: From major corridors and from exterior
Number of Occupants: 2 -5
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Storage shelving for supplies, task chairs at counter for issuing supplies

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Impact Resistant Wall Panels	LF		Impact Resistant wall panels, installed floor to 42" height with matching connectors and trim, as required.
C3020	Resinous Floor Finish	SF	AR	Per Part 3, Chapter 5, Room Requirement, Finish and FF&E Schedule and ESR C30.
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3020	Hardeners and Sealers	AR	AR	Hardened and cured concrete floors.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D2010	Emergency shower and Eyewash			Eyewash IAW UFC 3 420-01 Figure D-1 3 GPM
D20F0	Hose bibs			Threaded Hose Bibb
D2030	Floor drain			Trench drain at bay door with sand oil water separator
D2030	Floor drain			All Floor drains must have Trap primer.
D501004	Panelboards			Provide a minimum of one 208Y/120V panelboard to serve the receptacles and equipment loads in the lab.

Special Projects

Space Characteristics

Function/Adjacencies: This space is a used for storage of supplies and supplies that are issued to Marine trainees. It is a one stop shop for all student supplies such as seals, hoses, clamps and administrative supplies. It is required to be located adjacent to a site located unloading area with a loading platform and accessed from the exterior by an overhead door. This area also is to have a separate room for HAZMAT storage that includes cleaning supplies and nitrogen cylinders. It also included a separate Battery Room to store lead acid and gel cell type batteries.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height:10'-0'
Acoustics:
Sound Transmission Class (STC) 45
Access: From major corridors and from exterior
Number of Occupants: 2 -5
Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Storage shelving for supplies, task chairs at counter for issuing supplies

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide 3 duplex receptacles per student position.
D503001	Telecommunications Systems			Provide NMCI network drops.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1512F-LOG OPS SCHOOL

Vehicle Training Bays

Space Characteristics

Function/Adjacencies: These are large vehicle-training classroom spaces that contain 10 large Logistic Vehicle System Replacement (LVSR) vehicles parked 2 deep and 5 wide, or 10 vehicles of various smaller sizes that can be arranged in a similar fashion. The training involves the disassembly and reassembly of tactical vehicles and components by Marine trainees. The vehicles contained in these classrooms will remain in place for years without exiting the building and the exterior envelope at the vehicle access point must be well sealed and protected against air infiltration. The vehicular access from the exterior for the training bays are provided by a double leaf oversize well-insulated swinging steel doors.

Special Dimensions:
Ideal Plan Dimensions: 84'0" wide x 129'-0" long
Minimum Ceiling Height: 25'-0" clear to bottom of Structure

Acoustics:
Refer to ESR C10, Interior Construction for STC rating.

Access: Vehicle access from exterior via swinging doors
Student access from an exterior swinging man door with CAC enabled card readers or access from individual classrooms adjacent to this space.
Access also between each large training bay.

Number of Occupants:

Other/Special Requirements:
Suspended wide screen monitors to display training information.
Overhead hose reels for water, electric power and air to complement the training features of the open bay.
Vehicle exhaust system to allow for the brief running of the LVSR engines for each vehicle.
Overhead lighting must allow for true color rendition for vehicle wiring identification.
Toilets for students within each training bay – provide masonry partition for toilet walls facing the training bay, and GWB furred partition inside of toilets.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
B2020	Exterior windows, storefront or curtain wall			To provide controlled daylighting per UFC requirements.
B2030	Exterior Doors	1	Oversize	Refer to ESR B303090, Other Exterior Specialty Doors.
B2030	Exterior Doors	2 double leaf doors	3' X 7'	Steel Doors and Frames- Steel doors and frames shall be factory primed, field painted.
B2030	Exterior Door Hardware			Provide CAC enabled electronic door entry at one set of swinging man doors from exterior.

Vehicle Training Bays

Space Characteristics

Function/Adjacencies: These are large vehicle-training classroom spaces that contain 10 large Logistic Vehicle System Replacement (LVSR) vehicles parked 2 deep and 5 wide, or 10 vehicles of various smaller sizes that can be arranged in a similar fashion. The training involves the disassembly and reassembly of tactical vehicles and components by Marine trainees. The vehicles contained in these classrooms will remain in place for years without exiting the building and the exterior envelope at the vehicle access point must be well sealed and protected against air infiltration. The vehicular access from the exterior for the training bays are provided by a double leaf oversize well-insulated swinging steel doors.

Special Dimensions:
Ideal Plan Dimensions: 84'0" wide x 129'-0" long
Minimum Ceiling Height: 25'-0" clear to bottom of Structure

Acoustics:
Refer to ESR C10, Interior Construction for STC rating.

Access: Vehicle access from exterior via swinging doors
Student access from an exterior swinging man door with CAC enabled card readers or access from individual classrooms adjacent to this space.
Access also between each large training bay.

Number of Occupants:

Other/Special Requirements:
Suspended wide screen monitors to display training information.
Overhead hose reels for water, electric power and air to complement the training features of the open bay.
Vehicle exhaust system to allow for the brief running of the LVSR engines for each vehicle.
Overhead lighting must allow for true color rendition for vehicle wiring identification.
Toilets for students within each training bay – provide masonry partition for toilet walls facing the training bay, and GWB furred partition inside of toilets.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1010	Fixed Partitions	SF		Acoustical Concrete Masonry Unit (CMU) for main walls. Include sound insulation as coordinated with acoustical engineer. All STC rated partitions must terminate at underside of floor/roof deck.
C1010	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view from the corridor system.
C1020	Interior Doors	EA	3' x 7'	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide vision glazing in door. Door shall have a minimum STC rating of 40.
C1020	Interior Door Hardware			Provide classroom function locket and door seals to meet identified Interior Door STC rating.
C1030	Identifying Devices			Signage near convenience. phone: Indicate after-hours instructions and a list of twelve emergency and maintenance telephone numbers.

Vehicle Training Bays

Space Characteristics

Function/Adjacencies: These are large vehicle-training classroom spaces that contain 10 large Logistic Vehicle System Replacement (LVSR) vehicles parked 2 deep and 5 wide, or 10 vehicles of various smaller sizes that can be arranged in a similar fashion. The training involves the disassembly and reassembly of tactical vehicles and components by Marine trainees. The vehicles contained in these classrooms will remain in place for years without exiting the building and the exterior envelope at the vehicle access point must be well sealed and protected against air infiltration. The vehicular access from the exterior for the training bays are provided by a double leaf oversize well-insulated swinging steel doors.

Special Dimensions:
Ideal Plan Dimensions: 84'0" wide x 129'-0" long
Minimum Ceiling Height: 25'-0" clear to bottom of Structure

Acoustics:
Refer to ESR C10, Interior Construction for STC rating.

Access: Vehicle access from exterior via swinging doors
Student access from an exterior swinging man door with CAC enabled card readers or access from individual classrooms adjacent to this space.
Access also between each large training bay.

Number of Occupants:

Other/Special Requirements:
Suspended wide screen monitors to display training information.
Overhead hose reels for water, electric power and air to complement the training features of the open bay.
Vehicle exhaust system to allow for the brief running of the LVSR engines for each vehicle.
Overhead lighting must allow for true color rendition for vehicle wiring identification.
Toilets for students within each training bay – provide masonry partition for toilet walls facing the training bay, and GWB furred partition inside of toilets.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard in Training Bay toilets and facing adjacent classrooms and instructor spaces per ESR C30, Interior Finishes.
C3010	Masonry Wall Finishes	AR	AR	Sealed, primed and painted acoustical masonry block per C30, Interior Finishes.
C3020	Floor finishes	AR		Epoxy finish 5-part fuel resistive resinous system for vehicle bays.
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Stainless steel corner guards at all GWB partitions
C3020	Wall Base Finishes	AR	AR	Integral base with metal termination bar.

Vehicle Training Bays

Space Characteristics

Function/Adjacencies: These are large vehicle-training classroom spaces that contain 10 large Logistic Vehicle System Replacement (LVSR) vehicles parked 2 deep and 5 wide, or 10 vehicles of various smaller sizes that can be arranged in a similar fashion. The training involves the disassembly and reassembly of tactical vehicles and components by Marine trainees. The vehicles contained in these classrooms will remain in place for years without exiting the building and the exterior envelope at the vehicle access point must be well sealed and protected against air infiltration. The vehicular access from the exterior for the training bays are provided by a double leaf oversize well-insulated swinging steel doors.

Special Dimensions:
Ideal Plan Dimensions: 84'0" wide x 129'-0" long
Minimum Ceiling Height: 25'-0" clear to bottom of Structure

Acoustics:
Refer to ESR C10, Interior Construction for STC rating.

Access: Vehicle access from exterior via swinging doors
Student access from an exterior swinging man door with CAC enabled card readers or access from individual classrooms adjacent to this space.
Access also between each large training bay.

Number of Occupants:

Other/Special Requirements:
Suspended wide screen monitors to display training information.
Overhead hose reels for water, electric power and air to complement the training features of the open bay.
Vehicle exhaust system to allow for the brief running of the LVSR engines for each vehicle.
Overhead lighting must allow for true color rendition for vehicle wiring identification.
Toilets for students within each training bay – provide masonry partition for toilet walls facing the training bay, and GWB furred partition inside of toilets.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3020	Hardeners and Sealers	AR	AR	Hardened and cured concrete floors.
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed to structure surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished and per ESR C30, Interior Finishes
D2010	Sinks			Provide semi-circular multi occupant wash fountain(s) with foot pedal supply in each instructional area.
D2010	Emergency Shower and Eyewash			Eyewash IAW UFC 3 420-01 Figure D-1 3 GPM

Vehicle Training Bays

Space Characteristics

Function/Adjacencies: These are large vehicle-training classroom spaces that contain 10 large Logistic Vehicle System Replacement (LVSR) vehicles parked 2 deep and 5 wide, or 10 vehicles of various smaller sizes that can be arranged in a similar fashion. The training involves the disassembly and reassembly of tactical vehicles and components by Marine trainees. The vehicles contained in these classrooms will remain in place for years without exiting the building and the exterior envelope at the vehicle access point must be well sealed and protected against air infiltration. The vehicular access from the exterior for the training bays are provided by a double leaf oversize well-insulated swinging steel doors.

Special Dimensions:
Ideal Plan Dimensions: 84'0" wide x 129'-0" long
Minimum Ceiling Height: 25'-0" clear to bottom of Structure

Acoustics:
Refer to ESR C10, Interior Construction for STC rating.

Access: Vehicle access from exterior via swinging doors
Student access from an exterior swinging man door with CAC enabled card readers or access from individual classrooms adjacent to this space.
Access also between each large training bay.

Number of Occupants:

Other/Special Requirements:
Suspended wide screen monitors to display training information.
Overhead hose reels for water, electric power and air to complement the training features of the open bay.
Vehicle exhaust system to allow for the brief running of the LVSR engines for each vehicle.
Overhead lighting must allow for true color rendition for vehicle wiring identification.
Toilets for students within each training bay – provide masonry partition for toilet walls facing the training bay, and GWB furred partition inside of toilets.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D2020	Hose bibs			Threaded Hose Bibb every 20 feet.
D2020	Hose Reel			Provide hose reel with water supply for each vehicle.
D2020	Ice Machine Connector Box			Connector Box (2.5 GPM) for FLAKE Ice Machine. Filter. Ice Machine to be funded separately in FF&E.
D2030	Floor drain			One long trench drain down the center of the instruction area with an oil/water separator.
D2090	Compressed Air			Provide hose reel with compressed air for each vehicle.

Vehicle Training Bays

Space Characteristics

Function/Adjacencies: These are large vehicle-training classroom spaces that contain 10 large Logistic Vehicle System Replacement (LVSR) vehicles parked 2 deep and 5 wide, or 10 vehicles of various smaller sizes that can be arranged in a similar fashion. The training involves the disassembly and reassembly of tactical vehicles and components by Marine trainees. The vehicles contained in these classrooms will remain in place for years without exiting the building and the exterior envelope at the vehicle access point must be well sealed and protected against air infiltration. The vehicular access from the exterior for the training bays are provided by a double leaf oversize well-insulated swinging steel doors.

Special Dimensions:
Ideal Plan Dimensions: 84'0" wide x 129'-0" long
Minimum Ceiling Height: 25'-0" clear to bottom of Structure

Acoustics:
Refer to ESR C10, Interior Construction for STC rating.

Access: Vehicle access from exterior via swinging doors
Student access from an exterior swinging man door with CAC enabled card readers or access from individual classrooms adjacent to this space.
Access also between each large training bay.

Number of Occupants:

Other/Special Requirements:
Suspended wide screen monitors to display training information.
Overhead hose reels for water, electric power and air to complement the training features of the open bay.
Vehicle exhaust system to allow for the brief running of the LVSR engines for each vehicle.
Overhead lighting must allow for true color rendition for vehicle wiring identification.
Toilets for students within each training bay – provide masonry partition for toilet walls facing the training bay, and GWB furred partition inside of toilets.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D30	Mechanical			Heat and Cool space via DOAS. Interlock heating and cooling with on demand vehicle exhaust system.
D30	Mechanical			On demand vehicle exhaust system for each vehicle.
D501004	Panelboards			Provide a minimum of one 208Y/120V panelboard to serve the receptacles and equipment loads in the lab.
D5020	Lighting and Branch Wiring			Provide 3 duplex receptacles per student position.
D5020	Lighting and Branch Wiring			Install one Government-furnished 28VDC power converter per vehicle position.

Vehicle Training Bays

Space Characteristics

Function/Adjacencies: These are large vehicle-training classroom spaces that contain 10 large Logistic Vehicle System Replacement (LVSR) vehicles parked 2 deep and 5 wide, or 10 vehicles of various smaller sizes that can be arranged in a similar fashion. The training involves the disassembly and reassembly of tactical vehicles and components by Marine trainees. The vehicles contained in these classrooms will remain in place for years without exiting the building and the exterior envelope at the vehicle access point must be well sealed and protected against air infiltration. The vehicular access from the exterior for the training bays are provided by a double leaf oversize well-insulated swinging steel doors.

Special Dimensions:
Ideal Plan Dimensions: 84'0" wide x 129'-0" long
Minimum Ceiling Height: 25'-0" clear to bottom of Structure

Acoustics:
Refer to ESR C10, Interior Construction for STC rating.

Access: Vehicle access from exterior via swinging doors
Student access from an exterior swinging man door with CAC enabled card readers or access from individual classrooms adjacent to this space.
Access also between each large training bay.

Number of Occupants:

Other/Special Requirements:
Suspended wide screen monitors to display training information.
Overhead hose reels for water, electric power and air to complement the training features of the open bay.
Vehicle exhaust system to allow for the brief running of the LVSR engines for each vehicle.
Overhead lighting must allow for true color rendition for vehicle wiring identification.
Toilets for students within each training bay – provide masonry partition for toilet walls facing the training bay, and GWB furred partition inside of toilets.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Mount wall-mounted wiring devices at 60" AFF.
D5020	Lighting and Branch Wiring			Provide one 120V overhead power cord reel, one 28VDC overhead power cord reel, and one overhead light cord reel for each vehicle position.
D5020	Lighting and Branch Wiring			Provide lights suspended to provide a minimum of 25'-0" clear to the bottom of the luminaire. Coordinate placement with each vehicle.
D5030	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system to each bay.

Vehicle Training Bays

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Uniformat Section	Description	Qty	Size	Specific Requirements
D503090	Other Communications and Alarm Systems			Provide AV systems as described in ESR D503090.
E1040	Government-furnished Equipment		Existing	Relocate 28VDC power converters.

A10 FOUNDATIONS – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Provide foundation systems in accordance with UFC 3-301-01. Foundations must be designed to suit subsurface conditions and must be capable of transmitting all building loads to the ground.

This section addresses both non-structural slabs-on-grade and structured slabs at ground level. For both systems, provide recessed areas as required to accommodate utilities at raised access floors such that the walking surface is one continuous plane throughout each space.

See Section B10, *Superstructure*, for additional loading criteria.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information, including a geotechnical data report prepared specifically for this project and historical subsurface data from other projects in close proximity to the project site, are included in Part 6 – Attachments of this RFP.

The soils information provided in this RFP is for reference only and reflects the soil conditions encountered only at the locations indicated. The Government shall not be responsible for any interpretation or conclusion by the Contractor drawn from the soils information beyond the industry standard of care. Geotechnical engineering reports accompanying the subsurface information are provided only to better convey the encountered data and observed site conditions. Assumptions, analyses and recommendations included in any accompanying report may or may not be applicable to the Offeror's design concept. The Contractor must retain a Geotechnical Engineer to interpret the Government provided information as it relates to the Contractor's design concept prior to submission of the proposal and develop geotechnical requirements to support the design and construction of the project meeting the requirements of this RFP for bidding purposes.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

The Geotechnical Engineer must have a minimum of 5 years of recent relevant experience in the geographic region of the project and must be currently licensed as a professional engineer in the State of North Carolina. In accordance with FAR Subpart 9.5, Organizational and Consultant Conflicts of Interest, the Contractor is prohibited from hiring the Geotechnical Engineer who provided data, reports and any other services on behalf of the Government for this project.

After award, the Contractor's Geotechnical Engineer (Geotechnical Engineer of Record) must provide a site-specific geotechnical study to include in-situ testing, soil borings and supporting laboratory analysis of representative soil samples. The Geotechnical Engineer must prepare a Geotechnical Report providing recommendations for design and construction of foundations, earthwork and site development in accordance with UFC 1-200-01 *DoD Building Code (General Building Requirements)*, UFC 3-220-01 *Geotechnical Engineering*, and FC 1-300-09N *Navy and*

Marine Corps Design Procedures and associated references. Calculations must be provided in the report to support all conclusions and recommendations.

SEISMIC DESIGN

Refer to ESR B10 for seismic design information.

A1010 STANDARD FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Standard Foundation to support the structure(s) associated with this project. "Standard Foundations" are shallow foundations or deep foundations as addressed in IBC Chapter 18. Do not use masonry unit footings, steel grillage footings, timber footings or wood foundations. Treated timber piles are permitted if deemed appropriate by the Designer of Record.

The structure(s) must be entirely supported by either a shallow foundation system or a deep foundation system as determined by the Designer of Record. Provide foundation materials that are compatible with the environmental exposure. When foundation elements are exposed to corrosive or otherwise aggressive soils, provide protection in accordance with ACI 318 requirements.

Calculate foundation ultimate resistance using multiple established methods. Determine allowable foundation capacity using the factors of safety provided in UFC 3-220-01 Tables 2-2 and 2-3. Develop geotechnical engineering design parameters using in-situ tests, laboratory tests and established empirical correlations. Evaluate upper and lower bound soil capacities based on variations in subsurface conditions at the site. Determine the minimum foundation bearing depth for frost protection in accordance with UFC 3-301-01. Provide minimum foundation widths to avoid failure and with consideration given to placement tolerances, ease of construction, etc.

Determine estimated foundation settlement based on comparison of predicted values from multiple established methods based on reaction loads provided by the Structural Designer of Record. Settlement calculations must include dead and live load components, live load reductions used in the analyses, actual or estimated foundation sizes, planned site grading changes, and expected fluctuations in groundwater levels. Estimated differential settlement must include upper and lower bound foundation settlements based on soil properties, different foundation loading, and variations in subsurface conditions across the building footprint.

The presence of weak and compressible soils may result in excessive settlement that could impact the performance of surface bearing structures and supporting facilities such as foundations, slabs, pavements, sidewalks, and utilities. The magnitude and duration of settlement depends on the composition, depth, and thickness of the weak/compressible soils as well as the Contractor’s selected design concept. The Contractor's Geotechnical Engineer is responsible for evaluating potential global settlement due to designed grade increases and final structural loads, and must develop any settlement mitigation procedures (such as preloading, surcharging, fill monitoring programs, and ground improvement systems) needed to maintain global settlements within tolerable limits. Surcharge material, if required, must remain in place for 90 days minimum.

Design must incorporate measures that limit total and differential settlement to levels that prevent structural or aesthetic damage or impairment of the serviceability and function of the facility or structures, including drainage and utilities. The safety factor for liquefaction potential must meet or exceed Table 2-1 in UFC 3-220-01.

Use the following geotechnical tolerances to design shallow foundation systems:

- Limit slab-on-grade post construction total settlement due to permanent loads to ½ inch maximum;
- Limit total settlement of column and wall footing foundations to one inch maximum; and
- Limit differential settlement of adjacent footings to ½ inch maximum and an angular distortion of 1/500 maximum. Angular distortion is defined as the difference in settlement between two points divided by the distance between the points.

Use the following tolerances for designing deep foundation systems:

- Limit total settlement of individual piles and pile caps to ½ inch maximum under service load conditions as determined by static or dynamic pile load testing.
- Limit differential settlement of adjacent foundations to ½ inch maximum and to an angular distortion of 1/500 maximum. The angular distortion is defined as the difference in settlement between two points divided by the distance between the points.
- Limit lateral deflection of deep foundations to ½ inch, with an applied axial load equal to the expected dead load.

Ensure allowable pile stresses not to exceed limitations specified in IBC Section 1810, Deep Foundations. Evaluate and address time dependent pile capacity conditions (i.e. pile setup), group effects, negative skin friction, lateral squeeze, preboring/jetting, installation sequencing, refusal driving conditions, etc. as applicable. Include requirements for completing pre-construction condition surveys, ground vibration monitoring, structural instrumentation, etc. to mitigate risks of ground vibration damage to nearby structures as applicable for the specific project. The Structural Engineer of Record must design and detail the pile foundations in accordance with IBC Section 1810.3. Submit structural calculations and details for the piles to the Government for review and approval during project design development.

Conduct a test pile program overseen by the Geotechnical Engineer of Record and submit a final signed and stamped report to the Government for review and approval. Monitor and record driving during installation and subject to hammer restrikes in accordance with ASTM D4945, “Standard Test Method for High-Strain Dynamic Testing of Piles.” Evaluate the ultimate load capacity of selected test pile restrike(s) using CAPWAP analyses. Additional load test requirements are stated in Part 4 of this RFP. The Contractor is responsible for all foundation testing and monitoring costs.

A1020 SPECIAL FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Special Foundation system to support the structure(s) associated with this project. "Special Foundations" are any foundations that are not specifically "Standard Foundations", or which are a combination of Standard Foundations and a site improvement/ground modification system. Incorporate design of these systems in the project plans and specifications following FC 1-300-09N Chapters 7 and 8 and not as a construction submittal. Examples of site improvement/ground modification systems include surcharge preloading, prefabricated vertical drains, over-excavation and replacement, stone columns, rammed aggregate piers, rigid column inclusions, deep dynamic compaction, low and high mobility grouting, vibroflotation, etc. As most "Special Foundation" techniques or systems typically require the use of specialty contractors, a registered Professional Engineer must establish installation and acceptance criteria and supervise the installation. The Designer of Record must submit justification for use, including acceptable evidence of previous successful installation in similar conditions, methods and equipment used in their installation, proposed testing and inspection to be used, supporting test data,

calculations, and any other information related to the structural properties and load capacity of such system. The allowable stresses and testing requirements for pile-like elements used for ground improvement must comply with IBC Section 1810.

A1030 SLAB ON GRADE

As determined by the Designer of Record to be applicable, provide soil supported concrete slab(s) on ground. Provide a vapor retarder and porous fill layer beneath all slabs. Where slab on ground is below the existing adjacent exterior grade, provide waterproofing on foundation walls or grade beams and a perimeter drainage system to remove ground water from the area immediately adjacent to the building. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

A1040 STRUCTURALLY SUPPORTED SLAB

As determined by the Designer of Record to be applicable, provide a structurally supported slab. Provide for structural support of all utilities that may be adversely affected by soil consolidation or expansive soils. Provide stainless steel hangers sized adequately to support the in-service utility. Provide a vapor retarder and porous fill layer beneath all slabs. Where the structurally supported slab is below the existing adjacent exterior grade, provide waterproofing on foundation walls or grade beams and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

--End of Section--

A20 BASEMENT CONSTRUCTION – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

NOT USED

A2010 BASEMENT EXCAVATION

NOT USED

A2020 BASEMENT WALLS

NOT USED

--End of Section—

B10 SUPERSTRUCTURE – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

The superstructure consists of structural elements above the foundation that provide support for vertical loads and resistance to lateral loads.

This section includes the requirements for the superstructure of the building, including floor and roof framing, columns, interior load-bearing walls and the main lateral-force resisting system. Exterior load bearing walls are addressed in Section B20.

Provide the building framing system in accordance with UFC 3-301-01, *Structural Engineering*.

The building must be constructed with concrete, steel, or masonry. Wood construction is prohibited.

All steel deck used for roofs and structural wall panels must be 20 gauge minimum thickness.

A Special Inspector of Record (SIOR) is required for this project.

Pre-engineered building systems are prohibited.

Load bearing light gage framing systems are prohibited.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Risk Category: II

Design for Live Loads in accordance with IBC 2018 as modified by UFC 3-301-01.

Wind Load Parameters:

Wind speed	Comply with UFC 3-301-01
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Snow Load Parameters:

Ground snow load	Comply with UFC 3-301-01
Snow load importance factor	1.00
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Seismic Load Parameters:

A site-specific seismic ground motion study is not required. Use Risk Category II and soil classification D. Determine seismic loading adjusted for site class effects using the ground motion parameters specified by UFC 3-301-01, *Structural Engineering*. Seismic Design Category (SDC) is B.

B1010 ELEVATED FLOOR CONSTRUCTION

Provide elevated floors and mezzanines consisting of any of the following construction types.

1) Non-composite concrete slabs on form deck on steel joists.
2) Non-composite or composite concrete slabs on metal decking on steel beams.
3) Cast-in-place concrete slabs on removable forms.
4) Precast concrete planks or shallow double-tee beams.

Support elevated floors and mezzanines on cast-in place concrete walls, plant or site pre-cast concrete walls (including tilt-up walls), reinforced concrete masonry walls/pilasters, structural steel columns and girders or joist girders. Do not support elevated floors on light gage stud wall construction. Wood framed systems are prohibited.

Provide access platforms constructed of steel grating and supported by structural steel framing.

B1020 ROOF CONSTRUCTION

Provide roof construction consisting of metal decking supported by structural steel framing or open web steel joists and joist girders bearing on load bearing columns or walls. Cast-in-place and precast concrete roof systems are also permitted. Support roof construction on cast-in-place concrete walls, precast concrete walls, reinforced concrete masonry unit walls/pilasters, or structural steel columns. Training rooms and conference rooms must be free of columns and other obstructions. Refer to Architectural sections for roof slopes.

--End of Section--

B20 EXTERIOR ENCLOSURE – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

This system consists of the exterior shell of the facility, which includes all vertical and horizontal exterior closure such as exterior walls, exterior windows, and exterior doors. This system excludes roofing (See Section B30, Roofing). Load bearing exterior walls will be included here, and not in Section B10, Superstructure. Structural frame elements at the exterior enclosure such as columns, beams, and spandrels are included in Superstructure, with all exterior wall elements supported by columns, beams, and spandrels included in this section. Finishes to the inside face of walls which are not an integral part of the exterior wall construction will be included in Section C30, Interior finishes.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

It is permissible for exterior walls to be load bearing or non-load bearing. Exterior load bearing walls must consist of any of the following construction types and comply with the architectural and functional requirements that follow this list (also refer to B201001 Exterior Closure section for inclusion of load bearing walls in the overall exterior closure design).

1) Reinforced concrete masonry (CMU)
2) Cast-in-place reinforced concrete
3) Site precast concrete (tilt-up)
4) Plant precast concrete

Exterior walls must incorporate the materials directed in the Camp Lejeune, Base Exterior Architectural Plan (BEAP), 2010 – Section 4.13 Camp Johnson.

The primary exterior cladding material of the building must be modular brick per color and finish conforming to the BEAP, along with a water table as prescribed in the BEAP. If thin brick cladding is used, the color and finish of the brick must match as closely as possible to that indicated in the BEAP.

Brick detailing and design of the exterior wall must provide accent banding and design features at windows as prescribed in the BEAP

Provide a cast-in-place, split face masonry (used with veneer exterior wall closure) or precast concrete water table per the proportions shown in diagrams in the BEAP. If the cast-in-place option is chosen, the finish of the concrete is required to be a high quality, rubbed finish with a pattern mimicking CMU masonry joints.

Multiple options for providing the exterior wall system are as indicated in the Exterior Closure and the Exterior Wall Backup Construction sections shown below.

B201001 EXTERIOR CLOSURE

The following are options for providing the exterior closure. The Contractor has the option to use these systems as long as energy code requirements and design aesthetics as prescribed in the BEAP are provided:

1) A brick/masonry veneer cavity wall exterior wall closure.
2) A precast concrete panel veneer exterior wall closure with applied thin brick. This system must be a barrier system with sealed joints.
3) A site precast tilt-up concrete exterior wall closure or cast in place concrete exterior wall closure (load bearing) with applied thin brick cladding. This exterior closure is a barrier system with sealed joints.
4) A plant cast and site assembled precast concrete exterior wall closure (load bearing) with applied thin brick cladding. This exterior closure is a barrier system with sealed joints.

All exterior closure wall options where the exterior wall concrete (precast or cast in place) is exposed to moisture (at the exterior face of the wall or the base of the wall) must be designed with a plant added admixture to prevent moisture migration within the concrete to prevent the failure of applied thin brick systems, and prevent water migration into the interior of the building.

Thin brick placed on the exterior load bearing walls must be attached with systems that will ensure that the brick will not separate from the wall or form efflorescence. In addition, adequate control/construction joints must be incorporated into the concrete wall system to prevent thin brick cracking and adhesion issues.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

The backup systems for masonry and precast concrete veneer systems must be of single wythe reinforced concrete masonry. The backup wall system must be integrated with other exterior wall system requirements as indicated in B201003, Insulation and Air Barriers.

Exterior bearing walls consisting of metal studs as the primary floor or roof supporting structural element are not permitted.

For concrete exterior bearing walls (precast or cast in place) the backup wall system is defined in ESR C10, Interior Construction.

B201003 INSULATION and AIR BARRIERS

Provide continuous insulation, vapor retarder and air barrier to meet or exceed requirements of project's energy savings requirements.

Provide a continuous air barrier to control air leakage into, or out of, conditioned spaces. The building envelope must include all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, and compartmentalized unconditioned portions of the facility such as garages, and negatively pressurized spaces. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

Confirm air barrier compliance with Air Barrier Performance Test in RFP Part 4.

Provide thermal envelope performance testing through infrared thermography in accordance with RFP Part 4. Coordinate thermal imaging testing with air barrier testing construction schedule.

B201004 PARAPETS

Parapets will not be required for this building since sloped roof areas (with gutter/downspouts) are to be provide over the entire building.

B201005 EXTERIOR LOUVERS & SCREENS

Provide exterior louvers and screens, where required, that match the finish of the existing windows and detailed to integrate with the architecture of the building, as appropriate to the design of the building. Provide insect screens at all louvers.

B201006 BALCONY WALLS & HANDRAILS

NOT USED

B201007 EXTERIOR SOFFITS

Provide a pre-finished metal exterior soffit system and associated rake and eave trim as indicated in the BEAP – Section 4.13 Camp Johnson. Colors as defined in the BEAP

B201009 EXTERIOR PAINTING AND COATINGS

Provide a field applied exterior coating on all items that are not prefinished, and to prefinished items when required to provide a color other than a standard prefinished color.

B201010 EXTERIOR JOINT SEALANTS

Provide exterior application of joint sealants to seal joints and prepare for finish material installation.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Provide horizontal or vertical fixed type as required to provide sun control and prevent any direct sunlight hitting work surfaces of classrooms/vehicle training bays. Sun control devices must be detailed to integrate with the architectural wall/window systems.

B201012 SCREEN WALL

Provide screen walls where required to screen mechanical units, electrical substations, loading docks, and trash receptacles/dumpsters. Screen walls must be per the Camp Lejeune, BEAP, 2010, Section 4.13 Camp Johnson.

B2020 EXTERIOR WINDOWS

Windows and other fenestration systems that provide daylighting must be provided in regularly occupied spaces that include offices and classrooms as indicated in UFC 1-200-02 and reference to ASHRAE 189.1 sections. In the LOG OPS School, the vehicle training bays are to be considered classrooms in relation to providing windows and daylighting.

Due to the location of classrooms away from exterior walls in the LOG OPS block diagrams, the design must provide fenestration systems that will comply with the daylighting requirements prescribed in the aforementioned UFC.

Windows must meet the defined prescriptive AT/FP requirements per UFC 4-010-01, and if necessary curtain wall can be used in lieu of window or storefront systems to meet AT/FP or other design requirements.

The daylighting provided by windows and other fenestration systems must not compromise the visual acuity and comfort within the room.

Provide a sample window installation in a complete exterior wall, as determined by the DOR and approved by the Contracting Officer. If approved, this sample window installation will become a permanent part of the building.

B202001 WINDOWS

Windows must be pre-finished aluminum and fixed.

Provide a mockup of one combination window unit for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B.

At all interior window sills provide a ½" solid surface window sill trim to cap the wall at the base of windows.

B202002 STOREFRONTS

Storefronts must be pre-finished aluminum, and if provided must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

Provide a mockup of one designated storefront system unit for the project to be used for a field mockup test in compliance with AAMA 502 Method A and Method B.

If applicable when providing storefront that does not extend to the floor and has a wall area at the base/sill of the storefront refer to window sill requirement in B202001 Windows above.

B202003 CURTAIN WALLS

Curtain walls remains an option for fenestration if found necessary to meet applicable codes and UFC requirements. Curtain wall, if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

The curtain wall system must be a standard architectural type Stick or Unit and Mullion system, with mullions, horizontal rails, and/or non-integral spandrel panels. Fully coordinate curtain wall system components/accessories that are directly incorporated and adjacent to contiguous related work (i.e. wall systems). Ensure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances in the design of the curtain wall system and in coordination of the curtain wall design with adjacent exterior enclosure systems.

The system must incorporate a pressure equalized method to control air and water infiltration. Face sealed systems and water managed systems are not allowed.

System must be a combination of glazed panels and opaque panels as required by the design.

Provide a mockup of one designated Curtain Wall System unit for the project to be used for a field test of compliance with AAMA 503 Method A and Method B.

B202004 EXTERIOR GLAZING

Glazing color and reflectance must be provided and approved by Camp Lejeune's Architectural Review Board.

Glazing must be a heat absorbing insulated laminated glazing unit with the inner most pane being laminated glazing to meet the prescriptive AT/FP requirements of UFC 4-010-01 and building code/UFC prescribed wind load requirements.

B202090 OTHER EXTERIOR WINDOWS

NOT USED

B2030 EXTERIOR DOORS

All exterior doors must be weather protected and provided with weatherstripping/sealant and thresholds that stop water penetration that comply with ABA. Provide heavy duty overhead closers at all exterior doors

B203001 SOLID DOORS

Provide insulated solid steel door assemblies other than at storefront/curtain wall entrances.

Doors must be Extra Heavy Duty Doors -– ANSI /SDI A250.8, Level 3, physical performance Level A, Model 1.

Provide steel doors fabricated from hot dipped galvanized steel and provide a rust inhibitive factory finished primer coating. Finish coats are to be field painted.

B203002 GLAZED DOORS

Provide exterior prefinished aluminum framed glazed doors and entrances systems integrated into storefront/curtain wall system at main entry of the building or at secondary access points that incorporate storefront/curtain wall systems.

Doors must be factory-finished aluminum framed door assemblies with heat absorbing insulated laminated glazing, frames, and hardware.

Glazing must match the storefront/curtain wall system glazing.

Glazing in any hollow metal or glazed exterior door is required to meet the same prescriptive requirement for glazing as required for windows and other fenestration systems.

B203004 OVERHEAD AND ROLL-UP DOORS

Design doors and opening as loading entrances. Provide lockable doors with automatic operation with protected pushbuttons electric controls.

Provide insulated overhead roll-up doors. Provide powder coat painted finish with custom colors for the door and accessories to match facility color scheme. Design the galvanized steel overhead roll-up slats and door width to withstanding the design wind loading of ASCE 7 and operate normally.

Accomplish door operation by UL Listed electric motor operation with electric controller and an auxiliary hand chain operation. Provide slat profile. Also provide counterbalance, heavy duty springs, wear strips, full perimeter weather-stripping, continuous button pressure safety operation, electric or infrared safety edge, galvanized hardware, and manufactured trims and closures pieces. Protect the wall door jamb opening with guards designed to resist abuse from the type of material and vehicles that are transported through the opening.

For overhead doors that open into inhabited spaces, provide the doors with a tether system or intercepted walls to reduce the likelihood of the overhead doors from translating into the inhabited areas.

B203006 BLAST RESISTANT DOORS

NOT USED

B203008 EXTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule. Verify all door hardware requirements with the User.

Provide a programmable Common Access Card (CAC) enabled electronic locking system at all exterior swinging man doors. The exterior locking system must be capable of locking all doors via a “kill switch” (tied to a central monitoring location) and all doors be provided with a manual key override.

Exterior door hardware to provide complete weather-stripping, threshold, and rain deflector, and door closers with code compliant hold open devices. Other specific exterior door hardware to be confirmed by user.

Door hardware finish must be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

B203090 OTHER EXTERIOR SPECIALTY DOORS

Provide a double leaf oversized swinging insulated steel door at each Vehicle Training Bay. Door width of 14 feet and door height of 20 feet. Doors must be fabricated of core material and door gauges to provide zero tolerance for racking or twisting of any type. Door thickness is a function of the door size and can be greater than 2” if necessary.

Door hardware must ensure and guarantee an easy to operate door without assistance of motor operation and be able to be safely guided and opened by one person. Door hardware must ensure that the door can stop without floor applied stops.

Door hardware must provide weather-stripping and base of door seals to ensure a completely weatherproof seal when closed.

U value of door must meet those prescribed per UFC and the applicable energy code.

--End of Section—

B30 ROOFING – P1512F LOG OPS SCHOOL

B30 GENERAL SYSTEMS DESCRIPTION

Roof systems shall be watertight. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation.

Submittal Requirements: Components of a minimum roof submittal shall include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Provide a Pre-Design Roofing Conference (if required in RFP Part 4) and Pre-Construction Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

Refer to UFC 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02 *High Performance Sustainable Buildings* for additional roofing requirements such as Energy Star qualified products.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

Provide a SSMR (standing seam metal roof system). The slope and configuration of the roofing is suggested in the Base Exterior Architectural Plan (BEAP), 2010, Section 4.13, Camp Johnson. Refer to Part 3, Chapter 2 for prescribed roof slope.

The roof system shall be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance shall be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or ASTM uplift resistance test procedures. The roof material must be 3004 aluminum, ASTM B209M ASTM B209.

Organic Coatings for the metal roof must be a PVDF coating as specified in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing. All other material and construction for metal roofing are per Part 6 specification section.

The spacing of standing seams must be between 12 inches and 18 inches on center as prescribed in the BEAP.

Sub-purlins for the Structural Metal Roof System shall be galvanized and shop painted.

SSSMRS Warranty Certificate – Provide warranty requirements as defined in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing.

Specular Gloss of Finished roof surfaces must have a specular gloss value of 10 or less at an angle of 85 degrees or 30 plus or minus the value specified in project program at 60 degrees when measured in accordance with ASTM D 523.

B301002 LOW SLOPE ROOFING SYSTEMS

NOT USED

B301003 ROOF INSULATION AND FILL

Provide roof insulation values no less than in accordance with UFC 1-200-02 High Performance and Sustainable Buildings and UFC 3-110-03 Roofing.

B301004 FLASHINGS AND TRIM

Provide flashing and trim for the Aluminum Standing Seam Metal roof per specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing in Part 6 of this RFP.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited.

B301006 ROOF OPENINGS AND SUPPORTS

NOT USED

B301090 OTHER ROOFING

Provide lightning protection, without penetrating the roofing or flashing components.

--End of Section--

C10 INTERIOR CONSTRUCTION – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Interior construction includes interior partitions, interior doors, and fittings.

Provide durable construction appropriate for the building function. Acoustic properties of materials, as well as durability, shall be considered during material selection.

Provide an acoustical engineer to participate in the design and provide design quality reviews throughout the design. The acoustical engineer must be an active participant in the design of the classrooms, classroom/labs, and training spaces and any other space or portion of the design with special acoustical requirements. The engineer must evaluate and give input on, but not limited to, acoustical partitions carrying STC ratings, applied acoustical treatments, integration of audio-video components, and door and frame performance, The acoustical engineer must carry a bachelor's degree in Engineering, Physics, Architecture, or a related field, hold a PE or membership in a recognized acoustical professional organization, and demonstrate a minimum of 7 years of acoustical design/engineering consulting on similar projects.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Areas of the Project subject to abuse require that "Impact Resistant" systems be provided.

C1010 PARTITIONS

Provide partitions consisting of metal studs with gypsum wall board on each side as indicated in the Chapter 3, Part 5, Room Requirements portion of this RFP, and at all rooms not defined in the room requirements. Provide concrete masonry partitions as indicated in Part 3, Chapter 5, Room Requirements, or as necessary for spaces where wall durability is a consideration.

Gypsum board for partitions in moist and humid areas, and areas with water use on floors - that include but not limited to toilets, locker rooms, mechanical rooms and labs/training bays - must be in 5/8” moisture and mold resistant gypsum board panels. ASTM C1396, ASTM D3272 - Rating of 8 to 10, ASTM C473, Water Absorption <5%. Provide Impact resistant versions of this gypsum board for abuse prone areas.

C101001 FIXED PARTITIONS

Provide fixed interior partitions, except where retractable partitions are specifically required by the "Room Requirements."

UFC defined acoustic requirements in UFC 3-101-01, Section 4.8 and Figure 4-1 is not applicable to this project. Partitions requirements are defined using STC ratings in this RFP.

Sound-rated partition assemblies must meet the interior acoustic requirements for typical spaces as follows or as indicated in Chapter 3, Part 5, Additional Room Requirements:

- Classrooms and Labs STC 45
- Vehicle Training Bays STC 45

- Dyno Rooms STC 50
- Conference Rooms STC 45
- Mother's Room STC 45
- Heads STC 45
- Break Rooms/Lounges STC 45
- Private Offices STC 45**

** private office STC may be reduced to a lower STC in association with a high CAC acoustical ceiling or increased to STC 50 based on the requirements of the individual user. The requirements for each individual user must be verified during the design process.

- Mechanical Rooms (when wall is adjacent to occupied space) STC 50

C101002 DEMOUNTABLE PARTITIONS

NOT USED

C101003 RETRACTABLE PARTITIONS

If required, provide retractable partitions to include operable panel partitions (noted as Folding Panel Partition in the Architectural Block Diagram). Sound-rated partition assemblies shall have a minimum Sound Transmission Coefficient (STC) to match the room fixed partition in the room in accordance with ASTM E90 or ASTM E413 for frequency data. Coordinate finishes with Section C30 Interior Finishes.

In the pocketed stored position provide for a partitioned pocket area so the system panels when folded are not exposed in the room.

C101004 INTERIOR GUARDRAILS AND SCREENS

Provide balustrades where required by code. Provide screens where required to prohibit view of a particular area.

C101005 INTERIOR WINDOWS

Provide interior window system of aluminum if required by the design in rooms to provide borrowed light to occupied rooms.

If interior windows are provided at rooms with partitions of STC 45 or above, provide a window with laminated glazing to provide acoustical control.

For Dyno Rooms view window into room provide Bullet-resistant/Ballistic rated windows. Windows must meet U.L. Classification Rating Level to match existing window ballistic rating at the current Dyno Rooms in Building M107. Provide anchorage details that adequately transfer loads from the window frame to the adjacent wall. The window frame must be anchored in accordance with published manufacturer's recommendations. Each window shall be a complete factory-assembled unit.

All interior window systems must have a pre-finished coating finish or anodized finish.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide aluminum framed glazed storefront system in rooms as required by the design to provide borrowed light into occupied rooms.

If interior glazed storefront is provided, provide acoustically rated glazed systems to match the acoustical rating of the adjacent partition.

All interior storefront systems must have a pre-finished coating finish or anodized finish.

C101007 INTERIOR GLAZING

Interior glazing must be clear or patterned glass that is annealed/tempered based on code requirements.

Provide bullet resistant/ballistic rated glazing in the bullet resistant/ballistic rated window units.

If necessary, provide laminated glazing for sound control as indicated elsewhere in this section.

Interior glazing when provided in fire rated doors and glazed partitions must utilize fire rated glazing to meet code requirements. Wire glass must not be used in fire rated doors or partitions.

C1020 INTERIOR DOORS

C102001 STANDARD INTERIOR DOORS

Provide flush interior doors.

Provide wood or hollow metal interior doors in hollow metal frames.

Provide wood doors at all administrative office area rooms, classrooms, labs, heads , and lounges/break rooms.

Provide hollow metal doors at all mechanical rooms, electrical rooms, telecom rooms, high bay vehicle training rooms, Dyno rooms, spaces associated with the Special Projects Room, and any room with hollow metal doors defined in Part 3,Chapter 5, Room Requirements section of this RFP.

Hollow metal doors must be Level 4 with physical performance level A throughout the facility.

Flush wood doors must be WDMA I.S.1A-04, premium grade, extra heavy duty for classrooms, classrooms/labs, heads, lounges and conference rooms and heavy duty for all other spaces. Flush wood doors shall be SCLC-5 5-ply structural composite lumber core or FD core, as required by code.

Doors must have Factory Finish of AWI Quality Standards Section 1500, specification for Conversion varnish alkyd urea or catalyzed polyurethane.

Provide vision glazing within doors if it is deemed advantageous to be able to see through the door, either for safety of pedestrian traffic, or other functional reasons. If vision glazing within doors is provided it must have the provision to be blanked off during an active shooter event. This would require an easily activated shade, flap or other device that would obscure vision through the door lite.

Provide acoustic seals and gasketing to match acoustical rating as identified in Part 3, Chapter 5, Room Requirements. After installation, test the doors with a flashlight to determine if any gaps in the sound seals allow light to be viewed on the opposite side of the door.

C102002 GLAZED INTERIOR DOORS

Provide Aluminum/Glass glazed interior door as a part of an interior glazed partition as indicated in C101006 for spaces that do not require acoustical control.

C102003 FIRE DOORS

Provide interior fire doors, in fire rated partitions as required by Code.

C102004 SLIDING AND FOLDING DOORS

NOT USED

C102005 INTERIOR OVERHEAD DOORS

NOT USED

C102006 INTERIOR GATES

NOT USED

C102007 INTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule in conjunction with the approval of the client and to meet specific requirements outlined in this section or other referenced documents. Verify all door hardware requirements with the User.

Provide lock and latch hardware with levers as follows:

Use Series 1000, Operational Grade 1, Security Grade 2 for ,corridors, classrooms and labs, suite entrances, toilets, and other high use interior doors. Use Series 4000, Grade 1 for locations not using Series 1000 hardware.

a. Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2.
b. Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1, or Grade 2.

Provide cylinders/cores and keying system as indicated in Part 4, C102007 specifications. Other related door hardware requirements for hardware beyond locking devices is as indicated in Part 4, C102007 specifications. Lock cores shall match the BEST system.

Door hardware finish shall be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

C102090 OTHER INTERIOR SPECIALTY DOORS

NOT USED

C102091 OTHER INTERIOR PERSONNEL DOORS

NOT USED

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Provide solid plastic (HDPE) toilet partitions in all toilet rooms (Heads) with more than one water closet or urinal.

Provide floor mounted overhead braced toilet partitions.

C103002 TOILET AND BATH ACCESSORIES

Provide toilet and bath accessories per the following:

Double toilet tissue dispensers – standard roll size, motion sensing paper towel dispenser, wall-mounted trash disposal, manual soap dispensers at each sink, minimum of two coat/towel hooks, grab bars, convenience shelf/purse ledge. For toilets that have lockers/showers provide high efficiency electric hand dryer, shower rod and shower bench.

At janitor's closets provide wall-mounted mop rack with overhead shelf.

At toilets with counters with integral sinks, provide mirrors the full length of toilet lavatory counters in width and from backsplash to the light cove above in height.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker (dry erase) boards and tack boards as indicated in Chapter 5 "Room Requirements" portion of this RFP.

Marker boards and tack boards must be mounted with the lower edge at 42" above finished floor. Unless otherwise noted, boards must have anodized aluminum trim. Marker boards and tack boards must have tool trays and one set of tools provided for each room. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards and tack boards.

Glass marker boards must be frameless, opaque back-painted glass type and must attract standard magnets (rare-earth magnets not required) and be constructed of 1/4-inch-thick, shatter resistant, tempered glass, solid in color with non-staining finish, polished edges and eased corners and mounted with stainless steel standoffs. Provide magnetic accessory trays for glass markerboards.

Enclosed tack boards must be heavy gauge aluminum, with tackable interior surface, tempered glass sliding doors and lock. Provide selection from full range of manufacturer's finishes. Provide tack board dimensions as follows: Size: 3'-0" H by 4'-0" L.

Marker boards and tack boards are funded as part of the construction contract.C103004 IDENTIFYING DEVICES

All necessary interior signage must be incorporated as part of the architectural drawings. Interior signage is not collateral equipment. Interior signage must demonstrate complete coordination with the facility design, SID and FF&E submittals. Provide interior directional signage for facility wayfinding. Provide an identifying device at each interior door. Signs must meet ABA requirements. Refer to UFC 3-120-01, Design: Sign Standards, for more information.

Provide a 36” x 48” Command Photo Board just inside the main entrance vestibule to accommodate a minimum of (7) 8” x 10” Chain of Command photos. Command Photo Board should be durable and support easy photo changing.

Exterior building signage is also required and must be provided. This includes exterior door signs on any mechanical, electrical and telecommunications room with exterior doors. All exterior signage and their components must be resistant to ultraviolet light and must withstand a marine corrosive environment. This includes any other building signage attached to the building envelope, such as building name or number.

Specific exterior signage requirements follow:

Provide exterior signs at all building primary and secondary entrances stating, “ELECTRONIC DEVICES INCLUDING CELLULAR PHONES PROHIBITED.” Applicability must be verified by AE2 with MCB Camp Lejeune.

Provide exterior signs at all building primary and secondary entrances stating, “DO NOT ENTER IF IDS INDICATOR LIGHT IS ON. ALARM WILL SOUND.” Applicability must be verified by AE2 with MCB Camp Lejeune.

C103005 LOCKERS

Provide 18” wide x 18” deep x 72” high single-tier high density polyethylene (HPDE) personnel lockers. Provide perforated top and doors for better air flow. Each door must be engraved with a minimum 5/8” tall number in sequential order starting with “101”. Provide 6” height continuous HDPD base, sloped tops, metal garment bars, metal double hook, and latching hardware to accommodate pad locks.

All enclosed lockers must be fitted with hardware and devices that reduce noise when operating locker doors.

C103006 SHELVING

NOT USED

C103007 FIRE EXTINGUISHER CABINETS

Provide semi-recessed fire extinguisher cabinets for fire extinguishers in all occupied spaces, including corridors and lobbies, as required by the RFP. Cabinets shall be coordinated with interior finishes. Where cabinets are installed in fire rated partitions, cabinets must be tested and listed in accordance with ANSI/UL-1479 for membrane and penetration firestops. Fire extinguishers required in spaces not typically occupied, such as mechanical, electrical, and telecommunication rooms, may be surface-mounted with a bracket listed for the size and weight of the required fire extinguisher. Installation of all fire extinguisher cabinets and mounting brackets must be in strict compliance with NFPA 1, NFPA 10, and the manufacturer's installation instructions Refer to ESR Section D40.

C103008 COUNTERS

Provide solid surfacing material containing recycled content for counter tops and back splashes in Heads, Break Rooms and Mother’s Rooms.

Backsplash height must be a minimum of 4”.

C103009 CABINETS

Provide cabinetry and millwork items with associated accessories as indicated in RFP Part 6 drawings and RFP Part 3, Chapter 5 Room Finish and FF&E Requirements. Cabinetry must be Architectural Woodwork Institute (AWI) premium grade with hardwood plywood construction. Cabinets must have concealed hinges with adjustable recessed standards for shelves. Exposed surfaces must be covered with high pressure plastic laminate, and interior surfaces must be melamine. All cabinets must have base/toe kicks that match the height of the wall base. Provide ABA compliant doors at casework as required throughout the facility. Provide filler panels as required where cabinets abut wall.

Design and provide cabinets to accommodate equipment such as refrigerator, sink, microwave, commercial coffee pot, and ice maker.

Provide finish choices for built-in cabinetry to include the manufacturer's standard complete color line for all materials.

All cabinets to have solid surface counters with eased leading edge, unless noted otherwise in RFP.

Provide base and/or wall cabinets in administrative break rooms and other rooms as indicated in Part 3, Chapter 5, Room Requirements section of this DB RFP.

C103010 CASEWORK

NOT USED

C103011 CLOSETS

NOT USED

C103012 FIRESTOPPING SYSTEMS

All firestopping systems shall be performed by one experienced firestop contractor. Experienced firestop contractor is defined as following:

1. FM Research approved in accordance with FM 4991, or
2. Operating as a UL Certified Firestop Contractor, or
3. A contractor completed the manufacturer accredited firestop specialty contractor program. Certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years of experience in the installation of manufacturer’s products in accordance with specified requirements. Submit documentation of this experience. A manufacturer’s willingness to sell its firestopping products to the contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer. Individual building system subcontractor, such as Mechanical, Electrical, Plumbing, Gypsum wall, etc., is not permitted to install firestopping systems.

A single complete submittal including Shop Drawings, Product Data, UL details must be provided for all firestopping systems throughout entire project.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

The requirement for sprayed fire-resistive materials is determined by the building code analysis prepared by the design/build contractor's Qualified Fire Protection Engineer (QFPE). If required, provide sprayed fire-resistive materials to the building's framework.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide recessed walk-off floor mats or surface mounted/loose lay floor mats at building entrances in sizes as indicated in RFP Part 3, Chapter 5 Room Requirements and RFP Part 6 drawings. Recessed walk-off floor mats are part of the construction contract. Surface mounted or loose lay floor mats are part of the FF&E package. Provide sealed concrete underneath recessed walk-off floor mats.

Provide recessed walk-off floor mats with a carpet insert (100% solution dyed) designed for high traffic areas. Recessed walk-off floor mats must have T5 aluminum alloy frame with anodized finish. Provide architectural surface pattern with combination of inserts, finish colors, aluminum slots, and aluminum framework. Inserts must include monofilament abrasive fibers and finish colors must be offered in a broad range of standard neutral and bright colors. Floor mat surfaces must comply with ASHRAE 90.1 and ASHRAE 189.1 requirements.

C103015 ORNAMENTAL METAL WORK

NOT USED

C103090 OTHER INTERIOR SPECIALTIES

NOT USED

--End of Section--

C20 STAIRS AND LADDERS – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Provide ladders as required by the building code for access to platforms and mezzanines, and roof areas. Since this building is one story it is not anticipated that stairs will be needed, however the requirements of this section are included in the RFP in the case that a stair or ladder may be required for operations.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Provide ladders conforming to UFC 1-200-01, *General Building Requirements*.

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

Provide metal pan stair construction to access spaces that are regularly accessed.

C201002 FIRE ESCAPE STAIRS

NOT USED

C201090 HANDRAILS, GUARDRAILS, LADDERS AND ACCESSORIES

Provide painted, galvanized steel handrails, guardrails and ladders, as required by code. Exterior systems must be coated or galvanized to withstand extreme wear and weathering conditions. Provide handrails, guardrails and ladders with smooth, unbroken surfaces throughout the length of the stair or ladder as required by code.

Provide metal ladders and railings complying with OSHA requirements for access and protection to all mechanical mezzanines, lofts and similar spaces.

--End of Section--

C30 INTERIOR FINISHES – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Interior finishes include wall finishes, floor finishes, wall base finishes, and ceiling finishes.

Provide aesthetically pleasing, functional, durable finishes appropriate to the building function. Acoustic properties of materials, as well as durability and ease of maintenance, must be considered during material selection. Maximize the use of sustainable materials.

All interior finish products must be from manufacturer's standard running line offerings. Manufacturer's submitted materials must be made available for purchase at NO MINIMUMS for not less than 7 years from the date of the original product order. Custom fabrications must not be allowed unless otherwise noted.

Finish selections for this project will require the use of wall, floor, and ceiling material accents to enhance the interior design and architecture of the building. Provide an interior finish design scheme that includes a minimum of two different accent colors, to be used throughout the facility. Refer to Part 3, Chapter 6, ESR E20 for Structural Interior Design (SID) requirements and Part 3, Chapter 5, Room Requirements for required locations. Submit floor pattern and accent wall location drawings, indicating proposed interior finish locations with the Structural Interior Design submittal.

GENERAL SYSTEMS REQUIREMENTS

See Part 3 Chapter 5 Room Requirements for specific requirements on Interior Finishes.

C30 SSPC QP 1 CERTIFICATION

The Project requires industrial coatings on exposed steel surfaces. All contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council - SSPC) to the requirements of SSPC QP 91 prior to contract award and must remain certified while accomplishing any surface preparation or coating application.

C3010 WALL FINISHES

Provide architectural feature wall consisting of wood veneer panel and wood acoustical panel in key public locations to include the Lobby and main entrance areas. Acoustical fabric wall panels must be used in the Conference rooms.

C301001 CONCRETE WALL FINISHES

NOT USED

C301002 PLASTER WALL FINISHES

NOT USED

C301003 GYPSUM WALLBOARD FINISHES

All interior wall finish materials must be finished and painted gypsum wall board, as indicated in the Part 3 Chapter 5 Room Requirements.

In all locations, where concrete or concrete masonry walls exist in conjunction with GWB over metal stud construction within a space, all walls must be finished with GWB. Moisture-resistant

gypsum wall board must be used in all wet or humid areas including, but not limited to vestibules, toilet rooms and locker room areas. Gypsum walls, fascia, and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See Part 4, PTS, C304001 GENERAL REQUIREMENTS for the MPI standards for more information.

Regular and mold/moisture-resistant gypsum wall board must be used in spaces indicated in the Part 3, Chapter 5, Room Requirements.

C301004 CERAMIC AND PORCELAIN TILE WALL FINISHES

Porcelain Tile

Provide through-body color, rectified porcelain unglazed wall tile, minimum size of 12-inch x 12-inch with manufacturer recommended minimum width grout joints. Tile must be minimum Grade B, per ANSI 137.1 (1988), with a wide range of accent colors available.

Provide coordinating designer decorative accent strips or coordinating accessory tile shapes, minimum Grade D, as an integral part of the wall tile system. Porcelain wall tile must be installed full-height on gypsum wall board substrates. Provide grouted-in edge stainless steel protection strips at all outside and inside corners, stainless steel transition strips where wall tile and floor tile meet, and transitions from tile to other wall finishes.

Backer Board: Cementitious, water-durable board surfaced with fiberglass reinforcing mesh on front and back, long edges wrapped, and complying with ANSI A118.9 and ASTM C 1325.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

Aesthetic Classifications: Provide tile with an aesthetic classification of V2 Similarly colored with variations in texture and/or pattern.

Install tile to full height of the wall in a running bond pattern.

C301005 WALL COVERINGS

Corner Guards

For office and administrative areas, corner Guards must be placed on outside corners in all high-traffic interior exposed corners in corridors and room exposed with corners in open office areas, except on walls of CMU construction and must be 3-inch width. They must be surface-mounted in a through-color, recycled, extruded PETG finished aluminum material. Corner guards must extend from top of cove base and extend 8 feet high and be mechanically installed with a concealed continuous aluminum retainer. Double stick tape and adhesive mounted corner guard methods are not acceptable.

In vehicle training bays, storage areas, labs and mechanical rooms, corner guards of stainless steel and 3-inch width with brushed finish must be placed on outside corners at exposed corners of rooms or corridors. Corner guards must extend from floor to 60-inch above floor or be full height of wall if required and be mechanically fastened and adhered.

Wall Protection

Provide stainless-steel wall protectors at mop sinks in janitor rooms.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Provide sound absorbing acoustical fabric wrapped wall panels reinforced edges as identified in Part 3 Chapter 5 Room Requirements for conference rooms. Wall panel system must have a field-replaceable fabric system.

Provide wood veneer acoustical wall panels that are factory-assembled, and factory finished. Panels must be perforated and backed with an acoustic textile product for optimum acoustical quality with limited textile visibility when installed. Veneer selection must be selected from an A grade range of stain grade veneer with minimal graining. Species and finish must coordinate with other wood finishes on interior finish schedule. Include all required corner, transition and base components for a quality installation. Refer to Part 4 Section C103009 for veneer quality and graining of wood finish materials.

C301090 OTHER WALL FINISHES

Solid Surfacing Wall Finishes

Provide 100% Acrylic Polymer in a solid color or with small size particulate solid surface material for shower surround and window stools.

Exterior windows will receive a window stool.

100 percent acrylic solid surface at Break Rooms: 1/2-inch solid surface wall panel will extend width of sink to top cabinetry from backsplash to underside of wall cabinets.

100 percent acrylic solid surface at Showers: 1/2-inch solid surface wall panels will extend vertically from top of shower pan. Solid surface material will overlap top of shower pan with an air gap, as required by manufacturer installation instructions. Wall panels in shower areas will extend horizontally beyond the “wet area” to the exterior line of the shower receptor threshold. A solid surface transition will be required where solid surface meets wall tile. Locate wall panel seams at corners only. No material seams will be acceptable, except at corners. All shower seams at corners will be lap joints with solid surface corner trim from floor to ceiling. Chemically fuse seams. Include a matching corner shower shelf in each shower compartment. Full-height solid surface transitions will be provided at adjacent wall surfaces. Substrate behind solid surface shower walls will be equal to cementitious ceramic tile backer board. Solid surface shower receptors will be installed prior to wall system. Shower pan receptors will be a minimum thickness of 1/2-inch thick, with a 3/4-inch thick area at least 12 inches in diameter at the drain. Receptors will be one-piece, factory formed shower pans with integral thresholds. Thresholds will have structural supports every 4 inches on center.

Modular Architectural Panels/Decorative Paneling System

Provide modular architectural paneling wall system consisting of wood veneer acoustical panel in key public locations.

System must utilize ¾ inch thick panels in a rail and spline fastening system with 1/4-inch-wide or 1/2-inch-wide channel reveals, rails, splines and edge trim.

All exposed hardware must be black satin factory finished, anodized aluminum. Panel sizes must be a minimum of 4 x 8 feet.

Wood Trim

Paint grade hardwood trim to include crown molding, wainscot and chair rail. Veneer must be selected from A grade of paint grade veneer with minimal graining. Species and stain must coordinate with interior color scheme and interior wood doors. Refer to Part 4 Section C103009 for veneer quality and graining of wood finish materials.

Water-based Epoxy Wall Coating

Water-based epoxy wall coating must be used in the Janitor's Closets as noted in Part 3 Chapter 5 Room Requirements. Wall coating system must be a 10 to 12 mil thick wall system over adequate wall patching compound/wall prep. Wall coating system must consist of one coat of water-based epoxy primer, a waterproofing membrane, two coats of water-based epoxy body/bonding coat, and gloss finish/seal coat from a single wall coating system manufacturer for a uniform, monolithic, slightly textured wall surface with rounded 1-inch radius inside corners, wall-to-ceiling and floor-to-wall transitions. All plumbing, floor-to-ceiling and wall-to-floor transition details must be a recommended by wall and floor coating manufacturer.

Plywood

Telecomm closets must receive floor-to-ceiling, 3/4-inch plywood, Class A fire-rated, sanded, face-grade plywood on side and back walls.

C3020 FLOOR FINISHES

Provide floor finish materials to meet the following requirements.

C302001 TILE FLOOR FINISHES

Porcelain Tile Floor Finishes

Provide through-body, rectified porcelain tile in a minimum size of 12 x 12 inches with matching 6-inch-high cove tile base with flat top and bottom edge, or with stainless steel coved transition between floor and wall tile. The cove base must have a flat top/bottom edge. Grout joints in a maximum width of 3/16 inch must be provided. Tile must be non-slip, with a light texture. Texture of tile must be analyzed with regard to maintenance and selected based on a minimal maintenance program. Provide grouted-in stainless steel metal transition strips at expansion joints, corners (inside and outside), and transition between floor and wall tile.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

C302002 TERRAZZO FLOOR FINISHES – BID OPTION

Resinous (Epoxy) Flooring Requirements: Provide resinous (epoxy) flooring as identified in RFP Part 3, Chapter 5 Room Requirements, and as directed below. See Part 4 PTS for additional requirements.

Moisture Testing: Perform tests recommended by manufacturer and as follows:

a. Perform relative-humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
b. If the relative humidity exceeds 75 percent, then manufacturer approved primer moisture mitigation system must be installed prior to resinous flooring installation. Slab-on-grade substrates without a vapor barrier require a moisture mitigation system.
c. Poured-Epoxy Terrazzo Floor System – A 3/8-inch thick (minimum) epoxy terrazzo floor system in accordance with the "NTMA Epoxy Thin Set Terrazzo Specification" and manufacturer specifications, whichever is more stringent. Terrazzo floor system must include (but not be limited to) moisture vapor primer system, crack isolation membrane, zinc divider strips, aggregates, and epoxy terrazzo topping. Aggregate mixture to include marble and/or granite chips, 15 percent minimum colored glass chips and 20 percent minimum recycled mirror chips. Incorporate a base color, three accent colors, and

divider strips in a pattern to create a design of interest. Provide an 800-grit level polished finish. Wall base must be separate, 6-inch-height, top set, precast epoxy terrazzo, flat tile base matching the floor field color. See Part 4, Section A103001 Standard Slab on Grade for additional requirements.

C302003 WOOD FLOORING

NOT USED

C302004 RESILIENT FLOOR FINISHES

Luxury Vinyl Tile Flooring

Provide resilient luxury vinyl tile, in lobby, corridors break rooms, Mother's Room and other high traffic areas for floors with high durability, low maintenance, high slip-resistance requirements. Luxury vinyl tile will be planks or square tiles as indicated in Part 3 Chapter 5 Room Requirements. Luxury vinyl tile must fall under Product Classification Class III, Type B per ASTM F1700 and use Class III printed film that conforms to ASTM F1700. Luxury Vinyl Tile must not contain ortho-phthalates. Luxury Vinyl Tile must have a minimum Coefficient of Friction of >0.5. All products must be from manufacturer's standard running line offering. Custom products or products with a minimum order quantity are prohibited.

20 mil and 30 mil wear layer products will be accepted if they have the following characteristics: factory applied UV-cured polyurethane finish containing anti-scratch particles and anti-scuff qualities, a test result of B1 or B2 on the Martindale Procedure B Test - BS EN 16094:2012 Procedures B (which assesses the scratch performance of the topical factory applied finish treatment that enhances clean ability and durability), passes ASTM F970 for Static Loads resulting in Pounds per Square Inch (PSI) minimum of 1000 PSI (to avoid materials that have the potential to severely indent and/or break with heavy static loads), and must carry a 20 year manufacturer's written warranty.

40 mil wear layer product with a 20-year manufacturer's written warranty is required.

C302005 CARPETING

NOT USED

C302006 MASONRY & STONE FLOORING

NOT USED

C302007 WALL BASE FINISHES

Resilient Wall Base

Provide rubber cove wall base, throughout areas with resilient flooring and straight rubber for carpeted areas.as indicated in Part 3 Chapter 5 Room Requirements.

Tile Base

In areas where wall tile is required, or otherwise specified, tiled floor must have matching 6-inch high cove base or stainless-steel cove transition strips between floor tile and wall tile. In areas where no wall tile is specified, tiled floor must have matching 6-inch-high cove base. When tile cove base is used, base must have flat top and bottom edges to join evenly with adjacent tiles. Resilient base must be 120’ coils. Rounded edges are not allowed. Tile cove wall base units must be pre-formed; cut tiles are not allowed.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

C302008 STAIR FINISHES

NOT USED

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

NOT USED

C302010 HARDENERS AND SEALERS

Concrete Floor Requirements

Finish concrete surfaces smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Provide hardener in concrete mixture in accordance with the manufacture requirements. Exposed concrete floors that are not required to have an applied floor finish, must receive a minimum of three coats of the manufacturer's approved sealer.

Provide concrete flooring as identified in RFP Part 3, Chapter 5 Room Requirements, and as directed in the following.

Sealed Concrete: Finish concrete surface smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer’s smoothness requirements, whichever is the most restrictive. Apply both penetrating and topical sealers on exposed concrete floors that are not required to have an applied floor finish.

a. Water-based, clear, penetrating sealing compound blend of silane and siloxane for salt protection that penetrates into the pores of the concrete. Sealer must limit intrusion of moisture and chlorides into the concrete.
b. Water-based, topical, non-yellowing, clear, acrylic curing and sealing compound meeting the following requirements.
    I. ASTM C 309, Type 1, Class B
    II. ASSHTO M 148, Type 1, Class B
    III. ASTM C 1315, Class A, Section 6.4.1 – non-yellowing
    IV. ASTM C 1315, Section 6.6 – exceed 50 MPa (70 psi) adhesion.

C302011 RAISED ACCESS FLOORING

Provide concrete filled steel panel raised access floor system (24-inch X 24-inch panels) with steel pedestals and bolted stringers as indicated in Part 3, Chapter 5 – Room Requirements, of this RFP. All panels must be able to be interchangeable in the system.

Finish must be luxury vinyl tile - on module. Raised access flooring locations must be as indicated in Part 3 Chapter 5 Room Requirements. Raised flooring must accommodate data and electrical systems. Majority of Raised Flooring components must be available on GSA Schedule.

The total system height must be 6-inch. Provide in a flat or tiered arrangement with all accessories to provide stairs and guardrails as necessary, and provide vertical closure panels at ends of exposed steps and ramps.

Pedestals - Pedestals shall be capable of supporting a 5,000-pound axial load without permanent deformation. Bonding strength of pedestal adhesive - adhesive for anchoring pedestal bases - shall have a bonding strength capable of resisting an overturning moment of 1,000 lb/f-in when a force is applied to the top of the pedestal in any direction.

Bond strength of factory installed covering shall be sufficient to permit handling of the panels by use of the panel lifting device, and to withstand moving caster loads up to 1,000 pounds, without separation of the covering from the panel.
The raised access flooring shall be tested in accordance with ASM – CISCA Standards and Procedure and meet the following load requirements:

- Concentrated load of 1,250 pounds in classrooms and classroom/labs. Calculate concentrated load as load on one square inch, at any point on panel, without deflecting more than 0.08 inch, with a safety factor of 2 based on static design load, without permanent deformation in excess of 0.01 inch in any of the specified tests.
- Uniform live load of 400 psf for classrooms and classroom/labs without deflecting more than 0.04 inch.
- A rolling load of 800 pounds for classrooms and classroom/labs applied through hard rubber surfaced wheel 6 inches in diameter by 1 1/2-inch-wide for 10,000 cycles over the same path. Permanent set at conclusion of test shall not exceed 0.010 inch.
- A rolling load of 1,000 pounds for classrooms and classroom/labs applied through a 3-inch diameter by 1-13/16-inch-wide caster for 10 cycles over the same path, without deflecting more than 0.04 inch and without permanent deformation in excess of 0.02 inch. In accordance with CISCA Access Floors, the permanent deformation limit under rolling load shall be satisfied in all of the specified tests. In the specified tests, the permanent deformation shall be measured after 10 passes with Wheel 1 and after 10,000 passes with Wheel 2.
- An impact load of 150 pounds on one square inch from a height of 36 inches with permanent set not to exceed 0.060 inch.

C302090 OTHER FLOORING & FLOOR FINISHES

Provide fuel resistive resinous flooring finish system – 5 coat system as indicated in Chapter, Part 5, Room Requirements of this RFP. The system must provide an easily cleanable floor surface with a slip resistant top coat. Provide an integral wall base at height recommended by the manufacturer and metal termination bar.

Provide fuel resistive resinous flooring finish system – 3 coat system as indicated in Chapter, Part 5, Room Requirements of this RFP. The system must provide an easily cleanable floor surface with a slip resistant top coat. Provide an integral wall base at height recommended by the manufacturer and metal termination bar.

Provide Standard Resinous flooring finish system as indicated in Chapter, Part 5, Room Requirements of this RFP. The system must provide an easily cleanable floor surface with a slip resistant top coat

C3030 CEILING FINISHES

Finished surface of ceiling tiles must be selected to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide feature or accent ceiling of gypsum wall board in main entrance/lobby and administrative areas. Ceiling finishes must be as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP and as defined in this ESR.

C303001 ACOUSTICAL CEILING TILES & PANELS

Acoustic Ceiling Panels

Suspended Acoustical Panel System: Primary ceiling finish will be 24-inch x 24-inch by 5/8-inch minimum thickness suspended acoustical panel ceiling system as indicated in Part 3, Chapter 5, Room Requirements port of this RFP, except provide a suspended gypsum board ceiling in entrance lobby. Acoustical panels will have a square edge, closed pore panel surface unless as noted. Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide sustainable panels.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Gypsum Wallboard Ceiling Finishes

Provide Regular Gypsum Board and Moisture/Mold Resistant Gypsum Board as indicated in the Part 3 Chapter 5 Room Requirements and in ESR C10. Moisture/Mold Resistant gypsum wall board must be used in all wet or humid areas include, but not limited to vestibules, toilet rooms and locker rooms areas.

C303003 PLASTER CEILING FINISHES

NOT USED

C303004 WOOD CEILINGS

NOT USED

C303005 SUSPENSIONS SYSTEMS

Provide 24-inch by 24-inch aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish must be factory applied white baked enamel. Provide manufacturer’s hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106-inch diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16 inch galvanized steel

straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/580M, composition 302 or 304, condition annealed stainless steel, 0.106 inches in diameter over high humidity areas such as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, non-staining and ASTM C636). Recycled content must be a minimum of 25%.

C303006 METAL STRIP CEILINGS

NOT USED

C303009 OTHER CEILING & CEILING FINISHES

NOT USED

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

C304001 GENERAL REQUIREMENTS

Spray paint all interior exposed surfaces including metal items, such as interior grilles, registers, diffusers, access panels, and panel boxes with a minimum of two coats in color to match adjacent surfaces, unless otherwise indicated. All primer and paint systems must be the manufacturer’s highest premium quality, professional grade. All materials must be moisture and mildew resistant and easily cleaned.

C304002 CONCRETE FINISHES

NOT USED

C304003 CONCRETE MASONRY FINISHES

Paint finish as required for concrete masonry in Part 3, Chapter 5, Room Requirements portion of this RFP. See Part 4, C3040 INTERIOR COATINGS AND SPECIAL FINISHES and provide paint systems in accordance with the MPI standards for the interior architectural surface being finished – Concrete Masonry Units. Finish coat must be a semi-gloss.

C304004 METAL FINISHES

NOT USED

C304005 INTERIOR WOOD FINISHES

NOT USED

C304006 GYPSUM WALLBOARD FINISHES

Gypsum walls, gypsum wall board ceilings, fascias and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See Part 4, C3040 INTERIOR COATINGS AND SPECIAL FINISHES. Include a minimum of two paint selections for accent walls as indicated in Part 3 Chapter 5 Room Requirements.

C304007 SPECIAL COATINGS ON WALLS

High Performance Architectural Coating

Provide high performance architectural paint coatings in areas as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

--End of Section--

D10 CONVEYING SYSTEMS – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Provide Conveying System that include lifts and cranes.

GENERAL REQUIREMENTS

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

D1010 ELEVATORS

NOT USED

D101001 GENERAL CONSTRUCTION ITEMS

NOT USED

D101002 PASSENGER ELEVATORS

NOT USED

D101003 FREIGHT ELEVATORS

NOT USED

D101004 WHEELCHAIR LIFT

NOT USED

D101005 DUMBWAITERS

NOT USED

D101090 OTHER VERTICAL TRANSPORTATION EQUIPMENT

NOT USED

D1020 WEIGHT HANDLING EQUIPMENT

Ensure that the relocated crane satisfies the testing and certification requirements detailed in Part 4 of this RFP, to the satisfaction of the user activity designated weight handling certifying official. Coordinate witness testing with the user activity designated weight handling certifying official.

D102001 OVERHEAD CRANES

NOT USED

D102002 MONORAILS

NOT USED

D1030 ESCALATORS AND MOVING WALKS

D103001 ESCALATORS

NOT USED

D103002 MOVING WALKS

NOT USED

D103003 OTHER MOVING STAIRS & WALKS

NOT USED

D1090 OTHER CONVEYING SYSTEMS

NOT USED

D109001 PNEUMATIC TUBE SYSTEMS

NOT USED

D109002 CONVEYORS

NOT USED

D109003 LINEN, TRASH, AND MAIL CHUTES

NOT USED

D109004 TURNTABLES

NOT USED

D109005 OPERABLE SCAFFOLDING

NOT USED

--End of Section--

D20 PLUMBING – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

The plumbing system consists of all fixtures, potable cold and hot water piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 5 feet of the building.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS section D20 and the manufacturer's recommendations. Design and install plumbing systems in accordance with IPC and UFC 3-420-01, *Plumbing Systems*. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Include the hot and cold water systems to list of systems to be commissioned in accordance with UFGS 01 33 29.05 20 Sustainability Requirements for Design Build

Refer to RFP Part 3 – Project Program, Chapter 2 for commissioning requirements

D2010 PLUMBING FIXTURES

Provide quantity and type of plumbing fixtures required for the use and functions described for this facility. Obtain occupancy from the owner. Refer to Part 3 Chapter 5 Room Requirements Section for additional specific requirements for spaces with plumbing fixtures. Provide handicapped fixtures in accordance with the referenced criteria in the Project Program.

D201001 WATER CLOSETS

Provide floor mounted flush valve water closets with hard-wired automatic flush control with push button backup. Maximum flushing volume is 1.28 gallons.

D201002 URINALS

Provide flush valve urinals with hard-wired automatic flush control with push button backup. Maximum flushing volume is 0.125 gallons.

D201003 LAVATORIES

Provide solid surface lavatories with integral sinks with hard-wired sensing faucet with automatic control and battery backup.

Provide all stainless steel fixtures and counters for student restrooms that serve the training bays.

D201004 SINKS

Provide brushed stainless steel undermount sink in the pantry/break areas. Provide swivel faucet.

Provide semi-circular multi occupant wash fountain(s) with foot pedal supply in each instructional area.

Provide mop sink in janitor's closets.

D201005 SHOWERS

All showers are to be the low flow type, 2.0 gpm. The shower heads to be located at a stationary position pointed away from the shower entrance opening and to keep from spraying toward the shower entrance opening and causing water damage. The shower faucet and spray head is to be a surface mount unit complete with prefabricated stainless steel mount and enclosure panel, temperature compensating shower valve with metal stem handle and integral service stops, and a shower head with flow control on institutional bracket.

D201006 DRINKING FOUNTAINS AND COOLERS

Provide hi low drinking fountains. Each drinking fountain must have a bottle filler.

Provide wall recess or side walls to protect drinking fountains.

D201090 EMERGENCY FIXTURES

Provide emergency shower and eyewash in the with privacy curtain and rail.

Provide tepid water (60F to 100F) with water tempering valve assembly.

Provide alarms and appurtenances for service within NEMA type 4 enclosures.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine the potable water pressure at the building and calculate piping system requirements.

D202001 PIPES AND FITTINGS

Provide Copper piping Type L for above ground and Type K for buried. Press fittings are not allowed.

D202002 VALVES & HYDRANTS

Provide isolation valves at supply to each floor. Provide hose bibbs in mechanical rooms and within 25 feet of all exterior equipment with coils. Provide hose bibbs every 20 feet in vehicle instruction labs. Provide wall hydrants along the building exterior such that all points along the perimeter can be reached with a 25-foot-long hose.

D202003 DOMESTIC WATER EQUIPMENT

Provide backflow preventers of types and at points within domestic water systems as specified by IPC. Locate inside the mechanical room on service entrance lines where not provided exterior to the building.

Perform calculations to determine the water heater capacity to supply hot water to the fixtures.

Provide electric or natural gas water heater for heating of domestic water.

Provide water tempering valve assembly.

Provide domestic hot water recirculation system with high efficiency recirculation pump and recirculation loop with all associated fixtures, equipment, and appurtenances. Provide inline

circulator for domestic hot water distribution system. Provide balance valves throughout system to allow for system balance to achieve required maximum wait times per International Energy Conservation Code. Provide domestic water balance per UFGS 23 05 93.00 22 *Testing, Adjusting, and Balancing for Mechanical Systems*.

If water flow test shows inadequate water pressure, provide domestic water booster system for domestic water distribution system.

Provide water meter on the building main. Water meters must be appropriately sized for the building load. The water meter register must display gallons and must be clearly visible for inspection. The register must be compatible with the Itron 100W encoded radio transmitter (ERT). Refer to Itron's documentation for a compatibility list.

Contact: United Systems & Software, Incorporated

Jody Cline

800.455.3293

jodyc@united-systems.com

The ERT must be an Itron 100W+ with encoded output. The ERT must be installed per Itron installation guidelines. The contractor must supply all necessary mounting material, cabling, etc.

For meters installed inside of facilities (e.g. Mechanical room), the ERT must be mounted on the outside wall of the room.

Meters installed in pits must utilize the appropriate "through the LID" antenna.

The ERT must be proven to be capable of communicating with Itron's Advanced Meter Reading (AMR) and/or Advanced Metering Infrastructure (AMI) technology. Camp Lejeune's current AMR technology includes Mobile Collector Lite (MC Lite). AMR technology consists of Choice Connect version 5, with Cell Collector Units (CCUs). Prior to acceptance, all installations must prove successful communication between the meter endpoint (ERT) and Camp Lejeune's endpoint AMR and/or AMI communication equipment (i.e. MCLite/FC300 handheld and/or CCU).

The contract must submit the following information for each location (meter) included in the project.

Meter: Make, Serial Number, Size, Compound (Y/N)

Register (aka Encoder): Make, Model, Dials, Multiplier, Unit of Measure (i.e. gallons)

ERT: Make, Model, ID, Latitude, Longitude.

D202004 INSULATION & IDENTIFICATION

Provide cellular glass insulation with vapor barrier on domestic hot water supply piping and on domestic cold water supply piping. Provide identification for piping and equipment.

D202005 SPECIALTIES

Provide ice maker connector box for refrigerators.

Provide overhead cold water hose reels for each vehicle.

D202090 OTHER DOMESTIC WATER SUPPLY

Provide piping supports in accordance with the IPC. Provide inspections, disinfection, and testing in accordance with the IPC.

Provide recessed water-outlet boxes for ice and coffee makers.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10’ column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12” gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

Provide plastic PVC piping, fittings, and solvent cement for below ground installation.

D203002 VENT PIPE & FITTINGS

Provide cast iron hubless pipe and fittings, rubber compression gasket joints and stainless steel banding.

D203003 FLOOR DRAINS

Provide floor drains in mechanical rooms, restrooms, break rooms, in proximity to emergency eyewashes and showers, and plumbing chase areas.

Provide floor sinks to receive condensate from air handling units.

Provide trench drains with a manual control valve installed in-line to connect to Oil Water Separator in vehicle maintenance labs and other spaces that require Oil Water Separators.

Provide trench drains at overhead doors in Dyno Rooms.

D203004 SANITARY & VENT EQUIPMENT

Provide sump pump in building drains that cannot discharge to the sewer by gravity.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTING

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10’ column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12” gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

D204002 ROOF DRAINS

Provide roof drains that are compatible with the roofing system.

D204004 INSULATION & IDENTIFICATION

Domestic, Storm and Condensate piping.

D204090 OTHER RAIN WATER DRAINAGE SYSTEM

NOT USED

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Obtain natural gas pressures from the local gas utility provider. Contractor must invite the utility provider to the design reviews. Contractor is responsible for any applications and permits, and must provide the complete natural gas system from the load side of the utility meter to the heating equipment. Provide steel natural gas piping system. Include gas distribution piping from the gas meter to points of usage. Follow Camp Lejeune design standards for piping pressures inside the building.

The Contractor must provide the projected loads to the gas utility provider 6 months prior to in-service date. The Contractor must have the local gas utility provider install piping and appurtenances up to the load side of the meter. Tie the gas meter into the Building Automation System (BAS) and the existing Advanced Metering Infrastructure (AMI) metering system.

Natural Gas Utility Provider Information:

Piedmont Natural Gas (PNG)

Invite the following to Design Reviews:

- Michael Lilly - PNG Commercial and Residential Sales Specialist - michael.lilly@duke-energy.com - 252-808-7292
- Bobby Gurganus - PNG Construction - bobby.gurganus@duke-energy.com - 252-670-9613

D209002 ACID WASTE SYSTEMS

NOT USED

D209003 INTERCEPTORS

Provide an oil/water separator for the vehicle labs and other spaces as required.

D209005 COMPRESSED AIR SYSTEM

Provide a central compressed air system with primary and standby compressors to serve the vehicle maintenance tools and equipment throughout the facility. Provide compressed air to the rooms as indicated in Section 3, Chapter 5, Room Requirements, and as requested by the building owner.

Provide air compressor, refrigerated air dryer, aftercooler, and receiver. Provide piping and compressed air drops with quick disconnects throughout the work areas to allow connection of equipment such as pneumatic tools and air guns. Provide hose reel with one compressed air drop per vehicle. Provide other compressed air outlets as directed by owner.

D209090 OTHER SPECIAL PLUMBING SYSTEMS

NOT USED

--End of Section--

D30 HVAC – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Provide the following type of high performance system:

Provide a variable air volume (VAV) system with shut-off terminal units and hot water heating coils. The VAV AHU will feature a chilled water-cooling coil and a hot water preheating coil. Ventilation air will be provided via the VAV AHU(s). Provide a total enthalpy fixed plate heat exchanger energy recovery section in the VAV AHU. Chilled water will be generated by an air-cooled chiller, and hot water will be generated by condensing gas boiler[s]. Size the AHU coils, chillers, and boilers for full capacity, in the event of a heat recovery system failure.

The primary air from the VAV AHU will be ducted to the terminal units by medium-pressure galvanized metal ductwork. Supply air from the terminal unit to the zone and return air from the zone to the AHU will be ducted by low-pressure galvanized metal ductwork.

Provide dedicated outdoor air AHUs (DOAS) with fixed plate energy recovery to serve the vehicle maintenance labs.

Roof mounted equipment is not permitted.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections, and accessories required for a complete and usable system. Install all equipment in accordance with the criteria in Performance Technical Specification Section D30 and the manufacturer's recommendations. Where the word "should" or “must” is used in manufacturer’s instructions, substitute the word "must."

Economizer cycles must not be used.

The new facilities must not use rooftop heating, ventilation, and air conditioning (HVAC) equipment. All major HVAC equipment must be located in mechanical rooms. Consider attic and above-ceiling placement of AHU equipment only when absolutely necessary. Stairs are required for any above-ceiling or attic located air-handling equipment (excluding VAV terminals). Attic space may be used for mechanical equipment if there is a 6-foot-wide stairway with double doors for maintenance purposes. Equipment with cooling coils placed above ceilings must have secondary drain pans with approved gravity drainage piping.

Provide corrosion protection for ALL exterior HVAC equipment, including air-handling units (AHUs), heat exchanger coil surfaces, equipment casings, air-cooled water chiller coils, heat pumps, and air conditioning units that are exposed to the weather. Corrosion protection is also required on HVAC equipment within buildings that are subject to the outside weather conditions. Specifically, equipment requiring protection is defined as the first HVAC equipment (unit coils) met by the outside air in the supply air ductwork system. The corrosion protection must meet or exceed the requirements of a 3000-hour salt spray test in accordance with ASTM International (ASTM) B117. The specified capacities on the plans and specifications must be the capacities after the required corrosion protection coatings are applied. Specify manufacturer's standard off-

the-shelf anti-corrosion options for "coastal" or "sea coast" installations that meet or exceed the requirements stated above.

Provide radiant barriers in the exterior wall system. Optimize the building envelope and window requirements to exceed ASHRAE 90.1-2013.

Provide premium-efficiency motors, chillers, and boilers, and optimize the HVAC system.

Provide Seal Class A on all ducts to reduce duct losses. Increase thermal insulation on mechanical systems and use radiant barriers to reduce thermal losses.

Provide chemical shot feeders, air separators, and bladder type expansion tanks for hydronic systems. Provide inline centrifugal pumps with inlet suction diffusers, isolation valves, discharge check valves, balancing valves, drain valves, differential pressure gauges, and flexible pipe connectors and coupling guards.

Single-phase fractional horsepower alternating current motors must be high-efficiency types corresponding to the applications listed in National Electrical Manufacturers Association (NEMA) Motors and Generators (MG) 11. Select polyphase motors based on high-efficiency characteristics relative to the applications listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium-induction motors with continuous ratings must meet or exceed energy-efficient ratings per Table 2-10 of NEMA MG 1. Provide controllers for three-phase motors rated 1 horsepower (hp) and above with phase voltage monitors designed to protect motors from phase loss and over-/under-voltage. All motors 1 hp and larger must be premium efficiency. Provide the means to prevent automatic restart by a time-adjustable restart relay. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart. Provide reduced-voltage starters for all motors 25 hp and larger.

Provide minimum 4-inch (100 mm) thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment.

Provide factory painted finishes that are designed for 3000-hour duration test for outside equipment and for equipment bringing in outside air.

Provide a manufacturer approved coating system for coastal environments on mechanical equipment, cooling, heating, and condenser coils on units with more than 5 tons of cooling capacity. The submittals must indicate heat transfer rating of coated coils.

The facility must have a complete air and water balanced HVAC system. Calculations must be provided and show the air and water systems are balanced. Drawings must also show balanced air and water systems.

Provide air conditioning and heating for spaces as indicated and for the following Design conditions:

Outside Conditions

Summer	91	Degrees F dry bulb	Winter	26	Degrees F
	79	Degrees F wet bulb	Dehumidification	140	Grains/lb

Inside Conditions – Occupied Areas including vehicle maintenance labs

Summer	78	Degrees F dry	Winter	68	Degrees F

		bulb			
	50	%RH			

Heating and Ventilating Conditions – Electrical Rooms, Mech Rooms with Heat producing equipment (Boilers, Water Heaters, etc)

Summer	10	Degrees F dry bulb above ambient	Winter	55	Degrees F

Inside Conditions – Cold Mechanical Rooms (AHUs and pumps)

Summer	N/A	Degrees F dry bulb	Winter	55	Degrees F
	55	Degrees F Dew Point			

Inside Conditions – Communication and IT Rooms

Summer	78	Degrees F dry bulb	Winter	NA	Degrees F
	55	Degrees F Dew Point			

Provide Ventilation rates and systems per ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*. Provide carbon dioxide (CO_2) sensors to limit CO_2 concentration to 800 parts per million (ppm) in spaces with 25 or more occupants per 1,000 square feet (SF).

Provide carbon monoxide (CO) sensors with audible and visual alarms if CO concentration is greater than 25 ppm in areas where internal combustion engines will be operating.

Noise levels must comply with the requirements in the latest edition of the ASHRAE Applications Handbook. The design must provide noise level control by requiring maximum noise levels as well as noise separation areas for the Mechanical Rooms. The drawings must specify the maximum equipment noise level. Classrooms must not be adjacent to mechanical rooms

Mechanical room(s) and electrical room(s) with heat producing equipment must each be a separate zone, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01

Cold mechanical rooms(s) (AHU’s, chilled water pumps) must each be a separate zone, heated and dehumidified.

Provide a separate zone for IT closets, telecom rooms and server rooms. These zones shall be served by dedicated DX split system equipment.

The HVAC system must provide each zone with the choice of heating or cooling year-round unless otherwise indicated. Provide each zone with its own thermostatic range of control.

Zone the HVAC system as follows:

Administrative spaces such administrative areas, offices, shops, maintenance control, quality assurance, ready rooms, conference rooms, flight equipment, training rooms, tool rooms, restrooms, lockers, elevator lobbies, break rooms, corridors, and project rooms must be zoned separately, such that each administrative space greater than 175 square feet (SF) is its own zone, and any spaces less than 175 SF must be grouped into a single zone.

- Corridors must not be on separate zones. Locate thermostats for corridors in separate occupied spaces.
- Provide a separate zone for the boiler room, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01.
- Provide a separate zone for occupied spaces.
- Provide a separate zone for the boiler room, heated and ventilated only.
- Provide a separate zone for the chilled water pump/AHU room, heated and dehumidified only, no ventilation.
- Provide a separate zone for IT closets, telecom rooms and server rooms.
- Provide a separate zone for electrical rooms.
- Provide a separate zone for Vehicle Labs. Interlock DOAS with vehicle exhaust system.
- Provide a separate zone for Vehicle Dyno rooms.
- Provide a separate zone for Battery/Hazmat rooms.
- Provide a separate zone for the Fuel Lab.

For unoccupied mode, provide the following night setback temperatures:

- For winter, 10 degrees F lower than indoor heating design conditions, but no lower than 55 degrees F.
- For summer, 5 degrees F higher than indoor cooling design conditions, but no higher than 85 degrees F.
- Year round, 60 percent RH maximum.

Provide thermostats and temperature sensors with occupant adjustment control of +/- 3 degrees F.

Provide a manufacturer approved coating system for coastal environments on mechanical equipment, cooling, heating, and condenser coils on units with more than 5 tons of cooling capacity. The submittals must indicate heat transfer rating of coated coils.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

NOT USED

D301002 GAS SUPPLY SYSTEM

Provide a natural gas supply system for the heating of the facility. Natural gas must be the energy source (at a supply pressure of 5 inches water column [w.c.] minimum to 7 inches w.c. maximum) for all building heating systems. Provide a complete natural gas supply system as detailed in the specification in accordance with National Fire Protection Association (NFPA) 54, the North Carolina Building Code, the North Carolina Mechanical Code, and natural gas supplier requirements. Size natural gas piping to carry 15% more flow than is required by heating loads. Obtain natural gas pressures from the local gas company, Piedmont Natural Gas (PNG). The Contractor is responsible for coordinating with PNG and the Contracting Officer regarding the natural gas requirements for each facility. Provide a complete natural gas system, including any applications and permits. PNG will provide the natural gas to within 5 feet of each facility.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

NOT USED

D301004 HOT WATER SUPPLY SYSTEM

NOT USED

D301005 SOLAR ENERGY SUPPLY SYSTEMS

NOT USED

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility consisting of at least two boilers. Each boiler must be no greater than 399,000 Btu/hr. For loads less than 399,000 Btu/hr provide two boilers with 100% redundancy. For loads greater than 399,000 Btu/hr and two boilers are needed based on size limitations, each boiler must supply no less than 65% of the heating load. Where more than two boilers are required to meet size limitations, size each boiler for 1/N of the total load, where “N” is the total number of boilers. On multiple boiler installations with the largest boiler off line, the remaining boiler(s) must be capable of carrying not less than 65% of the maximum winter design load. The boiler fuel train must be compatible to match the available source at the project site. Use the building block load to size the heating plant.

Refer to Part 3, Chapter 2, Paragraph 2.3.9 Air Quality Management, for air emission permit information. Air Emission permit is required for each combustion device provided.

All combustion sources are subject to the NC Air Toxics Permitting requirements.

D302001 BOILERS

Provide packaged gas-fired condensing type boilers. Provide minimum 90% efficiency boilers with stainless steel heat exchangers. All heating equipment boilers must have the ENERGYSTAR label. Provide a stainless steel, multi-wall insulated boiler stack. The stack must be pre-engineered and pre-manufactured, Underwriters Laboratory (UL) listed, and must meet NFPA 211. Fuel for boilers must be natural gas. Provide boiler(s) with a condensate neutralization tank/kit.

All vents on gas control valves must be routed outdoors as required by NFPA 54. All gas lines serving gas-fired equipment must be fitted with UL or Factory Mutual approved gas trains suitable for the gas being provided.

D302002 FURNACES

NOT USED

D302003 FUEL-FIRED UNIT HEATERS

NOT USED

D302004 AUXILIARY EQUIPMENT

NOT USED

D302005 EQUIPMENT THERMAL INSULATION

Provide all hot water equipment with cellular glass insulation with vapor barrier jacket or molded fiberglass with vapor barrier jacket.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

HVAC refrigeration and air conditioning compressors must have full 5-year warranties including all parts and labor from the time of Beneficial Occupancy

Provide rotary screw or scroll air-cooled chillers. Provide high-efficiency air-cooled chillers. Provide constant primary/variable secondary pumping systems on single chiller systems greater than 60 tons and on multiple chiller systems. Primary pumping may be used only on single chiller systems less than 60 tons. Keep flow through the chiller constant; do not use variable primary flow. A buffer tank must be provided on all systems to provide thermal inertia. Provide multiple chillers for loads greater than 160 tons with each chiller sized for 50% of the total facility cooling load.

For unique facilities that exhibit widely variable occupant loading, multiple dissimilar sized chillers must be provided as appropriate for the low occupancy condition and fully occupied condition.

The chillers must be located in an exterior equipment yard area and properly spaced from each other and other equipment away from building perimeter. The air-cooled chiller(s) must be located outside on a 150 mm (6-inch) thick reinforced concrete housekeeping pad. Provide heat tape to ensure freeze protection as low as 10°F on chilled water piping and any other associated appurtenances. Refer to the MCB Camp Lejeune mechanical policy for the

requirements for phase and voltage protection requirements for chillers. Provide emergency chiller connections consisting of isolation valves and blind flanges.

Low ambient capability must be provided to allow chillers to operate in temperatures as low as 15°F (-9.4°C).

All coils must have the approved coatings that pass a salt-spray test conducted per ASTM B117 for duration of at least 3,000 hours and provide a minimum of loss of heat transfer due to the thickness of the coating.

Provide the approved quantity, size, spacing, material, and height of bollards around all yard equipment.

Provide blind flanges with butterfly isolation valves at the chiller location for emergency portable chiller connection. Coordinate site plan design to accommodate access needed for an 18-wheeler flat bed to park near the flange location.

Provide chiller controls with BACnet communication protocol.

Provide complete start-up and operational testing of chiller equipment.

Provide heat tracing of the chiller bundle and all above ground piping and valves, etc. that are subject to freezing.

Provide insulation and vapor barriers on all chilled water equipment.

Provide complete system flushing and start-up for the entire chilled water system including piping.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for chilled water piping system.

Startup must include operational testing of chiller equipment and full commissioning.

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled DX ductless split system cooling only unit for IT closets, telecom rooms, and server rooms and any other space requiring independent conditioning. If the unit does not have a BACnet system interface, provide a room temperature sensor and a current sensor, tied to the building DDC system, to determine the operating status of the system. Size DX cooling equipment at 120% of IT equipment load. Provide low ambient cooling.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide shutoff-type terminal units with hot water reheat coils to serve occupied spaces except vehicle maintenance labs. To maximize energy savings on this project: the shutoff-type terminal units must comply with ASHRAE 55 and sized to meet indoor design conditions (temperature, humidity, ventilation, etc.) that are used in the design; do not size shutoff-type terminal units to maintain a minimum of 4 AC/Hr in occupied mode.

Provide DOAS units for vehicle maintenance labs to maintain temperature comfort. Units must modulate the amount of DOAS exhaust fan when vehicle exhaust system is active to maintain

slightly negative pressure with respect to corridors and classrooms and neutral to slightly positive pressure with respect to the outdoor ambient pressure. If DOAS exhaust fan is turned off and the space is still negative with respect to outdoor, DOAS supply fan must modulate to maintain space pressurization requirements.

Provide insulated, galvanized steel ductwork in concealed locations constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards. For exposed ductwork, provide insulated, double walled, galvanized steel duct.

Provide medium-pressure duct from VAV AHU to shutoff-type terminal unit. Provide round or flat oval primary supply air duct. Size the medium pressure duct according to the static regain method. Provide low-pressure supply air duct from the terminal unit to the zone being served. Provide low-pressure return air duct from the zone to the VAV AHU. Provide a minimum of 6 diameters of rigid straight duct at the inlet to each VAV terminal to maintain a uniform velocity profile at the valve inlet for airflow measurement accuracy. Flexible duct connection to the primary air inlet of VAV terminal is not permitted.

Provide shutoff-type terminal units typically above lay-in ceilings. Provide terminal units above hard ceilings with lockable access panels.

Provide aluminum grilles, registers, and diffusers. Provide linear slot diffusers including manufacturer insulated plenum.

Provide manual balancing dampers for all main and branch ducts. Incorporate product requirements identified in the UFGS 23 00 00 Manual Balancing Damper Editing Guide, in RFP, Part 6, into project specifications.

Install all metal duct to Seal Class A standard. Insulated flexible duct may be installed in low-pressure supply duct but may not exceed 5 feet in length or provide more than a 45-degree change in direction. Flexible duct may not be installed in return or exhaust air duct.

Provide AMCA 540 and 550 rated louvers.

Size low pressure supply ductwork at 0.08"/100LF and negative pressure return/exhaust at 0.05"/100LF (max).

Provide rigid foil faced board insulation where ducts are exposed in mechanical spaces. Provide pre-manufactured double wall ductwork on building exterior or where ducts are exposed in occupied spaces. Insulate all ductwork.

Mineral fiber blanket wrap must meet the requirements of ASTM C1136, ASTM C1290, ASTM C1338, ASTM E84, UL 723, NFPA 90A, and NFPA 90B.

Rigid mineral fiber must meet the requirements of ASTM C553, ASTM C612, ASTM C1136, ASTM 1393, ASTM E84, and UL 723.

Make duct penetrations of all walls with sheet metal ducts. Flexible duct penetrations of walls are not acceptable.

Coordinate locations of all air devices with ceiling mounted equipment. Maintain minimum of 3'-0" from ceiling mounted smoke detectors.

Provide unvaned radius elbows with a radius equal to 1 ½ times the duct width. Provide all 90-degree mitered square elbows with turning vanes with a radius equal to 2 times the duct width. Provide access doors upstream of all elbows with turning vanes.

Do not hangs duct from other ducts.

Provide canvas duct connectors for all equipment ductwork connections containing fans. Provided grounding across flexible connections with flexible copper grounding straps. Grounding straps must be bolted or soldered to both the equipment and the duct.

Ductwork and air handling equipment must be sealed and protected from dirt and debris during the entire construction duration.

Provide separate chases for ductwork and piping. Do not install ductwork and piping in the same chase.

Route all ductwork perpendicular and parallel to the building structure.

Where sheet metal is visible through the face of air terminals, paint sheet metal with a flat black enamel finish.

Manual Balancing Dampers (Accessible): Round type is not acceptable. Provide pre-manufactured rectangular type with 16 gage galvanized steel channel frame with corner braces. Blades will be opposing type 16 gage with a maximum width of 8". Provide with a 20 gage blade stop on units 12" high and under. Provide with position lock, molded synthetic bearings, and square shaft.

Manual Balancing Dampers (Inaccessible): Provide cable operated remote controlled volume dampers in inaccessible branch ducts feeding diffusers. Dampers must be adjustable through the diffuser face with standard hand tools, providing positive balancing of multiple airflows to maintain design air throw and noise criteria. Radial damper must be direct actuated by a brass plated rotary cable which is fixed at the damper end in an integral support bracket. Rotary cable must have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions. The entire assembly must be furnished as one piece for installation with no linkage adjustment required or miscellaneous small parts. Each unit must be factory tested as a complete assembly prior to shipment (100% testing). Accessible cable end must be secured with a factory furnished nylon clamp, allowing maximum placement flexibility. Positive, direct, two-way damper control must be provided without sleeves, springs, or screw adjustments (that may loosen after ceiling closure).

Motorized dampers frame must be 16 gage (1.6) galvanized steel structural hat channel with tabbed corners for reinforcement for 11 gage (3.05) structural equivalence. Blades must be 14 gage (2.0) equivalent thickness galvanized steel, roll-formed airfoil type for low pressure drop and low noise generation. Blade edge seals must be suitable for -72°F to +275°F and mechanically locked into the blade edge. Adhesive or clip-on type seals are unacceptable. Jamb seals must be flexible metal, compression type to prevent leakage between blade end and damper frame. Blade end overlapping frame is unacceptable. Bearings must be corrosion resistant, permanently lubricated stainless steel sleeve type turning in an extruded hole in the damper frame. Axles must be hexagonal positively locked into the damper blade. Linkage must be concealed out of airstream, within the damper frame to reduce pressure drop and noise. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Dampers must be equipped with factory installed damper position indication switch package. The switch package must include two position indication switches linked directly to the damper blade to provide full open and full closed damper blade position. The switch package must be capable of interfacing with the HVAC control system and provide remote damper blade position status. Factory mounted damper actuators with adjustable

memory stops must be furnished and mounted by the damper manufacturer in their factory. Each damper must be cycle tested at the factory prior to shipment.

D304002 STEAM DISTRIBUTION SYSTEMS

NOT USED

D304003 HOT WATER DISTRIBUTION SYSTEMS

For exterior buried Hot Water Distribution Systems see Section G30, *Site Civil/Mechanical Utilities*.

Provide a variable speed pumping system to serve the HVAC hot water equipment throughout the facility. Provide two pumps, each sized at 100 percent of building load. Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility.

Provide valves and related hot water system appurtenances. Provide a bladder type expansion tank and air/solids separator for the hot water system. Provide a shot type feeder for manual chemical feed to the hot water piping system.

Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with mineral fiber insulation.

Provide system flushing and startup for the hot water piping system.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for hot water piping system.

Provide complete startup and operational testing of all hot water systems.

Hot-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

D304004 CHANGEOVER DISTRIBUTION SYSTEMS

NOT USED

D304005 GLYCOL DISTRIBUTION SYSTEMS

NOT USED

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

Provide a variable speed pumping system to serve the HVAC chilled water equipment throughout the facility. Provide a primary and standby pump each sized at 100 percent of building load.

For buildings with less than 60 tons of cooling load, provide a constant primary pumping system to serve the HVAC chilled water equipment throughout the facility. For buildings with more than

60 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with a single primary pump per chiller. For buildings with more than 160 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with one primary pump per chiller. In all cases, keep flow through the chiller constant.

For building less than 160 tons, provide two primary pumps or two secondary pumps as appropriate with each pump sized for 100% flow. For buildings with more than 160 tons, provide three secondary pumps, each sized for 50% of maximum building flow. Two pumps must operate as duty pumps and the third must act as standby. Provide a control sequence to rotate pump duty/standby assignments monthly and equalize running hours.

Provide valves and related chilled water system appurtenances. Provide a bladder type expansion tank and air/solids separator in chilled water system. “Triple duty” or “multi-purpose” valves that combine a check valve, throttling valve, and shut-off valve must not be used for the chilled water system. Provide air vents at all terminal equipment and system high points for air control.

Provide steel and copper chilled water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with cellular glass insulation on all above ground chilled water distribution piping.

Provide air vents at all terminal equipment and system high points for air control. Provide a shot type feeder for manual chemical feed for the chilled water piping system.

Provide thermal mass capability in the chilled water system to insure proper control and longevity of chillers by using inertia tanks. Provide inertia tanks, sized per chiller manufacturer recommendation to ensure stability of operation and temperature setpoint control. Total chilled water system volume must be a minimum of 7 gallons per ton of cooling. Provide an insulated storage tank within the mechanical room in order to meet this requirement.

Provide insulation, vapor barrier, and aluminum jacketing on piping exposed to outdoors. Install heat tracing on piping to ensure freeze protection to 10°F.

Provide system flushing and startup for the chilled water piping system.

Provide complete startup and operational testing of all chilled water systems.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

Provide threaded joints for steel pipe 2" or less and welded or bolted flange for sizes greater.

Provide flanged connections with flexible braided stainless steel connectors at all equipment connections.

Provide pre-manufactured dual containment system consisting of carrier pipe, cellular glass carrier insulation, air space, steel conduit, polyurethane outer insulation, and seamless extruded HDPE casing for direct buried piping. The carrier pipe must be ASTM A53 steel schedule 40 or 80 as scheduled. The product must be rated for corrosion resistance without the need for cathodic protection. Provide with leak detection system.

Chilled water piping 4 inches and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4 inches.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards. Install exhaust duct according to Seal Class A.

Provide ducted exhaust ventilation rate according to ASHRAE 62.1.

Provide stainless-steel fume hoods that are rated for heat and vapor removal with associated ducts and fans.

Provide battery charging area with dedicated exhaust according to IMC 2018 and UFC 3-520-05 requirements.

D304008 AIR HANDLING UNITS

Provide central station VAV AHUs to provide constant temperature primary supply air to all terminal units. Provide hot water preheating coils, chilled water-cooling coils, variable-speed fan sections, ultraviolet coil disinfection systems, and energy recovery sections. Units must include additional sections as necessary to facilitate ready access to all maintainable components.

Provide central station DOASs to provide temperature comfort and differential pressure control. Provide hot water preheating coils, chilled water-cooling coils, hot water reheat coil variable-speed exhaust and supply fan sections, ultraviolet coil disinfection systems, and energy recovery sections. Units must include additional sections as necessary to facilitate ready access to all maintainable components.

The energy recovery section must be a fixed plate total enthalpy heat exchanger with MERV 8 prefilters and MERV 13 filters upstream of the unit in both the outside air and exhaust air streams. If AHU manufacturers are unable to provide these filters in the central station unit, provide ducted filter boxes outside the unit in a location accessible for filter replacement.

Provide the means to measure filtered outdoor airflow to verify proper ventilation.

Provide modular, central station, air handlers with the following:

Unit panels must be 2-inch solid. Exterior surfaces of the unit casing must be factory painted to withstand ASTM B117 90 3000-hour salt spray requirements.

All interior casing panels must be made of stainless steel.

Casing air leakage must not exceed leak class 9 (CL = 9) per ASHRAE 111.

Panel insulation must provide a minimum thermal resistance (R) value of 13 $ft^2 \cdot h \cdot {}^oF/Btu$ throughout the entire unit.

Access doors must be 2-inch double-wall construction with latching door handles.

Provide factory-mounted, weather-resistant, light emitting diode (LED) fixtures in sections of the unit for maintenance and service visibility.

Provide a fan array for the supply and return. The fans must be direct drive, single-width, single-inlet plenum. The fan blades must be aluminum backward-inclined airfoil. Fan array fans must be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.

The fan and motor assembly must be internally isolated from the unit casing, furnished and installed by the unit manufacturer.

Provide with factory mounted VFD for control of fan speed to modulate the airflow.

Provide 24-inch-long (min.) modular inspection sections with removable doors on both sides of the chilled water coil module.

The coil must have a factory applied flexible epoxy polymer coating (1 mil min. thickness) uniformly applied to all coil surface areas without material bridging between fins.

Provide two sets of spare filters for each AHU.

Provide a factory-installed dial type differential pressure gauge piped to both sides of the filter to indicate status.

A mixing section module must be provided to support the damper assembly for outdoor, return, and/or exhaust air. Dampers must modulate the volume of outdoor, return, or exhaust air. The dampers must be of double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades. The blades must rotate on stainless-steel sleeve bearings. Airfoil dampers must be rated for a maximum leakage complying with ASHRAE 90.1.

Provide an air blender section to mix outside and return air, minimize stratification, and reduce the risk of frozen coils.

Fully modulating 2-way hydronic coils. If the AHU is at the end of the water loop, a 3-way valve arrangement at the final coil connection is acceptable in lieu of a bypass.

Provide a factory installed combination VFD/disconnect for each fan motor. Each VFD/disconnect must be properly sized, factory mounted in a full metal enclosure, wired to the fan motor (s), and commissioned. VFD/disconnects must include a circuit breaker disconnect with a through-the-door interlocking handle designed to rest only in the full ON or OFF state and must be lockable in these states. A concealed defeater mechanism must allow entry into the enclosure when the handle is in the ON position. The VFD package must also include:

- Electronic manual speed control
- Current limited stall prevention
- Auto restart after momentary power loss
- Speed search for starting into rotating motor
- Anti-windmill with DC injection before start
- Phase-to-phase short circuit protection
- Ground fault protection

D304090 OTHER DISTRIBUTION SYSTEMS

Provide inline pumps with variable frequency drives.

Hangers, Clamps, Rollers, and Supports must comply with MSS SP-58 unless otherwise noted. Steel channel strut and angle iron are acceptable materials for field constructed trapeze hanger assemblies where the rated load limit is not exceeded. Provide with MSS type carbon-steel hanger rods, nuts, saddles, and U-bolts.

Run all horizontal piping above ceiling unless otherwise noted.

Provide full line size valves except control and balancing valves. Provide extended plugs and labels where piping is insulated. Provide removable insulation over plugs.

Provide manual air vents at all high spots and the ends of all piping loops. Do not use automatic air vents in any place other than mechanical rooms where floor drains are already provided for. Provide 1/2" drain valves at low points in piping. Provide minimum pitch sufficient to insure adequate venting and draining.

Provide permanent flushing isolation valves and tees at both sides of all hydronic equipment. Provide tees with ¾” hose end connection and removable brass cap.

Do not hang pipe from other pipe.

Do not use flexible braided pipe to change direction at equipment connections regardless of manufacturer documentation.

Do not bend pipe or pipe hangers to correct poor alignment.

Route all piping perpendicular and parallel to the building structure.

Maintain a minimum of 3'-6" of ground cover over all underground HVAC piping.

Install piping so that all valves, strainers, unions, traps, flanges, and other appurtenances requiring access are accessible from below.

Install valves so that the valves will remain in service when equipment or piping on the equipment side of the valve are removed.

Provide balancing valves with position indicators and maximum adjustable stops (memory stops).

Provide chain wheel operators for all valves in equipment rooms mounted greater than 7'-0" above floor level; chain must extend to 7'-0" above floor level.

Install unions and/or flanges at each piece of equipment, in bypasses, and in long piping runs (100 feet or more) to permit disassembly for alteration and repairs.

Install all piping without forcing, springing, or bending.

Tap all branch lines from top of piping mains (45 degrees preferred, 90 degrees acceptable).

All valves must be set up and adjusted for smooth and easy operation.

All piping work must be coordinated with all trades involved. Offsets in piping around obstructions must be provided at no additional cost to the government.

Provide stainless steel flexible connections in all piping systems connected to pumps, chillers, cooling towers, and other equipment which require vibration isolation. Flexible connections must be provided as close to the equipment as possible.

Unless otherwise noted, all chilled water and hot water piping must be no less than ¾".

All piping must clear doors and windows.

Provide dielectric fittings at all pipe connections of dissimilar metals.

All piping must be free of dirt, debris, and moisture prior to installation of insulation. Chilled water systems must be disabled, brought to room temperature, and free of external moisture prior to insulation installation.

Install piping in accordance with the latest editions of MSS SP-58 and ASME B31.9. Use MSS type hangers and supports. Provide saddles and base supports. All-thread rod is acceptable for tension support applications only, not compression.

Select thermometers and pressure gages where the operating condition falls within the middle third of the range.

Provide chrome plated escutcheon plates for exposed pipe penetrations in occupied spaces.

Do not route pipe risers in duct shafts. Do not penetrate fire rated shafts with pipe unless the shaft is specifically allocated for that service.

Size all hydronic piping between 1 feet and 4 feet total dynamic head pressure drop per 100' length.

Grooved piping and press fittings are prohibited in all applications.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide gas fired or hot water unit heaters to serve the heating requirements of mechanical and air handler rooms of the facility.

D305003 FAN COIL UNITS

NOT USED

D305004 FIN TUBE RADIATORS

NOT USED

D305005 ELECTRIC HEATING

NOT USED

D305006 PACKAGE UNITS

NOT USED

D305007 COMPUTER ROOM AIR CONDITIONING (CRAC)

NOT USED

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROL SYSTEM (DDCS)

Provide a complete Direct Digital Control (DDC) system to comply with UFGS 23 09 00.00 22 Instrumentations and Control for HVAC, UFGS 23 09 13.00 22 Instrumentation and Control Devices for HVAC, and UFGS 23 09 23.02 22 BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems for the facility. All Camp Lejeune specific standards and requirements in Division 23 sections in Part 5 of this RFP must be incorporated into the design where applicable.

The DDCS must utilize intelligent distributed controllers, which communicate over a controller network in accordance with ASHRAE Standard 135-2016, BACnet – A Data Communication Protocol for Building and Control Networks. Provide all necessary hardware, software and control devices to perform the optimal operation of the entire HVAC system and other building systems.

The Energy Management Control System (EMCS) has an existing front-end system managed by DPW. The government is responsible for integration of the building onto the base-wide network and integration of new buildings into the front-end. Contractor point of demarcation is the field point of contact (FPOC) and will be designed using BACnet protocol for future integration. The EMCS building level system must be designed and commissioned to match the existing ATO level of L-M-M. Contractor must use DDC equipment and Meters selected from base ATO approved equipment listing or must provide forty (40) hours testing time and support for DPW cybersecurity testing and hardening at the base's test environment. Only equipment capable of meeting cybersecurity hardening requirements will be accepted for use.

Provide two (2) CAT6 cables from the Supervisory Panel to the telecommunications closet. Incorporate requirements identified in the UFGS 23 09 00.00 22 provided in RFP, Part 5, into project specifications.

Provide meters, monitored by DDC, on the following incoming utilities of the building: Domestic water, natural gas, electricity. Tie the gas meter into the existing Advanced Metering Infrastructure (AMI) metering system. For electrical energy monitoring refer to Section D50, *Electrical,* paragraph entitled, *Service Entrance Equipment.* For potable water meter refer to Section G30, *Site Civil/Mechanical Utilities,* paragraph entitled, *Potable Water Distribution.*

Preferred location for water meter is in the mechanical room.

Provide meters, monitored by DDC, on the following subsystems for steam, gas and water: HVAC and processes.

Provide ASHRAE Standard 135 building controller as the main interface for the building control system.

Provide notebook computer(s) and complete application software with all licenses.

Provide patch panel in the mechanical equipment room for ease of connection and disconnection of equipment.

Provide panels with locks and alarms. The alarms must include both a flashing light and an audible alarm inside the mechanical room. The alarms must also be a networked alarm (e.g. switch connected to controller DI) with alarm events recorded remotely for a period not less than one year.

Provide flow rate meters, monitored by the DDC system, for central, chilled, and hot water flow.

Provide air handlers and all terminal units, including VAV boxes, with discharge/supply temperature sensors.

Provide air handler unit outside air flow monitoring stations.

Provide a DDC option for automatic operation of building circulating pumps whenever outdoor air temperature is below 35 degrees F or when there is a high potential for freeze damage.

Provide control to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Primary and back-up equipment starter circuits must be wired to prevent both pieces of equipment from operating at the same time. Rotate primary and back-up HVAC equipment monthly (adjustable) with a lead/lag control routine.

Provide the following phase monitors for all 3 phase equipment:

1. Phase loss protection
2. Phase reversal protection
3. Phase unbalance protection

Provide the following phase monitors for all 3 phase chillers:

1. Phase unbalance protection
2. Over/under voltage protection
3. Phase loss protection
4. Delay of break timer to delay automatic restarts
5. Non critical fault delay
6. Programmable auto/manual restart
7. Load and line side monitoring
8. Phase reversal
9. Phase unbalance

Provide new DDCS front-end notebook computer(s) loaded with all necessary application software displaying graphic floor plan, equipment graphics, control diagrams, and complete sequence of operations graphic pages. Provide all alarming, trend services, and schedules and other BACnet services and configurations as described in the UFGS 23 09 23.02 22. Provide and incorporate all new control points and sequences by creating new graphics, alarms, trends, schedules, and system reports. In addition, provide each graphic screen of mechanical equipment with links to the applicable as-built written sequence of operation that fully describes every operating routine and as-built DDC wiring diagram.

Non-BACnet compliant or proprietary equipment or systems, including gateways/protocol convertors, are not desired and are to be avoided unless a conflict dictates, at which time Government review and approval will be required.

The Contractor must be responsible for developing construction documents in accordance with United Facilities Criteria (UFC) for the design of standard HVAC control systems including:

1. UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, dated 18 July 2018

2. UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, with Change 1; 1 October 2013 – Standard 18, Emergency Air Distribution Shutoff

DDC System Design: Submit all design documents to be reviewed and approved by Government. Control system design must include the following:

1. EMCS Control Diagrams showing the configuration of each system and equipment with applicable schematic flow diagram, control/field devices, device tags, input/output designations, and applicable field/interlock wiring in accordance with UFC 3-410-02.

2. EMCS Network Riser Diagram showing the layout of DDC system network, all network hardware, controllers, and notebook computer(s) in the building. The diagram must show the locations of notebook computer(s), network hardware, switches/router/hubs and network routing, distinguishing between different forms of media (i.e. Fiber, Category 5/6, shielded twisted pair, coaxial cable, etc.). Various types of LANs must be identified and distinguished from each other.

3. The Sequence of Operation describing all control processes and operation that are controlled by the control system must be included. The sequence of operation must be clearly shown in a text narrative form in order to demonstrate a clear understanding of how the system is to operate and be specific to the control system equipment used.

4. The DDC System Point Schedules indicating, at a minimum, the control point name, input/output designation, device code/tag, fail mode/position, software functions, alarms and alarm limits in accordance with UFC 3-410-02.

5. Provide control system specification to ensure that all of the components, which are expected to be used in the DDC system installation, are properly specified. In addition, the control system specifications must also specify detailed requirements for testing and commissioning of the DDC system. The control system specifications must also include all training requirements.

6. Provide graphic screens including mechanical floor plan indicating control locations and front-end graphic screens of mechanical equipment controls. The graphics must be submitted during construction stages for review and approval by Government.

DDC System Network Architecture:

1. The primary DDC system network, including DDC system network hardware, supervisory/building controllers (BC), Advanced Application Controllers (AAC) for major mechanical equipment, and DDC system notebook computer(s), must communicate via a dedicated DDC system network backbone using BACnet over IP (BACnet/IP). Using the Government Local Area Network (LAN) for DDC system communication is strictly prohibited.

2. The field controllers such as Advanced Application Controllers (AAC) and Application Specific Controllers (ASC) for small mechanical equipment, terminal units and miscellaneous/unitary equipment must be connected to the associated DDC system network hardware and supervisory/building (BC) controllers, and communicate via secondary DDC system network using BACnet MS/TP.

3. Network controllers, switches and/or routers must be provided to extend DDC system network throughout the facility, where necessary.

4. Non-BACnet-compliant or proprietary equipment or systems including gateways using a proprietary communication protocol are not acceptable and are strictly prohibited. For the existing equipment communicating with the existing control system using a proprietary or non-BACnet communication protocol, provide necessary gateway or network interface directly connected to the new DDC system network using a BACnet communication protocol.

Critical Systems:

1. For the DDC system associated with the critical equipment, provide separate controllers for primary and back-up HVAC units, which provide redundant HVAC service to critical spaces, to ensure that failure of any one controller will not cause the loss of the entire service to the critical space. The equipment must be distributed across multiple controllers in such a manner that no more than one unit must be powered, controlled and monitored using a single controller.

2. Each BC, AAC and network hardware such as Ethernet switch and router must be provided with an Uninterruptible Power Supply (UPS) that can supply electrical power for at least four hours to the attached load. This load must include the power required for HVAC equipment or field/control devices such as damper and control valves, etc.

3. For the HVAC equipment serving critical spaces or configured for redundant operation, a controls scheme for manual operation, which will bypass the automatic control through the DDC system, must be incorporated. Provide a HOA switch, if not provided as part of electrical equipment, so the equipment can be manually started and operated in Hand mode. The control valves and dampers associated with chilled water system and air handling units must be configured with necessary fail position so the equipment can operate manually and provide temporary cooling and/or ventilation if there is a failure in the control system.

4. When switching the redundant units during the rotation, the unit in the next sequence must be enabled or started before the previously enabled or started unit is disabled or stopped. If enabled unit should fail, an alarm must be generated at the DDC system and it must automatically enable the stand-by unit to replace the failed unit. Once the newly started unit is in operation, the failed unit must be disabled.

DDC System Software: Provide new DDCS and OWS with new front-end software and other utilities and tools as necessary. All software necessary for the configuration, operation, and maintenance of the installed DDC system must be provided, with licenses residing with the Government. Where new software, including application and tools, is provided, the latest tested, compatible and reliable version of the software available at the time must be installed prior to system testing and personnel training. In general, the front-end software must allow each authorized operator to execute the following functions as a minimum:

1. Security: Provide security function that prevents unauthorized use unless operator is logged on. Access must be limited to operator's assigned functions when user is logged on. Each operator's terminal must provide security for 10 users as a minimum. Each user must have an individual User ID/Name and Password. System user must be allowed individual assignment of only those control functions and menu items to which that user requires access. Each user must also have a set security level, which defines access to displays and individual objects the user may control. System must include minimum of 5 separate and distinct security levels for assignment to operators. Software must be initially configured to allow government personnel responsible for system administration full, unrestricted access. All default access passwords and user authentication identification must be documented and provided to the Government.

2. Schedule: Operators must be able to view scheduled operating hours of each schedulable piece of equipment on a weekly or monthly calendar-based graphical

schedule display; to select and adjust each schedule and time period; and to simultaneously schedule related equipment. Operators must be able to schedule holidays and special events directly from the calendar.

3. Alarm: The notebook computer(s) must provide audible, visual, and printed means of alarm indication. System input and status objects must be configurable to alarm on departing from and on returning to normal state. Operator must be able to enable or disable each alarm and to configure alarm limits, alarm limit differentials, alarm states, and alarm reactions for each system object. Alarms must be BACnet alarm objects and must use BACnet alarm services.

4. Trend Log: Operator must be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and must be able to retrieve data for use in spreadsheets and standard database programs. Controller must sample and store trend data and must be able to archive data to the hard disk. Coordinate items to be trended and trend configurations with the facility maintenance personnel. Trends must be BACnet trend objects.

5. Graphical Displays: The notebook computer(s) must display all data associated with project as required. The notebook computer(s) must display all data using two and/or three-dimensional graphic representations of all mechanical equipment. System must be capable of displaying graphic file, text, and dynamic object data together on each display. Information must be labeled with descriptors and must be shown with the appropriate engineering units. All information on any display must be dynamically updated without any action by the user.

Control Damper and Actuators:

1. Control Dampers: Motorized control dampers must have opposed blade dampers for modulating service and parallel blade dampers for 2-position service. Frames must be of five inch by one inch extruded aluminum hat channel with a minimum of 0.125-inch wall thickness. Blades must not exceed six inches wide and must be of heavy gage extruded aluminum airfoil shape to minimize pressure loss across the damper. Damper blades must be injected with CFC free, two part high density polyurethane foam. Each blade must include a thermal isolation gap. Dampers must be rated for minimum 2000 fpm air velocity at 2.5 inches static pressure and damper leakage must not exceeding 0.5 percent of total CFM (4.00 CFM/sq. ft.) based on 2000 fpm and one-inch static pressure when tested per AMCA Publication 500. Damper must be rated for a temperature range of minus 70 to 200°F

2. Provide electric type, direct shaft mount damper actuators with bracket arrangement for location outside of the air stream. Actuators must provide at least 125 percent of the required torque to effectively operate the damper. Actuator drive time for 90 degree rotation must be 150 seconds maximum. Actuators must be normally open, normally closed, or fail in position as required to obtain the operation as required by the application. Normally open and normally closed dampers must return to their normal position in the event of a power failure to the actuator. Provide auxiliary switches or damper position switches, rated as required, to provide specific operation. Provide transformers and accessories as required. Actuators requiring linkages, crank arms, connecting rods, or ball joints are not acceptable.

Control Valves and Actuators:

1. Characterized Control Ball Valves (up to and including 3 Inches): Nickel-plated forged brass body, valve trim must utilize stainless steel ball and stem, fiberglass reinforced Teflon PTFE seats with O-rings, 2 EPDM O-rings packing. A flow characterizing disc, made of Tefzel Teflon must be installed in the inlet of 2-way characterized control ball valves. 3-way valves must utilize flow characterizing discs at both input ports. Standard ball valves without this feature are not acceptable. 2-way valves must have equal port percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.

2. Globe Pattern Control Valves (over 3 inches): Iron body, bronze trim, 316 stainless steel rising stem, bronze plug-type disc, flanged ends, renewable bronze seat and disc, TFE V-ring packing. It must have replaceable plugs and seats of stainless steel or bronze. 2-way valves must have equal percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.

3. Valve Actuator: Provide electric valve actuators, which are two-position or modulating as required by application. Actuators must be of ample capacity to handle the required load under all conditions and as a minimum must close valves against pump shutoff head pressure of 55 psi. Unless otherwise indicated, valves must be arranged to return to the normal (fail-safe) position in the event of a power failure to the actuator.

Air Flow Measuring Stations (AFMS): For all air handling units with outdoor air intake, provide AFMS to continuously monitor the outdoor ventilation air in CFM values.

1. Provide high performance, thermal dispersion type AFMS. Pitot tubes, arrays, Piezo rings and other differential pressure based devices are not acceptable. AFMSs must contain an airflow straightener if required by the AFMS manufacturer's published installation instructions. The straightener must be contained inside a flanged sheet metal casing, with the AFMS located as specified according to the published recommendation of the AFMS manufacturer. In the absence of published documentation, airflow straighteners must be provided if there is any duct obstruction within 5 duct diameters upstream of the AFMS. Air-flow straighteners, where required, must be constructed of 0.125 inch aluminum honeycomb and the depth of the straightener must not be less than 1.5 inches. Sensing probe must be constructed of extruded aluminum or of stainless steel tubes. The operating humidity range must be 0 to 99% RH and direct exposure to water must not damage the sensing elements. AFMSs must have an accuracy of +/- 2% of reading with air velocity range of 0 to 5,000 fpm. The transmitter must have local LCD display, continuously displaying airflow and temperature and be calibrated for the appropriate operating range based on the required operating range.

Water Flow Meters: Provide electromagnetic type flow meters for water service where required by application. The flow meter must have the DC powered electromagnetic coils and electrodes, and measure the induced voltage across the electrodes as a conductive fluid flows through the magnetic fields. The voltage is proportional to the average flow velocity of the fluid

and then amplified and processed digitally by the converter to produce the signal for flow rate and totalization. Flow meter must be located to provide the most efficient and accurate reading recommended by the manufacturer.

Commissioning: The controls Contractor must provide the services of a factory-authorized service representative to start control systems and provide the commissioning the coordination and support required during the commissioning process.

D306001 1.2 ELECTRONIC CONTROLS

NOT USED

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air distribution systems, water distribution systems, including domestic hot water systems, and HVAC equipment. TAB must be provided by a tier one contractor. Provide duct air leakage testing and duct pressure testing. The Designer of Record must provide a duct construction and leak testing schedule on the drawings.

Clean entire duct system in accordance with National Air Duct Cleaners Association (NADCA) ACR after duct air leakage testing (DALT), and before test and balance (TAB). Document duct cleaning, prepare a written report, and submit report to the Construction Manager (CM) with signature of the ductwork contracting foreman indicating the test has been completed.

Acceptable Cleanliness Level: Net weight of debris collected on the filter media must not exceed 0.75 mg/100 sq. cm. Coordinate with other trades working in the building. Duct cleaning must be performed only after the building has been sealed and the completion of construction activities resulting in airborne particles has been completed. Examples of activities producing airborne particles include but are not limited to grinding, cutting, sanding, drywall installation, grout work, etc. Should the CM note construction dust contamination or openly unprotected ductwork and/or equipment after the initial cleaning, repeat duct cleaning on entire system after the final instance of airborne particle production within the building envelope at no additional cost.

Provide complete testing and balancing (TAB) of all air and water distribution systems and HVAC equipment after successful completion of the DALT testing and duct cleaning. Include all troubleshooting attempts and measurements within the TAB report. The TAB contractor must offer recommendations where flowrates cannot be kept within tolerance. Coordinate with and support Commissioning Authority effort during entire project duration. All system devices must be accessible during the TAB effort. Flush all strainers and replace air filters prior to TAB. Verify that air vents have been installed at every high point in the hydronic system(s); confirm the absence of air by testing every air vent prior to starting tests.

D307003 HVAC COMMISSIONING

Refer to RFP Part 3 - Project Program, Chapter 2 for Building Commissioning requirements. Mechanical systems to be commissioned, if provided, include HVAC systems and controls, refrigeration systems and controls, renewable energy systems, and domestic hot water systems.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide access to all mechanical equipment rooms through the building exterior walls. Provide roll up doors for mechanical room access. Arrange mechanical equipment so that any piece of equipment can be replaced without removal of other equipment.

All equipment and materials will be free of damage. Bent coil fins will be combed out. Where bent coil fins cannot be straightened, replace with new.

Locate and size 4" thick reinforced concrete housekeeping pads for base mounted equipment in mechanical rooms in accordance with actual equipment purchased. Extend pad beyond equipment for 6" in all directions. Provide with chamfered edges.

D309002 ROLL UP OR SWINGING BAY DOOR HEATING

Provide heated curtain fans at roll up and swinging bay doors.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide fixed plate enthalpy energy recovery in the air handling system.

--End of Section--

D40 FIRE PROTECTION – P1512F LOG OPS SCHOOL

Refer to Part 4 Section D40 for performance requirements of the building elements included in the fire protection systems. Comply with the latest editions of UFC 1-200-01, UFC 3-600-01, UFC 4-021- 01 and NFPA codes at the time of contract solicitation.

SYSTEM DESCRIPTION

Provide an integrated fire alarm/ mass notification system and fire suppression system capable of notifying building occupants inside the facility of an emergency event. This scope of work includes the installation of equipment and components and completing all programming necessary to fully control/interface/supervise building systems and transmit all alarm signals to the base reporting system.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. All equipment must be installed per the criteria of PTS section D40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

All Design Documents, (i.e., Fire Protection Design Analysis, Building Code Analysis, Life Safety Analysis, plans, specifications, and calculations) developed for Section D40 must be prepared by, or under the supervision of the design/build contractor's Qualified Fire Protection Engineer (QFPE) as detailed in UFC 3-600-01 and FC 1-300-09N.

The services of a Fire Protection Quality Control Specialist (FPQC) are required. Roles and responsibilities of the FPQC are defined in Specification Section 01 45 00.05 20 (Design and Construction Quality Control). The QFPE and the FPQC must be registered professional engineers who have passed the Fire Protection Engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and have relevant experience. The QFPE may serve as the FPQC.

GENERAL DESIGN AND INSTALLATION REQUIREMENTS

Prior to the start of design, the QFPE must meet with the NAVFAC FPE to discuss and confirm the extent and types of fire protection systems and engineering services required. All work shall comply with the requirements of the applicable NFPA standards, including recommended portions of the text and explanatory notes, which must be considered mandatory, and with UFC documents, including UFC 1-200-01, UFC 3-600-01, and UFC 4-021-01. Develop specifications for all fire protection work using the Unified Facilities Guide Specification format (UFGS), except for UFGS Section 28 31 76, *Interior Fire Alarm and Mass Notification System, Addressable*, which is included in Part 6 of this RFP. The designer is responsible for incorporating design elements and deliverables described in the “Editor’s Notes” included with all UFGS sections.

GENERAL INSTALLATION

All work for fire protection systems (Including fire alarm, fire suppression, and firestop systems) must be provided by contractors licensed to perform such work.

Workmanship must be neat and professional. Protect systems from damage during construction. Provide parts and components Listed for their particular service. Provide labels for all valves, addressable devices, panels, and controls. For any device located above a ceiling, provide legible, typed label on the ceiling to identify its purpose and location. With the exception of detection devices at ceiling level, mount all valves, panels, and controls no more than 5 ft above the finished floor. Provide clearance for access, inspection, maintenance, repair, and removal.

All conductors must be installed in conduit (EMT minimum). Pull all conductors splice free and be continuous from device to device. The use of wire nuts, crimped connectors, or twisting of conductors is prohibited. All devices must have screw terminals. Where devices are only provided with pigtails from the manufacturer, pigtails must be landed on terminal strips mounted within the junction box. All terminations must be at a terminal strip or the device screw terminals. Terminal strips are only permitted where direct connection to a device is not possible.

Provide a Knox Box at the building entrance approved by the fire department. Provide an additional Knox Box for any project including a gated and secured perimeter fence. Locate this supplemental Knox Box at the primary vehicle entrance point. Mount the Knox Box at the key pad access pedestal to allow fire department access if a gate/fence will be secured after hours.

DESIGN DRAWINGS/SPECIFICATIONS

Design drawings, specifications, and Basis of Design must be prepared by, or under the direct supervision of, the QFPE. Design submittals must comply with the FC 1-300-09N (Navy and Marine Corps Design Procedures), including but not limited to, Section 4-6 (Fire Protection Investigations and Survey), Section 5-8 (Fire Protection Basis of Design), Section 6-8 (Fire Protection Calculations), and 7-10 (Fire Protection Drawings).

INSTALLATION SHOP DRAWING REQUIREMENTS

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician who holds a current certification in the field of Fire Protection Engineering Technology with minimum certification in the appropriate subfield as noted below.

- Fire Alarm Systems only (no Mass Notification element)– Level III
- Combination Fire Alarm/Mass Notification Systems - Level IV
- Fire Sprinkler Systems (water only) - Level III

All installation drawings, shop drawings or working plans, calculations, and other required pre-construction documentation must be reviewed by the QFPE prior to submission to government for review. Documents must be signed and sealed or letter attached that is signed and sealed indicating QFPE review of submittal. All plans received without documentation of QFPE review will be rejected and returned without review.

CONTRACTOR INSTALLATION REQUIREMENTS

All fire protection systems installation work must be performed by, or under the supervision of a NICET technician having minimum Level III certification who must conduct onsite inspections each week that work is performed. Submit licenses and certifications to the Contracting Officer prior to the start of work. Signed weekly inspection reports confirming compliance with the

Contract and NFPA standards to the Contracting Officer's Technical Representative each week. Record of Completion forms must be signed by the NICET certified supervising installer for each fire protection system.

COMMISSIONING REQUIREMENTS

Commissioning procedures must comply with NFPA and NAVFAC criteria. All fire and life safety systems must be fully pre-tested by the contractor with the QA/QC manager present. Pre-final acceptance testing must be witnessed by the QFPE. Final acceptance testing must be requested by the QFPE in writing after successful completion of the pre-final acceptance test. The final acceptance test will be witnessed by the NAVFAC FPE for government acceptance. Once the system is accepted, it will be placed in service prior to occupancy. The Contractor is responsible for all cost and time delays caused by system retesting as a result of final acceptance testing failure.

D4010 FIRE ALARM/DETECTION AND MASS NOTIFICATION SYSTEMS

Provide an integrated fire alarm/detection and mass notification system capable of notifying building occupants inside and near the facility in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-18, UFC 4-021-01 and NFPA 72. Provide equipment manufactured by Simplex, Notifier or Fire-Lite. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system that also serves as a mass notification system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements. The fire reporting portion of the system must be compatible with the existing base fire reporting system.

Provide all fire alarm circuits in Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC) unless noted otherwise. All raceways must be factory painted red. Flexible Metallic Conduit (FMC) must not exceed 6 feet and must only be permitted for connections from junction boxes to field devices, Provide a raceway listed for the installation in wet locations, such as Rigid Metallic Conduit (RMC) and Liquidtight Flexible Metal Conduit (LFMC). Wet locations are considered any location within a 5 ft radius of fire suppression equipment, throughout a fire pump room/building, and as defined by NFPA 70.

Provide a laminated building floor plan (22” by 34”) mounted at the main entrance of the building, adjacent to the annunciator. Identify the location of the FMCP, LOC, remote power supply panels, and all initiating devices. The drawing must include room numbers.

Provide a steel Document Cabinet with a hinge-mounted door and lock with lock cylinder keyed the same as the FMCP. Mount the Document Cabinet on the wall adjacent to the FMCP. Prominently label the exterior of the cabinet "SYSTEM RECORD DOCUMENTS". Cabinet must include paper copies and a CD of Fire Alarm As-Built drawings, List of Contact ID descriptions for the fire alarm addressable devices, Sprinkler As-Built drawings, NFPA 72 & NFPA 13 Records of Completion. CD must also include site-specific software and O&M manuals stored in a CD jewel case. Cabinet must be of a minimum size to accommodate all required documents.

Provide a steel Parts Box with a hinge-mounted door and lock with lock cylinder keyed the same is the FMCP. Mount the Parts Box on the wall adjacent to FMCP. Cabinet must be of a minimum size to accommodate all spare parts as defined in the project specifications, plus four fuses for each fused circuit.

FMCP REQUIREMENTS

The fire alarm control unit and mass notification control unit (FMCP) must be capable of handling a minimum of 500 individually identified addressable devices. Provide Class B Notification Appliance Circuits (NACs), Class B Signaling Line Circuits (SLCs), and Class B Initiation Device Circuits (IDCs). Each NAC and SLC must include 25 percent spare capacity based on load and voltage drop. Mount FMCP and associated cabinets such that the top of each cabinet is no more than 6 ft above the finished floor. Provide conduit fill calculations to ensure 40% fill does not exceed limits of NFPA 70.

A lockout code must not be installed in the hardware, firmware, or software of the fire alarm system. Installer and operator codes must remain as the factory default setting.

Provide amplifiers sized for 25% spare power capacity. Battery calculations shall be based upon 48 hours of standby time and 15 minutes of alarm time or 60 minutes of alarm time, whichever is greater.

Provide a factory-trained instructor to teach a five-day technical training classroom instruction for at least five Government personnel at Camp Lejeune. The technical training must include classroom instruction as well as hands-on programming, troubleshooting and diagnostics exercises. Provide three laptops for the government's retention. Laptops must be Windows 10 based and include system software, special connecting cable(s), proprietary equipment necessary for the maintenance, testing and reprogramming of the fire alarm equipment and system. Factory training must occur within six months of system acceptance.

Provide a LCD remote annunciator located at the designated primary entrance. Coordinate final installation location with user and NAVFAC. Provide remote annunciator with control functions the same as the FMCP. Control functions must be accessible only by user code or secured behind a locked panel.

Provide a local operating console (LOC) at the primary entrance vestibule. Coordinate final installation location with user and NAVFAC. Microphone and pre-recorded buttons at LOC must be accessible and not installed behind a locked panel.

Obtain prerecorded mass notification messages from the installation fire alarm technician. Program mass notification pre-recorded message buttons to be non-latching that do not require a full system reset to activate or deactivate. Program pre-recorded message buttons such that a higher priority message will override a lower priority message. Once the higher priority message button is deactivated the lower message that is still activated must begin playing again. Program the system to allow any mass notification message to override the fire message. Upon deactivation of the mass notification message, the fire alarm message must automatic resume. Program live voice microphone paging to override all fire alarm and pre-recorded mass notification message. Microphone activation must not require more than two functions. Post clear instructions for operation (keying the microphone and turning a key switch to activate is an example of two functions).

The government will provide the TRX-401 mass notification transceiver. Provide space, antenna, conduit, cable, pull strings, and equipment as shown on the TRX-401 installation detail provided in Part 6.

Prior to building demolition, contact base fire alarm technicians and allow time for their retrieval of fire alarm and/or mass notification panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If

unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

INITIATION DEVICES

Provide a complete and useable fire alarm system including manual stations, system smoke detectors, duct smoke detectors, audio/visual notification appliances, electrical supervision of all sprinkler system alarm and supervisory devices, and electrical supervision of fire pump controllers. Provide an individual monitor module for each fire sprinkler system water flow switch. Provide all initiation devices with a permanent label adhered to the device identifying the addressable point. Handwritten labels are not permitted.

Provide flush-mounted manual pull stations. Provide manual pull stations within 5 feet of all exterior doors, including but not limited to mechanical rooms, electrical rooms, and communication rooms with direct exterior access. Provide double action type manual pull stations with mechanical reset features. Break glass type manual stations are not permitted.

Magnetic door hold-open devices must release upon activation any fire alarm initiating device of the building fire alarm system or upon loss of primary power to the FACP. Smoke detectors dedicated to door release are not permitted.

Provide carbon monoxide detectors in accordance with UFC 3-600-01. Detector activation must initiate a distinct message on all notification appliances and transmit an independent dedicated signal to the base reporting system.

NOTIFICATION APPLIANCES

Provide combined fire alarm and mass notification appliances. Provide white notification appliances with factory applied, permanent, red "ALERT" lettering with clear strobe lenses. Provide ceiling-mounted notification appliances in all areas with suspended ceiling systems. Where exterior speakers are required by UFC 4-021-01, provide exterior weatherproof notification speakers “bull horn” style. All conduit penetrations for exterior equipment must enter the junction box or equipment from the bottom to minimize water intrusion. Provide duct seal inside all conduits that penetrate exterior walls per NFPA 70, Section 300.7.

Visual notification appliances are required in all public use areas, common use areas, and employee work areas to include office suites and areas intended to have more than four desks/occupants. Offices that are designed for a single office worker, regardless of the calculated occupant load, do not require a strobe unless the room is designated as an ABA compliant space.

FIRE ALARM REPORTING

All fire alarms, supervisory alarms and trouble conditions indicated at the FMCP must be transmitted to the fire alarm receiving station. Provide point specific transmission via contact ID format with the address, location, and description of the condition as it appears on the FMCP.

Provide a point reporting digital alarm communicator transmitter that is compatible with the Sur-Gard System III Multi-platform Digital Telephone Receiver. Provide two CAT 6 UTP cables inside one-inch conduit from the FMCP to the telephone equipment room. Make connections to telephone equipment per the base’s telephone requirements. See Part 6 for schematic drawing of the FARS and the mass notification equipment.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

The water supply information below is provided for bidding purposes. A hydrant flow test was conducted on 05 August 2019 in proximity to the project site between Buildings M448 & M457 along Company Street B. Refer to Part 6 for the water flow test report and test hydrant locations.

Hydrant flow test summary: Pressure hydrant 8-78-8

Static pressure: 66 psig (gauge). Residual pressure: 62 psig (gauge).

Measured Flow: 1,552 gpm.

The proposed design point of connection to existing water supply must be approved by the Contracting Officer prior to proceeding with any work.

The QFPE shall conduct additional flow tests after contract award prior to any design submissions. Water flow testing must be coordinated through the Contracting Officer. The Contractor is responsible for providing all flow testing equipment. Perform flow testing in accordance with NFPA 291. The QFPE must prepare and submit a flow test report to the Contracting Officer for review by the NAVFAC FPE. This report must compare the flow test results with the hydrant flow test summary provided above.

Hydraulic calculations must be based upon a waterflow test was performed no more than 6 months prior to submission of the calculations.

Provide a reduced pressure zone backflow preventer for the incoming sprinkler service. Include a forward flow test connection, with one 2 ½” hose connection for every 250 gpm of anticipated flow of the fire sprinkler system.

Hydraulic calculations for the fire suppression system shall include a 12 psi loss through the backflow preventer.

Sleeve all incoming supply piping and provide thrust rods at floor penetrations. Sleeve all wall penetrations of incoming supply piping.

Provide a UL Listed post indicating valve (PIV) for the underground fire service main. Locate the PIV a minimum distance from the building equal to the height of the building plus fifteen feet. Provide bollards where the PIV could be subject to vehicular damage.

Provide a freestanding pedestal type fire department connection (FDC) at a location approved by the fire department and NAVFAC FPE. Provide a 5” Storz connection on a 30-degree galvanized elbow at the FDC. Check valve on FDC must be installed at fire protection system manifold inside the building. Provide ball drip valve on the FDC pipe. The FDC shall be accessible by fire apparatus and adjacent to fire department access. Provide bollards where the FDC could be subject to vehicular damage.

Provide an electric motor driven fire pump having a minimum rated capacity of 500 gpm. Locate the fire pump within the building in a separate fire-rated room having direct access to the exterior. Power supply at Camp Lejeune does not qualify as a “reliable power source” as defined in UFC 3-600-01. Provide an on-site standby generator with automatic transfer switch to serve as the required alternate power source. Refer to ESR Section D50 for requirements. A diesel engine driven fire pump will not be considered as an acceptable alternative to the specified electric motor drive fire pump.

D4040 SPRINKLER SYSTEMS

Provide automatic wet pipe sprinkler protection system throughout the facility, in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-7 and NFPA 13. Sprinkler system design demand and minimum sprinkler K-factor must be as specified in Table 9-3 and Table 9-4 of UFC 3-600-01.

Provide wet pipe sprinkler systems with pressure relief and air venting on each system in accordance with NFPA 13.

Provide quick-response sprinklers with ordinary temperature rating in areas with finished ceilings. Provide quick-response upright sprinklers with ordinary temperature rating in areas with exposed ceilings. Utilize higher temperature ratings where required by NFPA 13.

The use of flexible sprinkler hose and mechanical-T outlets are prohibited.

Provide training for the active systems consisting of a minimum of two (2) eight (8)-hour sessions to accommodate all shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

D4090 OTHER FIRE PROTECTION SYSTEMS

PORTABLE FIRE EXTINGUISHERS

Fire extinguishers are required by the FY20 National Defense Authorization Act that contradicts UFC 3-600-01. Provide fire extinguishers as required by NFPA 101 and NFPA 10. Include fire extinguishers in the Furniture, Fixtures & Equipment (FFE) Package. Refer to ESR Section C103007 for fire extinguisher cabinets and brackets. Electronic Monitoring of fire extinguishers and cabinets is not required. Provide clean agent fire extinguishers for electronic equipment installations (server rooms). Locate the clean agent fire extinguisher within the server room adjacent to the primary egress door.

--End of Section--

D50 ELECTRICAL – P1512F LOG OPS SCHOOL

SCOPE

The scope of this section is to describe the systems, components, and installations within buildings and extending no more than 5 feet beyond building exterior walls. Exterior systems and components are described in ESR G40 of this RFP.

Provide systems complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must".

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floor plan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floor plans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

Provide a power quality analysis to ensure the new Log Ops School does not negatively impact the quality of power available to adjacent facilities. If the results of the power quality analysis are outside of the acceptable limits defined by IEEE, provide power quality mitigation features in the design of the building's systems.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an interior electrical system consisting of but not limited to Service Entrance Wiring and Equipment, Distribution and Lighting Panelboards, Dry Type Transformers, Conduits, Feeder and Branch Circuits, Motor Control Equipment, Lighting and Branch Wiring, Communications,

Security and Alarm Systems, Emergency Generator, Emergency Lighting and Power, Grounding, Lightning Protection, and UPS, including accessories and devices as necessary and required for a complete and usable system.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Install interior electrical distribution equipment and components in spaces accessibly only by qualified persons. Provide a main electrical room to house the service entrance switchboard and branch circuit distribution equipment. Provide additional electrical rooms as required throughout the building to minimize branch circuit length to less than 200 feet for 120V circuits and 400 feet for 277V circuits. Provide electrical panels in mechanical rooms, computer rooms, and telecommunications rooms to serve loads within each respective room.

Provide branch circuit panelboards rated at 480Y/277V to serve lighting and large mechanical equipment. Provide dry-type transformers feeding 208Y/120V panelboards to transform the voltage where necessary to serve receptacle loads and small (less than ¾ hp) motor loads.

Provide individual feeders to each panelboard or transformer. A distribution system consisting of cable taps and/or through-feed panels is prohibited.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15% spare circuit and load capacity at all levels of the power distribution system, including life safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

EQUIPMENT ENCLOSURES

Provide enclosures for equipment described in this section at installed locations with the following environmental ratings:

- Indoor, Dry and Clean Locations: NEMA 250, Type 1.
- Outdoor Locations: NEMA 250, Type 4X, stainless steel
- Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
- Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
- Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids; equipment in Mechanical Rooms, Plumbing Rooms, and Elevator Machine Rooms; equipment in unconditioned spaces: NEMA 250, Type 12.

- Hazardous Areas: NEMA 250, Type 7 with cover attached by Type 316 stainless steel bolts.

SUSTAINABILITY

Provide electrical systems and components that support project sustainability and energy goals.

ANTITERRORISM

Provide bracing of electrical equipment which is suspended and weighs more than 31 pounds.

SEISMIC BRACING

Provide bracing of electrical equipment to resist seismic events based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING

Test new electrical equipment in accordance with NETA acceptance testing specifications. Test existing electrical equipment remaining in service in accordance with NETA maintenance testing specifications.

COMMISSIONING

Commission all systems in accordance with RFP Part 3 Chapter 2, Section 01 33 29.05 20 *Sustainability Requirements for Design Build* and UFC 01-200-02 *High Performance and Sustainable Buildings*.

EQUIPMENT IDENTIFICATION

Provide instruction and warning signs, identification labels and nameplates, and markings for equipment, wiring, raceways, boxes, and cabinets. Coordinate naming convention with Camp Lejeune Public Works Department.

Provide multi-line engraved nameplates on the exterior of panelboards, switchboards, switchgear, enclosed switches and breakers, transformers, and packaged equipment enclosures with the following information:

- Device Identification
- Device Rating (such as voltage, phase, ampacity, and kVA)
- Power source (Source panel and circuit number)

See the following figures for examples of equipment identification.

Figure 1: Transformer Identification Example

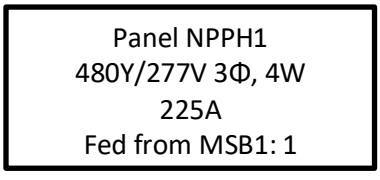


Figure 2: Transformer Identification Example

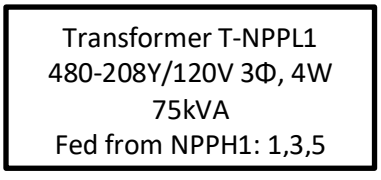


Figure 3: UPS Identification Example

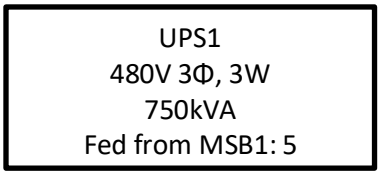
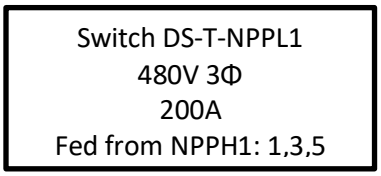


Figure 4: Disconnect Switch Identification Example



CONDUCTOR IDENTIFICATION

Label conductors with source panel circuit number at each junction box and termination point.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

Provide insulated copper conductors in conduit for all feeders. Refer to D502001 for raceway application for feeders.

D501001 MAIN TRANSFORMERS

Main transformer(s) are defined in Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

Provide an underground service into the facility.

Provide a main distribution switchboard as service equipment. Provide the main distribution switchboard with a main circuit breaker, fixed, group-mounted, molded case distribution circuit breakers, and surge protective device (SPD). Fused or bolted pressure switches are prohibited. Provide switchboard with spaces for future use that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide switchboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses.

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide a multi-function digital meter integral to the main switchboard that monitors and records the following values at a minimum:

- Voltage (per phase and 3-phase)
- Current (per phase and 3-phase average)
- Real power (per phase and 3-phase average)
- Reactive power (per phase and 3-phase average)
- Apparent power (per phase and 3-phase average)

- Power factor (3-phase total)
- Frequency
- Total harmonic distortion (voltage and current)

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

Provide enclosed and ventilated dry type transformers to step down secondary voltages for general purpose outlets and other low voltage equipment.

Terminate the transformer secondary at a single overcurrent protection device. Double-lugging the secondary terminals to serve multiple panelboards is prohibited.

Provide transformers with two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards to serve the loads.

Provide panelboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses. Where fed from K-rated transformers, neutral buses must be 200% the capacity of the phase buses.

Provide panelboards with bolt-on circuit breakers. Plug-in circuit breakers may be used in distribution panelboards if provided with an individual positive locking mechanism that requires operation for removal of the breaker. Load centers are prohibited. Fused switch panelboards are prohibited.

Provide panelboards with spaces that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide panelboards with main circuit breakers where they are not located within sight of their upstream overcurrent protective device or disconnecting means and where otherwise required by Code.

Provide panelboards with fully hinged front covers with a hinged door for accessing circuit breaker handles (door-in-door arrangement).

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide enclosed circuit breakers with an enclosure suitable for the environment in which it will be installed.

D501006 MOTOR CONTROLLERS

Provide individual motor starters with disconnect switches, combination motor starters, variable speed drives, and manual motor starters for motor controls as required by mechanical equipment. Provide all circuits and connections for motors.

Provide variable speed drives without external bypass.

Provide variable speed drives with 5% bus reactors.

D501090 OTHER SERVICE AND DISTRIBUTION

SURGE PROTECTIVE DEVICES

Provide transient voltage surge protective devices (SPD) at the main switchboard and at panelboards located in computer rooms serving the computer equipment.

SAFETY DISCONNECT SWITCHES

Provide 600V rated, heavy-duty type fused and non-fused, safety disconnect switches with external operating handle and lock-out, tag-out provisions. Provide switches with an enclosure suitable for the environment in which it will be installed.

D5020 LIGHTING AND BRANCH WIRING

Provide lighting and general-purpose receptacles throughout all spaces.

Provide the necessary special receptacle configurations to serve special equipment.

Provide one duplex receptacle at each television/display monitor. Locate the receptacle behind wall-mounted equipment.

Where equipment or furniture is located on a wall, provide receptacles and/or connections serving that equipment or furniture on the wall. Where equipment or furniture is located away from a wall, provide receptacles and/or connections in multi-service floor boxes. Use of power poles is prohibited. Locate devices such that they are not made inaccessible by furniture panels and supports or fixed equipment after the furniture and equipment is installed.

Provide one multi-service recessed floor box under the table in each conference room. Center the box under the table.

Provide a minimum of one multi-service floor box for each pair of adjacent student desks in each classroom to support desktop computer and monitors at each desk. Locate floor box so that it accessible from both desks. Where an odd number of student desks occur, provide the remaining desk with one multi-service floor box. Provide one multi-service floor box at each instructor’s location in each classroom.

Provide duplex receptacles with USB charging capability where receptacles are required on Briefing Room and Conference Room walls. Provide one wall mounted duplex receptacle with USB charging capability for each table in Break Rooms and Lounges. Provide one wall mounted duplex receptacle with USB charging capability at the seating area in Lobbies, Waiting Rooms, and Reception areas.

CIRCUITING REQUIREMENTS

Connect no more than six (6) duplex convenience receptacles to a single 20A circuit.

Connect no more than two (2) multi-service floor boxes to a single 20A circuit in Classrooms.

Provide individual dedicated circuits and receptacles or connections for each instance of equipment rated at 8 full load amps (FLA) and higher and for each of the following equipment:

- Copier
- Printer
- Multi-function device
- Fax machine
- Shredder
- VTC console
- Projector
- Refrigerator
- Coffee maker
- Microwave oven
- Garbage disposer
- Toaster
- Electric water cooler
- Vending machine
- Ice machine
- Washer
- Dryer
- Hand dryer
- Air compressor
- Fire alarm control panel
- EPO control panel (multiple dedicated circuits may be required as described elsewhere)
- EMCS control panel
- Telecommunications and/or server equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- Telecommunications and/or server equipment rack (multiple dedicated circuits may be required as described elsewhere)
- AV equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- AV equipment rack (multiple dedicated circuits may be required as described elsewhere)

Provide dedicated circuits for televisions/display monitors. Multiple receptacles that support televisions/display monitors may be circuited to the same dedicated circuit.

WIRING DEVICES

Provide wiring devices connected to the normal power source with either a white body or dark brown body, as determined by the surrounding wall finish. Provide dark brown or black devices where installed on dark surfaces and white devices where installed on light surfaces.

Provide stainless steel face plates for interior wiring devices and empty outlet boxes.

Provide exterior receptacles with thermoplastic enclosures rated as “weatherproof while in use”.

Provide receptacles with USB charging capability with a combination 125VAC NEMA 5-20R duplex receptacle and two 5VDC USB ports; one Type A port capable of delivering a maximum 2.4A of charging capacity and one Type C port capable of delivering a maximum of 3.0A of charging capacity (5A total charging capacity).

MULTI-OUTLET RACEWAYS

Provide extruded aluminum with clear anodized finish, dual-compartment, surface-mounted multi-outlet metal raceways with internal divider. Provide separate snap-on covers for each compartment. Provide the power compartment with NEMA 5-20R duplex receptacles at 18” on center. Where more than four (4) receptacles are installed in a raceway, connect adjacent receptacles to alternating circuits Refer to D5030 for communications & AV faceplate requirements.

UNDERFLOOR MODULAR WIRING SYSTEM

Provide a modular power wiring distribution system in spaces with raised access flooring to provide power to desks, tables, work benches, and equipment.

Provide a complete modular underfloor power wiring distribution system comprised of power distribution boxes, home run cables, multi-service recessed floor boxes, and all necessary interconnecting cables and accessories.

Provide pre-fabricated underfloor power distribution system components with plug-and-play modularity for use below Raised Access Flooring systems. Components and conductors must be listed for use in environmental air handling spaces. Provide manufacturer’s dust caps on unused plug-in connectors.

Install underfloor power distribution system components with adequate clearance to allow access to wiring compartments, removal of covers, and access to plug-in connector ports. Arrange the underfloor components such that no plug-in connector ports are obstructed.

Locate power distribution boxes in readily accessible locations below the Raised Access Floor. Identify the location of the distribution boxes on the ceiling grid above the box using a label placed at the intersection of the grid Ts. Provide one (1) spare circuit in each power distribution box.

MULTI-SERVICE RECESSED FLOOR BOXES

Provide multi-service recessed floor boxes with independent wiring compartments capable of accepting duplex receptacles, AV faceplates, and telecommunications faceplates. Provide

telecom adaptor plates to accept current Base Telephone standard jack sets per local 27 10 00. Provide the power compartment with a minimum of two (2) NEMA 5-20R duplex receptacles.

Provide boxes with stamped steel or cast-iron construction, as applicable to the installation location, and provide each compartment with multiple conduit knockouts capable of accepting conduit sizes up to and including 1 1/4" diameter.

Provide die-cast aluminum covers with self-closing cable egress doors. Covers must open 180° and close flush with the finished floor while in use. When closed, covers must comply with requirements for UL scrub water exclusion. Provide black covers in dark floor finishes and natural aluminum covers in light floor finishes.

Where raised access floors are provided, provide multi-service recessed floor boxes that are compatible with the modular wiring system and install floor boxes flush in raised access flooring.

D502001 BRANCH WIRING

Provide insulated copper THHN-2/THWN-2 or XHHW-2 single conductors in raceway for all branch wiring. Type AC and MC cables are prohibited.

Provide solid conductors for #10 AWG and smaller and stranded conductors for #8 AWG and larger. The minimum power and lighting conductor size is #12 AWG.

Provide a neutral conductor with each phase conductor in circuits feeding single phase loads requiring line-to-neutral service. Shared neutral conductors are prohibited.

RACEWAY APPLICATION FOR FEEDERS AND BRANCH WIRING

Provide expansion fittings in raceways crossing building expansion joints and seismic joints to compensate for building expansion and contraction.

The minimum raceway size for interior and above grade exterior applications is ¾" diameter. The minimum raceway size for below grade exterior applications is 1" diameter.

Outdoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed Conduit: GRC.
- Concealed Conduit, Aboveground: IMC.
- Underground Conduit: RNC, Type EPC-40-PVC direct buried.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

Indoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed, Not Subject to Physical or Severe Physical Damage: EMT.
- Exposed and Subject to Physical or Severe Physical Damage: GRC.
- Concealed in Ceilings and Interior Walls and Partitions: EMT.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- Connection to Recessed and Semi-Recessed Luminaires: FMC, except use LFMC in damp or wet locations.

- Damp or Wet Locations, Unconditioned Spaces, Spaces Subject to High Humidity: IMC.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting, area lighting, and manual and automatic controls. Controls include manual wall stations, occupancy sensors, vacancy sensors, daylighting controls, automatic lighting shutoff systems, and dimming systems.

LUMINAIRES

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide drivers that provide smooth and continuous dimming from 100% output to 10% output for standard-performance dimming luminaires and 100% output to 1% output for high-performance dimming luminaires. Step dimming drivers are prohibited.

Provide high-performance dimming drivers in conference rooms, classrooms, training rooms, and auditoriums.

Provide vanity luminaires above all mirrors in single-occupancy restrooms.

Pendant luminaires may use lenses, baffles or louvers, or perforated housings to shield the downlight component. Do not provide pendant luminaires in continuous lengths exceeding 16 feet.

Provide luminaires with the following minimum luminaire efficacy (LE):

- Recessed 1x4, 2x2, or 2x4 troffer: 90 Lumens per Watt (LPW)
- Surface or recessed downlight: 80 LPW
- Track or accent: 40 LPW
- High Bay/Low Bay: 90 LPW
- Linear Industrial or Strip Light: 80 LPW
- Suspended linear or non-linear ambient: 85 LPW
- Surface linear or non-linear ambient: 80 LPW
- Recessed linear or non-linear ambient: 85 LPW

LIGHTING CONTROLS

Provide devices including but not limited to drivers, wall stations, occupancy sensors, vacancy sensors, time-based scheduling, architectural dimming controls, and daylight dimming controls.

Provide occupancy and vacancy sensors to provide 100% minor motion coverage of the room or area controlled by the sensor. Where multiple sensors are provided to control a single room or area, provide overlapping minor motion sensor coverage taking into consideration all obstructions to include FF&E, collateral, and other Government furnished equipment that could impede the sensor coverage.

Provide low voltage control stations with momentary push-buttons with pilot light or indicator light to confirm operation.

Do not group public spaces into a single lighting control zone. Lighting control zones must not control luminaires on different floors.

Provide programmable multi-zone, multi-scene, architectural dimming controls in conference rooms, classrooms, training rooms, and auditoriums.

Architectural dimming controls consist of a master control station and additional wall stations used to recall preset lighting “scenes” consisting of multiple zones of lights and/or motorized shades and screens. Provide a minimum of six pre-programmed scenes, plus full on and full off, for each space or room with architectural dimming controls unless noted otherwise. Provide the capability to adjust each lighting zone individually from the master station without overwriting the scene programming.

Provide dimmers, modules, and controls that are capable of smoothly dimming LED lighting sources from 100% to a minimum of 1% of full light output.

Dim luminaires connected to life safety power sources along with the normal lighting in the space. Upon loss of normal power, or upon receiving a signal from the fire alarm system, the designated life safety luminaires must automatically return to full brightness regardless of selected scene or occupancy.

In spaces with moveable partitions, the lighting controls must be capable of operating independently when the partition(s) are closed and in unison when partition(s) are open. Provide partition sensors that automatically initiate combined and individual space operation modes based on the position of the moveable partition. Devices that require occupant input to select combined and individual operation modes are prohibited.

D5030 COMMUNICATIONS AND SECURITY

The following sub-element sections contained in D503001-D503090 identify locations for communications and security systems and equipment. Additional communications requirements can be found in part 5 specifications 27 10 00 and 33 82 00.

Refer to document “P1512 A.V. SOW AND COST ESTIMATE_RFP” (located in part 6) for additional telecommunications and A/V requirements.

D503001 TELECOMMUNICATIONS SYSTEMS

Provide a main distribution frame (MDF) to house telecommunications equipment and cabling, as well as service provider equipment and cabling. Additionally, provide floor or area serving intermediate distribution frames (IDF) to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide a complete Telecommunications horizontal and backbone distribution system per user requirements, maintainer requirements, latest Local provider, and applicable Using Military Department standards and criteria, UFC 3-580-01, ANSI/TIA 568C, 569, 606, 607, and 758 standards for support of Non-Secret Internet Protocol Router Network (NIPRNET) and Secret Internet Protocol Router Network (SIPRNET) Voice and data communications for Building 1512 LOG OPS School. Telecommunications systems must include, but not limited to, horizontal and vertical pathways consisting of underground duct bank systems, sleeves, cable tray, conduit, pull boxes, pull cords and outlet boxes, patch panels, equipment racks, cable management, telecommunications ground bus system, fire rated plywood backboards as required to support

the user requirements. Voice and data system cabling and outlets will consist of CAT 6 or higher rated horizontal UTP cabling and multimode fiber, patch panels, patch cords, 8-pin/8 contact (8P/8C) RJ-45 connectors, SC fiber connectors, copper and fiber backbone cabling, and cross connect equipment.

BACKBONE CABLING

Secondary fiber backbone: Provide (1) 12 strand OS2 single-mode fiber optical and (1) 12 strand OM4 multi-mode fiber optic cable from the MDF to each new Intermediate Distribution Frame (IDF). Provide fiber optic rack-mounted termination cabinets required to support classified, unclassified, and training networks. Additional backbone cabling will be required for training networks. Coordinate with government for requirements.

Secondary copper backbone: Provide 50 pair CAT 3 cabling from the MDF to each IDF. Provide copper terminal equipment for termination in each IDF. Copper terminal equipment selection per the latest Local provider and applicable Using Military Department standards and criteria.

HORIZONTAL CABLING

Provide (4) CAT 6 UTP green color for unclassified networks (i.e NIPR, etc.) and CAT6A UTP for simulation networks (i.e. CACCTUS, etc) from rack-mounted patch panels (in each IDF) to each WAO. Provide (2) CAT 6 UTP green color for WAP /DDC / FACP/ Elevators/ TV displays/Utility Monitoring or metering. Provide (4) CAT 6 UTP red color for classified networks (i.e. SIPR). Provide (1) CAT 5e UTP green color for each synchronized clock / wall phone. Jack colors must be the same as CAT 6 cable colors. Provide a dedicated above ceiling basket-type cable tray system for NIPR/VOIP, SIPR and Training Networks.

WORK AREA OUTLET(WAO)

Provide double-gang steel electrical boxes for voice/data work area outlets. Provide boxes with a minimum dimension of 5-inches square in standard gypsum board walls and 4-11/16 inches square in CMU block walls. Provide a 1-1/4 inch conduit from each double-gang outlet box to the cable tray system. Mount voice/data work area outlet boxes at 18” above finished floor and minimum 6 inches away from any power receptacle. Provide voice/data outlet locations with a 4-position faceplate with four RJ-45 (8P8C) connectors. All work areas will contain a minimum of two communications face plates. Any work area larger than 80 sq feet will require additional face plates to service any work location in the room within 6 feet of a faceplate. Refer to section 27 10 00 for WAO details. Provide RJ-11 jack at synchronized clock locations.

Provide single gang steel electrical boxes at wall telephone locations with a 1-inch conduit from the outlet box to the cable tray system. Example locations for wall telephones are utility spaces, IDF. Mount wall telephone work area outlet boxes at 48” AFF. Provide wall telephone outlet locations with a 1-position faceplate with metal mounting studs.

INTERMEDIATE DISTRIBUTION FRAME (IDF)

Provide minimum dimensions 10’x10’ or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The IDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. Each IDF will house Ethernet switches,

an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39" separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

Provide a dedicated IDF for training network servers and distribution equipment. Coordinate with government for requirements.

MAIN DISTRIBUTION FRAME (MDF)

Provide minimum dimensions 10'x10' or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The MDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. The MDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39" separation between NIPR and SIPR cabinets Provide a wall telephone in each room.

LABELING AND TESTING

Label and terminate backbone, horizontal cabling, and termination hardware in accordance with the latest Local provider and applicable Using Military Department standards and criteria.

Test UTP Category 6 and 6A cabling in accordance with the minimum standards established in ANSI/TIA-568-C.1 and ANSI/TIA-568-C.2-1.

Test fiber optic cables and terminations in accordance with the minimum standards established in ANSI/TIA-526-7B and ANSI/TIA-526-14B.

Perform tests at both ends of cables.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a Public Address system with speakers in all common spaces exterior speakers for outside activity spaces

Interface the Public Address System with the Mass Notification System.

D503004 TELEVISION SYSTEMS

Provide RG-6 coaxial cabling and (2) CAT 6 green cables from the closest IDF to each television location. Provide coax cabling that traverses a secure boundary with an RF filter. Terminate coaxial cabling at outlet side, coil coaxial cabling inside IDF. Leave enough cabling to terminate anywhere inside the IDF.

D503005 SECURITY SYSTEMS

NOT USED

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

AUDIO-VISUAL SYSTEMS

Provide a complete Audio-Visual system per government requirements. Typical systems include: Projectors, TV displays, A/V distribution equipment, cabling, pathways. Design must be completed by an individual with an CTS-D certification. Refer to E20 for the Best Value Determination process for AV systems.

Below is a description of the A/V requirements:

Vehicle Training Bays

- Provide a 70” monitor mounted every two bay spaces to broadcast Instructor Demonstration of tasks

Classroom

- Provide 1 monitor wall consisting of (9) 42” TV screens at front center of each 60-person classroom; Provide Electronic Control Panel for classroom Audio/Visual/Lighting.

OIC/SNCOIC Office with Conference Room

- Provide PA system control; 70” monitor in conference room; VTC and conference call capable

POI MANAGER OFFICE

- Provide a 43-55” wall mounted TV monitor for MLF Reconcile.

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

Provide General Construction Items (Electrical) including, but not necessarily limited to, all connections, fittings, boxes and associated equipment needed by this and other sections of this RFP as required for a complete and usable system.

Firestop conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors in accordance with Section C10, Interior Construction.

D509002 EMERGENCY LIGHTING AND POWER

Provide power and wiring for emergency lights and exit lights throughout the facility.

EMERGENCY LIGHTING AND EXIT SIGNS

Emergency lighting must be unswitched except where required for energy savings and where control is required to achieve complete darkness to meet the needs of the space (conference/briefing rooms, simulation spaces, auditorium, etc.). Where emergency lighting is switched or dimmed, the designated emergency lighting fixtures must immediately return to full brightness upon loss of normal power or signal from the fire alarm system. Devices necessary to facilitate this function must be UL Listed for the application and for use in emergency circuits.

Provide self-powered exit signs and luminaires to provide the required egress path marking and emergency lighting.

Provide self-powered exit signs and emergency lighting units with a sealed, maintenance-free, battery, a fully automatic solid-state charger, a test push button and indicator light, and an integral self-testing module.

Provide exit signs with cast aluminum housing and brushed aluminum stencil face(s).

ENGINE GENERATOR

Provide a Level 1 Type 10 diesel engine generator set to provide emergency/life safety, legally required standby, and optional standby power to the facility. Provide each service from separate automatic transfer switches in accordance with NEC Articles 700, 701, and 702.

The generator must support the emergency/life safety loads, including the building fire pumps, and the following standby loads:

- Oil-water separator
- Sump pump(s)
- Security equipment

Provide generators installed outdoors in vandal-resistant, Level III sound-attenuating, weatherproof steel enclosures that are wind resistant up to 175 mph. Provide the generator housing with multiple removable, lockable panels to provide adequate access to components requiring maintenance. Panels must be removable by one person without tools. Mount instruments, controls, protective devices, and engine muffler within the enclosure.

Diesel fuel engines greater than 50 break horsepower (bhp) must comply with the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI) Engines (17CCR 93115) adopted by the California Air Resource Board (CARB). For additional information go to http:www.sdapcd.org.

D509003 GROUNDING SYSTEMS

Provide a complete grounding system for the facility electrical and telecommunications systems.

The grounding system must bond all building systems and equipment in accordance with applicable Codes and standards including but not limited to: medium voltage distribution equipment, generators, metal equipment support structures, outdoor transformers, fencing, building structure, building electrical and mechanical systems, raised access floor systems, lightning protection system, and communications systems to the grounding electrode system.

Provide UL listed copper, tinned copper, or silver-plated copper grounding conductors, lugs, connectors, and ground bars.

Provide a grounding electrode system for each building or structure.

Provide driven ground rods at each building column and bond to the building structure with minimum #4/0 AWG. Interconnect the building structure ground rods with a bare conductor grounding grid. Provide a bare conductor building counterpoise to bond the power system grounding electrodes, building structure grounding grid, building lightning protection grounding electrodes, and adjacent structures' grounding electrode systems. The minimum size of the counterpoise and grounding grid conductors is #4/0.

Provide copper-clad steel ground rods; minimum 3/4 inches by 10 feet in length, driven such that the top of the rod is 24 inches below grade, except in test wells.

Provide exothermic welds for below grade connections, except at test wells. Provide mechanical type connectors for above grade connections, in test wells, and in other locations where welded connections are not required.

Provide a Telecommunications grounding and bonding system in accordance with UFC 3-580-01.

Provide each ground bar with a clear 3/16-inch thick polycarbonate or acrylic cover 2 inches larger in each direction of the bar it shields.

Provide a grounding conductor with all circuits and feeders. Conduits cannot be used as the sole grounding conductor. Where multiple circuits are contained in a conduit, they may share the grounding conductor.

D509004 LIGHTNING PROTECTION

Provide a complete lightning protection system with a UL Lightning Protection Inspection Certificate certified to UL 96A, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.

Conceal LPS down conductors within the building envelope. Provide access panels or other means for inspection of down conductors in accordance with NFPA 780 requirements.

Lightning Protection Systems must not void the roof warranty. Adhesive bases are prohibited on standing seam metal roofs.

D509005 ELECTRIC HEATING

Provide power wiring and connections as required for all electric heating systems and equipment.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide power wiring and connections as required for all systems and equipment including meters and controls. Coordinate connection requirements with switchgear and pad mounted transformer kWh metering.

D509007 BUILDING PHOTOVOLTAIC SYSTEM

NOT USED

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

EMERGENCY POWER OFF (EPO) SYSTEMS

Provide maintained contact, mushroom type, twist to reset EPO buttons with a clear flip-up cover. EPO systems must disconnect power to IT equipment within the room, disconnect power to dedicated HVAC equipment within and serving the room, and perform other operations in accordance with NEC Article 645.

Provide the EPO control panel with two sources of power, one originating from the Life Safety Power source and one from a Normal Power source. The Life Safety Power source is the preferred source. Neither power source is permitted to originate from a source affected by operation of the EPO system.

Provide the EPO control panel as an integrated control and monitoring system with electrically operated contactors. Provide contactor voltage and current ratings consistent with type of load served. Provide the control panel in a surface mounted enclosure with key lock and with door-mounted control and pilot devices. Provide with two spare output relays of each type.

Provide the EPO control panel with the following door-mounted pilot lamps and switches:

- Preferred Power Source Available (Green lamp)
- Alternate Power Source Available (Green lamp)
- Maintenance Bypass Override(Key switch)
- Normal Operation (Green lamp)
- Maintenance Bypass (Amber lamp)
- EPO Activation (Red lamp)
- System Reset (Momentary push button or switch)
- Lamp Test (Momentary push button or switch)

Provide an output signal to Fire Alarm System from each room's EPO system to provide the following status points per room:

- EPO system power available
- EPO activation
- EPO system in maintenance bypass

Placing EPO system in "Maintenance Bypass" allows testing of the EPO system without interrupting power to the IT or space support systems.

Locate the EPO control panel and EPO button adjacent to the entrance to the space. Where more than one entrance is provided, provide an EPO button adjacent to each entry point.

OVERHEAD CORD REELS

Provide heavy-duty overhead power cord reels with 100-foot cord and NEMA 5-20R GFI duplex receptacle.

Provide heavy-duty overhead 28VDC power cord reels with 100-foot cord and NATO receptacle compatible with Government vehicles. Coordinate receptacle type with COR.

Provide heavy-duty overhead light cord reels with 100-foot cord and impact-resistant LED shop light with switch.

Provide cord reels with electric unwind/rewind motor and remote-control station.

--End of Section--

E10 EQUIPMENT – P1512F LOG OPS SCHOOL

GENERAL SYSTEMS REQUIREMENTS

The contractor shall obtain the services of equipment specialists to specify audiovisual equipment. Equipment specialists shall not have any affiliation with the product specified.

All specialty equipment will be installed by qualified installers regularly engaged in installing the specialty equipment.

Provide energy using equipment per criteria listed in UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

E1010 COMMERCIAL EQUIPMENT

E101003 VENDING EQUIPMENT

Government to provide and install vending equipment under separate contract. Users to provide requirements of electrical and plumbing devices to be provided by Contractor to properly support the complete functional operation of the vending equipment. Design the break rooms to provide space, utilities, and cooling to accommodate the vending equipment.

Vending equipment shall include: 3 Drink Vending Machines and 2 Snack Vending Machines in each Break Room.

E101005 SECURITY AND VAULT EQUIPMENT

NOT USED

E1020 INSTITUTIONAL EQUIPMENT

E102003 LABORATORY EQUIPMENT

NOT USED

E102009 AUDIOVISUAL EQUIPMENT

Coordinate design requirements with the end user/Command IT personnel, and provide equipment specifications, and procurement and installation of the Audiovisual (AV) equipment. Obtain the services of an audiovisual equipment specialist with CTS-D certification to design and specify the audiovisual equipment.

Plan for and provide AV equipment for all conference rooms, classrooms, labs, and Vehicle Training Bays.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment must include, but is not limited to,: intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, interactive wall systems and CCTVs.

AV equipment is funded separately. The AV Equipment is identified on the AV Cost Estimate Worksheet. Refer to E20 for the Best Value Determination process for AV systems.

E1030 VEHICULAR EQUIPMENT

No recessed loading dock is provided for this project however at or near the overhead door of the Special Projects space provide a site located dock lift for use with a variety of truck types up to a semi-tractor trailer truck, and truck-trailer restraining device.

Minimum performance characteristics for the dock lift shall be based on the following:

a. Service Period:

   (1) Number of shift operations of 1.

   (2) Maximum number of trucks per shift opening of 8.

   (3) Maximum number of days per week of 6.

b. Fork Lift Loads:

   (1) Design lifts to accommodate 4-wheel fork trucks.

   (2) Design lifts to handle 10,000 lb. gross dynamic load.

   (3) Base lift design on number of cycles per loading/unloading operation per truck of 18.

E1040 GOVERNMENT FURNISHED EQUIPMENT

Rough-in and provide connections for Government-furnished equipment such that equipment will operate as intended, including providing miscellaneous items such as plugs, receptacles, wire, cable, conduit, flexible conduit and outlet boxes or fittings. It is the contractor's responsibility to determine existing equipment utility requirements at M107 prior to bid.

Contractor must obtain manufacturers installation instructions and drawings for each item to be transferred and comply with the installation requirements regarding room design, utilities, anchorage, and all other requirements.

Contractor must pick up equipment at Building M107 and transfer to site for installation when ready and approved by the Contracting Officer. Equipment shall remain in control of the Government until such time as the Contractor is ready to install. Contractor must provide 30 days advance notice of expected installation date and pick up equipment at Building M107 and transfer to site for installation.

Testing requirements of Government Furnished equipment shall be the responsibility of the Contractor and must follow the same guidelines as though the Contractor had provided the equipment.

The following items will be furnished by the Government and must be installed and tested by the Contractor:

- Engine Dynamometer System
- Power Train Dynamometer System
- Workstation bridge crane associated with Power Train Dynamometer.
- Fuel Testers
- Electrical Testers
- 28 VDC power converters

- Jib Crane associated with Electrical Testers
- Vehicle Bay Equipment
- Lounge Displays
- Equipment to be relocated from M107 to the new LOG OPS School; please refer to Part 6, P1512, General, Attachment 11 for a list of equipment, their current locations, and their projected new locations.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide light commercial kitchen equipment design to meet the needs of the end user. All light commercial electric kitchen equipment to be coordinated to provide a functional facility. Project includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the end user requirements and complete coordination with the facility design. Equipment must include, but is not limited to, refrigerator, microwave, coffee maker, and ice maker.

--End of Section--

E20 FURNISHINGS – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Furnishings must include fixed furnishings as part of the Structural Interior Design (SID) and the design and documentation of the movable furnishings, the Furniture, Fixtures, and Equipment (FF&E) Package and Audio/Visual (A/V) Equipment Package.

The design and documentation of both must be funded as part of the construction contract. The purchase and installation of the FF&E and A/V Packages must be funded separately as part of Collateral Equipment.

The movable furniture and furnishings (FF&E) for this facility may include, but are not limited to movable furniture systems, freestanding furniture, area/accent rugs, artwork, appliances, flat screen TVs (not connected to data), accessories, shop equipment, fire extinguishers, specialty equipment (specified by the Activity) and other miscellaneous items to support facility functions.

FF&E is estimated in the amount of $9,259,178.28 and AV is estimated in the amount of $842,003.48. This Government FF&E and AV budgets must not be altered by Contractors during the bid process.

Fixed furnishings (items that are fixed to the structure), such as specialty equipment, drying cages, weapon racks, lockers, fixed shelving, fixed display furnishings, marker boards, cork boards, motorized projection screens, blinds/shades, etc. are part of the construction contract.

The Audio Visual (AV) Equipment will be identified as a separate line item, priced separately from the FF&E and funded as a planned modification. The A/V Package must include shipping, freight, handling, installation, applicable state sales tax, and the Contractor's A/V Handling and Administration Rate (HAR) percentage as applied to the final A/V total cost. Refer to Part 3 Section E10 Equipment and D50 Electrical of this RFP.

GENERAL SYSTEMS REQUIREMENTS

Design and provide fixed and movable furnishings for all areas as developed during Activity programming and as indicated in the Room Requirements (refer to Part 3 Section 5 of this RFP) and other portions of this RFP to provide a fully usable and complete facility. Design a complete FF&E package and A/V package and prepare supporting plans and procurement data. The design, procurement, and installation of the A/V package must comply with all of the same requirements as those defined for the FF&E package in this specification section FF&E and A/V items identified in this RFP are to be used as a guideline to assist in establishing the minimum facility requirements and do not relieve the Contractor's Interior Designer and CTS-D from developing a complete and accurate design package that incorporates ALL of the Activity’s FF&E and A/V requirements determined during the design process. Design per specific UFC (i.e. Youth center, BEQ, etc.) and in conjunction with UFC 03-120-10, Interior Design.

The contractor must retain the services of an Interior Designer with a minimum of one of the following credentials: National Council for Interior Design Qualification (NCIDQ) certification or state, locality and/or jurisdiction Interior Design Certification, Registration, or License. This same Interior Designer must prepare both the SID and the FF&E Package, attend and participate, in entirety, all kick-off meetings, existing site visits, design meetings, to include, but not limited to, design charrettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package.

When A/V is required, or other specialty equipment, i.e. shop, kitchen, fitness, high density storage, etc., is required in the project, the Contractor must obtain the services of the appropriate Equipment Specialists to specify the specialty equipment.

A Certified Technology Specialist-Design (CTS-D) is required for the design and preparation of A/V packages. The CTS-D must attend and participate, in entirety, all design meetings, to include, but not limited to, design charrettes, concept design workshops, presentations and review meetings to develop the floor plan and the A/V package. The NAVFAC approved Specialist(s) must provide separate Best Value Determinations (BVDs) for this equipment, if required by NAVFAC.

The Contractor's Interior Designer and CTS-D, the Design Firm Owner(s), and any Specialists must not have any affiliation with the products specified. The NAVFAC Contracting Officer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer based upon review/recommendation of the NAVFAC Interior Designer Per UFC 3-120-10, the FF&E includes the design, selection, specification, color coordination and procurement documentation of the required items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility.

FF&E specifications must be based on NAVSUP Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The utilization of the current NAVSUP BPA list is required for BVD Analysis Request for Pricing. The current NAVSUP BPA list is located at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The CTS-D must provide A/V floor plans indicating equipment locations and A/V riser diagrams for all A/V systems and coordinate equipment locations and power requirements with power plans. The Final FF&E and A/V packages must utilize the most current generation technology. All fixed and movable furnishings and A/V selections and designs must be closely coordinated with Parts 3 and 4 Sections C10, C30, E10, D50, and all other parts of this RFP. All fixed and movable furnishings and A/V must be fully integrated with the final design, to include all building finishes, and all building systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architecture, etc.) construction and schedule. All outlets, switches, thermostats, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc., clearances must be accommodated. The Contractor's Interior Designer and equipment specialists must be responsible for designing and providing specifications for procurement of all FF&E, A/V and specialty equipment, to include delivery and installation, for the facilities built under this contract as directed by the NAVFAC Interior Designer. The Contractor must be responsible for installing all A/V, communications, data, and power cabling within systems and freestanding furniture raceways and performing connections to the building, as required.

The FF&E and A/V packages must be fully integrated into the design and construction schedule for the building. All submittal due dates for the SID, A/V and FF&E must be reflected in the Contractor’s construction schedule. **The Contractor and the Contractor’s Interior Designer must strictly adhere the FF&E submittal schedule defined prior to the 35% design development to ensure that the final FF&E package is submitted at least 4 months prior to FF&E funding deadlines and no later than 9 months prior to building completion.** Requests to change the SID or FF&E schedule must be submitted to the NAVFAC Interior Designer for review/recommendation and approved by the NAVFAC Contracting Officer.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS STRUCTURAL INTERIOR DESIGN (SID)

STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process must begin following the award of the RFP. The SID submittal must include Interior Design programming documents, FF&E Floor Plans, and exterior & interior finish/color and material sample boards and binders. Refer to this RFP Part 4 Section Z10 General Performance Technical Specifications and Part 2 UFGS Section 01 33 10.05 20, Design Submittal Procedures.

The Contractor’s Interior Designer must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative within 7 days of each occurrence.

Provide the following SID meetings and submittals;

a. Concept Design Workshop (CDW) (10%-15%) or Initial Design Meeting: The Contractor's Interior Designer must meet with the Activity and IDD/Base Property for Marine Corps projects to develop the Interior Design SID programming documents, which will include a preliminary Furniture and Equipment Plan and the FF&E Summary List. The Contractor's Interior Designer must conduct in-depth room by room interviews to confirm Activity requirements (SID, FF&E, A/V, etc.) for the new facility(s). These interviews must occur during the CDW and will include building walk-thru(s) at the Activity’s current location and/or similar facility(s), if possible.

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer’s representative must provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces. The Furniture and Equipment Plan, FF&E Summary List, and a preliminary Cost Estimate should be further developed and included in this submittal.

c. SID "Over the Shoulder" Review: Prior to the Prefinal (100%) Submittal, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer’s representative for an "over-the-shoulder" review meeting to present a minimum of three (3) options for the interior building finishes/colors/materials. Manufacturer choices and cost range of materials must be pre-approved by the Contractor to prevent any substitutions during the submittal process. Finish option samples for NAVFAC review must be clearly labeled and in a "loose" format for preliminary approval prior to the presentation to the Activity. Options must include manufacturer's label/specifications/data sheets. The over-the-shoulder review meeting must be held via conference call.

d. SID Presentation to Activity: The Contractor’s Interior Designer must present a minimum of two (2) NAVFAC Interior Designer-approved options for the interior building finishes/colors/materials to the Activity for approval. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for approval. The meeting must be held at the Activity. Photos documenting the selected finish option and preliminary finish schedule for that option must be emailed to the NAVFAC ID within 7 business days.

e. Prefinal (100%) Submittal: The Contractor's Interior Designer must submit the Activity-approved interior building finishes/color/material selections. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty

plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Prefinal SID Binder Submittal must be distributed to the NAVFAC Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

These finish options must be documented and submitted for review and approval as follows:

Submittal to NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's representative:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s) w/ floor patterns and accent wall locations
3. Finish Legend
4. Finish Schedule
5. Pre-Final Finish Selections and Physical Samples (photocopies of samples are not acceptable.)
6. CD copy of submittal in binder

f. Final Submittal: The Contractor's Interior Designer must incorporate the final approved Furniture and Equipment Plan, Finish Schedule, Floor Finish Plan and Finish Legend into the Contractor's final drawing set. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Final SID Binder Submittal must be distributed to the NAVFAC Project Manager/Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

The Final Submittal must include the following:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s)
3. Finish Legend
4. Finish Schedule
5. Final Finish Selections and Samples
6. CD copy of submittal in binder

SID CONSTRUCTION SUBMITTALS

No substitutions must be made to the SID finishes once they have been approved by NAVFAC during the design phase. In the event that revisions may be required due to unforeseen conditions such as discontinued product, such revisions must be submitted to the ROICC and NAVFAC Interior Designer's representative for approval by the NAVFAC Interior Designer before substitutions can be made.

FIXTURES, FURNISHINGS AND EQUIPMENT AND AUDIO VISUAL (FF&E and A/V)

The FF&E and A/V design process must begin at the CDW and develop concurrently with the building design. The submittals must include fixtures, furnishings, and equipment specifications in accordance with the Activity requirements to produce an optimally functional facility. FF&E are all items that are not fixed to the structure, but are fully integrated with the floor plan, building systems, and finishes. Refer to RFP Part 4 Section Z10 General Performance Technical Specification and Part 2 UFGS Section 01 33 1-.05 20, Design Submittal Procedures.

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the Activity requirements and complete coordination with the facility design and the SID.

For all projects, including fast track projects, the Contractor must be responsible for sufficiently scheduling all SID/FF&E and A/V submittals early enough to obtain the required government approvals, and meet all ordering and installation lead times to complete the project by the contract completion date.

These are minimum requirements and the Contractor must be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/FF&E and A/V coordination. The Contractor’s Interior Designer and CTS must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative and Electrical Engineer’s representative within 7 days of each occurrence.

Provide the following FF&E and A/V meetings and submittals;

a. FF&E and A/V Procurement Requirements Meeting (Interior Design Orientation): This meeting must occur at MIDLANT, located in Norfolk, VA prior to the Design Development (35%-50%) Submittal and the development of the FF&E package. The NAVFAC Interior Designer and NAVFAC Electrical Engineer will provide the Contractor's Interior Designer current sample documents to be used for the FF&E and A/V BVD Analysis solicitation package and submittals, review the Best Value Determination (BVD) process, discuss the number of Best Value Determinations required and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider.

b. FF&E "Over the Shoulder" Review: Prior to the FF&E Concept Presentation and Best Value Determination (BVD) Analysis the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review to present a minimum of two preliminary FF&E options. These can be presented in a "loose" format for preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA.

c. FF&E and A/V Concept Presentation: The Contractor's Interior Designer and CTS must present the NAVFAC approved preliminary FF&E and A/V package to the Activity for approval. This presentation must include loose format samples and catalog cuts. Sample boards are not required. This meeting must occur in conjunction with the SID presentation to the Activity, if possible. NAVFAC OICC, Project Manager, Interior Designer and Electrical Engineer must be invited to this meeting.

d. Best Value Determination (BVD) Analysis "Over the Shoulder Review": Prior to issuing the BVD Analysis solicitation package, the Contractor's Interior Designer and CTS must send an electronic copy and a hard copy in binder format, of the complete FF&E BVD Analysis solicitation packages to the NAVFAC Interior Designer and the complete A/V BVD Analysis solicitation package to the NAVFAC Electrical Engineer for review. The Contractor's Interior Designer and CTS must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review of all required solicitation packages and to review the most current NAVSUP BPA vendor list and discuss GSA Contract Audio Visual vendors. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA. Separate solicitations are required for each FF&E BPA category and the A/V package.

   BVD Analysis Solicitations must include the following:

   1. Copy of the BVD Analysis Request for Pricing cover letter – Indicate all revisions to this NAVFAC-provided template utilizing “Track Changes.” NAVFAC approved revisions may be added to this document, but no items may be deleted.

   2. BVD Analysis Request for Pricing Spreadsheet/Questionnaire with “basis of design” item product numbers, photos & descriptions

   3. Detailed Technical Specifications/Criteria developed for each FF&E and A/V item in NAVFAC MIDLANT’s standard format to establish minimum acceptable FF&E requirements for comparable bids.

   4. Project Specific Room / Furniture Typicals

   5. Furniture and A/V Plans with Legends coded to the BVD Analysis RFP (PDF format)

   6. Contractor’s subcontract agreement/terms and conditions (if applicable)

   7. Contractor’s Interior Designer must request the most current BPA Contract Holder vendor information prior to sending out the bid solicitations.

e. BVD Submittal and "Over the Shoulder" Review - The Contractor's Interior Designer must submit one (1) hard copy in binder format of the BVD package to the NAVFAC Interior Designer’s representative, NAVFAC Electrical Engineer’s representative, and one (1) copy to IDD/Base Property for Marine Corps projects. An electronic copy must be sent to the NAVFAC Contracting Officer, the NAVFAC Interior Designer and the NAVFAC Electrical Engineer. Additional back-up information from specific bid packages may be requested on an as-needed basis. The "over-the-shoulder" review meeting will be held via conference call VA to review the results of the solicitation and determine a best value recommendation. Submit the following in 3-ring binders and include a CD copy in each for review and approval:

   The BVD Submittal must include the following:

   1. Cover Title Page (project name, project #, location, submittal date, submittal title)

   2. Table of Contents

3. Point of Contact List
4. Narrative of Interior Designer Objectives
5. Copy of all information sent to bidders and documentation that all required sources were contacted
6. Technical Specifications used in bid request for all furniture and A/V etc.
7. BVD Analysis Request for Pricing Spreadsheet/Questionnaire completed by each bidder
8. Back-up Information submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meets all requirements.)
9 Responses from UNICOR (FF&E only)
10. Completed BVD Analysis Pricing Evaluation Spreadsheet comparing bidder quotes/responses
11. Contractor's Interior Designer/Electrical Engineer's recommendation for the Best Value vendor and justifications
12. CD copy of the FF&E and A/V BVD Submittal binders

f. The Contractor's Interior Designer must coordinate a mock-up for best value review of FF&E items as required by NAVFAC by at least the top three (3) BPA vendors submitting the highest rated FF&E proposals, as determined by NAVFAC. The reviewers must include the Contractor's Interior Designer, NAVFAC Interior Designer, Contracting Officer, IDD/Base Property, and the Activity.

g. Preliminary FF&E Submittal: The Preliminary submittal must be due at pre-final (100%). It must be presented to the Activity and NAVFAC Interior Designer's Representative and NAVFAC Electrical Engineer's Representative in loose format at a meeting to occur at the Activity. Presentation will consist of loose samples, to include all cut sheets and finishes from the recommended vendors. Immediately following this meeting, the Preliminary FF&E and A/V submittal binders will be submitted. Immediately following this meeting, the Preliminary FF&E submittal binders must be submitted. Five (5 submittals will be required; (1) for the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

Submit the following in a 3-ring binder (with the exception of the 16x20 color boards for the Activity only) for review and approval:

The Preliminary FF&E Submittal must include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)
2. Table of Contents

3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s) vendors and subcontractors)
4. Preliminary FF&E list (Cost Summary) to include shipping, freight, handling, professional installation, project management, HAR and applicable sales tax
5. Preliminary Procurement Data Spec Sheets completed for each product. Indicate general appearance as well as proposed finish and fabric selections
6. Furniture and A/V placement plans coded to the FF&E and A/V lists and Procurement Data Spec Sheets; include electrical and A/V plans for coordination.
7. Technical Specifications used in bid request for all furniture, and A/V etc.
8. Pre-Final Finish/Fabric Selections and Samples in 8 x 10 binder format mounted on heavy-duty card stock in edge-reinforced heavy-duty plastic sheet protectors.
9. Copy of Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes. Indicate and provide explanations for all changes to FF&E quantities and/or pricing that occur between accepted vendor proposal and Final FF&E Submittal.
10. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.

h. The Contractor and his Interior Designer must coordinate an on-site mock-up and review of FF&E items as required by NAVFAC with the selected, best-valued BPA vendor(s). Building finishes and fixtures must be installed in the affected area(s) to the greatest extent practicable in order to assess building systems/fixture coordination. The reviewers must include the NAVFAC Interior Designer and Construction Manager, The Contractor's Interior Designer, IDD, Base Property, and the Activity. The BPA vendor must be available on-site to respond to questions. The mock-up exercise must be completed prior to the submittal of the Final FF&E submittal and award of the modification for turnkey furniture procurement.

i. Final FF&E and A/V Submittal: The Contractor's Interior Designer must submit the Final FF&E and A/V Packages within 30-90 calendar days following the receipt of review comments on the preliminary FF&E submittal. **All required documentation revisions of price changes and product reselection due to price increases or discontinued product must be the responsibility of the Contractor's Interior Designer.** Five (5) submittals will be required; (1) for the NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative, (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

   The Final submittal must include the following:

   1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)

2. Table of Contents

3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s), vendors and subcontractors)

4. Final FF&E and A/V lists (Cost Summary) to include shipping, handling, freight, professional installation, project management, HAR and any applicable sales tax.

5. Final Procurement Data Spec Sheets completed for each product. Indicate final finish and fabric selections. Images of item and finishes to be represented.

6. Final Finish Selections and Memo Samples for the FF&E submitted in 8 x 10 binder format, mounted on heavy-duty card stock, using heavy-duty plastic sheet protectors.

7. Final Furniture and A/V Placement Plans coded to the FF&E and A/V lists, Procurement Data Sheets and specifications; include electrical and A/V plans for coordination.

8. Copy of Final Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes.

9. Indicate and provide explanations for all changes to quantities and/or pricing that occur between accepted vendor proposal and Final Submittal.

10. Best Value Determination Guidelines sheets (completed and signed by the Contactor's Interior Designer and CTS-D)

11. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.

12. CD copy of the final FF&E and A/V binders.

j Punch List: The Contractor's Interior Designer (and A/V consultant or other specialty consultants, if applicable) must attend two punch list site visits with the installation dealer(s), NAVFAC Interior Designer and the Base Representative/Activity Contact. The first site visit must identify all punch list items (at installation dealer's 98% completion) and the second (at 100% completion) will confirm that all punch list items have been resolved.

FF&E CONSTRUCTION SUBMITTALS

Submit any revisions or deviations caused by discontinued items to the Contracting Officer for approval by the NAVFAC Interior Designer.

SD-10 Operation and Maintenance Data

List Operation and Maintenance Manuals for seating, systems furniture and keyboard trays.

E2010 FIXED FURNISHINGS (SID)

Fixed furnishings (SID) are funded as part of the construction project and are not funded as part of FF&E Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

Develop design as described herein and provide storage shelving, equipment racks, and window treatments. Cross reference C10 Interior Construction, and C30 Interior Finishes, for performance requirements. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

E201001 FIXED ARTWORK

As required, provide wall graphics and/or logo of activity in appropriate locations. Coordinate with Activity and NAVFAC Interior Designer's representative for location and placement.

E201002 WINDOW TREATMENTS

Provide manually operated roller shades at windows and other glazed openings to the exterior of the building. Provide light filtering and blackout shades for all exterior windows unless otherwise noted below or in room requirements. Provide only blackout shades at frosted/obscured vision glazing locations.

Shade housing (fascia, valence, and trim) must be located above the window frame as to not conceal the glazing. Recess shade in ceiling at locations where window frame is at same level as ceiling system.

All exposed roller shades must be furnished with metal fascia / valance. Provide side and sill channels for black-out shades to prevent light leak / bleeding. Light seal hem bar may be provided in lieu of sill channel.

Shade cloth material and finish must be coordinated with NAVFAC Interior Designer during design-build. The following openness factors must be provided:

Sunscreen: 3% minimum - 6% maximum openness

Black-out: 0% openness

Shades are considered SID and are funded as part of the construction contract. Soft window treatments, such as draperies (not to include stage curtains), are considered FF&E and must be included in the FF&E package, as required.

E201003 FIXED SEATING AND TABLES

As required, but not limited to, provide fixed locker room benches, auditorium fixed seating and site furniture.

Provide auditorium seating with tablet arms. Arm caps must be molded vinyl. Seatbacks must be molded vinyl. Interior seat and back must be padded and fully upholstered.

E201004 INTERIOR LANDSCAPE (FIXED)

NOT USED

E201006 LOBBY AREA

Design and provide lobby areas consistent with quality commercial design, architecturally significant in scale, and coordinated with the interior finishes for each facility. Lobby areas must reflect the mission of the client and must be designed to accommodate the function and program required for the facilities. Lobby areas must include the following elements: fixed artwork, graphic floor inlay, and decorative lighting. Lobby elements noted above are part of the construction contract.

E2020 MOVABLE FURNISHINGS

The design of the FF&E package is funded as part of the construction contract base bid. The purchase and installation coordination of FF&E is a planned modification to the contract and funded separately as part of Collateral Equipment. The specific process is outlined in PTS E20 in Part 4 of this RFP. If a Collateral Equipment list is provided within this RFP, the costs associated with the purchase and installation of these items are NOT to be included in the base bid. The estimated Collateral Equipment cost is provided for information purposes only. The Contractor only needs to propose the Handling and Administrative Rate (HAR).

Design and provide an FF&E package in accordance with UFC 03-120-10, *Interior Design,* and other portions of this RFP for all areas as developed during Activity programming to provide a fully usable and complete facility. Collateral Equipment may also include specialty items specified by the Activity and the Contractor's Interior Designer is responsible for incorporating these into the FF&E and/or the A/V package. The estimated Collateral Equipment cost(s) are provided for information purposes only. Actual requirements may vary, and it is the responsibility of the Contractor’s Interior Designer and/or Equipment Specialist to determine the specific requirements of the End User during the design phase and design to these requirements.

The FF&E Package must include shipping, freight, handling, and professional installation, project management, applicable sales tax, and HAR.

A Best Value Determination must be performed on a minimum of three manufacturers and UNICOR for orders exceeding the micro-purchase threshold from an individual manufacturer/vendor. Multiple BVDs may be required in order to complete the final FF&E and A/V packages. The required quantity of BVDs to be performed will be determined by the NAVFAC Interior Designer’s representative during the design phase and is dependent on the appropriate NAVSUP BPA category(s) to be utilized and specific project requirements. Documentation must be provided to the Government with the final FF&E package. Specific Documentation is indicated in Part 4 of the RFP. The BVD Statement must be completed and signed by the contractor's interior designer. Sample BVD forms and instructions will be reviewed during the FF&E Procurement Requirements Meeting. Forms can be obtained from the WBDG at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The Contractor, as a planned modification, must be authorized by the Government Contracting Officer to procure all furniture/furnishings in the approved final FF&E and A/V packages using predominately negotiated Federal contracts as directed by the Contracting Officer and the NAVFAC Interior Designer and Electrical Engineer. When the modification for turnkey furniture and A/V procurement is exercised, the Contractor's proposed Handling and Administrative Rate (HAR) must not exceed 5% of the total cost of the FF&E, and A/V shipping, freight, handling, project management, and installation. The HAR includes all of the contractor's efforts related to the storage, coordination, handling and administration of subcontractors, deposits, bonds and all other associated costs and profit for the procurement of FF&E and A/V. No other charges, fees,

or markups will be authorized. The contractor must establish and submit a fixed percentage figure, for the administration effort of this modification (HAR), with the initial project proposal as part of the contractor's Pricing Schedule.

E202001 MOVABLE ARTWORK

Provide graphics and other movable artwork as required by Activity / User and NAVFAC Interior Designer’s Representative. Movable artwork is part of the FF&E package.

E202002 MODULAR PREFABRICATED FURNITURE

Provide modular freestanding workstations as required. Provide at a minimum, a 36 square foot workstation. The workstation to include: an adjustable height computer solution (electric height adjustable work surface, ergonomic keyboard tray, or split height work surface), a height adjustable monitor arm, a CPU holder, task lighting, overhead storage, and file storage. Ensure cable management within the workstation is provided. Approval in writing must be obtained from the Activity / User Commanding Officer for any deviation in workstation size reduction. Special coordination of workstation design must occur when workstations are located next to windows. All components of the workstation including but not limited to overhead storage and furniture partitions must not abut windows and block views to the exterior. Storage associated with these workstations may be accommodated by overhead storage perpendicular to the window or an additional counter height storage component of not less than 3'-0" and constructed in the same style as the workstation, located adjacent to the workstation at the end of the circulation aisle.

E202003 FREESTANDING FURNITURE AND FILES

Provide ergonomic task seating, lounge, reception and guest seating, storage and filing, tables, as required.

E202004 RUGS & ACCESSORIES

Provide decorative items as required. Include one wall clock in each office.

E202005 MULTIPLE SEATING (MOVABLE)

NOT USED

E202006 INTERIOR LANDSCAPING (MOVABLE)

Provide interior landscaping (planters, site furnishings, etc.) as required.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, fire extinguishers, clocks, literature racks, microwave ovens, refrigerators, non-plumbed coffee makers, and other appliances as required.

--End of Section--

F10 SPECIAL CONSTRUCTION – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Special Construction systems are not applicable to this project.

GENERAL SYSTEMS REQUIREMENTS

F1010 SPECIAL STRUCTURES

F101001 METAL BUILDING SYSTEMS (PRE-ENGINEERED)

NOT USED

F1020 INTEGRATED CONSTRUCTION

NOT USED

F102001 SPECIAL PURPOSE ROOMS

NOT USED

F1030 SPECIAL CONSTRUCTION SYSTEMS

NOT USED

F1040 SPECIAL FACILITIES

NOT USED

F104001 INTERIOR SWIMMING POOLS

NOT USED

--End of Section--

F20 SELECTIVE BUILDING DEMOLITION – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

A group of individual buildings are to be removed in their entirety as a part of the scope of this RFP. Refer to the list in F2010 Building Elements Demolition.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Perform all off-site work necessary to meet the requirements of the project, local codes, reference standards, technical specifications and performance criteria.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor shall submit complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form is in the UFC 3-201-01, *Civil Engineering*. Contractor shall determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form shall be forwarded to the EFD Environmental Reviewer.

Coordinate and obtain approval from the Contracting Officer for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

F2010 BUILDING ELEMENTS DEMOLITION

This project includes the complete demolition of the following: Buildings M90, M90A, M95, M119, M121, M122, M123, M126, M130, M132, M305, M311, M313, M403, M405, M406, M409, M411, M412, M413, M415, M416, M418, M420, and M422.

F2010 1.1 GENERAL DEMOLITION

Remove indicated existing structures 48 inches below existing grade.

F2010 1.2 UTILITIES

Remove all existing utility service connections including but not limited to water, sanitary sewer, natural gas, electric, and telecom. All service connections shall be demolished to the service main and capped per all State and Federal requirements.

Utility demolition must be coordinated with on-site personnel for planned outages.

Demolition of buildings' associated telecommunications services and pathways must be coordinated with Base Telephone office.

For natural gas demolition notify PNG when a facility is ready for demolition. Once the facility has been confirmed for demolition PNG will remove and retire the meter. PNG will valve off the lateral at the main and will disconnect both ends of the gas lateral, the meter side, and the main side. To depict retirement, PNG will remove the lines 4 to 5 feet from each end. Remove the remaining line left by PNG. Once a meter is retired, the lateral cannot be reused for a new facility.

F2010 1.3 DUST CONTROL

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area.

F2010 1.4 TRAFFIC CONTROL

Where pedestrian or vehicle safety is endangered, use traffic barricades to reroute traffic to safe routes.

F2010 1.5 WEATHER PROTECTION

NOT USED

F2010 1.6 BURNING

Where burning is permitted, adhere to federal, state and local regulations shall be required. Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

All open burning shall be coordinated with the Air Quality Manager at MCBCL (910-451-5836).

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

Brief descriptions of the buildings to be demolished follow. Refer to Demolition Site Plans in Part 6 for additional information.

Building M130 is a multi-winged single story building with shallow foundations supporting load bearing masonry walls and a wood truss roof structure.

Building M132 is a single story building with shallow foundations supporting load bearing masonry walls and a wood truss roof structure.

Building M403 is an H-shaped single story building with shallow foundations supporting load bearing masonry walls and a wood truss roof structure.

All remaining buildings to be demolished are similar to those outlined above.

F201002 EXTERIOR CLOSURE

The buildings listed above to be demolished in their entirety are low one story structures built in the 1940s and have various exterior materials dating from that time that include load bearing masonry exterior wall systems, windows and doors.

F201003 ROOFING

The buildings to be demolished have sloped roofs with primarily asphalt shingle roofing.

F201004 INTERIOR CONSTRUCTION & FINISHES

The building listed above to be demolished have been renovated at various times and in recent years. They have a combination of interior partition systems that includes CMU, gypsum wall board and metal stud partitions, and various other more historic partition systems. All have toilet rooms and finishes associated with toilet rooms.

F201005 CONVEYING SYSTEMS

No conveying systems are being demolished

F201006 MECHANICAL SYSTEMS

Demolish mechanical and plumbing systems. Follow Camp Lejeune Mechanical Design Guidance for proper refrigerant handling.

F201007 ELECTRICAL SYSTEMS

Demolish existing buildings' electrical distribution systems in their entirety, including equipment, luminaires, devices, wiring, pathways. Contact Tony Beckwith at (910) 451-2790 to coordinate electrical demolition. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

Demolish existing buildings' communications systems in their entirety, including equipment, devices, wiring, and pathways.

Demolish existing buildings' fire alarm systems in their entirety, including equipment, devices, wiring, and pathways. Prior to demolition, contact Base fire alarm technicians and allow time for their retrieval of existing fire alarm system panels, devices, and appliances. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

F201008 EQUIPMENT & FURNISHINGS

Equipment and furnishings must be removed by the Contractor prior to removal of the building.

F201090 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

F2020 HAZARDOUS COMPONENT ABATEMENT

A Hazardous Material Survey Report will be provided by the government for each building listed in Section F2010 above. The reports are to be provided after the issuance of this RFP but prior to the award of the project.

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

The General Contractor is required to hire, as a first tier subcontractor, a PQP to ensure compliance with the approved work plans and perform independent inspections, testing and verification of the hazardous components work including: asbestos, lead containing paint, and any other hazardous material identified in the Destructive Hazardous Material Survey Report.

F2020 1.2 FURNISHINGS

All furnishings in the listed buildings will be removed prior demolition.

F2020 1.3 ASBESTOS

Refer to F2020 above.

F2020 1.4 LEAD BASED PAINT

Refer to F2020 above.

F2020 1.5 PAINT RELATED WORK

Refer to F2020 above.

F2020 1.6 MERCURY & LLR COMPONENTS

Refer to F2020 above.

F2020 1.7 PCB'S

Refer to F2020 above.

F2020 1.8 OZONE DEPLETING SUBSTANCES (ODS)

Refer to F2020 above.

F2020 1.9 ANIMAL DROPPINGS

Refer to F2020 above.

F2020 1.10 MOLDS AND SPORES

Refer to F2020 above.

F2020 1.11 DISPOSAL

Perform disposal in accordance with the RFP and the specifications and plans provided in Part 5 and Part 6.

F202001 SUBSTRUCTURE & SUPERSTRUCTURE

Refer to F2020 above.

F202002 EXTERIOR CLOSURE

Refer to F2020 above.

F202003 ROOFING

Refer to F2020 above.

F202004 INTERIOR CONSTRUCTION & FINISHES

Refer to F2020 above.

F202005 CONVEYING SYSTEMS

No conveying systems are to be demolished

F202006 MECHANICAL SYSTEMS

Refer to F2020 above.

F202007 ELECTRICAL SYSTEMS

Refer to F2020 above.

F202008 EQUIPMENT & FURNISHINGS

Refer to F2020 above.

F202090 OTHER HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

--End of Section--

G10 SITE PREPARATION – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Provide site preparation that supports project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site preparation system consists of site clearing, demolition, salvage, relocation, earthwork, and hazardous waste remediation necessary to ready the site for other work associated with the project.

GENERAL SYSTEM REQUIREMENTS

Develop the project site and perform all off-site work necessary to meet the requirements of the project, antiterrorism criteria, local codes, reference standards, technical specifications and performance criteria.

A topographic survey of the existing site has not been performed for the site. The Contractor is required to perform a topographic survey of the project area in accordance with UFC 1-300-09N, Design Procedures, that will be impacted by his work. Include this topographic survey in all design submittals. The concept plans provided in Part 6 are based GIS information field verified to the extent practical. Underground utility sizes and exact locations were not able to be verified. The GIS topographic information has been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. Prior to starting work, physically verify the location of all existing utilities and obtain all additional survey data required to provide a quality final design. The existence, size and/or location of the utilities are not guaranteed by the GIS surveys provided. The Contractor must show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level B. Where critical utility crossings or conflicts are likely, show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level A. Verify the location of all utilities prior to construction.

Prior to beginning excavations, the Contractor must contact the Public Works Office. The Contractor must hire a private utility locating service to locate all Government owned utilities. Contractor will be responsible for obtaining all required permits prior to excavation and will be responsible for maintaining utility markings and calling to have utilities remarked if utility markings are not preserved. Contractor must add all located underground utilities to the topographic survey and must provide to the Government both a hard copy and in electronic format.

Unless otherwise noted, provide new facilities at the locations indicated on the drawings in Part 6.

Minimize the impact of construction activity on operations and neighboring facilities.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Submit a complete "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permit applications, permits, and the completed PROD form to the Government's Civil Reviewer and Environmental Reviewer. Perform work in accordance with the obtained permits.

Based on GIS information jurisdictional wetlands have been identified on the project site. Perform all tidal and non-tidal wetlands work in accordance with the permits obtained as required by UFC 3-201-01, Civil Engineering.

Coordinate and obtain the Resident Officer In Charge of Construction's (ROICC) approval for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

Refer to Site Analysis and Building Requirements Sections for additional site preparation functional program information.

Provide site preparation that supports project sustainability goals.

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information is included in Part 6 – Attachments. Refer to Part 3, Section 6, ESR A10 for additional information concerning the Government provided subsurface data and the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

Refer to Part 3, Section 6, ESR A10 for the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL EARTHWORK REQUIREMENTS

Refer to Part 3, Section 3, Site Analysis for base bid requirements concerning earthwork and site preparation.

G1010 SITE CLEARING

G101001 CLEARING

Preserve trees at the perimeter of the project site.

The project site does have saleable timber.

The Camp Lejeune Forest Management Program has first right of refusal for all merchantable timber on Camp Lejeune. If the first right of refusal is not waived, the Government will, by separate Contract, harvest saleable timber from the project site. Design Build Contractor must clear and dispose of remaining timber, limbs, tops, stumps, tree tops, and logging slash debris.

If the first right of refusal is waived, timber on the project site noted for clearing and grubbing will become the property of the Design Build Contractor. Remove all timber from the project site and dispose of it off installation. Timber value must be paid by the Contractor for all trees removed if the first right of refusal is waived – See G101002 TREE REMOVAL.

Provide MCB Camp Lejeune Forest Management final government approved clearing limits for Timber Management determination on merchantable timber first right of refusal before commencement of site construction work. Provide geospatial data shape file per Part 6 Chapter A MCIEAST Specs for geospatial data deliverables. See GIS DATA DELIVERABLES Section 01 78 30.00 22 in Part 2.

Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

G101002 TREE REMOVAL

Remove and dispose of all as required for project construction.

To reduce the incidental take of migratory birds and their nests, trees with active nests should not be cleared. If tree clearing is proposed between April and July, contact the LWRS Biologist for additional guidance.

G101003 STUMP REMOVAL

Remove all stumps under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101004 GRUBBING

Remove all root mat and organic debris under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101005 SELECTIVE THINNING

NOT USED

G101006 DEBRIS DISPOSAL

Dispose of all grubbing and clearing residue, demolished material, rubbish and debris generated by this project by hauling off-site and off station.

Dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G1020 SITE DEMOLITION & RELOCATIONS

This project requires the mass demolition of multiple buildings and service utilities.

G102001 BUILDING MASS DEMOLITION

Demolish the existing buildings M90, M90A, M95, M119, M121, M122, M123, M126, M130, M132, M305, M311, M313, M403, M405, M406, M409, M411, M412, M413, M415, M416, M418, M420, and M422. Refer to Section F2020, "Hazardous Component Abatement" for requirements regarding removal of hazardous components.

G102002 ABOVE GROUND SITE DEMOLITION

Remove and salvage the existing light poles along the gravel service road north of M458. Turn the light poles over to the COR.

Remove and dispose all other existing site features that conflict with the construction of the project, including asphalt and concrete pavements.

G102002 1.1 ABOVE GROUND STORAGE TANKS

An above ground storage tank report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

Remove and dispose of the following aboveground storage tanks at buildings M119, M121, and M122.

Coordinate AST removal with Thomas Richard (910-451-9641). If contaminants are suspected through odors or visual observation during construction activities, immediately stop work, call 911, and contact EQB at 910-451-9641 for further instructions. There are no known monitoring wells in the project areas, but if an unmarked well is discovered and inadvertently damaged, immediately contact EQB at 910-451-9641 for further instructions.

G102003 UNDERGROUND SITE DEMOLITION

Preserve the following underground site elements: all existing utilities required for the proposed project.

Remove or relocate existing utilities under or within 10 feet (3.0 m) of any new facilities or building additions. Existing utilities include but are not limited to piping, structures and conduits. Remove all appurtenances associated with the utility to be removed so there is no presence of the utility at ground surface.

Remove existing utility structures, not within the building footprint, to 3 feet (900 mm) below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Fill with clean sand.

Abandon utility systems in a manner that conforms to applicable codes and regulations. When piping is abandoned in place, fill abandoned piping with flowable fill.

Do not open cut pavement that is to remain to demolish utilities. Fill piping and/or conduits under pavements with flowable fill.

Remove all utility service connections of demolished buildings back to the main and cap per State and Federal regulations.

G102003 1.1 UNDERGROUND STORAGE TANKS

An underground storage tank report is not provided to support this project.

G102004 BUILDING RELOCATION

Relocate building elements as indicated on the drawings in Part 6. Refer to Section F2020, "Hazardous Component Abatement" for requirements related to removal of hazardous components.

G102005 UTILITY RELOCATION

Comply with the requirements of the utility provider concerning the utility relocation of the phone and fiber optic utilities along the physical fitness path. Comply with NAVFAC requirements and all applicable UFCs concerning other utility relocations.

Protect and preserve existing pole 4998 and associated guy wires.

Relocate the existing overhead utility lines and associated poles between pole #4998 and the junction boxes that serve Buildings M457 and M458.

Refer to the Part 3 narratives and Part 6 for additional utility relocation information and GIS utility information that is within the proposed site area respectively.

G102006 FENCING RELOCATION

NOT USED

G102007 SITE CLEANUP

Waste materials will become the property of the Contractor; transport, dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G102090 OTHER SITE DEMOLITION & RELOCATIONS

Demolish the existing lighting and associated wiring and pathways serving the basketball courts along Company Street B northwest of Building M457D.

Demolish the existing site lighting north of Building M457/east of Building M457D.

G1030 SITE EARTHWORK

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, Excavation and Fill, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Grading shall conform with UFC 3-201-01, *Civil Engineering*.

G103002 COMMON EXCAVATION

Perform common excavation with equipment of sufficient size to accomplish the work required. Over excavation of areas to obtain additional satisfactory material for the contractor's use is not permitted.

Preserve natural topographic features to minimize cut and fill requirements. All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer.

G103003 ROCK EXCAVATION

Blasting will not be permitted.

G103004 FILL & BORROW

Provide borrow and select fill from off-base sources.

A grading plan has not been designed, therefore it has not been determined if common fill, backfill and fill material, select fill or top soil is available on site in the required quantities.

On-site soils that are determined as clean fill by the geotechnical engineer via testing must be backfilled and compacted in accordance with the requirements in this section.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

For each borrow site, provide borrow site testing for hazardous materials characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

G103005 COMPACTION

Perform compaction per the Performance Technical Specifications or the Contractor's geotechnical report, whichever is more stringent.

G103006 SOIL STABILIZATION

The following methods of soil stabilization will not be allowed lime slurry, and pressure grouting.

G103007 SLOPE STABILIZATION

Provide slope stabilization through appropriate grading and site design for a minimum factor of safety of 1.5 or slope that does not exceed the maximum slope per local code requirements.

G103008 SOIL TREATMENT

Treat the area around the entire foundation of each building for termite control in accordance with manufacturer's instructions.

G103009 SHORING

Provide shoring, bracing, and sheeting, etc as required to prevent undermining of foundations, pavement, utility pipes, structures, and slabs and prevent slippage or movement in embankments or slopes adjacent to excavations to facilitate construction. Shoring will be in accordance with Section 25 A and B of EM 385-1-1. Provide a sheeting and shoring plan if required by local codes and/or OSHA. The plan must be signed and sealed by a professional engineer.

G103010 TEMPORARY DEWATERING

Provide pumps, temporary ditching, and grading required to maintain groundwater levels at the Contractor's geotechnical engineer's recommended level below footings and or pavements during construction. Ensure that there are no groundwater conditions that will promote deterioration of the soil or interruptions to the construction progress.

All dewatering effluent must be filtered per NCDEQ erosion and sediment control requirements prior to discharge to minimize sediment to surface waters.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Obtain an Erosion and Sediment Control permit required for the proposed work from NCDEQ Pay all associated permit fees.. Submit the permit application to the COR for approval prior to submitting to NCDEQ.

G103090 OTHER SITE EARTHWORK

NOT USED

G1040 HAZARDOUS WASTE REMEDIATION

A contaminated soil/groundwater report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

G1040 1.1 CONTAMINATED SOIL AND GROUNDWATER

The project site does not require contaminated soil or groundwater work.

--End of Section--

G20 SITE IMPROVEMENTS – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

Provide site improvements that support project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site improvements system consists of pavements and pavement related features, landscaping and other exterior site development work related to this project. Provide a pavement design by a licensed Professional Engineer familiar with conditions local to the project site. Site design, including but not limited to design of parking and pedestrian circulation, will include coordination with the Civil Engineer and the Landscape Architect.

GENERAL SYSTEMS REQUIREMENTS

Provide site improvements as required to make a useable facility that meets functional and operational requirements, incorporates all applicable anti-terrorism, force protection and physical security requirements and blends into the existing environment.

Provide accessibility in conformance with applicable requirements of UFC 1-200-01, *General Building Requirements*.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer. Perform work in accordance with the obtained permits.

Provide site improvements that support project sustainability goals.

Minimize the impact of construction activity on operations and neighboring facilities.

Locate new site improvements at locations indicated on the drawings in Part 6 of this RFP. If specific locations are not provided, site the improvements to develop appropriate and positive relationships with other facilities and to conform to existing development patterns.

Refer to Site Analysis and Building Requirements Sections for additional site improvement functional program information.

G2010 ROADWAYS

Provide roadways, as required, to allow for safe, convenient and logical circulation, while discouraging through traffic. Provide new roadway pavement sections as required by soil conditions and determined by Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*. See part 3 Site Analysis for pavement section bid criteria.

Provide roadways of bituminous pavement or Portland cement concrete (PCC) where indicated on the drawings in Part 6. Aggregate pavement may be used for access roads to mechanical equipment if approved by NAVFAC.

Provide new roadway and other pavement sections as required by soil conditions and determined by the Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*.

Provide other roadway improvements including traffic signalization, markings, and signage.

G201001 BASES & SUBBASES

The following materials will not be allowed for base or subbase courses: lean concrete, cement stabilized, sand-clay, lime rock, or shell.

G201002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities. Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent. Where NCDOT does not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of NCDOT for a minimum compressive strength at 28 days of 3500 psi concrete.

G201003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by the NCDOT.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks per UFC 3-201-01.

Provide signage per UFC 3-201-01 and the BEAP.

Provide temporary pavement markings and signage throughout construction to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition.

G201005 GUARDRAILS & BARRIERS

Provide wheelstops, and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G201006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G201090 OTHER ROADWAYS

NOT USED

G2020 PARKING LOTS

Provide parking for 200 vehicles plus one for one replacement of any existing spaces permanently displaced by the project. The design of pavements must include the anticipated daily traffic over the life of the project (20-years) as well as the existing soil conditions at the site. See part 3 Site Analysis for pavement section bid criteria.

Provide parking lots of bituminous pavement or Portland cement concrete (PCC) pavement where indicated on the drawings in Part 6. Do not use aggregate or permeable pavement

Provide new parking and other pavement sections as required by soil conditions and determined by Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*.

Provide other parking improvements including parking entrances for two-way traffic, signage, concrete dumpster pad, and landscaping.

Provide handicapped parking in accordance with ABA requirements.

Provide parking in accordance with UFC 3-201-01, Section 2-9.6 Parking Areas and SDDCTEA Pamphlet 55-17.

See G2050 LANDSCAPING and G205005 PLANTINGS for parking lot landscape requirements.

G202001 BASES & SUBBASES

Crushed concrete meeting NCDOT specifications for gradation for aggregate base or subbase courses may be used.

G202002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent.

G202003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by NCDOT.

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings (pavement, curb and object), signage (regulatory, warning and guidance) and other traffic control devices as required to facilitate proper utilization of the parking areas.

Provide pavement markings including crosswalks Provide parking in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide signage in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide temporary pavement markings and signage to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the MUTCD.

G202005 GUARDRAILS & BARRIERS

Provide wheel stops and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G202006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G202007 MISCELLANEOUS STRUCTURES AND EQUIPMENT

NOT USED

G202090 OTHER PARKING LOTS

NOT USED

G2030 PEDESTRIAN PAVING

Provide a network of Portland cement concrete (PCC) sidewalks, separated from, but connected to vehicular circulation systems, to allow for pedestrian circulation between various new and existing elements of the project. Interface new pedestrian circulation systems with existing pedestrian circulation systems and include input from the Civil Engineer, Architect, and Landscape Architect.

Provide sidewalks of Portland cement concrete pavement with 4 inches thick minimum. Provide concrete sidewalk in accordance with Section G201003 or with the standard NCDOT mix for a minimum compressive strength at 28 days of 3,500 psi. For PCC sidewalks, provide a broomed finish. Reference Part 3 Site Analysis for sidewalk widths.

Unless indicated otherwise, provide a transverse slope not to exceed 1/48. Limit variation in cross section to 0.25 inch in 5 feet.

Provide, as indicated in BEAP 3.2.8 PLAZAS AND COURTYARDS – EXTERIOR USE ARES, entrance plazas and pedestrian spaces to create outdoor meeting spaces and reinforce the arrival sequence from parking lot to building entrance(s). Size and placement must reflect functional needs and the appropriate importance to the setting. Forecourts may serve as outdoor plazas, courtyards or smaller landings and be furnished with benches, trash receptacles, plantings, lighting and distinctive architectural treatment and may include provisions for bicycle parking. Bike racks must be provided to support 5% of the building FTE and can be divided into more than one location. See PART 3 – CHAPTER 2 Antiterrorism Force Protection for additional requirements for plazas and pedestrian areas for a fully coordinated design

G203001 BASES & SUBBASES

Provide as required and per the Contractor’s geotechnical engineering report.

G203002 CURBS & GUTTERS

NOT USED

G203003 PAVED SURFACES

NOT USED

G203004 GUARDRAILS & BARRIERS

NOT USED

G203005 RESURFACING

NOT USED

G203006 OTHER WALKS, STEPS & TERRACES

NOT USED

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

NOT USED

G204002 RETAINING AND FREESTANDING WALLS

Provide retaining walls in areas of significant grade change. Follow the requirements set forth in Part 4, Performance Technical Specifications.

Provide concrete retaining walls with applicable safety protective measures. Retaining walls must match new facility exterior.

Provide retaining walls to permanently resist soil pressures as well as live loads. Provide wall drainage to minimize lateral loading and protect wall materials against degradation.

Retaining walls are required to comply with UFC 3-220-01. The DOR must obtain building permits for retaining walls greater than five feet in height.

G204003 EXTERIOR FURNISHINGS

All site furnishings are required to conform to the Base Exterior Architectural Plan (BEAP). At the picnic areas provide picnic tables, trash receptacles, benches, barbecues, recycling receptacles, hot ash receptacles. Provide a trash and ash receptacle at the designated smoking area.

Provide two picnic areas and design each picnic area to accommodate 20 people.

All site furnishings must be anchored to concrete pavement below.

G204004 SECURITY STRUCTURES

Provide concrete curbing at the edges of all parking areas to identify the site perimeter and prevent parking in the 33-foot unobstructed space. The exception is the parking spaces within the vehicle instruction bay access pavement. Provide curbing only at the exterior pavement edge in this location.

G204005 SIGNAGE

Provide building identification signage, building number signage, and way finding signage in accordance with the Activity's BEAP.

G204006 FOUNTAINS & POOLS

NOT USED

G204007 PLAYING FIELDS

NOT USED

G204008 TERRACE AND PERIMETER WALLS

NOT USED

G204009 FLAGPOLES

NOT USED

G204090 OTHER SITE IMPROVEMENTS

Provide heavy-duty concrete dumpster and utility pads. Provide dumpster enclosures conforming to the Activity’s BEAP. BEAP 3.4.10 indicates that dumpster areas should be located on structural concrete pads with adequate radius, approach length, and overhead

clearance from trees, utilities, and structures. Screening should be provided on three sides by a 7 foot tall masonry wall to block views of the containers. The dumpster enclosure's materials and style must complement the facility it serves. For each dumpster, install a minimum of two bollards at the rear of the enclosure to protect the rear wall from damage and a minimum of two bollards on each side of the dumpster. The contractor must provide separate vehicular and pedestrian access to the dumpsters within the enclosures.

If a fire pump is required, provide a heavy-duty concrete pad for an on-site standby generator outside the building so it can be easily taken off line and removed once the base upgrades their power grid at a subsequent date.

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn, groundcover trees, shrubs, ornamental grasses and organic and inorganic mulches as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with all applicable anti-terrorism, force protection and physical security requirements. The landscape design must reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 5' wide inorganic rock cobble mulch mow strip around the building with weed barrier fabric below rock. Provide concrete edging along mow strip where edging is adjacent to a turf area. Provide landscaping resistant to deer.

Trees, shrubs, and ground covers are acceptable within the AT/FP unobstructed space. Trees must have a 3-inch minimum caliper and branching structure that provides a 3-foot clear zone above the finished grade. Shrubs must be trimmed to provide a 3-foot clear zone above the finished grade and ground covers must not exceed 6-inches in height.

Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species. Areas of the site not covered by buildings or other structures and impervious paving or walkways within the project limits must be considered landscape area and must receive landscape improvements.

Guarantee all landscaping for a period of one year. Provide a one-year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

Provide complete landscaping maintenance, including but not limited to, routine lawn mowing, edging, pruning, pest inspection/treatment, re-mulching of mulch products, watering, weeding, fertilizing, and restaking, throughout the guarantee period.

Provide mechanical equipment screening wall on three sides of new equipment.

Provide shrubs or small growing trees if feasible for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205001 FINE GRADING AND SOIL PREPARATION

Provide 4" of topsoil for all lawn areas and fine grade.

G205002 EROSION CONTROL MEASURES

Prevent erosion from occurring by providing erosion control measures as required by state and federal requirements.

Erosion control temporary or permanent seeding must not be considered a permanent turf conditions. Provide centipede sod for permanent turf.

G205003 TOPSOIL AND PLANTING BEDS

Provide a planting soil mixture composed of 50% native soil blended with 50% topsoil and other amendments as recommended by the soil testing laboratory around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's root balls. Set tops of plant root balls 2 inches above adjacent grades

G205004 SODDING

Sod areas indicated to be turfed in Part 6. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of sodding and provide same guarantee and maintenance as for new landscape areas. Sod species must be Centipede – Eremochioa ophiuroides.

G205005 PLANTINGS

Preserve existing trees to the greatest extent possible.

MATERIAL SELECTION:

Select plant material from Master Plant Lists found within the Base Exterior Architecture Plan (BEAP), NC State Extension and the North Carolina Native Plant Society. Other plants not found on these lists may be used if approved by the reviewing Government Landscape Architect. Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. Final approval of new plant materials rests with the reviewing Government Landscape Architect. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species.

Shade trees must be a minimum size of 3-inch caliper at breast height and 14 to 16 feet tall minimum unless specified for Antiterrorism Force Protection measures where the trees are integrated into the vehicle-deterrent perimeter. See Antiterrorism Large Diameter Trees in PART 3 - CHAPTER 2 PROJECT OBJECTIVES. Flowering trees must be minimum 2-inch caliper and evergreen trees 8-10 feet tall. In general, select trees that have a normal lifespan over 60 years and a strong branch and limb structure. Trees must be relatively clean and free of potential nuisances such as fruit, berries, sap, thorns and pitch. In addition, trees must not have surface roots which will potentially uplift sidewalks and pavements. For palm trees, identify sizes on plans by brown trunk height (BTH) or clear trunk height (CTH). Unless otherwise approved by the reviewing government landscape architect, provide minimum BTH or CTH of 8 feet.

GENERAL PLANTING GUIDELINES:

All planting must adhere to any fence clear zone requirements for security and AT/FP criteria set forth in this RFP. Plantings must adhere to the Base Exterior Architectural Plan (BEAP). Coordinate with MCB Camp Lejeune for project specific requirements at CDW. Provide small trees and ground cover plantings at building main entrances to accentuate the entrances.

Provide plantings to frame the new building and lessen the visual impact of parking areas. Provide planted strip between any sidewalk and any Primary, Secondary and Tertiary streets.

For inorganic granular mulch applications, provide 3 to 5-inch diameter river stone mulch over weed control fabric at mow strips around buildings. For organic mulch applications, provide 3 inches of shredded hardwood mulch over weed control fabric at planting beds except for spreading groundcover planted areas.

Encompass planting beds not used for bioretention filters with concrete edging.

Provide 6-inch-wide (minimum) by 12-inch-deep concrete band edging for each of the following conditions: between rock mulch/cobble area and turf area, between rock mulch/cobble area and planting area, and between turf area and planting area. Contain turf areas adjacent to building walls, site walls, columns, stairs, and other structures by a 6-inch-wide (minimum) concrete header with a minimum separation of concrete header from walls, columns, and other structures of 2 feet to minimize damage to site improvements.

Provide a 6-foot-wide grass sod border around the entire bioretention filter. Grass sod species must be Centipede. Ensure that the bioretention filters are not compromised by sediment deposits during construction. Install bioretention filters only after upstream areas tributary to the bioretention filter location have been fully stabilized.

If used for stormwater management, provide bioretention filters, plants, plant quantities, and soil mix in accordance with the State's Stormwater Design Manual.

TREE PLANTING GUIDELINES:

Preserve existing trees to the greatest extent possible. Provide trees at the minimum rate of one (1) tree per 1,000 square feet of TOTAL LANDSCAPE AREA for this project.

Site trees such that their mature canopy will not negatively affect any building. Include no trees within utility easements. Coordinate tree planting locations with electrical site lighting for a fully coordinated and integrated design that allows tree and lighting to be complimentary. See G4020 SITE LIGHTING Plant trees a minimum of 10 feet from building, edge of sidewalks, curbs, and underground water and sewer lines. Provide root barrier for all trees planted within 8 feet of any utility, wall, curb or pavement.

Stake all trees as required to ensure a stable, true plumb form is established. Protect trees from damage from staking materials. Unless otherwise directed by the Contracting Officer, all staking materials must be removed prior to the end of the contract. Provide a five-foot watering basin around each tree, and also provide a 5-foot diameter mulch ring with a 3 inch layer of organic mulch.

Provide informal street tree plantings that encompass all base streets within the project limits with an average spacing of 30 to 40 feet on center unless noted otherwise.

PARKING LOT GUIDELINES:

A minimum of 10% of any at grade POV parking lot must be landscaped; Reference Section 5 of ASHRAE 189.1.

POV parking lots must have a minimum of one (1) canopy tree every five (5) parking spaces around parking lot perimeter including entrance drives and service areas. Tree plantings along perimeter of lot must follow the Camp Lejeune Base Exterior Architecture Plan (BEAP) for a natural, native appearance. Parking lots must have no more than two tree species unless authorized by Government Landscape Architect.

Provide deciduous shrubs along the parking lot perimeter to create an informal opaque screen.

Interior plantings must consist of a minimum of (1) tree per every 300 square feet of island area. Planting medians must have a minimum inside dimension width of 9 feet. Any parking lot that abuts a service drive or base road for the project must be separated by planted green space with a minimum inside dimension width of 9 feet.

Provide 3 inches of shredded hardwood, pine bark or pine needle mulch at all planting beds.

G205006 PLANTERS

NOT USED

G205007 IRRIGATION SYSTEMS

NOT USED

G205090 OTHER LANDSCAPING

Deliverables must include plans, details and specifications to accurately and completely convey design intent. Plans must identify all plants, turf, hardscapes, site furnishings, buildings and site features and other pertinent landscape elements.

Provide a plant schedule indicating as a minimum, quantity, species, (Latin and Common Name) spacing, and size and condition of each proposed plant as well as mulch materials. Provide the height and width of plant at time of planting for Contracting Officer.

Provide on Landscape Plans a 'Landscape Material Summary' which includes but is not limited to 'Mulches'(by type), Concrete Header, Pavers, and other landscape materials utilized in the project.

Document all field changes to the Landscape Planting drawings including changes in sod area, concrete header lengths, hardwood and stone mulch bed areas, weed fabric areas (in inorganic mulch areas), planting location, and type and number of plant(s). Any field changes made to the Landscape layout must be shown on the Landscape Planting drawings - also revise the data found in the 'Landscape Material Summary' and 'Plant Material Schedule' found on the Landscape Planting drawings.

Specifications must include the minimum following sections for Landscape Architecture:

- 01 78 00, Closeout Submittals
- 12 93 00, Site Furnishings
- 32 05 33, Landscape Establishment
- 32 93 00, Exterior Plants
- 32 92 23, Sodding

The Contractor must provide plant and grounds maintenance during the plant establishment period. The plant establishment period must extend one full year after completion of planting.

Maintenance during planting operation must ensure installed plants are maintained in a healthy growing condition from time of planting through plant establishment period. The typical growth habit of individual plants must be retained.

Maintenance during the establishment period must include as a minimum:

- Straightening and tightening of tree stakes and guying material
- Mowing and edging of turf protecting plant areas from erosion
- Maintaining edging of planter beds and checking for girdling of trees, watering of all plant material and turf, weeding, and removing and replacing unhealthy plants
- Watering of all project trees with slow release watering bags
- Controlling pests, diseases, fungi and rodents
- Removing dead or broken branches by pruning in accordance with ANSI A300 Part 1
- Fourteen (14) days prior to the end of the maintenance period, mow and edge lawn, re-mulch beds (if required depth or coverage of mulch is not met) and water and fertilize all plants
- Removal of all tree staking and slow release watering bags at end of establishment period

Warranties: All trees and plants must be guaranteed for a period of one year after final acceptance of the project, or area/s.

--End of Section--

G30 SITE CIVIL/MECHANICAL UTILITIES – P1512F LOG OPS SCHOOL

SYSTEM DESCRIPTION

The site civil/mechanical utility systems include water supply systems, sanitary sewer systems, storm drainage systems, heating distribution systems, cooling distribution systems, fuel distribution systems and associated appurtenances which are more than 5 feet outside the building.

The site mechanical utility system consists of all piping and appurtenances for chilled water, hot water, natural gas, including all accessories and devices as necessary and required for a complete and usable system up to 5 feet outside buildings.

GENERAL SYSTEM REQUIREMENTS

Develop the site to provide water, fire protection, sanitary sewer, storm drainage, heating, cooling and fuel distribution services that meet the requirements of each applicable regulatory agency that governs and issues permits for the construction and operation of these systems. Site design is required to comply with UFC 3-210-10, *Low Impact Developments*, as well as state or local stormwater management regulations and applicable project sustainability goals.

Provide each system complete and ready for operation.

Physically verify the location of existing above and below ground utilities prior to starting work.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil/Mechanical Reviewer. Perform work in accordance with the obtained permits.

Minimize the impact of construction activity on facility operations and neighboring facilities.

Utility connection points are indicated on the drawings in Part 6. Obtain final approvals from the Contracting Officer for all utility connection points associated with this work.

Coordinate with the local utility providers and pay any fees or charges required to connect to their utility.

All disciplines involved in site work design must coordinate utility locations with the Civil Engineer and the Landscape Architect.

Refer to Site Analysis and Building Requirements Sections for additional site civil/mechanical utilities information.

Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS Section G30 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

After installation of the equipment and systems, provide training courses for Government personnel for each of the items listed below, covering items contained in the Operations and Maintenance manuals. Provide one copy of the Operations and Maintenance manuals for each two course attendees. Provide one DVD disc of the training courses to be used as refresher courses and to train additional personnel. Conduct training by the same factory trained engineer that supervised the installation of the system. During training include classroom discussion as well as hands on maintenance, replacement of typical components and repair type maintenance training for parts typically replaced or repaired in the field. Submit training plan 30 calendar days prior to training sessions; include scheduling, content, outline, and training material handouts. Provide training for Cathodic Protection System.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Leakage tests are required.

Perform post-installation TV inspection of new storm sewer mains.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Imported bedding material must be provided for all utility lines and structures. Bedding material must consist of either ASTM C33 fine aggregate, or NCDOT coarse aggregate size No. 57, No. 67, or No. 78. A minimum of 6 inches of bedding must be provided for all utility lines and a minimum of 12 inches of bedding must be provided for all utility structures. Bedding material backfill must be placed to the spring line of the pipe for all concrete and PVC pipe trench excavations. Utility line and utility structure excavations in existing pavement areas must be completely backfilled to the aggregate base/subbase course elevation using excavatable flowable fill meeting NCDOT specifications.

G3010 WATER SUPPLY

The new water system is an extension of the existing water system. The existing water system serving the project site is owned and operated, by the federal government, operated and maintained. Provide the new water system and connections to the existing water system in accordance with UFC 3-230-01, *Water Supply: Storage, Distribution, and Transmission*; the utility provider’s requirements; and the state waterworks' regulations; whichever is more stringent.

Notify the government of the additional demand generated by the proposed facility.

Provide connection to the existing water distribution system at the point indicated on the drawings in Part 6. Make road crossings using directional boring.

Design the new water system so that water consumption is measured at a minimum, by one meter for each facility. Ensure the meter is easily accessible, but not obvious. Water Meters must comply with Camp Lejeune Water Meter Specifications included in Part 6 of this RFP.

Enable meter data to be collected and automatically transferred to a Meter Data Management (MDM) module in CIRCUITS for utility and energy management within an environment protected from cyber-attack.

G301001 WELL SYSTEMS

NOT USED

G301002 POTABLE WATER DISTRIBUTION

Connect the new potable water distribution system to the distribution system at the point described in Part 3 Site Analysis.

Provide cathodic protection on metallic pipe lines.

A water meter on each proposed service line is required. The Contractor shall provide meters selected from the base ATO approved equipment listing.

Provide meter box.

Provide fire hydrants with 5” Stortz x 4.5” HN/NST Fire Hydrant Converter. Paint fire hydrant barrels yellow. Paint fire hydrant bonnets based on its rated flow capacity in accordance with UFC 3-600-01 and NFPA 291. Consult with the project Fire Protection Engineer to obtain hydrant flow capacities for newly installed fire hydrants. For fire hydrants in or adjacent to vehicle pavements, provide bollards to protect the fire hydrant from vehicular collision.

Backflow preventers are required on all service entrance lines. If not specified in ESR D20 and D40, provide reduced pressure backflow preventers aboveground outside the building. Provide a heated enclosure.

G301003 POTABLE WATER STORAGE

NOT USED

G301004 FIRE PROTECTION WATER DISTRIBUTION

See G301002.

G301005 FIRE PROTECTION WATER STORAGE

NOT USED

G301006 NON-POTABLE WATER DISTRIBUTION

NOT USED

G301007 PUMPING STATIONS

NOT USED

G301008 PACKAGED WATER TREATMENT PLANTS

NOT USED

G301090 OTHER WATER SUPPLY

G3020 SANITARY SEWER

The new sanitary sewer system is an extension of the existing sanitary sewer collection system. The existing sanitary sewer collection system serving the project site is owned, operated, and maintained by the federal government. Provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with UFC 3-240-01, *Wastewater Collection*; the utility provider’s requirements; and the state sewerage regulations; whichever is more stringent.

Notify the utility provider of the additional wastewater flow generated by the proposed facility.

Anticipated connection point is to the gravity main serving the adjacent BEQ buildings. In identifying a suitable point of connection, evaluate the capacity of the existing collection system.

G302001 SANITARY SEWER PIPING

Provide cathodic protection on metallic pipe lines.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G302003 LIFT STATIONS AND PUMPING STATIONS

NOT USED

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

NOT USED

G302005 SEPTIC TANKS

NOT USED

G302006 DRAIN FIELDS

NOT USED

G302090 OTHER SANITARY SEWER

NOT USED

G3030 STORM SEWER

The new storm sewer system is an extension of the existing storm sewer system. The existing storm sewer system serving the project site is owned and operated by the federal government. Provide the new storm sewer system and connections to the existing storm sewer system in accordance with UFC 3-201-01, *Civil Engineering*; the utility provider's requirements; UFC 3-210-10, *Low Impact Development* the state stormwater management laws and regulations; and applicable project sustainability goals; whichever is more stringent.

Confirm that the existing outfall has adequate capacity to receive the additional stormwater flow generated by the project.

Vehicle wash areas are not to be provided.

G303001 STORM SEWER PIPING

Storm sewer piping materials are required to be polyvinyl chloride (PVC) for diameters less than 12 inches and reinforced concrete pipe (RCP) for diameters 12 inches and greater. Storm piping must meet NCDOT requirements.

G303002 STORM SEWER STRUCTURES

Storm structures must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303004 CULVERTS

All storm sewer piping materials for culverts are required to be reinforced concrete pipe (RCP).

Designer of Record must ensure that culverts and bridges are designed to safely pass the 100-year event. The following upstream controls limit headwater elevation:

- 100-year water elevation must not be higher than 18 inches below the outer edge of the shoulder at its lowest point in the grade.
- Designer of Record must ensure that upstream wetlands are not adversely impacted by crossing
- There must not be any appreciable change in flow, elevation, or wet/dry cycles of existing wetland.

Culverts must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303005 HEADWALLS

Headwalls must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Obtain Erosion and Sediment Control permit required for the proposed work from NCDEQ.

Submit permit application to the Contracting Officer for approval prior to submitting to NCDEQ.

G303007 STORM WATER MANAGEMENT

Comply with NDCEQ regulations, UFC 3-201-01 Civil Engineering, UFC 3-210-10, *Low Impact Development, FC 1-300-09N Navy and Marine Corps Design Procedures; whichever is more stringent*. Consider the following LID features: bioretention, filter/buffer strips, grassed swales, bioretention swales, wet swales, infiltration trenches, rain gardens. The use of rain barrels, cisterns, permeable pavement/pavers, and tree box filters are not allowed for this project.

Evaluate the drainage conditions and submit sealed calculations to the Government for civil and environmental review documenting how design meets UFC 3-210-10, state or local stormwater regulations, and applicable project sustainability goals. Provide a narrative indicating which criteria governs the design and all assumptions. Technical constraints that limit compliance with UFC 3-210-10 must be documented, reviewed and approved by the Government's Civil Reviewer.

If the project footprint exceeds 5,000 SF (464.5 SM) and does not maintain the predevelopment hydrology to the maximum extent technically feasible (METF), these constraints must be documented on the NAVFAC Sustainable Energy Data Record Card (NSEDRC) and approved by the Government's Civil Reviewer. The NSEDRC can be found at: http://www.wbdg.org/pdfs/navfac_sustainable_energy_data_record_card.pdf .

The contractor must obtain all required regulatory permits required for the proposed work. Coordinate all reports, submittals, and permit applications through the Contracting Officer.

The DOR is responsible for acquiring approval from NCDEQ for any BMPs. A Post-Construction certification will need to be provided to NCDEQ by the DOR. UFC 3-201-01 Civil Engineering Requirements will apply to all sites. Additionally, permitting through the United States Army Corps of Engineers will be required for any wetlands or stream disturbance.

See Part 6 for a copy of the LID calculation spreadsheet. This spreadsheet is to be filled out and included with the design calculations for all applicable submittals.

G303090 OTHER STORM SEWER

An oil/water separator will be required. Provide an oil/water separator designed to accommodate the flow from the trench drains in the building.

The grease and oil concentration in the effluent from the oil/water separator must not exceed 10 mg/L. Remove all free oil droplets equal to or greater than 20 microns. Discharge the effluent of the oil/water separator to the sanitary sewer system.

G3040 HEATING DISTRIBUTION

NOT USED

G304001 OVERHEAD HOT WATER SYSTEMS

NOT USED

G304002 OVERHEAD STEAM SYSTEMS

NOT USED

G304003 UNDERGROUND HOT WATER SYSTEMS

NOT USED

G304004 UNDERGROUND STEAM SYSTEMS

NOT USED

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

NOT USED

G304090 OTHER HEATING DISTRIBUTION

NOT USED

G3050 COOLING DISTRIBUTION

NOT USED

G305001 OVERHEAD COOLING SYSTEMS

NOT USED

G305002 UNDERGROUND COOLING SYSTEMS

NOT USED

G305090 OTHER COOLING DISTRIBUTION

NOT USED

G3060 FUEL DISTRIBUTION

NOT USED

G306001 LIQUID FUEL DISTRIBUTION PIPING

NOT USED

G306003 LIQUID FUEL STORAGE TANKS

NOT USED

G306004 LIQUID FUEL DISPENSING EQUIPMENT

NOT USED

G306006 GAS DISTRIBUTION PIPING (NATURAL GAS)

Coordinate with natural gas supply company for service supply to the building gas meter.

G306007 GAS STORAGE TANKS

NOT USED

G306009 OTHER GAS DISTRIBUTION

NOT USED

G306090 OTHER FUEL DISTRIBUTION

NOT USED

G3090 OTHER SITE MECHANICAL UTILITIES

NOT USED

--End of Section—

G40 SITE ELECTRICAL UTILITIES – P1512F LOG OPS SCHOOL

SCOPE

The site electrical utility system consists of all power and communications cabling from the existing distribution system point of connection including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet of new (or existing) building location.

Provide site systems complete in place, tested, and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must".

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floor plan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floor plans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

Electrical contractors must possess a valid North Carolina Public Utility Electrical contractor's license and be insured to do such work in the State of North Carolina.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an exterior electrical system consisting of but not limited to Service Entrance Wiring and Equipment, Conduits, Feeder and Branch Circuits, Lighting and Branch Wiring, Communications, Security and Alarm Systems, Emergency Generator, Emergency Lighting and

Power, Grounding, and Lightning Protection, including accessories and devices as necessary and required for a complete and usable system.

Provide each building with a single utility service with radial power distribution.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited. Assume the available fault current at the point of connection to be an infinite bus.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15-percent spare circuit and load capacity at all levels of the power distribution system, including life safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide site electrical utilities systems and components that support project sustainability goals.

Provide identification labels for site equipment, structures, and wiring in accordance with the Camp Lejeune GIS Numbering Convention provided in Part 6 Attachment 8, *Camp Lejeune Electrical Policies & Criteria.*

Make road crossings using directional boring.

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing overhead 12.47kV, three phase, three wire, 60 Hertz electrical power system at pole #4997 near the basketball courts along Company Street B. Provide a fused cutout switch on the pole. Transition from overhead to underground distribution at the pole and extend the primary service to the project site underground in concrete encased ductbank to a Pad Mounted Transformer.

Relocate the existing overhead utility lines and associated poles between pole #4998 and the junction boxes that serve Buildings M457 and M458. Provide new overhead line and poles along Company Street B. Transition to underground near the existing parking lot west of Building M457 and route the primary service to and terminate in the existing junction boxes that serve Buildings M457 and M458.

G401001 SUBSTATIONS

NOT USED

G401002 TRANSFORMERS

Provide a three-phase pad mounted transformer to feed the facility.

Provide the following features:

- Dead-Front Design with ANSI specific front plate spacing
- 15kV, 200A minimum, load break connectors
- Three 10kV minimum, surge arresters
- Tap changer with two 2.5% taps above rated voltage and two 2.5% taps below rated voltage
- Biodegradable less-flammable liquid-insulated

Provide a pre-cast concrete box pad for transformers. Refer to the box pad detail provided in Part 6 Attachment 8, *Camp Lejeune Electrical Policies & Criteria*.

G401003 SWITCHES, CONTROLS AND DEVICES

Provide sectionalizing cabinets configured with the existing overhead and or underground distribution system.

Provide a pole-top fused cutout switch configured with the existing overhead distribution system at the connection point for service to the building.

G401004 OVERHEAD ELECTRIC CONDUCTORS

NOT USED

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

NOT USED

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a medium voltage and a 600 volt secondary underground electrical power distribution systems to meet the connection requirements as indicated in paragraph G4010 *Electrical Distribution*.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks and above-ground junction boxes and above-ground sectionalizer switches.

Underground handholes and manholes are prohibited.

G401008 GROUNDING SYSTEMS

Provide a complete grounding system for the electrical power distribution system.

G401009 METERING

Provide a separate kilowatt demand meter capable of reporting to the existing Camp Lejeune Advanced Metering Infrastructure (AMI) at each pad-mounted transformer. The existing AMI is Itron Choice Connect (Fixed Network) version 5.0.

The provided meter must be compatible with the existing Camp Lejeune Itron MCLite and Itron Mobile Advanced Meter Reading (AMR) equipment.

Pre-program meters with Camp Lejeune's meter program. For programming of meters contact:

Border States Electric Product Manager

Ken Hause

864.242.6880 | EXT 11230

khause@borderstates.com

Refer to the Advanced Electric Meter requirements provided in Part 6 Attachment 7, *Water and Electrical Meter Information*, for additional features and information.

G401010 CATHODIC PROTECTION SYSTEMS

NOT USED

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

Provide site lighting for exterior and security applications including underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

Provide exterior luminaires, poles, and foundations in accordance with the Camp Lejeune Electrical Policies and the Camp Lejeune Base Exterior Architectural Plan. Provide architectural type luminaires for parking lot, walkway, and outdoor gathering area lighting. Provide cobra head type luminaires for roadway lighting.

Coordinate site lighting with plantings and landscape elements to provide a fully coordinated and integrated design that allows the lighting to be complimentary to the landscape design throughout the project site.

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide an automatic lighting control system for exterior lighting fixtures utilizing lighting contactors, bi-level or dimming drivers, motion sensors, and a centralized photocell. The photocell will automatically turn lights "ON" at dusk and turn "OFF" at sunrise while the motion sensors, in conjunction with the bi-level or dimming drivers, will adjust the lighting levels based on occupancy of the area.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Provide Area and Parking Lighting for parking lots, walkways, and outdoor gathering areas.

G402002 SPECIAL SECURITY LIGHTING SYSTEMS

Provide security lighting along the site perimeter fence line.

G402003 OTHER AREA LIGHTING

Provide area lighting for outdoor training areas.

G402004 LIGHTING POLES

Provide aluminum poles complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide a complete underground distribution system for all site lighting systems.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication and security system including, but not necessarily limited to, Voice and Data Telecommunications Systems, Cable Television (CATV) Systems including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system. “P1512_OSP” (located in part 6) for Outside Plant (OSP) existing communications pathways layout. Demolition of buildings' associated telecommunications services and pathways must be coordinated with Base Telephone office 30 days prior.

G403001 TELECOMMUNICATIONS SYSTEMS

OSP PATHWAYS AND CABLING

The description below applies to Log OPS School, JRC, and M107:

- Provide 6-way 4” concrete encased duct bank from MH602 (near M165) to the corner of Montford Point Road and Company Street B (~1500’).
- From 1st manhole (MH) of new duct bank, closest to MH602 (~500’ past MH602), provide 4-way 4” concrete encased duct bank to new JRC site (~600’).
- Provide 6-way 4” concrete encased duct bank from corner of Montford Point Road and Company Street B, to the new applied instruction facility (~1100’).
- Provide 6-way 4” concrete encased duct bank from the corner of Montford Point Road and Company Street B, to Building M107 (~1200).
- Provide 144-strand fiber optic cable (FOC) And 1500-pair outside plant (OSP) copper cable from Building M165 (vault) to 1st MH of new duct bank past MH602 (~400').
- From 1st MH of new duct bank past MH602 to new MH at the corner of Montford Point Road and Company Street B, provide 96-strand FOC and 900-pair OSP copper cabling (~1100'). Provide 60’ slack loop of FOC and 30’ slack loop of OSP copper in new manhole at the corner of Montford Point Road and Company Street B; government will perform splice.

- Perform splice of 96-strand FOC to 144-strand FOC and 900-pair OSP copper to 1500-pair copper in new MH nearest MHh602.

Coordinate with base telephone provider for cable identifications and pair allocations.

LOG OPS SCHOOL OSP PATHWAYS AND EXISTING CABLING

Existing cabling located under future driveway/s will require the installation of split duct and concrete encasement. ANY grading near the existing trail to accommodate driveways may "uncover existing comm cabling"; thus, a potential issue.

-ANY existing riser point/pedestal in the way of construction will require the installation of a maintenance hole with Tier 22 telecommunication lid. This may/would require a "pour in place" type maintenance hole. If building draining plan includes installing culverts/ditches to route the water southeast of the parking, existing comm cabling must be preserved which may require the installation of culverts underneath existing comm cabling to route water. AE2 coordinate with applicable design disciplines.

APPLIED INSTRUCTION FACILITY SPECIFIC OSP PATHWAYS AND CABLING

- Provide a minimum 4-way 4" concrete encased duct bank from new MH to the new applied instruction facility.
- From new MH at the corner of Montford Point Road and Company Street B, install 24-strand FOC and 200-pair copper OSP cabling to the new applied instruction facility (~2000'). Provide 60' slack loop of FOC and 30' slack loop of OSP copper in new manhole at the corner of Montford Point Road and Company Street B; government will perform the splices.

G403002 CABLE TV SYSTEMS (CATV)

Coordinate with local CATV service provider for requirements.

G403003 CABLES AND WIRING

Provide cables and wiring for site telecommunications and security systems as indicated in their respective categories.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a system of duct banks, manholes, and handholes for site telecommunications per section G403001..

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide duct banks, manholes, and hand holes as required for a communications and security cabling.

G403005 TOWERS, POLES AND STANDS

NOT USED

G403006 TV CAMERAS AND MONITORS

NOT USED

G403007 ELECTRONIC SECURITY SYSTEMS (ESS)

NOT USED

1.0 PROJECT DESCRIPTION – P1512F JOINT RECEPTION CENTER

1.1. Overview

Hurricane Florence impacted MCB Camp Lejeune and Marine Corps Air Station New River with periods of strong winds, heavy rains, flooding of urban and low-lying areas, flash floods and coastal storm surges. As a result, MCB Camp Lejeune, MCAS New River and MCAS Cherry Point experienced damage to approximately 781 buildings and structures. Numerous facilities were either partially damaged or rendered uninhabitable.

This project will replace facilities that sustained severe structural and water intrusion damage, rendering them uninhabitable. The existing facilities were already in poor condition due to age and deterioration and structural integrity issues. The effects of Hurricane Florence exacerbated chronic material conditions with the facilities, impacting mission capability. The Joint Reception Center (JRC) project consists of a one-story training facility to contain Headquarters and Support (H&S) administrative functions and student in-processing functions for Military Occupancy Specialty (MOS) - Motor Transport in the Marine Corps Combat Service Support School (MCCSSS). These functions will be consolidated into the new processing facility, to replace in-processing facilities rendered uninhabitable by Hurricane Florence.

The new JRC will allow for greater marine processing throughput and provide the MCCSSS with an administrative facility that is properly sized and configured. This project is one of several projects that is intended to improve the training and in-processing of Marines within the MCCSSS's MOS training programs, as well as demolish many of Camp Johnson's older buildings that were damaged by Hurricane Florence in September of 1918.

1.2. Project Components

The components found within the SOW for this project include, but are not limited to:

- One-story building of just over 22,000 GSF that includes multiple flexible classrooms, computer lab, and administrative space.
- Parking area for staff.
- A bus drop-off area.
- Stormwater management features.
- Sidewalks and site features that tie the facility into the adjacent buildings, streets, and pedestrian sidewalks of Camp Johnson.
- Outdoor covered canopy with storage area for Marine Seabags, backpacks and gear at the bus drop-off location.
- Building utility services for water, sewer, electric, and telecommunications.

1.3. Project Purpose

The purpose of the new JRC is to give Camp Lejeune and the Marine Corps a Marine in-processing facility that will meet the MCCSSS's Motor Transport administrative requirements in an efficient and properly planned facility that is planned for current and future technology.

Hurricane damage has rendered the previous JRC uninhabitable. The siting and planning of the new JRC will facilitate increased student throughput and integration of largescale infrastructure networks and will allow the new facility to address the current and future needs of the Log Ops School.

1.4. Most Relevant Codes and Standards

The following Codes and Standards, and those incorporated by reference within the below, are applicable to the project.

This is not a comprehensive list, and the Contractor is responsible for ensuring that the completed project complies with all applicable local, state and federal codes, standards, and regulations.

MCB Camp Lejeune

- MCB Camp Lejeune, North Carolina Public Works Division, Design Branch Electrical Policies & Criteria, 4 Feb 2020.
- Camp Lejeune Mechanical Design Guidance, 01 Jul 17
- MCB Camp Lejeune, BEAP
- Specification 27 10 00 Building Telecommunications Cabling System, 27 Jun 17
- Specification 33 82 00 Telecommunications Outside Plant, 19 Jun 17

Facilities Criteria

- FC 1-300-09N, Navy and Marine Corps Design Procedures, with Change 4, 14 Jun 18

Unified Facilities Criteria (UFC)

- UFC 1-200-01, DoD Building Code (General Building Requirements), 08 Oct 19
- UFC 1-200-02, High Performance and Sustainable Building Requirements, with Change 4, 1 Oct 2019.
- UFC 3-101-01, Architecture, with Change 4, 06 Mar 19
- UFC 3-110-03, Roofing, with Change 3, 06 Mar 19
- UFC 3-120-10, Interior Design, 16 May 18
- UFC 3-201-01, Civil Engineering, with Change 2, 01 Jul 19
- UFC 3-201-02, Landscape Architecture, with Change 1, 01 Nov 19
- UFC 3-210-10, Low Impact Development, with Change 1, 02 Feb 16
- UFC 3-220-01, Geotechnical Engineering, 01 Nov 12
- UFC 3-220-05, Dewatering and Groundwater Control, 16 Jan 04
- UFC 3-230-01, Water Storage and Distribution, with Change 1, 01 Oct 18
- UFC 3-230-02 O&M, Water Supply Systems, 10 Jul 01

- UFC 3-240-01, Wastewater Collection, with Change 2, 01 Jan 19
- UFC 3-240-02, Domestic Wastewater Treatment, with Change 1, 01 Jan 19
- UFC 3-250-01, Pavement Design for Roads and Parking Areas, 14 Nov 16
- UFC 3-250-04, Standard Practice for Concrete Pavements, with Change 2, 07 Jul 09
- UFC 3-250-11, Soil Stabilization for Pavements, 16 Jan 04
- UFC 3-270-01, O&M Manual, Asphalt and Concrete Pavement Maintenance and Repair, 21 Feb 18
- UFC 3-270-08, Pavement Maintenance Management, 16 Jan 04
- UFC 3-101-01, Architecture, with Change 4, 06 Mar 19
- UFC 3-110-03, Roofing, with Change 3, 06 Mar 19
- UFC 3-120-10, Interior Design, 16 May 18
- UFC 3-301-01, Structural Engineering, 01 Oct 19
- UFC 3-320-06A, Concrete Floor Slabs on Grade Subjected to Heavy Loads, 01 Mar 05.
- UFC 3-401-01, Mechanical Engineering, with Change 1, 01 Oct 15
- UFC 3-410-01, Heating, Ventilating and Air Conditioning Systems, with Change 5, 01 November 19
- UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, 18 Jul, 18
- UFC 3-420-01, Plumbing Systems, with Change 10, 26 Oct 15
- UFC 3-450-01, Noise and Vibration Control, 15 May 03
- UFC 3-501-01, Electrical Engineering, 06 Oct 15
- UFC 3-520-01, Interior Electrical Systems, with Change 1, 20 Mar 19
- UFC 3-520-05, Stationary Battery Areas, with Change 2, 03 Sep 19
- UFC 3-530-01, Interior and Exterior Lighting Systems and Controls, with Change 3, 01 Jun 16
- UFC 3-540-01, Engine-Generator Systems for Backup Power Applications, with Change 1, 24 Oct 17
- UFC 3-550-01, Exterior Electrical Power Distribution, with Change 2, 13 Mar 19
- UFC 3-560-01, Electrical Safety, O&M, with Change 1, 21 Feb 18
- UFC 3-575-01, Lightning and Static Electricity Protection Systems, 01 Jul 12
- UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design, Change 1, 01 June 2016
- UFC 3-600-01, Fire Protection Engineering for Facilities, with Change 3, 10 May 19
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, 12 Dec 18

- UFC 4-010-06, Cybersecurity of Facility-Related Control Systems, with Change 1, 18 Jan 17
- UFC 4-021-01, Design and O&M: Mass Notification Systems, with Change 1, January 2010
- UFC 4-021-02, Electronic Security Systems, October 2013

Tri-Services Electrical Working Group (TSEWG)

- TSEWG TP-1 Electrical Calculation Examples
- TSEWG TP-2 Capacitors for Power Factor Correction
- TSEWG TP-3 Surge Protector Performance and Evaluation Criteria
- TSEWG TP-4 Stationary Battery and Charger Sizing
- TSEWG TP-5 Interior Transformer Ratings and Installation
- TSEWG TP-6 Low-Voltage Breaker Interrupting Ratings
- TSEWG TP-7 Protection System Design
- TSEWG TP-8 Equipment Enclosures and Hazardous Locations
- TSEWG TP-9 Automatic Transfer Equipment
- TSEWG TP-10 Arc Flash Levels for Fused Voltage Inputs to Electricity Meters
- TSEWG TP-11 UFC 3-500-10N Best Practices
- TSEWG TP-12 UFC 3-500-10N Appendices
- TSEWG TP-13 UFC 3-501-03N Load Demand Analyses
- TSEWG TP-15 Arc Flash Calculations and Detailed Arc Flash Warning Labels
- TSEWG TP-19 Static Uninterruptible Power supply (UPS)

International Code Council (ICC)

- International Building Code (IBC), 2018 as modified by UFC 1-200-01
- International Existing Building Code (IEBC), 2015
- International Mechanical Code (IMC), 2018 as modified by UFC criteria
- International Plumbing Code (IPC), 2018 as modified by UFC criteria

2.0 PROJECT OBJECTIVES – P1512F JOINT RECEPTION CENTER

2.1. Mission Statement

Construct a new JRC building to house the MCCSSS student in-processing functions and administrative offices for the H&S company.

2.2. Facility Function

The JRC is being created to house the functions required for processing incoming Marines being placed into MCCSSS training programs at Camp Johnson. These functions are currently located in five separate buildings that were affected by Hurricane Florence in September 2018 and slated to be demolished. To aid in its function it will be located near Camp Johnson's main Barracks Buildings, the mess hall, and the new LOG OPS School. It will provide a central one-stop in-processing and briefing facility for Marines in Waiting, Entry Level Recruits, and intermediate level marine trainees. It also will be linked with a direct covered path to a planned new clinic slated to be built directly adjacent to this facility that will aid in the clinic's staff for providing in-processing functions.

2.3. Project Specific Priorities

2.3.1. Sustainable Design and Construction

All NAVFAC projects are subject to sustainable design criteria and are required to meet the requirements of the Guiding Principles for Sustainable Federal Buildings (HPSB). The Guiding Principles are outlined in a cross disciplinary publication addressing requirements for new building construction and modernization of all federally owned facilities. Sustainable principles will be integrated into the design, development and construction of the project in accordance with Executive Order 13834 and other applicable laws and Executive Orders.

Design and construct the project to comply with sustainability requirements identified in Part 2 Section 01 33 29.05 20, Sustainability Reporting for Design-Build. Additional specific sustainability requirements are found in RFP Part 2, Part 3, and Part 4 sections.

Design and construct the project in accordance with UFC 1-200-02, High Performance and Sustainable Building Requirements. The UFC provides design, construction and modernization criteria for projects of all sizes. It outlines performance thresholds in energy and water, addresses criteria of indoor air quality, identifies resiliency concerns, addresses planning and design, and establishes a baseline across all of DOD for documenting sustainability. A major component of the policy established in this UFC is the Sustainable Third Party Certification requirement for projects that reach specific size and cost thresholds.

Additional, agency-specific requirements can be found in NAVFAC Engineering & Construction Bulletins (ECBs) such as Issue No. 2014-02. ECB 2014-02 describes overall NAVFAC policy and guidance on sustainability and energy requirements.

2.3.2. Storm Water Management - Low Impact Development (LID)

Comply with UFC 3-210-10, *Low Impact Development* and FC 1-300-09N *Navy and Marine Corps Design Procedures*. Additional specific LID and stormwater management requirements

are found in RFP Parts 3 and 4, Section G30. In addition to LID, comply with State and Local stormwater regulations.

2.3.3. Energy Efficiency

The level of energy performance the Government seeks may only be achieved through coordinated design of architectural, electrical, and mechanical elements of the design. All energy systems must be designed in compliance with the following unless more stringent requirements are noted otherwise:

- UFC 1-200-02, High Performance and Sustainable Building Requirements. Incorporate energy efficiency in accordance with UFC 1-200-02, HPSB requirements
- EPAct 20105
- EISA 2007
- ASHRAE Standard 189.1 - 2014
- ASHRAE/IESNA Standard 90.1-2013.

Energy consuming equipment and products must meet or exceed Energy Star or FEMP efficiency levels. This includes built-in equipment (lights, HVAC, water heating, industrial equipment, etc.) and collateral equipment (office equipment, IT, task lighting, etc.). For equipment types not rated by Energy Star or FEMP, equipment efficiencies must be in the top 25 percent of similar products. All purchased electronics must be EPEAT registered. In addition, provide an ECA, which will demonstrate compliance with all energy related requirements in UFC 1-200-02. Measure and record existing building utility consumption, provide design calculated estimated energy savings and post construction documentation and reporting of actual realized energy savings.

2.3.4. Building Commissioning

Provide commissioning to meet requirements identified in Section 01 91 00.15 22 Total Building Commissioning, and UFC 1-200-02 High Performance and Sustainable Building Requirements.

2.3.5. Accessibility Requirements

Provide barrier-free design is generally required in accordance with UFC 1-200-01, General Building Requirements.

2.3.6. Antiterrorism Force Protection

The primary objective for the Marine Corps Base (MCB) security engineering is to ensure compliance with the Antiterrorism Force Protection (AT/FP) program requirements and applicable Marine Corps physical security measures in MCO 5530.14A, as supplemented by the UFC. The AT/FP program requirements and Marine Corps physical security measures are to safeguard personnel, equipment, and property. A risk analysis and vulnerability assessment (RAVA) has not been performed and a specific Design Basis Threat has not been identified.

The facility is considered Inhabited and will be routinely occupied by 11 or more personnel. The facility must be designed in accordance with the chapter 3 standards of UFC 4-010-01, except that parking is not permitted in the 33-foot unobstructed space around the building. This

includes low occupancy portions of the building, as applicable, due to physical security and operational requirements. The facility must also be designed in accordance with the following requirements:

a) **Antiterrorism Architectural Special Requirements** – Installation mission-assurance has requested security-conscious layouts and configurations for the interior layout of the building spaces and entrances to the building. The goal is to improve antiterrorism safety without adding cost, without hardening the building, and without adversely affecting the usability of the building.

b) **Building Entrance Orientation** – Orient the main building entrance such that it does not provide vehicles the capability to drive through the main entry of the building. Where this is impractical, ensure that the entry storefront does not directly face a main hallway or a mass-gathering space. Lay out entrances to be welcoming and accessible, but so that the entrances are visibly protected and inaccessible against a vehicle attempting to force entry. Ensure that building main entrance layouts are also compliant with UFC 4-010-01 Chapter 3-12, Standard 11 *Building Entrance Layout*. Where this section conflicts with Standard 11, Standard 11 must take precedence.

c) **Proximity of Densely Populated Areas to Parking** – To mitigate risks to densely populated areas, locate uninhabited, low-occupancy, and mechanical yard areas adjacent to parking lots. Locate densely populated areas away from parking lots to the maximum extent possible given available site space and building square footage. The preference is to keep densely populated areas 82 feet away from parking spaces, if sufficient site space is available. Uninhabited and low occupancy spaces include utility rooms, hallways/corridors without seating, and storage areas. Densely populated areas include classrooms, large break rooms, locker rooms, conference rooms, auditoriums, and other areas with a high personnel density. During the CDW, include the installation Antiterrorism Officer (mission-assurance) on discussions for the preferred layout of mass gathering and densely populated administrative areas relative to the proposed site plan.

d) **Antiterrorism Landscape Architecture Special Requirements** – Installation mission-assurance has requested security-conscious landscape features that afford improved protection to the building occupants. The goal is to improve antiterrorism safety without adding cost by utilizing UFC-mandated landscape architecture features to protect vulnerable areas and using excess fill from the project site for landscaped berms. A specific design basis threat for an active shooter or attack vehicle does not apply; therefore, the intent is to complement architectural layouts and civil site features to improve occupant protection within the project scope of work.

e) **Vehicle Deterrent Landscaping** – Landscaping features can provide a significant physical and psychological deterrent to the risk of a vehicle ramming attack as a part of a vehicle-deterrent perimeter. Landscaping features do not need to be rated passive vehicle barriers to afford greater security to the building occupants.

f) **Unobstructed Space** – Trees, plantings, and site furniture may be located within the 33-foot unobstructed space around each building, provided they are compliant with the UFC 4-010-01 and UFC 3-201-02 requirements for landscaping in the unobstructed space. For berms, ensure berms in the unobstructed space do not exceed a height of 4 feet, 6 inches to eliminate concealment opportunities.

g) **Large-Diameter Trees** – Tree species that will grow to a large DBH (greater than 6 inches) provide an aesthetically pleasing and natural barrier to vehicle traffic. It is

desirable to position large diameter trees in the space between the building and parking lots or roads where permissible by code and feasible based on available site space. Provide tree plantings with at least 4 inches DBH where the trees are integrated into the vehicle-deterrent perimeter. Multiple staggered rows of trees serve as highly effective vehicle barriers once the trees have grown. Where providing multiple rows of trees stagger and space the trees to eliminate any corridors exceeding a 5-foot width perpendicular to the adjacent roads or drive aisles. Final tree layout, tree spacing, and species must be approved by the Government Landscape Architect and installation Antiterrorism Officer.

h) **Concrete Site Features** – Concrete benches and picnic tables are excellent deterrents to vehicles. Concrete planters are not desirable due to landscaping maintenance issues and concealment concerns in the unobstructed space.

i) **Berms and Ditches** – Berms and ditches provide protection and can be integrated with the landscaping plan (e.g., trees along tops of berms and creeping juniper on the sides).

j) **Elevated Plazas** – For buildings that require elevated entryway access with stairs and accessible ramps, consider arranging the stairs, ramps, and any low retaining walls or sloped soil so that they are positioned near the edge of the vehicle parking lot and adjacent roadways. A steeper, landscaped, stabilized slope near the edge of the parking lot with a sidewalk in front of it serves as a visible deterrent to illegal parking and approaching vehicles.

k) **Bollards at Building Entrances** – Bollards are an option where other features such as stairs, pedestrian ramps, trees, or berms do not deter direct vehicle access to the main building entrance. Bollards are desirable for sidewalks and plazas leading into the main building entrance provided there is no adverse impact to pedestrian accessibility. A bollard spacing of 4 feet on center will meet ABA/ADA requirements. Architectural bollards near the building entry are a desirable way to improve protection while improving site lighting (for lighted bollards) and appeal. Removable bollards are acceptable and beneficial for future building maintenance. Coordinate with vehicle access control requirements as part of civil site design. Provide the option of either permanent or removable bollards, determined based on customer needs at the CDW and subsequent design review meetings.

l) **Visual Screening Landscaping at Queuing & Entry Areas** –Visual screening affords protection for building occupants and visitors against the potential for vehicular or active shooter threats. Landscaping that provides visual obscuration of building entrances and outdoor queuing or congregation areas is highly desirable to improve protection of personnel in exposed areas.

m) **Antiterrorism Civil Site Design Special Requirements** – Installation mission-assurance has requested security-conscious site plans that afford improved protection to the building occupants. The goal is to improve antiterrorism safety without adding cost by laying out necessary vehicle parking and storm water features to protect vulnerable areas of the building. A specific design basis threat for an attack vehicle does not apply; therefore, the intent is to complement architectural layouts and landscaping features to improve occupant protection within the project SOW. The unobstructed space and vehicle access control requirements defined below are added scope items to manage nuisance parking and maintain the unobstructed space for base operational considerations.

n) **Vehicle Access Control** – All projects must include consideration for vehicle access control in the form of lockable swing gates and/or lockable removable bollards along driveways and access roads that lead to service areas around the building within the 33-foot unobstructed space. Other open plaza areas must be secured with permanent bollards in combination with removable bollards. Portions of buildings that must be secured within a restricted area fence (e.g., motor pools) are excluded from this requirement.

o) **Service Area Access** – Access for service areas around the building includes roads and driveways that lead to utility rooms, loading docks, mechanical yards, other areas in the unobstructed space that are used for building maintenance, and for roads that are only used for fire access.

p) **Pedestrian Areas** – Open plazas, hardscaping, and other outdoor pedestrian-congregation areas that are adjacent to a roadway must also feature vehicle access control integrated with permanent landscaping and civil site features as part of a vehicle-deterrent perimeter. Removable and fixed architectural bollards (lighted, where beneficial) are preferred for vehicle access control to open plazas, hardscaping, and other outdoor pedestrian-congregation areas with at least four removable bollards in a row for service access to these pedestrian areas. Provide the option of either permanent or removable bollards, determined based on customer needs at the CDW and subsequent design review meetings.

q) **Access Control Requirements** – Where bollards are provided, space bollards 4 feet on center starting at each edge of the road or driveway. Where gates are provided, provide single or double leaf swing gates with posts that start at the edge of the roadway (or behind the curb) and which include receiving posts to secure the gate in the open position. Gates must not encroach on the roadway or driveway while in the open position. Gates and bollards must be high visibility and meet all other UFC requirements, such as those for signage, high-visibility, reflectivity, and striping, to meet traffic safety requirements. Gates and bollards for vehicle access control to service areas and pedestrian congregation areas need not be crash rated. Refer to UFC 4-022-03, *Security Fences and Gates* for additional requirements for gates.

r) **Vehicle-Deterrent Perimeter** – Gates and bollards must be integrated with landscaping and civil site features to deter vehicles from bypassing the access control by driving around the barriers and to maintain a vehicle-deterrent perimeter.

s) **Consolidating Access Control** – Access roads to service areas around the building can be secured where the access road begins at the adjacent roadway or parking lot, provided this is integrated with the vehicle-deterrent perimeter, in order to reduce the total cost of providing vehicle access control to the unobstructed space.

t) **Control Vehicle Speed** – Arrange parking lot access roads and drive aisles so that any direct approaches to the building walls or building entrance cannot exceed 25 miles per hour. Speed limit signage alone is not sufficient to constrain vehicle speed. Speed limit control in parking lots and access roads is also desirable to improve pedestrian safety and to reduce the risk of vehicle accidents.

u) **Limit Vehicle Approaches to Building** – Arrange access roads and drive aisles so that no vehicles have long straight approaches directly at the exterior walls of the building, particularly at the building entrance. Keep the long axis of drive aisles parallel with the walls of the building to control the approach direction of a vehicle. Arrange access roads

so that personnel do not drive directly facing the building walls or any entrance. For short drive aisles that run perpendicular to the long axis of the parking lot, coordinate with landscape architecture to provide civil site and landscaping features that visually or physically deter vehicle access. Alternatively, locate these perpendicular drive aisles beyond the ends of the building so traffic does not directly face the building walls or any entrance. Loading docks/heavy truck areas need not consider these requirements due to the impracticability of implementing this where building access is a requirement. Provide curb stops in parking spots that are adjacent to the building to discourage vehicle parking in the unobstructed space.

v) **Unobstructed Space & Vehicle-Deterrence** – Provide a minimum 33-foot unobstructed space around the building without new parking, existing parking, new roadways, or new drive aisles. Keep existing drive aisles and roadways out of the unobstructed space to the maximum extent practicable. Provide berms, drainage swales/ditches, and other civil site features between the building and any adjacent parking lots or roadways as part of a vehicle-deterrent perimeter. Berms can also reduce offsite fill disposal costs, provided that fill is verified to be non-hazardous, non-contaminated. The CDW must address how to integrate unobstructed space and vehicle-deterrence needs within the available site footprint in consultation with the installation Antiterrorism Officer.

w) **Unobstructed Space Preferences** – The installation mission-assurance personnel prefer larger unobstructed spaces where feasible based on available site space. Unobstructed space need not exceed 82 feet for larger, open sites. This unobstructed space preference is to the mass-gathering portions of each facility that excludes open hangar areas, apparatus bays, and other areas that are specifically designed to be low-occupancy spaces as defined in UFC 4-010-01. Refer to Paragraph C, *Proximity of Densely Populated Areas to Parking* for more information.

2.3.7. Facility-Related Control System Cybersecurity

Design, acquire and execute all facility-related control systems in accordance with UFC 4-010-06, *Cybersecurity of Facility-Related Control Systems.* Design the project using UFGS 25 05 11, *Cybersecurity for Facility-Related Control Systems.* CIO4 Government Point of Contact to be utilized in SECTION 25 05 11 is: James Mahoney, ICS ISSM for Camp LeJeune, email at James.D.Mahoney@usmc.mil]. Submit CCIs as attachments to SECTION 25 05 11.

The table below identifies the Facility Related Control Systems which must be included for this facility. Final C-I-A impact levels must be coordinated and approved by the Camp LeJeune ICS ISSM, James Mahoney, James.D.Mahoney@usmc.mil.

Authorizing Official	System Owner	System Group	System	Existing Authority To Operate?	C-I-A Impact Level
USMC AO Dr. Ken Bible	DPW	UMCS	HVAC	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Lighting	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Advanced Meter Infrastructure (AMI)	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Backup Power Generator Annunciator Panels and Controls	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Elevator Control Systems	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Fire Dept	FLS	Fire Alarm Reporting System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	FLS	Mass Notification System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Physical Access Control System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Intrusion Detection System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Security Forces	ESS	CCTV	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate

Incorporate cybersecurity requirements into project facility control systems identified in:

- ESR D20, Plumbing
- ESR D30, HVAC
- ESR D40 Fire Protection, including Cooper Notification, Inc. WAVES Emergency Notification System
- ESR D50, ELECTRICAL

2.3.8. Secured Areas

Comply with the Marine Corps physical security measures in MCO 5530.14A as supplemented by the Unified Facilities Criteria.

2.3.9. Air Quality Management

When demolition or renovation occur, ensure that subject buildings are evaluated for asbestos and asbestos-containing materials by a certified professional prior to the demolition or renovation.

Ensure that any fugitive dust emissions generated by construction, renovation, or demolition are appropriately controlled.

If the project includes installation of new activities or equipment which generate air emissions, and the sources have not been evaluated for air permitting by MCB CAMLEJ, contact AQ program at (910)451-9017. Please note that air emission sources are required to be permitted prior to their installation and operation. Examples of such sources include, but are not limited to: boilers, water heaters, generators, fuel storage tanks, painting/coating operations, woodworking, welding, abrasive blasting, engine testing, refrigerant recovery devices, and parts ovens.

If the project involves any refrigerant handling or manipulation, ensure that appropriate ODS servicing procedures are followed.

If the project includes removal of any currently permitted air emission sources (see Item 3 for examples), contact AQ program at (910)451-9017.

2.4. Appropriate Design

Design the new building and systems in accordance with all Codes, Standards, UFCs, and criteria explicitly and implicitly stated herein. Employ integrated design principles.

2.4.1. Building Design - Architecture

The JRC Building exterior envelope design must follow the architectural design features prescribed in the Camp Lejeune BEAP, 2010 for Camp Johnson (Section 4.13). This document establishes key exterior materials, material finishes/colors and building façade and roofing design elements to be incorporated into the building’s exterior design.

Options for the exterior wall design are listed in Part 3, Chapter 6, B20 Exterior Closure ESR. Any of the listed options is allowed for the design of the exterior wall, as long as the design elements for the exterior wall defined in the BEAP are provided.

The building design floor plan must generally follow the arrangement of spaces indicated in the Blocking Diagram in Part 3, Chapter 4 of this RFP. If any particular support space such as

mechanical rooms can be reduced in size as the building design develops, that space must be allotted to other user functional priorities with no reduction in building square footage.

The building design and design documentation must follow/meet applicable UFCs listed in Chapter 3, Part 1 and applicable building codes.

2.4.2. Civil/Site

The site for the JRC must provide for the easy delivery and processing of new students to Camp Johnson. To accommodate this, the site must provide bus and truck (student gear is delivered by flatbed truck (WB-50 semitrailer)) access that is easily negotiable in a drive-through fashion. The unloading and staging area for the students and their gear must be covered to provide protection from the elements while staging to enter the facility. This area also must be a paved or paver surface to eliminate the tracking of mud into the facility. Pedestrian circulation must be designed for the high volume of students and personnel that will be traversing to other common destinations adjacent to the facility, such as the mess hall. Most students are not allowed cars on base and as such, large groups of Marines often travel by foot together, often in formation. These formations will require wider than normal sidewalks.

Parking should be adjacent with sidewalk access to the building for the personnel working in the facility. The parking area must also be designed with consideration to expand the parking lot to co-locate additional parking for the future Ambulatory Care Center that is planned to be built immediately to the west of the JRC.

Provide sufficient area for the AT/FP compliant dumpster/trash/recycling containers that is convenient for both the building occupants and the solid waste pick-up vehicle.

All-weather access roads to the facility for emergency vehicles and for base maintenance access to mechanical rooms and exterior equipment must be provided.

Being in an already developed portion of Camp Johnson, site utilities (water/sewer) surround the building site and are readily available for connection.

Drainage will be a design challenge with two major storm drainage pipelines running through the building site. These large pipes (30-inch and 42-inch RCP) will need to be relocated outside of the building footprint. Site grading must provide sufficient slope to drainage structures to eliminate standing water and direct it away from buildings and paved areas.

Stormwater management must comply with UFC 3-210-10, *Low Impact Development*, and all State stormwater permit requirements for both treatment quality and discharge quantity and rate.

This project must meet Guiding Principles compliance and must comply with UFC 1-200-02, *High Performance and Sustainable Building Requirements.*

2.4.3. Environmental / Conservation / Cultural Resources

NEPA work for this project has been completed by NAVFAC.

2.4.4. Structural

The structural design objective is to construct an efficient, safe, and durable building constructed from any of the materials and load bearing systems permitted in the Part 3 ESR narratives and meeting the reference codes and standards. As part of this objective, the

structural design must be coordinated with all disciplines and must meet functional requirements.

To help meet the objective, NAVFAC has provided a significant amount of historic geotechnical information and ECS has performed a preliminary geotechnical investigation of this site. Refer to Part 6 for the ECS preliminary information that includes previous investigations provided by NAVFAC. The NAVFAC and ECS geotechnical information is reliable for preliminary information but must be verified by the Contractor. The Contractor is solely responsible for interpreting available geotechnical information. The Contractor is responsible for conducting an independent geotechnical investigation for foundation design.

2.4.5. Fire Protection

2.4.5.1. Building Code and Life Safety Analysis

Provide a complete building code and life safety code analyses in accordance with UFC 3-600-01 and FC 1-300-09N.

2.4.5.2. Fire Alarm and Mass Notification

Design and provide an integrated fire alarm, mass notification system capable of notifying building occupants inside the facility of an emergency event. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must".

2.4.5.3. Fire Protection Sprinkler System

Design and provide a wet pipe fire sprinkler system for complete fire protection coverage throughout the entire building. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must". Base hydraulic design on the water supply data provided in ESR Section D40 and Part 6.

2.4.6. Telecommunications

Provide a complete Telecommunications backbone and horizontal distribution system as specified throughout this RFP. Install all equipment, pathways, and cabling per the criteria per the PTS Sections D50 and G40 and the manufacturer’s recommendations. Where the words “should” or “shall” are used in the manufacturer’s recommendations, substitute with the word “must”.

Provide a MDF to house telecommunications equipment and cabling as well as, service provider equipment and cabling. Additionally, provide floor/area serving IDFs to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide exterior underground communications duct bank manhole system from existing duct bank(s) and manhole to the MDF inside each building.

The design and installation must be in accordance with the latest TIA standards, all applicable Unified Facilities Criteria documents, and the latest local provider and applicable military department standards and criteria.

2.5. Workflow Process

This Joint Reception Center houses several in-processing and administrative functions that will require separate entries to each one. They include separate entrances to the Marines Awaiting Training (MAT) classrooms, the Entry Level Recruits (ELR) classrooms, to the Personal Administrative Center (PAC) for intermediate level Marines and PAC staff, and to H&S (completely administrative department with no Marines requiring access).

In addition, the facility is required to handle busloads of Marines at one time with the greatest number of students in January and February. The buses arrive at a bus drop-off driveway just south of the building. Marines will off load under a covered canopy that is sited directly adjacent to the building, but it is a separate structure from the JRC Building. The covered canopy has a place for Marines to store their personal backpacks and gear while training takes place. If arriving by bus they will proceed to either the ELR classrooms or the MAT classrooms, both of which are located directly adjacent to the covered canopy. The PAC that has a much smaller load of students for in-processing functions is located to the east side of the building. H&S, a small administrative department, has their entrance located on the west side of the building.

The MAT and ELR classrooms are provided with a folding panel partition to allow the size of the classroom to be changed depending on the training requirements.

2.5.1. Hours of Operation

Hours of operation are from 0700 to 1700, Monday through Friday for student in-processing. Administrative staff access to the facility is allowed 24 hours per day, 7 days per week.

2.5.2. Staffing/Occupancy

The JRC is occupied primarily during daytime hours by students occupying training spaces, and administrative staff in administrative departments.

The number of occupants specified in this RFP and indicated in the Building Program in Part 3, Chapter 4 are identified for programming purposes. Determine occupancy load to be used to design building features, such as structural, egress, and plumbing fixtures must be as required in applicable building or life safety codes based on the spaces provided in the building design.

2.6 Special Design Challenges

Special design challenges include the following:

- The large number of MILCON facilities that are to be built at or around the same time as the Joint Reception Center at Camp Lejeune may create challenges with both material and labor availability. The design of the building and systems selected for exterior envelope materials should take into account these challenges.

- Refer to Part 6 for preliminary Construction Phasing Plan. Develop a detailed construction phasing plan as part of the design package for Government approval before construction.

2.7. Adaptability and Flexibility

The JRC provides flexibility in allowing the classrooms to be adjoined by utilizing folding panel partitions. The combined enlarged classrooms provide for instructional flexibility. The MAT computer lab can also be disassembled to accommodate an additional MAT classroom if necessary.

3.0 SITE ANALYSIS – P1512F JOINT RECEPTION CENTER

3.1. Existing Site Conditions

3.1.1. Site Conditions – Natural Constraints

3.1.1.1. Topography

The site for the JRC is on the Camp Johnson portion of MCB Camp Lejeune. The building site is an existing parking lot in the northeast end of Camp Johnson, just west of Company B Street, just south of Bachelor Enlisted Quarters (BEQ) Buildings M430 and M440, and north of, Building M413.

The parking lot will occupy the area just south of the building site and is the area west of Company B Street that will encompass a treed area north of, as well as the area currently occupied by, Building M418. Building M418 is in the schedule for early demolition with this package.

Site elevations range from approximately 20 feet down to 18 feet. The site currently drains to a piped drainage system that discharges to a large ditch to the east of Company B Street.

3.1.1.2. Vegetation / Landscaping

The building site is primarily paved with the exception of four turf islands containing a single shade tree each within the lot and a turf boarder with a handful of shade trees along the perimeter. The area for the parking lot has an area of approximately 0.5 acres of mature trees while the remaining area is turf.

3.1.1.3. Natural Resources

There is an existing ditch to the east of Company B Street that leads to a deeper draw east of the Camp Johnson Mess Hall (Building M455) that eventually drains to Scales Creek.

3.1.1.4. Subsurface Investigation

See Part 4 ESR G10 for information regarding requirements to locate all utilities on the site.

3.1.1.5. Earthwork and Site Preparation

See section 3.3.8 below for information regarding geotechnical earthwork, site preparation, and sitework requirements for this site.

3.1.1.6. Unexploded Ordnance (UXO)

There is no known unexploded ordinance within the project limits.

3.1.1.7. Wetlands

GIS info does not indicate any wetlands within the anticipated construction limits.

3.1.1.8. 100-Year Floodplain

Per the FEMA FIRM, the project site is in “Area of Minimal Flood Hazard - Zone X”

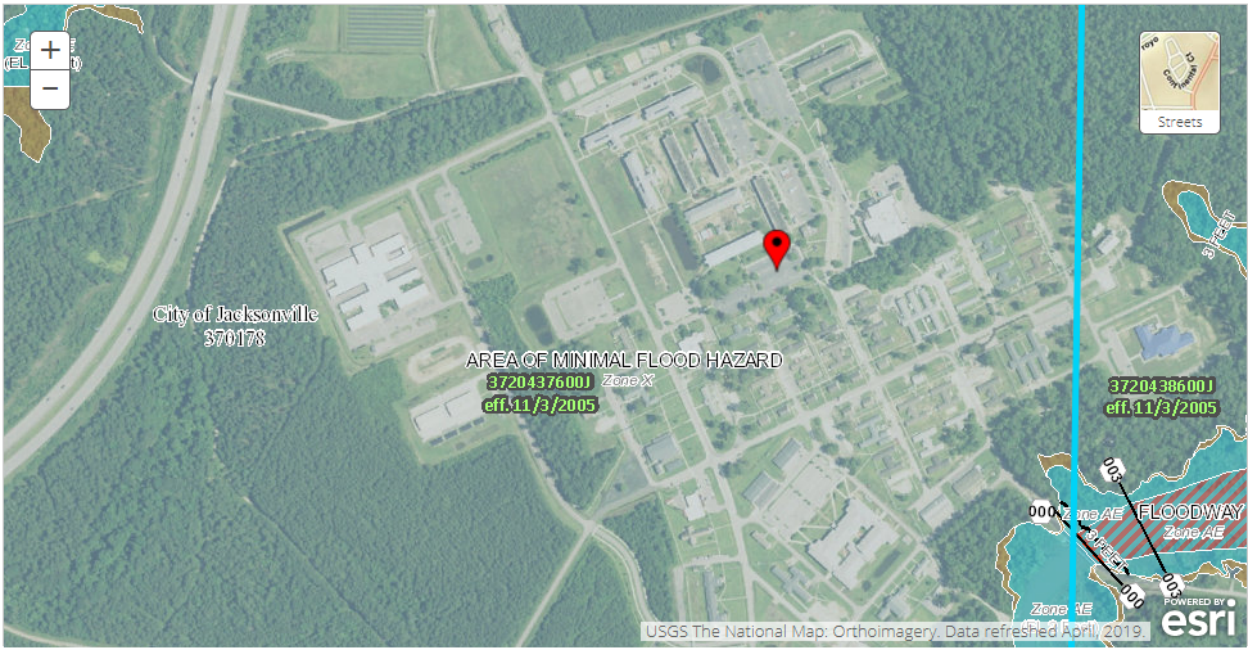


Figure 1: 100-Year Floodplain Map

3.1.2. Site Conditions – Man-made Constraints

3.1.2.1. Existing Vehicular Access and Circulation

There are existing roads and buildings in the vicinity of the location of the new JRC, Company B Street to the east, Company A Street to the southeast. Main access to the site will be through the Camp Johnson Gate, south down Montford Landing Road, turning to the northeast on Harlem Drive, and finally turning north on Company B Street. The student barracks to the north and Mess Hall to the east are buildings that will remain. To the south of the site, several buildings are slated for demolition. There is also an Ambulatory Care Center that is planned adjacent and to the west side of the JRC.

3.1.2.2. Site Drainage & Storm Water Runoff (hydrology)

The building site is currently collected into a piped system and discharged to the ditch east of Company B Street, just south of the Mess Hall (Building M455). The area for the parking lot drains generally to the east towards Company B Street and is eventually collected in a piped system east of the street that discharges to the same ditch mentioned above.

3.1.2.3. Site Features

As mentioned previously, the building site is primarily paved as an existing parking lot west of Company B Street, south of Buildings M430 and M440, north of Buildings M413 and M418. The proposed parking area is west of Company B Street and includes the treed area north of Building M418, the current footprint of Building M418, and is east of Buildings M411, M412, and M413.

3.1.2.4. Existing Site and Building Conditions Photographs

Photographs of the existing site and building can be found in the Part 6.

3.1.2.5. Hazardous Materials and Substances

See section 3.3.8 below for information regarding geotechnical earthwork, site preparation, and sitework requirements for any hazardous materials found on the site.

3.1.2.6. Fencing

There is no fencing on the proposed site.

3.1.2.7. Adjacent Land Use

Adjacent land use includes the barracks buildings complex to the north, M430, M435, and M440. East of Company B Street is Building M455, the Camp Johnson Mess Hall. To the south are various one-story block buildings used for various unit offices and other functions, the majority of which are scheduled for demolition. To the west is an existing parking lot. This parking lot and adjacent areas will be the site for a future clinic.

3.2. Existing Infrastructure Network

3.2.1. Vehicular Access and Circulation

Overall Site Traffic Requirements

The Contractor must develop one Traffic Investigation Report for the entire Camp Johnson site. Traffic Counts (TMC and 24-Hour Tube Counts) must be collected at key entry points and key intersections of the street network of Camp Johnson (see KMZ map of count locations in Figure 2) . Because this is a Controlled Entry Facility, UFC 4-022-01 and Section 2 of the Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15 must be used. In addition, UFC 3-201-01 for Civil Engineering, Sections 2-9 and 2-10 must be used, along with AASHTO GDHS and ITE guides, including ITE LP-674B (Highway Capacity Manual) and *Transportation Impact Analyses for Site Development*. The MUTCD and NCDOT Roadway Design Manual must also be used. The Contractor must apply the most stringent requirements from the various manuals.

The Contractor must also create a Temporary Traffic Control Plan for each phase of construction. The Plan must follow the MUTCD and the NCDOT Work Zone Traffic Control guidelines.

Construction of the three buildings in P1512 are anticipated to redistribute rather than generate new traffic volumes. Therefore, traffic impacts are anticipated to be minimal, with the exception of: driveways to the new buildings; enhanced pedestrian crossing facilities on the existing roads of Company B and Neuse Road; and new Pedestrian Paths between destinations.

Current conditions for traffic flow and circulation need to be confirmed through the Traffic Count Data. Projection of Future Traffic Volumes and Conditions must be determined for the Build Year, plus five years (e.g. 2020 and 2025). Peak Periods (2 hour) for the AM and PM must be established. Synchro must be used to determine Levels of Service (LOS) at intersections and queuing at the Controlled Access Gate. The Contractor must conduct an Origins and Destinations Study to determine traffic circulation to, from, and through the site.



Figure 2: Traffic Count Locations

Based on the overall Traffic Investigation Report, the Contractor must take into account the specific operations and access needs around the three buildings in P1512 and are outlined in this RFP.

Based on the findings of the Traffic Investigation Report, the Contractor must recommend improvements to mitigate challenges in Traffic Operations, Circulation, Safety, and Access during daily or intermittent base operations. An estimate of magnitude of cost must be provided for such improvements after the Contractor completes the Traffic Investigation Report with the required data collection including traffic counts and an origins and destinations study. Improvements and cost must be discussed with NAVFAC.

The Contractor must create a Temporary Traffic Control Plan (TTCP) for each phase of construction. The function of the TTCP is to provide for the safe and effective movement of road users (motorists and pedestrians) through and around the construction zone while protecting road users, workers, responders to emergency incidents, and equipment. The TTCP should start in the planning phase and continue through the design, construction, and restoration phases. Components of the TTCP shall include the Advanced Warning Area, the

Transition Area, the Activity Area, and the Termination Area. In the Advanced Warning Area, road users are informed about the upcoming work zone. In the Transition Area, road users are redirected out of their normal path, as needed. The Activity Area is comprised of the work space, the traffic space, and the buffer zone. In the Termination Area, road users are returned to their normal driving or walking path.

Building Specific Traffic Requirements

As shown in Figure 3, vehicular access to the JRC is anticipated primarily in the form of student buses. These buses are anticipated to enter Camp Johnson at the Gate on Montford Landing Road, travel south, head east on Harlem Drive, and then north on Company Street B (on the east side of the JRC). These buses do not run daily on the base. They arrive intermittently as needed to bring students to and from the base.

It is not desired for the buses to use the section of Company Street B north of the JRC, due to the heavy presence of pedestrian traffic by Student Pedestrian Formations. Therefore, the buses will need a circulation system that exists south on Company Street B.

There is local street network south of the JRC. Another option for access is through Company Street A which is north-south road located between Montford Landing and Company Street B. However, Company Street A is likely needed for secondary Emergency Vehicle Access for the future Ambulatory Care Center.

3.2.1.1. Parking

Provide a parking lot of a minimum of 80 spaces to serve staff and visitors. Commercial-style buses will be required to have canopy covered areas to park and offload students. Several hundred students may need to be accommodated at any one time.

Provide sufficient paved area for bus circulation and parking for offloading to accommodate 6 buses simultaneously. Provide bus parking for offloading and circulation pavement that does not require reversing movements to enter or exit the site. In addition, and simultaneous to the buses, provide accommodation for a single WB-50 vehicle to park and offload student bags adjacent to the student offloading area. Provide canopy coverage for the offloaded student bags equivalent in area to the size of a WB-50 trailer.

3.2.1.2. Service Access

Traffic circulation will also need to accommodate solid waste vehicles. The Traffic Circulation plan for buses and solid waste vehicles will need to mindful of the future project for the

Ambulatory Care Center. In addition to emergency vehicles to the JRC, the Traffic Circulation Plan will need to accommodate ambulances at the future Ambulatory Care Center to the west. Primary access to the Ambulatory Care Center is likely to be directly from Montford Landing Road, however the JRC site must allow for traffic flow between the JRC and the Ambulatory Care Center.

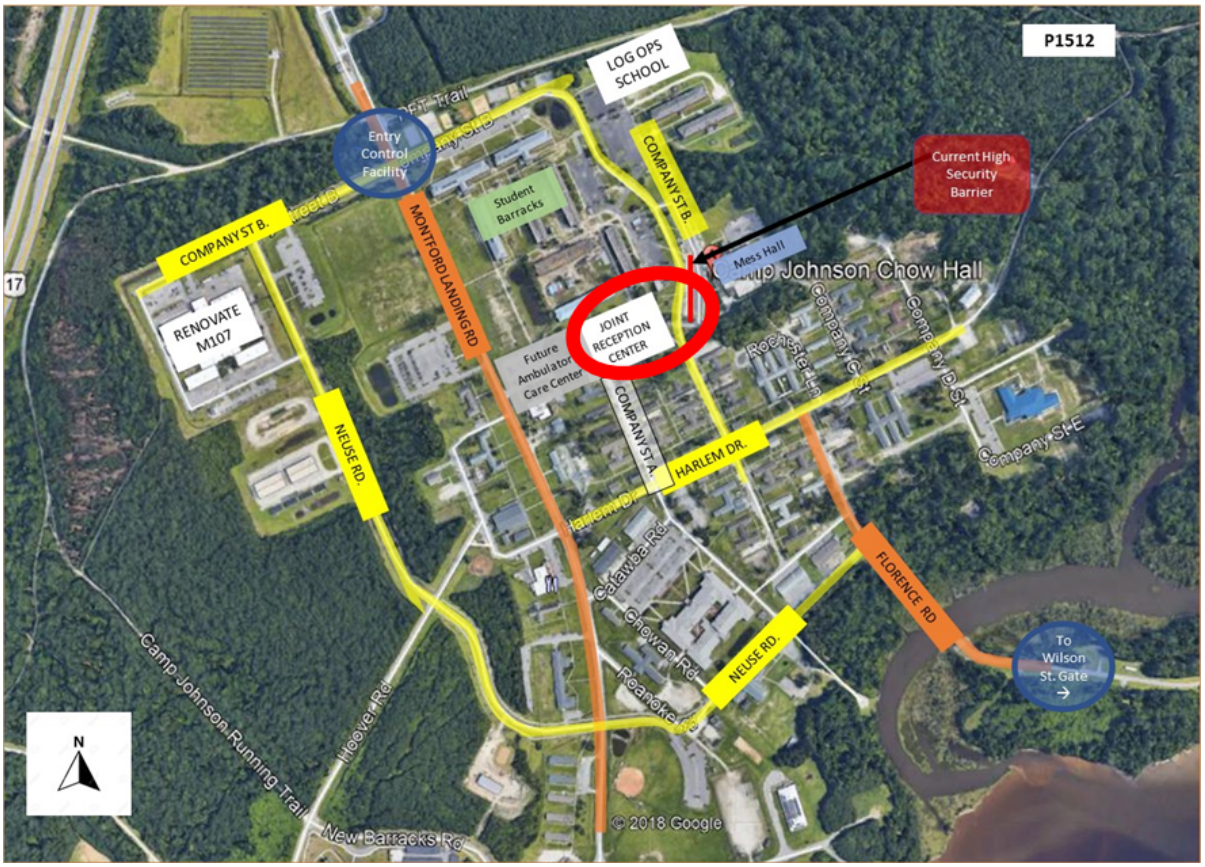


Figure 3: JRC Project Location

3.2.1.3. Pedestrian Access and Circulation (flow, paths, and sidewalks)

Pedestrian Access to the JRC will need to be provided from the Bus Shuttle drop-off pick-up area. This access should be mindful that each student will also be carrying their luggage and enough space allotted for efficient on and off-loading in a shelter protected from the elements.

Once the students have arrived at the JRC, they will travel as pedestrians to both the Student Barracks to the north and to the Mess Hall across Company Street B. Appropriately sized Pedestrian Paths, in addition to or in lieu of, may need to be provided to ensure the safe and efficient movement of Student Formations that are to be 4 students wide and 20 or more students deep. Pedestrian Paths to accommodate Student Formations should be 10 to 12 feet in width.

3.2.2. Landscaping

Limited plant material exists within the parking area. A lawn of approximately 0.5 acre with scattered mature canopy trees comprises the remainder of the site.

3.2.3. Site Utilities

There is an existing 8-inch PVC main running north-south parallel to and approximately 25 feet from the eastern edge of the existing parking lot. There is also an 8-inch PVC watermain that runs parallel to and just east of Company A Street that extends to Buildings M430 and M435 and beyond to the north.

An existing gravity sewer manhole is located at the southwest corner of Building M440 with an approximate depth of 6 feet. The gravity main leaving this manhole is 8 inches and flows northwest, parallel to Building M440.

A drop inlet roughly in the center of the parking lot collects surface drainage as well as a stormwater trunk line flowing from the north (30-inch RCP) as well as two additional pipes entering from the northwest (15" RCP) and from the southwest (18-inch RCP) and discharging to the southeast via a 42-inch RCP that crosses under Company B Street to discharge into the ditch south of Building M455.

18-inch and 30-inch RCP storm drainage pipes cross under the proposed parking area north of Building M418.

Existing telecommunications and electrical lines run underground along the north and south edge of the parking lot as well as north-south through the parking lot, roughly under the western landscape islands.

3.2.4. Signage

Any required signage must comply with Camp Lejeune sign standards and the BEAP.

3.3. Site Development Requirements

3.3.1. General Site

Site development must be designed in conformance with UFC 3-201-01, *Civil Engineering*. A bubble diagram site plan has been created, with project limits of 5.1 acres, to convey a potential general site layout and is included in Part 6. The bubble diagrams are the user's preferred general layout; however, the Contractor is responsible for the creation of a complete construction plan set meeting the requirements of this RFP for the construction of the project. It is anticipated that the project will require development in the Camp Johnson Historic District, see Part 6 for the limits of the district and the final executed IR/Florence programmatic agreement (PA). If the final design does encroach into this district, it will require conformance with Section 106. If conformance with Section 106 is required, draft a consultation letter for review and approval by MCBCL Environmental Management Division (EMD), SHPO SME (Rick Richardson) and Base Planning. EMD will submit the letter to SHPO for approval under their letterhead. The Contractor will be utilizing the documents provided in this RFP to determine their bid as follows.

- The JRC will require 80 parking spaces to be constructed. Provide a parking layout that can be extended to the west for an additional 40 spaces (final total of 120) to serve the future Ambulatory Care Center.
- Widen Company B Street to a minimum of two 13-foot wide lanes (26-foot total width) from Harlem Drive to the bus drop-off area.

- Provide sufficient paved area for bus circulation and parking for offloading to accommodate 6 buses simultaneously. Provide bus parking for offloading and circulation pavement that does not require reversing movements to enter or exit the site. Design vehicle for bus turning movement is AASHTO 2011 BUS-45. In addition, and simultaneous to the buses, provide accommodation for a single WB-50 vehicle to park and offload student bags adjacent to the student offloading area. Provide canopy coverage for the offloaded student bags equivalent in area to the size of a WB-50 trailer.
- All drive aisles, solid waste vehicle and bus/loading routes, and all pavement anticipated for emergency vehicle access must be rated for HL-93 loading and the section will be based upon the Contractor's geotechnical engineer's recommendations and calculations by the DOR,.
- All parking stalls may be light-duty pavement based on the Contractor's geotechnical engineer's calculations and recommendations.
- All disturbed areas not built upon with impervious surfaces, stormwater management facilities or landscape areas will be graded to drain and sodded with centipede sod.
- Provide and all-weather access road (pavement or gravel) to mechanical rooms.
- Please see the minimum pavement sections for bidding in paragraph 3.3.8.1.
- The facility does not require a fenced perimeter.
- Provide a concrete dumpster pad for 2 trash dumpster. The dumpster pad must extend to encompass the front wheels of the pick-up vehicle. The dumpster pad must have a masonry screen wall on three sides and be constructed of building materials similar in color to the proposed facility. Final dimensions, thickness, and reinforcement must be designed by the DOR based on contractor obtained geotechnical information. Location of the dumpster shall be in the staff parking lot convenient to the building.
- Provide perimeter concrete curb or curb and gutter at parking lot perimeters and locations where anticipated vehicle wheel loads will be within 1 foot of the edge of asphalt pavement. Where curb is provided, an integral concrete gutter is required at any point where water will flow parallel to the bottom of curb.
- Concrete sidewalk will be provided for pedestrian circulation and must be a minimum of 10 feet in width unless required to be wider as described above for circulation from the JRC to other destinations. Sidewalk must extend to the project limits to the west and coordinate with the future Ambulatory Care Center. Demolish all existing sidewalks within the project limits and replace with 10' wide sidewalks.
- Provide canopies to allow for the unloading of the student buses and student luggage under cover. Provide canopies that extend 5 feet beyond the curb to cover the bus unloading and extend a minimum of 10 feet from the face of curb over the sidewalk areas to provide cover for the students. Provide cover for 300 students minimum.
- Provide a concrete or paver plaza between the bus drop-off and front of the JRC to provide an assembly area for 300 students minimum.
- Widen Company B Street to a minimum paved width of 26 feet from the intersection of Harlem Street to entrance/exit to the bus drop-off loop and the entrance to the Mess Hall (Building M455).

- For the administration portion of the JRC, provide a Vapor Intrusion Mitigation System (VIMS) design and include construction cost for EPA compliant radon-resistant new construction (RRNC) consisting of a gas impermeable membrane barrier and radon soil gas piping collection network in the sub-slab aggregate bed before pouring the concrete slab. The piping network must connect to vent risers to passively exhaust the collected radon above the building. Provisions must be made to convert the system in the future from a passive venting system to an active system including an accessible space with conduit for electric and control connections for vent fans. See Part 6 “Vapor Intrusion Mitigation System” for additional requirements. Contractor must contact the IR Program Manager at 910-451-9385 regarding an environmental assessment in accordance with ESOP 10.1. As-built drawings, as well as O&M guidance for maintaining the barrier/system must be included in the project.

  The Environmental Waste Management Plan has been included in Part 6.

3.3.2. Site Demolition

Demolition of the existing site features will require both above-ground and sub-surface demolition to accommodate the replacement facility. This site will require select demolition, as certain features will be required to remain as is or be relocated as part of this project. Contractor will ensure access to the adjacent facilities at all times during demolition and construction.

The following facilities may be demolished prior to the completion of the proposed project; M305, M418 and M422.

See section 3.3.2 of the LOG OPS Site Analysis regarding additional whole building demolition requirements for the P1512 project.

The demolition of these buildings includes the complete removal of the building, including all shallow foundations, foundation walls, slabs, pits, pile caps, etc. Deep foundations, such as piles, must be removed to a minimum depth of 48 inches below existing grade. Demolish all utilities serving each building as described further in this section and ESR G10. Site demolition will include the demolition and removal of all pavements and sidewalks specific to serving the building. Main circulation sidewalks or pavements serving facilities to remain must not be disturbed. Following demolition, all graded slopes must conform with UFC 3-201-01, and direct runoff towards existing drainage structures or ditches with the flow patterns matching existing to the greatest extent feasible. Any pavement demolition that terminates at existing pavement will be terminated by saw cutting at the limits of demolition in neat straight lines.

Utility service lines to each building must be removed back to the main and capped. Do not demolish existing pavement to remain to facilitate the removal of a utility service line to be demolished. Where underground utilities to be demolished pass under pavement not to be demolished, cut the utility at each edge of pavement and fill the utility remaining under the pavement with flowable fill and abandon in place. Continue removal of the utility to the main on the far side of the pavement if applicable. If the utility main is within the pavement, cut and cap the service line at the edge of pavement and abandon the utility in place in accordance with applicable State or Federal regulations.

Prior to the demolition of any utility, coordinate with the utility owner to ensure the removal of the service line will not disrupt service to facilities to remain. Some telecom services may pass through buildings scheduled for demolition to buildings scheduled to remain.

For natural gas demolition notify PNG when a facility is ready for demolition. Once the facility has been confirmed for demolition PNG will remove and retire the meter. PNG will valve off the lateral at the main and will disconnect both ends of the gas lateral, the meter side and the main side. To depict retirement, PNG will remove the lines 4-5' from each end. Remove the remaining line left by PNG. Once a meter is retired the lateral cannot be reused for a new facility.

Any structure or pavement not to be demolished that is damaged during construction or demolition must be repaired or replaced at the expense of the contractor.

Demolition of buildings associated with telecommunications must coordinate with telecommunications services. Demolition of telecommunications pathways must be coordinated with base telephone office.

3.3.3. Utilities

The preferred connection point for water for potable use and fire protection services is via connection to the existing 8-inch PVC main running north-south parallel to and approximately 25 feet from the eastern edge of the existing parking lot. There is also an 8-inch PVC watermain that runs parallel to and just east of Company A Street that extends to Buildings M430 and M435 and beyond to the north.

An existing gravity sewer manhole is located at the southwest corner of building M440 with an approximate depth of 6 feet. The gravity main leaving this manhole is 8 inches and flows northwest, parallel to building M440.

Piedmont Natural Gas (PNG) will be providing natural gas service to the new facilities. During the design phase invite PNG representatives to design review meetings. Including Michael Lilly – PNG Commercial and Residential Sales Specialist – Michael.lilly@duke-energy.com 252-808-7292 and Bobby Gurganus – PNG Construction – Bobby.gurganus@duke-energy.com 252-670-9613. Coordinate with PNG to depict the gas line routes on the civil utility site plans. The natural gas lines must be included in the project GIS deliverables. Provide projected loads of natural gas equipment to PNG for gas meter sizing. Notify PNG at least 6 months prior to in-service date to install new laterals and meters.

Connect to the existing overhead electrical power system at a pole location selected by the COR. Extend the primary service underground to the pad mounted transformer.

3.3.4. Stormwater Management

Provide a complete stormwater management design that meets or exceeds UFC 3-210-10 Low Impact Development, UFC 3-201-01 Civil Engineering, and North Carolina Stormwater Management requirements. Provide calculations that demonstrate compliance with all three criteria.

A storm drainage system will be designed and constructed to collect and convey the ten-year peak flow from the building and other new impervious areas into a proposed SCM. Subsurface precast concrete structures such as catch basins and drop inlets will collect stormwater and RCP with watertight joints will convey the stormwater towards the stormwater SCM which will retain and treat the stormwater before it is discharged towards the nearby waterway. Roof downspouts must tie directly to drainage structures underground. The use of grassed swales, pre-treatment areas, and other low-impact stormwater strategies throughout the site are encouraged, where appropriate.

A stormwater SCM will be located onsite and will be designed to meet NCDEQ regulations for stormwater detention and water quality.

While specific SCM devices are not required at Camp Lejeune, preferences based upon historic performance of devices are noted. The DOR should be aware of the challenges of providing functioning devices at the sites. The goal is to provide functioning and compliant devices which are not maintenance intensive, nor require specialized or propriety materials. The DOR should be cautioned in the use of sand filters; Camp Lejeune has had experience with the majority of sand filters being compromised by the development of algae crust on the surface of the filters. A third-party inspector is recommended to be specified for the installation of SCMs. A pre- and post-construction infiltration test must be conducted for any SCMs that rely upon infiltration. A 3-day drawdown with a factor of safety of 2 must specified for SCMs to ensure continued stormwater compliance. Do not allow the conversion of sediment traps into infiltration SCMs. The sediment trap should be separate from the SCM to protect against premature failure. The use of heavy equipment in the bottom of infiltration devices will not be allowed due to the risk of compaction.

Overland relief for large storm events must be analyzed. Calculations must demonstrate that the 100-year storm routed through proposed stormwater management features will not reach higher than 1 foot below the Finish Floor Elevation of adjacent buildings. Demonstrate that the 100-year storm routed through proposed stormwater management features will not flood critical vehicle or pedestrian pathways.

Additional criteria that must be considered by the contractor:

- Project involves the disturbance of over 5,000 square feet. Therefore, Requirements under Section 438 of the EISA will be enforced. The policy directs all DoD construction projects and redevelopment projects with footprints greater than 5,000 square feet to implement LID techniques to maintain predevelopment hydrology to the maximum extent technically feasible. Coordinate with Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0869.
- Project involves the disturbance of 1 or more acres of land and will require a state-approved sedimentation and erosion control plan and stormwater permit. For questions regarding stormwater requirements coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application, contact Public Works Division, Design Branch at 451-2213. The purchase of nutrient credits in lieu of onsite stormwater quality treatment measures to meet North Carolina water quality requirements is not permitted.
- Project involves addition/construction of 10,000 square feet of impervious surface area. It requires state permitting through the NCDEQ DEMLR and the design and construction of approved SCMs (Coastal County Rules). Coordinate with Water Quality Manager, EQB at 451-9518 and the Storm Water Manager, ECB at 451-9657.
- If the project affects any existing BUA (impervious area) that is currently covered under an existing state issued stormwater permit, that permit will need to be modified. Coordinate with Public Works Design Branch at 451-2213.
- If additional new BUA above and beyond the existing amount is proposed, then at a minimum, a high density SCM is required to treat that runoff from the new BUA. If the existing BUA within that drainage area and its runoff cannot be regraded or rerouted, then the proposed SCM must be designed to accommodate all the runoff within its

drainage area. A full stormwater permit application will be required. Coordinate with Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0896. Coordinate with Public Works Design Branch at 451-2213.

- Per direction from PWD, each project site is considered to be a separate project. Building demolition, regardless of which project the building is demolished under, can be used to offset impervious area increases from new construction, as long as the demolished building and the new building are adjacent to each other. There is no time limit between the demolition completion and new construction starting.

3.3.5. Sediment and Erosion Control

Erosion and sediment control will be designed and installed per the North Carolina Department of Environmental Quality.

To prevent potential erosion and sedimentation from entering the surrounding wetlands, numerous erosion control methods and practices will be used. A stone construction entrance will be placed at a strategic location, inside the project limits to serve the site. A sediment basin with skimmer outlets and riser, if required, will be provided in the initial construction phase. This sediment basin must be separate from any proposed stormwater SCMs. The conversion of a sediment trap or basin to a stormwater SCM is not allowed. Basins may be constructed before the site is cleared and temporary swales graded to direct sediment laden stormwater towards the basin. A temporary construction fence should be installed around the entire limits of disturbance. Silt fence and silt fence outlets will be used around the perimeter of the of the construction sites to prevent sediment from exiting the disturbed areas. A double row of silt fence should be used along any wetland buffers. The site will then be cleared and graded once these erosion control measures are in place and have been approved by the local erosion control inspector representing NCDEQ.

Once stormwater structures are installed and brought to grade, inlet protection will be provided at all inlets to prevent sediment from entering the storm system. The site will be paved and disturbed areas will be stabilized with vegetation near the completion of the project.

Additional criteria that must be considered by the contractor:

- Ensure sediment does not leave a construction site of any size as a result of land-disturbing activities. Coordinate with Water Quality Manager, EQB at 451-9518 and the Stormwater Manager, ECB at 451-9522.
- Project involves the disturbance of 1 or more acres of land and will require a State approved sedimentation/erosion control plan and stormwater permit. For questions regarding stormwater requirements coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application contact Public Works Division, Design Branch at 451-2213.

3.3.6. Landscaping

Landscaping must comply with BEAP guidelines with regards to street trees, parking lot landscaping, outdoor amenities and stormwater management. Landscaping proposed near building must comply with all AT/FP requirements. See also Part 3 – Chapter 6 Section G20 for specific landscape requirements and plant establishment and maintenance requirements.

Company Street B will be lined with street trees at 40 feet on center.

Island at bus turnaround area offers and opportunity for a signature entrance garden.

Parking areas must be screened using a variety of tree and shrub planting to reduce visual impact from adjacent roadways. A minimum of 15 percent of the surface area of the parking lot must be shaded by deciduous trees within 10 years of installation. A minimum of 5 percent of the parking lot must be pervious planting bed.

Site furnishings must be provided in front of the building and will be constructed of durable materials with colors in compliance with the BEAP and surrounding examples.

Turf areas must be limited to the extent feasible in favor of naturalized planting and groundcover. Turf species in formal lawn areas must be centipede grass; all lawn areas must be sodded.

Trees to remain within or within 20 feet of the limits of disturbance will be monitored for a year after construction and replaced as directed by the COR. Turf areas must be graded and sodded for permanent stabilization. Other areas identified as turf must use centipede sod.

3.3.7. Permits

- Erosion and sediment control permit – North Carolina Department of Environmental Quality.
- Stormwater management permit - North Carolina Department of Environmental Quality.
- Water extension permit - North Carolina Department of Environmental Quality.
- Sewer extension permit - North Carolina Department of Environmental Quality.

3.3.8. Geotechnical Earthwork and Site Prep and Sitework Requirements

3.3.8.1. Criteria for Bidding

Base bids on the following criteria:

- Stripping depth of surficial soil material in existing grass surfaced areas; 6 inches.
- Stripping depth of surficial soil materials and root mat in existing wooded areas; 12 inches.
- Stripping depth of asphalt concrete in existing paved areas; 3 inches for asphalt and 6 inches of stone base.
- Grubbing depth in existing wooded areas; 24 inches.
- Depth and extent of buried demolition debris and/or uncontrolled fill materials; 2 feet in the area of the existing parking lot.
- Seasonal high-water table depth; 2 feet below existing grades.
- Stabilized water table depth; 6.5 feet at boring B-6.
- Perched water table depth; 4 feet below existing grades.
- Onsite soils excavated from planned excavations will not meet the gradation requirements for select material and backfill and fill material and can only be reused as common fill or must be disposed of at an approved location on the installation.

- Requirements for disposal of surplus soil; Dispose of per Specification 01.57.19. No soil is to leave Camp Lejeune.
- Imported select material or imported backfill and fill material meeting the specified requirements will be provided for all necessary fill in building and pavement areas and for all backfill in utility, foundation, and demolition excavations.
- Existing subgrade soils will require mechanical manipulation or chemical stabilization to reduce moisture content, or 12” minimum over excavation and replacement with imported backfill and fill material.
- Provide surcharging to mitigate excessive consolidation settlement associated with site grading impacts in all areas where finished site grade increases are 2 or more feet above existing site grades.
- Provide temporary sheeting, shoring, and dewatering of excavations greater than 3 feet.
- Minimum heavy-duty asphalt pavement section; 2-inch NCDOT surface course asphalt, 3-inch NCDOT base course asphalt, 8-inch NCDOT aggregate base course.
- Minimum light-duty asphalt pavement section; 2-inch NCDOT surface course asphalt, 8-inch NCDOT aggregate base course.
- Minimum sidewalk section; 4-inch – 3,000 psi compressive strength Portland Cement Concrete,
- Minimum dumpster pad/equipment pad section; 8-inch – 5,000 psi compressive strength Portland Cement Concrete, #4 bars at 12 inches on-center each way.

3.3.8.2. Earthwork and Site Preparation Criteria

The Contractor's Geotechnical Engineer will monitor site stripping operations on a full-time basis. Stripped surficial soil materials will be properly disposed of per Specification 01.57.19. No soils are to leave Marine Corps Base Camp LeJeune. Imported topsoil will be provided for the project where needed.

The underlying soils that will be exposed after completion of site stripping and undercutting will have a tendency to become softened and unstable when saturated and worked or subjected to construction equipment. Provide the necessary measures to address these marginal subgrade support conditions throughout design and construction to obtain required soil support while maintaining progress for completion on schedule. Do not allow construction traffic to travel directly on exposed subgrades. Provide geosynthetic reinforced haul roads and staging pads to facilitate construction traffic access across the site and to protect the underlying subgrade from deterioration. The Contractor is responsible for all costs associated with any necessary measures to repair subgrades deteriorated by construction traffic and exposure to water. Determination of unsuitable subgrade conditions and need to implement remedial measures will be made by a NAVFAC Geotechnical Engineer and subject to the approval of the Contracting Officer.

Provide control of groundwater and surface water encountered during construction. Provide temporary dewatering and positive site drainage to prevent conditions that will cause deterioration of exposed subgrades and open excavations. Do not allow deterioration of exposed subgrades to create interruptions to the progress of construction. Establish storm drainage features at the earliest stages of site development. Install and maintain all necessary temporary water containment facilities, channels, ditches, and diversions for groundwater and surface water control to include all necessary temporary environmental controls. Provide a multiple well point dewatering system for any utility or foundation excavations that extend down to and below the ground water level.

The site currently contains or may have formerly contained developments such as structures, surface pavements, haul roads, and above and below ground utilities that will require demolition and removal prior to earthwork operations under this contract. The required removal depth of the existing site features is expected to be highly varying. It is reasonable to anticipate that excavations made in areas of known prior development will encounter additional materials beyond what is specifically indicated on the test boring records that will need to be removed.

Imported Select Material and Backfill and Fill Material will be required for filling all undercut excavations, grubbing excavations, excavations resulting from the demolition of existing utilities/foundations as well as new utility/ foundation excavations within the planned building and pavement areas, and for grading fill in pavement and building areas. Provide imported Select Material for the top 2 feet of fill required beneath all pavements, foundations and slabs. Provide imported Backfill and Fill Material in all other structure and pavement locations. Select Material must meet ASTM D2487 classification symbols GW, GP, SW, SP, and SP-SM with not more than 12 percent passing the U.S. No. 200 sieve by ASTM D1140 and plasticity index not greater than zero by ASTM D4318. Backfill and Fill Material must meet ASTM D2487 classification symbols GW, GP, SW, SP, SP-SM, and SM and have a maximum of 20 percent passing the U.S. No. 200 sieve by ASTM D1140 and maximum liquid limit of 30 and maximum plasticity index of 9 by ASTM D4318.

Excavated existing onsite soils will only be reused as general fill beyond the limits of surface bearing structures (e.g., pavements, buildings, and pipe trenches) and beyond the limits of any

undercut excavations, provided the material meets the project requirements. All soil material must exhibit the characteristics required to compact the soil to the density and performance specified for the intended locations. Excavated onsite soils will be amended (e.g., mixed with lime, cement, or blended with imported structural materials) as necessary to facilitate reuse as general fill and Backfill and Fill Material. All fill materials will have a maximum particle diameter of 3 inches and will require moisture conditioning prior placement and compaction to within approximately 2 percent of the optimum moisture content as defined by ASTM D698 or ASTM D1557. Choose compaction standard as recommended by Geotechnical Engineer of Record.

The Contractor will be responsible for maintaining erosion control measures, preventing segregation, and moisture conditioning for any excavated onsite soil and aggregate materials and any imported soil and aggregate materials stockpiled onsite.

All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer. The Contractor is responsible for all costs associated with the management and disposal of surplus excavation spoils

4.0 BUILDING REQUIREMENTS – P1512F JOINT RECEPTION CENTER

4.1. Space Tabulation

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
Headquarters and Service Company (H&S)					
Private Office	CO	150	1		
Private Office	XO	150	1		
Private Office	StSgt	120	1		
Private Office	Co.Gysgt	120	1		
Open Office	Clerk (Reception)	256	4	64 NSF workstation each	
Conference Room (12-person)		240			
		1,036	**8**		
Personnel Administration Center (PAC)					
Private Office	OIC	120	1		
Private Office	SNCOIC	120	1		
Private Office	Legal Officer	120	1	Requires secure lock & storage	
Private Office	Legal Clerk	120	1	Requires secure lock & storage	
Private Office	Legal Clerk	120	1	Requires secure lock & storage	
Private Office	SACO	120	1	Requires secure lock & storage	
Private Office	Security Manager	120	1	Requires secure lock & storage	
Private Office	Civilian Personnel Officer	120	1		
Open Office	Clerk (Reception)	960	15	64 NSF workstation each	
Conference Room (12-person)		240			
Secure Filing		100			
		2,260	**23**		
Entry Level Receiving (ELR)					
General Purpose Room		415		For student check-in	
Classroom (125-person) #1		1,377			
Classroom (125-person) #2		1,377			
		3,169	**0**		
Marines Awaiting Training (MAT)					
Private Office	Instructor	120	1		
Private Office	Instructor	120	1		
Classroom (125-person) #1		1,377			
Classroom (125-person) #2		1,377			
Classroom (125-person) #3		1,377			
Classroom (125-person) #4		1,377		Can be configured as a 30-person computer lab	
Classroom Furniture Storage		400			
		6,148	**2**		

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
Other					
Lounge / Vending	For MAT/ELR	400		Refer to 4.2 Space Relationships	
Storage Room	For MAT/ELR	380		Classroom Furniture Storage	
Break Room	For PAC	200		Refer to 4.2 Space Relationships	
Break Room	For H&S	150			
Mother's Room	For H&S	80		Refer to 4.2 Space Relationships	
Mother's Room	For PAC	80			
		1,290	**0**		

TOTAL PROGRAMMED SPACE	**13,903**	**NSF**	**33 PN**
MAXIMUM ALLOWABLE GSF (PER 1391)	22,149	GSF	

Table of Support Spaces

Room Name	Comments	Additional Room Requirements
Support		
Heads (male/female/transgender)	Refer to 4.2 Space Relationships	
Showers (non-gender specific)	1 shower for H&S and 1 shower for PAC	
Mechanical	Two rooms - min 1,900 NSF total	
Electrical		
Telecom		
Fire Pump Room		
Janitor's Closet		

The Contractor must provide actual area in both square feet and square meters in proposals.

4.2. Space Relationships

Refer to the space arrangement shown in the Architectural Block Diagram at the end of this section. The diagram incorporates the spaces defined in the Space Tabulation. Although the space tabulation indicates separate spaces in the H&S and Personal Administrative Center (PAC) for the Mother's Room, Break Room, and Toilets/Showers (the Block Diagram shows this separation), the design of the building must provide these spaces grouped and shared between the two departments (with a connecting corridor between the two departments). Both H&S and PAC must retain separate entrances as shown in the Architectural Block Diagram. Any reduction in square footage of the building due to these spaces being shared between departments can be used for other spaces that require additional square footage as identified by the user. Any reduction in square footage of a space must be allotted to another user function as determined with the user in the design process.

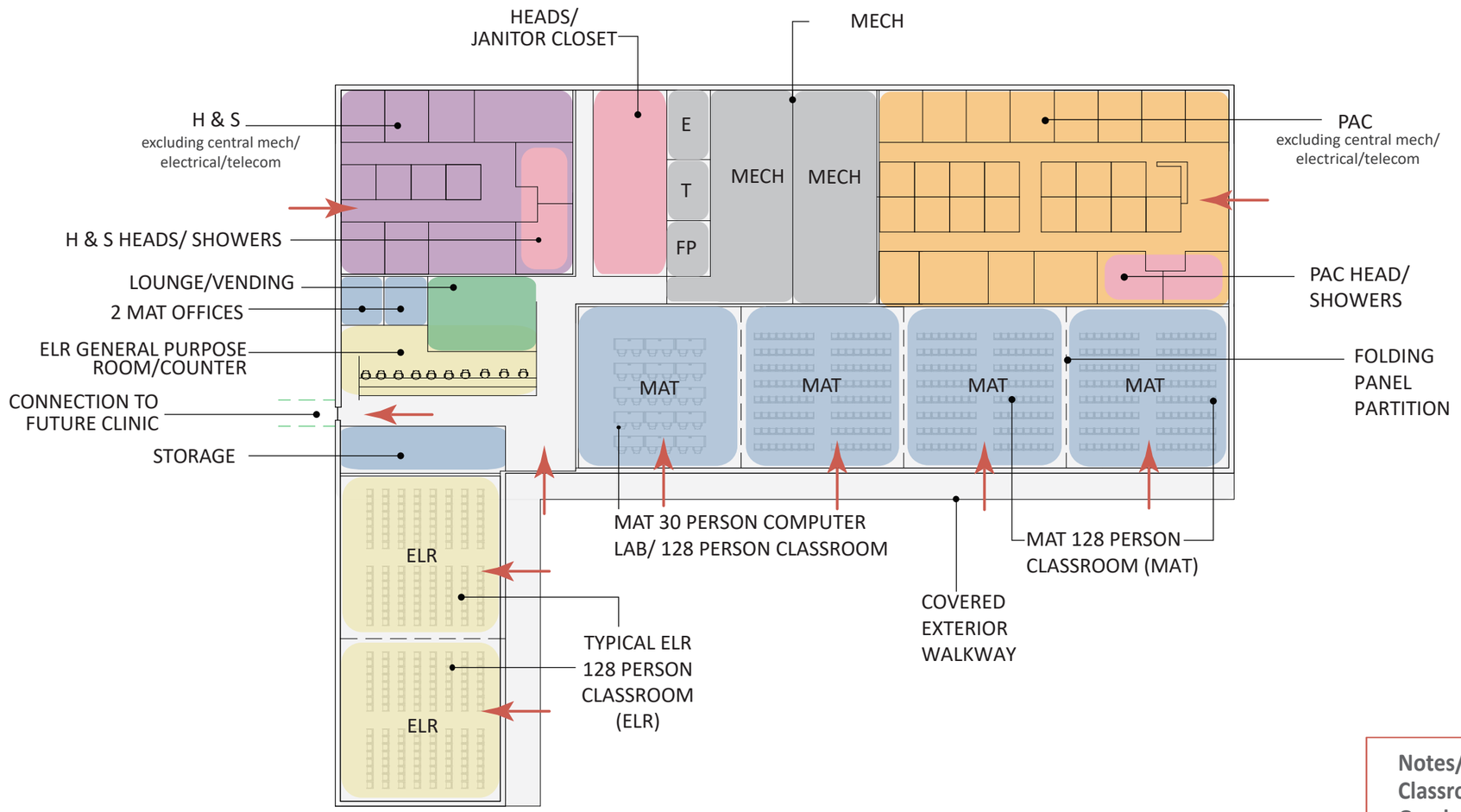
Exterior Design Alternative and preferred access to classrooms:

The Architectural Block Diagram in this section shows a planning scheme where the MAT and ELR Classrooms are accessed directly from the exterior by way of a covered walkway that is created by a roof overhang or integrated roof canopy. This was done to allow the total gross square footage (GSF) of the building to remain below the 1391 prescribed GSF. The direct exterior access to the classrooms is not the preferred way of accessing the classrooms. The

preferred means of accessing the classrooms is from an enclosed corridor within the building envelope. The building design must explore providing an enclosed corridor that also incorporates the main entry vestibule to the building that would allow access to the MAT and ELR classrooms. The design must look at making planning efficiencies and gaining square footage from other spaces to allow for the GSF of the building to remain below the identified 1391 GSF when the enclosed corridor is added in lieu of the covered walkway. It is intended that the GSF for the building remain at or just below the 1391 SF, and any increase above that would require additional approvals by NAVFAC and other government entities to grant a 1391 GSF increase.

4.3. Exterior Character

The exterior character of the JRC, as indicated in Part 3, Chapter 2, article 2.4.1, must follow the architectural expression prescribed in the Camp Lejeune BEAP for Camp Johnson (section 4.13). Building M-79 has been pointed out as an exemplary building that follows the BEAP requirements. However, the entire Camp Johnson campus must be considered during design. All building exterior architectural design will be reviewed and approved by the Camp Lejeune Architectural Review Board.



LEGEND

- PAC
- ELR CLASSROOMS/ GENERAL PURPOSE ROOM
- HEADS/ SHOWERS/
- LOUNGE
- H & S
- MAT
- MECHANICAL/ ELECTRICAL/ TELECOM

Notes/ Clarification:
Classroom size based on stackable/ folding chair
One lounge for both MAT and ELR

21,608	GSF BUILDING
781	GSF COVERED WALKWAY
22,068	GSF TOTAL
22,149	GSF per 1391

NAVFAC Naval Facilities Engineering Command

ARCHITECTURAL BLOCK DIAGRAM
JOINT RECEPTION CENTER (JRC)-P1512

JACOBS

5.0 ROOM REQUIREMENTS – P1512F JOINT RECEPTION CENTER

5.1. FINISH AND FF&E SCHEDULE

The following chart is provided for defining general room finishes and furniture, fixtures, and equipment (FF&E) items for the Joint Reception Center. Special interior finishes and FF&E items beyond those outlined below are provided in the Additional Room Requirements. The intent of each room requirement sheet is to highlight special, unique, additional, or exceptional room-specific requirements. These tables are not all-inclusive, and the requirements listed should be considered as an addition to the typical requirements outlined in the UFCs, ESRs, & PTSs.

FF&E and AV Equipment will be funded separately as a modification to the construction contract, with the exception of fixed furnishings (SID). Infrastructure to support all FF&E and AV is included in the construction contract. Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with Activity at concept Design workshop (CDW).

Refer to ESR D50 for specific electrical and audio visual (AV) requirements. Coordinate with the Base to determine preferred locations of fixed artwork.

FFE to include Automated External Defibrillators as required by National Fire Protection Association's (NFPA) 101 Life Safety Code and Marine Corps Order (MCO) 11000.11A. Access to an AED shall be provided for all Assembly occupancies, fitness centers and high-risk training centers and as required by NFPA 101.

Room Typical guidelines:

1. Private office required to be a minimum 9'-0" wide (10'-0" wide is preferred).
2. Workstations in open office areas will be a benching / desking system. Powered Cubicle walls will be used minimally.
3. Ceiling heights will be 10'-0" unless notes otherwise. See additional Room Requirements
4. All base to be 6" high

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
H & S						
CO Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
XO Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
StSgt Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
Co. GySgt Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
Clerk (Reception) Open Office	CPT	RB	PT	ACT	(4) Open Office Workstations (4) Task Chairs (4) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min) (1) Multi-function Printer (GFGI)
Conference Room	CPT	RB	PT/AFP	ACT	12 ppls with Conference Room furniture	
PAC						
OIC Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
SNCOIC Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
Legal Officer Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	Requires secure lock, storage (1) Marker Board (Min)
Legal Clerk Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	Requires secure lock, storage (1) Marker Board (Min)
Legal Clerk Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	Requires secure lock, storage (1) Marker Board (Min)
SACO Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	Requires secure lock, storage (1) Marker Board (Min)
Security Manager Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	Requires secure lock, storage (1) Marker Board (Min)
Civilian Personnel Officer Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
Clerk (Reception) Open Office	CPT	RB	PT	ACT	(15) Open Office Workstations (15) Task Chairs (15) Storage Solutions (min.) (1) Clock	Reception counter per room data sheet (1) Marker Board (Min)
Conference Room	CPT	RB	PT/AFP	ACT	12 ppls with Conference Room furniture	
Secure Filing Room	LVT	RB	PT	ACT	Locking Lateral File Cabinets	
ELR						
General Purpose Room - Reception	CPT	RB	PT	ACT		For Student check-in BID OPTION: Terrazzo Floor
Classroom #1	CPT	RB	PT/AFP	ACT	(125) Seating/chairs (flat floor)	
Classroom #2	CPT	RB	PT/AFP	ACT	(125) Seating/chairs (flat floor)	

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
MAT						
Instructor Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
Instructor Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min)
Classroom #1	CPT	RB	PT/AFP	ACT	(125) Seating/chairs (flat floor)	
Classroom #2	CPT	RB	PT/AFP	ACT	(125) Seating/chairs (flat floor)	
Classroom #3	CPT	RB	PT/AFP	ACT	(125) Seating/chairs (flat floor)	
Classroom #4	CPT	RB	PT/AFP	ACT	(125) Seating/chairs (flat floor)	Can be configured as a 30-person Computer Lab with remainder of room in seating
Classroom Furniture Storage	LVT	RB	PT	ACT	Stackable chairs Folding or nesting tables	
Other						
Lounge/Vending (MAT/ELR)	LVT	RB	PT	ACT	Café Tables Stacking Chairs	
Storage Room (MAT/ELR)	LVT	RB	PT	ACT		
Break Room (PAC)	LVT	RB	PT	ACT	Café Tables Stacking Chairs	
Break Room (H & S)	LVT	RB	PT	ACT	Café Tables Stacking Chairs	
Corridors	LVT	RB	PT	ACT		BID OPTION: Terrazzo Floor
Mother's Room (H & S)	LVT	RB	PT	ACT	(1) Lounge Chair (1) Table (1) Storage Shelf	
Mother's Room (PAC)	LVT	RB	PT	ACT	(1) Lounge Chair (1) Table (1) Storage Shelf	
Support Spaces						
Heads (male/female/transgender)	PFT	PFB	PWT	WBE	Provide lockers as indicated in ESR C10	Solid surface countertop
Showers (non-gender specific)	PFT	PFB	PWT	WBE	Provide lockers as indicated in ESR C10	1 shower-H & S, 2 showers-PAC
Mechanical	SC	RB	PT	EXP/PT		
Electrical	SC	RB	PT	EXP/PT		
Telecom	SC	NONE	PT	NONE		
Fire Pump Room	SC	RB	WBE	WBE		
Janitor's Closet	PFT	PFB	SSP/WBE	WBE		

FINISH LEGEND

ACP - Acoustical Ceiling Panel	PFB - Porcelain Floor Base	PWT - Porcelain Wall Tile	SC - Sealed Concrete
ACT - Acoutical Ceiling Tile	PFT - Porcelain Floor Tile	PCMU - Polished Concrete Masonry Unit	SSP-Stainless Steel Wall Protection
AFP - Acoustical Fabric Panel	PT - Paint	RAF - Raised Access Flooring (24")	WBE - Water-based Epoxy Paint
LVT - Luxury Vinyl Tile	EXP - Exposed	RB - Rubber Base	WM - Walk-Off Mat

5.2. ADDITIONAL ROOM REQUIREMENTS

The Room data sheets are provided for specific rooms in each facility to provide additional information for these rooms; and better define room requirements beyond those provided in the ESR, the Finish and FF&E Schedule located in section 5.1, and other parts of the RFP. If no room data sheet is provided for a space identified in this facility then the general requirements of the RFP, the Finish and FF&E schedule in section 5.1, and the referenced UFCs, Codes, and Standards apply.

P1512F-JOINT RECEPTION CENTER

Entry Level Receiving- (ELR)

Space Characteristics

Function/Adjacencies: This space will support the new Marines that have arrived at Camp Johnson for tactical vehicle and MOS maintenance training. It will support the new student in a dividable space that will seat 125 students each presentation room for a total of 250 Marines. These Marines will work from these two rooms for approximately 5 days by moving about the various in-processing stations and rooms in and around the JRC. Various support personnel will give live presentations to the Marine assembly to foster the arrival and processing functions of the JRC. Major features of this room are a large video wall for information presentations to the classes, a moveable electronic podium for live presentations, and a retractable partition to divide this large space into two equal spaces and stack chairs for each Marine.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: total 250 in two 125 person rooms

Other/Special Requirements: Acoustic retractable partition floor to ceiling

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
B2020	Exterior Windows, Storefront or Curtain Wall			Provide with covered walkway option
B2030	Glazed Doors	2	3' x 7'	Provide with covered walkway option
B2030	Exterior Door Hardware			One door to room CAC enabled electronic entry system that can be disabled to be unlocked for direct entry. Second door is egress only door. Provided if exterior glazed doors are provided.
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) over metal studs to underside of floor/roof deck.
C1010	Retractable Partitions			Floor to ceiling

Entry Level Receiving- (ELR)

Space Characteristics

Function/Adjacencies: This space will support the new Marines that have arrived at Camp Johnson for tactical vehicle and MOS maintenance training. It will support the new student in a dividable space that will seat 125 students each presentation room for a total of 250 Marines. These Marines will work from these two rooms for approximately 5 days by moving about the various in-processing stations and rooms in and around the JRC. Various support personnel will give live presentations to the Marine assembly to foster the arrival and processing functions of the JRC. Major features of this room are a large video wall for information presentations to the classes, a moveable electronic podium for live presentations, and a retractable partition to divide this large space into two equal spaces and stack chairs for each Marine.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: total 250 in two 125 person rooms

Other/Special Requirements: Acoustic retractable partition floor to ceiling

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1010	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view.to building corridor system if provided.
C1020	Interior Wood Doors	2	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, and field painted. Provide vision panels; integral to door frame (approx. 6" x 18"). Vision panel must have provisions to be covered – incorporated into the door. Provide wood door only with interior corridor option.
C1020	Interior Door Hardware			Provide classroom function hardware for interior doors.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Provide along presentation wall.
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.

Entry Level Receiving- (ELR)

Space Characteristics

Function/Adjacencies: This space will support the new Marines that have arrived at Camp Johnson for tactical vehicle and MOS maintenance training. It will support the new student in a dividable space that will seat 125 students each presentation room for a total of 250 Marines. These Marines will work from these two rooms for approximately 5 days by moving about the various in-processing stations and rooms in and around the JRC. Various support personnel will give live presentations to the Marine assembly to foster the arrival and processing functions of the JRC. Major features of this room are a large video wall for information presentations to the classes, a moveable electronic podium for live presentations, and a retractable partition to divide this large space into two equal spaces and stack chairs for each Marine.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: total 250 in two 125 person rooms

Other/Special Requirements: Acoustic retractable partition floor to ceiling

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Identifying Devices	AR		Departmental identification signage and directional signage, as required.
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3010	Acoustic Wall Panels	AR	30" h x 48" ea.	Wall-mounted acoustical panels as required for sound attenuation.
C3020	Carpeting	SF	24 x 24	Carpet Tile
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils

Entry Level Receiving- (ELR)

Space Characteristics

Function/Adjacencies: This space will support the new Marines that have arrived at Camp Johnson for tactical vehicle and MOS maintenance training. It will support the new student in a dividable space that will seat 125 students each presentation room for a total of 250 Marines. These Marines will work from these two rooms for approximately 5 days by moving about the various in-processing stations and rooms in and around the JRC. Various support personnel will give live presentations to the Marine assembly to foster the arrival and processing functions of the JRC. Major features of this room are a large video wall for information presentations to the classes, a moveable electronic podium for live presentations, and a retractable partition to divide this large space into two equal spaces and stack chairs for each Marine.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: total 250 in two 125 person rooms

Other/Special Requirements: Acoustic retractable partition floor to ceiling

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3020	Hardeners and Sealers	AR	AR	Hardened and cured concrete floors.
C3030	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile (70-80% of ceiling area)
C3030	Suspension Systems	AR	AR	9/16" suspended ceiling system
C3030	Gypsum Wallboard Ceiling			Provide soffits and accent ceiling areas of GWB in ceiling to break up continuous plane of acoustical ceiling tile ceiling.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished and per ESR C30, Interior Finishes.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide one floor box per 50 SF, or portion thereof. Coordinate requirements and locations with user.

Entry Level Receiving- (ELR)

Space Characteristics

Function/Adjacencies: This space will support the new Marines that have arrived at Camp Johnson for tactical vehicle and MOS maintenance training. It will support the new student in a dividable space that will seat 125 students each presentation room for a total of 250 Marines. These Marines will work from these two rooms for approximately 5 days by moving about the various in-processing stations and rooms in and around the JRC. Various support personnel will give live presentations to the Marine assembly to foster the arrival and processing functions of the JRC. Major features of this room are a large video wall for information presentations to the classes, a moveable electronic podium for live presentations, and a retractable partition to divide this large space into two equal spaces and stack chairs for each Marine.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: total 250 in two 125 person rooms

Other/Special Requirements: Acoustic retractable partition floor to ceiling

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system with control at check-in desk.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1512F-JOINT RECEPTION CENTER

General Purpose Room - Reception

Space Characteristics

Function/Adjacencies: This space is an area off the main circulation corridor system that features a long transaction counter with sound dividers for quiet speech to Marine students for 10 to 15 seated stations and one central reception station. JRC reps will talk with each Marine student to evaluate and direct the in-processing steps for the individual Marine trainee. These JRC in Processing reps will assist in check in problems and provide solutions on an individual basis to the Marine.

Special Dimensions:
Ideal Plan Dimensions: siting computer workstation for 10- to 15 Processing Reps
Minimum Ceiling Height: 9'-6"
Acoustics:
See other special requirements below.

Access: Off major entry corridor and in close proximity to restrooms

Number of Occupants: 10-15 seated stations

Other/Special Requirements: sound dividers between seated stations similar to hospital HIPA per input from acoustical engineer

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Room Requirements – Finish and FFE Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) over metal studs to underside of floor/roof deck (or underside of finished ceiling).
C1020	Interior Wood Doors	2	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18").
C1020	Interior Door Hardware			Provide classroom function lockset
C1030	Marker Boards and Tack Boards		36" H Minimum	One 36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 7'-0" AFF.
C1030	Marker Boards and Tack Boards		36"h x 48"w	One Tack board.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

General Purpose Room - Reception

Space Characteristics

Function/Adjacencies: This space is an area off the main circulation corridor system that features a long transaction counter with sound dividers for quiet speech to Marine students for 10 to 15 seated stations and one central reception station. JRC reps will talk with each Marine student to evaluate and direct the in-processing steps for the individual Marine trainee. These JRC in Processing reps will assist in check in problems and provide solutions on an individual basis to the Marine.

Special Dimensions:
Ideal Plan Dimensions: siting computer workstation for 10- to 15 Processing Reps
Minimum Ceiling Height: 9'-6"
Acoustics:
See other special requirements below.

Access: Off major entry corridor and in close proximity to restrooms

Number of Occupants: 10-15 seated stations

Other/Special Requirements: sound dividers between seated stations similar to hospital HIPA per input from acoustical engineer

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Room Requirements – Finish and FFE Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Counters	1	Per design	24" deep x 8'-0" wide x 36" high, 1/2" thick solid surface countertop above file and storage cabinets for multi-function printer and fax machine within room. Coordinate power, telephone and data outlets above counter height for all equipment and appliances.
C1030	Cabinetry	AR	AR	Area wide of high-pressure laminate overhead cabinets and base cabinets above/below the solid surface countertop referenced in C1030 Counters above. Coordinate power, telephone and data outlets at appropriate height for all equipment and appliances. Provide brushed stainless steel arc-style hardware pulls.

General Purpose Room - Reception

Space Characteristics

Function/Adjacencies: This space is an area off the main circulation corridor system that features a long transaction counter with sound dividers for quiet speech to Marine students for 10 to 15 seated stations and one central reception station. JRC reps will talk with each Marine student to evaluate and direct the in-processing steps for the individual Marine trainee. These JRC in Processing reps will assist in check in problems and provide solutions on an individual basis to the Marine.

Special Dimensions:
Ideal Plan Dimensions: siting computer workstation for 10- to 15 Processing Reps
Minimum Ceiling Height: 9'-6"
Acoustics:
See other special requirements below.

Access: Off major entry corridor and in close proximity to restrooms

Number of Occupants: 10-15 seated stations

Other/Special Requirements: sound dividers between seated stations similar to hospital HIPA per input from acoustical engineer

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Room Requirements – Finish and FFE Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Counter/Cabinetry		Per design	A counter 40" deep x length required for 10-15 seated stations (minimum of 3'-6" for each station) X 30" high with a millwork partition of wood veneer or a high-pressure laminate below the counter to divide the Marine trainee side facing corridor from the representative side inside the room. Provide sound control dividers at a height of 48" the full width of the counter and a minimum of 2'-6" beyond the counter into the corridor to separate trainee sitting spaces. The end of counter and divider panels must be integrated into adjacent full height partitions that incorporate entry doors into the General Purpose Room. (accessed by staff only). The base of dividers and cabinetry partition must incorporate a wood or HPL base to match the partition integrated into the cabinetry. Create one station as a standing height station as the main reception desk. This station would house the central reception function and be incorporated into yet clearly divided from the seated stations.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3010	Acoustic Wall Panels	6	30" h x 48" ea	Wall-mounted acoustical panels incorporated other wall panel areas.

General Purpose Room - Reception

Space Characteristics

Function/Adjacencies: This space is an area off the main circulation corridor system that features a long transaction counter with sound dividers for quiet speech to Marine students for 10 to 15 seated stations and one central reception station. JRC reps will talk with each Marine student to evaluate and direct the in-processing steps for the individual Marine trainee. These JRC in Processing reps will assist in check in problems and provide solutions on an individual basis to the Marine.

Special Dimensions:
Ideal Plan Dimensions: siting computer workstation for 10- to 15 Processing Reps
Minimum Ceiling Height: 9'-6"
Acoustics:
See other special requirements below.

Access: Off major entry corridor and in close proximity to restrooms

Number of Occupants: 10-15 seated stations

Other/Special Requirements: sound dividers between seated stations similar to hospital HIPA per input from acoustical engineer

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Room Requirements – Finish and FFE Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Other Wall Finishes	AR	Per design	Durable, modular architectural panel accent a feature wall in the room or at reception station. Integrate the Command Logo into the wall design with modular panels.
C3020	Carpeting	SF	24 x 24	Carpet Tile
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3030	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C3030	Suspension Systems	AR	AR	9/16" suspended ceiling system
C3030	Gypsum Wallboard Ceiling			Provide GWB soffits above the counter and reception station to divide the room from the corridor. Integrate lighting into soffit.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Coordinate entry lighting with site lighting and entry pathways.

General Purpose Room - Reception

Space Characteristics

Function/Adjacencies: This space is an area off the main circulation corridor system that features a long transaction counter with sound dividers for quiet speech to Marine students for 10 to 15 seated stations and one central reception station. JRC reps will talk with each Marine student to evaluate and direct the in-processing steps for the individual Marine trainee. These JRC in Processing reps will assist in check in problems and provide solutions on an individual basis to the Marine.

Special Dimensions:
Ideal Plan Dimensions: siting computer workstation for 10- to 15 Processing Reps
Minimum Ceiling Height: 9'-6"
Acoustics:
See other special requirements below.

Access: Off major entry corridor and in close proximity to restrooms

Number of Occupants: 10-15 seated stations

Other/Special Requirements: sound dividers between seated stations similar to hospital HIPA per input from acoustical engineer

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V: Refer to Part 3, Chapter 5, Room Requirements – Finish and FFE Schedule.

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system with control at check-in desk.
D503004	Television Systems			Provide CATV outlets.
E102009 D503004	AV Equipment/ Television System	EA		Provide power and CATV outlets at appropriate height for all wall-mounted monitors. Provide laptop interface from monitor location to check in counter.
E2010	Window Treatments	AR	AR	Manually operated, double solar shade system with 3% light filtering solar shade, room darkening lining and room darkening side channels, on all exterior windows. (USE FOR EXTERIOR WINDOWS)

P1512F-JOINT RECEPTION CENTER

Marines Awaiting Training (MAT) Classroom

Space Characteristics

Function/Adjacencies: These three (3) large classrooms will support 125 Marine Students each that are awaiting class space for Vehicle and MOS training at the LOG OPS school and other training venues at Camp Johnson. The rooms will have A/V systems to support group presentations. The students shall be seated in folding chairs for easy storage and arrangement. One instructor electronic podium will be required in each classroom

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for the partition STC rating.
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: 125 Marine students and 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
B2020	Exterior Windows, Storefront or Curtain Wall			Provide with covered exterior walkway option
B2030	Glazed Doors	2	3' x 7'	Provide with covered exterior walkway option.
B2030	Exterior Door Hardware			One door to room CAC enabled electronic entry system that can be disabled to be unlocked for direct entry. Second door is egress only door. Provided if exterior glazed doors in association with covered walkway are provided. Per ESR B10
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) over metal studs to underside of floor/roof deck
C1010	Retractable Partitions			Floor to ceiling
C1010	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view to building corridor systems if provided.

Marines Awaiting Training (MAT) Classroom

Space Characteristics

Function/Adjacencies: These three (3) large classrooms will support 125 Marine Students each that are awaiting class space for Vehicle and MOS training at the LOG OPS school and other training venues at Camp Johnson. The rooms will have A/V systems to support group presentations. The students shall be seated in folding chairs for easy storage and arrangement. One instructor electronic podium will be required in each classroom

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for the partition STC rating.
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: 125 Marine students and 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1020	Interior Wood Doors	2	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18"). Vision panel must have provisions to be covered – incorporated into the door. Provide wood door only with interior corridor option.
C1020	Interior Door Hardware			Provide classroom function hardware.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Provide along presentation wall.
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.

Marines Awaiting Training (MAT) Classroom

Space Characteristics

Function/Adjacencies: These three (3) large classrooms will support 125 Marine Students each that are awaiting class space for Vehicle and MOS training at the LOG OPS school and other training venues at Camp Johnson. The rooms will have A/V systems to support group presentations. The students shall be seated in folding chairs for easy storage and arrangement. One instructor electronic podium will be required in each classroom

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for the partition STC rating.
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: 125 Marine students and 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3010	Acoustic Wall Panels	AR	30" h x 48" ea	Wall-mounted acoustical panels as required for sound attenuation.
C3020	Carpeting	SF	24 x 24	Carpet Tile
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3030	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile (70-80% of ceiling area)
C3030	Suspension Systems	AR	AR	9/16" suspended ceiling system
C3030	Gypsum Wallboard Ceiling			Provide soffits and accent ceiling areas of GWB in ceiling to break up continuous plane of acoustical ceiling tile ceiling.

Marines Awaiting Training (MAT) Classroom

Space Characteristics

Function/Adjacencies: These three (3) large classrooms will support 125 Marine Students each that are awaiting class space for Vehicle and MOS training at the LOG OPS school and other training venues at Camp Johnson. The rooms will have A/V systems to support group presentations. The students shall be seated in folding chairs for easy storage and arrangement. One instructor electronic podium will be required in each classroom

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for the partition STC rating.
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: 125 Marine students and 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide one quad receptacle at the instructor's station.
D503001	Telecommunications Systems			Provide NMCI network drops. Provide NMCI network drop at instructor's station.
D503002	Public Address Systems			Provide audible paging system.
D503004	Television Systems			Provide CATV outlets.

Marines Awaiting Training (MAT) Classroom

Space Characteristics

Function/Adjacencies: These three (3) large classrooms will support 125 Marine Students each that are awaiting class space for Vehicle and MOS training at the LOG OPS school and other training venues at Camp Johnson. The rooms will have A/V systems to support group presentations. The students shall be seated in folding chairs for easy storage and arrangement. One instructor electronic podium will be required in each classroom

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for the partition STC rating.
Sound absorptive wall finishes to reduce noise

Access: From arriving bus drop off and easy access directly into space from a roof/canopy covered exterior walkway integrated into the building – Refer to the Architectural Block Diagram in Part, 3, Chapter 4. Refer to Part 3, Chapter 4, Building Requirements for requirement to investigate an alternative plan that incorporates an enclosed building corridor in lieu of a covered exterior walkway.

Number of Occupants: 125 Marine students and 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).
E2010	Window Treatments	AR	AR	Manually operated 1" horizontal metal blinds with full-length extension rods for easy operation. (USE FOR INTERIOR WINDOWS)

P1512F-JOINT RECEPTION CENTER

Marines Awaiting Training (MAT) Classroom and Computer Lab

Space Characteristics

Function/Adjacencies: This specialized MAT Classroom will support two functions for the 125 Marine students. A portion of the room will support 30 position computer desks for Marines to access data systems while the other portion of the room is folding chairs for the balance of 95 students and instructor. All on a flat floor. Marine student awaiting training will serve as base working parties and go on special tours or assignments from this room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating.
Sound absorptive wall finishes to reduce noise

Access: Same as MAT Classroom – refer to MAT classroom data sheet

Number of Occupants: 125 Marine students 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
B2020	Exterior Windows, Storefront or Curtain Wall			Provide with covered exterior walkway option
B2030	Glazed Doors	2	3' x 7'	Provide with covered exterior walkway option.
B2030	Exterior Door Hardware			One door to room CAC enabled electronic entry system that can be disabled to be unlocked for direct entry. Second door is egress only door. Provided if exterior glazed doors in association with covered walkway are provided. Per ESR B10
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) over metal studs to underside of floor/roof deck.
C1010	Retractable Partitions			Floor to ceiling
C1010	Interior Windows / Vision Panels			Windows/vision panels as required to achieve requisite view to the building corridor system if provided.

Marines Awaiting Training (MAT) Classroom and Computer Lab

Space Characteristics

Function/Adjacencies: This specialized MAT Classroom will support two functions for the 125 Marine students. A portion of the room will support 30 position computer desks for Marines to access data systems while the other portion of the room is folding chairs for the balance of 95 students and instructor. All on a flat floor. Marine student awaiting training will serve as base working parties and go on special tours or assignments from this room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating.
Sound absorptive wall finishes to reduce noise

Access: Same as MAT Classroom – refer to MAT classroom data sheet

Number of Occupants: 125 Marine students 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18"). Vision panel must have provisions to be covered – incorporated into the door. Provide wood door only with interior corridor option.
C1020	Interior Door Hardware			Provide classroom function hardware.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C1030	Identifying Devices			Signage on exterior side of room entry door(s). Indicate permanent room name(s) and/or provide slot for occupant/department name.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard

Marines Awaiting Training (MAT) Classroom and Computer Lab

Space Characteristics

Function/Adjacencies: This specialized MAT Classroom will support two functions for the 125 Marine students. A portion of the room will support 30 position computer desks for Marines to access data systems while the other portion of the room is folding chairs for the balance of 95 students and instructor. All on a flat floor. Marine student awaiting training will serve as base working parties and go on special tours or assignments from this room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating.
Sound absorptive wall finishes to reduce noise

Access: Same as MAT Classroom – refer to MAT classroom data sheet

Number of Occupants: 125 Marine students 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3010	Acoustic Wall Panels	AR	30" h x 48" ea	Wall-mounted acoustical panels as required for sound attenuation.
C3020	Carpeting	SF	24 x 24	Carpet Tile
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3030	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile (70-80% of ceiling area)
C3030	Suspension Systems	AR	AR	9/16" suspended ceiling system
C3030	Gypsum Wallboard Ceiling			Provide soffits and accent ceiling areas of GWB in ceiling to break up continuous plane of acoustical ceiling tile ceiling.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.

Marines Awaiting Training (MAT) Classroom and Computer Lab

Space Characteristics

Function/Adjacencies: This specialized MAT Classroom will support two functions for the 125 Marine students. A portion of the room will support 30 position computer desks for Marines to access data systems while the other portion of the room is folding chairs for the balance of 95 students and instructor. All on a flat floor. Marine student awaiting training will serve as base working parties and go on special tours or assignments from this room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 11'-0"

Acoustics:
Refer to ESR C10 for STC rating.
Sound absorptive wall finishes to reduce noise

Access: Same as MAT Classroom – refer to MAT classroom data sheet

Number of Occupants: 125 Marine students 2 instructors

Other/Special Requirements: Acoustic retractable partitions floor to ceiling.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide one quad receptacle at the instructor's station.
D5020	Lighting and Branch Wiring			Provide one quad receptacle at each student position in the computer lab area.
D503001	Telecommunications Systems			Provide NMCI network drops. Provide NMCI network drop at instructor's station, and at each student position in the computer lab area.
D503002	Public Address Systems			Provide audible paging system.
D503004	Television Systems			Provide CATV outlets.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).
E2010	Window Treatments	AR	AR	Manually operated 1" horizontal metal blinds with full-length extension rods for easy operation. (USE FOR INTERIOR WINDOWS)

P1512F-JOINT RECEPTION CENTER

Mother's Room

Space Characteristics

Function/Adjacencies: This small private room is for new mothers to support at home baby-feeding activities while at work. It features a comfortable armchair with retractable tablet arm for a breast pump, electric outlet for power, small refrigerator, small sink in base cabinet with drawers. This room can be part of the H&S area, the PAC area, or in separate area between departments in grouping with other common areas as long as it accessible to the building at large.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 8'-0"

Acoustics:
Refer to ESR C10 for partition STC rating
Access: Off corridor system

Number of Occupants: 1

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18").
C1020	Interior Door Hardware			Hinges and stop provide privacy lockset hardware.
C1030	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar.
C1030	Counters			½" thick solid surface counter with full height or 4" high backsplash and 4" high side splashes
C1030	Cabinets			Base cabinets under sink counter and space to place an undercounter refrigerator. Set of wall cabinets the full length of the sink counter sink counter.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard

Mother's Room

Space Characteristics

Function/Adjacencies: This small private room is for new mothers to support at home baby-feeding activities while at work. It features a comfortable armchair with retractable tablet arm for a breast pump, electric outlet for power, small refrigerator, small sink in base cabinet with drawers. This room can be part of the H&S area, the PAC area, or in separate area between departments in grouping with other common areas as long as it accessible to the building at large.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 8'-0"

Acoustics:
Refer to ESR C10 for partition STC rating
Access: Off corridor system

Number of Occupants: 1

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3030	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C3030	Suspension Systems	AR	AR	9/16" suspended ceiling system
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting.

P1512F - JOINT RECEPTION CENTER

Personnel Administrative Center (PAC) Reception Desk

Space Characteristics

Function/Adjacencies: Reception space/desk for the Personnel Administrative Center. This space is adjacent to the entry to the suite and separates the reception area from the clerk open office area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'

Acoustics:
N/A

Access: From clerk open office area

Number of Occupants: 1

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Counters	1	24 SF MIN	24" deep, ½ thick solid surface countertop/built-in desk surface; a minimum of 8'-0" wide that is at ABA compliant height. Provide a 12" deep, 1/2" thick standing -height transaction counter surface as well as an ABA compliant area at Check-In Desk location. Provide a fabric covered tack-able surface between standing height transaction counter and desk counter surface. Provide grommets as required for number of computers and equipment. This countertop and desk area is to be integrated into full height partitions that separate the PAC office area from the entry/reception space for this suite.

A10 FOUNDATIONS – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Provide foundation systems in accordance with UFC 3-301-01. Foundations must be designed to suit subsurface conditions and must be capable of transmitting all building loads to the ground.

This section addresses both non-structural slabs-on-grade and structured slabs at ground level. For both systems, provide recessed areas as required to accommodate utilities at raised access floors such that the walking surface is one continuous plane throughout each space.

See Section B10, *Superstructure*, for additional loading criteria.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information, including a geotechnical data report prepared specifically for this project and historical subsurface data from other projects in close proximity to the project site, are included in Part 6 – Attachments of this RFP.

The soils information provided in this RFP is for reference only and reflects the soil conditions encountered only at the locations indicated. The Government shall not be responsible for any interpretation or conclusion by the Contractor drawn from the soils information beyond the industry standard of care. Geotechnical engineering reports accompanying the subsurface information are provided only to better convey the encountered data and observed site conditions. Assumptions, analyses and recommendations included in any accompanying report may or may not be applicable to the Offeror's design concept. The Contractor must retain a Geotechnical Engineer to interpret the Government provided information as it relates to the Contractor's design concept prior to submission of the proposal and develop geotechnical requirements to support the design and construction of the project meeting the requirements of this RFP for bidding purposes.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

The Geotechnical Engineer must have a minimum of 5 years of recent relevant experience in the geographic region of the project and must be currently licensed as a professional engineer in the State of North Carolina. In accordance with FAR Subpart 9.5, Organizational and Consultant Conflicts of Interest, the Contractor is prohibited from hiring the Geotechnical Engineer who provided data, reports and any other services on behalf of the Government for this project.

After award, the Contractor's Geotechnical Engineer (Geotechnical Engineer of Record) must provide a site-specific geotechnical study to include in-situ testing, soil borings and supporting laboratory analysis of representative soil samples. The Geotechnical Engineer must prepare a Geotechnical Report providing recommendations for design and construction of foundations, earthwork and site development in accordance with UFC 1-200-01 *DoD Building Code (General Building Requirements)*, UFC 3-220-01 *Geotechnical Engineering*, and FC 1-300-09N *Navy and*

Marine Corps Design Procedures and associated references. Calculations must be provided in the report to support all conclusions and recommendations.

SEISMIC DESIGN

Refer to ESR B10 for seismic design information.

A1010 STANDARD FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Standard Foundation to support the structure(s) associated with this project. "Standard Foundations" are shallow foundations or deep foundations as addressed in IBC Chapter 18. Do not use masonry unit footings, steel grillage footings, timber footings or wood foundations. Treated timber piles are permitted if deemed appropriate by the Designer of Record.

The structure(s) must be entirely supported by either a shallow foundation system or a deep foundation system as determined by the Designer of Record. Provide foundation materials that are compatible with the environmental exposure. When foundation elements are exposed to corrosive or otherwise aggressive soils, provide protection in accordance with ACI 318 requirements.

Calculate foundation ultimate resistance using multiple established methods. Determine allowable foundation capacity using the factors of safety provided in UFC 3-220-01 Tables 2-2 and 2-3. Develop geotechnical engineering design parameters using in-situ tests, laboratory tests and established empirical correlations. Evaluate upper and lower bound soil capacities based on variations in subsurface conditions at the site. Determine the minimum foundation bearing depth for frost protection in accordance with UFC 3-301-01. Provide minimum foundation widths to avoid failure and with consideration given to placement tolerances, ease of construction, etc.

Determine estimated foundation settlement based on comparison of predicted values from multiple established methods based on reaction loads provided by the Structural Designer of Record. Settlement calculations must include dead and live load components, live load reductions used in the analyses, actual or estimated foundation sizes, planned site grading changes, and expected fluctuations in groundwater levels. Estimated differential settlement must include upper and lower bound foundation settlements based on soil properties, different foundation loading, and variations in subsurface conditions across the building footprint.

The presence of weak and compressible soils may result in excessive settlement that could impact the performance of surface bearing structures and supporting facilities such as foundations, slabs, pavements, sidewalks, and utilities. The magnitude and duration of settlement depends on the composition, depth, and thickness of the weak/compressible soils as well as the Contractor’s selected design concept. The Contractor's Geotechnical Engineer is responsible for evaluating potential global settlement due to designed grade increases and final structural loads, and must develop any settlement mitigation procedures (such as preloading, surcharging, fill monitoring programs, and ground improvement systems) needed to maintain global settlements within tolerable limits. Surcharge material, if required, must remain in place for 90 days minimum.

Design must incorporate measures that limit total and differential settlement to levels that prevent structural or aesthetic damage or impairment of the serviceability and function of the facility or structures, including drainage and utilities. The safety factor for liquefaction potential must meet or exceed Table 2-1 in UFC 3-220-01.

Use the following geotechnical tolerances to design shallow foundation systems:

- Limit slab-on-grade post construction total settlement due to permanent loads to ½ inch maximum;
- Limit total settlement of column and wall footing foundations to one inch maximum; and
- Limit differential settlement of adjacent footings to ½ inch maximum and an angular distortion of 1/500 maximum. Angular distortion is defined as the difference in settlement between two points divided by the distance between the points.

Use the following tolerances for designing deep foundation systems:

- Limit total settlement of individual piles and pile caps to ½ inch maximum under service load conditions as determined by static or dynamic pile load testing.
- Limit differential settlement of adjacent foundations to ½ inch maximum and to an angular distortion of 1/500 maximum. The angular distortion is defined as the difference in settlement between two points divided by the distance between the points.
- Limit lateral deflection of deep foundations to ½ inch, with an applied axial load equal to the expected dead load.

Ensure allowable pile stresses not to exceed limitations specified in IBC Section 1810, Deep Foundations. Evaluate and address time dependent pile capacity conditions (i.e. pile setup), group effects, negative skin friction, lateral squeeze, preboring/jetting, installation sequencing, refusal driving conditions, etc. as applicable. Include requirements for completing pre-construction condition surveys, ground vibration monitoring, structural instrumentation, etc. to mitigate risks of ground vibration damage to nearby structures as applicable for the specific project. The Structural Engineer of Record must design and detail the pile foundations in accordance with IBC Section 1810.3. Submit structural calculations and details for the piles to the Government for review and approval during project design development.

Conduct a test pile program overseen by the Geotechnical Engineer of Record and submit a final signed and stamped report to the Government for review and approval. Monitor and record driving during installation and subject to hammer restrikes in accordance with ASTM D4945, “Standard Test Method for High-Strain Dynamic Testing of Piles.” Evaluate the ultimate load capacity of selected test pile restrike(s) using CAPWAP analyses. Additional load test requirements are stated in Part 4 of this RFP. The Contractor is responsible for all foundation testing and monitoring costs.

A1020 SPECIAL FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Special Foundation system to support the structure(s) associated with this project. "Special Foundations" are any foundations that are not specifically "Standard Foundations", or which are a combination of Standard Foundations and a site improvement/ground modification system. Incorporate design of these systems in the project plans and specifications following FC 1-300-09N Chapters 7 and 8 and not as a construction submittal. Examples of site improvement/ground modification systems include surcharge preloading, prefabricated vertical drains, over-excavation and replacement, stone columns, rammed aggregate piers, rigid column inclusions, deep dynamic compaction, low and high mobility grouting, vibroflotation, etc. As most "Special Foundation" techniques or systems typically require the use of specialty contractors, a registered Professional Engineer must establish installation and acceptance criteria and supervise the installation. The Designer of Record must submit justification for use, including acceptable evidence of previous successful installation in similar conditions, methods and equipment used in their installation, proposed testing and inspection to be used, supporting test data,

calculations, and any other information related to the structural properties and load capacity of such system. The allowable stresses and testing requirements for pile-like elements used for ground improvement must comply with IBC Section 1810.

A1030 SLAB ON GRADE

As determined by the Designer of Record to be applicable, provide soil supported concrete slab(s) on ground. Provide a vapor retarder and porous fill layer beneath all slabs. Where slab on ground is below the existing adjacent exterior grade, provide waterproofing on foundation walls and a perimeter drainage system to remove ground water from the area immediately adjacent to the building. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

A1040 STRUCTURALLY SUPPORTED SLAB

As determined by the Designer of Record to be applicable, provide a structurally supported slab. Provide for structural support of all utilities that may be adversely affected by soil consolidation or expansive soils. Provide stainless steel hangers sized adequately to support the in-service utility. Provide a vapor retarder and porous fill layer beneath all slabs. Where the structurally supported slab is below the existing adjacent exterior grade, provide waterproofing on foundation walls or grade beams and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

--End of Section--

A20 BASEMENT CONSTRUCTION – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

NOT USED

A2010 BASEMENT EXCAVATION

NOT USED

A2020 BASEMENT WALLS

NOT USED

--End of Section—

B10 SUPERSTRUCTURE – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

The superstructure consists of structural elements above the foundation that provide support for vertical loads and resistance to lateral loads.

This section includes the requirements for the superstructure of the building, including floor and roof framing, columns, interior load-bearing walls and the main lateral-force resisting system. Exterior load bearing walls are addressed in Section B20.

Provide the building framing system in accordance with UFC 3-301-01, *Structural Engineering*.

The building must be constructed with concrete, steel, or masonry. Wood construction is prohibited.

All steel deck used for roofs and structural wall panels must be 20 gauge minimum thickness.

A Special Inspector of Record (SIOR) is required for this project.

Pre-engineered building systems are prohibited.

Load bearing light gage framing systems are prohibited.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Risk Category: II

Design for Live Loads in accordance with IBC 2018 as modified by UFC 3-301-01.

Wind Load Parameters:

Wind speed	Comply with UFC 3-301-01
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Snow Load Parameters:

Ground snow load	Comply with UFC 3-301-01
Snow load importance factor	1.00
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Seismic Load Parameters:

A site-specific seismic ground motion study is not required. Use Risk Category II and soil classification D. Determine seismic loading adjusted for site class effects using the ground motion parameters specified by UFC 3-301-01, *Structural Engineering*. Seismic Design Category (SDC) is B.

B1010 FLOOR CONSTRUCTION

Provide elevated floors and mezzanines consisting of any of the following construction types.

1) Non-composite concrete slabs on form deck on steel joists.
2) Non-composite or composite concrete slabs on metal decking on steel beams.
3) Cast-in-place concrete slabs on removable forms
4) Precast concrete planks or shallow double-tee beams.

Support elevated floors and mezzanines on cast-in place concrete walls, plant or site pre-cast concrete walls (including tilt-up walls), reinforced concrete masonry walls/pilasters, structural steel columns and girders or joist girders. Do not support elevated floors on light gage stud wall construction. Wood framed systems are prohibited.

Provide access platforms constructed of steel grating and supported by structural steel framing.

B1020 ROOF CONSTRUCTION

Provide roof construction consisting of metal decking supported by structural steel framing or open web steel joists and joist girders bearing on load bearing columns or walls. Cast-in-place and precast concrete roof systems are also permitted. Support roof construction on cast-in-place concrete walls, precast concrete walls, reinforced concrete masonry unit walls/pilasters, or structural steel columns. Training rooms and conference rooms must be free of columns and other obstructions.

--End of Section--

B20 EXTERIOR ENCLOSURE – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

This system consists of the exterior shell of the facility, which includes all vertical and horizontal exterior closure such as exterior walls, exterior windows, and exterior doors. This system excludes roofing (See Section B30, Roofing). Load bearing exterior walls will be included here, and not in Section B10, Superstructure. Structural frame elements at the exterior enclosure such as columns, beams, and spandrels are included in Superstructure, with all exterior wall elements supported by columns, beams and spandrels included in this section. Finishes to the inside face of walls which are not an integral part of the wall construction will be included in Section C30, Interior finishes.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

It is permissible for exterior walls to be load bearing or non-load bearing. Exterior load bearing walls must consist of any of the following construction types and comply with the architectural and functional requirements that follow this list (also refer to B201001 Exterior Closure section for inclusion of load bearing walls in the overall exterior closure design).

1) Reinforced concrete masonry (CMU)
2) Cast-in-place reinforced concrete
3) Site precast concrete (tilt-up)
4) Plant precast concrete

Exterior walls must incorporate the materials directed in the Camp Lejeune, Base Exterior Architectural Plan (BEAP), 2010 – Section 4.13 Camp Johnson.

The primary exterior cladding material of the building must be modular brick per color and finish conforming to the BEAP, along with a water table as prescribed in the BEAP. If thin brick cladding is used, the color and finish of the brick must match as closely as possible to that indicated in the BEAP.

Brick detailing and design of the exterior wall must provide accent banding and design features at windows as prescribed in the BEAP

Provide a cast-in-place, split face masonry (used with veneer exterior wall closure) or precast concrete water table per the proportions shown in diagrams in the BEAP. If the cast in place option is chosen, the finish of the concrete is required to be a high quality, rubbed finish with a pattern mimicking CMU masonry joints.

Multiple options for providing the exterior wall system are as indicated in the Exterior Closure and the Exterior Wall Backup Construction sections shown below.

B201001 EXTERIOR CLOSURE

The following are options for providing the exterior closure. The Contractor has the option to use these systems as long as energy code requirements and design aesthetics as prescribed in the BEAP are provided:

1) A brick/masonry veneer cavity wall exterior wall closure.
2) A precast concrete panel veneer exterior wall closure with applied thin brick cladding. This system must be a barrier system with sealed joints.
3) A site precast tilt-up concrete exterior wall closure or cast in place concrete exterior wall closure (load bearing) with applied thin brick cladding. This exterior closure is a barrier system with sealed joints.
4) A plant precast and site assembled precast concrete exterior wall closure (load bearing) with applied thin brick. This exterior closure is a barrier system with sealed joints.

All exterior closure wall options where the exterior wall concrete (precast or cast in place) is exposed to moisture (at the exterior face of the wall or the base of the wall) must be designed with a plant added admixture to prevent moisture migration within the concrete to prevent the failure of applied thin brick systems, and prevent water migration into the interior of the building.

Thin brick cladding placed on the exterior load bearing walls must be attached with systems that will ensure that the brick will not separate from the wall or form efflorescence. In addition, adequate control/construction joints must be incorporated into the concrete wall system to prevent thin brick cladding cracking and adhesion issues.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

The backup systems for masonry and precast concrete veneer systems must be of single wythe reinforced concrete masonry. The backup wall system shall be integrated with other exterior wall system requirements as indicated in B201003, Insulation and Air Barriers.

Exterior bearing walls consisting of metal studs as the primary floor or roof supporting structural element are not permitted.

For concrete exterior bearing walls (precast or cast-in-place) the backup wall system is defined in ESR C10, Interior Construction.

B201003 INSULATION and AIR BARRIERS

Provide continuous insulation, vapor retarder and air barrier to meet or exceed requirements of project's energy savings requirements.

Provide a continuous air barrier to control air leakage into, or out of, conditioned spaces. The building envelope must include all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, and compartmentalized unconditioned portions of the facility such as garages, and negatively pressurized spaces. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

Confirm air barrier compliance with Air Barrier Performance Test in RFP Part 4.

Provide thermal envelope performance testing through infrared thermography in accordance with RFP Part 4. Coordinate thermal imaging testing with air barrier testing construction schedule.

B201004 PARAPETS

Parapets are not required for this building because sloped roof areas (with gutter/downspouts) must be provided over the entire building.

B201005 EXTERIOR LOUVERS & SCREENS

Provide exterior louvers and screens, where required, that match the finish of the existing windows and detailed to integrate with the architecture of the building, as appropriate to the design of the building. Provide insect screens at all louvers.

B201006 BALCONY WALLS & HANDRAILS

NOT USED

B201007 EXTERIOR SOFFITS

Provide a pre-finished metal exterior soffit system and associated rake and eave trim as indicated in the BEAP – Section 4.13 Camp Johnson. Colors as defined in the BEAP

B201009 EXTERIOR PAINTING AND COATINGS

Provide a field applied exterior coating on all items that are not prefinished, and to prefinished items when required to provide a color other than a standard prefinished color.

B201010 EXTERIOR JOINT SEALANTS

Provide exterior application of joint sealants to seal joints and prepare for finish material installation.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Provide horizontal or vertical fixed type as required to provide sun control and prevent any direct sunlight hitting work surfaces of classrooms/vehicle training bays. Sun control devices must be detailed to integrate with the architectural wall/window systems.

B201012 SCREEN WALL

Provide screen walls where required to screen mechanical units, electrical substations, loading docks, and trash receptacles/dumpsters. Screen walls shall be per the Camp Lejeune, BEAP, 2010. Section 4.13 Camp Johnson.

B2020 EXTERIOR WINDOWS

Windows and other fenestration systems that provide daylighting must be provided in regularly occupied spaces that include offices and classrooms as indicated in UFC 1-200-02 and reference to ASHRAE 189.1 sections.

Windows must meet the defined prescriptive AT/FP requirements per UFC 4-010-01. If is permissible to use curtain wall systems in lieu of window or storefront systems, if necessary, to meet AT/FP or other design requirements.

The daylighting provided by windows and other fenestration systems must not compromise the visual acuity and comfort within the room.

Provide a sample window installation in a complete exterior wall, as determined by the DOR and approved by the Contracting Officer. If approved, this sample window installation will become a permanent part of the building.

B202001 WINDOWS

Windows must be pre-finished aluminum and fixed.

Provide a mockup of one combination window unit for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B.

At all interior window sills provide a ½" thick solid surface window sill trim to cap the wall at the base of windows.

B202002 STOREFRONTS

Storefronts must be pre-finished aluminum, and if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

Provide a mockup of one designated storefront system unit for the project to be used for a field mockup test in compliance with AAMA 502 Method A and Method B.

If applicable when providing storefront that does not extend to the floor and has a wall area at the base/sill of the storefront refer to window sill requirement in B202001 Windows above.

B202003 CURTAIN WALLS

Curtain walls are a permissible option for fenestration if determined necessary to meet applicable codes and UFC requirements. Curtain wall, if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

The curtain wall system must be a standard architectural type Stick or Unit and Mullion system, with mullions, horizontal rails, and/or non-integral spandrel panels. Fully coordinate curtain wall system components/accessories that are directly incorporated and adjacent to contiguous related work (i.e. wall systems). Ensure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances in the design of the curtain wall system and in coordination of the curtain wall design with adjacent exterior enclosure systems.

The system must incorporate a pressure equalized method to control air and water infiltration. Face-sealed systems and water managed systems are not allowed.

System must be a combination of glazed panels and opaque panels as required by the design.

Provide a mockup of one designated Curtain Wall System unit for the project to be used for a field test of compliance with AAMA 503 Method A and Method B.

B202004 EXTERIOR GLAZING

Glazing color and reflectance must be provided and approved by Camp Lejeune's Architectural Review Board.

Glazing must be a heat absorbing insulated laminated glazing unit with the inner most pane being laminated glazing to meet the prescriptive AT/FP requirements of UFC 4-010-01 and code/UFC prescribed wind load requirements.

B202090 OTHER EXTERIOR WINDOWS

NOT USED

B2030 EXTERIOR DOORS

All exterior doors must be weather protected and provided with weatherstripping/sealant and thresholds that stop water penetration that comply with ABA. Provide heavy duty overhead closers at all exterior doors.

B203001 SOLID DOORS

Provide insulated solid steel door assemblies at locations other than at storefront/curtainwall entrances.

Doors must be Extra Heavy Duty Doors -– ANSI /SDI A250.8, Level 3, physical performance Level A, Model 1.

Provide steel doors fabricated from hot dipped galvanized steel and provide a rust inhibitive factory finished primer coating. Finish coats are to be field painted.

B203002 GLAZED DOORS

Provide exterior aluminum framed glazed doors and entrances systems integrated into storefront/curtain wall system at main entry of the building or at secondary access points that incorporate storefront/curtain wall systems. Provide glazed entry doors as required in Special Room Requirements, Part 3, Chapter 5 of the BD RFP

Doors must be factory-finished aluminum framed door assemblies with heat absorbing insulated laminated glazing, frames, and hardware.

Glazing shall match the storefront/curtain wall system glazing.

Glazing in all hollow metal or glazed exterior door is required to meet the same prescriptive requirement for glazing as required for windows and other fenestration systems.

B203004 OVERHEAD AND ROLL-UP DOORS

Provide doors in mechanical rooms. Provide lockable doors with automatic operation with protected pushbuttons electric controls.

Provide doors compliant with UL Listed electric motor operation and equipped with electric controller and an auxiliary hand chain operation. Provide slat profile. Provide counterbalance, heavy duty springs, wear strips, full perimeter weather-stripping, continuous button pressure safety operation, electric or infrared safety edge, galvanized hardware, and manufactured trims and closures pieces. Protect the wall door jamb opening with guards designed to resist abuse from the type of material and vehicles that are transported through the opening.

Provide insulated overhead roll-up doors. Provide powder coat painted finish with custom colors for the door and accessories to match facility color scheme. Design the galvanized steel overhead roll-up slats and door width to withstanding the design wind loading of ASCE 7 and operate normally.

Overhead doors must not open into occupied space.

B203006 BLAST RESISTANT DOORS

NOT USED

B203008 EXTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule. Verify all door hardware requirements with the User.

Provide a programmable Common Access Card (CAC) enabled electronic locking system at all exterior swinging man doors. The exterior locking system must be capable of locking all doors via a “kill switch” (tied to a central monitoring location), and all doors be provided with a manual key override.

Exterior door hardware to provide complete weather-stripping, threshold, and rain deflector, and door closers with code compliant hold open devices. Other specific exterior door hardware to be confirmed by user.

Door hardware finish shall be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

B203090 OTHER EXTERIOR SPECIALTY DOORS

NOT USED

--End of Section--

B30 ROOFING – P1512F JOINT RECEPTION CENTER

B30 GENERAL SYSTEMS DESCRIPTION

Roof systems shall be watertight. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation.

Submittal Requirements: Components of a minimum roof submittal shall include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Provide a Pre-Design Roofing Conference (if required in RFP Part 4) and Pre-Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

Built-in gutter systems where drainage passes through an interior space or is concealed in the exterior cavity wall shall be prohibited.

Refer to UFC 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02 *High Performance Sustainable Buildings* for additional roofing requirements such as Energy Star qualified products.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

Provide a SSMR (standing seam metal roof system). The slope and configuration of the roofing is suggested in the Base Exterior Architectural Plan (BEAP), 2010, Section 4.13, Camp Johnson. Refer to Part 3, Chapter 2 for prescribed roof slope.

The roof system shall be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance shall be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or ASTM uplift resistance test procedures. The roof material must be 3004 aluminum, ASTM B209M ASTM B209 and AA

Organic Coatings for the metal roofing must be A PVDF coating as specified in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing. All other material and construction for metal roofing are per Part 6 specification section.

The spacing of standing seams shall between 12 inches and 18 inches on center as prescribed in the BEAP.

Sub-purlins for the Structural Metal Roof System shall be galvanized and shop painted.

SSSMRS Warranty Certificate. – Provide warranty requirements as defined in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing.

Specular Gloss of Finished roof surfaces must have a specular gloss value of 10 or less at an angle of 85 degrees or 30 plus or minus the value specified in project program at 60 degrees when measured in accordance with ASTM D 523.

B301002 LOW SLOPE ROOFING SYSTEMS

NOT USED

B301003 ROOF INSULATION AND FILL

Provide roof insulation values no less than in accordance with UFC 1-200-02 High Performance and Sustainable Buildings and UFC 3-110-03 Roofing.

B301004 FLASHINGS AND TRIM

Provide flashing and trim for the Aluminum Standing Seam Metal roof per specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing in Part 5 of this RFP.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited.

B301006 ROOF OPENINGS AND SUPPORTS

NOT USED

B301090 OTHER ROOFING

Provide lightning protection, without penetrating the roofing or flashing components.

--End of Section--

C10 INTERIOR CONSTRUCTION – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Interior construction includes interior partitions, interior doors, and fittings.

Provide durable construction appropriate for the building function. Acoustic properties of materials, as well as durability, shall be considered during material selection.

Provide an acoustical engineer to participate in the design and provide design quality reviews throughout the design. The acoustical engineer must be an active participant in the design of the classrooms, classroom/labs, and training spaces and any other space or portion of the design with special acoustical requirements. The engineer must evaluate and give input on, but not limited to, acoustical partitions carrying STC ratings, applied acoustical treatments, integration of audio-video components, and door and frame performance, The acoustical engineer must carry a bachelor's degree in Engineering, Physics, Architecture, or a related field, hold a PE or membership in a recognized acoustical professional organization, and demonstrate a minimum of 7 years of acoustical design/engineering consulting on similar projects.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Areas of the Project subject to abuse require that "Impact Resistant" systems be provided.

C1010 PARTITIONS

Provide partitions consisting of metal studs with gypsum board on each side.

Gypsum board for partitions in moist and humid areas and areas with water use on floors, that include but are not limited to toilets, locker rooms, and mechanical rooms, must be 5/8-inch moisture and mold resistant gypsum board panels. ASTM C1396, ASTM D3272 - Rating of 8 to 10, ASTM C473, Water Absorption <5%. Provide Impact resistant versions of this gypsum board for abuse prone areas.

C101001 FIXED PARTITIONS

Provide fixed interior partitions, except where retractable partitions are specifically required by the "Room Requirements."

UFC defined acoustic requirements in UFC 3-101-01, Section 4.8 and Figure 4-1 is not applicable to this project. Partitions requirements are defined using STC ratings in defined in this RFP.

Sound-rated partition assemblies must meet the interior acoustic requirements for typical spaces as follows or as indicated in Chapter 3, Part 5, Additional Room Requirements:

- Classrooms STC 45
- Conference Rooms STC 45
- Mother’s Room STC 45

- Heads STC 45
- Break Rooms STC 45
- Private Offices STC 45**

** private office STC may be reduced to a lower STC in association with a high CAC acoustical ceiling or increased to STC 50 based on the requirements of the individual user. The requirements for each individual user must be verified during the design process.

- Mechanical Rooms (when wall is adjacent to occupied space) STC 50
- Separation wall between classrooms and PAC/H&S STC 50

C101002 DEMOUNTABLE PARTITIONS

NOT USED

C101003 RETRACTABLE PARTITIONS

If required, provide retractable partitions to include operable panel partitions (noted as Folding Panel Partition in Architectural Block Diagrams). Sound-rated partition assemblies shall have a minimum Sound Transmission Coefficient (STC) as indicated in Part 3, Chapter 5, Additional Room requirements in accordance with ASTM E 90 or ASTM E 413 for frequency data. Coordinate finishes with Section C30 Interior Finishes.

In the pocketed stored position provide for a partitioned pocket area so the system panels when folded are not exposed in the room.

C101004 INTERIOR GUARDRAILS AND SCREENS

Provide balustrades where required by code. Provide screens where required to prohibit view of a particular area.

C101005 INTERIOR WINDOWS

Provide interior window system of aluminum, if required by the design, in rooms that provide borrowed light to occupied rooms.

If interior windows are provided at rooms with partitions of STC 45 or above, provide a window with laminated glazing to provide acoustical control.

All interior window systems must have a pre-finished coating finish or anodized finish.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide aluminum framed glazed storefront system in rooms as required by the design.

All interior storefront systems must be pre-finished coating finish or anodized finish.

C101007 INTERIOR GLAZING

Interior glazing must be clear or patterned glass that is annealed/tempered based on code requirements.

Interior glazing when provided in fire rated doors and glazed partitions must utilize fire-rated glazing to meet code requirements. Wire glass must not be used in fire rated doors or partitions.

C1020 INTERIOR DOORS

C102001 STANDARD INTERIOR DOORS

Provide flush interior doors.

Provide wood or hollow metal interior doors in hollow metal frames.

Provide wood doors at all administrative office area rooms, classrooms, labs, heads, and lounges/break rooms.

Provide hollow metal doors at all mechanical rooms, electrical rooms, telecom rooms, and related mechanical spaces.

Hollow metal doors must be Level 4 with physical performance level A throughout the facility

Flush wood doors must be WDMA I.S.1A-04, premium grade, extra heavy duty for classrooms, classrooms/labs, heads , lounges and conference rooms and heavy duty for all other spaces. Flush wood doors shall be SCLC-5 5-ply structural composite lumber core or FD core, as required by code.

Doors must have Factory Finish of AWI Quality Standards Section 1500, specification for Conversion varnish alkyd urea or catalyzed polyurethane.

Provide vision glazing within doors if it is deemed advantageous to be able to see through the door, either for safety of pedestrian traffic, or other functional reasons. If vision glazing within doors is provided, it must have the provision to be blanked off during an active shooter event. This would require an easily activated shade, flap, or other device that would obscure vision through the door light.

Provide acoustic seals and gasketing to match acoustical rating of the surrounding partition. After installation, test the doors with a flashlight to determine if any gaps in the sound seals allow light to be viewed on the opposite side of the door.

C102002 GLAZED INTERIOR DOORS

Provide Aluminum/Glass glazed interior door as a part of an interior glazed partition as indicated in C101006.

C102003 FIRE DOORS

Provide interior fire doors, in fire rated partitions as required by Code.

C102004 SLIDING AND FOLDING DOORS

NOT USED

C102005 INTERIOR OVERHEAD DOORS

NOT USED

C102006 INTERIOR GATES

NOT USED

C102007 INTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule in conjunction with the approval of the client and to meet specific requirements outlined in this section or other referenced documents. Verify all door hardware requirements with the User.

Provide lock and latch hardware with levers as follows:

- Use Series 1000, Operational Grade 1, Security Grade 2 for corridors, classrooms and labs, suite entrances, toilets, and other high use interior doors. Use Series 4000, Grade 1 for locations not using Series 1000 hardware.
- Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2.
- Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1, or Grade 2.

Provide cylinders/cores and keying system as indicated in Part 4, C102007 specifications. Other related door hardware requirements for hardware beyond locking devices is as indicated in Part 4, C102007 specifications. Lock cores will match the BEST system.

Door hardware finish shall be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

C102090 OTHER INTERIOR SPECIALTY DOORS

NOT USED

C102091 OTHER INTERIOR PERSONNEL DOORS

NOT USED

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Provide solid plastic (HDPE) toilet partitions in all toilet rooms (heads) with more than one water closet or urinal.

Provide floor mounted overhead braced toilet partitions.

C103002 TOILET AND BATH ACCESSORIES

Provide toilet and bath accessories per the following:

Double toilet tissue dispensers – standard roll size, motion sensing paper towel dispenser, wall-mounted trash disposal, manual soap dispensers at each sink, minimum of two coat/towel hooks, grab bars, convenience shelf/purse ledge. For toilets that have lockers/showers provide high efficiency electric hand dryer, shower rod and shower bench.

At janitor’s closets provide wall-mounted mop rack with overhead shelf.

At toilets with counters with integral sinks, provide mirrors the full length of toilet lavatory counters in width and from backsplash to the light cove above in height.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker (dry erase) boards and tack boards as indicated in Chapter 5 "Room Requirements" portion of this RFP.

Marker boards and tack boards must be mounted with the lower edge at 42" above finished floor. Unless otherwise noted, boards must have anodized aluminum trim. Marker boards and tack boards must have tool trays and one set of tools provided for each room. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards and tack boards.

Glass marker boards must be frameless, opaque back-painted glass type and must attract standard magnets (rare-earth magnets not required) and be constructed of 1/4-inch-thick, shatter resistant, tempered glass, solid in color with non-staining finish, polished edges and eased corners and mounted with stainless steel standoffs. Provide magnetic accessory trays for glass markerboards.

Enclosed tack boards must be heavy gauge aluminum, with tackable interior surface, tempered glass sliding doors and lock. Provide selection from full range of manufacturer's finishes. Provide tack board dimensions as follows: Size: 3'-0" H by 4'-0" L.

Marker boards and tack boards are funded as part of the construction contract.

C103004 IDENTIFYING DEVICES

All necessary interior signage must be incorporated as part of the architectural drawings. Interior signage is not collateral equipment. Interior signage must demonstrate complete coordination with the facility design, SID and FF&E submittals. Provide interior directional signage for facility wayfinding. Provide an identifying device at each interior door. Signs must meet ABA requirements. Refer to UFC 3-120-01, Design: Sign Standards, for more information.

Provide a 36" x 48" Command Photo Board at the entrance area of the PAC, H&S, and the public entry to the MAT/ELR classroom area to accommodate a minimum of (7) 8" x 10" Chain of Command photos. Command Photo Board should be durable and support easy photo changing.

Exterior building signage is also required and must be provided. This includes exterior door signs on any mechanical, electrical, and telecommunications room with exterior doors. All exterior signage and their components must be resistant to ultraviolet light and must withstand a marine corrosive environment. This includes any other building signage attached to the building envelope, such as building name or number.

Specific exterior signage requirements follow:

- Provide exterior signs at all building primary and secondary entrances stating, "ELECTRONIC DEVICES INCLUDING CELLULAR PHONES PROHIBITED." Applicability must be verified by AE2 with MCB Camp Lejeune.
- Provide exterior signs at all building primary and secondary entrances stating, "DO NOT ENTER IF IDS INDICATOR LIGHT IS ON. ALARM WILL SOUND." Applicability must be verified by AE2 with MCB Camp Lejeune.

C103005 LOCKERS

Provide 18" wide x 18" deep x 72" high single-tier high density polyethylene (HPDE) personnel lockers. Provide perforated top and doors for better air flow. Each door must be engraved with a

minimum 5/8” tall number in sequential order starting with “101”. Provide 6” height continuous HDPD base, sloped tops, metal garment bars, metal double hook, and latching hardware to accommodate pad locks.

Lockers are funded as part of the construction contract.

All enclosed lockers shall be fitted with hardware and devices that reduce noise when operating locker doors.

C103006 SHELVING

NOT USED

C103007 FIRE EXTINGUISHER CABINETS

Provide semi-recessed fire extinguisher cabinets for fire extinguishers in all occupied spaces, including corridors and lobbies, as required by the RFP. Cabinets shall be coordinated with interior finishes. Where cabinets are installed in fire rated partitions, cabinets must be tested and listed in accordance with ANSI/UL-1479 for membrane and penetration firestops. Fire extinguishers required in spaces not typically occupied, such as mechanical, electrical, and telecommunication rooms, may be surface-mounted with a bracket listed for the size and weight of the required fire extinguisher. Installation of all fire extinguisher cabinets and mounting brackets must be in strict compliance with NFPA 1, NFPA 10, and the manufacturer's installation instructions Refer to ESR Section D40.

C103008 COUNTERS

Provide solid surfacing material containing recycled content for counter tops and back splashes in Restrooms/Lounge, Heads/Showers, Break Rooms and Mother’s Room.

Backsplash height must be a minimum of 4”.

C103009 CABINETS

Provide cabinetry and millwork items with associated accessories as indicated in RFP Part 6 drawings and RFP Part 3, Chapter 5 Room Finish and FF&E Requirements. Cabinetry must be Architectural Woodwork Institute (AWI) premium grade with hardwood plywood construction. Cabinets must have concealed hinges with adjustable recessed standards for shelves. Exposed surfaces must be covered with high pressure plastic laminate, and interior surfaces must be melamine. All cabinets must have base/toe kicks that match the height of the wall base. Provide ABA compliant doors at casework as required throughout the facility. Provide filler panels as required where cabinets abut wall.

Design and provide cabinets to accommodate equipment such as refrigerator, sink, microwave, commercial coffee pot, and ice maker.

Provide finish choices for built-in cabinetry to include the manufacturer's standard complete color line for all materials.

All cabinets to have solid surface counters with eased leading edge, unless noted otherwise in RFP.

Provide base and/or wall cabinets in administrative break rooms and other rooms as indicated in Part 3, Chapter 5, Room Requirements section of this DB RFP.

C103010 CASEWORK

NOT USED

C103011 CLOSETS

NOT USED

C103012 FIRESTOPPING SYSTEMS

All firestopping systems shall be performed by one experienced firestop Contractor. Experienced firestop Contractor is defined as following:

1. FM Research approved in accordance with FM 4991, or
2. Operating as a UL Certified Firestop Contractor, or
3. A Contractor completed the manufacturer accredited firestop specialty contractor program. Certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years of experience in the installation of manufacturer's products in accordance with specified requirements. Submit documentation of this experience. A manufacturer's willingness to sell its firestopping products to the contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer. Individual building system subcontractor, such as Mechanical, Electrical, Plumbing, Gypsum wall, etc., is not permitted to install firestopping systems.

A single complete submittal including Shop Drawings, Product Data, UL details must be provided for all firestopping systems throughout entire project.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

The requirement for sprayed fire-resistive materials is determined by the building code analysis prepared by the design/build contractor's Qualified Fire Protection Engineer (QFPE). If required, provide sprayed fire-resistive materials to the building's framework.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide recessed walk-off floor mats or surface mounted/loose lay floor mats at building entrances in sizes as indicated in RFP Part 3, Chapter 5 Room Requirements and RFP Part 6 drawings. Recessed walk-off floor mats are part of the construction contract. Surface mounted or loose lay floor mats are part of the FF&E package. Provide sealed concrete underneath recessed walk-off floor mats.

Provide recessed walk-off floor mats with a carpet insert (100% solution dyed) designed for high traffic areas. Recessed walk-off floor mats must have T5 aluminum alloy frame with anodized finish. Provide architectural surface pattern with combination of inserts, finish colors, aluminum slots, and aluminum framework. Inserts must include monofilament abrasive fibers and finish colors must be offered in a broad range of standard neutral and bright colors. Floor mat surfaces must comply with ASHRAE 90.1 and ASHRAE 189.1 requirements.

C103015 ORNAMENTAL METAL WORK

NOT USED

C103090 OTHER INTERIOR SPECIALTIES

NOT USED

--End of Section--

C20 STAIRS AND LADDERS – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Provide ladders as required by the building code for access to platforms and mezzanines, and roof areas.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Provide ladders conforming to UFC 1-200-01, *General Building Requirements*.

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

NOT USED

C201002 FIRE ESCAPE STAIRS

NOT USED

C201090 HANDRAILS, GUARDRAILS, LADDERS AND ACCESSORIES

Provide painted or galvanized steel handrails, guardrails and ladders as required by code. Exterior systems must be coated or galvanized to withstand extreme wear and weathering conditions. Provide handrails, guardrails and ladders with smooth, unbroken surfaces throughout the length of the stair or ladder, as required by code.

Provide metal ladders and railings complying with OSHA requirements for access and protection to all mechanical mezzanines, lofts and similar spaces.

--End of Section--

C30 1INTERIOR FINISHES – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Interior finishes include wall finishes, floor finishes, wall base finishes, and ceiling finishes.

Provide aesthetically pleasing, functional, durable finishes appropriate to the building function. Acoustic properties of materials, as well as durability and ease of maintenance, must be considered during material selection. Maximize the use of sustainable materials.

All interior finish products must be from manufacturer's standard running line offerings. Manufacturer's submitted materials must be made available for purchase at NO MINIMUMS for not less than 7 years from the date of the original product order. Custom fabrications must not be allowed unless otherwise noted.

Finish selections for this project will require the use of wall, floor, and ceiling material accents to enhance the interior design and architecture of the building. Provide an interior finish design scheme that includes a minimum of two different accent colors, to be used throughout the facility. Refer to Part 3, Chapter 6, ESR E20 for Structural Interior Design (SID) requirements and Part 3, Chapter 5, Room Requirements for required locations. Submit floor pattern and accent wall location drawings, indicating proposed interior finish locations with the Structural Interior Design submittal.

GENERAL SYSTEMS REQUIREMENTS

See Part 3 Chapter 5 Room Requirements for specific requirements on Interior Finishes.

C30 SSPC QP 1 CERTIFICATION

C3010 WALL FINISHES

Provide architectural feature wall consisting of wood veneer panel and wood acoustical panel in key public locations to include Lobby and main entrance areas. Acoustical fabric wall panels must be used in the MAT and ELR Classrooms.

Add graphic elements to walls in areas that may be subjected to heavy abuse, or to create design features using wall coverings, graphic art panels or modular textured panels.

C301001 CONCRETE WALL FINISHES

NOT USED

C301002 PLASTER WALL FINISHES

NOT USED

C301003 GYPSUM WALLBOARD FINISHES

All interior wall finish materials must be finished and painted gypsum wall board, as indicated in the Part 3 Chapter 5 Room Requirements.

In all locations where concrete or concrete masonry walls exist in conjunction with GWB over metal stud construction within a space, all walls must be finished with GWB. Moisture-resistant gypsum wall board must be used in all wet or humid areas including, but not limited to

vestibules, toilet rooms and locker room areas. Gypsum walls, fascia, and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. Refer to Part 4, PTS, C304001 General Requirements for the MPI Standards for more information.

Regular and moisture-resistant gypsum wall board must be used in spaces indicated in the Part 3 Chapter 5 Room Requirements.

C301004 CERAMIC AND PORCELAIN TILE WALL FINISHES

Porcelain Tile

Provide through-body color, rectified porcelain unglazed wall tile, minimum size of 12-inch x 12 inch with manufacturer recommended minimum width grout joints. Tile must be minimum Grade B, per ANSI 137.1 (1988), with a wide range of accent colors available. Provide coordinating designer decorative accent strips or coordinating accessory tile shapes, minimum Grade D, as an integral part of the wall tile system. Wall tile must be installed full-height on gypsum wall board substrates. Provide grouted-in edge stainless steel protection strips at all outside and inside corners, stainless steel transition strips where wall tile and floor tile meet, and transitions from tile to other wall finishes.

Backer Board: Cementitious, water-durable board surfaced with fiberglass reinforcing mesh

on front and back, long edges wrapped, and complying with ANSI A118.9 and ASTM C 1325.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

Aesthetic Classifications: Provide tile with an aesthetic classification of V2 Similarly colored with variations in texture and/or pattern.

Install tile to full height of the wall in a running bond pattern.

C301005 WALL COVERINGS

Corner Guards

Corner Guards must be outside corners in all high-traffic interior exposed corners in corridors, except on walls of CMU construction and must be 3” width. They must be surface-mounted in a through-color, recycled, extruded PETG finished aluminum material. Corner guards must extend from top of cove base and extend 8’-0” high and be mechanically installed with a concealed continuous aluminum retainer. Double stick tape and adhesive mounted corner guard methods are not acceptable.

Wall Protection

Provide stainless-steel wall protectors at mop sinks in janitor rooms.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Provide sound absorbing acoustical fabric wrapped wall panels reinforced edges as identified in Part 3 Chapter 5 Room Requirements for MAT and ELR Classrooms. Wall panel system must have a field-replaceable fabric system.

Provide wood veneer acoustical wall panels that are factory-assembled, and factory finished. Panels must be perforated and backed with an acoustic textile product for optimum acoustical quality with limited textile visibility when installed. Veneer selection must be selected from an A grade range of stain grade veneer with minimal graining. Species and finish must coordinate with other wood finishes on interior finish schedule. Include all required corner, transition and

base components for a quality installation. Refer to Part 4 Section C103009 for veneer quality and graining of wood finish materials.

C301090 OTHER WALL FINISHES

Solid Surfacing Wall Finishes

Provide 100% Acrylic Polymer in a solid color or with small size particulate solid surface material for shower surround and window stools.

Exterior windows will receive a window stool.

100 percent acrylic solid surface at Break Rooms: 1/2-inch solid surface wall panel will extend width of sink to top cabinetry from backsplash to underside of wall cabinets.

100 percent acrylic solid surface at Showers: 1/2-inch solid surface wall panels will extend vertically from top of shower pan. Solid surface material will overlap top of shower pan with an air gap, as required by manufacturer installation instructions. Wall panels in shower areas will extend horizontally beyond the “wet area” to the exterior line of the shower receptor threshold. A solid surface transition will be required where solid surface meets wall tile. Locate wall panel seams at corners only. No material seams will be acceptable, except at corners. All shower seams at corners will be lap joints with solid surface corner trim from floor to ceiling. Chemically fuse seams. Include a matching corner shower shelf in each shower compartment. Full-height solid surface transitions will be provided at adjacent wall surfaces. Substrate behind solid surface shower walls will be equal to cementitious ceramic tile backer board. Solid surface shower receptors will be installed prior to wall system. Shower pan receptors will be a minimum thickness of 1/2-inch thick, with a 3/4-inch thick area at least 12 inches in diameter at the drain. Receptors will be one-piece, factory formed shower pans with integral thresholds. Thresholds will have structural supports every 4 inches on center.

Modular Architectural Panels/Decorative Paneling System

Provide modular architectural paneling wall system consisting of wood veneer acoustical panel in key public locations to include Lobby and main entrance areas.

System must utilize ¾ inch thick panels in a rail and spline fastening system with 1/4-inch-wide or 1/2-inch-wide channel reveals, rails, splines and edge trim.

All exposed hardware must be black satin factory finished, anodized aluminum. Panel sizes must be a minimum of 4 x 8 feet.

Wood Trim

paint grade hardwood trim to include crown molding, wainscot and chair rail. Veneer must be selected from A grade of paint grade veneer with minimal graining. Species and stain must coordinate with interior color scheme and interior wood doors. Refer to Part 4 Section C103009 for veneer quality and graining of wood finish materials.

Water-based Epoxy Wall Coating

Water-based epoxy wall coating must be used in the Janitor’s Closet as noted in Part 3 Chapter 5 Room Requirements. Wall coating system must be 10 to 12 mil thick wall system over adequate wall patching compound/wall prep. Wall coating system must consist of one coat of water-based epoxy primer, a waterproofing membrane, two coats of water-based epoxy body/bonding coat, and gloss finish/seal coat from a single wall coating system manufacturer for a uniform, monolithic, slightly textured wall surface with rounded 1” radius inside corners, wall-

to-ceiling and floor-to-wall transitions. All plumbing, floor-to-ceiling and wall-to-floor transition details must be a recommended by wall and floor coating manufacturer.

Plywood

Telecomm closets must receive floor-to-ceiling, 3/4-inch plywood, Class A fire-rated, sanded, face-grade plywood on side and back walls.

C3020 FLOOR FINISHES

Provide floor finish materials to meet the following requirements.

C302001 TILE FLOOR FINISHES

Porcelain Tile Floor Finishes

Provide through-body, rectified porcelain tile in a minimum size of 12 x 12 inches with matching 6-inch-high cove tile base with flat top and bottom edge, or with stainless steel coved transition between floor and wall tile. The cove base must have a flat top/bottom edge. Grout joints in a maximum width of 3/16 inch must be provided. Tile must be non-slip, with a light texture. Texture of tile must be analyzed with regard to maintenance and selected based on a minimal maintenance program. Provide grouted-in stainless steel metal transition strips at expansion joints, corners (inside and outside), and transition between floor and wall tile.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

C302002 TERRAZZO FLOOR FINISHES – BID OPTION

Resinous (Epoxy) Flooring Requirements: Provide resinous (epoxy) flooring as identified in RFP Part 3, Chapter 5 Room Requirements, and as directed below. See Part 4 PTS for additional requirements.

Moisture Testing: Perform tests recommended by manufacturer and as follows:

a. Perform relative-humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
b. If the relative humidity exceeds 75 percent, then manufacturer approved primer moisture mitigation system must be installed prior to resinous flooring installation. Slab-on-grade substrates without a vapor barrier require a moisture mitigation system.
c. Poured-Epoxy Terrazzo Floor System – A 3/8-inch thick (minimum) epoxy terrazzo floor system in accordance with the “NTMA Epoxy Thin Set Terrazzo Specification” and manufacturer specifications, whichever is more stringent. Terrazzo floor system must include (but not be limited to) moisture vapor primer system, crack isolation membrane, zinc divider strips, aggregates, and epoxy terrazzo topping. Aggregate mixture to include marble and/or granite chips, 15 percent minimum colored glass chips and 20 percent minimum recycled mirror chips. Incorporate a base color, three accent colors, and divider strips in a pattern to create a design of interest. Provide an 800-grit level polished finish. Wall base must be separate, 6-inch-height, top set, precast epoxy terrazzo, flat tile base matching the floor field color. See Part 4, Section A103001 Standard Slab on Grade for additional requirements.

C302003 WOOD FLOORING

NOT USED

C302004 RESILIENT FLOOR FINISHES

Luxury Vinyl Tile Flooring

Provide resilient luxury vinyl tile, in corridors, break rooms and other high traffic areas for floors with high durability, low maintenance, high slip-resistance requirements. Luxury vinyl tile will be planks or square tiles as indicated in Part 3 Chapter 5 Room Requirements. Luxury vinyl tile must fall under Product Classification Class III, Type B per ASTM F1700 and use Class III printed film that conforms to ASTM F1700. Luxury Vinyl Tile must not contain ortho-phthalates. Luxury Vinyl Tile must have a minimum Coefficient of Friction of >0.5. All products must be from manufacturer's standard running line offering. Custom products or products with a minimum order quantity are prohibited.

20 mil and 30 mil wear layer products will be accepted if they have the following characteristics: factory applied UV-cured polyurethane finish containing anti-scratch particles and anti-scuff qualities, a test result of B1 or B2 on the Martindale Procedure B Test - BS EN 16094:2012 Procedures B (which assesses the scratch performance of the topical factory applied finish treatment that enhances clean ability and durability), passes ASTM F970 for Static Loads resulting in Pounds per Square Inch (PSI) minimum of 1000 PSI (to avoid materials that have the potential to severely indent and/or break with heavy static loads), and must carry a 20-year manufacturer's written warranty.

40 mil wear layer product with a 20-year manufacturer's written warranty is required.

C302005 CARPETING

a. Carpet Requirements

CARPET CHARACTERISTIC	MINIMUM CARPET REQUIREMENTS
Surface Color	Multi-colored and Patterned with no less than three separate dark colored yarns in the weave, (not variation of color within the fiber) in addition to accent colors, to create a multi-hued background with excellent soil and stain masking properties. Heathered carpet is not allowed.
Surface Texture	Loop or Textured Loop
Modular	24' x 24 or Plank (except on Raised Access Floor)
Yarn Weight	22 oz. minimum for Type 6 Nylon; 18 oz. minimum for Type 6.6 Nylon
Gauge	1/12
Density	7000 oz./cubic yard minimum for Type 6 Nylon 6000 oz./cubic yard minimum for Type 6.6 Nylon
Dye Method	Minimum 100% Solution Dyed
Backing	Attached cushion
Fiber	Type 6.6 or Type 6 Commercially Branded nylon
Stain Resistance	Inherent or permanent stain resistance

Texture Appearance Retention Rating (TARR)	Severe > 3.5
Service Life	10 Year Warranty
Environmental	15% Post-Consumer Recycled Content
	NSF 140 Gold Label Service Life

C302006 MASONRY & STONE FLOORING

NOT USED

C302007 WALL BASE FINISHES

Resilient Wall Base

Provide rubber cove wall base, throughout areas with resilient flooring and straight rubber for carpeted areas.as indicated in Part 3 Chapter 5 Room Requirements.

Tile Base

In areas where wall tile is required, or otherwise specified, tiled floor must have matching 6”-high cove base or stainless-steel cove transition strips between floor tile and wall tile. In areas where no wall tile is specified, tiled floor must have matching 6”-high cove base. When tile cove base is used, base must have flat top and bottom edges to join evenly with adjacent tiles. Resilient base must be 120’ coils. Rounded edges are not allowed. Tile cove wall base units must be pre-formed; cut tiles are not allowed.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

C302008 STAIR FINISHES

NOT USED

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

NOT USED

C302010 HARDENERS AND SEALERS

Finish concrete surfaces smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Provide hardener in concrete mixture in accordance with the manufacture requirements. Exposed concrete floors that are not required to have an applied floor finish, must receive a minimum of three coats of the manufacturer's approved sealer. All polished concrete floor surfaces must be moist-cured, integrally colored and polished to a low gloss level, as required in the Part 4 section of this RFP. A Dynamic Coefficient of Friction of 0.42 minimum must be achieved, tested and documented for all polished interior floor surfaces, as determined by ANSI A137.1-2012. An 8’ x 8’ mock-up of the polished concrete floor must be produced using the same process that will be used to produce the final polished concrete floor surfaces.

C302011 RAISED ACCESS FLOORING

NOT USED

C302090 OTHER FLOORING & FLOOR FINISHES

NOT USED

C3030 CEILING FINISHES

Finished surface of ceiling tiles must be selected to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide interest to ceiling with acoustical panels, clouds, curved feature ceilings or wood feature ceilings.

C303001 ACOUSTICAL CEILING TILES & PANELS

Acoustic Ceiling Panels

Suspended Acoustical Panel System: Primary ceiling finish will be 24” x 24” by 5/8” minimum thickness suspended acoustical panel ceiling system, except provide a suspended gypsum board ceiling in entrance lobby. Acoustical panels will have a square edge, closed pore panel surface unless as noted. Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide sustainable panels.

Provide interest to ceilings in gathering spaces or where the opportunity exists where applicable.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Gypsum Wallboard Ceiling Finishes

Provide Regular Gypsum Board and Moisture Resistant Gypsum Board as indicated in the Part 3 Chapter 5 Room Requirements. Moisture Resistant gypsum wall board must be used in all wet or humid areas include, but not limited to vestibules, toilet rooms and locker rooms areas.

C303003 PLASTER CEILING FINISHES

NOT USED

C303004 WOOD CEILINGS

NOT USED

C303005 SUSPENSIONS SYSTEMS

Provide 24” by 24” aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish must be factory applied white baked enamel. Provide manufacturer’s hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106-inch diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16-inch galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/580M, composition 302 or 304, condition annealed stainless steel, 0.106 inches in diameter over high humidity areas such as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, non-staining and ASTM C636). Recycled content must be a minimum of 25%.

C303006 METAL STRIP CEILINGS

NOT USED

C303009 OTHER CEILING & CEILING FINISHES

Ceiling finishes must be as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

Provide interest to ceilings in gathering spaces or where the opportunity exists where applicable.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

C304001 GENERAL REQUIREMENTS

Spray paint all interior exposed surfaces including metal items, such as interior grilles, registers, diffusers, access panels, and panel boxes with a minimum of two coats in color to match adjacent surfaces, unless otherwise indicated. All primer and paint systems must be the manufacturer's highest premium quality, professional grade. All materials must be moisture and mildew resistant and easily cleaned.

C304002 CONCRETE FINISHES

Paint finish as required for concrete masonry in Part 3, Chapter 5, Room Requirements portion of this RFP. See Part 4, C3040 INTERIOR COATINGS AND SPECIAL FINISHES and provide paint systems in accordance with the MPI standards for the interior architectural surface being finished – Concrete Masonry Units. Finish coat must be a semi-gloss.

C304003 CONCRETE MASONRY FINISHES

NOT USED

C304004 METAL FINISHES

NOT USED

C304005 INTERIOR WOOD FINISHES

NOT USED

C304006 GYPSUM WALLBOARD FINISHES

Gypsum walls, gypsum wall board ceilings, fascias and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See Part 4, C3040 INTERIOR COATINGS AND SPECIAL FINISHES. Include a minimum of two paint selections for accent walls as indicated in Part 3 Chapter 5 Room Requirements.

C304007 SPECIAL COATINGS ON WALLS

High Performance Architectural Coating

Provide high performance architectural paint coatings in areas as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

--End of Section--

D10 CONVEYING SYSTEMS – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Conveying System are not in the scope of the Joint Reception Center.

GENERAL REQUIREMENTS

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

D1010 ELEVATORS

NOT USED

D101001 GENERAL CONSTRUCTION ITEMS

NOT USED

D101002 PASSENGER ELEVATORS

NOT USED

D101003 FREIGHT ELEVATORS

NOT USED

D101004 WHEELCHAIR LIFT

NOT USED

D101005 DUMBWAITERS

NOT USED

D101090 OTHER VERTICAL TRANSPORTATION EQUIPMENT

NOT USED

D1020 WEIGHT HANDLING EQUIPMENT

NOT USED

D102001 OVERHEAD CRANES

NOT USED

D102002 MONORAILS

NOT USED

D1030 ESCALATORS AND MOVING WALKS

NOT USED

D103001 ESCALATORS

NOT USED

D103002 MOVING WALKS

NOT USED

D103003 OTHER MOVING STAIRS & WALKS

NOT USED

D1090 OTHER CONVEYING SYSTEMS

NOT USED

D109001 PNEUMATIC TUBE SYSTEMS

NOT USED

D109002 CONVEYORS

NOT USED

D109003 LINEN, TRASH, AND MAIL CHUTES

NOT USED

D109004 TURNTABLES

NOT USED

D109005 OPERABLE SCAFFOLDING

NOT USED

--End of Section--

D20 PLUMBING – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

The plumbing system consists of all fixtures, potable cold and hot water piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 5 feet of the building.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS section D20 and the manufacturer's recommendations. Design and install plumbing systems in accordance with IPC and UFC 3-420-01, *Plumbing Systems*. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Include the hot and cold-water systems to list of systems to be commissioned in accordance with UFGS 01 33 29.05 20 Sustainability Requirements for Design Build

Refer to RFP Part 3 – Project Program, Chapter 2 for commissioning requirements

D2010 PLUMBING FIXTURES

Provide quantity and type of plumbing fixtures required for the use and functions described for this facility. Obtain occupancy from the owner. Refer to Part 3 Chapter 5 Room Requirements Section for additional specific requirements for spaces with plumbing fixtures. Provide handicapped fixtures in accordance with the referenced criteria in the Project Program.

D201001 WATER CLOSETS

Provide floor mounted flush valve water closets with hard-wired automatic flush control with push button backup. Maximum flushing volume is 1.28 gallons.

D201002 URINALS

Provide flush valve urinals with hard-wired automatic flush control with push button backup. Maximum flushing volume is 0.125 gallons.

D201003 LAVATORIES

Provide solid surface lavatories with integral sinks with hard-wired sensing faucet with automatic control and battery backup.

D201004 SINKS

Provide brushed stainless steel undermount sink in the pantry and break areas. Provide swivel faucet.

Provide countertop sink for Mother's Room.

Provide mop sink in janitor's closets.

D201005 SHOWERS

All showers are to be the low flow type, 2.0 gpm. The shower heads to be located at a stationary position pointed away from the shower entrance opening and to keep from spraying toward the shower entrance opening and causing water damage. The shower faucet and spray head are to be a surface mount unit complete with prefabricated stainless-steel mount and enclosure panel, temperature compensating shower valve with metal stem handle and integral service stops, and a shower head with flow control on institutional bracket.

D201006 DRINKING FOUNTAINS AND COOLERS

Provide hi low drinking fountains. Each drinking fountain must have a bottle filler.

Provide wall recess or side walls to protect drinking fountains.

D201090 EMERGENCY FIXTURES

Provide emergency shower and eyewash in the with privacy curtain and rail.

Provide tepid water (60F to 100F) with water tempering valve assembly.

Provide alarms and appurtenances for service within NEMA type 4 enclosures.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine the potable water pressure at the building and calculate piping system requirements.

D202001 PIPES AND FITTINGS

Provide Copper piping Type L for above ground and Type K for buried. Press fittings are not allowed.

D202002 VALVES & HYDRANTS

Provide isolation valves at supply to each floor. Provide hose bibbs in mechanical rooms and within 25 feet of all exterior equipment with coils. Provide wall hydrants along the building exterior such that all points along the perimeter can be reached with a 25-foot-long hose.

D202003 DOMESTIC WATER EQUIPMENT

Provide backflow preventers of types and at points within domestic water systems as specified by IPC. Locate inside the mechanical room on service entrance lines where not provided exterior to the building.

Perform calculations to determine the water heater capacity to supply hot water to the fixtures.

Provide electric or natural gas water heater for heating of domestic water.

Provide water tempering valve assembly.

Provide domestic hot water recirculation system with high efficiency recirculation pump and recirculation loop with all associated fixtures, equipment, and appurtenances. Provide inline circulator for domestic hot water distribution system. Provide balance valves throughout system to allow for system balance to achieve required maximum wait times per International Energy Conservation Code. Provide domestic water balance per UFGS 23 05 93.00 22 *Testing, Adjusting, and Balancing for Mechanical Systems*.

If water flow test shows inadequate water pressure, provide domestic water booster system for domestic water distribution system.

Provide water meter on the building main. Water meters must be appropriately sized for the building load. The water meter register must display gallons and must be clearly visible for inspection. The register must be compatible with the Itron 100W encoded radio transmitter (ERT). Refer to Itron's documentation for a compatibility list.

Contact: United Systems & Software, Incorporated

Jody Cline

800.455.3293

jodyc@united-systems.com

The ERT must be an Itron 100W+ with encoded output. The ERT must be installed per Itron installation guidelines. The contractor must supply all necessary mounting material, cabling, etc.

For meters installed inside of facilities (e.g. Mechanical room), the ERT must be mounted on the outside wall of the room.

Meters installed in pits must utilize the appropriate "through the LID" antenna.

The ERT must be proven to be capable of communicating with Itron's Advanced Meter Reading (AMR) and/or Advanced Metering Infrastructure (AMI) technology. Camp Lejeune's current AMR technology includes Mobile Collector Lite (MC Lite). AMR technology consists of Choice Connect version 5, with Cell Collector Units (CCUs). Prior to acceptance, all installations must prove successful communication between the meter endpoint (ERT) and Camp Lejeune's endpoint AMR and/or AMI communication equipment (i.e. MCLite/FC300 handheld and/or CCU).

The contract must submit the following information for each location (meter) included in the project.

Meter: Make, Serial Number, Size, Compound (Y/N)

Register (aka Encoder): Make, Model, Dials, Multiplier, Unit of Measure (i.e. gallons)

ERT: Make, Model, ID, Latitude, Longitude.

D202004 INSULATION & IDENTIFICATION

Provide cellular glass insulation with vapor barrier on domestic hot water supply piping and on domestic cold water supply piping. Provide identification for piping and equipment.

D202005 SPECIALTIES

NOT USED

D202090 OTHER DOMESTIC WATER SUPPLY

Provide piping supports in accordance with the IPC. Provide inspections, disinfection, and testing in accordance with the IPC.

Provide recessed water-outlet boxes for ice and coffee makers.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

D203002 VENT PIPE & FITTINGS

Provide cast iron hubless pipe and fittings, rubber compression gasket joints and stainless steel banding.

D203003 FLOOR DRAINS

Provide floor drains in mechanical rooms, restrooms, break rooms, in proximity to emergency eyewashes and showers, and plumbing chase areas.

Provide floor sinks to receive condensate from air handling units.

D203004 SANITARY & VENT EQUIPMENT

Provide sump pump in building drains that cannot discharge to the sewer by gravity.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTING

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

D204002 ROOF DRAINS

Provide roof drains that are compatible with the roofing system.

D204004 INSULATION & IDENTIFICATION

Domestic, Storm and Condensate piping.

D204090 OTHER RAIN WATER DRAINAGE SYSTEM

NOT USED

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Obtain natural gas pressures from the local gas utility provider. Contractor must invite the utility provider to the design reviews. Contractor is responsible for any applications and permits, and

must provide the complete natural gas system from the load side of the utility meter to the heating equipment. Provide steel natural gas piping system and include gas distribution piping from the gas meter to points of usage. Follow Camp Lejeune design standards for piping pressures inside the building.

The Contractor must provide the projected loads to the gas utility provider 6 months prior to in-service date. The Contractor must have the local gas utility provider install piping and appurtenances up to the load side of the meter. Tie the gas meter into the building automation system (BAS) and the existing advanced metering infrastructure (AMI) metering system.

Natural Gas Utility Provider Information:

Piedmont Natural Gas

Invite the following to Design Reviews:

i. Michael Lilly- PNG Commercial and Residential Sales Specialist- michael.lilly@duke-energy.com - 252-808-7292

ii. Bobby Gurganus- PNG Construction- bobby.gurganus@duke-energy.com - 252-670-9613

D209002 ACID WASTE SYSTEMS

NOT USED

D209003 INTERCEPTORS

NOT USED

D209005 COMPRESSED AIR SYSTEM

NOT USED

D209090 OTHER SPECIAL PLUMBING SYSTEMS

NOT USED

--End of Section--

D30 HVAC – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Provide the following type of high performance system:

Provide a variable air volume (VAV) system with shut-off terminal units and hot water heating coils. The VAV AHU will feature a chilled water-cooling coil and a hot water preheating coil. Ventilation air will be provided via the VAV AHU(s). Provide a total enthalpy fixed plate heat exchanger energy recovery section in the VAV AHU. Chilled water will be generated by an air-cooled chiller, and hot water will be generated by condensing gas boiler[s]. Size the AHU coils, chillers, and boilers for full capacity, in the event of a heat recovery system failure.

The primary air from the VAV AHU will be ducted to the terminal units by medium-pressure galvanized metal ductwork. Supply air from the terminal unit to the zone and return air from the zone to the AHU will be ducted by low-pressure galvanized metal ductwork.

Roof mounted equipment is not permitted.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections, and accessories required for a complete and usable system. Install all equipment in accordance with the criteria in Performance Technical Specification Section D30 and the manufacturer's recommendations. Where the word "should" or “must” is used in manufacturer’s instructions, substitute the word "must."

Economizer cycles must not be used.

The new facilities must not use rooftop heating, ventilation, and air conditioning (HVAC) equipment. All major HVAC equipment must be located in mechanical rooms. Consider attic and above-ceiling placement of AHU equipment only when absolutely necessary. Stairs are required for any above-ceiling or attic located air-handling equipment (excluding VAV terminals). Attic space may be used for mechanical equipment if there is a 6-foot-wide stairway with double doors for maintenance purposes. Equipment with cooling coils placed above ceilings must have secondary drain pans with approved gravity drainage piping.

Provide corrosion protection for ALL exterior HVAC equipment, including air-handling units (AHUs), heat exchanger coil surfaces, equipment casings, air-cooled water chiller coils, heat pumps, and air conditioning units that are exposed to the weather. Corrosion protection is also required on HVAC equipment within buildings that are subject to the outside weather conditions. Specifically, equipment requiring protection is defined as the first HVAC equipment (unit coils) met by the outside air in the supply air ductwork system. The corrosion protection must meet or exceed the requirements of a 3000-hour salt spray test in accordance with ASTM International (ASTM) B117. The specified capacities on the plans and specifications must be the capacities after the required corrosion protection coatings are applied. Specify manufacturer's standard off-the-shelf anti-corrosion options for "coastal" or "sea coast" installations that meet or exceed the requirements stated above.

Provide radiant barriers in the exterior wall system. Optimize the building envelope and window requirements to exceed ASHRAE 90.1-2013.

Provide premium-efficiency motors, chillers, and boilers, and optimize the HVAC system.

Provide Seal Class A on all ducts to reduce duct losses. Increase thermal insulation on mechanical systems and use radiant barriers to reduce thermal losses.

Provide chemical shot feeders, air separators, and bladder type expansion tanks for hydronic systems. Provide inline centrifugal pumps with inlet suction diffusers, isolation valves, discharge check valves, balancing valves, drain valves, differential pressure gauges, and flexible pipe connectors and coupling guards.

Single-phase fractional horsepower alternating current motors must be high-efficiency types corresponding to the applications listed in National Electrical Manufacturers Association (NEMA) Motors and Generators (MG) 11. Select polyphase motors based on high-efficiency characteristics relative to the applications listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium-induction motors with continuous ratings must meet or exceed energy-efficient ratings per Table 2-10 of NEMA MG 1. Provide controllers for three-phase motors rated 1 horsepower (hp) and above with phase voltage monitors designed to protect motors from phase loss and over-/under-voltage. All motors 1 hp and larger must be premium efficiency. Provide the means to prevent automatic restart by a time-adjustable restart relay. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart. Provide reduced-voltage starters for all motors 25 hp and larger.

Provide minimum 4-inch (100 mm) thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment.

Provide factory painted finishes that are designed for 3000 hour duration test for outside equipment and for equipment bringing in outside air.

Provide a manufacturer approved coating system for coastal environments on mechanical equipment, cooling, heating, and condenser coils on units with more than 5 tons of cooling capacity. The submittals must indicate heat transfer rating of coated coils.

The facility must have a complete air and water balanced HVAC system. Calculations must be provided and show the air and water systems are balanced. Drawings must also show balanced air and water systems.

Provide air conditioning and heating for spaces as indicated and for the following Design conditions:

Outside Conditions

Summer	91	Degrees F dry bulb	Winter	26	Degrees F
	79	Degrees F wet bulb	Dehumidification	140	Grains/lb

Outside Design Conditions for Air Cooled Equipment

Summer	95	Degrees F dry bulb			

Inside Conditions – Heated and Cooled Area (unless otherwise noted in Room Requirements - Chapter 5)

Summer	78	Degrees F dry bulb	Winter	68	Degrees F
	50	%RH			

Heating and Ventilating Conditions – Electrical Rooms, Mech Rooms with Heat producing equipment (Boilers, Water Heaters, etc)

Summer	10	Degrees F dry bulb above ambient	Winter	55	Degrees F

Inside Conditions – Cold Mechanical Rooms (AHUs and pumps)

Summer	N/A	Degrees F dry bulb	Winter	55	Degrees F
	55	Degrees F Dew Point			

Inside Conditions – Communication and IT Rooms

Summer	78	Degrees F dry bulb	Winter	NA	Degrees F
	55	Degrees F Dew Point			

Provide Ventilation rates and systems per ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*. Provide CO2 sensors to limit CO2 concentration to 800ppm in spaces with 25 or more occupants per 1,000 square feet.

Noise levels must comply with the requirements in the latest edition of the ASHRAE Applications Handbook. The design must provide noise level control by requiring maximum noise levels as well as noise separation areas for the Mechanical Rooms. The drawings must specify the maximum equipment noise level. Classrooms must not be adjacent to mechanical rooms

Mechanical room(s) and electrical room(s) with heat producing equipment must each be a separate zone, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01

Cold mechanical rooms(s) (AHU's, chilled water pumps) must each be a separate zone, heated and dehumidified.

Provide a separate zone for IT closets, telecom rooms and server rooms. These zones shall be served by dedicated DX split system equipment.

The HVAC system must provide each zone with the choice of heating or cooling year-round unless otherwise indicated. Provide each zone with its own thermostatic range of control.

Zone the HVAC system as follows:

Administrative spaces such administrative areas, offices, shops, maintenance control, quality assurance, ready rooms, conference rooms, flight equipment, training rooms, tool rooms, restrooms, lockers, elevator lobbies, break rooms, corridors, and project rooms must be zoned separately, such that each administrative space greater than 175 square feet (SF) is its own zone, and any spaces less than 175 SF must be grouped into a single zone.

- Corridors must not be on separate zones. Locate thermostats for corridors in separate occupied spaces.
- Provide a separate zone for the boiler room, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01.
- Provide a separate zone for IT closets, telecom rooms, and server rooms.
- Provide a separate zone for electrical rooms.
- Provide a separate zone for the chilled water pump and AHU rooms, heated and dehumidified only, no ventilation.
- Provide separate zones as indicated on the room information sheets.

For unoccupied mode, provide the following night setback temperatures:

- For winter, 10 degrees F lower than indoor heating design conditions, but no lower than 55 degrees F.
- For summer, 5 degrees F higher than indoor cooling design conditions, but no higher than 85 degrees F.
- Year round, 60 percent RH maximum.

Provide thermostats and temperature sensors with occupant adjustment control of +/- 3 degrees F.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

NOT USED

D301002 GAS SUPPLY SYSTEM

Provide a natural gas supply system for the heating of the facility. Natural gas must be the energy source (at a supply pressure of 5 inches water column [w.c.] minimum to 7 inches w.c. maximum) for all building heating systems. Provide a complete natural gas supply system as detailed in the specification in accordance with National Fire Protection Association (NFPA) 54,

the North Carolina Building Code, the North Carolina Mechanical Code, and natural gas supplier requirements. Size natural gas piping to carry 15% more flow than is required by heating loads. Obtain natural gas pressures from the local gas company, Piedmont Natural Gas (PNG). The Contractor is responsible for coordinating with PNG and the Contracting Officer regarding the natural gas requirements for each facility. Provide a complete natural gas system, including any applications and permits. PNG will provide the natural gas to within 5 feet of each facility.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

NOT USED

D301004 HOT WATER SUPPLY SYSTEM

NOT USED

D301005 SOLAR ENERGY SUPPLY SYSTEMS

NOT USED

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility consisting of at least two boilers. Each boiler must be no greater than 399,000 Btu/hr. For loads less than 399,000 Btu/hr provide two boilers with 100% redundancy. For loads greater than 399,000 Btu/hr and two boilers are needed based on size limitations, each boiler must supply no less than 65% of the heating load. Where more than two boilers are required to meet size limitations, size each boiler for 1/N of the total load, where “N” is the total number of boilers. On multiple boiler installations with the largest boiler off line, the remaining boiler(s) must be capable of carrying not less than 65% of the maximum winter design load. The boiler fuel train must be compatible to match the available source at the project site. Use the building block load to size the heating plant.

Refer to Part 3, Chapter 2, Paragraph 2.3.9 Air Quality Management, for air emission permit information. Air Emission permit is required for each combustion device provided.

All combustion sources are subject to the NC Air Toxics Permitting requirements.

D302001 BOILERS

Provide packaged gas-fired condensing type boilers. Provide minimum 90% efficiency boilers with stainless steel heat exchangers. All heating equipment boilers must have the ENERGYSTAR label. Provide a stainless steel, multi-wall insulated boiler stack. The stack must be pre-engineered and pre-manufactured, Underwriters Laboratory (UL) listed, and must meet NFPA 211. Fuel for boilers must be natural gas. Provide boiler(s) with a condensate neutralization tank/kit.

All vents on gas control valves must be routed outdoors as required by NFPA 54. All gas lines serving gas-fired equipment must be fitted with UL or Factory Mutual approved gas trains suitable for the gas being provided.

D302002 FURNACES

NOT USED

D302003 FUEL-FIRED UNIT HEATERS

NOT USED

D302004 AUXILIARY EQUIPMENT

NOT USED

D302005 EQUIPMENT THERMAL INSULATION

Provide all hot water equipment with cellular glass insulation with vapor barrier jacket or molded fiberglass with vapor barrier jacket.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

HVAC refrigeration and air conditioning compressors must have full 5-year warranties including all parts and labor from the time of Beneficial Occupancy

Provide rotary screw or scroll air-cooled chillers. Provide high-efficiency air-cooled chillers. Provide constant primary/variable secondary pumping systems on single chiller systems greater than 60 tons and on multiple chiller systems. Primary pumping may be used only on single chiller systems less than 60 tons. Keep flow through the chiller constant; do not use variable primary flow. A buffer tank must be provided on all systems to provide thermal inertia. Provide multiple chillers for loads greater than 160 tons with each chiller sized for 50% of the total facility cooling load.

For unique facilities that exhibit widely variable occupant loading, multiple dissimilar sized chillers must be provided as appropriate for the low occupancy condition and fully occupied condition.

The chillers must be located in an exterior equipment yard area and properly spaced from each other and other equipment away from building perimeter. The air-cooled chiller(s) must be located outside on a 150 mm (6-inch) thick reinforced concrete housekeeping pad. Provide heat tape to ensure freeze protection as low as 10°F on chilled water piping and any other associated appurtenances. Refer to the MCB Camp Lejeune mechanical policy for the requirements for phase and voltage protection requirements for chillers. Provide emergency chiller connections consisting of isolation valves and blind flanges.

Low ambient capability must be provided to allow chillers to operate in temperatures as low as 15°F (-9.4°C).

All coils must have the approved coatings that pass a salt-spray test conducted per ASTM B117 for duration of at least 3,000 hours and provide a minimum of loss of heat transfer due to the thickness of the coating.

Provide the approved quantity, size, spacing, material, and height of bollards around all yard equipment.

Provide blind flanges with butterfly isolation valves at the chiller location for emergency portable chiller connection. Coordinate site plan design to accommodate access needed for an 18-wheeler flatbed to park near the flange location.

Provide chiller controls with BACnet communication protocol.

Provide complete start-up and operational testing of chiller equipment.

Provide heat tracing of the chiller bundle and all above ground piping and valves, etc. that are subject to ambient temperatures.

Provide insulation and vapor barriers on all chilled water equipment.

Provide complete system flushing and start-up for the entire chilled water system including piping.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for chilled water piping system.

Startup must include operational testing of chiller equipment and full commissioning.

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled DX ductless split system cooling only unit for IT closets, telecom rooms, and server rooms and any other space requiring independent conditioning. If the unit does not have a BACnet system interface, provide a room temperature sensor and a current sensor, tied to the building DDC system, to determine the operating status of the system. Size DX cooling equipment at 120% of IT equipment load. Provide low ambient cooling.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide shutoff-type terminal units with hot water reheat coils to serve zones. To maximize energy savings on this project: the shutoff-type terminal units must comply with ASHRAE 55 and sized to meet indoor design conditions (temperature, humidity, ventilation, etc.) that are used in the design; do not size shutoff-type terminal units to maintain a minimum of 4 AC/Hr in occupied mode.

Provide insulated, galvanized steel ductwork in concealed locations constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards. For exposed ductwork, provide insulated, double walled, galvanized steel duct.

Provide medium-pressure duct from VAV AHU to shutoff-type terminal unit. Provide round or flat oval primary supply air duct. Size the medium pressure duct according to the static regain method. Provide low-pressure supply air duct from the terminal unit to the zone being served. Provide low-pressure return air duct from the zone to the VAV AHU. Provide a minimum of 6 diameters of rigid straight duct at the inlet to each VAV terminal to maintain a uniform velocity profile at the valve inlet for airflow measurement accuracy. Flexible duct connection to the primary air inlet of VAV terminal is not permitted.

Provide shutoff-type terminal units typically above lay-in ceilings. Provide terminal units above hard ceilings with lockable access panels.

Provide aluminum grilles, registers, and diffusers. Provide linear slot diffusers including manufacturer insulated plenum.

Provide manual balancing dampers for all main and branch ducts. Incorporate product requirements identified in the UFGS 23 00 00 Manual Balancing Damper Editing Guide, in RFP, Part 6, into project specifications.

Install all metal duct to Seal Class A standard. Insulated flexible duct may be installed in low-pressure supply duct but may not exceed 5 feet in length or provide more than a 45-degree change in direction. Flexible duct may not be installed in return or exhaust air duct.

Provide AMCA 540 and 550 rated louvers.

Size low pressure supply ductwork at 0.08"/100LF and negative pressure return/exhaust at 0.05"/100LF (max).

Provide rigid foil faced board insulation where ducts are exposed in mechanical spaces. Provide pre-manufactured double wall ductwork on building exterior or where ducts are exposed in occupied spaces. Insulate all ductwork.

Mineral fiber blanket wrap must meet the requirements of ASTM C1136, ASTM C1290, ASTM C1338, ASTM E84, UL 723, NFPA 90A, and NFPA 90B.

Rigid mineral fiber must meet the requirements of ASTM C553, ASTM C612, ASTM C1136, ASTM 1393, ASTM E84, and UL 723.

Make duct penetrations of all walls with sheet metal ducts. Flexible duct penetrations of walls are not acceptable.

Coordinate locations of all air devices with ceiling mounted equipment. Maintain minimum of 3'-0" from ceiling mounted smoke detectors.

Provide unvaned radius elbows with a radius equal to 1 ½ times the duct width. Provide all 90-degree mitered square elbows with turning vanes with a radius equal to 2 times the duct width. Provide access doors upstream of all elbows with turning vanes.

Do not hangs duct from other ducts.

Provide canvas duct connectors for all equipment ductwork connections containing fans. Provided grounding across flexible connections with flexible copper grounding straps. Grounding straps must be bolted or soldered to both the equipment and the duct.

Ductwork and air handling equipment must be sealed and protected from dirt and debris during the entire construction duration.

Provide separate chases for ductwork and piping. Do not install ductwork and piping in the same chase.

Route all ductwork perpendicular and parallel to the building structure.

Where sheet metal is visible through the face of air terminals, paint sheet metal with a flat black enamel finish.

Manual Balancing Dampers (Accessible): Round type is not acceptable. Provide pre-manufactured rectangular type with 16 gage galvanized steel channel frame with corner braces. Blades will be opposing type 16 gage with a maximum width of 8". Provide with a 20 gage blade stop on units 12" high and under. Provide with position lock, molded synthetic bearings, and square shaft.

Manual Balancing Dampers (Inaccessible): Provide cable operated remote controlled volume dampers in inaccessible branch ducts feeding diffusers. Dampers must be adjustable through

the diffuser face with standard hand tools, providing positive balancing of multiple airflows to maintain design air throw and noise criteria. Radial damper must be direct actuated by a brass plated rotary cable which is fixed at the damper end in an integral support bracket. Rotary cable must have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions. The entire assembly must be furnished as one piece for installation with no linkage adjustment required or miscellaneous small parts. Each unit must be factory tested as a complete assembly prior to shipment (100% testing). Accessible cable end must be secured with a factory furnished nylon clamp, allowing maximum placement flexibility. Positive, direct, two-way damper control must be provided without sleeves, springs, or screw adjustments (that may loosen after ceiling closure).

Motorized dampers frame must be 16 gage (1.6) galvanized steel structural hat channel with tabbed corners for reinforcement for 11 gage (3.05) structural equivalence. Blades must be 14 gage (2.0) equivalent thickness galvanized steel, roll-formed airfoil type for low pressure drop and low noise generation. Blade edge seals must be suitable for -72°F to +275°F and mechanically locked into the blade edge. Adhesive or clip-on type seals are unacceptable. Jamb seals must be flexible metal, compression type to prevent leakage between blade end and damper frame. Blade end overlapping frame is unacceptable. Bearings must be corrosion resistant, permanently lubricated stainless steel sleeve type turning in an extruded hole in the damper frame. Axles must be hexagonal positively locked into the damper blade. Linkage must be concealed out of airstream, within the damper frame to reduce pressure drop and noise. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Dampers must be equipped with factory installed damper position indication switch package. The switch package must include two position indication switches linked directly to the damper blade to provide full open and full closed damper blade position. The switch package must be capable of interfacing with the HVAC control system and provide remote damper blade position status. Factory mounted damper actuators with adjustable memory stops must be furnished and mounted by the damper manufacturer in their factory. Each damper must be cycle tested at the factory prior to shipment.

D304002 STEAM DISTRIBUTION SYSTEMS

NOT USED

D304003 HOT WATER DISTRIBUTION SYSTEMS

For exterior buried Hot Water Distribution Systems see Section G30, *Site Civil/Mechanical Utilities*.

Provide a variable speed pumping system to serve the HVAC hot water equipment throughout the facility. Provide two pumps, each sized at 100% of building load. Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility.

Provide valves and related hot water system appurtenances. Provide a bladder type expansion tank and air/solids separator for the hot water system. Provide a shot type feeder for manual chemical feed to the hot water piping system.

Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with mineral fiber insulation.

Provide system flushing and startup for the hot water piping system.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for hot water piping system.

Provide complete startup and operational testing of all hot water systems.

Hot-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

D304004 CHANGEOVER DISTRIBUTION SYSTEMS

NOT USED

D304005 GLYCOL DISTRIBUTION SYSTEMS

NOT USED

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

For buildings with less than 60 tons of cooling load, provide a constant primary pumping system to serve the HVAC chilled water equipment throughout the facility. For buildings with more than 60 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with a single primary pump per chiller. For buildings with more than 160 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with one primary pump per chiller. In all cases, keep flow through the chiller constant.

For building less than 160 tons, provide two primary pumps or two secondary pumps as appropriate with each pump sized for 100% flow. For buildings with more than 160 tons, provide three secondary pumps, each sized for 50% of maximum building flow. Two pumps must operate as duty pumps and the third must act as standby. Provide a control sequence to rotate pump duty/standby assignments monthly and equalize running hours.

Provide valves and related chilled water system appurtenances. Provide a bladder type expansion tank and air/solids separator in chilled water system. “Triple duty” or “multi-purpose” valves that combine a check valve, throttling valve, and shut-off valve must not be used for the chilled water system. Provide air vents at all terminal equipment and system high points for air control.

Provide steel and copper chilled water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with cellular glass insulation on all above ground chilled water distribution piping.

Provide air vents at all terminal equipment and system high points for air control. Provide a shot type feeder for manual chemical feed for the chilled water piping system.

Provide thermal mass capability in the chilled water system to insure proper control and longevity of chillers by using inertia tanks. Provide inertia tanks, sized per chiller manufacturer recommendation to ensure stability of operation and temperature setpoint control. Total chilled water system volume must be a minimum of 7 gallons per ton of cooling. Provide an insulated storage tank within the mechanical room in order to meet this requirement.

Provide insulation, vapor barrier, and aluminum jacketing on piping exposed to outdoors. Install heat tracing on piping to ensure freeze protection to 10°F.

Provide system flushing and startup for the chilled water piping system.

Provide complete startup and operational testing of all chilled water systems.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

Provide threaded joints for steel pipe 2" or less and welded or bolted flange for sizes greater.

Provide flanged connections with flexible braided stainless steel connectors at all equipment connections.

Provide pre-manufactured dual containment system consisting of carrier pipe, cellular glass carrier insulation, air space, steel conduit, polyurethane outer insulation, and seamless extruded HDPE casing for direct buried piping. The carrier pipe must be ASTM A53 steel schedule 40 or

80 as scheduled. The product must be rated for corrosion resistance without the need for cathodic protection. Provide with leak detection system.

Chilled-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards. Install exhaust duct according to Seal Class A.

Provide ducted exhaust ventilation rate according to ASHRAE 62.1.

D304008 AIR HANDLING UNITS

Provide central station VAV AHUs to provide constant temperature primary supply air to all terminal units. Provide hot water preheating coils, chilled water-cooling coils, variable-speed fan sections, ultraviolet coil disinfection systems, and energy recovery sections. Units must include additional sections as necessary to facilitate ready access to all maintainable components.

The energy recovery section must be a fixed plate total enthalpy heat exchanger with MERV 8 prefilters and MERV 13 filters upstream of the unit in both the outside air and exhaust air streams. If AHU manufacturers are unable to provide these filters in the central station unit, provide ducted filter boxes outside the unit in a location accessible for filter replacement.

Provide the means to measure filtered outdoor airflow to verify proper ventilation.

Provide modular, central station, air handlers with the following:

Unit panels must be 2-inch solid. Exterior surfaces of the unit casing must be factory painted to withstand ASTM B117 90 3000-hour salt spray requirements.

All interior casing panels must be made of stainless steel.

Casing air leakage must not exceed leak class 9 (CL = 9) per ASHRAE 111.

Panel insulation must provide a minimum thermal resistance (R) value of 13 $ft^2 \cdot h \cdot {}^oF/Btu$ throughout the entire unit.

Access doors must be 2-inch double-wall construction with latching door handles.

Provide factory-mounted, weather-resistant, light emitting diode (LED) fixtures in sections of the unit for maintenance and service visibility.

Provide a fan array for the supply and return. The fans must be direct drive, single-width, single-inlet plenum. The fan blades must be aluminum backward-inclined airfoil. Fan array fans must be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.

The fan and motor assembly must be internally isolated from the unit casing, furnished and installed by the unit manufacturer.

Provide with factory mounted VFD for control of fan speed to modulate the airflow.

Provide 24-inch-long (min.) modular inspection sections with removable doors on both sides of the chilled water coil module.

The coil must have a factory applied flexible epoxy polymer coating (1 mil min. thickness) uniformly applied to all coil surface areas without material bridging between fins.

Provide two sets of spare filters for each AHU.

Provide a factory-installed dial type differential pressure gauge piped to both sides of the filter to indicate status.

A mixing section module must be provided to support the damper assembly for outdoor, return, and/or exhaust air. Dampers must modulate the volume of outdoor, return, or exhaust air. The dampers must be of double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades. The blades must rotate on stainless-steel sleeve bearings. Airfoil dampers must be rated for a maximum leakage complying with ASHRAE 90.1.

Provide an air blender section to mix outside and return air, minimize stratification, and reduce the risk of frozen coils.

Fully modulating 2-way hydronic coils. If the AHU is at the end of the water loop, a 3-way valve arrangement at the final coil connection is acceptable in lieu of a bypass.

Provide a factory installed combination VFD/disconnect for each fan motor. Each VFD/disconnect must be properly sized, factory mounted in a full metal enclosure, wired to the fan motor (s), and commissioned. VFD/disconnects must include a circuit breaker disconnect with a through-the-door interlocking handle designed to rest only in the full ON or OFF state and must be lockable in these states. A concealed defeater mechanism must allow entry into the enclosure when the handle is in the ON position. The VFD package must also include:

• Electronic manual speed control

• Current limited stall prevention

• Auto restart after momentary power loss

• Speed search for starting into rotating motor

• Anti-windmill with DC injection before start

• Phase-to-phase short circuit protection

• Ground fault protection

D304090 OTHER DISTRIBUTION SYSTEMS

Provide inline pumps with variable frequency drives.

Hangers, Clamps, Rollers, and Supports must comply with MSS SP-58 unless otherwise noted. Steel channel strut and angle iron are acceptable materials for field constructed trapeze hanger assemblies where the rated load limit is not exceeded. Provide with MSS type carbon-steel hanger rods, nuts, saddles, and U-bolts.

Run all horizontal piping above ceiling unless otherwise noted.

Provide full line size valves except control and balancing valves.

Provide extended plugs and labels where piping is insulated. Provide removable insulation over plugs.

Provide manual air vents at all high spots and the ends of all piping loops. Do not use automatic air vents in any place other than mechanical rooms where floor drains are already provided for.

Provide 1/2" drain valves at low points in piping. Provide minimum pitch sufficient to insure adequate venting and draining.

Provide permanent flushing isolation valves and tees at both sides of all hydronic equipment. Provide tees with ¾” hose end connection and removable brass cap.

Do not hang pipe from other pipe.

Do not use flexible braided pipe to change direction at equipment connections regardless of manufacturer documentation.

Do not bend pipe or pipe hangers to correct poor alignment.

Route all piping perpendicular and parallel to the building structure.

Maintain a minimum of 3'-6" of ground cover over all underground HVAC piping.

Install piping so that all valves, strainers, unions, traps, flanges, and other appurtenances requiring access are accessible from below.

Install valves so that the valves will remain in service when equipment or piping on the equipment side of the valve are removed.

Provide balancing valves with position indicators and maximum adjustable stops (memory stops).

Provide chain wheel operators for all valves in equipment rooms mounted greater than 7'-0" above floor level; chain must extend to 7'-0" above floor level.

Install unions and/or flanges at each piece of equipment, in bypasses, and in long piping runs (100 feet or more) to permit disassembly for alteration and repairs.

Install all piping without forcing, springing, or bending.

Tap all branch lines from top of piping mains (45 degrees preferred, 90 degrees acceptable).

All valves must be set up and adjusted for smooth and easy operation.

All piping work must be coordinated with all trades involved. Offsets in piping around obstructions must be provided at no additional cost to the government.

Provide stainless steel flexible connections in all piping systems connected to pumps, chillers, cooling towers, and other equipment which require vibration isolation. Flexible connections must be provided as close to the equipment as possible.

Unless otherwise noted, all chilled water and hot water piping must be no less than ¾".

All piping must clear doors and windows.

Provide dielectric fittings at all pipe connections of dissimilar metals.

All piping must be free of dirt, debris, and moisture prior to installation of insulation. Chilled water systems must be disabled, brought to room temperature, and free of external moisture prior to insulation installation.

Install piping in accordance with the latest editions of MSS SP-58 and ASME B31.9. Use MSS type hangers and supports. Provide saddles and base supports. All-thread rod is acceptable for tension support applications only, not compression.

Select thermometers and pressure gages where the operating condition falls within the middle third of the range.

Provide chrome plated escutcheon plates for exposed pipe penetrations in occupied spaces.

Do not route pipe risers in duct shafts. Do not penetrate fire rated shafts with pipe unless the shaft is specifically allocated for that service.

Size all hydronic piping between 1 feet and 4 feet total dynamic head pressure drop per 100' length.

Grooved piping and press fittings are prohibited in all applications.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide gas fired or hot water unit heaters to serve the heating requirements of mechanical and air handler rooms of the facility.

D305003 FAN COIL UNITS

NOT USED

D305004 FIN TUBE RADIATORS

NOT USED

D305005 ELECTRIC HEATING

NOT USED

D305006 PACKAGE UNITS

NOT USED

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROL SYSTEM (DDCS)

Provide a complete Direct Digital Control (DDC) system to comply with UFGS 23 09 00.00 22 Instrumentations and Control for HVAC, UFGS 23 09 13.00 22 Instrumentation and Control Devices for HVAC, and UFGS 23 09 23.02 22 BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems for the facility. All Camp Lejeune specific standards and requirements in Division 23 sections in Part 5 of this RFP must be incorporated into the design where applicable.

The DDCS must utilize intelligent distributed controllers, which communicate over a controller network in accordance with ASHRAE Standard 135-2016, BACnet – A Data Communication Protocol for Building and Control Networks. Provide all necessary hardware, software and control devices to perform the optimal operation of the entire HVAC system and other building systems.

The Energy Management Control System (EMCS) has an existing front-end system managed by DPW. The government is responsible for integration of the building onto the base-wide network and integration of new buildings into the front-end. Contractor point of demarcation is the field point of contact (FPOC) and will be designed using BACnet protocol for future

integration. The EMCS building level system must be designed and commissioned to match the existing ATO level of L-M-M. Contractor must use DDC equipment and Meters selected from base ATO approved equipment listing or must provide forty (40) hours testing time and support for DPW cybersecurity testing and hardening at the base's test environment. Only equipment capable of meeting cybersecurity hardening requirements will be accepted for use.

Provide two (2) CAT6 cables from the Supervisory Panel to the telecommunications closet. Incorporate requirements identified in the UFGS 23 09 00.00 22 provided in RFP, Part 5, into project specifications.

Provide meters, monitored by DDC, on the following incoming utilities of the building: Domestic water, natural gas, electricity. Tie the gas meter into the existing Advanced Metering Infrastructure (AMI) metering system. For electrical energy monitoring refer to Section D50, *Electrical,* paragraph entitled, *Service Entrance Equipment.* For potable water meter refer to Section G30, *Site Civil/Mechanical Utilities,* paragraph entitled, *Potable Water Distribution.*

Preferred location for water meter is in the mechanical room.

Provide meters, monitored by DDC, on the following subsystems for steam, gas and water: HVAC and processes.

Provide ASHRAE Standard 135 building controller as the main interface for the building control system.

Provide notebook computer(s) and complete application software with all licenses.

Provide patch panel in the mechanical equipment room for ease of connection and disconnection of equipment.

Provide panels with locks and alarms. The alarms must include both a flashing light and an audible alarm inside the mechanical room. The alarms must also be a networked alarm (e.g. switch connected to controller DI) with alarm events recorded remotely for a period not less than one year.

Provide flow rate meters, monitored by the DDC system, for central, chilled, and hot water flow.

Provide air handlers and all terminal units, including VAV boxes, with discharge/supply temperature sensors.

Provide air handler unit outside air flow monitoring stations.

Provide a DDC option for automatic operation of building circulating pumps whenever outdoor air temperature is below 35 degrees F or when there is a high potential for freeze damage.

Provide control to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Primary and back-up equipment starter circuits must be wired to prevent both pieces of equipment from operating at the same time. Rotate primary and back-up HVAC equipment monthly (adjustable) with a lead/lag control routine.

Provide the following phase monitors for all 3 phase equipment:

1. Phase loss protection
2. Phase reversal protection
3. Phase unbalance protection

Provide the following phase monitors for all 3 phase chillers:

1. Phase unbalance protection

2. Over/under voltage protection
3. Phase loss protection
4. Delay of break timer to delay automatic restarts
5. Non critical fault delay
6. Programmable auto/manual restart
7. Load and line side monitoring
8. Phase reversal

Phase unbalance

Provide new DDCS front-end notebook computer(s) loaded with all necessary application software displaying graphic floor plan, equipment graphics, control diagrams, and complete sequence of operations graphic pages. Provide all alarming, trend services, and schedules and other BACnet services and configurations as described in the UFGS 23 09 23.02 22. Provide and incorporate all new control points and sequences by creating new graphics, alarms, trends, schedules, and system reports. In addition, provide each graphic screen of mechanical equipment with links to the applicable as-built written sequence of operation that fully describes every operating routine and as-built DDC wiring diagram.

Non-BACnet compliant or proprietary equipment or systems, including gateways/protocol convertors, are not desired and are to be avoided unless a conflict dictates, at which time Government review and approval will be required.

The Contractor must be responsible for developing construction documents in accordance with United Facilities Criteria (UFC) for the design of standard HVAC control systems including:

1. UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, dated 18 July 2018
2. UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, with Change 1; 1 October 2013 – Standard 18, Emergency Air Distribution Shutoff

DDC System Design: Submit all design documents to be reviewed and approved by Government. Control system design must include the following:

1. EMCS Control Diagrams showing the configuration of each system and equipment with applicable schematic flow diagram, control/field devices, device tags, input/output designations, and applicable field/interlock wiring in accordance with UFC 3-410-02.
2. EMCS Network Riser Diagram showing the layout of DDC system network, all network hardware, controllers, and notebook computer(s) in the building. The diagram must show the locations of notebook computer(s), network hardware, switches/router/hubs and network routing, distinguishing between different forms of media (i.e. Fiber, Category 5/6, shielded twisted pair, coaxial cable, etc.). Various types of LANs must be identified and distinguished from each other.
3. The Sequence of Operation describing all control processes and operation that are controlled by the control system must be included. The sequence of operation must be clearly shown in a text narrative form in order to demonstrate a clear understanding of how the system is to operate and be specific to the control system equipment used.
4. The DDC System Point Schedules indicating, at a minimum, the control point name, input/output designation, device code/tag, fail mode/position, software functions, alarms and alarm limits in accordance with UFC 3-410-02.

5. Provide control system specification to ensure that all of the components, which are expected to be used in the DDC system installation, are properly specified. In addition, the control system specifications must also specify detailed requirements for testing and commissioning of the DDC system. The control system specifications must also include all training requirements.
6. Provide graphic screens including mechanical floor plan indicating control locations and front-end graphic screens of mechanical equipment controls. The graphics must be submitted during construction stages for review and approval by Government.

DDC System Network Architecture:

1. The primary DDC system network, including DDC system network hardware, supervisory/building controllers (BC), Advanced Application Controllers (AAC) for major mechanical equipment, and DDC system notebook computer(s), must communicate via a dedicated DDC system network backbone using BACnet over IP (BACnet/IP). Using the Government Local Area Network (LAN) for DDC system communication is strictly prohibited.
2. The field controllers such as Advanced Application Controllers (AAC) and Application Specific Controllers (ASC) for small mechanical equipment, terminal units and miscellaneous/unitary equipment must be connected to the associated DDC system network hardware and supervisory/building (BC) controllers, and communicate via secondary DDC system network using BACnet MS/TP.
3. Network controllers, switches and/or routers must be provided to extend DDC system network throughout the facility, where necessary.
4. Non-BACnet-compliant or proprietary equipment or systems including gateways using a proprietary communication protocol are not acceptable and are strictly prohibited. For the existing equipment communicating with the existing control system using a proprietary or non-BACnet communication protocol, provide necessary gateway or network interface directly connected to the new DDC system network using a BACnet communication protocol.

Critical Systems:

1. For the DDC system associated with the critical equipment, provide separate controllers for primary and back-up HVAC units, which provide redundant HVAC service to critical spaces, to ensure that failure of any one controller will not cause the loss of the entire service to the critical space. The equipment must be distributed across multiple controllers in such a manner that no more than one unit must be powered, controlled and monitored using a single controller.
2. Each BC, AAC and network hardware such as Ethernet switch and router must be provided with an Uninterruptible Power Supply (UPS) that can supply electrical power for at least four hours to the attached load. This load must include the power required for HVAC equipment or field/control devices such as damper and control valves, etc.
3. For the HVAC equipment serving critical spaces or configured for redundant operation, a controls scheme for manual operation, which will bypass the automatic control through the DDC system, must be incorporated. Provide a HOA switch, if not provided as part of electrical equipment, so the equipment can be manually started and operated in Hand

mode. The control valves and dampers associated with chilled water system and air handling units must be configured with necessary fail position so the equipment can operate manually and provide temporary cooling and/or ventilation if there is a failure in the control system.

4. When switching the redundant units during the rotation, the unit in the next sequence must be enabled or started before the previously enabled or started unit is disabled or stopped. If enabled unit should fail, an alarm must be generated at the DDC system and it must automatically enable the stand-by unit to replace the failed unit. Once the newly started unit is in operation, the failed unit must be disabled.

DDC System Software: Provide new DDCS and notebook computer(s) with new front-end software and other utilities and tools as necessary. All software necessary for the configuration, operation, and maintenance of the installed DDC system must be provided, with licenses residing with the Government. Where new software, including application and tools, is provided, the latest tested, compatible and reliable version of the software available at the time must be installed prior to system testing and personnel training. In general, the front-end software must allow each authorized operator to execute the following functions as a minimum:

1. Security: Provide security function that prevents unauthorized use unless operator is logged on. Access must be limited to operator's assigned functions when user is logged on. Each operator's terminal must provide security for 10 users as a minimum. Each user must have an individual User ID/Name and Password. System user must be allowed individual assignment of only those control functions and menu items to which that user requires access. Each user must also have a set security level, which defines access to displays and individual objects the user may control. System must include minimum of 5 separate and distinct security levels for assignment to operators. Software must be initially configured to allow government personnel responsible for system administration full, unrestricted access. All default access passwords and user authentication identification must be documented and provided to the Government.
2. Schedule: Operators must be able to view scheduled operating hours of each schedulable piece of equipment on a weekly or monthly calendar-based graphical schedule display; to select and adjust each schedule and time period; and to simultaneously schedule related equipment. Operators must be able to schedule holidays and special events directly from the calendar.
3. Alarm: The notebook computer(s) must provide audible, visual, and printed means of alarm indication. System input and status objects must be configurable to alarm on departing from and on returning to normal state. Operator must be able to enable or disable each alarm and to configure alarm limits, alarm limit differentials, alarm states, and alarm reactions for each system object. Alarms must be BACnet alarm objects and must use BACnet alarm services.
4. Trend Log: Operator must be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and must be able to retrieve data for use in spreadsheets and standard database programs. Controller must sample and store trend data and must be able to archive data to the hard disk. Coordinate items to be trended and trend configurations with the facility maintenance personnel. Trends must be BACnet trend objects.
5. Graphical Displays: The notebook computer(s) must display all data associated with project as required. The notebook computer(s) must display all data using two and/or

three-dimensional graphic representations of all mechanical equipment. System must be capable of displaying graphic file, text, and dynamic object data together on each display. Information must be labeled with descriptors and must be shown with the appropriate engineering units. All information on any display must be dynamically updated without any action by the user.

Control Damper and Actuators:

1. Control Dampers: Motorized control dampers must have opposed blade dampers for modulating service and parallel blade dampers for 2-position service. Frames must be of five inch by one inch extruded aluminum hat channel with a minimum of 0.125-inch wall thickness. Blades must not exceed six inches wide and must be of heavy gage extruded aluminum airfoil shape to minimize pressure loss across the damper. Damper blades must be injected with CFC free, two-part high density polyurethane foam. Each blade must include a thermal isolation gap. Dampers must be rated for minimum 2000 fpm air velocity at 2.5 inches static pressure and damper leakage must not exceeding 0.5 percent of total CFM (4.00 CFM/sq. ft.) based on 2000 fpm and one-inch static pressure when tested per AMCA Publication 500. Damper must be rated for a temperature range of minus 70 to 200°F
2. Provide electric type, direct shaft mount damper actuators with bracket arrangement for location outside of the air stream. Actuators must provide at least 125 percent of the required torque to effectively operate the damper. Actuator drive time for 90-degree rotation must be 150 seconds maximum. Actuators must be normally open, normally closed, or fail in position as required to obtain the operation as required by the application. Normally open and normally closed dampers must return to their normal position in the event of a power failure to the actuator. Provide auxiliary switches or damper position switches, rated as required, to provide specific operation. Provide transformers and accessories as required. Actuators requiring linkages, crank arms, connecting rods, or ball joints are not acceptable.

Control Valves and Actuators:

1. Characterized Control Ball Valves (up to and including 3 Inches): Nickel-plated forged brass body, valve trim must utilize stainless steel ball and stem, fiberglass reinforced Teflon PTFE seats with O-rings, 2 EPDM O-rings packing. A flow characterizing disc, made of Tefzel Teflon must be installed in the inlet of 2-way characterized control ball valves. 3-way valves must utilize flow characterizing discs at both input ports. Standard ball valves without this feature are not acceptable. 2-way valves must have equal port percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.
2. Globe Pattern Control Valves (over 3 inches): Iron body, bronze trim, 316 stainless steel rising stem, bronze plug-type disc, flanged ends, renewable bronze seat and disc, TFE V-ring packing. It must have replaceable plugs and seats of stainless steel or bronze. 2-way valves must have equal percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.

3. Valve Actuator: Provide electric valve actuators, which are two-position or modulating as required by application. Actuators must be of ample capacity to handle the required load under all conditions and as a minimum must close valves against pump shutoff head pressure of 55 psi. Unless otherwise indicated, valves must be arranged to return to the normal (fail-safe) position in the event of a power failure to the actuator.

Air Flow Measuring Stations (AFMS): For all air handling units with outdoor air intake, provide AFMS to continuously monitor the outdoor ventilation air in CFM values.

1. Provide high performance, thermal dispersion type AFMS. Pitot tubes, arrays, Piezo rings and other differential pressure based devices are not acceptable. AFMSs must contain an airflow straightener if required by the AFMS manufacturer's published installation instructions. The straightener must be contained inside a flanged sheet metal casing, with the AFMS located as specified according to the published recommendation of the AFMS manufacturer. In the absence of published documentation, airflow straighteners must be provided if there is any duct obstruction within 5 duct diameters upstream of the AFMS. Air-flow straighteners, where required, must be constructed of 0.125 inch aluminum honeycomb and the depth of the straightener must not be less than 1.5 inches. Sensing probe must be constructed of extruded aluminum or of stainless steel tubes. The operating humidity range must be 0 to 99% RH and direct exposure to water must not damage the sensing elements. AFMSs must have an accuracy of +/- 2% of reading with air velocity range of 0 to 5,000 fpm. The transmitter must have local LCD display, continuously displaying airflow and temperature and be calibrated for the appropriate operating range based on the required operating range.

Water Flow Meters: Provide electromagnetic type flow meters for water service where required by application. The flow meter must have the DC powered electromagnetic coils and electrodes, and measure the induced voltage across the electrodes as a conductive fluid flows through the magnetic fields. The voltage is proportional to the average flow velocity of the fluid and then amplified and processed digitally by the converter to produce the signal for flow rate and totalization. Flow meter must be located to provide the most efficient and accurate reading recommended by the manufacturer.

Commissioning: The controls Contractor must provide the services of a factory-authorized service representative to start control systems and provide the commissioning the coordination and support required during the commissioning process.

D306001 1.2 ELECTRONIC CONTROLS

NOT USED

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air distribution systems, water distribution systems, including domestic hot water systems, and HVAC equipment. TAB must be provided by a tier one contractor. Provide duct air leakage testing and duct pressure testing. The Designer of Record must provide a duct construction and leak testing schedule on the drawings.

Clean entire duct system in accordance with National Air Duct Cleaners Association (NADCA) ACR after duct air leakage testing (DALT), and before test and balance (TAB). Document duct cleaning, prepare a written report, and submit report to the Construction Manager (CM) with signature of the ductwork contracting foreman indicating the test has been completed.

Acceptable Cleanliness Level: Net weight of debris collected on the filter media must not exceed 0.75 mg/100 sq. cm. Coordinate with other trades working in the building. Duct cleaning must be performed only after the building has been sealed and the completion of construction activities resulting in airborne particles has been completed. Examples of activities producing airborne particles include but are not limited to grinding, cutting, sanding, drywall installation, grout work, etc. Should the CM note construction dust contamination or openly unprotected ductwork and/or equipment after the initial cleaning, repeat duct cleaning on entire system after the final instance of airborne particle production within the building envelope at no additional cost.

Provide complete testing and balancing (TAB) of all air and water distribution systems and HVAC equipment after successful completion of the DALT testing and duct cleaning. Include all troubleshooting attempts and measurements within the TAB report. The TAB contractor must offer recommendations where flowrates cannot be kept within tolerance. Coordinate with and support Commissioning Authority effort during entire project duration. All system devices must be accessible during the TAB effort. Flush strainers and replace air filters prior to TAB. Verify that air vents have been installed at every high point in the hydronic system(s); confirm the absence of air by testing every air vent prior to starting tests.

D307003 HVAC COMMISSIONING

Refer to RFP Part 3 - Project Program, Chapter 2 for Building Commissioning requirements. All mechanical systems will be commissioned as required.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide access to all mechanical equipment rooms through the building exterior walls. Provide roll up doors for mechanical room access. Arrange mechanical equipment so that any piece of equipment can be replaced without removal of other equipment.

All equipment and materials will be free of damage. Bent coil fins will be combed out. Where bent coil fins cannot be straightened, replace with new.

Locate and size 4" thick reinforced concrete housekeeping pads for base mounted equipment in mechanical rooms in accordance with actual equipment purchased. Extend pad beyond equipment for 6" in all directions. Provide with chamfered edges.

D309002 ROLL UP DOOR HEATING

Provide heated curtain fans at roll up doors.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide fixed plate enthalpy energy recovery in the air handling system.

--End of Section--

D40 FIRE PROTECTION – P1512F JOINT RECEPTION CENTER

Refer to Part 4 Section D40 for performance requirements of the building elements included in the fire protection systems. Comply with the latest editions of UFC 1-200-01, UFC 3-600-01, UFC 4-021- 01 and NFPA codes at the time of contract solicitation.

SYSTEM DESCRIPTION

Provide an integrated fire alarm/mass notification system and fire suppression system capable of notifying building occupants inside the facility of an emergency event. This scope of work includes the installation of equipment and components and completing all programming necessary to fully control/interface/supervise building systems and transmit all alarm signals to the base reporting system.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. All equipment must be installed per the criteria of PTS section D40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

All Design Documents, (i.e., Fire Protection Design Analysis, Building Code Analysis, Life Safety Analysis, plans, specifications, and calculations) developed for Section D40 must be prepared by, or under the supervision of the design/build contractor's Qualified Fire Protection Engineer (QFPE) as detailed in UFC 3-600-01 and FC 1-300-09N.

The services of a Fire Protection Quality Control Specialist (FPQC) are required. Roles and responsibilities of the FPQC are defined in Specification Section 01 45 00.05 20 (Design and Construction Quality Control). The QFPE and the FPQC must be registered professional engineers who have passed the Fire Protection Engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and have relevant experience. The QFPE may serve as the FPQC.

GENERAL DESIGN AND INSTALLATION REQUIREMENTS

Prior to the start of design, the QFPE must meet with the NAVFAC FPE to discuss and confirm the extent and types of fire protection systems and engineering services required. All work shall comply with the requirements of the applicable NFPA standards, including recommended portions of the text and explanatory notes, which must be considered mandatory, and with UFC documents, including UFC 1-200-01, UFC 3-600-01, and UFC 4-021-01. Develop specifications for all fire protection work using the Unified Facilities Guide Specification format (UFGS), except for UFGS Section 28 31 76, *Interior Fire Alarm and Mass Notification System, Addressable*, which is included in Part 6 of this RFP. The designer is responsible for incorporating design elements and deliverables described in the “Editor’s Notes” included with all UFGS sections.

GENERAL INSTALLATION

All work for fire protection systems (Including fire alarm, fire suppression, and firestop systems) must be provided by contractors licensed to perform such work.

Workmanship must be neat and professional. Protect systems from damage during construction. Provide parts and components Listed for their particular service. Provide labels for all valves, addressable devices, panels, and controls. For any device located above a ceiling, provide legible, typed label on the ceiling to identify its purpose and location. With the exception of detection devices at ceiling level, mount all valves, panels, and controls no more than 5 ft above the finished floor. Provide clearance for access, inspection, maintenance, repair, and removal.

All conductors must be installed in conduit (EMT minimum). Pull all conductors splice free and be continuous from device to device. The use of wire nuts, crimped connectors, or twisting of conductors is prohibited. All devices must have screw terminals. Where devices are only provided with pigtails from the manufacturer, pigtails must be landed on terminal strips mounted within the junction box. All terminations must be at a terminal strip or the device screw terminals. Terminal strips are only permitted where direct connection to a device is not possible.

Provide a Knox Box at the building entrance approved by the fire department. Provide an additional Knox Box for any project including a gated and secured perimeter fence. Locate this supplemental Knox Box at the primary vehicle entrance point. Mount the Knox Box at the key pad access pedestal to allow fire department access if a gate/fence will be secured after hours.

DESIGN DRAWINGS/SPECIFICATIONS

Design drawings, specifications, and Basis of Design must be prepared by, or under the direct supervision of, the QFPE. Design submittals must comply with the FC 1-300-09N (Navy and Marine Corps Design Procedures), including but not limited to, Section 4-6 (Fire Protection Investigations and Survey), Section 5-8 (Fire Protection Basis of Design), Section 6-8 (Fire Protection Calculations), and 7-10 (Fire Protection Drawings).

INSTALLATION SHOP DRAWING REQUIREMENTS

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician who holds a current certification in the field of Fire Protection Engineering Technology with minimum certification in the appropriate subfield as noted below.

- Fire Alarm Systems only (no Mass Notification element)– Level III
- Combination Fire Alarm/Mass Notification Systems - Level IV
- Fire Sprinkler Systems (water only) - Level III

All installation drawings, shop drawings or working plans, calculations, and other required pre-construction documentation must be reviewed by the QFPE prior to submission to government for review. Documents must be signed and sealed or letter attached that is signed and sealed indicating QFPE review of submittal. All plans received without documentation of QFPE review will be rejected and returned without review.

CONTRACTOR INSTALLATION REQUIREMENTS

All fire protection systems installation work must be performed by, or under the supervision of a NICET technician having minimum Level lll certification who must conduct onsite inspections each week that work is performed. Submit licenses and certifications to the Contracting Officer prior to the start of work. Signed weekly inspection reports confirming compliance with the Contract and NFPA standards to the Contracting Officer's Technical Representative each week. Record of Completion forms must be signed by the NICET certified supervising installer for each fire protection system.

COMMISSIONING REQUIREMENTS

Commissioning procedures must comply with NFPA and NAVFAC criteria. All fire and life safety systems must be fully pre-tested by the contractor with the QA/QC manager present. Pre-final acceptance testing must be witnessed by the QFPE. Final acceptance testing must be requested by the QFPE in writing after successful completion of the pre-final acceptance test. The final acceptance test will be witnessed by the NAVFAC FPE for government acceptance. Once the system is accepted, it will be placed in service prior to occupancy. The Contractor is responsible for all cost and time delays caused by system retesting as a result of final acceptance testing failure.

D4010 FIRE ALARM/DETECTION AND MASS NOTIFICATION SYSTEMS

Provide an integrated fire alarm/detection and mass notification system capable of notifying building occupants inside and near the facility in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-18, UFC 4-021-01 and NFPA 72. Provide equipment manufactured by Simplex, Notifier or Fire-Lite. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system that also serves as a mass notification system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements. The fire reporting portion of the system must be compatible with the existing base fire reporting system.

Provide all fire alarm circuits in Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC) unless noted otherwise. All raceways must be factory painted red. Flexible Metallic Conduit (FMC) must not exceed 6 feet and is only be permitted for connections from junction boxes to field devices, Provide a raceway listed for the installation in wet locations, such as Rigid Metallic Conduit (RMC) and Liquidtight Flexible Metal Conduit (LFMC). Wet locations are considered any location within a 5 ft radius of fire suppression equipment, throughout a fire pump room/building, and as defined by NFPA 70.

Provide a laminated building floor plan (22” by 34”) mounted at the main entrance of the building, adjacent to the annunciator. Identify the location of the FMCP, LOC, remote power supply panels, and all initiating devices. The drawing must include room numbers.

Provide a steel Document Cabinet with a hinge-mounted door and lock with lock cylinder keyed the same as the FMCP. Mount the Document Cabinet on the wall adjacent to the FMCP.. Prominently label the exterior of the cabinet "SYSTEM RECORD DOCUMENTS". Cabinet must include paper copies and a CD of Fire Alarm As-Built drawings, List of Contact ID descriptions for the fire alarm addressable devices, Sprinkler As-Built drawings, NFPA 72 & NFPA 13

Records of Completion. CD must also include site-specific software and O&M manuals stored in a CD jewel case. Cabinet must be of a minimum size to accommodate all required documents.

Provide a steel Parts Box with a hinge-mounted door and lock with lock cylinder keyed the same is the FMCP. Mount the Parts Box on the wall adjacent to FMCP. Cabinet must be of a minimum size to accommodate all spare parts as defined in the project specifications, plus four fuses for each fused circuit.

FMCP REQUIREMENTS

The fire alarm control unit and mass notification control unit (FMCP) must be capable of handling a minimum of 500 individually identified addressable devices. Provide Class B Notification Appliance Circuits (NACs), Class B Signaling Line Circuits (SLCs), and Class B Initiation Device Circuits (IDCs). Each NAC and SLC must include 25 percent spare capacity based on load and voltage drop. Mount FMCP and associated cabinets such that the top of each cabinet is no more than 6 ft above the finished floor. Provide conduit fill calculations to ensure 40% fill does not exceed limits of NFPA 70.

A lockout code must not be installed in the hardware, firmware, or software of the fire alarm system. Installer and operator codes must remain as the factory default setting.

Provide amplifiers sized for 25% spare power capacity. Battery calculations must be based upon 48 hours of standby time and 15 minutes of alarm time or 60 minutes of alarm time, whichever is greater.

Provide a factory-trained instructor to teach a five-day technical training classroom instruction for at least five Government personnel at Camp Lejeune. The technical training must include classroom instruction as well as hands-on programming, troubleshooting and diagnostics exercises. Provide three laptops for the government’s retention. Laptops must be Windows 10 based and include system software, special connecting cable(s), proprietary equipment necessary for the maintenance, testing and reprogramming of the fire alarm equipment and system. Factory training must occur within six months of system acceptance.

Provide a LCD remote annunciator located at the designated primary entrance. Coordinate final installation location with user and NAVFAC. Provide remote annunciator with control functions the same as the FMCP. Control functions must be accessible only by user code or secured behind a locked panel.

Provide a local operating console (LOC) at the primary entrance vestibule. Coordinate final installation location with user and NAVFAC. Microphone and pre-recorded buttons at LOC must be accessible and not installed behind a locked panel.

Obtain prerecorded mass notification messages from the installation fire alarm technician. Program mass notification pre-recorded message buttons to be non-latching that do not require a full system reset to activate or deactivate. Program pre-recorded message buttons such that a higher priority message will override a lower priority message. Once the higher priority message button is deactivated the lower message that is still activated must begin playing again. Program the system to allow any mass notification message to override the fire message. Upon deactivation of the mass notification message, the fire alarm message must automatic resume. Program live voice microphone paging to override all fire alarm and pre-recorded mass notification message. Microphone activation must not require more than two functions. Post clear instructions for operation (keying the microphone and turning a key switch to activate is an example of two functions).

The government will provide the TRX-401 mass notification transceiver. Provide space, antenna, conduit, cable, pull strings, and equipment as shown on the TRX-401 installation detail provided in Part 6.

Prior to building demolition, contact base fire alarm technicians and allow time for their retrieval of fire alarm and/or mass notification panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

INITIATION DEVICES

Provide a complete and useable fire alarm system including manual stations, system smoke detectors, duct smoke detectors, audio/visual notification appliances, electrical supervision of all sprinkler system alarm and supervisory devices, and electrical supervision of fire pump controllers if provided. Provide an individual monitor module for each fire sprinkler system water flow switch. Provide all initiation devices with a permanent label adhered to the device identifying the addressable point. Handwritten labels are not permitted.

Provide flush-mounted manual pull stations. Provide manual pull stations within 5 feet of all exterior doors, including but not limited to mechanical rooms, electrical rooms, and communication rooms with direct exterior access. Provide double action type manual pull stations with mechanical reset features. Break glass type manual stations are not permitted.

Magnetic door hold-open devices must release upon activation any fire alarm initiating device of the building fire alarm system or upon loss of primary power to the FACP. Smoke detectors dedicated to door release are not permitted.

Provide carbon monoxide detectors in accordance with UFC 3-600-01. Detector activation must initiate a distinct message on all notification appliances and transmit an independent dedicated signal to the base reporting system.

NOTIFICATION APPLIANCES

Provide combined fire alarm and mass notification appliances. Provide white notification appliances with factory applied, permanent, red "ALERT" lettering with clear strobe lenses. Provide ceiling-mounted notification appliances in all areas with suspended ceiling systems. Where exterior speakers are required by UFC 4-021-01, provide exterior weatherproof notification speakers “bull horn” style. All conduit penetrations for exterior equipment must enter the junction box or equipment from the bottom to minimize water intrusion. Provide duct seal inside all conduits that penetrate exterior walls per NFPA 70, Section 300.7.

Visual notification appliances are required in all public use areas, common use areas, and employee work areas to include office suites and areas intended to have more than four desks/occupants. Offices that are designed for a single office worker, regardless of the calculated occupant load, do not require a strobe unless the room is designated as an ABA compliant space.

FIRE ALARM REPORTING

All fire alarms, supervisory alarms and trouble conditions indicated at the FMCP must be transmitted to the fire alarm receiving station. Provide point specific transmission via contact ID format with the address, location, and description of the condition as it appears on the FMCP.

Provide a point reporting digital alarm communicator transmitter that is compatible with the Sur-Gard System III Multi-platform Digital Telephone Receiver. Provide two CAT 6 UTP cables

inside one-inch conduit from the FMCP to the telephone equipment room. Make connections to telephone equipment per the base's telephone requirements. See Part 6 for schematic drawing of the FARS and the mass notification equipment.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

The water supply information is provided for bidding purposes. A hydrant flow test was conducted on 05 August 2019 in proximity to the project site on an un-numbered Hydrant South of Building M430.

Hydrant flow test summary:

- Pressure hydrant Un-numbered Hydrant South of Bldg M430:
- Static pressure: 62 psig (gauge). Residual pressure: 50 psig (gauge).
- Flow hydrant Un-numbered Hydrant South of Bldg M446:
- Measured Flow: 1,420 gpm.

The proposed design point of connection to existing water supply must be approved by the Contracting Officer prior to proceeding with any work.

The QFPE must conduct additional flow tests after contract award prior to any design submissions. Water flow testing must be coordinated through the Contracting Officer. The Contractor is responsible for providing all flow testing equipment. Perform flow testing in accordance with NFPA 291. The QFPE must prepare and submit a flow test report to the Contracting Officer for review by the NAVFAC FPE. This report must compare the flow test results with the hydrant flow test summary provided above.

Hydraulic calculations must be based upon a waterflow test was performed no more than 6 months prior to submission of the calculations.

Provide a reduced pressure zone backflow preventer for the incoming sprinkler service. Include a forward flow test connection, with one two and a half inch hose connection for every 250 gpm of anticipated flow of the fire sprinkler system.

Hydraulic calculations for the fire suppression system shall include a 12 psi loss through the backflow preventer.

Sleeve all incoming supply piping and provide thrust rods at floor penetrations. Sleeve all wall penetrations of incoming supply piping.

Provide a UL Listed post indicating valve (PIV) for the underground fire service main. Locate the PIV a minimum distance from the building equal to the height of the building plus fifteen feet. Provide bollards where the PIV could be subject to vehicular damage.

Provide a freestanding pedestal type fire department connection (FDC) at the main vehicle entrance just outside the compound fence line. Provide a 5" Storz connection on a 30-degree galvanized elbow at the FDC. Check valve on FDC must be installed at fire protection system manifold inside the building. Provide ball drip valve on the FDC pipe. Provide bollards where the FDC could be subject to vehicular damage.

D4040 SPRINKLER SYSTEMS

Provide automatic wet pipe sprinkler protection system throughout the facility, in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-7 and

NFPA 13. Sprinkler system design demand and minimum sprinkler K-factor must be as specified in Table 9-3 and Table 9-4 of UFC 3-600-01.

Provide wet pipe sprinkler systems with pressure relief and air venting in accordance with NFPA 13.

Provide quick-response sprinklers with ordinary temperature rating in areas with finished ceilings. Provide quick-response upright sprinklers with ordinary temperature rating in areas with exposed ceilings. Utilize higher temperature ratings where required by NFPA 13.

The use of flexible sprinkler hose and mechanical-T outlets are prohibited.

Provide training for the active systems consisting of a minimum of two (2) eight (8)-hour sessions to accommodate all shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

D4090 OTHER FIRE PROTECTION SYSTEMS

PORTABLE FIRE EXTINGUISHERS

Fire extinguishers are required by the FY20 National Defense Authorization Act that contradicts UFC 3-600-01. Provide fire extinguishers as required by NFPA 101 and NFPA 10. Include fire extinguishers in the Furniture, Fixtures & Equipment (FFE) Package. Refer to ESR Section C103007 for fire extinguisher cabinets and brackets. Electronic Monitoring of fire extinguishers and cabinets is not required. Provide clean agent fire extinguishers for electronic equipment installations (server rooms). Locate the clean agent fire extinguisher within the server room adjacent to the primary egress door.

--End of Section--

D50 ELECTRICAL – P1512F JOINT RECEPTION CENTER

SCOPE

The scope of this section is to describe the systems, components, and installations within buildings and extending no more than 5 feet beyond building exterior walls. Exterior systems and components are described in ESR G40 of this RFP.

Provide systems complete in place, tested, and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must".

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floor plan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floor plans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an interior electrical system consisting of but not limited to Service Entrance Wiring and Equipment, Distribution and Lighting Panelboards, Dry Type Transformers, Conduits, Feeder and Branch Circuits, Motor Control Equipment, Lighting and Branch Wiring, Communications, Security and Alarm Systems, Emergency Generator, Emergency Lighting and Power, Grounding, Lightning Protection, and UPS, including accessories and devices as necessary and required for a complete and usable system.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Install interior electrical distribution equipment and components in spaces accessibly only by qualified persons. Provide a main electrical room to house the service entrance switchboard and branch circuit distribution equipment. Provide additional electrical rooms as required throughout the building to minimize branch circuit length to less than 200 feet for 120V circuits and 400 feet for 277V circuits. Provide electrical panels in mechanical rooms, computer rooms, and telecommunications rooms to serve loads within each respective room.

Provide branch circuit panelboards rated at 480Y/277V to serve lighting and large mechanical equipment. Provide dry-type transformers feeding 208Y/120V panelboards to transform the voltage where necessary to serve receptacle loads and small (less than ¾ hp) motor loads.

Provide individual feeders to each panelboard or transformer. A distribution system consisting of cable taps and/or through-feed panels is prohibited.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15% spare circuit and load capacity at all levels of the power distribution system, including life safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

EQUIPMENT ENCLOSURES

Provide enclosures for equipment described in this section at installed locations with the following environmental ratings:

- Indoor, Dry and Clean Locations: NEMA 250, Type 1.
- Outdoor Locations: NEMA 250, Type 4X, stainless steel
- Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
- Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
- Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids; equipment in Mechanical Rooms, Plumbing Rooms, and Elevator Machine Rooms; equipment in unconditioned spaces: NEMA 250, Type 12.
- Hazardous Areas: NEMA 250, Type 7 with cover attached by Type 316 stainless steel bolts.

SUSTAINABILITY

Provide electrical systems and components that support project sustainability and energy goals.

ANTITERRORISM

Provide bracing of electrical equipment which is suspended and weighs more than 31 pounds.

SEISMIC BRACING

Provide bracing of electrical equipment to resist seismic events based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING

Test new electrical equipment in accordance with NETA acceptance testing specifications. Test existing electrical equipment remaining in service in accordance with NETA maintenance testing specifications.

COMMISSIONING

Commission all systems in accordance with RFP Part 3 Chapter 2, Section 01 33 29.05 20 *Sustainability Requirements for Design Build* and UFC 01-200-02 *High Performance and Sustainable Buildings*.

EQUIPMENT IDENTIFICATION

Provide instruction and warning signs, identification labels and nameplates, and markings for equipment, wiring, raceways, boxes, and cabinets. Coordinate naming convention with Camp Lejeune Public Works Department.

Provide instruction and warning signs, identification labels and nameplates, and markings for equipment, wiring, raceways, boxes, and cabinets. Coordinate naming convention with Camp Lejeune Public Works Department.

Provide multi-line engraved nameplates on the exterior of panelboards, switchboards, switchgear, enclosed switches and breakers, transformers, and packaged equipment enclosures with the following information:

- Device Identification
- Device Rating (such as voltage, phase, ampacity, and kVA)
- Power source (source panel and circuit number)

See the following figures for examples of equipment identification.

Figure 1: Transformer Identification Example

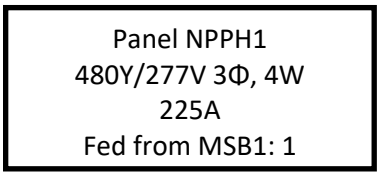


Figure 2: Transformer Identification Example

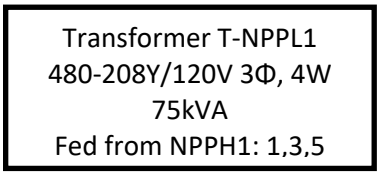


Figure 3: UPS Identification Example

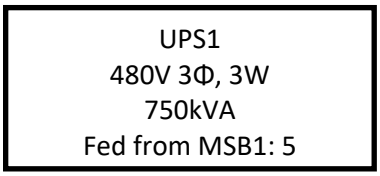
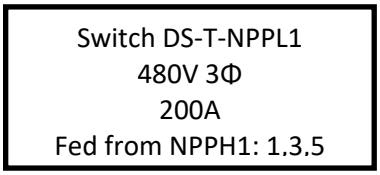


Figure 4: Disconnect Switch Identification Example



CONDUCTOR IDENTIFICATION

Label conductors with source panel circuit number at each junction box and termination point.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

Provide insulated copper conductors in conduit for all feeders. Refer to D502001 for raceway application for feeders.

D501001 MAIN TRANSFORMERS

Main transformer(s) are defined in Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

Provide an underground service into the facility.

Provide a main distribution switchboard as service equipment. Provide the main distribution switchboard with a draw-out main circuit breaker, fixed, group-mounted, molded case distribution circuit breakers, and surge protective device (SPD). Fused or bolted pressure switches are prohibited. Provide switchboard with spaces for future use that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide switchboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses.

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide a multi-function digital meter integral to the main switchboard that monitors and records the following values at a minimum:

- Voltage (per phase and 3-phase)
- Current (per phase and 3-phase average)
- Real power (per phase and 3-phase average)
- Reactive power (per phase and 3-phase average)
- Apparent power (per phase and 3-phase average)
- Power factor (3-phase total)
- Frequency
- Total harmonic distortion (voltage and current)

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

Provide enclosed and ventilated dry type transformers to step down secondary voltages for general purpose outlets and other low voltage equipment.

Terminate the transformer secondary at a single overcurrent protection device. Double-lugging the secondary terminals to serve multiple panelboards is prohibited.

Provide transformers with two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards to serve the loads.

Provide panelboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses. Where fed from K-rated transformers, neutral buses must be 200% the capacity of the phase buses.

Provide panelboards with bolt-on circuit breakers. Plug-in circuit breakers may be used in distribution panelboards if provided with an individual positive locking mechanism that requires operation for removal of the breaker. Load centers are prohibited. Fused switch panelboards are prohibited.

Provide panelboards with spaces that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide panelboards with main circuit breakers where they are not located within sight of their upstream overcurrent protective device or disconnecting means and where otherwise required by Code.

Provide panelboards with fully hinged front covers with a hinged door for accessing circuit breaker handles (door-in-door arrangement).

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide

circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide enclosed circuit breakers with an enclosure suitable for the environment in which it will be installed.

D501006 MOTOR CONTROLLERS

Provide individual motor starters with disconnect switches, combination motor starters, variable speed drives, and manual motor starters for motor controls as required by mechanical equipment. Provide all circuits and connections for motors.

Provide variable speed drives without external bypass.

Provide variable speed drives with 5% bus reactors.

D501090 OTHER SERVICE AND DISTRIBUTION

SURGE PROTECTIVE DEVICES

Provide transient voltage surge protective devices (SPD) at the main switchboard and at panelboards located in computer rooms serving the computer equipment.

SAFETY DISCONNECT SWITCHES

Provide 600V rated, heavy-duty type fused and non-fused, safety disconnect switches with external operating handle and lock-out, tag-out provisions. Provide switches with an enclosure suitable for the environment in which it will be installed.

D5020 LIGHTING AND BRANCH WIRING

Provide lighting and general-purpose receptacles throughout all spaces.

Provide the necessary special receptacle configurations to serve special equipment.

Provide one duplex receptacle at each television/display monitor. Locate the receptacle behind wall-mounted equipment.

Where equipment or furniture is located on a wall, provide receptacles and/or connections serving that equipment or furniture on the wall. Where equipment or furniture is located away from a wall, provide receptacles and/or connections in multi-service floor boxes. Use of power poles is prohibited. Locate devices such that they are not made inaccessible by furniture panels and supports or fixed equipment, after the furniture and equipment is installed.

Provide one multi-service recessed floor box under the table in each conference room. Center the box under the table.

Provide one multi-service floor box for each pair of adjacent student desks in each classroom to support desktop computer and monitors at each desk. Locate floor box so that it accessible from both desks. Where an odd number of student desks occur, provide the remaining desk with one multi-service floor box. Provide one multi-service floor box at each instructor's location in each classroom.

Provide duplex receptacles with USB charging capability where receptacles are required on Briefing Room, Conference Room, and Classroom walls. Provide one wall mounted duplex receptacle with USB charging capability for each table in Break Rooms and Lounges. Provide one wall mounted duplex receptacle with USB charging capability at the seating area in Lobbies, Waiting Rooms, and Reception areas.

CIRCUITING REQUIREMENTS

Connect no more than six (6) duplex convenience receptacles to a single 20A circuit.

Connect no more than two (2) multi-service floor boxes to a single 20A circuit in Classrooms.

Provide individual dedicated circuits and receptacles or connections for each instance of equipment rated at 8 full load amps (FLA) and higher and for each of the following equipment:

- Copier
- Printer
- Multi-function device
- Fax machine
- Shredder
- VTC console
- Projector
- Refrigerator
- Coffee maker
- Microwave oven
- Garbage disposer
- Toaster
- Electric water cooler
- Vending machine
- Ice machine
- Washer
- Dryer
- Hand dryer
- Fire alarm control panel
- EPO control panel (multiple dedicated circuits may be required as described elsewhere)

- EMCS control panel
- Telecommunications and/or server equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- Telecommunications and/or server equipment rack (multiple dedicated circuits may be required as described elsewhere)
- AV equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- AV equipment rack (multiple dedicated circuits may be required as described elsewhere)

Provide dedicated circuits for televisions/display monitors. Multiple receptacles that support televisions/display monitors may be circuited to the same dedicated circuit.

WIRING DEVICES

Provide wiring devices connected to the normal power source with either a white body or dark brown body, as determined by the surrounding wall finish. Provide dark brown or black devices where installed on dark surfaces and white devices where installed on light surfaces.

Provide stainless steel face plates for interior wiring devices and empty outlet boxes.

Provide exterior receptacles with thermoplastic enclosures rated as “weatherproof while in use”.

Provide receptacles with USB charging capability with a combination125VAC NEMA 5-20R duplex receptacle and two 5VDC USB ports; one Type A port capable of delivering a maximum 2.4A of charging capacity and one Type C port capable of delivering a maximum of 3.0A of charging capacity (5A total charging capacity).

MULTI-OUTLET RACEWAYS

Provide extruded aluminum with clear anodized finish, dual-compartment, surface-mounted multi-outlet metal raceways with internal divider. Provide separate snap-on covers for each compartment. Provide the power compartment with NEMA 5-20R duplex receptacles at 18” on center. Where more than four (4) receptacles are installed in a raceway, connect adjacent receptacles to alternating circuits. Refer to D5030 for communications & AV faceplate requirements.

UNDERFLOOR MODULAR WIRING SYSTEM

Provide a modular power wiring distribution system in spaces with raised access flooring to provide power to desks, tables, work benches, and equipment.

Provide a complete modular underfloor power wiring distribution system comprised of power distribution boxes, home run cables, multi-service recessed floor boxes, and all necessary interconnecting cables and accessories.

Provide pre-fabricated underfloor power distribution system components with plug-and-play modularity for use below Raised Access Flooring systems. Components and conductors must be listed for use in environmental air handling spaces. Provide manufacturer’s dust caps on unused plug-in connectors.

Install underfloor power distribution system components with adequate clearance to allow access to wiring compartments, removal of covers, and access to plug-in connector ports. Arrange the underfloor components such that no plug-in connector ports are obstructed.

Locate power distribution boxes in readily accessible locations below the Raised Access Floor. Identify the location of the distribution boxes on the ceiling grid above the box using a label placed at the intersection of the grid Ts. Provide one (1) spare circuit in each power distribution box.

MULTI-SERVICE RECESSED FLOOR BOXES

Provide multi-service recessed floor boxes with independent wiring compartments capable of accepting duplex receptacles, AV faceplates, and telecommunications faceplates. Provide telecom adaptor plates to accept current Base Telephone standard jack sets per local 27 10 00. Provide the power compartment with two (2) NEMA 5-20R duplex receptacles.

Provide boxes with stamped steel or cast-iron construction, as applicable to the installation location, and provide each compartment with multiple conduit knockouts capable of accepting conduit sizes up to and including 1 1/4” diameter.

Provide die-cast aluminum covers with self-closing cable egress doors. Covers must open 180° and close flush with the finished floor while in use. When closed, covers must comply with requirements for UL scrub water exclusion. Provide black covers in dark floor finishes and natural aluminum covers in light floor finishes.

Where raised access floors are provided, provide multi-service recessed floor boxes that are compatible with the modular wiring system and install floor boxes flush in raised access flooring.

D502001 BRANCH WIRING

Provide insulated copper THHN-2/THWN-2 or XHHW-2 single conductors in raceway for all branch wiring. Type AC and MC cables are prohibited.

Provide solid conductors for #10 AWG and smaller and stranded conductors for #8 AWG and larger. The minimum power and lighting conductor size is #12 AWG.

Provide a neutral conductor with each phase conductor in circuits feeding single phase loads requiring line-to-neutral service. Shared neutral conductors are prohibited.

RACEWAY APPLICATION FOR FEEDERS AND BRANCH WIRING

Provide expansion fittings in raceways crossing building expansion joints and seismic joints, to compensate for building expansion and contraction.

The minimum raceway size for interior and above grade exterior applications is ¾” diameter. The minimum raceway size for below grade exterior applications is 1” diameter.

Outdoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed Conduit: GRC.
- Concealed Conduit, Aboveground: IMC.
- Underground Conduit: RNC, Type EPC-40-PVC direct buried.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

Indoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed, Not Subject to Physical or Severe Physical Damage: EMT.
- Exposed and Subject to Physical or Severe Physical Damage: GRC.
- Concealed in Ceilings and Interior Walls and Partitions: EMT.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- Connection to Recessed and Semi-Recessed Luminaires: FMC, except use LFMC in damp or wet locations.
- Damp or Wet Locations, Unconditioned Spaces, Spaces Subject to High Humidity: IMC.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting, area lighting, and manual and automatic controls. Controls include manual wall stations, occupancy sensors, vacancy sensors, daylighting controls, automatic lighting shutoff systems, and dimming systems.

LUMINAIRES

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide drivers that provide smooth and continuous dimming from 100% output to 10% output for standard-performance dimming luminaires and 100% output to 1% output for high-performance dimming luminaires. Step dimming drivers are prohibited.

Provide high-performance dimming drivers in conference rooms, classrooms, training rooms, and auditoriums.

Provide vanity luminaires above all mirrors in single-occupancy restrooms.

Provide blue beacon luminaires in classified spaces that are directly accessible from a corridor to alert the occupants of the space of the presence of uncleared persons in the space.

Pendant luminaires may use lenses, baffles or louvers, or perforated housings to shield the downlight component. Do not provide pendant luminaires in continuous lengths exceeding 16 feet.

Provide luminaires with the following minimum luminaire efficacy (LE):

- Recessed 1x4, 2x2, or 2x4 troffer: 90 Lumens per Watt (LPW)
- Surface or recessed downlight: 80 LPW
- Track or accent: 40 LPW
- High Bay/Low Bay: 90 LPW
- Linear Industrial or Strip Light: 80 LPW
- Suspended linear or non-linear ambient: 85 LPW
- Surface linear or non-linear ambient: 80 LPW

- Recessed linear or non-linear ambient: 85 LPW

LIGHTING CONTROLS

Provide devices including, but not limited to, drivers, wall stations, occupancy sensors, vacancy sensors, time-based scheduling, architectural dimming controls, and daylight dimming controls.

Devices using wireless radio frequency, Bluetooth, Wi-Fi, or other wireless technologies are prohibited. Obtain written approval from the COR to use devices that have infrared transmitters/receivers.

Provide occupancy and vacancy sensors to provide 100% minor motion coverage of the room or area controlled by the sensor. Where multiple sensors are provided to control a single room or area, provide overlapping minor motion sensor coverage taking into consideration all obstructions to include FF&E, collateral, and other Government furnished equipment that could impede the sensor coverage.

Provide light switches controlling uncleared visitor indicator luminaires with a gray body. Provide the faceplate containing switches controlling uncleared visitor lights with a label reading “Uncleared Visitor Lights” above the switch controlling the uncleared visitor indicator luminaires.

Provide low voltage control stations with momentary push-buttons with pilot light or indicator light to confirm operation.

Do not group public spaces into a single lighting control zone. Lighting control zones must not control luminaires on different floors.

Provide programmable multi-zone, multi-scene, architectural dimming controls in conference rooms, classrooms, training rooms, and auditoriums.

Architectural dimming controls consist of a master control station and additional wall stations used to recall preset lighting “scenes” consisting of multiple zones of lights and/or motorized shades and screens. Provide a minimum of six pre-programmed scenes, plus full on and full off, for each space or room with architectural dimming controls unless noted otherwise. Provide the capability to adjust each lighting zone individually from the master station without overwriting the scene programming.

Provide dimmers, modules, and controls that are capable of smoothly dimming LED lighting sources from 100% to a minimum of 1% of full light output.

Dim luminaires connected to life safety power sources along with the normal lighting in the space. Upon loss of normal power, or upon receiving a signal from the fire alarm system, the designated life safety luminaires must automatically return to full brightness regardless of selected scene or occupancy.

In spaces with moveable partitions, the lighting controls must be capable of operating independently when the partition(s) are closed and in unison when partition(s) are open. Provide partition sensors that automatically initiate combined and individual space operation modes based on the position of the moveable partition. Devices that require occupant input to select combined and individual operation modes are prohibited.

D5030 COMMUNICATIONS AND SECURITY

The Room Requirements Section identifies locations for communications and security systems and equipment, unless noted otherwise in the following sub-elements.

D503001 TELECOMMUNICATIONS SYSTEMS

Provide a main distribution frame (MDF) to house telecommunications equipment and cabling, as well as service provider equipment and cabling. Additionally, provide floor or area serving intermediate distribution frames (IDF) to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide a complete Telecommunications horizontal and backbone distribution system per user requirements, maintainer requirements, latest local provider and applicable using military department standards and criteria, UFC 3-580-01, ANSI/TIA 568C, 569, 606, 607, and 758 standards for support of Non-Secret Internet Protocol Router Network (NIPRNET) and Secret Internet Protocol Router Network (SIPRNET) Voice and data communications for Building 1512 LOG OPS School. Telecommunications systems must include, but not be limited to, horizontal and vertical pathways consisting of underground duct bank systems, sleeves, cable tray, EMT conduit, pull boxes, pull cords and outlet boxes, patch panels, equipment racks, cable management, telecommunications ground bus system, fire rated plywood backboards as required to support the user requirements. Voice and data system cabling and outlets will consist of CAT 6 or higher-rated horizontal unshielded twisted pair (UTP) cabling and multimode fiber, patch panels, patch cords, 8-pin/8 contact (8P/8C) RJ-45 connectors, SC fiber connectors, copper and fiber backbone cabling, and cross connect equipment.

BACKBONE CABLING

Secondary fiber backbone: Provide (1) 12 strand OS2 single-mode fiber optical and (1) 12 strand OM4 multi-mode fiber optic cable from the MDF to each new IDF. Provide fiber optic rack-mounted termination cabinets required to support classified, unclassified, and training networks. Additional backbone cabling will be required for training networks. Coordinate with government for requirements.

Secondary copper backbone: Provide 50 pair CAT 3 cabling from the MDF to each IDF. Provide copper terminal equipment for termination in each IDF. Copper terminal equipment selection per the latest Local provider and applicable Using Military Department standards and criteria.

HORIZONTAL CABLING

Provide (4) CAT 6 UTP green color for unclassified networks (i.e NIPR, etc.) and CAT6A UTP for simulation networks (i.e. CACCTUS, etc) from rack-mounted patch panels (in each IDF) to each WAO. Provide (2) CAT 6 UTP green color for WAP /DDC / FACP/ Elevators/ TV displays/ Utility Monitoring or metering. Provide (4) CAT 6 UTP red color for classified networks (i.e. SIPR). Provide (1) CAT 5e UTP green color for each synchronized clock / wall phone. Jack colors must be the same as CAT 6 cable colors. Provide a dedicated above ceiling basket-type cable tray system for NIPR/VOIP, SIPR and Training Networks.

WORK AREA OUTLET(WAO)

Provide double-gang steel electrical boxes for voice/data work area outlets. Provide boxes with a minimum dimension of 5-inches square in standard gypsum board walls and 4-11/16 inches square in CMU block walls. Provide a 1-1/4-inch conduit from each double-gang outlet box to the cable tray system. Mount voice/data work area outlet boxes at 18” above finished floor and minimum 6 inches away from any power receptacle. Provide voice/data outlet locations with a 4-

position faceplate with four RJ-45 (8P8C) connectors. All work areas will contain a minimum of two communications face plates. Any work area larger than 80 square feet will require additional face plates to service any work location in the room within 6 feet of a faceplate. Refer to section 27 10 00 for WAO details. Provide RJ-11 jack at synchronized clock locations.

Provide single gang steel electrical boxes at wall telephone locations with a 1-inch conduit from the outlet box to the cable tray system. Example locations for wall telephones are utility spaces, IDF. Mount wall telephone work area outlet boxes at 48” AFF. Provide wall telephone outlet locations with a 1-position faceplate with metal mounting studs.

INTERMEDIATE DISTRIBUTION FRAME

Provide minimum dimensions 10’x10’ or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42” from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The IDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. Each IDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39” separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

Provide a dedicated IDF for training network servers and distribution equipment. Coordinate with Government for requirements.

MAIN DISTRIBUTION FRAME (MDF)

Provide minimum dimensions 10’x10’ or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The MDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. The MDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39” separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

LABELING AND TESTING

Label and terminate backbone, horizontal cabling, and termination hardware in accordance with the latest Local provider and applicable Using Military Department standards and criteria.

Test UTP Category 6 and 6A cabling in accordance with the minimum standards established in ANSI/TIA-568-C.1 and ANSI/TIA-568-C.2-1.

Test fiber optic cables and terminations in accordance with the minimum standards established in ANSI/TIA-526-7B and ANSI/TIA-526-14B.

Perform tests at both ends of cables.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a Public Address system with speakers in all common spaces exterior speakers for outside activity spaces

Interface the Public Address System with the Mass Notification System.

D503004 TELEVISION SYSTEMS

Provide RG-6 coaxial cabling and (2) CAT 6 green cables from the closest IDF to each television location. Provide coax cabling that traverses a secure boundary with an RF filter. Terminate coaxial cabling at outlet side, coil coaxial cabling inside IDF. Leave enough cabling to terminate anywhere inside the IDF.

503005 SECURITY SYSTEMS

NOT USED

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

Refer to E20 for the Best Value Determination process for AV systems.

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

Provide General Construction Items (Electrical) including, but not necessarily limited to, all connections, fittings, boxes and associated equipment needed by this and other sections of this RFP as required for a complete and usable system.

Firestop conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors in accordance with Section C10, Interior Construction.

D509002 EMERGENCY LIGHTING AND POWER

Provide power and wiring for emergency lights and exit lights throughout the facility.

EMERGENCY LIGHTING AND EXIT SIGNS

Emergency lighting must be unswitched except where required for energy savings and where control is required to achieve complete darkness to meet the needs of the space (conference/briefing rooms, simulation spaces, auditorium, etc.). Where emergency lighting is switched or dimmed, the designated emergency lighting fixtures must immediately return to full brightness upon loss of normal power or signal from the fire alarm system. Devices necessary to facilitate this function must be UL Listed for the application and for use in emergency circuits.

Provide self-powered exit signs and luminaires to provide the required egress path marking and emergency lighting.

Provide self-powered exit signs and emergency lighting units with a sealed, maintenance-free, battery, a fully automatic solid-state charger, a test push button and indicator light, and an integral self-testing module.

Provide exit signs with cast aluminum housing and brushed aluminum stencil face(s).

D509003 GROUNDING SYSTEMS

Provide a complete grounding system for the facility electrical and telecommunications systems.

The grounding system must bond all building systems and equipment in accordance with applicable Codes and standards including but not limited to: medium voltage distribution equipment, generators, metal equipment support structures, outdoor transformers, fencing, building structure, building electrical and mechanical systems, raised access floor systems, lightning protection system, and communications systems to the grounding electrode system.

Provide UL listed copper, tinned copper, or silver-plated copper grounding conductors, lugs, connectors, and ground bars.

Provide a grounding electrode system for each building or structure.

Provide driven ground rods at each building column and bond to the building structure with minimum #4/0 AWG. Interconnect the building structure ground rods with a bare conductor grounding grid. Provide a bare conductor building counterpoise to bond the power system grounding electrodes, building structure grounding grid, building lightning protection grounding electrodes, and adjacent structures' grounding electrode systems. The minimum size of the counterpoise and grounding grid conductors is #4/0.

Provide copper-clad steel ground rods; minimum 3/4 inches by 10 feet in length, driven such that the top of the rod is 24 inches below grade, except in test wells.

Provide exothermic welds for below grade connections, except at test wells. Provide mechanical type connectors for above grade connections, in test wells, and in other locations where welded connections are not required.

Provide ground bars in electrical and telecommunications rooms. In multi-story buildings, provide a common grounding electrode riser to bond the secondary electrical ground bars (EGB) to the electrical main ground bar (EMGB) located in the main electrical room.

Provide a Telecommunications grounding and bonding system in accordance with UFC 3-580-01.

Provide each ground bar with a clear 3/16-inch thick polycarbonate or acrylic cover 2 inches larger in each direction of the bar it shields.

Install ground bars at 18 inches above finished floor (AFF) in areas without Raised Access Floor (RAF) or 18 inches above RAF in areas with RAF.

Provide a grounding conductor with all circuits and feeders. Conduits cannot be used as the sole grounding conductor. Where multiple circuits are contained in a conduit, they may share the grounding conductor.

D509004 LIGHTNING PROTECTION

Provide a complete lightning protection system with a UL Lightning Protection Inspection Certificate certified to UL 96A, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.

Conceal LPS down conductors within the building envelope. Provide access panels or other means for inspection of down conductors in accordance with NFPA 780 requirements.

Lightning Protection Systems must not void the roof warranty. Adhesive bases are prohibited on standing seam metal roofs.

D509005 ELECTRIC HEATING

Provide power wiring and connections as required for all electric heating systems and equipment.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide power wiring and connections as required for all systems and equipment including meters and controls. Coordinate connection requirements with switchgear and pad mounted transformer kWh metering.

D509007 BUILDING PHOTOVOLTAIC SYSTEM

NOT USED.

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

EMERGENCY POWER OFF (EPO) SYSTEMS

Provide maintained contact, mushroom type, twist to reset EPO buttons with a clear flip-up cover. EPO systems must disconnect power to IT equipment within the room, disconnect power to dedicated HVAC equipment within and serving the room, and perform other operations in accordance with NEC Article 645.

The EPO system power source must not originate from a source affected by operation of the EPO system.

Provide the EPO control panel as an integrated control and monitoring system with electrically operated contactors. Provide contactor voltage and current ratings consistent with type of load served. Provide the control panel in a surface mounted enclosure with key lock and with door-mounted control and pilot devices. Provide with two spare output relays of each type.

Provide the EPO control panel with the following door-mounted pilot lamps and switches:

- Preferred Power Source Available (Green lamp)
- Alternate Power Source Available (Green lamp)
- Maintenance Bypass Override(Key switch)
- Normal Operation (Green lamp)
- Maintenance Bypass (Amber lamp)
- EPO Activation (Red lamp)
- System Reset (Momentary push button or switch)
- Lamp Test (Momentary push button or switch)

Provide an output signal to Fire Alarm System from each room’s EPO system to provide the following status points per room:

- EPO system power available
- EPO activation

- EPO system in maintenance bypass

Placing EPO system in “Maintenance Bypass” allows testing of the EPO system without interrupting power to the IT or space support systems.

Locate the EPO control panel and EPO button adjacent to the entrance to the space. Where more than one entrance is provided, provide an EPO button adjacent to each entry point.

--End of Section--

E10 EQUIPMENT – P1512F JOINT RECEPTION CENTER

GENERAL SYSTEMS REQUIREMENTS

The contractor shall obtain the services of equipment specialists to specify audiovisual equipment. Equipment specialists shall not have any affiliation with the product specified.

All specialty equipment will be installed by qualified installers regularly engaged in installing the specialty equipment.

Provide energy using equipment per criteria listed in UFGS 01 33 29.05 20, Sustainability Requirements for Design Build.

E1010 COMMERCIAL EQUIPMENT

E101003 VENDING EQUIPMENT

Government to provide and install vending equipment (four units) under separate contract. Users to provide requirements of electrical and plumbing devices to be provided by Contractor to properly support the complete functional operation of the vending equipment. Design the break rooms to provide space, utilities, and cooling to accommodate the vending equipment.

E101005 SECURITY AND VAULT EQUIPMENT

NOT USED

E1020 INSTITUTIONAL EQUIPMENT

E102003 LABORATORY EQUIPMENT

NOT USED

E102009 AUDIOVISUAL EQUIPMENT

Coordinate design requirements with the end user/Command IT personnel, and provide equipment specifications, and procurement and installation of the Audiovisual (AV) equipment. Obtain the services of an audiovisual equipment specialist with CTS-D certification to design and specify the audiovisual equipment.

Plan for and provide AV equipment for all conference rooms, classrooms, labs, and Vehicle Training Bays.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment must include but is not limited to: intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, interactive wall systems and CCTVs.

AV equipment is funded separately. The AV Equipment is identified on the AV Cost Estimate Worksheet. Refer to E20 for the Best Value Determination process for AV systems.

E1030 VEHICULAR EQUIPMENT

NOT USED

E1040 GOVERNMENT FURNISHED EQUIPMENT

Rough-in and provide connections for Government-furnished equipment such that equipment will operate as intended, including providing miscellaneous items such as plugs, receptacles, wire, cable, conduit, flexible conduit and outlet boxes or fittings. Equipment shall remain in control of the Government until such time as the Contractor is ready to install. Contractor shall provide 30 days advance notice of expected installation date and pick up equipment at the location provided by the Government and transfer to site for installation. Testing requirements of Government Furnished equipment shall be the responsibility of the Contractor and shall follow the same guidelines as though the Contractor had provided the equipment.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide light commercial kitchen equipment design to meet the needs of the end user. All light commercial electric kitchen equipment to be coordinated to provide a functional facility.

Project includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the end user requirements and complete coordination with the facility design.

Equipment must include, but is not limited to, refrigerator, microwave, coffee maker, and ice maker.

--End of Section--

E20 FURNISHINGS – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Furnishings must include fixed furnishings as part of the Structural Interior Design (SID) and the design and documentation of the movable furnishings, the Furniture, Fixtures, and Equipment (FF&E) Package and Audio/Visual (A/V) Equipment Package.

The design and documentation of both must be funded as part of the construction contract. The purchase and installation of the FF&E and A/V Packages must be funded separately as part of Collateral Equipment.

The movable furniture and furnishings (FF&E) for this facility may include, but are not limited to movable furniture systems, freestanding furniture, area/accent rugs, artwork, appliances, flat screen TVs (not connected to data), accessories, shop equipment, fire extinguishers, specialty equipment (specified by the Activity) and other miscellaneous items to support facility functions.

FF&E is estimated in the amount of $1,276,183.71 and AV is estimated in the amount of $67,404.07. This Government FF&E and AV budgets must not be altered by Contractors during the bid process.

Fixed furnishings (items that are fixed to the structure), such as specialty equipment, drying cages, weapon racks, lockers, fixed shelving, fixed display furnishings, marker boards, cork boards, motorized projection screens, blinds/shades, etc. are part of the construction contract.

The Audio Visual (AV) Equipment will be identified as a separate line item, priced separately from the FF&E and funded as a planned modification. The A/V Package must include shipping, freight, handling, installation, applicable state sales tax, and the Contractor's A/V Handling and Administration Rate (HAR) percentage as applied to the final A/V total cost. Refer to Part 3 Section E10 Equipment and D50 Electrical of this RFP.

GENERAL SYSTEMS REQUIREMENTS

Design and provide fixed and movable furnishings for all areas as developed during Activity programming and as indicated in the Room Requirements (refer to Part 3 Section 5 of this RFP) and other portions of this RFP to provide a fully usable and complete facility. Design a complete FF&E package and A/V package and prepare supporting plans and procurement data. The design, procurement, and installation of the A/V package must comply with all of the same requirements as those defined for the FF&E package in this specification section FF&E and A/V items identified in this RFP are to be used as a guideline to assist in establishing the minimum facility requirements and do not relieve the Contractor's Interior Designer and CTS-D from developing a complete and accurate design package that incorporates ALL of the Activity’s FF&E and A/V requirements determined during the design process. Design per specific UFC (i.e. Youth center, BEQ, etc.) and in conjunction with UFC 03-120-10, Interior Design.

The contractor must retain the services of an Interior Designer with a minimum of one of the following credentials: National Council for Interior Design Qualification (NCIDQ) certification or state, locality and/or jurisdiction Interior Design Certification, Registration, or License. This same Interior Designer must prepare both the SID and the FF&E Package, attend and participate, in entirety, all kick-off meetings, existing site visits, design meetings, to include, but not limited to, design charrettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package.

When A/V is required, or other specialty equipment, i.e. shop, kitchen, fitness, high density storage, etc., is required in the project, the Contractor must obtain the services of the appropriate Equipment Specialists to specify the specialty equipment.

A Certified Technology Specialist-Design (CTS-D) is required for the design and preparation of A/V packages. The CTS-D must attend and participate, in entirety, all design meetings, to include, but not limited to, design charrettes, concept design workshops, presentations and review meetings to develop the floor plan and the A/V package. The NAVFAC approved Specialist(s) must provide separate Best Value Determinations (BVDs) for this equipment, if required by NAVFAC.

The Contractor's Interior Designer and CTS-D, the Design Firm Owner(s), and any Specialists must not have any affiliation with the products specified. The NAVFAC Contracting Officer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer based upon review/recommendation of the NAVFAC Interior Designer Per UFC 3-120-10, the FF&E includes the design, selection, specification, color coordination and procurement documentation of the required items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility.

FF&E specifications must be based on NAVSUP Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The utilization of the current NAVSUP BPA list is required for BVD Analysis Request for Pricing. The current NAVSUP BPA list is located at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The CTS-D must provide A/V floor plans indicating equipment locations and A/V riser diagrams for all A/V systems and coordinate equipment locations and power requirements with power plans. The Final FF&E and A/V packages must utilize the most current generation technology. All fixed and movable furnishings and A/V selections and designs must be closely coordinated with Parts 3 and 4 Sections C10, C30, E10, D50, and all other parts of this RFP. All fixed and movable furnishings and A/V must be fully integrated with the final design, to include all building finishes, and all building systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architecture, etc.) construction and schedule. All outlets, switches, thermostats, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc., clearances must be accommodated. The Contractor's Interior Designer and equipment specialists must be responsible for designing and providing specifications for procurement of all FF&E, A/V and specialty equipment, to include delivery and installation, for the facilities built under this contract as directed by the NAVFAC Interior Designer. The Contractor must be responsible for installing all A/V, communications, data, and power cabling within systems and freestanding furniture raceways and performing connections to the building, as required.

The FF&E and A/V packages must be fully integrated into the design and construction schedule for the building. All submittal due dates for the SID, A/V and FF&E must be reflected in the Contractor’s construction schedule. **The Contractor and the Contractor’s Interior Designer must strictly adhere the FF&E submittal schedule defined prior to the 35% design development to ensure that the final FF&E package is submitted at least 4 months prior to FF&E funding deadlines and no later than 9 months prior to building completion.** Requests to change the SID or FF&E schedule must be submitted to the NAVFAC Interior Designer for review/recommendation and approved by the NAVFAC Contracting Officer.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS
STRUCTURAL INTERIOR DESIGN (SID)

STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process must begin following the award of the RFP. The SID submittal must include Interior Design programming documents, FF&E Floor Plans, and exterior & interior finish/color and material sample boards and binders. Refer to this RFP Part 4 Section Z10 General Performance Technical Specifications and Part 2 UFGS Section 01 33 10.05 20, Design Submittal Procedures.

The Contractor’s Interior Designer must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative within 7 days of each occurrence.

Provide the following SID meetings and submittals;

a. Concept Design Workshop (CDW) (10%-15%) or Initial Design Meeting: The Contractor's Interior Designer must meet with the Activity and IDD/Base Property for Marine Corps projects to develop the Interior Design SID programming documents, which will include a preliminary Furniture and Equipment Plan and the FF&E Summary List. The Contractor's Interior Designer must conduct in-depth room by room interviews to confirm Activity requirements (SID, FF&E, A/V, etc.) for the new facility(s). These interviews must occur during the CDW and will include building walk-thru(s) at the Activity’s current location and/or similar facility(s), if possible.

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer’s representative must provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces. The Furniture and Equipment Plan, FF&E Summary List, and a preliminary Cost Estimate should be further developed and included in this submittal.

c. SID "Over the Shoulder" Review: Prior to the Prefinal (100%) Submittal, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer’s representative for an "over-the-shoulder" review meeting to present a minimum of three (3) options for the interior building finishes/colors/materials. Manufacturer choices and cost range of materials must be pre-approved by the Contractor to prevent any substitutions during the submittal process. Finish option samples for NAVFAC review must be clearly labeled and in a "loose" format for preliminary approval prior to the presentation to the Activity. Options must include manufacturer's label/specifications/data sheets. The over-the-shoulder review meeting must be held via conference call.

d. SID Presentation to Activity: The Contractor’s Interior Designer must present a minimum of two (2) NAVFAC Interior Designer-approved options for the interior building finishes/colors/materials to the Activity for approval. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for approval. The meeting must be held at the Activity. Photos documenting the selected finish option and preliminary finish schedule for that option must be emailed to the NAVFAC ID within 7 business days.

e. Prefinal (100%) Submittal: The Contractor's Interior Designer must submit the Activity-approved interior building finishes/color/material selections. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty

plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Prefinal SID Binder Submittal must be distributed to the NAVFAC Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

These finish options must be documented and submitted for review and approval as follows:

Submittal to NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's representative:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s) w/ floor patterns and accent wall locations
3. Finish Legend
4. Finish Schedule
5. Pre-Final Finish Selections and Physical Samples (photocopies of samples are not acceptable.)
6. CD copy of submittal in binder

f. Final Submittal: The Contractor's Interior Designer must incorporate the final approved Furniture and Equipment Plan, Finish Schedule, Floor Finish Plan and Finish Legend into the Contractor's final drawing set. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Final SID Binder Submittal must be distributed to the NAVFAC Project Manager/Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

The Final Submittal must include the following:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s)
3. Finish Legend
4. Finish Schedule
5. Final Finish Selections and Samples
6. CD copy of submittal in binder

SID CONSTRUCTION SUBMITTALS

No substitutions must be made to the SID finishes once they have been approved by NAVFAC during the design phase. In the event that revisions may be required due to unforeseen conditions such as discontinued product, such revisions must be submitted to the ROICC and NAVFAC Interior Designer's representative for approval by the NAVFAC Interior Designer before substitutions can be made.

FIXTURES, FURNISHINGS AND EQUIPMENT AND AUDIO VISUAL (FF&E and A/V)

The FF&E and A/V design process must begin at the CDW and develop concurrently with the building design. The submittals must include fixtures, furnishings, and equipment specifications in accordance with the Activity requirements to produce an optimally functional facility. FF&E are all items that are not fixed to the structure, but are fully integrated with the floor plan, building systems, and finishes. Refer to RFP Part 4 Section Z10 General Performance Technical Specification and Part 2 UFGS Section 01 33 1-.05 20, Design Submittal Procedures.

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the Activity requirements and complete coordination with the facility design and the SID.

For all projects, including fast track projects, the Contractor must be responsible for sufficiently scheduling all SID/FF&E and A/V submittals early enough to obtain the required government approvals, and meet all ordering and installation lead times to complete the project by the contract completion date.

These are minimum requirements and the Contractor must be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/FF&E and A/V coordination. The Contractor’s Interior Designer and CTS must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative and Electrical Engineer’s representative within 7 days of each occurrence.

Provide the following FF&E and A/V meetings and submittals;

a. FF&E and A/V Procurement Requirements Meeting (Interior Design Orientation): This meeting must occur at MIDLANT, located in Norfolk, VA prior to the Design Development (35%-50%) Submittal and the development of the FF&E package. The NAVFAC Interior Designer and NAVFAC Electrical Engineer will provide the Contractor's Interior Designer current sample documents to be used for the FF&E and A/V BVD Analysis solicitation package and submittals, review the Best Value Determination (BVD) process, discuss the number of Best Value Determinations required and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider.

b. FF&E "Over the Shoulder" Review: Prior to the FF&E Concept Presentation and Best Value Determination (BVD) Analysis the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review to present a minimum of two preliminary FF&E options. These can be presented in a "loose" format for preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA.

c. FF&E and A/V Concept Presentation: The Contractor's Interior Designer and CTS must present the NAVFAC approved preliminary FF&E and A/V package to the Activity for approval. This presentation must include loose format samples and catalog cuts. Sample boards are not required. This meeting must occur in conjunction with the SID presentation to the Activity, if possible. NAVFAC OICC, Project Manager, Interior Designer and Electrical Engineer must be invited to this meeting.

d. Best Value Determination (BVD) Analysis "Over the Shoulder Review": Prior to issuing the BVD Analysis solicitation package, the Contractor's Interior Designer and CTS must send an electronic copy and a hard copy in binder format, of the complete FF&E BVD Analysis solicitation packages to the NAVFAC Interior Designer and the complete A/V BVD Analysis solicitation package to the NAVFAC Electrical Engineer for review. The Contractor's Interior Designer and CTS must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review of all required solicitation packages and to review the most current NAVSUP BPA vendor list and discuss GSA Contract Audio Visual vendors. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA. Separate solicitations are required for each FF&E BPA category and the A/V package.

   BVD Analysis Solicitations must include the following:

   1. Copy of the BVD Analysis Request for Pricing cover letter – Indicate all revisions to this NAVFAC-provided template utilizing “Track Changes.” NAVFAC approved revisions may be added to this document, but no items may be deleted.

   2. BVD Analysis Request for Pricing Spreadsheet/Questionnaire with “basis of design” item product numbers, photos & descriptions

   3. Detailed Technical Specifications/Criteria developed for each FF&E and A/V item in NAVFAC MIDLANT’s standard format to establish minimum acceptable FF&E requirements for comparable bids.

   4. Project Specific Room / Furniture Typicals

   5. Furniture and A/V Plans with Legends coded to the BVD Analysis RFP (PDF format)

   6. Contractor’s subcontract agreement/terms and conditions (if applicable)

   7. Contractor’s Interior Designer must request the most current BPA Contract Holder vendor information prior to sending out the bid solicitations.

e. BVD Submittal and "Over the Shoulder" Review - The Contractor's Interior Designer must submit one (1) hard copy in binder format of the BVD package to the NAVFAC Interior Designer’s representative, NAVFAC Electrical Engineer’s representative, and one (1) copy to IDD/Base Property for Marine Corps projects. An electronic copy must be sent to the NAVFAC Contracting Officer, the NAVFAC Interior Designer and the NAVFAC Electrical Engineer. Additional back-up information from specific bid packages may be requested on an as-needed basis. The "over-the-shoulder" review meeting will be held via conference call VA to review the results of the solicitation and determine a best value recommendation. Submit the following in 3-ring binders and include a CD copy in each for review and approval:

   The BVD Submittal must include the following:

   1. Cover Title Page (project name, project #, location, submittal date, submittal title)

   2. Table of Contents

3. Point of Contact List
4. Narrative of Interior Designer Objectives
5. Copy of all information sent to bidders and documentation that all required sources were contacted
6. Technical Specifications used in bid request for all furniture and A/V etc.
7. BVD Analysis Request for Pricing Spreadsheet/Questionnaire completed by each bidder
8. Back-up Information submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meets all requirements.)
9 Responses from UNICOR (FF&E only)
10. Completed BVD Analysis Pricing Evaluation Spreadsheet comparing bidder quotes/responses
11. Contractor's Interior Designer/Electrical Engineer's recommendation for the Best Value vendor and justifications
12. CD copy of the FF&E and A/V BVD Submittal binders

f. The Contractor's Interior Designer must coordinate a mock-up for best value review of FF&E items as required by NAVFAC by at least the top three (3) BPA vendors submitting the highest rated FF&E proposals, as determined by NAVFAC. The reviewers must include the Contractor's Interior Designer, NAVFAC Interior Designer, Contracting Officer, IDD/Base Property, and the Activity.

g. Preliminary FF&E Submittal: The Preliminary submittal must be due at pre-final (100%). It must be presented to the Activity and NAVFAC Interior Designer's Representative and NAVFAC Electrical Engineer's Representative in loose format at a meeting to occur at the Activity. Presentation will consist of loose samples, to include all cut sheets and finishes from the recommended vendors. Immediately following this meeting, the Preliminary FF&E and A/V submittal binders will be submitted. Immediately following this meeting, the Preliminary FF&E submittal binders must be submitted. Five (5 submittals will be required; (1) for the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

Submit the following in a 3-ring binder (with the exception of the 16x20 color boards for the Activity only) for review and approval:

The Preliminary FF&E Submittal must include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)
2. Table of Contents

3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s) vendors and subcontractors)
4. Preliminary FF&E list (Cost Summary) to include shipping, freight, handling, professional installation, project management, HAR and applicable sales tax
5. Preliminary Procurement Data Spec Sheets completed for each product. Indicate general appearance as well as proposed finish and fabric selections
6. Furniture and A/V placement plans coded to the FF&E and A/V lists and Procurement Data Spec Sheets; include electrical and A/V plans for coordination.
7. Technical Specifications used in bid request for all furniture, and A/V etc.
8. Pre-Final Finish/Fabric Selections and Samples in 8 x 10 binder format mounted on heavy-duty card stock in edge-reinforced heavy-duty plastic sheet protectors.
9. Copy of Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes. Indicate and provide explanations for all changes to FF&E quantities and/or pricing that occur between accepted vendor proposal and Final FF&E Submittal.
10. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.

h. The Contractor and his Interior Designer must coordinate an on-site mock-up and review of FF&E items as required by NAVFAC with the selected, best-valued BPA vendor(s). Building finishes and fixtures must be installed in the affected area(s) to the greatest extent practicable in order to assess building systems/fixture coordination. The reviewers must include the NAVFAC Interior Designer and Construction Manager, The Contractor's Interior Designer, IDD, Base Property, and the Activity. The BPA vendor must be available on-site to respond to questions. The mock-up exercise must be completed prior to the submittal of the Final FF&E submittal and award of the modification for turnkey furniture procurement.

i. Final FF&E and A/V Submittal: The Contractor's Interior Designer must submit the Final FF&E and A/V Packages within 30-90 calendar days following the receipt of review comments on the preliminary FF&E submittal. **All required documentation revisions of price changes and product reselection due to price increases or discontinued product must be the responsibility of the Contractor's Interior Designer.** Five (5) submittals will be required; (1) for the NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative, (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

   The Final submittal must include the following:

   1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)

2. Table of Contents

3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s), vendors and subcontractors)

4. Final FF&E and A/V lists (Cost Summary) to include shipping, handling, freight, professional installation, project management, HAR and any applicable sales tax.

5. Final Procurement Data Spec Sheets completed for each product. Indicate final finish and fabric selections. Images of item and finishes to be represented.

6. Final Finish Selections and Memo Samples for the FF&E submitted in 8 x 10 binder format, mounted on heavy-duty card stock, using heavy-duty plastic sheet protectors.

7. Final Furniture and A/V Placement Plans coded to the FF&E and A/V lists, Procurement Data Sheets and specifications; include electrical and A/V plans for coordination.

8. Copy of Final Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes.

9. Indicate and provide explanations for all changes to quantities and/or pricing that occur between accepted vendor proposal and Final Submittal.

10. Best Value Determination Guidelines sheets (completed and signed by the Contactor's Interior Designer and CTS-D)

11. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.

12. CD copy of the final FF&E and A/V binders.

j Punch List: The Contractor's Interior Designer (and A/V consultant or other specialty consultants, if applicable) must attend two punch list site visits with the installation dealer(s), NAVFAC Interior Designer and the Base Representative/Activity Contact. The first site visit must identify all punch list items (at installation dealer's 98% completion) and the second (at 100% completion) will confirm that all punch list items have been resolved.

FF&E CONSTRUCTION SUBMITTALS

Submit any revisions or deviations caused by discontinued items to the Contracting Officer for approval by the NAVFAC Interior Designer.

SD-10 Operation and Maintenance Data

List Operation and Maintenance Manuals for seating, systems furniture and keyboard trays.

E2010 FIXED FURNISHINGS (SID)

Fixed furnishings (SID) are funded as part of the construction project and are not funded as part of FF&E Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

Develop design as described herein and provide storage shelving, equipment racks, and window treatments. Cross reference C10 Interior Construction, and C30 Interior Finishes, for performance requirements. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

E201001 FIXED ARTWORK

As required, provide wall graphics and/or logo of activity in appropriate locations. Coordinate with Activity and NAVFAC Interior Designer's representative for location and placement.

E201002 WINDOW TREATMENTS

Provide manually operated roller shades at windows and other glazed openings to the exterior of the building. Provide light filtering and blackout shades for all exterior windows unless otherwise noted below or in room requirements. Provide only blackout shades at frosted/obscured vision glazing locations.

Shade housing (fascia, valence, and trim) must be located above the window frame as to not conceal the glazing. Recess shade in ceiling at locations where window frame is at same level as ceiling system.

All exposed roller shades must be furnished with metal fascia / valance. Provide side and sill channels for black-out shades to prevent light leak / bleeding. Light seal hem bar may be provided in lieu of sill channel.

Shade cloth material and finish must be coordinated with NAVFAC Interior Designer during design-build. The following openness factors must be provided:

Sunscreen: 3% minimum - 6% maximum openness

Black-out: 0% openness

Shades are considered SID and are funded as part of the construction contract. Soft window treatments, such as draperies (not to include stage curtains), are considered FF&E and must be included in the FF&E package, as required.

E201003 FIXED SEATING AND TABLES

NOT USED

E201004 INTERIOR LANDSCAPE (FIXED)

NOT USED

E201006 LOBBY AREA

Design and provide lobby areas consistent with quality commercial design, architecturally significant in scale, and coordinated with the interior finishes for each facility. Lobby areas must reflect the mission of the client and must be designed to accommodate the function and program required for the facilities. Lobby areas must include the following elements: fixed

artwork, graphic floor inlay, and decorative lighting. Lobby elements noted above are part of the construction contract.

E2020 MOVABLE FURNISHINGS

The design of the FF&E package is funded as part of the construction contract base bid. The purchase and installation coordination of FF&E is a planned modification to the contract and funded separately as part of Collateral Equipment. The specific process is outlined in PTS E20 in Part 4 of this RFP. If a Collateral Equipment list is provided within this RFP, the costs associated with the purchase and installation of these items are NOT to be included in the base bid. The estimated Collateral Equipment cost is provided for information purposes only. The Contractor only needs to propose the Handling and Administrative Rate (HAR).

Design and provide an FF&E package in accordance with UFC 03-120-10, *Interior Design,* and other portions of this RFP for all areas as developed during Activity programming to provide a fully usable and complete facility. Collateral Equipment may also include specialty items specified by the Activity and the Contractor's Interior Designer is responsible for incorporating these into the FF&E and/or the A/V package. The estimated Collateral Equipment cost(s) are provided for information purposes only. Actual requirements may vary, and it is the responsibility of the Contractor’s Interior Designer and/or Equipment Specialist to determine the specific requirements of the End User during the design phase and design to these requirements.

The FF&E Package must include shipping, freight, handling, and professional installation, project management, applicable sales tax, and HAR.

A Best Value Determination must be performed on a minimum of three manufacturers and UNICOR for orders exceeding the micro-purchase threshold from an individual manufacturer/vendor. Multiple BVDs may be required in order to complete the final FF&E and A/V packages. The required quantity of BVDs to be performed will be determined by the NAVFAC Interior Designer’s representative during the design phase and is dependent on the appropriate NAVSUP BPA category(s) to be utilized and specific project requirements. Documentation must be provided to the Government with the final FF&E package. Specific Documentation is indicated in Part 4 of the RFP. The BVD Statement must be completed and signed by the contractor's interior designer. Sample BVD forms and instructions will be reviewed during the FF&E Procurement Requirements Meeting. Forms can be obtained from the WBDG at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The Contractor, as a planned modification, must be authorized by the Government Contracting Officer to procure all furniture/furnishings in the approved final FF&E and A/V packages using predominately negotiated Federal contracts as directed by the Contracting Officer and the NAVFAC Interior Designer and Electrical Engineer. When the modification for turnkey furniture and A/V procurement is exercised, the Contractor's proposed Handling and Administrative Rate (HAR) must not exceed 5% of the total cost of the FF&E, and A/V shipping, freight, handling, project management, and installation. The HAR includes all of the contractor's efforts related to the storage, coordination, handling and administration of subcontractors, deposits, bonds and all other associated costs and profit for the procurement of FF&E and A/V. No other charges, fees, or markups will be authorized. The contractor must establish and submit a fixed percentage figure, for the administration effort of this modification (HAR), with the initial project proposal as part of the contractor's Pricing Schedule.

E202001 MOVABLE ARTWORK

Provide graphics and other movable artwork as required by Activity / User and NAVFAC Interior Designer's Representative. Movable artwork is part of the FF&E package.

E202002 MODULAR PREFABRICATED FURNITURE

Provide modular freestanding workstations as required. Provide at a minimum, a 36 square foot workstation. The workstation to include: an adjustable height computer solution (electric height adjustable work surface, ergonomic keyboard tray, or split height work surface), a height adjustable monitor arm, a CPU holder, task lighting, overhead storage, and file storage. Ensure cable management within the workstation is provided. Approval in writing must be obtained from the Activity / User Commanding Officer for any deviation in workstation size reduction. Special coordination of workstation design must occur when workstations are located next to windows. All components of the workstation including but not limited to overhead storage and furniture partitions must not abut windows and block views to the exterior. Storage associated with these workstations may be accommodated by overhead storage perpendicular to the window or an additional counter height storage component of not less than 3'-0" and constructed in the same style as the workstation, located adjacent to the workstation at the end of the circulation aisle.

E202003 FREESTANDING FURNITURE AND FILES

Provide ergonomic task seating, lounge, reception and guest seating, storage and filing, tables, as required.

E202004 RUGS & ACCESSORIES

Provide decorative items as required. Include one wall clock in each office.

E202005 MULTIPLE SEATING (MOVABLE)

Provide movable seating.

E202006 INTERIOR LANDSCAPING (MOVABLE)

Provide interior landscaping (planters, site furnishings, etc.) as required.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, fire extinguishers, clocks, literature racks, microwaves, refrigerators, non-plumbed coffee makers, and other appliances as required.

--End of Section--

F10 SPECIAL CONSTRUCTION – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Special Construction systems are not applicable to this project.

GENERAL SYSTEMS REQUIREMENTS

F1010 SPECIAL STRUCTURES

F101001 METAL BUILDING SYSTEMS (PRE-ENGINEERED)

NOT USED

F1020 INTEGRATED CONSTRUCTION

NOT USED

F102001 SPECIAL PURPOSE ROOMS

NOT USED

F1030 SPECIAL CONSTRUCTION SYSTEMS

NOT USED

F1040 SPECIAL FACILITIES

Provide a covered canopy at the bus drop off as indicated in the Concept Site Plan, in Part 6 of this RFP. The canopy is required to provide cover for Marines disembarking from buses and allow for a bus to pull under the canopy for at least half the width of the bus. Materials for columns and roofing are to match the materials used for the JRC building.

The length of the canopy should handle two full buses and be no less than 20 feet deep.

The roof must be a standing seam metal roofing to match the JRC building roof.

F104001 INTERIOR SWIMMING POOLS

NOT USED

--End of Section--

F20 SELECTIVE BUILDING DEMOLITION – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

The demolition/removal of existing buildings defined for the P1512 Milcon projects is defined in ESR F20 of the Log Ops Building.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Perform all off-site work necessary to meet the requirements of the project, local codes, reference standards, technical specifications and performance criteria.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor shall submit complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form is in the UFC 3-201-01, *Civil Engineering*. Contractor shall determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form shall be forwarded to the EFD Environmental Reviewer.

Coordinate and obtain approval from the Contracting Officer for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

F2010 BUILDING ELEMENTS DEMOLITION

NOT USED

F2010 1.1 GENERAL DEMOLITION

NOT USED

F2010 1.2 UTILITIES

NOT USED

F2010 1.3 DUST CONTROL

NOT USED

F2010 1.4 TRAFFIC CONTROL

NOT USED

F2010 1.5 WEATHER PROTECTION

NOT USED

F2010 1.6 BURNING

Where burning is permitted, adhere to federal, state and local regulations shall be required. Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

All open burning shall be coordinated with the Air Quality Manager at MCBCL (910-451-5836).

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

NOT USED

F201002 EXTERIOR CLOSURE

NOT USED

F201003 ROOFING

NOT USED

F201004 INTERIOR CONSTRUCTION & FINISHES

NOT USED

F201005 CONVEYING SYSTEMS

NOT USED

F201006 MECHANICAL SYSTEMS

NOT USED

F201007 ELECTRICAL SYSTEMS

NOT USED

F201008 EQUIPMENT & FURNISHINGS

NOT USED

F201090 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

F2020 HAZARDOUS COMPONENT ABATEMENT

NOT USED

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

NOT USED

F2020 1.2 FURNISHINGS

NOT USED

F2020 1.3 ASBESTOS

NOT USED

F2020 1.4 LEAD BASED PAINT

NOT USED

F2020 1.5 PAINT RELATED WORK

NOT USED

F2020 1.6 MERCURY & LLR COMPONENTS

NOT USED

F2020 1.7 PCB'S

NOT USED

F2020 1.8 OZONE DEPLETING SUBSTANCES (ODS)

NOT USED

F2020 1.9 ANIMAL DROPPINGS

NOT USED

F2020 1.10 MOLDS AND SPORES

NOT USED

F2020 1.11 DISPOSAL

NOT USED

F202001 SUBSTRUCTURE & SUPERSTRUCTURE

NOT USED

F202002 EXTERIOR CLOSURE

NOT USED

F202003 ROOFING

NOT USED

F202004 INTERIOR CONSTRUCTION & FINISHES

NOT USED

F202005 CONVEYING SYSTEMS

NOT USED

F202006 MECHANICAL SYSTEMS

NOT USED

F202007 ELECTRICAL SYSTEMS

NOT USED

F202008 EQUIPMENT & FURNISHINGS

NOT USED

F202090 OTHER HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

--End of Section--

G10 SITE PREPARATION

SYSTEM DESCRIPTION

Provide site preparation that supports project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site preparation system consists of site clearing, demolition, salvage, relocation, earthwork, and hazardous waste remediation necessary to ready the site for other work associated with the project.

GENERAL SYSTEM REQUIREMENTS

Develop the project site and perform all off-site work necessary to meet the requirements of the project, antiterrorism criteria, local codes, reference standards, technical specifications and performance criteria.

A topographic survey of the existing site has not been performed for the site. The Contractor is required to perform a topographic survey of the project area in accordance with UFC 1-300-09N, Design Procedures, that will be impacted by his work. Include this topographic survey in all design submittals. The concept plans provided in Part 6 are based GIS information field verified to the extent practical. Underground utility sizes and exact locations were not able to be verified. The GIS topographic information has been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. Prior to starting work, physically verify the location of all existing utilities and obtain all additional survey data required to provide a quality final design. The existence, size and/or location of the utilities are not guaranteed by the GIS provided. The Contractor must show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level B. Where critical utility crossings or conflicts are likely, show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level A. Verify the location of all utilities prior to construction.

Prior to beginning excavations, the Contractor must contact the Public Works Office. The Contractor must hire a private utility locating service to locate all Government owned utilities. Contractor will be responsible for obtaining all required permits prior to excavation and will be responsible for maintaining utility markings and calling to have utility remarked if utility markings are not preserved. Contractor must add all located underground utilities to the topographic survey and must provide to the Government both a hard copy and in electronic format.

Unless otherwise noted, provide new facilities at the locations indicated on the drawings in Part 6.

Minimize the impact of construction activity on operations and neighboring facilities.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Submit a complete "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453. Determine correct permit fees and pay said fees. Forward copies of all permit applications, permits, and the completed PROD form to the Government's Civil Reviewer and Environmental Reviewer. Perform work in accordance with the obtained permits.

Based on GIS information jurisdictional tidal and non-tidal wetlands have not been identified on the project site.

Coordinate and obtain the Resident Officer In Charge of Construction's (ROICC) approval for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

Refer to Site Analysis and Building Requirements Sections for additional site preparation functional program information.

Provide site preparation that supports project sustainability goals.

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information is included in Part 6 – Attachments. Refer to Part 3, Section 6, ESR A10 for additional information concerning the Government provided subsurface data and the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

Refer to Part 3, Section 6, ESR A10 for the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL EARTHWORK REQUIREMENTS

Refer to Part 3, Section 3, Site Analysis for base bid requirements concerning earthwork and site preparation.

G1010 SITE CLEARING

G101001 CLEARING

Preserve trees at the perimeter of the site.

This project site does not have saleable timber.

Adhere to federal, state and local regulations for burning. Design Build Contractor must comply with MCIEAST-MCB CAMLEJBul 5090 (Open Burning of Vegetative Debris). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

G101002 TREE REMOVAL

Remove and dispose of all as required for project construction.

To reduce the incidental take of migratory birds and their nests, trees with active nests should not be cleared. If tree clearing is proposed between April and July, contact the LWRS Biologist for additional guidance.

G101003 STUMP REMOVAL

Remove all stumps under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction

G101004 GRUBBING

Remove all root mat and organic debris under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101005 SELECTIVE THINNING

NOT USED

G101006 DEBRIS DISPOSAL

Dispose of all grubbing and clearing residue, demolished material, rubbish and debris generated by this project by hauling off-site and off station.

Dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls*.

G1020 SITE DEMOLITION & RELOCATIONS

This project requires the mass demolition of multiple buildings and service utilities.

G102001 BUILDING MASS DEMOLITION

Refer to section G102001 of the Logistics Operations School.

G102002 ABOVEGROUND SITE DEMOLITION

Remove and dispose all existing site features that conflict with the construction of the project, including asphalt and concrete pavements.

G102002 1.1 ABOVE GROUND STORAGE TANKS

An above ground storage tank report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

G102003 UNDERGROUND SITE DEMOLITION

Preserve or relocate the following underground site elements: all existing utilities required for proposed project.

Remove or relocate existing utilities under or within 10 feet (3.0 m) of any new facilities or building additions. Existing utilities include but are not limited to piping, structures and conduits. Remove all appurtenances associated with the utility to be removed so there is no presence of the utility at ground surface. Remove existing utility structures, not within the building footprint, to 3 feet (900 mm) below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Fill with clean sand.

Do not open cut pavement that is to remain to demolish utilities. Fill piping and/or conduits under pavements with flowable fill.

Remove all utility service connections of demolished buildings back to the main and cap per State and Federal regulations.

G102003 1.1 UNDERGROUND STORAGE TANKS

An underground storage tank report is not provided to support this project.

G102004 BUILDING RELOCATION

NOT USED

G102005 UTILITY RELOCATION

Comply with the requirements of the utility provider concerning the utility relocation of the phone and fiber optic utilities. Comply with NAVFAC requirements and all applicable UFCs concerning other utility relocations.

Refer to the Part 3 narratives and Part 6 for additional utility relocation information and GIS utility information that is within the proposed site area respectively.

G102006 FENCING RELOCATION

NOT USED

G102007 SITE CLEANUP

Waste materials will become the property of the Contractor; transport, dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G102090 OTHER SITE DEMOLITION & RELOCATIONS

Demolish existing site lighting and associated wiring and pathways in the footprint of the proposed building and site amenities.

G1030 SITE EARTHWORK

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, Excavation and Fill, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Grading shall conform with UFC 3-201-01, *Civil Engineering*.

G103002 COMMON EXCAVATION

Perform common excavation with equipment of sufficient size to accomplish the work required. Over excavation of areas to obtain additional satisfactory material for the contractor’s use is not permitted.

Preserve natural topographic features to minimize cut and fill requirements. All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer.

G103003 ROCK EXCAVATION

Blasting will not be permitted.

G103004 FILL & BORROW

Provide borrow and select fill from off-base sources.

A grading plan has not been designed, therefore it has not been determined if common fill, backfill and fill material, select fill or top soil is available on site in the required quantities.

On-site soils that are determined as clean fill by the geotechnical engineer via testing must be backfilled and compacted in accordance with the requirements in this section.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

For each borrow site, provide borrow site testing for hazardous materials characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

G103005 COMPACTION

Perform compaction per the Performance Technical Specifications or the Contractor's geotechnical report, whichever is more stringent.

G103006 SOIL STABILIZATION

The following methods of soil stabilization will not be allowed: lime, lime slurry, and pressure grouting.

G103007 SLOPE STABILIZATION

Provide slope stabilization through appropriate grading and site design for a minimum factor of safety of 1.5 or slope that does not exceed the maximum slope per local code requirements.

G103008 SOIL TREATMENT

Treat the area around the entire foundation of each building for termite control in accordance with manufacturer's instructions.

G103009 SHORING

Provide shoring, bracing, and sheeting, etc., as required to prevent undermining of foundations, pavement, utility pipes, structures, and slabs and prevent slippage or movement in embankments or slopes adjacent to excavations to facilitate construction. Shoring will be in accordance with Section 25 A and B of EM 385-1-1. Provide a sheeting and shoring plan if required by local codes and/or OSHA. The plan must be signed and sealed by a professional engineer.

G103010 TEMPORARY DEWATERING

Provide pumps, temporary ditching, and grading required to maintain groundwater levels at the Contractor's geotechnical engineer's recommended level below footings and or pavements during construction. Ensure that there are no groundwater conditions that will promote deterioration of the soil or interruptions to the construction progress.

All dewatering effluent must be filtered per NCDEQ erosion and sediment control requirements prior to discharge to minimize sediment to surface waters.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Obtain an Erosion and Sediment Control permit required for the proposed work from NCDEQ. Submit the permit application to the COR for approval prior to submitting to NCDEQ.

G103090 OTHER SITE EARTHWORK

NOT USED

G1040 HAZARDOUS WASTE REMEDIATION

A contaminated soil/groundwater report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

G1040 1.1 CONTAMINATED SOILS AND GROUNDWATER

The project site does require contaminated soil or groundwater work.

Perform contaminated soil or groundwater work in accordance with the specifications and plans provided in Parts 5 and 6.

--End of Section--

G20 SITE IMPROVEMENTS – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

Provide site improvements that support project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site improvements system consists of pavements and pavement related features, landscaping and other exterior site development work related to this project. Provide a pavement design by a licensed Professional Engineer familiar with conditions local to the project site. Site design, including but not limited to design of parking and pedestrian circulation, will include coordination with the Civil Engineer and the Landscape Architect.

GENERAL SYSTEMS REQUIREMENTS

Provide site improvements as required to make a useable facility that meets functional and operational requirements, incorporates all applicable anti-terrorism, force protection and physical security requirements and blends into the existing environment.

Provide accessibility in conformance with applicable requirements of UFC 1-200-01, *General Building Requirements*.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer. Perform work in accordance with the obtained permits.

Provide site improvements that support project sustainability goals.

Minimize the impact of construction activity on operations and neighboring facilities.

Locate new site improvements at locations indicated on the drawings in Part 6 of this RFP. If specific locations are not provided, site the improvements to develop appropriate and positive relationships with other facilities and to conform to existing development patterns.

Refer to Site Analysis and Building Requirements Sections for additional site improvement functional program information.

G2010 ROADWAYS

Provide roadways, as required, to allow for safe, convenient and logical circulation, while discouraging through traffic. Provide new roadway pavement sections as required by soil conditions and as determined by the Designer of Record. Design pavement sections in accordance with UFC 3-201-01 Civil Engineering. See part 3 Site Analysis for pavement section bid criteria.

Provide roadways of bituminous pavement or Portland cement concrete (PCC) where indicated on the drawings in Part 6. Aggregate pavement may be used for access roads to mechanical equipment if approved by NAVFAC.

A subsurface drainage system must be provided for all roadways and drives greater than 50 feet in length. The subsurface drainage system must consist of, at a minimum, weep holes in all drainage structures and perimeter underdrain or strip drains designed such that the aggregate base course and sand subbase layers remain in a drained (i.e. unsaturated) condition during construction and in service.

Provide other roadway improvements including traffic signalization, pavement markings, and signage.

G201001 BASES & SUBBASES

The following materials will not be allowed for base or subbase courses: lean concrete, cement stabilized, sand-clay, lime rock, or shell.

G201002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent. Where NCDOT do not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of NCDOT for a minimum compressive strength at 28 days of 3500 psi concrete.

G201003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous pavement as permitted by the NCDOT.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks per UFC 3-201-01.

Provide signage per UFC 3-201-01 and the BEAP.

Provide temporary pavement markings and signage throughout construction to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition.

G201005 GUARDRAILS & BARRIERS

Provide wheelstops and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G201006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G201090 OTHER ROADWAYS

NOT USED

G2020 PARKING LOTS

The design of pavements must include the anticipated daily traffic over the life of the project (20 years) as well as the existing soil conditions at the site. See part 3 Site Analysis for pavement section bid criteria.

Provide parking lots of bituminous pavement or Portland cement concrete (PCC) pavement where indicated on the drawings in Part 6. Do not use aggregate or permeable pavement.

Provide new parking and other pavement sections as required by soil conditions and determined by Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*.

Provide other parking improvements including parking entrances for two-way traffic, signage, concrete dumpster pad, and landscaping.

Provide handicapped parking in accordance with UFC 1-200-01, General Building Requirements.

Provide parking in accordance with UFC 3-201-01, Section 2-9.6 Parking Areas and SDDCTEA Pamphlet 55-17.

See G2050 LANDSCAPING and G205005 PLANTINGS for parking lot landscape requirements.

G202001 BASES & SUBBASES

Crushed concrete meeting NCDOT specifications for gradation for aggregate base or subbase courses may be used.

G202002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent.

G202003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by NCDOT.

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings on pavement, curb and objects, signage (regulatory, warning and guidance) and other traffic control devices as required to facilitate proper utilization of the parking areas.

Provide pavement markings including crosswalks. Provide parking spaces in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide signage in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide temporary pavement markings and signage to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the MUTCD.

G202005 GUARDRAILS & BARRIERS

Provide wheel stops and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G202006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G202007 MISCELLANEOUS STRUCTURES AND EQUIPMENT

NOT USED

G202090 OTHER PARKING LOTS

NOT USED

G2030 PEDESTRIAN PAVING

Provide a network of Portland cement concrete (PCC) sidewalks, separated from, but connected to vehicular circulation systems, to allow for pedestrian circulation between various new and existing elements of the project. Interface new pedestrian circulation systems with existing pedestrian circulation systems and include input from the Civil Engineer, Architect, and Landscape Architect.

Provide sidewalks of Portland cement concrete pavement with 4 inches thick minimum. Provide concrete sidewalk in accordance with Section G201003 or with the standard NCDOT mix for a minimum compressive strength at 28 days of 3,500 psi. For PCC sidewalks, provide a broomed finish. Reference Part 3 Site Analysis for sidewalk widths.

Unless indicated otherwise, provide a transverse slope not to exceed 1/48. Limit variation in cross section to 0.25 inch in 5 feet.

Provide, as indicated in BEAP 3.2.8 PLAZAS AND COURTYARDS – EXTERIOR USE ARES, entrance plazas and pedestrian spaces to create outdoor meeting spaces and reinforce the arrival sequence from parking lot to building entrance(s). Size and placement must reflect functional needs and the appropriate importance to the setting. Forecourts may serve as outdoor plazas, courtyards or smaller landings and be furnished with benches, trash receptacles, plantings, lighting and distinctive architectural treatment and may include provisions for bicycle parking. Bike racks must be provided to support 5% of the building FTE and can be divided into more than one location. See PART 3 – CHAPTER 2 Antiterrorism Force Protection for additional requirements for plazas and pedestrian areas for a fully coordinated design.

G203001 BASES & SUBBASES

Provide as required and per the Contractor’s geotechnical engineering report.

G203002 CURBS & GUTTERS

NOT USED

G203003 PAVED SURFACES

NOT USED

G203004 GUARDRAILS & BARRIERS

NOT USED

G203005 RESURFACING

NOT USED

G203006 OTHER WALKS, STEPS & TERRACES

NOT USED

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

NOT USED

G204002 RETAINING AND FREESTANDING WALLS

Provide retaining walls in areas of significant grade change. Follow the requirements set forth in Part 4, Performance Technical Specifications.

Provide concrete retaining walls with applicable safety protective measures. Retaining walls must match new facility exterior.

Provide retaining walls to permanently resist soil pressures as well as live loads. Provide wall drainage to minimize lateral loading and protect wall materials against degradation.

Retaining walls are required to comply with UFC 3-220-01. The DOR must obtain building permits for retaining walls greater than five feet in height.

G204003 EXTERIOR FURNISHINGS

All site furnishings are required to conform to the Base Exterior Architectural Plan (BEAP). For the picnic area provide picnic tables, trash receptacles, benches, recycling receptacles. Provide a trash and ash receptacle at the designated smoking area.

Design picnic area for 50 people.

All site furnishings must be anchored to concrete pavement below.

G204004 SECURITY STRUCTURES

Provide concrete curbing at the edges of all parking areas to identify the site perimeter and prevent parking in the 33-foot unobstructed space.

G204005 SIGNAGE

Provide building identification signage, building number signage, and way finding signage in accordance with the Activity's BEAP.

G204006 FOUNTAINS & POOLS

NOT USED

G204007 PLAYING FIELDS

NOT USED

G204008 TERRACE AND PERIMETER WALLS

NOT USED

G204009 FLAGPOLES

NOT USED

G204090 OTHER SITE IMPROVEMENTS

Provide heavy-duty concrete dumpster and utility pads. Provide dumpster enclosures conforming to the Activity’s BEAP. BEAP 3.4.10 indicates that dumpster areas should be

located on structural concrete pads with adequate radius, approach length, and overhead clearance from trees, utilities, and structures. Screening should be provided on three sides by a 7-foot-tall masonry wall to block views of the containers. The dumpster enclosure's materials and style must complement the facility it serves. For each dumpster, install a minimum of two bollards at the rear of the enclosure to protect the rear wall from damage and a minimum of two bollards on each side of the dumpster. The contractor must provide separate vehicular and pedestrian access to the dumpsters within the enclosures.

If a fire pump is required, provide a heavy-duty concrete pad for an on-site standby generator outside the building so it can be easily taken off line and removed once the base upgrades their power grid at a subsequent date.

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn groundcover trees shrubs ornamental grasses and organic mulches and inorganic mulches as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with all applicable anti-terrorism, force protection and physical security requirements. The landscape design must reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 5' wide inorganic rock cobble mulch mow strip around the building with weed barrier fabric below rock. Provide concrete edging along mow strip where edging is adjacent to a turf area. Provide landscaping resistant to deer.

Trees, shrubs, and ground covers are acceptable within the AT/FP unobstructed space. Trees must have a 3-inch minimum caliper and branching structure that provides a 3-foot clear zone above the finished grade. Shrubs must be trimmed to provide a 3-foot clear zone above the finished grade and ground covers must not exceed 6-inches in height.

Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species. Areas of the site not covered by buildings or other structures and impervious paving or walkways within the project limits must be considered landscape area and must receive landscape improvements.

Guarantee all landscaping for a period of one year. Provide a one-year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

Provide complete landscaping maintenance, including but not limited to, routine lawn mowing, edging, pruning, pest inspection/treatment, re-mulching of mulch products, watering, weeding, fertilizing, and restaking, throughout the guarantee period.

Provide mechanical equipment screening wall on three sides of new equipment.

Provide shrubs or small growing trees if feasible for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205001 FINE GRADING AND SOIL PREPARATION

Provide 4 inches of topsoil for all lawn areas and fine grade.

G205002 EROSION CONTROL MEASURES

Prevent erosion from occurring by providing erosion control measures as required by NCDEQ and federal requirements.

G205003 TOPSOIL AND PLANTING BEDS

Provide a planting soil mixture composed of 50% native soil blended with 50% topsoil and other amendments as recommended by the soil testing laboratory around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's root balls. Set tops of plant root balls 2 inches above adjacent grades

Provide shrubs or small growing trees if feasible for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205004 SODDING

Sod all areas intended to be turf. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of sodding and provide same guarantee and maintenance as for new landscape areas. Sod species must be Centipede – Eremochioa ophiuroides.

G205005 PLANTINGS

Preserve existing trees to the greatest extent possible.

MATERIAL SELECTION:

Select plant material from Master Plant Lists found within the Base Exterior Architecture Plan (BEAP), NC State Extension and the North Carolina Native Plant Society. Other plants not found on these lists may be used if approved by the reviewing Government Landscape Architect. Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. Final approval of new plant materials rests with the reviewing Government Landscape Architect. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species.

Shade trees must be a minimum size of 3 inch caliper at breast height and 14 to 16 feet tall minimum unless specified for Antiterrorism Force Protection measures where the trees are integrated into the vehicle-deterrent perimeter. See Antiterrorism Large Diameter Trees in PART 3 - CHAPTER 2 PROJECT OBJECTIVES. Flowering trees must be minimum 2 inch caliper and evergreen trees 8-10 feet tall. In general, select trees that have a normal lifespan over 60 years and a strong branch and limb structure. Trees must be relatively clean and free of potential nuisances such as fruit, berries, sap, thorns and pitch. In addition, trees must not have surface roots which will potentially uplift sidewalks and pavements. For palm trees, identify sizes on plans by brown trunk height (BTH) or clear trunk height (CTH). Unless otherwise approved by the reviewing government landscape architect, provide minimum BTH or CTH of 8 feet.

GENERAL PLANTING GUIDELINES:

All planting must adhere to any fence clear zone requirements for security and AT/FP criteria set forth in this RFP. Plantings must adhere to the Base Exterior Architectural Plan (BEAP). Coordinate with MCB Camp Lejeune for project specific requirements at CDW. Provide small trees and ground cover plantings at building main entrances to accentuate the entrances.

Provide plantings to frame the new building and lessen the visual impact of parking areas. Provide planted strip between any sidewalk and any Primary, Secondary and Tertiary streets.

For inorganic granular mulch applications, provide 3 to 5 inch diameter river stone mulch over weed control fabric at mow strips around buildings. For organic mulch applications, provide 3 inches of shredded hardwood mulch over weed control fabric at planting beds except for spreading groundcover planted areas.

Encompass planting beds not used for bioretention filters with concrete edging.

Provide 6-inch-wide (minimum) by 12-inch-deep concrete band edging for each of the following conditions: between rock mulch/cobble area and turf area, between rock mulch/cobble area and planting area, and between turf area and planting area. Contain turf areas adjacent to building walls, site walls, columns, stairs, and other structures by a 6-inch-wide (minimum) concrete header with a minimum separation of concrete header from walls, columns, and other structures of 2 feet to minimize damage to site improvements.

Provide a 6-foot-wide grass sod border around the entire bioretention filter. Grass sod species must be Centipede. Ensure that the bioretention filters are not compromised by sediment deposits during construction. Install bioretention filters only after upstream areas tributary to the bioretention filter location have been fully stabilized.

If used for stormwater management, provide bioretention filters, plants, plant quantities, and soil mix in accordance with the State's Stormwater Design Manual.

TREE PLANTING GUIDELINES:

Preserve existing trees to the greatest extent possible. Provide trees at the minimum rate of one (1) tree per 1,000 square feet of TOTAL LANDSCAPE AREA for this project.

Site trees such that their mature canopy will not negatively affect any building. Include no trees within utility easements. Coordinate tree planting locations with electrical site lighting for a fully coordinated and integrated design that allows tree and lighting to be complimentary. See G4020 SITE LIGHTING Plant trees a minimum of 10 feet from building, edge of sidewalks, curbs, and underground water and sewer lines. Provide root barrier for all trees planted within 8 feet of any utility, wall, curb or pavement.

Stake all trees as required to ensure a stable, true plumb form is established. Protect trees from damage from staking materials. Unless otherwise directed by the Contracting Officer, all staking materials must be removed prior to the end of the contract. Provide a five-foot watering basin around each tree, and also provide a 5-foot diameter mulch ring with a 3 inch layer of organic mulch.

Provide informal street tree plantings that encompass all base streets within the project limits with an average spacing of 30 to 40 feet on center unless noted otherwise.

PARKING LOT GUIDELINES:

A minimum of 10% of any at grade POV parking lot must be landscaped; Reference Section 5 of ASHRAE 189.1.

POV parking lots must have a minimum of one (1) canopy tree every five (5) parking spaces around parking lot perimeter including entrance drives and service areas. Tree plantings along perimeter of lot must follow the Camp Lejeune Base Exterior Architecture Plan (BEAP) for a natural, native appearance. Parking lots must have no more than two tree species unless authorized by Government Landscape Architect.

Provide deciduous shrubs along the parking lot perimeter to create an informal opaque screen.

Interior plantings must consist of a minimum of (1) tree per every 300 square feet of island area. Planting medians must have a minimum inside dimension width of 9 feet. Any parking lot that abuts a service drive or base road for the project must be separated by planted green space with a minimum inside dimension width of 9 feet.

Provide 3 inches of shredded hardwood, pine bark or pine needle mulch at all planting beds.

G205006 PLANTERS

NOT USED

G205007 IRRIGATION SYSTEMS

NOT USED

G205090 OTHER LANDSCAPING

Deliverables must include plans, details and specifications to accurately and completely convey design intent. Plans must identify all plants, turf, hardscapes, site furnishings, buildings and site features and other pertinent landscape elements.

Provide a plant schedule indicating as a minimum, quantity, species, (Latin and Common Name) spacing, and size and condition of each proposed plant as well as mulch materials. Provide the height and width of plant at time of planting for Contracting Officer.

Provide on Landscape Plans a 'Landscape Material Summary' which includes but is not limited to 'Mulches'(by type), Concrete Header, Pavers, and other landscape materials utilized in the project.

Document all field changes to the Landscape Planting drawings including changes in sod area, concrete header lengths, hardwood and stone mulch bed areas, weed fabric areas (in inorganic mulch areas), planting location, and type and number of plant(s). Any field changes made to the Landscape layout must be shown on the Landscape Planting drawings - also revise the data found in the 'Landscape Material Summary' and 'Plant Material Schedule' found on the Landscape Planting drawings.

Specifications must include the minimum following sections for Landscape Architecture:

- 01 78 00, Closeout Submittals
- 12 93 00, Site Furnishings
- 32 05 33, Landscape Establishment
- 32 93 00, Exterior Plants
- 32 92 23, Sodding

The Contractor must provide plant and grounds maintenance during the plant establishment period. The plant establishment period must extend one full year after completion of planting.

Maintenance during planting operation must ensure installed plants are maintained in a healthy growing condition from time of planting through plant establishment period. The typical growth habit of individual plants must be retained.

Maintenance during the establishment period must include as a minimum:

- Straightening and tightening of tree stakes and guying material

- Mowing and edging of turf protecting plant areas from erosion
- Maintaining edging of planter beds and checking for girdling of trees, watering of all plant material and turf, weeding, and removing and replacing unhealthy plants
- Watering of all project trees with slow release watering bags
- Controlling pests, diseases, fungi and rodents
- Removing dead or broken branches by pruning in accordance with ANSI A300 Part 1
- Fourteen (14) days prior to the end of the maintenance period, mow and edge lawn, re-mulch beds (if required depth or coverage of mulch is not met) and water and fertilize all plants
- Removal of all tree staking and slow release watering bags at end of establishment period

Warranties: All trees and plants must be guaranteed for a period of one year after final acceptance of the project, or area/s.

--End of Section--

G30 SITE CIVIL/MECHANICAL UTILITIES – P1512F JOINT RECEPTION CENTER

SYSTEM DESCRIPTION

The site civil/mechanical utility systems include water supply systems, sanitary sewer systems, storm drainage systems, heating distribution systems, cooling distribution systems, fuel distribution systems and associated appurtenances which are more than 5 feet outside the building.

The site mechanical utility system consists of all piping and appurtenances for chilled water, hot water and natural gas, including all accessories and devices as necessary and required for a complete and usable system up to 5 feet outside buildings.

GENERAL SYSTEM REQUIREMENTS

Develop the site to provide water, fire protection, sanitary sewer, storm drainage, heating, and cooling distribution services that meet the requirements of each applicable regulatory agency that governs and issues permits for the construction and operation of these systems. Site design is required to comply with UFC 3-210-10, Low Impact Developments, as well as state or local stormwater management regulations and applicable project sustainability goals.

Provide each system complete and ready for operation.

Physically verify the location of existing above and below ground utilities prior to starting work.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil/Mechanical Reviewer. Perform work in accordance with the obtained permits.

Minimize the impact of construction activity on facility operations and neighboring facilities.

Obtain final approvals from the Contracting Officer for all utility connection points associated with this work.

Coordinate with the local utility providers and pay any fees or charges required to connect to their utility.

All disciplines involved in site work design must coordinate utility locations with the Civil Engineer and the Landscape Architect.

Refer to Site Analysis and Building Requirements Sections for additional site civil/mechanical utilities information.

Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS Section G30 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

After installation of the equipment and systems, provide training courses for Government personnel for each of the items listed below, covering items contained in the Operations and

Maintenance manuals. Provide one copy of the Operations and Maintenance manuals for each two course attendees. Provide one DVD disc of the training courses to be used as refresher courses and to train additional personnel. Conduct training by the same factory trained engineer that supervised the installation of the system. During training include classroom discussion as well as hands on maintenance, replacement of typical components and repair type maintenance training for parts typically replaced or repaired in the field. Submit training plan 30 calendar days prior to training sessions; include scheduling, content, outline, and training material handouts. Provide training for Cathodic Protection System.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Leakage tests are required.

Perform post-installation TV inspection of new storm sewer mains.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Imported bedding material must be provided for all utility lines and structures. Bedding material must consist of either ASTM C33 fine aggregate, or NCDOT coarse aggregate size No. 57, No. 67, or No. 78. A minimum of 6 inches of bedding must be provided for all utility lines and a minimum of 12 inches of bedding must be provided for all utility structures. Bedding material backfill must be placed to the spring line of the pipe for all concrete and PVC pipe trench excavations. Utility line and utility structure excavations in existing pavement areas must be completely backfilled to the aggregate base/subbase course elevation using excavatable flowable fill meeting NCDOT specifications.

G3010 WATER SUPPLY

The new water system is an extension of the existing water system. The existing water system serving the project site is owned and operated, by the federal government, operated and maintained. Provide the new water system and connections to the existing water system in accordance with UFC 3-230-01, Water Supply: Storage, Distribution, and Transmission; the utility provider’s requirements; and the state waterworks' regulations; whichever is more stringent.

Notify the government of the additional demand generated by the proposed facility.

Provide connection to the existing water distribution system at the point indicated on the drawings in Part 6.

Design the new water system so that water consumption is measured at a minimum, by one meter for each facility. Ensure the meter is easily accessible, but not obvious. Water Meters must comply with Camp Lejeune Water Meter Specifications included in Part 6 of this RFP.

Enable meter data to be collected and automatically transferred to a Meter Data Management (MDM) module in CIRCUITS for utility and energy management within an environment protected from cyber attack.

G301001 WELL SYSTEMS

NOT USED

G301002 POTABLE WATER DISTRIBUTION

Connect the new potable water distribution system to the distribution system at the point described in Part 3 Site Analysis.

Provide cathodic protection on metallic pipe lines. Make road crossings using directional boring.

A water meter on each proposed service line is required. Contractor shall provide meters selected from the base ATO approved equipment listing.

Provide meter box.

Provide fire hydrants with 5” Stortz x 4.5” HN/NST Fire Hydrant Converter. Paint fire hydrant barrels yellow. Paint fire hydrant bonnets based on its rated flow capacity in accordance with UFC 3-600-01 and NFPA 291. Consult with the project Fire Protection Engineer to obtain hydrant flow capacities for newly installed fire hydrants.

Backflow preventers are required on all service entrance lines. If not specified in ESR D20 and D40, provide reduced pressure backflow preventers above ground outside the building. Provide a heated enclosure.

G301003 POTABLE WATER STORAGE

NOT USED

G301004 FIRE PROTECTION WATER DISTRIBUTION

See G301002.

G301005 FIRE PROTECTION WATER STORAGE

NOT USED

G301006 NON-POTABLE WATER DISTRIBUTION

G301007 PUMPING STATIONS

NOT USED

G301008 PACKAGED WATER TREATMENT PLANTS

NOT USED

G301090 OTHER WATER SUPPLY

G3020 SANITARY SEWER

The new sanitary sewer system is an extension of the existing sanitary sewer collection system. The existing sanitary sewer collection system serving the project site is owned, operated, and maintained by the federal government. Provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with UFC 3-240-01, Wastewater Collection; the utility provider’s requirements; and the state sewerage regulations; whichever is more stringent.

Notify the utility provider of the additional wastewater flow generated by the proposed facility.

Provide connection to the existing sanitary sewer collection system at the point indicated on the drawings in another part of this RFP.

G302001 SANITARY SEWER PIPING

Provide cathodic protection on metallic pipe lines.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G302003 LIFT STATIONS AND PUMPING STATIONS

NOT USED

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

NOT USED

G302005 SEPTIC TANKS

NOT USED

G302006 DRAIN FIELDS

NOT USED

G302090 OTHER SANITARY SEWER

NOT USED

G3030 STORM SEWER

The new storm sewer system is an extension of the existing storm sewer system. The existing storm sewer system serving the project site is owned and operated by the federal government. Provide the new storm sewer system and connections to the existing storm sewer system in accordance with UFC 3-201-01, *Civil Engineering*; the utility provider's requirements; UFC 3-210-10, *Low Impact Development* the state stormwater management laws and regulations; and applicable project sustainability goals; whichever is more stringent.

Provide connection to the existing storm sewer collection system at the point indicated on the drawings in another part of this RFP. Confirm that the existing outfall has adequate capacity to receive the additional stormwater flow generated by the project.

Vehicle wash areas are not to be provided.

G303001 STORM SEWER PIPING

Storm sewer piping materials are required to be polyvinyl chloride (PVC) for diameters less than 12 inches and reinforced concrete pipe (RCP) for diameters 12 inches and greater. Storm piping must meet NCDOT requirements.

G303002 STORM SEWER STRUCTURES

Storm structures must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303004 CULVERTS

All storm sewer piping materials for culverts are required to be reinforced concrete pipe (RCP).

Designer of Record must ensure that culverts and bridges are designed to safely pass the 100-year event. The following upstream controls limit headwater elevation:

- 100-year water elevation must not be higher than 18 inches below the outer edge of the shoulder at its lowest point in the grade.
- Designer of Record must ensure that upstream wetlands are not adversely impacted by crossing
- There must not be any appreciable change in flow, elevation, or wet/dry cycles of existing wetland.

Culverts must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303005 HEADWALLS

Headwalls must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Obtain Erosion and Sediment Control permit required for the proposed work from NCDEQ.

Submit permit application to the Contracting Officer for approval prior to submitting to NCDEQ.

G303007 STORM WATER MANAGEMENT

Comply with NDCEQ regulations, UFC 3-201-01 Civil Engineering, UFC 3-210-10, Low Impact Development, FC 1-300-09N Navy and Marine Corps Design Procedures; whichever is more stringent. Consider the following LID features: bioretention, filter/buffer strips, grassed swales, bioretention swales, wet swales, infiltration trenches, rain gardens. The use of rain barrels, cisterns, permeable pavement/pavers, and tree box filters are not allowed for this project.

Evaluate the drainage conditions and submit sealed calculations to the Government for civil and environmental review documenting how design meets UFC 3-210-10, state or local stormwater regulations, and applicable project sustainability goals. Provide a narrative indicating which criteria governs the design and all assumptions. Technical constraints that limit compliance with UFC 3-210-10 must be documented, reviewed and approved by the Government's Civil Reviewer.

If the project footprint exceeds 5,000 SF (464.5 SM) and does not maintain the predevelopment hydrology to the maximum extent technically feasible (METF), these constraints must be documented on the NAVFAC Sustainable Energy Data Record Card (NSEDRC) and approved by the Government's Civil Reviewer. The NSEDRC can be found at: http://www.wbdg.org/pdfs/navfac_sustainable_energy_data_record_card.pdf.

The contractor must obtain all required regulatory permits required for the proposed work. Coordinate all reports, submittals, and permit applications through the Contracting Officer.

The DOR is responsible for acquiring approval from NCDEQ for any BMP’s. A Post-Construction certification will need to be provided to NCDEQ by the DOR. UFC 3-201-01 Civil

Engineering Requirements will apply to all sites. Additionally, permitting through the United States Army Corps of Engineers will be required for any wetlands or stream disturbance.

See Part 6 for a copy of the LID calculation spreadsheet. This spreadsheet is to be filled out and included with the design calculations for all applicable submittals.

G303090 OTHER STORM SEWER

An oil/water separator will not be required.

G3040 HEATING DISTRIBUTION

NOT USED

G304001 OVERHEAD HOT WATER SYSTEMS

NOT USED

G304002 OVERHEAD STEAM SYSTEMS

NOT USED

G304003 UNDERGROUND HOT WATER SYSTEMS

NOT USED

G304004 UNDERGROUND STEAM SYSTEMS

NOT USED

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

NOT USED

G304090 OTHER HEATING DISTRIBUTION

NOT USED

G3050 COOLING DISTRIBUTION

G305001 OVERHEAD COOLING SYSTEMS

NOT USED

G305002 UNDERGROUND COOLING SYSTEMS

NOT USED

G305090 OTHER COOLING DISTRIBUTION

NOT USED

G3060 FUEL DISTRIBUTION

G306001 LIQUID FUEL DISTRIBUTION PIPING

Coordinate with natural gas supply company for service supply to the building gas meter.

G306003 LIQUID FUEL STORAGE TANKS

NOT USED

G306004 LIQUID FUEL DISPENSING EQUIPMENT

NOT USED

G306006 GAS DISTRIBUTION PIPING NATURAL GAS

Provide natural gas piping system. See ESR D30.

G306007 GAS STORAGE TANKS

NOT USED

G306009 OTHER GAS DISTRIBUTION

NOT USED

G306090 OTHER FUEL DISTRIBUTION

NOT USED

G3090 OTHER SITE MECHANICAL UTILITIES

-- End of Section –

G40 SITE ELECTRICAL UTILITIES – P1512F JOINT RECEPTION CENTER

SCOPE

The site electrical utility system consists of all power and communications cabling from the existing distribution system point of connection including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet of new (or existing) building location.

Provide site systems complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must".

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floor plan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floor plans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

Electrical contractors must possess a valid North Carolina Public Utility Electrical contractor's license and be insured to do such work in the State of North Carolina.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an exterior electrical system consisting of but not limited to Service Entrance Wiring and Equipment, Conduits, Feeder and Branch Circuits, Lighting and Branch Wiring, Communications, Security and Alarm Systems, Emergency Generator, Emergency Lighting and

Power, Grounding, and Lightning Protection, including accessories and devices as necessary and required for a complete and usable system.

Provide each building with a single utility service with radial power distribution.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited. Assume the available fault current at the point of connection to be an infinite bus.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15% spare circuit and load capacity at all levels of the power distribution system, including life safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide site electrical utilities systems and components that support project sustainability goals.

Provide identification labels for site equipment, structures, and wiring in accordance with the Camp Lejeune GIS Numbering Convention provided in Part 6 Attachment 8. *Camp Lejeune Electrical Policies & Criteria.*

Make road crossings using directional boring.

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing underground 12.47kV, three phase, three wire, 60 Hertz electrical power system at the manhole southeast of Building M430 (coordinates 34.735740, -77.407253). Refer to the JRC Electrical Manhole Location Map in Part 6 Attachment 2. Convert the underground structure to an above-ground junction box.

G401001 SUBSTATIONS

NOT USED

G401002 TRANSFORMERS

Provide a three-phase pad mounted transformer to feed the facility.

Provide the following features:

- Dead-Front Design with ANSI specific front plate spacing
- 15kV, 200A minimum, load break connectors
- Three 10kV minimum, surge arresters

- Tap changer with two 2.5% taps above rated voltage and two 2.5% taps below rated voltage
- Biodegradable less-flammable liquid-insulated

Provide a pre-cast concrete box pad for transformers. Refer to the box pad detail provided in Part 6 Attachment 8. *Camp Lejeune Electrical Policies & Criteria*.

G401003 SWITCHES, CONTROLS AND DEVICES

Provide sectionalizing cabinets configured with the existing overhead and or underground distribution system.

G401004 OVERHEAD ELECTRIC CONDUCTORS

NOT USED

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

NOT USED

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a medium voltage and a 600-volt secondary underground electrical power distribution system to meet the connection requirements as indicated in paragraph G4010 *Electrical Distribution*.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks and above-ground junction boxes and above-ground sectionalizer switches.

Underground handholes and manholes are prohibited.

G401008 GROUNDING SYSTEMS

Provide a complete grounding system for the electrical power distribution system.

G401009 METERING

Provide a separate Kilowatt Demand Meter capable of reporting to the existing Camp Lejeune Advanced Metering Infrastructure (AMI) at each Pad Mounted Transformer. The existing AMI is Itron Choice Connect (Fixed Network) version 5.0.

The provided meter must be compatible with the existing Camp Lejeune Itron MCLite and Itron Mobile Advanced Meter Reading (AMR) equipment.

Pre-program meters with Camp Lejeune’s meter program. For programming of meters contact:

Border States Electric Product Manager

Ken Hause

864.242.6880 | EXT 11230

khause@borderstates.com

Refer to the Advanced Electric Meter requirements provided in Part 6 Attachment 7, *Water and Electrical Meter Information* for additional features and information.

G401010 CATHODIC PROTECTION SYSTEMS

NOT USED

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

Provide site lighting for exterior and security applications including underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

Provide exterior luminaires, poles, and foundations in accordance with the Camp Lejeune Electrical Policies and the Camp Lejeune Base Exterior Architectural Plan. Provide architectural type luminaires for parking lot, walkway, and outdoor gathering area lighting. Provide cobra head type luminaires for roadway lighting.

Coordinate site lighting with plantings and landscape elements to provide a fully coordinated and integrated design that allows the lighting to be complimentary to the landscape design throughout the project site.

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide an automatic lighting control system for exterior lighting fixtures utilizing lighting contactors, bi-level or dimming drivers, motion sensors, and a centralized photocell. The photocell will automatically turn lights "ON" at dusk and turn "OFF" at sunrise while the motion sensors, in conjunction with the bi-level or dimming drivers, will adjust the lighting levels based on occupancy of the area.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Provide Area and Parking Lighting for parking lots, walkways, and outdoor gathering areas.

G402002 SPECIAL SECURITY LIGHTING SYSTEMS

Provide security lighting along the site perimeter fence line.

G402003 OTHER AREA LIGHTING

Provide area lighting for outdoor training areas.

G402004 LIGHTING POLES

Provide aluminum poles complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide a complete underground distribution system for all site lighting systems.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4090 OTHER SITE ELECTRICAL UTILITIES

NOT USED

G409007 PHOTOVOLTAIC ENERGY SYSTEM

NOT USED

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication and security system including, but not necessarily limited to, Voice and Data Telecommunications Systems, Cable Television (CATV) Systems including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system. Refer to drawing "P1512_OSP" (located in part 6) for Outside Plant (OSP) existing communications pathways layout. Demolition of buildings' associated telecommunications services and pathways must be coordinated with Base Telephone office 30 days prior.

G403001 TELECOMMUNICATIONS SYSTEMS

OSP PATHWAYS AND CABLING

The description below applies to Log OPS School, JRC, and M107:

- Provide 6-way 4" concrete encased duct bank from MH602 (near M165) to the corner of Montford Point Road and Company Street B (~1500').
- From 1st manhole (MH) of new duct bank, closest to MH602 (~500' past MH602), provide 4-way 4" concrete encased duct bank to new JRC site (~600').
- Provide 6-way 4" concrete encased duct bank from corner of Montford Point Road and Company Street B, to the new applied instruction facility (~1100').
- Provide 6-way 4" concrete encased duct bank from the corner of Montford Point Road and Company Street B, to Building M107 (~1200).
- Provide 144-strand fiber optic cable (FOC) And 1500-pair outside plant (OSP) copper cable from Building M165 (vault) to 1st MH of new duct bank past MH602 (~400').
- From 1st MH of new duct bank past MH602 to new MH at the corner of Montford Point Road and Company Street B, provide 96-strand FOC and 900-pair OSP copper cabling (~1100'). Provide 60' slack loop of FOC and 30' slack loop of OSP copper in new manhole at the corner of Montford Point Road and Company Street B; government will perform splice.
- Perform splice of 96-strand FOC to 144-strand FOC and 900-pair OSP copper to 1500-pair copper in new MH nearest MHh602.

Coordinate with base telephone provider for cable identifications and pair allocations.

JRC SPECIFIC OSP PATHWAYS AND CABLING

- Provide a minimum of (3) 4” ducts from last MH of the new duct run into the new JRC facility.
- Provide 100-pair OSP copper and 24-strand FOC from the 1st MH of the new duct bank past MH602, to the JRC site through the new duct bank (~600'). Provide 60’ slack loop of FOC and 30’ slack loop of OSP copper in first manhole of the new duct bank past MH602; Government will perform the splices.

G403002 CABLE TV SYSTEMS (CATV)

Coordinate with local CATV provider for requirements.

G403003 CABLES AND WIRING

Provide cables and wiring for site telecommunications and security systems as indicated in their respective categories.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a system of duct banks, manholes, and handholes for site telecommunications per section G403001.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide duct banks, manholes, and hand holes as required for a communications and security cabling.

G403005 TOWERS, POLES AND STANDS

NOT USED

G403006 TV CAMERAS AND MONITORS

NOT USED

G403007 ELECTRONIC SECURITY SYSTEMS (ESS)

NOT USED

G403008 OTHER COMMUNICATION AND ALARM

NOT USED

G403009 GROUNDING SYSTEMS

Provide a complete grounding system for all site communications and security systems.

--End of Section--

1.0 PROJECT DESCRIPTION – P1512F RENOVATE M107

1.1. Overview

Hurricane Florence impacted MCB Camp Lejeune and MCAS New River with periods of strong winds, heavy rains, flooding of urban and low-lying areas, flash floods and coastal storm surges. As a result, MCB Camp Lejeune, MCAS New River and MCAS Cherry Point experienced damage to approximately 781 buildings and structures. Numerous facilities were either partially damaged or rendered uninhabitable.

This project will replace facilities that sustained severe structural and water intrusion damage, rendering them uninhabitable. The existing facilities were already in poor condition due to age and deterioration and structural integrity issues. The effects of Hurricane Florence exacerbated chronic material conditions with the facilities, impacting mission capability.

This project will consolidate several departments scattered across many facilities at Camp Johnson into one renovated and repurposed facility. After renovation, Building M107 will provide office and training space in a single-story building.

1.2. Project Components

The components found within the SOW for this project include, but are not limited to:

- Interior renovation of Building M107, a building of just over 112,000 GSF, to house a variety of administrative and training functions.
- A new multi-purpose auditorium within renovated space.
- Exterior roof replacement.
- Exterior wall and downspout repair and alterations.
- Exterior wall infill, new window placement and all new exterior hollow metal doors.
- Exterior wall metal panel replacement and window removal.
- Creation of outdoor fenced areas for training on equipment that is stored in these fenced yards.
- New landscaping.
- Removal of all mechanical equipment from roof areas and new equipment placed in the building and on the site around the building.
- Secure fenced areas on the south side of the building for the setup of various field equipment items for training and testing.
- Relocation of the training aid on the east side of the site. Demolition of the concrete pad underneath and associated electrical service lines.
- Demolition of the sanitary sewer system that serves the current training bay trench drains and the exterior piping, including the exterior oil/water separator.

1.3. Project Purpose

The purpose of the Building M107 renovation is address roofing and exterior wall water infiltration issues and provide a complete interior renovation that meets all applicable UFCs and codes. The renovated facility will provide office and classroom space, efficiently and properly planned for current and future technology. The siting and planning of the new JRC will facilitate increased student throughput and integration of largescale infrastructure networks and will allow the new facility to address the current and future needs of the Log Ops school.

1.4. Most Relevant Codes and Standards

The following Codes and Standards, and those incorporated by reference within the below, are applicable to the project.

This is not a comprehensive list, and the Contractor is responsible for ensuring that the completed project complies with all applicable local, state and Federal codes, standards, and regulations.

MCB Camp Lejeune

- MCB Camp Lejeune, North Carolina Public Works Division, Design Branch Electrical Policies & Criteria, 4 Feb 2020.
- Camp Lejeune Mechanical Design Guidance, 1 Jul 17
- Specification 27 10 00 Building Telecommunications Cabling System, 27 Jun 17
- Specification 33 82 00 Telecommunications Outside Plant, 19 Jun 17

Marine Corps Criteria

- Marine Corps Physical Security Program Manual, 28 Sep 09

Facilities Criteria

- FC 1-300-09N, *Navy and Marine Corps Design Procedures*, with Change 4, 14 June 18

Unified Facilities Criteria (UFC)

- UFC 1-200-01, DoD Building Code (General Building Requirements), 8 Oct 19
- UFC 1-200-02, High Performance and Sustainable Building Requirements, with Change 4, 1 Oct 19.
- UFC 3-201-01, Civil Engineering, with Change 2, 1 Jul 19
- UFC 3-201-02, Landscape Architecture, with Change 1, 1 Nov 19
- UFC 3-210-10, Low Impact Development, with Change 1, 2 Feb 16
- UFC 3-220-01, Geotechnical Engineering, 1 Nov 12
- UFC 3-220-05, Dewatering and Groundwater Control, 16 Jan 04
- UFC 3-230-01, Water Storage and Distribution, with Change 1, 1 Oct 18
- UFC 3-230-02, O&M, *Water Supply Systems*, 10 Jul 01
- UFC 3-240-01, Wastewater Collection, with Change 2, 1 Jan 19

- UFC 3-240-02, Domestic Wastewater Treatment, with Change 1, 1 Jan 19
- UFC 3-250-01, Pavement Design for Roads and Parking Areas, 14 Nov 16
- UFC 3-250-04, Standard Practice for Concrete Pavements, with Change 2, 7 Jul 09
- UFC 3-250-11, Soil Stabilization for Pavements, 16 Jan 04
- UFC 3-270-01, O&M Manual, Asphalt and Concrete Pavement Maintenance and Repair, 21 Feb 18
- UFC 3-270-08, Pavement Maintenance Management, 16 Jan 04
- UFC 3-101-01, Architecture, with Change 4,6 Mar 19
- UFC 3-110-03, Roofing, with Change 3,6 Mar 19
- UFC 3-120-10, Interior Design, 16 May 18
- UFC 3-301-01, Structural Engineering, 1 Oct 19
- UFC 3-320-06A, Concrete Floor Slabs on Grade Subjected to Heavy Loads, 1 Mar 05.
- UFC 3-401-01, Mechanical Engineering, with Change 1, 01 Oct 2015
- UFC 3-410-01, Heating, Ventilating and Air Conditioning Systems, with Change 5, 01 Nov 19
- UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, 18 Jul, 18
- UFC 3-420-01, Plumbing Systems, with Change 10, 26 Oct 15
- UFC 3-450-01, Noise and Vibration Control, 15 May 03
- UFC 3-501-01, Electrical Engineering, 06 Oct 15
- UFC 3-520-01, Interior Electrical Systems, with Change 1, 20 Mar 19
- UFC 3-520-05, Stationary Battery Areas, with Change 2, 03 Sep 19
- UFC 3-530-01, Interior and Exterior Lighting Systems and Controls, with Change 3, 01 Jun 16
- UFC 3-540-01, Engine-Generator Systems for Backup Power Applications, with Change 1, 24 Oct 17
- UFC 3-550-01, Exterior Electrical Power Distribution, with Change 2, 13 Mar 19
- UFC 3-560-01, Electrical Safety, O&M, with Change 1, 21 Feb 18
- UFC 3-575-01, Lightning and Static Electricity Protection Systems, 01 Jul 12
- UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design, Change 1, 01 Jun 16
- UFC 3-600-01, Fire Protection Engineering for Facilities, with Change 3, 10 May 19
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, 12 Dec 18
- UFC 4-010-06, Cybersecurity of Facility-Related Control Systems, with Change 1, 18 Jan 17

- UFC 4-021-01, Design and O&M: Mass Notification Systems, with Change 1, January 2010
- UFC 4-021-02, Electronic Security Systems, October 2013

Tri-Services Electrical Working Group (TSEWG)

- TSEWG TP-1 Electrical Calculation Examples
- TSEWG TP-2 Capacitors for Power Factor Correction
- TSEWG TP-3 Surge Protector Performance and Evaluation Criteria
- TSEWG TP-4 Stationary Battery and Charger Sizing
- TSEWG TP-5 Interior Transformer Ratings and Installation
- TSEWG TP-6 Low-Voltage Breaker Interrupting Ratings
- TSEWG TP-7 Protection System Design
- TSEWG TP-8 Equipment Enclosures and Hazardous Locations
- TSEWG TP-9 Automatic Transfer Equipment
- TSEWG TP-10 Arc Flash Levels for Fused Voltage Inputs to Electricity Meters
- TSEWG TP-11 UFC 3-500-10N Best Practices
- TSEWG TP-12 UFC 3-500-10N Appendices
- TSEWG TP-13 UFC 3-501-03N Load Demand Analyses
- TSEWG TP-15 Arc Flash Calculations and Detailed Arc Flash Warning Labels
- TSEWG TP-19 Static Uninterruptible Power supply (UPS)

International Code Council (ICC)

- International Building Code (IBC), 2018 as modified by UFC 1-200-01
- International Existing Building Code (IEBC), 2015
- International Mechanical Code (IMC), 2018 as modified by UFC criteria
- International Plumbing Code (IPC), 2018 as modified by UFC criteria

2.0 PROJECT OBJECTIVES – P1512F RENOVATE M107

2.1. Mission Statement

Renovate Building M107 to house multiple administrative departments that provide training and support for a variety of Marine Corp missions. The renovation is required to address the exterior of the building and includes providing a roof replacement and a variety of exterior façade work, as well as, a comprehensive interior renovation that meets all applicable UFCs and codes.

2.2. Facility Function

This project will repurpose and renovate an existing one-story building built in the late 1980's and early 1990's, that currently serves as the LOG OPS School, to provide renovated office and training space for the following departments (and department description). Many of these departments will be moving from buildings that are slated for demolition due to age and damage caused by Hurricane Florence in 2018. Most of these departments include a training function that requires either secure (classified) or unsecure (unclassified) classroom space. The departments include:

2.2.1. RITC – East – Regional Intelligence Training Center

Provides central location for MCIS (ITEP) representatives to provide and deliver intelligence training solutions for Operating Forces. Provides resources and programs to meet the training requirements of the Operating Forces.

2.2.2. MISTC – East – MAGTF Integrated Training Center – East

Command and Control Training and Educating Center of Excellence.

The MAGTF IT Support Center-East (MISTC-East) provides 24/7/365 Marine Corps Enterprise Network (MCEN) IT support to all Mid-Atlantic Region installations and tenant commands. This includes Unclassified and Classified services with the primary focus on Garrison Network support for the Operational Forces.

Supports C2 systems and unit collective training for active and reserve Marines along the East Coast.

Currently housed in Buildings M409, M411, M412 and M416.

2.2.3. FSMAO – Field Supply and Maintenance Analysis Office

Part of Logistics Policy and Capabilities Branch (LPC)

Conducting analyses with an emphasis on compliance, education, monitoring and continuous process improvement within supply, maintenance, maintenance management and distribution commodity areas.

Enhancing unit readiness, increasing operational availability of equipment and reviewing commanders' accountability, readiness, reporting and maintenance management practices.

Currently housed in M609.

2.2.4. MISSO - Manpower Information Systems Support Office

Responsible for assisting units in accurately reporting and retrieving personnel and pay information using various automated manpower information systems.

Currently in Building M614

2.2.5. MCNAFAS - Marine Corps Non-Appropriated Funds Audit Service

Currently located in Building M413

2.2.6. AAU - Marine Corp Forces Reserve - Admin Assist Unit

Currently located in Building M132

2.2.7. East Coast Food Management

Currently located in Building M415

2.2.8. S4 and S6 – Staff sections that are a part of Headquarters and Support Battalion (H&S)

Currently in Buildings M327. M403 and M405

2.2.9. CTC – Communication Training Center

Both MISTC and RITC departments require an outdoor yard for using equipment for training and the M107 with its open site and paved area allows these yards to be easily accommodated.

The newly renovated facility is expected to accommodate administrative functions in the wings of the existing building that currently house vehicle repair training labs and classrooms, most of which have very few exterior windows. The function of the newly renovated facility is required to provide for proper daylighting for occupied spaces and to bring the building up to standards prescribed in applicable UFCs.

2.3. Project Specific Priorities

The specific priorities of this project include:

- Replacing roofing with Aluminum Standing Seam Metal Roof is a priority, if costs permit, and reworking exterior facades to provide cohesive and unified exterior architectural exterior design.
- Providing shared common spaces throughout the renovated building.
- Providing window areas for new administrative space.

2.3.1. Sustainable Design and Construction

All NAVFAC projects are subject to sustainable design criteria and are required to meet the requirements of the Guiding Principles for Sustainable Federal Buildings (HPSB). The Guiding Principles are outlined in a cross disciplinary publication addressing requirements for new building construction and modernization of all federally owned facilities. Sustainable principles will be integrated into the design, development and construction of the project in accordance with Executive Order 13834 and other applicable laws and Executive Orders.

Design and construct the project to comply with sustainability requirements identified in Part 2 Section 01 33 29.05 20, Sustainability Reporting for Design-Build. Additional specific sustainability requirements are found in RFP Part 2, Part 3, and Part 4 sections.

Design and construct the project in accordance with UFC 1-200-02, High Performance and Sustainable Building Requirements. The UFC provides design, construction and modernization criteria for projects of all sizes. It outlines performance thresholds in energy and water, addresses criteria of indoor air quality, identifies resiliency concerns, addresses planning and design, and establishes a baseline across all of DOD for documenting sustainability. A major component of the policy established in this UFC is the Sustainable Third-Party Certification requirement for projects that reach specific size and cost thresholds.

Additional, agency-specific requirements can be found in NAVFAC Engineering & Construction Bulletins (ECBs) such as Issue No. 2014-02. ECB 2014-02 describes overall NAVFAC policy and guidance on sustainability and energy requirements.

2.3.2. Stormwater Management - Low Impact Development (LID)

Comply with UFC 3-210-10, *Low Impact Development* and FC 1-300-09N *Navy and Marine Corps Design Procedures*. Additional specific LID and stormwater management requirements are found in RFP Parts 3 and 4, Section G30. In addition to LID, comply with State and Local stormwater regulations.

2.3.3. Energy Efficiency

The level of energy performance the Government seeks may only be achieved through coordinated design of architectural, electrical, and mechanical elements of the design. All energy systems must be designed in compliance with the following unless more stringent requirements are noted otherwise:

- UFC 1-200-02, High Performance and Sustainable Building Requirements. Incorporate energy efficiency in accordance with UFC 1-200-02, HPSB requirements
- EPAct 2005
- EISA 2007
- ASHRAE Standard 189.1 - 2014
- ASHRAE/IESNA Standard 90.1-2013

Energy consuming equipment and products must meet or exceed Energy Star or FEMP efficiency levels. This includes built-in equipment (lights, HVAC, water heating, industrial equipment, etc.) and collateral equipment (office equipment, IT, task lighting, etc.). For equipment types not rated by Energy Star or FEMP, equipment efficiencies must be in the top 25 percent of similar products. All purchased electronics must be EPEAT registered. In addition, provide an ECA, which will demonstrate compliance with all energy related requirements in UFC 1-200-02. Measure and record existing building utility consumption, provide design calculated estimated energy savings and post construction documentation and reporting of actual realized energy savings.

2.3.4. Building Commissioning

Provide commissioning to meet requirements identified in Section 01 91 00.15 22 Total Building Commissioning, and UFC 1-200-02 High Performance and Sustainable Building Requirements.

2.3.5. Accessibility Requirements

Provide barrier-free design is generally required in accordance with UFC 1-200-01, General Building Requirements.

2.3.6. Antiterrorism Force Protection

The primary objective for the Marine Corps Base (MCB) security engineering is to ensure compliance with the Antiterrorism Force Protection (AT/FP) program requirements and applicable Marine Corps physical security measures in MCO 5530.14A, as supplemented by the UFC. The AT/FP program requirements and Marine Corps physical security measures are to safeguard personnel, equipment, and property. A risk analysis and vulnerability assessment (RAVA) has not been performed and a specific Design Basis Threat has not been identified.

The renovated facility is considered Inhabited and will be routinely occupied by 11 or more personnel. The renovation costs are less than 50 percent of the replacement cost of the existing building, therefore implementation of UFC 4-010-01 standards to bring the entire existing facility into compliance is not required but recommended. If the renovation changes any portion of the existing facility that is currently considered as Low Occupancy to Inhabited, that portion of the facility must meet all provisions of chapter 3 of UFC 4-010-01. The UFC 4-010-01 standards must be implemented for any new renovation work. UFC 4-010-01 Chapter 3 Standards 10 and 12 must also be implemented per chapter 1-5.2.3.

Whenever HVAC systems featuring outside air intakes or control systems associated with HVAC systems including outside air intakes are being replaced or modified, apply provisions of Standards 18 and 16. Modifications include, but are not limited to, complete air handling unit replacement, outside air control damper replacement, major ductwork reconfiguration, control system replacement, and control system reprogramming. Modifications do not include replacement of or repair of components such as coils and fans, and do not include control system software updates or reprogramming in support of additional equipment added to an existing control system.

The facility modifications and renovations must be designed in accordance with the chapter 3 standards of UFC 4-010-01, except that parking is not permitted in the 33-foot unobstructed space around the building. This includes low occupancy portions of the building, as applicable, due to physical security and operational requirements. The facility must also be designed in accordance with the following requirements:

a) **Antiterrorism Architectural Special Requirements** – Installation mission-assurance has requested security-conscious layouts and configurations for the interior layout of the building spaces and entrances to the building. The goal is to improve antiterrorism safety without adding cost, without hardening the building, and without adversely affecting the usability of the building.

b) **Building Entrance Orientation** - Orient the main building entrance such that it does not provide vehicles the capability to drive through the main entry of the building. Where this

is impractical, ensure that the entry storefront does not directly face a main hallway or a mass-gathering space. Lay out entrances to be welcoming and accessible, but so that the entrances are visibly protected and inaccessible against a vehicle attempting to force entry. Ensure that building main entrance layouts are also compliant with UFC 4-010-01 Chapter 3-12, Standard 11 “Building Entrance Layout”. Where this section conflicts with Standard 11, Standard 11 must take precedence.

c) **Proximity of Densely Populated Areas to Parking** – To mitigate risks to densely populated areas, locate uninhabited, low-occupancy, and mechanical yard areas adjacent to parking lots. Locate densely populated areas away from parking lots to the maximum extent possible given available site space and building square footage. The preference is to keep densely populated areas 82 feet away from parking spaces, if sufficient site space is available. Uninhabited and low-occupancy spaces include utility rooms, hallways/corridors without seating, stairwells, elevator shafts, storage areas, etc. Densely populated areas include classrooms, large break rooms, locker rooms, conference rooms, auditoriums, and other areas with a high personnel density. During the CDW, include the installation Antiterrorism Officer (mission-assurance) on discussions for the preferred layout of mass gathering and densely populated administrative areas relative to the proposed site plan.

d) **Antiterrorism Landscape Architecture Special Requirements** – Installation mission-assurance has requested security-conscious landscape features that afford improved protection to the building occupants. The goal is to improve antiterrorism safety without adding cost by utilizing UFC-mandated landscape architecture features to protect vulnerable areas and using excess fill from the project site for landscaped berms. A specific design basis threat for an active shooter or attack vehicle does not apply; therefore, the intent is to complement architectural layouts and civil site features to improve occupant protection within the project scope of work.

e) **Vehicle Deterrent Landscaping** – Landscaping features can provide a significant physical and psychological deterrent to the risk of a vehicle ramming attack as a part of a vehicle-deterrent perimeter. Landscaping features do not need to be rated passive vehicle barriers to afford greater security to the building occupants.

f) **Unobstructed Space** – Trees, plantings, and site furniture may be located within the 33-foot unobstructed space around each building, provided they are compliant with the UFC 4-010-01 and UFC 3-201-02 requirements for landscaping in the unobstructed space. For berms, ensure berms in the unobstructed space do not exceed a height of 4 feet, 6 inches to eliminate concealment opportunities.

g) **Large Diameter Trees** – Tree species that will grow to a large DBH (more than 6 inches) provide an aesthetically pleasing and natural barrier to vehicle traffic. It is desirable to position large diameter trees in the space between the building and parking lots or roads where permissible by code and feasible based on available site space. Provide tree plantings with at least 4 inches DBH where the trees are integrated into the vehicle-deterrent perimeter. Multiple staggered rows of trees serve as highly effective vehicle barriers once the trees have grown. Where providing multiple rows of trees stagger and space the trees to eliminate any corridors exceeding a 5-foot width perpendicular to the adjacent roads or drive aisles. Final tree layout, tree spacing, and species must be approved by the Government Landscape Architect and installation Antiterrorism Officer (or their designated representative).

h) **Concrete Site Features** - Concrete benches and picnic tables are excellent deterrents to vehicles. Concrete planters are not desirable due to landscaping maintenance issues and concealment concerns in the unobstructed space.

i) **Berms and Ditches** - Berms and ditches provide protection and can be integrated with the landscaping plan (e.g., trees along tops of berms and creeping juniper on the sides).

j) **Elevated Plazas** – For buildings that require elevated entryway access with stairs and accessible ramps, consider arranging the stairs, ramps, and any low retaining walls or sloped soil so that they are positioned near the edge of the vehicle parking lot and adjacent roadways. A steeper, landscaped, stabilized slope near the edge of the parking lot with a sidewalk in front of it serves as a visible deterrent to illegal parking and approaching vehicles.

k) **Bollards at Building Entrances** – Bollards are an option where other features such as stairs, pedestrian ramps, trees, or berms do not deter direct vehicle access to the main building entrance. Bollards are desirable for sidewalks and plazas leading into the main building entrance provided there is no adverse impact to pedestrian accessibility. A bollard spacing of 4 feet on center will meet ABA/ADA requirements. Architectural bollards near the building entry are a desirable way to improve protection while improving site lighting (for lighted bollards) and appeal. Removable bollards are acceptable and beneficial for future building maintenance. Coordinate with vehicle access control requirements as part of civil site design. Provide the option of either permanent or removable bollards, determined based on customer needs at the CDW and subsequent design review meetings.

l) **Visual Screening Landscaping at Queuing & Entry Areas** –Visual screening affords protection for building occupants and visitors against the potential for vehicular or active shooter threats. Landscaping that provides visual obscuration of building entrances and outdoor queuing or congregation areas is highly desirable to improve protection of personnel in exposed areas.

m) **Antiterrorism Civil Site Design Special Requirements** - Installation mission-assurance has requested security-conscious site plans that afford improved protection to the building occupants. The goal is to improve antiterrorism safety without adding cost by laying out necessary vehicle parking and stormwater features to protect vulnerable areas of the building. A specific design basis threat for an attack vehicle does not apply; therefore, the intent is to complement architectural layouts and landscaping features to improve occupant protection within the project scope of work. The unobstructed space and vehicle access control requirements defined below are added scope items to manage nuisance parking and maintain the unobstructed space for base operational considerations.

n) **Vehicle Access Control** - All projects must include consideration for vehicle access control in the form of lockable swing gates and/or lockable removable bollards along driveways and access roads that lead to service areas around the building within the 33-foot unobstructed space. Other open plaza areas must be secured with permanent bollards in combination with removable bollards. Portions of buildings that must be secured within a restricted area fence (e.g. motor pools) are excluded from this requirement.

o) **Service Area Access** - Access for service areas around the building includes roads and driveways that lead to utility rooms, loading docks, mechanical yards, other areas in the

unobstructed space that are used for building maintenance, and for roads that are only used for fire access.

p) **Pedestrian Areas** - Open plazas, hardscaping, and other outdoor pedestrian-congregation areas that are adjacent to a roadway must also feature vehicle access control integrated with permanent landscaping and civil site features as part of a vehicle-deterrent perimeter. Removable and fixed architectural bollards (lighted, where beneficial) are preferred for vehicle access control to open plazas, hardscaping, and other outdoor pedestrian-congregation areas with at least four removable bollards in a row for service access to these pedestrian areas. Provide the option of either permanent or removable bollards, determined based on customer needs at the CDW and subsequent design review meetings.

q) **Access Control Requirements** - Where bollards are provided, space bollards 4 feet on center starting at each edge of the road or driveway. Where gates are provided, provide single or double leaf swing gates with posts that start at the edge of the roadway (or behind the curb) and which include receiving posts to secure the gate in the open position. Gates must not encroach on the roadway or driveway while in the open position. Gates and bollards must be high visibility and meet all other UFC requirements for signage such as high-visibility, reflectivity, and striping, to meet traffic safety requirements. Gates and bollards for vehicle access control to service areas and pedestrian congregation areas need not be crash rated. Refer to UFC 4-022-03, *Security Fences and Gates* for additional requirements for gates.

r) **Vehicle-Deterrent Perimeter** - Gates and bollards must be integrated with landscaping and civil site features to deter vehicles from bypassing the access control by driving around the barriers and to maintain a vehicle-deterrent perimeter.

s) **Consolidating Access Control** - Access roads to service areas around the building can be secured where the access road begins at the adjacent roadway or parking lot, provided this is integrated with the vehicle-deterrent perimeter, in order to reduce the total cost of providing vehicle access control to the unobstructed space.

t) **Control Vehicle Speed** – Arrange parking lot access roads and drive aisles so that any direct approaches to the building walls or building entrance cannot exceed 25 miles per hour. Speed limit signage alone is not sufficient to constrain vehicle speed. Speed limit control in parking lots and access roads is also desirable to improve pedestrian safety and to reduce the risk of vehicle accidents.

u) **Limit Vehicle Approaches to Building** – Arrange access roads and drive aisles so that no vehicles have long straight approaches directly at the exterior walls of the building, particularly at the building entrance. Keep the long axis of drive aisles parallel with the walls of the building to control the approach direction of a vehicle. Arrange access roads so that personnel do not drive directly facing the building walls or any entrance. For short drive aisles that run perpendicular to the long axis of the parking lot, coordinate with landscape architecture to provide civil site and landscaping features that visually or physically deter vehicle access. Alternatively, locate these perpendicular drive aisles beyond the ends of the building so traffic does not directly face the building walls or any entrance. Loading docks/heavy truck areas need not consider these requirements due to the impracticability of implementing this where building access is a requirement. Provide curb stops in parking spots that are adjacent to the building to discourage vehicle parking in the unobstructed space.

v) **Unobstructed Space & Vehicle-Deterrence** – Provide a minimum 33-foot unobstructed space around the building without new parking, existing parking, new roadways, or new drive aisles. Keep existing drive aisles and roadways out of the unobstructed space to the maximum extent practicable. Provide berms, drainage swales/ditches, and other civil site features between the building and any adjacent parking lots or roadways as part of a vehicle-deterrent perimeter. Berms can also reduce off-site fill disposal costs, provided that fill is verified to be non-hazardous, non-contaminated. The CDW must address how to integrate unobstructed space and vehicle-deterrence needs within the available site footprint in consultation with the installation Antiterrorism Officer.

w) **Unobstructed Space Preferences** – The installation mission-assurance personnel prefer larger unobstructed spaces where feasible based on available site space. Unobstructed space need not exceed 82 feet for larger, open sites. This unobstructed space preference is to the mass-gathering portions of each facility that excludes open hangar areas, apparatus bays, and other areas that are specifically designed to be low occupancy spaces as defined in UFC 4-010-01. Refer to Paragraph C, Proximity of Densely Populated Areas to Parking, for more information.

2.3.7. Facility Related Control Systems Cybersecurity

Design, acquire and execute all facility related control systems in accordance with UFC 4-010-06 Cybersecurity of Facility-Related Control Systems.

Design the project using UFGS 25 05 11 *Cybersecurity of Facility-Related Control Systems*. Government Point of Contact to be used for SECTION 25 05 11 is James Mahoney, ICS ISSM for Camp LeJeune, email James.D.Mahoney@usmc.mil. Submit CCIs as attachments to SECTION 25 05 11.

The table below identifies the Facility Related Control Systems which must be included for this facility. Final C-I-A impact levels must be coordinated and approved by the Camp LeJeune ICS ISSM noted above, James Mahoney, James.D.Mahoney@usmc.mil.

Authorizing Official	System Owner	System Group	System	Existing Authority to Operate?	C-I-A Impact Level
USMC AO Dr. Ken Bible	DPW	UMCS	HVAC	Existing ATO MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Lighting	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Advanced Meter Infrastructure (AMI)	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Backup Power Generator Annunciator Panels and Controls	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Elevator Control Systems	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Fire Dept	FLS	Fire Alarm Reporting System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	FLS	Mass Notification System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Physical Access Control System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Intrusion Detection System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Security Forces	ESS	CCTV	Existing ATO in eMASS (Navy) or MCCAST (USMC)?? ISSM to validate.	LOW-LOW-LOW – ISSM to validate

Incorporate cybersecurity requirements into project facility control systems identified in:

- ESR D20, Plumbing
- ESR D30, HVAC
- ESR D40 Fire Protection, including Cooper Notification, Inc. WAVES Emergency Notification System
- ESR D50, Electrical

2.3.8. Secured Areas

Comply with the Marine Corps physical security measures in MCO 5530.14A as supplemented by the UFC.

2.3.9. Air Quality Management

When demolition or renovation occurs, ensure that subject buildings are evaluated for asbestos and asbestos-containing materials by a certified professional prior to the demolition or renovation.
Ensure that any fugitive dust emissions generated by construction, renovation, and demolition are appropriately controlled.
If the project includes installation of new activities/equipment which generate air emissions, and the sources have not been evaluated for air permitting by MCB CAMLEJ, contact AQ program at (910)451-9017. Please note that air emission sources are required to be permitted prior to their installation/operation. Examples of such sources include, but are not
limited to: boilers, water heaters, generators, fuel storage tanks, painting/coating operations, woodworking, welding, abrasive blasting, engine testing, refrigerant recovery devices, and parts ovens.
If the project involves any refrigerant handling or manipulation, ensure that appropriate ODS servicing procedures are followed.
If the project includes removal of any currently permitted air emission sources (see Item 3 for examples), contact AQ program at (910)-451-9017.

2.4. Appropriate Design

Design the new building components and systems in accordance with all Codes, Standards, UFCs, and criteria explicitly and implicitly stated herein. Employ integrated design principles.

2.4.1. Building Design - Architecture

The renovation of M107 is a comprehensive architectural renovation that includes both exterior and interior components. Since this is an existing building that was built in the late 1980s the renovation will not be held to the requirements of the Camp Lejeune Base Exterior Architectural Plan, 2010 with the exception of completely new systems introduced to the building that would include a new standing seam metal roofing system (an option for roofing). For window systems, new window and storefront systems will be required to blend and match with existing window systems. Otherwise any exterior systems that are being added to the building will blend with or replace in kind existing exterior systems. All exterior materials chosen for the M107 renovation must be approved by the MCBCL Architectural Review Board.

2.4.1.1. Building Exterior - the following is a description of exterior system scope:

a) **Roof/Downspout Replacement** – The existing roof of M107 was damaged in Hurricane Florence in 2018 and it must be replaced or repaired using one of the following options:

b) **Modified Bitumen roof replacement (base bid option)** – this option replaces the existing low sloped roofing system down to the existing structural deck with a similar low sloped system. The design of this roof option must resolve design issues that the current roofing system displays and code/UFC related issues that the renovation must address:

i. It must address parapet heights related to providing adequate roof flashing height (per industry standard flashing heights),and to address increased insulation height due to energy code requirements/sustainable principles, along with the UFC prescribed roof slope.

ii. It must provide roof drains that are not tied to scuppers at parapet locations leading to downspouts (in some of these locations the head of the downspout is concealed), that provides access to all drain locations on the roof and provides drains that meet code requirements for providing overflow drains. These qualifications will require a new roof drainage pattern with completely new drain locations.

iii. A new metal coping that is designed to meet wind loads and meet all applicable codes must be provided.

iv. If additional parapet height is required, the parapet/wall extension must use the same materials as the existing wall. The brick must match as closely as possible to the existing brick and if that is not possible detailing of the brick to include a different color brick must provide an architecturally cohesive solution.

v. Structurally patch all openings created by removal of mechanical equipment, and repair walls at existing scupper/downspout locations.

vi. Refer to the specification Section 07 52 00 Modified Bituminous Membrane in Part 6 of this RFP as the basis of the specification for this system.

c) **Roof recover and downspout repair (Option 1 for roofing – requires an energy code compliance waiver)** – this option provides for repair of roofing/downspouts and a roof recover with the mesh reinforced elastomeric membrane. This option requires that all necessary roof substrate evaluation takes place to prove the validity of this option prior to being considered. This option includes:

i. Structurally infill roof openings from abandoned roof top equipment.

ii. Secure existing insulation if found not to be adequately attached and infill abandoned mechanical openings with new insulation and provide patched roofing membrane over insulation infill.

iii. Coping - Remove and replace all existing coping at brick cavity wall and at metal panel cladding (since metal panel is being replaced the coping design can be incorporated into metal panel).

1. Replace and provide modified bitumen roofing manufacturers recommended roof flashing membrane under coping and vertical flashing treatment at parapet and tie flashing into the existing membrane.

2. Coping redesign should be simplified and meet all current codes (including wind forces) Downspouts

iv. Repair and replace all downspouts and repair scupper drains at parapets at both new metal panel and at brick wall areas. This would require removal and replacement of standing seam roofs at courtyard canopies to be able to access all downspouts and inspect them – or removal or redesign of roofing of those canopies in entirety).

v. Replace all roof drains with roof drains with overflow drains to meet current codes. (most of the roof is drained from downspouts – there are limited roof drains)

vi. Provide a Mesh Reinforced elastomeric roof coating (MREC) over the entire existing roof and patched roof areas. UFC 3-110-03 for roofing allows this option over existing modified bitumen roof systems.

vii. Replace roof expansion joints and associated flashings where buildings abut.

viii. This option does not allow for an increase in depth of roofing insulation and prohibits additional roof insulation from being added below the structural roof deck.

d) **Aluminum Standing Seam Metal Roofing (Option 2 for roofing)** – this option provides for a metal roofing overbuild that keeps the existing roofing in place. The existing roofing is patched and made watertight and must follow requirements for a Metal Roofing Overbuild in the Roofing UFC. This roof system also has additional structural requirements. Refer to the specification section 07 61 15.00 20 Aluminum Standing Seam Roofing in Part 6 of this RFP as the basis of the specification for this system. This roofing replacement type is an option as defined in the CLIN in Part 1 of this RFP.

e) **Downspout alterations/replacement and existing standing seam metal roof canopies**– Downspout replacement/removal will be affected by the type of roof replacement selected. The following are scenarios based on the roof replacement type:

i. Modified bitumen roof replacement – with this option all existing scupper outlets to downspout must be replaced with new primary roof drains/overflow drains with rainleaders routed through the building to an exterior wall and brought to under grade drainage. Using locations of existing downspouts for placement of new interior rainleaders is suggested. The standing seam metal roof canopies must be removed to access and repair all scuppers in the exterior wall and remove the downspouts. The canopy must be replaced with a new standing seam system per specification Section 07 61 15.00 20 in Part 6. The new canopy roofing must be provided with a gutter and downspout for roof drainage. The metal canopy roof replacement must take into account the connection to the exterior wall and coping of the flat roof and provide proper detailing to ensure wall and roof watertightness.

ii. Standing seam metal roof replacement - For the standing seam metal roof replacement option, existing downspouts must be abandoned and removed with a new system of exterior downspout attached to the gutter of the new standing seam metal roofing. If accessible the recesses in the brick wall that contain downspouts are to be used when locating metal roofing downspouts. As with the modified bitumen roof option the existing metal canopies must be removed to

access and repair abandoned scuppers and remove the existing downspouts. The design of the replacement canopy must take in account the new standing seam roofing and consider water drainage from one to the other.

f) **Metal Panel Replacement** – Provide a new metal panel system to replace the existing system located at the high bay wings of M107 per criteria in Part 3, Chapter 6, ESR B20.

The color must match the current metal panel color, or an alternate color as approved by the Architectural Review Board. Window's located in the metal panel must be removed and replaced with the new metal panel system to provide a continuous metal panel area. Coordinate the metal panel system termination details at the parapet and roof with the type of roof replacement chosen. At areas where the metal panel extends adjacent to flat roof area provide proper flashing heights. At new mechanical rooms located in the block diagrams the metal panels must be designed to incorporate a louver for intake and exhaust. These louvers must not extend down into brick areas.

Infill of overhead door areas – The four high bay spaces in each quadrant of the building have a series of overhead doors to provide vehicular access. The renovation must remove these doors, except for those specifically identified to remain, and infill the door areas with a matching or complementary brick infill in association with windows for occupied spaces that include classrooms and offices. Any overhead door opening that remains must be provided a new overhead door. For both the S4 and S6 storage areas, one overhead door must be retained. The brick veneer wall system that replaces the overhead door must be designed to be recessed in the opening and to not align with the face of the existing brick, with all steel angles and plates that remain at the existing jamb and head of the door opening covered by the new brick or window.

g) **Introduction of new window areas** – At wings of the building as indicated in the Architectural Block diagram in Part 3, Chapter 4 of this RFP – new window areas must be introduced to provide daylighting for administrative areas placed in them. These new window areas must provide or consider the following:

i. Facades with downspouts – In exterior walls with existing recessed downspouts the top of the new windows must match the heads of existing overhead doors or the highest existing opening in the wall area (if no overhead door). The new window jamb can start at the outer jamb of an existing opening that is near a recessed downspout; or start approximately 1 to 2 feet from the downspout recess and extend the window area as one continuous centered window between downspouts. The wall area removed would extend to the nearest full concrete masonry unit (CMU) course closest to 3 feet above the structural slab, or alternately the new opening extends to the structural slab.

ii. All existing overhead doors and windows must be removed in renovated administrative areas of the building and be replaced with new window areas as described in this section. Existing swinging doors must be removed if not used for egress from renovated areas with the wall area around the door included as part of new window areas described in this section. Any exterior door opening that remains must be replaced with a new hollow metal door and frame. Existing bollards at overhead doors must be removed.

iii. On facades that do not have downspouts, the rhythm and configuration of windows placed in these façades must be very similar to those window areas being placed in facades with downspouts to create a cohesive architectural

expression between separate facade in the building. If new windows placed in facades with no downspouts do not face an opposite wall with new windows, provide window openings sizes and configuration of those placed in facades with downspouts and use the existing opening height for the head height of new windows.

iv. Other considerations for placing window areas include locations of expansion joints and sealant joints. In those walls the sealant/expansion joint must be retained with an area of brick to each side of the joint.

v. The areas of window that are placed on facades opposite each other to the greatest extent possible must form a consistent and uniform appearance between the two facades.

vi. The base of the new window areas and wall above foundation must work with the existing grade and sidewalks that may be adjacent to the building.

h) **Existing storefront and window openings –** Existing windows and storefront entrance areas beyond those that are being removed to place new window areas, and those removed in metal panel areas are to be retained. These window/storefront areas include the main entrances north and south facing entrances each main corridor, the windows in the south facing landscaped courtyard, and windows in the main north south corridors.

Sealant joints in brick – all soft joints in brick areas are to be replaced with new material to match the brick.

i) **Repair of existing brick masonry –** At areas of brick masonry where mechanical equipment, piping or other through wall infrastructure is removed, the brick must be repaired with brick to match the existing brick as closely as possible, and mortar to match the existing brick mortar.

j) **Roof ladders –** If the low sloped roofing option is provided, provide new roof ladders to meet applicable codes/UFC criteria at existing locations or at new locations if a new location is preferred over the existing.

2.4.1.2. Building Interior – the following pertains to interior construction and finishes:

a) **Interior Finishes** – Refer to Part 3, Chapter 5 Finish Schedule and Room Data Sheets for more information on finishes based on room type; and for additional room data requirements for selected spaces.

a) **Demolition** – Refer to ESR F20 for description of interior systems to be demolished.

b) **Interior Construction** – Interior Construction is defined in the following section and in the Additional Room Requirements in Part 3, Chapter 5, Room Requirements portion of this RFP. The following is a summary of interior construction scope based on room type. For the Architectural Block Diagram that is mentioned throughout the text below refer to Part 3, Chapter 4, Building Requirements portion of this RFP.

i. **Classrooms in High Bay space** – As located in the Architectural Block Diagram the two southern high baby vehicle repair spaces are to contain secure and unsecure classroom space. Provide classrooms with a top enclosure as defined in Part 3, Chapter 5, Additional Room Requirements for secure and unsecure classroom to prevent storage above these rooms and allow access to visually inspect the structural deck above. The bottom of the top enclosure must align

with the top of the existing overhead door opening or be in close proximity to the top of the overhead door. Windows must be placed in classrooms and integrated into the exterior closure infill placed in the area where overhead doors are removed. On the north side of the open bay space windows are not required to be placed in the classrooms. The secure area classrooms in the southwest high bay space are a part of a larger suite that includes the MISTC/RITC admin area in adjacent wings to the north of the classrooms.

ii. **Mechanical Rooms in High Bay space** – As located in the Architectural Block Diagram provide mechanical rooms for the renovated building located mechanical equipment in the high bay space. Each mechanical room serves the originally constructed building wings and are centrally located to allow for efficient air distribution to these building areas. The mechanical room must retain one overhead door opening with a new overhead door for accessing the mechanical room, and it must add a swinging hollow metal man door incorporated into the exterior closure infill areas. Refer to Part 3, Chapter 5, Additional Room Requirements for mechanical rooms and for additional requirements.

iii. **Reconfigured existing toilets outside of the Secure area** – As indicated in the Architectural Block Diagram (space numbers 52,53,5,6,23, and 24) provide reconfigured toilets within the same or slightly larger area as the existing toilet and orient the entries to these toilets from the existing main corridor (opposite the current entry location). The toilet count for these toilets can be reworked as required to provide portions of the total building toilet fixture count required as calculated per applicable building codes and UFCs.

iv. **Reconfigured existing toilets inside the Secure area** – In the secure area the existing toilet rooms showers (space number 36 and 37) and must be reconfigured in place. These toilets/showers entry locations are dependent on the planning of the entire secure area department and possible connection of admin space with the training space being placed in the high bay space.

v. **Renovated existing classrooms** – As indicated in the Architectural Block Diagram several of the existing building classrooms are being retained as an unsecure classroom. These classrooms are to be generally shared by several departments. In these renovated classrooms, provide new gypsum wall board furred partitions to cover existing CMU wall construction and all new finishes as indicated in Part 3, Chapter 5, Room Requirements of this RFP. The entry wall of existing classrooms since not load bearing may be reconfigured with new entry doors to provide additional space to the classroom if required by the seating capacity of a particular classroom. Alternatively the existing entry walls may be retained with new doors placed within existing openings.

vi. **Auditorium** – Provide a tiered fixed seating auditorium at the area indicated in the Architectural Block Diagram. The seating must be maximized to provide as many seats as possible within the space. The seating tiers must maintain a flat area at the entry to the auditorium to function as a large conference room and also provide an area for a lectern with electronic presentation controls. Finish and AV requirements, and more detailed room data requirements for the auditorium are defined in Part 3, Chapter 5, Room Requirements of this RFP.

vii. **Unsecure Administrative space** – a variety of administrative space is placed in the wings of the building that currently house training spaces, classrooms and labs. The spaces added must allow existing CMU load bearing partitions to remain in place. The existing load bearing partitions are generally identified in the Architectural Block Diagram in Part 3, Chapter 4, but all interior walls must be verified as load bearing before building design and demolition takes place. If unsecure departments require a classroom, the intent is that the existing renovated classrooms in the center of the building are shared by several departments. Some private office space is being placed in existing classrooms spaces as identified in the Architectural Block Diagram. Provide partitions for private offices and other enclosed space of metal stud and gypsum wall board (GWB) partitions. Administrative spaces in wings outside of the open bay wings will not require top enclosures but will require a ceiling placed below the structure in circulation corridors, private offices and other enclosed spaces and open office areas.

viii. **Secure Area Administrative space** – MISTC/RITC departments are co-located in a secure area space as noted in the Architectural Block Diagram. This space will require controlled access for those that work in or visit the space. This area must provide cell phone lockers for students entering the space for training. Provide partitions for private offices and other enclosed space of metal stud and GWB partitions. Admin spaces in wings outside of the open bay wings will not require top enclosures but will require a ceiling placed below the structure in corridors, private offices and other enclosed spaces and open office areas.

ix. **Common area conference rooms** – Shared conference room locations are identified in the Architectural Block Diagram in space numbers 55, 7, and 25. These conference rooms are new space. Provide new gypsum wall board and metal stud partitions going to structure for enclosing the rooms and ceilings within the rooms and the corridor leading to these rooms.

x. **Common area spaces placed in existing classrooms or administrative space** – A variety of common area space that includes both heads, break rooms and general storage are identified in the Architectural block diagrams space numbers 44,42,17, and 18. All renovated space within existing spaces must receive new furred partitions at existing CMU walls to remain, and room partitions of metal studs and GWB with finishes as defined in Part 3, Chapter 5; Room Requirements. If the toilet count is provided for within the existing heads noted in items c. and d. above or the total area for the common area heads identified in the Architectural Block Diagram is not required for heads, the unused space is to be turned into additional general storage.

xi. **Interior door openings** – All existing interior door openings that are retained in the renovated space must be replaced with a new door and door hardware with material as defined in Part 3, Chapter 6, ESR C10.

2.4.2. Civil/Site

Objectives for the site as part of the building M107 renovation are minimal.

The MISTC and RITC units that will occupy the southern wings of the building require secure outside areas to set up, test and train with field equipment. Provide a secure fenced area

adjacent to and with direct access from the southern wings of the building. The equipment is typically towed in behind military vehicles and dropped off with the vehicle parked elsewhere. To facilitate easy drop off and pick up of the equipment trailers, provide vehicle gates on the east and west ends of the fenced area that will allow for pull-through operations.

With the change in use of the building the interior trench drains will no longer be required. Remove the drainage pipes (inside and outside of the building) from the interior trench drains and associated exterior oil/water separator to their termination point at the pump house south of the site on Neuse Road.

To create additional greenspace and improve the exterior aesthetics, remove the existing pavement on the east and west side between the central wings of the building. Provide turf, landscaping, and site furnishings to create an outdoor break space.

It is not anticipated that this portion of the P1512 project will require a stormwater or erosion and sediment control permit from NCDEQ. It is not anticipated that this site development will trigger compliance with UFC 3-210-10 for *Low Impact Development*.

2.4.3. Environmental/Conservation/Cultural Resources

NEPA work for this project has been completed by NAVFAC.

2.4.4. Structural

The structural design objective is to preserve the existing building structure to the extent possible while meeting functional requirements and constructing alterations in accordance with the reference Codes and standards.

The roof currently leaks at several locations. The basis of this DB RFP is to replace the entire roof membrane assembly, including but not limited to the membrane, insulation, and fasteners. Two options must also be considered; 1) perform a complete moisture condition survey of the roof and repair wet and damaged areas and 2) provide a new sloped roof, including structural framing. These options are described in detail in other sections of the DB RFP.

Evaluation and design of the roof structure, existing and new, must comply with the requirements of the UFC and International Building Code (IBC). In addition to the requirements of the referenced documents, the Structural Engineer of Record (SER) must perform and submit numerical analysis of the following:

- **Roof Diaphragms:** The existing metal roof decking appears to be in serviceable condition. However, the actual condition and ability to reuse the decking must be determined by the SER. The SER must verify the existing diaphragm(s), connections between the existing diaphragm(s) and the roof framing members and connections of the existing diaphragm(s) to the lateral load resisting system are adequate to resist at least 75% of the current design wind load, including uplift. Elements that are not sufficient to resist 75% of the current design wind load must be replaced or supplemented so that the diaphragm system has adequate strength. Any new decking and diaphragms must be adequate to resist 100% of the current loads.

- **Structural Framing Supporting Gravity Loads:** Where more than 25 square feet of roof membrane is replaced or repaired a structural analysis must be performed to document that all structural members that support, directly or indirectly, the work area comply with the UFC and International Building Code (IBC) requirements. Elements that are not sufficient must

be replaced or supplemented so that they have adequate strength. New construction must comply with the current Code requirements.

2.4.5. Fire Protection

2.4.5.1. Building Code and Life Safety Analysis

Provide a complete building code and life safety code analyses in accordance with UFC 3-600-01 and FC 1-300-09N.

2.4.5.2. Fire Alarm and Mass Notification

This project replaces the existing fire alarm system with a new integrated fire alarm/ mass notification system and fire suppression system capable of notifying building occupants inside the facility of an emergency event. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must".

Prior to demolition in preparation for the building renovation, contact base fire alarm technicians and allow time for their retrieval of fire alarm and/or mass notification panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

2.4.5.3. Fire Protection Sprinkler System

This project includes the renovation of the five existing wet-pipe fire sprinkler systems to accommodate the required building renovations and provide complete fire protection coverage throughout the entire building. System modifications include replacing all sprinklers, removing and replacing existing sprinkler piping as necessary, replacing each of the 5 existing 6-inch sprinkler risers and providing new reduced-pressure principle backflow preventers. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must". Base hydraulic design on the water supply data provided in ESR Section D40 and Part 6.

2.4.6. Electrical

Provide interior and site Electrical Systems complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must".

Provide a complete Telecommunications backbone and horizontal distribution system as specified throughout this RFP. Install all equipment, pathways, and cabling per the criteria per the PTS Sections D50 and G40 and the manufacturer’s recommendations. Where the words “should” or “shall” are used in the manufacturer’s recommendations, substitute with the word “must”.

Provide a MDF to house telecommunications equipment and cabling as well as, service provider equipment and cabling. Additionally, provide floor/area serving IDFs to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit J-Hook pathways to each Work Area Outlet (WAO).

Provide exterior underground communications duct bank manhole system from existing duct bank(s) and manhole to the MDF inside each building.

The design and installation must be in accordance with the latest TIA standards, and, all applicable Unified Facilities Criteria documents and the latest local provider and applicable Using Military Department standards and criteria.

2.4.7. Workflow Process

The M107 facility when renovated houses various departments focusing on providing Marine Corp training or logistics support. Due to the training functions the renovated building has a considerable flow of trainees in and out of the building during the day. The current circulation within the building is provided by the two central main corridors and the cross corridors that connect these two corridors. These corridors located in the center portion of the existing building will remain and provide the interconnectivity between the newly housed departments, as well as, to shared common spaces, shared classrooms, and a new auditorium. The current entrances at both the south and north ends of the building will be maintained and provide access to the two main corridors. Entrances to unsecure departments are accessed from the main corridor or connecting corridors that lead from the central corridor to the new department entrance. Secured access to the MISTC and RITC department are to be provided from the central corridor.

Workflow also includes training functions that are tied to equipment located in exterior fenced yards accessed by gates and located directly adjacent to the building. These yards are required to be located at the south end of the building for equipment to have access to satellite signals. Access to these yards must be from the building and from a gated site entry point.

2.4.7.1. Hours of Operation

Hours of operation are 24 hours per day, 7 days per week, 365 days per year.

2.4.7.2. Staffing/Occupancy

When renovated, M107 is operating as an office building and training facility. It will be occupied primarily during daytime hours by students occupying the training spaces; and instructional and administrative staff going between administrative areas and training spaces, or to common area spaces used by more than one department.

The number of occupants specified in this RFP and indicated in the Space Tabulation in Part 3, Chapter 4 are identified for programming purposes. Determine occupancy load to be used to design building features, such as structural, egress, and plumbing fixtures must be as required in applicable building or life safety codes based on the spaces provided in the building design.

2.5. Special Design Challenges

Special design challenges include the following:

- The large number of MILCON facilities that are to be built at or around the same time as the M107 renovation at Camp Lejeune may create challenges with both material and labor availability. The design of the building and systems selected should consider these challenges.
- Refer to Part 6 for preliminary Construction Phasing Plan. Develop a detail construction phasing plan as part of the design package for Government approval before construction.
- Planning and placing new office areas in spaces that must maintain the existing load bearing partitions.
- Providing an effective roof replacement that is storm-resistant, does not leak and that takes into consideration the multiple building expansion joints.
- Providing classroom space in high bay space.
- Providing window areas in existing exterior walls for daylighting.

2.6. Adaptability and Flexibility

Adaptability and flexibility in the M107 design is provided by placing many common shared spaces among the administrative departments and limiting the duplication of these areas within individual departments. They include, shared conference rooms, shared restrooms, break rooms and classrooms.

3.0 SITE ANALYSIS – P1512F RENOVATE M107

3.1. Existing Site Conditions

3.1.1. Site Conditions – Natural Constraints

3.1.1.1. Topography

The elevations on the site average 20 feet. There are existing ditches surrounding the site with bottoms approximately 14 feet. The building sits at the center of the site and drains away from the building to the perimeter ditches.

3.1.1.2. Vegetation / Landscaping

The site is mostly building and pavement. Areas that are not building or pavement are turf with a handful of existing ornamental trees in the courtyard areas.

3.1.1.3. Natural Resources

NOT USED

3.1.1.4. Subsurface Investigation

See Part 4 ESR G10 for information regarding requirements to locate all utilities on the site.

3.1.1.5. Earthwork and Site Preparation

Provide backfill and topsoil as required following pavement demolition for the greenspace areas.

3.1.1.6. Unexploded Ordnance (UXO)

There is no known unexploded ordinance within the project limits.

3.1.1.7. Wetlands

Per Base GIS information, the ditch running from north of the building to the west side of the site is shown as wetlands. The renovation project proposes no work in this area.

3.1.1.8. 100-Year Floodplain

Per the FEMA FIRM the project site is in “Area of Minimal Flood Hazard - Zone X”

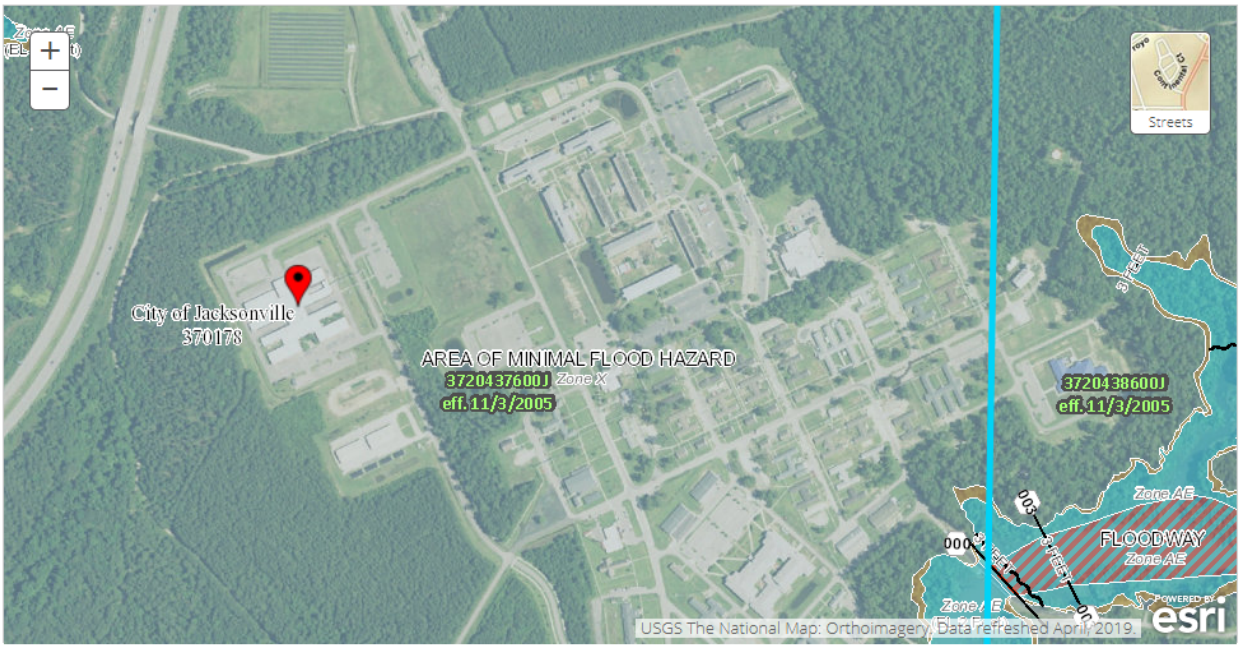


Figure 1: 100-Year Floodplain Map

3.1.2. Site Conditions – Man-made Constraints

3.1.2.1. Existing Vehicular Access and Circulation

There are primarily vacant land and parking lots around the existing Building M107. There is an existing road network surrounding the site including Company Street B to the north, west, and south; and Neuse Road to the east.

3.1.2.2. Site Drainage & Storm Water Runoff (hydrology)

The site is generally high-pointed at the building and drainage flow to the surrounding ditches that flow to the northwest to Wilson Bay and the New River.

3.1.2.3. Site Features

The site is basically square in shape, approximately 800 feet on a side containing roughly 15 acres. The building occupies approximately 4 acres and is surrounded by paving for circulation, staging and parking. There are parking lots to the north, east and south containing approximately 250 parking spaces. There is one connex-box-sized training apparatus on the east side of the site. This must be removed and reinstalled at the new LOG OPS School site. There is an existing oil water separator near the ditch on the southwest corner of the site.

3.1.2.4. Existing Site and Building Conditions Photographs

Photographs of the existing site and building can be found in the Part 6.

3.1.2.5. Hazardous Materials and Substances

There are no known hazardous materials or substances on the site.

3.1.2.6. Fencing

There is no existing fencing on the site.

3.1.2.7. Adjacent Land Use

Land adjacent to the site to the north and west is wooded area. To the east beyond the parking lot is the parade field and to the south are other training facilities.

3.2. Existing Infrastructure Network

3.2.1. Vehicular Access and Circulation

Overall Site Traffic Requirements

The Contractor must develop one Traffic Investigation Report for the entire Camp Johnson site. Traffic Counts (TMC and 24-Hour Tube Counts) must be collected at key entry points and key intersections of the street network of Camp Johnson (see KMZ map of count locations in Figure 2) . Because this is a Controlled Entry Facility, UFC 4-022-01 and Section 2 of the Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15 must be used. In addition, UFC 3-201-01 for Civil Engineering, Sections 2-9 and 2-10 must be used, along with AASHTO GDHS and ITE guides, including ITE LP-674B (Highway Capacity Manual) and *Transportation Impact Analyses for Site Development*. The MUTCD and NCDOT Roadway Design Manual must also be used. The Contractor must apply the most stringent requirements from the various manuals.

The Contractor must also create a Temporary Traffic Control Plan for each phase of construction. The Plan must follow the MUTCD and the NCDOT Work Zone Traffic Control guidelines.

Construction of the three buildings in P1512 are anticipated to redistribute rather than generate new traffic volumes. Therefore, traffic impacts are anticipated to be minimal, with the exception of: driveways to the new buildings; enhanced pedestrian crossing facilities on the existing roads of Company B and Neuse Road; and new Pedestrian Paths between destinations.

Current conditions for traffic flow and circulation need to be confirmed through the Traffic Count Data. Projection of Future Traffic Volumes and Conditions must be determined for the Build Year, plus five years (e.g. 2020 and 2025). Peak Periods (2 hour) for the AM and PM must be established. Synchro must be used to determine Levels of Service (LOS) at intersections and queuing at the Controlled Access Gate. The Contractor must conduct an Origins and Destinations Study to determine traffic circulation to, from, and through the site.

Based on the overall Traffic Investigation Report, the Contractor must take into account the specific operations and access needs around the three buildings in P1512 and are outlined in this RFP.

Based on the findings of the Traffic Investigation Report, the Contractor must recommend improvements to mitigate challenges in Traffic Operations, Circulation, Safety, and Access during daily or intermittent base operations.



Figure 2: Traffic Count Locations

An estimate of magnitude of cost must be provided for such improvements after the Contractor completes the Traffic Investigation Report with the required data collection including traffic counts and an origins and destinations study. Improvements and cost must be discussed with NAVFAC.

The Contractor must create a Temporary Traffic Control Plan (TTCP) for each phase of construction. The function of the TTCP is to provide for the safe and effective movement of road users (motorists and pedestrians) through and around the construction zone while protecting road users, workers, responders to emergency incidents, and equipment. The TTCP should start in the planning phase and continue through the design, construction, and restoration phases. Components of the TTCP shall include the Advanced Warning Area, the Transition Area, the Activity Area, and the Termination Area. In the Advanced Warning Area, road users are informed about the upcoming work zone. In the Transition Area, road users are redirected out of their normal path, as needed. The Activity Area is comprised of the work space, the traffic space, and the buffer zone. In the Termination Area, road users are returned to their normal driving or walking path.

Building Specific Traffic Requirements

As shown in Figure 3, vehicular access for military and civilian staff at Building M107 will occur from Montford Landing Road. Vehicles will enter Camp Johnson from the Entry Control Facility Gate on Montford Landing Road, or will be driving north on Montford Landing Road from the Wilson Street Gate which is east of Florence Road There will also be military vehicles and trucks that will need to access the site.

The Traffic Investigation Report will provide an assessment of the volumes of traffic, and possible queuing of traffic during the AM and PM Peak Periods at the Entry Control Facility Gate on Montford Landing Road Although most traffic entering this gate is going to Camp Johnson, the Origins and Destinations Study will also determine if there is traffic entering this gate, and going through Camp Johnson to other destinations in Camp Lejeune to circumvent heavy traffic and delay at the Wilson Gate further to the East.

3.2.1.1. Parking

There is currently parking both north and south of the M107 building. Although some of the current parking may be re-purposed, the redesign will leave the appropriate amount of parking for staff. There is also a staff parking lot just east of Neuse Road that will remain for staff parking. Pedestrian access across Neuse Road will need to be addressed for safety, particularly during AM and PM Peak periods.

3.2.1.2. Service Access

In addition to large military trucks, there is currently a Solid Waste Container in the parking lot south of the M107 building. Appropriate access will need to be provided. Access for Emergency Vehicles will also need to be maintained.

3.2.1.3. Pedestrian Access and Circulation (flow, paths, sidewalks, etc.)

The only anticipated pedestrian traffic will be from the staff parking lot east of Neuse Road based on the AM and PM Peak volumes determined through the Traffic Investigation Report, appropriate accommodations should be made for pedestrians crossing Neuse Road during the peak periods.



Figure 3: P1512F Renovate M107 Location

3.3. Landscaping

Limited plant material exists around the building. Specimen trees and lawn areas occupy the unpaved areas between the building wings.

3.4. Site Utilities

Water distribution mains encircle the site primarily running parallel to the existing road network and range in size from 8 inches to 10 inches. A 6-inch gravity sanitary sewer accesses the building primarily from the east and flows to the south. Sanitary sewer lines associated with the training bay trench drains (4-inch) flow through an oil water separator at the southeast corner of the site.

The utility service to the building is served from a near-by overhead distribution line on the east side of the building. From the overhead pole, a primary feeder is run underground to feed a 1500kVA pad mounted utility transformer. The secondary feeder from the utility transformer, consisting of three sets of 350kcmil conductors, is run underground to the main switchgear.

3.5. Signage

Any required signage must comply with Camp Lejeune sign standards and the BEAP.

3.6. Site Development Requirements

3.6.1. General Site

Site development must be designed in conformance with UFC 3-201-01 “Civil Engineering”. A bubble diagram site plan has been created to convey a potential general site layout and is included in Part 6. The bubble diagrams are the user’s preferred general layout, however, the Contractor is responsible for the creation of a complete construction plan set meeting the requirements of this RFP for the construction of the project. The Contractor will be utilizing the documents provided in this RFP to determine their bid as follows.

- The purpose of this project is primarily a building renovation.
- Provide security fenced areas on the south side of the building corresponding to the two southern building wings. The areas will be approximately 50 feet by 150 feet with gates provided to allow for pull through traffic of military vehicles pulling equipment trailers. These areas are intended to be used to temporarily simulate field set up of equipment that will be secure with regard to personnel and vehicle access.
- Provide chain link security fence to surround buildings M150, M151, M151A, M151B, M151C and M151D, which are along Bob Henson Way. Connect to the existing fence east of building M151 along Neuse Road north of the surrounding paved access pavement, enclose all buildings and pavement and connect the fence to the existing fence line to the south of the buildings adjacent to the existing pump house along Neuse Road. Provide minimum required clear zones inside and outside of the fence line. Clear trees and shrubs as required to ensure the required clear zones.
- Provide chain link security fence from the existing State Highway fence northeast of the entrance to Camp Johnson, along the entry road to the south, and terminate at the existing bollards adjacent to the security checkpoint. Provide minimum required clear zones both inside and outside the new fence line, clearing trees and shrubs if necessary, and minimum setback from the roadway.
- All disturbed area not built upon with impervious surfaces or landscape areas will be graded to drain and sodded with centipede sod.
- Provide and all-weather access road (pavement or gravel) to mechanical equipment and mechanical room access doors at the building.
- Provide heavy duty concrete pads for two chillers with proper spacing on the south end of the site, to the east of the existing parking area.
- Provide a concrete dumpster pad for one trash dumpster. The dumpster pad must extend to encompass the front wheels of the pick-up vehicle. The dumpster pad must have a masonry screen wall on three sides and be constructed of building materials similar in color to the proposed facility.
- Any structure or pavement not to be demolished that is damaged during construction or demolition must be repaired or replaced at the expense of the Contractor.

- Provide outdoor seating and gathering areas to include seating, trash cans, plantings, lighting and distinctive architectural treatments, see Section G2030 PEDESTRIAN PAVING.

3.6.2. Site Demolition

Demolition of the existing site features will require limited above-ground and sub-surface demolition to accommodate the building renovation. This site will require select demolition, as certain features will be required to remain as is or be relocated as part of this project. The Contractor will ensure access to the adjacent facilities at all times during demolition and construction.

Demolish the sanitary sewer associated with the training bay trench drains and the associated oil/water separator to the connection with the sewer main.

Demolish the secondary conductors and pathways between the existing service transformer and the existing main switchgear inside the building. Retain the transformer and switchgear.

Select pavement demolition is required in the courtyard areas to create greenspace. Sawcut the existing pavement at the interface of pavements to remain.

See section 3.3.2 of the LOG OPS Site Analysis regarding the whole building demolition requirements for the P1512 project.

3.6.3. Utilities

Existing utility services to the building must remain with the exception of the sanitary sewer line mentioned above and the electrical feeder between the secondary of the service transformer and the main switchgear inside the building.

3.6.4. Stormwater Management

NOT USED

3.6.5. Sediment and Erosion Control

As required to prevent soil laden runoff from leaving the site, erosion and sediment control must be designed and installed per the NCDEQ standards.

To prevent potential erosion and sedimentation from entering the surrounding wetlands, standard erosion control methods and practices must be used. Silt fence and silt fence outlets must be used around the perimeter of the of the exterior construction sites to prevent sediment from exiting the disturbed areas. A double row of silt fence should be used along any wetland buffers that will receive runoff from site construction. Site work must not begin until erosion and sediment control measures are installed.

Additional criteria that must be considered by the Contractor:

- Ensure sediment does not leave a construction site of any size as a result of land-disturbing activities. Coordinate with Water Quality Manager, EQB at 451-9518 and the Storm Water Manager, ECB at 451-9522.

3.6.6. Landscaping

Landscaping must include replacement of trees equal in number to those removed or damaged due to construction. Trees within the limits of disturbance will be monitored for a year after construction and replaced as noted above. Turf areas must be graded and sodded where damaged during construction. Other areas identified as turf will be installed via soding.

Landscaping must comply with BEAP guidelines with regards to landscaping and outdoor amenities. Landscaping proposed near building must comply with all AT/FP requirements. See also Part 3 – Chapter 6 Section G20 for specific landscape requirements and plant establishment and maintenance requirements.

Site furnishings must be provided within outdoor seating areas and will be constructed of durable materials with colors in compliance with the BEAP and surrounding examples.

3.6.7. Permits

NOT USED

4.0 BUILDING REQUIREMENTS – P1512F RENOVATE M107

4.1. Space Tabulation

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
FSMAO					
Headquarters		1,876			
Private Office - Large	OIC		1	Includes a 4-Person round conference table	
Private Office	AOIC		1		
Private Office	SNCOIC		1		
Open Office	Clerk		1		
Conference Room (16-person)				May be shared	
Operations		7,336			
Private Office - Large	Operations Officer		1	Includes a 4-Person round conference table	
Private Office	Future Operations Officer		1		
Private Office	Operations Chief		1		
Open Office	Clerk		6		
Conference Room (16-person)				May be shared	
5 Teams			50	Each area includes desks, a working table, and storage	
ICART			10		
Guest				Includes desks, a 20-seat classroom area, and storage	
3 Unsecure Classrooms (50-person, seminar style)		0		Utilize shared unsecure classrooms in center of building	
		9,212	**73**		
MCNAFAS					
Private Office - Large	Regional Director	6,817	1	Includes 1 locker, 1 shelf, a meeting table for 4	
Private Office - Extra Large	Audit Manager		1	Includes 2 lockers, 2 shelves, a meeting table for 4	
Open Office	Staff Auditor		6		
Conference Room (10-person)				May be shared	
		6,817	**8**		
MISSO					
Private Office	Staff	7,990	4		
Open Office	Clerk		15		
Unsecure Classroom (40 to 45-person)					
Conference Room (8-person)				May be shared	
		7,990	**19**		

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
MISTC/ RITC COMBINED					
MISTC		28,000		SF includes Telecom and	
Private Office	MISTC Director		1	Electrical Rooms	
Private Office	MISTC Deputy Director		1		
Private Office	COC Specialist		1		
Private Office	Active duty Ops Chief		1		
Private Office	Lead contractor		1		
Open Office	Administrative receptionist		1		
Private Office	Contractor (Instructor)		13		
RITC					
Private Office	Site Lead		1		
Private Office	Logistics Lead		1		
Private Office	Instructor		3		
Private Office	VIP/Visitor				
Library					
9 Secure Classrooms (25-person)					
8 Unsecure Classrooms (25-person)					
Conference Room (20-person)					
Reconfigured Existing Heads/showers					
MISTC/ RITC Storage		700		Existing space per block diagram	
		28,700	**24**		
EAST COAST FOOD MANAGEMENT					
Private Office	SNCOIC	3,152	1		
Private Office	OIC		1		
Open Office	Instructor		6		
Conference Room (10-person)				May be shared	
		3,152	**8**		
CTC					
Private Office		2,551	1		
Private Office			1		
2 Unsecure Classrooms (maximized number of seats in existing space)					
		2,551	**2**		
AAU					
Private Office		1,320	1		
Private Office			1		
Private Office			1		
		1,320	**3**		

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
S-6/ S-4					
Private Office		18,168	1	SF includes Telecom and	
Private Office			1	Electrical Rooms	
Open Office			6		
Equipment Storage					
		18,168	**8**		
Common Area					
Auditorium/Conference Room		6,132			
Shared Conference Rooms		1,809		As shown in block diagram (Spaces #7,25,55); SF is approximate	
Shared Unsecure Classrooms (FSMAO and other departments)		5,830		Existing space per block diagram; SF is approximate	
Common Area Break Room		1,572			
General Storage		564			
Mother's Room		80			
		15,987	**0**		

TOTAL PROGRAMMED SPACE	**93,897**	**NSF**	**145 PN**
TOTAL BUILDING GSF	112,113	GSF	

Table of Support Spaces

Room Name	Comments	Additional Room Requirements
Support		
Mechanical Rooms	Four rooms - 6,000 SF total	
Reconfigured Existing Shared Heads	Existing space per block diagram. Including showers and lockers.	
Common Area Heads		
Central Telecom & Server Rooms	Existing space per block diagram.	
Electrical Rooms	SF included in groups as indicated above.	
Telecom Rooms		

The Contractor must provide actual area in both square feet and square meters in proposals.

4.2. Space Relationships

Refer to the Architectural Block Diagram for the renovated building's space arrangements.

4.3. Exterior Character

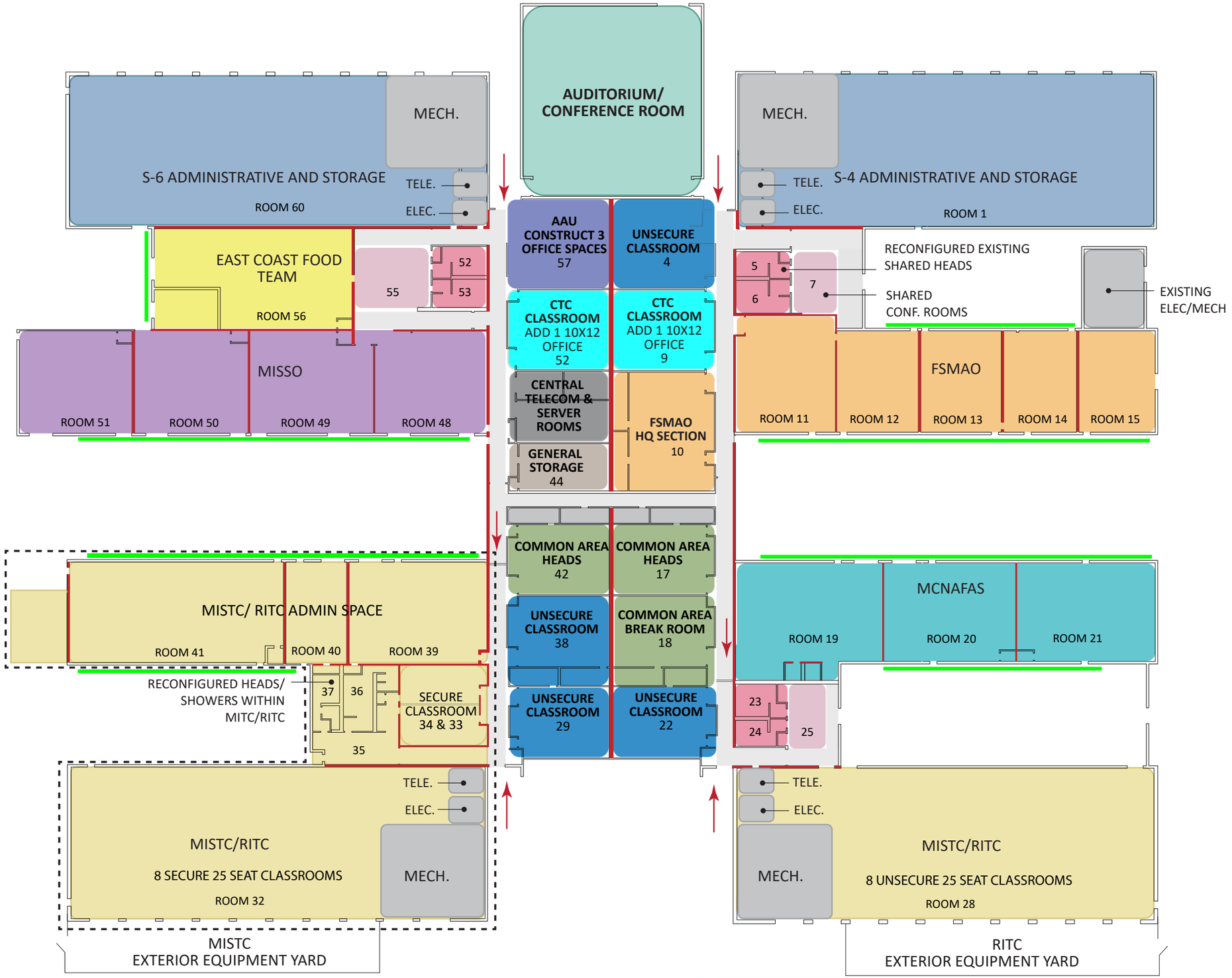
Per the Camp Lejeune BEAP, 2010 the exterior character of the renovated building's exterior alterations and additions must be compatible in aesthetics, scale, form, material and style with the existing building. As examples, exterior window mullion colors must match the existing windows to remain. New exterior windows should follow the aesthetic of the existing window systems. Brick used for small repair infill is required to match as closely as possible the existing brick. Brick used for new architectural wall infill has more design flexibility but must be compatible and blend with the existing buildings expression. Due to the extensive nature of this renovation, this building will be required to go through the Architectural Review process required by the BEAP, which includes a review of the building design and approval by the MCBCL Architectural Review Board starting with the early design phases.

LEGEND

- FSMAO
- MISTC/ RITC COMBINED
- MCNAFAS
- MISSO
- EAST COAST FOOD MANAGMENT
- CTC CLASSROOM
- RENOVATED EXISTING CLASSROOM (UNSECURE)
- AAU OFFICE SPACE
- AUDITORIUM/ CONFERENCE ROOM
- S-6/ S-4 ADMINISTRATIVE AND STORAGE
- RECONFIGURED EXISTING SHARED HEADS
- MECHANICAL/ ELECTRICAL/ TELECOM
- SHARED CONFERENCE ROOMS
- COMMON AREA HEADS/ BREAK
- EXISTING PUBLIC CORRIDOR
- GENERAL STORAGE

- EXISTING LOAD BEARING WALLS
- NEW WINDOWS CUT INTO BUILDING
- SECURE AREA - CLASSIFIED

112,113 GSF TOTAL BUILDING



NAVFAC Naval Facilities Engineering Command

ARCHITECTURAL BLOCK DIAGRAM
CAMP LEJEUNE - M107 RENOVATION

JACOBS

5.0 ROOM REQUIREMENTS – P1512F RENOVATE M107

5.1. FINISH and FF&E SCHEDULE

The following chart is provided for defining general room finishes and furniture, fixtures, and equipment (FF&E) items for M107. Special interior finishes and FF&E items beyond those outlined below are provided in the Additional Room Requirements. The intent of each room requirement sheet is to highlight special, unique, additional, or exceptional room-specific requirements. These tables are not all-inclusive, and the requirements listed should be considered as an addition to the typical requirements outlined in the UFCs, ESRs, & PTSs.

FF&E and AV Equipment will be funded separately as a modification to the construction contract, with the exception of fixed furnishings (SID). Infrastructure to support all FF&E and AV is included in the construction contract. Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with Activity at concept Design workshop (CDW).

Refer to ESR D50 for specific electrical and audio visual (AV) requirements. Coordinate with the Base to determine preferred locations of fixed artwork.

FFE to include Automated External Defibrillators as required by National Fire Protection Association's (NFPA) 101 Life Safety Code and Marine Corps Order (MCO) 11000.11A. Access to an AED shall be provided for all Assembly occupancies, fitness centers and high-risk training centers and as required by NFPA 101.

Room Typical guidelines:

1. Private office required to be a minimum 9'-0" wide (10'-0" wide is preferred).
2. Workstations in open office areas will be a benching / desking system. Powered Cubicle walls will be used minimally.
3. Ceiling heights will be 10'-0" unless notes otherwise. See additional Room Requirements
4. All base to be 6" high

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
FSMAO						
Headquarters						
OIC Office - Large	CPT	RB	PT	ACT	(1) Large Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Conference Table with Seating for 4 (1) Clock	(1) Marker Board (Min.)
AOIC Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
SNCOIC Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Clerk - Open Office	CPT	RB	PT	ACT	(1) Open Office Workstation (1) Task Chair (1) Storage Solution (min.) (1) Clock	(1) Marker Board (Min.)
Conference Room	CPT	RB	PT	ACT	16 ppls with Conference Room furniture	May be shared
Operations						
Operations Officer Office - Large	CPT	RB	PT	ACT	(1) Large Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Conference Table with Seating for 4 (1) Clock	(1) Marker Board (Min.)
Future Ops Officer Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Operations Chief Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Clerk - Open Office	CPT	RB	PT	ACT	(6) Open Office Workstations (6) Task Chairs (6) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min.)
Conference Room	CPT	RB	PT	ACT	16 ppls with Conference Room furniture	May be shared
Team 1	CPT	RB	PT	ACT	Desks, working table, storage each team	10 ppls each team
Team 2	CPT	RB	PT	ACT	Desks, working table, storage each team	10 ppls each team
Team 3	CPT	RB	PT	ACT	Desks, working table, storage each team	10 ppls each team
Team 4	CPT	RB	PT	ACT	Desks, working table, storage each team	10 ppls each team
Team 5	CPT	RB	PT	ACT	Desks, working table, storage each team	10 ppls each team
ICART	CPT	RB	PT	ACT	Desks, working table, storage each team	10 ppls each team
Guest Work Area	CPT	RB	PT	ACT	Desks 20 seat classroom area Storage	10 ppls
Classroom 1 - Unsecure	RAF/CPT	RB	PT	ACT	Seminar style seating for 50 ppls	RAF not required if in existing classroom (all FSMAO classrooms) may be part of shared classrooms
Classroom 2 - Unsecure	RAF/CPT	RB	PT	ACT	Seminar style seating for 50 ppls	
Classroom 3 - Unsecure	RAF/CPT	RB	PT	ACT	Seminar style seating for 50 ppls	

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
MCNAFAS						
Regional Director Office - Large	CPT	RB	PT	ACT	(1) Large Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Locker (1) Shelf (1) Meeting Table with Seating for 4 (1) Clock	(1) Marker Board (Min.)
Audit Manager Office - XL	CPT	RB	PT	ACT	(1) Large Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (2) Lockers (2) Shelves (1) Meeting Table with Seating for 4 (1) Clock	(1) Marker Board (Min.)
Staff Auditor - Open Office	CPT	RB	PT	ACT	(6) Open Office Workstations (6) Task Chairs (6) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min.)
Conference Room	CPT	RB	PT	ACT	10 ppls with Conference Room furniture	May be shared
MISSO						
Staff Private Office	CPT	RB	PT	ACT	(4) Desks (4) Task Chairs (4) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	4 people in one large office (1) Marker Board (Min.)
Clerk Open Office	CPT	RB	PT	ACT	(15) Open Office Workstations (15) Task Chairs (15) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min.)
Classroom - Unsecure	CPT	RB	PT	ACT	Seminar style seating for 40-45 ppls	May be shared
Conference Room	CPT	RB	PT	ACT	8 ppls with Conference Room furniture	May be shared
MISTC/RITC COMBINED						
MISTC						
MISTC Director Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
MISTC Deputy Director Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
COC Specialist Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Active Duty Ops Chief Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Lead Contractor Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Open Office - Admin reception	CPT	RB	PT	ACT	(1) Open Office Workstation (1) Task Chair (1) Storage Solution (min.) (1) Clock	(1) Marker Board (Min.)
Contractor Instructor Office	CPT	RB	PT	ACT	(13) Individual Instructor desks	13 Instructors in large office (1) Marker Board (Min.)

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
RITC						
Site Lead Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Logistics Lead Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Instructor Office	CPT	RB	PT	ACT	(3) Individual Instructor desks	3 Instructors in large office (1) Marker Board (Min.)
VIP/Visitor Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Library	CPT	RB	PT	ACT	Typical Library Furniture	
Secure Classroom 1	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 2	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 3	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 4	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 5	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 6	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 7	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 8	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Secure Classroom 9	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 1	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 2	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 3	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 4	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 5	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 6	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 7	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Unsecure Classroom 8	RAF/CPT	RB	PT	ACT	Classroom tables (25) Chairs	New classroom space
Conference Room	CPT	RB	PT	ACT	20 ppls with Conference Room furniture	
Reconfig. Exist. Heads/Showers	PFT	PFB	PWT/WBE	WBE		
MISTC/RITC Storage	LVT	RB	PT	ACT	Storage cabinets Shelving	Existing space per block diagram
East Coast Food Management						
SNCOIC Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
OIC Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Instructor Open Office	CPT	RB	PT	ACT	(6) Open Office Workstations (6) Task Chairs (6) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min.)
Conference Room	CPT	RB	PT	ACT	10 ppls with Conference Room furniture	

Room	Floor Finish (C3020)	Base Finish (C302007)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
CTC						
Private Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Private Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Unsecure Classroom 1	RAF/CPT	RB	PT	ACT	Seminar style seating maximized per area	RAF not required if in existing classroom (all CTC classrooms)
Unsecure Classroom 2	RAF/CPT	RB	PT	ACT	Seminar style seating maximized per area	
AAU						
Private Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Private Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Private Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
S-6/S-4						
Private Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Private Office	CPT	RB	PT	ACT	(1) Desk (1) Task Chair (2) Wardrobe/ Filing Cabinet/ Other Storage Solution (1) Clock	(1) Marker Board (Min.)
Open Office	CPT	RB	PT	ACT	(6) Open Office Workstations (6) Task Chairs (6) Storage Solutions (min.) (1) Clock	(1) Marker Board (Min.)
Equipment Storage	SC	RB	PT	ACT		
Common Areas						
Auditorium/Conference Room	CPT	RB	PT/AFP	ACT/GWB	Maximized Fixed Seating and Conference Room Table/seating	
Shared Conference Room 1	CPT	RB	PT	ACT	20 ppls with Conference Room furniture	
Shared Conference Room 2	CPT	RB	PT	ACT	12 ppls with Conference Room furniture	
Shared Conference Room 3	CPT	RB	PT	ACT	12 ppls with Conference Room furniture	
Renov. Unsecure Classroom 1	CPT	RB	PT	ACT	Classroom tables, chairs maximized per area	Shared-Existing renovated classroom
Renov. Unsecure Classroom 2	CPT	RB	PT	ACT	Classroom tables, chairs maximized per area	Shared -Existing renovated classroom
Renov. Unsecure Classroom 3	CPT	RB	PT	ACT	Classroom tables, chairs for maximized per area	Shared -Existing renovated classroom
Renov. Unsecure Classroom 4	CPT	RB	PT	ACT	Classroom tables, chairs for maximized per area	Shared -Existing renovated classroom
Corridors	LVT	RB	PT	ACT		BID OPTION: Terrazzo Floor
Common Area Break Room	LVT	RB	PT	ACT		
General Storage	LVT	RB	PT	ACT		
Support Spaces						
Heads (Reconfig. Exist. Shared)	PFT	PFB	PWT	WBE		
Showers (Reconfig. Exist. Shared)	PFT	PFB	PWT	WBE		
Lockers (Reconfig. Exist. Shared)	PFT	PFB	PWT	WBE	Provide Lockers	
Mechanical	SC	RB	PT	EXP/PT		
Electrical	SC	RB	PT	EXP/PT		
Telecom	SC	NONE	PT	NONE		

FINISH LEGEND

ACP - Acoustical Ceiling Panel
ACT - Acoutical Ceiling Tile
AFP - Acoustical Fabric Panel
LVT - Luxury Vinyl Tile
PFB - Porcelain Floor Base
PFT - Porcelain Floor Tile
PT - Paint
EXP - Exposed
PWT - Porcelain Wall Tile
PCMU - Polished Concrete Masonry Unit
RAF - Raised Access Flooring (24")
RB - Rubber Base
SC - Sealed Concrete
WBE - Water-based Epoxy Paint
WM - Walk-Off Mat

5.2. ADDITIONAL ROOM REQUIREMENTS

Room data sheets are provided for specific rooms in each facility to provide additional information for these rooms; and better define room requirements beyond those provided in the ESR, the Finish and FFE Schedule located in section 5.1, and other parts of the RFP. If no room data sheet is provided for a space identified in this facility then the general requirements of the RFP, the Finish and FFE schedule in section 5.1, and the referenced UFCs, Codes, and Standards apply.

P1512-M107

Auditorium

Space Characteristics

Function/Adjacencies: Provide a tiered floor auditorium and conference center space in the renovated facility. Maximize the amount of fixed seating while providing a flat floor area at the front of the room for presentations. Provide A/V systems for presentations to a large audience.

Special Dimensions:
Ideal Plan Dimensions: provide 12'-0 wide by total width of room flat floor at the front of the room for instructor presentations and conference room area.
Minimum Ceiling Height: 9'-0" above tallest tiered floor area.

Acoustics:
Sound Transmission Class (STC) 45
Access: From existing exterior doors.

Number of Occupants: Maximize number of fixed seats

Other/Special Requirements: Gypsum Wall Board Soffits per auditorium design. Acoustically design interior to maximize audibility of presentations.
Requires removal and infill of an exterior overhead door opening with new door openings as required for egress.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	Existing slab on grade. New tiered concrete slab on metal deck above existing slab for tiered seating. Tiers will have minimum 7" rise.
B2030	Exterior Doors	EA	3' X 7' (2)	Provide new hollow metal doors at existing exterior doorways at the former open bay space. Provide a separate door opening in the infilled overhead door of the former open bay space as required for egress.
B2030	Exterior Door Hardware			Provide a CAC enabled electronic entry system at one entry door with key override.
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling) for furred partitions at perimeter of room. Provide furred partitions at all existing perimeter walls of the new auditorium space and interior partitions if required for egress path or separated space from tiered seating.

Auditorium

Space Characteristics

Function/Adjacencies: Provide a tiered floor auditorium and conference center space in the renovated facility. Maximize the amount of fixed seating while providing a flat floor area at the front of the room for presentations. Provide A/V systems for presentations to a large audience.

Special Dimensions:
Ideal Plan Dimensions: provide 12'-0 wide by total width of room flat floor at the front of the room for instructor presentations and conference room area.
Minimum Ceiling Height: 9'-0" above tallest tiered floor area.

Acoustics:
Sound Transmission Class (STC) 45
Access: From existing exterior doors.

Number of Occupants: Maximize number of fixed seats

Other/Special Requirements: Gypsum Wall Board Soffits per auditorium design. Acoustically design interior to maximize audibility of presentations.
Requires removal and infill of an exterior overhead door opening with new door openings as required for egress.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room on main wall of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF. Provide along screen wall in association with flat room area
C1030	Identifying Devices			Signage near convenience phone: Indicate after-hours instructions and a list of twelve emergency and maintenance telephone numbers.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C1030	Entrance Floor Grilles and Mats	SF		Provide a walk off surface integrated into the carpet at the main entry door for full width of door and 4' from face of door.
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.

Auditorium

Space Characteristics

Function/Adjacencies: Provide a tiered floor auditorium and conference center space in the renovated facility. Maximize the amount of fixed seating while providing a flat floor area at the front of the room for presentations. Provide A/V systems for presentations to a large audience.

Special Dimensions:
Ideal Plan Dimensions: provide 12'-0 wide by total width of room flat floor at the front of the room for instructor presentations and conference room area.
Minimum Ceiling Height: 9'-0" above tallest tiered floor area.

Acoustics:
Sound Transmission Class (STC) 45
Access: From existing exterior doors.

Number of Occupants: Maximize number of fixed seats

Other/Special Requirements: Gypsum Wall Board Soffits per auditorium design. Acoustically design interior to maximize audibility of presentations.
Requires removal and infill of an exterior overhead door opening with new door openings as required for egress.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Acoustic Wall Panels	AR	Maximum size per design	Wall-mounted acoustical panels, both wood and fabric, along the side and rear walls as required for the acoustical design.
C3020	Carpeting	SF	24 x 24	Carpet Tile
C3020	Wall Base Finishes	LF	4" high	Provide a wall base material that works with carpet and the tiered seating of the room and works around the steps of tiers. Same base material to be used at flat areas of room.
C3030	Acoustical Ceiling Tiles & Panels	AR	24 x 24	Acoustical Ceiling Tile
C3030	Suspension Systems	AR	AR	9/16" suspended ceiling system
C3030	Gypsum Wallboard Ceiling			Provide soffits and accent ceiling areas of GWB in ceiling to break up continuous plane of acoustical ceiling tile ceiling.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished and Per ESR C30, Interior Finishes.
D5020	Lighting and Branch Wiring			Provide dimmable LED lighting in minimum of four zones controlled via wall switches and AV podium control.

Auditorium

Space Characteristics

Function/Adjacencies: Provide a tiered floor auditorium and conference center space in the renovated facility. Maximize the amount of fixed seating while providing a flat floor area at the front of the room for presentations. Provide A/V systems for presentations to a large audience.

Special Dimensions:
Ideal Plan Dimensions: provide 12'-0 wide by total width of room flat floor at the front of the room for instructor presentations and conference room area.
Minimum Ceiling Height: 9'-0" above tallest tiered floor area.

Acoustics:
Sound Transmission Class (STC) 45
Access: From existing exterior doors.

Number of Occupants: Maximize number of fixed seats

Other/Special Requirements: Gypsum Wall Board Soffits per auditorium design. Acoustically design interior to maximize audibility of presentations.
Requires removal and infill of an exterior overhead door opening with new door openings as required for egress.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide multi-service recessed floor boxes at 6' on center in tiered floors.
D5030	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system
E1020 D5030	AV Equipment/ Television Systems	EA		Provide power and CATV outlets at appropriate height for all wall-mounted monitors.
E1020	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1512-M107

MISTC/ RITC Secured Fenced Area

Space Characteristics

Function/Adjacencies: Provide an outdoor secured fenced area outside the MISTC and RITC office and class room suites of the renovated facility per part 6 attachments for the M107 renovation project.

Special Dimensions:
Ideal Plan Dimensions: see Part 6 attachment for secured fenced enclosure
Acoustics:
Sound Transmission Class (STC) none
Access: Exterior access

Number of Occupants: None

Uniformat Section	Description	Qty	Size	Specific Requirements
	Secure conduit and power supply from interior MISTC and RITC suites to secure enclosure	AR		
	Chain link fence with concertina wire top	AR		Per Part 6 attachment

P1512-M107 Renovation

Renovated Existing Classroom

Space Characteristics

Function/Adjacencies: These existing renovated classrooms will provide classroom space that is to be shared among several M107 located departments for the teaching or presentation of training information. Most of these room will not include raised access floors, however 2-3 classrooms that have existing raised access floor will be replaced with new access flooring.
Special Dimensions:
Ideal Plan Dimensions: Existing room size
Minimum Ceiling Height: 9'-0"

Acoustics:
Refer to ESR C10, Interior Construction for STC rating by room type.

Access: From existing main corridors of the building

Number of Occupants: Varies – Refer to Space Tabulation in Part 3, Chapter 4 Building Requirements. The space tabulation seating capacity and space provided in existing classrooms will require vetting and review in the design phase.

Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	Existing floor
C1010	Fixed Partitions	SF		Furred out Gypsum wallboard (GWB) on steel channels to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation.
C1020	Interior Wood Doors	1 single leaf door and 1 double leaf	3' x 7'	Solid core, flush door with transparent finish, along with hollow metal steel frame, factory primed, and field painted placed in existing openings, or new openings if entry wall is reconfigured.
C1020	Interior Door Hardware			Provide classroom function lockset. Provide acoustical seals to provide minimum 40 STC rating.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 6'-8" AFF.
C1030	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

Renovated Existing Classroom

Space Characteristics

Function/Adjacencies: These existing renovated classrooms will provide classroom space that is to be shared among several M107 located departments for the teaching or presentation of training information. Most of these room will not include raised access floors, however 2-3 classrooms that have existing raised access floor will be replaced with new access flooring.
Special Dimensions:
Ideal Plan Dimensions: Existing room size
Minimum Ceiling Height: 9'-0"

Acoustics:
Refer to ESR C10, Interior Construction for STC rating by room type.

Access: From existing main corridors of the building

Number of Occupants: Varies – Refer to Space Tabulation in Part 3, Chapter 4 Building Requirements. The space tabulation seating capacity and space provided in existing classrooms will require vetting and review in the design phase.

Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Carpeting	SF		Carpet tiles
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3020	Raised access flooring	AR	AR	For rooms with existing raised access flooring only Provide interchangeable 24"x24" square module panels capable of supporting design loads. Provide a minimum height access floor to enable data and power for computer tables.
C3030	ACT	AR	24 x 24	
C3030	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished and per ESR C30, Interior Finishes

Renovated Existing Classroom

Space Characteristics

Function/Adjacencies: These existing renovated classrooms will provide classroom space that is to be shared among several M107 located departments for the teaching or presentation of training information. Most of these room will not include raised access floors, however 2-3 classrooms that have existing raised access floor will be replaced with new access flooring.
Special Dimensions:
Ideal Plan Dimensions: Existing room size
Minimum Ceiling Height: 9'-0"

Acoustics:
Refer to ESR C10, Interior Construction for STC rating by room type.

Access: From existing main corridors of the building

Number of Occupants: Varies – Refer to Space Tabulation in Part 3, Chapter 4 Building Requirements. The space tabulation seating capacity and space provided in existing classrooms will require vetting and review in the design phase.

Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide dedicated circuits for computer tables.
D5020	Lighting and Branch Wiring			Provide one quad receptacle per student and instructor workstation.
D5030	Telecommunications Systems			Provide one NMCI network drop per student and instructor workstation.
D503002	Public Address Systems			Provide audible paging system.
E1020	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1512-M107 Renovation

Secure Classroom

Space Characteristics

Function/Adjacencies: These new secure classrooms will provide a secure area for the teaching or presentation of sensitive information for the Camp Johnson Marines and Staff. Most of these classrooms are to be located within M107's high bay space and will require a top enclosure as described in Other/Special Requirements below. They are located within the secure area of the building and access to them is managed after occupants enter the secure area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'-0" above raised access floor level

Acoustics:
Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From within the secure area of the renovated building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC. Ties for suspended acoustical ceiling below must not interfere or reduce STC rating of top enclosure.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	Existing slabs
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) over metal studs to underside of floor/roof deck or top enclosure.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with transparent finish, along with hollow metal steel frame, factory primed, and field painted.
C1020	Interior Door Hardware			Provide classroom function lock. Provide sound seals and door bottom and threshold for a minimum of STC 45 rating.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 6'-8" AFF.
C1030	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar.

Secure Classroom

Space Characteristics

Function/Adjacencies: These new secure classrooms will provide a secure area for the teaching or presentation of sensitive information for the Camp Johnson Marines and Staff. Most of these classrooms are to be located within M107's high bay space and will require a top enclosure as described in Other/Special Requirements below. They are located within the secure area of the building and access to them is managed after occupants enter the secure area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'-0" above raised access floor level

Acoustics:
Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From within the secure area of the renovated building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC. Ties for suspended acoustical ceiling below must not interfere or reduce STC rating of top enclosure.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.
C3010	Gypsum Wallboard Finishes	AR	AR	Cementitious backing units for wall tile installation where metal wall stud, CMU or concrete occurs.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Carpeting	SF	24 x 24	Carpet for raised access flooring
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils

Secure Classroom

Space Characteristics

Function/Adjacencies: These new secure classrooms will provide a secure area for the teaching or presentation of sensitive information for the Camp Johnson Marines and Staff. Most of these classrooms are to be located within M107's high bay space and will require a top enclosure as described in Other/Special Requirements below. They are located within the secure area of the building and access to them is managed after occupants enter the secure area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'-0" above raised access floor level

Acoustics:
Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From within the secure area of the renovated building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC. Ties for suspended acoustical ceiling below must not interfere or reduce STC rating of top enclosure.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3020	Raised Access Flooring	AR	AR	Provide interchangeable 24"x24" square module panels capable of supporting design loads. Provide a minimum height access floor to enable data and power for computer tables. Provide ramps to allow floor accessibility without interfering with egress.
C3030	Acoustical Ceiling Tiles & Panels	AR	24 X 24	Acoustical ceiling tile below the top enclosure
C3030	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished and per ESR C30, Interior Finishes.
D3090	Special Mechanical Systems			Ducts and pipes passing from unsecured to secured areas will have man bars and other security measures.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide dedicated circuits for computer tables.

Secure Classroom

Space Characteristics

Function/Adjacencies: These new secure classrooms will provide a secure area for the teaching or presentation of sensitive information for the Camp Johnson Marines and Staff. Most of these classrooms are to be located within M107's high bay space and will require a top enclosure as described in Other/Special Requirements below. They are located within the secure area of the building and access to them is managed after occupants enter the secure area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'-0" above raised access floor level

Acoustics:
Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From within the secure area of the renovated building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC. Ties for suspended acoustical ceiling below must not interfere or reduce STC rating of top enclosure.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide one quad receptacle per student and instructor workstation.
D5030	Telecommunications Systems			Provide one NMCI network drop per student and instructor workstation.
D503002	Public Address Systems			Provide audible paging system.
E1020	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

P1512-M107 Renovation

Unsecure Classroom

Space Characteristics

Function/Adjacencies: These new unsecure classrooms will provide a secure area for the teaching or presentation of sensitive information for the Camp Johnson Marines and Staff. Most of these classrooms are to be located within M107's high bay space and will require a top enclosure as described in Other/Special Requirements below. They will be required to be built to the same standard of security as the secure classrooms for future flexibility of the renovated facility.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'-0" above raised floor level

Acoustics:
Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From main corridors and corridors in newly renovated areas of the building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	Existing slabs
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) over metal studs to underside of floor/roof deck or top enclosure.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with transparent finish, along with hollow metal steel frame, factory primed, and field painted.
C1020	Interior Door Hardware			Provide classroom function lock. Provide sound seals and door bottom and threshold for a minimum of STC 45 rating.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of room. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 6'-8" AFF.
C1030	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

Unsecure Classroom

Space Characteristics

Function/Adjacencies: These new unsecure classrooms will provide a secure area for the teaching or presentation of sensitive information for the Camp Johnson Marines and Staff. Most of these classrooms are to be located within M107's high bay space and will require a top enclosure as described in Other/Special Requirements below. They will be required to be built to the same standard of security as the secure classrooms for future flexibility of the renovated facility.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'-0" above raised floor level

Acoustics:
Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From main corridors and corridors in newly renovated areas of the building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Projection Screen	1	AR	Ceiling recessed, manual, pull-down projection screen, as required for viewing distances within the area. Mounting location must be coordinated with wall-mounted flat screen monitor.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Carpeting	SF	24 x 24	Carpet for raised access flooring
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3020	Raised Access Flooring	AR	AR	Provide interchangeable 24"x24" square module panels capable of supporting design loads. Provide a minimum height access floor to enable data and power for computer tables. Provide ramps to allow floor accessibility without interfering with egress.
C3030	Acoustical Ceiling Tiles & Panels	AR	24 X 24	Acoustical ceiling tile below top enclosure
C3030	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system

Unsecure Classroom

Space Characteristics

Function/Adjacencies: These new unsecure classrooms will provide a secure area for the teaching or presentation of sensitive information for the Camp Johnson Marines and Staff. Most of these classrooms are to be located within M107's high bay space and will require a top enclosure as described in Other/Special Requirements below. They will be required to be built to the same standard of security as the secure classrooms for future flexibility of the renovated facility.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 9'-0" above raised floor level

Acoustics:
Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From main corridors and corridors in newly renovated areas of the building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D2010	Drinking Fountains with Bottle Filler			ABA Complaint electric water cooler with bottle filler located near toilet / restroom areas.
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide dedicated circuits for computer tables.
D5020	Lighting and Branch Wiring			Provide one quad receptacle per student and instructor workstation.
D5030	Telecommunications Systems			Provide one NMCI network drop per student and instructor workstation. Provide network connectivity for multifunction printer.
D503002	Public Address Systems			Provide audible paging system.

Unsecure Classroom

Space Characteristics

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Ideal Plan Dimensions:
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Refer to ESR C10, Interior Construction for STC Rating based on room type.

Access: From main corridors and corridors in newly renovated areas of the building.

Number of Occupants: Refer to Space Tabulation in Part 3, Chapter 4, Building Requirements. Student seats and instructor.

Other/Special Requirements:
In association with providing a GWB partition, provide a top enclosure of cold formed framing with two layers of 5/8" gypsum wallboard on the interior face (joints staggered) and a ¾" plywood on the top face to cap the room below the structural joist. Provide acoustical batt insulation same as partition. Seal all joints to ensure the STC for the top enclosure matches the wall STC.

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FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Space will accommodate, at a minimum, the following FF&E and A/V:

Uniformat Section	Description	Qty	Size	Specific Requirements
E1020	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and wall-mounted LCD monitor (Podium and Monitor to be funded separately in AV Package).

A10 FOUNDATIONS – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Changes to the existing building structure foundations are not anticipated. In the event that building additions, site structures or equipment foundations are required, follow the requirements in the following sections and provide foundation systems in accordance with UFC 3-301-01, *Structural Engineering*. Foundations must be designed to suit subsurface conditions and capable of transmitting all building or equipment loads to the ground.

See Section B10, *Superstructure*, for additional loading criteria.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information, including a geotechnical data report prepared specifically for this project and historical subsurface data from other projects in close proximity to the project site, are included in Part 6 – Attachments of this RFP.

The soils information provided in this RFP is for reference only and reflects the soil conditions encountered only at the locations indicated. The Government shall not be responsible for any interpretation or conclusion by the Contractor drawn from the soils information beyond the industry standard of care. Geotechnical engineering reports accompanying the subsurface information are provided only to better convey the encountered data and observed site conditions. Assumptions, analyses and recommendations included in any accompanying report may or may not be applicable to the Offeror's design concept. The Contractor must retain a Geotechnical Engineer to interpret the Government provided information as it relates to the Contractor's design concept prior to submission of the proposal and develop geotechnical requirements to support the design and construction of the project meeting the requirements of this RFP for bidding purposes.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

The Geotechnical Engineer must have a minimum of 5 years of recent relevant experience in the geographic region of the project and must be currently licensed as a professional engineer in the State of North Carolina. In accordance with FAR Subpart 9.5, Organizational and Consultant Conflicts of Interest, the Contractor is prohibited from hiring the Geotechnical Engineer who provided data, reports and any other services on behalf of the Government for this project.

After award, the Contractor's Geotechnical Engineer (Geotechnical Engineer of Record) must provide a site-specific geotechnical study to include in-situ testing, soil borings and supporting laboratory analysis of representative soil samples. The Geotechnical Engineer must prepare a Geotechnical Report providing recommendations for design and construction of foundations, earthwork and site development in accordance with UFC 1-200-01 *DoD Building Code (General Building Requirements)*, UFC 3-220-01 *Geotechnical Engineering*, and FC 1-300-09N *Navy and Marine Corps Design Procedures* and associated references. Calculations must be provided in the report to support all conclusions and recommendations.

SEISMIC DESIGN

Refer to ESR B10 for seismic design information.

A1010 STANDARD FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Standard Foundation to support the structure(s) associated with this project. "Standard Foundations" are shallow foundations or deep foundations as addressed in IBC Chapter 18. Do not use masonry unit footings, steel grillage footings, timber footings or wood foundations. Treated timber piles are permitted if deemed appropriate by the Designer of Record.

The structure(s) must be entirely supported by either a shallow foundation system or a deep foundation system as determined by the Designer of Record. Provide foundation materials that are compatible with the environmental exposure. When foundation elements are exposed to corrosive or otherwise aggressive soils, provide protection in accordance with ACI 318 requirements.

Calculate foundation ultimate resistance using multiple established methods. Determine allowable foundation capacity using the factors of safety provided in UFC 3-220-01 Tables 2-2 and 2-3. Develop geotechnical engineering design parameters using in-situ tests, laboratory tests and established empirical correlations. Evaluate upper and lower bound soil capacities based on variations in subsurface conditions at the site. Determine the minimum foundation bearing depth for frost protection in accordance with UFC 3-301-01. Provide minimum foundation widths to avoid failure and with consideration given to placement tolerances, ease of construction, etc.

Determine estimated foundation settlement based on comparison of predicted values from multiple established methods based on reaction loads provided by the Structural Designer of Record. Settlement calculations must include dead and live load components, live load reductions used in the analyses, actual or estimated foundation sizes, planned site grading changes, and expected fluctuations in groundwater levels. Estimated differential settlement must include upper and lower bound foundation settlements based on soil properties, different foundation loading, and variations in subsurface conditions across the building footprint.

The presence of weak and compressible soils may result in excessive settlement that could impact the performance of surface bearing structures and supporting facilities such as foundations, slabs, pavements, sidewalks, and utilities. The magnitude and duration of settlement depends on the composition, depth, and thickness of the weak/compressible soils as well as the Contractor’s selected design concept. The Contractor's Geotechnical Engineer is responsible for evaluating potential global settlement due to designed grade increases and final structural loads and must develop any settlement mitigation procedures (such as preloading, surcharging, fill monitoring programs, and ground improvement systems) needed to maintain global settlements within tolerable limits. Surcharge material, if required, must remain in place for 90 days minimum.

Design must incorporate measures that limit total and differential settlement to levels that prevent structural or aesthetic damage or impairment of the serviceability and function of the facility or structures, including drainage and utilities. The safety factor for liquefaction potential must meet or exceed Table 2-1 in UFC 3-220-01.

Use the following geotechnical tolerances to design shallow foundation systems:

- Limit slab-on-grade post construction total settlement due to permanent loads ½ inch maximum;

- Limit total settlement of column and wall footing foundations to one inch maximum; and

- Limit differential settlement of adjacent footings to ½ inch maximum and an angular distortion of 1/500 maximum. Angular distortion is defined as the difference in settlement between two points divided by the distance between the points.

Use the following tolerances for designing deep foundation systems:

- Limit total settlement of individual piles and pile caps ½ inch maximum under service load conditions as determined by static or dynamic pile load testing.

- Limit differential settlement of adjacent foundations to ½ inch maximum and to an angular distortion of 1/500 maximum. The angular distortion is defined as the difference in settlement between two points divided by the distance between the points.

- Limit lateral deflection of deep foundations to ½ inch, with an applied axial load equal to the expected dead load.

Ensure allowable pile stresses not to exceed limitations specified in IBC Section 1810, Deep Foundations. Evaluate and address time dependent pile capacity conditions (i.e. pile setup), group effects, negative skin friction, lateral squeeze, preboring/jetting, installation sequencing, refusal driving conditions, etc. as applicable. Include requirements for completing pre-construction condition surveys, ground vibration monitoring, structural instrumentation, etc. to mitigate risks of ground vibration damage to nearby structures as applicable for the specific project. The Structural Engineer of Record must design and detail the pile foundations in accordance with IBC Section 1810.3. Submit structural calculations and details for the piles to the Government for review and approval during project design development.

Conduct a test pile program overseen by the Geotechnical Engineer of Record and submit a final signed and stamped report to the Government for review and approval. Monitor and record driving during installation and subject to hammer restrikes in accordance with ASTM D4945, “Standard Test Method for High-Strain Dynamic Testing of Piles.” Evaluate the ultimate load capacity of selected test pile restrike(s) using CAPWAP analyses. Additional load test requirements are stated in Part 4 of this RFP. The Contractor is responsible for all foundation testing and monitoring costs.

A1020 SPECIAL FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Special Foundation system to support the structure(s) associated with this project. "Special Foundations" are any foundations that are not specifically "Standard Foundations", or which are a combination of Standard Foundations and a site improvement/ground modification system. Incorporate design of these systems in the project plans and specifications following FC 1-300-09N Chapters 7 and 8 and not as a construction submittal. Examples of site improvement/ground modification systems include surcharge preloading, prefabricated vertical drains, over-excavation and replacement, stone columns, rammed aggregate piers, rigid column inclusions, deep dynamic compaction, low and high mobility grouting, vibroflotation, etc. As most "Special Foundation" techniques or systems typically require the use of specialty contractors, a registered Professional Engineer must establish installation and acceptance criteria and supervise the installation. The Designer of Record must submit justification for use, including acceptable evidence of previous successful installation in similar conditions, methods and equipment used in their installation, proposed testing and inspection to be used, supporting test data,

calculations, and any other information related to the structural properties and load capacity of such system. The allowable stresses and testing requirements for pile-like elements used for ground improvement must comply with IBC Section 1810.

A1030 SLAB ON GRADE

Ground floors in the existing building comprise non-structural slabs-on-ground. As determined by the Designer of Record to be applicable, provide soil supported concrete slab(s) on ground. Provide a vapor retarder and porous fill layer beneath all slabs. Where slab on ground is below the existing adjacent exterior grade, provide waterproofing and a perimeter drainage system to remove ground water from the area immediately adjacent to the building. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

A1040 STRUCTURALLY SUPPORTED SLAB

As determined by the Designer of Record to be applicable, provide a structurally supported slab. Provide for structural support of all utilities that may be adversely affected by soil consolidation or expansive soils. Provide stainless steel hangers sized adequately to support the in-service utility. Provide a vapor retarder and porous fill layer beneath all slabs. Where the structurally supported slab is below the existing adjacent exterior grade, provide waterproofing and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

--End of Section--

A20 BASEMENT CONSTRUCTION – P1512F RENOVATE M107

SYSTEM DESCRIPTION

NOT USED

A2010 BASEMENT EXCAVATION

NOT USED

A2020 BASEMENT WALLS

NOT USED

--End of Section—

B10 SUPERSTRUCTURE – P1512F RENOVATE M107

SYSTEM DESCRIPTION

The existing superstructure consists of load bearing masonry walls supporting steel joists and joist girders.

This section includes requirements for new framing elements as well as for analyzing the existing superstructure of the building, including floor and rood framing, columns, interior load-bearing walls and the main lateral-force resisting system consisting of CMU shear walls. Exterior load bearing walls are addressed in Section B20.

Provide new framing systems as required in accordance with UFC 3-301-01, *Structural Engineering*.

All new steel deck used for roofs and structural wall panels must be 20 gauge minimum thickness.

A Special Inspector of Record (SIOR) is required for this project.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Risk Category: II

Design for Live Loads in accordance with IBC 2018 as modified by UFC 3-301-01.

Wind Load Parameters:

Wind speed	Comply with UFC 3-301-01
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Snow Load Parameters:

Ground snow load	Comply with UFC 3-301-01
Snow load importance factor	1.00
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Seismic Load Parameters:

A site-specific seismic ground motion study is not required. Use Risk Category II and soil classification D. Determine seismic loading adjusted for site class effects using the ground motion parameters specified by UFC 3-301-01, *Structural Engineering*. Seismic Design Category (SDC) is B.

B1010 FLOOR CONSTRUCTION

Provide framing to support a tiered fixed-seat auditorium at the center high bay space located at the north part of the existing structure (between the north building entrances). Provide a concrete slab on metal decking system supported by either structural steel framing, concrete walls, or CMU walls bearing on the existing concrete floor slab. Wood and light gage steel framing is prohibited.

In the event that new framed floors are required, provide elevated floors and mezzanines consisting of any of the following construction types.

- Non-composite concrete slabs on form deck on steel joists.
- Non-composite or composite concrete slabs on metal decking on steel beams.
- Cast-in-place concrete slabs on removable forms.
- Precast concrete planks or shallow double-tee beams.

Support elevated floors on cast-in place concrete walls, plant or site pre-cast concrete walls including tilt-up walls, reinforced concrete masonry walls/pilasters, structural steel columns and steel beams or joists. Do not support elevated floors on light gage stud wall construction. Wood framed systems are prohibited.

Provide access platforms constructed of steel grating and supported by structural steel framing.

B1020 ROOF CONSTRUCTION

The existing roof construction consists of metal decking supporting modified bitumen insulated roofing. The roof leaks at many locations and must be fully replaced down to the metal decking. Based on visual observations, the metal roof decking is in adequate condition and does not require replacement unless warranted by numerical analysis of the diaphragm system.

As part of the work, numerically analyze the roof deck diaphragm and connections to structural framing based on wind load criteria and UFC documents indicated herein. If numerical analysis indicates that demand loads exceed capacity, either strengthen the decking or replace it to meet the loading demands.

--End of Section--

B20 EXTERIOR ENCLOSURE – P1512F RENOVATE M107

SYSTEM DESCRIPTION

This system consists of the exterior shell of the facility, which includes all vertical and horizontal exterior closure such as exterior walls, exterior windows, and exterior doors. This system excludes roofing (See Section B30, Roofing). Load bearing exterior walls are included here, and not in Section B10, Superstructure. Structural frame elements at the exterior enclosure such as columns, beams, and spandrels are included in Section B10 Superstructure, with all exterior wall elements supported by columns, beams, and spandrels included in this section. Finishes to the inside face of walls which are not an integral part of the wall construction will be included in Section C30, Interior finishes.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

It is anticipated that there will be no new load bearing walls required. Exterior wall work includes infill of existing roll-up door openings as required per new program requirements with systems as indicated in B201001 and B201002.

Provide galvanized steel lintel beams comprised of wide flange, channel, or angle shapes at new openings in existing masonry walls as required to accommodate new openings.

The primary exterior materials of the building shall be brick masonry for new wall infill and wall repair and prefinished metal panels to replace existing metal panel system.

Brick masonry details shall be consistent with the existing brick of the building.

New window and/or storefront systems are added to the building in wings with few windows.

B201001 EXTERIOR CLOSURE

Provide brick veneer exterior wall closure for wall infill areas at overhead doors.

Provide prefabricated metal panel exterior wall closure in the location of the existing metal panels. The metal panel system must have concealed fasteners. The metal panel system can be an insulated metal panel system (with integral insulation laminate between metal sheets) or be non-insulated metal panel system with insulation behind the face panels to provide code prescribed energy efficiency upgrades (refer to B201003).

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

Provide Exterior Wall Construction System back-up systems for wall veneer of reinforced concrete masonry unit at infill walls where exterior roll up doors are removed.

Patch and repair existing exterior wall backup systems where infrastructure and openings are removed.

B201003 INSULATION and AIR BARRIERS

The building envelope shall include all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, and compartmentalized unconditioned portions of the facility such as garages, and negatively pressurized spaces.

Provide additional insulation at the interior face of existing CMU exterior walls, and at the exterior metal panel wall area as a part of an integrated system approach for providing UFC 1-200-02 renovated building energy efficiency requirements defined in Section 2-3.1.3 – Option 3-

Reduce modeled energy use (from all sources including renewable energy) by 20% compared to the ASHRAE 90.1 baseline building design.

In addition to providing thermal upgrades, it must be explored if added insulation on the interior of the exterior wall can also be used to upgrade/create an air barrier at the existing wall.

Any alteration to the exterior wall insulation must include a dew point analysis to ensure moisture is not an issue in the renovated wall assembly.

The existing building does not have what is considered an air barrier per current standards, but it does have a dampproofing/waterproofing layer at the existing CMU back up wall. Permanently seal and repair penetrations and openings left in the wall by abandoned penetrations through existing wall systems and through water/dampproofing and insulation layers of the existing wall.

At all new infill walls provide a continuous air barrier to control air leakage into, or out of, conditioned spaces and tie the air barrier into adjacent existing CMU wall surfaces to ensure the seal of the joint between the two systems. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

Ensure compatibility between new air barrier systems and existing exterior wall systems.

Provide thermal envelope performance testing through infrared thermography in accordance with RFP Part 4. Coordinate thermal imaging testing with air barrier testing construction schedule

B201004 PARAPETS

Alter parapets (by increasing height) as necessary to accommodate UFC prescribed and minimum industry standard roof flashing heights, and to accommodate upgraded insulation thickness and drainage patterns provided in the new low sloped roof system.

B201005 EXTERIOR LOUVERS & SCREENS

Provide exterior louvers and screens, where required, that match the finish of the existing windows and detailed to integrate with the architecture of the building, as appropriate to the design of the building. Provide insect screens at all louvers.

B201006 BALCONY WALLS & HANDRAILS

NOT USED

B201007 EXTERIOR SOFFITS

Provide exterior soffit system metal or painted exterior grade gypsum board. Metal soffits systems and eave trim must be provided with a slope roof installation. Existing exterior grade gypsum board soffits systems must be replaced with new soffit systems.

B201009 EXTERIOR PAINTING AND COATINGS

Provide a field applied exterior coating on all items that are not prefinished, and to prefinished items when required to provide a color other than a standard prefinished color.

B201010 EXTERIOR JOINT SEALANTS

All exterior sealant joints in the existing exterior brick masonry wall must be replaced. Sealant color must blend with adjacent material and be the same or slightly darker than adjacent material.

Provide exterior application of joint sealants to seal joints and prepare for finish material installation.

B201011 SUN CONTROL DEVICES (EXTERIOR)

NOT USED

B201012 SCREEN WALL

Provide screen walls where required (on site around building) to screen mechanical units (chillers), electrical substations, loading docks, and trash receptacles. Screen walls shall be compatible with the building architecture.

B2020 EXTERIOR WINDOWS

As noted in Part 3, Chapter 2, Building Design, provide new windows in areas of the building that are regularly occupied, to enhance the working environment, without compromising visual acuity and comfort. Natural daylighting is preferred. Exterior windows shall be prefinished aluminum. Windows shall meet Antiterrorism requirements.

Provide a sample window installation in a complete exterior wall, as determined by the DOR and approved by the Contracting Officer. If approved, this sample window installation will become a permanent part of the building.

B202001 WINDOWS

Windows must be pre-finished aluminum and fixed.

Provide a mockup of one combination window unit for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B.

At all new interior window sills provide a ½” thick solid surface window sill trim to cap the wall at the base of windows. At existing windows provide the solid surface sill in association with adding new furred partitions over existing CMU walls.

B202002 STOREFRONTS

Provide Storefronts in lieu of windows as required per the design in adding openings to regularly occupied areas.

Storefronts must be pre-finished aluminum.

Provide a mockup of one designated storefront system unit for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B.

If applicable when providing storefront that does not extend to the floor and has a wall area at the base/sill of the storefront refer to window sill requirement in B202001 Windows above.

B202003 CURTAIN WALLS

Curtain wall remains an option for fenestration if found necessary to meet applicable codes and UFC requirements. Curtain wall, if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

The curtain wall system must be a standard architectural type Stick or Unit and Mullion system, with mullions, horizontal rails, and/or non-integral spandrel panels. Fully coordinate curtain wall system components/accessories that are directly incorporated and adjacent to contiguous related work (i.e. wall systems). Ensure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances in the design of the curtain wall system and in coordination of the curtain wall design with adjacent exterior enclosure systems.

The system must incorporate a pressure equalized method to control air and water infiltration. Face sealed systems and water managed systems are not allowed.

System must be a combination of glazed panels and opaque panels as required by the design.

Provide a mockup of one designated Curtain Wall System unit for the project to be used for a field test of compliance with AAMA 503 Method A and Method B.

B202004 EXTERIOR GLAZING

Glazing color and reflectance must be provided and approved by Camp Lejeune's Architectural Review Board.

Glazing must be a heat absorbing insulated laminated glazing unit with the inner most pane being laminated glazing to meet the prescriptive AT/FP requirements of UFC 4-010-01 and building code/UFC prescribed wind load requirements for all new fenestrated openings.

B202090 OTHER EXTERIOR WINDOWS

NOT USED

B2030 EXTERIOR DOORS

All exterior doors must be weather protected and provided with weatherstripping/sealant and thresholds that stop water penetration and that comply with ABA. Provide heavy duty overhead closers at all exterior doors.

B203001 SOLID DOORS

Provide insulated solid steel door assemblies at existing openings with steel door assemblies or at new door openings that are not required to be glazed doors.

Doors must be Extra Heavy Duty Doors -– ANSI /SDI A250.8, Level 3, physical performance Level A, Model 1.

Provide steel doors fabricated from hot dipped galvanized steel and provide a rust inhibitive factory finished primer coating. Finish coats are to be field painted.

B203002 GLAZED DOORS

If required, provide exterior prefinished aluminum framed glazed doors and entrances systems.

Doors must be factory-finished aluminum framed door assemblies with heat absorbing insulated laminated glazing, frames, and hardware.

Glazing must match the storefront/curtain wall system glazing.

Glazing in any hollow metal or glazed exterior door is required to meet the same prescriptive requirement for glazing as required for windows and other fenestration systems.

B203004 OVERHEAD AND ROLL-UP DOORS

Design doors and opening for a loading entrance. Provide lockable doors with automatic operation with protected pushbuttons electric controls.

Provide insulated overhead roll-up doors. Provide powder coat painted finish with custom colors for the door and accessories to match facility color scheme. Design the galvanized steel overhead roll-up slats and door width to withstanding the design wind loading of ASCE 7 and operate normally.

Accomplish door operation by UL Listed electric motor operation with electric controller and an auxiliary hand chain operation. Provide slat profile. Also provide counterbalance, heavy duty springs, wear strips, full perimeter weather-stripping, continuous button pressure safety operation, electric or infrared safety edge, galvanized hardware, and manufactured trims and closures pieces. Protect the wall door jamb opening with guards designed to resist abuse from the type of material and vehicles that are transported through the opening.

For overhead doors that open into inhabited spaces, provide the doors with a tether system or intercepted walls to reduce the likelihood of the overhead doors from translating into the inhabited areas.

B203006 BLAST RESISTANT DOORS

NOT USED

B203008 EXTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule. Verify all door hardware requirements with the User.

Provide a programmable Common Access Card (CAC) enabled electronic locking system at one exterior entrance door to be used as the only entrance door to the facility at the north side of the building, and at one set of auditorium doors. The other three exterior glazed doors in the main corridors are to be modified to be egress only and will not be utilized as entrance doors. The electronic locking system must be capable to lock the entry door via a “kill switch” (tied to a central monitoring location) and have a manual key override.

Door hardware finish must be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

B203090 OTHER EXTERIOR SPECIALTY DOORS

NOT USED

--End of Section—

B30 ROOFING – P1512F RENOVATE M107

B30 GENERAL SYSTEMS DESCRIPTION

Roof systems shall be watertight and compatible with facility function, construction, and service conditions. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation.

Submittal Requirements: Components of a minimum roof submittal shall include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Provide a Pre-Design Roofing Conference (if required in RFP Part 4) and Pre-Construction Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

Built-in gutter systems where drainage passes through an interior space or is concealed in the exterior cavity wall shall be prohibited.

Refer to UFC 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02 *High Performance Sustainable Buildings* for additional roofing requirements such as Energy Star qualified products.

The project is a renovation of the existing building. A new roofing system is required conforming to the requirements specified herein.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

CLIN OPTION for Roofing – Provide a SSMR (standing seam metal roof system). The slope and configuration of the roofing is indicated in the Base Exterior Architectural Plan (BEAP), 2010, Section 4.13, Camp Johnson. Refer to Part 3, Chapter 2 for prescribed roof slope. The roof slope is to be lowered to a 2:12 slope if the 4:12 slope roof areas of Building M107 cause a roof cavity of over 12 feet.

The roof system shall be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance shall be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or ASTM uplift resistance test procedures. The roof material must be 3004 aluminum, ASTM B209M ASTM B209.

Organic Coatings for the metal roofing must be A PVDF coating as specified in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing. All other material and construction for metal roofing are per Part 6 specification section.

The spacing of standing seams shall between 12 inches and 18 inches on center as prescribed in the BEAP.

Sub-purlins for the Structural Metal Roof System shall be galvanized and shop painted.

SSSMRS Warranty Certificate – Provide warranty requirements as defined in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing.

Specular Gloss of Finished roof surfaces must have a specular gloss value of 10 or less at an angle of 85 degrees or 30 plus or minus the value specified in project program at 60 degrees when measured in accordance with ASTM D 523.

B301002 LOW SLOPE ROOFING SYSTEMS (BASE BID)

A three-ply modified bitumen system consisting of modified base sheet, modified bitumen interply sheet, and modified bitumen cap sheet is the system of choice for new low sloped roofing. Refer to specification section 07 52 00 Modified Bituminous Membrane in Part 5 of this RFP for this roof systems specification.

Use a ventilating base sheet over any materials which may contain moisture which may need to transpire out of the building.

Provide polyester reinforced cap sheet on Modified Bitumen roofs expected to experience high levels of traffic, on roofs with congested equipment, where equipment is expected to receive regular service or high maintenance, and where other service conditions warrant.

Cool Roof - Meet the ASHRAE 90.1 Chapter 5 values for cool roofing. If a cool roof is not selected in zones 1-3, meet one of the exception requirements listed in ASHRAE 90.1 Chapter 5 or provide thermal insulation above the deck with an R value of 33 or greater.

B301003 ROOF INSULATION AND FILL

Provide roof insulation values no less than in accordance with UFC 1-200-02 High Performance and Sustainable Buildings and UFC 3-110-03 Roofing.

Refer to specification section 07 52 00 Modified Bituminous Membrane in Part 5 of this RFP for roof insulation requirements.

B301004 FLASHINGS AND TRIM

Flashing and sheet metal work shall include scuppers, splash pans, and sheet metal roofing. Flashings shall be Stainless Steel - ASTM A 167, Type 302 or 304, Pre-Finished Aluminum. Finish shall be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.

B301005 GUTTERS AND DOWNSPOUTS

For metal standing seam roof option, provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited.

For the modified bitumen roofing option, existing downspouts are to be removed and replaced with rainleaders that are routed to below grade drainage systems at the exterior of the building. At canopy roof areas where connections of downspouts back to main roof drains are inaccessible, remove existing metal roofing to allow the removal of downspouts.

B301006 ROOF OPENINGS AND SUPPORTS

Roof openings are not allowed.

B301090 OTHER ROOFING

Provide lightning protection without penetrating the roof membrane, copings, or flashing components.

Provide new roof drains and accessories for the modified bitumen roofing option.

--End of Section--

C10 INTERIOR CONSTRUCTION – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Interior construction includes interior partitions, interior doors, and fittings.

Provide durable construction appropriate for the building function. Acoustic properties of materials, as well as durability, shall be considered during material selection.

Provide an acoustical engineer to participate in the design and provide design quality reviews throughout the design. The acoustical engineer must be an active participant in the design of the classrooms, classroom/labs, and training spaces and any other space or portion of the design with special acoustical requirements. The engineer must evaluate and give input on, but not limited to, acoustical partitions carrying STC ratings, applied acoustical treatments, integration of audio-video components, and door and frame performance, The acoustical engineer must carry a bachelor's degree in Engineering, Physics, Architecture, or a related field, hold a PE or membership in a recognized acoustical professional organization, and demonstrate a minimum of 7 years of acoustical design/engineering consulting on similar projects.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Areas of the Project subject to abuse require that "Impact Resistant" systems be provided. See "Room Requirements" for specific requirements on "Partitions", "Interior Doors", and "Fittings".

C1010 PARTITIONS

All new interior partitions must be metal studs with gypsum wall board on each side or a furred partition with gypsum wall board over metal stud or hat channel on one side. All existing CMU walls in the building that remain must be furred with gypsum wall board partitions to allow fully recessed electrical outlets and related devices.

Gypsum board for partitions in moist and humid areas, and areas with consistent water use on floors, include but are not limited to toilets, locker rooms and mechanical rooms, must be 5/8” moisture and mold resistant gypsum board panels. ASTM C1396, ASTM D3272 - Rating of 8 to 10, ASTM C473, Water Absorption <5%. Provide impact-resistant versions of this gypsum board for abuse-prone areas.

C101001 FIXED PARTITIONS

Provide fixed interior partitions, except where retractable partitions are specifically required by the "Room Requirements."

UFC defined acoustic requirements in UFC 3-101-01, Section 4.8 and Figure 4-1 is not applicable to this project. Partitions requirements are defined using STC ratings in this RFP.

Sound-rated partition assemblies must meet the interior acoustic requirements for typical spaces as follows or as indicated in Chapter 3, Part 5, Additional Room Requirements:

- Classrooms STC 45

- Conference Rooms STC 45
- Private Offices STC 45**

  ** Private office STC may be reduced to a lower STC in association with a high CAC acoustical ceiling or increased to STC 50 based on the requirements of the individual user. The requirements for each individual user must be verified during the design process.
- Heads STC 45
- Break Rooms STC 45
- Mother's Room STC 45
- Mechanical Rooms (when wall is adjacent to occupied space) STC 50

C101002 DEMOUNTABLE PARTITIONS

NOT USED

C101003 RETRACTABLE PARTITIONS

If required, provide retractable partitions to include operable panel partitions. Sound-rated partition assemblies shall have a minimum Sound Transmission Coefficient (STC) as indicated in Part 3, Chapter 5, Additional Room requirements in accordance with ASTM E 90 or ASTM E 413 for frequency data. Coordinate finishes with Section C30 Interior Finishes.

In the pocketed stored position provide for a partitioned pocket area so the system panels when folded are not exposed in the room.

C101004 INTERIOR GUARDRAILS AND SCREENS

Provide balustrades where required by code. Provide screens where required to prohibit view of a particular area.

C101005 INTERIOR WINDOWS

Provide interior window system of aluminum if required by the design in rooms to provide borrowed light to occupied rooms .

If interior windows are provided, provide acoustically rated glazed systems to match the acoustical rating of the adjacent partition.

All interior window systems must have a be pre-finished coating finish or anodized finish.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide aluminum framed glazed storefront system in rooms as required by the design in new rooms of renovated space.

If interior glazed storefront is provided, provide acoustically rated glazed systems to match the acoustical rating of the adjacent partition.

All interior storefront systems must be pre-finished coating finish or anodized finish.

C101007 INTERIOR GLAZING

Interior glazing must be clear or patterned glass that is annealed / tempered based on code requirements. If necessary, provide laminated glazing to obtain STC requirements.

Interior glazing when provided in fire rated doors and glazed partitions must utilize fire rated glazing to meet code requirements. Wire glass must not be used in fire rated doors or partitions.

C1020 INTERIOR DOORS

C102001 STANDARD INTERIOR DOORS

Provide flush interior doors

Provide wood or hollow metal interior doors in hollow metal frames at all new or existing openings to be retained in the building.

Provide wood doors at all administrative office area rooms, classrooms, heads, lounges/break rooms, storage rooms and any other room outside of the list of rooms to provide hollow metal doors in this section.

Provide hollow metal doors at all mechanical rooms, electrical rooms, and telecom rooms.

Hollow metal doors must be Level 4 with physical performance level A throughout the facility

Flush wood doors must be WDMA I.S.1A-04, premium grade, extra heavy duty for classrooms, heads, lounges/breakrooms and conference rooms and heavy duty for all other spaces. Flush wood doors shall be SCLC-5 5-ply structural composite lumber core or FD core, as required by code.

Doors shall must Factory Finish of AWI Quality Standards Section 1500, specification for Conversion varnish alkyd urea or catalyzed polyurethane.

Provide vision glazing within doors if it is deemed advantageous to be able to see through the door, either for safety of pedestrian traffic, or other functional reasons. If vision glazing within doors is provided, it must have the provision to be blanked off during an active shooter event. This would require an easily activated shade, flap, or other device that would obscure vision through the door light.

Provide sound rated door assemblies for doors leading into Room(s) as indicated in Part 3, Chapter 5 – Additional Room Requirements.

Provide acoustic seals and gasketing to match acoustical rating of the surrounding partition. After installation, test the doors with a flashlight to determine if any gaps in the sound seals allow light to be viewed on the opposite side of the door.

C102002 GLAZED INTERIOR DOORS

Provide Aluminum/Glass glazed interior door as a part of an interior glazed partition as indicated in C101006 for spaces that do not require acoustical control.

C102003 FIRE DOORS

Provide interior fire doors, in fire rated partitions as required by Code.

C102004 SLIDING AND FOLDING DOORS

NOT USED

C102005 INTERIOR OVERHEAD DOORS

Provide an interior overhead door as defined in Part 3, Chapter 5, Additional Room Requirements of this DB RFP.

C102006 INTERIOR GATES

NOT USED

C102007 INTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule in conjunction with the approval of the client and to meet specific requirements outlined in this section or other referenced documents. Verify all door hardware requirements with the User.

Provide lock and latch hardware with levers as follows:

- Use Series 1000, Operational Grade 1, Security Grade 2 for corridors, classrooms and labs, suite entrances, toilets, and other high use interior doors. Use Series 4000, Grade 1 for locations not using Series 1000 hardware.
- Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2.
- Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1, or Grade 2.

Provide cylinders/cores and keying system as indicated in Part 4, C102007 specifications. Other related door hardware requirements for hardware beyond locking devices is as indicated in Part 4, C102007 specifications. Lock cores shall match the BEST system.

Door hardware finish shall be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

C102090 OTHER INTERIOR SPECIALTY DOORS

NOT USED

C102091 OTHER INTERIOR PERSONNEL DOORS

NOT USED

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Provide solid plastic (HDPE) toilet partitions in all toilet rooms (Heads) with more than one water closet or urinal.

Provide floor mounted overhead braced toilet partitions.

C103002 TOILET AND BATH ACCESSORIES

Provide toilet and bath accessories per the following:

Double toilet tissue dispensers – standard roll size, motion sensing paper towel dispenser, wall-mounted trash disposal, manual soap dispensers at each sink, minimum of two coat/towel

hooks, grab bars, convenience shelf/purse ledge. For toilets that have lockers/showers provide high efficiency electric hand dryer, shower rod and shower bench.

At janitor's closets provide wall-mounted mop rack with overhead shelf.

At toilets with counters with integral sinks, provide mirrors the full length of toilet lavatory counters in width and from backsplash to the light cove above in height.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker (dry erase) boards and tack boards as indicated in Chapter 5 "Room Requirements" portion of this RFP.

Marker boards and tack boards must be mounted with the lower edge at 42" above finished floor. Unless otherwise noted, boards must have anodized aluminum trim. Marker boards and tack boards must have tool trays and one set of tools provided for each room. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards and tack boards.

Glass marker boards must be frameless, opaque back-painted glass type and must attract standard magnets (rare-earth magnets not required) and be constructed of 1/4-inch-thick, shatter resistant, tempered glass, solid in color with non-staining finish, polished edges and eased corners and mounted with stainless steel standoffs. Provide magnetic accessory trays for glass markerboards.

Enclosed tack boards must be heavy gauge aluminum, with tackable interior surface, tempered glass sliding doors and lock. Provide selection from full range of manufacturer's finishes. Provide tack board dimensions as follows: Size: 3'-0" H by 4'-0" L.

Marker boards and tack boards are funded as part of the construction contract.

C103004 IDENTIFYING DEVICES

All necessary interior signage must be incorporated as part of the architectural drawings. Interior signage is not collateral equipment. Interior signage must demonstrate complete coordination with the facility design, SID and FF&E submittals. Provide interior directional signage for facility wayfinding. Provide an identifying device at each interior door. Signs must meet ABA requirements. Refer to UFC 3-120-01, Design: Sign Standards, for more information.

Provide a 36" x 48" Command Photo Board just inside the designated new main entrance to Building M107 to accommodate a minimum of (7) 8" x 10" Chain of Command photos. Command Photo Board should be durable and support easy photo changing.

Exterior building signage is also required and must be provided. This includes exterior door signs on any mechanical, electrical, and telecommunications room with exterior doors. All exterior signage and their components must be resistant to ultraviolet light and must withstand a marine corrosive environment. This includes any other building signage attached to the building envelope, such as building name or number.

Specific exterior signage requirements are as follow:

- Provide exterior signs at all building primary and secondary entrances stating, "ELECTRONIC DEVICES INCLUDING CELLULAR PHONES PROHIBITED." Applicability must be verified by AE2 with MCB Camp Lejeune.

- Provide exterior signs at all building primary and secondary entrances stating, “DO NOT ENTER IF IDS INDICATOR LIGHT IS ON. ALARM WILL SOUND.” Applicability must be verified by AE2 with MCB Camp Lejeune.

C103005 LOCKERS

Provide 18” wide x 18” deep x 72” high single-tier high density polyethylene (HPDE) personnel lockers. Provide perforated top and doors for better air flow. Each door must be engraved with a minimum 5/8” tall number in sequential order starting with “101”. Provide 6” height continuous HDPD base, sloped tops, metal garment bars, metal double hook, and latching hardware to accommodate pad locks.

Lockers are funded as part of the construction contract.

All enclosed lockers must be fitted with hardware and devices that reduce noise when operating locker doors.

Provide 150 - 8” deep cell phone lockers and 60 laptop lockers, and locate at entry area of secure area as reviewed with building user.

C103006 SHELVING

NOT USED

C103007 FIRE EXTINGUISHER CABINETS

Provide semi-recessed fire extinguisher cabinets for fire extinguishers in all occupied spaces, including corridors and lobbies, as required by the RFP. Cabinets shall be coordinated with interior finishes. Where cabinets are installed in fire rated partitions, cabinets must be tested and listed in accordance with ANSI/UL-1479 for membrane and penetration firestops. Fire extinguishers required in spaces not typically occupied, such as mechanical, electrical, and telecommunication rooms, may be surface-mounted with a bracket listed for the size and weight of the required fire extinguisher. Installation of all fire extinguisher cabinets and mounting brackets must be in strict compliance with NFPA 1, NFPA 10, and the manufacturer's installation instructions Refer to ESR Section D40.

C103008 COUNTERS

Provide solid surfacing material containing recycled content for countertops and back splashes in Heads, Break Rooms, Mother’s Rooms, and any other room specified with cabinets and a countertop.

Backsplash height must be a minimum of 4 inches.

C103009 CABINETS

Provide cabinetry and millwork items with associated accessories as indicated in RFP Part 6 drawings and RFP Part 3, Chapter 5 Room Finish and FF&E Requirements. Cabinetry must be Architectural Woodwork Institute (AWI) premium grade with hardwood plywood construction. Cabinets must have concealed hinges with adjustable recessed standards for shelves. Exposed surfaces must be covered with high pressure plastic laminate, and interior surfaces must be melamine. All cabinets must have base/toe kicks that match the height of the wall base. Provide ABA compliant doors at casework as required throughout the facility. Provide filler panels as required where cabinets abut wall.

Design and provide cabinets to accommodate equipment such as refrigerator, sink, microwave, commercial coffee pot, and ice maker.

Provide finish choices for built-in cabinetry to include the manufacturer's standard complete color line for all materials.

All cabinets to have solid surface counters with eased leading edge, unless noted otherwise in RFP.

Provide base and/or wall cabinets in administrative break rooms and other rooms as indicated in Part 3, Chapter 5, Room Requirements section of this DB RFP.

C103010 CASEWORK

NOT USED

C103011 CLOSETS

NOT USED

C103012 FIRESTOPPING SYSTEMS

All firestopping systems shall be performed by one experienced firestop contractor. Experienced firestop contractor is defined as following:

1. FM Research approved in accordance with FM 4991, or
2. Operating as a UL Certified Firestop Contractor, or
3. A contractor completed the manufacturer accredited firestop specialty contractor program. Certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years of experience in the installation of manufacturer’s products in accordance with specified requirements. Submit documentation of this experience. A manufacturer’s willingness to sell its firestopping products to the contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer. Individual building system subcontractor, such as Mechanical, Electrical, Plumbing, Gypsum wall, etc., is not permitted to install firestopping systems.

A single complete submittal including Shop Drawings, Product Data, UL details must be provided for all firestopping systems throughout entire project.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

The requirement for sprayed fire-resistive materials is determined by the building code analysis prepared by the design/build contractor's Qualified Fire Protection Engineer (QFPE). If required, provide sprayed fire-resistive materials to the building’s framework.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide recessed walk-off floor mats or surface mounted/loose lay floor mats at building entrances in sizes as indicated in RFP Part 3, Chapter 5 Room Requirements and RFP Part 6 drawings. Recessed walk-off floor mats are part of the construction contract. Surface mounted or loose lay floor mats are part of the FF&E package. Provide sealed concrete underneath recessed walk-off floor mats.

Provide recessed walk-off floor mats with a carpet insert (100% solution dyed) designed for high traffic areas. Recessed walk-off floor mats must have T5 aluminum alloy frame with anodized finish. Provide architectural surface pattern with combination of inserts, finish colors, aluminum slots, and aluminum framework. Inserts must include monofilament abrasive fibers and finish colors must be offered in a broad range of standard neutral and bright colors. Floor mat surfaces must comply with ASHRAE 90.1 and ASHRAE 189.1 requirements.

C103015 ORNAMENTAL METAL WORK

NOT USED

C103090 OTHER INTERIOR SPECIALTIES

NOT USED

--End of Section--

C20 STAIRS AND LADDERS – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Provide stairs and ladders as required by the building code for access to platforms and mezzanines, and for building egress.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Provide stairs and ladders conforming to UFC 1-200-01, *General Building Requirements*.

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

Provide interior stairs constructed of steel or steel with concrete filled pans. Interior steel stairs must be primed and painted.

Provide exterior stairs constructed of galvanized steel or cast-in-place reinforced concrete. Concrete is an acceptable finish for exterior stairs. Exterior concrete stairs must have cast aluminum non-slip tread nosings with abrasive surface.

C201002 FIRE ESCAPE STAIRS

Provide fire escapes of the type and arrangement conforming to Fire Escape Stairs, of NFPA 101, *Life Safety Code*.

C201090 HANDRAILS, GUARDRAILS, AND ACCESSORIES

Provide painted or galvanized steel handrails, guardrails and ladders, as required by code. Exterior systems must be coated or galvanized to withstand extreme wear and weathering conditions. Provide handrails, guardrails and ladders with smooth, unbroken surfaces throughout the length of the stair or ladder, as required by code.

Provide metal ladders and railings complying with OSHA requirements for access and protection to all mechanical mezzanines, lofts and similar spaces.

--End of Section--

C30 INTERIOR FINISHES – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Interior finishes include wall finishes, floor finishes, wall base finishes, and ceiling finishes.

Provide aesthetically pleasing, functional, durable finishes appropriate to the building function. Acoustic properties of materials, as well as durability and ease of maintenance, must be considered during material selection. Maximize the use of sustainable materials.

All interior finish products must be from manufacturer's standard running line offerings. Manufacturer's submitted materials must be made available for purchase at NO MINIMUMS for not less than 7 years from the date of the original product order. Custom fabrications must not be allowed unless otherwise noted.

Finish selections for this project will require the use of wall, floor, and ceiling material accents to enhance the interior design and architecture of the building. Provide an interior finish design scheme that includes a minimum of two different accent colors, to be used throughout the facility. Refer to Part 3, Chapter 6, ESR E20 for Structural Interior Design (SID) requirements and Part 3, Chapter 5, Room Requirements for required locations. Submit floor pattern and accent wall location drawings, indicating proposed interior finish locations with the Structural Interior Design submittal.

GENERAL SYSTEMS REQUIREMENTS

See Part 3 Chapter 5 Room Requirements for specific requirements on Interior Finishes."

C30 SSPC QP 1 CERTIFICATION

The Project requires industrial coatings on exposed steel surfaces. All contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council - SSPC) to the requirements of SSPC QP 91 prior to contract award and must remain certified while accomplishing any surface preparation or coating application.

C3010 WALL FINISHES

Provide architectural feature wall consisting of wood veneer panel and wood acoustical panel in key public locations to include Lobby and main entrance areas. Acoustical fabric wall panels must be used in the Conference rooms and Secure Classrooms.

C301001 CONCRETE MASONRY WALL FINISHES

Interior wall finish materials must be filled and polished ground face concrete masonry units.

C301002 PLASTER WALL FINISHES

NOT USED

C301003 GYPSUM WALLBOARD FINISHES

All interior wall finish materials must be finished and painted gypsum wall board, as indicated in the Part 3 Chapter 5 Room Requirements.

In all locations where concrete or concrete masonry walls exist in conjunction with GWB over metal stud construction within a space, all walls must be finished with GWB. Moisture-resistant gypsum wall board must be used in all wet or humid areas including, but not limited to vestibules, toilet rooms and locker room areas. Gypsum walls, fascia, and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See Part 4, PTS, C304001 GENERAL REQUIREMENTS for the MPI standards for more information.

Regular and moisture-resistant gypsum wall board must be used in spaces indicated in the Part 3 Chapter 5 Room Requirements.

C301004 CERAMIC AND PORCELAIN TILE WALL FINISHES

Porcelain Tile

Provide through-body color, rectified porcelain unglazed wall tile, minimum size of 12-inch x 12-inch with manufacturer recommended minimum width grout joints. Tile must be minimum Grade B, per ANSI 137.1 (1988), with a wide range of accent colors available. Provide coordinating designer decorative accent strips or coordinating accessory tile shapes, minimum Grade D, as an integral part of the wall tile system. Wall tile must be installed full-height on gypsum wall board substrates. Provide grouted-in edge stainless steel protection strips at all outside and inside corners, stainless steel transition strips where wall tile and floor tile meet, and transitions from tile to other wall finishes.

Backer Board: Cementitious, water-durable board surfaced with fiberglass reinforcing mesh on front and back, long edges wrapped, and complying with ANSI A118.9 and ASTM C 1325. Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

Aesthetic Classifications: Provide tile with an aesthetic classification of V2 Similarly colored with variations in texture and/or pattern.

Install tile to full height of the wall in a running bond pattern.

C301005 WALL COVERINGS

Corner Guards

Corner Guards must be outside corners in all high-traffic interior exposed corners in corridors, except on walls of CMU construction and must be 3-inch width. They must be surface-mounted in a through-color, recycled, extruded PETG finished aluminum material. Corner guards must extend from top of cove base and extend 8-feet high and be mechanically installed with a concealed continuous aluminum retainer. Double stick tape and adhesive mounted corner guard methods are not acceptable.

Wall Protection

Provide stainless-steel wall protectors at mop sinks in janitor rooms.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Provide sound absorbing acoustical fabric wrapped wall panels reinforced edges as identified in Part 3 Chapter 5 Room Requirements for conference rooms and secure classrooms. Wall panel system must have a field-replaceable fabric system.

Provide wood veneer acoustical wall panels that are factory-assembled, and factory finished. Panels must be perforated and backed with an acoustic textile product for optimum acoustical quality with limited textile visibility when installed. Veneer selection must be selected from an A

grade range of stain grade veneer with minimal graining. Species and finish must coordinate with other wood finishes on interior finish schedule. Include all required corner, transition and base components for a quality installation. Refer to Part 4 Section C103009 for veneer quality and graining of wood finish materials.

C301090 OTHER WALL FINISHES

Solid Surfacing Wall Finishes

Provide 100% Acrylic Polymer in a solid color or with small size particulate solid surface material for shower surround and window stools.

Exterior windows will receive a window stool.

100 percent acrylic solid surface at Break Rooms: 1/2-inch solid surface wall panel will extend width of sink to top cabinetry from backsplash to underside of wall cabinets.

100 percent acrylic solid surface at Showers: 1/2-inch solid surface wall panels will extend vertically from top of shower pan. Solid surface material will overlap top of shower pan with an air gap, as required by manufacturer installation instructions. Wall panels in shower areas will extend horizontally beyond the “wet area” to the exterior line of the shower receptor threshold. A solid surface transition will be required where solid surface meets wall tile. Locate wall panel seams at corners only. No material seams will be acceptable, except at corners. All shower seams at corners will be lap joints with solid surface corner trim from floor to ceiling. Chemically fuse seams. Include a matching corner shower shelf in each shower compartment. Full-height solid surface transitions will be provided at adjacent wall surfaces. Substrate behind solid surface shower walls will be equal to cementitious ceramic tile backer board. Solid surface shower receptors will be installed prior to wall system. Shower pan receptors will be a minimum thickness of 1/2-inch thick, with a 3/4-inch thick area at least 12 inches in diameter at the drain. Receptors will be one-piece, factory formed shower pans with integral thresholds. Thresholds will have structural supports every 4 inches on center.

Modular Architectural Panels / Decorative Paneling System

Provide modular architectural paneling wall system consisting of wood veneer acoustical panel in key public locations to include Lobby.

System must utilize ¾ inch thick panels in a rail and spline fastening system with 1/4-inch-wide or 1/2-inch-wide channel reveals, rails, splines and edge trim.

All exposed hardware must be black satin factory finished, anodized aluminum. Panel sizes must be a minimum of 4 x 8 feet.

Wood Trim

Paint grade hardwood trim to include crown molding, wainscot and chair rail. Veneer must be selected from A grade of paint grade veneer with minimal graining. Species and stain must coordinate with interior color scheme and interior wood doors. Refer to Part 4 Section C103009 for veneer quality and graining of wood finish materials.

Water-based Epoxy Wall Coating

Water-based epoxy wall coating must be used in the Janitor’s Closets as noted in Part 3 Chapter 5 Room Requirements. Wall coating system must be a 10 to 12 mil thick wall system over adequate wall patching compound/wall prep. Wall coating system must consist of one coat of resinous epoxy primer, a waterproofing membrane, two coats of resinous epoxy

body/bonding coat, and gloss finish/seal coat from a single wall coating system manufacturer for a uniform, monolithic, slightly textured wall surface with rounded 1-inch radius inside corners, wall-to-ceiling and floor-to-wall transitions. All plumbing, floor-to-ceiling and wall-to-floor transition details must be a recommended by wall and floor coating manufacturer.

Plywood

Telecomm closets must receive floor-to-ceiling, 3/4-inch plywood, Class A fire-rated, sanded, face-grade plywood on side and back walls.

C3020 FLOOR FINISHES

Provide floor finish materials to meet the following requirements.

C302001 TILE FLOOR FINISHES

Porcelain Tile Floor Finishes

Provide through-body, rectified porcelain tile in a minimum size of 12-inch x 12-inch with matching 6-inch-high cove tile base with flat top and bottom edge, or with stainless steel coved transition between floor and wall tile. The cove base must have a flat top/bottom edge. Grout joints in a maximum width of 3/16 inch must be provided. Tile must be non-slip, with a light texture. Texture of tile must be analyzed with regard to maintenance and selected based on a minimal maintenance program. Provide grouted-in stainless steel metal transition strips at expansion joints, corners (inside and outside), and transition between floor and wall tile.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

C302002 TERRAZZO FLOOR FINISHES – BID OPTION

Resinous (Epoxy) Flooring Requirements: Provide resinous (epoxy) flooring as identified in RFP Part 3, Chapter 5 Room Requirements, and as directed below. See Part 4 PTS for additional requirements.

Moisture Testing: Perform tests recommended by manufacturer and as follows:

a. Perform relative-humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
b. If the relative humidity exceeds 75 percent, then manufacturer approved primer moisture mitigation system must be installed prior to resinous flooring installation. Slab-on-grade substrates without a vapor barrier require a moisture mitigation system.
c. Poured-Epoxy Terrazzo Floor System – A 3/8-inch thick (minimum) epoxy terrazzo floor system in accordance with the “NTMA Epoxy Thin Set Terrazzo Specification” and manufacturer specifications, whichever is more stringent. Terrazzo floor system must include (but not be limited to) moisture vapor primer system, crack isolation membrane, zinc divider strips, aggregates, and epoxy terrazzo topping. Aggregate mixture to include marble and/or granite chips, 15 percent minimum colored glass chips and 20 percent minimum recycled mirror chips. Incorporate a base color, three accent colors, and divider strips in a pattern to create a design of interest. Provide an 800-grit level polished finish. Wall base must be separate, 6-inch-height, top set, precast epoxy terrazzo, flat tile base matching the floor field color. See Part 4, Section A103001 Standard Slab on Grade for additional requirements.

C302003 WOOD FLOORING

NOT USED

C302004 RESILIENT FLOOR FINISHES

Luxury Vinyl Tile Flooring: Provide resilient luxury vinyl tile, in lobby, corridors, break rooms, Mother's Room and other high traffic areas for floors with high durability, low maintenance, high slip-resistance requirements. Luxury vinyl tile will be planks or square tiles as indicated in Part 3 Chapter 5 Room Requirements. Luxury vinyl tile must fall under Product Classification Class III, Type B per ASTM F1700 and use Class III printed film that conforms to ASTM F1700. Luxury Vinyl Tile must not contain ortho-phthalates. Luxury Vinyl Tile must have a minimum Coefficient of Friction of >0.5. All products must be from manufacturer's standard running line offering. Custom products or products with a minimum order quantity are prohibited.

20 mil and 30 mil wear layer products will be accepted if they have the following characteristics: factory applied UV-cured polyurethane finish containing anti-scratch particles and anti-scuff qualities, a test result of B1 or B2 on the Martindale Procedure B Test - BS EN 16094:2012 Procedures B (which assesses the scratch performance of the topical factory applied finish treatment that enhances clean ability and durability), passes ASTM F970 for Static Loads resulting in Pounds per Square Inch (PSI) minimum of 1000 PSI (to avoid materials that have the potential to severely indent and/or break with heavy static loads), and must carry a 20 year manufacturer's written warranty.

40 mil wear layer product with a 20-year manufacturer's written warranty is required.

C302005 CARPETING

a. Carpet Requirements

CARPET CHARACTERISTIC	MINIMUM CARPET REQUIREMENTS
Surface Color	Multi-colored and Patterned with no less than three separate dark colored yarns in the weave, (not variation of color within the fiber) in addition to accent colors, to create a multi-hued background with excellent soil and stain masking properties.
	Heathered carpet is not allowed.
Surface Texture	Loop or Textured Loop
Modular	24’ x 24 or Plank (except on Raised Access Floor)
Yarn Weight	22 oz. minimum for Type 6 Nylon; 18 oz. minimum for Type 6.6 Nylon
Gauge	1/12-inch
Density	7000 oz./cubic yard minimum for Type 6 Nylon 6000 oz./cubic yard minimum for Type 6.6 Nylon
Dye Method	Minimum 100% Solution Dyed
Backing	Attached cushion
Fiber	Type 6.6 or Type 6 Commercially Branded nylon
Stain Resistance	Inherent or permanent stain resistance
Texture Appearance Retention Rating (TARR)	Severe > 3.5
Service Life Environmental	10 Year Warranty
	15% Post-Consumer Recycled Content
	NSF 140 Gold Label Service Life

C302006 MASONRY & STONE FLOORING

NOT USED

C302007 WALL BASE FINISHES

Resilient Wall Base

Provide rubber cove wall base, throughout areas with resilient flooring and straight rubber for carpeted areas.as indicated in Part 3 Chapter 5 Room Requirements.

Tile Base

In areas where wall tile is required, or otherwise specified, tiled floor must have matching 6-inch high cove base or stainless-steel cove transition strips between floor tile and wall tile. In areas where no wall tile is specified, tiled floor must have matching 6-inch high cove base. When tile cove base is used, base must have flat top and bottom edges to join evenly with adjacent tiles. Resilient base must be 120’ coils. Rounded edges are not allowed. Tile cove wall base units must be pre-formed; cut tiles are not allowed.

Provide coordinating epoxy grout for all tile finishes. Avoid light colored grout.

Terrazzo Floor Base

Terrazzo floor base must be 6-inch high, pre-cast with cove. Base must be finished with a smooth vertical surface and smooth top edge to match adjacent floor finish. Provide terrazzo floor base as bid option only.

C302008 STAIR FINISHES

NOT USED

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

NOT USED

C302010 HARDENERS AND SEALERS

Finish concrete surfaces smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Provide hardener in concrete mixture in accordance with the manufacture requirements. Exposed concrete floors that are not required to have an applied floor finish, must receive a minimum of three coats of the manufacturer's approved sealer.

Provide concrete flooring as identified in RFP Part 3, Chapter 5 Room Requirements, and as directed in the following.

Sealed Concrete: Finish concrete surface smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer’s smoothness requirements, whichever is the most restrictive. Apply both penetrating and topical sealers on exposed concrete floors that are not required to have an applied floor finish.

a. Water-based, clear, penetrating sealing compound blend of silane and siloxane for salt protection that penetrates into the pores of the concrete. Sealer must limit intrusion of moisture and chlorides into the concrete.
b. Water-based, topical, non-yellowing, clear, acrylic curing and sealing compound meeting the following requirements.
    I. ASTM C 309, Type 1, Class B
    II. ASSHTO M 148, Type 1, Class B
    III. ASTM C 1315, Class A, Section 6.4.1 – non-yellowing
    IV. ASTM C 1315, Section 6.6 – exceed 50 MPa (70 psi) adhesion.

All polished concrete floor surfaces must be moist-cured, integrally colored and polished to a low gloss level, as required in the Part 4 section of this RFP. A Dynamic Coefficient of Friction of 0.42 minimum must be achieved, tested and documented for all polished interior floor surfaces, as determined by ANSI A137.1-2012. An 8’ x 8’ mock-up of the polished concrete floor must be produced using the same process that will be used to produce the final polished concrete floor surfaces.

C302011 RAISED ACCESS FLOORING

Provide concrete filled steel panel raised access floor system (24-inch X 24-inch panels) with steel pedestals and bolted stringers as indicated in Part 3, Chapter 5 – Room Requirements, of this RFP. All panels must be able to be interchangeable in the system.

Raised access flooring locations and finish must be as indicated in Part 3 Chapter 5 Room Requirements. Raised flooring must accommodate data and electrical systems. Majority of Raised Flooring components must be available on GSA Schedule.

The total system height for new classroom space must be 4-inch. If RAF is added to existing classrooms it would match existing RAF height. Provide in a flat arrangement with all accessories to provide ramps and guardrails as necessary, and provide vertical closure panels at ends of exposed ramps.

Pedestals - Pedestals shall be capable of supporting a 5,000-pound axial load without permanent deformation. Bonding strength of pedestal adhesive - adhesive for anchoring pedestal bases - shall have a bonding strength capable of resisting an overturning moment of 1,000 lb/f-in when a force is applied to the top of the pedestal in any direction.

Bond strength of factory installed covering shall be sufficient to permit handling of

the panels by use of the panel lifting device, and to withstand moving caster loads up to 1,000 pounds, without separation of the covering from the panel.

The raised access flooring shall be tested in accordance with ASM – CISCA Standards and Procedure and meet the following load requirements:

- Concentrated load of 1,250 pounds in classrooms and classroom/labs. Calculate concentrated load as load on one square inch, at any point on panel, without deflecting more than 0.08 inch, with a safety factor of 2 based on static design load, without permanent deformation in excess of 0.01 inch in any of the specified tests.
- Uniform live load of 400 psf for classrooms and classroom/labs without deflecting more than 0.04 inch.
- A rolling load of 800 pounds for classrooms and classroom/labs applied through hard rubber surfaced wheel 6 inches in diameter by 1 1/2-inch-wide for 10,000 cycles over the same path. Permanent set at conclusion of test shall not exceed 0.010 inch.
- A rolling load of 1,000 pounds for classrooms and classroom/labs applied through a 3 inch diameter by 1-13/16 inch wide caster for 10 cycles over the same path, without deflecting more than 0.04 inch and without permanent deformation in excess of 0.02 inch. In accordance with CISCA Access Floors, the permanent deformation limit under rolling load shall be satisfied in all of the specified tests. In the specified tests, the permanent deformation shall be measured after 10 passes with Wheel 1 and after 10,000 passes with Wheel 2.
- An impact load of 150 pounds on one square inch from a height of 36 inches with permanent set not to exceed 0.060 inch.

C302090 OTHER FLOORING & FLOOR FINISHES

NOT USED

C3030 CEILING FINISHES

Finished surface of ceiling tiles must be selected to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide a feature/accent ceiling for Ready Room/Auditorium. Provide interest to ceiling with acoustical panels, clouds, curved feature ceilings or wood feature ceilings.

C303001 ACOUSTICAL CEILING TILES & PANELS

Acoustic Ceiling Panels: Suspended Acoustical Panel System: Primary ceiling finish will be 24-inch x 24-inch by 5/8-inch minimum thickness suspended acoustical panel ceiling system, except provide a suspended gypsum board ceiling in entrance lobby. Acoustical panels will have a square edge, closed pore panel surface unless as noted. Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact resistance requirements of the room Provide sustainable panels.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Gypsum Wallboard Ceiling Finishes: Provide Regular Gypsum Board and Moisture Resistant Gypsum Board as indicated in the Part 3 Chapter 5 Room Requirements. Moisture Resistant gypsum wall board must be used in all wet or humid areas include, but not limited to vestibules, toilet rooms and locker rooms areas.

C303003 PLASTER CEILING FINISHES

NOT USED

C303004 WOOD CEILINGS

NOT USED

C303005 SUSPENSIONS SYSTEMS

Provide 24-inch by 24-inch aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish must be factory applied white baked enamel. Provide manufacturer’s hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106-inch diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16-inch galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/580M, composition 302or 304, condition annealed stainless steel, 0.106 inches in diameter over high humidity areas such as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, non-staining and ASTM C636). Recycled content must be a minimum of 25%.

C303006 METAL STRIP CEILINGS

NOT USED

C303009 OTHER CEILING & CEILING FINISHES

Ceiling finishes must be as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

C304001 GENERAL REQUIREMENTS

Spray paint all interior exposed surfaces including metal items, such as interior grilles, registers, diffusers, access panels, and panel boxes with a minimum of two coats in color to match adjacent surfaces, unless otherwise indicated. All primer and paint systems must be the manufacturer's highest premium quality, professional grade. All materials must be moisture and mildew resistant and easily cleaned.

C304002 CONCRETE FINISHES

NOT USED

C304003 CONCRETE MASONRY FINISHES

NOT USED

C304004 METAL FINISHES

NOT USED

C304005 INTERIOR WOOD FINISHES

NOT USED

C304006 GYPSUM WALLBOARD FINISHES

Gypsum walls, gypsum wallboard ceilings, fascias and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See Part 4, C3040 INTERIOR COATINGS AND SPECIAL FINISHES. Include a minimum of two paint selections for accent walls as indicated in Part 3 Chapter 5 Room Requirements.

C304007 SPECIAL COATINGS ON WALLS

High Performance Architectural Coating: Provide high performance architectural paint coatings in areas as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

--End of Section--

D10 CONVEYING SYSTEMS – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Conveying System shall include elevators, lifts and, other conveying systems, and weight handling equipment.

GENERAL REQUIREMENTS

NOT USED

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

D1010 ELEVATORS

Design assembly and arrangement of elevator, accessories, and supporting systems in accordance with ASME/ANSI A17.1 and NAVFAC ITG FY 2013, *Elevator Design Guide*. Provide all materials and equipment, including but not limited to elevator cab and hoist equipment, operating and signal fixtures, doors, door and car frames, car enclosure, controllers, motors, guide rails, brackets, and testing.

D101001 GENERAL CONSTRUCTION ITEMS

Provide a traffic analysis.

D101002 PASSENGER ELEVATORS

NOT USED

D101003 FREIGHT ELEVATORS

NOT USED

D101004 WHEELCHAIR LIFT

NOT USED

D101005 DUMBWAITERS

NOT USED

D101090 OTHER VERTICAL TRANSPORTATION EQUIPMENT

NOT USED

D1020 WEIGHT HANDLING EQUIPMENT

Ensure that the crane satisfies the testing and certification requirements detailed in Part 4 of this RFP to the satisfaction of the user activity designated weight handling certifying official. Coordinate witness testing with the user activity designated weight handling certifying official.

D102001 OVERHEAD CRANES

NOT USED

D102002 MONORAILS

NOT USED

D1030 ESCALATORS AND MOVING WALKS

NOT USED

D103001 ESCALATORS

NOT USED

D103002 MOVING WALKS

NOT USED

D103003 OTHER MOVING STAIRS & WALKS

NOT USED

D1090 OTHER CONVEYING SYSTEMS

NOT USED

D109001 PNEUMATIC TUBE SYSTEMS

NOT USED

D109002 CONVEYORS

NOT USED

D109003 LINEN, TRASH, AND MAIL CHUTES

NOT USED

D109004 TURNTABLES

NOT USED

D109005 OPERABLE SCAFFOLDING

NOT USED

--End of Section--

D20 PLUMBING – P1512F RENOVATE M107

SYSTEM DESCRIPTION

The plumbing system consists of all fixtures, potable cold and hot water piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 5 feet of the building.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS section D20 and the manufacturer's recommendations. Design and install plumbing systems in accordance with IPC and UFC 3-420-01, *Plumbing Systems*. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Include the hot and cold water systems to list of systems to be commissioned in accordance with UFGS 01 33 29.05 20 Sustainability Requirements for Design Build

Refer to RFP Part 3 – Project Program, Chapter 2 for commissioning requirements

D2010 PLUMBING FIXTURES

Provide quantity and type of plumbing fixtures required for the use and functions described for this facility. Obtain occupancy from the owner. Refer to Part 3 Chapter 5 Room Requirements Section for additional specific requirements for spaces with plumbing fixtures. Provide handicapped fixtures in accordance with the referenced criteria in the Project Program.

D201001 WATER CLOSETS

Provide floor mounted flush valve water closets with hard-wired automatic flush control with push button backup. Maximum flushing volume is 1.28 gallons.

D201002 URINALS

Provide flush valve urinals with hard-wired automatic flush control with push button backup. Maximum flushing volume is 0.125 gallons.

D201003 LAVATORIES

Provide solid surface lavatories with integral sinks with hard-wired sensing faucet with automatic control and battery backup.

D201004 SINKS

Provide brushed stainless steel undermount sink in the pantry/break areas. Provide a swivel faucet.

Provide countertop sink for Mother's Room.

Provide mop sink in janitors closets.

D201005 SHOWERS

All showers are to be the low flow type, 2.0 gpm. The shower heads to be located at a stationary position pointed away from the shower entrance opening and to keep from spraying toward the shower entrance opening and causing water damage. The shower faucet and spray head is to be a surface mount unit complete with prefabricated stainless steel mount and enclosure panel, temperature compensating shower valve with metal stem handle and integral service stops, and a shower head with flow control on institutional bracket.

D201006 DRINKING FOUNTAINS AND COOLERS

Provide hi low drinking fountains. Each drinking fountain must have a bottle filler.

Provide wall recess or side walls to protect drinking fountains.

D201090 EMERGENCY FIXTURES

Provide emergency shower and eyewash in the with privacy curtain and rail.

Provide tepid water (60F to 100F) with water tempering valve assembly.

Provide alarms and appurtenances for service within NEMA type 4 enclosures.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine the potable water pressure at the building and calculate piping system requirements.

D202001 PIPES AND FITTINGS

Provide Copper piping Type L for above ground and Type K for buried. Press fittings are not allowed.

D202002 VALVES & HYDRANTS

Provide isolation valves at supply to each floor. Provide hose bibbs in mechanical rooms and within 25 feet of all exterior equipment with coils. Provide wall hydrants along the building exterior such that all points along the perimeter can be reached with a 25-foot-long hose.

D202003 DOMESTIC WATER EQUIPMENT

Provide backflow preventers of types and at points within domestic water systems as specified by IPC. Locate inside the mechanical room on service entrance lines where not provided exterior to the building.

Perform calculations to determine the water heater capacity to supply hot water to the fixtures.

Provide electric or natural gas water heater for heating of domestic water.

Provide water tempering valve assembly.

Provide domestic hot water recirculation system with high efficiency recirculation pump and recirculation loop with all associated fixtures, equipment, and appurtenances. Provide inline circulator for domestic hot water distribution system. Provide balance valves throughout system to allow for system balance to achieve required maximum wait times per International Energy Conservation Code. Provide domestic water balance per UFGS 23 05 93.00 22 *Testing, Adjusting, and Balancing for Mechanical Systems.*

If water flow test shows inadequate water pressure, provide domestic water booster system for domestic water distribution system.

Provide water meter on the building main. Water meters must be appropriately sized for the building load. The water meter register must display gallons and must be clearly visible for inspection. The register must be compatible with the Itron 100W encoded radio transmitter (ERT). Refer to Itron's documentation for a compatibility list.

Contact: United Systems & Software, Incorporated

Jody Cline

800.455.3293

jodyc@united-systems.com

The ERT must be an Itron 100W+ with encoded output. The ERT must be installed per Itron installation guidelines. The contractor must supply all necessary mounting material, cabling, etc.

For meters installed inside of facilities (e.g. Mechanical room), the ERT must be mounted on the outside wall of the room.

Meters installed in pits must utilize the appropriate "through the LID" antenna.

The ERT must be proven to be capable of communicating with Itron's Advanced Meter Reading (AMR) and/or Advanced Metering Infrastructure (AMI) technology. Camp Lejeune's current AMR technology includes Mobile Collector Lite (MC Lite). AMR technology consists of Choice Connect version 5, with Cell Collector Units (CCUs). Prior to acceptance, all installations must prove successful communication between the meter endpoint (ERT) and Camp Lejeune's endpoint AMR and/or AMI communication equipment (i.e. MCLite/FC300 handheld and/or CCU).

The contract must submit the following information for each location (meter) included in the project.

Meter: Make, Serial Number, Size, Compound (Y/N)

Register (aka Encoder): Make, Model, Dials, Multiplier, Unit of Measure (i.e. gallons)

ERT: Make, Model, ID, Latitude, Longitude

D202004 INSULATION & IDENTIFICATION

Provide cellular glass insulation with vapor barrier on domestic hot water supply piping and on domestic cold water supply piping. Provide identification for piping and equipment.

D202005 SPECIALTIES

NOT USED

D202090 OTHER DOMESTIC WATER SUPPLY

Provide piping supports in accordance with the IPC. Provide inspections, disinfection, and testing in accordance with the IPC.

Provide recessed water-outlet boxes for ice and coffee makers.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

Provide plastic PVC piping, fittings, and solvent cement for below ground installation.

D203002 VENT PIPE & FITTINGS

Provide cast iron hubless pipe and fittings, rubber compression gasket joints and stainless steel banding.

D203003 FLOOR DRAINS

Provide floor drains in mechanical rooms, restrooms, break rooms, in proximity to emergency eyewashes and showers, and plumbing chase areas.

Provide floor sinks to receive condensate from air handling units.

D203004 SANITARY & VENT EQUIPMENT

Provide sump pump in building drains that cannot discharge to the sewer by gravity.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTING

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

D204002 ROOF DRAINS

Existing roof drainage system located above grade must be demolished. Below-grade roof drainage system may be reused. If a flat roof is provided, provide roof drains and overflow drains. Route primary drains through the building and out the exterior wall to connect to existing underground draining system. Route overflow drains through the building and down the exterior wall to discharge at grade. If a standing seam metal roof is provided, provide gutters and downspouts.

D204004 INSULATION & IDENTIFICATION

Domestic, Storm and Condensate piping.

D204090 OTHER RAIN WATER DRAINAGE SYSTEM

NOT USED

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Obtain natural gas pressures from the local gas utility provider. Contractor must invite the utility provider to the design reviews. Contractor is responsible for any applications and permits, and must provide the complete natural gas system from the load side of the utility meter to the heating equipment. Provide steel natural gas piping system. Include gas distribution piping from the gas meter to points of usage. Follow Camp Lejeune design standards for piping pressures inside the building.

The Contractor must provide the projected loads to the gas utility provider 6 months prior to in-service date. The Contractor must have the local gas utility provider install piping and appurtenances up to the load side of the meter. Tie the gas meter into the Building Automation System (BAS) and the existing Advanced Metering Infrastructure (AMI) metering system.

Natural Gas Utility Provider Information:

Piedmont Natural Gas (PNG)
Invite the following to Design Reviews:

- Michael Lilly- PNG Commercial and Residential Sales Specialist- michael.lilly@duke-energy.com - 252-808-7292
- Bobby Gurganus- PNG Construction- bobby.gurganus@duke-energy.com - 252-670-9613

D209002 ACID WASTE SYSTEMS

NOT USED

D209003 INTERCEPTORS

NOT USED

D209005 COMPRESSED AIR SYSTEM

NOT USED

D209090 OTHER SPECIAL PLUMBING SYSTEMS

NOT USED

--End of Section--

D30 HVAC – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Provide the following type of high performance system:

Provide a variable air volume (VAV) system with shut-off terminal units and hot water heating coils. The VAV AHU will feature a chilled water cooling coil and a hot water preheating coil. Ventilation air will be provided via the VAV AHU(s). Provide a total enthalpy fixed plate heat exchanger energy recovery section in the VAV AHU. Chilled water will be generated by an air-cooled chiller, and hot water will be generated by condensing gas boiler[s]. Size the AHU coils, chillers, and boilers for full capacity, in the event of a heat recovery system failure.

The primary air from the VAV AHU will be ducted to the terminal units by medium-pressure galvanized metal ductwork. Supply air from the terminal unit to the zone and return air from the zone to the AHU will be ducted by low-pressure galvanized metal ductwork.

Roof mounted equipment is not permitted.

This renovation may not include tenants for the entire building. For occupied portions of the building, provide complete and functioning HVAC systems. For unoccupied portions of the building, provide infrastructure including air handlers, outside air units, 1 VAV box for every 400 square feet, exhaust fans, and hot and chilled water piping and controls. Maintain the unoccupied portions of the building at the unoccupied temperature setback and 60% relative humidity.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

Provide working space around all equipment. Provide all required fittings, connections, and accessories required for a complete and usable system. Install all equipment in accordance with the criteria in Performance Technical Specification Section D30 and the manufacturer's recommendations. Where the word "should" or “must” is used in manufacturer’s instructions, substitute the word "must."

Economizer cycles must not be used.

The new facilities must not use rooftop heating, ventilation, and air conditioning (HVAC) equipment. All major HVAC equipment must be located in mechanical rooms. Consider attic and above-ceiling placement of AHU equipment only when absolutely necessary. Stairs are required for any above-ceiling or attic located air-handling equipment (excluding VAV terminals). Attic space may be used for mechanical equipment if there is a 6-foot-wide stairway with double doors for maintenance purposes. Equipment with cooling coils placed above ceilings must have secondary drain pans with approved gravity drainage piping.

Provide corrosion protection for ALL exterior HVAC equipment, including air-handling units (AHUs), heat exchanger coil surfaces, equipment casings, air-cooled water chiller coils, heat pumps, and air conditioning units that are exposed to the weather. Corrosion protection is also required on HVAC equipment within buildings that are subject to the outside weather conditions. Specifically, equipment requiring protection is defined as the first HVAC equipment (unit coils) met by the outside air in the supply air ductwork system. The corrosion protection must meet or exceed the requirements of a 3000 hour salt spray test in accordance with ASTM International (ASTM) B117. The specified capacities on the plans and specifications must be the capacities

after the required corrosion protection coatings are applied. Specify manufacturer's standard off-the-shelf anti-corrosion options for "coastal" or "sea coast" installations that meet or exceed the requirements stated above.

Provide radiant barriers in the exterior wall system. Optimize the building envelope and window requirements to exceed ASHRAE 90.1-2013.

Provide premium-efficiency motors, chillers, and boilers, and optimize the HVAC system.

Provide Seal Class A on all ducts to reduce duct losses. Increase thermal insulation on mechanical systems and use radiant barriers to reduce thermal losses.

Provide chemical shot feeders, air separators, and bladder type expansion tanks for hydronic systems. Provide inline centrifugal pumps with inlet suction diffusers, isolation valves, discharge check valves, balancing valves, drain valves, differential pressure gauges, and flexible pipe connectors and coupling guards.

Single-phase fractional horsepower alternating current motors must be high-efficiency types corresponding to the applications listed in National Electrical Manufacturers Association (NEMA) Motors and Generators (MG) 11. Select polyphase motors based on high-efficiency characteristics relative to the applications listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium-induction motors with continuous ratings must meet or exceed energy-efficient ratings per Table 2-10 of NEMA MG 1. Provide controllers for three-phase motors rated 1 horsepower (hp) and above with phase voltage monitors designed to protect motors from phase loss and over-/under-voltage. All motors 1 hp and larger must be premium efficiency. Provide the means to prevent automatic restart by a time-adjustable restart relay. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart. Provide reduced-voltage starters for all motors 25 hp and larger.

Provide minimum 4-inch (100 mm) thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment.

Provide factory painted finishes that are designed for 3000-hour duration test for outside equipment and for equipment bringing in outside air.

Provide a manufacturer approved coating system for coastal environments on mechanical equipment, cooling, heating, and condenser coils on units with more than 5 tons of cooling capacity. The submittals must indicate heat transfer rating of coated coils.

The facility must have a complete air and water balanced HVAC system. Calculations must be provided and show the air and water systems are balanced. Drawings must also show balanced air and water systems.

Provide air conditioning and heating for spaces as indicated and for the following Design conditions:

Outside Conditions

Summer	91	Degrees F dry bulb	Winter	26	Degrees F
	79	Degrees F wet bulb	Dehumidification	140	Grains/lb

Outside Design Conditions for Air Cooled Equipment

Summer	95	Degrees F dry bulb			

Inside Conditions – Occupied Areas and Storage Areas

Summer	78	Degrees F dry bulb	Winter	68	Degrees F
	50	%RH			

Heating and Ventilating Conditions – Electrical Rooms, Mech Rooms with Heat producing equipment (Boilers, Water Heaters, etc)

Summer	10	Degrees F dry bulb above ambient	Winter	55	Degrees F

Inside Conditions – Cold Mechanical Rooms (AHUs and pumps)

Summer	N/A	Degrees F dry bulb	Winter	55	Degrees F
	55	Degrees F Dew Point			

Inside Conditions – Communication and IT Rooms

Summer	78	Degrees F dry bulb	Winter	NA	Degrees F
	55	Degrees F Dew Point			

Provide Ventilation rates and systems per ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*. Provide CO_2 sensors to limit CO_2 concentration to 800 ppm in spaces with 25 or more occupants per 1,000 SF.

Noise levels must comply with the requirements in the latest edition of the ASHRAE Applications Handbook. The design must provide noise level control by requiring maximum noise levels as well as noise separation areas for the Mechanical Rooms. The drawings must

specify the maximum equipment noise level. Classrooms must not be adjacent to mechanical rooms

Mechanical room(s) and electrical room(s) with heat producing equipment must each be a separate zone, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01

Cold mechanical rooms(s) (AHU's, chilled water pumps) must each be a separate zone, heated and dehumidified.

Provide a separate zone for IT closets, telecom rooms and server rooms. These zones shall be served by dedicated DX split system equipment.

The HVAC system must provide each zone with the choice of heating or cooling year-round unless otherwise indicated. Provide each zone with its own thermostatic range of control.

Zone the HVAC system as follows:

Administrative spaces such administrative areas, offices, shops, maintenance control, quality assurance, ready rooms, conference rooms, flight equipment, training rooms, tool rooms, restrooms, lockers, elevator lobbies, break rooms, corridors, and project rooms must be zoned separately, such that each administrative space greater than 175 square feet (SF) is its own zone, and any spaces less than 175 SF must be grouped into a single zone.

- Corridors must not be on separate zones. Locate thermostats for corridors in separate occupied spaces.
- Provide a separate zone for the boiler room, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01.
- Provide a separate zone for the chilled water pump/AHU room, heated and dehumidified only, no ventilation.
- Provide a separate zone for IT closets and server rooms.
- Provide a separate zone for electrical rooms.

For unoccupied mode, provide the following night setback temperatures:

- For winter, 10 degrees F lower than indoor heating design conditions, but no lower than 55 degrees F.
- For summer, 5 degrees F higher than indoor cooling design conditions, but no higher than 85 degrees F.
- Year round, 60 percent RH maximum.

Provide thermostats and temperature sensors with occupant adjustment control of +/- 3 degrees F.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

NOT USED

D301002 GAS SUPPLY SYSTEM

Provide a natural gas supply system for the heating of the facility. Natural gas must be the energy source (at a supply pressure of 5 inches water column [w.c.] minimum to 7 inches w.c. maximum) for all building heating systems. Provide a complete natural gas supply system as detailed in the specification in accordance with National Fire Protection Association (NFPA) 54, the North Carolina Building Code, the North Carolina Mechanical Code, and natural gas supplier requirements. Size natural gas piping to carry 15% more flow than is required by heating loads. Obtain natural gas pressures from the local gas company, Piedmont Natural Gas (PNG). The Contractor is responsible for coordinating with PNG and the Contracting Officer regarding the natural gas requirements for each facility. Provide a complete natural gas system, including any applications and permits. PNG will provide the natural gas to within 5 feet of each facility.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

NOT USED

D301004 HOT WATER SUPPLY SYSTEM

NOT USED

D301005 SOLAR ENERGY SUPPLY SYSTEMS

NOT USED

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility consisting of at least two boilers. Each boiler must be no greater than 399,000 Btu/hr. For loads less than 399,000 Btu/hr provide two boilers with 100% redundancy. For loads greater than 399,000 Btu/hr and two boilers are needed based on size limitations, each boiler must supply no less than 65% of the heating load. Where more than two boilers are required to meet size limitations, size each boiler for 1/N of the total load, where “N” is the total number of boilers. On multiple boiler installations with the largest boiler off line, the remaining boiler(s) must be capable of carrying not less than 65% of the maximum winter design load. The boiler fuel train must be compatible to match the available source at the project site. Use the building block load to size the heating plant.

Refer to Part 3, Chapter 2, Paragraph 2.3.9 Air Quality Management, for air emission permit information. Air Emission permit is required for each combustion device provided.

All combustion sources are subject to the NC Air Toxics Permitting requirements.

D302001 BOILERS

Provide packaged gas-fired condensing type boilers. Provide minimum 90% efficiency boilers with stainless steel heat exchangers. All heating equipment boilers must have the ENERGYSTAR label. Provide a stainless steel, multi-wall insulated boiler stack. The stack must be pre-engineered and pre-manufactured, Underwriters Laboratory (UL) listed, and must meet NFPA 211. Fuel for boilers must be natural gas. Provide boiler(s) with a condensate neutralization tank/kit.

All vents on gas control valves must be routed outdoors as required by NFPA 54. All gas lines serving gas-fired equipment must be fitted with UL or Factory Mutual approved gas trains suitable for the gas being provided.

D302002 FURNACES

NOT USED

D302003 FUEL-FIRED UNIT HEATERS

NOT USED

D302004 AUXILIARY EQUIPMENT

NOT USED

D302005 EQUIPMENT THERMAL INSULATION

Provide all hot water equipment with cellular glass insulation with vapor barrier jacket or molded fiberglass with vapor barrier jacket.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

HVAC refrigeration and air conditioning compressors must have full 5-year warranties including all parts and labor from the time of Beneficial Occupancy

Provide rotary screw or scroll air-cooled chillers. Provide high-efficiency air-cooled chillers. Provide constant primary/variable secondary pumping systems on single chiller systems greater than 60 tons and on multiple chiller systems. Primary pumping may be used only on single chiller systems less than 60 tons. Keep flow through the chiller constant; do not use variable primary flow. A buffer tank must be provided on all systems to provide thermal inertia. Provide multiple chillers for loads greater than 160 tons with each chiller sized for 50% of the total facility cooling load.

For unique facilities that exhibit widely variable occupant loading, multiple dissimilar sized chillers must be provided as appropriate for the low occupancy condition and fully occupied condition.

The chillers must be located in an exterior equipment yard area and properly spaced from each other and other equipment away from building perimeter. The air-cooled chiller(s) must be located outside on a 150 mm (6-inch) thick reinforced concrete housekeeping pad. Provide heat tape to ensure freeze protection as low as 10°F on chilled water piping and any other associated appurtenances. Refer to the MCB Camp Lejeune mechanical policy for the

requirements for phase and voltage protection requirements for chillers. Provide emergency chiller connections consisting of isolation valves and blind flanges.

Low ambient capability must be provided to allow chillers to operate in temperatures as low as 15°F (-9.4°C).

All coils must have the approved coatings that pass a salt-spray test conducted per ASTM B117 for duration of at least 3,000 hours and provide a minimum of loss of heat transfer due to the thickness of the coating.

Provide the approved quantity, size, spacing, material, and height of bollards around all yard equipment.

Provide blind flanges with butterfly isolation valves at the chiller location for emergency portable chiller connection. Coordinate site plan design to accommodate access needed for an 18-wheeler flat bed to park near the flange location.

Provide chiller controls with BACnet communication protocol.

Provide complete start-up and operational testing of chiller equipment.

Provide heat tracing of the chiller bundle and all above ground piping and valves, etc. that are subject to ambient.

Provide insulation and vapor barriers on all chilled water equipment.

Provide complete system flushing and start-up for the entire chilled water system including piping.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for chilled water piping system.

Startup must include operational testing of chiller equipment and full commissioning.

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled DX ductless split system cooling only unit for IT closets, telecom rooms, and server rooms and any other space requiring independent conditioning. If the unit does not have a BACnet system interface, provide a room temperature sensor and a current sensor, tied to the building DDC system, to determine the operating status of the system. Size DX cooling equipment at 120% of IT equipment load. Provide low ambient cooling.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide shutoff-type terminal units with hot water reheat coils to serve zones. To maximize energy savings on this project: the shutoff-type terminal units must comply with ASHRAE 55 and sized to meet indoor design conditions (temperature, humidity, ventilation, etc.) that are used in the design; do not size shutoff-type terminal units to maintain a minimum of 4 AC/Hr in occupied mode.

Provide insulated, galvanized steel ductwork in concealed locations constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards. For exposed ductwork, provide insulated, double walled, galvanized steel duct.

Provide medium-pressure duct from VAV AHU to shutoff-type terminal unit. Provide round or flat oval primary supply air duct. Size the medium pressure duct according to the static regain method. Provide low-pressure supply air duct from the terminal unit to the zone being served. Provide low-pressure return air duct from the zone to the VAV AHU. Provide a minimum of 6 diameters of rigid straight duct at the inlet to each VAV terminal to maintain a uniform velocity profile at the valve inlet for airflow measurement accuracy. Flexible duct connection to the primary air inlet of VAV terminal is not permitted.

Provide shutoff-type terminal units typically above lay-in ceilings. Provide terminal units above hard ceilings with lockable access panels.

Provide aluminum grilles, registers, and diffusers. Provide linear slot diffusers including manufacturer insulated plenum.

Provide manual balancing dampers for all main and branch ducts. Incorporate product requirements identified in the UFGS 23 00 00 Manual Balancing Damper Editing Guide, in RFP, Part 6, into project specifications.

Install all metal duct to Seal Class A standard. Insulated flexible duct may be installed in low-pressure supply duct but may not exceed 5 feet in length or provide more than a 45-degree change in direction. Flexible duct may not be installed in return or exhaust air duct.

Provide AMCA 540 and 550 rated louvers.

Size low pressure supply ductwork at 0.08"/100LF and negative pressure return/exhaust at 0.05"/100LF (max).

Provide rigid foil faced board insulation where ducts are exposed in mechanical spaces. Provide pre-manufactured double wall ductwork on building exterior or where ducts are exposed in occupied spaces. Insulate all ductwork.

Mineral fiber blanket wrap must meet the requirements of ASTM C1136, ASTM C1290, ASTM C1338, ASTM E84, UL 723, NFPA 90A, and NFPA 90B.

Rigid mineral fiber must meet the requirements of ASTM C553, ASTM C612, ASTM C1136, ASTM 1393, ASTM E84, and UL 723.

Make duct penetrations of all walls with sheet metal ducts. Flexible duct penetrations of walls are not acceptable.

Coordinate locations of all air devices with ceiling mounted equipment. Maintain minimum of 3'-0" from ceiling mounted smoke detectors.

Provide unvaned radius elbows with a radius equal to 1 ½ times the duct width. Provide all 90-degree mitered square elbows with turning vanes with a radius equal to 2 times the duct width. Provide access doors upstream of all elbows with turning vanes.

Do not hangs duct from other ducts.

Provide canvas duct connectors for all equipment ductwork connections containing fans. Provided grounding across flexible connections with flexible copper grounding straps. Grounding straps must be bolted or soldered to both the equipment and the duct.

Ductwork and air handling equipment must be sealed and protected from dirt and debris during the entire construction duration.

Provide separate chases for ductwork and piping. Do not install ductwork and piping in the same chase.

Route all ductwork perpendicular and parallel to the building structure.

Where sheet metal is visible through the face of air terminals, paint sheet metal with a flat black enamel finish.

Manual Balancing Dampers (Accessible): Round type is not acceptable. Provide pre-manufactured rectangular type with 16 gage galvanized steel channel frame with corner braces. Blades will be opposing type 16 gage with a maximum width of 8". Provide with a 20 gage blade stop on units 12" high and under. Provide with position lock, molded synthetic bearings, and square shaft.

Manual Balancing Dampers (Inaccessible): Provide cable operated remote controlled volume dampers in inaccessible branch ducts feeding diffusers. Dampers must be adjustable through the diffuser face with standard hand tools, providing positive balancing of multiple airflows to maintain design air throw and noise criteria. Radial damper must be direct actuated by a brass plated rotary cable which is fixed at the damper end in an integral support bracket. Rotary cable must have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions. The entire assembly must be furnished as one piece for installation with no linkage adjustment required or miscellaneous small parts. Each unit must be factory tested as a complete assembly prior to shipment (100% testing). Accessible cable end must be secured with a factory furnished nylon clamp, allowing maximum placement flexibility. Positive, direct, two-way damper control must be provided without sleeves, springs, or screw adjustments (that may loosen after ceiling closure).

Motorized dampers frame must be 16 gage (1.6) galvanized steel structural hat channel with tabbed corners for reinforcement for 11 gage (3.05) structural equivalence. Blades must be 14 gage (2.0) equivalent thickness galvanized steel, roll-formed airfoil type for low pressure drop and low noise generation. Blade edge seals must be suitable for -72°F to +275°F and mechanically locked into the blade edge. Adhesive or clip-on type seals are unacceptable. Jamb seals must be flexible metal, compression type to prevent leakage between blade end and damper frame. Blade end overlapping frame is unacceptable. Bearings must be corrosion resistant, permanently lubricated stainless steel sleeve type turning in an extruded hole in the damper frame. Axles must be hexagonal positively locked into the damper blade. Linkage must be concealed out of airstream, within the damper frame to reduce pressure drop and noise. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Dampers must be equipped with factory installed damper position indication switch package. The switch package must include two position indication switches linked directly to the damper blade to provide full open and full closed damper blade position. The switch package must be capable of interfacing with the HVAC control system and provide remote damper blade position status. Factory mounted damper actuators with adjustable memory stops must be furnished and mounted by the damper manufacturer in their factory. Each damper must be cycle tested at the factory prior to shipment.

D304002 STEAM DISTRIBUTION SYSTEMS

NOT USED

D304003 HOT WATER DISTRIBUTION SYSTEMS

For exterior buried Hot Water Distribution Systems see Section G30, *Site Civil/Mechanical Utilities*.

Provide a variable speed pumping system to serve the HVAC hot water equipment throughout the facility. Provide two pumps, each sized at 100% of building load. Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility.

Provide valves and related hot water system appurtenances. Provide a bladder type expansion tank and air/solids separator for the hot water system. Provide a shot type feeder for manual chemical feed to the hot water piping system.

Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with mineral fiber insulation.

Provide system flushing and startup for the hot water piping system.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for hot water piping system.

Provide complete startup and operational testing of all hot water systems.

Hot-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

D304004 CHANGEOVER DISTRIBUTION SYSTEMS

NOT USED

D304005 GLYCOL DISTRIBUTION SYSTEMS

NOT USED

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

For buildings with less than 60 tons of cooling load, provide a constant primary pumping system to serve the HVAC chilled water equipment throughout the facility. For buildings with more than 60 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with a single primary pump per chiller. For buildings with more than 160 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with one primary pump per chiller. In all cases, keep flow through the chiller constant.

For building less than 160 tons, provide two primary pumps or two secondary pumps as appropriate with each pump sized for 100% flow. For buildings with more than 160 tons, provide three secondary pumps, each sized for 50% of maximum building flow. Two pumps must operate as duty pumps and the third must act as standby. Provide a control sequence to rotate pump duty/standby assignments monthly and equalize running hours.

Provide valves and related chilled water system appurtenances. Provide a bladder type expansion tank and air/solids separator in chilled water system. “Triple duty” or “multi-purpose” valves that combine a check valve, throttling valve, and shut-off valve must not be used for the chilled water system. Provide air vents at all terminal equipment and system high points for air control.

Provide steel and copper chilled water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with cellular glass insulation on all above ground chilled water distribution piping.

Provide air vents at all terminal equipment and system high points for air control. Provide a shot type feeder for manual chemical feed for the chilled water piping system.

Provide thermal mass capability in the chilled water system to insure proper control and longevity of chillers by using inertia tanks. Provide inertia tanks, sized per chiller manufacturer recommendation to ensure stability of operation and temperature setpoint control. Total chilled water system volume must be a minimum of 7 gallons per ton of cooling. Provide an insulated storage tank within the mechanical room in order to meet this requirement.

Provide insulation, vapor barrier, and aluminum jacketing on piping exposed to outdoors. Install heat tracing on piping to ensure freeze protection to 10°F.

Provide system flushing and startup for the chilled water piping system.

Provide complete startup and operational testing of all chilled water systems.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

Provide threaded joints for steel pipe 2" or less and welded or bolted flange for sizes greater.

Provide flanged connections with flexible braided stainless steel connectors at all equipment connections.

Provide pre-manufactured dual containment system consisting of carrier pipe, cellular glass carrier insulation, air space, steel conduit, polyurethane outer insulation, and seamless extruded HDPE casing for direct buried piping. The carrier pipe must be ASTM A53 steel schedule 40 or

80 as scheduled. The product must be rated for corrosion resistance without the need for cathodic protection. Provide with leak detection system.

Chilled-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards.

Provide ducted exhaust ventilation rate according to ASHRAE 62.1.

D304008 AIR HANDLING UNITS

Provide central station VAV AHUs to provide constant temperature primary supply air to all terminal units. Provide hot water preheating coils, chilled water cooling coils, variable-speed fan sections, ultraviolet coil disinfection systems, and energy recovery sections. Units must include additional sections as necessary to facilitate ready access to all maintainable components.

The energy recovery section must be a fixed plate total enthalpy heat exchanger with MERV 8 prefilters and MERV 13 filters upstream of the unit in both the outside air and exhaust air streams. If AHU manufacturers are unable to provide these filters in the central station unit, provide ducted filter boxes outside the unit in a location accessible for filter replacement.

Provide the means to measure filtered outdoor airflow to verify proper ventilation.

Provide modular, central station, air handlers with the following:

Unit panels must be 2-inch solid. Exterior surfaces of the unit casing must be factory painted to withstand ASTM B117 90 3000-hour salt spray requirements.

All interior casing panels must be made of stainless steel.

Casing air leakage must not exceed leak class 9 (CL = 9) per ASHRAE 111.

Panel insulation must provide a minimum thermal resistance (R) value of 13 $ft^2 \cdot h \cdot {}^oF/Btu$ throughout the entire unit.

Access doors must be 2-inch double-wall construction with latching door handles.

Provide factory-mounted, weather-resistant, light emitting diode (LED) fixtures in sections of the unit for maintenance and service visibility.

Provide a fan array for the supply and return. The fans must be direct drive, single-width, single-inlet plenum. The fan blades must be aluminum backward-inclined airfoil. Fan array fans must be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.

The fan and motor assembly must be internally isolated from the unit casing, furnished and installed by the unit manufacturer.

The fan and motor assembly must be internally isolated from the unit casing with 2-inch deflection spring isolators, furnished and installed by the unit manufacturer.

Provide with factory mounted VFD for control of fan speed to modulate the airflow.

Provide 24-inch-long (min.) modular inspection sections with removable doors on both sides of the chilled water coil module.

The coil must have a factory applied flexible epoxy polymer coating (1 mil min. thickness) uniformly applied to all coil surface areas without material bridging between fins.

Provide two sets of spare filters for each AHU.

Provide a factory-installed dial type differential pressure gauge piped to both sides of the filter to indicate status.

A mixing section module must be provided to support the damper assembly for outdoor, return, and/or exhaust air. Dampers must modulate the volume of outdoor, return, or exhaust air. The dampers must be of double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades. The blades must rotate on stainless-steel sleeve bearings. Airfoil dampers must be rated for a maximum leakage complying with ASHRAE 90.1.

Provide an air blender section to mix outside and return air, minimize stratification, and reduce the risk of frozen coils.

Fully modulating 2-way hydronic coils. If the AHU is at the end of the water loop, a 3-way valve arrangement at the final coil connection is acceptable in lieu of a bypass.

Provide a factory installed combination VFD/disconnect for each fan motor. Each VFD/disconnect must be properly sized, factory mounted in a full metal enclosure, wired to the fan motor (s), and commissioned. VFD/disconnects must include a circuit breaker disconnect with a through-the-door interlocking handle designed to rest only in the full ON or OFF state and must be lockable in these states. A concealed defeater mechanism must allow entry into the enclosure when the handle is in the ON position. The VFD package must also include:

- Electronic manual speed control
- Current limited stall prevention
- Auto restart after momentary power loss
- Speed search for starting into rotating motor
- Anti-windmill with DC injection before start
- Phase-to-phase short circuit protection
- Ground fault protection

D304090 OTHER DISTRIBUTION SYSTEMS

Provide inline pumps with variable frequency drives.

Hangers, Clamps, Rollers, and Supports must comply with MSS SP-58 unless otherwise noted. Steel channel strut and angle iron are acceptable materials for field constructed trapeze hanger assemblies where the rated load limit is not exceeded. Provide with MSS type carbon-steel hanger rods, nuts, saddles, and U-bolts.

Run all horizontal piping above ceiling unless otherwise noted.

Provide full line size valves except control and balancing valves.

Provide extended plugs and labels where piping is insulated. Provide removable insulation over plugs.

Provide manual air vents at all high spots and the ends of all piping loops. Do not use automatic air vents in any place other than mechanical rooms where floor drains are already provided for. Provide 1/2" drain valves at low points in piping. Provide minimum pitch sufficient to insure adequate venting and draining.

Provide permanent flushing isolation valves and tees at both sides of all hydronic equipment. Provide tees with ¾” hose end connection and removable brass cap.

Do not hang pipe from other pipe.

Do not use flexible braided pipe to change direction at equipment connections regardless of manufacturer documentation.

Do not bend pipe or pipe hangers to correct poor alignment.

Route all piping perpendicular and parallel to the building structure.

Maintain a minimum of 3'-6" of ground cover over all underground HVAC piping.

Install piping so that all valves, strainers, unions, traps, flanges, and other appurtenances requiring access are accessible from below.

Install valves so that the valves will remain in service when equipment or piping on the equipment side of the valve are removed.

Provide balancing valves with position indicators and maximum adjustable stops (memory stops).

Provide chain wheel operators for all valves in equipment rooms mounted greater than 7'-0" above floor level; chain must extend to 7'-0" above floor level.

Install unions and/or flanges at each piece of equipment, in bypasses, and in long piping runs (100 feet or more) to permit disassembly for alteration and repairs.

Install all piping without forcing, springing, or bending.

Tap all branch lines from top of piping mains (45 degrees preferred, 90 degrees acceptable).

All valves must be set up and adjusted for smooth and easy operation.

All piping work must be coordinated with all trades involved. Offsets in piping around obstructions must be provided at no additional cost to the government.

Provide stainless steel flexible connections in all piping systems connected to pumps, chillers, cooling towers, and other equipment which require vibration isolation. Flexible connections must be provided as close to the equipment as possible.

Unless otherwise noted, all chilled water and hot water piping must be no less than ¾".

All piping must clear doors and windows.

Provide dielectric fittings at all pipe connections of dissimilar metals.

All piping must be free of dirt, debris, and moisture prior to installation of insulation. Chilled water systems must be disabled, brought to room temperature, and free of external moisture prior to insulation installation.

Install piping in accordance with the latest editions of MSS SP-58 and ASME B31.9. Use MSS type hangers and supports. Provide saddles and base supports. All-thread rod is acceptable for tension support applications only, not compression.

Select thermometers and pressure gages where the operating condition falls within the middle third of the range.

Provide chrome plated escutcheon plates for exposed pipe penetrations in occupied spaces.

Do not route pipe risers in duct shafts. Do not penetrate fire rated shafts with pipe unless the shaft is specifically allocated for that service.

Size all hydronic piping between 1 feet and 4 feet total dynamic head pressure drop per 100' length.

Grooved piping and press fittings are prohibited in all applications.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide gas fired or hot water unit heaters to serve the heating requirements of mechanical and air handler rooms of the facility.

D305003 FAN COIL UNITS

NOT USED

D305004 FIN TUBE RADIATORS

NOT USED

D305005 ELECTRIC HEATING

NOT USED

D305006 PACKAGE UNITS

NOT USED

D305007 COMPUTER ROOM AIR CONDITIONING (CRAC)

NOT USED

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROL SYSTEM (DDCS)

Provide a complete Direct Digital Control (DDC) system to comply with UFGS 23 09 00.00 22 Instrumentations and Control for HVAC, UFGS 23 09 13.00 22 Instrumentation and Control Devices for HVAC, and UFGS 23 09 23.02 22 BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems for the facility. All Camp Lejeune specific standards and requirements in Division 23 sections in Part 5 of this RFP must be incorporated into the design where applicable.

The DDCS must utilize intelligent distributed controllers, which communicate over a controller network in accordance with ASHRAE Standard 135-2016, BACnet – A Data Communication

Protocol for Building and Control Networks. Provide all necessary hardware, software and control devices to perform the optimal operation of the entire HVAC system and other building systems.

The Energy Management Control System (EMCS) has an existing front-end system managed by DPW. The government is responsible for integration of the building onto the base-wide network and integration of new buildings into the front-end. Contractor point of demarcation is the field point of contact (FPOC) and will be designed using BACnet protocol for future integration. The EMCS building level system must be designed and commissioned to match the existing ATO level of L-M-M. Contractor must use DDC equipment and Meters selected from base ATO approved equipment listing or must provide forty (40) hours testing time and support for DPW cybersecurity testing and hardening at the base's test environment. Only equipment capable of meeting cybersecurity hardening requirements will be accepted for use.

Provide two (2) CAT6 cables from the Supervisory Panel to the telecommunications closet. Incorporate requirements identified in the UFGS 23 09 00.00 22 provided in RFP, Part 5, into project specifications.

Provide meters, monitored by DDC, on the following incoming utilities of the building: Domestic water, natural gas, electricity. Tie the gas meter into the existing Advanced Metering Infrastructure (AMI) metering system. For electrical energy monitoring refer to Section D50, *Electrical,* paragraph entitled, *Service Entrance Equipment.* For potable water meter refer to Section G30, *Site Civil/Mechanical Utilities,* paragraph entitled, *Potable Water Distribution.*

Preferred location for water meter is in the mechanical room.

Provide meters, monitored by DDC, on the following subsystems for steam, gas and water: HVAC and processes.

Provide ASHRAE Standard 135 building controller as the main interface for the building control system.

Provide notebook computer(s) and complete application software with all licenses.

Provide patch panel in the mechanical equipment room for ease of connection and disconnection of equipment.

Provide panels with locks and alarms. The alarms must include both a flashing light and an audible alarm inside the mechanical room. The alarms must also be a networked alarm (e.g. switch connected to controller DI) with alarm events recorded remotely for a period not less than one year.

Provide flow rate meters, monitored by the DDC system, for central, chilled, and hot water flow.

Provide air handlers and all terminal units, including VAV boxes, with discharge/supply temperature sensors.

Provide air handler unit outside air flow monitoring stations.

Provide a DDC option for automatic operation of building circulating pumps whenever outdoor air temperature is below 35 degrees F or when there is a high potential for freeze damage.

Provide control to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Primary and back-up equipment starter circuits must be wired to prevent both pieces of equipment from operating at the same time. Rotate primary and back-up HVAC equipment monthly (adjustable) with a lead/lag control routine.

Provide the following phase monitors for all 3-phase equipment:

1. Phase loss protection
2. Phase reversal protection
3. Phase unbalance protection

Provide the following phase monitors for all 3 phase chillers:

1. Phase unbalance protection
2. Over/under voltage protection
3. Phase loss protection
4. Delay of break timer to delay automatic restarts
5. Non critical fault delay
6. Programmable auto/manual restart
7. Load and line side monitoring
8. Phase reversal
9. Phase unbalance

Provide new DDCS front-end notebook computer(s) loaded with all necessary application software displaying graphic floor plan, equipment graphics, control diagrams, and complete sequence of operations graphic pages. Provide all alarming, trend services, and schedules and other BACnet services and configurations as described in the UFGS 23 09 23.02 22. Provide and incorporate all new control points and sequences by creating new graphics, alarms, trends, schedules, and system reports. In addition, provide each graphic screen of mechanical equipment with links to the applicable as-built written sequence of operation that fully describes every operating routine and as-built DDC wiring diagram.

Non-BACnet compliant or proprietary equipment or systems, including gateways/protocol convertors, are not desired and are to be avoided unless a conflict dictates, at which time Government review and approval will be required.

The Contractor must be responsible for developing construction documents in accordance with United Facilities Criteria (UFC) for the design of standard HVAC control systems including:

1. UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, dated 18 July, 2018
2. UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, with Change 1; 1 October 2013 – Standard 18, Emergency Air Distribution Shutoff

DDC System Design: Submit all design documents to be reviewed and approved by Government. Control system design must include the following:

1. EMCS Control Diagrams showing the configuration of each system and equipment with applicable schematic flow diagram, control/field devices, device tags, input/output designations, and applicable field/interlock wiring in accordance with UFC 3-410-02.
2. EMCS Network Riser Diagram showing the layout of DDC system network, all network hardware, controllers, and notebook computer(s) in the building. The diagram must show the locations of notebook computer(s), network hardware, switches/router/hubs and network routing, distinguishing between different forms of media (i.e. Fiber, Category 5/6, shielded twisted pair, coaxial cable, etc.). Various types of LANs must be identified and distinguished from each other.

3. The Sequence of Operation describing all control processes and operation that are controlled by the control system must be included. The sequence of operation must be clearly shown in a text narrative form in order to demonstrate a clear understanding of how the system is to operate and be specific to the control system equipment used.
4. The DDC System Point Schedules indicating, at a minimum, the control point name, input/output designation, device code/tag, fail mode/position, software functions, alarms and alarm limits in accordance with UFC 3-410-02.
5. Provide control system specification to ensure that all of the components, which are expected to be used in the DDC system installation, are properly specified. In addition, the control system specifications must also specify detailed requirements for testing and commissioning of the DDC system. The control system specifications must also include all training requirements.
6. Provide graphic screens including mechanical floor plan indicating control locations and front-end graphic screens of mechanical equipment controls. The graphics must be submitted during construction stages for review and approval by Government.

DDC System Network Architecture:

1. The primary DDC system network, including DDC system network hardware, supervisory/building controllers (BC), Advanced Application Controllers (AAC) for major mechanical equipment, and DDC system notebook computer(s), must communicate via a dedicated DDC system network backbone using BACnet over IP (BACnet/IP). Using the Government Local Area Network (LAN) for DDC system communication is strictly prohibited.
2. The field controllers such as Advanced Application Controllers (AAC) and Application Specific Controllers (ASC) for small mechanical equipment, terminal units and miscellaneous/unitary equipment must be connected to the associated DDC system network hardware and supervisory/building (BC) controllers, and communicate via secondary DDC system network using BACnet MS/TP.
3. Network controllers, switches and/or routers must be provided to extend DDC system network throughout the facility, where necessary.
4. Non-BACnet-compliant or proprietary equipment or systems including gateways using a proprietary communication protocol are not acceptable and are strictly prohibited. For the existing equipment communicating with the existing control system using a proprietary or non-BACnet communication protocol, provide necessary gateway or network interface directly connected to the new DDC system network using a BACnet communication protocol.

Critical Systems:

1. For the DDC system associated with the critical equipment, provide separate controllers for primary and back-up HVAC units, which provide redundant HVAC service to critical spaces, to ensure that failure of any one controller will not cause the loss of the entire service to the critical space. The equipment must be distributed across multiple controllers in such a manner that no more than one unit must be powered, controlled and monitored using a single controller.
2. Each BC, AAC and network hardware such as Ethernet switch and router must be provided with an Uninterruptible Power Supply (UPS) that can supply electrical power for at least four hours to the attached load. This load must include the power required for HVAC equipment or field/control devices such as damper and control valves, etc.
3. For the HVAC equipment serving critical spaces or configured for redundant operation, a controls scheme for manual operation, which will bypass the automatic control through the DDC system, must be incorporated. Provide a HOA switch, if not provided as part of electrical equipment, so the equipment can be manually started and operated in Hand mode. The control valves and dampers associated with chilled water system and air handling units must be configured with necessary fail position so the equipment can operate manually and provide temporary cooling and/or ventilation if there is a failure in the control system.
4. When switching the redundant units during the rotation, the unit in the next sequence must be enabled or started before the previously enabled or started unit is disabled or stopped. If enabled unit should fail, an alarm must be generated at the DDC system and it must automatically enable the stand-by unit to replace the failed unit. Once the newly started unit is in operation, the failed unit must be disabled.

DDC System Software: Provide new DDCS and OWS with new front-end software and other utilities and tools as necessary. All software necessary for the configuration, operation, and maintenance of the installed DDC system must be provided, with licenses residing with the Government. Where new software, including application and tools, is provided, the latest tested, compatible and reliable version of the software available at the time must be installed prior to system testing and personnel training. In general, the front-end software must allow each authorized operator to execute the following functions as a minimum:

1. Security: Provide security function that prevents unauthorized use unless operator is logged on. Access must be limited to operator's assigned functions when user is logged on. Each operator's terminal must provide security for 10 users as a minimum. Each user must have an individual User ID/Name and Password. System user must be allowed individual assignment of only those control functions and menu items to which that user requires access. Each user must also have a set security level, which defines access to displays and individual objects the user may control. System must include minimum of 5 separate and distinct security levels for assignment to operators. Software must be initially configured to allow government personnel responsible for system administration full, unrestricted access. All default access passwords and user authentication identification must be documented and provided to the Government.
2. Schedule: Operators must be able to view scheduled operating hours of each schedulable piece of equipment on a weekly or monthly calendar-based graphical schedule display; to select and adjust each schedule and time period; and to

simultaneously schedule related equipment. Operators must be able to schedule holidays and special events directly from the calendar.

3. Alarm: The notebook computer(s) must provide audible, visual, and printed means of alarm indication. System input and status objects must be configurable to alarm on departing from and on returning to normal state. Operator must be able to enable or disable each alarm and to configure alarm limits, alarm limit differentials, alarm states, and alarm reactions for each system object. Alarms must be BACnet alarm objects and must use BACnet alarm services.
4. Trend Log: Operator must be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and must be able to retrieve data for use in spreadsheets and standard database programs. Controller must sample and store trend data and must be able to archive data to the hard disk. Coordinate items to be trended and trend configurations with the facility maintenance personnel. Trends must be BACnet trend objects.
5. Graphical Displays: The notebook computer(s) must display all data associated with project as required. The notebook computer(s) must display all data using two and/or three-dimensional graphic representations of all mechanical equipment. System must be capable of displaying graphic file, text, and dynamic object data together on each display. Information must be labeled with descriptors and must be shown with the appropriate engineering units. All information on any display must be dynamically updated without any action by the user.

Control Damper and Actuators:

1. Control Dampers: Motorized control dampers must have opposed blade dampers for modulating service and parallel blade dampers for 2-position service. Frames must be of five inch by one inch extruded aluminum hat channel with a minimum of 0.125-inch wall thickness. Blades must not exceed six inches wide and must be of heavy gage extruded aluminum airfoil shape to minimize pressure loss across the damper. Damper blades must be injected with CFC free, two part high density polyurethane foam. Each blade must include a thermal isolation gap. Dampers must be rated for minimum 2000 fpm air velocity at 2.5 inches static pressure and damper leakage must not exceeding 0.5 percent of total CFM (4.00 CFM/sq. ft.) based on 2000 fpm and one-inch static pressure when tested per AMCA Publication 500. Damper must be rated for a temperature range of minus 70 to 200°F
2. Provide electric type, direct shaft mount damper actuators with bracket arrangement for location outside of the air stream. Actuators must provide at least 125 percent of the required torque to effectively operate the damper. Actuator drive time for 90 degree rotation must be 150 seconds maximum. Actuators must be normally open, normally closed, or fail in position as required to obtain the operation as required by the application. Normally open and normally closed dampers must return to their normal position in the event of a power failure to the actuator. Provide auxiliary switches or damper position switches, rated as required, to provide specific operation. Provide transformers and accessories as required. Actuators requiring linkages, crank arms, connecting rods, or ball joints are not acceptable.

Control Valves and Actuators:

1. Characterized Control Ball Valves (up to and including 3 Inches): Nickel-plated forged brass body, valve trim must utilize stainless steel ball and stem, fiberglass reinforced Teflon PTFE seats with O-rings, 2 EPDM O-rings packing. A flow characterizing disc, made of Tefzel Teflon must be installed in the inlet of 2-way characterized control ball valves. 3-way valves must utilize flow characterizing discs at both input ports. Standard ball valves without this feature are not acceptable. 2-way valves must have equal port percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.
2. Globe Pattern Control Valves (over 3 inches): Iron body, bronze trim, 316 stainless steel rising stem, bronze plug-type disc, flanged ends, renewable bronze seat and disc, TFE V-ring packing. It must have replaceable plugs and seats of stainless steel or bronze. 2-way valves must have equal percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.
3. Valve Actuator: Provide electric valve actuators, which are two-position or modulating as required by application. Actuators must be of ample capacity to handle the required load under all conditions and as a minimum must close valves against pump shutoff head pressure of 55 psi. Unless otherwise indicated, valves must be arranged to return to the normal (fail-safe) position in the event of a power failure to the actuator.

Air Flow Measuring Stations (AFMS): For all air handling units with outdoor air intake, provide AFMS to continuously monitor the outdoor ventilation air in CFM values.

1. Provide high performance, thermal dispersion type AFMS. Pitot tubes, arrays, Piezo rings and other differential pressure based devices are not acceptable. AFMSs must contain an airflow straightener if required by the AFMS manufacturer's published installation instructions. The straightener must be contained inside a flanged sheet metal casing, with the AFMS located as specified according to the published recommendation of the AFMS manufacturer. In the absence of published documentation, airflow straighteners must be provided if there is any duct obstruction within 5 duct diameters upstream of the AFMS. Air-flow straighteners, where required, must be constructed of 0.125 inch aluminum honeycomb and the depth of the straightener must not be less than 1.5 inches. Sensing probe must be constructed of extruded aluminum or of stainless steel tubes. The operating humidity range must be 0 to 99% RH and direct exposure to water must not damage the sensing elements. AFMSs must have an accuracy of +/- 2% of reading with air velocity range of 0 to 5,000 fpm. The transmitter must have local LCD display, continuously displaying airflow and temperature and be calibrated for the appropriate operating range based on the required operating range.

Water Flow Meters: Provide electromagnetic type flow meters for water service where required by application. The flow meter must have the DC powered electromagnetic coils and electrodes, and measure the induced voltage across the electrodes as a conductive fluid flows through the magnetic fields. The voltage is proportional to the average flow velocity of the fluid and then amplified and processed digitally by the converter to produce the signal for flow rate

and totalization. Flow meter must be located to provide the most efficient and accurate reading recommended by the manufacturer.

Commissioning: The controls Contractor must provide the services of a factory-authorized service representative to start control systems and provide the commissioning the coordination and support required during the commissioning process.

D306001 1.2 ELECTRONIC CONTROLS

NOT USED

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air distribution systems, water distribution systems, including domestic hot water systems, and HVAC equipment. TAB must be provided by a tier one contractor. Provide duct air leakage testing and duct pressure testing. The Designer of Record must provide a duct construction and leak testing schedule on the drawings.

Clean entire duct system in accordance with National Air Duct Cleaners Association (NADCA) ACR after duct air leakage testing (DALT), and before test and balance (TAB). Document duct cleaning, prepare a written report, and submit report to the Construction Manager (CM) with signature of the ductwork contracting foreman indicating the test has been completed.

Acceptable Cleanliness Level: Net weight of debris collected on the filter media must not exceed 0.75 mg/100 sq. cm. Coordinate with other trades working in the building. Duct cleaning must be performed only after the building has been sealed and the completion of construction activities resulting in airborne particles has been completed. Examples of activities producing airborne particles include but are not limited to grinding, cutting, sanding, drywall installation, grout work, etc. Should the CM note construction dust contamination or openly unprotected ductwork and/or equipment after the initial cleaning, repeat duct cleaning on entire system after the final instance of airborne particle production within the building envelope at no additional cost.

Provide complete testing and balancing (TAB) of all air and water distribution systems and HVAC equipment after successful completion of the DALT testing and duct cleaning. Include all troubleshooting attempts and measurements within the TAB report. The TAB contractor must offer recommendations where flowrates cannot be kept within tolerance. Coordinate with and support Commissioning Authority effort during entire project duration. All system devices must be accessible during the TAB effort. Flush all strainers and replace air filters prior to TAB. Verify that air vents have been installed at every high point in the hydronic system(s); confirm the absence of air by testing every air vent prior to starting tests.

D307003 HVAC COMMISSIONING

Refer to RFP Part 3 - Project Program, Chapter 2 for Building Commissioning requirements. All mechanical systems will be commissioned as required.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide access to all mechanical equipment rooms through the building exterior walls. Provide roll up doors for mechanical room access. Arrange mechanical equipment so that any piece of equipment can be replaced without removal of other equipment.

All equipment and materials will be free of damage. Bent coil fins will be combed out. Where bent coil fins cannot be straightened, replace with new.

Locate and size 6" thick reinforced concrete housekeeping pads for base mounted equipment in mechanical rooms in accordance with actual equipment purchased. Extend pad beyond equipment for 6" in all directions. Provide with chamfered edges.

D309002 ROLL UP DOOR HEATING

Provide heated curtain fans at roll up doors.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide fixed plate enthalpy energy recovery in the air handling system.

Ducts and pipes passing from unsecured to secured areas will have man bars and other security measures as required. See the Marine Corps physical security measures in MCO 5530.14A and UFC for specific requirements.

--End of Section--

D40 FIRE PROTECTION – P1512F RENOVATE M107

Refer to Part 4 Section D40 for performance requirements of the building elements included in the fire protection systems. Comply with the latest editions of UFC 1-200-01, UFC 3-600-01, UFC 4-021- 01 and NFPA codes at the time of contract solicitation.

SYSTEM DESCRIPTION

Provide an integrated fire alarm/ mass notification system and fire suppression system capable of notifying building occupants inside the facility of an emergency event. This scope of work includes the installation of equipment and components and completing all programming necessary to fully control/interface/supervise building systems and transmit all alarm signals to the base reporting system.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. All equipment must be installed per the criteria of PTS section D40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

All Design Documents, (i.e., Fire Protection Design Analysis, Building Code Analysis, Life Safety Analysis, plans, specifications, and calculations) developed for Section D40 must be prepared by, or under the supervision of the design/build contractor's Qualified Fire Protection Engineer (QFPE) as detailed in UFC 3-600-01 and FC 1-300-09N.

The services of a Fire Protection Quality Control Specialist (FPQC) are required. Roles and responsibilities of the FPQC are defined in Specification Section 01 45 00.05 20 (Design and Construction Quality Control). The QFPE and the FPQC must be registered professional engineers who have passed the Fire Protection Engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and have relevant experience. The QFPE may serve as the FPQC.

GENERAL DESIGN AND INSTALLATION REQUIREMENTS

Prior to the start of design, the QFPE must meet with the NAVFAC FPE to discuss and confirm the extent and types of fire protection systems and engineering services required. All work shall comply with the requirements of the applicable NFPA standards, including recommended portions of the text and explanatory notes, which must be considered mandatory, and with UFC documents, including UFC 1-200-01, UFC 3-600-01, and UFC 4-021-01. Develop specifications for all fire protection work using the Unified Facilities Guide Specification format (UFGS), except for UFGS Section 28 31 76, *Interior Fire Alarm and Mass Notification System, Addressable*, which is included in Part 6 of this RFP. The designer is responsible for incorporating design elements and deliverables described in the “Editor’s Notes” included with all UFGS sections.

GENERAL INSTALLATION

All work for fire protection systems (Including fire alarm, fire suppression, and firestop systems) must be provided by contractors licensed to perform such work.

Workmanship must be neat and professional. Protect systems from damage during construction. Provide parts and components shall be Listed for their particular service. Provide labels for all valves, addressable devices, panels, and controls. For any device located above a ceiling, provide legible, typed label on the ceiling to identify its purpose and location. With the exception of detection devices at ceiling level, mount all valves, panels, and controls no more than 5 ft above the finished floor. Provide clearance for access, inspection, maintenance, repair, and removal.

All conductors must be installed in conduit (EMT minimum). Pull all conductors splice free and be continuous from device to device. The use of wire nuts, crimped connectors, or twisting of conductors is prohibited. All devices must have screw terminals. Where devices are only provided with pigtails from the manufacturer, pigtails must be landed on terminal strips mounted within the junction box. All terminations must be at a terminal strip or the device screw terminals. Terminal strips are only permitted where direct connection to a device is not possible.

Provide a Knox Box at the building entrance approved by the fire department. Provide an additional Knox Box for any project including a gated and secured perimeter fence. Locate this supplemental Knox Box at the primary vehicle entrance point. Mount the Knox Box at the key pad access pedestal to allow fire department access if a gate/fence will be secured after hours.

DESIGN DRAWINGS/SPECIFICATIONS

Design drawings, specifications, and Basis of Design must be prepared by, or under the direct supervision of, the QFPE. Design submittals must comply with the FC 1-300-09N (Navy and Marine Corps Design Procedures), including but not limited to, Section 4-6 (Fire Protection Investigations and Survey), Section 5-8 (Fire Protection Basis of Design), Section 6-8 (Fire Protection Calculations), and 7-10 (Fire Protection Drawings).

INSTALLATION SHOP DRAWING REQUIREMENTS

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician who holds a current certification in the field of Fire Protection Engineering Technology with minimum certification in the appropriate subfield as noted below.

- Fire Alarm Systems only (no Mass Notification element)– Level III
- Combination Fire Alarm/Mass Notification Systems - Level IV
- Fire Sprinkler Systems (water only) - Level III

All installation drawings, shop drawings or working plans, calculations, and other required pre-construction documentation must be reviewed by the QFPE prior to submission to government for review. Documents must be signed and sealed or letter attached that is signed and sealed indicating QFPE review of submittal. All plans received without documentation of QFPE review will be rejected and returned without review.

CONTRACTOR INSTALLATION REQUIREMENTS

All fire protection systems installation work must be performed by, or under the supervision of a NICET technician having minimum Level III certification who must conduct onsite inspections each week that work is performed. Submit licenses and certifications to the Contracting Officer prior to the start of work. Signed weekly inspection reports confirming compliance with the

Contract and NFPA standards to the Contracting Officer's Technical Representative each week. Record of Completion forms must be signed by the NICET certified supervising installer for each fire protection system.

COMMISSIONING REQUIREMENTS

Commissioning procedures must comply with NFPA and NAVFAC criteria. All fire and life safety systems must be fully pre-tested by the contractor with the QA/QC manager present. Pre-final acceptance testing must be witnessed by the QFPE. Final acceptance testing must be requested by the QFPE in writing after successful completion of the pre-final acceptance test. The final acceptance test will be witnessed by the NAVFAC FPE for government acceptance. Once the system is accepted, it will be placed in service prior to occupancy. The Contractor is responsible for all cost and time delays caused by system retesting as a result of final acceptance testing failure.

D4010 FIRE ALARM/DETECTION AND MASS NOTIFICATION SYSTEMS

The project renovates an existing building do provide a complete new integrated fire alarm/detection and mass notification system capable of notifying building occupants inside and near the facility in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-18, UFC 4-021-01 and NFPA 72. The scope includes demolition of the existing fire alarm system, including cabinets, field devices, and circuits. Existing conduit may be reused as permitted by NFPA 70. Provide new equipment manufactured by Simplex, Notifier or Fire-Lite. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system that also serves as a mass notification system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements. The fire reporting portion of the system must be compatible with the existing base fire reporting system.

Provide all fire alarm circuits in Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC) unless noted otherwise. All raceways must be factory painted red. Flexible Metallic Conduit (FMC) must not exceed 6 feet and is only be permitted for connections from junction boxes to field devices. Provide a raceway listed for the installation in wet locations, such as Rigid Metallic Conduit (RMC) and Liquidtight Flexible Metal Conduit (LFMC). Wet locations are considered any location within a 5 ft radius of fire suppression equipment, throughout a fire pump room/building, and as defined by NFPA 70.

Provide a laminated building floor plan (22” by 34”) mounted at the main entrance of the building, adjacent to the annunciator. Identify the location of the FMCP, LOC, remote power supply panels, and all initiating devices. The drawing must include room numbers.

Provide a steel Document Cabinet with a hinge-mounted door and lock with lock cylinder keyed the same as the FMCP. Mount the Document Cabinet on the wall adjacent to the FMCP. Prominently label the exterior of the cabinet "SYSTEM RECORD DOCUMENTS". Cabinet must include paper copies and a CD of Fire Alarm As-Built drawings, List of Contact ID descriptions for the fire alarm addressable devices, Sprinkler As-Built drawings, NFPA 72 & NFPA 13 Records of Completion. CD must also include site-specific software and O&M manuals stored in a CD jewel case. Cabinet must be of a minimum size to accommodate all required documents.

Provide a steel Parts Box with a hinge-mounted door and lock with lock cylinder keyed the same is the FMCP. Mount the Parts Box on the wall adjacent to FMCP. Cabinet must be of a minimum size to accommodate all spare parts as defined in the project specifications, plus four fuses for each fused circuit.

FMCP REQUIREMENTS

The fire alarm control unit and mass notification control unit (FMCP) must be capable of handling a minimum of 500 individually identified addressable devices. Provide Class B Notification Appliance Circuits (NACs), Class B Signaling Line Circuits (SLCs), and Class B Initiation Device Circuits (IDCs). Each NAC and SLC must include 25 percent spare capacity based on load and voltage drop. Mount FMCP and associated cabinets such that the top of each cabinet is no more than 6 ft above the finished floor. Provide conduit fill calculations to ensure 40% fill does not exceed limits of NFPA 70.

A lockout code must not be installed in the hardware, firmware, or software of the fire alarm system. Installer and operator codes must remain as the factory default setting.

Provide amplifiers sized for 25% spare power capacity. Battery calculations shall be based upon 48 hours of standby time and 15 minutes of alarm time or 60 minutes of alarm time, whichever is greater.

The technical training must include classroom instruction as well as hands-on programming, troubleshooting and diagnostics exercises. Provide three laptops for the government’s retention. Laptops must be Windows 10 based and include system software, special connecting cable(s), proprietary equipment necessary for the maintenance, testing and reprogramming of the fire alarm equipment and system. Factory training must occur within six months of system acceptance.

Provide a LCD remote annunciator located at the designated primary entrance. Coordinate final installation location with user and NAVFAC. Provide remote annunciator with control functions the same as the FMCP. Control functions must be accessible only by user code or secured behind a locked panel.

Provide a local operating console (LOC) at the primary entrance vestibule. Coordinate final installation location with user and NAVFAC. Microphone and pre-recorded buttons at LOC must be accessible and not installed behind a locked panel.

Obtain prerecorded mass notification messages from the installation fire alarm technician. Program mass notification pre-recorded message buttons to be non-latching that do not require a full system reset to activate or deactivate. Program pre-recorded message buttons such that a higher priority message will override a lower priority message. Once the higher priority message button is deactivated the lower message that is still activated must begin playing again. Program the system to allow any mass notification message to override the fire message. Upon deactivation of the mass notification message, the fire alarm message must automatic resume. Program live voice microphone paging to override all fire alarm and pre-recorded mass notification message. Microphone activation must not require more than two functions. Post clear instructions for operation (keying the microphone and turning a key switch to activate is an example of two functions).

The government will provide the TRX-401 mass notification transceiver. Provide space, antenna, conduit, cable, pull strings, and equipment as shown on the TRX-401 installation detail provided in Part 6.

Prior to demolition in preparation for the building renovation, contact base fire alarm technicians and allow time for their retrieval of fire alarm and/or mass notification panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

INITIATION DEVICES

Provide a complete and useable fire alarm system including manual stations, system smoke detectors, duct smoke detectors, audio/visual notification appliances, electrical supervision of all sprinkler system alarm and supervisory devices. Provide an individual monitor module for each fire sprinkler system water flow switch. Provide all initiation devices with a permanent label adhered to the device identifying the addressable point. Handwritten labels are not permitted.

Provide flush-mounted manual pull stations. Provide manual pull stations within 5 feet of all exterior doors, including but not limited to mechanical rooms, electrical rooms, and communication rooms with direct exterior access. Provide double action type manual pull stations with mechanical reset features. Break glass type manual stations are not permitted.

Magnetic door hold-open devices must release upon activation any fire alarm initiating device of the building fire alarm system or upon loss of primary power to the FACP. Smoke detectors dedicated to door release are not permitted.

Provide carbon monoxide detectors in accordance with UFC 3-600-01. Detector activation must initiate a distinct message on all notification appliances and transmit an independent dedicated signal to the base reporting system.

NOTIFICATION APPLIANCES

Provide combined fire alarm and mass notification appliances. Provide white notification appliances with factory applied, permanent, red "ALERT" lettering with clear strobe lenses. Provide ceiling-mounted notification appliances in all areas with suspended ceiling systems. Where exterior speakers are required by UFC 4-021-01, provide exterior weatherproof notification speakers “bull horn” style. All conduit penetrations for exterior equipment must enter the junction box or equipment from the bottom to minimize water intrusion. Provide duct seal inside all conduits that penetrate exterior walls per NFPA 70, Section 300.7.

Visual notification appliances are required in all public use areas, common use areas, and employee work areas to include office suites and areas intended to have more than four desks/occupants. Offices that are designed for a single office worker, regardless of the calculated occupant load, do not require a strobe unless the room is designated as an ABA compliant space

FIRE ALARM REPORTING

All fire alarms, supervisory alarms and trouble conditions indicated at the FMCP must be transmitted to the fire alarm receiving station. Provide point specific transmission via contact ID format with the address, location, and description of the condition as it appears on the FMCP.

Provide a point reporting digital alarm communicator transmitter that is compatible with the Sur-Gard System III Multi-platform Digital Telephone Receiver. Provide two CAT 6 UTP cables inside one-inch conduit from the FMCP to the telephone equipment room. Make connections to telephone equipment per the base’s telephone requirements. See Part 6 for schematic drawing of the FARS and the mass notification equipment.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

The water supply information below is provided for bidding purposes. A hydrant flow test was conducted on 05 August 2019 in proximity to the project site on the distribution loop around Building M107. Refer to Part 6 for the water flow test report and test hydrant locations.

Hydrant flow test summary:

- Pressure Hydrant: Hyd. No. 8-86-10:
- Static pressure: 65 psig (gauge). Residual pressure: 50 psig (gauge).
- Flow Hydrant: Un-numbered Hydrant at South end of building adjacent to Power Train Lab 51.
- Measured Flow: 1,529 gpm

The proposed design point of connection to existing water supply must be approved by the Contracting Officer prior to proceeding with any work. The QFPE shall conduct additional flow tests after contract award prior to any design submissions. Water flow testing must be coordinated through the Contracting Officer. The Contractor is responsible for providing all flow testing equipment. Perform flow testing in accordance with NFPA 291. The QFPE must prepare and submit a flow test report to the Contracting Officer for review by the NAVFAC FPE. This report must compare the flow test results with the hydrant flow test summary provided above.

Modify the existing 5 sprinkler service entrances to provide each with a new reduced pressure zone backflow preventer. Include a forward flow test connection, with one 2 ½” hose connection for every 250 gpm of anticipated flow of the fire sprinkler system.

Hydraulic calculations for the fire suppression system shall include a 12-psi loss through the backflow preventer.

Modify the existing fire department connections (FDC) to provide a 5” Storz connection on a 30-degree galvanized elbow at the FDC. Check valve on FDC must be installed at fire protection system manifold inside the building. Provide ball drip valve on the FDC pipe.

D4040 SPRINKLER SYSTEMS

Renovate the existing wet pipe fire sprinkler system to accommodate building renovations and to provide complete protection throughout the facility in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-7 and NFPA 13. Sprinkler system design demand and minimum sprinkler K-factor must be as specified in Table 9-3 and Table 9-4 of UFC 3-600-01. System modification include replacing all sprinklers, removing and replacing existing sprinkler piping as necessary, replacing each of the 5 existing 6-inch sprinkler alarm check valves. Provide new listed sprinkler riser assemblies with control valve, flow switch, main drain and test valves with pressure relief valve, and system and supply pressure gauges. Provide new reduced-pressure principle backflow preventers for each sprinkler riser assembly.

Wet pipe sprinkler systems shall include pressure relief and air venting on each system in accordance with NFPA 13.

Provide quick-response sprinklers with ordinary temperature rating in areas with finished ceilings. Provide quick-response upright sprinklers with ordinary temperature rating in areas with exposed ceilings. Utilize higher temperature ratings where required by NFPA 13.

The use of flexible sprinkler hose is prohibited.

Saddle tees using rubber gasket fittings are only permitted when connecting to existing piping for additions or modifications. Saddle tees must use a connection method that completely wraps around the pipe.

Provide training for the active systems consisting of a minimum of two (2) eight (8)-hour sessions to accommodate all shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

D4090 OTHER FIRE PROTECTION SYSTEMS

PORTABLE FIRE EXTINGUISHERS

Fire extinguishers are required by the FY20 National Defense Authorization Act that contradicts UFC 3-600-01. Provide fire extinguishers as required by NFPA 101 and NFPA 10. Include fire extinguishers in the Furniture, Fixtures & Equipment (FFE) Package. Refer to ESR Section C103007 for fire extinguisher cabinets and brackets. Electronic Monitoring of fire extinguishers and cabinets is not required. Provide clean agent fire extinguishers for electronic equipment installations (server rooms). Locate the clean agent fire extinguisher within the server room adjacent to the primary egress door.

--End of Section--

D50 ELECTRICAL – P1512F RENOVATE M107

SCOPE

The scope of this section is to describe the systems and components within buildings and extending no more than 5 feet beyond building exterior walls. Exterior systems and components are described in ESR G40 of this RFP.

Provide systems complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must".

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detailed bubbles or notes used on the floor plan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floor plans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

SYSTEM DESCRIPTION

Demolish the existing power distribution equipment, wiring devices, luminaires, controls, motor controllers, disconnecting means, and associated conduit, boxes, pathways, wiring, supports, and appetences in their entirety back to the existing main switchboard. Retain the existing main switchboard to serve the renovated building.

Where conduits or boxes are embedded in existing partitions that are to remain, or where conduits are installed below the slab on ground, the conduits may be abandoned in place. Cut abandoned conduits at the finished surface and seal to prevent infiltration of debris, water, or vapors. Provide blank face plates for unused boxes and seal conduits associated with the unused box to prevent infiltration of debris, water, and vapors. Conduits and boxes may be reused for new work where approved in writing by the Contracting Officer.

Provide an interior electrical system consisting of but not limited to Distribution and Lighting Panelboards, Dry Type Transformers, Conduits, Feeder and Branch Circuits, Motor Control Equipment, Lighting and Branch Wiring, Communications, Security and Alarm Systems, Emergency Generator, Emergency Lighting and Power, Grounding, Lightning Protection, and UPS, including accessories and devices as necessary and required for a complete and usable system.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Install interior electrical distribution equipment and components in spaces accessibly only by qualified persons. Provide a main electrical room to house the service entrance switchboard and branch circuit distribution equipment. Provide additional electrical rooms as required throughout the building to minimize branch circuit length to less than 200 feet for 120V circuits and 400 feet for 277V circuits. Provide electrical panels in mechanical rooms, computer rooms, and telecommunications rooms to serve loads within each respective room.

Provide branch circuit panelboards rated at 480Y/277V to serve lighting and large mechanical equipment. Provide dry-type transformers feeding 208Y/120V panelboards to transform the voltage where necessary to serve receptacle loads and small (less than ¾ hp) motor loads.

Provide individual feeders to each panelboard or transformer. A distribution system consisting of cable taps and/or through-feed panels is prohibited.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15% spare circuit and load capacity at all levels of the power distribution system, including life safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

EQUIPMENT ENCLOSURES

Provide enclosures for equipment described in this section at installed locations with the following environmental ratings:

- Indoor, Dry and Clean Locations: NEMA 250, Type 1.
- Outdoor Locations: NEMA 250, Type 4X, stainless steel
- Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
- Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.

- Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids; equipment in Mechanical Rooms, Plumbing Rooms, and Elevator Machine Rooms; equipment in unconditioned spaces: NEMA 250, Type 12.
- Hazardous Areas: NEMA 250, Type 7 with cover attached by Type 316 stainless steel bolts.

SUSTAINABILITY

Provide electrical systems and components that support project sustainability and energy goals.

ANTITERRORISM

Provide bracing of electrical equipment which is suspended and weighs more than 31 pounds.

SEISMIC BRACING

Provide bracing of electrical equipment to resist seismic events based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING

Test new electrical equipment in accordance with NETA acceptance testing specifications. Test existing electrical equipment remaining in service in accordance with NETA maintenance testing specifications.

COMMISSIONING

Commission all systems in accordance with RFP Part 3 Chapter 2, Section 01 33 29.05 20 *Sustainability Requirements for Design Build* and UFC 01-200-02 *High Performance and Sustainable Buildings*.

EQUIPMENT IDENTIFICATION

Provide instruction and warning signs, identification labels and nameplates, and markings for equipment, wiring, raceways, boxes, and cabinets. Coordinate naming convention with Camp Lejeune Public Works Department.

Provide multi-line engraved nameplates on the exterior of panelboards, switchboards, switchgear, enclosed switches and breakers, transformers, and packaged equipment enclosures with the following information:

- Device Identification
- Device Rating (voltage, phase, ampacity, and kVA)
- Power source (Source panel and circuit number)

Figure 1: Transformer Identification Example

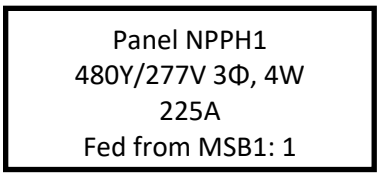


Figure 2: Transformer Identification Example

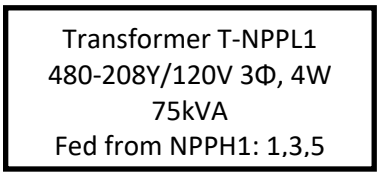


Figure 3: UPS Identification Example

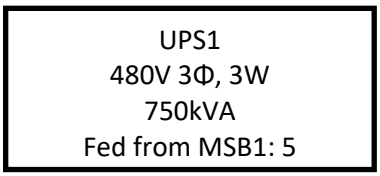
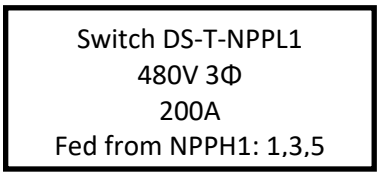


Figure 4: Disconnect Switch Identification Example:



CONDUCTOR IDENTIFICATION

Label conductors with source panel circuit number at each junction box and termination point.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

Provide insulated copper conductors in conduit for all feeders. Refer to D502001 for raceway application for feeders.

D501001 MAIN TRANSFORMERS

NOT USED

D501002 SERVICE ENTRANCE EQUIPMENT

Reuse the existing service feeder and main switchboard.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

Provide enclosed and ventilated dry type transformers to step down secondary voltages for general purpose outlets and other low voltage equipment.

Terminate the transformer secondary at a single overcurrent protection device. Double-lugging the secondary terminals to serve multiple panelboards is prohibited.

Provide transformers with two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards to serve the loads.

Provide panelboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses. Where fed from K-rated transformers, neutral buses must be 200% the capacity of the phase buses.

Provide panelboards with bolt-on circuit breakers. Plug-in circuit breakers may be used in distribution panelboards if provided with an individual positive locking mechanism that requires operation for removal of the breaker. Load centers are prohibited. Fused switch panelboards are prohibited.

Provide panelboards with spaces that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide panelboards with main circuit breakers where they are not located within sight of their upstream overcurrent protective device or disconnecting means and where otherwise required by Code.

Provide panelboards with fully hinged front covers with a hinged door for accessing circuit breaker handles (door-in-door arrangement).

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide enclosed circuit breakers with an enclosure suitable for the environment in which it will be installed.

D501006 MOTOR CONTROLLERS

Provide individual motor starters with disconnect switches, combination motor starters, variable speed drives, and manual motor starters for motor controls as required by mechanical equipment. Provide all circuits and connections for motors.

Provide variable speed drives without external bypass.

Provide variable speed drives with 5% bus reactors.

D501090 OTHER SERVICE AND DISTRIBUTION

SURGE PROTECTIVE DEVICES

Provide transient voltage surge protective devices (SPD) at the main switchboard and at panelboards located in computer rooms serving the computer equipment.

SAFETY DISCONNECT SWITCHES

Provide 600V rated, heavy-duty type fused and non-fused, safety disconnect switches with external operating handle and lock-out, tag-out provisions. Provide switches with an enclosure suitable for the environment in which it will be installed.

D5020 LIGHTING AND BRANCH WIRING

Provide lighting and general-purpose receptacles throughout all spaces.

Provide the necessary special receptacle configurations to serve special equipment.

Provide one duplex receptacle at each television/display monitor. Locate the receptacle behind wall-mounted equipment.

Where equipment or furniture is located on a wall, provide receptacles and/or connections serving that equipment or furniture on the wall. Where equipment or furniture is located away from a wall, provide receptacles and/or connections in multi-service floor boxes. Use of power poles is prohibited. Locate devices such that they are not made inaccessible by furniture panels and supports or fixed equipment after the furniture and equipment is installed.

Provide one multi-service floor box or poke-through assembly for each pair of adjacent student desks in each classroom to support desktop computer and monitors at each desk. Locate floor box so that it accessible from both desks. Where an odd number of student desks occur, provide the remaining desk with one multi-service floor box. Provide one multi-service floor box or poke-through assembly at each instructor’s location in each classroom.

Provide one multi-service recessed floor box or poke-through assembly under the table in each conference room. Center the box or poke-through assembly under the table.

Provide poke-through assemblies in existing slabs where no raised access floor is installed. Provide recessed multi-service floor boxes in all other areas.

Do not surface mount devices on new finishes.

Provide duplex receptacles with USB charging capability where receptacles are required on Briefing Room, Conference Room, and Classroom walls. Provide one wall mounted duplex receptacle with USB charging capability for each table in Break Rooms and Lounges. Provide one wall mounted duplex receptacle with USB charging capability at the seating area in Lobbies, Waiting Rooms, and Reception areas.

CIRCUITING REQUIREMENTS

Connect no more than six (6) duplex convenience receptacles to a single 20A circuit.

Connect no more than two (2) multi-service floor boxes to a single 20A circuit in Classrooms.

Provide individual dedicated circuits and receptacles or connections for each instance of equipment rated at 8 full load amps (FLA) and higher and for each of the following equipment:

- Copier
- Printer
- Multi-function device
- Fax machine

- Shredder
- VTC console
- Projector
- Refrigerator
- Coffee maker
- Microwave oven
- Garbage disposer
- Toaster
- Electric water cooler
- Vending machine
- Ice machine
- Washer
- Dryer
- Hand dryer
- Fire alarm control panel
- EPO control panel (multiple dedicated circuits may be required as described elsewhere)
- EMCS control panel
- Telecommunications and/or server equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- Telecommunications and/or server equipment rack (multiple dedicated circuits may be required as described elsewhere)
- AV equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- AV equipment rack (multiple dedicated circuits may be required as described elsewhere)

Provide dedicated circuits for televisions/display monitors. Multiple receptacles that support televisions/display monitors may be circuited to the same dedicated circuit.

WIRING DEVICES

Provide wiring devices connected to the normal power source with either a white body or dark brown body, as determined by the surrounding wall finish. Provide dark brown or black devices where installed on dark surfaces and white devices where installed on light surfaces.

Provide stainless steel face plates for interior wiring devices and empty outlet boxes.

Provide exterior receptacles with thermoplastic enclosures rated as “weatherproof while in use”.

Provide receptacles with USB charging capability with a combination125VAC NEMA 5-20R duplex receptacle and two 5VDC USB ports; one Type A port capable of delivering a maximum

2.4A of charging capacity and one Type C port capable of delivering a maximum of 3.0A of charging capacity (5A total charging capacity).

MULTI-OUTLET RACEWAYS

Provide extruded aluminum with clear anodized finish, dual-compartment, surface-mounted multi-outlet metal raceways with internal divider. Provide separate snap-on covers for each compartment. Provide the power compartment with NEMA 5-20R duplex receptacles at 18” on center. Where more than four (4) receptacles are installed in a raceway, connect adjacent receptacles to alternating circuits Refer to D5030 for communications & AV faceplate requirements.

UNDERFLOOR MODULAR WIRING SYSTEM

Provide a modular power wiring distribution system in spaces with raised access flooring to provide power to desks, tables, work benches, and equipment.

Provide a complete modular underfloor power wiring distribution system comprised of power distribution boxes, home run cables, multi-service recessed floor boxes, and all necessary interconnecting cables and accessories.

Provide pre-fabricated underfloor power distribution system components with plug-and-play modularity for use below Raised Access Flooring systems. Components and conductors must be listed for use in environmental air handling spaces. Provide manufacturer’s dust caps on unused plug-in connectors.

Install underfloor power distribution system components with adequate clearance to allow access to wiring compartments, removal of covers, and access to plug-in connector ports. Arrange the underfloor components such that no plug-in connector ports are obstructed.

Locate power distribution boxes in readily accessible locations below the Raised Access Floor. Identify the location of the distribution boxes on the ceiling grid above the box using a label placed at the intersection of the grid Ts. Provide one (1) spare circuit in each power distribution box.

MULTI-SERVICE RECESSED FLOOR BOXES

Provide multi-service recessed floor boxes with independent wiring compartments capable of accepting duplex receptacles, AV faceplates, and telecommunications faceplates. Provide telecom adaptor plates to accept current Base Telephone standard jack sets per local 27 10 00.Provide the power compartment with two (2) NEMA 5-20R duplex receptacles.
Provide boxes with stamped steel or cast-iron construction, as applicable to the installation location, and provide each compartment with multiple conduit knockouts capable of accepting conduit sizes up to and including 1 1/4” diameter.

Provide die-cast aluminum covers with self-closing cable egress doors. Covers must open 180° and close flush with the finished floor while in use. When closed, covers must comply with requirements for UL scrub water exclusion. Provide black covers in dark floor finishes and natural aluminum covers in light floor finishes.

Where raised access floors are provided, provide multi-service recessed floor boxes that are compatible with the modular wiring system and install floor boxes flush in raised access flooring.

MULTI-SERVICE POKE-THROUGH ASSEMBLY

Provide recessed multi-service poke-through assemblies that consist of a recessed insert body and a cover. Provide the insert body with independent wiring compartments capable of accepting duplex receptacles. Provide the power compartment with two (2) NEMA 5-20R duplex receptacles. Provide the insert body with an intumescent firestop material to maintain the rating of the floor slab.

Provide die-cast aluminum covers with self-closing cable egress doors. Covers must open 180° and close flush with the finished floor while in use. When closed, covers must comply with requirements for UL scrub water exclusion. Provide black covers in dark floor finishes and natural aluminum covers in light floor finishes.

D502001 BRANCH WIRING

Provide insulated copper THHN-2/THWN-2 or XHHW-2 single conductors in raceway for all branch wiring. Type AC and MC cables are prohibited.

Provide solid conductors for #10 AWG and smaller and stranded conductors for #8 AWG and larger. The minimum power and lighting conductor size is #12 AWG.

Provide a neutral conductor with each phase conductor in circuits feeding single phase loads requiring line-to-neutral service. Shared neutral conductors are prohibited.

RACEWAY APPLICATION FOR FEEDERS AND BRANCH WIRING

Provide expansion fittings in raceways crossing building expansion joints and seismic joints to compensate for building expansion and contraction.

The minimum raceway size for interior and above grade exterior applications is ¾” diameter. The minimum raceway size for below grade exterior applications is 1” diameter.

Outdoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed Conduit: GRC.
- Concealed Conduit, Aboveground: IMC.
- Underground Conduit: RNC, Type EPC-40-PVC direct buried.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

Indoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed, Not Subject to Physical or Severe Physical Damage: EMT.
- Exposed and Subject to Physical or Severe Physical Damage: GRC.
- Concealed in Ceilings and Interior Walls and Partitions: EMT.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- Connection to Recessed and Semi-Recessed Luminaires: FMC, except use LFMC in damp or wet locations.

- Damp or Wet Locations, Unconditioned Spaces, Spaces Subject to High Humidity: IMC.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting, area lighting, and manual and automatic controls. Controls include manual wall stations, occupancy sensors, vacancy sensors, daylighting controls, automatic lighting shutoff systems, and dimming systems.

LUMINAIRES

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide drivers that provide smooth and continuous dimming from 100% output to 10% output for standard-performance dimming luminaires and 100% output to 1% output for high-performance dimming luminaires. Step dimming drivers are prohibited.

Provide high-performance dimming drivers in conference rooms, classrooms, training rooms, and auditoriums.

Provide vanity luminaires above all mirrors in single-occupancy restrooms.

Provide blue beacon luminaires in classified spaces that are directly accessible from a corridor to alert the occupants of the space of the presence of uncleared persons in the space.

Pendant luminaires may use lenses, baffles or louvers, or perforated housings to shield the downlight component. Do not provide pendant luminaires in continuous lengths exceeding 16 feet.

Provide luminaires with the following minimum luminaire efficacy (LE):

- Recessed 1x4, 2x2, or 2x4 troffer: 90 Lumens per Watt (LPW)
- Surface or recessed downlight: 80 LPW
- Track or accent: 40 LPW
- High Bay/Low Bay: 90 LPW
- Linear Industrial or Strip Light: 80 LPW
- Suspended linear or non-linear ambient: 85 LPW
- Surface linear or non-linear ambient: 80 LPW
- Recessed linear or non-linear ambient: 85 LPW

LIGHTING CONTROLS

Provide devices including, but not limited to, drivers, wall stations, occupancy sensors, vacancy sensors, time-based scheduling, architectural dimming controls, and daylight dimming controls.

Devices using wireless radio frequency, Bluetooth, Wi-Fi, or other wireless technologies are prohibited. Obtain written approval from the COR to use devices that have infrared transmitters/receivers.

Provide occupancy and vacancy sensors to provide 100% minor motion coverage of the room or area controlled by the sensor. Where multiple sensors are provided to control a single room or area, provide overlapping minor motion sensor coverage taking into consideration all obstructions to include FF&E, collateral, and other Government furnished equipment that could impede the sensor coverage.

Provide light switches controlling uncleared visitor indicator luminaires with a gray body. Provide the faceplate containing switches controlling uncleared visitor lights with a label reading “Uncleared Visitor Lights” above the switch controlling the uncleared visitor indicator luminaires.

Provide low voltage control stations with momentary push-buttons with pilot light or indicator light to confirm operation.

Do not group public spaces into a single lighting control zone. Lighting control zones must not control luminaires on different floors.

Provide programmable multi-zone, multi-scene, architectural dimming controls in conference rooms, classrooms, training rooms, and auditoriums.

Architectural dimming controls consist of a master control station and additional wall stations used to recall preset lighting “scenes” consisting of multiple zones of lights and/or motorized shades and screens. Provide a minimum of six pre-programmed scenes, plus full on and full off, for each space or room with architectural dimming controls unless noted otherwise. Provide the capability to adjust each lighting zone individually from the master station without overwriting the scene programming.

Provide dimmers, modules, and controls that are capable of smoothly dimming LED lighting sources from 100% to a minimum of 1% of full light output.

Dim luminaires connected to life safety power sources along with the normal lighting in the space. Upon loss of normal power, or upon receiving a signal from the fire alarm system, the designated life safety luminaires must automatically return to full brightness regardless of selected scene or occupancy.

In spaces with moveable partitions, the lighting controls must be capable of operating independently when the partition(s) are closed and in unison when partition(s) are open. Provide partition sensors that automatically initiate combined and individual space operation modes based on the position of the moveable partition. Devices that require occupant input to select combined and individual operation modes are prohibited.

D5030 COMMUNICATIONS AND SECURITY

The Room Requirements Section identifies locations for communications and security systems and equipment, unless noted otherwise in the following sub-elements.

D503001 TELECOMMUNICATIONS SYSTEMS

Provide a main distribution frame (MDF) to house telecommunications equipment and cabling as well as service provider equipment and cabling. Additionally, provide floor or area serving intermediate distribution frames (IDF) to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide a complete Telecommunications horizontal and backbone distribution system per user requirements, maintainer requirements, latest local provider and applicable Using Military Department standards and criteria, UFC 3-580-01, ANSI/TIA 568C, 569, 606, 607, and 758 standards for support of Non-Secret Internet Protocol Router Network (NIPRNET) and Secret Internet Protocol Router Network (SIPRNET) Voice and data communications for building 1512 LOG OPS School. Telecommunications systems must include, but not be limited to, horizontal and vertical pathways consisting of underground duct bank systems, sleeves, cable tray, EMT conduit, pull boxes, pull cords and outlet boxes, patch panels, equipment racks, cable management, telecommunications ground bus system, fire-rated plywood backboards as required to support the user requirements. Voice and data system cabling and outlets will consist of CAT 6 or higher rated horizontal UTP cabling and multimode fiber, patch panels, patch cords, 8-pin/8 contact (8P/8C) RJ-45 connectors, SC fiber connectors, copper and fiber backbone cabling, and cross connect equipment.

BACKBONE CABLING

Secondary fiber backbone: Provide (1) 12 strand OS2 single-mode fiber optical and (1) 12 strand OM4 multi-mode fiber optic cable from the MDF to each new IDF. Provide fiber optic rack-mounted termination cabinets required to support classified, unclassified, and training networks. Additional backbone cabling will be required for training networks. Coordinate with Government for requirements.

Secondary copper backbone: Provide 50 pair CAT 3 cabling from the MDF to each IDF. Provide copper terminal equipment for termination in each IDF. Copper terminal equipment selection per the latest local provider and applicable Using Military Department standards and criteria.

HORIZONTAL CABLING

Provide (4) CAT 6 UTP green color for unclassified networks (i.e NIPR, etc.) and CAT6A UTP for simulation networks (i.e. CACCTUS, etc) from rack-mounted patch panels (in each IDF) to each WAO. Provide (2) CAT 6 UTP green color for WAP /DDC / FACP/ Elevators/ TV displays/ Utility Monitoring or metering. Provide (4) CAT 6 UTP red color for classified networks (i.e. SIPR). Provide (1) CAT 5e UTP green color for each synchronized clock / wall phone. Jack colors must be the same as CAT 6 cable colors. Provide a dedicated above ceiling basket-type cable tray system for NIPR/VOIP, SIPR and Training Networks.

WORK AREA OUTLET (WAO)

Provide double-gang steel electrical boxes for voice/data work area outlets. Provide boxes with a minimum dimension of 5-inches square in standard gypsum board walls and 4-11/16 inches square in CMU block walls. Provide a 1-1/4 inch conduit from each double-gang outlet box to the cable tray system. Mount voice/data work area outlet boxes at 18” above finished floor and minimum6 inches away from any power receptacle. Provide voice/data outlet locations with a 4-position faceplate with four RJ-45 (8P8C) connectors. All work areas will contain a minimum of two communications face plates. Any work area larger than 80 square feet will require additional face plates to service any work location in the room within 6 feet of a faceplate. Refer to section 27 10 00 for WAO details. Provide RJ-11 jack at synchronized clock locations.

Provide single gang steel electrical boxes at wall telephone locations with a 1-inch conduit from the outlet box to the cable tray system. Example locations for wall telephones are utility spaces,

IDF. Mount wall telephone work area outlet boxes at 48” AFF. Provide wall telephone outlet locations with a 1-position faceplate with metal mounting studs.

INTERMEDIATE DISTRIBUTION FRAME

Provide minimum dimensions 10’x10’ or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The IDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. Each IDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39” separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

Provide a dedicated IDF for training network servers and distribution equipment. Coordinate with Government for requirements.

MAIN DISTRIBUTION FRAME (MDF)

Provide minimum dimensions 10’x10’ or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.

The MDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. The MDF will house ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39” separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

LABELING AND TESTING

Label and terminate backbone, horizontal cabling, and termination hardware in accordance with the latest Local provider and applicable Using Military Department standards and criteria.

Test UTP Category 6 and 6A cabling in accordance with the minimum standards established in ANSI/TIA-568-C.1 and ANSI/TIA-568-C.2-1.

Test fiber optic cables and terminations in accordance with the minimum standards established in ANSI/TIA-526-7B and ANSI/TIA-526-14B.

Perform tests at both ends of cables.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a Public Address system with speakers in all common spaces exterior speakers for outside activity spaces

Interface the Public Address System with the Mass Notification System.

D503004 TELEVISION SYSTEMS

Provide RG-6 coaxial cabling and (2) CAT 6 green cables from the closest IDF to each television location. Provide coax cabling that traverses a secure boundary with an RF filter. Terminate coaxial cabling at outlet side, coil coaxial cabling inside IDF. Leave enough cabling to terminate anywhere inside the IDF.

D503005 SECURITY SYSTEMS

NOT USED

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

Refer to E20 for the Best Value Determination process for AV systems.

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

Provide General Construction Items (Electrical) including, but not necessarily limited to, all connections, fittings, boxes and associated equipment needed by this and other sections of this RFP as required for a complete and usable system.

Firestop conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors in accordance with Section C10, Interior Construction.

D509002 EMERGENCY LIGHTING AND POWER

Provide power and wiring for emergency lights and exit lights throughout the facility.

EMERGENCY LIGHTING AND EXIT SIGNS

Emergency lighting must be unswitched except where required for energy savings and where control is required to achieve complete darkness to meet the needs of the space (conference/briefing rooms, simulation spaces, auditorium, etc.). Where emergency lighting is switched or dimmed, the designated emergency lighting fixtures must immediately return to full brightness upon loss of normal power or signal from the fire alarm system. Devices necessary to facilitate this function must be UL Listed for the application and for use in emergency circuits.

Provide self-powered exit signs and luminaires to provide the required egress path marking and emergency lighting.

Provide self-powered exit signs and emergency lighting units with a sealed, maintenance-free, battery, a fully automatic solid-state charger, a test push button and indicator light, and an integral self-testing module.

Provide exit signs with cast aluminum housing and brushed aluminum stencil face(s).

D509003 GROUNDING SYSTEMS

Provide a complete grounding system for the facility electrical and telecommunications systems.

The grounding system must bond all building systems and equipment in accordance with applicable Codes and standards including but not limited to: medium voltage distribution equipment, generators, metal equipment support structures, outdoor transformers, fencing,

building structure, building electrical and mechanical systems, raised access floor systems, lightning protection system, and communications systems to the grounding electrode system.

Provide UL listed copper, tinned copper, or silver-plated copper grounding conductors, lugs, connectors, and ground bars.

Provide a grounding electrode system for each building or structure.

Provide driven ground rods at each building column and bond to the building structure with minimum #4/0 AWG. Interconnect the building structure ground rods with a bare conductor grounding grid. Provide a bare conductor building counterpoise to bond the power system grounding electrodes, building structure grounding grid, building lightning protection grounding electrodes, and adjacent structures' grounding electrode systems. The minimum size of the counterpoise and grounding grid conductors is #4/0.

Provide copper-clad steel ground rods; minimum 3/4 inches by 10 feet in length, driven such that the top of the rod is 24 inches below grade, except in test wells.

Provide exothermic welds for below grade connections, except at test wells. Provide mechanical type connectors for above grade connections, in test wells, and in other locations where welded connections are not required.

Provide a Telecommunications grounding and bonding system in accordance with UFC 3-580-01.

Provide each ground bar with a clear 3/16-inch thick polycarbonate or acrylic cover 2 inches larger in each direction of the bar it shields.

Provide a grounding conductor with all circuits and feeders. Conduits cannot be used as the sole grounding conductor. Where multiple circuits are contained in a conduit, they may share the grounding conductor.

D509004 LIGHTNING PROTECTION

Provide a complete lightning protection system with a UL Lightning Protection Inspection Certificate certified to UL 96A, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.

Conceal LPS down conductors within the building envelope. Provide access panels or other means for inspection of down conductors in accordance with NFPA 780 requirements.

Lightning Protection Systems must not void the roof warranty. Adhesive bases are prohibited on standing seam metal roofs.

D509005 ELECTRIC HEATING

Provide power wiring and connections as required for all electric heating systems and equipment.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide power wiring and connections as required for all systems and equipment including meters and controls. Coordinate connection requirements with switchgear and pad mounted transformer kWh metering.

D509007 BUILDING PHOTOVOLTAIC SYSTEM

NOT USED

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

EMERGENCY POWER OFF (EPO) SYSTEMS

Provide maintained contact, mushroom type, twist to reset EPO buttons with a clear flip-up cover. EPO systems must disconnect power to IT equipment within the room, disconnect power to dedicated HVAC equipment within and serving the room, and perform other operations in accordance with NEC Article 645.

The EPO system power source must not originate from a source affected by operation of the EPO system.

Provide the EPO control panel as an integrated control and monitoring system with electrically operated contactors. Provide contactor voltage and current ratings consistent with type of load served. Provide the control panel in a surface mounted enclosure with key lock and with door-mounted control and pilot devices. Provide with two spare output relays of each type.

Provide the EPO control panel with the following door-mounted pilot lamps and switches:

- Preferred Power Source Available (Green lamp)
- Alternate Power Source Available (Green lamp)
- Maintenance Bypass Override(Key switch)
- Normal Operation (Green lamp)
- Maintenance Bypass (Amber lamp)
- EPO Activation (Red lamp)
- System Reset (Momentary push button or switch)
- Lamp Test (Momentary push button or switch)

Provide an output signal to Fire Alarm System from each room’s EPO system to provide the following status points per room:

- EPO system power available
- EPO activation
- EPO system in maintenance bypass

Placing EPO system in “Maintenance Bypass” allows testing of the EPO system without interrupting power to the IT or space support systems.

Locate the EPO control panel and EPO button adjacent to the entrance to the space. Where more than one entrance is provided, provide an EPO button adjacent to each entry point.

--End of Section--

E10 EQUIPMENT – P1512F RENOVATE M107

GENERAL SYSTEMS REQUIREMENTS

E1010 COMMERCIAL EQUIPMENT

The contractor must obtain the services of equipment specialists to specify audiovisual equipment. Equipment specialists shall not have any affiliation with the product specified.

All specialty equipment must be installed by qualified installers regularly engaged in installing the specialty equipment.

Provide energy using equipment per criteria listed in UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

E101003 VENDING EQUIPMENT

Government to provide and install vending equipment (four units) under separate contract. Users to provide requirements of electrical and plumbing devices to be provided by Contractor to properly support the complete functional operation of the vending equipment. Design the break rooms to provide space, utilities, and cooling to accommodate the vending equipment. :

E101005 SECURITY AND VAULT EQUIPMENT

NOT USED

E1020 INSTITUTIONAL EQUIPMENT

E102003 LABORATORY EQUIPMENT

NOT USED

E102009 AUDIOVISUAL EQUIPMENT

Coordinate design requirements with the end user/Command IT personnel, and provide equipment specifications, and procurement and installation of the Audiovisual (AV) equipment. Obtain the services of an audiovisual equipment specialist with CTS-D certification to design and specify the audiovisual equipment.

Plan for and provide AV equipment for all conference rooms, classrooms, and the auditorium.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment must include, but is not limited to,: intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, interactive wall systems and CCTVs.

AV equipment is funded separately. The AV Equipment is identified on the AV Cost Estimate Worksheet. Refer to E20 for the Best Value Determination process for AV systems.

E1030 VEHICULAR EQUIPMENT

No recessed loading dock is provided for this project however at or near the overhead door of the S4 and S6 space provide a site located dock lift for use with a variety of truck types, and truck-trailer restraining device.

Minimum performance characteristics for the dock lift shall be based on the following:

a. Service Period:

(1) Number of shift operations of 1.
(2) Maximum number of trucks per shift opening of 8.
(3) Maximum number of days per week of 6.

b. Fork Lift Loads:

(1) Design lifts to accommodate 4-wheel fork trucks.
(2) Design lifts to handle 10,000 lb. gross dynamic load.
(3) Base lift design on number of cycles per loading/unloading operation per truck of 18.

E1040 GOVERNMENT FURNISHED EQUIPMENT

Government Furnished equipment includes equipment to be placed in secured exterior yards.

Rough-in and provide connections for Government-furnished equipment such that equipment will operate as intended, including providing miscellaneous items such as plugs, receptacles, wire, cable, conduit, flexible conduit and outlet boxes or fittings Equipment shall remain in control of the Government until such time as the Contractor is ready to install. The Contractor shall provide 30 days advance notice of expected installation date and pick up equipment at and transfer to site for installation. Testing requirements of Government Furnished equipment shall be the responsibility of the Contractor and shall follow the same guidelines as though the Contractor had provided the equipment.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide light commercial kitchen equipment design to meet the needs of the end user. All light commercial electric kitchen equipment to be coordinated to provide a functional facility. Project includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the end user requirements and complete coordination with the facility design. Equipment must include, but is not limited to, refrigerator, microwave, coffee maker, and ice maker.

--End of Section--

E20 FURNISHINGS – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Furnishings must include fixed furnishings as part of the Structural Interior Design (SID) and the design and documentation of the movable furnishings, the Furniture, Fixtures, and Equipment (FF&E) Package and Audio/Visual (A/V) Equipment Package.

The design and documentation of both must be funded as part of the construction contract. The purchase and installation of the FF&E and A/V Packages must be funded separately as part of Collateral Equipment.

The movable furniture and furnishings (FF&E) for this facility may include, but are not limited to movable furniture systems, freestanding furniture, area/accent rugs, artwork, appliances, flat screen TVs (not connected to data), accessories, shop equipment, fire extinguishers, specialty equipment (specified by the Activity) and other miscellaneous items to support facility functions.

FF&E is estimated in the amount of $5,922,847.23 and AV is estimated in the amount of $483,147.34. This Government FF&E and AV budgets must not be altered by Contractors during the bid process.

Fixed furnishings (items that are fixed to the structure), such as specialty equipment, drying cages, weapon racks, lockers, fixed shelving, fixed display furnishings, marker boards, cork boards, motorized projection screens, blinds/shades, etc. are part of the construction contract.

The Audio Visual (AV) Equipment will be identified as a separate line item, priced separately from the FF&E and funded as a planned modification. The A/V Package must include shipping, freight, handling, installation, applicable state sales tax, and the Contractor's A/V Handling and Administration Rate (HAR) percentage as applied to the final A/V total cost. Refer to Part 3 Section E10 Equipment and D50 Electrical of this RFP.

GENERAL SYSTEMS REQUIREMENTS

Design and provide fixed and movable furnishings for all areas as developed during Activity programming and as indicated in the Room Requirements (refer to Part 3 Section 5 of this RFP) and other portions of this RFP to provide a fully usable and complete facility. Design a complete FF&E package and A/V package and prepare supporting plans and procurement data. The design, procurement, and installation of the A/V package must comply with all of the same requirements as those defined for the FF&E package in this specification section FF&E and A/V items identified in this RFP are to be used as a guideline to assist in establishing the minimum facility requirements and do not relieve the Contractor's Interior Designer and CTS-D from developing a complete and accurate design package that incorporates ALL of the Activity’s FF&E and A/V requirements determined during the design process. Design per specific UFC (i.e. Youth center, BEQ, etc.) and in conjunction with UFC 03-120-10, Interior Design.

The contractor must retain the services of an Interior Designer with a minimum of one of the following credentials: National Council for Interior Design Qualification (NCIDQ) certification or state, locality and/or jurisdiction Interior Design Certification, Registration, or License. This same Interior Designer must prepare both the SID and the FF&E Package, attend and participate, in entirety, all kick-off meetings, existing site visits, design meetings, to include, but not limited to, design charrettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package.

When A/V is required, or other specialty equipment, i.e. shop, kitchen, fitness, high density storage, etc., is required in the project, the Contractor must obtain the services of the appropriate Equipment Specialists to specify the specialty equipment.

A Certified Technology Specialist-Design (CTS-D) is required for the design and preparation of A/V packages. The CTS-D must attend and participate, in entirety, all design meetings, to include, but not limited to, design charrettes, concept design workshops, presentations and review meetings to develop the floor plan and the A/V package. The NAVFAC approved Specialist(s) must provide separate Best Value Determinations (BVDs) for this equipment, if required by NAVFAC.

The Contractor's Interior Designer and CTS-D, the Design Firm Owner(s), and any Specialists must not have any affiliation with the products specified. The NAVFAC Contracting Officer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer based upon review/recommendation of the NAVFAC Interior Designer Per UFC 3-120-10, the FF&E includes the design, selection, specification, color coordination and procurement documentation of the required items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility.

FF&E specifications must be based on NAVSUP Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The utilization of the current NAVSUP BPA list is required for BVD Analysis Request for Pricing. The current NAVSUP BPA list is located at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The CTS-D must provide A/V floor plans indicating equipment locations and A/V riser diagrams for all A/V systems and coordinate equipment locations and power requirements with power plans. The Final FF&E and A/V packages must utilize the most current generation technology. All fixed and movable furnishings and A/V selections and designs must be closely coordinated with Parts 3 and 4 Sections C10, C30, E10, D50, and all other parts of this RFP. All fixed and movable furnishings and A/V must be fully integrated with the final design, to include all building finishes, and all building systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architecture, etc.) construction and schedule. All outlets, switches, thermostats, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc., clearances must be accommodated. The Contractor's Interior Designer and equipment specialists must be responsible for designing and providing specifications for procurement of all FF&E, A/V and specialty equipment, to include delivery and installation, for the facilities built under this contract as directed by the NAVFAC Interior Designer. The Contractor must be responsible for installing all A/V, communications, data, and power cabling within systems and freestanding furniture raceways and performing connections to the building, as required.

The FF&E and A/V packages must be fully integrated into the design and construction schedule for the building. All submittal due dates for the SID, A/V and FF&E must be reflected in the Contractor’s construction schedule. **The Contractor and the Contractor’s Interior Designer must strictly adhere the FF&E submittal schedule defined prior to the 35% design development to ensure that the final FF&E package is submitted at least 4 months prior to FF&E funding deadlines and no later than 9 months prior to building completion.** Requests to change the SID or FF&E schedule must be submitted to the NAVFAC Interior Designer for review/recommendation and approved by the NAVFAC Contracting Officer.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS STRUCTURAL INTERIOR DESIGN (SID)

STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process must begin following the award of the RFP. The SID submittal must include Interior Design programming documents, FF&E Floor Plans, and exterior & interior finish/color and material sample boards and binders. Refer to this RFP Part 4 Section Z10 General Performance Technical Specifications and Part 2 UFGS Section 01 33 10.05 20, Design Submittal Procedures.

The Contractor’s Interior Designer must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative within 7 days of each occurrence.

Provide the following SID meetings and submittals;

a. Concept Design Workshop (CDW) (10%-15%) or Initial Design Meeting: The Contractor's Interior Designer must meet with the Activity and IDD/Base Property for Marine Corps projects to develop the Interior Design SID programming documents, which will include a preliminary Furniture and Equipment Plan and the FF&E Summary List. The Contractor's Interior Designer must conduct in-depth room by room interviews to confirm Activity requirements (SID, FF&E, A/V, etc.) for the new facility(s). These interviews must occur during the CDW and will include building walk-thru(s) at the Activity’s current location and/or similar facility(s), if possible.

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer’s representative must provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces. The Furniture and Equipment Plan, FF&E Summary List, and a preliminary Cost Estimate should be further developed and included in this submittal.

c. SID "Over the Shoulder" Review: Prior to the Prefinal (100%) Submittal, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer’s representative for an "over-the-shoulder" review meeting to present a minimum of three (3) options for the interior building finishes/colors/materials. Manufacturer choices and cost range of materials must be pre-approved by the Contractor to prevent any substitutions during the submittal process. Finish option samples for NAVFAC review must be clearly labeled and in a "loose" format for preliminary approval prior to the presentation to the Activity. Options must include manufacturer's label/specifications/data sheets. The over-the-shoulder review meeting must be held via conference call.

d. SID Presentation to Activity: The Contractor’s Interior Designer must present a minimum of two (2) NAVFAC Interior Designer-approved options for the interior building finishes/colors/materials to the Activity for approval. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for approval. The meeting must be held at the Activity. Photos documenting the selected finish option and preliminary finish schedule for that option must be emailed to the NAVFAC ID within 7 business days.

e. Prefinal (100%) Submittal: The Contractor's Interior Designer must submit the Activity-approved interior building finishes/color/material selections. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty

plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Prefinal SID Binder Submittal must be distributed to the NAVFAC Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

These finish options must be documented and submitted for review and approval as follows:

Submittal to NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's representative:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s) w/ floor patterns and accent wall locations
3. Finish Legend
4. Finish Schedule
5. Pre-Final Finish Selections and Physical Samples (photocopies of samples are not acceptable.)
6. CD copy of submittal in binder

f. Final Submittal: The Contractor's Interior Designer must incorporate the final approved Furniture and Equipment Plan, Finish Schedule, Floor Finish Plan and Finish Legend into the Contractor's final drawing set. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Final SID Binder Submittal must be distributed to the NAVFAC Project Manager/Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

The Final Submittal must include the following:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s)
3. Finish Legend
4. Finish Schedule
5. Final Finish Selections and Samples
6. CD copy of submittal in binder

SID CONSTRUCTION SUBMITTALS

No substitutions must be made to the SID finishes once they have been approved by NAVFAC during the design phase. In the event that revisions may be required due to unforeseen conditions such as discontinued product, such revisions must be submitted to the ROICC and NAVFAC Interior Designer's representative for approval by the NAVFAC Interior Designer before substitutions can be made.

FIXTURES, FURNISHINGS AND EQUIPMENT AND AUDIO VISUAL (FF&E and A/V)

The FF&E and A/V design process must begin at the CDW and develop concurrently with the building design. The submittals must include fixtures, furnishings, and equipment specifications in accordance with the Activity requirements to produce an optimally functional facility. FF&E are all items that are not fixed to the structure, but are fully integrated with the floor plan, building systems, and finishes. Refer to RFP Part 4 Section Z10 General Performance Technical Specification and Part 2 UFGS Section 01 33 1-.05 20, Design Submittal Procedures.

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the Activity requirements and complete coordination with the facility design and the SID.

For all projects, including fast track projects, the Contractor must be responsible for sufficiently scheduling all SID/FF&E and A/V submittals early enough to obtain the required government approvals, and meet all ordering and installation lead times to complete the project by the contract completion date.

These are minimum requirements and the Contractor must be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/FF&E and A/V coordination. The Contractor’s Interior Designer and CTS must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative and Electrical Engineer’s representative within 7 days of each occurrence.

Provide the following FF&E and A/V meetings and submittals;

a. FF&E and A/V Procurement Requirements Meeting (Interior Design Orientation): This meeting must occur at MIDLANT, located in Norfolk, VA prior to the Design Development (35%-50%) Submittal and the development of the FF&E package. The NAVFAC Interior Designer and NAVFAC Electrical Engineer will provide the Contractor's Interior Designer current sample documents to be used for the FF&E and A/V BVD Analysis solicitation package and submittals, review the Best Value Determination (BVD) process, discuss the number of Best Value Determinations required and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider.

b. FF&E "Over the Shoulder" Review: Prior to the FF&E Concept Presentation and Best Value Determination (BVD) Analysis the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review to present a minimum of two preliminary FF&E options. These can be presented in a "loose" format for preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA.

c. FF&E and A/V Concept Presentation: The Contractor's Interior Designer and CTS must present the NAVFAC approved preliminary FF&E and A/V package to the Activity for approval. This presentation must include loose format samples and catalog cuts. Sample boards are not required. This meeting must occur in conjunction with the SID presentation to the Activity, if possible. NAVFAC OICC, Project Manager, Interior Designer and Electrical Engineer must be invited to this meeting.

d. Best Value Determination (BVD) Analysis "Over the Shoulder Review": Prior to issuing the BVD Analysis solicitation package, the Contractor's Interior Designer and CTS must send an electronic copy and a hard copy in binder format, of the complete FF&E BVD Analysis solicitation packages to the NAVFAC Interior Designer and the complete A/V BVD Analysis solicitation package to the NAVFAC Electrical Engineer for review. The Contractor's Interior Designer and CTS must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review of all required solicitation packages and to review the most current NAVSUP BPA vendor list and discuss GSA Contract Audio Visual vendors. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA. Separate solicitations are required for each FF&E BPA category and the A/V package.

   BVD Analysis Solicitations must include the following:

   1. Copy of the BVD Analysis Request for Pricing cover letter – Indicate all revisions to this NAVFAC-provided template utilizing “Track Changes.” NAVFAC approved revisions may be added to this document, but no items may be deleted.

   2. BVD Analysis Request for Pricing Spreadsheet/Questionnaire with “basis of design” item product numbers, photos & descriptions

   3. Detailed Technical Specifications/Criteria developed for each FF&E and A/V item in NAVFAC MIDLANT’s standard format to establish minimum acceptable FF&E requirements for comparable bids.

   4. Project Specific Room / Furniture Typicals

   5. Furniture and A/V Plans with Legends coded to the BVD Analysis RFP (PDF format)

   6. Contractor’s subcontract agreement/terms and conditions (if applicable)

   7. Contractor’s Interior Designer must request the most current BPA Contract Holder vendor information prior to sending out the bid solicitations.

e. BVD Submittal and "Over the Shoulder" Review - The Contractor's Interior Designer must submit one (1) hard copy in binder format of the BVD package to the NAVFAC Interior Designer’s representative, NAVFAC Electrical Engineer’s representative, and one (1) copy to IDD/Base Property for Marine Corps projects. An electronic copy must be sent to the NAVFAC Contracting Officer, the NAVFAC Interior Designer and the NAVFAC Electrical Engineer. Additional back-up information from specific bid packages may be requested on an as-needed basis. The "over-the-shoulder" review meeting will be held via conference call VA to review the results of the solicitation and determine a best value recommendation. Submit the following in 3-ring binders and include a CD copy in each for review and approval:

   The BVD Submittal must include the following:

   1. Cover Title Page (project name, project #, location, submittal date, submittal title)

   2. Table of Contents

3. Point of Contact List
4. Narrative of Interior Designer Objectives
5. Copy of all information sent to bidders and documentation that all required sources were contacted
6. Technical Specifications used in bid request for all furniture and A/V etc.
7. BVD Analysis Request for Pricing Spreadsheet/Questionnaire completed by each bidder
8. Back-up Information submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meets all requirements.)
9 Responses from UNICOR (FF&E only)
10. Completed BVD Analysis Pricing Evaluation Spreadsheet comparing bidder quotes/responses
11. Contractor's Interior Designer/Electrical Engineer's recommendation for the Best Value vendor and justifications
12. CD copy of the FF&E and A/V BVD Submittal binders

f. The Contractor's Interior Designer must coordinate a mock-up for best value review of FF&E items as required by NAVFAC by at least the top three (3) BPA vendors submitting the highest rated FF&E proposals, as determined by NAVFAC. The reviewers must include the Contractor's Interior Designer, NAVFAC Interior Designer, Contracting Officer, IDD/Base Property, and the Activity.

g. Preliminary FF&E Submittal: The Preliminary submittal must be due at pre-final (100%). It must be presented to the Activity and NAVFAC Interior Designer's Representative and NAVFAC Electrical Engineer's Representative in loose format at a meeting to occur at the Activity. Presentation will consist of loose samples, to include all cut sheets and finishes from the recommended vendors. Immediately following this meeting, the Preliminary FF&E and A/V submittal binders will be submitted. Immediately following this meeting, the Preliminary FF&E submittal binders must be submitted. Five (5 submittals will be required; (1) for the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

Submit the following in a 3-ring binder (with the exception of the 16x20 color boards for the Activity only) for review and approval:

The Preliminary FF&E Submittal must include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)
2. Table of Contents

3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s) vendors and subcontractors)
4. Preliminary FF&E list (Cost Summary) to include shipping, freight, handling, professional installation, project management, HAR and applicable sales tax
5. Preliminary Procurement Data Spec Sheets completed for each product. Indicate general appearance as well as proposed finish and fabric selections
6. Furniture and A/V placement plans coded to the FF&E and A/V lists and Procurement Data Spec Sheets; include electrical and A/V plans for coordination.
7. Technical Specifications used in bid request for all furniture, and A/V etc.
8. Pre-Final Finish/Fabric Selections and Samples in 8 x 10 binder format mounted on heavy-duty card stock in edge-reinforced heavy-duty plastic sheet protectors.
9. Copy of Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes. Indicate and provide explanations for all changes to FF&E quantities and/or pricing that occur between accepted vendor proposal and Final FF&E Submittal.
10. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.

h. The Contractor and his Interior Designer must coordinate an on-site mock-up and review of FF&E items as required by NAVFAC with the selected, best-valued BPA vendor(s). Building finishes and fixtures must be installed in the affected area(s) to the greatest extent practicable in order to assess building systems/fixture coordination. The reviewers must include the NAVFAC Interior Designer and Construction Manager, The Contractor's Interior Designer, IDD, Base Property, and the Activity. The BPA vendor must be available on-site to respond to questions. The mock-up exercise must be completed prior to the submittal of the Final FF&E submittal and award of the modification for turnkey furniture procurement.

i. Final FF&E and A/V Submittal: The Contractor's Interior Designer must submit the Final FF&E and A/V Packages within 30-90 calendar days following the receipt of review comments on the preliminary FF&E submittal. **All required documentation revisions of price changes and product reselection due to price increases or discontinued product must be the responsibility of the Contractor's Interior Designer.** Five (5) submittals will be required; (1) for the NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative, (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

   The Final submittal must include the following:

   1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)

2. Table of Contents

3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s), vendors and subcontractors)

4. Final FF&E and A/V lists (Cost Summary) to include shipping, handling, freight, professional installation, project management, HAR and any applicable sales tax.

5. Final Procurement Data Spec Sheets completed for each product. Indicate final finish and fabric selections. Images of item and finishes to be represented.

6. Final Finish Selections and Memo Samples for the FF&E submitted in 8 x 10 binder format, mounted on heavy-duty card stock, using heavy-duty plastic sheet protectors.

7. Final Furniture and A/V Placement Plans coded to the FF&E and A/V lists, Procurement Data Sheets and specifications; include electrical and A/V plans for coordination.

8. Copy of Final Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes.

9. Indicate and provide explanations for all changes to quantities and/or pricing that occur between accepted vendor proposal and Final Submittal.

10. Best Value Determination Guidelines sheets (completed and signed by the Contactor's Interior Designer and CTS-D)

11. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.

12. CD copy of the final FF&E and A/V binders.

j Punch List: The Contractor's Interior Designer (and A/V consultant or other specialty consultants, if applicable) must attend two punch list site visits with the installation dealer(s), NAVFAC Interior Designer and the Base Representative/Activity Contact. The first site visit must identify all punch list items (at installation dealer's 98% completion) and the second (at 100% completion) will confirm that all punch list items have been resolved.

FF&E CONSTRUCTION SUBMITTALS

Submit any revisions or deviations caused by discontinued items to the Contracting Officer for approval by the NAVFAC Interior Designer.

SD-10 Operation and Maintenance Data

List Operation and Maintenance Manuals for seating, systems furniture and keyboard trays.

E2010 FIXED FURNISHINGS (SID)

Fixed furnishings (SID) are funded as part of the construction project and are not funded as part of FF&E Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

Develop design as described herein and provide storage shelving, equipment racks, and window treatments. Cross reference C10 Interior Construction, and C30 Interior Finishes, for performance requirements. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

E201001 FIXED ARTWORK

As required, provide wall graphics and/or logo of activity in appropriate locations. Coordinate with Activity and NAVFAC Interior Designer's representative for location and placement.

E201002 WINDOW TREATMENTS

Provide manually operated roller shades at windows and other glazed openings to the exterior of the building. Provide light filtering and blackout shades for all exterior windows unless otherwise noted below or in room requirements. Provide only blackout shades at frosted/obscured vision glazing locations.

Shade housing (fascia, valence, and trim) must be located above the window frame as to not conceal the glazing. Recess shade in ceiling at locations where window frame is at same level as ceiling system.

All exposed roller shades must be furnished with metal fascia / valance. Provide side and sill channels for black-out shades to prevent light leak / bleeding. Light seal hem bar may be provided in lieu of sill channel.

Shade cloth material and finish must be coordinated with NAVFAC Interior Designer during design-build. The following openness factors must be provided:

Sunscreen: 3% minimum - 6% maximum openness

Black-out: 0% openness

Shades are considered SID and are funded as part of the construction contract. Soft window treatments, such as draperies (not to include stage curtains), are considered FF&E and must be included in the FF&E package, as required.

E201003 FIXED SEATING AND TABLES

As required, but not limited to, provide fixed locker room benches, auditorium fixed seating and site furniture.

Provide auditorium seating with tablet arms. Arm caps must be molded vinyl. Seatbacks must be molded vinyl. Interior seat and back must be padded and fully upholstered.

E201004 INTERIOR LANDSCAPE (FIXED)

NOT USED

E201006 LOBBY AREA

Design and provide lobby areas consistent with quality commercial design, architecturally significant in scale, and coordinated with the interior finishes for each facility. Lobby areas must reflect the mission of the client and must be designed to accommodate the function and program required for the facilities. Lobby areas must include the following elements: fixed artwork, graphic floor inlay, and decorative lighting. Lobby elements noted above are part of the construction contract.

E2020 MOVABLE FURNISHINGS

The design of the FF&E package is funded as part of the construction contract base bid. The purchase and installation coordination of FF&E is a planned modification to the contract and funded separately as part of Collateral Equipment. The specific process is outlined in PTS E20 in Part 4 of this RFP. If a Collateral Equipment list is provided within this RFP, the costs associated with the purchase and installation of these items are NOT to be included in the base bid. The estimated Collateral Equipment cost is provided for information purposes only. The Contractor only needs to propose the Handling and Administrative Rate (HAR).

Design and provide an FF&E package in accordance with UFC 03-120-10, *Interior Design,* and other portions of this RFP for all areas as developed during Activity programming to provide a fully usable and complete facility. Collateral Equipment may also include specialty items specified by the Activity and the Contractor's Interior Designer is responsible for incorporating these into the FF&E and/or the A/V package. The estimated Collateral Equipment cost(s) are provided for information purposes only. Actual requirements may vary, and it is the responsibility of the Contractor’s Interior Designer and/or Equipment Specialist to determine the specific requirements of the End User during the design phase and design to these requirements.

The FF&E Package must include shipping, freight, handling, and professional installation, project management, applicable sales tax, and HAR.

A Best Value Determination must be performed on a minimum of three manufacturers and UNICOR for orders exceeding the micro-purchase threshold from an individual manufacturer/vendor. Multiple BVDs may be required in order to complete the final FF&E and A/V packages. The required quantity of BVDs to be performed will be determined by the NAVFAC Interior Designer’s representative during the design phase and is dependent on the appropriate NAVSUP BPA category(s) to be utilized and specific project requirements. Documentation must be provided to the Government with the final FF&E package. Specific Documentation is indicated in Part 4 of the RFP. The BVD Statement must be completed and signed by the contractor's interior designer. Sample BVD forms and instructions will be reviewed during the FF&E Procurement Requirements Meeting. Forms can be obtained from the WBDG at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The Contractor, as a planned modification, must be authorized by the Government Contracting Officer to procure all furniture/furnishings in the approved final FF&E and A/V packages using predominately negotiated Federal contracts as directed by the Contracting Officer and the NAVFAC Interior Designer and Electrical Engineer. When the modification for turnkey furniture and A/V procurement is exercised, the Contractor's proposed Handling and Administrative Rate (HAR) must not exceed 5% of the total cost of the FF&E, and A/V shipping, freight, handling, project management, and installation. The HAR includes all of the contractor's efforts related to the storage, coordination, handling and administration of subcontractors, deposits, bonds and all other associated costs and profit for the procurement of FF&E and A/V. No other charges, fees,

or markups will be authorized. The contractor must establish and submit a fixed percentage figure, for the administration effort of this modification (HAR), with the initial project proposal as part of the contractor's Pricing Schedule.

E202001 MOVABLE ARTWORK

Provide graphics and other movable artwork as required by Activity / User and NAVFAC Interior Designer’s Representative. Movable artwork is part of the FF&E package.

E202002 MODULAR PREFABRICATED FURNITURE

Provide modular freestanding workstations as required. Provide at a minimum, a 36 square foot workstation. The workstation to include: an adjustable height computer solution (electric height adjustable work surface, ergonomic keyboard tray, or split height work surface), a height adjustable monitor arm, a CPU holder, task lighting, overhead storage, and file storage. Ensure cable management within the workstation is provided. Approval in writing must be obtained from the Activity / User Commanding Officer for any deviation in workstation size reduction. Special coordination of workstation design must occur when workstations are located next to windows. All components of the workstation including but not limited to overhead storage and furniture partitions must not abut windows and block views to the exterior. Storage associated with these workstations may be accommodated by overhead storage perpendicular to the window or an additional counter height storage component of not less than 3'-0" and constructed in the same style as the workstation, located adjacent to the workstation at the end of the circulation aisle.

E202003 FREESTANDING FURNITURE AND FILES

Provide ergonomic task seating, lounge, reception and guest seating, storage and filing, tables, as required.

E202004 RUGS & ACCESSORIES

Provide decorative items as required. Include one wall clock in each office.

E202005 MULTIPLE SEATING (MOVABLE)

NOT USED

E202006 INTERIOR LANDSCAPING (MOVABLE)

Provide interior landscaping (planters, site furnishings, etc.) as required.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, fire extinguishers, clocks, literature racks, microwave ovens, refrigerators, non-plumbed coffee makers, and other appliances as required.

--End of Section--

F10 SPECIAL CONSTRUCTION – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Special Construction systems are not applicable to this project.

GENERAL SYSTEMS REQUIREMENTS

F1010 SPECIAL STRUCTURES

F101001 METAL BUILDING SYSTEMS (PRE-ENGINEERED)

NOT USED

F1020 INTEGRATED CONSTRUCTION

NOT USED

F102001 SPECIAL PURPOSE ROOMS

NOT USED

F1030 SPECIAL CONSTRUCTION SYSTEMS

NOT USED

F1040 SPECIAL FACILITIES

NOT USED

F104001 INTERIOR SWIMMING POOLS

NOT USED

F1020 INTEGRATED CONSTRUCTION

F102001 SPECIAL PURPOSE ROOMS

NOT USED

F1030 SPECIAL CONSTRUCTION SYSTEMS

NOT USED

F1040 SPECIAL FACILITIES

F104001 INTERIOR SWIMMING POOLS

NOT USED

--End of Section--

F20 SELECTIVE BUILDING DEMOLITION – P1512F RENOVATE M107

SYSTEM DESCRIPTION

The general demolition/removal of existing buildings defined for the P1512 Milcon projects is described in ESR F20 for the Log Ops Building. This ESR defines selective building demolition pertaining to the renovation of Building M107 only.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Perform all off-site work necessary to meet the requirements of the project, local codes, reference standards, technical specifications and performance criteria.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor shall submit complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form is in the UFC 3-201-01, *Civil Engineering*. Contractor shall determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form shall be forwarded to the EFD Environmental Reviewer.

Coordinate and obtain approval from the Contracting Officer for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

F2010 BUILDING ELEMENTS DEMOLITION

This project includes the selective demolition of the following: Building M107 Selective demolition work will be required where building systems are being modified and/or replaced, including but not limited to: Exterior building envelope – walls/roofing/openings, interior partitions and construction; HVAC systems, Fire Protection systems, modifications to egress paths, data/voice/telecomm/security design, electrical systems, and interior finishes.

F2010 1.1 GENERAL DEMOLITION

No general demolition of a complete structure is part of this demolition scope.

F2010 1.2 UTILITIES

Retain the existing electrical service transformer and primary and secondary feeders to serve the renovated building.

Demolish the building’s telecommunications services to the nearest splice point outside the building. Underground service pathways may be retained for reuse if approved by the COR.

Utility demolition must be coordinated with on-site personnel for planned outages.

F2010 1.3 DUST CONTROL

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area.

F2010 1.4 TRAFFIC CONTROL

Due to the location of Building M107 within Camp Johnson traffic control will not be required.

F2010 1.5 WEATHER PROTECTION

Upon removal of any element of the building envelope that provides the building weather resistant barriers and openings the Contractor must provide temporary protection systems that will effectively keep the building water tight until the new building envelope systems are provided. All temporary construction system must be stable and be able to withstand inclement weather and wind.

F2010 1.6 BURNING

Where burning is permitted, the Contractor must adhere to federal, state and local regulations. Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

M107 is a single-story building constructed in phases during the late 1980's and early 1990's. The building is configured into multiple wings serving as work bays typically comprising long-span open web steel joists supported by load bearing CMU walls bearing on strip footings. While the majority of the roof framing is steel joists, portions of the roof comprise wide-flange steel beam framing, some of which support a monorail system. Though there exist some non-load bearing masonry partition walls, most of the CMU walls throughout the building are load bearing and act as shear walls for lateral load transfer. The ground floor is a non-structural slab-on-ground. The roof diaphragm is 1 ½-inch metal decking. Mechanical equipment mezzanines are provided at some locations. Work bays typically include several roll-up doors and a continuous floor trench at the exterior wall.

Foundations comprise continuous strip footings supporting load bearing walls. Soil boring locations and logs are included on the original design drawings available from NAVFAC. Foundations were designed based on an allowable bearing pressure of 2000-psf.

F201002 EXTERIOR CLOSURE

Provide selective demolition of the following exterior closure elements for Building M107:

- Overhead doors in High Bay Space – All overhead doors in the existing high bay vehicle training areas must be removed to make way for new exterior envelope elements that will include in new overhead doors some locations.
- Remove wall areas for the addition of fenestration for daylighting as required per the design per parameters provided in Part 3, Chapter 2, Building Design – Architecture and in areas indicated in the Architectural Block Diagram in Part 3, Chapter 4 of this RFP. The removal of wall areas to place new fenestration includes removing existing swinging doors, windows, and overhead doors.
- Smoking shelters that are comprised of a shed type roof supported by wood structure that have been built in two locations, both in the northern wings of M107, must be removed in their entirety.

- All corrugated metal panels at high bay spaces are to be removed in preparation for replacement with new metal panel systems. All windows located in these metal panel areas are to be removed.
- Remove existing downspouts at all wall areas in association with both reroofing options.

F201003 ROOFING

Roofing removal options are based on the selected roofing replacement option as follows:

- Replacement of existing modified bitumen system: With this roofing option, all of the existing roofing system must be demolished and removed down to the structural deck in preparation for the placement of a new modified bitumen roofing system. In addition, all metal coping is to be removed.
- New Aluminum Standing Seam Roofing: With this roofing option, the existing roofing is to remain (and patched). Selectively remove roofing materials and insulation down to the existing metal deck only at locations where new structural supports are required to extend up from the existing structure below the roofing.

F201004 INTERIOR CONSTRUCTION & FINISHES

The following pertains to interior construction and finishes to be demolished and removed:

- Toilets – Demolish and remove all existing toilet fixtures, fittings, counters and finishes and coordinate removal of toilet and locker room walls with the new work prior to any demolition.
- High Bay Space mechanical space and office areas – Demolish and remove interior walls forming space within the four high bay spaces at each quadrant of the building.
- Ceilings – Demolish and remove all existing finish ceilings throughout the building.
- Door Openings – Demolish and remove all interior doors in walls to remain.
- Raised Access Flooring – Demolish and remove all raised access flooring throughout the building.
- Existing floor finishes – Remove applied floor finishes that are placed on top of the structural slab.
- Surface mounted items on walls – Remove all surface wall mounted items (beyond mechanical, electrical, and fire safety devices) from existing CMU walls. Refer to mechanical, electrical and fire safety sections scope of this section and RFP for what is to be demolished and removed for each particular discipline.
- Remove all existing fire extinguisher cabinets throughout the building.
- Existing load bearing partitions are to remain but can be altered (selectively removed) as required by the renovation design to allow new openings. If the new openings are provided the new opening must be provided with the proper structural support and maintain the structural integrity of the load-bearing wall.. Refer to the Architectural Block Diagram in Part 3, Chapter 4, Building Requirements for general locations of existing load bearing walls. Although load bearing walls are shown for information in the Architectural Block Diagram, it is the contractor’s responsibility to verify all loading bearing walls to remain, or if altered provide the required structural support.

- Walls that are not loading bearing - Any existing interior wall that is not load bearing can be demolished and removed if required to be removed by the renovation design.

F201005 CONVEYING SYSTEMS

No conveying system requiring removal are located in building M107.

F201006 MECHANICAL SYSTEMS

Demolish and remove mechanical systems in their entirety including rooftop mounted equipment. Follow Camp Lejeune Mechanical Design Guidance for proper refrigerant handling. Demolish above slab Plumbing systems outside the mechanical room and DHW pumping system. Demolish plumbing within the mechanical room as directed by the owner. Demolish trench drains in the Vehicle Bays. Demolish oil/water separator.

Coordinate demolition of fire sprinkler system piping and components with the fire protection designer and fire sprinkler system installer. Demolition work associated with the fire sprinkler system includes removal of all existing sprinklers, removal of the five existing fire sprinkler risers and alarm valve assemblies and select removal of existing sprinkler cross main and branch line piping. Refer to ESR Section D40.

F201007 ELECTRICAL SYSTEMS

Demolish the interior power distribution systems including but not limited to equipment, wiring, conduits, supports, and appurtenances back to the existing service switchgear. Retain the main switchgear to serve the renovated building. Demolish existing wiring devices, equipment connections, disconnecting means, luminaires, and controls and associated wiring, conduits, supports, and appurtenances back to their sources.

Demolish the power service to the oil water separator and exterior shipping container.

Demolish the generator and its associated feeders, transfer switches, controls and fuel system.

Demolish the interior telecommunications systems including but not limited to equipment, wiring, conduits, supports, and appurtenances back to the existing entrance facility.

Demolish the exterior site lighting including but not limited to luminaires, poles, foundations, conduit wiring, supports and appurtenances back to their sources.

Where conduits are embedded in partitions that are designated to remain, or where installed beneath the slab on ground, the conduits may be abandoned in place. Cut abandoned conduits at the finished surface, cap, and seal to prevent water and debris entrainment. Conduits may be reused only where approved by the COR.

Contact Tony Beckwith at (910) 451-2790 to coordinate electrical demolition. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

Prior to demolition in preparation for the building renovation, contact base fire alarm technicians and allow time for their retrieval of existing fire alarm system panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

F201008 EQUIPMENT & FURNISHINGS

Prior to construction, all movable equipment and furnishings must be removed from the building by the Contractor.

F201090 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

F2020 HAZARDOUS COMPONENT ABATEMENT

Since M107 was built in the late 1980's and the likelihood of hazardous materials is minimal a hazardous material survey report will not be provided for this building.

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

The General Contractor is required to hire, as a first-tier subcontractor, a PQP to ensure compliance with the approved work plans and perform independent inspections, testing and verification of the hazardous components work including: asbestos, lead containing paint, and any other hazardous material identified in the Destructive Hazardous Material Survey Report.

F2020 1.2 FURNISHINGS

This subject is not applicable to this project

F2020 1.3 ASBESTOS

Refer to F2020 above

F2020 1.4 LEAD BASED PAINT

Refer to F2020 above.

F2020 1.5 PAINT RELATED WORK

Refer to F2020 above.

F2020 1.6 MERCURY & LLR COMPONENTS

Refer to F2020 above.

F2020 1.7 PCB'S

Refer to F2020 above.

F2020 1.8 OZONE DEPLETING SUBSTANCES (ODS)

Refer to F2020 above.

F2020 1.9 ANIMAL DROPPINGS

This subject is not applicable to this project

F2020 1.10 MOLDS AND SPORES

Refer to F2020 above.

F2020 1.11 DISPOSAL

Perform disposal in accordance with the RFP and the specifications and plans provided in Part 5 and Part 6.

--End of Section--

G10 SITE PREPARATION – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Provide site preparation that supports project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site preparation system consists of demolition, salvage, relocation, and minimal earthwork, necessary to ready the site for other work associated with the project.

GENERAL SYSTEM REQUIREMENTS

Develop the project site and perform all off-site work necessary to meet the requirements of the project, antiterrorism criteria, local codes, reference standards, technical specifications and performance criteria.

A topographic survey of the existing site has not been performed for the site. The Contractor is required to perform a topographic survey of the project area in accordance with UFC 1-300-09N, *Design Procedures*, that will be impacted by his work. Include this topographic survey in all design submittals. The concept plans provided in Part 6 are based GIS information field verified to the extent practical. Underground utility sizes and exact locations were not able to be verified. The GIS topographic information has been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. Prior to starting work, physically verify the location of all existing utilities and obtain all additional survey data required to provide a quality final design. The existence, size and/or location of the utilities are not guaranteed by the GIS provided. The Contractor must show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level B. Where critical utility crossings or conflicts are likely, show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level A. Verify the location of all utilities prior to construction.

Prior to beginning excavations, the Contractor must contact the Public Works Office. The Contractor must hire a private utility locating service to locate all Government owned utilities. Contractor will be responsible for obtaining dig permits, prior to excavation and will be responsible for maintaining utility markings and calling to have utility remarked if utility markings are not preserved. Contractor must add all located underground utilities to the topographic survey and must provide to the Government both a hard copy and in electronic format.

Unless otherwise noted, provide new facilities at the locations indicated on the drawings in Part 6.

Minimize the impact of construction activity on operations and neighboring facilities.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Submit a complete "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer and Environmental Reviewer. Perform work in accordance with the obtained permits.

Based on GIS information jurisdictional tidal and non-tidal wetlands have not been identified within the limits of work on the project site.

Coordinate and obtain the Resident Officer In Charge of Construction's (ROICC) approval for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

Refer to Site Analysis and Building Requirements Sections for additional site preparation functional program information.

Provide site preparation that supports project sustainability goals.

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information is included in Part 6 – Attachments. Refer to Part 3, Section 6, ESR A10 for additional information concerning the Government provided subsurface data and the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

Refer to Part 3, Section 6, ESR A10 for the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL EARTHWORK REQUIREMENTS

Refer to Part 3, Section 3, Site Analysis for base bid requirements concerning earthwork and site preparation.

G1010 SITE CLEARING

G101001 CLEARING

Preserve trees at the perimeter of the site.

The project site does not have saleable timber.

Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

G101002 TREE REMOVAL

Remove and dispose of all as required for project construction.

To reduce the incidental take of migratory birds and their nests, trees with active nests should not be cleared. If tree clearing is proposed between April and July, contact the LWRS Biologist for additional guidance.

G101003 STUMP REMOVAL

Remove all stumps under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101004 GRUBBING

Remove all root mat and organic debris under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101005 SELECTIVE THINNING

NOT USED

G101006 DEBRIS DISPOSAL

Dispose of all demolished material, rubbish and debris generated by this project by hauling off-site and off station.

Dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls*.

G1020 SITE DEMOLITION & RELOCATIONS

The items to be reused or relocated include the vehicle electric training device east of the existing building. Demolish the associated equipment pad and electric service connections.

G102001 BUILDING MASS DEMOLITION

Refer to section G102001 of the Logistics Operations School.

G102002 ABOVEGROUND SITE DEMOLITION

Demolish existing pavement in the courtyard areas identified as new greenspace. Sawcut at the limits of pavement demolition that abuts pavement to remain.

G102002 1.1 ABOVEGROUND STORAGE TANKS

There are no known aboveground storage tanks associated with the demolition or construction of this project. An aboveground storage tank report is not provided to support this project.

G102003 UNDERGROUND SITE DEMOLITION

Preserve the following underground site elements: all existing utilities required for proposed project.

Remove or relocate existing utilities under or within 10 feet (3.0 m) of any new facilities or building additions. Existing utilities include but are not limited to piping, structures and conduits. Remove all appurtenances associated with the utility to be removed so there is no presence of the utility at ground surface.

Remove existing utility structures to 3 feet (900 mm) below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Fill with clean sand.

Abandon utility systems in a manner that conforms to applicable codes and regulations. When piping is abandoned in place, fill abandoned piping with flowable fill.

Do not open cut pavement that is to remain to demolish utilities. Fill piping and/or conduits under pavements with flowable fill.

G102003 1.1 UNDERGROUND STORAGE TANKS

There are no known underground storage tanks associated with the demolition or construction of this project. An underground storage tank report is not provided to support this project.

G102004 BUILDING RELOCATION

NOT USED

G102005 UTILITY RELOCATION

NOT USED

G102006 FENCING RELOCATION

NOT USED

G102007 SITE CLEANUP

Waste materials will become the property of the Contractor; transport, dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G102090 OTHER SITE DEMOLITION & RELOCATIONS

NOT USED

G1030 SITE EARTHWORK

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, Excavation and Fill, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Grading shall conform with UFC 3-201-01, *Civil Engineering*.

G103002 COMMON EXCAVATION

Perform common excavation with equipment of sufficient size to accomplish the work required. Over excavation of areas to obtain additional satisfactory material for the contractor's use is not permitted.

Preserve natural topographic features to minimize cut and fill requirements. All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer

G103003 ROCK EXCAVATION

Blasting will not be permitted.

G103004 FILL & BORROW

Provide borrow and select fill from off-base sources.

A grading plan has not been designed, therefore it has not been determined if common fill, backfill and fill material, select fill or top soil is available on site in the required quantities.

On-site soils that are determined as clean fill by the geotechnical engineer via testing must be backfilled and compacted in accordance with the requirements in this section.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

For each borrow site, provide borrow site testing for hazardous materials characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

G103005 COMPACTION

Perform compaction per the Performance Technical Specifications or the Contractor's geotechnical report, whichever is more stringent.

G103006 SOIL STABILIZATION

The following methods of soil stabilization will not be allowed: lime slurry, and pressure grouting.

G103007 SLOPE STABILIZATION

Provide slope stabilization through appropriate grading and site design for a minimum factor of safety of 1.5 or slope that does not exceed the maximum slope per local code requirements.

G103008 SOIL TREATMENT

Treat the area around the entire foundation of each building for termite control in accordance with manufacturer's instructions.

G103009 SHORING

Provide shoring, bracing, and sheeting, etc., as required to prevent undermining of foundations, pavement, utility pipes, structures, and slabs and prevent slippage or movement in embankments or slopes adjacent to excavations to facilitate construction. Shoring will be in accordance with Section 25 A and B of EM 385-1-1. Provide a sheeting and shoring plan if required by local codes and/or OSHA. The plan must be signed and sealed by a professional engineer.

G103010 TEMPORARY DEWATERING

Provide pumps, temporary ditching, and grading required to maintain groundwater levels at the Contractor's geotechnical engineer's recommended level below footings and or pavements during construction. Ensure that there are no groundwater conditions that will promote deterioration of the soil or interruptions to the construction progress.

All dewatering effluent must be filtered per NCDEQ erosion and sediment control requirements prior to discharge to minimize sediment to surface waters.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

It is not anticipated, but if required, obtain an Erosion and Sediment Control permit required for the proposed work from NCDEQ. Submit the permit application to the COR for approval prior to submitting to NCDEQ.

G103090 OTHER SITE EARTHWORK

NOT USED

G1040 HAZARDOUS WASTE REMEDIATION

A contaminated soil/groundwater report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

G1040 1.1 CONTAMINATED SOIL AND GROUNDWATER

The project site does not require contaminated soil or groundwater work.

--End of Section--

G20 SITE IMPROVEMENTS – P1512F RENOVATE M107

SYSTEM DESCRIPTION

Provide site improvements that support project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site improvements system consists of pavements and pavement related features, landscaping and other exterior site development work related to this project. Provide a pavement design by a licensed Professional Engineer familiar with conditions local to the project site and based on site specific geotechnical investigation. Site design, including but not limited to design of parking and pedestrian circulation, will include coordination with the Civil Engineer and the Landscape Architect.

GENERAL SYSTEMS REQUIREMENTS

Provide site improvements as required to make a useable facility that meets functional and operational requirements, incorporates all applicable anti-terrorism, force protection and physical security requirements and blends into the existing environment.

Provide accessibility in conformance with applicable requirements of UFC 1-200-01 , *General Building Requirements*.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer. Perform work in accordance with the obtained permits.

Provide site improvements that support project sustainability goals.

Minimize the impact of construction activity on operations and neighboring facilities.

Locate new site improvements at locations indicated on the drawings in Part 6 of this RFP. If specific locations are not provided, site the improvements to develop appropriate and positive relationships with other facilities and to conform to existing development patterns.

Refer to Site Analysis and Building Requirements Sections for additional site improvement functional program information.

G2010 ROADWAYS

Provide roadways patches, as required, to repair existing pavements demolished for utility installation or demolition or other required. Provide new roadway pavement sections as required by soil conditions and as determined by the Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*. See part 3 Site Analysis for pavement section bid criteria.

Aggregate pavement may be used for access roads to mechanical equipment if approved by NAVFAC.

Provide other roadway improvements including pavement markings and signage.

G201001 BASES & SUBBASES

The following materials will not be allowed for base or subbase courses: lean concrete, cement stabilized, sand-clay, lime rock, or shell.

G201002 CURBS & GUTTERS

Provide curb and gutter to replace curb and/or curb and gutter removed with demolition activities. Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent. Where NCDOT do not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of NCDOT for a minimum compressive strength at 28 days of 3500 psi concrete.

G201003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous pavement as permitted by the NCDOT.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks per UFC 3-201-01.

Provide signage per UFC 3-201-01.

Provide temporary pavement markings and signage throughout construction to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition.

G201005 GUARDRAILS & BARRIERS

Wheelstops are not anticipated, but if required, provide wheelstops and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G201006 RESURFACING

Pavement resurfacing is not anticipated, but if required provide resurfacing of existing pavement by milling and bituminous overlay.

G201090 OTHER ROADWAYS

NOT USED

G2020 PARKING LOTS

Additional parking is not anticipated, but if provided; design new parking and other pavement sections as required by soil conditions and as determined by the Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*. See part 3 Site Analysis for pavement section bid criteria.

Do not use aggregate pavement.

Provide other parking improvements including parking entrances for two-way traffic, signage, concrete dumpster pad, and landscaping.

Provide handicapped parking in accordance with UFC 1-200-01 , *General Building Requirements*.

Provide parking in accordance with UFC 3-201-01, Section 2-9.6 Parking Areas and SDDCTEA Pamphlet 55-17.

See G2050 LANDSCAPING and G205005 PLANTINGS for parking lot landscape requirements.

G202001 BASES & SUBBASES

Crushed concrete meeting specified gradation for aggregate base or subbase courses may be used.

G202002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent.

G202003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by NCDOT.

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings (pavement, curb and object), signage (regulatory, warning and guidance) and other traffic control devices as required to facilitate proper utilization of the parking areas.

Provide pavement markings including crosswalks. Provide parking in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide signage in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide temporary pavement markings and signage to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the MUTCD.

G202005 GUARDRAILS & BARRIERS

Provide wheel stops and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G202006 RESURFACING

Pavement resurfacing is not anticipated, but if required provide resurfacing of existing pavement by milling and bituminous overlay.

G202007 MISCELLANEOUS STRUCTURES AND EQUIPMENT

NOT USED

G202090 OTHER PARKING LOTS

NOT USED

G2030 PEDESTRIAN PAVING

Provide Portland cement concrete (PCC) sidewalks to allow for pedestrian circulation in the new greenspace areas adjacent to the building and where appropriate interface new pedestrian circulation systems with existing pedestrian circulation systems and include input from the Civil Engineer, Architect, and Landscape Architect.

Provide sidewalks of Portland cement concrete pavement with 4 inches thick minimum. Provide concrete sidewalk in accordance with Section G201003 or with the standard NCDOT mix for a minimum compressive strength at 28 days of 3,500 psi. For PCC sidewalks, provide a broomed finish. Reference Part 3 Site Analysis for sidewalk widths.

Provide, as indicated in BEAP 3.2.8 PLAZAS AND COURTYARDS – EXTERIOR USE ARES, entrance plazas and pedestrian spaces to create outdoor meeting spaces and reinforce the arrival sequence from parking lot to building entrance(s). Size and placement must reflect functional needs and the appropriate importance to the setting. Forecourts may serve as outdoor plazas, courtyards or smaller landings and be furnished with benches, trash receptacles, plantings, lighting and distinctive architectural treatment and may include provisions for bicycle parking. Bike racks must be provided to support 5% of the building FTE and can be divided into more than one location. See PART 3 – CHAPTER 2 Antiterrorism Force Protection for additional requirements for plazas and pedestrian areas for a fully coordinated design

Unless indicated otherwise, provide a transverse slope not to exceed 1/48. Limit variation in cross section to 0.25 inch in 5 feet.

G203001 BASES & SUBBASES

Provide as required and per the Contractor’s geotechnical engineering report.

G203002 CURBS & GUTTERS

NOT USED

G203003 PAVED SURFACES

NOT USED

G203004 GUARDRAILS & BARRIERS

NOT USED

G203005 RESURFACING

NOT USED

G203006 OTHER WALKS, STEPS & TERRACES

NOT USED

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

Provide chain link security fence as indicated on the drawings in Part 6.

Provide zinc-coated steel fencing components in accordance with FS RR-F-191/1, Type 1 for the fencing

system. Provide top tension wire and bottom rails.

For the security fence, provide one single line fence surrounding the restricted area. Provide security clear zones as required. Ensure that the fabric height is at least 7 feet (2.1 m). Provide outriggers and three strands of barbed wire. Design security fencing in accordance with UFC 4-022-03, *Security Fences and Gates*.

G204002 RETAINING AND FREESTANDING WALLS

Retaining walls are not anticipated, but if required provide retaining walls in areas of significant grade change. Follow the requirements set forth in Part 4, Performance Technical Specifications.

Provide concrete retaining walls with applicable safety protective measures. Retaining walls must match new facility exterior.

Provide retaining walls to permanently resist soil pressures as well as live loads. Provide wall drainage to minimize lateral loading and protect wall materials against degradation.

Retaining walls are required to comply with UFC 3-220-01. The DOR must obtain building permits for retaining walls greater than five feet in height

G204003 EXTERIOR FURNISHINGS

All site furnishings are required to conform to the Base Exterior Architectural Plan (BEAP). For each picnic area provide picnic tables, trash receptacles, benches, barbecues, recycling receptacles, hot ash receptacles. Provide a trash and ash receptacle at the designated smoking area.

All exterior furnishings must meet AT/FP Unobstructed Space requirements.

Design picnic areas to accommodate 20 people.

All site furnishings must be anchored to concrete pavement below.

G204004 SECURITY STRUCTURES

NOT USED

G204005 SIGNAGE

Provide building identification signage, building number signage, and way finding signage in accordance with the Activity's BEAP.

G204006 FOUNTAINS & POOLS

NOT USED

G204007 PLAYING FIELDS

NOT USED

G204008 TERRACE AND PERIMETER WALLS

NOT USED

G204009 FLAGPOLES

NOT USED

G204090 OTHER SITE IMPROVEMENTS

Provide heavy-duty concrete dumpster and utility pads. Provide dumpster enclosures conforming to the Activity's BEAP. BEAP 3.4.10 indicates that dumpster areas should be located on structural concrete pads with adequate radius, approach length, and overhead clearance from trees, utilities, and structures. Screening should be provided on three sides by a 7-foot-tall masonry wall to block views of the containers. The dumpster enclosure's materials and style must complement the facility it serves. For each dumpster, install a minimum of two bollards at the rear of the enclosure to protect the rear wall from damage and a minimum of two bollards on each side of the dumpster. The contractor must provide separate vehicular and pedestrian access to the dumpsters within the enclosures.

If a fire pump is required, provide a heavy-duty concrete pad for an on-site standby generator outside the building so it can be easily taken off line and removed once the base upgrades their power grid at a subsequent date.

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn groundcover trees shrubs ornamental grasses and organic mulches and inorganic mulches as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with all applicable anti-terrorism, force protection and physical security requirements. The landscape design must reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 5' wide inorganic rock cobble mulch mow strip around the building with weed barrier fabric below rock. Provide concrete edging along mow strip where edging is adjacent to a turf area. Provide landscaping resistant to deer.

Trees, shrubs, and ground covers are acceptable within the AT/FP unobstructed space. Trees must have a 3-inch minimum caliper and branching structure that provides a 3-foot clear zone above the finished grade. Shrubs must be trimmed to provide a 3-foot clear zone above the finished grade and ground covers must not exceed 6-inches in height.

Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species. Areas of the site not covered by buildings or other structures and impervious paving or walkways within the project limits must be considered landscape area and must receive landscape improvements.

Guarantee all landscaping for a period of one year. Provide a one-year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

Provide complete landscaping maintenance, including but not limited to, routine lawn mowing, edging, pruning, pest inspection/treatment, re-mulching of mulch products, watering, weeding, fertilizing, and restaking, throughout the guarantee period.

Provide mechanical equipment screening wall on three sides of new equipment.

Provide shrubs or small growing trees if feasible for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205001 FINE GRADING AND SOIL PREPARATION

Provide 4" of topsoil for all lawn areas and fine grade.

G205002 EROSION CONTROL MEASURES

Prevent erosion from occurring by providing erosion control measures designed and installed per NCDEQ standards.

G205003 TOPSOIL AND PLANTING BEDS

Provide a planting soil mixture composed of 50% native soil blended with 50% topsoil and other amendments as recommended by the soil testing laboratory around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's root balls. Set tops of plant root balls 2 inches above adjacent grades

Provide shrubs or small growing trees if feasible for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205004 SODDING

Sod areas indicated to be turfed. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of sodding and provide same guarantee and maintenance as for new landscape areas. Sod species must be Centipede – Eremochioa ophiuroides.

G205005 PLANTINGS

Preserve existing trees to the greatest extent possible.

MATERIAL SELECTION:

Select plant material from Master Plant Lists found within the Base Exterior Architecture Plan (BEAP), NC State Extension and the North Carolina Native Plant Society. Other plants not found on these lists may be used if approved by the reviewing Government Landscape Architect. Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. Final approval of new plant materials rests with the reviewing Government Landscape Architect. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species.

Shade trees must be a minimum size of 3-inch caliper at breast height and 14 to 16 feet tall minimum unless specified for Antiterrorism Force Protection measures where the trees are integrated into the vehicle-deterrent perimeter. See Antiterrorism Large Diameter Trees in PART 3 - CHAPTER 2 PROJECT OBJECTIVES. Flowering trees must be minimum 2-inch caliper and evergreen trees 8-10 feet tall. In general, select trees that have a normal lifespan over 60 years and a strong branch and limb structure. Trees must be relatively clean and free of potential nuisances such as fruit, berries, sap, thorns and pitch. In addition, trees must not have surface roots which will potentially uplift sidewalks and pavements. For palm trees, identify sizes on plans by brown trunk height (BTH) or clear trunk height (CTH). Unless otherwise approved by the reviewing government landscape architect, provide minimum BTH or CTH of 8 feet.

GENERAL PLANTING GUIDELINES:

All planting must adhere to any fence clear zone requirements for security and AT/FP criteria set forth in this RFP. Plantings must adhere to the Base Exterior Architectural Plan (BEAP). Coordinate with MCB Camp Lejeune for project specific requirements at CDW. Provide small trees and ground cover plantings at building main entrances to accentuate the entrances. Provide plantings to frame the new building and lessen the visual impact of parking areas. Provide planted strip between any sidewalk and any Primary, Secondary and Tertiary streets.

For inorganic granular mulch applications, provide 3 to 5 inch diameter river stone mulch over weed control fabric at mow strips around buildings. For organic mulch applications, provide 3 inches of shredded hardwood mulch over weed control fabric at planting beds except for spreading groundcover planted areas.

Encompass planting beds not used for bioretention filters with concrete edging.

Provide 6-inch-wide (minimum) by 12-inch-deep concrete band edging for each of the following conditions: between rock mulch/cobble area and turf area, between rock mulch/cobble area and planting area, and between turf area and planting area. Contain turf areas adjacent to building walls, site walls, columns, stairs, and other structures by a 6-inch-wide (minimum) concrete header with a minimum separation of concrete header from walls, columns, and other structures of 2 feet to minimize damage to site improvements.

Provide a 6-foot-wide grass sod border around the entire bioretention filter. Grass sod species must be Centipede. Ensure that the bioretention filters are not compromised by sediment deposits during construction. Install bioretention filters only after upstream areas tributary to the bioretention filter location have been fully stabilized.

If used for stormwater management, provide bioretention filters, plants, plant quantities, and soil mix in accordance with the State's Stormwater Design Manual.

TREE PLANTING GUIDELINES:

Preserve existing trees to the greatest extent possible. Provide trees at the minimum rate of one (1) tree per 1,000 square feet of TOTAL LANDSCAPE AREA for this project.

Site trees such that their mature canopy will not negatively affect any building. Include no trees within utility easements. Coordinate tree planting locations with electrical site lighting for a fully coordinated and integrated design that allows tree and lighting to be complimentary. See G4020 SITE LIGHTING Plant trees a minimum of 10 feet from building, edge of sidewalks, curbs, and underground water and sewer lines. Provide root barrier for all trees planted within 8 feet of any utility, wall, curb or pavement.

Stake all trees as required to ensure a stable, true plumb form is established. Protect trees from damage from staking materials. Unless otherwise directed by the Contracting Officer, all staking materials must be removed prior to the end of the contract. Provide a five-foot watering basin around each tree, and also provide a 5-foot diameter mulch ring with a 3-inch layer of organic mulch.

Provide informal street tree plantings that encompass all base streets within the project limits with an average spacing of 30 to 40 feet on center unless noted otherwise.

PARKING LOT GUIDELINES:

A minimum of 10% of any at grade POV parking lot must be landscaped; Reference Section 5 of ASHRAE 189.1.

POV parking lots must have a minimum of one (1) canopy tree every five (5) parking spaces around parking lot perimeter including entrance drives and service areas. Tree plantings along perimeter of lot must follow the Camp Lejeune Base Exterior Architecture Plan (BEAP) for a natural, native appearance. Parking lots must have no more than two tree species unless authorized by Government Landscape Architect.

Provide deciduous shrubs along the parking lot perimeter to create an informal opaque screen.

Interior plantings must consist of a minimum of (1) tree per every 300 square feet of island area. Planting medians must have a minimum inside dimension width of 9 feet. Any parking lot that abuts a service drive or base road for the project must be separated by planted green space with a minimum inside dimension width of 9 feet.

Provide 3 inches of shredded hardwood, pine bark or pine needle mulch at all planting beds.

G205006 PLANTERS

NOT USED

G205007 IRRIGATION SYSTEMS

NOT USED

G205090 OTHER LANDSCAPING

Deliverables must include plans, details and specifications to accurately and completely convey design intent. Plans must identify all plants, turf, hardscapes, site furnishings, buildings and site features and other pertinent landscape elements.

Provide a plant schedule indicating as a minimum, quantity, species, (Latin and Common Name) spacing, and size and condition of each proposed plant as well as mulch materials. Provide the height and width of plant at time of planting for Contracting Officer.

Provide on Landscape Plans a 'Landscape Material Summary' which includes but is not limited to 'Mulches'(by type), Concrete Header, Pavers, and other landscape materials utilized in the project.

Document all field changes to the Landscape Planting drawings including changes in sod area, concrete header lengths, hardwood and stone mulch bed areas, weed fabric areas (in inorganic mulch areas), planting location, and type and number of plant(s). Any field changes made to the Landscape layout must be shown on the Landscape Planting drawings - also revise the data found in the 'Landscape Material Summary' and 'Plant Material Schedule' found on the Landscape Planting drawings.

Specifications must include the minimum following sections for Landscape Architecture:

- 01 78 00, Closeout Submittals
- 12 93 00, Site Furnishings
- 32 05 33, Landscape Establishment
- 32 93 00, Exterior Plants
- 32 92 23, Sodding

The Contractor must provide plant and grounds maintenance during the plant establishment period. The plant establishment period must extend one full year after completion of planting.

Maintenance during planting operation must ensure installed plants are maintained in a healthy growing condition from time of planting through plant establishment period. The typical growth habit of individual plants must be retained.

Maintenance during the establishment period must include as a minimum:

- Straightening and tightening of tree stakes and guying material
- Mowing and edging of turf protecting plant areas from erosion
- Maintaining edging of planter beds and checking for girdling of trees, watering of all plant material and turf, weeding, and removing and replacing unhealthy plants
- Watering of all project trees with slow release watering bags
- Controlling pests, diseases, fungi and rodents
- Removing dead or broken branches by pruning in accordance with ANSI A300 Part 1
- Fourteen (14) days prior to the end of the maintenance period, mow and edge lawn, re-mulch beds (if required depth or coverage of mulch is not met) and water and fertilize all plants
- Removal of all tree staking and slow release watering bags at end of establishment period

Warranties: All trees and plants must be guaranteed for a period of one year after final acceptance of the project, or area/s.

--End of Section--

G30 SITE CIVIL/MECHANICAL UTILITIES – P1512F RENOVATE M107

SYSTEM DESCRIPTION

The site civil/mechanical utility systems include water supply systems, sanitary sewer systems, storm drainage systems, heating distribution systems, cooling distribution systems, fuel distribution systems and associated appurtenances which are more than 5 feet outside the building.

The site mechanical utility system consists of all piping and appurtenances for chilled water, hot water and natural gas, including all accessories and devices as necessary and required for a complete and usable system up to 5 feet outside buildings.

GENERAL SYSTEM REQUIREMENTS

New utilities to Building M017 are not anticipated to be required, however if relocation of existing utilities exterior to the building are required develop the site to provide water, fire protection, sanitary sewer, storm drainage, heating, and cooling distribution services that meet the requirements of each applicable regulatory agency that governs, and issues permits for the construction and operation of these systems. Site design is required to comply applicable project sustainability goals.

Provide each system complete and ready for operation.

Physically verify the location of existing above and below ground utilities prior to starting work.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453. Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil/Mechanical Reviewer. Perform work in accordance with the obtained permits.

Minimize the impact of construction activity on facility operations and neighboring facilities.

Obtain final approvals from the Contracting Officer for all utility connection points associated with this work.

Coordinate with the local utility providers and pay any fees or charges required to connect to their utility.

All disciplines involved in site work design must coordinate utility locations with the Civil Engineer and the Landscape Architect.

Refer to Site Analysis and Building Requirements Sections for additional site civil/mechanical utilities information.

Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS Section G30 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

After installation of the equipment and systems, provide training courses for Government personnel for each of the items listed below, covering items contained in the Operations and Maintenance manuals. Provide one copy of the Operations and Maintenance manuals for each two course attendees. Provide one DVD disc of the training courses to be used as refresher courses and to train additional personnel. Conduct training by the same factory trained engineer that supervised the installation of the system. During training include classroom discussion as well as hands on maintenance, replacement of typical components and repair type maintenance training for parts typically replaced or repaired in the field. Submit training plan 30 calendar days prior to training sessions; include scheduling, content, outline, and training material handouts. Provide training for Cathodic Protection System.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Leakage tests are required.

Perform post-installation TV inspection of new storm sewer mains.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Imported bedding material must be provided for all utility lines and structures. Bedding material must consist of either ASTM C33 fine aggregate, or NCDOT coarse aggregate size No. 57, No. 67, or No. 78. A minimum of 6 inches of bedding must be provided for all utility lines and a minimum of 12 inches of bedding must be provided for all utility structures. Bedding material backfill must be placed to the spring line of the pipe for all concrete and PVC pipe trench excavations. Utility line and utility structure excavations in existing pavement areas must be completely backfilled to the aggregate base/subbase course elevation using excavatable flowable fill meeting NCDOT specifications.

G3010 WATER SUPPLY

The existing water system serving the project site is owned and operated, by the federal government, operated and maintained. If the building water service is relocated, provide the new water system and connections to the existing water system in accordance with UFC 3-230-01, *Water Supply: Storage, Distribution, and Transmission*; the utility provider’s requirements; and the state waterworks' regulations; whichever is more stringent.

Notify the government of the additional demand generated by the proposed facility.

Provide a water meter so that water consumption is measured at the facility. Ensure the meter is easily accessible, but not obvious. Water Meters must comply with Camp Lejeune Water Meter Specifications included in Part 6 of this RFP.

Enable meter data to be collected and automatically transferred to a Meter Data Management (MDM) module in CIRCUITS for utility and energy management within an environment protected from cyber attack.

G301001 WELL SYSTEMS

NOT USED

G301002 POTABLE WATER DISTRIBUTION

Provide cathodic protection on metallic pipe lines.

A water meter on each proposed service line is required. If the existing meter is not of sufficient size or compliant with current regulations provide meters selected from the base ATO approved equipment listing.

Provide meter box.

If new fire hydrants are required, provide fire hydrants with 5” Stortz x 4.5” HN/NST Fire Hydrant Converter. Paint fire hydrant barrels yellow. Paint fire hydrant bonnets based on its rated flow capacity in accordance with UFC 3-600-01 and NFPA 291. Consult with the project Fire Protection Engineer to obtain hydrant flow capacities for newly installed fire hydrants.

Backflow preventers are required on all service entrance lines. If not specified in ESR D20 and D40, provide reduced pressure backflow preventers aboveground outside the building. Provide a heated enclosure.

G301003 POTABLE WATER STORAGE

NOT USED

G301004 FIRE PROTECTION WATER DISTRIBUTION

See G301002.

G301005 FIRE PROTECTION WATER STORAGE

NOT USED

G301006 NON-POTABLE WATER DISTRIBUTION

NOT USED

G301007 PUMPING STATIONS

NOT USED

G301008 PACKAGED WATER TREATMENT PLANTS

NOT USED

G301090 OTHER WATER SUPPLY

NOT USED

G3020 SANITARY SEWER

The existing sanitary sewer collection system serving the project site is owned, operated, and maintained by the federal government. If a new building connection if required, provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with UFC 3-240-01, *Wastewater Collection*; the utility provider’s requirements; and the state sewerage regulations; whichever is more stringent.

Notify the utility provider of the additional wastewater flow generated by the proposed facility.

G302001 SANITARY SEWER PIPING

Provide cathodic protection on metallic pipe lines.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G302003 LIFT STATIONS AND PUMPING STATIONS

NOT USED

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

NOT USED

G302005 SEPTIC TANKS

NOT USED

G302006 DRAIN FIELDS

NOT USED

G302090 OTHER SANITARY SEWER

NOT USED

G3030 STORM SEWER

The existing storm sewer system serving the project site is owned and operated by the federal government. If required, provide the new storm sewer system and connections to the existing storm sewer system in accordance with UFC 3-201-01, *Civil Engineering*; the utility provider's requirements; UFC 3-210-10, *Low Impact Development* the state stormwater management laws and regulations; and applicable project sustainability goals; whichever is more stringent.

If the final configuration of the site will increase the stormwater runoff confirm that the existing outfall has adequate capacity to receive the additional stormwater flow generated by the project. Provide final runoff calculations for the site.

Vehicle wash areas are not to be provided.

G303001 STORM SEWER PIPING

Storm sewer piping materials are required to be polyvinyl chloride (PVC) for diameters less than 12 inches and reinforced concrete pipe (RCP) for diameters 12 inches and greater. Storm piping must meet NCDOT requirements.

G303002 STORM SEWER STRUCTURES

Storm structures must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303004 CULVERTS

NOT USED.

G303005 HEADWALLS

Headwalls must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303006 EROSION & SEDIMENT CONTROL MEASURES

An Erosion and Sediment Control permit is not anticipated to be required for the proposed work from NCDEQ, however erosion from construction activities must be contained on site. Install any erosion and sediment control measures required to meet this goal. All measures must be designed and installed per NCDEQ requirements

G303007 STORM WATER MANAGEMENT

NOT USED

G303090 OTHER STORM SEWER

An oil/water separator will not be required.

G3040 HEATING DISTRIBUTION

NOT USED

G304001 OVERHEAD HOT WATER SYSTEMS

NOT USED

G304002 OVERHEAD STEAM SYSTEMS

NOT USED

G304003 UNDERGROUND HOT WATER SYSTEMS

NOT USED

G304004 UNDERGROUND STEAM SYSTEMS

NOT USED

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

NOT USED

G304090 OTHER HEATING DISTRIBUTION

NOT USED

G3050 COOLING DISTRIBUTION

NOT USED

G305001 OVERHEAD COOLING SYSTEMS

NOT USED

G305002 UNDERGROUND COOLING SYSTEMS

NOT USED

G305090 OTHER COOLING DISTRIBUTION

NOT USED

G3060 FUEL DISTRIBUTION

NOT USED

G306001 LIQUID FUEL DISTRIBUTION PIPING

NOT USED

G306003 LIQUID FUEL STORAGE TANKS

NOT USED

G306004 LIQUID FUEL DISPENSING EQUIPMENT

NOT USED

G306006 GAS DISTRIBUTION PIPING - NATURAL GAS

NOT USED

G306007 GAS STORAGE TANKS

NOT USED

G306009 OTHER GAS DISTRIBUTION

NOT USED

G306090 OTHER FUEL DISTRIBUTION

NOT USED

G3090 OTHER SITE MECHANICAL UTILITIES

NOT USED

--End of Section--

G40 SITE ELECTRICAL UTILITIES – P1512F RENOVATE M107

SCOPE

The site electrical utility system consists of all power and communications cabling from the existing distribution system point of connection including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet of new (or existing) building location.

Provide site systems complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must".

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detailed bubbles or notes used on the floor plan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floor plans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

Electrical contractors must possess a valid North Carolina Public Utility Electrical contractor's license and be insured to do such work in the State of North Carolina.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an exterior electrical system consisting of but not limited to Service Entrance Wiring and Equipment, Conduits, Feeder and Branch Circuits, Lighting and Branch Wiring, Communications, Security and Alarm Systems, Emergency Generator, Emergency Lighting and

Power, Grounding, and Lightning Protection, including accessories and devices as necessary and required for a complete and usable system.

Provide each building with a single utility service with radial power distribution.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited. Assume the available fault current at the point of connection to be an infinite bus.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15-percent spare circuit and load capacity at all levels of the power distribution system, including life safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide site electrical utilities systems and components that support project sustainability goals.

Provide identification labels for site equipment, structures, and wiring in accordance with the Camp Lejeune GIS numbering convention provided in Part 6 Attachment 8, *Camp Lejeune Electrical Policies & Criteria.*

Make road crossings using directional boring.

G4010 ELECTRICAL DISTRIBUTION

Provide a new underground secondary feeder in concrete encased duct bank from the secondary side of the existing 1500kVA service transformer and terminate at the existing 2000A main switchgear inside the building. Size the secondary feeder to supply the full rated secondary current of the transformer to the switchgear.

G401001 SUBSTATIONS

NOT USED

G401002 TRANSFORMERS

Reuse the existing building transformer.

G401003 SWITCHES, CONTROLS AND DEVICES

NOT USED

G401004 OVERHEAD ELECTRIC CONDUCTORS

NOT USED

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

NOT USED

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a 600-volt secondary underground electrical power distribution system to meet the connection requirements as indicated in paragraph G4010 *Electrical Distribution*.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

NOT USED

G401008 GROUNDING SYSTEMS

Provide a complete grounding system for the electrical power distribution system.

G401009 METERING

NOT USED

G401010 CATHODIC PROTECTION SYSTEMS

NOT USED

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

Provide site lighting for exterior and security applications including underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

Provide exterior luminaires, poles, and foundations in accordance with the Camp Lejeune Electrical Policies and the Camp Lejeune Base Exterior Architectural Plan. Provide architectural type luminaires for parking lot, walkway, and outdoor gathering area lighting. Provide cobra head type luminaires for roadway lighting.

Coordinate site lighting with plantings and landscape elements to provide a fully coordinated and integrated design that allows the lighting to be complimentary to the landscape design throughout the project site.

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide an automatic lighting control system for exterior lighting fixtures utilizing lighting contactors, bi-level or dimming drivers, motion sensors, and a centralized photocell. The photocell will automatically turn lights "ON" at dusk and turn "OFF" at sunrise while the motion sensors, in conjunction with the bi-level or dimming drivers, will adjust the lighting levels based on occupancy of the area.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Provide Area and Parking Lighting for parking lots, walkways, and outdoor gathering areas.

G402002 SPECIAL SECURITY LIGHTING SYSTEMS

Provide security lighting along the site perimeter fence line.

G402003 OTHER AREA LIGHTING

Provide area lighting for outdoor training areas.

G402004 LIGHTING POLES

Provide aluminum poles complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide a complete underground distribution system for all site lighting systems.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication and security system including, but not necessarily limited to, Voice and Data Telecommunications Systems, Cable Television (CATV) Systems including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system. “P1512_OSP” (located in part 6) for Outside Plant (OSP) existing communications pathways layout. Site demolition of building’s telecommunications services Must be coordinated for location/demarcation, and time 30 days prior with Base Telecomm.

G403001 TELECOMMUNICATIONS SYSTEMS

OSP PATHWAYS AND CABLING

The description below applies to Log OPS School, JRC, and M107:

- Provide 6-way 4” concrete encased duct bank from MH602 (near M165) to the corner of Montford Point Road and Company Street B (~1500’).
- From 1st manhole (MH) of new duct bank, closest to MH602 (~500’ past MH602), provide 4-way 4” concrete encased duct bank to new JRC site (~600’).
- Provide 6-way 4” concrete encased duct bank from corner of Montford Point Road and Company Street B, to the new applied instruction facility (~1100’).
- Provide 6-way 4” concrete encased duct bank from the corner of Montford Point Road and Company Street B, to Building M107 (~1200).

- Provide 144-strand fiber optic cable (FOC) And 1500-pair outside plant (OSP) copper cable from Building M165 (vault) to 1st MH of new duct bank past MH602 (~400').
- From 1st MH of new duct bank past MH602 to new MH at the corner of Montford Point Road and Company Street B, provide 96-strand FOC and 900-pair OSP copper cabling (~1100'). Provide 60’ slack loop of FOC and 30’ slack loop of OSP copper in new manhole at the corner of Montford Point Road and Company Street B; government will perform splice.
- Perform splice of 96-strand FOC to 144-strand FOC and 900-pair OSP copper to 1500-pair copper in new MH nearest MHh602.

Coordinate with base telephone provider for cable identifications and pair allocations.

M107 SPECIFIC OSP PATHWAYS AND CABLING

- Provide a minimum of (3) 4” ducts from last MH of the new duct run into M107.
- From the new MH at the corner of Montford Point Road and Company Street B, provide 300-pair copper OSP and 24-strand FOC to Building M107 (~1200'). Provide 60’ slack loop of FOC and 30’ slack loop of OSP copper in new manhole at the corner of Montford Point Road and Company Street B; government will perform splices.

G403002 CABLE TV SYSTEMS (CATV)

Provide two 2” conduits from an existing manhole (coordinate with government for actual location) to the building Main Distribution Frame. Provide a Building Entrance Terminal (BET) with integral surge protection for termination of the service provider’s cabling.

G403003 CABLES AND WIRING

Provide cables and wiring for site telecommunications and security systems as indicated in their respective categories.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a system of duct banks, manholes, and handholes for site telecommunications per section G403001.

G403005 TOWERS, POLES AND STANDS

NOT USED

G403006 TV CAMERAS AND MONITORS

NOT USED

G403007 ELECTRONIC SECURITY SYSTEMS (ESS)

NOT USED

G403008 OTHER COMMUNICATION AND ALARM

NOT USED

G403009 GROUNDING SYSTEMS

Provide a complete grounding system for all site communications and security systems.

G4090 OTHER SITE ELECTRICAL UTILITIES

Provide a transformer and a distribution panel to serve power and data pedestals located at the outdoor fenced area. Locate the distribution panel at a location to be selected by the COR. Provide power service from the distribution panel and data services from the building and terminate at power and data pedestals. Quantity of pedestals, feeder ampacity, data requirements, and connector types for the pedestals will be selected by the COR.

G409007 PHOTOVOLTAIC ENERGY SYSTEM

NOT USED

--End of Section--

1.0 PROJECT DESCRIPTION – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

1.1. Overview

Hurricane Florence impacted MCB Camp Lejeune and Marine Corps Air Station New River with periods of strong winds, heavy rains, flooding of urban and low-lying areas, flash floods and coastal storm surges. As a result, MCB Camp Lejeune, MCAS New River and MCAS Cherry Point experienced damage to approximately 781 buildings and structures. Numerous facilities were either partially damaged or rendered uninhabitable.

This project will replace a facility that sustained severe structural, roof truss and water intrusion damage, rendering it uninhabitable. The existing warehouse was already in poor condition due to age and deterioration and structural integrity issues. The effects of Hurricane Florence exacerbated chronic material conditions with the facility, impacting mission capability.

The project consists of a one-story warehouse facility to contain the Logistics and Command Consolidated Storage Program (LOGCOM) and JPEO-CBD Joint Enterprise Fielding and Surveillance (JEFS) Program that currently occupy an existing warehouse, Building 1601. The facility will be constructed on a site that currently exists as three city blocks. Buildings 1601, 1602, 1603, 1604 and 1605, will be fully demolished, and the three city blocks turned into one city block to make way for the new warehouse plus parking expansion. The new warehouse building will include a main warehouse area with pallet racks, shipping and receiving areas, testing rooms, a training/conference room, and support spaces necessary to conduct day-to-day operations.

The existing warehouse building will be occupied during construction on the new warehouse building. Building 1601 will be fully demolished after it is vacated.

1.2. Project Components

The components found within the Scope of Work for this project include, but are not limited to:

- Redevelopment of an occupied site between Fir and Gum Streets, and Michael and East Roads
- Stormwater management features to comply with Government LID requirements and state stormwater management permit requirements.
- Concrete dumpster pad and masonry screen wall for trash and recycling containers.
- Site utility connections.
- Parking areas
- One story building of approximately 109,200 square feet to house a new warehouse and related operations for two tenants (LOGCOM and JEFS)
- Covered loading dock and uncovered ramps
- Shipping and receiving areas for each tenant
- Issue and return area for LOGCOM
- Warehouse storage areas for each tenant

- Testing, inspection, repair and maintenance areas for each tenant
- Personnel and administrative offices and work areas
- Full demolition of Buildings 1601, 1602, 1603, 1604 and 1605.

1.3. Project Purpose

Marine Corps Logistics Command provides globally responsive ground equipment inventory control and integrated operational-level logistics capabilities in order to maximize Marine Corps material readiness and sustainment. The operation services approximately 40,000 military personnel. Also included is space utilized in support of pre-positioned war reserve stocks.

The primary driver behind the requirement is to provide an adequate and efficiently configured facilities to conduct day-to-day operations for LOGCOM CSP and JEFS Program.

The secondary driver behind the requirement is LOGCOM CSP and JEFS Program have outgrown their facilities in Building 1601 and require more space to conduct their day-to-day operations. The current facility does not provide any dedicated warehouse storage to JEFS Program. Its current poor condition was aggravated by Hurricane Florence, thus, impacting mission capability even further.

1.4. Most Relevant Codes and Standards

The following Codes and Standards, and those incorporated by reference within the below, are applicable to the project.

This is not a comprehensive list, and the Contractor is responsible for ensuring that the completed project complies with all applicable local, state and Federal codes, standards and regulations.

MCB Camp Lejeune

- MCB Camp Lejeune, North Carolina Public Works Division, Design Branch Electrical Policies & Criteria, 4 Feb 2020.
- Camp Lejeune Mechanical Design Guidance, 1 July 2017
- MCB Camp Lejeune, Base Exterior Architecture Plan (BEAP), 2010
- Specification 27 10 00 Building Telecommunications Cabling System, 27 Jun 17
- Specification 33 82 00 Telecommunications Outside Plant, 19 Jun 17

Facilities Criteria

- FC 1-300-09N, *Navy and Marine Corps Design Procedures*

Unified Facilities Criteria

- UFC 1-200-01, DoD Building Code (General Building Requirements), 8 Oct 2019
- UFC 1-200-02, *High Performance and Sustainable Building Requirements*, with Change 4, 1 October 2019.
- UFC 2-000-05N, *Facility Planning Criteria For Navy/Marine Corps Shore Installations*
- UFC 3-101-01, *Architecture*, with Change 5, 25 Sep 2019

- UFC 3-120-10, *Interior Design*, 16 May 2018
- UFC 3-201-01, *Civil Engineering*, with Change 2, 19 March 2019
- UFC 3-201-02, *Landscape Architecture*, with Change 1, 1 November 2019
- UFC 3-210-10, Low Impact Development, with Change 1, 2 February 2016
- UFC 3-220-01, *Geotechnical Engineering*, 1 November 2012
- UFC 3-220-05, *Dewatering and Groundwater Control*, 16 January 2004
- UFC 3-230-01, *Water Storage and Distribution*, with Change 1, 1 October 2018
- UFC 3-230-02 O&M, *Water Supply Systems*, 10 July 2001
- UFC 3-240-01, *Wastewater Collection*, with Change 2, 1 January 2019
- UFC 3-240-02, *Domestic Wastewater Treatment*, with Change 1, 1 January 2019
- UFC 3-250-01, *Pavement Design for Roads and Parking Areas*, 14 November 2016
- UFC 3-250-04, *Standard Practice for Concrete Pavements*, with Change 2, 7 July 2009
- UFC 3-250-11, *Soil Stabilization for Pavements*, 16 January 2004
- UFC 3-270-01 O&M Manual, *Asphalt and Concrete Pavement Maintenance and Repair*, 21 February 2018
- UFC 3-270-08, *Pavement Maintenance Management*, 16 January 2004
- FC 1-300-09N, *Navy and Marine Corps Design Procedures*, with Change 4, 14 June 2018
- UFC 3-301-01, *Structural Engineering*, 1 October 2019
- UFC 3-320-06A, *Concrete Floor Slabs on Grade Subjected to Heavy Loads*, 1 March 2005.
- UFC 3-401-01 *Mechanical Engineering*, with Change 1, 01 Oct 2015
- UFC 3-410-01 *Heating, Ventilating and Air Conditioning Systems,* with Change 5, 01 November 2019
- UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, 18 Jul, 18
- UFC 3-420-01, *Plumbing Systems*, with Change 10, 26 October 2015
- UFC 3-420-02FA *Compressed Air*, with Change, 01 December 2007
- UFC 3-450-01 *Noise and Vibration Control*, 15 May 2003
- UFC 3-501-01, Electrical Engineering
- UFC 3-520-01, Interior Electrical Systems
- UFC 3-520-05, Stationary Battery Areas
- UFC 3-530-01, Interior and Exterior Lighting Systems and Controls
- UFC 3-540-01, Engine-Generator Systems for Backup Power Applications

- UFC 3-550-01, Exterior Electrical Power Distribution
- UFC 3-560-01, Electrical Safety, O&M
- UFC 3-575-01, Lightning and Static Electricity Protection Systems
- UFC 3-580-01 Telecommunications Interior Infrastructure Planning and Design
- UFC 3-600-01, Fire Protection Engineering for Facilities, with Change 3, 10 May 2019
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, 12 December 2018
- UFC 4-010-06, Cybersecurity of Facility-Related Control Systems, with Change 1, 18 January 2017
- UFC 4-021-01. Design and O&M: Mass Notification Systems, with Change 1, January 2010
- UFC 4-021-02, Electronic Security Systems, October 2013
- UFC 4-440-01, *Warehouses and Storage Facilities*, with Change 1, 1 April 2019

Tri-Services Electrical Working Group (TSEWG)

- TSEWG TP-1 Electrical Calculation Examples
- TSEWG TP-2 Capacitors for Power Factor Correction
- TSEWG TP-3 Surge Protector Performance and Evaluation Criteria
- TSEWG TP-4 Stationary Battery and Charger Sizing
- TSEWG TP-5 Interior Transformer Ratings and Installation
- TSEWG TP-6 Low-Voltage Breaker Interrupting Ratings
- TSEWG TP-7 Protection System Design
- TSEWG TP-8 Equipment Enclosures and Hazardous Locations
- TSEWG TP-9 Automatic Transfer Equipment
- TSEWG TP-10 Arc Flash Levels for Fused Voltage Inputs to Electricity Meters
- TSEWG TP-11 UFC 3-500-10N Best Practices
- TSEWG TP-12 UFC 3-500-10N Appendices
- TSEWG TP-13 UFC 3-501-03N Load Demand Analyses
- TSEWG TP-15 Arc Flash Calculations and Detailed Arc Flash Warning Labels
- TSEWG TP-19 Static Uninterruptible Power supply (UPS)

International Code Council (ICC)

- International Building Code (IBC), 2018 as modified by UFC 1-200-01
- International Mechanical Code (IMC), 2018 as modified by UFC criteria
- International Plumbing Code (IPC), 2018 as modified by UFC criteria

2.0 PROJECT OBJECTIVES – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

2.1. Mission Statement

After Hurricane Florence numerous Camp Lejeune facilities were rendered un-occupiable, including Building 1601. Severe roof and water intrusion damage made the building unable to be occupied. This hurricane damage aggravated the fact that the building's tenants had outgrown this 1940s facility which was already in very poor condition due to its age and deterioration. The hurricane exacerbated chronic material conditions with the facility, impacting mission capability. Therefore, the existing operations will be replaced with new adequate and efficiently configured facilities that will be constructed on a brownfield site located across the street. These facilities will include a new building with more area and satisfy the tenants' needs and requirements to adequately conduct their day-to-day operations.

2.2. Facility Function

2.2.1. Overview

The new facilities will include a new warehouse building that will house two separate tenants: Logistics Command Consolidated Storage Program (LOGCOM CSP) and Joint Enterprise Fielding and Surveillance (JEFS) Program.

LOGCOM CSP requires warehouse storage for pallets racks capable of holding numerous amounts of diversely sized inventories and other storage. It also requires rooms for maintenance activities, sanitation, testing, radiological testing, cleaning, quality control, and areas for administrative functions directly related to their services.

The JEFS Program requires warehouse storage, other storage, a classroom or conference room for trainings, and areas for inspection, testing, repairs, technician workstations/reference library, and administrative functions directly related to their services.

2.3. Project Specific Priorities

The specific priorities of this project include:

- Protection of health, safety and welfare of those who currently occupy the existing warehouse facility located in a dated and hurricane-damaged substandard building.
- Replacement of existing warehouse with a larger building with more area and interior height clearance. Both building tenants have outgrown the facility and lack enough space for effective day-to-day operations.
- Increase pallet storage capacity for LOGCOM CSP for a more effective day-to-day operation. Current pallet storage warehouse is not UFC-compliant.
- Increase area for LOGCOM CSP' Radiological Room for a more efficient testing and filing operation.
- Provide JEFS with UFC-compliant pallet storage space that is currently lacking in the existing facility.
- Provide JEFS with a UFC-compliant training facility for up to 50 students.

- Provide both tenants with efficient shipping and receiving facilities in the form of properly design loading and unloading docks compliant to applicable UFC requirements.

2.3.1. Sustainable Design and Construction

All NAVFAC projects are subject to sustainable design criteria and are required to meet the requirements of the Guiding Principles for Sustainable Federal Buildings (HPSB). The Guiding Principles are outlined in a cross disciplinary publication addressing requirements for new building construction and modernization of all federally owned facilities. Sustainable principles will be integrated into the design, development and construction of the project in accordance with Executive Order 13834 and other applicable laws and Executive Orders.

Design and construct the project to comply with sustainability requirements identified in Part 2 Section 01 33 29.05 20, Sustainability Reporting for Design-Build. Additional specific sustainability requirements are found in RFP Part 2, Part 3, and Part 4 sections.

Design and construct the project in accordance with UFC 1-200-02, High Performance and Sustainable Building Requirements. The UFC provides design, construction and modernization criteria for projects of all sizes. It outlines performance thresholds in energy and water, addresses criteria of indoor air quality, identifies resiliency concerns, addresses planning and design, and establishes a baseline across all of DOD for documenting sustainability. A major component of the policy established in this UFC is the Sustainable Third-Party Certification requirement for projects that reach specific size and cost thresholds.

Additional, agency-specific requirements can be found in NAVFAC Engineering & Construction Bulletins (ECBs) such as Issue No. 2014-02. ECB 2014-02 describes overall NAVFAC policy and guidance on sustainability and energy requirements.

2.3.2. Storm Water Management - Low Impact Development (LID)

Comply with UFC 3-210-10, *Low Impact Development* and FC 1-300-09N *Navy and Marine Corps Design Procedures*. Additional specific LID and stormwater management requirements are found in RFP Parts 3 and 4, Section G30. In addition to LID, comply with State and Local stormwater regulations.

2.3.3. Energy Efficiency

The level of energy performance the Government seeks may only be achieved through coordinated design of architectural, electrical, and mechanical elements of the design. All energy systems must be designed in compliance with the following unless more stringent requirements are noted otherwise:

- UFC 1-200-02, High Performance and Sustainable Building Requirements. Incorporate energy efficiency in accordance with UFC 1-200-02, HPSB requirements
- Energy Policy Act (EPAct) 2005
- Energy Independence and Security Act (EISA) 2007
- ASHRAE Standard 189.1 - 2014
- ASHRAE/ IESNA Standard 90.1-2013.

Energy consuming equipment and products must meet or exceed Energy Star or Federal Energy Management (FEMP) efficiency levels. This includes built-in equipment (lights, HVAC,

water heating, industrial equipment, etc.) and collateral equipment (office equipment, IT, task lighting, etc.). For equipment types not rated by Energy Star or FEMP, equipment efficiencies must be in the top 25% of similar products. All purchased electronics must be Electronic Product Environmental Assessment Tool (EPEAT) registered. In addition, provide an Energy Compliance Analysis (ECA), which will demonstrate compliance with all energy related requirements in UFC 1-200-02. Measure and record existing building utility consumption, provide design calculated estimated energy savings and post construction documentation and reporting of actual realized energy savings.

2.3.4. Building Commissioning

Provide commissioning to meet requirements identified in Section 01 91 00.15 22 Total Building Commissioning, and UFC 1-200-02 High Performance and Sustainable Building Requirements.

2.3.5. Accessibility Requirements

Provide barrier-free design in accordance with UFC 1-200-01, General Building Requirements.

2.3.6. Anti-Terrorism Force Protection

The primary objective for the Marine Corps Base (MCB) security engineering is to ensure compliance with the Antiterrorism Force Protection (AT/FP) program requirements and applicable Marine Corps physical security measures in MCO 5530.14A, as supplemented by the UFC. The AT/FP program requirements and Marine Corps physical security measures are to safeguard personnel, equipment, and property. A risk analysis and vulnerability assessment (RAVA) has not been performed and a specific Design Basis Threat has not been identified.

The facility will have office, administration, and training areas that are considered Inhabited and will be routinely occupied by 11 or more personnel. The warehouse areas of the facility are considered Low Occupancy. If the warehouse areas are designed as Low Occupancy in accordance with the UFC 4-010-01 standards, then the warehouse areas must be structurally isolated from the Inhabited areas. This will require structurally isolated buildings with building expansion joints between the Inhabited building structure and the Low Occupancy building structure. Alternatively, the Low Occupancy areas of the building may be designed to meet the requirements for Inhabited buildings, therefore eliminating the requirement for structural isolation.

The facility must be designed in accordance with the chapter 3 standards of UFC 4-010-01, except that parking is not permitted in the 33 feet unobstructed space around the building. This includes low occupancy portions of the building, as applicable, due to physical security and operational requirements. The facility must also be designed in accordance with the following requirements:

a) **Anti-Terrorism Architectural Special Requirements** – Installation mission-assurance has requested security-conscious layouts and configurations for the interior layout of the building spaces and entrances to the building. The goal is to improve anti-terrorism safety without adding cost, without hardening the building, and without adversely affecting the usability of the building.

b) **Building Entrance Orientation** – Orient the main building entrance such that it does not provide vehicles the capability to drive through the main entry of the building. Where this is impractical, ensure that the entry storefront does not directly face a main hallway or a mass-gathering space. Lay out entrances to be welcoming and accessible, but so that

the entrances are visibly protected and inaccessible against a vehicle attempting to force entry. Ensure that building main entrance layouts are also compliant with UFC 4-010-01 Chapter 3-12, Standard 11 "Building Entrance Layout". Where this section conflicts with Standard 11, Standard 11 must take precedence.

c) **Proximity of Densely Populated Areas to Parking** – To mitigate risks to densely populated areas, locate uninhabited, low-occupancy, and mechanical yard areas adjacent to parking lots. Locate densely populated areas away from parking lots to the maximum extent possible given available site space and building square footage. The preference is to keep densely populated areas 82 feet away from parking spaces, if sufficient site space is available. Uninhabited and low occupancy spaces include utility rooms, hallways/corridors without seating, and storage areas. Densely populated areas include classrooms, large break rooms, locker rooms, conference rooms, auditoriums, and other areas with a high personnel density. During the Concept Development Workshop (CDW), include the installation anti-terrorism officer (mission-assurance) on discussions for the preferred layout of mass gathering and densely populated administrative areas relative to the proposed site plan.

d) **Anti-Terrorism Landscape Architecture Special Requirements** – Installation mission-assurance has requested security-conscious landscape features that afford improved protection to the building occupants. The goal is to improve anti-terrorism safety without adding cost by utilizing UFC-mandated landscape architecture features to protect vulnerable areas and using excess fill from the project site for landscaped berms. A specific design basis threat for an active shooter or attack vehicle does not apply; therefore, the intent is to complement architectural layouts and civil site features to improve occupant protection within the project scope of work.

e) **Vehicle Deterrent Landscaping** – Landscaping features can provide a significant physical and psychological deterrent to the risk of a vehicle ramming attack as a part of a vehicle-deterrent perimeter. Landscaping features do not need to be rated passive vehicle barriers to afford greater security to the building occupants.

f) **Unobstructed Space** – Trees, plantings, and site furniture may be located within the 33 ft unobstructed space around each building, provided they are compliant with the UFC 4-010-01 and UFC 3-201-02 requirements for landscaping in the unobstructed space. For berms, ensure berms in the unobstructed space do not exceed a 4'-6" height to eliminate concealment opportunities.

g) **Large Diameter Trees** – Tree species that will grow to a large diameter at breast height (6+ inches DBH) provide an aesthetically pleasing and natural barrier to vehicle traffic. It is desirable to position large diameter trees in the space between the building and parking lots or roads where permissible by code and feasible based on available site space. Provide tree plantings with at least 4 inches DBH where the trees are integrated into the vehicle-deterrent perimeter. Multiple staggered rows of trees serve as highly effective vehicle barriers once the trees have grown. Where providing multiple rows of trees stagger and space the trees to eliminate any corridors exceeding a 5-foot width perpendicular to the adjacent roads or drive aisles. Final tree layout, tree spacing, and species must be approved by the Government Landscape Architect and installation Anti-Terrorism Officer (or their designated representative).

h) **Concrete Site Features** – Concrete benches and picnic tables are excellent deterrents to vehicles. Concrete planters are not desirable due to landscaping maintenance issues and concealment concerns in the unobstructed space.

i) **Berms and Ditches** – Berms and ditches provide protection and can be integrated with the landscaping plan (e.g. trees along tops of berms, creeping juniper on the sides, etc).

j) **Elevated Plazas** – For buildings that require elevated entryway access with stairs and accessible ramps, consider arranging the stairs, ramps, and any low retaining walls or sloped soil so that they are positioned near the edge of the vehicle parking lot and adjacent roadways. A steeper, landscaped, stabilized slope near the edge of the parking lot with a sidewalk in front of it serves as a visible deterrent to illegal parking and approaching vehicles.

k) **Bollards at Building Entrances** – Bollards are an option where other features such as stairs, pedestrian ramps, trees, or berms do not deter direct vehicle access to the main building entrance. Bollards are desirable for sidewalks and plazas leading into the main building entrance provided there is no adverse impact to pedestrian accessibility. A bollard spacing of 4 feet on center will meet ABA/ADA requirements. Architectural bollards near the building entry are a desirable way to improve protection while improving site lighting (for lighted bollards) and appeal. Removable bollards are acceptable and beneficial for future building maintenance. Coordinate with vehicle access control requirements as part of civil site design. Provide the option of either permanent or removable bollards, determined based on customer needs at the Concept Development Workshop (CDW) and subsequent design review meetings.

l) **Visual Screening Landscaping at Queuing & Entry Areas** – Visual screening affords protection for building occupants and visitors against the potential for vehicular or active shooter threats. Landscaping that provides visual obscuration of building entrances and outdoor queuing or congregation areas is highly desirable to improve protection of personnel in exposed areas.

m) **Anti-Terrorism Civil Site Design Special Requirements** – Installation mission-assurance has requested security-conscious site plans that afford improved protection to the building occupants. The goal is to improve anti-terrorism safety without adding cost by laying out necessary vehicle parking and storm water features to protect vulnerable areas of the building. A specific design basis threat for an attack vehicle does not apply; therefore, the intent is to complement architectural layouts and landscaping features to improve occupant protection within the project scope of work. The unobstructed space and vehicle access control requirements defined below are added scope items to manage nuisance parking and maintain the unobstructed space for base operational considerations.

n) **Vehicle Access Control** – All projects must include consideration for vehicle access control in the form of lockable swing gates and/or lockable removable bollards along driveways and access roads that lead to service areas around the building within the 33-foot unobstructed space. Other open plaza areas must be secured with permanent bollards in combination with removable bollards. Portions of buildings that must be secured within a restricted area fence (e.g. motor pools) are excluded from this requirement.

o) **Service Area Access** – Access for service areas around the building includes roads and driveways that lead to utility rooms, loading docks, mechanical yards, other areas in

the unobstructed space that are used for building maintenance, and for roads that are only used for fire access.

p) **Pedestrian Areas** – Open plazas, hardscaping, and other outdoor pedestrian-congregation areas that are adjacent to a roadway must also feature vehicle access control integrated with permanent landscaping and civil site features as part of a vehicle-deterrent perimeter. Removable and fixed architectural bollards (lighted, where beneficial) are preferred for vehicle access control to open plazas, hardscaping, and other outdoor pedestrian-congregation areas with at least (4) removable bollards in a row for service access to these pedestrian areas. Provide the option of either permanent or removable bollards, determined based on customer needs at the Concept Development Workshop (CDW) and subsequent design review meetings.

q) **Access Control Requirements** – Where bollards are provided, space bollards 4 feet on center starting at each edge of the road or driveway. Where gates are provided, provide single or double leaf swing gates with posts that start at the edge of the roadway (or behind the curb) and which include receiving posts to secure the gate in the open position. Gates must not encroach on the roadway or driveway while in the open position. Gates and bollards must be high visibility and meet all other UFC requirements for signage, high-visibility, reflectivity, striping, etc., to meet traffic safety requirements. Gates and bollards for vehicle access control to service areas and pedestrian congregation areas need not be crash rated. Refer to UFC 4-022-03 *Security Fences and Gates* for additional requirements for gates.

r) **Vehicle-Deterrent Perimeter** – Gates and bollards must be integrated with landscaping and civil site features to deter vehicles from bypassing the access control by driving around the barriers and to maintain a vehicle-deterrent perimeter.

s) **Consolidating Access Control** – Access roads to service areas around the building can be secured where the access road begins at the adjacent roadway or parking lot, provided this is integrated with the vehicle-deterrent perimeter, in order to reduce the total cost of providing vehicle access control to the unobstructed space.

t) **Control Vehicle Speed** – Arrange parking lot access roads and drive aisles so that any direct approaches to the building walls or building entrance cannot exceed 25 miles per hour. Speed limit signage alone is not sufficient to constrain vehicle speed. Speed limit control in parking lots and access roads is also desirable to improve pedestrian safety and to reduce the risk of vehicle accidents.

u) **Limit Vehicle Approaches to Building** – Arrange access roads and drive aisles so that no vehicles have long straight approaches directly at the exterior walls of the building, particularly at the building entrance. Keep the long axis of drive aisles parallel with the walls of the building to control the approach direction of a vehicle. Arrange access roads so that personnel do not drive directly facing the building walls or any entrance. For short drive aisles that run perpendicular to the long axis of the parking lot, coordinate with landscape architecture to provide civil site and landscaping features that visually or physically deter vehicle access. Alternatively, locate these perpendicular drive aisles beyond the ends of the building so traffic does not directly face the building walls or any entrance. Loading docks/heavy truck areas need not consider these requirements due to the impracticability of implementing this where building access is a requirement. Provide curb stops in parking spots that are adjacent to the building to discourage vehicle parking in the unobstructed space.

v) **Unobstructed Space & Vehicle-Deterrence** – Provide a minimum 33-foot unobstructed space around the building without new parking, existing parking, new roadways, or new drive aisles. Keep existing drive aisles and roadways out of the unobstructed space to the maximum extent practicable. Provide berms, drainage swales/ditches, and other civil site features between the building and any adjacent parking lots or roadways as part of a vehicle-deterrent perimeter. Berms can also reduce off-site fill disposal costs, provided that fill is verified to be non-hazardous, non-contaminated. The Concept Development Workshop (CDW) must address how to integrate unobstructed space and vehicle-deterrence needs within the available site footprint in consultation with the installation Anti-Terrorism Officer.

w) **Unobstructed Space Preferences** – The installation mission-assurance personnel prefer larger unobstructed spaces where feasible based on available site space. Unobstructed space need not exceed 82 feet for larger, open sites. This unobstructed space preference is to the mass-gathering portions of each facility that excludes open hangar areas, apparatus bays, and other areas that are specifically designed to be low occupancy spaces as defined in UFC 4-010-01. Refer to paragraph '**Proximity of Densely Populated Areas to Parking**' for more information.

2.3.7. Facility-Related Control Systems Cybersecurity

Design, acquire and execute all facility-related control systems in accordance with UFC 4-010-06 Cybersecurity of Facility-Related Control Systems. Design the project using UFGS 25 05 11 Cybersecurity for Facility-Related Control Systems. Government Point of Contact to be utilized in SECTION 25 05 11 for Camp Lejeune is James Mahoney, ICS ISSM, email James.D.Mahoney@usmc.mil. Submit Control Correlation Identifiers (CCIs) as attachments to SECTION 25 05 11.

The table below identifies the Facility-Related Control Systems which must be included for this facility. Final C-I-A impact levels must be coordinated and approved by the Camp LeJeune ICS ISSM noted above, James Mahoney, James.D.Mahoney@usmc.mil.

Authorizing Official	System Owner	System Group	System	Existing Authority To Operate?	C-I-A Impact Level
USMC AO Dr. Ken Bible	DPW	UMCS	HVAC	Existing ATO MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Lighting	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	UMCS	Advanced Meter Infrastructure (AMI)	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate

USMC AO Dr. Ken Bible	DPW	BCS	Backup Power Generator Annunciator Panels and Controls	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	DPW	BCS	Elevator Control Systems	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Fire Dept	FLS	Fire Alarm Reporting System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	FLS	Mass Notification System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Physical Access Control System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Physical Security	ESS	Intrusion Detection System	Existing ATO in MCCAST (USMC) to be validated by ISSM	LOW-LOW-LOW – ISSM must validate
USMC AO Dr. Ken Bible	Security Forces	ESS	CCTV	Existing ATO in eMASS (Navy) or MCCAST (USMC)?? ISSM to validate.	LOW-LOW-LOW – ISSM to validate

Incorporate cybersecurity requirements into project facility control systems identified in:

- ESR D20, Plumbing
- ESR D30, HVAC
- ESR D40 Fire Protection including Cooper Notification, Inc WAVES Emergency Notification System
- ESR D50, ELECTRICAL

2.3.8. Secured Areas

Comply with the Marine Corps physical security measures in MCO 5530.14A as supplemented by the Unified Facilities Criteria.

All windows and glazing at the exterior building envelope must have security bars. The bars must be minimum 3/8-inch diameter hardened steel spanning each way with 4 inch vertical spacing and 8-inch horizontal spacing.

2.3.9. Air Quality Management

When demolition/renovation occurs, ensure that subject buildings are evaluated for asbestos/asbestos containing materials by a certified professional prior to the demolition/renovation.

Ensure that any fugitive dust emissions generated by construction/renovation/demolition are appropriately controlled.

If the project includes installation of new activities/equipment which generate air emissions, and the sources have not been evaluated for air permitting by MCB CAMLEJ, contact Air Quality (AQ) program at (910)451-9017. Please note that air emission sources are required to be permitted prior to their installation/operation. Examples of such sources include, but are not

limited to: boilers, water heaters, generators, fuel storage tanks, painting/coating operations, woodworking, welding, abrasive blasting, engine testing, refrigerant recovery devices, and parts ovens.

If the project involves any refrigerant handling or manipulation, ensure that appropriate Ozone Depleting Substance (ODS) servicing procedures are followed.

If the project includes removal of any currently permitted air emission sources (see Item 3 for examples), contact AQ program at (910)-451-9017.

2.4. Appropriate Design

Design the new building and systems in accordance with all Codes, Standards, UFCs, and criteria explicitly and implicitly stated herein. Employ integrated design principles.

2.4.1. Building Design – Architecture

The Logistics Command Consolidated Storage Program (LOGCOM CSP) and JEFS Program Warehouse exterior envelope design must follow the architectural design features prescribed in the Camp Lejeune Base Exterior Architectural Plan (BEAP), 2010 for Hadnot Point (Section 4.2 – note that it is in the Industrial Area subdistrict of Hadnot Point). This document establishes key exterior materials, material finishes/colors and building façade and roofing design elements to be incorporated into the building's exterior design.

Options for the exterior wall design are listed in Part 3, Chapter 6, B20 Exterior Closure ESR. Any of the listed options is allowed for the design of the exterior wall, as long as the design elements for the exterior wall defined in the BEAP are provided.

In lieu of a 4:12 to 6:12 roof slope that is defined in the BEAP for Hadnot Point, provide a low slope 1:12 roof for this building's roofs, as required in the BEAP for Hadnot Point's Industrial Area (Section 4.2.2).

The building design floor plan must generally follow the arrangement of spaces indicated in the Blocking Diagram in Part 3, Chapter 4 of this RFP. Locations of break rooms and heads may vary from what is shown in the diagrams if the functions of primary spaces are maintained.

The massing of the building and roofing placement will be influenced by the continuous high bay space of the warehouse bays and the adjacent spaces that will require a lower building height. The high bay warehouse can be provided with clerestory windows. Adjacent or nearby spaces occupied spaces require daylighting per UFC requirements.

The building design and design documentation must follow/meet applicable UFCs listed in Chapter 3, Part 1 and applicable building codes.

2.4.2. Civil/Site

2.4.2.1. General

The Logistics Command Consolidated Storage Program (LOGCOM CSP) and JEFS Program Warehouse will be located on what currently are two city blocks, each one with two existing one-story buildings: one block sites Buildings 1602 and 1603, the other block sites Buildings 1604 and 1605. To create the new LOGCOM CSP Warehouse site, these four buildings will be demolished as part of the development effort and the two blocks will be turned into one site, eliminating a portion of Hammond Road. The site will be surrounded by Gum Street, Michael Road, Fir Street and E Road. All four existing buildings were built in the 1940s and appear to be identical.

The existing Building 1601 currently houses the two tenants that will be relocated to the new LOGCOM CSP Warehouse building. It will be vacated and demolished after completion of the new warehouse facility. The new building will incorporate all functions currently being held in existing Building 1601.

The new Warehouse will front Gum Street, with the loading docks at the rear of the warehouse, with direct access from Fir Street. If the JEFS portion of the warehouse is separated from the LOGCOM portion, the two spaces shall be structurally isolated. Two (2) dumpster pads and associated enclosures, one for recycling and one for trash shall be provided on the site. A separate concrete pad/space for the JEFS trailer shall be provided and shall be located adjacent to the new Warehouse facility.

2.4.2.2. Parking and Access

Paved parking for the proposed facility shall include 30 fulltime staff and located southeast of E Road. Perpendicular parking as well as a full travel aisle adjacent to E Road must be considered to accommodate backup space. For truck turning movements, a WB-50 semi-tractor trailer shall be assumed as the largest vehicle accessing the site. A minimum 5-foot wide concrete pedestrian access shall be provided from the parking areas to the entrance of the new Warehouse building, satisfying all applicable ABA requirements. There shall be no POV parking adjacent to the loading dock.

2.4.2.3. Utilities

Civil utilities to the site include water, gravity sewer, and stormwater piping and drainage ditches. Domestic water exists in line with E Road, Michael Road and Gum Street. Gravity sanitary sewer surrounds the site and outfalls to the southeast. Roadside ditches, culverts and a closed stormwater drainage system shall collect stormwater from the site, including parking lot drainage, and convey the drainage in a closed system at existing Michael Road to the southeast to an existing outfall southeast of existing Louis Road. Once demolition of building 1601 is completed, proper grading shall be established to mitigate any ponding on the newly vacant site.

GIS information indicates electric and communication utilities surround the site. There is also overhead power along Gum Street. While not confirmed by inspection of the GIS information

received, it is anticipated that natural gas is adjacent to the site and serves the surrounding facilities.

2.4.3. Environmental / Conservation / Cultural Resources

There are no environmental, conservation or cultural resources identified for this project.

2.4.4. Structural

The structural design objective is to construct an efficient, safe and durable building constructed from any of the materials and load bearing systems permitted in the Part 3 ESR narratives and meeting the reference codes and standards. As part of this objective, the structural design must be coordinated with all disciplines and must meet functional requirements.

To help meet the objective, NAVFAC has provided a significant amount of historic geotechnical information and ECS has performed a preliminary geotechnical investigation of this site. Refer to Part 6 for the ECS preliminary information that includes previous investigations provided by NAVFAC. The NAVFAC and ECS geotechnical information is reliable for preliminary information but must be verified by the Contractor. The Contractor is solely responsible for interpreting available geotechnical information. The Contractor is responsible for conducting an independent geotechnical investigation for foundation design.

2.4.5. Fire Protection

2.4.5.1. Building Code and Life Safety Analysis

Provide a complete building code and life safety code analyses in accordance with UFC 3-600-01 and FC 1-300-09N.

2.4.5.2. Fire Alarm and Mass Notification

Design and provide an integrated fire alarm/ mass notification system capable of notifying building occupants inside the facility of an emergency event. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must".

2.4.5.3. Fire Protection Sprinkler System

Design and provide a wet pipe fire sprinkler system for complete fire protection coverage throughout the entire building. The fire protection design approach for protection of the storage area must utilize Early Suppression Fast-Response technology. The use of in-rack sprinklers will not be accepted. Design and install all equipment per the criteria of ESR and PTS Sections D40 and the manufacturer’s recommendations. Where the words "should" or “shall” are used in the manufacturer’s recommendations and in referenced Codes and Standards, substitute the word "must". Base hydraulic design on the water supply data provided in ESR Section D40 and Part 6.

This project includes an electric motor driven fire pump with an on-site standby generator and automatic transfer switch to serve as the required alternate power source. Power supply at Camp Lejeune does not qualify as a “reliable power source” as defined in UFC 3-600-01. Refer

to ESR Sections D40 and D50 for requirements. A diesel engine driven fire pump will not be considered as an acceptable alternative to the specified electric motor drive fire pump.

2.4.5.4. Special Detailed Requirements Based on Use

Protect the warehouse area in accordance with Chapter 4-44 of UFC 3-600-01. Protect the storage area utilizing ESFR sprinklers designed in accordance with NFPA 13 for protection of palletized, solid pile, and rack storage of exposed, non-expanded Group A Plastics.

2.4.6. Telecommunications

Provide a complete Telecommunications backbone and horizontal distribution system as specified throughout this RFP. Install all equipment, pathways, and cabling per the criteria per the PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations, substitute with the word "must."

Provide a MDF to house telecommunications equipment and cabling as well as service provider equipment and cabling. Additionally, provide floor/area serving IDFs to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit J-Hook pathways to each Work Area Outlet (WAO).

Provide exterior underground communications duct bank manhole system from existing duct bank(s) and manhole to the MDF inside each building.

The design and installation must be in accordance with the latest TIA standards, all applicable Unified Facilities Criteria documents, and the latest Local provider and applicable Using Military Department standards and criteria. Workflow Process

This warehouse facility houses two tenants, LOGCOM CSP and JEFS Program, each with their separate, yet related, operations. They service over 40,000 DoD personnel, including Marines, by providing, testing and maintaining, among other inventory, handout equipment, gas masks, portable shelters and decontamination units.

The facility has two main entrances on the north, one for each tenant. The LOGCOM CSP entrance leads directly to administrative offices and into the main warehouse area. The JEFS program entrance leads directly to the classroom and to the administrative offices. A separate JEFS entrance for staff is also provided. Each tenant is separated by a wall and has its own set of heads and breakrooms. However, both tenants will share the loading dock that will also serve as a means of connection between them. This loading dock will be accessed through each tenant's shipping/receiving area plus LOGCOM CSP's issue/return area.

At the LOGCOM CSP part of the building, related functions are located on each side of the main warehouse area. Shipping/receiving, shelter storage, issue/return, sorting, disposal and battery charge are all areas that require direct open access to the main warehouse area. Inasmuch, the sorting area requires direct access to the issue/return and disposal areas. One end of the warehouse requires two bay overhead doors for truck access that does not require the loading dock. It is also necessary that the ESAPI and NDTE functions be across one another on opposite sides of the warehouse.

At the JEFS Program part of the building, the administrative areas will be separate from their warehouse/industrial areas but connect through a door. The warehouse storage area is open to their shipping and receiving area and all inspection, testing and repair activities. The classroom will hold up to 50 students and is located close to the area's heads and breakroom.

2.4.7. Hours of Operation

Hours of operation range from 0700 to 1630, Monday through Friday, for CSP LOGCOM and JEFs. Instructors and other administrative and non-administrative staff access to the facility is allowed 24/7, even though they will be there mostly during normal working hours.

2.4.8. Staffing/Occupancy

The LOGCOM/JEFS warehouse is occupied primarily during daytime hours by administrative working in office environments and non-administrative staff working in warehouse-related areas. At times, the JEFS classroom will be occupied by students, mostly during daytime hours.

The numbers of occupants specified in the Design-Build RFP and indicated in the Building Program in Part 3, Chapter 4 are identified for programming purposes. Determine occupancy load to be used to design building features, such as structural, egress, and plumbing fixtures must be as required in applicable building or life safety codes based on the spaces provided in the building design.

2.5. Special Design Challenges

Special design challenges include the following:

- The large number of MILCON facilities that are to be built at or around the same time as the LOGCOM CSP and JEFS Program warehouse at Camp Lejeune may create challenges with both material and labor availability. The design of the building and systems selected for exterior envelope materials should take these challenges into account.
- Due to site constraints, it may be a challenge to get the best building footprint length to width ratio required by UFC 4-440-01. For the same reason, It may also be a challenge to incorporate parking spaces and necessary maneuvering truck space between the street and loading dock.

2.6. Adaptability and Flexibility

The LOGCOM CSP and JEFS Program warehouse provides a loading dock along the whole building length that connects both tenants. The main purpose of this long loading dock is for flexibility in allowing to simultaneously load and unload a multiple number of trucks at any given time. There will be ramps at both ends of the loading dock. Also, the facility's main warehouse area will provide an ample open space for storage racks and staging areas. This provides flexibility in use depending on needs and tasks being performed at any given time.

3.0 SITE ANALYSIS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

3.1. Existing Site Conditions

3.1.1. Site Conditions – Natural Constraints

3.1.1.1. Topography

The Logistics Command Consolidated Storage Program (LOGCOM CSP) and Joint Enterprise Fielding and Surveillance (JEFS) Program Warehouse will be located on what currently are two city blocks, each one with two existing one-story buildings: one block sites Buildings 1602 and 1603, the other block sites Buildings 1604 and 1605. The existing Building 1601 currently houses the two tenants that will be relocated to the new LOGCOM CSP Warehouse building. Site elevations range from approximately 26 feet down to 24 feet.

3.1.1.2. Vegetation / Landscaping

The project site is currently occupied by buildings and their repective paved and fenced-in storage areas, but the remainder of the site is generally turf.

3.1.1.3. Natural Resources

There are no known natural resources within the project limits.

3.1.1.4. Subsurface Investigation

See Part 4 ESR G10 for information regarding requirements to locate all utilities on the site.

3.1.1.5. Earthwork and Site Preparation

See Section 3.3.9 below for information regarding Geotechnical Earthwork and Site Prep and Sitework requirements for the site.

3.1.1.6. Unexploded Ordnance (UXO)

There is no known unexploded ordinance within the project limits.

3.1.1.7. Wetlands

There are no wetlands expected within the limits of the proposed project area.

3.1.1.8. 100-Year Floodplain

Per the FEMA Flood Insurance Rate Maps (FIRM) the project site is in “Area of Minimal Flood Hazard - Zone X”.

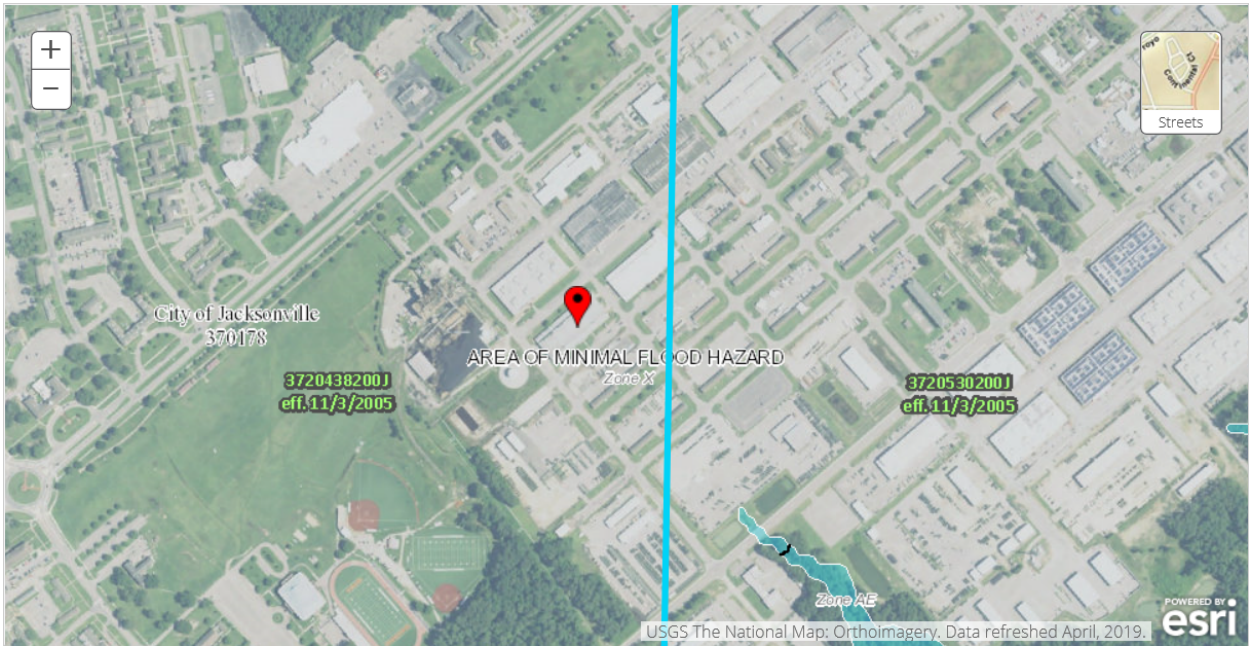


Figure 1: 100-Year Floodplain Map

3.1.2. Site Conditions – Man-made Constraints

3.1.2.1. Existing Vehicular Access and Circulation

There are existing roads and buildings in the vicinity of the location of the new Logistics Command Consolidated Storage Program (LOGCOM CSP) and JEFS Program Warehouse. The site is surrounded by Gum Street, Michael Road, Fir Street and E Road. To create the new LOGCOM CSP Warehouse site, four buildings will be demolished as part of the development effort and the two blocks will be turned into one site, eliminating a portion of Hammond Road between Gum Street and Fir Street. The southeast end of the site adjacent to E Road is an existing parking lot of approximately 30 parking spaces for personnel utilizing Building 1601.

3.1.2.2. Site Drainage & Storm Water Runoff (hydrology)

Roadside ditches and culverts combine with a closed stormwater drainage system that collects stormwater from the site, including parking lot drainage, and conveys the drainage in a closed system at existing Michael Road to the southeast to an existing outfall southeast of existing Louis Road. It has been noticed over time that a recurring flooding problem exists at the intersection of E Road and Fir Street.

3.1.2.3. Site Features

There are several aboveground tanks adjacent to buildings 1601, 1602, 1603, 1604 and 1605 that will require removal.

On the southwest and northeast sides of the site, there are concrete/gravel entrances that provide access to the existing mechanical yards for buildings 1602, 1603, 1604 and 1605. Also, on the southwest and northeast sides of the site currently occupied by building 1601, there are concrete/gravel entrances that provide access to the loading docks for that building. This access must be maintained.

A separate concrete pad/space for the JEFS trailer exists adjacent to building 1601.

GIS information indicates electric and communication utilities surround the site. There is also overhead power along Gum Street. While not confirmed by inspection of the GIS information received, it is anticipated that natural gas is adjacent to the site and serves the surrounding facilities.

3.1.2.4. Existing Site and Building Conditions Photographs

Photographs of the existing site and building can be found in the Part 6.

3.1.2.5. Hazardous Materials and Substances

The project area is within the boundaries of IR-78, which has known groundwater contamination and an active groundwater pump and treat system. Shallow groundwater contamination (<35' below ground surface) exists in both the demolition and new construction area.

The Decision Memorandum dated July 24, 2019 (1527 NEPA) detailing the contaminated groundwater condition and mitigation requirements for this project can be found in the Part 6.

Also see Section 3.3.8 below for information regarding Geotechnical Earthwork and Site Prep/Sitework requirements for any hazardous materials found on the site.

3.1.2.6. Fencing

A chain-link fence surrounds the mechanical/storage areas for buildings 1602, 1603, 1604 and 1605.

3.1.2.7. Adjacent Land Use

The site is surrounded by Gum Street, Michael Road, Fir Street and E Road.

3.2. Existing Infrastructure Network

3.2.1. Facility Footprint

3.2.1.1. Building Footprint and Building Characteristics

NOT USED

3.2.2. Vehicular Access and Circulation

3.2.2.1. General

A portion of Hammond Road will be eliminated with the construction of the new LOGCOM CSP Warehouse.

Although construction of the new warehouse in P1527 and the subsequent demolition of the existing buildings 1601, 1602, 1603, 1604 and 1605 may result is a minor redistribution of existing traffic movements, traffic volumes are not anticipated to increase.

A Traffic Investigation Report is not required for this project.

3.2.2.2. Parking

There is currently limited parking along the southeast side E Road. This parking area is currently utilized by personnel assigned to the existing warehouse building 1601 as well as visitors to it and the surrounding adjacent buildings. An assessment of future parking needs and infrastructure will need to be made in conjunction with ultimate building site layout.

The Contractor must consult the Parking section of the SDDCTEA Pamphlet 55-17 for this project.

3.2.2.3. Service Access

The new LOGCOM CSP Warehouse will have one continuous, covered and raised loading dock accessible by WB-50 vehicles, along with uncovered ramps on both ends. Appropriate access to this dock and ramps will need to be accommodated and circulation to and from the site. In addition, accommodations will need to be made for Solid Waste Trucks and Emergency Vehicles.

3.2.2.4. Pedestrian Access and Circulation (flow, walkways, sidewalks, etc.)

A system of standard sidewalks and wider walkways connecting the sidewalk along Gum Street and the perpendicular and parallel parking spaces to the entrances for the new LOGCOM CSP Warehouse must be provided for pedestrian access and safety. These wider walkways must exceed the standards for regular sidewalk and must be 10-12 feet wide to accommodate the foot traffic from Gum Street, along the proposed stormwater management areas and leading to the entrances to the new warehouse. The location of the pedestrian walkways should be strategically placed to allow convenient movement between the new LOGCOM CSP Warehouse and the perpendicular and parallel parking spaces on the northwest and southeast sides of the site, respectively.

3.2.3. Landscaping

The extent of landscaping on the project site consists of turf and few trees

3.2.4. Site Utilities

Civil utilities to the site include water, gravity sewer, and stormwater piping and drainage ditches. Domestic water exists in line with E Road, Michael Road and Gum Street. Gravity sanitary sewer surrounds the site and outfalls to the southeast.

Existing overhead primary electrical service lines run along Hammond Road, Gum Street, Michael Road, Fir Street, and E Road.

3.2.5. Signage

Provide building identification signage, building number signage, and way finding signage in accordance with the activity's BEAP.

3.3. Site Development Requirements

3.3.1. General Site

Site development must be designed in conformance with UFC 3-201-01 “Civil Engineering”. The site must be cleared of existing structures as required to accommodate the project (refer to CD101 Site Demolition Plan in Part 6 for a conceptual demolition plan). A bubble diagram site plan, with project limits of 8.7 acres, has been created to convey a potential general site layout and is included in Part 6. The bubble diagrams are the user’s preferred general layout; however, the Contractor is responsible for the creation of a complete construction plan set meeting the requirements of this RFP for the construction of the project. The Contractor will be utilizing the documents provided in this RFP to determine their bid.

- There are no wetlands as part of this project.
- An area for the Mobile Testing Units with utility hookup must be provided. The government will relocate the testing unit trailer.
- The building must face Gum Street and the loading dock area must be accessed from Fir Street.
- The building will require up to 73 parking spaces for warehouse personnel.
- The two military vehicle loading areas adjacent to the parking lot on the northwest side of the new warehouse as well as the pavement between Fir Street and the loading dock will require heavy-duty pavement to allow for maneuvering vehicles in and around the loading areas. Note that a hydraulic lift is not required for the loading dock for this project.
- All pavement access pavement, drive aisles, dumpster and loading routes, and all pavement anticipated for emergency vehicle access must be rated for HL-93 loading and the section must be based upon the Contractor’s geotechnical engineer’s calculations and recommendations. See minimum pavement section requirements for bidding in Section 3.3.9.1.
- All parking stalls may be light duty pavement based on the Contractor’s geotechnical engineer’s calculations and recommendations.
- All disturbed area not built upon with impervious surfaces must be graded to drain and covered in centipede sod.
- The facility does not require a fenced perimeter.
- Provide each break area with 4 picnic tables and AT/FP compliant trash receptacles.
- Provide a concrete dumpster pad for one trash and one recycling dumpster. The dumpster pad must extend to encompass the front wheels of the pick-up vehicle. The dumpster pad must have a masonry screen wall of building materials similar in nature and color to the proposed facility. Dumpster must be located at the back of the building adjacent to the loading dock area.
- Provide perimeter concrete curb or curb and gutter at parking lot perimeters and locations where anticipated vehicle wheel loads will be within 2 feet of the edge of asphalt pavement. Where curb is provided, an integral concrete gutter is required at any point where water will flow parallel to the bottom of curb.

- Concrete sidewalk must be provided for pedestrian circulation and must be a minimum of 5 feet in width unless required to be wider as described above for circulation from the Warehouse to other destinations. Sidewalk must be a minimum of 4" thick concrete.
- For the new warehouse, provide a Vapor Intrusion Mitigation System (VIMS) design and include construction cost for EPA compliant radon-resistant new construction (RRNC) consisting of a gas impermeable membrane barrier and radon soil gas piping collection network in the sub-slab aggregate bed before pouring the concrete slab. The piping network must connect to vent risers to passively exhaust the collected radon above the building. Provisions must be made to convert the system in the future from a passive venting system to an active system including an accessible space with conduit for electric and control connections for vent fans. See Part 6 "Vapor Intrusion Mitigation System" for additional requirements. Contractor must contact the IR Program Manager at 910-451-9385 regarding an environmental assessment in accordance with ESOP 10.1. As-built drawings, as well as O&M guidance for maintaining the barrier/system must be included in the project.

3.3.2. Site Demolition

Demolition of the existing site features will require both above ground and sub-surface demolition. This site will require select demolition, as certain features will be required to remain as is or be relocated as part of this project. The Contractor must ensure access to the adjacent facilities at all times during demolition and construction.

All utilities and access must be maintained until directed otherwise by the COR.

The following facilities must be demolished prior to the completion of the proposed project; 1602, 1603, 1604 and 1605.

The existing Building 1601 currently houses the two tenants that will be relocated to the new LOGCOM CSP Warehouse building. It will be vacated and demolished after completion of the new warehouse facility. The new warehouse building will incorporate all functions currently being held in existing Building 1601.

The demolition of these buildings includes the complete removal of the building, including all shallow foundations, foundation walls, slabs, pits, pile caps, etc. Deep foundations, such as piles, must be removed to a minimum depth of 48 inches below existing grade. Demolish all utilities serving each building as described further in this section and ESR G10. Site demolition must include the demolition and removal of all pavements and sidewalks specific to serving the building. Main circulation sidewalks or pavements serving facilities to remain must not be disturbed. Following demolition of buildings 1602, 1603, 1604, 1605 and Hammond Road, all graded slopes must conform with UFC 3-201-01 towards existing drainage structures or ditches with the flow patterns matching existing. Specifically, to the demolition of Building 1601, the Contractor must grade the site with a minimum slope of 2% towards existing drainage structures or ditches with the flow patterns matching existing to the greatest extent feasible to mitigate the existing flooding issue at the intersection of Fir Street and East Road. Any pavement demolition that terminates at existing pavement must be terminated by saw cutting at the limits of demolition in neat straight lines.

Utility service lines to each building must be removed back to the main and capped. Do not demolish existing pavement to remain to facilitate the removal of a utility service line to be demolished. Where underground utilities to be demolished pass under pavement not to be demolished, cut the utility at each edge of pavement and fill the utility remaining under the

pavement with flowable fill and abandon in place. Continue removal of the utility to the main on the far side of the pavement if applicable. If the utility main is within the pavement, cut and cap the service line at the edge of pavement and abandon the utility in place in accordance with applicable State or Federal regulations.

Prior to the demolition of any utility, coordinate with the utility owner to ensure the removal of the service line will not disrupt service to facilities to remain. Some telecom services may pass through buildings scheduled for demolition to buildings scheduled to remain.

For natural gas demolition notify PNG when a facility is ready for demolition. Once the facility has been confirmed for demolition PNG will remove and retire the meter. PNG will valve off the lateral at the main and will disconnect both ends of the gas lateral, the meter side and the main side. To depict retirement, PNG will remove the lines 4-5' from each end. Remove the remaining line left by PNG. Once a meter is retired the lateral cannot be reused for a new facility.

Any structure or pavement not to be demolished that is damaged during construction or demolition must be repaired or replaced at the expense of the contractor.

3.3.3. Utilities

An 8-inch domestic watermain exists in line with Michael Road . This main will serve as the source for both potable and fire protection water service.

An 18-inch gravity sanitary sewer exists along Michael Road and outfalls to the southeast. This will serve as the connection point for the building's sanitary sewer service.

Demolish existing overhead electrical lines and associated poles along Hammond Road to the nearest poles on Fir Street and Gum Street. Connect to a pole along on Gum Street, Michael Road, Fir Street, or E Road and extend primary electrical service underground to the pad mounted transformer associated with the Warehouse.

The Contractor must coordinate with the base in order to re-route the existing communication lines running along Hammond Road between Fir Street and Gum Street.

Piedmont Natural Gas (PNG) will be providing natural gas service to the new facilities. During the design phase invite PNG representatives to design review meetings. Including Michael Lilly – PNG Commercial and Residential Sales Specialist – Michael.lilly@duke-energy.com 252-808-7292 and Bobby Gurganus – PNG Construction – Bobby.gurganus@duke-energy.com 252-670-9613. Coordinate with PNG to depict the gas line routes on the civil utility site plans. The natural gas lines must be included in the project GIS deliverables. Provide projected loads of natural gas equipment to PNG for gas meter sizing. Notify PNG at least 6 months prior to in-service date to install new laterals and meters.

3.3.4. Signage

Provide building identification signage, building number signage, and wayfinding signage in accordance with the activity's BEAP.

3.3.5. Stormwater Management

Provide a complete stormwater management design that meets or exceeds UFC 3-210-10 Low Impact Development, UFC 3-201-01 Civil Engineering, and North Carolina Stormwater

Management requirements. Provide calculations that demonstrate compliance with all three criteria.

A storm drainage system must be designed and constructed to collect and convey the ten-year peak flow from the building and other new impervious areas into a proposed Stormwater Control Measure (SCM). Subsurface precast concrete structures such as catch basins and drop inlets will collect stormwater and reinforced concrete pipe (RCP) with watertight joints where appropriate will convey the stormwater towards the stormwater SCM which will retain and treat the stormwater before it is discharged towards the nearby waterway. Roof downspouts must tie directly to drainage structures underground. The use of grassed swales, pre-treatment areas, and other low impact stormwater strategies throughout the site are encouraged, where appropriate.

A stormwater SCM will be located on site and will be designed to meet the North Carolina Department of Environmental Quality's (NCDEQ) regulations for stormwater detention and water quality.

While specific SCM devices are not required at Camp Lejeune, preferences based upon historic performance of devices are noted. The Designer of Record (DOR) should be aware of the challenges of providing functioning devices at the sites. The goal is to provide functioning and compliant devices which are not maintenance intensive, nor require specialized or propriety materials. The DOR should be cautioned in the use of sand filters; Camp Lejeune has had experience with the majority of sand filters being compromised by the development of algae crust on the surface of the filters. A third-party inspector is recommended to be specified for the installation of SCMs. A pre- and post-construction infiltration test must be conducted for any SCMs that rely upon infiltration. A 3-day drawdown with a factor of safety of 2 must specified for SCMs to ensure continued stormwater compliance. Do not allow the conversion of sediment traps into infiltration SCMs. The sediment trap should be separate from the SCM to protect against premature failure. The use of heavy equipment in the bottom of infiltration devices will not be allowed due to the risk of compaction.

Overland relief for large storm events must be analyzed. Calculations must demonstrate that the 100-year storm routed through proposed stormwater management features will not reach higher than 1 foot below the Finish Floor Elevation of adjacent buildings. Demonstrate that the 100-year storm routed through proposed stormwater management features will not flood critical vehicle or pedestrian pathways.

Additional criteria that must be considered by the Contractor:

- Project involves the disturbance of over 5,000 square feet. Therefore, Requirements under Section 438 of the Energy Independence and Security Act (EISA) will be enforced. The policy directs all DoD construction projects and redevelopment projects with footprints greater than 5,000 square feet to implement Low Impact Development (LID) techniques to maintain predevelopment hydrology to the maximum extent technically feasible. Coordinate with Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0869.
- Project involves the disturbance of 1 or more acres of land and will require a State approved sedimentation/erosion control plan and stormwater permit. For questions regarding stormwater requirements coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application, contact Public Works Division, Design Branch at 451-2213. Note that the Hadnot Point area has an existing stormwater permit that may be adjusted for this project. The Contractor must consult with the base

Environmental Division to determine if this is an option before any stormwater management activities are initiated.

- Project involves addition/construction of 10,000 SF of impervious surface area. It requires State permitting through the North Carolina Department of Environmental Quality – Energy, Mineral and Land Resources Division (NCDEMLR) and the design/construction of approved SCMs (Coastal County Rules). Coordinate with Water Quality Manager, EQB at 451-9518 and the Storm Water Manager, ECB at 451-9657.
- If the project affects any existing built upon area (BUA) (impervious area) that is currently covered under an existing state issued stormwater permit, that permit will need to be modified. Coordinate with Public Works Design Branch at 451-2213.
- If additional new built-upon area (BUA) above and beyond the existing amount is proposed, then at a minimum, a high density SCM is required to treat that runoff from the new BUA. If the existing BUA within that drainage area and its runoff cannot be regraded or rerouted, then the proposed SCM must be designed to accommodate all the runoff within its drainage area. A full stormwater permit application will be required. Coordinate with Water Quality Manager, EQB at 451-9518 or Public Works Division, Operations Branch at 451-0896. Coordinate with Public Works Design Branch at 451-2213.
- Per direction from PWD, each project site is considered to be a separate project. Building demolition, regardless of which project the building is demolished under, can be used to offset impervious area increases from new construction, as long as the demolished building and the new building are adjacent to each other. There is no time limit between the demolition completion and new construction starting.

3.3.6. Sediment and Erosion Control

Erosion and sediment control is to be designed and installed per the North Carolina Department of Environmental Quality.

To prevent potential erosion and sedimentation from entering the surrounding wetlands, numerous erosion control methods and practices must be utilized. A stone construction entrance will be placed at a strategic location, inside the project limits to serve the site. A sediment basin with skimmer outlets and riser, if required, must be provided in the initial construction phase. This sediment basin must be separate from any proposed stormwater SCMs. The conversion of a sediment trap or basin to a stormwater SCM is not allowed. Basins may be constructed before the site is cleared and temporary swales graded to direct sediment laden stormwater towards the basin. A temporary construction fence should be installed around the entire limits of disturbance. Silt fence and silt fence outlets must be used around the perimeter of the of the construction sites to prevent sediment from exiting the disturbed areas. A double row of silt fence should be used along any wetland buffers. The site will then be cleared and graded once these erosion control measures are in place and have been approved by the local erosion control inspector representing NCDEQ.

Once stormwater structures are installed and brought to grade, inlet protection must be provided at all inlets to prevent sediment from entering the storm system. The site will be paved, and areas will be stabilized with vegetation near the completion of the project.

Additional criteria that must be considered by the Contractor:

- Ensure sediment does not leave a construction site of any size as a result of land-disturbing activities. Coordinate with Water Quality Manager, EQB at 451-9518 and the Storm Water Manager, ECB at 451-9522.
- Project involves the disturbance of 1 or more acres of land and will require a State approved sedimentation/erosion control plan and stormwater permit. For questions regarding stormwater requirements coordinate with Water Quality Manager, EQB at 451-9518. To coordinate the permit application contact Public Works Division, Design Branch at 451-2213.

3.3.7. Landscaping

Landscaping must include parking lot shade and ornamental trees and trees and shrubs as required for stormwater management facilities. Trees to remain within the limits of disturbance will be monitored for a year after construction and replaced as directed by the COR. Turf areas must be graded and sodded where damaged during construction. Other areas identified as turf must be installed via centipede sod. Landscaping must comply with the Base Exterior Architecture Plan (BEAP), see also Part 3 – Chapter 6 Section G20 for specific landscape requirements and plant establishment and maintenance requirements.

3.3.8. Permits

- Erosion and sediment control permit – North Carolina Department of Environmental Quality.
- Stormwater management permit – North Carolina Department of Environmental Quality.
- Water extension permit – North Carolina Department of Environmental Quality.
- Sewer extension permit – North Carolina Department of Environmental Quality.
- Wetlands Disturbance – USACE

3.3.9. Geotechnical Earthwork and Site Prep/Sitework Requirements

3.3.9.1. Criteria for Bidding

Base bids on the following criteria:

- Stripping depth of surficial soil material in existing grass surfaced areas; 4 inches.
- Stripping depth of asphalt concrete in existing paved areas; 3 inches for asphalt and 6 inches of stone base.
- Anticipate removing foundations and stormwater features three to five feet in the ground. Pavement and fill across the site will require one foot undercut to remove.
- Perched water table depth and elevation: The stabilized groundwater was observed approximately 4 to 6 feet below the surface. Saturated soil was observed behind the building on the south side of the site that may indicate a perched water condition from a hardpan or a water leak from the building.
- Seasonal high-water table depth; 28 to 60 inches below the ground surface.
- Excavated onsite soils will not be suitable for re-use as structural fill.

- Vapor Intrusion Mitigation Systems (VIMS) for the new building is included in the project; The Proposed project area is within the boundaries of IR-78, which has known groundwater contamination and an active groundwater pump and treat system. See enclosed figures. There are multiple active monitoring wells and groundwater extraction wells in the proposed redevelopment complex, as well as adjacent to building 1601. A passive chemical vapor mitigation system that can be converted to an active system is recommended in lieu of collecting site-specific data, as several buildings in this area are already on the vapor intrusion "watch" list and a vapor intrusion Land Use Control is in place. groundwater remediation conveyance piping may be anywhere from 2 to 4 feet below ground surface. Heavy coordination with the IR Program will be needed to ensure conflicts in design and construction are mitigated. In addition, the vapor mitigation system design and specifications will need to be provided to the State and EPA for review and approval prior to start of construction. Contact the IR Program Manager (Lejeune_IR_Program@usmc.mil; 910-451-9385) for additional information. The Environmental Waste Management Plan has been included in Part 6.
- The ditch on the south side of the site will require 18 inches of undercut to remove silty organic soil.
- Provide preloading or surcharging to mitigate excessive consolidation settlement associated with site grading impacts in all areas where finished site grade increases are 2 or more feet above existing site grades.
- Need and depth of predrilling/spudding to facilitate pile installation; 10 feet.
- Provide a preconstruction survey and vibration monitoring during pile installation.
- Provide temporary sheeting, shoring, and dewatering of excavations greater than three feet.
- Minimum heavy-duty asphalt pavement section; 2” NCDOT surface course asphalt, 3” NCDOT base course asphalt, 8” NCDOT aggregate base course.
- Minimum light-duty asphalt pavement section; 2” NCDOT surface course asphalt, 8” NCDOT aggregate base course.
- Minimum sidewalk section; 4” – 3,000 psi compressive strength Portland Cement Concrete,
- Minimum dumpster pad/equipment pad section; 8” – 5,000 psi compressive strength Portland Cement Concrete, #4 bars at 12” on-center each way.

3.3.9.2. Earthwork and Site Preparation Criteria

The Contractor’s Geotechnical Engineer is required to monitor site stripping operations on a full-time basis. Stripped surficial soil materials will be properly disposed of per Specification 01.57.19. No soils are to leave Marine Corps Base Camp LeJeune. Imported topsoil will be provided for the project where needed.

The underlying soils that will be exposed after completion of site stripping and undercutting will have a tendency to become softened and unstable when saturated and worked or subjected to construction equipment. Provide the necessary measures to address these marginal subgrade support conditions throughout design and construction to obtain required soil support while maintaining progress for completion on schedule. Do not allow construction traffic to travel

directly on exposed subgrades. Provide geosynthetic reinforced haul roads and staging pads to facilitate construction traffic access across the site and to protect the underlying subgrade from deterioration. The Contractor is responsible for all costs associated with any necessary measures to repair subgrades deteriorated by construction traffic and exposure to water. Determination of unsuitable subgrade conditions and need to implement remedial measures will be made by a NAVFAC Geotechnical Engineer and subject to the approval of the Contracting Officer.

Provide control of ground water and surface water encountered during construction. Provide temporary dewatering and positive site drainage to prevent conditions that will cause deterioration of exposed subgrades and open excavations. Do not allow deterioration of exposed subgrades to create interruptions to the progress of construction. Establish storm drainage features at the earliest stages of site development. Install and maintain all necessary temporary water containment facilities, channels/ditches, and diversions for ground water and surface water control to include all necessary temporary environmental controls. Provide a multiple well point dewatering system for any utility or foundation excavations that extend down to and below the ground water level.

The site currently contains or may have formerly contained developments such as structures, surface pavements, haul roads, above and below ground utilities, etc. that will require demolition and removal prior to earthwork operations under this contract. The required removal depth of the existing site features is expected to be highly varying. It is reasonable to anticipate that excavations made in areas of known prior development will encounter additional materials beyond what is specifically indicated on the test boring records that will need to be removed.

Imported Select Material and Backfill and Fill Material will be required for filling all undercut excavations, grubbing excavations, excavations resulting from the demolition of existing utilities/foundations as well as new utility/ foundation excavations within the planned building and pavement areas, and for grading fill in pavement and building areas. Provide imported Select Material for the top 2 feet of fill required beneath all pavements, foundations and slabs. Provide imported Backfill and Fill Material in all other structure and pavement locations. Select Material must meet ASTM D2487 classification symbols GW, GP, SW, SP, and SP-SM with not more than 12 percent passing the U.S. No. 200 sieve by ASTM D1140 and plasticity index not greater than zero by ASTM D4318. Backfill and Fill Material must meet ASTM D2487 classification symbols GW, GP, SW, SP, SP-SM, and SM and have a maximum of 20 percent passing the U.S. No. 200 sieve by ASTM D1140 and maximum liquid limit of 30 and maximum plasticity index of 9 by ASTM D4318.

Excavated existing on-site soils will only be reused as general fill beyond the limits of surface bearing structures (i.e. pavements, buildings, pipe trenches, etc.) and beyond the limits of any undercut excavations, provided the material meets the project requirements. All soil material must exhibit the characteristics required to compact the soil to the density and performance specified for the intended locations. Excavated on-site soils will be amended (i.e. mixed with lime, cement, or blended with imported structural materials, etc.) as necessary to facilitate reuse as general fill and Backfill and Fill Material. All fill materials will have a maximum particle diameter of 3 inches and will require moisture conditioning prior placement and compaction to within ± 2 percent of the optimum moisture content as defined by ASTM D698 or ASTM D1557. Chose compaction standard as recommended by Geotechnical Engineer of Record.

The Contractor will be responsible for maintaining erosion control measures, preventing segregation, and moisture conditioning for any excavated onsite soil and aggregate materials and any imported soil and aggregate materials stockpiled onsite.

All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material Is permitted to leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer. The Contractor is responsible for all costs associated with the management and disposal of surplus excavation spoils.

4.0 BUILDING REQUIREMENTS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

4.1. Space Tabulation

4.1.1. LOGCOM CSP Program Summary

LOGCOM WAREHOUSE	**79,907 NSF**	**7 PN**
JEFS	**19,037 NSF**	**16 PN**
TOTAL PROGRAMMED SPACE	**98,944 NSF**	**23 PN**
MAXIMUM ALLOWABLE GSF (PER 1391)	109,253 GSF	

Tenant 1 – LOGCOM Warehouse

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
Office					
CBRND Office		300	3		
Regional Manager Office		120	1		
Gov't Office		120	1		
NDTE Office		120	1		
NDTE Room & Storage		1,200	3		
ESAPI Office		120	1		
ESAPI Room		250	2		
		2,230	**12**		
Warehouse Related					
Radiological Room		2,280			
Computer Equip & RSDL DECON Lotion		323			
Storage Area SL-3/Repair Parts		700			
Final QC Area		500			
Sanitation Area		800			
JSMLT Test Area		500			
Maintenance Room		600			
Battery Forklift Charging Area		1,111			
Shipping & Receiving (2 docks)		4,000			
Shelters Storage Area		2,539			
Issue/Return Area		2,600			
Sort Area		1,900			
Disposal Area		2,100			
		19,953	**0**		
Warehouse					
Warehouse area		56,582		1,536 pallet positions	
		56,582	**0**		

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
Common Spaces					
Break Room		442			
Heads (male/female/transgender)		466			
Mother's Room		77			
Janitor's Closet		77			
Vestibule/Entry		80			
Loading Dock Canopy (1/2)		0			
		1,142	**0**		

LOGCOM WAREHOUSE PROGRAMMED SPACE	**79,907 NSF**	**12 PN**

Table of Utilities

Room Name	Comments	Additional Room Requirements
Utilities		
Mechanical	600 SF	
Fire Pump	200 SF	
Electrical	659 SF	
Telecom	339 SF	

Tenant 2 – JEFS

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
JEFS Office					
Private Office	JEFS FFS Operations Officer	600	1	Each office includes a work area for group meetings and working sessions	
Private Office	JEFS FST Officer in Charge	600	1		
Private Office	Assistant OIC/NCOIC	400	2		
Open Office	Technician / Technical Ref Library	1,500	12		
Classroom/Conference Room (30 - 50 Students)		1,500			
		4,600	**16**		
JEFS Industrial					
Shipping/Receiving/Water Testing		2,000		Requires roll-up freight door	
Test & Repair		2,200		Limited Storage	
Visual Inspection & Repair		2,200		Limited Storage	
Storage/Warehouse/Preparation		6,037		96 pallet positions	
		12,437	**0**		

Room Name	Occupant	NSF	PN	Comments	Additional Room Requirements
JEFS Common Spaces					
Break/Lunch Room		715			
Heads (male/female/transgender)		425			
Administrative Storage		347			
Hazmat Storage Room		300			
Janitor's Closet		69			
Main Vestibule/Entry		80			
Secondary Vestibule/Entry		64			
		2,000	**0**		

JEFS PROGRAMMED SPACE	**19,037 NSF**	**16 PN**	

Table of Utilities

Room Name	Comments	Additional Room Requirements
Utilities		
AHU	1,400 SF, including an approximately 150 SF mechanical Air Compressor Room	
Boiler	700 SF	
Fire Pump	200 SF	
Electrical	69 SF	
Telecom	231 SF	

Corridors must be a minimum of 6 feet wide. However, AE2 will be responsible for determining if greater corridor widths are required by code.

Contractor must provide actual area in both square feet and square meters in proposals.

4.2. Space Relationships

Refer to the space arrangement shown in the Architectural Bock Diagram in this section. The diagram incorporates the spaces defined in the Space Tabulation. The new warehouse building will house two separate tenants (LOGCOM CSP and JEFS Program) that will be separated by a wall but connected through a door and a loading dock along one whole side of the building. Each tenant has its own unique spatial requirements and requires separate areas.

4.2.1. LOGCOM CSP

This is will be the building's main tenant and will occupy approximately 90,800 square feet of the gross building area. This area's main space will be the warehouse area that will include staging areas and space for 1,536 pallets stored on four tier high racks. Many spaces are required to be contiguous and have direct access to the warehouse storage area. The Sanitation Area, JSMLT Test Area, Final Quality Control (QC) Area and Toilet Rooms do not need to be adjacent to the warehouse storage area. However, the Sanitation Area must be adjacent to the JSMLT Test Area. The NDTE and ESAPI areas should be at opposite ends of the open warehouse storage area and not adjacent to one another. ESAPI and Shipping & Receiving must have immediate adjacency. The Sort Area must be adjacent to the Issue/Return Area and the Disposal Area must be adjacent to the Sort Area. Controlled access from the building exterior is required through a lobby, opposite from the Shipping & Receiving Area. The CBNRD Office requires a separate entrance.

ESAPI Room & Office include a catalog area with workstations for four and areas for three staff members in a staging area within. The requirement is for an area to layout and scan and catalog items all at once. The Break Room will include a vending area and seating for at least seven at any given time.

The CBRND Office area will provide three workstations. The Regional Manager and Government Offices will each be for one person.

All rooms must be free of columns, except the main pallet rack storage area that may contain columns that do not impede access to any racks; all aisles must be column-free.

4.2.2. JEFS Program

This will be the building's tenant that will occupy less area, approximately 18,450 square feet of the gross building area. This area's main spaces will be the warehouse storage area and inspection, repair and testing areas. The warehouse must include an area for four-tiers of pallet rack storage for approximately 48 pallets. The training classroom for up to 50 trainees is also a JEFS Program main function. Trainees can enter this classroom directly from the exterior or through interior corridors. However, a single entrance for staff is required.

Three private work areas will be required, one for the operations officer, another for the officer in charge, and a third for the Assistant OIC NCOIC. These should be near the Technician Office Area and Reference Library with 12 work stations and the Assistant OIC NCOIC work area which should be adjacent to a space with a large multifunction floor copier. The Break Room will also be nearby and include a vending area and seating for at least four at any given time.

4.3. Exterior Character

The new single-story warehouse building will be situated on Gum Street on a city block surrounded by Gum Street, East Road, Fir Street, and Michael Road within the Hadnot Point district's Industrial Area subdistrict, as defined by the MCB Camp Lejeune BEAP 2010, which also dictates the building's architectural design. However, this building's utilitarian function and location within the district's warehouse neighborhood must be taken into consideration. Design the building in harmony with its context, in compliance to the BEAP and incorporating good architectural design principles. Include brick exteriors and a taupe color standing metal seam roof, which is a standard for all new facilities in Camp Lejeune, and for which a specification is provided herewith. Refer to the BEAP for specific design details. All building exterior architectural design will be reviewed and approved by the MCB Camp Lejeune Architectural Review Board.

CANOPY

LOADING DOCK

WHSE FP

WHSE MECH.

HAZMAT STORAGE

RAMP

DN

DN

RAMP

SHIPPING/RECEIVING

SHELTER STORAGE

ISSUE/ RETURN AREA

SORT AREA

DISPOSAL AREA

TELE.

ELEC.

SHIPPING/RECEIVING/
WATER TESTING

ESAPI ROOM & OFFICE

ELEC.

VISUAL
INSPECTION
& REPAIR

STORAGE/
WAREHOUSE/
PREPARATION

WAREHOUSE AREA

107,040 GSF BUILDING
2,030 GSF LOADING DOCK CANOPY
109,070 GSF TOTAL
109,253 GSF per 1391

4 TIERS, ± 890 L/FT DOUBLE DEPTH,
1536 PALLET POSITIONS AT LOGCOM
± 56 L/FT DOUBLE DEPTH,
96 PALLET POSITIONS AT JEFS

TEST &
REPAIR

PALLET RACK

PALLET RACK

JEFS FST
OIC

JEFS FSS
OPERATIONS
OFFICER

ASSISTANT
OIC/NCOIC

ADMIN
STORAGE

TELE.

VESTIBULE/
ENTRY

HEADS

TECHNICIAN
OFFICE/
REFERENCE
LIBRARY

BREAK

ELEC.

JAN.

ELEC.

NDTE OFFICE

TELE.

COMP. EQ. & RSDL
DECON. LOTION

MOTHER'S
ROOM

NDTE /
STORAGE

MECH.

RADIOLOGICAL

HEADS

BREAK

CBRND
OFFICE

REG.
MNGR

GOV'T
OFFICE

FINAL
QC

JSMLT
TEST
AREA

ELEC.

MAINT.

JEFS
FP

JEFS
BOILER
ROOM

JEFS AHU

CLASSROOM

JAN.

VESTIBULE/
ENTRY

STORAGE AREA
SL-3/REPAIR PARTS

SANITATION
AREA

BATTERY
CHARGING AREA

AIR COMPRESSOR
ROOM

VESTIBULE/
ENTRY

LEGEND

JEFS

LOGCOM WAREHOUSE

BAY DOOR

OPEN TO ADJACENT AREA

ENTRY

NOTE:
ALL WINDOWS MUST BE PROTECTED
WITH SECURITY BARS

06 JANUARY 2020

NAVFAC Naval Facilities Engineering Command

ARCHITECTURAL BLOCK DIAGRAM
LOGCOM CSP WAREHOUSE - P1527

JACOBS

5.0 ROOM FINISH AND FF&E REQUIREMENTS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

5.1. FINISH AND FF&E SCHEDULE

. The following chart is provided for defining general room finishes and furniture, fixtures, and equipment (FF&E) items for the LOGCOM CSP Warehouse. Special interior finishes and FF&E items beyond those outlined below are provided in the Additional Room Requirements. The intent of each room requirement sheet is to highlight special, unique, additional, or exceptional room-specific requirements. These tables are not all-inclusive and the requirements listed should be considered as an addition to the typical requirements outlined in the UFCs, ESRs, & PTSs.

FF&E and AV Equipment will be funded separately as a modification to the construction contract, with the exception of fixed furnishings (SID). Infrastructure to support all FF&E and AV is included in the construction contract. Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with Activity at concept Design workshop (CDW).

Refer to ESR D50 for specific electrical and audio visual (AV) requirements. Coordinate with the Base to determine preferred locations of fixed artwork.

FFE to include Automated External Defibrillators as required by National Fire Protection Association's (NFPA) 101 Life Safety Code and Marine Corps Order (MCO) 11000.11A. Access to an AED shall be provided for all Assembly occupancies, fitness centers and high risk training centers and as required by NFPA 101.

Room Typical guidelines:

1. Private office required to be a minimum 9'-0" wide (10'-0" wide is preferred).
2. Workstations in open office areas will be a benching / desking system. Powered Cubicle walls will be used minimally.
3. Ceiling heights will be 10'-0" unless notes otherwise. See additional Room Requirements
4. All base to be 6" high

Room	Floor Finish (C3020)	Base Finish (C3020)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
LOGCOM CSP						
Warehouse						
Warehouse Area	SC	None	PT CMU	EXP	-	Refer to E1030 and block diagram for additional pallet rack storage details.
Warehouse Related						
Sanitation Area	SC	None	PT CMU	EXP	-	User provided drying racks.
JSMLT Test Area	SC	None	PT CMU	ACT	(4) Workbenches with Storage Shelving (Workbenches to include rubber mats and task lights). (3) Tear Down Tables (3) Task Stools.	
Storage Area SL-3/Repair Parts	SC	None	PT CMU	EXP	Storage shelving for small containers and parts.	
CBRN Office	LVT	RB	PNT	ACT	(3) Open workstations (Non-panel based). (3) Task Chairs. (3) Five-drawer Lateral Files. (3) Two-drawer Lateral Files. (3) Bookcases. (3) In/out Box Trays. (1) Clock.	Provide corner guards. (1) Marker Board (Min)
Regional Manager Office	LVT	RB	PNT	ACT	(1) Desk. (1) Task Chair. (1) Five-drawer Lateral File. (1) Bookcase. (1) In/out Box Tray. (1) Clock.	(1) Marker Board (Min)
GOV'T Office	LVT	RB	PNT	ACT	(1) Desk. (1) Task Chair. (1) Five-drawer Lateral File. (1) Bookcase. (1) In/out Box Tray. (1) Clock.	(1) Marker Board (Min)
Computer Equip & RSDL DECON Lotion	SC	None	PT CMU	ACT	(2) Workbenches (Wood). Storage Shelving (For small containers and parts).	
Radiological Room	SC	RB	PNT	ACT	(2) Open workstations (Non-panel based). (2) Task Chairs. (2) Fiver-drawer Lateral Files. (2) Bookcases. (1) High-Density Shelving Unit (for test equipment) (2) In/out Box Trays. (1) Clock.	Provide corner guards. (1) Marker Board (Min)
NDTE Office	LVT	RB	PNT	ACT	(1) Desk. (1) Task Chair. (1) Five-drawer Lateral File. (1) Bookcase. (1) In/out Box Tray. (1) Clock.	(1) Marker Board (Min)
NDTE Room & Storage	SC	RB	PT CMU	EXP	(10) large anti-static assembly tables. (5) Task Stools. Mats & Shelving (For small bins). (1) Water Dispenser. (1) Clock. (3) Open workstations (Non-panel based). (3) Task Chairs. (3) Storage Solutions (Min.) (3) In/out Box Trays.	Provide corner guards. (1) Marker Board (Min) Relocated scanning machine.
Battery Forklift Charging Area	SC	None	PT CMU	EXP	-	
Maintenance Room	SC	None	PT CMU	EXP	(1) Open workstation (Non-panel based). (1) Task Chair. (1) Four-drawer Lateral File. (1) Bookcase. (1) In/out Box Tray. (1) Clock. (2) Workbenches. Storage Shelving (For small bins).	(1) Marker Board (Min)

Legend

ACT - Acoustical Ceiling Tile
EXP - Exposed Structure (Painted)
LVT - Luxury Vinyl Tile
PFB - Porcelain Floor Base
PFT - Porcelain Floor Tile
PNT - Painted Gypsum Board
PT CMU - Painted Concrete Masonry Unit
PWT - Porcelain Wall Tile
RB - Resilient Wall Base
SC - Sealed Concrete
SS - Stainless Steel
WBE - Water-Based Epoxy Paint
WM - Walk-off Mat

Room	Floor Finish (C3020)	Base Finish (C3020)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
LOGCOM CSP (Continued)						
Shelters Storage Area	SC	None	PT CMU	EXP	-	
Sort Area	SC	None	PT CMU	EXP	(1) Open workstation (Non-panel based). (1) Task Chair. (1) Two-drawer Lateral File. Assembly Tables (For sorting). (1) In/out Box Tray. (1) Clock.	(1) Marker Board (Min)
Issue/Return Area	SC	None	PT CMU	EXP	(1) Open workstation (Non-panel based). (1) Task Chair. (2) Four-drawer Lateral Files. (1) Water Dispenser. (1) In/out Box Tray. (1) Clock.	(1) Marker Board (Min)
Disposal Area	SC	None	PT CMU	EXP	(1) Open workstation (Non-panel based). (1) Task Chair. (1) Four-drawer Lateral File. (1) In/out Box Tray. (1) Clock.	(1) Marker Board (Min)
Shipping & Receiving (2 docks)	SC	None	PT CMU	EXP	(1) Open workstation (Non-panel based). (1) Task Chair. (2) Four-drawer Lateral Files. (1) Water Dispenser. Storage Shelving. Work Tables. (1) In/out Box Tray. (1) Clock.	(1) Marker Board (Min)
ESAPI Room & Office	LVT	RB	PNT	ACT	(2) Open workstations (Non-panel based). (2) Task Chairs. (2) Four-drawer Lateral Files. (2) In/out Box Trays. (1) Clock.	(1) Marker Board (Min)
Final QC Area	SC	None	PT CMU	EXP	(2) Open workstations (Non-panel based). (2) Task Chairs. (2) Four-drawer Lateral Files. (2) Storage Cabinets. (2) Bookcases. (2) Workbenches. Storage Shelving (For small bins). (2) In/out Box Trays. (1) Clock.	(1) Marker Board (Min)
Loading Dock Canopy (1/2)	-	-	-	-	-	
Roof Access Stairwell	SC	None	PT CMU	EXP	-	
Other / Support Spaces						
Break Room	LVT	RB	PNT	ACT	(1) Table with seating for 10 minimum. (1) Refrigerator. (1) Microwave. (1) Coffee Maker. (1) Ice Maker. (2) Vending Machines. (2) Lockable Tackboards.	Plastic laminate millwork with solid surface countertop and backsplash.
Heads	PFT	PFB	PWT	WBE	-	Solid surface countertop and backsplash at sink.
Janitor	SC	RB	WBE	WBE	-	Stainless steel (SS) wall protection 3'-0"H at mop sink.
Mother's Room	LVT	RB	PNT	ACT	(1) Lounge Chair. (1) Side Table. (1) Undercounter Refrigerator.	Plastic laminate millwork with solid surface countertop and backsplash.
Vestibule/Entry	SC/WM	None	PT CMU	PNT	-	Walk-off mat 40-60 SF.
Mech/Elec						
Fire Pump Room	SC	None	PT CMU	EXP	-	
Main Electrical Room	SC	None	PT CMU	EXP	-	
Mechanical Room	SC	None	PT CMU	EXP	-	
Telecom Room	SC	None	PT CMU	EXP	-	
Detached Structure						
Outdoor Smoking Pavilion	-	-	-	-	-	

Legend

ACT - Acoustical Ceiling Tile
EXP - Exposed Structure (Painted)
LVT - Luxury Vinyl Tile
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PT CMU - Painted Concrete Masonry Unit
PWT - Porcelain Wall Tile
RB - Resilient Wall Base
SC - Sealed Concrete
SS - Stainless Steel
WBE - Water-Based Epoxy Paint
WM - Walk-off Mat

Room	Floor Finish (C3020)	Base Finish (C3020)	Wall Finish (C3010)	Ceiling Finish (C3030)	FF&E	Additional Notes
JEFS						
Office						
JEFS FSS Operations Officer Work Area	LVT	RB	PNT	ACT	(1) Desk (1) Task Chair. (2) Wardrobe / Filing Cabinet / Other Storage Solution. (1) Meeting table with seating for 4-6. (1) Clock.	(1) Marker Board (Min)
JEFS FST Officer in Charge Work Area	LVT	RB	PNT	ACT	(1) Desk (1) Task Chair. (2) Wardrobe / Filing Cabinet / Other Storage Solution. (1) Meeting table with seating for 4-6. (1) Clock.	(1) Marker Board (Min)
Assistant OIC/NCOIC Office	LVT	RB	PNT	ACT	(1) Desk (1) Task Chair. (2) Wardrobe / Filing Cabinet / Other Storage Solution. (1) Clock.	(1) Marker Board (Min)
Technician Office Space/Technical Ref Library (12 Techs)	LVT	RB	PNT	ACT	(12) Open workstations (Non-panel based). (12) Task Chairs. (1) Clock.	(1) Marker Board (Min) Provide corner guards. (1) Multifunction Floor Copier (GFGI).
Classroom/Conference Room (50 Students Maximum)	LVT	RB	PNT	ACT	Training Tables with Casters - To accommodate 50 max. (50 Max) Chairs.. (1) Instructor's Desk. (1) Clock. (3) TV Monitors- (1) located in the front and (1) on each side.	(1) Large Marker Board - 8'-0"W x 4'-0"H Provide corner guards.
Closet/Administrative Storage	SC	RB	PNT	ACT	Shelving (Standard commercial)	
Other / Support Spaces						
Janitor	SC	RB	WBE	WBE	-	Stainless steel (SS) wall protection 3'-0"H at mop sink.
Heads	PFT	PFB	PWT	WBE	-	Solid surface countertop and backsplash at sink.
Break Room	LVT	RB	PNT	ACT	(1) Table with seating for 4 minimum. (1) Refrigerator. (1) Microwave. (1) Coffee Maker. (1) Ice Maker. (2) Vending Machines. (2) Lockable Tackboards.	Plastic laminate millwork with solid surface countertop and backsplash.
Vestibule/Entry	SC/WM	None	PT CMU	PNT	-	Walk-off mat 40-60 SF.
Industrial						
Test/Repair Room with limited storage	SC	None	PT CMU	EXP	(6) Standard Workbenches.	
Visual Inspection/Repair Room with limited storage	SC	None	PT CMU	EXP	(1) Standard Workbench. (1) Task Stool. Shelving / Storage Cabinets (for small parts).	
Shipping/Receiving/water testing room (1 dock)	SC	None	PT CMU	EXP	Shelving. (2) Work Tables.	No desk required.
Loading Dock Canopy (1/2)	-	-	-	-	-	
Storage						
Hazmat Storage Room	SC	None	PT CMU	EXP	-	
Storage/Warehouse/Preparation Area	SC	None	PT CMU	EXP	-	Refer to E1030 and block diagram for additional pallet rack storage details.
Warehouse Related						
Electrical Closet	SC	None	PT CMU	EXP	-	
Mechanical Room	SC	None	PT CMU	EXP	-	

Legend

ACT - Acoustical Ceiling Tile
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PWT - Porcelain Wall Tile
RB - Resilient Wall Base
SC - Sealed Concrete
SS - Stainless Steel
WBE - Water-Based Epoxy Paint
WM - Walk-off Mat

5.2. ADDITIONAL ROOM REQUIREMENTS

The Room data sheets are provided for specific rooms in each facility to provide additional information for these rooms; and better define room requirements beyond those provided in the ESR, the Finish and FF&E Schedule located in section 5.1, and other parts of the RFP. If no room data sheet is provided for a space identified in this facility then the general requirements of the RFP, the Finish and FF&E schedule in section 5.1, and the referenced UFCs, Codes, and Standards apply.

P1527- LOGCOM CSP WAREHOUSE

JEFS Classroom

Space Characteristics

Function/Adjacencies: Classroom.
Classroom for instruction of up to 50 students. The classroom must be adjacent to an exterior entry and close to toilet facilities and the break room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from JEFS areas of the building

Number of Occupants: 30-50 and instructor

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation. For classified enclosures
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, and field painted.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, secure lockset hardware, kick-plate, hold-open devices.
C1030	Marker Boards and Tack Boards		8'-0"W x 4'-0"H (Markerboards)	4'-0" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C1030	Identifying Devices			Signage on exterior of room entry door(s): Indicate the room name for the space being entered with an "Occupied" slider bar.

JEFS Classroom

Space Characteristics

Function/Adjacencies: Classroom.
Classroom for instruction of up to 50 students. The classroom must be adjacent to an exterior entry and close to toilet facilities and the break room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from JEFS areas of the building

Number of Occupants: 30-50 and instructor

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Resilient Floor Finish	SF	18" x 18"	Luxury Vinyl Tile
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3030	ACT	AR	AR	Below top enclosure
C3030	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.

JEFS Classroom

Space Characteristics

Function/Adjacencies: Classroom.
Classroom for instruction of up to 50 students. The classroom must be adjacent to an exterior entry and close to toilet facilities and the break room.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: from JEFS areas of the building

Number of Occupants: 30-50 and instructor

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting and Branch Wiring			Provide dimmable LED direct/indirect lighting in a minimum of three zones controlled via wall switches and AV podium control.
D5020	Lighting and Branch Wiring			Provide a dedicated circuit for each computer table.
D5020	Lighting and Branch Wiring			Provide one quad receptacle per student position and instructor station.
D503001	Telecommunications Systems			Provide one NMCI network drop per student position and instructor station.
D503002	Public Address Systems			Provide audible paging system.
E102009 D503004	AV Equipment/ Television Systems			Provide CATV outlets at appropriate height for all wall-mounted monitors.
E102009	AV Equipment			Provide infrastructure for freestanding AV podium with LCD touchpad equipment controls and (3) wall-mounted LCD monitors (Podium and Monitor to be funded separately in AV Package).

P1527- LOGCOM CSP WAREHOUSE

Computer Equipment & RSDL Decontamination Lotion Room

Space Characteristics

Function/Adjacencies: Climate controlled room for the storage of decontamination lotion and computer equipment.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: off general warehouse

Number of Occupants: N/A storage room

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Wood Doors	1	3' x 7'	Solid core, flush door with stain finish, along with hollow metal steel frame, factory primed, and field painted.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, secure lockset hardware, kick-plate, hold-open devices.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3020	Flooring	SF		Sealed concrete
C3030	ACT	AR	AR	Below top enclosure
C3030	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D30	Temperature Control			Maintain 70F year-round.

Computer Equipment & RSDL Decontamination Lotion Room

Space Characteristics

Function/Adjacencies: Climate controlled room for the storage of decontamination lotion and computer equipment.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0"

Acoustics:
Sound Transmission Class (STC) 45

Access: off general warehouse

Number of Occupants: N/A storage room

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D303002	Direct Expansion Systems			Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump unit for the space to back up the base building system.
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.

P1527- LOGCOM CSP WAREHOUSE

Battery Charging Area

Space Characteristics

Function/Adjacencies: Battery charging area with 6 forklift charging positions. In addition, the space must include an area with a workbench and enough room to park a forklift for maintenance work.

Special Dimensions:
Ideal Plan Dimensions: exposed roof structure. No ceiling is required.

Acoustics:
Sound Transmission Class (STC) 45

Access: off and open to general warehouse

Number of Occupants: N/A forklift storage area
Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D2010	Emergency shower and Eyewash			Eyewash IAW UFC 3 420-01 Figure D-1 3 GPM
D203003	Floor drain			All Floor drains must have Trap primer.
D304007	Battery Charging Exhaust			Provide battery charging area with dedicated exhaust according to IMC 2018 and UFC 3-520-05 requirements.
D50	Battery Charging	6		Provide power supply for forklift battery chargers as required. Each charger must be a separate circuit

Battery Charging Area

Space Characteristics

Function/Adjacencies: Battery charging area with 6 forklift charging positions. In addition, the space must include an area with a workbench and enough room to park a forklift for maintenance work.

Special Dimensions:
Ideal Plan Dimensions: exposed roof structure. No ceiling is required.

Acoustics:
Sound Transmission Class (STC) 45

Access: off and open to general warehouse

Number of Occupants: N/A forklift storage area
Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.

P1527- LOGCOM CSP WAREHOUSE

General Warehouse

Space Characteristics

Function/Adjacencies: General Storage warehouse for palletized supplies and equipment. Open to structure above. Heated. Warehouse area must include pallet racks for a minimum of 1,536 positions in 4 tiers, staging and truck access. An aisle width of 14'-0" is required between pallet racks. A staging area is required for plastic wrapping.

Special Dimensions:
Ideal Plan Dimensions: see space Tabulations
Minimum Ceiling Height; This area will have no ceiling but requires a minimum height clearance of 27'-0" (to be confirmed by AE2). This includes a minimum clearance of 3'-0" to bottom of structure (for handling and fire protection sprinklers) to the top of tallest over-height item that will be stored.

Acoustics:
Sound Transmission Class (STC)

Access: through Shipping/Receiving and Issue/Return areas off exterior10'-0" wide loading dock and ramped access areas via 2 - 10'-0" wide x 12'-0" high bay roll up doors. Separate from the loading dock, 2 bay roll up doors are required at grade or finish floor level for direct truck access into the warehouse area. These doors must be a minimum of 12'-0" wide x 14'-0" high, wide and high enough for 7-ton MK23 trucks.

Number of Occupants: N/A storage area?

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
B2030	Exterior Overhead Doors			Two 10'-0" wide x 12'-0" high at Shipping/Receiving loading dock area and one of the same size at Issue/Return loading dock area. Two 12'-0" wide x 14'-0" high for direct truck access into warehouse area
B2030	Exterior Door Hardware			Outside: Weather-stripping, overhead hold-open device, rain deflector, hinges, ABA-compliant pulls, panic bar exit device, keyed lockset. Inside: Overhead hold-open device, hinges, passage hardware, cypher lock, key card access.
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Steel Doors	1	3' x 7'	Steel flush door, along with hollow metal steel frame, factory primed, field painted. Provide vision panels; integral to door frame (approx. 6" x 18").

General Warehouse

Space Characteristics

Function/Adjacencies: General Storage warehouse for palletized supplies and equipment. Open to structure above. Heated. Warehouse area must include pallet racks for a minimum of 1,536 positions in 4 tiers, staging and truck access. An aisle width of 14'-0" is required between pallet racks. A staging area is required for plastic wrapping.

Special Dimensions:
Ideal Plan Dimensions: see space Tabulations
Minimum Ceiling Height; This area will have no ceiling but requires a minimum height clearance of 27'-0" (to be confirmed by AE2). This includes a minimum clearance of 3'-0" to bottom of structure (for handling and fire protection sprinklers) to the top of tallest over-height item that will be stored.

Acoustics:
Sound Transmission Class (STC)

Access: through Shipping/Receiving and Issue/Return areas off exterior10'-0" wide loading dock and ramped access areas via 2 - 10'-0" wide x 12'-0" high bay roll up doors. Separate from the loading dock, 2 bay roll up doors are required at grade or finish floor level for direct truck access into the warehouse area. These doors must be a minimum of 12'-0" wide x 14'-0" high, wide and high enough for 7-ton MK23 trucks.

Number of Occupants: N/A storage area?

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
C1020	Interior Double Doors	EA	(2) 3'x8' double leaf	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide 8" x 38" glazing in one door. Door shall have a minimum STC rating of 40. Provide 12" high metal kick plate, both sides.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C1030	Identifying Devices	1	36" x 48"	Command Photo Board, inside main entrance vestibule, to accommodate a minimum of (7) 8" x 10" Chain of Command photos. Command Photo Board should be durable and support easy photo changing.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
D2010	Drinking Fountains with Bottle Filler			ABA Complaint electric water cooler with bottle filler located near toilet / restroom areas.
D203003	Floor drain			All Floor drains must have trap primer. Provide one floor drain for every other storage bay and connect to sand and oil water separator.

General Warehouse

Space Characteristics

Function/Adjacencies: General Storage warehouse for palletized supplies and equipment. Open to structure above. Heated. Warehouse area must include pallet racks for a minimum of 1,536 positions in 4 tiers, staging and truck access. An aisle width of 14'-0" is required between pallet racks. A staging area is required for plastic wrapping.

Special Dimensions:
Ideal Plan Dimensions: see space Tabulations
Minimum Ceiling Height; This area will have no ceiling but requires a minimum height clearance of 27'-0" (to be confirmed by AE2). This includes a minimum clearance of 3'-0" to bottom of structure (for handling and fire protection sprinklers) to the top of tallest over-height item that will be stored.

Acoustics:
Sound Transmission Class (STC)

Access: through Shipping/Receiving and Issue/Return areas off exterior10'-0" wide loading dock and ramped access areas via 2 - 10'-0" wide x 12'-0" high bay roll up doors. Separate from the loading dock, 2 bay roll up doors are required at grade or finish floor level for direct truck access into the warehouse area. These doors must be a minimum of 12'-0" wide x 14'-0" high, wide and high enough for 7-ton MK23 trucks.

Number of Occupants: N/A storage area?

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D203003	Floor drain			Provide trench drains at bay doors connected to oil water separator
D501003 D501004	Transformers Panelboards			Provide 480-208Y/120V transformers feeding 208Y/120V panelboards in the warehouse area to support receptacle loads in the warehouse.
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.
D503004	Television Systems			Provide CATV outlets.
E102009 D503004	AV Equipment/ Television Systems			Provide CATV outlets at appropriate height for all wall-mounted monitors. Provide laptop interface from monitor location to check in counter.

P1527- LOGCOM CSP WAREHOUSE

JEFS Shipping and Receiving Water Test Room

Space Characteristics

Function/Adjacencies: shipping and receiving area adjacent to loading dock to receive items delivered mostly by small and large FedEx trucks. An area for wet testing is also required in this space. This space must be adjacent to the loading dock, Hazmat Storage, Visual Inspection & Repair, and Storage/Warehouse/Preparation areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required.

Acoustics:
Sound Transmission Class (STC) 45

Access: off loading dock through a 10'-0" wide x 12'-0" high roll up door. Area must also be accessible to Storage/Warehouse/Preparation and Visual Inspection & Repair.

Number of Occupants:

Other/Special Requirements: water and compressed air for wet testing, and a janitor station raised drain for draining test tanks

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
B2030	Exterior Door Hardware			Outside: Weather-stripping, overhead hold-open device, rain deflector, hinges, ABA-compliant pulls, panic bar exit device, keyed lockset. Inside: Overhead hold-open device, hinges, passage hardware, cypher lock, key card access.
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Double Doors	EA	(2) 3'x8' double leaf	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide 8" x 38" glazing in one door. Door shall have a minimum STC rating of 40. Provide 12" high metal kick plate, both sides.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.

JEFS Shipping and Receiving Water Test Room

Space Characteristics

Function/Adjacencies: shipping and receiving area adjacent to loading dock to receive items delivered mostly by small and large FedEx trucks. An area for wet testing is also required in this space. This space must be adjacent to the loading dock, Hazmat Storage, Visual Inspection & Repair, and Storage/Warehouse/Preparation areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required.

Acoustics:
Sound Transmission Class (STC) 45

Access: off loading dock through a 10'-0" wide x 12'-0" high roll up door. Area must also be accessible to Storage/Warehouse/Preparation and Visual Inspection & Repair.

Number of Occupants:

Other/Special Requirements: water and compressed air for wet testing, and a janitor station raised drain for draining test tanks

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D201004	Water Test Area			Provide hot & cold water hose bibs, floor drain, and janitor drain for water test/cleaning masks.
D203003	Floor drain			All Floor drains must have Trap primer.
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.
D503004	Television System			Provide CATV outlets.
E102009 D503004	AV Equipment/ Television System			Provide CATV outlets at appropriate height for all wall-mounted monitors. Provide laptop interface from monitor location to check in counter.

P1527- LOGCOM CSP WAREHOUSE

JEFS Test and Repair Room

Space Characteristics

Function/Adjacencies: area for testing and repair of gas masks. This space must be adjacent to Visual Inspection & Repair and Storage/Warehouse/Preparation areas.
Special Dimensions:
Ideal Plan Dimensions?
Minimum Ceiling Height: exposed roof structure. No ceiling is required?

Acoustics:
Sound Transmission Class (STC) 45

Access: off Visual Inspection & Repair. Access to Storage/Warehouse/Preparation

Number of Occupants:

Other/Special Requirements Testers (4 units) require hoods and low exhaust for fumes and smoke.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Double Doors	EA	(2) 3'x8' double leaf	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide 8" x 38" glazing in one door. Door shall have a minimum STC rating of 40. Provide 12" high metal kick plate, both sides.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D2010	Emergency shower and Eyewash			Eyewash IAW UFC 3 420-01 Figure D-1 3 GPM

JEFS Test and Repair Room

Space Characteristics

Function/Adjacencies: area for testing and repair of gas masks. This space must be adjacent to Visual Inspection & Repair and Storage/Warehouse/Preparation areas.
Special Dimensions:
Ideal Plan Dimensions?
Minimum Ceiling Height: exposed roof structure. No ceiling is required?

Acoustics:
Sound Transmission Class (STC) 45

Access: off Visual Inspection & Repair. Access to Storage/Warehouse/Preparation

Number of Occupants:

Other/Special Requirements Testers (4 units) require hoods and low exhaust for fumes and smoke.

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D203003	Floor drain			All Floor drains must have Trap primer.
D209005	Compressed Air			Provide 14 compressed air ports w/independent regulators.
D30	Temperature Control			Maintain a design temperature of 70F year-round.
D304007	Exhaust	2	AR	Provide exhaust hoods with fans above relocated mask testing stands, also provide low level exhaust connections to the stands.
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.
D503004	Television Systems			Provide CATV outlets.
E102009 D503004	AV Equipment/ Television Systems			

P1527- LOGCOM CSP WAREHOUSE

JEFS Visual Inspection and Repair

Space Characteristics

Function/Adjacencies: area for cleaning and repair of gas masks. This space must be adjacent to Shipping Receiving, Storage/Warehouse/Preparation and Test & Repair areas.
Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required

Acoustics:
Sound Transmission Class (STC) 45

Access: off Shipping/Receiving/Water Testing and into Test & Repair. Access to Storage/Warehouse/Preparation

Number of Occupants:

Other/Special Requirements

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Double Doors	EA	(2) 3'x8' double leaf	Steel Doors and Frames- Steel interior doors and frames shall be factory primed, field painted. Provide fire rated doors as required by Code if required. Provide 8" x 38" glazing in one door. Door shall have a minimum STC rating of 40. Provide 12" high metal kick plate, both sides.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, lockset hardware, kick-plate, hold-open devices.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D203003	Floor drain			All Floor drains must have Trap primer.

JEFS Visual Inspection and Repair

Space Characteristics

Function/Adjacencies: area for cleaning and repair of gas masks. This space must be adjacent to Shipping Receiving, Storage/Warehouse/Preparation and Test & Repair areas.
Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required

Acoustics:
Sound Transmission Class (STC) 45

Access: off Shipping/Receiving/Water Testing and into Test & Repair. Access to Storage/Warehouse/Preparation

Number of Occupants:

Other/Special Requirements

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D209005	Compressed Air			Provide 4 compressed air ports w/independent regulators.
D201004	Sinks			Provide sanitation sink
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.
E102009 D503004	AV Equipment/ Television Systems			

P1527- LOGCOM CSP WAREHOUSE

JSMLT Test Area

Space Characteristics

Function/Adjacencies: testing and repair of sanitized gas masks prior to final quality control check. This area must be adjacent to and in between the Sanitation and Final QC areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required.

Acoustics:
Sound Transmission Class (STC) 45

Access: off general warehouse

Number of Occupants:

Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab on Grade	SF	SF	
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, secure lockset hardware, kick-plate, hold-open devices.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3030	ACT	AR	AR	Below top enclosure
C3030	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D30	Temperature Control			Maintain 70F and below year-round.

JSMLT Test Area

Space Characteristics

Function/Adjacencies: testing and repair of sanitized gas masks prior to final quality control check. This area must be adjacent to and in between the Sanitation and Final QC areas.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required.

Acoustics:
Sound Transmission Class (STC) 45

Access: off general warehouse

Number of Occupants:

Other/Special Requirements:
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.

P1527- LOGCOM CSP WAREHOUSE

Radiological Room

Space Characteristics

Function/Adjacencies: Storage for Chemical Biological Radiological Nuclear (CBRN) Defense sensitive equipment.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0" (AE2 must coordinate ceiling height with clearance required by X-Ray machine in case a higher ceiling is required).

Acoustics:
Sound Transmission Class (STC) 45

Access off general warehouse
Number of Occupants: 2 operators

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
C1010	Fixed Partitions	SF		Gypsum wallboard (GWB) on steel studs to underside of floor/roof deck (or underside of finished ceiling). Include sound insulation. For classified enclosures
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, secure lockset hardware, kick-plate, hold-open devices.
C1030	Marker Boards and Tack Boards		36" H Minimum	36" high porcelain, magnetic dry erase boards, with tack strips at top and bottom of board, on two entire sides of. Tool trays and accessory kits shall be provided for each board. Top of boards to be mounted at approx. 8'-0" AFF.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3010	Gypsum Wallboard Finishes	AR	AR	Primed and painted gypsum wallboard

Radiological Room

Space Characteristics

Function/Adjacencies: Storage for Chemical Biological Radiological Nuclear (CBRN) Defense sensitive equipment.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: 10'-0" (AE2 must coordinate ceiling height with clearance required by X-Ray machine in case a higher ceiling is required).

Acoustics:
Sound Transmission Class (STC) 45

Access off general warehouse
Number of Occupants: 2 operators

Other/Special Requirements:

FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
C3010	Corner and Wall Guards	AR	1-1/2" flange, Full-Height	Surface-mounted, color-matched, through-color, recycled, extruded PETG corner guards on all outside corners of gypsum wallboard partitions.
C3020	Wall Base Finishes	LF	4" high	Rubber cove base in 120' coils
C3030	ACT	AR	AR	Below top enclosure
C3030	Suspension Systems	AR	AR	9/16" or 15/16" suspended ceiling system
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.
E1040	Radiological Inspection System			Relocate and install Radiological Inspection System from existing facility

P1527- LOGCOM CSP WAREHOUSE

Sanitation Area

Space Characteristics

Function/Adjacencies: cleaning, washing and sanitizing of gas masks prior to testing. This area must be adjacent to JSMLT Test Area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required.?

Acoustics:
Sound Transmission Class (STC) 45

Access: off general warehouse

Number of Occupants: ?

Other/Special Requirements: ?
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
A1030	Slab	SF	SF	
C1010	Fixed Partitions	SF		CMU or concrete. Include sound insulation. All STC rated partitions must terminate at underside of floor/roof deck.
C1020	Interior Door Hardware			Hinges, stop, astragal, acoustical gaskets, secure lockset hardware, kick-plate, hold-open devices.
C1030	Identifying Devices			Departmental identification signage and directional signage, as required.
C3030	Other Ceiling and Ceiling Finishes	AR	AR	Paint all exposed surfaces in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
C3040	Interior Coatings	AR	AR	Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished.
D203003	Floor drain			All Floor drains must have Trap primer.
D209005	Compressed Air			Provide compressed air ports w/independent regulators.
D201004	Sinks			Provide 2 stainless steel, 6 ft. wide, three compartment sanitation sinks

Sanitation Area

Space Characteristics

Function/Adjacencies: cleaning, washing and sanitizing of gas masks prior to testing. This area must be adjacent to JSMLT Test Area.

Special Dimensions:
Ideal Plan Dimensions:
Minimum Ceiling Height: exposed roof structure. No ceiling is required.?

Acoustics:
Sound Transmission Class (STC) 45

Access: off general warehouse

Number of Occupants: ?

Other/Special Requirements: ?
FF&E and A/V Information for Coordination:
FF&E and AV Equipment will be funded separately as a modification to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design workshop (CDW). Refer to Part 3 Chapter 5 Room Finish and FF&E Requirements for details.

Uniformat Section	Description	Qty	Size	Specific Requirements
D503001	Telecommunications Systems			Provide NMCI network drops.
D503002	Public Address Systems			Provide audible paging system.

A10 FOUNDATIONS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Provide the foundation systems in accordance with UFC 3-301-01, *Structural Engineering*. Foundations must be designed to suit subsurface conditions and must be capable of transmitting all building loads to the ground.

This section addresses both non-structural slabs-on-grade and structured slabs at ground level. For both systems, provide recessed areas as required to accommodate utilities at raised access floors such that the walking surface is one continuous plane throughout each space.

See Section B10, *Superstructure*, for additional loading criteria.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information, including a geotechnical data report prepared specifically for this project and historical subsurface data from other projects in close proximity to the project site, are included in Part 6 – Attachments of this RFP.

The soils information provided in this RFP is for reference only and reflects the soil conditions encountered only at the locations indicated. The Government shall not be responsible for any interpretation or conclusion by the Contractor drawn from the soils information beyond the industry standard of care. Geotechnical engineering reports accompanying the subsurface information are provided only to better convey the encountered data and observed site conditions. Assumptions, analyses and recommendations included in any accompanying report may or may not be applicable to the Offeror's design concept. The Contractor must retain a Geotechnical Engineer to interpret the Government provided information as it relates to the Contractor's design concept prior to submission of the proposal and develop geotechnical requirements to support the design and construction of the project meeting the requirements of this RFP for bidding purposes.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

The Geotechnical Engineer must have a minimum of 5 years of recent relevant experience in the geographic region of the project and must be currently licensed as a professional engineer in the State of North Carolina. In accordance with FAR Subpart 9.5, Organizational and Consultant Conflicts of Interest, the Contractor is prohibited from hiring the Geotechnical Engineer who provided data, reports and any other services on behalf of the Government for this project.

After award, the Contractor's Geotechnical Engineer (Geotechnical Engineer of Record) must provide a site-specific geotechnical study to include in-situ testing, soil borings and supporting laboratory analysis of representative soil samples. The Geotechnical Engineer must prepare a Geotechnical Report providing recommendations for design and construction of foundations,

earthwork and site development in accordance with UFC 1-200-01 *DoD Building Code (General Building Requirements)*, UFC 3-220-01 *Geotechnical Engineering*, and FC 1-300-09N *Navy and Marine Corps Design Procedures* and associated references. Calculations must be provided in the report to support all conclusions and recommendations.

SEISMIC DESIGN

Refer to ESR B10 for seismic design information.

A1010 STANDARD FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Standard Foundation to support the structure(s) associated with this project. "Standard Foundations" are shallow foundations or deep foundations as addressed in IBC Chapter 18. Do not use masonry unit footings, steel grillage footings, timber footings or wood foundations. Treated timber piles are permitted if deemed appropriate by the Designer of Record.

The structure(s) must be entirely supported by either a shallow foundation system or a deep foundation system as determined by the Designer of Record. Provide foundation materials that are compatible with the environmental exposure. When foundation elements are exposed to corrosive or otherwise aggressive soils, provide protection in accordance with ACI 318 requirements.

Calculate foundation ultimate resistance using multiple established methods. Determine allowable foundation capacity using the factors of safety provided in UFC 3-220-01 Tables 2-2 and 2-3. Develop geotechnical engineering design parameters using in-situ tests, laboratory tests and established empirical correlations. Evaluate upper and lower bound soil capacities based on variations in subsurface conditions at the site. Determine the minimum foundation bearing depth for frost protection in accordance with UFC 3-301-01. Provide minimum foundation widths to avoid failure and with consideration given to placement tolerances, ease of construction, etc.

Determine estimated foundation settlement based on comparison of predicted values from multiple established methods based on reaction loads provided by the Structural Designer of Record. Settlement calculations must include dead and live load components, live load reductions used in the analyses, actual or estimated foundation sizes, planned site grading changes, and expected fluctuations in groundwater levels. Estimated differential settlement must include upper and lower bound foundation settlements based on soil properties, different foundation loading, and variations in subsurface conditions across the building footprint.

The presence of weak and compressible soils may result in excessive settlement that could impact the performance of surface bearing structures and supporting facilities such as foundations, slabs, pavements, sidewalks, and utilities. The magnitude and duration of settlement depends on the composition, depth, and thickness of the weak/compressible soils as well as the Contractor’s selected design concept. The Contractor's Geotechnical Engineer is responsible for evaluating potential global settlement due to designed grade increases and final structural loads, and must develop any settlement mitigation procedures (such as preloading, surcharging, fill monitoring programs, and ground improvement systems) needed to maintain global settlements within tolerable limits. Surcharge material, if required, must remain in place for 90 days minimum.

Design must incorporate measures that limit total and differential settlement to levels that prevent structural or aesthetic damage or impairment of the serviceability and function of the

facility or structures, including drainage and utilities. The safety factor for liquefaction potential must meet or exceed Table 2-1 in UFC 3-220-01.

Use the following geotechnical tolerances to design shallow foundation systems:

- Limit slab-on-grade post construction total settlement due to permanent loads to ½ inch maximum;
- Limit total settlement of column and wall footing foundations to one inch maximum; and
- Limit differential settlement of adjacent footings to ½ inch maximum and an angular distortion of 1/500 maximum. Angular distortion is defined as the difference in settlement between two points divided by the distance between the points.

Use the following tolerances for designing deep foundation systems:

- Limit total settlement of individual piles and pile caps to ½ inch maximum under service load conditions as determined by static or dynamic pile load testing.
- Limit differential settlement of adjacent foundations to ½ inch maximum and to an angular distortion of 1/500 maximum. The angular distortion is defined as the difference in settlement between two points divided by the distance between the points.
- Limit lateral deflection of deep foundations to ½ inch, with an applied axial load equal to the expected dead load.

Ensure allowable pile stresses not to exceed limitations specified in IBC Section 1810, Deep Foundations. Evaluate and address time dependent pile capacity conditions (i.e. pile setup), group effects, negative skin friction, lateral squeeze, preboring/jetting, installation sequencing, refusal driving conditions, etc. as applicable. Include requirements for completing pre-construction condition surveys, ground vibration monitoring, structural instrumentation, etc. to mitigate risks of ground vibration damage to nearby structures as applicable for the specific project. The Structural Engineer of Record must design and detail the pile foundations in accordance with IBC Section 1810.3. Submit structural calculations and details for the piles to the Government for review and approval during project design development.

Conduct a test pile program overseen by the Geotechnical Engineer of Record and submit a final signed and stamped report to the Government for review and approval. Monitor and record driving during installation and subject to hammer restrikes in accordance with ASTM D4945, “Standard Test Method for High-Strain Dynamic Testing of Piles.” Evaluate the ultimate load capacity of selected test pile restrike(s) using CAPWAP analyses. Additional load test requirements are stated in Part 4 of this RFP. The Contractor is responsible for all foundation testing and monitoring costs.

A1020 SPECIAL FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Special Foundation system to support the structure(s) associated with this project. "Special Foundations" are any foundations that are not specifically "Standard Foundations", or which are a combination of Standard Foundations and a site improvement/ground modification system. Incorporate design of these systems in the project plans and specifications following FC 1-300-09N Chapters 7 and 8 and not as a construction submittal. Examples of site improvement/ground modification systems include surcharge preloading, prefabricated vertical drains, over-excavation and replacement, stone columns, rammed aggregate piers, rigid column inclusions, deep dynamic compaction, low and high mobility grouting, vibroflotation, etc. As most "Special Foundation"

techniques or systems typically require the use of specialty contractors, a registered Professional Engineer must establish installation and acceptance criteria and supervise the installation. The Designer of Record must submit justification for use, including acceptable evidence of previous successful installation in similar conditions, methods and equipment used in their installation, proposed testing and inspection to be used, supporting test data, calculations, and any other information related to the structural properties and load capacity of such system. The allowable stresses and testing requirements for pile-like elements used for ground improvement must comply with IBC Section 1810.

A1030 SLAB ON GRADE

As determined by the Designer of Record to be applicable, provide soil supported concrete slab(s) on ground. Provide a vapor retarder and porous fill layer beneath all slabs. Where slab on ground is below the existing adjacent exterior grade, provide waterproofing on foundation walls or grade beams and a perimeter drainage system to remove ground water from the area immediately adjacent to the building. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

The slab-on-grade must be able to support the live loads defined in UFC 3-301-01, *Structural Engineering* and, where applicable, the weight of stored and stockpiled materials, pallets, pallet racks, and the equipment used to access and transport the pallets.

A1040 STRUCTURALLY SUPPORTED SLAB

As determined by the Designer of Record to be applicable, provide a structurally supported slab. Provide for structural support of all utilities that may be adversely affected by soil consolidation or expansive soils. Provide stainless steel hangers sized adequately to support the in-service utility. Provide a vapor retarder and porous fill layer beneath all slabs. Where the structurally supported slab is below the existing adjacent exterior grade, provide waterproofing on foundation walls or grade beams and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01, *Architecture*.

--End of Section--

A20 BASEMENT CONSTRUCTION – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

NOT USED

A2010 BASEMENT EXCAVATION

NOT USED

A2020 BASEMENT WALLS

NOT USED

--End of Section--

B10 SUPERSTRUCTURE – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

The superstructure consists of structural elements above the foundation that provide support for vertical loads and resistance to lateral loads.

This section includes the requirements for the superstructure of the building, including floor and roof framing, columns, interior load-bearing walls and the main lateral-force resisting system. Exterior load bearing walls are addressed in Section B20.

Provide the building framing system in accordance with UFC 3-301-01, Structural Engineering.

The building must be constructed with concrete, steel, or masonry. Wood construction is prohibited.

All steel deck used for roofs and structural wall panels must be 20 gauge minimum thickness.

A Special Inspector of Record (SIOR) is required for this project.

Pre-engineered building systems are prohibited.

Load bearing light gage framing systems are prohibited.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Risk Category: II

Design for Live Loads in accordance with IBC 2018 as modified by UFC 3-301-01.

Wind Load Parameters:

Wind speed	Comply with UFC 3-301-01
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Snow Load Parameters:

Ground snow load	Comply with UFC 3-301-01
Snow load importance factor	1.00
Exposure	Design must be based on ASCE 7-16. Use Exposure C or D, whichever is applicable. Use of Exposure B is prohibited.

Seismic Load Parameters:

A site-specific seismic ground motion study is not required. Use Risk Category II and soil classification D. Determine seismic loading adjusted for site class effects using the ground motion parameters specified by UFC 3-301-01, *Structural Engineering*. Seismic Design Category (SDC) is B.

B1010 FLOOR CONSTRUCTION

Provide elevated floors and mezzanines consisting of any of the following construction types.

1) Non-composite concrete slabs on form deck on steel joists.

2) Non-composite or composite concrete slabs on metal decking on steel beams.

3) Cast-in-place concrete slabs on removable forms.

4) Precast concrete planks or shallow double-tee beams.

Support elevated floors and mezzanines on cast-in place concrete walls, plant or site pre-cast concrete walls (including tilt-up walls), reinforced concrete masonry walls/pilasters, structural steel columns and girders or joist girders. Do not support elevated floors on light gage stud wall construction. Wood framed systems are prohibited.

Provide access platforms constructed of steel grating and supported by structural steel framing.

B1020 ROOF CONSTRUCTION

Provide roof construction consisting of metal decking supported by structural steel framing, open web steel joists and joist girders, cast-in-place concrete or precast concrete bearing on load bearing columns or walls. Support roof construction on cast-in-place concrete walls, precast concrete walls, reinforced concrete masonry unit walls/pilasters, structural steel columns. All rooms must be free of columns, except it is permissible for main pallet rack storage areas to contain columns that do not impede access to storage racks. Aisles must be column free. Roof structure may be flat or sloping, but clearance beneath the structure must be enough to install all building systems, including but not limited to mechanical equipment and ducts, pipes, lights, and sprinklers, without interfering with the pallet rack system or the equipment used to access and transport the pallets. Refer to Architectural sections for roof slopes.

--End of Section--

B20 EXTERIOR ENCLOSURE – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

This system consists of the exterior shell of the facility, which includes all vertical and horizontal exterior closure such as exterior walls, exterior windows, and exterior doors. This system excludes roofing (See Section B30, Roofing). Load bearing exterior walls will be included here, and not in Section B10, Superstructure. Structural frame elements at the exterior enclosure such as columns, beams, and spandrels are included in Superstructure, with all exterior wall elements supported by columns, beams, and spandrels included in this section.. Finishes to the inside face of walls which are not an integral part of the wall construction will be included in Section C30, Interior finishes.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

It is permissible for exterior walls to be load bearing or non-load bearing. Exterior load bearing walls must consist of any of the following construction types and comply with the architectural and functional requirements that follow this list (also refer to B201001 Exterior Closure section for inclusion of load bearing walls in the overall exterior closure design).

1) Reinforced concrete masonry (CMU)
2) Cast-in-place reinforced concrete
3) Site precast concrete (tilt-up)
4) Plant precast concrete

Exterior walls must incorporate the materials directed in the Camp Lejeune, Base Exterior Architectural Plan (BEAP), 2010 – Section 4.2 Hadnot Point, particularly Industrial Area subdistrict (Section 4.2.2) requirements.

The primary exterior cladding material of the building must be modular brick per color and finish conforming to the BEAP, along with a water table as prescribed in the BEAP. If thin brick cladding is used, the color and finish of the brick must match as closely as possible to that indicated in the BEAP.

Brick detailing and design of the exterior wall must provide accent banding and design features at windows as prescribed in the BEAP.

Provide a cast-in-place, split-face masonry (used with veneer exterior wall closure) or precast concrete water table per the proportions shown in diagrams in the BEAP. If the cast in place option is chosen, the finish of the concrete is required to be a high quality, rubbed finish with a pattern mimicking CMU masonry joints.

Multiple options for providing the exterior wall system composed of the Exterior Closure and the Exterior Wall Backup Construction sections shown below.

B201001 EXTERIOR CLOSURE

The following are options for providing the exterior closure. The Contractor has the option to use these systems as long as energy code requirements and design aesthetics as prescribed in the BEAP are provided:

1) A brick/masonry veneer cavity wall exterior wall closure.
2) A precast concrete panel veneer exterior wall closure with applied thin brick. This system must be a r barrier system with sealed joints.
3) A site precast tilt-up concrete exterior wall closure or cast in place concrete exterior wall closure (load bearing) with applied thin brick cladding. This exterior closure is a barrier system with sealed joints.
4) A plant precast and site assembled precast concrete exterior wall closure (load bearing) with applied thin brick cladding. This exterior closure is a barrier system with sealed joints.

All exterior closure wall options where the exterior wall concrete (precast or cast in place) is exposed to moisture (at the exterior face of the wall or the base of the wall) must be designed with a plant added admixture to prevent moisture migration within the concrete to prevent the failure of applied thin brick systems, and prevent water migration into the interior of the building.

Thin brick placed on the exterior load bearing walls must be attached with systems that will ensure that the brick will not separate from the wall or form efflorescence. In addition, adequate control/construction joints must be incorporated into the concrete wall system to prevent thin brick cracking and adhesion issues.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

The backup systems for masonry and precast concrete veneer systems must be of single wythe reinforced concrete masonry. The backup wall system must be integrated with other exterior wall system requirements as indicated in B201003, Insulation and Air Barriers

Exterior bearing walls consisting of metal studs as the primary floor or roof supporting structural element are not permitted.

For concrete exterior bearing walls (precast or cast in place) the backup wall system is defined in ESR C10, Interior Construction.

B201003 INSULATION and AIR BARRIERS

Provide continuous insulation, vapor retarder and air barrier to meet or exceed requirements of project's energy savings requirements.

Provide a continuous air barrier to control air leakage into, or out of, conditioned spaces. The building envelope shall include all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, and compartmentalized unconditioned portions of the facility such as garages, and negatively pressurized spaces. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

Confirm air barrier compliance with Air Barrier Performance Test in RFP Part 4.

Provide thermal envelope performance testing through infrared thermography in accordance with RFP Part 4. Coordinate thermal imaging testing with air barrier testing construction schedule.

B201004 PARAPETS

Parapets will not be required for this building since sloped roof areas (with gutter/downspouts) are to be provide over the entire building.

B201005 EXTERIOR LOUVERS & SCREENS

Provide exterior louvers and screens, where required, that match the finish of the existing windows and detailed to integrate with the architecture of the building, as appropriate to the design of the building. Provide insect screens at all louvers.

B201006 BALCONY WALLS & HANDRAILS

NOT USED

B201007 EXTERIOR SOFFITS

Provide a pre-finished metal exterior soffit system and associated rake and eave trim as indicated in the BEAP – Section 4.2 Hadnot Point. Colors as defined in the BEAP.

B201009 EXTERIOR PAINTING AND COATINGS

Provide a field applied exterior coating on all items that are not prefinished, and to prefinished items when required to provide a color other than a standard prefinished color.

B201010 EXTERIOR JOINT SEALANTS

Provide exterior application of joint sealants to seal joints and prepare for finish material installation.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Provide horizontal or vertical fixed type as required to provide sun control and prevent any direct sunlight hitting work surfaces of offices and classroom. Sun control devices must be detailed to integrate with the architectural wall/window system.

B201012 SCREEN WALL

Provide screen walls where required to screen mechanical units, electrical substations, loading docks, and trash receptacles/dumpsters. Screen walls shall be per the Camp Lejeune, Base Exterior Architectural Plan, 2010, Section 4.2 Hadnot Point. Rooftop mechanical screens are not required since roof mounted mechanical equipment is prohibited.

B2020 EXTERIOR WINDOWS

Windows and other fenestration systems that provide daylighting must be provided in regularly occupied spaces that include offices and classrooms as indicated in UFC 1-200-02 and reference to ASHRAE 189.1 sections.

Due to the location of several offices and a break room away from exterior walls in the LOGCOM Warehouse block diagram, the design must provide fenestration systems that will comply with the daylighting requirements prescribed in the aforementioned UFC.

Windows must meet the defined prescriptive AT/FP requirements per UFC 4-010-01. If is permissible to use curtain wall systems in lieu of window or storefront systems, if necessary, to meet AT/FP or other design requirements.

The daylighting provided by windows and other fenestration systems must not compromise the visual acuity and comfort within the room.

All exterior windows must be protected and made secure. Provide security bars at all windows.

Provide a sample window installation with security bars in a complete exterior wall, as determined by the DOR and approved by the Contracting Officer. If approved, this sample window and security bars installation will become a permanent part of the building.

B202001 WINDOWS

Windows must be pre-finished aluminum and fixed.

All exterior windows must be protected and made secure. Provide security bars at all windows.

Provide a mockup of one combination window unit, including security bars, for the project to be used for a field mockup test of compliance with AAMA 502 Method A and Method B

B202002 STOREFRONTS

Storefronts must be pre-finished aluminum and, if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

If storefronts are provided in lieu of windows, provide security bars. All exterior windows must be protected and made secure.

Provide a mockup of one designated storefront system unit with security bars for the project to be used for a field mockup test in compliance with AAMA 502 Method A and Method B.

B202003 CURTAIN WALLS

Curtain walls are a permissible option for fenestration if determined necessary to meet applicable codes and UFC requirements. Curtain walls, if provided, must meet the requirements defined for windows in relation to providing daylighting and meeting AT/FP requirements.

The curtain wall system must be a standard architectural type Stick or Unit and Mullion system, with mullions, horizontal rails, and/or non-integral spandrel panels. Fully coordinate curtain wall system components/accessories that are directly incorporated and adjacent to contiguous related work (i.e. wall systems). Ensure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances in the design of the curtain wall system and in coordination of the curtain wall design with adjacent exterior enclosure systems.

The system must incorporate a pressure equalized method to control air and water infiltration. Face sealed systems and water managed systems are not allowed.

System must be a combination of glazed panels and opaque panels as required by the design.

If curtain wall is provided in lieu of windows, provide security bars. All exterior windows must be protected and made secure.

Provide a mockup of one designated Curtain Wall System unit for the project to be used for a field test of compliance with AAMA 503 Method A and Method B.

B202004 EXTERIOR GLAZING

Glazing color and reflectance must be provided and approved by Camp Lejeune's Architectural Review Board.

Glazing must be a heat absorbing insulated laminated glazing unit with the inner most pane being laminated glazing to meet the prescriptive AT/FP requirements of UFC 4-010-01 and code/UFC prescribed wind load requirements.

B202090 OTHER EXTERIOR WINDOWS

NOT USED

B2030 EXTERIOR DOORS

All exterior doors must be weather protected and provided with weather stripping/sealant and thresholds that stop water penetration and comply with ABA. Provide heavy duty overhead closers at all exterior doors

B203001 SOLID DOORS

Provide insulated solid steel door assemblies other than at storefront/curtainwall entrances.

Doors must be Extra Heavy Duty Doors -– ANSI /SDI A250.8, Level 3, physical performance Level A, Model 1.

Provide steel doors fabricated from hot dipped galvanized steel and provide a rust inhibitive factory finished primer coating. Finish coats are to be field painted.

B203002 GLAZED DOORS

Provide exterior aluminum framed glazed doors and entrances systems integrated into storefront/curtain wall system at main entry of the building or at secondary access points that incorporate storefront/curtain wall systems. Doors must be factory-finished aluminum framed door assemblies with heat absorbing insulated laminated glazing, frames, and hardware.

Glazing shall match the storefront/curtain wall system glazing.

Glazing in any hollow metal or glazed exterior door is required to meet the same prescriptive requirement for glazing as required for windows and other fenestration systems.

B203004 OVERHEAD AND ROLL-UP DOORS

Design doors and openings for four (4) loading dock doors, two (2) bay doors and all mechanical rooms with exterior access, including AHU and boiler rooms. Provide lockable doors with automatic operation with protected pushbuttons electric controls.

Accomplish door operation by UL Listed electric motor operation with electric controller and an auxiliary hand chain operation. Provide slat profile, Also Provide counterbalance, heavy duty springs, wear strips, full perimeter weather-stripping, continuous button pressure safety operation, electric or infrared safety edge, galvanized hardware, and manufactured trims and closures pieces. Protect the wall door jamb opening with guards designed to resist abuse from the type of material and vehicles that are transported through the opening.

For overhead doors that open into inhabited spaces, provide the doors with a tether system or intercepted walls to reduce the likelihood of the overhead doors from translating into the inhabited areas.

Provide insulated overhead roll-up doors. Provide powder coat painted finish with custom colors for the door and accessories to match facility color scheme. Design the galvanized steel overhead roll-up slats and door width to withstanding the design wind loading of ASCE 7 and operate normally.

B203006 BLAST RESISTANT DOORS

NOT USED

B203008 EXTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule. Verify all door hardware requirements with the User.

Provide a programmable CAC enabled electronic locking system at all exterior swinging man doors. The exterior locking system must be capable of locking all doors via a “kill switch” (tied to a central monitoring location), and all doors are to be provided with a manual key override.

Door hardware finish must be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

B203090 OTHER EXTERIOR SPECIALTY DOORS

NOT USED

--End of Section—

B30 ROOFING – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

B30 GENERAL SYSTEMS DESCRIPTION

Roof systems shall be watertight. Provide complete roof system design and construction services for the entire new facility roof system, including all ancillary and incidental work necessary for a complete, new, watertight roof system installation.

Submittal Requirements: Components of a minimum roof submittal shall include the roof plan, method of drainage, standard details and details unique to the project, wind load calculations and requirements.

Provide a Pre-Design Roofing Conference (if required in RFP Part 4) and Pre-Construction Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

Refer to UFC 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02 *High Performance Sustainable Buildings* for additional roofing requirements such as Energy Star qualified products.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

B3010 ROOF COVERINGS

B301001 STEEP SLOPE ROOFING SYSTEMS

NOT USED

B301002 LOW SLOPE ROOFING SYSTEMS

Provide a SSMR (standing seam metal roof system). The preferred slope is 1:12. Per UFC 4-440-01, sloped roofs having a pitch exceeding 1:12 must be avoided unless available roofing materials require a greater pitch. However, a pitch exceeding 2:12 is not permitted. Other requirements are suggested in the Base Exterior Architectural Plan (BEAP), 2010, Section 4.2, Hadnot Point.

The roof system shall be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance shall be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or ASTM uplift resistance test procedures. The roof material must be 3004 aluminum, ASTM B209M ASTM B209.

Organic Coatings for the metal roof must be a PVDF coating as specified in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing. All other material and construction for metal roofing are per Part 6 specification section.

The spacing of standing seams shall between 12 inches and 18 inches on center as prescribed in the BEAP.

Sub-purlins for the Structural Metal Roof System shall be galvanized and shop painted.

SSSMRS Warranty Certificate. – Provide warranty requirements as defined in Part 6, Roof specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing.

B301003 ROOF INSULATION AND FILL

Provide roof insulation values no less than in accordance with UFC 1-200-02 High Performance and Sustainable Buildings and UFC 3-110-03 Roofing.

B301004 FLASHINGS AND TRIM

Provide flashing and trim for the Aluminum Standing Seam Metal roof per specification section 07 61 15. 00 20 Aluminum Standing Seam Roofing in Part 6 of this RFP.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited.

B301006 ROOF OPENINGS AND SUPPORTS

NOT USED

B301090 OTHER ROOFING

Provide lightning protection, without penetrating the roofing or flashing components.

--End of Section--

C10 INTERIOR CONSTRUCTION – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Interior construction includes interior partitions, interior doors, and fittings.

Provide durable construction appropriate for the building function. Acoustic properties of materials, as well as durability, shall be considered during material selection.

Provide an acoustical engineer to participate in the design and provide design quality reviews throughout the design. The acoustical engineer must be an active participant in the design of the classroom and any other space or portion of the design with special acoustical requirements. The engineer must evaluate and give input on, but not limited to, acoustical partitions carrying STC ratings, applied acoustical treatments, integration of audio-video components, and door and frame performance, The acoustical engineer must carry a bachelor's degree in Engineering, Physics, Architecture, or a related field, hold a PE or membership in a recognized acoustical professional organization, and demonstrate a minimum of 7 years of acoustical design/engineering consulting on similar projects.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Areas of the Project subject to abuse require that "Impact Resistant" systems be provided.

C1010 PARTITIONS

All interior partitions must be either concrete masonry or metal studs with gypsum board on each side ,as permitted by the applicable UFCs. Per UFC 4-440-01 Warehouse and Storage Facilities, interior partition requirements include, but are not limited to, concrete masonry around shop areas, at partitions separating warehouse and administrative areas, around toilet rooms, at corridors in support spaces, and around mechanical rooms, electrical rooms and similar spaces.

C101001 FIXED PARTITIONS

Provide fixed interior partitions.

Sound-rated partition assemblies must meet the interior acoustic requirements for Typical Figure Spaces based on room type in UFC 3-101-01 or as otherwise indicated in Part 3, Chapter 5, Additional Room Requirements in this DB RFP .

UFC defined acoustic requirements in UFC 3-101-01, Section 4.8 and Figure 4-1 is not applicable to this project. Partitions requirements are defined using STC ratings in this RFP.

Sound-rated partition assemblies must meet the interior acoustic requirements for typical spaces as follows or as indicated in Chapter 3, Part 5, Additional Room Requirements:

- Classroom STC 45
- Radiological STC 45
- Work Rooms STC 45

- Visual Inspection & Repair STC 45
- Test & Repair STC 45
- Mother's Room STC 45
- Heads STC 45
- Break Rooms STC 45
- Technician Office/Reference Library STC 45
- Private Offices STC 45**

** private office STC may be reduced to a lower STC in association with a high CAC acoustical ceiling or increased to STC 50 based on the requirements of the individual user. The requirements for each individual user must be verified during the design process.

- Mechanical Rooms (when wall is adjacent to occupied space) STC 50

Glass masonry units shall transmit 75 percent light.

C101002 DEMOUNTABLE PARTITIONS

NOT USED

C101003 RETRACTABLE PARTITIONS

NOT USED

C101004 INTERIOR GUARDRAILS AND SCREENS

Provide balustrades where required by code. Provide screens where required to prohibit view of a particular area.

C101005 INTERIOR WINDOWS

Provide interior windows systems of aluminum if required by the design in rooms for borrowed light to occupied spaces.

If interior windows are provided at rooms with partitions of STC 45 or above, provide a window with laminated glazing to provide acoustical control.

All interior window systems must have a pre-finished coating finish or anodized finish.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide aluminum framed glazed storefront system in rooms as required by the design to allow borrowed light into occupied rooms.

If interior glazed storefront is provided, provide acoustically rated glazed systems to match the acoustical rating of the adjacent partition.

All interior storefront systems must be pre-finished coating finish or anodized finish.

C101007 INTERIOR GLAZING

Interior glazing must be clear or patterned glass that is annealed / tempered based on code requirements. If necessary, provide laminated glazing to obtain STC/NIC requirements.

If necessary, provide laminated glazing for sound control as indicated elsewhere in this section.

Interior glazing when provided in fire rated doors and glazed partitions must utilize fire rated glazing to meet code requirements. Wire glass must not be used in fire rated doors or partitions.

C1020 INTERIOR DOORS

C102001 STANDARD INTERIOR DOORS

Provide flush interior doors.

Provide wood or hollow metal interior doors in hollow metal frames.

Provide wood doors at all administrative office area rooms, classroom, heads, lounges/break rooms.

Provide hollow metal doors at all mechanical rooms, electrical rooms, telecom rooms, and warehouse related industrial areas.

Hollow metal doors must be Level 4 with physical performance level A throughout the facility

Flush wood doors must be WDMA I.S.1A-04, premium grade, extra heavy duty for classroom, heads, break rooms and heavy duty for all other spaces. Flush wood doors shall be SCLC-5 5-ply structural composite lumber core or FD core, as required by code.

Doors must have Factory Finish of AWI Quality Standards Section 1500, specification for Conversion varnish alkyd urea or catalyzed polyurethane.

Provide vision glazing within doors if it is deemed advantageous to be able to see through the door, either for safety of pedestrian traffic, or other functional reasons. If vision glazing within doors is provided it must have the provision to be blanked off during an active shooter event. This would require an easily activated shade, flap or other device that would obscure vision through the door lite.

Provide acoustic seals and gasketing to match acoustical rating of the surrounding partition. After installation, test the doors with a flashlight to determine if any gaps in the sound seals allow light to be viewed on the opposite side of the door.

C102002 GLAZED INTERIOR DOORS

Provide Aluminum/Glass glazed interior door or all glass door as a part of an interior glazed partition as indicated in C101006 for spaces that do not require acoustical control.

C102003 FIRE DOORS

Provide interior fire doors, in fire rated partitions as required by Code.

C102004 SLIDING AND FOLDING DOORS

NOT USED

C102005 INTERIOR OVERHEAD DOORS

Provide interior overhead doors as defined in Part 3, Chapter 5, Additional Room Requirements of this DB RFP.

C102006 INTERIOR GATES

NOT USED

C102007 INTERIOR DOOR HARDWARE

Provide the services of a certified door hardware consultant to prepare the door hardware schedule in conjunction with the approval of the client and to meet specific requirements outlined in this section or other referenced documents. Verify all door hardware requirements with the User.

Provide lock and latch hardware with levers as follows:

- Use Series 1000, Operational Grade 1, Security Grade 2 for corridors, classroom, offices, entrances, toilets, and other high use interior doors. Use Series 4000, Grade 1 for locations not using Series 1000 hardware.
- Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2.
- Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1, or Grade 2.

Provide cylinders/cores and keying system as indicated in Part 4, C102007 specifications. Other related door hardware requirements for hardware beyond locking devices is as indicated in Part 4, C102007 specifications. Lock cores shall match the BEST system.

Door hardware finish must be satin stainless steel or an alternate system that matches satin stainless steel if stainless steel is not available.

C102090 OTHER INTERIOR SPECIALTY DOORS

NOT USED

C102091 OTHER INTERIOR PERSONNEL DOORS

NOT USED

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Provide solid plastic (HDPE) toilet partitions in all toilet rooms (Heads) with more than one water closet or urinal.

Provide floor mounted overhead braced toilet partitions.

C103002 TOILET AND BATH ACCESSORIES

Provide toilet and bath accessories.

TOILET & BATHROOMACCESSORY SCHEDULE

ACCESSORY	SPACE					
	MALE RESTROOMS	FEMALE RESTROOMS	MOTHER'S ROOM	MEN'S & WOMEN'S SHOWERS	HEAD	JANITOR'S CLOSETS
Dual roll toilet tissue dispenser for each water closet (Typical supplies available at base supply)	●	●			●	
Seat cover dispenser for each water closet	●	●				

Coat hooks for each water closet stall	●	●				
ABA Grab bars for toilet (in restrooms with multiple stalls, grab bars required only for ABA water closet stall)	●	●			●	
Paper towel dispenser in each room (Typical supplies available at base supply)	●	●	●		●	
Electric hand dryers with motion sensors in each room; HEPA filtered, Certified hygenic by NSF and HACCP (same quantity as lavatories)	●	●			●	
Full length mirror in each room (refer to note below)	●	●	●	●	●	
Stainless steel convenience shelf on wall near entrance doors in each room. Minimum dimensions: 6" deep by 36" long.	●	●		●	●	
Sanitary napkin disposal for each water closet		●				
Utility shelf integrated with 5 hooks and 4 broom/mop holders						●

Note: At heads with counters with integral sinks, provide mirrors the full length of toilet lavatory counters in width and from backsplash to the light cove above in height.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker (dry erase) boards and tack boards as indicated in Chapter 5 "Room Requirements" portion of this RFP.

Marker boards and tack boards must be mounted with the lower edge at 42" above finished floor. Unless otherwise noted, boards must have anodized aluminum trim. Marker boards and tack boards must have tool trays and one set of tools provided for each room. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards and tack boards.

Glass marker boards must be frameless, opaque back-painted glass type and must attract standard magnets (rare-earth magnets not required) and be constructed of 1/4-inch-thick, shatter resistant, tempered glass, solid in color with non-staining finish, polished edges and eased corners and mounted with stainless steel standoffs. Provide magnetic accessory trays for glass markerboards.

Enclosed tack boards must be heavy gauge aluminum, with tackable interior surface, tempered glass sliding doors and lock. Provide selection from full range of manufacturer’s finishes. Provide tack board dimensions as follows: Size: 3’-0” H by 4’-0” L.

Marker boards and tack boards are funded as part of the construction contract.

C103004 IDENTIFYING DEVICES

All necessary interior signage must be incorporated as part of the architectural drawings. Interior signage is not collateral equipment. Interior signage must demonstrate complete coordination with the facility design, SID and FF&E submittals. Provide interior directional signage for facility wayfinding. Provide an identifying device at each interior door. Signs must meet ABA requirements. Refer to UFC 3-120-01, Design: Sign Standards, for more information.

Exterior building signage is also required and must be provided. This includes exterior door signs on any mechanical, electrical and telecommunications room with exterior doors. All exterior signage and their components must be resistant to ultraviolet light and must withstand a marine corrosive environment. This includes any other building signage attached to the building envelope, such as building name or number.

Specific exterior signage requirements follow:

Provide exterior signs at all building primary and secondary entrances stating, “ELECTRONIC DEVICES INCLUDING CELLULAR PHONES PROHIBITED.” Applicability must be verified by AE2 with MCB Camp Lejeune.

Provide exterior signs at all building primary and secondary entrances stating, “DO NOT ENTER IF IDS INDICATOR LIGHT IS ON. ALARM WILL SOUND.” Applicability must be verified by AE2 with MCB Camp Lejeune.

C103005 LOCKERS

NOT USED

C103006 SHELVING

Refer to General Warehouse Room Requirements data sheet and E1030 Warehouse and Vehicular Equipment for pallet racks/shelving that must be included in the construction contract.C103007 FIRE EXTINGUISHER CABINETS

Provide semi-recessed fire extinguisher cabinets for fire extinguishers in all finished spaces, including corridors and lobbies, as required by the RFP. Cabinets shall be coordinated with interior finishes. Where cabinets are installed in fire rated partitions, cabinets must be tested and listed in accordance with ANSI/UL-1479 for membrane and penetration firestops. Fire extinguishers required in spaces not typically occupied, such as mechanical, electrical, and telecommunication rooms, may be surface-mounted with a bracket listed for the size and weight of the required fire extinguisher. Installation of all fire extinguisher cabinets and mounting brackets must be in strict compliance with NFPA 1, NFPA 10, and the manufacturer's installation instructions Refer to ESR Section D40.

C103008 COUNTERS

Provide solid acrylic countertops and backsplashes. Material to be matte finish with a particulate.

Solid colors are unacceptable for countertops/backsplashes. Refer to Part 4 specifications for additional information. Solid acrylic lavatories and sinks, where applicable, must comply with ANSI Z124.3 and ANSI Z124.6 respectively.

Counter material must be minimum 1/2" thick solid surface with eased leading edge having a minimum 1-1/2" edge profile.

Counter only: Solid surface with continuous 6-inch backsplash (entire length and sides). Material must be 1/2" (min) thick. Counter supports must not be visible.

Counters with sinks and no base cabinet: Solid surface counter with continuous 6-inch solid surface backsplash (back and sides where adjacent to wall) and plastic laminate shroud with removable panels to visually hide the plumbing under counter (front and sides). Shroud must be

fabricated with a minimum AWI custom grade and a minimum 1/2" thick hardwood plywood substrate material. Counter supports and shroud fasteners must not be visible.

Counters with base cabinet: Solid surface counter with continuous 6-inch high backsplash (length and sides).

Counters with base and upper cabinet: Solid surface counter with continuous solid surface backsplash that extends from counter to underside of the upper cabinet. Backsplash panel(s) to be 1/4" thick and must extend the full width of cabinetry. Provide continuous 6-inch solid surface sidesplash at sides where adjacent to wall.

Provide counter tops and backsplashes in areas as indicated in RFP Part 6 drawings and RFP Part 3, Chapter 5 Room Finish and FF&E Requirements

C103009 CABINETS

Provide cabinetry and millwork items with associated accessories as indicated in RFP Part 6 drawings and RFP Part 3, Chapter 5 Room Finish and FF&E Requirements. Cabinetry must be Architectural Woodwork Institute (AWI) premium grade with hardwood plywood construction. Cabinets must have concealed hinges with adjustable recessed standards for shelves. Exposed surfaces must be covered with high pressure plastic laminate. All cabinets must have 6-inch high base/toe kicks. Provide ABA compliant doors at casework as required throughout the facility. Provide filler panels as required where cabinets abut wall.

Design and provide cabinets to accommodate equipment such as refrigerator, sink, microwave, commercial coffee pot, and ice maker.

Provide finish choices for built-in cabinetry to include the manufacturer's standard complete color line for all materials.

All cabinets to have solid surface counters with eased leading edge, unless noted otherwise in RFP.

C103010 CASEWORK

NOT USED

C103011 CLOSETS

NOT USED

C103012 FIRESTOPPING SYSTEMS

All firestopping systems shall be performed by one experienced firestop contractor. Experienced firestop contractor is defined as following:

1. FM Research approved in accordance with FM 4991, or
2. Operating as a UL Certified Firestop Contractor, or
3. A contractor completed the manufacturer accredited firestop specialty contractor program. Certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years of experience in the installation of manufacturer’s products in accordance with specified requirements. Submit documentation of this experience. A manufacturer’s willingness to sell its firestopping products to the contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer. Individual building system

subcontractor, such as Mechanical, Electrical, Plumbing, Gypsum wall, etc., is not permitted to install firestopping systems.

A single complete submittal including Shop Drawings, Product Data, UL details must be provided for all firestopping systems throughout entire project.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

The requirement for sprayed fire-resistive materials is determined by the building code analysis prepared by the design/build contractor's Qualified Fire Protection Engineer (QFPE). If required, provide sprayed fire-resistive materials to the building’s framework.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide recessed walk-off floor mats or surface mounted/loose lay floor mats at building entrances in sizes as indicated in RFP Part 3, Chapter 5 Room Requirements and RFP Part 6 drawings. Recessed walk-off floor mats are part of the construction contract. Surface mounted or loose lay floor mats are part of the FF&E package. Provide sealed concrete underneath recessed walk-off floor mats.

Provide recessed walk-off floor mats with a carpet insert (100% solution dyed) designed for high traffic areas. Recessed walk-off floor mats must have T5 aluminum alloy frame with anodized finish. Provide architectural surface pattern with combination of inserts, finish colors, aluminum slots, and aluminum framework. Inserts must include monofilament abrasive fibers and finish colors must be offered in a broad range of standard neutral and bright colors. Floor mat surfaces must comply with ASHRAE 90.1 and ASHRAE 189.1 requirements.

C103015 ORNAMENTAL METAL WORK

NOT USED

C103090 OTHER INTERIOR SPECIALTIES

NOT USED

--End of Section--

C20 STAIRS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Provide stairs as required by the building code for building egress, if necessary. Provide ladders as required by the building code for access to platforms and mezzanines, if necessary, and roof areas. The requirements of this section are included in the RFP in the case that stairs or ladders may be required for operations.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Provide stairs and ladders conforming to UFC 1-200-01, *General Building Requirements*. Provide stairs to connect grade level with loading dock level. There must be a stair close to each one of these areas: JEFS Shipping/Receiving, LOGCOM Shipping/Receiving and LOGCOM Issue/Return.

C2010 STAIR CONSTRUCTION

C201001 EXTERIOR STAIRS

Provide exterior stairs constructed of cast-in-place reinforced concrete. Concrete is an acceptable finish for exterior stairs. Exterior concrete stairs must have cast aluminum non-slip tread nosings with abrasive surface.

C201002 FIRE ESCAPE STAIRS

NOT USED

C201090 HANDRAILS, GUARDRAILS, AND ACCESSORIES

Provide painted or galvanized steel handrails, guardrails and ladders, as required by code. Exterior systems must be coated or galvanized to withstand extreme wear and weathering conditions. Provide handrails, guardrails and ladders with smooth, unbroken surfaces throughout the length of the stair or ladder, as required by code.

Provide metal ladders and railings complying with OSHA requirements for access and protection to all mechanical mezzanines, lofts and similar spaces.

--End of Section--

C30 INTERIOR FINISHES – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Interior finishes include wall finishes, floor finishes, wall base finishes, and ceiling finishes.

Provide aesthetically pleasing, functional, durable finishes appropriate to the building function. Acoustic properties of materials, as well as durability and ease of maintenance, must be considered during material selection. Maximize the use of sustainable materials.

All interior finish products must be from manufacturer's standard running line offerings. Manufacturer's submitted materials must be made available for purchase at NO MINIMUMS for not less than 7 years from the date of the original product order. Custom fabrications must not be allowed unless otherwise noted.

Finish selections for this project will require the use of wall, floor, and ceiling material accents to enhance the interior design and architecture of the building. Provide an interior finish design scheme that includes a minimum of two different accent colors, to be used throughout the facility. Refer to Part 3, Chapter 6, ESR E20 for Structural Interior Design (SID) requirements and Part 3, Chapter 5 Room Finish and FF&E Requirements for required locations. Submit floor pattern and accent wall location drawings, indicating proposed interior finish locations with the Structural Interior Design submittal.

GENERAL SYSTEMS REQUIREMENTS

See "Part 3 Chapter 5 Room Finish and FF&E Requirements" for specific requirements on "Interior Finishes."

C30 SSPC QP 1 CERTIFICATION

The Project requires industrial coatings on exposed steel surfaces. All contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council - SSPC) to the requirements of SSPC QP 1 prior to contract award and must remain certified while accomplishing any surface preparation or coating application.

C3010 WALL FINISHES

C301001 CONCRETE MASONRY WALL FINISHES

Interior wall finish materials must be finished and painted concrete masonry units, as indicated in the Part 3 Chapter 5 Room Finish and FF&E Requirements.

C301002 PLASTER WALL FINISHES

NOT USED

C301003 GYPSUM WALLBOARD FINISHES

Interior wall finish materials must be finished and painted gypsum wall board, as indicated in the Part 3 Chapter 5 Room Finish and FF&E Requirements.

In all locations where concrete or concrete masonry walls exist in conjunction with GWB over metal stud construction within a space, all walls must be finished with GWB. Moisture-resistant

gypsum wall board must be used in all wet or humid areas including, but not limited to vestibules and toilet rooms. Gypsum walls, fascias, and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See Part 4, C3040 INTERIOR COATINGS AND SPECIAL FINISHES for more information.

Refer to Part 4, PTS, C304001 General Requirements for MPI Standards.

Regular and cementitious backer board must be used in spaces indicated in the Part 3 Chapter 5 Room Finish and FF&E Requirements.

C301004 CERAMIC AND PORCELAIN TILE WALL FINISHES

Porcelain Tile: Provide through-body, rectified porcelain wall tile, minimum size of 12” x 12” with manufacturer recommended minimum width grout joints. Tile must be minimum Grade B, per ANSI 137.1 (1988), with a wide range of accent colors available. Accent tile pattern must be provided in another size or color.

Provide coordinating designer decorative accent strips or coordinating accessory tile shapes, minimum Grade D, as an integral part of the wall tile system. Wall tile must be installed full-height to ceiling, on all walls on cementitious backer board substrates. Provide grouted-in stainless steel edge protection strips at all outside and inside corners. Stainless steel transition strips must be used where wall tile and floor tile meet.

Backer Board: Cementitious, water durable, board; surfaced with fiberglass reinforcing mesh on front and back; long edges wrapped; and complying with ANSI A118.9 and ASTM C 1325. Provide coordinating epoxy grout at all tile finishes. Avoid light colored grout.

Aesthetic Classifications: Provide tile with an aesthetic classification of V2 Similarly colored with variations in texture and/or pattern.

Install tile to full height of the wall in a running bond pattern.

C301005 WALL COVERINGS

Corner Guards: Corner Guards must be used on all outside corners, except on walls of CMU construction, in spaces as identified in Part 3 Chapter 5 Room Finish and FF&E Requirements and must be 3” width. They must be surface-mounted in a through-color, recycled, extruded PETG material as indicated in Part 3 Chapter 5 Room Finish and FF&E Requirements. Corner guards must extend from top of cove base and extend 8’-0” high and be mechanically installed with a concealed continuous aluminum retainer. . Double stick tape and adhesive mounted corner guard methods are not acceptable.

Wall Protection: Provide stainless steel wall protectors at mop sinks in janitor rooms.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

NOT USED

C301090 OTHER WALL FINISHES

Solid Surfacing Wall Finishes: Provide 100% Acrylic Polymer in a solid color with small size particulate solid surface material for window stools.

Exterior windows will receive a window stool.

100% acrylic solid surface at Break Rooms: ½” Solid Surface wall panel will extend width of sink to top cabinetry from backsplash or underside of wall cabinets.

Solid surfacing wall panels must extend vertically from finished floor to 36" AFF. Locate wall panel seams at corners only. No material seams will be acceptable, except at corners. Epoxy seams to match solid surfacing material. Solid surface transitions will be as per manufacturer's requirements. Substrate behind solid surface walls will be equal to cementitious ceramic tile backer board. Solid surface wall finish must include manufacturer recommended fasteners/adhesives/sealants/caulk to complete and match the installation.

Water-based Epoxy Wall Coating: Water-based epoxy coating must be used in the Janitor's Closets as noted in Part 3 Chapter 5 Room Finish and FF&E Requirements. Coating system must be 10 to 12 mil/250 to 300 microns thick wall system over adequate wall patching compound/wall prep. Coating system must consist of one coat of water-based epoxy primer, a waterproofing membrane, two coats of water-based epoxy body/bonding coat, and gloss finish/seal coat from a single coating system manufacturer for a uniform, monolithic, slightly textured wall surface with rounded one inch radius inside corners.

Plywood: Telecomm closets must receive floor-to-ceiling, 3/4 inch plywood, Class A fire-rated, sanded, face-grade plywood on side and back walls.

Provide floor finish materials to meet the following requirements.

C302001 TILE FLOOR FINISHES

Porcelain Tile Floor Finishes: Provide through-body, rectified porcelain tile in a minimum size of 12 x 12 inches with matching 6-inch-high cove tile base with flat top and bottom edge, or with stainless steel coved transition between floor and wall tile.. Grout joints in a maximum width of 3/16 inch shall be provided. Tile must be non-slip, with a light texture. Texture of tile must be analyzed regarding maintenance and selected based on a minimal maintenance program. Provide grouted-in stainless steel metal transition strips at expansion joints and corners (inside and outside).

Provide coordinating epoxy grout at all tile finishes. Avoid light colored grout.

C302002 TERRAZZO FLOOR FINISHES

NOT USED

C302003 WOOD FLOORING

NOT USED

C302004 RESILIENT FLOOR FINISHES

Luxury Vinyl Tile Flooring: Provide resilient luxury vinyl tile, in areas as indicated for floors with high durability, low maintenance, high slip-resistance requirements. Luxury vinyl tile will be planks or square tiles as indicated in Part 3 Chapter 5 Room Finish and FF&E Requirements. Luxury vinyl tile must fall under Product Classification Class III, Type B per ASTM F1700 and use Class III printed film that conforms to ASTM F1700. Luxury Vinyl Tile must not contain ortho-phthalates. Luxury Vinyl Tile must have a minimum Coefficient of Friction of >0.5. All products must be from manufacturer's standard running line offering. Custom products or products with a minimum order quantity are prohibited.

40 mil wear layer product with a 20-year manufacturer's written warranty is required.

C302005 CARPETING

NOT USED

C302006 MASONRY & STONE FLOORING

NOT USED

C302007 WALL BASE FINISHES

Resilient Wall Base: Provide cove rubber throughout areas with resilient flooring and straight rubber for carpeted areas as indicated in Part 3 Chapter 5 Room Finish and FF&E Requirements. Wall base must come in 120'-0" coils.

Tile Base: In areas where wall tile is required, or otherwise specified, tiled floor must have matching 6"-high cove base or stainless steel cove transition strips between floor tile and wall tile. In areas where no wall tile is specified, tiled floor must have matching 6"-high cove base. When tile cove base is used, base must have flat top and bottom edges to join evenly with adjacent tiles. Rounded edges are not allowed. Tile cove wall base units must be pre-formed; cut tiles are not allowed.

Provide coordinating epoxy grout at all tile finishes. Avoid light colored grout.

C302008 STAIR FINISHES

NOT USED

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

NOT USED

C302010 HARDENERS AND SEALERS

Concrete Floor Requirements

Finish concrete surfaces smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Provide hardener in concrete mixture in accordance with the manufacture requirements. Exposed concrete floors that are not required to have an applied floor finish, must receive a minimum of three coats of the manufacturer's approved sealer.

Provide concrete flooring as identified in RFP Part 3 Chapter 5 Room Finish & FF&E Requirements, and as directed in the following.

Sealed Concrete: Finish concrete surface smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Apply both penetrating and topical sealers on exposed concrete floors that are not required to have an applied floor finish.

a. Water-based, clear, penetrating sealing compound blend of silane and siloxane for salt protection that penetrates into the pores of the concrete. Sealer must limit intrusion of moisture and chlorides into the concrete.
b. Water-based, topical, non-yellowing, clear, acrylic curing and sealing compound meeting the following requirements.
    I. ASTM C 309, Type 1, Class B
    II. ASSHTO M 148, Type 1, Class B
    III. ASTM C 1315, Class A, Section 6.4.1 – non-yellowing

IV. ASTM C 1315, Section 6.6 – exceed 50 MPa (70 psi) adhesion.

All polished concrete floor surfaces must be moist-cured, integrally colored and polished to a low gloss level, as required in the Part 4 section of this RFP. A Dynamic Coefficient of Friction of 0.42 minimum must be achieved, tested and documented for all polished interior floor surfaces, as determined by ANSI A137.1-2012. An 8’ x 8’ mock-up of the polished concrete floor must be produced using the same process that will be used to produce the final polished concrete floor surfaces.

C302011 RAISED ACCESS FLOORING

NOT USED

C302090 OTHER FLOORING & FLOOR FINISHES

NOT USED

C3030 CEILING FINISHES

Finished surface of ceiling tiles must be selected to address acoustical, maintenance, moisture or impact resistance requirements of the room.

C303001 ACOUSTICAL CEILING TILES & PANELS

Acoustic Ceiling Panels: Suspended Acoustical Panel System: Primary ceiling finish will be 24” x 24”by 5/8” minimum thickness suspended acoustical panel ceiling system, except provide a suspended gypsum board ceiling in restrooms. Acoustical panels will have a square edge. Provide closed pore panel surface. Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact resistance requirements of the room. Provide sustainable panels.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Gypsum Wallboard Ceiling Finishes: Provide Regular Gypsum Board and Moisture Resistant Gypsum Board as indicated in the Part 3 Chapter 5 Room Finish and FF&E Requirements. Moisture Resistant gypsum wall board must be used in all wet or humid areas include, but not limited to vestibules and toilet rooms.

C303003 PLASTER CEILING FINISHES

NOT USED

C303004WOOD CEILINGS

NOT USED

C303005 SUSPENSIONS SYSTEMS

Provide 24” by 24” aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish shall be factory applied white baked enamel. Provide manufacturer’s hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106 inch diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16 inch galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/580M, composition 302or 304, condition annealed stainless steel, 0.106 inches in diameter over high humidity areas such

as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, non-staining and ASTM C636). Recycled content shall be a minimum of 25%.

C303006 METAL STRIP CEILINGS

NOT USED

C303009 OTHER CEILING & CEILING FINISHES

Ceiling finishes must be as indicated in Part 3 Chapter 5 Room Finish and FF&E Requirements portion of this DB RFP.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

C304001 GENERAL REQUIREMENTS

Spray paint all interior exposed surfaces including metal items, such as interior grilles, registers, diffusers, access panels, and panel boxes with a minimum of two coats in color to match adjacent surfaces, unless otherwise indicated. All primer and paint systems must be the manufacturer's highest premium quality, professional grade. All materials must be moisture and mildew resistant and easily cleaned.

C304002 CONCRETE FINISHES

NOT USED

C304003 CONCRETE MASONRY FINISHES

NOT USED

C304004 METAL FINISHES

NOT USED

C304005 INTERIOR WOOD FINISHES

NOT USED

C304006 GYPSUM WALLBOARD FINISHES

Gypsum walls, gypsum wall board ceilings, fascias and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. Include a minimum of two paint selections for accent walls Room Finish and FF&E Requirements located where appropriate.

C304007 SPECIAL COATINGS ON WALLS

Provide high performance architectural paint coatings in areas as indicated in Part 3 Chapter 5 Room Finish and FF&E Requirements portion of this RFP. All finish coatings must be as indicated in Part 3 Chapter 5 Room Finish and FF&E Requirements portion of this RFP.

--End of Section--

D10 CONVEYING SYSTEMS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

NOT USED

D20 PLUMBING – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

The plumbing system consists of all fixtures, potable cold and hot water piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 5 feet of the building.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS section D20 and the manufacturer's recommendations. Design and install plumbing systems in accordance with IPC and UFC 3-420-01, *Plumbing Systems*. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Include the hot and cold water systems to list of systems to be commissioned in accordance with UFGS 01 33 29.05 20 Sustainability Requirements for Design Build

Refer to RFP Part 3 – Project Program, Chapter 2 for commissioning requirements

D2010 PLUMBING FIXTURES

Provide quantity and type of plumbing fixtures required for the use and functions described for this facility. Obtain occupancy from the owner. Refer to Part 3 Chapter 5 Room Requirements Section for additional specific requirements for spaces with plumbing fixtures. Provide handicapped fixtures in accordance with the referenced criteria in the Project Program.

D201001 WATER CLOSETS

Provide floor mounted flush valve water closets with hard-wired automatic flush control with push button backup. Maximum flushing volume is 1.28 gallons.

D201002 URINALS

Provide flush valve urinals with hard-wired automatic flush control with push button backup. Maximum flushing volume is 0.125 gallons.

D201003 LAVATORIES

Provide solid surface lavatories with integral sinks with hard-wired sensing faucet with automatic control and battery backup.

D201004 SINKS

Provide brushed stainless-steel undermount sink in the pantry/break areas. Provide a swivel faucet.

Provide mop sink in janitors closets.

Provide sanitation sinks are required by the user.

D201005 SHOWERS

All showers are to be the low flow type, 2.0 gpm. The shower heads to be located at a stationary position pointed away from the shower entrance opening and to keep from spraying toward the shower entrance opening and causing water damage. The shower faucet and spray head is to be a surface mount unit complete with prefabricated stainless steel mount and enclosure panel, temperature compensating shower valve with metal stem handle and integral service stops, and a shower head with flow control on institutional bracket.

D201006 DRINKING FOUNTAINS AND COOLERS

Provide hi low drinking fountains. Each drinking fountain must have a bottle filler.

Provide wall recess or side walls to protect drinking fountains.

D201090 EMERGENCY FIXTURES

Provide emergency shower and eyewash with privacy curtain and rail.

Provide tepid water (60F to 100F) with water tempering valve assembly.

Provide alarms and appurtenances for service within NEMA type 4 enclosures.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine the potable water pressure at the building and calculate piping system requirements.

D202001 PIPES AND FITTINGS

Provide Copper piping Type L for above ground and Type K for buried. Press fittings are not allowed.

D202002 VALVES & HYDRANTS

Provide isolation valves at supply to each floor. Provide hose bibbs in mechanical rooms and within 25 feet of all exterior equipment with coils. Provide hose bibbs in the warehouse within 20 feet of overhead doors. Provide wall hydrants along the building exterior such that all points along the perimeter can be reached with a 25 foot long hose.

D202003 DOMESTIC WATER EQUIPMENT

Provide backflow preventers of types and at points within domestic water systems as specified by IPC. Locate inside the mechanical room on service entrance lines where not provided exterior to the building.

Perform calculations to determine the water heater capacity to supply hot water to the fixtures.

Provide electric or natural gas water heater for heating of domestic water.

Provide water tempering valve assembly.

Provide domestic hot water recirculation system with high efficiency recirculation pump and recirculation loop with all associated fixtures, equipment, and appurtenances. Provide inline circulator for domestic hot water distribution system. Provide balance valves throughout system to allow for system balance to achieve required maximum wait times per International Energy

Conservation Code. Provide domestic water balance per UFGS 23 05 93.00 22 *Testing, Adjusting, and Balancing for Mechanical Systems.*

.

If water flow test shows inadequate water pressure, provide domestic water booster system for domestic water distribution system.

Provide water meter on the building main. Water meters must be appropriately sized for the building load. The water meter register must display gallons and must be clearly visible for inspection. The register must be compatible with the Itron 100W encoded radio transmitter (ERT). Refer to Itron's documentation for a compatibility list.

Contact: United Systems & Software, Incorporated

Jody Cline

800.455.3293

jodyc@united-systems.com

The ERT must be an Itron 100W+ with encoded output. The ERT must be installed per Itron installation guidelines. The contractor must supply all necessary mounting material, cabling, etc.

For meters installed inside of facilities (e.g. Mechanical room), the ERT must be mounted on the outside wall of the room.

Meters installed in pits must utilize the appropriate "through the LID" antenna.

The ERT must be proven to be capable of communicating with Itron's Advanced Meter Reading (AMR) and/or Advanced Metering Infrastructure (AMI) technology. Camp Lejeune's current AMR technology includes Mobile Collector Lite (MC Lite). AMR technology consists of Choice Connect version 5, with Cell Collector Units (CCUs). Prior to acceptance, all installations must prove successful communication between the meter endpoint (ERT) and Camp Lejeune's endpoint AMR and/or AMI communication equipment (i.e. MCLite/FC300 handheld and/or CCU).

The contract must submit the following information for each location (meter) included in the project.

Meter: Make, Serial Number, Size, Compound (Y/N)

Register (aka Encoder): Make, Model, Dials, Multiplier, Unit of Measure (i.e. gallons)

ERT: Make, Model, ID, Latitude, Longitude.

D202004 INSULATION & IDENTIFICATION

Provide cellular glass insulation with vapor barrier on domestic hot water supply piping and on domestic cold water supply piping. Provide identification for piping and equipment.

D202005 SPECIALTIES

Provide ice maker connector box for refrigerators.

D202090 OTHER DOMESTIC WATER SUPPLY

Provide piping supports in accordance with the IPC. Provide inspections, disinfection, and testing in accordance with the IPC.

Provide recessed water-outlet boxes for ice and coffee makers.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

Provide plastic PVC piping, fittings, and solvent cement for below ground installation.

D203002 VENT PIPE & FITTINGS

Provide cast iron hubless pipe and fittings, rubber compression gasket joints and stainless steel banding.

D203003 FLOOR DRAINS

Provide floor drains in mechanical rooms, restrooms, break rooms, warehouse areas, proximity to emergency eyewashes and showers and plumbing chase areas.

Provide trench drains along overhead door opening to drain to sand and oil water separator.

Provide floor sinks to receive condensate from air handling units.

Provide trench drains in diesel engine storage preparation area of the Maintenance Room attached to oil water separator.

Provide trench drain with a manual control valve installed in-line to connect to oil-water separator.

Provide one floor drain for every other storage bay and connect to sand and oil water separator.

D203004 SANITARY & VENT EQUIPMENT

Provide sump pump in building drains that cannot discharge to the sewer by gravity.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTING

Above ground provide cast iron hubless pipe with rubber gasket and stainless-steel banding. Below ground provide hub and spigot. Line trenches with gravel for continuous slope and support prior to the 10' column testing. Provide easy access for inspection of each joint on all sides during the test. Encase all direct buried sanitary lines in a minimum of 12" gravel on all sides after successful completion of the column test and prior to backfill and tampering. Provide slab anchored hangers for buildings with pile foundation systems.

D204002 ROOF DRAINS

Provide roof drains that are compatible with the roofing system.

D204004 INSULATION & IDENTIFICATION

Domestic, Storm and Condensate piping.

D204090 OTHER RAIN WATER DRAINAGE SYSTEM

NOT USED

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Obtain natural gas pressures from the local gas utility provider. Contractor must invite the utility provider to the design reviews. Contractor is responsible for any applications and permits and must provide the complete natural gas system from the load side of the utility meter to the heating equipment. Provide steel natural gas piping system. Include gas distribution piping from the gas meter to points of usage. Follow Camp Lejeune design standards for piping pressures inside the building.

The Contractor must provide the projected loads to the gas utility provider 6 months prior to in-service date. The Contractor must have the local gas utility provider install piping and appurtenances up to the load side of the meter. Tie the gas meter into the Building Automation System (BAS) and the existing Advanced Metering Infrastructure (AMI) metering system.

Natural Gas Utility Provider Information:

Piedmont Natural Gas (PNG)
Invite the following to Design Reviews:

i. Michael Lilly - PNG Commercial and Residential Sales Specialist - michael.lilly@duke-energy.com (252) 808-7292

ii. Bobby Gurganus - PNG Construction - bobby.gurganus@duke-energy.com (252) 670-9613

D209002 ACID WASTE SYSTEMS

NOT USED

D209003 INTERCEPTORS

Provide an oil/water separator for the vehicle labs and other spaces as required.

D209005 COMPRESSED AIR SYSTEM

Provide air compressor, refrigerated air dryer, aftercooler, and receiver. Provide a primary and standby that alternate monthly. Provide compressed air to the rooms as indicated in Section 3, Chapter 5, Room requirements and as requested by the building owner.

D209090 OTHER SPECIAL PLUMBING SYSTEMS

NOT USED

--End of Section--

D30 HVAC – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Provide the following type of high performance system:

Provide a variable air volume (VAV) system with shut-off terminal units and hot water heating coils. The VAV AHU will feature a chilled water cooling coil and a hot water preheating coil. Ventilation air will be provided via the VAV AHU(s). Provide a total enthalpy fixed plate heat exchanger energy recovery section in the VAV AHU. Chilled water will be generated by an air-cooled chiller, and hot water will be generated by condensing gas boiler[s]. Size the AHU coils, chillers, and boilers for full capacity, in the event of a heat recovery system failure.

The primary air from the VAV AHU will be ducted to the terminal units by medium-pressure galvanized metal ductwork. Supply air from the terminal unit to the zone and return air from the zone to the AHU will be ducted by low-pressure galvanized metal ductwork.

Roof mounted equipment is not permitted.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections, and accessories required for a complete and usable system. Install all equipment in accordance with the criteria in Performance Technical Specification Section D30 and the manufacturer's recommendations. Where the word "should" or “must” is used in manufacturer’s instructions, substitute the word "must."

Economizer cycles must not be used.

The new facilities must not use rooftop heating, ventilation, and air conditioning (HVAC) equipment. All major HVAC equipment must be located in mechanical rooms. Consider attic and above-ceiling placement of AHU equipment only when absolutely necessary. Stairs are required for any above-ceiling or attic located air-handling equipment (excluding VAV terminals). Attic space may be used for mechanical equipment if there is a 6-foot-wide stairway with double doors for maintenance purposes. Equipment with cooling coils placed above ceilings must have secondary drain pans with approved gravity drainage piping.

Provide corrosion protection for ALL exterior HVAC equipment, including air-handling units (AHUs), heat exchanger coil surfaces, equipment casings, air-cooled water chiller coils, heat pumps, and air conditioning units that are exposed to the weather. Corrosion protection is also required on HVAC equipment within buildings that are subject to the outside weather conditions. Specifically, equipment requiring protection is defined as the first HVAC equipment (unit coils) met by the outside air in the supply air ductwork system. The corrosion protection must meet or exceed the requirements of a 3000-hour salt spray test in accordance with ASTM International (ASTM) B117. The specified capacities on the plans and specifications must be the capacities after the required corrosion protection coatings are applied. Specify manufacturer's standard off-the-shelf anti-corrosion options for "coastal" or "sea coast" installations that meet or exceed the requirements stated above.

Provide radiant barriers in the exterior wall system. Optimize the building envelope and window requirements to exceed ASHRAE 90.1-2013.

Provide premium-efficiency motors, chillers, and boilers, and optimize the HVAC system.

Provide Seal Class A on all ducts to reduce duct losses. Increase thermal insulation on mechanical systems and use radiant barriers to reduce thermal losses.

Provide chemical shot feeders, air separators, and bladder type expansion tanks for hydronic systems. Provide inline centrifugal pumps with inlet suction diffusers, isolation valves, discharge check valves, balancing valves, drain valves, differential pressure gauges, and flexible pipe connectors and coupling guards.

Single-phase fractional horsepower alternating current motors must be high-efficiency types corresponding to the applications listed in National Electrical Manufacturers Association (NEMA) Motors and Generators (MG) 11. Select polyphase motors based on high-efficiency characteristics relative to the applications listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium-induction motors with continuous ratings must meet or exceed energy-efficient ratings per Table 2-10 of NEMA MG 1. Provide controllers for three-phase motors rated 1 horsepower (hp) and above with phase voltage monitors designed to protect motors from phase loss and over-/under-voltage. All motors 1 hp and larger must be premium efficiency. Provide the means to prevent automatic restart by a time-adjustable restart relay. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart. Provide reduced-voltage starters for all motors 25 hp and larger.

Provide minimum 4-inch (100 mm) thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment.

Provide factory painted finishes that are designed for 3000-hour duration test for outside equipment and for equipment bringing in outside air.

Provide a manufacturer approved coating system for coastal environments on mechanical equipment, cooling, heating, and condenser coils on units with more than 5 tons of cooling capacity. The submittals must indicate heat transfer rating of coated coils.

The facility must have a complete air and water balanced HVAC system. Calculations must be provided and show the air and water systems are balanced. Drawings must also show balanced air and water systems.

Provide air conditioning and heating for spaces as indicated and for the following Design conditions:

Outside Conditions

Summer	91	Degrees F dry bulb	Winter	26	Degrees F
	79	Degrees F wet bulb	Dehumidification	140	Grains/lb

Outside Design Conditions for Air Cooled Equipment

Summer	95	Degrees F dry bulb			

Inside Conditions – Heated and Cooled Area (unless otherwise noted in Room Requirements - Chapter 5)

Summer	78	Degrees F dry bulb	Winter	68	Degrees F
	50	%RH			

Inside Conditions – Warehouse and heating only areas

Summer	10	Degrees F dry bulb above ambient	Winter	60	Degrees F

Heating and Ventilating Conditions – Electrical Rooms, Mech Rooms with Heat producing equipment (Boilers, Water Heaters, etc)

Summer	10	Degrees F dry bulb above ambient	Winter	55	Degrees F

Inside Conditions – Cold Mechanical Rooms (AHUs and pumps)

Summer	N/A	Degrees F dry bulb	Winter	55	Degrees F
	55	Degrees F Dew			

		Point			

Inside Conditions – Communication and IT Rooms

Summer	78	Degrees F dry bulb	Winter	NA	Degrees F
	55	Degrees F Dew Point			

Provide Ventilation rates and systems per ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*. Provide CO2 sensors to limit CO2 concentration to 800ppm in spaces with 25 or more occupants per 1,000 square feet.

Provide carbon monoxide (CO) sensors with audible and visual alarms if CO concentration is greater than 25 ppm in areas where internal combustion engines will be operating.

Noise levels must comply with the requirements in the latest edition of the ASHRAE Applications Handbook. The design must provide noise level control by requiring maximum noise levels as well as noise separation areas for the Mechanical Rooms. The drawings must specify the maximum equipment noise level. Classrooms must not be adjacent to mechanical rooms

Mechanical room(s) and electrical room(s) with heat producing equipment must each be a separate zone, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01

Cold mechanical rooms(s) (AHU's, chilled water pumps) must each be a separate zone, heated and dehumidified.

Provide a separate zone for IT closets, telecom rooms and server rooms. These zones shall be served by dedicated DX split system equipment.

The HVAC system must provide each zone with the choice of heating or cooling year-round unless otherwise indicated. Provide each zone with its own thermostatic range of control.

Zone the HVAC system as follows:

Administrative spaces such administrative areas, offices, shops, maintenance control, quality assurance, ready rooms, conference rooms, flight equipment, training rooms, tool rooms, restrooms, lockers, elevator lobbies, break rooms, corridors, and project rooms must be zoned separately, such that each administrative space greater than 175 square feet (SF) is its own zone, and any spaces less than 175 SF must be grouped into a single zone.

- Corridors must not be on separate zones. Locate thermostats for corridors in separate occupied spaces.
- Provide a separate zone for the boiler room, heated and ventilated only. Mechanical rooms with combustion units (boilers, water heaters, and similar) must be provided supply fans instead of exhaust fans as required in UFC 3-410-01.
- Provide a separate zone for IT closets, telecom rooms, and server rooms.
- Provide a separate zone for electrical rooms.

- Provide a separate zone for the chilled water pump and AHU rooms, heated and dehumidified only, no ventilation.
- Provide a separate zone for the Warehouse/Storage areas.
- Provide a separate zone for Battery/Hazmat rooms.
- Provide a separate zone with heating and cooling for each of the following rooms: Final QC Area, CBRND Office, EAPI Room and Office, Regional Manager Office, Government Office, NDTE Office, JSMLT Test Area.
- Provide a separate zone for the NDTE/Storage area. This zone is required to maintain 70F year-round.
- Provide separate zones as indicated on the room information sheets.

For unoccupied mode, provide the following night setback temperatures:

- For winter, 10 degrees F lower than indoor heating design conditions, but no lower than 55 degrees F.
- For summer, 5 degrees F higher than indoor cooling design conditions, but no higher than 85 degrees F.
- Year round, 60 percent RH maximum.

Provide thermostats and temperature sensors with occupant adjustment control of +/- 3 degrees F.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

NOT USED

D301002 GAS SUPPLY SYSTEM

Provide a natural gas supply system for the heating of the facility. Natural gas must be the energy source (at a supply pressure of 5 inches water column [w.c.] minimum to 7 inches w.c. maximum) for all building heating systems. Provide a complete natural gas supply system as detailed in the specification in accordance with National Fire Protection Association (NFPA) 54, the North Carolina Building Code, the North Carolina Mechanical Code, and natural gas supplier requirements. Size natural gas piping to carry 15% more flow than is required by heating loads. Obtain natural gas pressures from the local gas company, Piedmont Natural Gas (PNG). The Contractor is responsible for coordinating with PNG and the Contracting Officer regarding the natural gas requirements for each facility. Provide a complete natural gas system, including any applications and permits. PNG will provide the natural gas to within 5 feet of each facility.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

NOT USED

D301004 HOT WATER SUPPLY SYSTEM

NOT USED

D301005 SOLAR ENERGY SUPPLY SYSTEMS

NOT USED

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility consisting of at least two boilers. Each boiler must be no greater than 399,000 Btu/hr. For loads less than 399,000 Btu/hr provide two boilers with 100% redundancy. For loads greater than 399,000 Btu/hr and two boilers are needed based on size limitations, each boiler must supply no less than 65% of the heating load. Where more than two boilers are required to meet size limitations, size each boiler for 1/N of the total load, where “N” is the total number of boilers. On multiple boiler installations with the largest boiler off line, the remaining boiler(s) must be capable of carrying not less than 65% of the maximum winter design load. The boiler fuel train must be compatible to match the available source at the project site. Use the building block load to size the heating plant.

Refer to Part 3, Chapter 2, Paragraph 2.3.9 Air Quality Management, for air emission permit information. Air Emission permit is required for each combustion device provided.

All combustion sources are subject to the NC Air Toxics Permitting requirements.

D302001 BOILERS

Provide packaged gas-fired condensing type boilers. Provide minimum 90% efficiency boilers with stainless steel heat exchangers. All heating equipment boilers must have the ENERGYSTAR label. Provide a stainless steel, multi-wall insulated boiler stack. The stack must be pre-engineered and pre-manufactured, Underwriters Laboratory (UL) listed, and must meet NFPA 211. Fuel for boilers must be natural gas. Provide boiler(s) with a condensate neutralization tank/kit.

All vents on gas control valves must be routed outdoors as required by NFPA 54. All gas lines serving gas-fired equipment must be fitted with UL or Factory Mutual approved gas trains suitable for the gas being provided.

D302002 FURNACES

NOT USED

D302003 FUEL-FIRED UNIT HEATERS

NOT USED

D302004 AUXILIARY EQUIPMENT

NOT USED

D302005 EQUIPMENT THERMAL INSULATION

Provide all hot water equipment with cellular glass insulation with vapor barrier jacket or molded fiberglass with vapor barrier jacket.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

HVAC refrigeration and air conditioning compressors must have full 5-year warranties including all parts and labor from the time of Beneficial Occupancy

Provide rotary screw or scroll air-cooled chillers. Provide high-efficiency air-cooled chillers. Provide constant primary/variable secondary pumping systems on single chiller systems greater than 60 tons and on multiple chiller systems. Primary pumping may be used only on single chiller systems less than 60 tons. Keep flow through the chiller constant; do not use variable primary flow. A buffer tank must be provided on all systems to provide thermal inertia. Provide multiple chillers for loads greater than 160 tons with each chiller sized for 50% of the total facility cooling load.

For unique facilities that exhibit widely variable occupant loading, multiple dissimilar sized chillers must be provided as appropriate for the low occupancy condition and fully occupied condition.

The chillers must be located in an exterior equipment yard area and properly spaced from each other and other equipment away from building perimeter. The air-cooled chiller(s) must be located outside on a 150 mm (6-inch) thick reinforced concrete housekeeping pad. Provide heat tape to ensure freeze protection as low as 10°F on chilled water piping and any other associated appurtenances. Refer to the MCB Camp Lejeune mechanical policy for the requirements for phase and voltage protection requirements for chillers. Provide emergency chiller connections consisting of isolation valves and blind flanges.

Low ambient capability must be provided to allow chillers to operate in temperatures as low as 15°F (-9.4°C).

All coils must have the approved coatings that pass a salt-spray test conducted per ASTM B117 for duration of at least 3,000 hours and provide a minimum of loss of heat transfer due to the thickness of the coating.

Provide the approved quantity, size, spacing, material, and height of bollards around all yard equipment.

Provide blind flanges with butterfly isolation valves at the chiller location for emergency portable chiller connection. Coordinate site plan design to accommodate access needed for an 18-wheeler flat bed to park near the flange location.

Provide chiller controls with BACnet communication protocol.

Provide complete start-up and operational testing of chiller equipment.

Provide heat tracing of the chiller bundle and all above ground piping and valves, etc. that are subject to freezing.

Provide insulation and vapor barriers on all chilled water equipment.

Provide complete system flushing and start-up for the entire chilled water system including piping.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for chilled water piping system.

Startup must include operational testing of chiller equipment and full commissioning.

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled DX ductless split system cooling only unit for IT closets, telecom rooms, and server rooms and any other space requiring independent conditioning. If the unit does not have a BACnet system interface, provide a room temperature sensor and a current sensor, tied to the building DDC system, to determine the operating status of the system. Size DX cooling equipment at 120% of IT equipment load. Provide low ambient cooling.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide shutoff-type terminal units with hot water reheat coils to serve zones. To maximize energy savings on this project: the shutoff-type terminal units must comply with ASHRAE 55 and sized to meet indoor design conditions (temperature, humidity, ventilation, etc.) that are used in the design; do not size shutoff-type terminal units to maintain a minimum of 4 AC/Hr in occupied mode.

Provide insulated, galvanized steel ductwork in concealed locations constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards. For exposed ductwork, provide insulated, double walled, galvanized steel duct.

Provide medium-pressure duct from VAV AHU to shutoff-type terminal unit. Provide round or flat oval primary supply air duct. Size the medium pressure duct according to the static regain method. Provide low-pressure supply air duct from the terminal unit to the zone being served. Provide low-pressure return air duct from the zone to the VAV AHU. Provide a minimum of 6 diameters of rigid straight duct at the inlet to each VAV terminal to maintain a uniform velocity profile at the valve inlet for airflow measurement accuracy. Flexible duct connection to the primary air inlet of VAV terminal is not permitted.

Provide shutoff-type terminal units typically above lay-in ceilings. Provide terminal units above hard ceilings with lockable access panels.

Provide aluminum grilles, registers, and diffusers. Provide linear slot diffusers including manufacturer insulated plenum.

Provide manual balancing dampers for all main and branch ducts. Incorporate product requirements identified in the UFGS 23 00 00 Manual Balancing Damper Editing Guide, in RFP, Part 6, into project specifications.

Install all metal duct to Seal Class A standard. Insulated flexible duct may be installed in low-pressure supply duct but may not exceed 5 feet in length or provide more than a 45-degree change in direction. Flexible duct may not be installed in return or exhaust air duct.

Provide AMCA 540 and 550 rated louvers.

Size low pressure supply ductwork at 0.08"/100LF and negative pressure return/exhaust at 0.05"/100LF (max).

Provide rigid foil faced board insulation where ducts are exposed in mechanical spaces. Provide pre-manufactured double wall ductwork on building exterior or where ducts are exposed in occupied spaces. Insulate all ductwork.

Mineral fiber blanket wrap must meet the requirements of ASTM C1136, ASTM C1290, ASTM C1338, ASTM E84, UL 723, NFPA 90A, and NFPA 90B.

Rigid mineral fiber must meet the requirements of ASTM C553, ASTM C612, ASTM C1136, ASTM 1393, ASTM E84, and UL 723.

Make duct penetrations of all walls with sheet metal ducts. Flexible duct penetrations of walls are not acceptable.

Coordinate locations of all air devices with ceiling mounted equipment. Maintain minimum of 3'-0" from ceiling mounted smoke detectors.

Provide unvaned radius elbows with a radius equal to 1 ½ times the duct width. Provide all 90-degree mitered square elbows with turning vanes with a radius equal to 2 times the duct width. Provide access doors upstream of all elbows with turning vanes.

Do not hangs duct from other ducts.

Provide canvas duct connectors for all equipment ductwork connections containing fans. Provided grounding across flexible connections with flexible copper grounding straps. Grounding straps must be bolted or soldered to both the equipment and the duct.

Ductwork and air handling equipment must be sealed and protected from dirt and debris during the entire construction duration.

Provide separate chases for ductwork and piping. Do not install ductwork and piping in the same chase.

Route all ductwork perpendicular and parallel to the building structure.

Where sheet metal is visible through the face of air terminals, paint sheet metal with a flat black enamel finish.

Manual Balancing Dampers (Accessible): Round type is not acceptable. Provide pre-manufactured rectangular type with 16 gage galvanized steel channel frame with corner braces. Blades will be opposing type 16 gage with a maximum width of 8". Provide with a 20 gage blade stop on units 12" high and under. Provide with position lock, molded synthetic bearings, and square shaft.

Manual Balancing Dampers (Inaccessible): Provide cable operated remote controlled volume dampers in inaccessible branch ducts feeding diffusers. Dampers must be adjustable through the diffuser face with standard hand tools, providing positive balancing of multiple airflows to maintain design air throw and noise criteria. Radial damper must be direct actuated by a brass plated rotary cable which is fixed at the damper end in an integral support bracket. Rotary cable must have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions. The entire assembly must be furnished as one piece for installation with no linkage adjustment required or miscellaneous small parts. Each unit must be factory tested as a complete assembly prior to shipment (100% testing). Accessible cable end must be secured with a factory furnished nylon clamp, allowing maximum placement flexibility. Positive, direct, two-way damper control must be provided without sleeves, springs, or screw adjustments (that may loosen after ceiling closure).

Motorized dampers frame must be 16 gage (1.6) galvanized steel structural hat channel with tabbed corners for reinforcement for 11 gage (3.05) structural equivalence. Blades must be 14 gage (2.0) equivalent thickness galvanized steel, roll-formed airfoil type for low pressure drop and low noise generation. Blade edge seals must be suitable for -72°F to +275°F and mechanically locked into the blade edge. Adhesive or clip-on type seals are unacceptable. Jamb seals must be flexible metal, compression type to prevent leakage between blade end and damper frame. Blade end overlapping frame is unacceptable. Bearings must be corrosion resistant, permanently lubricated stainless steel sleeve type turning in an extruded hole in the damper frame. Axles must be hexagonal positively locked into the damper blade. Linkage must be concealed out of airstream, within the damper frame to reduce pressure drop and noise. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Dampers must be equipped with factory installed damper position indication switch package. The switch package must include two position indication switches linked directly to the damper blade to provide full open and full closed damper blade position. The switch package must be capable of interfacing with the HVAC control system and provide remote damper blade position status. Factory mounted damper actuators with adjustable memory stops must be furnished and mounted by the damper manufacturer in their factory. Each damper must be cycle tested at the factory prior to shipment.

D304002 STEAM DISTRIBUTION SYSTEMS

NOT USED

D304003 HOT WATER DISTRIBUTION SYSTEMS

For exterior buried Hot Water Distribution Systems see Section G30, *Site Civil/Mechanical Utilities*.

Provide a variable speed pumping system to serve the HVAC hot water equipment throughout the facility. Provide two pumps, each sized at 100% of building load. Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility.

Provide valves and related hot water system appurtenances. Provide a bladder type expansion tank and air/solids separator for the hot water system. Provide a shot type feeder for manual chemical feed to the hot water piping system.

Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with mineral fiber insulation.

Provide system flushing and startup for the hot water piping system.

Provide air vents at all terminal equipment and system high points, drains at system low points, and provide chemical treatment equipment for hot water piping system.

Provide complete startup and operational testing of all hot water systems.

Hot-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable

must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

D304004 CHANGEOVER DISTRIBUTION SYSTEMS

NOT USED

D304005 GLYCOL DISTRIBUTION SYSTEMS

NOT USED

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

For buildings with less than 60 tons of cooling load, provide a constant primary pumping system to serve the HVAC chilled water equipment throughout the facility. For buildings with more than 60 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with a single primary pump per chiller. For buildings with more than 160 tons of cooling load, provide a constant primary/variable secondary pumping arrangement with one primary pump per chiller. In all cases, keep flow through the chiller constant.

For building less than 160 tons, provide two primary pumps or two secondary pumps as appropriate with each pump sized for 100% flow. For buildings with more than 160 tons, provide three secondary pumps, each sized for 50% of maximum building flow. Two pumps must operate as duty pumps and the third must act as standby. Provide a control sequence to rotate pump duty/standby assignments monthly and equalize running hours.

Provide valves and related chilled water system appurtenances. Provide a bladder type expansion tank and air/solids separator in chilled water system. “Triple duty” or “multi-purpose” valves that combine a check valve, throttling valve, and shut-off valve must not be used for the chilled water system. Provide air vents at all terminal equipment and system high points for air control.

Provide steel and copper chilled water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with cellular glass insulation on all above ground chilled water distribution piping.

Provide air vents at all terminal equipment and system high points for air control. Provide a shot type feeder for manual chemical feed for the chilled water piping system.

Provide thermal mass capability in the chilled water system to insure proper control and longevity of chillers by using inertia tanks. Provide inertia tanks, sized per chiller manufacturer recommendation to ensure stability of operation and temperature setpoint control. Total chilled water system volume must be a minimum of 7 gallons per ton of cooling. Provide an insulated storage tank within the mechanical room in order to meet this requirement.

Provide insulation, vapor barrier, and aluminum jacketing on piping exposed to outdoors. Install heat tracing on piping to ensure freeze protection to 10°F.

Provide system flushing and startup for the chilled water piping system.

Provide complete startup and operational testing of all chilled water systems.

Provide insulation for piping exposed to outdoor ambient temperatures; provide heat tracing to ensure freeze protection down to 10°F. Heat trace must be UL listed and self-regulating cable construction consisting of two 16 AWG, stranded, nickel plated copper bus wires, between which a positive temperature coefficient conductive polymer heating element is placed. Cable

must be provided with tinned copper metal braid for additional protection and path for ground fault currents, and a thermoplastic over jacket.

Provide threaded joints for steel pipe 2" or less and welded or bolted flange for sizes greater.

Provide flanged connections with flexible braided stainless steel connectors at all equipment connections.

Provide pre-manufactured dual containment system consisting of carrier pipe, cellular glass carrier insulation, air space, steel conduit, polyurethane outer insulation, and seamless extruded HDPE casing for direct buried piping. The carrier pipe must be ASTM A53 steel schedule 40 or 80 as scheduled. The product must be rated for corrosion resistance without the need for cathodic protection. Provide with leak detection system.

Chilled-water piping 4-inch and smaller must be ASTM B 88 Type K (below ground) or L (above ground) copper. Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M must be used for piping greater than 4-inch.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed per the IMC and SMACNA standards. Install exhaust duct according to Seal Class A.

Provide ducted exhaust ventilation rate according to ASHRAE 62.1.

Provide stainless-steel fume hoods that are rated for heat and vapor removal with associated ducts and fans.

Provide battery charging area with dedicated exhaust according to IMC 2018 and UFC 3-520-05 requirements.

D304008 AIR HANDLING UNITS

Provide central station VAV AHUs to provide constant temperature primary supply air to all terminal units. Provide hot water preheating coils, chilled water cooling coils, variable-speed fan sections, ultraviolet coil disinfection systems, and energy recovery sections. Units must include additional sections as necessary to facilitate ready access to all maintainable components.

The energy recovery section must be a fixed plate total enthalpy heat exchanger with MERV 8 prefilters and MERV 13 filters upstream of the unit in both the outside air and exhaust air streams. If AHU manufacturers are unable to provide these filters in the central station unit, provide ducted filter boxes outside the unit in a location accessible for filter replacement.

Provide the means to measure filtered outdoor airflow to verify proper ventilation.

Provide modular, central station, air handlers with the following:

Unit panels must be 2-inch solid. Exterior surfaces of the unit casing must be factory painted to withstand ASTM B117 90 3000-hour salt spray requirements.

All interior casing panels must be made of stainless steel.

Casing air leakage must not exceed leak class 9 (CL = 9) per ASHRAE 111.

Panel insulation must provide a minimum thermal resistance (R) value of 13 $ft^2 \cdot h \cdot {}^oF/Btu$ throughout the entire unit.

Access doors must be 2-inch double-wall construction with latching door handles.

Provide factory-mounted, weather-resistant, light emitting diode (LED) fixtures in sections of the unit for maintenance and service visibility.

Provide a fan array for the supply and return. The fans must be direct drive, single-width, single-inlet plenum. The fan blades must be aluminum backward-inclined airfoil. Fan array fans must be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.

The fan and motor assembly must be internally isolated from the unit casing, furnished and installed by the unit manufacturer.

Provide with factory mounted VFD for control of fan speed to modulate the airflow.

Provide 24-inch-long (min.) modular inspection sections with removable doors on both sides of the chilled water coil module.

The coil must have a factory applied flexible epoxy polymer coating (1 mil min. thickness) uniformly applied to all coil surface areas without material bridging between fins.

Provide two sets of spare filters for each AHU.

Provide a factory-installed dial type differential pressure gauge piped to both sides of the filter to indicate status.

A mixing section module must be provided to support the damper assembly for outdoor, return, and/or exhaust air. Dampers must modulate the volume of outdoor, return, or exhaust air. The dampers must be of double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades. The blades must rotate on stainless-steel sleeve bearings. Airfoil dampers must be rated for a maximum leakage complying with ASHRAE 90.1.

Provide an air blender section to mix outside and return air, minimize stratification, and reduce the risk of frozen coils.

Fully modulating 2-way hydronic coils. If the AHU is at the end of the water loop, a 3-way valve arrangement at the final coil connection is acceptable in lieu of a bypass.

Provide a factory installed combination VFD/disconnect for each fan motor. Each VFD/disconnect must be properly sized, factory mounted in a full metal enclosure, wired to the fan motor (s), and commissioned. VFD/disconnects must include a circuit breaker disconnect with a through-the-door interlocking handle designed to rest only in the full ON or OFF state and must be lockable in these states. A concealed defeater mechanism must allow entry into the enclosure when the handle is in the ON position. The VFD package must also include:

- Electronic manual speed control
- Current limited stall prevention
- Auto restart after momentary power loss
- Speed search for starting into rotating motor
- Anti-windmill with DC injection before start
- Phase-to-phase short circuit protection
- Ground fault protection

D304090 OTHER DISTRIBUTION SYSTEMS

Provide inline pumps with variable frequency drives.

Hangers, Clamps, Rollers, and Supports must comply with MSS SP-58 unless otherwise noted. Steel channel strut and angle iron are acceptable materials for field constructed trapeze hanger assemblies where the rated load limit is not exceeded. Provide with MSS type carbon-steel hanger rods, nuts, saddles, and U-bolts.

Run all horizontal piping above ceiling unless otherwise noted.

Provide full line size valves except control and balancing valves.

Provide extended plugs and labels where piping is insulated. Provide removable insulation over plugs.

Provide manual air vents at all high spots and the ends of all piping loops. Do not use automatic air vents in any place other than mechanical rooms where floor drains are already provided for. Provide 1/2" drain valves at low points in piping. Provide minimum pitch sufficient to insure adequate venting and draining.

Provide permanent flushing isolation valves and tees at both sides of all hydronic equipment. Provide tees with ¾” hose end connection and removable brass cap.

Do not hang pipe from other pipe.

Do not use flexible braided pipe to change direction at equipment connections regardless of manufacturer documentation.

Do not bend pipe or pipe hangers to correct poor alignment.

Route all piping perpendicular and parallel to the building structure.

Maintain a minimum of 3'-6" of ground cover over all underground HVAC piping.

Install piping so that all valves, strainers, unions, traps, flanges, and other appurtenances requiring access are accessible from below.

Install valves so that the valves will remain in service when equipment or piping on the equipment side of the valve are removed.

Provide balancing valves with position indicators and maximum adjustable stops (memory stops).

Provide chain wheel operators for all valves in equipment rooms mounted greater than 7'-0" above floor level; chain must extend to 7'-0" above floor level.

Install unions and/or flanges at each piece of equipment, in bypasses, and in long piping runs (100 feet or more) to permit disassembly for alteration and repairs.

Install all piping without forcing, springing, or bending.

Tap all branch lines from top of piping mains (45 degrees preferred, 90 degrees acceptable).

All valves must be set up and adjusted for smooth and easy operation.

All piping work must be coordinated with all trades involved. Offsets in piping around obstructions must be provided at no additional cost to the government.

Provide stainless steel flexible connections in all piping systems connected to pumps, chillers, cooling towers, and other equipment which require vibration isolation. Flexible connections must be provided as close to the equipment as possible.

Unless otherwise noted, all chilled water and hot water piping must be no less than ¾".

All piping must clear doors and windows.

Provide dielectric fittings at all pipe connections of dissimilar metals.

All piping must be free of dirt, debris, and moisture prior to installation of insulation. Chilled water systems must be disabled, brought to room temperature, and free of external moisture prior to insulation installation.

Install piping in accordance with the latest editions of MSS SP-58 and ASME B31.9. Use MSS type hangers and supports. Provide saddles and base supports. All-thread rod is acceptable for tension support applications only, not compression.

Select thermometers and pressure gages where the operating condition falls within the middle third of the range.

Provide chrome plated escutcheon plates for exposed pipe penetrations in occupied spaces.

Do not route pipe risers in duct shafts. Do not penetrate fire rated shafts with pipe unless the shaft is specifically allocated for that service.

Size all hydronic piping between 1 feet and 4 feet total dynamic head pressure drop per 100' length.

Grooved piping and press fittings are prohibited in all applications.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide gas fired or hot water unit heaters to serve the heating requirements of mechanical and air handler rooms of the facility.

D305003 FAN COIL UNITS

NOT USED

D305004 FIN TUBE RADIATORS

NOT USED

D305005 ELECTRIC HEATING

NOT USED

D305006 PACKAGE UNITS

NOT USED

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROL SYSTEM (DDCS)

Provide a complete Direct Digital Control (DDC) system to comply with UFGS 23 09 00.00 22 Instrumentations and Control for HVAC, UFGS 23 09 13.00 22 Instrumentation and Control Devices for HVAC, and UFGS 23 09 23.02 22 BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems for the facility. All Camp Lejeune specific standards and requirements in Division 23 sections in Part 5 of this RFP must be incorporated into the design where applicable.

The DDCS must utilize intelligent distributed controllers, which communicate over a controller network in accordance with ASHRAE Standard 135-2016, BACnet – A Data Communication Protocol for Building and Control Networks. Provide all necessary hardware, software and control devices to perform the optimal operation of the entire HVAC system and other building systems.

The Energy Management Control System (EMCS) has an existing front-end system managed by DPW. The government is responsible for integration of the building onto the base-wide network and integration of new buildings into the front-end. Contractor point of demarcation is the field point of contact (FPOC) and will be designed using BACnet protocol for future integration. The EMCS building level system must be designed and commissioned to match the existing ATO level of L-M-M. Contractor must use DDC equipment and Meters selected from base ATO approved equipment listing or must provide forty (40) hours testing time and support for DPW cybersecurity testing and hardening at the base's test environment. Only equipment capable of meeting cybersecurity hardening requirements will be accepted for use.

Provide two (2) CAT6 cables from the Supervisory Panel to the telecommunications closet. Incorporate requirements identified in the UFGS 23 09 00.00 22 provided in RFP, Part 5, into project specifications.

Provide meters, monitored by DDC, on the following incoming utilities of the building: Domestic water, natural gas, electricity. Tie the gas meter into the existing Advanced Metering Infrastructure (AMI) metering system. For electrical energy monitoring refer to Section D50, *Electrical,* paragraph entitled, *Service Entrance Equipment.* For potable water meter refer to Section G30, *Site Civil/Mechanical Utilities,* paragraph entitled, *Potable Water Distribution.*

Preferred location for water meter is in the mechanical room.

Provide meters, monitored by DDC, on the following subsystems for steam, gas and water: HVAC and processes.

Provide ASHRAE Standard 135 building controller as the main interface for the building control system.

Provide notebook computer(s) and complete application software with all licenses.

Provide patch panel in the mechanical equipment room for ease of connection and disconnection of equipment.

Provide panels with locks and alarms. The alarms must include both a flashing light and an audible alarm inside the mechanical room. The alarms must also be a networked alarm (e.g. switch connected to controller DI) with alarm events recorded remotely for a period not less than one year.

Provide flow rate meters, monitored by the DDC system, for central, chilled, and hot water flow.

Provide air handlers and all terminal units, including VAV boxes, with discharge/supply temperature sensors.

Provide air handler unit outside air flow monitoring stations.

Provide a DDC option for automatic operation of building circulating pumps whenever outdoor air temperature is below 35 degrees F or when there is a high potential for freeze damage.

Provide control to automatically start back-up pumps (or other HVAC equipment) if the primary device fails. Primary and back-up equipment starter circuits must be wired to prevent both pieces of equipment from operating at the same time. Rotate primary and back-up HVAC equipment monthly (adjustable) with a lead/lag control routine.

Provide the following phase monitors for all 3 phase equipment:

1. Phase loss protection
2. Phase reversal protection
3. Phase unbalance protection

Provide the following phase monitors for all 3 phase chillers:

1. Phase unbalance protection
2. Over/under voltage protection
3. Phase loss protection
4. Delay of break timer to delay automatic restarts
5. Non critical fault delay
6. Programmable auto/manual restart
7. Load and line side monitoring
8. Phase reversal
9. Phase unbalance

Provide new DDCS front-end notebook computer(s) loaded with all necessary application software displaying graphic floor plan, equipment graphics, control diagrams, and complete sequence of operations graphic pages. Provide all alarming, trend services, and schedules and other BACnet services and configurations as described in the UFGS 23 09 23.02 22. Provide and incorporate all new control points and sequences by creating new graphics, alarms, trends, schedules, and system reports. In addition, provide each graphic screen of mechanical equipment with links to the applicable as-built written sequence of operation that fully describes every operating routine and as-built DDC wiring diagram.

Non-BACnet compliant or proprietary equipment or systems, including gateways/protocol convertors, are not desired and are to be avoided unless a conflict dictates, at which time Government review and approval will be required.

The Contractor must be responsible for developing construction documents in accordance with United Facilities Criteria (UFC) for the design of standard HVAC control systems including:

1. UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, dated 18 July, 2018

2. UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, with Change 1; 1 October 2013 – Standard 18, Emergency Air Distribution Shutoff

DDC System Design: Submit all design documents to be reviewed and approved by Government. Control system design must include the following:

1. EMCS Control Diagrams showing the configuration of each system and equipment with applicable schematic flow diagram, control/field devices, device tags, input/output designations, and applicable field/interlock wiring in accordance with UFC 3-410-02.

2. EMCS Network Riser Diagram showing the layout of DDC system network, all network hardware, controllers, and notebook computer(s) in the building. The diagram must show the locations of notebook computer(s), network hardware, switches/router/hubs and network routing, distinguishing between different forms of media (i.e. Fiber, Category 5/6, shielded twisted pair, coaxial cable, etc.). Various types of LANs must be identified and distinguished from each other.

3. The Sequence of Operation describing all control processes and operation that are controlled by the control system must be included. The sequence of operation must be clearly shown in a text narrative form in order to demonstrate a clear understanding of how the system is to operate and be specific to the control system equipment used.

4. The DDC System Point Schedules indicating, at a minimum, the control point name, input/output designation, device code/tag, fail mode/position, software functions, alarms and alarm limits in accordance with UFC 3-410-02.

5. Provide control system specification to ensure that all of the components, which are expected to be used in the DDC system installation, are properly specified. In addition, the control system specifications must also specify detailed requirements for testing and commissioning of the DDC system. The control system specifications must also include all training requirements.

6. Provide graphic screens including mechanical floor plan indicating control locations and front-end graphic screens of mechanical equipment controls. The graphics must be submitted during construction stages for review and approval by Government.

DDC System Network Architecture:

1. The primary DDC system network, including DDC system network hardware, supervisory/building controllers (BC), Advanced Application Controllers (AAC) for major mechanical equipment, and DDC system notebook computer(s), must communicate via a dedicated DDC system network backbone using BACnet over IP (BACnet/IP). Using the Government Local Area Network (LAN) for DDC system communication is strictly prohibited.

2. The field controllers such as Advanced Application Controllers (AAC) and Application Specific Controllers (ASC) for small mechanical equipment, terminal units and miscellaneous/unitary equipment must be connected to the associated DDC system network hardware and supervisory/building (BC) controllers, and communicate via secondary DDC system network using BACnet MS/TP.

3. Network controllers, switches and/or routers must be provided to extend DDC system network throughout the facility, where necessary.

4. Non-BACnet-compliant or proprietary equipment or systems including gateways using a proprietary communication protocol are not acceptable and are strictly prohibited. For the existing equipment communicating with the existing control system using a proprietary or non-BACnet communication protocol, provide necessary gateway or network interface directly connected to the new DDC system network using a BACnet communication protocol.

Critical Systems:

1. For the DDC system associated with the critical equipment, provide separate controllers for primary and back-up HVAC units, which provide redundant HVAC service to critical spaces, to ensure that failure of any one controller will not cause the loss of the entire service to the critical space. The equipment must be distributed across multiple controllers in such a manner that no more than one unit must be powered, controlled and monitored using a single controller.

2. Each BC, AAC and network hardware such as Ethernet switch and router must be provided with an Uninterruptible Power Supply (UPS) that can supply electrical power for at least four hours to the attached load. This load must include the power required for HVAC equipment or field/control devices such as damper and control valves, etc.

3. For the HVAC equipment serving critical spaces or configured for redundant operation, a controls scheme for manual operation, which will bypass the automatic control through the DDC system, must be incorporated. Provide a HOA switch, if not provided as part of electrical equipment, so the equipment can be manually started and operated in Hand mode. The control valves and dampers associated with chilled water system and air handling units must be configured with necessary fail position so the equipment can operate manually and provide temporary cooling and/or ventilation if there is a failure in the control system.

4. When switching the redundant units during the rotation, the unit in the next sequence must be enabled or started before the previously enabled or started unit is disabled or stopped. If enabled unit should fail, an alarm must be generated at the DDC system and it must automatically enable the stand-by unit to replace the failed unit. Once the newly started unit is in operation, the failed unit must be disabled.

DDC System Software: Provide new DDCS and OWS with new front-end software and other utilities and tools as necessary. All software necessary for the configuration, operation, and maintenance of the installed DDC system must be provided, with licenses residing with the Government. Where new software, including application and tools, is provided, the latest tested, compatible and reliable version of the software available at the time must be installed prior to system testing and personnel training. In general, the front-end software must allow each authorized operator to execute the following functions as a minimum:

1. Security: Provide security function that prevents unauthorized use unless operator is logged on. Access must be limited to operator’s assigned functions when user is logged on. Each operator’s terminal must provide security for 10 users as a minimum. Each user must have an individual User ID/Name and Password. System user must be

allowed individual assignment of only those control functions and menu items to which that user requires access. Each user must also have a set security level, which defines access to displays and individual objects the user may control. System must include minimum of 5 separate and distinct security levels for assignment to operators. Software must be initially configured to allow government personnel responsible for system administration full, unrestricted access. All default access passwords and user authentication identification must be documented and provided to the Government.

2. Schedule: Operators must be able to view scheduled operating hours of each schedulable piece of equipment on a weekly or monthly calendar-based graphical schedule display; to select and adjust each schedule and time period; and to simultaneously schedule related equipment. Operators must be able to schedule holidays and special events directly from the calendar.

3. Alarm: The notebook computer(s) must provide audible, visual, and printed means of alarm indication. System input and status objects must be configurable to alarm on departing from and on returning to normal state. Operator must be able to enable or disable each alarm and to configure alarm limits, alarm limit differentials, alarm states, and alarm reactions for each system object. Alarms must be BACnet alarm objects and must use BACnet alarm services.

4. Trend Log: Operator must be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and must be able to retrieve data for use in spreadsheets and standard database programs. Controller must sample and store trend data and must be able to archive data to the hard disk. Coordinate items to be trended and trend configurations with the facility maintenance personnel. Trends must be BACnet trend objects.

5. Graphical Displays: The notebook computer(s) must display all data associated with project as required. The notebook computer(s) must display all data using two and/or three-dimensional graphic representations of all mechanical equipment. System must be capable of displaying graphic file, text, and dynamic object data together on each display. Information must be labeled with descriptors and must be shown with the appropriate engineering units. All information on any display must be dynamically updated without any action by the user.

Control Damper and Actuators:

1. Control Dampers: Motorized control dampers must have opposed blade dampers for modulating service and parallel blade dampers for 2-position service. Frames must be of five inch by one inch extruded aluminum hat channel with a minimum of 0.125-inch wall thickness. Blades must not exceed six inches wide and must be of heavy gage extruded aluminum airfoil shape to minimize pressure loss across the damper. Damper blades must be injected with CFC free, two part high density polyurethane foam. Each blade must include a thermal isolation gap. Dampers must be rated for minimum 2000 fpm air velocity at 2.5 inches static pressure and damper leakage must not exceeding 0.5 percent of total CFM (4.00 CFM/sq. ft.) based on 2000 fpm and one-inch static pressure when tested per AMCA Publication 500. Damper must be rated for a temperature range of minus 70 to 200°F

2. Provide electric type, direct shaft mount damper actuators with bracket arrangement for location outside of the air stream. Actuators must provide at least 125 percent of the required torque to effectively operate the damper. Actuator drive time for 90 degree rotation must be 150 seconds maximum. Actuators must be normally open, normally closed, or fail in position as required to obtain the operation as required by the application. Normally open and normally closed dampers must return to their normal position in the event of a power failure to the actuator. Provide auxiliary switches or damper position switches, rated as required, to provide specific operation. Provide transformers and accessories as required. Actuators requiring linkages, crank arms, connecting rods, or ball joints are not acceptable.

Control Valves and Actuators:

1. Characterized Control Ball Valves (up to and including 3 Inches): Nickel-plated forged brass body, valve trim must utilize stainless steel ball and stem, fiberglass reinforced Teflon PTFE seats with O-rings, 2 EPDM O-rings packing. A flow characterizing disc, made of Tefzel Teflon must be installed in the inlet of 2-way characterized control ball valves. 3-way valves must utilize flow characterizing discs at both input ports. Standard ball valves without this feature are not acceptable. 2-way valves must have equal port percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.

2. Globe Pattern Control Valves (over 3 inches): Iron body, bronze trim, 316 stainless steel rising stem, bronze plug-type disc, flanged ends, renewable bronze seat and disc, TFE V-ring packing. It must have replaceable plugs and seats of stainless steel or bronze. 2-way valves must have equal percentage characteristics; 3-way valves must have linear characteristics. Operators must close valves against pump shutoff head. Control valves must be selected for the pressure drop calculated to ensure proper control valve authority for the application.

3. Valve Actuator: Provide electric valve actuators, which are two-position or modulating as required by application. Actuators must be of ample capacity to handle the required load under all conditions and as a minimum must close valves against pump shutoff head pressure of 55 psi. Unless otherwise indicated, valves must be arranged to return to the normal (fail-safe) position in the event of a power failure to the actuator.

Air Flow Measuring Stations (AFMS): For all air handling units with outdoor air intake, provide AFMS to continuously monitor the outdoor ventilation air in CFM values.

1. Provide high performance, thermal dispersion type AFMS. Pitot tubes, arrays, Piezo rings and other differential pressure based devices are not acceptable. AFMSs must contain an airflow straightener if required by the AFMS manufacturer's published installation instructions. The straightener must be contained inside a flanged sheet metal casing, with the AFMS located as specified according to the published recommendation of the AFMS manufacturer. In the absence of published documentation, airflow straighteners must be provided if there is any duct obstruction within 5 duct diameters upstream of the AFMS. Air-flow straighteners, where required, must be constructed of 0.125 inch aluminum honeycomb and the depth of the straightener must not be less than 1.5 inches. Sensing probe must be constructed of extruded aluminum or of stainless steel tubes. The operating humidity range must be 0

to 99% RH and direct exposure to water must not damage the sensing elements. AFMSs must have an accuracy of +/- 2% of reading with air velocity range of 0 to 5,000 fpm. The transmitter must have local LCD display, continuously displaying airflow and temperature and be calibrated for the appropriate operating range based on the required operating range.

Water Flow Meters: Provide electromagnetic type flow meters for water service where required by application. The flow meter must have the DC powered electromagnetic coils and electrodes, and measure the induced voltage across the electrodes as a conductive fluid flows through the magnetic fields. The voltage is proportional to the average flow velocity of the fluid and then amplified and processed digitally by the converter to produce the signal for flow rate and totalization. Flow meter must be located to provide the most efficient and accurate reading recommended by the manufacturer.

Commissioning: The controls Contractor must provide the services of a factory-authorized service representative to start control systems and provide the commissioning the coordination and support required during the commissioning process.

D306001 1.2 ELECTRONIC CONTROLS

NOT USED

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing and Balancing (TAB) of all air distribution systems, water distribution systems, including domestic hot water systems, and HVAC equipment. TAB must be provided by a tier one contractor. Provide duct air leakage testing and duct pressure testing. The Designer of Record must provide a duct construction and leak testing schedule on the drawings.

Clean entire duct system in accordance with National Air Duct Cleaners Association (NADCA) ACR after duct air leakage testing (DALT), and before test and balance (TAB). Document duct cleaning, prepare a written report, and submit report to the Construction Manager (CM) with signature of the ductwork contracting foreman indicating the test has been completed.

Acceptable Cleanliness Level: Net weight of debris collected on the filter media must not exceed 0.75 mg/100 sq. cm. Coordinate with other trades working in the building. Duct cleaning must be performed only after the building has been sealed and the completion of construction activities resulting in airborne particles has been completed. Examples of activities producing airborne particles include but are not limited to grinding, cutting, sanding, drywall installation, grout work, etc. Should the CM note construction dust contamination or openly unprotected ductwork and/or equipment after the initial cleaning, repeat duct cleaning on entire system after the final instance of airborne particle production within the building envelope at no additional cost.

Provide complete testing and balancing (TAB) of all air and water distribution systems and HVAC equipment after successful completion of the DALT testing and duct cleaning. Include all troubleshooting attempts and measurements within the TAB report. The TAB contractor must offer recommendations where flowrates cannot be kept within tolerance. Coordinate with and support Commissioning Authority effort during entire project duration. All system devices must be accessible during the TAB effort. Flush strainers and replace air filters prior to TAB. Verify that air vents have been installed at every high point in the hydronic system(s); confirm the absence of air by testing every air vent prior to starting tests.

D307003 HVAC COMMISSIONING

Refer to RFP Part 3 - Project Program, Chapter 2 for Building Commissioning requirements. All mechanical systems will be commissioned as required.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide access to all mechanical equipment rooms through the building exterior walls. Provide roll up doors for mechanical room access. Arrange mechanical equipment so that any piece of equipment can be replaced without removal of other equipment.

All equipment and materials will be free of damage. Bent coil fins will be combed out. Where bent coil fins cannot be straightened, replace with new.

Locate and size 4" thick reinforced concrete housekeeping pads for base mounted equipment in mechanical rooms in accordance with actual equipment purchased. Extend pad beyond equipment for 6" in all directions. Provide with chamfered edges.

D309002 ROLL UP DOOR HEATING

Provide heated curtain fans at roll up doors.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide fixed plate enthalpy energy recovery in the air handling system.

Provide infrared tube heaters for warehouse heating. Provide stainless steel venting.

--End of Section--

D40 FIRE PROTECTION – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

Refer to Part 4 Section D40 for performance requirements of the building elements included in the fire protection systems. Comply with the latest editions of UFC 1-200-01, UFC 3-600-01, UFC 4-021- 01 and NFPA codes at the time of contract solicitation.

SYSTEM DESCRIPTION

Provide an integrated fire alarm/ mass notification system and fire suppression system capable of notifying building occupants inside the facility of an emergency event. This scope of work includes the installation of equipment and components and completing all programming necessary to fully control/interface/supervise building systems and transmit all alarm signals to the base reporting system.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS section D40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

All Design Documents, (i.e., Fire Protection Design Analysis, Building Code Analysis, Life Safety Analysis, plans, specifications, and calculations) developed for Section D40 must be prepared by, or under the supervision of the Contractor's Qualified Fire Protection Engineer (QFPE) as detailed in UFC 3-600-01 and FC 1-300-09N.

The services of a Fire Protection Quality Control Specialist (FPQC) are required. Roles and responsibilities of the FPQC are defined in Specification Section 01 45 00.05 20 (Design and Construction Quality Control). The QFPE and the FPQC must be registered professional engineers who have passed the Fire Protection Engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and have relevant experience. The QFPE may serve as the FPQC.

GENERAL DESIGN AND INSTALLATION REQUIREMENTS

Prior to the start of design, the QFPE must meet with the NAVFAC FPE to discuss and confirm the extent and types of fire protection systems and engineering services required. All work shall comply with the requirements of the applicable NFPA standards, including recommended portions of the text and explanatory notes, which must be considered mandatory, and with UFC documents, including UFC 1-200-01, UFC 3-600-01, and UFC 4-021-01. Develop specifications for all fire protection work using the Unified Facilities Guide Specification format (UFGS), except for UFGS Section 28 31 76, *Interior Fire Alarm and Mass Notification System, Addressable,* which is included in Part 6 of this RFP. The designer is responsible for incorporating design elements and deliverables described in the “Editor’s Notes” included with all UFGS sections.

GENERAL INSTALLATION

All work for fire protection systems (Including fire alarm, fire suppression, and firestop systems) must be provided by contractors licensed to perform such work.

Workmanship must be neat and professional. Protect systems from damage during construction. Provide parts and components Listed for their particular service. Provide labels for all valves, addressable devices, panels, and controls. For any device located above a ceiling, provide legible, typed label on the ceiling to identify its purpose and location. With the exception of detection devices at ceiling level, mount all valves, panels, and controls no more than 5 feet above the finished floor. Provide clearance for access, inspection, maintenance, repair, and removal.

All conductors must be installed in conduit (EMT minimum). Pull all conductors splice free and be continuous from device to device. The use of wire nuts, crimped connectors, or twisting of conductors is prohibited. All devices must have screw terminals. Where devices are only provided with pigtails from the manufacturer, pigtails must be landed on terminal strips mounted within the junction box. All terminations must be at a terminal strip or the device screw terminals. Terminal strips are only permitted where direct connection to a device is not possible.

Provide a Knox Box at the building entrance approved by the fire department. Provide an additional Knox Box for any project including a gated and secured perimeter fence. Locate this supplemental Knox Box at the primary vehicle entrance point. Mount the Knox Box at the key pad access pedestal to allow fire department access if a gate/fence will be secured after hours.

DESIGN DRAWINGS/SPECIFICATIONS

Design drawings, specifications, and Basis of Design must be prepared by, or under the direct supervision of, the QFPE. Design submittals must comply with the FC 1-300-09N (Navy and Marine Corps Design Procedures), including but not limited to, Section 4-6 (Fire Protection Investigations and Survey), Section 5-8 (Fire Protection Basis of Design), Section 6-8 (Fire Protection Calculations), and 7-10 (Fire Protection Drawings).

INSTALLATION SHOP DRAWING REQUIREMENTS

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician who holds a current certification in the field of Fire Protection Engineering Technology with minimum certification in the appropriate subfield as noted below.

- Fire Alarm Systems only (no Mass Notification element)– Level III
- Combination Fire Alarm/Mass Notification Systems - Level IV
- Fire Sprinkler Systems (water only) - Level III

All installation drawings, shop drawings or working plans, calculations, and other required pre-construction documentation must be reviewed by the QFPE prior to submission to government for review. Documents must be signed and sealed or letter attached that is signed and sealed indicating QFPE review of submittal. All plans received without documentation of QFPE review will be rejected and returned without review.

CONTRACTOR INSTALLATION REQUIREMENTS

All fire protection systems installation work must be performed by, or under the supervision of a NICET technician having minimum Level lll certification who must conduct onsite inspections each week that work is performed. Submit licenses and certifications to the Contracting Officer prior to the start of work. Signed weekly inspection reports confirming compliance with the Contract and NFPA standards to the Contracting Officer's Technical Representative each week. Record of Completion forms must be signed by the NICET certified supervising installer for each fire protection system.

COMMISSIONING REQUIREMENTS

Commissioning procedures must comply with NFPA and NAVFAC criteria. All fire and life safety systems must be fully pre-tested by the contractor with the QA/QC manager present. Pre-final acceptance testing must be witnessed by the QFPE. Final acceptance testing must be requested by the QFPE in writing after successful completion of the pre-final acceptance test. The final acceptance test will be witnessed by the NAVFAC FPE for government acceptance. Once the system is accepted, it will be placed in service prior to occupancy. The Contractor is responsible for all cost and time delays caused by system retesting as a result of final acceptance testing failure.

D4010 FIRE ALARM/DETECTION AND MASS NOTIFICATION SYSTEMS

Provide an integrated fire alarm/detection and mass notification system capable of notifying building occupants inside and near the facility in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-18, UFC 4-021-01 and NFPA 72. Provide equipment manufactured by Simplex, Notifier or Fire-Lite. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system that also serves as a mass notification system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements. The fire reporting portion of the system must be compatible with the existing base fire reporting system.

Provide all fire alarm circuits in Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC) unless noted otherwise. All raceways must be factory painted red. Flexible Metallic Conduit (FMC) must not exceed 6 feet and is only be permitted for connections from junction boxes to field devices, Provide a raceway listed for the installation in wet locations, such as Rigid Metallic Conduit (RMC) and Liquidtight Flexible Metal Conduit (LFMC). Wet locations are considered any location within a 5 ft radius of fire suppression equipment, throughout a fire pump room/building, and as defined by NFPA 70. Provide a laminated building floor plan (22” by 34”) mounted at the main entrance of the building, adjacent to the annunciator. Identify the location of the FMCP, LOC, remote power supply panels, and all initiating devices. The drawing must include room numbers.

Provide a steel Document Cabinet with a hinge-mounted door and lock with lock cylinder keyed the same as the FMCP. Mount the Document Cabinet on the wall adjacent to the FMCP. Prominently label the exterior of the cabinet "SYSTEM RECORD DOCUMENTS". Cabinet must include paper copies and a CD of Fire Alarm As-Built drawings, List of Contact ID descriptions for the fire alarm addressable devices, Sprinkler As-Built drawings, NFPA 72 & NFPA 13

Records of Completion. CD must also include site-specific software and O&M manuals stored in a CD jewel case. Cabinet must be of a minimum size to accommodate all required documents.

Provide a steel Parts Box with a hinge-mounted door and lock with lock cylinder keyed the same is the FMCP. Mount the Parts Box on the wall adjacent to FMCP. Cabinet must be of a minimum size to accommodate all spare parts as defined in the project specifications, plus four fuses for each fused circuit.

FMCP REQUIREMENTS

The fire alarm control unit and mass notification control unit (FMCP) must be capable of handling a minimum of 500 individually identified addressable devices. Provide Class B Notification Appliance Circuits (NACs), Class B Signaling Line Circuits (SLCs), and Class B Initiation Device Circuits (IDCs). Each NAC and SLC must include 25 percent spare capacity based on load and voltage drop. Mount FMCP and associated cabinets such that the top of each cabinet is no more than 6 ft above the finished floor. Provide conduit fill calculations to ensure 40% fill does not exceed limits of NFPA 70.

A lockout code must not be installed in the hardware, firmware, or software of the fire alarm system. Installer and operator codes must remain as the factory default setting.

Provide amplifiers sized for 25% spare power capacity. Battery calculations shall be based upon 48 hours of standby time and 15 minutes of alarm time or 60 minutes of alarm time, whichever is greater.

Provide a factory-trained instructor to teach a five-day technical training classroom instruction for at least five Government personnel at Camp Lejeune. The technical training must include classroom instruction as well as hands-on programming, troubleshooting and diagnostics exercises. Provide three laptops for the government’s retention. Laptops must be Windows 10 based and include system software, special connecting cable(s), proprietary equipment necessary for the maintenance, testing and reprogramming of the fire alarm equipment and system. Factory training must occur within six months of system acceptance.

Provide a LCD remote annunciator located at the designated primary entrance. Coordinate final installation location with user and NAVFAC. Provide remote annunciator with control functions the same as the FMCP. Control functions must be accessible only by user code or secured behind a locked panel.

Provide a local operating console (LOC) at the primary entrance vestibule. Coordinate final installation location with user and NAVFAC. Microphone and pre-recorded buttons at LOC must be accessible and not installed behind a locked panel.

Obtain prerecorded mass notification messages from the installation fire alarm technician. Program mass notification pre-recorded message buttons to be non-latching that do not require a full system reset to activate or deactivate. Program pre-recorded message buttons such that a higher priority message will override a lower priority message. Once the higher priority message button is deactivated the lower message that is still activated must begin playing again. Program the system to allow any mass notification message to override the fire message. Upon deactivation of the mass notification message, the fire alarm message must automatic resume. Program live voice microphone paging to override all fire alarm and pre-recorded mass notification message. Microphone activation must not require more than two functions. Post clear instructions for operation (keying the microphone and turning a key switch to activate is an example of two functions).

The government will provide the TRX-401 mass notification transceiver. Provide space, antenna, conduit, cable, pull strings, and equipment as shown on the TRX-401 installation detail provided in Part 6..

Prior to building demolition, contact base fire alarm technicians and allow time for their retrieval of fire alarm and/or mass notification panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

INITIATION DEVICES

Provide a complete and useable fire alarm system including manual stations, system smoke detectors, duct smoke detectors, audio/visual notification appliances, electrical supervision of all sprinkler system alarm and supervisory devices, and electrical supervision of fire pump controllers and emergency generators. Provide an individual monitor module for each fire sprinkler system water flow switch. Provide all initiation devices with a permanent label adhered to the device identifying the addressable point. Handwritten labels are not permitted.

Provide flush-mounted manual pull stations. Provide manual pull stations within 5 feet of all exterior doors, including but not limited to mechanical rooms, electrical rooms, and communication rooms with direct exterior access. Provide double action type manual pull stations with mechanical reset features. Break glass type manual stations are not permitted.

Provide carbon monoxide detectors in accordance with UFC 3-600-01. Detector activation shall initiate a distinct message on all notification appliances and transmit an independent dedicated signal to the base reporting system.

NOTIFICATION APPLIANCES

Provide combined fire alarm and mass notification appliances. Provide white notification appliances with factory applied, permanent, red "ALERT" lettering with clear strobe lenses. Provide ceiling-mounted notification appliances in all areas with suspended ceiling systems. Where exterior speakers are required by UFC 4-021-01, provide exterior weatherproof notification speakers “bull horn” style. All conduit penetrations for exterior equipment must enter the junction box or equipment from the bottom to minimize water intrusion. Provide duct seal inside all conduits that penetrate exterior walls per NFPA 70, Section 300.7.

Visual notification appliances are required in all public use areas, common use areas, and employee work areas to include office suites and areas intended to have more than four desks/occupants. Offices that are designed for a single office worker, regardless of the calculated occupant load, do not require a strobe unless the room is designated as an ABA compliant space.

FIRE ALARM REPORTING

All fire alarms, supervisory alarms and trouble conditions indicated at the FMCP must be transmitted to the fire alarm receiving station. Provide point specific transmission via contact ID format with the address, location, and description of the condition as it appears on the FMCP.

Provide a point reporting digital alarm communicator transmitter that is compatible with the Sur-Gard System III Multi-platform Digital Telephone Receiver. Provide two CAT 6 UTP cables inside one-inch conduit from the FMCP to the telephone equipment room. Make connections to telephone equipment per the base’s telephone requirements. See Part 6 for schematic drawing of the FARS and the mass notification equipment

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

The water supply information below is provided for bidding purposes. A hydrant flow test was conducted on 05 August 2019 in proximity to the project site along Gum Street. Refer to Part 6 for the water flow test report and test hydrant locations.

Hydrant flow test summary: Pressure hydrant Hyd. No. 5-88-12

Static pressure: 66 psig (gauge). Residual pressure: 59 psig (gauge).

Measured Flow hydrant: 1,724gpm.

The proposed design point of connection to existing water supply must be approved by the Contracting Officer prior to proceeding with any work.

The QFPE shall conduct additional flow tests after contract award prior to any design submissions. Water flow testing must be coordinated through the Contracting Officer. The Contractor is responsible for providing all flow testing equipment. Perform flow testing in accordance with NFPA 291. The QFPE must prepare and submit a flow test report to the Contracting Officer for review by the NAVFAC FPE. This report must compare the flow test results with the hydrant flow test summary provided above.

Hydraulic calculations must be based upon a waterflow test was performed no more than 6 months prior to submission of the calculations.

Provide a reduced pressure zone backflow preventer for the incoming sprinkler service. Include a forward flow test connection, with one 2 ½” hose connection for every 250 gpm of anticipated flow of the fire sprinkler system.

Hydraulic calculations for the fire suppression system shall include a 12-psi loss through the backflow preventer.

Sleeve all incoming supply piping and provide thrust rods at floor penetrations. Sleeve all wall penetrations of incoming supply piping.

Provide a UL Listed post indicating valve (PIV) for the underground fire service main. Locate the PIV a minimum distance from the building equal to the height of the building plus fifteen feet. Provide bollards where the PIV could be subject to vehicular damage.

Provide a freestanding pedestal type fire department connection (FDC) at a location approved by the fire department and NAVFAC FPE. Provide a 5” Storz connection on a 30-degree galvanized elbow at the FDC. Check valve on FDC must be installed at fire protection system manifold inside the building. Provide ball drip valve on the FDC pipe. The FDC shall be accessible by fire apparatus and adjacent to fire department access. Provide bollards where the FDC could be subject to vehicular damage.

Provide an electric motor driven fire pump having a minimum rated capacity of 1,250 gallons per minute. Locate the fire pump within the building in a separate fire-rated room having direct access to the exterior. Power supply at Camp Lejeune does not qualify as a “reliable power source” as defined in UFC 3-600-01. Provide an on-site standby generator with automatic transfer switch to serve as the required alternate power source. Refer to ESR Section D50 for requirements. A diesel engine driven fire pump will not be considered as an acceptable alternative to the specified electric motor drive fire pump.

D4040 SPRINKLER SYSTEMS

Provide automatic wet pipe sprinkler protection system throughout the facility, in accordance with the latest editions of UFC 3-600-01, including but not limited to Chapter 9, Section 9-7 and NFPA 13. Protect the storage area utilizing ESFR sprinklers designed in accordance with NFPA 13 for protection of palletized, solid pile, and rack storage of exposed, non-expanded Group A Plastics. The use of in-rack sprinkler will not be accepted. For other areas, sprinkler system design demand and minimum sprinkler K-factor must be as specified in Table 9-3 and Table 9-4 of UFC 3-600-01.

Wet pipe sprinkler systems shall include pressure relief and air venting on each system in accordance with NFPA 13.

Provide quick-response sprinklers with ordinary temperature rating in areas with finished ceilings. Provide quick-response upright sprinklers with ordinary temperature rating in areas with exposed ceilings. Utilize higher temperature ratings where required by NFPA 13.

The use of flexible sprinkler hose and Mechanical-T outlets is prohibited.

Provide training for the active systems consisting of a minimum of two (2) eight (8)-hour sessions to accommodate all shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

D4090 OTHER FIRE PROTECTION SYSTEMS

PORTABLE FIRE EXTINGUISHERS

Fire extinguishers are required by the FY20 National Defense Authorization Act that contradicts UFC 3-600-01. Provide fire extinguishers as required by NFPA 101 and NFPA 10. Include fire extinguishers in the Furniture, Fixtures & Equipment (FFE) Package. Refer to ESR Section C103007 for fire extinguisher cabinets and brackets. Electronic Monitoring of fire extinguishers and cabinets is not required. Provide clean agent fire extinguishers for electronic equipment installations (server rooms). Locate the clean agent fire extinguisher within the server room adjacent to the primary egress door.

D50 ELECTRICAL – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SCOPE

The scope of this section is to describe the systems, components, and installations within buildings and extending no more than 5 feet beyond building exterior walls. Exterior systems and components are described in ESR G40 of this RFP.

Provide systems complete in place, tested, and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must."

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floorplan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floorplans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an interior electrical system consisting of, but not limited to, Service Entrance Wiring and Equipment, Distribution and Lighting Panelboards, Dry Type Transformers, Conduits, Feeder and Branch Circuits, Motor Control Equipment, Lighting and Branch Wiring, Communications, Security and Alarm Systems, Emergency Generator, Emergency Lighting and Power, Grounding, Lightning Protection, and UPS, including accessories and devices as necessary and required for a complete and usable system.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life safety distribution systems.

Install interior electrical distribution equipment and components in spaces accessibly only by qualified persons, except in warehouse spaces. Provide a main electrical room to house the service entrance switchboard and branch circuit distribution equipment. Provide additional electrical rooms as required throughout the building to minimize branch circuit length to less than 200 feet for 120V circuits and 400 feet for 277V circuits. Provide electrical panels in warehouse space, mechanical rooms, computer rooms, and telecommunications rooms to serve loads within each respective room.

Provide branch circuit panelboards rated at 480Y/277V to serve lighting and large mechanical equipment. Provide dry-type transformers feeding 208Y/120V panelboards to transform the voltage where necessary to serve receptacle loads and small (less than ¾ hp) motor loads.

Provide individual feeders to each panelboard or transformer. A distribution system consisting of cable taps and/or through-feed panels is prohibited.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15% spare circuit and load capacity at all levels of the power distribution system, including life safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

EQUIPMENT ENCLOSURES

Provide enclosures for equipment described in this section at installed locations with the following environmental ratings:

- Indoor, Dry and Clean Locations: NEMA 250, Type 1.
- Outdoor Locations: NEMA 250, Type 4X, stainless steel
- Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
- Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
- Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids; equipment in Mechanical Rooms, Plumbing Rooms, and Elevator Machine Rooms; equipment in unconditioned spaces: NEMA 250, Type 12.
- Hazardous Areas: NEMA 250, Type 7 with cover attached by Type 316 stainless steel bolts.

SUSTAINABILITY

Provide electrical systems and components that support project sustainability and energy goals.

ANTITERRORISM

Provide bracing of electrical equipment which is suspended and weighs more than 31 pounds.

SEISMIC BRACING

Provide bracing of electrical equipment to resist seismic events based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING

Test new electrical equipment in accordance with NETA acceptance testing specifications. Test existing electrical equipment remaining in service in accordance with NETA maintenance testing specifications.

COMMISSIONING

Commission all systems in accordance with RFP Part 3 Chapter 2, Section 01 33 29.05 20 *Sustainability Requirements for Design Build* and UFC 01-200-02 *High Performance and Sustainable Buildings*.

EQUIPMENT IDENTIFICATION

Provide instruction and warning signs, identification labels and nameplates, and markings for equipment, wiring, raceways, boxes, and cabinets. Coordinate naming convention with Camp Lejeune Public Works Department.

Provide multi-line, engraved nameplates on the exterior of panelboards, switchboards, switchgear, enclosed switches and breakers, transformers, and packaged equipment enclosures with the following information:

- Device Identification
- Device Rating (voltage, phase, ampacity, kVA, etc.)
- Power source (source panel and circuit number)

Figure 1: Transformer Identification Example

Panel NPPH1
480Y/277V 3Φ, 4W
225A
Fed from MSB1: 1

Figure 2: Transformer Identification Example

Transformer T-NPPL1
480-208Y/120V 3Φ, 4W
75kVA
Fed from NPPH1: 1,3,5

Figure 3: UPS Identification Example

UPS1 480V 3Φ, 3W 750kVA Fed from MSB1: 5

Figure 4: Disconnect Switch Identification Example:

Switch DS-T-NPPL1 480V 3Φ 200A Fed from NPPH1: 1,3,5

CONDUCTOR IDENTIFICATION

Label conductors with source panel circuit number at each junction box and termination point.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

Provide insulated copper conductors in conduit for all feeders. Refer to D502001 for raceway application for feeders.

D501001 MAIN TRANSFORMERS

Main transformer(s) are defined in Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

Provide an underground service into the facility.

Provide a main distribution switchboard as service equipment. Provide the main distribution switchboard with a main circuit breaker, fixed, group-mounted, molded case distribution circuit breakers, and surge protective device (SPD). Fused or bolted pressure switches are prohibited. Provide switchboard with spaces for future use that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide switchboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses.

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide a multi-function digital meter integral to the main switchboard that monitors and records the following values at a minimum:

- Voltage (per phase and 3-phase)
- Current (per phase and 3-phase average)
- Real power (per phase and 3-phase average)
- Reactive power (per phase and 3-phase average)
- Apparent power (per phase and 3-phase average)

- Power factor (3-phase total)
- Frequency
- Total harmonic distortion (voltage and current)

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

Provide enclosed and ventilated dry type transformers to step down secondary voltages for general purpose outlets and other low voltage equipment.

Terminate the transformer secondary at a single overcurrent protection device. Double-lugging the secondary terminals to serve multiple panelboards is prohibited.

Provide transformers with two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards to serve the loads.

Provide panelboards with copper phase, neutral, and ground buses. Neutral bus capacity must be equal to the phase buses. Where fed from K-rated transformers, neutral buses must be 200% the capacity of the phase buses.

Provide panelboards with bolt-on circuit breakers. Plug-in circuit breakers may be used in distribution panelboards if provided with an individual positive locking mechanism that requires operation for removal of the breaker. Load centers are prohibited. Fused switch panelboards are prohibited.

Provide panelboards with spaces that are fully bused with necessary hardware and connections for installation of future overcurrent devices without disturbing existing devices.

Provide panelboards with main circuit breakers where they are not located within sight of their upstream overcurrent protective device or disconnecting means and where otherwise required by Code.

Provide panelboards with fully hinged front covers with a hinged door for accessing circuit breaker handles (door-in-door arrangement).

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case thermal-magnetic type circuit breakers with fixed trips for breakers sized up to 225A. Provide breakers from 250A to 600A with adjustable magnetic trip elements. Provide breakers 600A and larger with microprocessor controlled electronic trip units with adjustable instantaneous trip, long- and short-time pickup, long- and short-time adjustments, and ground-fault pickup. Provide ground-fault pickup only where required by the NEC. Provide circuit breakers with continuous current trip ratings 1200A and higher with an Arc Energy Reduction system.

Provide enclosed circuit breakers with an enclosure suitable for the environment in which it will be installed.

D501006 MOTOR CONTROLLERS

Provide individual motor starters with disconnect switches, combination motor starters, variable speed drives, and manual motor starters for motor controls as required by mechanical equipment. Provide all circuits and connections for motors.

Provide variable speed drives without external bypass.

Provide variable speed drives with 5% bus reactors.

D501090 OTHER SERVICE AND DISTRIBUTION

SURGE PROTECTIVE DEVICES

Provide transient voltage surge protective devices (SPD) at the main switchboard and at panelboards located in computer rooms serving the computer equipment.

SAFETY DISCONNECT SWITCHES

Provide 600V rated, heavy-duty type fused and non-fused, safety disconnect switches with external operating handle and lock-out, tag-out provisions. Provide switches with an enclosure suitable for the environment in which it will be installed.

D5020 LIGHTING AND BRANCH WIRING

Provide lighting and general-purpose receptacles throughout all spaces.

Provide a luminaire above or adjacent to each pedestrian and bay door.

Provide the necessary special receptacle configurations to serve special equipment.

Provide one duplex receptacle at each television/display monitor. Locate the receptacle behind wall-mounted equipment.

Where equipment or furniture is located on a wall, provide receptacles and/or connections serving that equipment or furniture on the wall. Where equipment or furniture is located away from a wall, provide receptacles and/or connections in multi-service floor boxes. Use of power poles is prohibited. Locate devices such that they are not made inaccessible by furniture panels and supports or fixed equipment after the furniture and equipment is installed.

Provide one multi-service recessed floor box under the table in each conference room. Center the box under the table.

Provide duplex receptacles with USB charging capability where receptacles are required on Conference Room and Classroom walls. Provide one wall mounted duplex receptacle with USB charging capability for each table in Break Rooms and Lounges. Provide one wall mounted duplex receptacle with USB charging capability at the seating area in Lobbies, Waiting Rooms, and Reception areas.

CIRCUITING REQUIREMENTS

Connect no more than six (6) duplex convenience receptacles to a single 20A circuit.

Connect no more than two (2) multi-service floor boxes to a single 20A circuit in Simulator/Training areas.

Provide individual dedicated circuits and receptacles or connections for each instance of equipment rated at 8 full load amps (FLA) and higher and for each of the following equipment:

- Copier
- Printer
- Multi-function device
- Fax machine
- Shredder
- VTC console
- Projector
- Refrigerator
- Coffee maker
- Microwave oven
- Garbage disposer
- Toaster
- Electric water cooler
- Vending machine
- Ice machine
- Washer
- Dryer
- Hand dryer
- Fire alarm control panel
- EPO control panel (multiple dedicated circuits may be required as described elsewhere)
- EMCS control panel
- Telecommunications and/or server equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- Telecommunications and/or server equipment rack (multiple dedicated circuits may be required as described elsewhere)
- AV equipment cabinet (multiple dedicated circuits may be required as described elsewhere)
- AV equipment rack (multiple dedicated circuits may be required as described elsewhere)

Provide dedicated circuits for televisions/display monitors. Multiple receptacles that support televisions/display monitors may be circuited to the same dedicated circuit.

WIRING DEVICES

Provide wiring devices connected to the normal power source with either a white body or dark brown body, as determined by the surrounding wall finish. Provide dark brown or black devices where installed on dark surfaces and white devices where installed on light surfaces.

Provide stainless steel face plates for interior wiring devices and empty outlet boxes.

Provide exterior receptacles with thermoplastic enclosures rated as “weatherproof while in use”.

Provide receptacles with USB charging capability with a combination125VAC NEMA 5-20R duplex receptacle and two 5VDC USB ports; one Type A port capable of delivering a maximum 2.4A of charging capacity and one Type C port capable of delivering a maximum of 3.0A of charging capacity (5A total charging capacity).

MULTI-OUTLET RACEWAYS

Provide extruded aluminum with clear anodized finish, dual-compartment, surface-mounted multi-outlet metal raceways with internal divider. Provide separate snap-on covers for each compartment. Provide the power compartment with NEMA 5-20R duplex receptacles at 18” on center. Where more than four (4) receptacles are installed in a raceway, connect adjacent receptacles to alternating circuits Refer to D5030 for communications & AV faceplate requirements.

UNDERFLOOR MODULAR WIRING SYSTEM

Provide a modular power wiring distribution system in spaces with raised access flooring to provide power to desks, tables, work benches, and equipment.

Provide a complete modular underfloor power wiring distribution system comprised of power distribution boxes, home run cables, multi-service recessed floor boxes, and all necessary interconnecting cables and accessories.

Provide pre-fabricated underfloor power distribution system components with plug-and-play modularity for use below Raised Access Flooring systems. Components and conductors must be listed for use in environmental air handling spaces. Provide manufacturer’s dust caps on unused plug-in connectors.

Install underfloor power distribution system components with adequate clearance to allow access to wiring compartments, removal of covers, and access to plug-in connector ports. Arrange the underfloor components such that no plug-in connector ports are obstructed.

Locate power distribution boxes in readily accessible locations below the Raised Access Floor. Identify the location of the distribution boxes on the ceiling grid above the box using a label placed at the intersection of the grid Ts. Provide one (1) spare circuit in each power distribution box.

MULTI-SERVICE RECESSED FLOOR BOXES

Provide multi-service recessed floor boxes with independent wiring compartments capable of accepting duplex receptacles, AV faceplates, and telecommunications faceplates. Provide telecom adaptor plates to accept current Base Telephone standard jack sets per local 27 10 00. Provide the power compartment with two (2) NEMA 5-20R duplex receptacles.

Provide boxes with stamped steel or cast-iron construction, as applicable to the installation location, and provide each compartment with multiple conduit knockouts capable of accepting conduit sizes up to and including 1 1/4” diameter.

Provide die-cast aluminum covers with self-closing cable egress doors. Covers must open 180° and close flush with the finished floor while in use. When closed, covers must comply with requirements for UL scrub water exclusion. Provide black covers in dark floor finishes and natural aluminum covers in light floor finishes.

Where raised access floors are provided, provide multi-service recessed floor boxes that are compatible with the modular wiring system and install floor boxes flush in raised access flooring.

D502001 BRANCH WIRING

Provide insulated copper THHN-2/THWN-2 or XHHW-2 single conductors in raceway for all branch wiring. Type AC and MC cables are prohibited.

Provide solid conductors for #10 AWG and smaller and stranded conductors for #8 AWG and larger. The minimum power and lighting conductor size is #12 AWG.

Provide a neutral conductor with each phase conductor in circuits feeding single phase loads requiring line-to-neutral service. Shared neutral conductors are prohibited.

RACEWAY APPLICATION FOR FEEDERS AND BRANCH WIRING

Provide expansion fittings in raceways crossing building expansion joints and seismic joints to compensate for building expansion and contraction.

The minimum raceway size for interior and above grade exterior applications is ¾” diameter. The minimum raceway size for below grade exterior applications is 1” diameter.

Outdoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed Conduit: GRC.
- Concealed Conduit, Aboveground: IMC.
- Underground Conduit: RNC, Type EPC-40-PVC direct buried.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

Indoors: Apply raceway products as specified below unless otherwise indicated:

- Exposed, Not Subject to Physical or Severe Physical Damage: EMT.
- Exposed and Subject to Physical or Severe Physical Damage: GRC.
- Concealed in Ceilings and Interior Walls and Partitions: EMT.
- Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- Connection to Recessed and Semi-Recessed Luminaires: FMC, except use LFMC in damp or wet locations.
- Damp or Wet Locations, Unconditioned Spaces, Spaces Subject to High Humidity: IMC.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting, area lighting, and manual and automatic controls. Controls include manual wall stations, occupancy sensors, vacancy sensors, daylighting controls, automatic lighting shutoff systems, and dimming systems.

LUMINAIRES

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide drivers that provide smooth and continuous dimming from 100% output to 10% output for standard-performance dimming luminaires and 100% output to 1% output for high-performance dimming luminaires. Step dimming drivers are prohibited.

Provide high-performance dimming drivers in conference rooms, classrooms, training rooms, and auditoriums.

Provide vanity luminaires above all mirrors in single-occupancy restrooms.

Provide blue beacon luminaires in classified spaces that are directly accessible from a corridor to alert the occupants of the space of the presence of uncleared persons in the space.

Pendant luminaires may use lenses, baffles or louvers, or perforated housings to shield the downlight component. Do not provide pendant luminaires in continuous lengths exceeding 16 feet.

Provide luminaires with the following minimum luminaire efficacy (LE):

- Recessed 1x4, 2x2, or 2x4 troffer: 90 Lumens per Watt (LPW)
- Surface or recessed downlight: 80 LPW
- Track or accent: 40 LPW
- High Bay/Low Bay: 90 LPW
- Linear Industrial or Strip Light: 80 LPW
- Suspended linear or non-linear ambient: 85 LPW
- Surface linear or non-linear ambient: 80 LPW
- Recessed linear or non-linear ambient: 85 LPW

LIGHTING CONTROLS

Provide devices including, but not limited to, drivers, wall stations, occupancy sensors, vacancy sensors, time-based scheduling, architectural dimming controls, and daylight dimming controls.

Devices using wireless radio frequency, Bluetooth, Wi-Fi, or other wireless technologies are prohibited. Obtain written approval from the COR to use devices that have infrared transmitters/receivers.

Provide occupancy and vacancy sensors to provide 100% minor motion coverage of the room or area controlled by the sensor. Where multiple sensors are provided to control a single room or area, provide overlapping minor motion sensor coverage taking into consideration all

obstructions to include FF&E, collateral, and other Government furnished equipment that could impede the sensor coverage.

Provide light switches controlling uncleared visitor indicator luminaires with a gray body. Provide the faceplate containing switches controlling uncleared visitor lights with a label reading “Uncleared Visitor Lights” above the switch controlling the uncleared visitor indicator luminaires.

Provide low voltage control stations with momentary push-buttons with pilot light or indicator light to confirm operation.

Do not group public spaces into a single lighting control zone. Lighting control zones must not control luminaires on different floors.

Provide programmable multi-zone, multi-scene, architectural dimming controls in conference rooms, classrooms, training rooms, and auditoriums.

Architectural dimming controls consist of a master control station and additional wall stations used to recall preset lighting “scenes” consisting of multiple zones of lights and/or motorized shades and screens. Provide a minimum of six pre-programmed scenes, plus full on and full off, for each space or room with architectural dimming controls unless noted otherwise. Provide the capability to adjust each lighting zone individually from the master station without overwriting the scene programming.

Provide dimmers, modules, and controls that are capable of smoothly dimming LED lighting sources from 100% to a minimum of 1% of full light output.

Dim luminaires connected to life safety power sources along with the normal lighting in the space. Upon loss of normal power, or upon receiving a signal from the fire alarm system, the designated life safety luminaires must automatically return to full brightness regardless of selected scene or occupancy.

In spaces with moveable partitions, the lighting controls must be capable of operating independently when the partition(s) are closed and in unison when partition(s) are open. Provide partition sensors that automatically initiate combined and individual space operation modes based on the position of the moveable partition. Devices that require occupant input to select combined and individual operation modes are prohibited.

D5030 COMMUNICATIONS AND SECURITY

The Room Requirements Section identifies locations for communications and security systems and equipment, unless noted otherwise in the following sub-elements.

D503001 TELECOMMUNICATIONS SYSTEMS

Provide a main distribution frame (MDF) to house telecommunications equipment and cabling as well as service provider equipment and cabling. Additionally, provide floor or area serving intermediate distribution frames (IDF) to house telecommunications equipment and cabling.

Provide fiber and copper exterior and interior backbone cabling to each MDF and IDF. Provide copper horizontal cabling from each IDF with cable tray and conduit pathways to each Work Area Outlet (WAO).

Provide a complete Telecommunications horizontal and backbone distribution system per user requirements, maintainer requirements, latest Local provider and applicable Using Military Department standards and criteria, UFC 3-580-01, ANSI/TIA 568C, 569, 606, 607, and 758

standards for support of Non-Secret Internet Protocol Router Network (NIPRNET) and Secret Internet Protocol Router Network (SIPRNET) Voice and data communications for building 1527 LOGCOM Warehouse.. Telecommunications systems must include, but not limited to, horizontal and vertical pathways consisting of underground duct bank systems, sleeves, cable tray, EMT conduit, pull boxes, pull cords and outlet boxes, patch panels, equipment racks, cable management, telecommunications ground bus system, and fire-rated plywood backboards as required to support the user requirements. Voice and data system cabling and outlets will consist of CAT 6 or higher rated horizontal UTP cabling and multimode fiber, patch panels, patch cords, 8-pin/8 contact (8P/8C) RJ-45 connectors, SC fiber connectors, copper and fiber backbone cabling, and cross-connect equipment.

BACKBONE CABLING

Secondary fiber backbone: Provide (1) 12-strand OS2 single-mode fiber optical and (1) 12-strand OM4 multi-mode fiber optic cable from the MDF to each new Intermediate Distribution Frame (IDF). Provide fiber optic rack-mounted termination cabinets required to support classified, unclassified, and training networks. Additional backbone cabling will be required for training networks. Coordinate with Government for requirements.

Secondary copper backbone: Provide 50 pair CAT 3 cabling from the MDF to each IDF. Provide copper terminal equipment for termination in each IDF. Copper terminal equipment selection per the latest Local provider and applicable Using Military Department standards and criteria.

HORIZONTAL CABLING

Provide (4) CAT 6 UTP green color for unclassified networks (i.e NIPR, etc.) and CAT6A UTP for simulation networks (i.e. CACCTUS, etc) from rack-mounted patch panels (in each IDF) to each WAO. Provide (2) CAT 6 UTP green color for WAP /DDC / FACP/ Elevators/ TV displays/Utility Monitoring or metering. Provide (4) CAT 6 UTP red color for classified networks (i.e. SIPR). Provide (1) CAT 5e UTP green color for each synchronized clock / wall phone. Jack colors must be the same as CAT 6 cable colors. Provide a dedicated above ceiling basket-type cable tray system for NIPR/VOIP, SIPR and Training Networks.

WORK AREA OUTLET(WAO)

Provide double-gang steel electrical boxes for voice/data work area outlets. Provide boxes with a minimum dimension of 5-inches square in standard gypsum board walls and 4-11/16 inches square in CMU block walls. Provide a 1-1/4-inch conduit from each double-gang outlet box to the cable tray system. Mount voice/data work area outlet boxes at 18” above finished floor and minimum 6 inches away from any power receptacle. Provide voice/data outlet locations with a 4-position faceplate with four RJ-45 (8P8C) connectors. All work areas will contain a minimum of two communications face plates. Any work area larger than 80 sq. feet will require additional face plates to service any work location in the room within 6 feet of a faceplate. Refer to section 27 10 00 for WAO details. Provide RJ-11 jack at synchronized clock locations.

JFES Classroom- Provide 2 WAOs. Coordinate with government for network type(s).

Provide single gang steel electrical boxes at wall telephone locations with a 1-inch conduit from the outlet box to the cable tray system. Example locations for wall telephones are utility spaces, IDF. Mount wall telephone work area outlet boxes at 48” AFF. Provide wall telephone outlet locations with a 1-position faceplate with metal mounting studs.

INTERMEDIATE DISTRIBUTION FRAME (IDF)

Provide minimum dimensions 10-feet by 10-feet or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable to restrict access to authorized government personnel only.

The IDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. Each IDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39 inches of separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

Provide a dedicated IDF for training network servers and distribution equipment. Coordinate with government for requirements.

MAIN DISTRIBUTION FRAME (MDF)

Provide minimum dimensions 10 feet by 10 feet or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of 42 inches from an adjacent wall and 36 inches in aisles between racks. All telecommunications rooms will be securable to restrict access to authorized government personnel only.

The MDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. The MDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39 inches of separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

LABELING AND TESTING

Label and terminate backbone, horizontal cabling, and termination hardware in accordance with the latest Local provider and applicable Using Military Department standards and criteria.

Test UTP Category 6 and 6A cabling in accordance with the minimum standards established in ANSI/TIA-568-C.1 and ANSI/TIA-568-C.2-1.

Test fiber optic cables and terminations in accordance with the minimum standards established in ANSI/TIA-526-7B and ANSI/TIA-526-14B.

Perform tests at both ends of cables.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a public address system with speakers in all common spaces and exterior speakers for outside activity spaces.

Interface the public address system with the mass notification system.

D503004 TELEVISION SYSTEMS

Provide RG-6 coaxial cabling and (2) CAT 6 green cables from the closest IDF to each television location. Provide coaxial cabling that traverses a secure boundary with an RF filter. Terminate coaxial cabling at outlet side, coil coaxial cabling inside IDF. Leave enough cabling to terminate anywhere inside the IDF.

D503005 SECURITY SYSTEMS

NOT USED

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

Refer to document (located in part 6 of the RFP) “Audio Visual (AV) Cost Summary” for additional AV requirements.

Audio Visual System requirements

JFES classroom- Provide (3) TV monitors. Install one monitor on each side of room and one monitor in the front of the room.

Refer to E20 for the Best Value Determination process for AV systems.

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

Provide General Construction Items (Electrical) including, but not necessarily limited to, all connections, fittings, boxes and associated equipment needed by this and other sections of this RFP as required for a complete and usable system.

Firestop conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors in accordance with Section C10, Interior Construction.

D509002 EMERGENCY LIGHTING AND POWER

Provide power and wiring for emergency lights and exit lights throughout the facility.

EMERGENCY LIGHTING AND EXIT SIGNS

Emergency lighting must be unswitched except where required for energy savings and where control is required to achieve complete darkness to meet the needs of the space (conference/briefing rooms, simulation spaces, auditorium, etc.). Where emergency lighting is switched or dimmed, the designated emergency lighting fixtures must immediately return to full brightness upon loss of normal power or signal from the fire alarm system. Devices necessary to facilitate this function must be UL Listed for the application and for use in emergency circuits.

Provide exit signs with cast aluminum housing and brushed aluminum stencil face(s).

ENGINE GENERATOR

Provide a Level 1 Type 10 diesel engine generator set to provide emergency/life safety, legally required standby, and optional standby power to the facility. Provide each service from separate automatic transfer switches in accordance with NEC Articles 700, 701, and 702.

The generator must support the emergency/life safety loads, including the building fire pumps, and the following standby loads:

- Cold Storage Room
- Cold Storage Room mechanical equipment
- Sump pump(s)
- Security equipment

Provide generators installed outdoors in vandal-resistant, Level III sound-attenuating, weatherproof steel enclosures that are wind resistant up to 175 mph. Provide the generator housing with multiple removable, lockable panels to provide adequate access to components requiring maintenance. Panels must be removable by one person without tools. Mount instruments, controls, protective devices, and engine muffler within the enclosure.

Diesel fuel engines greater than 50 break horsepower (bhp) must comply with the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI) Engines (17CCR 93115) adopted by the California Air Resource Board (CARB). For additional information go to http:www.sdapcd.org.

D509003 GROUNDING SYSTEMS

Provide a complete grounding system for the facility electrical and telecommunications systems.

The grounding system must bond all building systems and equipment in accordance with applicable Codes and standards including but not limited to: medium voltage distribution equipment, generators, metal equipment support structures, outdoor transformers, fencing, building structure, building electrical and mechanical systems, raised access floor systems, lightning protection system, and communications systems to the grounding electrode system.

Provide UL listed copper, tinned copper, or silver-plated copper grounding conductors, lugs, connectors, and ground bars.

Provide a grounding electrode system for each building or structure.

Provide driven ground rods at each building column and bond to the building structure with minimum #4/0 AWG. Interconnect the building structure ground rods with a bare conductor grounding grid. Provide a bare conductor building counterpoise to bond the power system grounding electrodes, building structure grounding grid, building lightning protection grounding electrodes, and adjacent structures' grounding electrode systems. The minimum size of the counterpoise and grounding grid conductors is #4/0.

Provide copper-clad steel ground rods; minimum 3/4 inches by 10 feet in length, driven such that the top of the rod is 24 inches below grade, except in test wells.

Provide exothermic welds for below grade connections, except at test wells. Provide mechanical type connectors for above grade connections, in test wells, and in other locations where welded connections are not required.

Provide ground bars in electrical and telecommunications rooms. In multi-story buildings, provide a common grounding electrode riser to bond the secondary electrical ground bars (EGB) to the electrical main ground bar (EMGB) located in the main electrical room.

Provide a main telecommunications ground bar (TMGB) in the main Communications Equipment Room and bond to the EMGB. Provide secondary telecommunications ground bars (TGB) in each secondary telecommunications room and bond to the TMGB using a common bonding conductor. The common bonding conductor and common grounding electrode must be separate conductors.

Provide minimum 24”x4”x1/4” copper main ground bars minimum 12”x2”x1/4” copper. secondary ground bars. Provide electrical ground bars pre-drilled with a

standard NEMA two-hole configuration for the entire length of the bar. Provide telecommunications ground bars pre-drilled with a TIA-607 hole pattern for the entire length of the bar.

Provide each ground bar with a clear 3/16-inch thick polycarbonate or acrylic cover 2 inches larger in each direction of the bar it shields.

Install ground bars at 18 inches above finished floor (AFF) in areas without Raised Access Floor (RAF) or 18 inches above RAF in areas with RAF.

Provide a grounding conductor with all circuits and feeders. Conduits cannot be used as the sole grounding conductor. Where multiple circuits are contained in a conduit, they may share the grounding conductor.

D509004 LIGHTNING PROTECTION

Provide a complete lightning protection system with a UL Lightning Protection Inspection Certificate certified to UL 96A, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.

Conceal LPS down conductors within the building envelope. Provide access panels or other means for inspection of down conductors in accordance with NFPA 780 requirements.

Lightning Protection Systems must not void the roof warranty. Adhesive bases are prohibited on standing seam metal roofs.

D509005 ELECTRIC HEATING

Provide power wiring and connections as required for all electric heating systems and equipment.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide power wiring and connections as required for all systems and equipment including meters and controls. Coordinate connection requirements with switchgear and pad mounted transformer kWH metering.

D509007 BUILDING PHOTOVOLTAIC SYSTEM

NOT USED

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

EMERGENCY POWER OFF (EPO) SYSTEMS

Provide maintained contact, mushroom type, twist to reset EPO buttons with a clear flip-up cover. EPO systems must disconnect power to IT equipment within the room, disconnect power to dedicated HVAC equipment within and serving the room, and perform other operations in accordance with NEC Article 645.

Provide the EPO control panel with two sources of power, one originating from the Life Safety Power source and one from a Normal Power source. The Life Safety Power source is the preferred source. Neither power source is permitted to originate from a source affected by operation of the EPO system.

Provide the EPO control panel as an integrated control and monitoring system with electrically operated contactors. Provide contactor voltage and current ratings consistent with type of load served. Provide the control panel in a surface mounted enclosure with key lock and with door-mounted control and pilot devices. Provide with two spare output relays of each type.

Provide the EPO control panel with the following door-mounted pilot lamps and switches:

- Preferred Power Source Available (Green lamp)
- Alternate Power Source Available (Green lamp)
- Maintenance Bypass Override(Key switch)
- Normal Operation (Green lamp)
- Maintenance Bypass (Amber lamp)
- EPO Activation (Red lamp)
- System Reset (Momentary push button or switch)
- Lamp Test (Momentary push button or switch)

Provide an output signal to Fire Alarm System from each room's EPO system to provide the following status points per room:

- EPO system power available
- EPO activation
- EPO system in maintenance bypass

Placing EPO system in "Maintenance Bypass" allows testing of the EPO system without interrupting power to the IT or space support systems.

Locate the EPO control panel and EPO button adjacent to the entrance to the space. Where more than one entrance is provided, provide an EPO button adjacent to each entry point.

--End of Section--

E10 EQUIPMENT – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

GENERAL SYSTEMS REQUIREMENTS

E1010 COMMERCIAL EQUIPMENT

Obtain the services of equipment specialists to specify audiovisual equipment, as indicated in E102009. Equipment specialists shall not have any affiliation with the product specified.

All specialty equipment will be installed by qualified installers regularly engaged in installing the specialty equipment.

Provide energy using equipment per criteria listed in UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

E101003 VENDING EQUIPMENT

Government to provide and install vending equipment (four units) under separate contract. Users to provide requirements of electrical and plumbing devices to be provided by Contractor to properly support the complete functional operation of the vending equipment. Design the break rooms to provide space, utilities, and cooling to accommodate the vending equipment.

E101005 SECURITY AND VAULT EQUIPMENT

NOT USED

E1020 INSTITUTIONAL EQUIPMENT

E102003 LABORATORY EQUIPMENT

NOT USED

E102009 AUDIOVISUAL EQUIPMENT

Coordinate design requirements with the end user/Command IT personnel, and provide equipment specifications, and procurement and installation of the Audiovisual (AV) equipment. Obtain the services of an audiovisual equipment specialist with CTS-D certification to design and specify the audiovisual equipment.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment must include, but is not limited to, intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, interactive wall systems and CCTVs.

AV equipment is funded separately. The AV Equipment is identified on the AV Cost Estimate Worksheet. Refer to E20 for the Best Value Determination process for AV systems.

E1030 WAREHOUSE AND VEHICULAR EQUIPMENT

Provide warehouse pallet racks complying with UFC 4-440-01, Change 1 and Rack Manufacturers Institute MH16.1 Specification for the Design, Testing and Utilization of Industrial Steel Storage Racks:

a. Load beam length: 9 ft. (108 in.)
b. Load beam capacity: 2 loads, 3,000 lb. each per pair of beams
c. 4-levels high with load beam elevations at 1’-0”, 6’-4”, 11’-8”, and 17’-0”’
d. Double deep design with 96” depth for two pallets.
e. 12” minimum back-to-back flue space between rows of double deep rack
f. 6” minimum clearance between racks and building columns
g. 14 ft. wide aisles between racks faces
h. 16 ft. minimum wide cross aisles and end aisles
i. Overall capacity of 1,536 pallet positions minimum.

Provide pallet rack with capacity for 48 pallets minimum in JEFS storage area. This may be either single deep or double deep as fits building arrangement. Beam length, beam capacity, beam elevations, aisle widths, and clearance shall be the same as warehouse pallet racks.

Provide new shelving for Test Equipment Storage similar to existing shelving including 120 volt power strips for some sections.

Loading dock shall be provided with dock lifts and truck-trailer restraining devices.

Minimum performance characteristics for the dock lift shall be based on the following:

a. Service Period:
   (1) Number of shift operations of 1.
   (2) Maximum number of trucks per shift opening of 8.
   (3) Maximum number of days per week of 6.
b. Fork Lift Loads:
   (1) Design lift s to accommodate 4-wheel fork trucks with rated capacity of at least 6,000 lbs.
   (2) Design lifts to handle 15,000 lb. gross dynamic load.
   (3) Base lift design on number of cycles per loading/unloading operation per truck of 18.
c. Dock lift design:
   (1) Dock lift must be surface mount type. Pits are not acceptable.
   (2) Dock lift must be end design with approach ramp, straight across travel.

E1040 GOVERNMENT FURNISHED EQUIPMENT

Rough-in and provide connections for Government-furnished equipment such that equipment will operate as intended, including providing miscellaneous items such as plugs, receptacles, wire, cable, conduit, flexible conduit and outlet boxes or fittings. Contractor shall pick up equipment at Building 1601 and transfer to site when ready for installation and relocation is approved by Contracting Officer. Equipment shall remain in control of the Government until such time as the Contractor is ready to install. Contractor shall provide 30 days advance notice of expected installation date and pick up equipment and transfer to site for installation. Testing requirements of Government Furnished equipment shall be the responsibility of the Contractor

and shall follow the same guidelines as though the Contractor had provided the equipment. The following items will be furnished by the Government and shall be relocated, installed and tested by the Contractor:

- JSMLT (Joint Service Mask Leak Tester) equipment in warehouse.
- JSMLT equipment, 4 units, in JEFS.
- Hazardous Storage Cabinets, 3 units in JEFS.
- 50 pallets of JEFS equipment, not to exceed 500 pounds and 48” x 48” x 48” each.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide light commercial kitchen equipment design to meet the needs of the end user. All light commercial electric kitchen equipment to be coordinated to provide a functional facility. Project includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the end user requirements and complete coordination with the facility design. Equipment must include, but is not limited to, refrigerator, microwave, coffee maker, and ice maker.

--End of Section--

E20 FURNISHINGS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Furnishings must include fixed furnishings as part of the Structural Interior Design (SID) and the design and documentation of the movable furnishings, the Furniture, Fixtures, and Equipment (FF&E) Package and Audio/Visual (A/V) Equipment Package.

The design and documentation of both must be funded as part of the construction contract. The purchase and installation of the FF&E and A/V Packages must be funded separately as part of Collateral Equipment.

The movable furniture and furnishings (FF&E) for this facility may include, but are not limited to movable furniture systems, freestanding furniture, area/accent rugs, artwork, appliances, flat screen TVs (not connected to data), accessories, shop equipment, fire extinguishers, specialty equipment (specified by the Activity) and other miscellaneous items to support facility functions.

FF&E is estimated in the amount of $3,456,530.70 and AV is estimated in the amount of $11,565.56. The Government FF&E and AV budgets must not be altered by Contractors during the bid process.

Fixed furnishings (items that are fixed to the structure), such as specialty equipment, drying cages, weapon racks, lockers, fixed shelving, fixed display furnishings, marker boards, cork boards, motorized projection screens, blinds/shades, etc. are part of the construction contract.

The Audio Visual (AV) Equipment will be identified as a separate line item, priced separately from the FF&E and funded as a planned modification. The A/V Package must include shipping, freight, handling, installation, applicable state sales tax, and the Contractor's A/V Handling and Administration Rate (HAR) percentage as applied to the final A/V total cost. Refer to Part 3 Section E10 Equipment and D50 Electrical of this RFP.

GENERAL SYSTEMS REQUIREMENTS

Design and provide fixed and movable furnishings for all areas as developed during Activity programming and as indicated in the Room Requirements (refer to Part 3 Section 5 of this RFP) and other portions of this RFP to provide a fully usable and complete facility. Design a complete FF&E package and A/V package and prepare supporting plans and procurement data. The design, procurement, and installation of the A/V package must comply with all of the same requirements as those defined for the FF&E package in this specification section FF&E and A/V items identified in this RFP are to be used as a guideline to assist in establishing the minimum facility requirements and do not relieve the Contractor's Interior Designer and CTS-D from developing a complete and accurate design package that incorporates ALL of the Activity’s FF&E and A/V requirements determined during the design process. Design per specific UFC (i.e. Youth center, BEQ, etc.) and in conjunction with UFC 03-120-10, Interior Design.

The contractor must retain the services of an Interior Designer with a minimum of one of the following credentials: National Council for Interior Design Qualification (NCIDQ) certification or state, locality and/or jurisdiction Interior Design Certification, Registration, or License. This same Interior Designer must prepare both the SID and the FF&E Package, attend and participate, in entirety, all kick-off meetings, existing site visits, design meetings, to include, but not limited to, design charrettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package.

When A/V is required, or other specialty equipment, i.e. shop, kitchen, fitness, high density storage, etc., is required in the project, the Contractor must obtain the services of the appropriate Equipment Specialists to specify the specialty equipment.

A Certified Technology Specialist-Design (CTS-D) is required for the design and preparation of A/V packages. The CTS-D must attend and participate, in entirety, all design meetings, to include, but not limited to, design charrettes, concept design workshops, presentations and review meetings to develop the floor plan and the A/V package. The NAVFAC approved Specialist(s) must provide separate Best Value Determinations (BVDs) for this equipment, if required by NAVFAC.

The Contractor's Interior Designer and CTS-D, the Design Firm Owner(s), and any Specialists must not have any affiliation with the products specified. The NAVFAC Contracting Officer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer based upon review/recommendation of the NAVFAC Interior Designer Per UFC 3-120-10, the FF&E includes the design, selection, specification, color coordination and procurement documentation of the required items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility.

FF&E specifications must be based on NAVSUP Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The utilization of the current NAVSUP BPA list is required for BVD Analysis Request for Pricing. The current NAVSUP BPA list is located at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The CTS-D must provide A/V floor plans indicating equipment locations and A/V riser diagrams for all A/V systems and coordinate equipment locations and power requirements with power plans. The Final FF&E and A/V packages must utilize the most current generation technology. All fixed and movable furnishings and A/V selections and designs must be closely coordinated with Parts 3 and 4 Sections C10, C30, E10, D50, and all other parts of this RFP. All fixed and movable furnishings and A/V must be fully integrated with the final design, to include all building finishes, and all building systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architecture, etc.) construction and schedule. All outlets, switches, thermostats, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc., clearances must be accommodated. The Contractor's Interior Designer and equipment specialists must be responsible for designing and providing specifications for procurement of all FF&E, A/V and specialty equipment, to include delivery and installation, for the facilities built under this contract as directed by the NAVFAC Interior Designer. The Contractor must be responsible for installing all A/V, communications, data, and power cabling within systems and freestanding furniture raceways and performing connections to the building, as required.

The FF&E and A/V packages must be fully integrated into the design and construction schedule for the building. All submittal due dates for the SID, A/V and FF&E must be reflected in the Contractor’s construction schedule. **The Contractor and the Contractor’s Interior Designer must strictly adhere the FF&E submittal schedule defined prior to the 35% design development to ensure that the final FF&E package is submitted at least 4 months prior to FF&E funding deadlines and no later than 9 months prior to building completion.** Requests to change the SID or FF&E schedule must be submitted to the NAVFAC Interior Designer for review/recommendation and approved by the NAVFAC Contracting Officer.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS

STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process must begin following the award of the RFP. The SID submittal must include Interior Design programming documents, FF&E Floor Plans, and exterior & interior finish/color and material sample boards and binders. Refer to this RFP Part 4 Section Z10 General Performance Technical Specifications and Part 2 UFGS Section 01 33 10.05 20, Design Submittal Procedures.

The Contractor’s Interior Designer must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative within 7 days of each occurrence.

Provide the following SID meetings and submittals;

a. Concept Design Workshop (CDW) (10%-15%) or Initial Design Meeting: The Contractor's Interior Designer must meet with the Activity and IDD/Base Property for Marine Corps projects to develop the Interior Design SID programming documents, which will include a preliminary Furniture and Equipment Plan and the FF&E Summary List. The Contractor's Interior Designer must conduct in-depth room by room interviews to confirm Activity requirements (SID, FF&E, A/V, etc.) for the new facility(s). These interviews must occur during the CDW and will include building walk-thru(s) at the Activity’s current location and/or similar facility(s), if possible.

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer’s representative must provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces. The Furniture and Equipment Plan, FF&E Summary List, and a preliminary Cost Estimate should be further developed and included in this submittal.

c. SID "Over the Shoulder" Review: Prior to the Prefinal (100%) Submittal, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer’s representative for an "over-the-shoulder" review meeting to present a minimum of three (3) options for the interior building finishes/colors/materials. Manufacturer choices and cost range of materials must be pre-approved by the Contractor to prevent any substitutions during the submittal process. Finish option samples for NAVFAC review must be clearly labeled and in a "loose" format for preliminary approval prior to the presentation to the Activity. Options must include manufacturer's label/specifications/data sheets. The over-the-shoulder review meeting must be held via conference call.

d. SID Presentation to Activity: The Contractor’s Interior Designer must present a minimum of two (2) NAVFAC Interior Designer-approved options for the interior building finishes/colors/materials to the Activity for approval. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for approval. The meeting must be held at the Activity. Photos documenting the selected finish option and preliminary finish schedule for that option must be emailed to the NAVFAC ID within 7 business days.

e. Prefinal (100%) Submittal: The Contractor's Interior Designer must submit the Activity-approved interior building finishes/color/material selections. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the

Prefinal SID Binder Submittal must be distributed to the NAVFAC Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

These finish options must be documented and submitted for review and approval as follows:

Submittal to NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's representative:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s) w/ floor patterns and accent wall locations
3. Finish Legend
4. Finish Schedule
5. Pre-Final Finish Selections and Physical Samples (photocopies of samples are not acceptable.)
6. CD copy of submittal in binder

f. Final Submittal: The Contractor's Interior Designer must incorporate the final approved Furniture and Equipment Plan, Finish Schedule, Floor Finish Plan and Finish Legend into the Contractor's final drawing set. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock. Four (4) sets of the Final SID Binder Submittal must be distributed to the NAVFAC Project Manager/Interior Designer's representative, ROICC, IDD/Base Property (for Marine Corps projects) and the Activity.

The Final Submittal must include the following:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s)
3. Finish Legend
4. Finish Schedule
5. Final Finish Selections and Samples
6. CD copy of submittal in binder

SID CONSTRUCTION SUBMITTALS

No substitutions must be made to the SID finishes once they have been approved by NAVFAC during the design phase. In the event that revisions may be required due to unforeseen conditions such as discontinued product, such revisions must be submitted to the ROICC and NAVFAC Interior Designer's representative for approval by the NAVFAC Interior Designer before substitutions can be made.

FIXTURES, FURNISHINGS AND EQUIPMENT and AUDIO VISUAL (FF&E and A/V)

The FF&E and A/V design process must begin at the CDW and develop concurrently with the building design. The submittals must include fixtures, furnishings, and equipment specifications in accordance with the Activity requirements to produce an optimally functional facility. FF&E are all items that are not fixed to the structure, but are fully integrated with the floor plan, building systems, and finishes. Refer to RFP Part 4 Section Z10 General Performance Technical Specification and Part 2 UFGS Section 01 33 1-.05 20, Design Submittal Procedures.

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the Activity requirements and complete coordination with the facility design and the SID.

The Activity will supply the Contractor’s Interior Designer and CTS-D with a complete list of all existing FF&E and A/V, to include sizes, utility requirements, weight, etc., to be relocated to the new facility. The Contractor’s Interior Designer and CTS-D must perform inventory of all existing FF&E to be re-used and provide a complete inventory list by room/area. Identify product manufacturer and quantity/series/model #/style/size/finish/fabric. Provide the FF&E availability and relocation phasing plan/schedule, and identify the party(s) responsible for storage, logistics, and re-installation of existing FF&E, as required. Incorporate the existing FF&E and A/V into the FF&E and A/V plans. The Activity will coordinate the relocation of specialized equipment.

For all projects, including fast track projects, the Contractor must be responsible for sufficiently scheduling all SID/FF&E and A/V submittals early enough to obtain the required government approvals, and meet all ordering and installation lead times to complete the project by the contract completion date.

These are minimum requirements and the Contractor must be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/FF&E and A/V coordination. The Contractor’s Interior Designer and CTS must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer’s representative and Electrical Engineer’s representative within 7 days of each occurrence.

Provide the following FF&E and A/V meetings and submittals;

a. FF&E and A/V Procurement Requirements Meeting (Interior Design Orientation): This meeting must occur at MIDLANT, located in Norfolk, VA prior to the Design Development (35%-50%) Submittal and the development of the FF&E package. The NAVFAC Interior Designer and NAVFAC Electrical Engineer will provide the Contractor's Interior Designer current sample documents to be used for the FF&E and A/V BVD Analysis solicitation package and submittals, review the Best Value Determination (BVD) process, discuss the number of Best Value Determinations required and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider.

b. FF&E "Over the Shoulder" Review: Prior to the FF&E Concept Presentation and Best Value Determination (BVD) Analysis the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review to present a minimum of two preliminary FF&E options. These can be presented in a "loose" format for

preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA.

c. FF&E and A/V Concept Presentation: The Contractor's Interior Designer and CTS must present the NAVFAC approved preliminary FF&E and A/V package to the Activity for approval. This presentation must include loose format samples and catalog cuts. Sample boards are not required. This meeting must occur in conjunction with the SID presentation to the Activity, if possible. NAVFAC OICC, Project Manager, Interior Designer and Electrical Engineer must be invited to this meeting.

d. Best Value Determination (BVD) Analysis "Over the Shoulder Review": Prior to issuing the BVD Analysis solicitation package, the Contractor's Interior Designer and CTS must send an electronic copy and a hard copy in binder format, of the complete FF&E BVD Analysis solicitation packages to the NAVFAC Interior Designer and the complete A/V BVD Analysis solicitation package to the NAVFAC Electrical Engineer for review. The Contractor's Interior Designer and CTS must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review of all required solicitation packages and to review the most current NAVSUP BPA vendor list and discuss GSA Contract Audio Visual vendors. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA. Separate solicitations are required for each FF&E BPA category and the A/V package.

   BVD Analysis Solicitations must include the following:

   1. Copy of the BVD Analysis Request for Pricing cover letter – Indicate all revisions to this NAVFAC-provided template utilizing “Track Changes.” NAVFAC approved revisions may be added to this document, but no items may be deleted.

   2. BVD Analysis Request for Pricing Spreadsheet/Questionnaire with “basis of design” item product numbers, photos & descriptions

   3. Detailed Technical Specifications/Criteria developed for each FF&E and A/V item in NAVFAC MIDLANT’s standard format to establish minimum acceptable FF&E requirements for comparable bids.

   4. Project Specific Room / Furniture Typicals

   5. Furniture and A/V Plans with Legends coded to the BVD Analysis RFP (PDF format)

   6. Contractor’s subcontract agreement/terms and conditions (if applicable)

   7. Contractor’s Interior Designer must request the most current BPA Contract Holder vendor information prior to sending out the bid solicitations.

e. BVD Submittal and "Over the Shoulder" Review - The Contractor's Interior Designer must submit one (1) hard copy in binder format of the BVD package to the NAVFAC Interior Designer’s representative, NAVFAC Electrical Engineer’s representative, and one (1) copy to IDD/Base Property for Marine Corps projects. An electronic copy must be sent to the NAVFAC Contracting Officer, the NAVFAC Interior Designer and the

NAVFAC Electrical Engineer. Additional back-up information from specific bid packages may be requested on an as-needed basis. The "over-the-shoulder" review meeting will be held via conference call VA to review the results of the solicitation and determine a best value recommendation. Submit the following in 3-ring binders and include a CD copy in each for review and approval:

The BVD Submittal must include the following:

1. Cover Title Page (project name, project #, location, submittal date, submittal title)
2. Table of Contents
3. Point of Contact List
4. Narrative of Interior Designer Objectives
5. Copy of all information sent to bidders and documentation that all required sources were contacted
6. Technical Specifications used in bid request for all furniture and A/V etc.
7. BVD Analysis Request for Pricing Spreadsheet/Questionnaire completed by each bidder
8. Back-up Information submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meets all requirements.)
9 Responses from UNICOR (FF&E only)
10. Completed BVD Analysis Pricing Evaluation Spreadsheet comparing bidder quotes/responses
11. Contractor’s Interior Designer/Electrical Engineer’s recommendation for the Best Value vendor and justifications
12. CD copy of the FF&E and A/V BVD Submittal binders

f. The Contractor’s Interior Designer must coordinate a mock-up for best value review of FF&E items as required by NAVFAC by at least the top three (3) BPA vendors submitting the highest rated FF&E proposals, as determined by NAVFAC. The reviewers must include the Contractor’s Interior Designer, NAVFAC Interior Designer, Contracting Officer, IDD/Base Property, and the Activity.

g. Preliminary FF&E Submittal: The Preliminary submittal must be due at pre-final (100%). It must be presented to the Activity and NAVFAC Interior Designer’s Representative and NAVFAC Electrical Engineer’s Representative in loose format at a meeting to occur at the Activity. Presentation will consist of loose samples, to include all cut sheets and finishes from the recommended vendors. Immediately following this meeting, the Preliminary FF&E and A/V submittal binders will be submitted. Immediately following this meeting, the Preliminary FF&E submittal binders must be submitted. Five (5 submittals will be required; (1) for the NAVFAC Interior Designer’s Representative,

NAVFAC Electrical Engineer's Representative (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

Submit the following in a 3-ring binder (with the exception of the 16x20 color boards for the Activity only) for review and approval:

The Preliminary FF&E Submittal must include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)
2. Table of Contents
3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s) vendors and subcontractors)
4. Preliminary FF&E list (Cost Summary) to include shipping, freight, handling, professional installation, project management, HAR and applicable sales tax
5. Preliminary Procurement Data Spec Sheets completed for each product. Indicate general appearance as well as proposed finish and fabric selections
6. Furniture and A/V placement plans coded to the FF&E and A/V lists and Procurement Data Spec Sheets; include electrical and A/V plans for coordination.
7. Technical Specifications used in bid request for all furniture, and A/V etc.
8. Pre-Final Finish/Fabric Selections and Samples in 8 x 10 binder format mounted on heavy-duty card stock in edge-reinforced heavy-duty plastic sheet protectors.
9. Copy of Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes. Indicate and provide explanations for all changes to FF&E quantities and/or pricing that occur between accepted vendor proposal and Final FF&E Submittal.
10. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.

h. The Contractor and his Interior Designer must coordinate an on-site mock-up and review of FF&E items as required by NAVFAC with the selected, best-valued BPA vendor(s). Building finishes and fixtures must be installed in the affected area(s) to the greatest extent practicable in order to assess building systems/fixture coordination. The reviewers must include the NAVFAC Interior Designer and Construction Manager, The Contractor's Interior Designer, IDD, Base Property, and the Activity. The BPA vendor must be available on-site to respond to questions. The mock-up exercise must be completed prior to the submittal of the Final FF&E submittal and award of the modification for turnkey furniture procurement.

i. Final FF&E and A/V Submittal: The Contractor's Interior Designer must submit the Final FF&E and A/V Packages within 30-90 calendar days following the receipt of review

comments on the preliminary FF&E submittal. **All required documentation revisions of price changes and product reselection due to price increases or discontinued product must be the responsibility of the Contractor's Interior Designer.** Five (5) submittals will be required; (1) for the NAVFAC Project Manager for distribution to the NAVFAC Interior Designer's Representative, NAVFAC Electrical Engineer's Representative, (3) for the ROICC and IDD/Base Property, and (1) for the Activity.

The Final submittal must include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)
2. Table of Contents
3. Manufacturer Point of Contact List (includes contact info for recommended Best Value BPA Holder(s), vendors and subcontractors)
4. Final FF&E and A/V lists (Cost Summary) to include shipping, handling, freight, professional installation, project management, HAR and any applicable sales tax.
5. Final Procurement Data Spec Sheets completed for each product. Indicate final finish and fabric selections. Images of item and finishes to be represented.
6. Final Finish Selections and Memo Samples for the FF&E submitted in 8 x 10 binder format, mounted on heavy-duty card stock, using heavy-duty plastic sheet protectors.
7. Final Furniture and A/V Placement Plans coded to the FF&E and A/V lists, Procurement Data Sheets and specifications; include electrical and A/V plans for coordination.
8. Copy of Final Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to FF&E Cost Summary Item Codes.
9. Indicate and provide explanations for all changes to quantities and/or pricing that occur between accepted vendor proposal and Final Submittal.
10. Best Value Determination Guidelines sheets (completed and signed by the Contactor's Interior Designer and CTS-D)
11. Copy of Final quote summary, broken out by line item of product and related services, and applicable taxes, on letterhead from the vendor(s) determined to be the Best Value.
12. CD copy of the final FF&E and A/V binders.

j Punch List: The Contractor's Interior Designer (and A/V consultant or other specialty consultants, if applicable) must attend two punch list site visits with the installation dealer(s), NAVFAC Interior Designer and the Base Representative/Activity Contact. The first site visit must identify all punch list items (at installation dealer's 98% completion) and the second (at 100% completion) will confirm that all punch list items have been

resolved.

FF&E CONSTRUCTION SUBMITTALS

Submit any revisions or deviations caused by discontinued items to the Contracting Officer for approval by the NAVFAC Interior Designer.

SD-10 Operation and Maintenance Data

List Operation and Maintenance Manuals for seating, systems furniture and keyboard trays.

E2010 FIXED FURNISHINGS (SID)

Fixed furnishings (SID) are funded as part of the construction project and are not funded as part of FF&E Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

Develop design as described herein and provide storage shelving, equipment racks, and window treatments. Cross reference C10 Interior Construction, and C30 Interior Finishes, for performance requirements. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

E201001 FIXED ARTWORK

As required, provide wall graphics and/or logo of activity in appropriate locations. Coordinate with Activity and NAVFAC Interior Designer’s representative for location and placement.

E201002 WINDOW TREATMENTS

Provide manually operated roller shades at windows and other glazed openings to the exterior of the building. Provide light filtering and blackout shades for all exterior windows unless otherwise noted below or in room requirements. Provide only blackout shades at frosted/obscured vision glazing locations.

Shade housing (fascia, valence, and trim) must be located above the window frame as to not conceal the glazing. Recess shade in ceiling at locations where window frame is at same level as ceiling system.

All exposed roller shades must be furnished with metal fascia / valance. Provide side and sill channels for black-out shades to prevent light leak / bleeding. Light seal hem bar may be provided in lieu of sill channel.

Shade cloth material and finish must be coordinated with NAVFAC Interior Designer during design-build. The following openness factors must be provided:

Sunscreen: 3% minimum - 6% maximum openness

Black-out: 0% openness

Shades are considered SID and are funded as part of the construction contract. Soft window treatments, such as draperies (not to include stage curtains), are considered FF&E and must be included in the FF&E package, as required.

E201003 FIXED SEATING AND TABLES

NOT USED

E201004 INTERIOR LANDSCAPE (FIXED)

NOT USED

E201006 LOBBY AREA

Design and provide lobby areas consistent with quality commercial design, architecturally significant in scale, and coordinated with the interior finishes for each facility. Lobby areas must reflect the mission of the client and must be designed to accommodate the function and program required for the facilities. Lobby areas must include the following elements: fixed artwork, graphic floor inlay, and decorative lighting. Lobby elements noted above are part of the construction contract.

E2020 MOVABLE FURNISHINGS

The design of the FF&E package is funded as part of the construction contract base bid. The purchase and installation coordination of FF&E is a planned modification to the contract and funded separately as part of Collateral Equipment. The specific process is outlined in PTS E20 in Part 4 of this RFP. If a Collateral Equipment list is provided within this RFP, the costs associated with the purchase and installation of these items are NOT to be included in the base bid. The estimated Collateral Equipment cost is provided for information purposes only. The Contractor only needs to propose the Handling and Administrative Rate (HAR).

Design and provide an FF&E package in accordance with UFC 03-120-10, *Interior Design,* and other portions of this RFP for all areas as developed during Activity programming to provide a fully usable and complete facility. Collateral Equipment may also include specialty items specified by the Activity and the Contractor's Interior Designer is responsible for incorporating these into the FF&E and/or the A/V package. The estimated Collateral Equipment cost(s) are provided for information purposes only. Actual requirements may vary, and it is the responsibility of the Contractor’s Interior Designer and/or Equipment Specialist to determine the specific requirements of the End User during the design phase and design to these requirements.

The FF&E Package must include shipping, freight, handling, and professional installation, project management, applicable sales tax, and HAR.

A Best Value Determination must be performed on a minimum of three manufacturers and UNICOR for orders exceeding the micro-purchase threshold from an individual manufacturer/vendor. Multiple BVDs may be required in order to complete the final FF&E and A/V packages. The required quantity of BVDs to be performed will be determined by the NAVFAC Interior Designer’s representative during the design phase and is dependent on the appropriate NAVSUP BPA category(s) to be utilized and specific project requirements. Documentation must be provided to the Government with the final FF&E package. Specific Documentation is indicated in Part 4 of the RFP. The BVD Statement must be completed and signed by the contractor's interior designer. Sample BVD forms and instructions will be reviewed during the FF&E Procurement Requirements Meeting. Forms can be obtained from the WBDG at http://www.wbdg.org/ffc/navy-navfac/collateral-equipment.

The Contractor, as a planned modification, must be authorized by the Government Contracting Officer to procure all furniture/furnishings in the approved final FF&E and A/V packages using predominately negotiated Federal contracts as directed by the Contracting Officer and the NAVFAC Interior Designer and Electrical Engineer. When the modification for turnkey furniture and A/V procurement is exercised, the Contractor's proposed Handling and Administrative Rate (HAR) must not exceed 5% of the total cost of the FF&E, and A/V shipping, freight, handling,

project management, and installation. The HAR includes all of the contractor's efforts related to the storage, coordination, handling and administration of subcontractors, deposits, bonds and all other associated costs and profit for the procurement of FF&E and A/V. No other charges, fees, or markups will be authorized. The contractor must establish and submit a fixed percentage figure, for the administration effort of this modification (HAR), with the initial project proposal as part of the contractor's Pricing Schedule.

E202001 MOVABLE ARTWORK

Provide graphics and other movable artwork as required by Activity / User and NAVFAC Interior Designer’s Representative. Movable artwork is part of the FF&E package.

E202002 MODULAR PREFABRICATED FURNITURE

Provide modular freestanding workstations as required. Provide at a minimum, a 36 square foot workstation. The workstation to include: an adjustable height computer solution (electric height adjustable work surface, ergonomic keyboard tray, or split height work surface), a height adjustable monitor arm, a CPU holder, task lighting, overhead storage, and file storage. Ensure cable management within the workstation is provided. Approval in writing must be obtained from the Activity / User Commanding Officer for any deviation in workstation size reduction. Special coordination of workstation design must occur when workstations are located next to windows. All components of the workstation including but not limited to overhead storage and furniture partitions must not abut windows and block views to the exterior. Storage associated with these workstations may be accommodated by overhead storage perpendicular to the window or an additional counter height storage component of not less than 3'-0" and constructed in the same style as the workstation, located adjacent to the workstation at the end of the circulation aisle.

E202003 FREESTANDING FURNITURE AND FILES

Provide ergonomic task seating, lounge, reception and guest seating, storage and filing, tables, as required.

E202004 RUGS & ACCESSORIES

Provide decorative items as required. Include one wall clock in each office.

E202005 MULTIPLE SEATING (MOVABLE)

NOT USED

E202006 INTERIOR LANDSCAPING (MOVABLE)

Provide interior landscaping (planters, site furnishings, etc.) as required.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, clocks, literature racks, microwave ovens, refrigerators, non-plumbed coffee makers and other appliances as required.

--End of Section--

F10 SPECIAL CONSTRUCTION – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Special Construction systems are not applicable to this project.

GENERAL SYSTEMS REQUIREMENTS

F1010 SPECIAL STRUCTURES

F101001 METAL BUILDING SYSTEMS (PRE-ENGINEERED)

NOT USED

F1020 INTEGRATED CONSTRUCTION

NOT USED

F102001 SPECIAL PURPOSE ROOMS

NOT USED

F1030 SPECIAL CONSTRUCTION SYSTEMS

NOT USED

F1040 SPECIAL FACILITIES

NOT USED

F104001 INTERIOR SWIMMING POOLS

NOT USED

--End of Section--

F20 SELECTIVE BUILDING DEMOLITION – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

A group of individual buildings are to be removed in their entirety as a part of the scope of this RFP. Refer to the list in F2010 Building Elements Demolition.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEMS REQUIREMENTS

Perform all off-site work necessary to meet the requirements of the project, local codes, reference standards, technical specifications and performance criteria.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. The contractor must submit complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form is in the UFC 3-201-01, *Civil Engineering*. Contractor must determine correct permit fees and pay said fees. Copies of all permits, permit applications, and the completed PROD form must be forwarded to the EFD Environmental Reviewer.

Coordinate and obtain approval from the Contracting Officer for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

F2010 BUILDING ELEMENTS DEMOLITION

This project includes the complete demolition of the following: Buildings 1601, 1602, 1603, 1604 and 1605.

F2010 1.1 GENERAL DEMOLITION

Completely remove all shallow foundations, foundation walls, slabs, pits, pile caps, etc. Remove existing deep foundations, such as piles, to a depth of 48 inches below existing grade.

F2010 1.2 UTILITIES

Remove all existing utility service connections including but not limited to water, sanitary sewer, natural gas, electric, and telecom. All service connections must be demolished to the service main and capped per all State and Federal requirements.

Utility demolition must be coordinated with on-site personnel for planned outages.

F2010 1.3 DUST CONTROL

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area.

F2010 1.4 TRAFFIC CONTROL

Where pedestrian or vehicle safety is endangered, use traffic barricades to reroute traffic to safe routes.

F2010 1.5 WEATHER PROTECTION

NOT USED

F2010 1.6 BURNING

Where burning is permitted, the Contractor must adhere to federal, state and local regulations. Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

Brief descriptions of the buildings to be demolished follow. Refer to Demolition Site Plans in Part 6 for additional information.

Building 1601 was built in the 1940s and originally used as a garage and repair shop. It is mostly a one-story concrete framed building on pile foundation with a partial second story. Exterior walls are concrete. Building footprint is approximately 156 ft x 360 ft with an overall height of approximately 23 ft. Interior walls in warehouse areas on the first floor and toilet/shower areas on the second floor are in concrete masonry.

Buildings 1602, 1603, 1604 and 1605were built in the 1940s, are single-story and appear to be identical: concrete masonry exterior and interior walls with exposed wooden roof structure. Their building footprint is approximately 28 ft x 57 ft, and overall height approximately 20 ft.

F201002 EXTERIOR CLOSURE

Building 1601 has a concrete exterior closure. Buildings 1602, 1603, 1604 and 1605 have masonry concrete exterior closures.

F201003 ROOFING

Building 1601 has a flat roof with built-up roofing on insulation over concrete. Buildings 1602, 1603, 1604 and 1605 have high slope roofs with shingles on wood over wooden trusses.

F201004 INTERIOR CONSTRUCTION & FINISHES

Interior construction of these buildings appears to be mostly concrete masonry partitions with exposed structure. However, there are areas with acoustical or gypsum board ceilings. There may also be areas, i.e. the existing JEFS office areas on the second level of building 1601, that appear to include gypsum board partitions.

F201005 CONVEYING SYSTEMS

No conveying systems are being demolished.

F201006 MECHANICAL SYSTEMS

Demolish mechanical and plumbing systems. Follow Camp Lejeune Mechanical Design Guidance for proper refrigerant handling.

F201007 ELECTRICAL SYSTEMS

Demolish existing buildings' electrical distribution systems in their entirety, including equipment, luminaires, devices, wiring, pathways. Contact Tony Beckwith at (910) 451-2790 to coordinate electrical demolition. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

Demolish existing buildings' communications systems in their entirety, including equipment, devices, wiring, and pathways.

Demolish existing buildings' fire alarm systems in their entirety, including equipment, devices, wiring, and pathways. Prior to demolition, contact base fire alarm technicians and allow time for their retrieval of existing fire alarm system panels, devices, appliances, etc. Contact David Jones (910) 376-0437 to schedule the removal of the existing fire alarm system components. If unsuccessful, contact the construction manager who will coordinate with the Public Works Department.

F201008 EQUIPMENT & FURNISHINGS

Equipment and furnishings, including existing pallet racks, must be removed by the Contractor prior to the removal of the building.

F201090 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

F2020 HAZARDOUS COMPONENT ABATEMENT

A Hazardous Material Survey Report will be provided by the government for each building listed in Section F2010 above. The reports are to be provided after the issuance of this BD RFP but prior to the award of the project.

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

The General Contractor is required to hire as a first tier subcontractor a PQP to ensure compliance with the approved work plans and perform independent inspections, testing and verification of the hazardous components work including asbestos, lead containing paint, and any other hazardous material identified in the Destructive Hazardous Materials Survey Report.

F2020 1.2 FURNISHINGS

All furnishings in the listed buildings will be removed prior demolition.

F2020 1.3 ASBESTOS

Refer to F2020 above.

F2020 1.4 LEAD BASED PAINT

Refer to F2020 above.

F2020 1.5 PAINT RELATED WORK

Refer to F2020 above.

F2020 1.6 MERCURY & LLR COMPONENTS

Refer to F2020 above.

F2020 1.7 PCB'S

Refer to F2020 above.

F2020 1.8 OZONE DEPLETING SUBSTANCES (ODS)

Refer to F2020 above.

F2020 1.9 ANIMAL DROPPINGS

Refer to F2020 above.

F2020 1.10 MOLDS AND SPORES

Refer to F2020 above.

F2020 1.11 DISPOSAL

Perform disposal in accordance with the RFP and the specifications and plans provided in Part 5 and Part 6.

F202001 SUBSTRUCTURE & SUPERSTRUCTURE

Refer to F2020 above.

F202002 EXTERIOR CLOSURE

Refer to F2020 above.

F202003 ROOFING

Refer to F2020 above.

F202004 INTERIOR CONSTRUCTION & FINISHES

Refer to F2020 above.

F202005 CONVEYING SYSTEMS

No conveying systems are to be demolished

F202006 MECHANICAL SYSTEMS

Refer to F2020 above.

F202007 ELECTRICAL SYSTEMS

Refer to F2020 above.

F202008 EQUIPMENT & FURNISHINGS

Refer to F2020 above.

F202090 OTHER HAZARDOUS SELECTIVE BUILDING DEMOLITION

NOT USED

--End of Section--

G10 SITE PREPARATION – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Provide site preparation that supports project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site preparation system consists of site clearing, demolition, salvage, relocation, earthwork, and hazardous waste remediation necessary to ready the site for other work associated with the project.

GENERAL SYSTEM REQUIREMENTS

Develop the project site and perform all off-site work necessary to meet the requirements of the project, antiterrorism criteria, local codes, reference standards, technical specifications and performance criteria.

A topographic survey of the existing site has not been performed for the site. The Contractor is required to perform a topographic survey of the project area in accordance with UFC 1-300-09N, *Design Procedures*, that will be impacted by his work. Include this topographic survey in all design submittals. The concept plan provided in Part 6 are based GIS information field verified to the extent practical. Underground utility sizes and exact locations were not able to be verified. The GIS topographic information has been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. Prior to starting work, physically verify the location of all existing utilities and obtain all additional survey data required to provide a quality final design. The existence, size and/or location of the utilities are not guaranteed by the GIS surveys provided. The Contractor must show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level B. Where critical utility crossings or conflicts are likely, show subsurface utility locations on the topographic survey in accordance with ASCE 38-02 Quality Level A. Verify the location of all utilities prior to construction.

Prior to beginning excavations, the Contractor must contact the Public Works Office. The Contractor must hire a private utility locating service to locate all Government owned utilities. Contractor will be responsible for obtaining dig permits, prior to excavation and will be responsible for maintaining utility markings and calling to have utility remarked if utility markings are not preserved. Contractor must add all located underground utilities to the topographic survey and must provide to the Government both a hard copy and in electronic format.

Unless otherwise noted, provide new facilities at the locations indicated on the drawings in Part 6.

Minimize the impact of construction activity on operations and neighboring facilities.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Submit a complete "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer and Environmental Reviewer. Perform work in accordance with the obtained permits.

Jurisdictional tidal and non-tidal wetlands have not been identified on the project site.

Coordinate and obtain the Resident Officer In Charge of Construction's (ROICC) approval for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

Refer to Site Analysis and Building Requirements Sections for additional site preparation functional program information.

Provide site preparation that supports project sustainability goals.

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information is included in Part 6 – Attachments. Refer to Part 3, Section 6, ESR A10 for additional information concerning the Government provided subsurface data and the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

Refer to Part 3, Section 6, ESR A10 for the pre-bid and post-award requirements of the Contractor and Geotechnical Engineer.

GEOTECHNICAL EARTHWORK REQUIREMENTS

Refer to Part 3, Section 3, Site Analysis for base bid requirements concerning earthwork and site preparation.

G1010 SITE CLEARING

G101001 CLEARING

Preserve trees at the perimeter of the project site.

The project site does not have saleable timber.

Contractor must comply with Base Bulletin 5090 (Open Burning of Vegetation Debris aboard Marine Corps Base Camp Lejeune and Marine Corps Air Station New River). Refer to Part 6 Attachments – General for the Base Bulletin 5090.

Coordinate all open burning with the Air Quality Manager at MCBCL (910-451-5836).

G101002 TREE REMOVAL

Remove and dispose of all as required for project construction.

To reduce the incidental take of migratory birds and their nests, trees with active nests should not be cleared.

G101003 STUMP REMOVAL

Remove all stumps under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101004 GRUBBING

Remove all root mat and organic debris under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101005 SELECTIVE THINNING

NOT USED

G101006 DEBRIS DISPOSAL

Dispose of all grubbing and clearing residue, demolished material, rubbish and debris generated by this project by hauling off-site and off station.

Dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G1020 SITE DEMOLITION & RELOCATIONS

This project requires the mass demolition of multiple buildings and service utilities.

G102001 BUILDING MASS DEMOLITION

Demolish the existing buildings 1601, 1602, 1603, 1604 and 1605. Refer to Section F2020, "Hazardous Component Abatement" for requirements regarding removal of hazardous components.

G102002 ABOVEGROUND SITE DEMOLITION

Remove and salvage the existing light poles along Hammond Road.

Remove and dispose all other existing site features that conflict with the construction of the project, including asphalt and concrete pavements.

Demolish existing overhead electrical lines and associated poles along Hammond Road. Demolish electrical lines to nearest poles on Fir Street and Gum Street.

G102002 1.1 ABOVEGROUND STORAGE TANKS

An aboveground storage tank report is not provided to support this project.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

Remove and dispose of the aboveground storage tanks at buildings 1602, 1603, 1604 and 1605.

Coordinate AST removal with Thomas Richard (910-451-9641). If contaminants are suspected through odors or visual observation during construction activities, immediately stop work, call 911, and contact EQB at 910-451-9641 for further instructions. There are no known monitoring wells in the project areas, but if an unmarked well is discovered and inadvertently damaged, immediately contact EQB at 910-451-9641 for further instructions.

G102003 UNDERGROUND SITE DEMOLITION

Preserve the following underground site elements: All existing utilities required for the proposed project.

Remove or relocate existing utilities under or within 10 feet (3.0 m) of any new facilities or building additions. Existing utilities include but are not limited to piping, structures and conduits. Remove all appurtenances associated with the utility to be removed so there is no

presence of the utility at ground surface. Remove existing utility structures, not within the building footprint, to 3 feet below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Fill with clean sand.

Do not open cut pavement that is to remain to demolish utilities. Fill piping and/or conduits under pavements with flowable fill.

Remove all utility service connections of demolished buildings back to the main and cap per State and Federal regulations.

Remove all utility service connections back to the main and cap per State and Federal regulations.

G102003 1.1 UNDERGROUND STORAGE TANKS

An underground storage tank report is not provided to support this project.

G102004 BUILDING RELOCATION

Refer to Section F2020, "Hazardous Component Abatement" for requirements related to removal of hazardous components.

G102005 UTILITY RELOCATION Comply with the requirements of the utility provider concerning the utility relocation of the phone and fiber optic utilities along the physical fitness path. Comply with NAVFAC requirements and all applicable UFCs concerning utility relocations.

Refer to the Part 3 narratives and Part 6 for additional utility relocation information and GIS utility information that is within the proposed site area respectively.

G102006 FENCING RELOCATION

NOT USED

G102007 SITE CLEANUP

Waste materials will become the property of the Contractor; transport, dispose of or recycle waste materials in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls.*

G102090 OTHER SITE DEMOLITION & RELOCATIONS

NOT USED

G1030 SITE EARTHWORK

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, Excavation and Fill, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Grading shall conform with UFC 3-201-01, *Civil Engineering*.

G103002 COMMON EXCAVATION

Perform common excavation with equipment of sufficient size to accomplish the work required. Over excavation of areas to obtain additional satisfactory material for the contractor’s use is not permitted.

Preserve natural topographic features to minimize cut and fill requirements. All excavated materials which cannot be reused on the project as common fill (surplus soils) must be transported to one of the designated locations on Government property. Refer to RFP Part 2, Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for locations and contact information. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer.

G103003 ROCK EXCAVATION

Blasting will not be permitted.

G103004 FILL & BORROW

Provide borrow and select fill from off-base sources.

A grading plan has not been designed, therefore it has not been determined if common fill, backfill and fill material, select fill or top soil is available on site in the required quantities.

On-site soils that are determined as clean fill by the geotechnical engineer via testing must be backfilled and compacted in accordance with the requirements in this section.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

For each borrow site, provide borrow site testing for hazardous materials characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

G103005 COMPACTION

Perform compaction per the Performance Technical Specifications or the Contractor’s geotechnical report, whichever is more stringent.

G103006 SOIL STABILIZATION

The following methods of soil stabilization will not be allowed: lime slurry, and pressure grouting.

G103007 SLOPE STABILIZATION

Provide slope stabilization through appropriate grading and site design for a minimum factor of safety of 1.5 or slope that does not exceed the maximum slope per local code requirements.

G103008 SOIL TREATMENT

Treat the area around the entire foundation of each building for termite control in accordance with manufacturer's instructions.

G103009 SHORING

Provide shoring, bracing, and sheeting, etc. as required to prevent undermining of foundations, pavement, utility pipes, structures, and slabs and prevent slippage or movement in embankments or slopes adjacent to excavations to facilitate construction. Shoring will be in accordance with Section 25 A and B of EM 385-1-1. Provide a sheeting and shoring plan if required by local codes and/or OSHA. The plan must be signed and sealed by a professional engineer.

G103010 TEMPORARY DEWATERING

Provide pumps, temporary ditching, and grading required to maintain groundwater levels at the Contractor's geotechnical engineer's recommended level below footings and or pavements during construction. Ensure that there are no groundwater conditions that will promote deterioration of the soil or interruptions to the construction progress.

All dewatering effluent must be filtered per NCDEQ erosion and sediment control requirements prior to discharge to minimize sediment to surface waters.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Obtain an Erosion and Sediment Control permit required for the proposed work from NCDEQ. Submit the permit application to the COR for approval prior to submitting to NCDEQ.

G103090 OTHER SITE EARTHWORK

NOT USED

G1040 HAZARDOUS WASTE REMEDIATION

The project area is within the boundaries of IR-78, which has known groundwater contamination and an active groundwater pump and treat system. Shallow groundwater contamination (<35' below ground surface) exists in both the demolition and new construction area.

The Decision Memorandum dated July 24, 2019 (1527 NEPA) detailing the contaminated groundwater condition and mitigation requirements for this project can be found in the Part 6.

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable federal, regional, state and local regulations. Refer to UFC 3-800-10N, *Environmental Engineering for Facility Construction*, for additional requirements and criteria.

G1040 1.1 CONTAMINATED SOIL AND GROUNDWATER

The project site does require contaminated soil or groundwater work.

Perform contaminated soil or groundwater work in accordance with the specifications and plans provided in Parts 5 and 6.

--End of Section--

G20 SITE IMPROVEMENTS – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

Provide site improvements that support project sustainability goals of UFGS 01 33 29.05 20 Sustainability Requirements for Design Build.

The site improvements system consists of pavements and pavement related features, landscaping and other exterior site development work related to this project. Provide a pavement design by a licensed Professional Engineer familiar with conditions local to the project site. Site design, including but not limited to design of parking and pedestrian circulation, will include coordination with the Civil Engineer and the Landscape Architect.

GENERAL SYSTEMS REQUIREMENTS

Provide site improvements as required to make a useable facility that meets functional and operational requirements, incorporates all applicable anti-terrorism, force protection and physical security requirements and blends into the existing environment.

Provide accessibility in conformance with applicable requirements of UFC 1-200-01 , *General Building Requirements*.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453 . Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil Reviewer. Perform work in accordance with the obtained permits.

Provide site improvements that support project sustainability goals.

Minimize the impact of construction activity on operations and neighboring facilities.

Locate new site improvements at locations indicated on the drawings in another part of this RFP. If specific locations are not provided, site the improvements to develop appropriate and positive relationships with other facilities and to conform to existing development patterns.

Refer to Site Analysis and Building Requirements Sections for additional site improvement functional program information.

G2010 ROADWAYS

Provide roadways and roadway repairs, as required, to allow for safe, convenient and logical circulation, while discouraging through traffic. Provide new roadway pavement sections as required by soil conditions and as determined by the Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*. See part 3 Site Analysis for pavement section bid criteria.

Provide roadways of bituminous pavement or Portland cement concrete (PCC) where indicated on the drawings in Part 6. Aggregate pavement may be used for access roads to mechanical equipment if approved by NAVFAC.

A subsurface drainage system must be provided for all roadways and drives greater than 50 feet in length. The subsurface drainage system must consist of, at a minimum, weep holes in all drainage structures and perimeter underdrain or strip drains designed such that the aggregate base course and sand subbase layers remain in a drained (i.e. unsaturated) condition during construction and in service.

Provide other roadway improvements including traffic signalization, markings, and signage.

G201001 BASES & SUBBASES

The following materials will not be allowed for base or subbase courses: lean concrete, cement stabilized, sand-clay, lime rock, or shell.

G201002 CURBS & GUTTERS

Concrete curb and gutter may be used to tie into adjacent facilities. Concrete curbs and gutters may be used in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent. Where NCDOT do not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of NCDOT for a minimum compressive strength at 28 days of 3500 psi concrete.

G201003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by the NCDOT.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks per UFC 3-201-01.

Provide signage per UFC 3-201-01.

Provide temporary pavement markings and signage throughout construction to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition.

G201005 GUARDRAILS & BARRIERS

Provide wheelstops, and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G201006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G201090 OTHER ROADWAYS

NOT USED

G2020 PARKING LOTS

Provide 2 parking bays along E Road for 30 vehicles each as well as a parallel parking bay along Michael Road for 13 vehicles for the project. The design of pavements must include the anticipated daily traffic over the life of the project (20-years) as well as the existing soil conditions at the site.

Provide parking lots of bituminous pavement or Portland cement concrete (PCC) pavement. Aggregate pavement may not be used.

Provide new parking and other pavement sections as required by soil conditions and determined by Designer of Record. Design pavement sections in accordance with UFC 3-201-01 *Civil Engineering*.

Provide other parking improvements including parking entrances for two-way traffic, signage, concrete dumpster pad, and landscaping.

Provide handicapped parking in accordance with ABA requirements.

Provide parking in accordance with UFC 3-201-01, Section 2-9.6 Parking Areas and SDDCTEA Pamphlet 55-17.

See G2050 LANDSCAPING and G205005 PLANTINGS for parking lot landscape requirements.

G202001 BASES & SUBBASES

Crushed concrete meeting specified gradation for aggregate base or subbase courses may be used.

G202002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the NCDOT standards or as specified in UFC 3-201-01, Civil Engineering, whichever is more stringent.

G202003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

Recycled asphalt pavement material may be used for bituminous concrete pavement as permitted by NCDOT.

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings (pavement, curb and object), signage (regulatory, warning and guidance) and other traffic control devices as required to facilitate proper utilization of the parking areas.

Provide pavement markings including crosswalks Provide parking in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide signage in accordance with UFC 3-201-01 and SDDCTEA Pamphlet 55-17.

Provide temporary pavement markings and signage to meet phasing requirements indicated in the project program. Provide temporary signage in accordance with the MUTCD.

G202005 GUARDRAILS & BARRIERS

Provide wheel stops and bollards in accordance with the UFC 3-201-01, *Civil Engineering*.

G202006 RESURFACING

Provide resurfacing of existing pavement by milling and bituminous overlay.

G202007 MISCELLANEOUS STRUCTURES AND EQUIPMENT

NOT USED

G202090 OTHER PARKING LOTS

NOT USED

G2030 PEDESTRIAN PAVING

Provide a network of Portland cement concrete (PCC) sidewalks, separated from, but connected to vehicular circulation systems, to allow for pedestrian circulation between various new and existing elements of the project. Interface new pedestrian circulation systems with existing pedestrian circulation systems and include input from the Civil Engineer, Architect, and Landscape Architect.

Provide sidewalks of Portland cement concrete pavement with 4 inches thick minimum. Provide concrete sidewalk in accordance with Section G201003 or with the standard NCDOT mix for a minimum compressive strength at 28 days of 3,500 psi. For PCC sidewalks, provide a broomed finish. Reference BEAP for sidewalk widths.

Unless indicated otherwise, provide a transverse slope not to exceed 1/4”/foot. Limit variation in cross section to 0.25 inch in 5 feet.

Provide, as indicated in BEAP 3.2.8 PLAZAS AND COURTYARDS – EXTERIOR USE ARES, entrance plazas and pedestrian spaces to create outdoor meeting spaces and reinforce the arrival sequence from parking lot to building entrance(s). Size and placement must reflect functional needs and the appropriate importance to the setting. Forecourts may serve as outdoor plazas, courtyards or smaller landings and be furnished with benches, trash receptacles, plantings, lighting and distinctive architectural treatment and may include provisions for bicycle parking. Bike racks must be provided to support 5% of the building FTE and can be divided into more than one location. See PART 3 – CHAPTER 2 Antiterrorism Force Protection for additional requirements for plazas and pedestrian areas for a fully coordinated design.

G203001 BASES & SUBBASES

Provide as required and per the Contractor’s geotechnical engineering report.

G203002 CURBS & GUTTERS

NOT USED

G203003 PAVED SURFACES

NOT USED

G203004 GUARDRAILS & BARRIERS

NOT USED

G203005 RESURFACING

NOT USED

G203006 OTHER WALKS, STEPS & TERRACES

NOT USED

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

NOT USED

G204002 RETAINING AND FREESTANDING WALLS

Provide retaining walls in areas of significant grade change. Follow the requirements set forth in Part 4, Performance Technical Specifications.

Provide concrete retaining walls with applicable safety protective measures. Retaining walls must match new facility exterior.

Provide retaining walls to permanently resist soil pressures as well as live loads. Provide wall drainage to minimize lateral loading and protect wall materials against degradation.

Retaining walls are required to comply with UFC 3-220-01. The DOR must obtain building permits for retaining walls greater than five feet in height.

G204003 EXTERIOR FURNISHINGS

All site furnishings are required to conform to the Base Exterior Architectural Plan (BEAP).

Provide picnic tables, trash receptacles, benches in areas of green space at the project site for users of the facility. At the designated smoking area, provide a trash and ash receptacle and Smoking Area sign as well as directional signage at the building that indicates direction of designated smoking area.

Design picnic areas to accommodate up to 20 people.

All site furnishings must be anchored to concrete pavement below, connected to the pedestrian sidewalk network and meet AT/FP Unobstructed Space requirements.

G204004 SECURITY STRUCTURES

Provide concrete curbing at the edges of all parking areas to identify the site perimeter and prevent parking in the 33-foot unobstructed space.

G204005 SIGNAGE

Provide building identification signage, building number signage, and way finding signage in accordance with the Activity's BEAP.

G204006 FOUNTAINS & POOLS

NOT USED

G204007 PLAYING FIELDS

NOT USED

G204008 TERRACE AND PERIMETER WALLS

NOT USED

G204009 FLAGPOLES

NOT USED

G204090 OTHER SITE IMPROVEMENTS

Provide heavy-duty concrete dumpster and utility pads. Provide dumpster enclosure(s) conforming to the Activity's BEAP. BEAP 3.4.10 indicates that dumpster areas should be located on structural concrete pads with adequate radius, approach length, and overhead clearance from trees, utilities, and structures. The dumpster enclosure must be placed in back of the building adjacent to the loading dock area. Screening should be provided on three sides by a 7-foot-tall masonry wall to block views of the containers. The dumpster enclosure's materials and style must complement the facility it serves. For each dumpster, install a minimum of two bollards at the rear of the enclosure to protect the rear wall from damage and a minimum of two bollards on each side of the dumpster. The contractor must provide separate vehicular and pedestrian access to the dumpsters within the enclosures.

Provide a heavy-duty concrete pad for an on-site standby generator outside the building so it can be easily taken off line and removed once the base upgrades their power grid at a subsequent date.

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn, groundcover trees, shrubs, ornamental grasses and organic and inorganic mulches as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with all applicable anti-terrorism, force protection and physical security requirements. The landscape design must reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 5' wide inorganic rock cobble mulch mow strip around the building with weed barrier fabric below rock. Provide concrete edging along mow strip where edging is adjacent to a turf area. Provide landscaping resistant to deer.

Trees, shrubs, and ground covers are acceptable within the AT/FP unobstructed space. Trees must have a 3-inch minimum caliper and branching structure that provides a 3-foot clear zone above the finished grade. Shrubs must be trimmed to provide a 3-foot clear zone above the finished grade and ground covers must not exceed 6-inches in height.

Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species. Areas of the site not covered by buildings or other structures and impervious paving or walkways within the project limits must be considered landscape area and must receive landscape improvements.

Guarantee all landscaping for a period of one year. Provide a one-year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

Provide complete landscaping maintenance, including but not limited to, routine lawn mowing, edging, pruning, pest inspection/treatment, re-mulching of mulch products, watering, weeding, fertilizing, and restaking, throughout the guarantee period.

Provide mechanical equipment screening wall on three sides of new equipment.

Provide shrubs or small growing trees if feasible for screening of mechanical equipment/walls, dumpster enclosures, and other obstructions that do not present an aesthetic view from the street.

G205001 FINE GRADING AND SOIL PREPARATION

Provide 4" of topsoil for all lawn areas and fine grade.

G205002 EROSION CONTROL MEASURES

Prevent erosion from occurring by providing erosion control measures as required by NCDEQ requirements.

Erosion control temporary or permanent seeding must not be considered a permanent turf conditions. Provide centipede sod for permanent turf.

G205003 TOPSOIL AND PLANTING BEDS

Provide a planting soil mixture composed of 50% native soil blended with 50% topsoil and other amendments as recommended by the soil testing laboratory around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's rootballs. Set tops of plant rootballs 2 inches above adjacent grades.

G205004 SODDING

Sod areas indicated to be turfed in Part 6. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of sodding and provide same guarantee and maintenance as for new landscape areas. Sod species must be Centipede – Eremochioa ophiuroides.

G205005 PLANTINGS

Preserve existing trees to the greatest extent possible.

MATERIAL SELECTION:

Select plant material from Master Plant Lists found within the Base Exterior Architecture Plan (BEAP), NC State Extension and the North Carolina Native Plant Society. Other plants not found on these lists may be used if approved by the reviewing Government Landscape Architect. Provide high quality plants that comply with the criteria found in the American Standard for Nursery Stock, ANSI Z60.1. Final approval of new plant materials rests with the reviewing Government Landscape Architect. With the exception of streetscape tree plantings, do not exceed 10% of any one tree species.

Shade trees must be a minimum size of 3 inch caliper at breast height and 14 to 16 feet tall minimum unless specified for Antiterrorism Force Protection measures where the trees are integrated into the vehicle-deterrent perimeter. See Antiterrorism Large Diameter Trees in PART 3 - CHAPTER 2 PROJECT OBJECTIVES. Flowering trees must be minimum 2 inch caliper and evergreen trees 8-10 feet tall. In general, select trees that have a normal lifespan over 60 years and a strong branch and limb structure. Trees must be relatively clean and free of potential nuisances such as fruit, berries, sap, thorns and pitch. In addition, trees must not have surface roots which will potentially uplift sidewalks and pavements. For palm trees, identify sizes on plans by brown trunk height (BTH) or clear trunk height (CTH). Unless otherwise approved by the reviewing government landscape architect, provide minimum BTH or CTH of 8 feet.

GENERAL PLANTING GUIDELINES:

All planting must adhere to any fence clear zone requirements for security and AT/FP criteria set forth in this RFP. Plantings must adhere to the Base Exterior Architectural Plan (BEAP). Coordinate with MCB Camp Lejeune for project specific requirements at CDW. Provide small trees and ground cover plantings at building main entrances to accentuate the entrances. Provide plantings to frame the new building and lessen the visual impact of parking areas. Provide planted strip between any sidewalk and any Primary, Secondary and Tertiary streets.

For inorganic granular mulch applications, provide 3 to 5 inch diameter river stone mulch over weed control fabric at mow strips around buildings. For organic mulch applications, provide 3 inches of shredded hardwood mulch over weed control fabric at planting beds except for spreading groundcover planted areas.

Encompass planting beds not used for bioretention filters with concrete edging.

Provide 6-inch-wide (minimum) by 12-inch-deep concrete band edging for each of the following conditions: between rock mulch/cobble area and turf area, between rock mulch/cobble area and planting area, and between turf area and planting area. Contain turf areas adjacent to building walls, site walls, columns, stairs, and other structures by a 6-inch-wide (minimum) concrete header with a minimum separation of concrete header from walls, columns, and other structures of 2 feet to minimize damage to site improvements.

Provide a 6-foot-wide grass sod border around the entire bioretention filter. Grass sod species must be Centipede. Ensure that the bioretention filters are not compromised by sediment deposits during construction. Install bioretention filters only after upstream areas tributary to the bioretention filter location have been fully stabilized.

If used for stormwater management, provide bioretention filters, plants, plant quantities, and soil mix in accordance with the State's Stormwater Design Manual.

TREE PLANTING GUIDELINES:

Preserve existing trees to the greatest extent possible. Provide trees at the minimum rate of one (1) tree per 1,000 square feet of TOTAL LANDSCAPE AREA for this project.

Site trees such that their mature canopy will not negatively affect any building. Include no trees within utility easements. Coordinate tree planting locations with electrical site lighting for a fully coordinated and integrated design that allows tree and lighting to be complimentary. See G4020 SITE LIGHTING Plant trees a minimum of 10 feet from building, edge of sidewalks, curbs, and underground water and sewer lines. Provide root barrier for all trees planted within 8 feet of any utility, wall, curb or pavement.

Stake all trees as required to ensure a stable, true plumb form is established. Protect trees from damage from staking materials. Unless otherwise directed by the Contracting Officer, all staking materials must be removed prior to the end of the contract. Provide a five-foot watering basin around each tree, and also provide a 5-foot diameter mulch ring with a 3 inch layer of organic mulch.

Provide informal street tree plantings that encompass all base streets within the project limits with an average spacing of 30 to 40 feet on center unless noted otherwise.

PARKING LOT GUIDELINES:

A minimum of 10% of any at grade POV parking lot must be landscaped; Reference Section 5 of ASHRAE 189.1.

POV parking lots must have a minimum of one (1) canopy tree every five (5) parking spaces around parking lot perimeter including entrance drives and service areas. Tree plantings along perimeter of lot must follow the Camp Lejeune Base Exterior Architecture Plan (BEAP) for a natural, native appearance. Parking lots must have no more than two tree species unless authorized by Government Landscape Architect.

Provide deciduous shrubs along the parking lot perimeter to create an informal opaque screen.

Interior plantings must consist of a minimum of (1) tree per every 300 square feet of island area. Planting medians must have a minimum inside dimension width of 9 feet. Any parking lot that abuts a service drive or base road for the project must be separated by planted green space with a minimum inside dimension width of 9 feet.

Provide 3 inches of shredded hardwood, pine bark or pine needle mulch at all planting.

G205006 PLANTERS

NOT USED

G205007 IRRIGATION SYSTEMS

NOT USED

G205090 OTHER LANDSCAPING

Deliverables must include plans, details and specifications to accurately and completely convey design intent. Plans must identify all plants, turf, hardscapes, site furnishings, buildings and site features and other pertinent landscape elements.

Provide a plant schedule indicating as a minimum, quantity, species, (Latin and Common Name) spacing, and size and condition of each proposed plant as well as mulch materials. Provide the height and width of plant at time of planting for Contracting Officer.

Provide on Landscape Plans a 'Landscape Material Summary' which includes but is not limited to 'Mulches'(by type), Concrete Header, Pavers, and other landscape materials utilized in the project.

Document all field changes to the Landscape Planting drawings including changes in sod area, concrete header lengths, hardwood and stone mulch bed areas, weed fabric areas (in inorganic mulch areas), planting location, and type and number of plant(s). Any field changes made to the Landscape layout must be shown on the Landscape Planting drawings - also revise the data found in the 'Landscape Material Summary' and 'Plant Material Schedule' found on the Landscape Planting drawings.

Specifications must include the minimum following sections for Landscape Architecture:

- 01 78 00, Closeout Submittals
- 12 93 00, Site Furnishings
- 32 05 33, Landscape Establishment
- 32 93 00, Exterior Plants
- 32 92 23, Sodding

The Contractor must provide plant and grounds maintenance during the plant establishment period. The plant establishment period must extend one full year after completion of planting.

Maintenance during planting operation must ensure installed plants are maintained in a healthy growing condition from time of planting through plant establishment period. The typical growth habit of individual plants must be retained.

Maintenance during the establishment period must include as a minimum:

- Straightening and tightening of tree stakes and guying material
- Mowing and edging of turf protecting plant areas from erosion
- Maintaining edging of planter beds and checking for girdling of trees, watering of all plant material and turf, weeding, and removing and replacing unhealthy plants
- Watering of all project trees with slow release watering bags
- Controlling pests, diseases, fungi and rodents
- Removing dead or broken branches by pruning in accordance with ANSI A300 Part 1
- Fourteen (14) days prior to the end of the maintenance period, mow and edge lawn, re-mulch beds (if required depth or coverage of mulch is not met) and water and fertilize all plants
- Removal of all tree staking and slow release watering bags at end of establishment period

Warranties: All trees and plants must be guaranteed for a period of one year after final acceptance of the project, or area/s.

--End of Section--

G30 SITE CIVIL/MECHANICAL UTILITIES – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SYSTEM DESCRIPTION

The site civil/mechanical utility systems include water supply systems, sanitary sewer systems, storm drainage systems, heating distribution systems, cooling distribution systems, fuel distribution systems and associated appurtenances which are more than 5 feet outside the building.

The site mechanical utility system consists of all piping and appurtenances for chilled water, hot water, and natural gas, including all accessories and devices as necessary and required for a complete and usable system up to 5 feet outside the building.

GENERAL SYSTEM REQUIREMENTS

Develop the site to provide water, fire protection, sanitary sewer, storm drainage, heating, cooling and fuel distribution services that meet the requirements of each applicable regulatory agency that governs and issues permits for the construction and operation of these systems. Site design is required to comply with UFC 3-210-10, Low Impact Developments, as well as state or local stormwater management regulations and applicable project sustainability goals.

Provide each system complete and ready for operation.

Physically verify the location of existing above and below ground utilities prior to starting work.

Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Complete the "Permits Record of Decision" (PROD) form with the first design submittal package. A blank PROD form can be obtained at the Download Tab of Part 6 of the NAVFAC Design-Build website at the following link http://ndbm.wbdg.org/system/html/6/453. Determine correct permit fees and pay said fees. Forward copies of all permits, permit applications, and the completed PROD form to the Government's Civil/Mechanical Reviewer. Perform work in accordance with the obtained permits.

Minimize the impact of construction activity on facility operations and neighboring facilities.

Utility connection points are indicated on the drawings in Part 6. Obtain final approvals from the Contracting Officer for all utility connection points associated with this work.

Coordinate with the local utility providers and pay any fees or charges required to connect to their utility.

All disciplines involved in site work design must coordinate utility locations with the Civil Engineer and the Landscape Architect.

Refer to Site Analysis and Building Requirements Sections for additional site civil/mechanical utilities information.

Provide all required fittings, connections and accessories required for a complete and usable system. Install all equipment per the criteria of PTS Section G30 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

After installation of the equipment and systems, provide training courses for Government personnel for each of the items listed below, covering items contained in the Operations and Maintenance manuals. Provide one copy of the Operations and Maintenance manuals for each two course attendees. Provide one DVD disc of the training courses to be used as refresher courses and to train additional personnel. Conduct training by the same factory trained engineer that supervised the installation of the system. During training include classroom discussion as well as hands on maintenance, replacement of typical components and repair type maintenance training for parts typically replaced or repaired in the field. Submit training plan 30 calendar days prior to training sessions; include scheduling, content, outline, and training material handouts. Provide training for Cathodic Protection System.

Provide site civil/mechanical utility systems and components that support project sustainability goals.

Leakage tests are required.

Perform post-installation TV inspection of new storm sewer mains.

Imported bedding material must be provided for all utility lines and structures. Bedding material must consist of either ASTM C33 fine aggregate, or NCDOT coarse aggregate size No. 57, No. 67, or No. 78. A minimum of 6 inches of bedding must be provided for all utility lines and a minimum of 12 inches of bedding must be provided for all utility structures. Bedding material backfill must be placed to the spring line of the pipe for all concrete and PVC pipe trench excavations. Utility line and utility structure excavations in existing pavement areas must be completely backfilled to the aggregate base/subbase course elevation using excavatable flowable fill meeting NCDOT specifications.

G3010 WATER SUPPLY

The new water system is an extension of the existing water system. The existing water system serving the project site is owned and operated, by the federal government, operated and maintained. Provide the new water system and connections to the existing water system in accordance with UFC 3-230-01, Water Supply: Storage, Distribution, and Transmission; the utility provider’s requirements; and the state waterworks' regulations; whichever is more stringent.

Notify the government of the additional demand generated by the proposed facility.

Provide connection to the existing water distribution system.

Design the new water system so that water consumption is measured at a minimum, by one meter for each facility. Ensure the meter is easily accessible, but not obvious. Water Meters must comply with Camp Lejeune Water Meter Specifications included in Part 6 of this RFP.

Enable meter data to be collected and automatically transferred to a Meter Data Management (MDM) module in CIRCUITS for utility and energy management within an environment protected from cyber-attack.

G301001 WELL SYSTEMS

NOT USED

G301002 POTABLE WATER DISTRIBUTION

Connect the new potable water distribution system to the existing distribution system along Gum Street, Fir Street or Michael Road.

Provide cathodic protection on metallic pipe lines.

A water meter on each proposed service line is required. Contractor shall provide meters selected from the base ATO approved equipment listing.

Provide meter box.

Provide fire hydrants with 5” Stortz x 4.5” HN/NST Fire Hydrant Converter. Paint fire hydrant barrels yellow. Paint fire hydrant bonnets based on its rated flow capacity in accordance with UFC 3-600-01 and NFPA 291. Consult with the project Fire Protection Engineer to obtain hydrant flow capacities for newly installed fire hydrants. For fire hydrants in or adjacent to vehicle pavements, provide bollards to protect the fire hydrant from vehicular collision.

Backflow preventers are required on all service entrance lines. If not specified in ESR D20 and D40, provide reduced pressure backflow preventers aboveground outside the building. Provide a heated enclosure.

G301003 POTABLE WATER STORAGE

NOT USED

G301004 FIRE PROTECTION WATER DISTRIBUTION

See G301002.

G301005 FIRE PROTECTION WATER STORAGE

NOT USED

G301006 NON-POTABLE WATER DISTRIBUTION

NOT USED

G301007 PUMPING STATIONS

NOT USED

G301008 PACKAGED WATER TREATMENT PLANTS

NOT USED

G301090 OTHER WATER SUPPLY

NOT USED

G3020 SANITARY SEWER

The new sanitary sewer system is an extension of the existing sanitary sewer collection system. The existing sanitary sewer collection system serving the project site is owned, operated, and maintained by the federal government. Provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with UFC 3-240-01, Wastewater Collection; the utility provider’s requirements; and the state sewerage regulations; whichever is more stringent.

Notify the utility provider of the additional wastewater flow generated by the proposed facility.

Provide one (1) connection to the existing sanitary sewer collection system that exists along Gum Street, Fir Street, or Michael Road. In identifying a suitable point of connection, evaluate the capacity of the existing collection system.

G302001 SANITARY SEWER PIPING

Provide cathodic protection on metallic pipe lines.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G302003 LIFT STATIONS AND PUMPING STATIONS

NOT USED

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

NOT USED

G302005 SEPTIC TANKS

NOT USED

G302006 DRAIN FIELDS

NOT USED

G302090 OTHER SANITARY SEWER

NOT USED

G3030 STORM SEWER

The new storm sewer system is an extension of the existing storm sewer system. The existing storm sewer system serving the project site is owned and operated by the federal government. Provide the new storm sewer system and connections to the existing storm sewer system in accordance with UFC 3-201-01, *Civil Engineering*; the utility provider's requirements; UFC 3-210-10, *Low Impact Development* the state stormwater management laws and regulations; and applicable project sustainability goals; whichever is more stringent.

Confirm that the existing outfall has adequate capacity to receive the additional stormwater flow generated by the project.

Vehicle wash areas are not to be provided.

G303001 STORM SEWER PIPING

Storm sewer piping materials are required to be polyvinyl chloride (PVC) for diameters less than 12 inches and reinforced concrete pipe (RCP) for diameters 12 inches and greater. Storm piping must meet NCDOT requirements.

G303002 STORM SEWER STRUCTURES

Storm structures must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303004 CULVERTS

All storm sewer piping materials for culverts are required to be reinforced concrete pipe (RCP).

Designer of Record must ensure that culverts and bridges are designed to safely pass the 100-year event. The following upstream controls limit headwater elevation:

100-year water elevation must not be higher than 18 inches below the outer edge of the shoulder at its lowest point in the grade.

Designer of Record must ensure that upstream wetlands are not adversely impacted by crossing

There must not be any appreciable change in flow, elevation, or wet/dry cycles of existing wetland.

Culverts must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303005 HEADWALLS

Headwalls must meet NCDOT requirements per the current Standard Specifications for Roads and Structures.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Obtain Erosion and Sediment Control permit required for the proposed work from NCDEQ.

Submit permit application to the Contracting Officer for approval prior to submitting to NCDEQ.

G303007 STORM WATER MANAGEMENT

Comply with NDCEQ regulations, UFC 3-201-01 Civil Engineering, UFC 3-210-10, *Low Impact Development, FC 1-300-09N Navy and Marine Corps Design Procedures; whichever is more stringent*. Consider the following LID features: bioretention, filter/buffer strips, grassed swales, bioretention swales, wet swales, infiltration trenches, and rain gardens. The use of rain barrels, cisterns, permeable pavement/pavers, and tree box filters are **not** allowed for this project.

Evaluate the drainage conditions and submit sealed calculations to the Government for civil and environmental review documenting how design meets UFC 3-210-10, state or local stormwater regulations, and applicable project sustainability goals. Provide a narrative indicating which criteria governs the design and all assumptions. Technical constraints that limit compliance with UFC 3-210-10 must be documented, reviewed and approved by the Government's Civil Reviewer.

If the project footprint exceeds 5,000 SF and does not maintain the predevelopment hydrology to the maximum extent technically feasible (METF), these constraints must be documented on the NAVFAC Sustainable Energy Data Record Card (NSEDRC) and approved by the Government's Civil Reviewer. The NSEDRC can be found at: http://www.wbdg.org/pdfs/navfac_sustainable_energy_data_record_card.pdf .

The Contractor/DOR is required to design/construct on-site water quality stormwater management facilities to meet NC water quality requirements under this RFP without the option

of purchasing nutrient credits.

The Contractor must obtain all required regulatory permits required for the proposed work. Coordinate all reports, submittals, and permit applications through the Contracting Officer.

The DOR is responsible for acquiring approval from NCDEQ for any BMPs. A Post-Construction certification will need to be provided to NCDEQ by the DOR. UFC 3-201-01 Civil Engineering Requirements will apply to all sites. Additionally, permitting through the United States Army Corps of Engineers will be required for any wetlands or stream disturbance.

See Part 6 for a copy of the LID calculation spreadsheet. This spreadsheet is to be filled out and included with the design calculations for all applicable submittals.

G303090 OTHER STORM SEWER

NOT USED

G3040 HEATING DISTRIBUTION

NOT USED

G304001 OVERHEAD HOT WATER SYSTEMS

NOT USED

G304002 OVERHEAD STEAM SYSTEMS

NOT USED

G304003 UNDERGROUND HOT WATER SYSTEMS

NOT USED

G304004 UNDERGROUND STEAM SYSTEMS

NOT USED

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

NOT USED

G304090 OTHER HEATING DISTRIBUTION

NOT USED

G3050 COOLING DISTRIBUTION

G305001 OVERHEAD COOLING SYSTEMS

NOT USED

G305002 UNDERGROUND COOLING SYSTEMS

NOT USED

G305090 OTHER COOLING DISTRIBUTION

NOT USED

G3060 FUEL DISTRIBUTION

G306001 LIQUID FUEL DISTRIBUTION PIPING

NOT USED

G306003 LIQUID FUEL STORAGE TANKS

NOT USED

G306004 LIQUID FUEL DISPENSING EQUIPMENT

NOT USED

G306006 GAS DISTRIBUTION PIPING (NATURAL GAS)

Coordinate with natural gas supply company for service supply to the building gas meter.

G306007 GAS STORAGE TANKS

NOT USED

G306009 OTHER GAS DISTRIBUTION

NOT USED

G306090 OTHER FUEL DISTRIBUTION

Provide warning and identification tape for underground utilities.

G3090 OTHER SITE MECHANICAL UTILITIES

NOT USED

--End of Section--

G40 SITE ELECTRICAL UTILITIES – P1527F LOGCOM CSP WAREHOUSE REPLACEMENT

SCOPE

The site electrical utility system consists of all power and communications cabling from the existing distribution system point of connection including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet of new (or existing) building location.

Provide site systems complete in place, tested, and approved, as specified throughout this RFP, as needed for a complete, usable, and proper installation. Install all equipment per the criteria of PTS Sections D50 and G40 and the manufacturer's recommendations. Where the words "should" or "shall" are used in the manufacturer's recommendations and in referenced Codes and Standards, substitute the word "must."

DOCUMENTATION REQUIREMENTS

Use standard NAVFAC lighting plates, where possible, for all interior and exterior lighting applications. Provide more specific details where warranted but provide a plate or detail for each luminaire used in the project.

The electrical legend and symbols used throughout the design must be similar to those defined in Appendix D of TSEWG TP-12. Reference all electrical details used in the drawing set. Detail bubbles or notes used on the floorplan sheets must clearly reference where in the set of drawings the detail resides. Coordinate and use the same annotation symbol graphics for details on the electrical and telecommunications plans as those used in architectural and other building design discipline drawings.

Lighting and power plans must clearly diagrammatically denote all branch circuit information, complete with homeruns and raceway graphics to logically group circuits and devices together. Providing a circuit number adjacent to the device on the electrical floorplans, without interconnecting raceway drawing graphics, is prohibited.

Provide sensor layout drawings to demonstrate sensor coverage and that overlap requirements are met. Sensor layout drawings must depict minor and major coverage patterns, obstructions, and the impact the obstructions have on the coverage patterns.

In addition to the lighting calculations required in the referenced UFCs, provide light trespass calculations to demonstrate that the installed lighting design does not intrude on adjacent properties. Provide scaled drawings indicating the point outside the boundary of the project where the light levels drop below 0.1 horizontal foot-candles.

Electrical contractors must possess a valid North Carolina Public Utility electrical contractor's license and be insured to do such work in the State of North Carolina.

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an exterior electrical system consisting of, but not limited to, service entrance wiring and equipment, conduits, feeder and branch circuits, lighting and branch wiring, communications, security and alarm systems, emergency generator, emergency lighting and power, grounding,

and lightning protection, including accessories and devices as necessary and required for a complete and usable system.

Provide each building with a single utility service with radial power distribution.

Select electrical characteristics of the power system to provide a safe, efficient, and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide separate normal, standby, and life-safety distribution systems.

Provide distribution equipment that is fully rated for the symmetrical short circuit current available at the terminals. Series rating is prohibited. Assume the available fault current at the point of connection to be an infinite bus.

Design the electrical distribution system to achieve selective coordination throughout the system. Provide calculations to demonstrate the selective coordination.

Provide a minimum of 15 percent spare circuit and load capacity at all levels of the power distribution system, including life-safety and stand-by power systems.

Provide electrical connections for all systems, equipment, and devices requiring electrical service.

MOST RELEVANT CODES AND STANDARDS

Refer to Part 3, Chapter 1.

GENERAL SYSTEM REQUIREMENTS

Provide site electrical utilities systems and components that support project sustainability goals.

Provide identification labels for site equipment, structures, and wiring in accordance with the Camp Lejeune GIS Numbering Convention provided in Part 6 Attachment 8. *Camp Lejeune Electrical Policies & Criteria.*

Make road crossings using directional boring.

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing overhead 12.47kV, three phase, three wire, 60 Hertz electrical power system. Select from the available connection points on Gum Street, Michael Road, Fir Street, and E Road. Coordinate connection point with Camp Lejeune Public Works Department. Provide a fused cutout switch on the pole. Transition from overhead to underground distribution at the pole and extend the primary service to the project site underground in concrete encased ductbank to a Pad Mounted Transformer.

Assume the available fault current at the point of connection to be an infinite bus.

G401001 SUBSTATIONS

NOT USED

G401002 TRANSFORMERS

Provide a three-phase pad mounted transformer to feed the facility.

Provide the following features:

- Dead-Front Design with ANSI specific front plate spacing
- 15kV, 200A minimum, load break connectors
- Three 10kV minimum, surge arresters
- Tap changer with two 2.5% taps above rated voltage and two 2.5% taps below rated voltage
- Biodegradable less-flammable liquid-insulated

Provide a pre-cast concrete box pad for transformers. Refer to the box pad detail provided in Part 6 Attachment 8, *Camp Lejeune Electrical Policies & Criteria*.

G401003 SWITCHES, CONTROLS AND DEVICES

Provide sectionalizing cabinets configured with the existing overhead and or underground distribution system.

Provide a pole-top fused cutout switch configured with the existing overhead distribution system at the connection point for service to the building.

G401004 OVERHEAD ELECTRIC CONDUCTORS

NOT USED

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

NOT USED

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a medium voltage and a 600 volt secondary underground electrical power distribution systems to meet the connection requirements as indicated in paragraph G4010 *Electrical Distribution*.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks and above-ground junction boxes and above-ground sectionalizer switches.

Underground handholes and manholes are prohibited.

G401008 GROUNDING SYSTEMS

Provide a complete grounding system for the electrical power distribution system.

G401009 METERING

Provide a separate kilowatt demand meter capable of reporting to the existing Camp Lejeune Advanced Metering Infrastructure (AMI) at each pad-mounted transformer. The existing AMI is Itron Choice Connect (Fixed Network) version 5.0.

The provided meter must be compatible with the existing Camp Lejeune Itron MCLite and Itron Mobile Advanced Meter Reading (AMR) equipment.

Pre-program meters with Camp Lejeune’s meter program. For programming of meters contact:

Border States Electric Product Manager

Ken Hause

(864) 242-6880 | EXT 11230

khause@borderstates.com

Refer to the Advanced Electric Meter requirements provided in Part 6 Attachment 7, *Water and Electrical Meter Information* for additional features and information.

G401010 CATHODIC PROTECTION SYSTEMS

NOT USED

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

Provide site lighting for exterior and security applications including underground distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

Provide exterior luminaires, poles, and foundations in accordance with the Camp Lejeune Electrical Policies and the Camp Lejeune Base Exterior Architectural Plan. Provide architectural type luminaires for parking lot, walkway, and outdoor gathering area lighting. Provide cobra head type luminaires for roadway lighting.

Coordinate site lighting with plantings and landscape elements to provide a fully coordinated and integrated design that allows the lighting to be complimentary to the landscape design throughout the project site.

Provide luminaires designed for LED sources. Luminaires designed for other sources that use retrofit LED lamps are not acceptable.

Provide an automatic lighting control system for exterior lighting fixtures using lighting contactors, bi-level or dimming drivers, motion sensors, and a centralized photocell. The photocell will automatically turn lights "ON" at dusk and turn "OFF" at sunrise, while the motion sensors, in conjunction with the bi-level or dimming drivers, will adjust the lighting levels based on occupancy of the area.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Provide Area and Parking Lighting for parking lots, walkways, and outdoor gathering areas.

G402002 SPECIAL SECURITY LIGHTING SYSTEMS

Provide security lighting along the site perimeter fence line.

G402003 OTHER AREA LIGHTING

Provide area lighting for outdoor storage areas.

G402004 LIGHTING POLES

Provide aluminum poles complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide a complete underground distribution system for all site lighting systems.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

Provide a site communication and security system including, but not necessarily limited to, Voice and Data Telecommunications Systems, Cable Television (CATV) Systems including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system.

G403001 TELECOMMUNICATIONS SYSTEMS

Extend telecommunications services to the project site underground in a system of manholes and ductbank to the telecommunications equipment room. Leave minimum 50-foot cable loop at existing demarcation tie-in location for cable terminations by government. Contractor must coordinate with the base telephone office 30 days prior to demolition of existing telecommunication services, as well as re-route the existing communication lines running along Hammond Road between Fir Street and Gum Street. Refer to document (located in part 6 of the RFP) “P1527_Comm_Map” for additional Comm OSP pathways and cabling details.

OSP PATHWAYS AND CABLING RELOCATION

Protect and preserve MH416-4.

Install new handholes; corner of Fir and Hammond, Fir and Michael, Gum and Michael.

Install (1) 4" from MH416-4 to new handhole at Fir and Hammond, continue W/ (1) 4" to RP416-4-2 near 1504 (~150').

Install (1) 4" from new handhole Fir and Hammond, to new handhole Fir and Michael (~300').

Install (1) 4" duct from RP405-4 to new handhole Gum and Michael, continue (1) 4" to new handhole Fir and Michael (~830').

Install 25 PR 24 AWG OSP copper cable from MH416-4 to RP416-4-2 near 1504; leave 15' slack coil in MH416-4 and RP416-4-2, Gov/t shall per splice in MH416-4 and RP416-4-2 (~180').

Install 25 PR 24 AWG OSP copper cable from MH416-4 to new handhole at Fir and Michael; leave 15' slack coil in MH416-4 and new handhole at Fir and Michael, gov/t shall per splice in MH416-4 and new handhole at Fir and Michael (~430').

Install 50 PR 24 AWG OSP copper cable from RP405-4 to new handhole at Fir and Michael; via new handhole at Gum and Michael; leave 15' slack coil in RP405-4 and new handhole at Fir and Michael, gov/t shall per splice in RP405-4 and new handhole at Fir and Michael (~860').

**Conduits may be direct buried, no concrete encasement required.

OSP PATHWAYS AND CABLING-NEW WORK

Install min (3) 4" from site to MH416-4. Install 50 PR OSP copper and 12 FOC FM site to MH416-4.

Coordinate with Government regarding location, any communication cabling and pathway requirements for the test trailer.

G403002 CABLE TV SYSTEMS (CATV)

Provide two 2-inch conduits from an existing manhole (coordinate with government for actual location) to the building Main Distribution Frame. Provide a Building Entrance Terminal (BET) with integral surge protection for termination of the service provider's cabling.

G403003 CABLES AND WIRING

Provide cables and wiring for site telecommunications and security systems as indicated in their respective categories.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide a system of duct banks, manholes, and handholes for site telecommunications per section G403001.

G403005 TOWERS, POLES AND STANDS

NOT USED

G403006 TV CAMERAS AND MONITORS

NOT USED

G403007 ELECTRONIC SECURITY SYSTEMS (ESS)

NOT USED

G403008 OTHER COMMUNICATION AND ALARM

NOT USED

G403009 GROUNDING SYSTEMS

Provide a complete grounding system for all site communications and security systems.

G4090 OTHER SITE ELECTRICAL UTILITIES

OUTDOOR POWER AND DATA CONNECTIONS

Provide a 100A, 208Y/120V, 3-phase, 4-wire power service to a location outside the building for connection to the JEFS trailer and terminate at a power pedestal. Provide the power pedestal with a heavy-duty NEMA 4X stainless-steel, fused disconnect switch with color-coded quick-connect receptacles (one per conductor). Provide the pedestal enclosure with a weather-protected output pathway that will allow user cabling to exit the enclosure with the door closed.

Provide a data pedestal with a NEMA 4X stainless-steel, 12-rack-unit enclosure that can accept 19-inch rack-mountable equipment. Provide fiber and copper patch panels in each enclosure for termination of backbone and user horizontal cabling. Provide one 25-pair CAT 6 cable and one 12-strand, single-mode optical fiber cable from the MDF to the pedestal and terminate in the patch panels in the enclosure. Provide the pedestal enclosure with a weather-protected output pathway that will allow user cabling to exit the enclosure with the door closed.

Coordinate location of the outdoor power and data connections with the COR.

G409007 PHOTOVOLTAIC ENERGY SYSTEM

NOT USED

--End of Section--

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PART 4 – PERFORMANCE TECHNICAL SPECIFICATIONS

4.1 DIVISION A – SUBSTRUCTURE
- A10 FOUNDATIONS
- A20 BASEMENT CONSTRUCTION

4.2 DIVISION B – SHELL
- B10 SUPERSTRUCTURE
- B20 EXTERIOR ENCLOSURE
- B30 ROOFING

4.3 DIVISION C – INTERIORS
- C10 INTERIOR CONSTRUCTION
- C20 STAIRS
- C30 INTERIOR FINISHES

4.4 DIVISION D – SERVICES
- D10 CONVEYING
- D20 PLUMBING
- D30 HVAC
- D40 FIRE PROTECTION
- D50 ELECTRICAL

4.5 DIVISION E – EQUIPMENT AND FURNISHINGS
- E10 EQUIPMENT
- E20 FURNISHINGS

4.6 DIVISION F – SPECIAL CONSTRUCTON
- F10 SPECIAL CONSTRUCTION
- F20 SELECTIVE BUILDING DEMOLITION

4.7 DIVISION G – BUILDING SITE WORK
- G10 SITE PREPARATION
- G20 SITE IMPROVEMENTS
- G30 SITE CIVIL/MECHANICAL UTILITES
- G40 SITE ELECTRICAL UTILITIES

4.8 DIVISION Z – GENERAL PERFORMANCE TECHNICAL SPECIFICATIONS
- Z10 GENERAL PERFORMANCE TECHNICAL SPECIFICATIONS

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SECTION A10

FOUNDATIONS
12/18

A10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

A10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

A10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements).(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed there, which includes the following significant UFC(s):UFC 3-101-01, Architecture UFC 3-220-01, Geotechnical Engineering UFC 3-301-01, Structural Engineering)

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS Section 31 23 00.00 20	Excavation and Fill

A10 1.2 GENERAL REQUIREMENTS

A10 1.2.1 Earthwork

Prepare the following UFGS Specification as part of the project

specification and include the prepared specification section in the design submittal for the project:

UFGS Section 31 23 00.00 20 *Excavation and Fill*

A10 1.2.2 Geotechnical Report

A10 1.2.2.1 Subsurface Soils Information

Any provided subsurface soil information is included for the Contractor's information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP is to assist in proposal preparation. Perform such subsurface exploration, investigation, testing, and analysis for the design and construction of the foundation system at no additional cost to the Government.

A10 1.2.2.2 Contractor-provided Geotechnical Engineer

Retain a Geotechnical Engineer experienced and licensed in the geographic region of the project to interpret any provided data as related to his design concept and develop requirements for bidding. Requirements stated in Parts 3 and 4 of the RFP take precedence over any content of any included geotechnical report. Additional requirements for the geotechnical design of this project are provided elsewhere in this RFP.

Coordinate all work by the Contractor-provided Geotechnical Engineer with the Contracting Officer and ensure that work does not conflict with Base operations. When providing the Foundation Work Design submittal, provide the Contractor's Geotechnical Report (an Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report becomes the property of the Government. Provide the Geotechnical reports generated during construction, such as pile load tests or PDA results, pile driving results and analysis, to the Contracting Officer (an Adobe Acrobat PDF version and two printed copies) for record keeping purposes.

A10 1.2.2.3 Contractor-Provided Geotechnical Report

Submit a written Geotechnical report based upon Government-provided subsurface investigation data and all additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. The Geotechnical Report must include all requirements listed in UFC 3-220-01, *Geotechnical Engineering*, paragraph entitled "Section 1803 "Geotechnical Investigations"; in addition, include the following:

a. The project site description, vicinity map and site

map indicating the location of borings and any other sampling locations. Provide 24 hour groundwater observations for at least 20% of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.

b. Results of all applicable field and laboratory testing, whether Government or Contractor-provided. Address existing subsurface conditions, selection and design of the foundation and floor slab, all underground construction including utility installation and all other site-specific requirements (such as soil stabilization and slope stability).

c. Engineering analysis, discussion and recommendations addressing:

1) Settlement analysis. Settlement must be limited as required in EM 1110-1-1904, *Settlement Analysis*

2) Bearing Capacity Analysis.

3) Foundation selection and construction considerations (shallow, deep, special); dimensions, and installation procedures.

4) Site preparation (earthwork procedures and equipment), compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, groundwater influence on construction, mitigation of expansive soils or liquefaction potential, dewatering requirements, slope stability, and other necessary instructions.

5) Sheeting and shoring considerations, as applicable

6) Pavement design calculations with parameters defined, actual or assumed, and recommended thicknesses and materials, whether for design or for proposed modifications to the RFP provided pavement design

7) Haul routes and stockpile locations for earthwork, as applicable.

8) Calculations to support conclusions and recommendations.

9) Present recommendations on a structure-by-structure Basis.

Provide the Geotechnical Report signed by the Contractor-provided Geotechnical Engineer.

Submit report accompanied by a cover letter identifying any report recommendations of the report proposed to be adopted

into the design which are interpreted by the Contractor as a change condition to the Geotechnical or Pavement related requirements of the RFP.

A10 1.2.2.4 Geotechnical Site Data required in Design Drawings

The Contractor's final design drawings must include the Government-provided subsurface data presented in the RFP as noted below, as well as all additional borings and laboratory test data results performed by the Contractor. The data provided must include:

a. Logs of Borings and related summary of laboratory test results and groundwater observations. Provide 24-hour groundwater observations for at least 20% of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.
b. Indicate locations of all borings on the drawings. Revise applicable design drawings to reference the Contractor’s Geotechnical Report as being a basis for design.

A10 1.2.3 Pile Driver Analyzer (PDA)

If deemed necessary by the Contractor's Geotechnical Engineer, the dynamic wave equation method of analysis, pile driver analyzer, must be used to validate pile and pile hammer compatibility, establish pile driving criteria, establish terminal penetration resistance, or verify as-driven capacity of the pile. Provide PDA or static load test(s) for piles with required allowable design capacity equal to or greater than 40 tons.

A10 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory construction and system performance of the foundations via Performance Verification Testing, and by field inspection, as detailed in this section of the RFP and in Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20.

A10 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with International Building Code (IBC) Chapter 17 and UFGS Section 31 23 00.00 20. A competent person, as defined by COE EM 385-1-1, under supervision of a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction. The Engineer must perform periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, must update the excavation, sheeting, shoring, and dewatering plans as

construction progresses to reflect actual site conditions and submit the updated plan and a written report (with professional stamp) at least monthly informing the Contractor and the Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the contract duration. The Contractor will bear all costs of the Engineer.

A10 1.3.2 Piles

If piles are required, perform quality assurance for pile construction in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*. Pile installation procedures and installed piles must be inspected and found to be in compliance with these specifications prior to acceptance of the work.

Provide test piles as directed by the Contractor's Geotechnical Engineer.

Perform pile load tests, if required, in accordance with UFC 1-200-01.

Submit results of the pile test program and final pile installation criteria to the Contracting Officer prior to installation of the production piles.

If deemed necessary by the Contractor's Geotechnical Engineer, use the dynamic wave equation method of analysis, pile driver analyzer, to validate pile and pile hammer compatibility, establish pile driving criteria, establish terminal penetration resistance, or verify as-driven capacity of the pile.

Perform PDA or static pile load test (American Society for Testing and Materials - ASTM D 1143) for piles with an allowable design capacity equal to or greater than 40 tons. When required, perform PDA on all indicator or test piles. Perform CAPWAP analysis on at least one test (indicator) pile to determine capacity with a minimum three-day set-up and develop pile installation criteria.

A10 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*,UFC 3-220-01, *Geotechnical Engineering, and* UFC 1-200-01, *DoD Building Code (General Building Requirements)*.

UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. The DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10,

General Performance Technical Specifications.

UFGS Section 31 23 00.00 20 *Excavation and Fill*

A10 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

All structural elements necessary for construction

Contractor-provided geotechnical report

Controlled fill or backfill material tests

Test pile and production pile installation records

Pile load testing reports

As-Built drawings - Include a statement on the drawings indicating the method used to verify the allowable design capacity of the piles (load tests or PDA).

A1010 STANDARD FOUNDATIONS

A1010 1.1 SHEETING AND SHORING

Provide sheeting and shoring as required. Provides sheeting and shoring plans signed by the Contractor's Geotechnical Engineer.

A1010 1.2 TERMITE CONTROL

A1010 1.2.1 Termite Control Barrier System

Formulate and apply termiticide in accordance with the manufacturer's label directions. Provide termiticide with a label bearing evidence of registration by the U.S. Environmental Protection Agency or appropriate requirements of the host country.

Apply termiticide to the soil that will be covered by or lie immediately adjacent to the building(s) and structure(s), providing a protective barrier against subterranean termites.

Maintain the Pest Management Maintenance Record, DD Form 1532-1 and submit the Pest Management Report, DD Form 1532 as required.

Provide applicator(s) that are licensed or certified by the Federal government or the state or the host country, as applicable.

A1010 1.2.2 Warranty

Provide a 3-year written warranty against infestations or reinfestation by subterranean termites of the buildings or building additions constructed under this contract. Perform annual inspections of the building(s) or building addition(s). If live subterranean termite infestation or subterranean termite damage is discovered during the warranty period, and building conditions have not been altered in the interim:

a. Perform treatment as necessary for elimination of subterranean termite infestation;
b. Repair damage caused by termite infestation;
c. Reinspect the building approximately 180 calendar days after the repair.

A1010 1.2.3 Visual Inspection Guide

To maintain resistance to termites, complete the system and do not disturb, penetrate or damage during the remaining contract time period. Provide Manufacturer's Guidance for performing a visual assessment of the installed system to ensure the system provides the designed termite physical barrier.

A101001 WALL FOUNDATIONS

Provide foundation walls as required in accordance with the requirements of this section and other portions of this RFP.

A101002 COLUMN FOUNDATIONS AND PILE CAPS

Provide column foundations or pile caps and grade beams as required in accordance with the requirements of this section and other portions of this RFP.

A1020 SPECIAL FOUNDATIONS

A102001 PILE FOUNDATIONS

Where piles are required, design, install, and test piles (including sheet piles, as applicable) in accordance with UFC 1-200-01, except as noted otherwise. Provide piles in accordance with the requirements of the Contractor's Geotechnical Engineer, and the following paragraphs.

A102001 1.1 DRIVING EQUIPMENT

Provide piles (including sheet piles, as applicable) to the required tip elevation and capacity with the appropriate equipment as recommended by the Contractor's Geotechnical Engineer. Provide pile hammer(s) of sufficient weight and energy to suitably install piles without damage.

Drive production piles with the same hammer, cap block, and cushion materials, and using the same operating conditions as test piles, including pre-augering and spudding.

Pile driving equipment must match the equipment assumptions on which

the pile driving formulae used to determine blow counts are based.

A102001 1.2 INSTALLATION TOLERANCES

Locate the center of pile butts not more than four horizontal inches from the location indicated at cutoff elevation. Manipulation of the piles is not permitted. In addition to the stated tolerances, provide a minimum clear distance of five inches between the heads of piles and the edges of pile caps.

Locate top of sheet piles at cutoff elevation within 1/2 inch horizontally and 2 inches vertical of the location indicated. Manipulation of the piles is not permitted.

A variation of not more than 2 percent from the vertical for plumb piles, or not more than 4 percent from the required angle for batter piles will be permitted.

A102001 1.3 MISLOCATED AND DAMAGED PILES

Remove and replace with new piles those piles that are damaged, mislocated, or installed out of alignment tolerance or provide additional piles, installed as directed by the Contractor's Geotechnical Engineer and approved by the Contracting Officer, at no additional cost to the Government.

A102001 1.4 PILE SPACING

For cast-in-place concrete or augercast piles, provide adequate distance, as determined by the Contractor's Geotechnical/Structural Engineer, between freshly placed concrete and other pile installation operations to avoid damage to concrete.

A102001 1.5 COATED PILES

Handle treated or coated piles so as to protect the treatment or the coating. Repair damage or defects to treatment or coating.

A102002 CAISSONS

If required, provide caissons as required in accordance with the requirements of this section and other portions of this RFP.

A102003 UNDERPINNING

If required, underpin existing construction as required in accordance with the requirements of this section and other portions of this RFP.

A102004 DEWATERING

Dewater site for foundation construction as required by soil conditions and local subsurface and surface water, including rainfall, and considering any potential adverse impact on adjacent facilities, including settlement. Dewatering requirements and methods must be established by the Contractor’s Geotechnical Engineer, based on his subsurface exploration and investigation.

A102005 RAFT FOUNDATIONS

If required, provide a raft foundation as required to achieve the requirements of this section and other portions of this RFP and as required by the Contractor's Geotechnical Engineer.

A102006 PRESSURE INJECTED GROUTING

If required, pressure inject grout as required in accordance with the requirements of this section and other portions of this RFP.

A1030 GROUND FLOOR SLABS

A103001 STANDARD SLAB ON GROUND

If allowed by site conditions and recommended by the Contractor-provided Geotechnical Engineer, provide standard concrete slab on grade to meet the required loading requirement in accordance with the requirements of this section and other portions of this RFP.

Design and construct floor slab on grade in accordance with EM 1110-1-1904, Settlement Analysis, and so that any settlement of the floor slab will not result in harmful distortion of the floor, nor vertical misalignment of the floor with other building components (such as doorways and trenches), building utilities or with pile-supported building elements. If these above conditions cannot be met, provide a pile supported slab.

A103003 TRENCHES

Provide reinforced concrete trenches with water proof joints and seals to prevent ground water infiltration.

A103004 PITS AND BASES

Provide reinforced concrete pits and bases with water proof joints and seals to prevent ground water infiltration.

A103005 FOUNDATION DRAINAGE

A103005 1.1 PERIMETER FOUNDATION DRAINAGE

Provide a perimeter drainage system shall be provided to remove water away from the foundation of the facility and to be deposited in the storm sewerage system of the site. Provide perforated pipe for the foundation drainage system of the type specified, and of a size sufficient to remove water from the foundation successfully. Provide one, or a combination of more than one, of the following types of pipe:

a. Corrugated Polyethylene (PE) Drainage Pipe: ASTM F 405, heavy duty, for pipe 3 to 6 inches in diameter inclusive; ASTM F 667 for pipe 8 to 24 inches in diameter. Fittings must be manufacturer's standard type and must conform to the indicated specifications.
b. Acrylonitrile-Butadiene-Styrene (ABS) Pipe: ASTM D 2751, with a maximum SDR of 35.

c. Polyvinyl Chloride (PVC) Pipe: ASTM F 758, Type PS 46, ASTM D 3034, or ASTM F 949 with a minimum pipe stiffness of 46 psi.

Installation includes wrapping the pipe with filter fabric sock and careful bedding of the pipe with appropriate fill material to ensure that the pipe does not become obstructed with the bedding material.

A103090 OTHER SLAB ON GROUND

A103090 1.1 BLOCK OR BOARD PERIMETER INSULATION

Provide only thermal insulating materials recommended by manufacturer for perimeter insulation. Provide one of the board or block thermal insulations listed below conforming to the following standards:

a. Extruded Preformed Cellular Polystyrene: ASTM C 578

Provide insulation to meet requirements of UFC 3-101-01, *Architecture*.

-- End of Section --

SECTION A20

BASEMENT CONSTRUCTION
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A20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

A20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

A20 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, Architecture UFC 3-220-01, Geotechnical Engineering UFC 3-301-01, Structural Engineering)

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS Section 31 23 00.00 20	Excavation and Fill

A20 1.2 GENERAL REQUIREMENTS

A20 1.2.1 Required Specifications

The Designer of Record shall utilize the following UFGS

Specifications for the project specification.

Section 31 23 00.00 20, *Excavation and Fill*

A20 1.2.2 Geotechnical Report

A20 1.2.2.1 Contractor-provided Geotechnical Engineer

The Contractor-provided Geotechnical Engineer is required to be experienced with soil conditions in the region where the project site is located. The geotechnical engineer must evaluate the RFP data, obtain and evaluate all additional data as required to support the design and construction, and prepare a Geotechnical Report.

A20 1.2.2.2 Subsurface Soils Information

Subsurface soil information, if provided, is included for the Contractor's information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP are intended for proposal preparation and preliminary design only. Perform subsurface exploration, investigation, testing, and analysis for the design and construction of the foundation system at no additional cost to the Government.

Coordinate all work by the Contractor-provided Geotechnical Engineer with the Contracting Officer and ensure that work does not conflict with Base operations. Prior to the Foundation Work Design submittal, provide a Contractor Geotechnical Report (an editable Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report becomes the property of the Government. Provide the Geotechnical reports generated during construction, such as pile driving results and analysis to the Contracting Officer. In addition, provide an editable Adobe Acrobat PDF version and two printed copies for record keeping purposes.

A20 1.2.2.3 Contractor-Provided Geotechnical Report

Submit a written Geotechnical report based upon Government-provided subsurface investigation data and all additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. The Geotechnical Report must include all requirements listed in UFC 3-220-01, *Geotechnical Engineering*, paragraph entitled "Section 1803 Geotechnical Investigations"; in addition include the following:

a. The project site description, vicinity map and site map.
b. Results of all the field and laboratory testing, whether Government or Contractor-provided.

c. Engineering analysis, discussion and recommendations addressing:
d. Settlement
e. Bearing Capacity
f. Foundation selection and construction considerations (shallow, deep, special); dimensions, and installation procedures.
g. Site preparation (earthwork procedures and equipment), compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, and groundwater influence on construction
h. Sheeting and shoring considerations, as applicable
i. Pavement design parameters, actual or assumed, including recommended thicknesses and materials, be for design or for proposed modifications to the RFP provided pavement design only
j. Haul routes and stockpile locations for earthwork, as applicable
k. Calculations to support conclusions and recommendations
l. Present recommendations on a structure-by-structure basis

Provide the Geotechnical Report signed by a registered Geotechnical Engineer.

Submit the report accompanied by a cover letter identifying any recommendations of the report proposed to be adopted into the design which are interpreted by the Contractor as either conflicting with or being modifications to the Geotechnical or Pavement related requirements of the RFP.

A20 1.2.2.4 Geotechnical Site Data required in Design Drawings

The Contractor's final design drawings must include the Government-provided subsurface data presented in the RFP as noted below, as well as any additional borings and laboratory test result data performed by the Contractor.

a. Logs of Borings and related summary of laboratory test results and groundwater observations.
b. Indicate locations of all borings on the drawings. Revise the applicable design drawings to reference the Contractor’s Geotechnical Report as being a basis for design.

A20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory construction and system performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*.

A20 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with International Building Code (IBC) Chapter 17 and UFGS Section 31 23 00.00 20. If a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction, the Engineer must perform pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, must update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and must submit the updated plan and a written report (with professional stamp) at least monthly informing the Contractor and the Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the contract duration. Provide the services of the Engineer at no additional cost to the Government.

A20 1.4 DESIGN SUBMITTALS

Provide design submittals shall be in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-301-01, *Structural Engineering*, and UFC 3-220-01, *Geotechnical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 31 23 00.00 20, *Excavation and Fill*

A20 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

Contractor-provided geotechnical report

Controlled fill or backfill material tests

All structural elements necessary for construction

A2010 BASEMENT EXCAVATION

A201001 EXCAVATION FOR BASEMENTS

Excavate for the basement as required in accordance with the requirements of this section and other portions of this RFP.

A201002 STRUCTURE BACKFILL AND COMPACTION

Provide backfill and soil compaction as required in accordance with the requirements of this section and other portions of this RFP.

A201003 SHORING

Provide shoring and sheeting as required in accordance with the requirements of this section and other portions of this RFP. Provide shoring and sheeting plans signed by the Contractor's Geotechnical/Structural Engineer.

A2020 BASEMENT WALLS

A202001 BASEMENT WALL CONSTRUCTION

Provide basement walls as required in accordance with the requirements of this section and other portions of this RFP.

A202002 MOISTURE PROTECTION

A202002 1.1 BUILT-UP BITUMINOUS WATERPROOFING

A202002 1.1.1 Environmental Conditions

Apply the primers and waterproofing specified herein when the ambient temperature is above 40 degrees F.

A202002 1.1.2 Liquid Asphalt

Deliver bulk liquid asphalt in fully insulated, heated transport tanker vehicles with circulating pump devices. Maintain the temperature of the liquid asphalt between 400 and 450 degrees F during storage, provided the transport and storage time does not exceed 12 hours. If the transport and storage time exceeds 12 hours, lower the temperature to between 300 and 325 degrees F at the time the 12 hours are exceeded. Use liquid asphalt within 36 hours after loading in the transport tanker.

A202002 1.1.3 Materials

a. Bitumen - Asphalt; American Society for Testing and Materials (ASTM) D 449, Type I.
b. Bituminous Plastic Cement - ASTM D 4586, Type I for asphalt.
c. Membrane Fabric

The following requirements apply:

Felt or Fabric Saturant or

Material	Impregnant	Specification
Glass (felt) mat	Asphalt	ASTM D 2178, Type III
Reinforcing glass fabric	Asphalt	ASTM D 1668, Type I

d. Nails - Galvanized roofing nails.
e. Primer - ASTM D 41 for asphalt.
f. Protection Board - ASTM D 517, plain, asphalt plank; ASTM C 208, construction grade building board, 1/2 inch thick, asphalt saturated or coated; ASTM C 726, 7/16 inch thick, covered on one side with waterproof paper or asphalt-saturated felt.

A202002 1.2 ELASTOMERIC SHEET WATERPROOFING

A202002 1.2.1 Environmental Conditions

Do not apply waterproofing during inclement weather or when there is ice, frost, surface moisture, or visible dampness on the surface to receive waterproofing and when ambient and surface temperatures are 40 degrees F or below. The restriction on the application of waterproofing materials when ambient and surface temperatures are below 40 degrees F will be waived if the Contractor devises a means, approved by the Contracting Officer, of maintaining the surface and ambient temperatures above 40 degrees F.

A202002 1.2.2 Butyl Rubber Sheeting

Not less than 60 mils minimum thickness.

A202002 1.2.2.1 Butyl Rubber Sheeting Performance Requirements

a. Thickness Tolerance, ASTM D 412: Plus or minus 10 percent;
b. Specific Gravity, ASTM D 297: 1.20, plus or minus 0.05;
c. Tensile Strength, ASTM D 412: 1200 psi minimum;
d. Tensile Stress at 300 percent elongation, ASTM D 412: 600 psi minimum;
e. Elongation, ASTM D 412: 300 percent minimum;
f. Tear Resistance, Die C, ASTM D 624: 125 pound force per inch (lbf/inch) minimum;
g. Shore A Hardness, ASTM D 2240: Five-second interval before reading; 60 plus or minus 10;
h. Ozone Resistance, ASTM D 1149: No cracks, 7 days - 50 pphm - 100 degrees F, 20 percent elongation;
i. Heating Aging-Accelerated, ASTM D 573: Tensile retention, 60 percent of minimum original elongation retention; 60 percent of minimum original requirement; 7 days, 240 degrees F.
j. Butyl Identification, ASTM D 471, Tricresyl Phosphate Immersion: Maximum volume swell 10 percent, 70 hrs, 212 degrees F;
k. Low Temperature Flexibility, ASTM D 746: No failure

at -40 degrees F;
l. Water Absorption, ASTM D 471: +1 percent maximum. 7 days, 158 degrees F;
m. Exposure to Fungi and Bacteria in Soil, Minimum 16 Weeks: Unaffected; and
n. Water Vapor Transmission, 80 Degrees F Permeance, ASTM E 96, Procedure B or BW: 0.15 perms maximum.

A202002 1.2.2.2 Adhesive, Cement, and Tape for Use with Butyl Rubber

Provide as recommended by the butyl rubber waterproofing membrane manufacturer.

A202002 1.2.3 Composite, Self-Adhering Membrane Sheeting

Cold applied composite sheet consisting of rubberized asphalt and cross laminated, high-density polyethylene film. Not less than 60 mils minimum thickness is required.

A202002 1.2.3.1 Composite, Self-Adhering Sheeting Performance Requirements

a. Tensile Strength, ASTM D 412, Die C: 250 psi minimum;
b. Ultimate Elongation, ASTM D 412, Die C: 200 percent minimum;
c. Water Vapor Transmission, ASTM E 96 80 Degrees F Permeance, Procedure B: 0.1 perm maximum;
d. Pliability Degrees F, ASTM D 146: (180 Degrees Bend Over One Inch Mandrel): No cracks at minus -25 degrees F;
e. Cycling Over Crack at Minus 15 Degrees F: Membrane is applied and rolled across two primed concrete blocks with no separation between blocks. Crack opened and closed from zero to 1/4 inch. No effect at 100 cycles;
f. Puncture Resistance, ASTM E 154: 40 lb. minimum;
g. Lap Adhesion at Minimum Application Temperature, ASTM D1876 Modified, 5 lbs/in.(880 N/m);
h. Peel Strength, ASTM D 903: Modified, 9 lbs/in;
i. Resistance to Hydrostatic Head, ASTM D 5385: 231 ft of water
j. Water Absorption, ASTM D 570; 0.1% maximum.

A202002 1.2.3.2 Primer

Asphalt composition, ASTM D 41, or synthetic polymer in solvent as recommended by the membrane manufacturer.

A202002 1.2.3.3 Mastic

Polymer modified asphalt in suitable solvent of trowel-grade consistency and as recommended by the membrane manufacturer.

A202002 1.2.4 Protection Board

Three-dimensional, high impact resistant polymeric grid with woven monofilament drainage fabric bonded to the grid.

A202003 BASEMENT WALL INSULATION

A202003 1.1 BLOCK OR BOARD INSULATION

Provide only thermal insulating materials recommended by manufacturer for the indicated application. Provide one of the board or block thermal insulations listed below conforming to the following standards:

a. Cellular Glass: ASTM C 552
b. Extruded Preformed Cellular Polystyrene: ASTM C 578
c. Unfaced Preformed Rigid Polyurethane and Polyisocyanurate Board: ASTM C 591
d. Faced Rigid Cellular Polyisocyanurate and Polyurethane Insulation: ASTM C 1289
e. Type I Aluminum Foil on both major surfaces. Class 1 - Non-reinforced core foam.

A202003 1.2 BLANKET INSULATION

ASTM C 665, Type I, blankets without membrane coverings; with a thermal resistance value, which will be sufficient to meet the applicable building code and energy budget for the facility. The insulation material must not contain asbestos materials.

A202003 1.2.1 Recycled Materials

Provide Thermal Insulation containing recycled materials to the extent practicable, provided the material meets all other requirements of this section. The minimum required recycled materials content by weight are:

Rock Wool: 75 percent slag

Fiberglass: 20 to 25 percent glass cullet

A202004 INTERIOR SKIN

Comply with Section C30, *Interior Finishes*.

-- End of Section --

SECTION B10

SUPERSTRUCTURE
12/18

B10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

B10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

B10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, Architecture UFC 3-301-01, Structural Engineering)
UFC 4-023-03	Design of Buildings to Resist Progressive Collapse

B10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verify satisfactory construction and system performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section

01 45 00.05 20, *Design and Construction Quality Control*. The cost of all testing is included in the Contract.

B10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

B10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

All structural elements necessary for construction of the superstructure.

B1010 FLOOR CONSTRUCTION

B101001 STRUCTURAL FRAME

Structural frame elements may include columns, girders, beams, trusses, joists, moment frames, shear walls, and bracing. See Section B20, *Exterior Enclosure*, for additional requirements for exterior walls used as load-bearing walls or shear walls.

B101002 STRUCTURAL INTERIOR WALLS

Provide structural interior walls as required in accordance with the requirements of this section and other portions of this RFP. See Section C10, *Interior Construction*, for additional requirements.

B101003 FLOOR DECKS AND SLABS

If required, provide floor decks as required in accordance with the requirements of this section and other portions of this RFP.

B101005 BALCONY CONSTRUCTION

Design and construct exterior balconies to drain and with the top of the balcony high-point below the interior floor elevation as required for flashing.

B101006 RAMPS

Provide ramps as required in accordance with the requirements of this section and other portions of this RFP.

B101007 FLOOR RACEWAY SYSTEMS

See Section D50, *Electrical*, for floor raceway systems.

B1020 ROOF CONSTRUCTION

B102001 STRUCTURAL FRAME

Structural frame elements may include columns, girders, beams, trusses, joists, moment frames, shear walls, and bracing. See Section B20, *Exterior Enclosure*, for additional requirements for exterior walls used as load-bearing walls or shear walls.

B102002 STRUCTURAL INTERIOR WALLS

Provide structural interior walls as required in accordance with the requirements of this section and other portions of this RFP. See Section C10, *Interior Construction*, for additional requirements.

B102003 ROOF DECKS AND SLABS

Provide roof deck as required in accordance with the requirements of this section and other portions of this RFP.

B102004 CANOPIES

Provide canopies as required in accordance with the requirements of this section and other portions of this RFP.

-- End of Section --

SECTION B20

EXTERIOR ENCLOSURE
12/18

B20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

B20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

B20 1.1.1 Industry Standards and Codes

NATIONAL LUMBER GRADES AUTHORITY (NLGA)

B20 1.1.2 Government Standards

Military Handbook 1013/1A, *Design Guidance for Physical Security of Facilities*

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture)
UFC 1-200-02	High Performance and Sustainable

B20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory exterior enclosure system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*. The cost of all testing is included in the Contract.

B20 1.2.1 Required Brick Masonry Testing and Field Samples

a. Where field testing is required, determine masonry strength in accordance with American Concrete Institute (ACI) 530.1.

b. Field Samples: Masonry Panel Requirements - At the job site submit for approval by the Designer of Record, a sample masonry panel minimum 8 feet (2.4 meters) long by a minimum of 4 feet (1.2 meters) high. Actual Sample size will be determined by number of components in the sample wall but provide a span of at least 4 feet (1.2 meters) of uninterrupted brickwork and 2 feet (.6 meters) above wall openings. The approved sample must exhibit the standard for workmanship and materials for the project. The sample panel must include brick coursing, bond, weep holes, flashing, thickness, anchors, joint reinforcing, wall ties, rigid-board insulation, intersection of walls, bond beams, expansion and control joints, and tooling of joints, range of color, texture of masonry, and mortar color; or cold-formed steel framing, insulation, fiberglass-faced gypsum sheathing, air barrier, moisture barrier/vapor retarders, exterior enclosure barrier connections to adjoining construction, sealing of exterior enclosure barrier penetrations, sealant, masonry ties and anchors, and tooling of joints, the range of color and texture of brick veneer, and the color of mortar. Protect the sample panel from damage at the site until masonry work is complete and approved, at which time the panel must be removed from the site. If there are windows or curtain walls in the project which interface with the masonry, a cut-away sample window or curtain wall mock-up must be installed in the masonry field panel, with all accessories, finishes, and trim (see B20 1.2.4 and 1.2.5). Masonry work must match the approved sample.

B20 1.2.2 Air Barrier Field Sample

Designate a portion of the project that reveals the various edge, seam, transition, and penetration conditions that the air barrier is exposed to. Determine this location with the Contracting Officer and obtain approval of the sealing methods employed on the project from the air barrier Manufacturer. Leave sample area exposed to view as long as practical to serve as a construction

standard and comparison of future air barrier construction on the project. Before construction covers the sample area, provide detailed photographs of the air barrier details for future reference.

B20 1.2.3 Air Barrier Performance

Provide air barrier inspection on all projects and air barrier performance testing when required in RFP Part 3, Section B20.

B20 1.2.3.1 Air Barrier Inspection

Coordinate all subcontractors that provide part of the air barrier construction to provide an air tight barrier. Review the air barrier prior to being covered by subsequent construction to confirm that the air barrier complies with the following requirements;

a. Prior to applying an air barrier, confirm that the substrate complies with conditions required by the applied air barrier material manufacturer.
b. Air barrier must create a continuous barrier, without gaps, "fish mouths", holes, unsealed seams, or unsealed penetrations.
c. Air barrier components are compatible and capable of being permanently connected to form an air tight barrier.
d. Construction of the air barrier complies with air barrier design as indicated in the Basis of Design and exterior enclosure barrier drawings.
e. Air barrier is installed in accordance with manufacturer's standard details available on the Air Barrier Association of America (ABAA) website named "Air Barrier Materials, Components, Assemblies & Systems" and found at the following web link; http://www.airbarrier.org/materials/assemblies_e.php

B20 1.2.3.2 Air Barrier Performance Testing

Provide air barrier testing and repair as follows (coordinate with infrared thermal testing):

a. Provide a testing plan as a part of the Commissioning Plan and notify the Contracting Officer 7 working days before the testing will take place. Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

   Also coordinate building access during the test with the Contracting Officer. Perform pretest inspection with all parties involved in the test and possible

repairs of the building enclosure. Record pretest conditions and utilize pictures to assist in the documentation.

b. Designer of Record (DOR) must utilize UFGS Section 07 05 23, *Pressure Testing an Air Barrier System for Air Tightness,*and Contractor must perform testing as described in that specification. Where conflicts exist between the UFGS Section 07 05 23 and this performance specification, UFGS Secction 07 05 23 will govern. The air leak flow rate must not exceed 0.25 CFM at 75 Pa per square foot (0.076 cmm 75 Pa per square meter) of building enclosure area including roof or ceiling, walls and floor as provided by the DOR.

Method 1: This test consists of measuring the flow rates required to establish 12 positive and 12 negative building pressures from at least 25 Pa to at least 50 Pa. Take at least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 30% of the minimum test pressure.

Method 2: this test consists of measuring the flow rates required to establish 12 positive building pressures from at least 50 Pa to at least 75 Pa. Takeat least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 20% of the minimum test pressure.

The test results must be either pass or fail. Provide the theoretical size of the opening that leaks the same amount as the building enclosure at 75 Pa, to facilitate the search for leaks and repair of the exterior enclosure.

c. Provide infrared thermography to determine air leakage paths if facility fails to retain the required air pressure in the test above. Utilize infrared cameras with a resolution of 0.1 degree C or better.

Perform infrared thermography in accordance with ISO 6781:1983 and American Society for Testing and Materials (ASTM) C1060 and B20 1.2.4 *Thermal Envelope Performance Testing (Infrared Thermography).* Determine air leakage pathways in accordance with ASTM E1186-03 *Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems*, and perform corrective work as necessary to achieve the whole building air leakage rate specified.

Modify construction to stop identified air leakage

until target is reached. Correct air path leaks at the source of the leak, do not use sealant to close air leakage paths that are required to be opened for maintenance of the facility such as fixtures, switches covers, receptacle covers, access doors, etc.

d. Seal air leaks in the following order of priority:

1. Top of the building. These include attics, roof/wall intersections, penthouse doors and walls, HVAC equipment.
2. Bottom of the building. These include ground floor access doors and inspection hatches, exhaust and air intake vents, service penetrations of enclosure, crawl spaces.
3. Vertical shafts. These include gasket stairwell fire doors, fire hose cabinets and recessed toilet accessories connected to vertical shaft, vertical and horizontal utility penetrations in service rooms, elevator rooms and shafts.
4. Exterior walls. These include weather strip doors and windows, exhaust fans and ducts, service penetrations, electrical receptacles, wall base.

B20 1.2.4 Thermal Envelope Performance Testing (Infrared Thermography)

Where required in RFP Part 3 or B20 1.2.3.2 *Air Barrier Performance Testing*, provide infrared thermal testing and repair as follows (coordinate with air barrier testing):

a. Test the building envelope using Infrared Thermography technology. Complete thermography testing in accordance with the requirements of ASTM C1060 and ISO 6781. The Contracting Officer will witness the testing. Testing must occur just before the building air tightness test. Testing must also occur during the air tightness test so that areas of building air leaks are detected. If the building air tightness test is failed, repeat thermographic testing just before and during subsequent air tightness tests until the air tightness test is successful.
b. Thermography Test Procedures: Submit detailed test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed not later than 60 days after Notice to Proceed.
c. Thermography Test Report: Provide a report. The report must include thermographs in color and a color temperature scale to define the temperature indicated by the various colors. The report must identify the high temperature reading, the outdoor air temperature, the building indoor air temperature, and the wind speed and direction. The report must note any areas of compromise in the building envelope,

and must note all actions required and taken to correct those areas.

d. Final Test: Final thermography test report must demonstrate the problem areas have been corrected. Submit the complete test and analysis for review and approval.

B20 1.2.5 Required Records for Concrete Wall Panels

a. Cast-in-place - Submit to DOR mandatory batch ticket information as ASTM C 94 for each load of ready-mixed concrete.

b. Submit to DOR commercial testing results in accordance with PCI MNL-117 and as required in paragraph entitled "Sampling and Testing for Precast"

B20 1.2.6 Precast Concrete Wall Panel Surface Finish Sample

Submit to DOR a concrete wall panel sample 12 inches (300 mm) by 12 inches (300 mm) by approximately 1 1/2 inches (38 mm) in thickness, to illustrate quality, color, and texture of both exposed-to-view surface finish and finish of panel surfaces that will be concealed by other construction. Obtain initial approval of color and texture from DOR prior to submission of sample panels.

B20 1.2.6.1 Manufacturing Plant Sampling And Testing for Precast

Plant Quality Control - PCI MNL-117 for PCI enrolled plants. Where panels are manufactured by specialists in plants not currently enrolled in the PCI "Quality Control Program," provide a product quality control system in accordance with PCI MNL-117 and perform concrete and aggregate quality control testing using an approved, independent commercial testing laboratory. Submit test results to the Contracting Officer.

a. Aggregate Tests: ASTM C 33. Perform one test for each aggregate size, including determination of the specific gravity.

b. Strength Tests: ASTM C 172. Provide ASTM C 39 and ASTM C 31/C 31M compression tests. Perform ASTM C 143 slump tests. Mold six cylinders each day or for every 20 cubic yards (15 cubic meters) of concrete placed, whichever is greater. Perform strength tests using two cylinders at 7 days and two at 28 days. Cure four cylinders in the same manner as the panels and place at the point where the poorest curing conditions are offered. Moist cure two cylinders and test at 28 days.

c. Changes in Proportions: If, the compressive strength falls below that specified, adjust the mix proportions and water content and make necessary changes in the temperature, moisture, and curing procedures to secure the specified strength. Notify

the Contracting Officer of all changes.

d. Strength Test Results: Evaluate compression test results at 28 days in accordance with ACI 214 using a coefficient of variation of 20 percent. Evaluate the strength of concrete by averaging the test results (two specimens) of standard cylinders tested at 28 days. Not more than 20 percent of the individual tests must have an average compressive strength less than the specified ultimate compressive strength.

B20 1.2.6.2 Acceptable Appearance

Refer to *Architectural Precast Concrete*by the Prestressed Concrete Institute, in the "Acceptability of Appearance" paragraph for reasons to reject precast panels. Panels in place may be rejected for any one of the product defects or installation deficiencies remaining after repairs and cleaning have been accomplished. "Visible" means visible to a person with normal eyesight when viewed from a distance of 20 feet (6 meters) in broad daylight.

B20 1.2.7 Window Sample Mock-Up

a. Provide mock-up of one (1) typical combination window unit to be used within the project and conduct a field mock-up test in strict compliance with American Architectural Manufacturers Association (AAMA) 502 method A and method B. Each opening must be tested to achieve performance of American Society of Civil Engineers (ASCE) 7-02 calculated requirements (PSF or Kg/m2) for water resistance, which must not exceed .667 % of the products capable water based on AAMA 101/I.S.2. Allowable rates of air leakage for field testing must be 1.5 times applicable AAMA 101/I.S.2 rate for the Product Type and Performance Class.

b. Opening is to be tested under "Quality Control" testing by a designated independent testing agency.

1) Schedule mock-up installation sufficiently in advance of need to allow adequate time for cure of sealants, testing and reconstruction, if needed, without delaying the project.

2) Build mock-up in building enclosure wall in location selected by Owner and Architect.

3) Modify mock-up construction and perform additional tests as required to achieve specified minimum acceptable results. If corrections are not adequate, construct new mock-up, at written direction of Owner and Architect. Co-ordinate construction of mock-up with other involved trades.

4) Approved mock-ups may become part of completed Work if undisturbed at time of Substantial Completion.

5) Flood test Mock-up window subsill and obtain approval of DOR prior to installing window unit.

B20 1.2.8 Curtain Wall Systems Field Sample and Testing

a. At the job site submit for approval by the Designer of Record, a sample curtain wall installation which may be a cut-away portion of a curtain wall, if appropriate, to show the construction, the workmanship, tie-in to building, infiltration and moisture barriers, wrap, flashing, head, window unit installation where required, sill, lintel if required, interior and exterior trim, anchors and reinforcing, and sealants.

b. Provide mock-up of (1) designated Curtain Wall System unit to be used in conducting a field mock-up test in strict compliance with AAMA 503 method A and method B. Each opening must be tested to achieve performance of ASCE 7 calculated requirements (PSF or Kg/m2) for water resistance, which must not exceed the derived water expectation of 0 infiltration at the calculated Design Pressure. Allowable rates of air leakage for field testing must be .30 CFM/Ft2 of wall area test specimen. Performance test at 6.24 PSF (30.3 Kg/m2) allows .30 cfm/ft2. Opening is to be tested under "Quality Control" testing by a designated independent testing agency.

1) Schedule mock-up installation sufficiently in advance of need to allow adequate time for cure of sealants, testing and reconstruction, if needed, without delaying the project.

2) Build mock-up in building enclosure wall in location selected by DOR.

3) Modify mock-up construction and perform additional tests as required to achieve specified minimum acceptable results. If corrections are not adequate, construct new mock-up, at written direction of DOR. Co-ordinate construction of mock-up with other involved trades.

4) Approved mock-ups may become part of completed Work if undisturbed at time of Substantial Completion.

Protect the sample curtain wall from damage at the site until curtain wall construction work is complete and approved, at which time the panel must be removed from the site. On projects where the curtain wall interfaces with masonry walls, a cut-away sample curtain wall must be installed with the masonry sample panel. Curtain wall installations must match the approved sample.

Water Penetration: No water penetration must occur when the wall is tested in accordance with ASTM E 331 at a differential static test pressure of 20 percent of the inward acting design wind pressure as specified, but not less than 15 psf (80 Kg/m2). Make provision in the wall construction for adequate drainage to the

outside of water leakage or condensation that occurs within the outer face of the wall. Leave drainage and weep openings in members and wall open during test.

B20 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*, UFC 3-101-01, *Architecture,*and UFC 3-301-01, *Structural Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS Section 08 34 16.10, *Steel Sliding Hangar Door*

UFGS Section 08 34 16.20, *Vertical Lift Fabric Door*

B20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum;

Shop drawings for reinforcing steel in masonry walls, doors, door hardware, windows, storefront, curtainwall, glazing, paint, exterior enclosure barrier systems, and visible exterior materials.

All structural elements necessary for construction.

B20 1.4.1 Manufacturer's Verification Inspection Documentation for Galvanized Steel

Submit manufacturer's verification inspection documentation for all galvanized steel in accordance with ASTM A123, ASTM A 153, and ASTM A 653.

B20 1.4.2 Field Inspection of Field-erected Concrete Panels

a. Perform field inspection of panel welded connections. Furnish the services of AWS-certified welding inspector for erection inspections. Welding inspector must visually inspect all welds and identify all defective welds.
b. Notify the DOR in writing of defective welds, bolts, nuts

and washers within 7 working days of the date of inspection. Remove all defective connections or welds and re-welded or repaired as required by the DOR.

B20 1.4.3 Sustainable Construction Submittals

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build.*

B2010 EXTERIOR WALLS

Provide exterior wall construction that consists of exterior skin system of non-structural outside face elements with rain-screen back-up wall systems that include; flashing (embedded, exposed, and thru-wall), a water resistive barrier, moisture barrier/ vapor retarder (if required), air barrier, and insulation systems with interior skin system materials to provide a protective finish on the inside face of exterior walls. Provide all components necessary for a shingled water resistive barrier to direct water that would penetrate the wall to be directed to the outside of the wall. Provide exterior enclosure components and barriers in accordance with UFC 3-101-01, *Architecture*.

Design all work to comply with UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*, and the following requirements:

a. Vapor Pressure and Hygrothermal Analysis - Perform a job specific vapor pressure and hygrothermal analysis in accordance with UFC 3-101-01, *Architecture*. The conclusion of the analysis must indicate if a moisture barrier/ vapor retarder is required, the appropriate locations of needed moisture barrier/ vapor retarder, and anticipated dew-point locations in the exterior enclosure during different critical times of the year.
b. Wind Loads - Provide wind load calculations for exterior cladding in accordance with UFC 1-200-01 and UFC 3-301-01 with comparative analysis of the cladding system to be provided.
c. Water Penetration - No water penetration must occur at a pressure of 8 psf (39 Kg/m2) of fixed area when tested in accordance with ASTM E 331.
d. Insulating Value – Comply with UFC 3-101-01, *Architecture*, for the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standards to determine the minimum insulating value of the complete wall system.

B201001 EXTERIOR CLOSURE

B201001 1.1 MASONRY VENEER EXTERIOR WALL CLOSURE COMPONENTS

B201001 1.1.1 General Requirements

a. The masonry veneer includes the non-load bearing exterior walls of the structure, and also includes colored mortar, special shapes such as sills, headers, trim units and copings of brick masonry, precast concrete, concrete masonry units, or other approved materials. Tie the veneer to the backup wall system with a system that allows the

veneer to move independently of the backup wall system, while being structurally supported. Allow for expansion and contraction of the veneer without cracking the exterior material.

b. Use running bond, tooled concave joints and full head joint weeps at 24 inches (610 mm) on center in the course immediately above the base flashing. Where rowlocks are permitted, slope rowlocks and project not less than 1/2 inch (13 mm) beyond the face of the wall to form a wash and drip. Where required, provide colored mortar conforming to ASTM C270. Provide special shapes where required.

c. Locate expansion/control joints and seal with proper backing material and ASTM C 920 polyurethane sealant, or preformed foam or rubberized expansion joint closure. Conform to UFC 3-101-01 and BIA Technotes 18, 18A. Match joint color of the brick, unless DOR directs otherwise.

d. Conform to ACI 530.1 for masonry veneer installation, including cold weather construction. Antifreeze admixtures are not to be used.

e. Clean the masonry in accordance with manufacturer's instructions and BIA Technote 20.

f. Utilize BIA Technical Notes to design, detail, and construct brick masonry walls. This PTS section amends the BIA documents and takes precedence over similar BIA requirements. Substitute directive language in the place of BIA suggestive language as required in PTS Section Z10, *General Performance Technical Specifications*. The results of these wording substitutions change this document to required procedures.

B201001 1.1.2 Face Brick

a. Brick Masonry Appearance - Do not change source or supply of materials after brick manufacturing work has started. Blend all brick to produce a uniform appearance when installed. An observable "banding" or "layering" of colors or textures caused by improperly mixed brick is unacceptable.

b. Brick Type – Provide brick in accordance with ASTM C216, Grade SW, type FBX. Test rating of ASTM C67 must be "Not effloresced".

B201001 1.1.3 Split Faced or Ground Faced Masonry

ASTM C 90. If required, provide split faced or ground faced units, or split-ribbed units or scored-faced units.

B201001 1.1.4 Cast Stone Trim Units

a. Cast stone must be the product of a manufacturer regularly engaged in the manufacture of architectural cast stone (precast concrete building unit) products. Meet or exceed the requirements of ASTM C 1364.

b. Trim units of cast stone include sills, fascias, header units, copings and other trim units as required by the

approved design.

B201001 1.1.5 The Wall Cavity

Comply with UFC 3-101-01, *Architecture*and BIA Technical Notes 21A, 21B, 21C, 28B.

B201001 1.1.6 Through-Wall Flashing Components

Provide through-wall flashing over all openings, spandrels, shelf angles, lintels, and built-in structural steel members. Provide through-wall flashing below all openings, parapets copings, sills, and at the base of the wall. Provide a method of weeping water collected by the through-wall flashing to the outside of the wall.

a. Incorporate weep holes to align with through-wall flashing in cavity wall construction as required by UFC 3-101-01, *Architecture*, and BIA Technotes. Install flashing according to BIA Technotes 7, 7A, 7B, 21A, 21B, 21C, 28B, and SMACNA figures 4-1A and 4-1B. Extend metal drip edge flashing beyond the wall plane using a 1/4 inch (6 mm) preformed 45 degree angle turn down.
b. Provide flashing material as required by UFC 3-101-01, *Architecture*and the following: Provide flashing of 7 ounce copper flashing with a 3 ounce bituminous coating on each side or a fiberglass fabric bonded on each side of the copper sheet. Sixteen (16) ounce uncoated copper, 28 gauge Type 302 or 304 stainless steel is also acceptable. 'Flexible membrane flashing, plastic or PVC-based membrane flashing is prohibited. Lap and seal turndown solid metal drip edge flashing to through- wall flashing. Refer to "Flashing" in this section to find requirements for non-through-wall flashing.
c. Incorporate the through-wall flashing in the water resistive barrier and seal joints to flashing to form a shingled effect and direct water to the exterior to the exterior enclosure and away from back-up wall assembly.
d. Where flashing is not continuous, such as at masonry wall opening heads and sills, extend flashing four inches beyond each side of the opening and turn up ends to form a pan and prevent water from reentering the wall cavity.

B201001 1.1.7 Reinforcing in Veneer Layer

Reinforcing in the veneer layer must be galvanized in accordance with ASTM A 123/A123M, ASTM A153/A153M, or ASTM A653/A653M, Z275 (G90) coating, and be of sufficient size to eliminate damage to the veneer layer from wind and other live and dead loads imposed on the veneer layer.

B201001 1.2 METAL WALL PANEL EXTERIOR CLOSURE

B201001 1.2.1 General Wall Panel Requirements

a. Factory Color Finish – Provide panels with a factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Provide exterior finish topcoat of 70 percent polyvinylidene fluoride (PVDF) resin with not less than 0.8 mil dry film thickness (DFT). Provide exterior primer that is standard with panel manufacturer but not less than 0.8 mil dry film thickness (DFT). Provide factory applied 70 percent PVDF clear coating of 0.8 mil DFT over the color topcoat and edge coating for projects within 300 feet (91 meters) of a water shoreline or industrial environment. Field apply 70 percent PVDF clear coat to unfinished panel edges or field cut panels. Interior finish exposed to sun or rain must be the same coating and DFT as the exterior coating.
b. Wall system and attachments must resist wind loads as determined by ASCE 7, with a factor of safety appropriate for the material holding the anchor. Maximum deflection due to wind on aluminum wall panels must be 1/60. Limit maximum deflection due to wind on steel wall panels and girts behind aluminum or steel wall panels to 1/120 of their respective spans, except that when interior finishes are used limit the maximum allowable deflection to 1/180 of their respective spans. The structural performance test methods and requirements of the wall system and attachments must be in accordance with ASTM E 1592.
c. Conformations - Non-insulated steel or aluminum wall panels must have configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets and fastened to framework using exposed or concealed fasteners, as specified. Provide sheets of sufficient length to cover the entire height of any unbroken wall surface when the length of run is 30 feet (9 meters) or less. Design wall systems with provisions for expansion and contraction. Where required, provide series 305 stainless steel fasteners factory finished to match panels.
d. Shape - Standard V-beam or boxed beam type having 5 to 8 inch (125 mm to 200 mm) pitch for steel panels or 4 to 8 inch (100 mm to 200 mm) pitch for aluminum panels, and 1.5 inch (38 mm) overall depth, exclusive of coating. Other shapes may be considered if approved by the DOR.

B201001 1.2.2 Steel Wall Panels

a. Material and Coating - Form sheets from steel conforming to ASTM A 653/A 653M, Structural Grade 40, galvanized coating conforming to ASTM A 924/A 924M, Class G-90; aluminum-coated steel conforming to SAE AMS 5036; or steel-coated with aluminum-zinc alloy conforming to ASTM A 792/A 792M, except that coating chemical composition must be approximately 55 percent aluminum, 1.6 percent silicon, and 43.4 percent zinc with minimum coating weight of 0.5 ounce per square foot.
b. Gage - Minimum 22 U.S. Standard Gage for wall panels, but in no case lighter than required to meet maximum deflection requirements specified.

B201001 1.2.3 Aluminum Wall Panels

a. Material and Coating - Form sheets of Alloy 3004 or Alclad 3004 conforming to ASTM B 209 having proper temper to suit respective forming operations.
b. Thickness - Minimum 0.032 inch (0.81 mm) nominal, but in no case thinner than that required to meet maximum deflection requirements specified.

B201001 1.2.4 Insulated Aluminum or Steel Wall Panels

Insulated wall panels must be steel or aluminum factory-fabricated units with insulating core between metal face sheets securely fastened together and uniformly separated with rigid spacers. Provide factory color finish on panels. Insulation must be compatible with adjoining materials and capable of retaining its R-value for the life of the metal facing sheets; and unaffected by extremes of temperature and humidity. The assembly must have a flame spread rating not higher than 25, and smoke developed rating not higher than 50 when tested in accordance with ASTM E 84. Panels must be not less than 8 inches (200 mm) wide and must be in one piece for unbroken wall heights.

Provide wall panel edge configurations with interlocking ribs for securing adjacent panels. Utilize factory fabricated corners and trim pieces at intersections with other materials. Fasten wall panels to framework using concealed fasteners. Install in accordance with DOR-approved shop drawings and manufacturer's recommendations.

a. Insulated Steel Panels - Zinc-coated steel conforming to ASTM A 653/A 653M; or Aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating. Uncoated wall panels must be 0.024 inch (0.61 mm) thick minimum.
b. Insulated Aluminum Panels - Alloy conforming to ASTM B209, temper as required for the forming operation, minimum 0.032 inch (0.81 mm) thick.

B201001 1.3 STUCCO EXTERIOR WALL CLOSURE

B201001 1.3.1 Portland Cement Plaster

ASTM C150, gray Portland cement Type II with 1/2 inch (13 mm) maximum chopped alkali resistant fiberglass strands, minimum 1.5 percent by weight to cement; 1 1/2 pounds (.68 kg) per sack of cement. Lime must conform to ASTM C206, Type S. Utilize stainless steel or zinc corner beads, J-beads and other accessories for the system.

a. Unless specifically deleted, utilize an acrylic admixture or coating to give additional moisture suppression to control fungus growth for the system.
b. Sand aggregate for job-mixed base coat and job-mixed finish coat stucco must conform to ASTM C897.

c. Sand for Finish Coats: Natural color and graded within the limits shown above for basecoats, except that the sand must pass the No. 8 sieve, and for smooth finish the sand must pass the No. 30 sieve.
d. Mix scratch coat in proportion of one part by volume Portland cement, 3/4 to 1 1/2 parts by volume hydrated lime and 2 1/2 to 4 parts sand (volume of sand per sum of cement and lime). Mix brown coat in proportion of one part by volume Portland cement, 3/4 to 1 1/2 parts by volume hydrated lime and 3 to 5 parts sand (volume of sand per sum of cement and lime). Mix proportions can vary depending on climate and application variations, with the approval of the DOR.
e. Portland Cement Stucco Finish Coat 3 to 5 parts sand (volume of sand per sum of cement and lime).
f. Portland cement plaster application must be in accordance with ASTM C 926. Furring and lath application must be in accordance with ASTM C 1063.
g. Bonding Agents: ASTM C 932. Provide for exterior applications to masonry or concrete substrates.
h. Provide water resistive barrier under stucco in accordance with manufacturer's recommendations and code requirements.

B201001 1.4 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

EIMA TM 101 and 01 EIMA TM 101.86. Refer to the RFP Part 3 Project Program to determine if EIFS is used as the non-primary or the primary exterior finish material for the project. Job-fabricate the exterior insulation and finish system (EIFS) covering consisting of sheathing, water resistive barrier, moisture drainable insulation board system, reinforcing fabric, base coat, finish coat, adhesive, primer, accessories, flashing, sealant, and mechanical fasteners. The system components must be compatible with each other and with the substrate as recommended or approved by, and the products of, a single manufacturer regularly engaged in furnishing Exterior Insulation and Finish Systems. Install all materials using an applicator trained and approved by the system manufacturer in accordance with DOR-approved shop drawings and manufacturer's recommendations. Provide EIFS Class PB or Class PM. Do not use Class PB EIFS in first floor, high traffic areas, or in areas where pedestrians congregate without at least one layer of 20 ounce (567 grams) reinforcing fabric mesh. Use 1/8 inch (4 mm) minimum thickness for PB finish system. Color of the EIFS finish must be consistent, with no variation noticeable to the DOR. Seal all joints in EIFS in accordance with ASTM C 1481 and as recommended by the manufacturer. Furnish manufacturer's standard warranty for the EIFS. Provide warranty directly to Government and cover a period of not less than 5 years from date Government accepted the work.

B201001 1.4.1 EIFS System Components

a. Glass Mat Gypsum Sheathing Board - Conform to ASTM C 1177/C 1177M. Nail Pull Resistance: No less than 120 lb (54.4 Kg) when tested in accordance with ASTM C 473.
b. Mechanical Fasteners - Corrosion resistant and as approved by EIFS manufacturer. Select fastener type and pattern

based on applicable wind loads and substrate into which fastener will be attached, to provide the necessary pull-out, tensile, and shear strengths.

c. Thermal Insulation - Drainable type. Do not use any layer of insulation less than 3/4 in (19 mm) thick. The maximum thickness of all layers must not exceed 4 in (101 mm). Insulation Board must be certified as aged, in block form, prior to cutting and shipping, a minimum of 6 weeks by air-drying, or equivalent. Insulating material must conform to ASTM C 578, Type I or IV, as recommended by the EIFS manufacturer and treated to be compatible with other EIFS components.

d. Reinforcing Fabric - Reinforcing fabric mesh must be alkali-resistant, balanced, open weave, glass fiber fabric made from twisted multi-end strands specifically treated for compatibility with the other system materials, and comply with EIMA TM 105.01 and as recommended by EIFS manufacturer.

B201001 1.5 CONCRETE EXTERIOR WALL CLOSURE

B201001 1.5.1 Precast Concrete Wall Panels:

ACI 211.1 and ACI 301. PCI MNL-116 or PCI MNL-117. Concrete must have a minimum 28-day compressive strength of 4000 psi (281 Kg/cm2). Air content of plastic concrete must be between 4 and 6 percent air by volume. Provide a dosage of air entraining agent, which will produce 19 plus or minus 3 percent air in a 1 to 4 by weight standard sand mortar in accordance ASTM C 185. Provide aggregate in accordance with ASTM C 33. Seal the panel joints with fully loaded and tooled sealant joints that are properly sized, shaped, and placed against manufacturer approved backing material. Sealant material thickness must not be less than 1/4 inch (6mm).

For rain screen precast panel wall systems with back-up wall construction, provide sealed face joints that allow moisture to be drained from the wall cavity behind the precast panels via weeps. Provide flashing and water/ moisture resistant barriers to direct water from the wall cavity to the outside of the building. Locate weeps where cavity is obstructed such as above through-wall flashing, at head and sill flashing above and below windows, above door flashings, and wall base flashing.

For barrier wall precast panel wall systems without back-up wall construction, provide a two stage drained joint system on all precast panels joints. Design the two staged drained joint system to provide the following;

a. Locate all sealant beads on the exterior side of the backer rod. Align placement of the exterior sealant bead with the exterior surface of the precast panel and space the placement of the interior sealant bead as required below but no less than 3 inches (75 mm) from the face of the panel to the face of the interior tooled sealant bead.

b. Space sealant beads as far apart as possible but provide no less than 1 inch (25mm) clear air space between the exterior seal backer rod and the tooled interior sealant bead.
c. Form minimum of 1/2 inch (12mm) weep holes to facilitate drainage in the vertical sealant joints. Attach a bead of sealant to the interior vertical sealant bead with an outward slope and a drop in height of at least 4 inches (100mm) to form the drainage plane for the weep opening.
d. Locate weeps as necessary to allow complete drainage of water from the two stage air/ vent space. Provide weeps at obstructions in the air/ vent space such as through wall flashing, horizontal panel joints, head and sill flashing above and below windows, above door flashing, and wall base flashing.

Minimize cracking potential of precast concrete elements by implementing expansion and control joints in the precast assembly. Comply with the following;

a. Exposed Aggregates - In addition to the above aggregate, facing mixture aggregate, and aggregate for homogeneous panels with exposed aggregate finish, must be crushed stone.
b. Cement - ASTM C 150.
c. Admixtures - ASTM C 260 for air-entraining admixtures. Other admixtures: ASTM C 494. Certify that admixtures are free of chlorides.
d. Reinforcement - ACI 301.
e. Inserts - ASTM A 47, Grade 32510 or 35018, or may be medium strength cast steel conforming to ASTM A 27/A 27M, Grade U-60-30. Where exposed to moisture, provide inserts hot-dip galvanized after fabrication in accordance with ASTM A 153/A 153M.
f. Embedded Plates - ASTM A 36/A 36.
g. Flashing Reglets - Fabricate of sheet metal, open-type with continuous groove 1-1/8 inches (28 mm) deep minimum by 3/16 inch (5 mm) wide at opening and sloped upward at 45 degrees. Top surface must have toothed lip section to anchor upturned edge of metal snap-lock counter flashing when inserted. Provide stainless steel sheet metal, 0.011 inch (0.28 mm) minimum thickness, ASTM A 167, Type 302 or Type 304, Number 2D finish, soft temper.
h. Clip Angles - ASTM A 36/A 36M steel, galvanized after fabrication in accordance with ASTM A 153/A 153M.
i. Ferrous Casting Clamps - ASTM A 47, Grade 32510 or Grade 35018 malleable iron or cast steel, or ASTM A 27/A 27M, Grade U-60-30, cast steel casting, hot-dip galvanized in accordance with ASTM A 153/A 153M.
j. Threaded Fasteners – Provide galvanized machine bolts, washers and, when required, nuts.

1) Bolts: ASTM A 449, 3/4 inch (19 mm) diameter machine bolts with hexagon head.

2) Washers: American National Standards Institute (ANSI) B18.21.1, medium or heavy lock-spring washers.

3) Nuts: ASTM A 563, Grade C, heavy, hexagon-type nuts.

4) Square Nuts: ASTM A 563, Grade A, plain.

B201001 1.6 CONCRETE WALL PANEL RESTORATION

Match the materials, physical and chemical properties, and composition of new concrete of the existing concrete to be repaired, unless samples and testing determine that existing mixtures and materials are faulty or non-performing.

B201001 1.6.1 Existing Concrete Testing

Take representative samples of existing concrete from areas of the structure to be repaired at indicated locations. Take samples in accordance with ASTM C 42 and ASTM C 823 and test in accordance with ASTM C 39, ASTM C 42, ASTM C 295, ASTM C 457, ASTM C 856, ASTM C 1218/C 1218M, and ASTM C 642, ASTM C 114, and ASTM C 1084. Evaluate aggregates in the existing concrete in accordance with ASTM C 136 and ASTM C 295. Determine the air content of the existing concrete in accordance with ASTM C 457 and ASTM C 642.

B201001 1.6.2 Admixtures

Air entraining admixtures must conform to ASTM C 260, water-reducing or -retarding admixtures must conform to ASTM C 494, and pigments for integrally colored concrete must conform to ASTM C 979 and ASTM C 1017. Admixtures must not contain added chlorides.

B201001 1.6.3 Aggregates

Aggregates must conform to ASTM C 33.

B201001 1.6.4 Cement

Match cement composition of cement used in existing concrete to be repaired as determined by samples and testing and conforms to the basic requirements of ASTM C 150, Type I or II. Provide cement with non-shrink (shrinkage compensating) properties and conforms to ASTM C 1107, Class B or C, expansive cement type.

B201001 1.6.5 Pozzolan

Provide pozzolan to conform with ASTM C 618, Class F, including limit on available alkalis, "Table 2 - Supplementary Optional Chemical Requirements," and uniformity requirements, "Table 4 - Supplementary Optional Physical Requirements."

B201001 1.6.6 Epoxy Anchor Adhesives

Use epoxy-resin grout to bond steel anchors to concrete with a

100 percent solids, moisture insensitive, low creep, structural adhesive. The epoxy must conform to ASTM C 881, type IV; grade and class selected to conform to the manufacturer's recommendations for the application. The epoxy adhesive must be conditioned, proportioned, mixed, and applied in accordance with the manufacturer's recommendations, except as otherwise specified herein.

a. Epoxy-resin grout - Provide a two-component material, 100 percent solids by weight, formulated to meet the requirements of ASTM C 881, Type I or II. Use type I material when materials or atmospheric temperatures are 70 degrees F (21 degrees C) or above. Use type II material when materials or atmospheric temperatures are below 70 degrees F (21 degrees C). Provide epoxy-resin grout with the ability to structurally rebond cracks, delaminations, and hollow plane conditions in concrete; must be insensitive to the presence of water; and must have the capability to penetrate cracks down to 5 mils in width. Materials must have been successfully used in similar conditions for a period of at least five years.
b. Epoxy Injection Ports – Design injection ports for epoxy-resin grout for the intended use as required in this section and made according to the recommendation of the epoxy manufacturer.

B201001 1.7 WOOD SIDING SYSTEM

B201001 1.7.1 Horizontal Wood Siding

Horizontal Wood Siding: DOC PS 20, exterior, lap type, 6 inches wide, maximum practicable lengths, 7/16 inch (11 mm) thick, smooth face. Shop coat all surfaces of wood siding and trim with an alkyd primer.

a. Species and Grades

Utilize species and grades listed:

1) Grade 1 Common spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

2) Grade Prime or D finish, pressure-preservative-treated hem-fir; NLGA, WCLIB, or WWPA.

3) Grade D Select (Quality) eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NELMA, NLGA, WCLIB, or WWPA.

4) Grade D Select northern white cedar; NELMA or NLGA.

5) Grade B & B, pressure-preservative-treated southern pine; SPIB.
b. Water resistive barrier – Install to protect back-up wall assembly.

B201001 1.8 VINYL SIDING SYSTEM

Integrally colored, vinyl siding complying with ASTM D 3679. Horizontal or vertical pattern with exposure and shape to be compatible with overall design concept. Provide a water resistive barrier to protect back-up wall assembly and install in accordance with manufacturer's recommendations.

B201001 1.8.1 Texture, Thickness, Finish and Color

Wood grain texture. Minimum Nominal Thickness: 0.044 inch (1.1 mm). Minimum Profile Depth (Butt Thickness): 5/8 inch (16 mm) or 3/4 inch (19 mm). Nailing Hem: Double thickness. Comply with manufacturer's requirements for fastener types and nailing process.

B201001 1.8.2 Accessories

Provide integrally colored, premanufactured accessories to match siding. Use accessories at terminations with other materials.

B201001 1.9 MANUFACTURED FACED PANELS SYSTEMS EXTERIOR WALL SIDING

B201001 1.9.1 Glass Fiber Reinforced Cementitious Panels System

Siding made from fiber-cement board that does not contain asbestos fibers; complies with ASTM C 1186, Type A, Grade II; is classified as noncombustible when tested according to ASTM E 136; and has a flame-spread index of 25 or less when tested according to ASTM E 84. Provide a water resistive barrier under panel systems and install in accordance with manufacturers recommendations. Panel system must be a horizontal siding pattern in plain or beaded-edge style, unless vertical sheet panels are allowed by the RFP Part 3. Texture: Rough sawn or smooth, factory primed.

B201001 1.10 OTHER EXTERIOR WALL CLOSURE

B201001 1.10.1 Glass Block

a. Provide clear colorless glass block. Units to have polyvinyl butyral edge coating. Units to have 75 percent light transmission allowance. Utilize ventilators and accessories recommended by glass block manufacturer. Glass block specified is manufactured by Pittsburgh Corning Corporation. The manufacturer's name and catalog identification are provided to describe physical characteristics and functional requirements of the product desired. Other manufacturers' products that are considered to be the functional equivalent will be acceptable.
b. Provide DECORA, VUE, or ARGUS pattern for the exterior glass block units. Units designated as "reflective glass block" must have a highly reflective oxide surface coating of a gray color.

B201001 1.10.2 Concrete Unit Masonry

Masonry walls must comply with ACI 530.1. Load-bearing units: ASTM C90, Non-load bearing- units: ASTM C129, Type I or II. Provide ground face units, split-faced units, or split-ribbed units for exposed exterior walls. Provide water repellent admixture to masonry units where the exterior face of the units will not receive a waterproof coating such as paint. Mortar must conform to ASTM C 270, Type S. Test mortar in accordance with ASTM C 780. Provide water repellent admixture and color additive in mortar for masonry walls that will not receive a waterproof coating such as paint. Do not use admixtures containing chlorides. Provide air entrainment, not to exceed 12 percent, in mortar.

a. Adjustable Anchors for Structural Members - Use adjustable anchors to anchor masonry structural steel columns or beams. Weld the fixed portion of the anchors (steel anchor rods) to the structural steel member. Provide adjustable anchors 3/16 inch (5 mm) diameter steel wire, triangular-shaped. Anchors attached to steel must be 5/16 inch (8 mm) diameter steel bars placed to provide 1/16 inch (1.6 mm) play between flexible anchors and structural steel members.
b. Deformed Bars - ASTM A 615/A 615M, ASTM A 616/A 616M, ASTM A 617/A 617M, or ASTM A 706/A 706M.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

B201002 1.1 CONCRETE UNIT MASONRY

Provide concrete unit masonry as described in B201001 1.10.2

Provide water resistive barrier on the cavity-facing wythe of the backup masonry. Coordinate water resistant barrier materials and methods to provide water control and vapor transmission control for the lifetime of the structure. Seal all holes and penetrations in the water resistive barrier and repair any material damaged by other construction operations.

B201002 1.2 LOAD-BEARING METAL FRAMING SYSTEM

Deflections of structural members must not exceed the more restrictive of the limitations of International Code Council/International Building Code (ICC/IBC) and UFC 3-301-01, *Architecture*.

a. Studs - ASTM A1003/ASTM A1003M, Structural Grade 50, Type H minimum; provide Z180 (G60) galvanized coating in accordance with ASTM A653/ASTM A653M. Do not expose studs to direct moisture contact. Clearly stamp studs with manufacturer's name, initials, or logo, an ICC number, material thickness and yield strength. Choose size and gage as required to meet the loading requirements specified.
b. Bracing - Provide horizontal bracing in accordance with design calculations and American Iron and Steel Institute (AISI)

S100, consisting of, as a minimum, runner channel cut to fit between and welded to the studs or hot- or cold-rolled steel channels inserted through cutouts in the web of each stud and secured to studs with welded clip angles. Provide bracing, as a minimum, at 5 feet (1.52 meters) o.c. for wind load only, and 3 foot 4 inches (1.0 meters) o.c. for axial loads.

c. Sheathing - Provide sheathing to withstand structural loads imposed on the wall structure. Cover sheathing with either a 15 pound asphalt-impregnated building paper, or air barrier as required by the wall moisture analysis. Provide one of the following sheathings:

(1) Plywood: C-D Grade, Exposure 1, with an Identification Index of not less than 24/0.

(2) Structural-Use and Oriented Strand Board (OSB) Panels: Sheathing grade with durability equivalent to Exposure 1, Span Rating of 24/0 or greater.

(3) Gypsum: ASTM C79/C 79M and ASTM C1177/C1177M, 1/2 inch (13 mm) thick fire retardant (Type X) 5/8 inch (15 mm) thick; 4 feet (1.2 meters) wide with square edge for supports 16 inches (400 mm) o.c. with or without corner bracing of framing. Face gypsum sheathing with materials capable of resisting six months of weathering exposure without degradation of the covering or the gypsum material. Seal all joints as recommended by the manufacturer.

d. Water resistive barrier – Install to protect back-up wall assembly.

B201002 1.3 WOOD FRAMING SYSTEM

Kiln-dry all lumber materials to comply with DOC PS 20. Install lumber materials in accordance with AF&PA T11. Use preservative pressure treated lumber at sill plates and other members in contact with concrete and masonry surfaces. Preservative pressure treated must be in accordance with American Wood Protection Association (AWPA) Standard U1.

a. Species and Grades - Provide species and grades listed:

(1) Grade 2 Common spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

(2) Grade 2 Common, hem-fir; Douglas-fir; NLGA, WCLIB, or WWPA.

(3) Grade 2 Common, southern pine; SPIB.

b. Sheathing - Sheathing must withstand structural loads imposed on the wall structure. Cover sheathing with a water resistive barrier and other barriers as required by the vapor pressure and hygrothermal analysis. Provide one of the following sheathings:

(1) Plywood: C-D Grade, Exposure 1, with an Identification Index of not less than 24/0.

(2) Structural-Use and Oriented Strand Board (OSB) Panels:

Sheathing grade with durability equivalent to Exposure 1, Span Rating of 24/0 or greater.

(3) Gypsum: ASTM D 3273 for mold resistance, ASTM C 1177/C1177M, fire retardant (Type X) 5/8 inch (15 mm) thick; 4 feet (1.2 meters) wide with square edge for supports 16 inches (400 mm) o.c. with or without corner bracing of framing. Face gypsum sheathing with materials capable of resisting six months of weathering exposure without degradation or the covering or the gypsum material. Seal all joints as recommended by the manufacturer.

c. Water resistive barrier – Install to protect back-up wall assembly.

B201002 1.4 CAST-IN-PLACE CONCRETE SYSTEM

a. Unless otherwise noted herein, all concrete design and construction must be in accordance with UFC 1-200-01.
b. Provide concrete construction ccordance with ACI 301.
c. Refer to Performance Verification Testing for Cast-in-place field quality control.
d. Concrete construction tolerances must be in accordance with ACI 117.
e. Design for watertight joints, or weeping joints having back-up water penetration protection in precast elements. Minimize cracking potential of precast concrete elements by implementing expansion and control joints in the precast assembly.
f. Joints must include properly sized and placed backing material and fully loaded and tooled sealant joint of no less than 1/4 inch sealant material thickness.
g. Provide a water resistive barrier to protect back-up wall assembly.

B201003 INSULATION AND VAPOR RETARDER

Provide insulation, air barriers, water resistive barriers, and moisture barrier/ vapor retarders (if required) in the exterior enclosure to control heat loss/gain, air infiltration/diffusion, moisture infiltration/diffusion, and water infiltration.

Provide insulation, air barrier and water resistive barrier on all conditioned facilities and moisture barrier/ vapor retarders when required by the exterior enclosure vapor pressure and hygrothermal analysis. These barrier materials may be installed separately or combined if different air barrier, moisture barrier/ vapor retarder, and water resistive barrier functions can be consolidated in one material.

Provide exterior enclosure barriers that are durable and designed to last the life of the facility. Seal the continuous air and water resistive barrier in a flexible manner to allow for relative movement of adjacent building enclosure components. Support exterior enclosure barriers to withstand maximum positive and negative air pressure to be placed on the building without displacement or damage and transfer the load to the structure. Permanently seal penetrations, joints, holes, and transitions to adjoining construction in air and water resistive barriers as recommended by the

material manufacturer. Do not compromise exterior enclosure barrier integrity at electrical boxes, fixture supports, and fasteners with holes through the exterior enclosure barriers that allow air or water leakage. Do not expose exterior enclosure barriers or retarders to environment conditions longer than is recommended by the manufacturer.

B201003 1.1 INSULATION SYSTEMS

Provide vertical and horizontal polystyrene insulation conforming to ASTM C578 or rigid polyisocyanurate board wall insulating products conforming to ASTM C591 or mineral-fiber blanket insulation conforming to ASTM C 665. Wall insulating product must have a minimum R-value as indicated by applicable ASHRAE 90.1 calculations called for in UFC 1-200-02, *High Performance and Sustainable Building Requirements*, and meeting minimum building envelope insulation requirements of UFC 3-101-01 *Architecture*and the energy design of the facility. Seal the joints in rigid insulation within cavity/veneer walls for additional moisture and air infiltration protection.

B201003 1.2 AIR BARRIER

The building air barrier is a combination of various construction materials/ components that form a continuous air barrier seal on all six sides of a building. Use methods recommended by the manufacture to seal joints and intersections for air-tightness of materials designated as part of the air barrier. Individual materials used in the continuous air barrier must have an air permeance not to exceed 0.004 cfm/ft2 at a pressure differential of 0.3 inches water (1.56lb/ft2), (0.02 L/s. m2 at 75 Pa) when tested in accordance with ASTM E 2178. If the air barrier is to be field tested, refer to the requirements in the paragraph entitled "Air Barrier Performance Testing" of this section for entire building minimum air permeance. Provide air barrier installation at windows in accordance with ASTM E 2112.

B201003 1.2.1 Exterior Enclosure Air Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the air barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link; http://www.airbarrier.org/materials/index_e.php

B201003 1.3 WATER RESISTIVE BARRIER

Provide a water resistant barrier to resist bulk water penetration and wind-driven rain that passes the exterior cladding of the facility. Provide vapor permeable water resistant barrier if the water resistive barrier function is combined with other exterior enclosure barrier functions. Integrate water resistive barriers with wall flashing to form a shingled effect and direct water down the outside surface of the water resistive barrier, away from the back-up wall assembly, and out of the wall. Comply with the requirements of ASTM E2256 for mechanical fastened building wrap materials or ICC-ES Acceptance Criteria AC38 for other materials.

B201003 1.3.1 Exterior Enclosure Water Resistive Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the water resistive barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link; http://www.airbarrier.org/resistive/index_e.php

B201003 1.4 MOISTURE BARRIER/ VAPOR RETARDER

Provide a moisture barrier/ vapor retarder to slow or reduce the unintended movement of water vapor in and out of conditioned space, if required by exterior enclosure vapor pressure and hygrothermal analysis. Perform the analysis and provide a moisture barrier/ vapor retarders in accordance with UFC 3-101-01, *Architecture*. Choose the moisture barrier/ vapor retarder permeability as a function of climate, the characteristics of the materials that comprise the assembly, and the interior conditions. If required, install moisture barrier/ vapor retarder materials on the warm side of the building assembly insulation (in the predominate season for the facility climate). Select moisture barrier/ vapor retarders in accordance with ASTM C755.

B201004 PARAPETS

Avoid parapets when possible, but when necessary, provide parapets with the same materials as the exterior wall construction, including framing members, anchors, flashings, cants, and accessories. Design parapets to withstand the lateral loads prevailing at the project site and be provided with thruwall flashing below the parapet cap, at structural members, at penetrations, and at the roof level. Provide flashing and scuppers in accordance with SMACNA.

B201005 EXTERIOR LOUVERS & SCREENS

If required, provide louvers, which are not an integral part of the mechanical equipment, exterior closures, grilles and screens, storm shutters, and other materials used for a variety of purposes including screening of equipment or as louvers for exterior doors.

Louvers, screens, grilles in must be selected in a color and design that is compatible with the fabric of the exterior architectural character as described below. For frame construction, install in accordance with ASTM E 2112.

B201005 1.1 WALL LOUVERS

Provide drainable blade type wall louvers with blade slopes of 45 degrees minimum, but provide wind driven rain rated louvers for wall louvered rooms without a floor drain within the room. Louvers must withstand a wind load of not less than 30 psf (146 Kg/m2), .08 inch (2 mm) thick 6063-T5 or T52 extruded aluminum in a factory-finished color in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mil to match the building facade. Wall louvers must bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500 , 500L (wind driven rain), and AMCA 511. Provide sill flashing with sloped drain pan at base of louver

to collect moisture that migrates down the interior face of the louver. This sill flashing must drain water to the outside of the building. Louvers must have bird screens.

B201005 1.2 SCREENED EQUIPMENT ENCLOSURE

Design and fabricate support frames to withstand wind loads. Anchor frames securely in place. Provide secondary horizontal steel or aluminum framing for attachment of screen materials. Screen material must be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Form metal panels from galvanized steel sheet in accordance with per ASTM A 653 or aluminum sheet in accordance with ASTM B 209.

B201005 1.3 STORM SHUTTERS

B201005 1.3.1 Roll Shutters

Roll shutters must have factory finished 0.050 inch (1.27 mm), 6063-T5/T6 aluminum slats with continuous over-head housing, frame and tracks. Roll shutter must be capable of being locked in a closed position by a non-key device.

B201005 1.3.2 Accordion Shutters

Accordion shutters must have factory-finished aluminum alloy 6063-T5/T6 slats and tracks. Accordion shutter must have stainless steel wheel carriers, nylon wheels and guides with stainless steel fasteners and be capable of being locked in a closed position by a non-key device.

B201005 1.3.3 Hinged Louvered Shutters

Hinged louvered shutters must have factory finished 0.50 inch (13 mm), 6063-T5/T6 aluminum louvered blades and frames with stainless steel hinges, holders, and fasteners. Allow minimum space between horizontal louver blades. Provide storm bar where required due to the lateral loads imposed on the shutter.

B201005 1.3.4 Removable Shutters

Removable shutters must have formed factory finished 0.050 inch (1.27 mm), 3003-H16 aluminum panels and continuous 6063-T5/T6 header and base frame with stainless steel fasteners or spring tempered stainless steel clips.

B201005 1.3.5 Exterior Door Louvers

If allowed by UFC 4-010-01, louvers for exterior doors must be inverted "Y" type with minimum of 30 percent net-free opening. Weld or tenon louver blades to continuous channel frame and weld assembly to door to form watertight assembly. Form louvers of hot-dip galvanized steel of same gage as door facings. Louvers must have steel-framed insect screens secured to room side and readily removable. Louvers must have aluminum wire cloth, 18 by

18 or 18 by 16 inch mesh, for insect screens. Net-free louver area to be before screening.

B201006 BALCONY WALLS & HANDRAILS

B201006 1.1 PRECAST CONCRETE BALCONY WALLS

Precast concrete balcony walls must be in accordance with section B201001 EXTERIOR CLOSURE paragraph titled, "Precast Concrete Wall Panels."

B201006 1.2 UNIT MASONRY BALCONY WALLS

B201006 1.2.1 Clay Masonry Units

Clay masonry balcony walls must be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Face Brick."

B201006 1.2.2 Concrete Masonry Units

Concrete masonry balcony walls must be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Unit Masonry."

B201006 1.3 METAL FRAMED ASSEMBLY BALCONY WALLS

Metal framed assembly balcony walls must be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Load Bearing Metal Framing System."

B201006 1.4 WOOD FRAMED ASSEMBLY BALCONY

Wood framed assembly balcony walls must be in accordance with section B201001, *EXTERIOR CLOSURE*, paragraph titled, "Wood Framing System."

B201006 1.5 HANDRAILS

Design handrails and anchorage connections to resist loads in accordance with IBC. Provide steel and aluminum materials in accordance with NAAMM Pipe Railing Systems Manual, with the same size handrail and vertical post. Provide series 300 stainless steel pipe collars. Factory coat all metal railings, except ornamental metals such as brass, bronze, and nickel-silver, with a high performance coating in accordance with AAMA 2605 for aluminum with a minimum coating thickness of 1.2 mils unless otherwise noted. For steel handrails provide finish coating in accordance with UFGS 09 96 00, *High Performance Coatings*.

B201006 1.5.1 Steel Handrails

Provide steel handrails, including inserts in concrete, steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel railings must be of 1 1/2 inches (38 mm) nominal size. Railings must be hot-dip galvanized, shop primed shop painted for exterior applications.

B201006 1.5.2 Aluminum Handrails

Aluminum railing must be of 1-1/2 inch (38 mm) nominal schedule 40 pipe conforming to ASTM B 429 or 1-3/4 inch (44 mm) square aluminum semi-hollow tube with rounded corners conforming to ASTM B 221. Railings must be coated with a high performance coating or anodized in accordance with AAMA 612, Class I. All fasteners must be series 300 stainless steel.

B201006 1.5.3 Wood Handrails

Wood handrails must be of pre-finished natural hardwood in oak, walnut, or ash. Wood must be coated with hard acrylic finish to withstand indentations.

B201006 1.5.4 Fiber Reinforced Plastic (FRP) Handrails

Provide FRP handrails in structural shapes manufactured by the pultrusion process with qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with ASCE 7,29 Code of Federal Regulations (CFR) 1910.23, National Fire Protection Association (NFPA) 101. Provide integral UV inhibitors within the resin, synthetic surfacing veil to help produce a resin rich surface, and UV resistant coating for outdoor exposures.

B201007 EXTERIOR SOFFITS

Exterior soffit system assemblies must include trim and necessary accessories including high performance coatings, if required. Installation must be crisp, fit and trim with tight joinery to back-up framing. Design soffits to be field assembled by lapping side edges of adjacent panels and mechanically attaching through panels to galvanized, non-load bearing framing conforming to ASTM A 653 (G60) and ASTM C 645, using concealed fasteners. Provide trim accessories of the same material and finish as the soffit material where soffit abuts other materials.

Use adequate backing material to assure snug joints and even face planes. Where soffits ventilate an attic space, or an otherwise unventilated space, provide a soffit/ridge/louver/ventilator ventilation system with air quantities complying to the IBC. For spaces intentionally not vented, provide sealed soffits to maintain the integrity of the air barrier and insulation barrier.

B201007 1.1 METAL SOFFIT PANELS

Provided metal soffit panels factory-formed and factory-finished. Use factory-applied sealant in side laps

B201007 1.2 VINYL SOFFIT SYSTEM

If required, provide integrally colored vinyl soffit complying with ASTM D 4477.

B201007 1.3 EXTERIOR GYPSUM BOARD SYSTEM

Provide exterior gypsum wall board soffit system with a tapered edge 5/8 inch (16 mm) thick, 48 inch (1.2 meter) wide exterior gypsum board panels conforming to ASTM C 931 and ASTM C 840, mechanically attached to galvanized non-load bearing framing conforming to ASTM A 653, G60 and ASTM C 754. Tape and finish gypsum board joints in accordance with ASTM C840. Soffit design must assure that the gypsum soffit material does not have direct water contact.

B201008 WALL FLASHING

Flashing must be aluminum or stainless steel or copper. Aluminum must conform to ASTM B 209/B 209M, 0.040 inches (1.27 mm) thick and must be coated to match the item flashed. Stainless steel must conform to ASTM A 167, type 302 or 304, 2D finish, fully annealed, dead soft temper. Thickness must be a minimum of 0.018 inches (0.4572 mm). Copper must conform to ASTM B 370, cold rolled temper. Thickness of copper must be 20 ounces per square foot (6.125 Kg/m2). Incorporate the flashing in the water resistive barrier and seal joints to flashing to form a shingled effect and direct liquid water to the exterior of the exterior enclosure and away from back-up wall assembly.

B201009 EXTERIOR PAINTING AND SPECIAL COATINGS

Apply coatings directly to all non-prefinished surfaces of the exterior construction. Comply with Master Painters Institute requirements for surface degradation analysis, surface preparation, paint and coating selection, paint application restrictions for substrate materials, and paint application.

B201009 1.1 GENERAL REQUIREMENTS

Painting practices must comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with Society for Protective Coatings (SSPC) PA 1. SSPC PA 1 methods are applicable to all substrates.

Provide all paint in accordance with the Master Painter Institute (MPI) standards for the exterior architectural surface being finished. The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Select paint systems for the project in accordance with the MPI Architectural Painting Decision Tree available on the Whole Building Design Guide. Use this interactive MPI Decision Tree website to identify applicable paint system(s) for the project. The MPI Decision Tree identifies paint systems for each interior or exterior coated surface in "Normal" or "Aggressive" environmental conditions and generally lists the applicable paint systems in descending order of

performance. The paint system at the top of each substrate list generally indicates the highest performing acceptable coating system.

Choose the "Aggressive" environmental conditions in the MPI Decision Tree for exterior systems that are used in moist humid conditions, abrasive conditions, chemical exposure conditions, or within five miles proximity of the ocean or a body of water. Also use "Aggressive " environmental conditions in interior spaces that are exposed to in moist humid conditions, abrasive conditions, chemical exposure conditions, such as bathrooms, shower rooms, kitchens, chemical storage area, swimming pools, laundry, sanitary areas, commercial kitchens, industrial production areas, and hospital operating rooms provide paint systems that comply with the MPI Decision Tree "Aggressive" environmental conditions.

Comply with the following requirements when determining the appropriate paint or coating system from the MPI Decision Tree:

a. Some of these paint systems are identified with a "NAVFAC Anchor". This "NAVFAC Anchor" indicates the minimum performing system that NAVFAC will accept for that substrate and environmental conditions.

b. When multiple "NAVFAC Anchors" are indicated on a certain substrate and environmental condition, provide the "NAVFAC Anchor" paint or coating system that is most appropriate for the facility use.

c. If only one MPI Decision Tree choice is available for a certain substrate and environmental condition with no indicated NAVFAC preference, provide that sole option for NAVFAC projects.

d. If the MPI Decision Tree provides multiple choices and no NAVFAC preference is denoted, refer to the Additional RFP Requirements below to determine level of performance.

e. If the MPI Decision Tree does not identify all paint system applicable to the facility, utilize the *MPI Architectural Painting, Exterior Systems Manual* to identify other appropriate paint systems for the project. Utilize the "Premium Grade" systems and comply with all limitations stated in the MPI "Approved Product List" for each paint product. Products having an MPI VOC Range E3 must be given preferential consideration over lower VOC Ranges. Use higher performing paint systems unless the lower performing paint system can be justified based on a lifecycle cost to include surface preparation, application, disposal, environmental impact, and required recoating cycles. Only use paint products that have been tested for MPI'S "DETAILED PERFORMANCE" or "EVALUATED PERFORMANCE ". Do not use products that have only been tested for "INTENDED USE".

f. If an "Aggressive" environmental condition option is not available in the MPI Decision Tree for a certain substrate, use the "Normal" environmental condition option.

g. Refer to the Additional Exterior Paint and Coating System Requirements below for further system requirements.

Paints and coatings must comply with Master Painters Institute Green Performance Standard GPS-1-12 which is available at the following website;
http://www.specifygreen.com/EvrPerf/EnvironmentalPerformance.html .
Choose paints that provide performance, are environmentally friendly, and that conform to EPA or local environmental regulations, whichever requires the lowest VOC content.

B201009 1.1.1 MPI Gloss Levels

Gloss levels must comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufacturers' description of the product. The MPI Gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. Navy only uses MPI Gloss Levels G2, G3, G5, G6.

The MPI Decision Tree indicates a default gloss level for each paint system, however consider the appearance, anticipated conditions, and need for cleaning when establishing the final gloss level for each coated surface of the project. Comply with the following guidance in choosing the appropriate gloss level.

a. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas.

b. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when human contact with the wall is limited, and for dark accent colors.

c. Use G5 Semigloss for walls, doors and trim for high durability and clean ability and when a surface is expected to have routine human contact.

d. Use G6 Gloss only in special situations such as for piping identification or special effects.

The MPI gloss and sheen standard values are in accordance with ASTM D523, and are as follows:

Gloss Level Number	Gloss@60 Degrees	Sheen@85 Degrees
Gloss Level 1(G1)-Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2(G2)-"Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3(G3)-"Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4(G4)-"Satin-like	Max. 20-35 units	Min. 35 units
Gloss Level 5(G5)-Semi-Gloss	35-70 units	
Gloss Level 6(G6)-Gloss	70-85 units	
Gloss Level 7(G7)-High Gloss	More than 85 units	

B201009 1.1.2 MPI System Designations and Table Abbreviations

The MPI coating system number description is found in either the *MPI Architectural Painting Specification Manual*or the *Maintenance Repainting Manual*and defined as an exterior system

a. EXT - MPI short-term designation for an exterior coating system on a new surface.
b. REX - the MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.
c. DSD - the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the *MPI Maintenance Repainting Manual*. Degree of Surface Degradation designates the MPI Standard for description and appearance of existing condition of surfaces to be painted. This DSD classification is used to determine the proper surface preparation necessary for painting.

B201009 1.1.3 Surface Preparation

Comply with the "Exterior Surface Preparation" section of the *MPI Architectural Painting Specification Manual,*or the Exterior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All suggestive language such as "may" or "should" are deleted from the standard and "must" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or "required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments. Not-withstanding MPI requirements, clean exterior ferrous metal that is exposed to weather conditions (wind, precipitation, solar degradation, and humidity) to a SSPC SP 10 level (near white).

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. For existing buildings, use MPI *Maintenance Repainting Manual* to determine the coatings that need to be removed. Remove deteriorated or loose coatings before repainting begins. Remove oil and grease prior to mechanical cleaning. Program cleaning so that dust and other contaminants will not fall on wet, newly painted surfaces. Spot-prime exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

B201009 1.2 ADDITIONAL EXTERIOR PAINT AND COATING SYSTEM REQUIREMENTS

In addition to the MPI Decision Tree, comply with the following paint system requirements:

B201009 1.2.1 Pavement Coatings

a. EXT 3.2 Concrete Horizontal Surfaces

Normal/ Aggressive Condition; Pigmented;

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23.00 20, *Pavement Markings.*

b. EXT 10.2 Bituminous Coated Surfaces

Normal/ Aggressive Condition; Pigmented;

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23.00 20, *Pavement Markings.*

B201009 1.2.2 Hot Metal Surfaces (including smokestacks),

a. EXT 5.2 Hot Metal, Up to 205 degrees C 400 degrees F

Normal/ Aggressive Condition; Pigmented

(1) EXT 5.2A - Heat Resistant Enamel

Primer: Intermediate/ Topcoat:

MPI 21 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

b. EXT 5.2 Hot Metal (Ferrous), Up to 400 degree C, 750 degree F

Normal/ Aggressive Condition; Pigmented;

(1) 5.2C - Heat resistant - inorganic zinc coating

Primer: Intermediate/ Topcoat:

MPI 19 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

(2) 5.2B - Heat resistant - aluminum finish enamel

Primer: Intermediate/ Topcoat:

MPI 2 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

c. EXT 5.2 Hot Metal (Non-Ferrous), Up to 593 degree C, 1100 degree F

Normal/ Aggressive Condition; Pigmented

(1) 5.2D - Heat Resistant Coating

New and existing surfaces cleaned bare to SSPC SP 10/NACE No. 2

Primer: Intermediate/ Topcoat:

MPI 22 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

B201010 EXTERIOR JOINT SEALANT

Provide sealant joint design, priming, tooling, masking, cleaning and application in accordance with the general requirements of *Sealants: A Professionals' Guide*from the Sealant, Waterproofing & Restoration Institute (SWRI). All sealant must conform to ASTM C 920.

Joints must include proper backing material for sealant support during application, control of sealant depth, and to act as a bond breaker. Use filler boards, backer rods and bond breaker tapes. Provide priming unless specifically not recommended by the sealant manufacturer. Applied sealant must be tooled. Tooling must not compact sealant too less than the minimum sealant thickness required. Mask adjacent surfaces to control sealant boundaries during sealant application.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Sun control devices must be manufactured devices to provide sun control on exterior windows and storefronts. Provide sun control devices to withstand the wind loads prevailing at the project site.

B201011 1.1 EXTERIOR SUN SCREENS

Exterior sun screens must be of aluminum with 6063-T5/T6 aluminum demountable frame attachment. Screen material must be formed factory finished metal from aluminum sheet in accordance with ASTM B 209. Screen material must be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Sunscreen must be awning, fin or other type appropriate to the installation.

B201012 SCREEN WALL

Screen walls include attached or unattached walls adjacent to the main building. Screen walls must conform to the applicable portions of Section B201001 EXTERIOR CLOSURE.

B201090 OTHER EXTERIOR WALLS

B2020 EXTERIOR WINDOWS

Provide standard windows in compliance with American National Standards Institute/American Architectural Manufacturers Association/Window and Door Manufacturers Association (ANSI/AAMA/WDMA) 101, Steel Windows Institute (SWI) SWS, UFC 4-010-01, and the design criteria of ASCE 7 for glazed windows to meet the Building Code.

If required, provide windows that meet the requirements of AAMA/WDMA 101/I.S.2. Residential construction must utilize windows that comply with AAMA LC-25 designation unless the wind pressure on the building exceeds 38 psf (185 Kg/m2). Commercial (non-residential) construction must utilize windows that comply with AAMA designation HC-40 (60 psf - 293 Kg/m2) for windows that do not have to meet anti-terrorism requirements, and HC-60 (90 psf - 439 Kg/m2) for commercial windows that are required to meet anti-terrorism requirements, unless the wind pressure or blast pressure on the building exceeds the design pressure for these minimum windows. Determine the wind pressure on the building by converting the ASCE-7 basic wind speed to wind pressure and find the corresponding structural test pressure in the AAMA specific requirements or optional performance tables. If the residential window wind pressure exceeds of 38 psf (185 Kg/m2) or the commercial (non-residential) window wind pressure exceeds 60 psf (293 Kg/m2) or exceeds 90 psf (439 Kg/m2), utilize a higher AAMA designated window complying with the calculated wind pressure. Anti- Terrorism window systems (including connections) must meet the testing requirements of UFC 4-010-01 when tested in accordance with ASTM F1642.

Comply with ASTM E 2112 and with flashing and weather-resistive barrier manufacturers' recommendations to install windows in framed wall construction. Comply with window flashing details from BIA for masonry back-up and veneer walls. Engineer and install window cleaning access and anchorage to the exterior wall or roof for facilities over three stories tall without interior window cleaning access from pivoting or tilting sash. Provide anchors in accordance with Occupational Safety and Health Administration (OSHA) standard 29 CFR Section 1910.66.

Windows must be provided with sills on the exterior and stools on the interior of the opening. Sills must be special shape or cut unit masonry or precast concrete in masonry exterior construction and extruded aluminum or aluminum-wrapped wood framing or formed metal in other construction. Positively slope sills away from windows. Window stools must be slate or solid polymer for commercial construction and painted wood for residential construction.

B202001 WINDOWS

Exterior windows must consist of fixed and operable sash used singly and in multiples. Provide operable sash in spaces occupied by people as a minimum. Include operating hardware, non-corroding framed metal screens for operable sash, and security grilles. Provide jamb support for larger windows where recommended by manufacturer. Metal windows with insulating glass must have thermally broken frames and sash. Provide thermally broken windows and window assemblies where separating conditioned and unconditioned spaces. Provide

windows and window assemblies that bear an NFRC energy performance label and meet or exceed current EnergyStar requirements.

Provide glazing in exterior windows in accordance with section B202004 EXTERIOR GLAZING.

B202001 1.1 STANDARD WINDOW SYSTEMS

B202001 1.1.1 Steel Windows

Conform to SWI SWS. Solid hot-rolled steel shape welded frames and mullions. Provide chemically cleaned and primed galvanized frames with polysteel powder coat finish. Provide glazing beads, steel frame screens with aluminum mesh at operable sashes, hardware and locks, and glazing. Aluminum screens must comply with ANSI/SMA 1004.

B202001 1.1.2 Aluminum Windows

Conform to ANSI/AAMA/WDMA 101. Factory finish aluminum windows and provide with aluminum frame screens with aluminum mesh at operable sash, hardware and locks, and glazing. Aluminum screens must comply with ANSI/SMA 1004.

Exposed aluminum surfaces must be factory finished with an AA 45 anodic coating or an AAMA organic coating. Provide a minimum of architectural Class II anodized coating or a baked enamel finish conforming to AAMA 2604 for residential construction. Provide a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605 for non-residential (commercial) construction. AAMA coatings must have a total dry film thickness of 1.2 mils.

B202001 1.1.3 Security Windows

Security windows delay forced entry into the building through the windows. In addition to meeting the requirements of AAMA 101, windows designated "resistance to forced entry" must conform to the requirements of AAMA 1302.

B202001 1.1.4 Plastic Windows, Factory Finish

Provide integral colored or co-extruded color PVC, welded and reinforced corners, reinforcing members, fasteners, hardware, weatherstripping, welded sill, and anchors conforming to ANSI/AAMA/WDMA 101 or ASTM D 4099. The exterior grade polyvinyl chloride extrusion must comply with AAMA 303 and ASTM 4726.

B202001 1.1.5 Wood Windows

Wood windows must consist of complete units including sash, glass, frame, weatherstripping, insect screen, and hardware. Window units must meet the requirements of AAMA 101, except maximum air infiltration must not exceed 0.30 CFM per linear foot of sash crack when tested under uniform static air pressure

difference of 1.57 psf (7.66 Kg/m2). Glass and glazing materials must conform to section B202004, EXTERIOR GLAZING. Insect screen must meet ASTM D 3656, Class 2, 18 by 14 mesh, color charcoal. Aluminum screen frames must meet SMA 1004.

a. Finish

1) Vinyl (PVC) Cladding: Preservative treat all basic wood frame and sash members in accordance with WDMA I.S.4, except do not use pentachlorophenol. Clad all exterior surfaces with rigid polyvinyl sheathing, complying with ASTM D 1784, class 14344-C, not less than 35 mil average thickness.

2) Aluminum Cladding: Preservative treat all basic wood frame and sash members in accordance with WDMA I.S.4, except do not use pentachlorophenol. Clad all exterior surfaces with roll formed aluminum with joints sealed during assembly. Aluminum clad frames and sash must meet performance requirements of AAMA 101. Aluminum finish must be an organic coating of an AAMA 2604 coating for residential construction and AAMA 2605 for non-residential (commercial) construction with a minimum dry film thickness of 1.2 mils.

B202002 STOREFRONTS

Provide one-story storefront system fabricated from formed and extruded aluminum and glass components for exterior use.

B202002 1.1 ALUMINUM-FRAMED STOREFRONTS

B202002 1.1.1 Performance Requirements

a. Structural Requirements, as measured in accordance with ANSI/ASTM E330: Wind loads for exterior assemblies must meet or exceed 25 psf (122 Kg/m2) acting inward and 25 psf (122 Kg/m2) acting outward. Design system to withstand this as a minimum and comply with design pressure established within the required ASCE 7 Wind Speed Calculations determined by the overall average opening within the project.

b. Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13’-6" must be limited to 1/175 of its clear span and for spans greater than 13’-6" deflection must be limited to 1/240 + 1/4" of its clear span, except that maximum deflection of members supporting plaster surfaces must not exceed 1/360 of its span.

c. Air Infiltration - Air leakage through fixed light areas of storefront must not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf (33.84 Kg/m2).

d. Water Penetration - When tested in accordance with ASTM E 331, there must be no water penetration at a pressure of 15 psf (73 Kg/m2) of fixed area.

e. Water infiltration No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 10 psf (48 Kg/m2) for system standard and capable of performing within the Design Pressure requirements derived from the ASCE 7 requirements.

f. Provide storefront framing and glazing assembly with an overall thermal transmittance value of not more than 0.40 BTU/hr x ft2 x deg F as determined according to NFRC 100. Provide a thermally broken storefront system where storefront occurs between conditioned and unconditioned spaces. A non-structural thermal break system is not acceptable.

B202002 1.1.2 Doors And Frames

Provide doors complete with frames, framing members, subframes, transoms, adjoining sidelights, adjoining window wall, trim, and accessories, as required for a complete installation. Anchors must be stainless steel. Weatherstripping must be Continuous wool pile, silicone treated, or type recommended by door manufacturer. See B203008, EXTERIOR DOOR HARDWARE for hardware requirements.

B202002 1.1.3 Aluminum Alloy for Doors and Frames

ASTM B 221, Alloy 6063-T6 for extrusions. ASTM B 209, alloy and temper best suited for aluminum sheets and strips.

B202002 1.1.4 Fabrication

a. Aluminum Frames: Provide removable glass stops and glazing beads for frames accommodating fixed glass. Use countersunk stainless steel Phillips screws for exposed fastenings, and space not more than 12 inches (300 mm) o.c.. Mill joints in frame members to a hairline fit, reinforce, and secure mechanically.
b. Aluminum Doors: Doors must be medium or wide stile. Doors must be not less than 1-3/4 inches (44 mm) thick. Minimum wall thickness, 0.125 inch (3.175 mm), except beads and trim, 0.050 inch (1.27 mm). Bevel single-acting doors at lock, hinge, and meeting stile edges. Double-acting doors must have rounded edges at hinge stile, lock stile, and meeting stile edges.
c. Finishes: Provide exposed aluminum surfaces with factory finish of anodic coating conforming to AA45, Architectural Class I or an organic coating conforming to AAMA 2605 with a total dry film thickness of not less than 1.2 mils.

B202003 CURTAIN WALLS

B202003 1.1 GLAZED CURTAIN WALL SYSTEM REQUIREMENTS

Provide system complete with framing, mullions, trim, panels, windows,

glass, glazing, sealants, insulation, fasteners, anchors, accessories, concealed auxiliary members, and attachment devices for securing the wall to the structure as specified.

Fully coordinate system accessories directly incorporated and adjacent to related work and insure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances as specified. Design and test in accordance with *AAMA Curtain Wall Manual*.

Provide thermally broken curtain wall framing and infill glazing and panels where separating conditioned and unconditioned spaces.

B202003 1.1.1 Source

Provide curtain wall system components furnished by one manufacturer or fabricator; however, all components need not be products of the same manufacturer.

B202003 1.1.2 Cleaning Provisions

For curtain wall systems over two stories in height reinforce curtain wall members and provide support for cleaning rigs. The support for cleaning rigs may be provided by other elements of the facility.

B202003 1.1.3 Warranty

a. System Warranty – Manufacturer of the curtain wall system must warrant that the design, construction, and materials installed in the system must be free of manufacturer's defects for the life of the installation. The manufacturer must provide a similar warranty for the individual components of the system that are provided by other, outside manufacturers. Execute the warranty for the system directly to the Government.
b. Additional Glass Warranty – Insulating glass units must be guaranteed not to develop material obstruction of vision as a result of dust or film formation on the inner glass surface caused by failure of the seal, other than through glass breakage, within a period of 5 years from date of acceptance of work by the Government. Units failing to comply with the terms of this guarantee must be replaced with new units without additional cost to the Government. The Contractor must require the manufacturer to execute their warranties in writing directly to the Government.

B202003 1.1.4 Design

a. Structural Requirements, as measured in accordance with ANSI/ASTM E330:

1) Wind loads for exterior assemblies: Provide systems capable of performing at a minimum C acting inward and 25 psf (122 Kg/m2) acting outward. Design system to withstand this as a minimum and comply with design pressure

established within the required ASCE 7 Wind Speed Calculations determined by the overall average opening within the project.

2) Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13'-6" must be limited to 1/175 of its clear span and for spans greater than 13'-6" deflection must be limited to 1/240 + 1/4" of its clear span, except that maximum deflection of members supporting plaster surfaces must not exceed 1/360 of its span.

3) Water Penetration/Water infiltration - No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 10 psf (48.6 Kg/m2) for system standard and capable of performing within the Design Pressure requirements derived from the ASCE 7 requirements.

4) Air Infiltration - Air leakage through fixed light areas of storefront must not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 26.24 psf (30.32 Kg/m2).

b. Delamination: Adhesively bonded metal-faced or glass faced panels must show no evidence of delamination, warpage or other deterioration or damage when subjected to the six "Accelerated Aging Cycles" specified in ASTM D 1037.

c. Thermal Conductance: The thermal transmittance of opaque panels must not exceed the specified U-value, when tested in accordance with ASTM C 236. The average calculated thermal transmittance of the complete wall assembly including panels, windows, and all other components must not exceed a U-value necessary to meet the energy budget of the facility. Determine U-values of components in accordance with ASTM C 236.

d. Window Tests: Windows must meet the requirements specified herein. Windows must meet the same requirements for deflection and structural adequacy as specified for framing members when tested in accordance with ASTM E 330 except permanent deformation must not exceed 0.4 percent; there must be no glass breakage, and no permanent damage to fasteners, anchors, hardware, or operating devices. Windows must have no water penetration when tested in accordance with ASTM E 331.

e. Fire Resistance Tests: Insulation provided in the curtain wall system or field applied in conjunction with the curtain wall system must have a flame spread rating not exceeding 75 and a smoke developed rating not exceeding 150 when tested in accordance with ASTM E 84, except as specified otherwise herein.

1) Insulation: Insulation contained entirely within panel assemblies which meet the flame spread and smoke developed ratings of 75 and 150 respectively. Insulation isolated from the building interior by masonry walls, masonry cavity

walls, or encased in masonry cores is not required to comply with the flame spread and smoke developed ratings specified.

2) Curtain Wall Systems: Material for firestopping the opening between the edge of the floor slab and back of the curtain wall system, must have not less than the flame spread and smoke developed ratings specified for insulation which is neither isolated from the building interior nor encased in masonry cores.

3) Curtain Wall Panels: Panels for fire resistive curtain walls must have the required fire resistive rating when tested in accordance with ASTM E 119.

4) Firestopping Materials and Devices: Firestopping material and attachment devices must be an effective barrier against the spread of fire, smoke, and gases for the required period of when exposed to the conditions of the standard ASTM E 119 time-temperature curve for a period equivalent to the fire rating of the floor system and must also be rated noncombustible when tested in accordance with ASTM E 136.

B202003 1.1.5 Tolerances

Design and erect wall system to accommodate tolerances in building frame and other contiguous work. Provide with the following tolerances:

a. Maximum variation from plane or location shown on DOR-approved shop drawings: 1/8 inch (3 mm) per 12 feet (3.7 meters) of length up to not more than 1/2 inch (13 mm) in any total length.
b. Maximum offset from true alignment between two identical members abutting end to end in line: 1/16 inch (1.6 mm).

B202003 1.1.6 Structural Requirements

Deflection and Structural Tests: No curtain wall framing member must deflect, in a direction normal to the plane of the wall, more than 1/175 of its clear span or 3/4 inch (20 mm), whichever is less, when tested in accordance with ASTM E 330, except that when a plastered or gypsum board surface will be affected the deflection must not exceed 1/360 of the span. No framing member must have a permanent deformation in excess of 0.2 percent of its clear span when tested in accordance with ASTM E 330 for a minimum test period of 10 seconds at 1.5 times the design wind pressures specified.

B202003 1.1.7 Thermal Movement

Fabricate, assemble, and erect system with adequate allowances for expansion and contraction of components and fastenings to

prevent buckling damage, joint seal failure, glass breakage, undue stress on fastenings or other detrimental effects.

B202003 1.1.8 Curtain Wall Components

Design the curtain wall and the components listed below to meet the performance requirements below.

a. Framing Members in Curtain Wall Main Frames and Sash or Ventilator Members: extrusion strength must meet or exceed the physical properties required for minimum ultimate tensile yield strength of 16,000 psi (110 MPa) when tested under AA ASD1, ASTM E34, and ASTM B221M (or ASTM B221).
b. Joint and Glazing Sealants: Perform tests as required by ASTM C 920.
c. Preformed Compression Gaskets and Seals: ASTM C 864.
d. Preformed Lock-strip Gaskets: ASTM C 542, modified as follows: Heat age specimens seven days at 158 degrees F (70 degrees C), in zipped or locked position under full design compression. Unzip, cool for one hour, re-zip, and test lip seal pressure, which must be minimum 2.5 pounds per linear inch on any extruded or corner specimen.
e. Spandrel Glass: Fallout resistance test, ASTM C 1048.
f. Porcelain Enamel: Acid resistance, color retention, and spall resistance tests, PEI 1001.
g. Anodized Finishes: Aluminum used for framing must have a color anodized NAAMM MFM finish designation AA-M10-C22-A34 and AA-M10-C22-A44, meeting the requirements of AAMA 611.
h. Glass and Glazing:

1) Conform to paragraph B202004, GLAZING.

2) Insulating Glass must meet ASTM E 546 or ASTM E 576 at minus 20 degrees F (minus 29 degrees C), no frost or dew point.

i. Firestopping Material - Mineral fiber manufactured from asbestos-free materials, and conforming to ASTM C 612 or ASTM C 665, meeting fire resistance requirements specified.
j. Screens - ASTM D 3656, Class 2, 18 by 14 mesh, color charcoal.
k. Panels - Unless otherwise indicated, design for installation from outside the building. Provide moisture/ vapor retarder on interior face of insulation. Seal edges of panels with cores of absorptive material to prevent entrance of water and allow venting of the core space to outside air.

1) Metal Facing Panels, Single Thickness - Metal facing panels must be single thickness. Panel facing must be flat sheet or textured type, made of porcelain enamel, aluminum, bronze, stainless steel and, with backside stiffeners or edge flanges spaced as required to meet flatness specified.

2) Adhesively Bonded Panels - Adhesively bonded panels must be sandwich type, metal faced both sides, and bonded to

form stable and composite unit. Nonexposed face must be galvanized steel. Exposed face must be porcelain enamel, aluminum, bronze, or stainless steel, with continuous laminated backing or internal stiffening ribs or breaks spaced as required to meet flatness specified.

3) Nonmetallic Panels

a) Panels must be glass-faced on the side that will be exposed to view. Glass must be spandrel glass with ceramic coating on its non-weathering surface and smooth finish on the exposed surface; backing must be adhesively bonded to non-weathering surface.

b) Adhesively bonded insulated panels must be nonmetallic faced, sandwich type, tempered hardboard on exposed face and on non-exposed face. Apply coating of epoxy or polyester followed by application of inert aggregate to exposed face in the factory. Inert aggregate must be natural stone chips.

l. Metal Windows – Conform to ANSI/AAMA/WDMA 101. Provide inside glazing with removable metal glazing beads except for windows with structural glazing. Factory finish aluminum windows and provide with aluminum frame screens with aluminum mesh at operable sash, hardware and locks, and glazing. Aluminum screens must comply with ANSISMA 1004.

Exposed aluminum surfaces must be factory finished with an AA 45 anodic coating or an AAMA organic coating. Provide a minimum of architectural Class II anodized coating or a baked enamel finish conforming to AAMA 2604 for residential construction. Provide a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605 for non-residential (commercial) construction. AAMA coatings must have a total dry film thickness of 1.23 mils.

m. Metal Accessories - Provide gravel stops and fascias, flashings, metal sills, metal stools, louvers, venetian blind pockets, and closures. Fabricate accessories of sizes and shapes indicated from similar materials and finish as specified for the wall system.

B202004 EXTERIOR GLAZING

Provide setting and sealing materials, stops and gaskets as recommended by the glass or acrylic sheet manufacturer.

Provide warranty for insulating glass units for a period of 10 years against development of material obstruction to vision (such as dust or film formation on the inner glass surfaces) caused by failure of the hermetic seal, other than through glass breakage. The Contractor is required to provide a glazing warranty for curtain wall glazing written directly to the Government.

Provide warranty for polycarbonate sheet glazing for a period of 5-years

against breakage, coating delamination, and yellowing.

Glazing thickness indicated in the following paragraphs is the minimum acceptable thickness. Provide thicker glazing if required by the manufacturer for the given application.

B202004 1.1 GLASS

B202004 1.1.1 Clear Glass

Type I, Class 1 (clear), Quality q4 (A).

B202004 1.1.2 Heat-Absorbing Glass

ASTM 1036, Type I, Class 2 (heat absorbing and light reducing), Quality q3 (select), 1/4 inch (6 mm) thick, with a light transmittance of approximately 45 percent and total solar transmittance of not more than 50 percent for 1/4 inch (6 mm) thickness. Use warm color tint for warm color frames and cool color tints for white and gray frames.

B202004 1.1.3 Wire Glass

Type II, Class 1, Form 1, Quality q8 Mesh m1 or Form 2, Quality q7, Finish f1, Mesh m1, 1/4 inch (6 mm) thick. Conform to NFPA 80. Glass for fire-rated windows must be Underwriters Laboratories (UL) listed and must be rated when tested in accordance with ASTM E 163.

B202004 1.1.4 Laminated Glass

ASTM 1172, fabricated from two pieces of Type I, Class 1, Quality q3 glass laminated together with a clear 0.030 inch (0.75 mm) thick polyvinyl butyral interlayer. The total thickness must be nominally 1/4 inch (6 mm). Laminated glass used for anti-terrorism window assemblies must be a minimum of 1/4 inch (6 mm) thickness.

B202004 1.1.5 Insulating Glass Units

Provide insulated glass using a combination of the interior and exterior glazing materials listed below filled with a thermal resistive gas. The air space must be sized to meet the thermal requirements below but not less than one half inch (12 mm) for non-residential construction and one quarter inch (6 mm) minimum for residential construction.

Provide active solar control glazing by using tinting, maximum thermal resistance, special coatings to meet Energy Star climate zone and window type requirements (including frames), and comply with the performance characteristics below. Provide an active low-emissivity coating on glass surface number 2 (the inside surface of the exterior glass pane).

If the building is located in a heat dominated climate zone, the

facility is designed to utilize solar heat gain to augment the HVAC system, and the window overhang design prohibits excessive solar gain; a passive low-emissivity coating may be used to accommodate the design. Design occupied spaces adjoining passive low-emissivity coated glass for comfortable use of the space.

Provide two panes of glass separated by a dehydrated airspace and hermetically sealed. Dimensional tolerances must be as specified in IGMA TR-1200. The units must conform to ASTM E 773 and ASTM E 774, Class A. Provide primary seal, secondary seal, and spacers to eliminate moisture and hydrocarbon vapor transmission into airspace. Warranty insulating glass units against development of material obstruction to vision (such as dust, fogging, or film formation on the inner glass surfaces) caused by failure of the hermetic seal for a 10-year period following acceptance of the work.

The interior glass pane must be one of the following:

1. Typically ASTM C 1036, Type I, Class 1, Quality q4, minimum 1/4 inch (6 mm) thick;
2. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 1 (transparent), Quality q4, minimum 1/4 inch (6 mm) thick when required by ANSI Z97.1 or possible human impact is anticipated;
3. ASTM C 1172, laminated glass as specified above, when required by antiterrorism requirements and code requirements for windborne debris.

The exterior glass pane must be one of the following:

1. Typically ASTM C 1036, Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick;
2. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick when required by ANSI Z97.1 or possible human impact is anticipated.

Insulating glass performance for active solar control using low-emissivity coatings:

1. Visible Light Transmission, 66% or lower

2. Outdoor Light Reflectance, 11% or greater

3. Solar Heat Gain Coefficient, .36 or lower

4. Winter U-Value, .35 Btu/square foot x hr x degree F or lower for residential construction and .29 Btu/square foot x hr x degree F or lower for all other types of construction.

B202004 1.1.6 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated),

Type I, Class 1 (transparent) or 2 (tinted heat absorbing, Quality q3, 1/4 inch (6 mm) thick.

B202004 1.1.7 Bullet-Resisting Glass

ASTM 1172 and UL 752, fabricated from Type I, Class 1, Quality q3 glass with polyvinyl butyral plastic interlayers between the layers of glass and listed by UL as bullet resisting, with a power rating of Medium—Small Arms, High—Small Arms, Super—Small Arms, High—Rifle, or as required by the building program in accordance with UL 752.

B202004 1.1.8 Patterned Glass

ASTM 1036, Type II, Class 1 (translucent), Form 3 (patterned), Quality q7 (decorative), Finish f1 (patterned one side), Pattern p2 (geometric) 7/32 inch (5.55 mm) thick.

B202004 1.1.9 Spandrel Glass

ASTM C 1048, Kind HS or FT, Condition B (ceramic coated), Type I, Quality q5, 1/4 inch (6 mm) thick.

B202004 1.1.10 Spandrel Glass with Adhered Backing

ASTM C 1048, Kind HS or FT, Condition B (ceramic coated), Type I, Quality q5, 1/4 inch (6 mm) thick and must pass the fallout resistance test specified in ASTM C 1048.

B202004 1.2 PLASTIC GLAZING

All plastic glazing exposed to the interior or exterior environment must have an applied hardcoat.

B202004 1.2.1 Bullet-Resistant Plastic Sheet

Provide cast acrylic sheet or mar-resistant polycarbonate sheet laminated with a special interlayer, and listed in UL 752 as bullet resisting, Class I, II, III, clear, or in color.

B202004 1.2.2 Acrylic Sheet Glazing

ASTM D 4802, Type I, regular, Type II, heat resistant, in various thicknesses, clear or colored.

B202004 1.2.3 Polycarbonate Sheet Glazing

ASTM D 3595, ANSI Z97.1, Mar-resistant, Clear and smooth both sides when used for vision glazing; Translucent, textured both sides when used for obscure glazing, tint to match frame, ultraviolet stabilized, thickness to be specified in mm and inches, and listed in UL as burglar resisting. Mar-resistant sheet must have a change in haze of between 5 and 8 percent under silica carbide test, 56.44 ounces (1600 grams), ASTM D 673.

B202004 1.3 FRAGMENT RETENTION FILM FOR GLAZING

Existing windows that will not be replaced in the project must have fragment retention film if antiterrorism protection is required. The film must be polyester, polyethylene terephthalate, or a composite. Fragment retention film must be optically clear and free of waves, distortions, impurities, and adhesive lines. The film may be a single layer or laminated. Lamination of the film must only occur at the factory of the fragment retention film manufacturer. The film must include an abrasion resistant coating on the surface that does not receive the film adhesive. Fragment retention film must be a minimum thickness of 0.004 inch (0.1016 mm), or 0.007 inch (0.1778 mm), or 0.010 inch (0.254 mm). The film must be supplied with an optically clear weatherable pressure sensitive adhesive. The adhesive must contain ultraviolet inhibitors to protect the film for its required life and must limit ultraviolet transmission to not more than 8 percent of the radiation between 300 and 380 nanometers. The adhesive must not be water activated. A water-soluble detackifier or release liner may be incorporated over the adhesive to facilitate film application. The adhesive must be 90 percent cured within 30 days of installation. Adhesives on film thicknesses of 0.010 inch (0.254 mm) and greater must be a minimum of 0.0008 inch (0.02032 mm) thick.

B202090 OTHER EXTERIOR WINDOWS

B202090 1.1 OPERABLE TRAY PASS WINDOWS

Provide frames and glass channels of heavy type 6063-TS aluminum extrusions with reinforcing as required. Include bullet-resistant glazing and heavy-duty operable pass tray. Unit must have a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605. AAMA coatings must have a total dry film thickness of 1.2 mils.

B2030 EXTERIOR DOORS

Provide heavy duty insulated exterior steel doors and frames for service access. Door frames must be welded. Corner knockdown door frames are not permitted.

Use heavy-duty overhead holder and closer to protect doors from wind damage. Provide kickplates on the inside face of all exterior doors.

Weather-protect all exterior doors and related construction with low infiltration weatherstripping and sealants. Provide threshold with offset to stop water penetration while maintaining accessibility compliance.

Conform to the design criteria of ASCE 7.

See section B203008, EXTERIOR DOOR HARDWARE, for door hardware requirements. For all installations, provide a recessed key box (Knox Box) approximately 7 inches x 7 inches (175 mm x 175 mm) with 4-3/4 inches (120 mm) solid steel door at primary exterior entry for storage of keys and access cards accessible by the fire department.

B203001 SOLID DOORS

B203001 1.1 STEEL DOORS

Provide hardware preparation in accordance with American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) A156.115. Doors must be hung in accordance with ASTM E2112.

B203001 1.1.1 Steel Doors

Steel doors must be American National Standards Institute/Steel Door Institute (ANSI/SDI) A250.8, Level 4, exterior, main entry doors, with a physical performance level of, Model 1 or 2.

Doors may be specified to be insulated. Door selection must be specified in the project program according to the following:

a. Standard Duty Doors - Level 1, physical performance Level C, Model [1] [2]
b. Heavy Duty Doors - physical performance Level B, Model [1] [2]
c. Extra Heavy Duty Doors – ANSI/SDI A250.8, Level 3, physical performance Level A, Model [1] [2] [3]
d. Maximum Duty Doors – ANSI/SDI A250.8, Level 4, physical performance Level A, Model [1] [2]

B203001 1.1.2 Residential Insulated Steel Entry Door Systems

Provide insulated steel doors and frames for residential construction with a core of polyurethane foam and an R factor of 10.0 or more (based on a k value of 0.16). Face sheets, edges, and frames of galvanized steel not lighter than 23 gage thick (0.7 mm), 16 gage (1.5 mm) and 16 gage (1.5 mm) respectively; for paneled door faces, or 16 gage thick (1.5 mm) for solid doors, with vinyl door bottom flashing. Frames must be a minimum 16 gage thick (1.5 mm); with magnetic weatherstripping; nonremovable-pin hinges; thermal-break aluminum threshold. Doors and frames must receive phosphate treatment, rust-inhibitive primer, and baked acrylic enamel finish. Doors must have been tested in accordance with SDI/DOOR A250.4 and must have met the requirements for Level C. Prepare doors to receive specified hardware. Doors must be 1-3/4 inch (44.5 mm) thick.

B203001 1.1.3 Insulation Cores

Provide insulated cores of type specified, and provide an apparent U-factor of .48 in accordance with SDI 113 and must conform to:

a. Rigid Polyurethane Foam: ASTM C591, Type 1 or 2, foamed-in-place or in board form, with oxygen index of not less than 22 percent when tested in accordance with ASTM D2863; or
b. Rigid Polystyrene Foam Board: ASTM C578, Type I or II; or
c. Mineral board: ASTM C612, Type I.

B203001 1.1.4 Accessories

a. Provide stationary, sight-proof type louvers which comply with SDI 111-C. Use lightproof louvers if function of room requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage.
b. Astragals: For pairs of exterior steel doors that will not have aluminum astragals or removable mullions, provide overlapping steel astragals with the doors.
c. Moldings: Provide moldings around glass of exterior doors and louvers. Provide non-removable moldings on outside of exterior doors. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins must interlock at intersections and must be fitted and welded to stationary moldings.

B203001 1.1.5 Standard Steel Frames

ANSI/SDI A250.8. Form frames with welded corners for installation in exterior walls. Form stops and beads of 20 gage steel. Set frames in accordance with ASTM A250.11.

B203001 1.1.6 Anchors

Anchor all frames with a minimum of three jamb anchors and base steel anchors per frame, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gage. Mortar infill frames in masonry walls, and infill with gypsum board compound at each jamb anchor in metal frame walls. Only use surface exposed bolted anchors in concrete walls.

B203001 1.1.7 Finishes

a. Exterior Doors, Factory-Primed and Field Painted Finish – Doors and frames must be factory primed with a rust inhibitive coating as specified in ANSI/SDI A250.8. Factory prime doors on six sides of the door. Manufacturer's primer and field painting must be compatible with finish system in the paragraph "EXTERIOR PAINTING AND SPECIAL COATINGS".
b. Exterior Doors Galvanized Finish – Must be Commercial Quality, Coating Class A, zinc coating in accordance with ASTM A 591 when facility is located further than 300 feet (91 meters) from the ocean. When facility is located within 300 feet (91 meters) of the ocean, provide G60 galvanized coating in accordance with ASTM A 924/A 924M and ASTM A 653/A 653M.

B203001 1.2 WOOD DOORS

Solid wood or particleboard core with solid wood edge bands and reinforced at all hardware attachments to door with sound grade hardwood. Exterior wood doors are only allowed in residential construction where facility design, overhangs and porches eliminate direct rain/moisture contact from wind driven rain.

B203001 1.2.1 Stile and Rail Doors

Stile and rail doors must be premium or custom grade Ponderosa pine stile and rail doors conforming to WDMA I.S.6A-01, heavy duty.

B203001 1.2.2 Flush Doors

Flush doors must conform to WDMA I.S.1-A.

Exterior Flush Doors - Solid wood core, Type I conforming to WDMA I.S. 1-A.

B203001 1.2.3 Wood Door Louvers

Provide wood door louvers of the manufacturer's standard designwhich transmit a minimum of 35 percent free air. Louver must be a galvanized coated louvers with insect screens and comply with SDI 111-C, must be stationary, sight-proof type. Use lightproof louvers if function of room requires darkness.

B203001 1.2.4 Door Light Openings

Where glazed openings are required, use the manufacturer's standard wood moldings. Moldings for doors to receive a natural finish must be of the same species and color of the face veneer.

B203001 1.2.5 Fabrication

a. Marking - Each door must bear a stamp, brand or other identifying mark indicating quality and construction of the door.
b. Adhesives and Bonds - WDMA I.S. 1-A. Use Type I bond for exterior doors. Adhesive for doors to receive a natural finish must be non-staining.

B203001 1.3 FIBERGLASS REINFORCED PLASTIC (FRP) DOORS

Hardware preparation must be in accordance with ANSI/BHMA A156.115. Doors must be hung in accordance with ASTM E2112.

B203001 1.3.1 FRP Doors

Provide door and frame components including, but not limited to, astragals, cores, faces, stiles, rails, heads, jambs, and internal reinforcement, which are FRP structural shapes manufactured by the pultrusion process. Ensure all structural shapes are composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with ASCE 7, ICC/IBC and dimensions specified.

Ensure fiberglass reinforcements are a combination of continuous

roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.

Verify resins are of isophthalic polyester with chemical formulation necessary for corrosion resistance, strength and other physical properties as required.

Provide documentation that all pultruded structural shapes are further protected from ultraviolet (UV) attack with:

a. Integral UV inhibitors within the resin.
b. Synthetic surfacing veil to help produce a resin rich surface.

UV resistant coating for outdoor exposures.

B203001 1.3.2 Accessories

a. Louvers must comply with SDI 111-C, must be stationary, sight-proof type. Use lightproof louvers if function of room requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage. Cutouts for door lights and louvers are to be manufactured and not field fabricated. Cutouts are to be totally enclosed by internal pultruded FRP stiles and rails as specified and incorporated into the door subframe with the opening completely fused to both door faces.
b. Astragals: Provide an integral heavy pultruded FRP astragal on the stile edge of the inactive leaf for double doors of the same materials as specified for door stiles and rails.
c. Moldings: Provide moldings around glass of exterior doors and louvers. Provide non-removable moldings on outside of exterior doors. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins must interlock at intersections and must be fitted and welded to stationary moldings.

B203001 1.3.3 Standard FRP Frames

Provide FRP Door Frame utilizing a high-modulus pultruded structural FRP shape. Fabricate pultruded frame with a wall thickness of not less than 5 mm 3/16-inch. Frames are to be one-piece factory constructed with molded stop. Jambs and header to utilize miter corner connections chemically welded with FRP material ground for a visibly smooth frame face. Post and beam or mechanical fastened corners and joints are not acceptable. Provide sizes and shapes as detailed on the approved drawings.

Provide hardware reinforcement connections utilizing a chemical weld with FRP material at required locations. A minimum pull-out force strength of 1,100 lbs per screw is required for all hardware locations.

B203001 1.3.4 Anchors

Provide anchorage devices and fasteners where necessary for fastening fabricated FRP door frame to the adjacent construction-in-place as recommended by the FRP frame manufacturer.

B203001 1.3.5 Finishes

Ensure all finished surfaces of FRP items and fabrications are smooth, resin-rich, free of voids and without dry spots, cracks, and un-reinforced areas. Completely cover all glass fibers with resin to protect against their exposure due to wear or weathering. All stiles, rails, heads, jambs, and internal reinforcement are to be integrally pigmented.

B203002 GLAZED DOORS

B203002 1.1 ALUMINUM GLAZED DOORS

See B202002 STOREFRONTS, paragraph titled, "Doors and Frames."

B203004 OVERHEAD ROLL-UP AND OVERHEAD SECTIONAL DOORS

Refer to RFP PART 3, Chapter 6 for project specific exterior overhead sectional and roll-up doors system requirements. Do not use exterior roll-up doors as an entrance into conditioned spaces.

B203004 1.1 OVERHEAD ROLL-UP DOORS

Provide overhead doors in accordance with Door and Access Systems Manufacturers Association International (DASMA) requirements. Overhead roll-up doors must conform to ANSI/ DASMA 207. Provide overhead roll-up doors with minimum 22 gage thermal insulated slats, however use door weight, pressure, and width to determine if a heavier gauge slat is required. Electric operators must have protected 3-button switches conforming to National Electrical Manufacturers Association (NEMA) MG 1, NEMA ICS 1, and NEMA ICS 2. Galvanize door and sheet metal components in accordance with ASTM A653. Apply painted coat required in RFP Part 3, Chapter 6, over the galvanizing to all components directly exposed to the weather.

B203004 1.2 OVERHEAD SECTIONAL DOORS

Provide overhead doors in accordance with Door and Access Systems Manufacturers Association International (DASMA) requirements. Overhead sectional doors must conform to ANSI/DASMA 102 Completely close the door opening in the closed position and make the full width and height of the door opening available for use in the open position. Provide a 3 inch (75 mm) track when required by manufacturers standards, or design pressure and forces on the door, or if the door is equal to or greater than 16 feet (4877 mm) high or wide. Design door storage to allow full use of the space around the door for the activities required in the space. Provide a minimum of 16 inches (400 mm) of headroom for 2 inch (50 mm) tracks, 21 inches (525 mm) of headroom for 3 inch (75 mm) tracks, or a high lift type or vertical lift type. If motorized, provide limit switches to automatically stop doors at the fully open

and closed positions. Provide readily adjustable limit switch positions.

Doors must remain operable and undamaged after conclusion of tests conducted in accordance with ASTM E 330 using the design wind load. Form steel door sections of hot-dipped galvanized steel not lighter than 16 gage using a flush surface without ribs or grooves. Sections must be not less than 1 3/4 inches (44.50 mm) minimum panel thickness. Provide maximum insulation value to insulate doors as required to meet energy requirements. Cover interior of door sections with steel sheets of not lighter than 24 gauge to completely enclose the insulating material. Provide galvanized steel tracks not lighter than 14 gauge for 2 inch (50 mm) tracks and not lighter than 12 gauge for 3 inch (75 mm) track. Provide a positive locking device and cylinder lock with two keys on manually operated doors. Form aluminum door panels of 0.050 inch (1.3 mm) sheet aluminum and styles and rails of 6063-T6 aluminum. Galvanize door and steel sheet metal components in accordance with ASTM A653.

B203004 1.3 OVERHEAD DOOR FINISH

Finish steel door and components with hot dipped galvanized coating and apply a baked-on primer and topcoat painted finish. If powder coat finish is required in RFP Part 3, Chapter 6, painted system must conform to the following requirements;

a. Outgas Forgiving Primer

b. Film Thickness per ISO 2360 - 2.5-3.5 mils (60-80 Î¼m)

c. Mandrel Bending Test per ASTM D522 - 1/8 inches (3mm)

d. Impact Test per ASTM D2794 - Up to 80 in/lb. Cracking at the perimeter of the concave area

but no cracking pick off

e. Pencil Hardness per ASTM D3363 - 2H minimum.

f. Color Change per ASTM D2244 - â‰¤Î”Îµ 5.0 (Hunter)

g. Gloss Retention per ASTM D523 - >80%

h. Salt Spray Test per ASTM B117 - 3000 hours

B203005 HANGAR DOORS

Use UFGS Section 08 34 16.10, *Steel Sliding Hangar Doors*, or UFGS Section 08 34 16.20, *Vertical Lift Fabric Doors*, as required by Part 3 of the RFP.

B203006 BLAST RESISTANT DOORS

Provide blast resistant doors as required by Part 3 of the RFP in accordance with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

B203008 EXTERIOR DOOR HARDWARE

Provide the services of an Architectural Hardware Consultant (AHC), Certified Door Consultant (CDC), or an Electrified Hardware Consultant (EHC) to assist the Designer of Record in preparation of the door hardware schedule and product selection. The hardware consultant must sign and seal the door hardware construction submittal. Provide, as far as possible, door hardware of one manufacturer's make. All hardware must be clearly and permanently marked by the manufacturer where it will be visible after installation.

B203008 1.1 HINGES

BHMA A156.1, size to match door size, but in no case less than 4-1/2 x 4-1/2 inches (114 mm x 114 mm), with non-removable pin and anti-friction bearing hinges. Use two hinges for doors 60 inches (1500 mm) or less in height and one additional hinge for each additional 30 inches (750 mm), or fraction thereof, in door height.

B203008 1.2 PIVOTS

BHMA A156.4.

B203008 1.3 LOCKS AND LATCHES

Commercial (all construction except family housing) buildings locks and latches must be BHMA A 156.13, Series 1000, Operational Grade 1, Security Grade 2 for exterior building entrances and other high-use doors not requiring exit devices. Use BHMA A 156.2, Series 4000, Grade 1 for all Commercial buildings locks and latches not using Series 1000 hardware.

For Residential (family housing) projects, use Series 4000, Grade 2 hardware.

B203008 1.3.1 Combination Locks for Sensitive Areas and Vault Doors

If required for exterior use, see C102007 1.1.6 "Combination Locks" for the specification. This installation may require special weather protection.

B203008 1.3.2 Pushbutton Combination Locks

Where required, provide a heavy-duty, mechanical combination lockset with 5 pushbuttons, standard-sized knob or lever, 3/4 inch (19 mm) deadlocking latch with 2-3/4 inch (70 mm) back-set. Provide deadbolt key override option. Safelock, Simplex, and Venn are acceptable manufacturers. Provide a hardware grade equivalent to Grade 1, series 4000. Include a 5-year parts and labor warranty.

B203008 1.4 CARD KEY SYSTEM

Where required, provide card key type access units. Provide lithium battery powered, magnetic stripe keycard locksets that are ANSI/BHMA A156.13, Series 1000, Grade 1, mortise or ANSI/BHMA A156.2, Series

4000, Grade 1, cylindrical locks, tamper resistant, UL listed with 1 inch (25 mm) throw deadbolt, 3/4-inch (19 mm) throw latch bolt, auxiliary deadlocking latch, and 2-3/4 inch (68.75 mm) backset. The latch bolt and the dead bolt must be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks must be operated only by a correctly encoded keycard. Use of a newly issued keycard automatically re-keys the lock and voids the previous keycard. The lock must re-lock immediately after outside lever is turned and latch retracted. Locks must have memory that is capable of recording up to 140 entries into each room, identification of the keycard used to access the room, the date and time of entry. Entry information of the lock must be retrievable by a data key that can be inserted into the lock and then taken to the front desk printer to display information. Other components that are required for this system at the front desk are a personal or laptop computer, printer and encoder to program each key.

For exit device locks with card key access, provide mortise type, narrow stile exit devices with 24 volt DC, solenoid option for card key exterior access at aluminum storefront doors. Provide mortise type exit devices with 24 volt DC, solenoid option with alarm and remote exterior access for card key access at insulated hollow metal doors. The alarmed exit device must sound when exiting only.

Provide a card key system capable of accepting a minimum of 12 keycard access levels, security auditing and computer interfacing with existing installations management system. Provide a single point of contact customer service representative accessible by telephone with a 10-digit telephone number without additional dialing hierarchies except that a maximum 4-digit extension is permissible. On-site service must be provided within 3 hours from request within the first 12 months of occupancy. Provide a 5-year parts and labor warranty.

B203008 1.5 EXIT DEVICES

BHMA A 156.3, Grade 1. Provide on exit doors if it is anticipated that more than 50 people may use a particular door in an emergency exit situation. Touch bars must be provided in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.

B203008 1.6 EXIT LOCKS WITH ALARM

BHMA A 156.5.

B203008 1.7 CYLINDERS AND CORES

If required, provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores must have seven pin tumblers. Cylinders must be products of one manufacturer, and cores must be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets must have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

B203008 1.8 KEYING SYSTEM

Provide a master key system for the facility, unless more than one tenant/tenant command must reside in a facility, or a grand master keying system, or great, grand master keying system if multiple tenants or buildings are required. The keying system must be an extension of the existing keying system for additions to existing facilities. The keying system must allow for construction interchangeable cores when subcontractors require keys during construction. If required, provide a key cabinet.

The Contractor must coordinate a keying system meeting. The Contractor's Project Manager, Superintendent, Hardware Subcontractor, Electrical Subcontractor (if keying hardware is electric), Designer of Record, Contracting Officer, Public Works Base Hardware Specialist, and the Using Activity must attend this meeting to establish the keying system for the project. This meeting is intended to identify base limitations, the necessary security, and access control within the facility. The meeting must produce a marked up copy of the floor plan indicating the doors to receive locks and the doors to be keyed together, and any master keying or grand master keying.

B203008 1.9 KEYS

Furnish one file key, one duplicate key and one working key for each key exchange and for each master and grand master keying system.

B203008 1.10 LOCK TRIM

Cast, forged or heavy wrought construction and commercial plain in design.

B203008 1.10.1 Knobs and Roses

Knobs and roses must meet test requirements of BHMA A 156.2 and BHMA A 156.13.

B203008 1.10.2 Lever Handles

Provide lever handles in lieu of knobs as required by DoD Architectural Barriers Act (ABA) Standards. Lever handles must meet the test requirements of BHMA A 156.13 for mortise locks. All lever handles (mortise or cylinder) must be the freewheeling type.

B203008 1.11 DOOR BOLTS

BHMA A 156.16, Grade 1. Provide two flush bolts for each inactive leaf of a pair of doors.

B203008 1.12 CLOSERS

BHMA A 156.4, Series C02000, Grade 1, with PT 4C, 1-1/2 inch piston, heavy duty forged arm, full size case. Provide closers for all exterior doors, fire-rated doors, corridor doors, stairway doors, and secure

area doors, for non-residential (commercial) construction, as a minimum.

B203008 1.13 OVERHEAD HOLDERS

BHMA A 156.8, Grade 1. Provide for exterior doors for non-residential (commercial) construction.

B203008 1.14 DOOR PROTECTION PLATES

Kick plates must conform to BHMA A 156.6. Provide kick plates on all doors with closers and all doors leading to corridors or circulation spaces. Provide armor plates on all doors to receive cart traffic. Provide mop plates on all doors in rooms with a mopable floor finish that do not have kick plates.

B203008 1.15 DOOR STOPS AND SILENCERS

BHMA A 156.16. Provide silencers, Type L03011, three per single door and four per double door, for doors in hollow metal frames.

B203008 1.16 THRESHOLDS

BHMA A 156.21. Provide thresholds with offset to stop water infiltration, while maintaining accessibility requirements.

B203008 1.17 WEATHERSTRIPPING

BHMA A 156.22. Air leakage of weatherstripped doors must not exceed 0.5 CFM of air per square foot of door for residential doors, and 1.25 CFM for non-residential doors (unless a more restrictive infiltration level is specified).

B203008 1.18 RAIN DRIPS

For all exterior doors that open to the outside, where the door swing area is not covered by an overhang, provide top and bottom rain drips complying with ANSI R3Y535 as a minimum. Greater weather sealing may be required by the geographic location of the project.

B203008 1.19 FINISHES

Provide one of the following hardware finish systems, and match the interior door hardware:

a. BHMA A156.18. Hardware must have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which must have aluminum paint finish, and except steel hinges which must have BHMA 652 finish (satin chromium plated). Hinges for exterior doors must be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish. Exposed parts of concealed closers must have finish

to match lock and door trim. Hardware for aluminum doors must be finished to match the doors.

b. BHMA A156.18. Hardware must have BHMA 612 finish (satin bronze), unless specified otherwise. Surface door closers must have bronze paint finish. Steel hinges must have BHMA 639 finish (satin bronze plated). Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to match the doors. Hardware showing on interior of bathrooms, shower rooms, toilet rooms, washrooms, laundry rooms, and kitchens must have BHMA 629 finish (bright stainless steel) or BHMA 625 finish (bright chromium plated).

B203090 OTHER EXTERIOR SPECIALTY DOORS

Where required, provide special function exterior doors and gates and assemblies required for the proper operation and functioning of the facility. Exterior doors system may include factory-finished or painted doors and frames.

B203090 1.1 AUTOMATIC ENTRANCE DOORS

B203090 1.1.1 Automatic Swinging Entrance Door Controller

Automatic swinging entrance doors must be glazed aluminum doors and frames as specified in this section. Controller must be a dual function safety device that utilizes planar K-band microwave motion detectors and active infrared presence sensors at each door to protect individuals in the path of the swinging door. The planar K-band motion detector must be capable of sensing an individual moving as slow as 2.2 inches (55.8 mm) per foot. The infrared sensors must employ both diffused presence sensors that see through the plane of the door, and distance measuring sensors. The infrared sensors must constantly remain in operation. The safety device must call for reactivation or creep closing function, depending on the location of the sensor. If the sensor is located on the swing side, it will call for reactivation; if it is located on the pull side, it will call for creep closing function. Sensing system must be fully adjustable with a universal remote control, and meet or exceed the requirements of ANSI A156.10. System must include aluminum guard rails and signage for additional personnel safety.

B203090 1.1.2 Automatic Sliding Entrance Door Controller

Automatic sliding entrance doors must be glazed aluminum doors and frames as specified in this section. Controller must be a dual function safety device that utilizes planar K-band microwave motion detectors and focused active infrared presence sensors at each door to protect individuals in the path of the sliding door. The planar K-band motion detector must be capable of sensing an individual moving as slow as 2.2 inches (55.8 mm) per foot. The focused active infrared sensors must overlap their patterns for full coverage of the motion pattern and extend its range all the way to the floor surface. The infrared sensors must constantly remain in operation even when the door is in the closing cycle.

Door and frame must have a "break-away" feature that allows the door to be pushed open in an emergency exit situation.

-- End of Section --

SECTION B30

ROOFING
12/18

B30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

B30 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

B30 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01 Architecture UFC 3-110-03 Roofing)
UFC 1-200-02	High Performance and Sustainable Building Requirements

B30 1.1.2 Design Requirements

Wind Uplift Resistance: Determine the required wind uplift

resistance based on American Society of Civil Engineers (ASCE) 7 wind loading calculations or applicable building code requirements and UFC 3-301-01 *Architecture* and UFC 3-110-03 *Roofing*. The specified Factory Mutual (FM) rating incorporates a safety factor of 2 over the maximum calculated uplift pressure. Therefore, a FM rating of 1-90 correlates to a maximum uplift calculation of 2.2 kPa, 45 psf. When a rated system is specified, ensure the specified roof system is capable of meeting the wind uplift resistance specified. Where non-rated systems may be allowed and used, delineate calculated values in the roof specification or drawings. Utilize independently tested and rated roof systems, such as Factory Mutual (FM), Underwriters Laboratory (UL), and Single Ply Roofing Industry (SPRI).

The complete roof system assembly must be rated and installed to resist wind loads calculated in accordance with ASCE 7 and validated by uplift resistance testing in accordance with Factory Mutual (FM) test procedures. Non-rated systems must not be installed, except as approved by the Contracting Officer. Submit licensed engineer's wind uplift calculations and substantiating data to validate any non-rated roof system.

B30 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory roofing system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. All performance and acceptance testing including final/warranty inspections must be witnessed by the Contracting Officer on all significant roof projects.

A significant roof is defined as a single or group of buildings with greater than 15,000 square feet (1,400 m2) of roof area; or a roof with area that is allocated to energy generating equipment such as solar hot water panels or photovoltaic panels; or where building equipment (excluding HVAC), use, or safety causes multiple roof penetrations.

B30 1.2.1 Pre-Roofing Design Conference

If the project roof meets the definition of a significant roof above, provide a Pre-Roofing Design Conference. Schedule this conference prior to the roof design and roof layout of the facility. Required attendees include the Designer of Record (DOR), Design Quality Control (DQC) Manager, Roof Design Assurance Consultant (if applicable), Commissioning Authority, and Subcontractors directly responsible for installing the roof and equipment that will be mounted on the roof. Discuss and coordinate the following as a minimum:

a. Renewable energy systems to be mounted on the roof and interface with building systems and utilities,
b. Allocation of space on the roof for different functions,
c. Impact of renewable energy systems and building orientation to the suns path,
d. Waterproofing, flashing, and future reroofing considerations of the facility resulting from renewable

energy systems inclusion on the roof,

e. Measures taken to eliminate penetration of the roof membrane. National Roofing Contractors Association (NRCA) roof details proposed for each necessary penetration,
f. Structural requirements to support roof mounted equipment,
g. Aesthetic impact of roof mounted equipment on the facility and measures taken to mitigate negative appearances of equipment.
h. Maintenance and Commissioning requirements of the roof and roof mounted equipment to facilitate final testing and provide proper access and roof membrane protection.

B30 1.2.2 Pre-Roofing Conference

Prior to beginning roofing work, hold a Pre-Roofing Conference with the Contracting Officer. Required attendees include personnel directly responsible for the roofing systems design and construction, DQC Manager, Commissioning Authority, as well as the roofing manufacturer's technical representative, and Roof Design Consultant (if applicable). At this time the Contractor will address any conflicts between the proposed roofing system, the design documents, and the scheduling of work / workers (trades) to assure a watertight roofing installation. Resolutions will be obtained and documented in writing prior to the start of roofing work. A quality assurance/quality control plan must also be established at this time, inclusive of the roofing manufacturer's recommended testing and inspections procedures, and in accordance with industry standard guidelines.

Contractor must provide the following additional information at the pre-roofing conference: Procedure for the roof manufacturer’s technical representative's onsite inspection and acceptance of the roofing substrate, roof insulation, and installation of the roofing in accordance with the roof system warranty, the name of the manufacturer's technical representatives, the frequency of the onsite visits, copies of the roof status reports from the technical representatives to the roof manufacturer, and pertinent structural details to the roofing system.

B30 1.2.3 Roof Design Assurance

If the project roof meets the definition of a significant roof above, the Contractor must utilize the services of a Registered Roof Consultant (RRC) certified by the Roof Consultant Institute, or a Registered Professional Architect or Engineer who specializes in roofing, to approve the roof design. The roof consultant must derive his or her principal income from roofing design on the quality control staff of the Design or Design-Build team. The roof consultant must verify in writing that the design for the project is in accordance with the current edition of NRCA *Roofing and Waterproofing Manual*, UFC 3-110-03, the RFP, and standard industry practices and building codes.

B30 1.2.4 Low Slope Roof Drain Test

Plug roof drains and fill with water to the edge of the drain sump for 24 hours. Not all drains will be tested at one time. Measure water at the beginning and end of the 24-hour time period to ensure there is no leakage. Repeat testing until all leaks have been located, corrected, and no leaks found.

B30 1.2.5 Tests for Surface Dryness

Prior to application of roofing materials, perform surface dryness tests in presence of DOR. Asphalt of 350 to 400 degrees F (177 to 204 degrees C) must not foam upon contact with substrate. After foaming test is performed, test for strippability (adherence).

B30 1.2.6 Quality Control Program

Establish a quality control program to assure adherence to NRCA recommended Quality Control Guidelines for the Application of Roofing Systems and other specified application requirements. Compliance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*, is required.

B30 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures,* UFC 3-101-01, *Architecture* and UFC 3-110-03, *Roofing*.

B30 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

Test reports, color samples, certificates of conformance, warranties, close out documentation, and manufacturer's instructions for application and installation on all products used on the roof. Products used on the roof consist of but are not limited to structural deck, insulation, membrane or panels, Standing Seam Metal Roofing (SSMR), flashing, fasteners, nailers, accessories and equipment support curbs or equipment support stands for solar equipment, equipment roof plan, maintenance access and paths.

B3010 ROOF COVERINGS

Roof coverings must comply with the requirements of UFC 3-110-03, *Roofing*, and NRCA, *Roofing and Waterproofing Manual*found at http://www.nrca.net/rp/technical/manual/manual.aspx as the primary NAVFAC roofing criteria. Determine wind uplift using wind speed in accordance with ASCE-7.

Submit the INFORMATION CARD (see "Form 1" at the end of this section) Provide a typewritten card, laminated in plastic and framed in a weather-tight frame, or a photoengraved 0.032-inch (0.81 mm) thick aluminum card for the roof. This card must be a minimum size of 8 1/2 x 11 inch (216 x 280 mm) and contain information listed in the attached Form 1. Install the card where directed. Furnish framed card and a duplicate card to the Designer of Record.

B301001 STEEP SLOPE ROOF SYSTEMS

Slope conversions from low slope to steep slope roofing systems must specifically address temporary waterproofing protection where new framing connections penetrate the existing low slope system.

B301001 1.1 SLATE ROOFING

Install slate roofing systems in accordance with NRCA Standards.

B301001 1.1.1 Warranty

Contractor must supply manufacturer's standard warranty against defects in product workmanship and materials, including related metal flashing for a period of 30 years from the date of FINAL acceptance of the work.

B301001 1.1.2 Materials

a. Slate - Slate materials must meet the grading standards of the National Slate Association. Field punching of slate must be from the back of the slate.
b. Underlayment Membrane - For standard slate roofs, roofing felts must be un-perforated asphalt-saturated felts, No. 30 or heavier. For graduated slate roofs, two layers of felts must be applied with joints and laps staggered. When roof slopes are less than 4:12, a double layer of felt must be applied in mastic or hot asphalt must be applied. At the roofing perimeter, eaves, rakes, sidewalls, head walls, valleys and all penetrations, install self-adhering membrane (3 foot band minimum) (900 mm band minimum).
c. Fastening - Nails must be stainless steel or copper ring shank nails. Nails must be long enough to penetrate the roof sheathing with heads of sufficient diameter to prevent pullover of slate. Slate must hang on the shaft of the fastener, and drawn to, but not tight against the slate surface. Exposed nails on the top courses must be sealed. In high wind areas, provide mechanical fastening plus sealant adhesive attachment. Provide screws, wire ties, hook nails, tile locks and storm clips of brass, copper or stainless steel as recommended by the manufacturer for the project.
d. Flashing - Flashings for slate roofing must be 16 oz. (454 g) copper or 24 gage stainless steel, and 16 oz. (454 g) lead-coated copper, and must be protected to prevent the potential for galvanic action by having contact with dissimilar metals.
e. Snow Guards - Provide snow guards of type compatible with

roof system specified, and designed to meet design loads for the project location.

B301001 1.2 ASPHALT SHINGLES

The shingle roofing system shall be installed in accordance with NRCA *Roofing and Waterproofing Manual*(Latest Edition), "Steep Roofing", closed cut valley flashing shall not be allowed and per ASTM D 3462.

B301001 1.2.1 Warranties

Furnish to the Government the manufacturer's standard lifetime material warranty for the asphalt shingles. The Contractor must also warrant that the asphalt shingle roofing system, as installed, is free from defects in workmanship. Provide a minimum 10-year fungus resistance warranty in southern climate and areas susceptible to fungus growth on shingles.

B301001 1.2.2 Materials

a. Shingles - Shingles must meet ASTM D 3018, Type I, and ASTM D 3462, and must weigh not less than 210 pounds per 100 square feet (95 kg per 9.3 square meters). Shingles must meet the fire resistance requirements of Underwriters Laboratories (UL) 790 for Class 'A' and resist winds in accordance with ASCE-7 when tested in accordance with UL 997.
b. Shingle Underlayment - Asphalt-saturated felt conforming to ASTM D 226, Type I.
c. Self-Adhering Membrane - Self-adhering rubberized asphaltic membrane, a minimum of 40 mils thick. Provide at all ridges, valleys, sidewalls and starter strips.
d. Nails - 11 or 12 gauge hot-dipped galvanized steel, corrosion resistant roofing nails, with sharp points and flat heads 3/8 inch to 7/16 inch (9.5 mm to 11 mm) diameter. Shank diameter must be a minimum of 0.105 inch (2.7 mm) to a maximum of 0.135 inch (3.4 mm). Nails must be long enough to penetrate through all layers of roofing materials and achieve secure anchorage into a roof deck. A minimum of 4 nails must be used on a full width shingle, and six nails in high wind areas. Location of nails must be as shown in manufacturers printed installation instructions. Staples are not permitted as a means of attachment.
e. Asphalt Roof Cement - ASTM D 4586, Type II
f. Asphalt Primer - ASTM D 41

B301001 1.3 ROOF TILES

B301001 1.3.1 Warranty

The contractor must warrant for 30 years that the tile roofing system, as installed, is free from defects in workmanship.

B301001 1.3.2 Materials

a. Clay Tile - ASTM C 1167, machine-formed natural clay tiles, kiln-fired to vitrification and free from surface imperfections. Provide specially shaped units as required to provide watertight installation and closure. Form fastening holes prior to firing.
b. Concrete Tile - ASTM C 1492, molded or extruded, interlocking concrete roofing tile units, and specially shaped as required to provide a watertight installation and closure. Provide with cast-in anchor lugs, transverse weather checks and fastening holes.

B301001 1.3.3 Underlayment

Determine underlayment type by slope as follows:

10:12 slope and above must have a minimum of one layer of number 30 felt, laid in shingle fashion with a minimum of a 2 inch (50 mm) lap.

4:12 to 10:12 slopes must have a minimum of 2 layers of number 30 felt or one layer of a modified bitumen underlayment for use with standard size tile as long as tile is laid with a minimum of a 3 inch (75 mm) headlap. Underlayment must be laid shingle fashion with a 19-inch (480 mm) lap.

Tiles are not permitted to be laid on slopes less than 4:12.

a. Felt Underlayment - Asphalt saturated felt conforming to ASTM D 226, Type I.
b. Flexible Hip, Starter and Ridge Flashing - Provide SBS Modified rubberized asphalt adhesive on a linear, low-density polyethylene membrane with a 60 mil total thickness, or 40 mil thick self-adhered membrane underlayment in accordance with ASTM D 1970. At the roofing perimeter, eaves, rakes, sidewalls, head walls, valleys and all penetrations, install self-adhering membrane (3 foot (900 mm) band minimum).

B301001 1.3.4 Substrate Panels for Application Over Metal Deck

a. Glass Mesh Mortar Units - ASTM E 84, exterior type panels of Portland cement.
b. Fiberglass-Faced Gypsum Roof Board - ASTM 1177/C 1177M

B301001 1.3.5 Fasteners

a. Nails for Applying Felt Underlayment - Hot dip galvanized steel, 11 gage, of sufficient length to penetrate through

substrate panels.

b. Materials for Installation of Tile - Nails must be round-head, sharp point, 11 or 12 gauge, copper or stainless steel ring shank roofing nails. Nail heads must be low profile, smooth and flat. Shanks may be smooth, barbed or otherwise deformed for added pull out resistance. Nails should be of sufficient length to penetrate one inch (25 mm) into wood ridge and hip boards, or battens, with heads of sufficient size to prevent pullover of the tile.
1) Wind Locks must be of 10 gage copper or brass, 12 gage galvanized steel, or 0.084 inch (2.1 mm) stainless steel formed wire clips.

2) Provide hurricane clips with two nail holes in the horizontal leg for anchorage to deck or substrate.

3) Provide dual means of attachment of tile as follows, or as recommended by the tile manufacturer: Mechanical fastening plus hurricane clips, mechanical fastening plus foam setting, mechanical fastening plus sealant adhesive attachment of tile to tile in headlap areas.

B301001 1.3.6 Preservative-Treated Lumber - AWPA C1

B301001 1.3.7 Sheet Metal Flashing and Trim

Fabricate sheet metal flashing and trim of 20 oz. Copper, lead-coated copper or stainless steel to comply with SMACNA *Architectural Sheet Metal Manual*.

B301001 1.3.8 Bird-stop for Concrete Tile

Provide 20 oz. (567 g) copper, lead or stainless steel "L" section with 3-inch (75 mm) wide horizontal leg and vertical leg cut to conform to bottom profile of tile, or provide mortar formed bird-stops with weep holes, molded plastic bird-stops, or prefabricated tiles as recommended by roofing tile manufacturer.

B301001 1.3.9 Mortar

ASTM C 270, Type M mortar mix. Use of mortar set tile is not permitted in high-wind areas.

B301001 1.3.10 Asphaltic Plastic Cement

ASTM D 4586.

B301001 1.3.11 Foam-set Tile

Provide foam plastic adhesive designed to meet the concrete and clay tile roofing industries requirements for adhering roofing tile to specified roof underlayment assemblies. Foam adhesive must meet ASTM E 84, with a flame spread of less than 75. When tested in accordance with ASTM E 108, the roof covering system

must qualify as a Class 'A' roof covering system.

B301001 1.4 METAL ROOF PANELS (ARCHITECTURAL STANDING SEAM METAL ROOFS ON SUPPORTED SUBSTRATE)

B301001 1.4.1 Manufactured Sheet Metal Roofing

Provide galvanized steel or aluminum-zinc coated steel or aluminum panels formed at the manufacturing plant and conditioned for flatness. Determine panel thickness by the requirements of NRCA, *Roofing and Waterproofing Manual*, but not less than 24 gauge for panels less than 16 inches wide (400 mm), and 22 gauge for panels 16 inches (400 mm) wide or greater. All panels greater than 12 inches (300 mm) wide must have preformed reinforcing ribs or embossed for stiffening. The minimum gauge for aluminum panels must be 20-gauge, .032 inch thick (.8 mm thick) or greater. Roofing design must meet deflection and wind load requirements per building code.

The SSMR system covered under this specification must include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system must consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system.

a. Provide inverted "L" Standing Seam shape roofing panels.
b. Panel Protection - Treat exposed cut edges with compatible coating comparable to the factory applied coating system for corrosion protection.
c. Sealants - Provide non-curing, non-skinning butyl based sealants and tapes for concealed locations such as within laps and under eaves. Provide polyurethane and curing butyl elastomeric sealants for exposed locations such as along top edge of surface mounted counter flashings.
d. Factory Color Finish - Provide factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Provide exterior finish top coat of 70 percent polyvinylidene fluoride resin with not less than 0.8 mil dry film thickness. Provide exterior primer standard with panel manufacturer with not less than 0.8 mil dry film thickness. Interior finish must consist of 0.5 mil dry film thick backer coat if permanently concealed from view by construction or the same coating and dry film thickness as the exterior coating if the panel interior side will be exposed. Provide factory-applied clear 70 percent polyvinylidene fluoride (PVF), 0.8 mil top coat and edge coating on all factory-cut or unfinished panel edges for projects within 300 feet (91 meters) of the ocean

or industrial environments.

e. Warranty - Furnish manufacturer's no dollar limit materials and workmanship warranty for the roofing system. The warranty period must not be less than 20 years from the date of Government acceptance of the work. The warranty must be issued directly to the Government. The warranty must provide that if within the warranty period the metal roofing system becomes non-watertight or shows evidence of corrosion, perforation, peeling paint, rupture or excess weathering due to deterioration of the roofing system resulting from defective materials or workmanship the repair or replacement of the defective materials and correction of the defective workmanship must be the responsibility of the roofing system manufacturer. Repairs that become necessary because of defective materials and workmanship while roofing is under warranty must be performed within 7 days after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the manufacturer. Provide a 2-year contractor installation warranty. Coating must not show a color change greater than 5 NBS color units in accordance with ASTM D2244, and not show chalking in excess of 10 in accordance with ASTM D4214.

f. Wind Uplift - Metal roofing systems must be designed and attached to resist wind uplift pressures calculated in accordance with ASCE 7. Uplift resistance must be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL), or ASTM uplift resistance test procedures.

B301001 1.4.2 Metal Roof Design Requirements

Design the SSMR system as a complete system. Roof panels, components, transitions, accessories, and assemblies must be supplied by the same roofing system manufacturer. Provide to the DOR a design analysis signed by a Registered Professional Engineer employed by the SSMR manufacturer. The design analysis must include a list of the design loads, and complete calculations for the roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and indicate how expected thermal movements are accommodated.

B301001 1.4.3 Accessories

Provide other sheet metal flashings, trim moldings, closure strips, caps and other preformed metal panel accessories, of the same material, thickness and finish as panels, except accessories that are concealed after installation, and are aluminum or zinc-coated steel may be provided unfinished. Provide molded closure strips of closed-cell or solid-cell synthetic rubber, neoprene, or polyvinyl chloride premolded to match configurations of

preformed metal panels. All accessories must be manufactured or approved by the roof panel manufacturer.

B301001 1.4.4 Fasteners

Provide concealed fasteners for attaching panels to structural supports and to adjoining panels as approved and in accordance with printed manufacturer's recommendations.

B301001 1.4.5 Field Quality Control

Install in accordance with the approved manufacturer's erection instructions, shop drawings, and diagrams. Panels must be in full and firm contact with attachment clips. Where prefinished panels are cut in the field, or where any of the factory applied coverings or coatings are abraded or damaged in handling or installation, they must, after necessary repairs have been made with material of the same color as the weather coating, be approved before being installed. Seal openings through panels. Correct defects or errors in the materials. Replace materials which cannot be corrected in an approved manner with nondefective materials. Provide molded closure strips where necessary to provide weathertight construction. Use shims as required to ensure attachment clip line is true. Use a spacing gage at each row of panels to ensure that panel width is not stretched or shortened. Provide 30-pound layer of asphalt-saturated felt placed perpendicular to roof slope, covered by a slip sheet. Overlap side and end laps 75 mm 3 inches, offset seams in building paper with seams in felt.

Apply roofing panels with the standing seams parallel to the slope of the roof. Provide roofing panels in longest practical lengths from ridge to eaves (top to eaves on shed roofs), with no transverse joints except at the junction of ventilators, curbs, and similar openings. Install flashing to assure positive water drainage away from roof penetrations. Locate panel end laps such that fasteners do not engage supports or otherwise restrain the longitudinal thermal movement of panels. Attach panels to the structure with concealed clips incorporated into panel seams. Clip attachment must allow roof to move independently of the structure, except at fixed points as necessary.

B301001 1.5 STRUCTURAL METAL ROOFING SYSTEM

B301001 1.5.1 Structural Standing Seam Metal Roof (SSSMR) System

The SSSMR system covered under this specification must include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system must consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake,

gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system.

B301001 1.5.2 Design Requirements

Design the SSSMR system as a complete system, in accordance with ASCE 7. Provide a design for framing members and connections not indicated on the drawings. Roof panels, components, transitions, accessories, and assemblies must be supplied by the same roofing system manufacturer. Provide to the DOR a design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis must include a list of the design loads, and complete calculations for the support system (when provided by the Contractor), roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and indicate how expected thermal movements are accommodated.

a. Dead Loads - The dead load is the weight of the SSSMR system. Collateral loads such as sprinklers, mechanical and electrical systems, and ceilings must not be attached to the panels.
b. Concentrated Loads - The panels and anchor clips must be capable of supporting a 300 pound concentrated load. The concentrated load must be applied at the panel mid-span and will be resisted by a single standing seam metal roof panel assumed to be acting as a beam. Use the un-deformed shape of the panel to determine the section properties.
c. Uniform Loads - The panels and concealed anchor clips must be capable of supporting the minimum uniform live load specified in the project program.
d. Roof Snow Loads - The design roof snow loads must be shown on the contract drawings.
e. Wind Loads - The design wind uplift pressure for the roof system must be shown on the contract drawings. The design uplift force for each connection assembly must be the pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below must be applied to the design force and compared against the ultimate capacity. Prying must be considered when figuring fastener design loads.

    1) Single fastener in each connection.....3.0

    2) Two or more fasteners in each connection...2.25
f. Framing Members Supporting the SSSMR System - Design of new or revised framing members and their connections must in accordance with American Institute of Steel Construction (AISC) 335, American Iron and Steel Institute (AISI) SG-973, or SJI Specs & Tables. Maximum deflection under applied live load, snow, or wind load must not exceed 1/180 of the span length.
g. Roof Panels Design – Deflections must be based on panels being continuous across three or more supports. Deflection

must be calculated and measured along the major ribs of the panels.

1) Design steel panels in accordance with AISI SG-973.

2) Design aluminum panels in accordance with AA ADM. The panel deflection from concentrated loads must not exceed 1/180 of the span length. The panel deflection under applied live load, snow, or wind load shall not exceed 1/180 times the span length.

B301001 1.5.3 Performance Requirements

a. Test the SSSMR for wind uplift resistance in accordance with ASTM E 1592; SSSMR systems previously tested and approved may be acceptable.

b. SSSMRS Warranty Certificate -- At the completion of the project furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to this section, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weather-tightness warranty.

1) Contractor's Weather-tightness Warranty

Warranty the SSSMR system on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The SSSMR system covered under this warranty must include the entire roofing system including, but not limited to, the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system must consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, and skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system; and items specified in other sections of these specifications that are part of the SSSMR system. Repair all material and workmanship deficiencies, system deterioration caused by exposure to the elements /or inadequate resistance to specified design loads, water leaks and wind uplift damage as approved by the DOR. See the attached Contractor's required warranty for issue resolution of warrantable defects. This warranty must warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. Supplement this warranty with written warranties from the installer and system manufacturer, and submit them along

with Contractor's warranty; however, the Contractor will be ultimately responsible for this warranty

2) Manufacturer's Material Warranties

Furnish, in writing, the following manufacturer's material warranties which cover all SSSMR system components such as roof panels, anchor clips and fasteners, flashing, accessories, and trim, fabricated from coil material:

a) A manufacturer's 20-year material warranty warranting that the aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty must be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.

b) A manufacturer's 20-year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change color in excess of five CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to refinishing with an air-drying version of the specified finish or replacing the defective coated material.

c) A roofing system manufacturer's 20 year, non-prorated, system weather tightness warranty.

B301001 1.5.4 Roof Panels

Panels must be steel or aluminum and have a factory color or mill finish. Length of sheets must be sufficient to cover the entire length of any unbroken roof slope for slope lengths that do not exceed 30 feet. When length of run exceeds 30 feet and panel laps are provided, each sheet in the run must extend over three or more supports. Sheets longer than 100 feet may be furnished if approved by the DOR. Width of sheets must provide not more than 24 inches of coverage in place. SSSMR system with roofing panels greater than 12 inches in width must have standing seams rolled during installation by an electrically driven seaming machine.

a. Steel panels

1) Provide zinc-coated steel panels conforming to ASTM A 653/A 653M; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 or 50 coating; or aluminum-coated steel conforming to ASTM A 463/A 463M,Type 2, coating designation T2 65. Zinc, zinc-aluminum alloy or aluminum coated panels must be 0.023 inch (0.584 mm) thick minimum.

Panels must be within 95 percent of reported tested thickness as noted in wind uplift resistance testing required in paragraph "PERFORMANCE REQUIREMENTS".

2) Prior to shipment, if the panels are not specified with a factory color finish, mill finish panels must be treated with a passivating chemical to inhibit the formation of oxide corrosion products. Panels that have become wet during shipment and have started to oxidize will be rejected.

b. Aluminum Panels - Alloy conforming to ASTM B 209, temper as required for the forming operation, minimum 0.032 inch thick.

B301001 1.5.5 Concealed Anchor Clips

Concealed anchor clips must be the same as the tested roofing system.

B301001 1.5.6 Accessories

Flashing, trim, metal closure strips, caps and similar metal accessories must be the manufacturer's standard products. Exposed metal accessories must be finished to match the panels furnished.

B301001 1.5.7 Fasteners

Fasteners for steel roof panels must be zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for aluminum roof panels must be aluminum or corrosion resisting steel. Fasteners for structural connections must provide both tensile and shear ultimate strengths of not less than 750 pounds per fastener. Exposed roof fasteners must be sealed or have sealed washers on the exterior side of the roof to waterproof the fastener penetration. Washer material must be compatible with the roofing; have a minimum diameter of 3/8 inch for structural connections; and gasketed portion of fasteners or washers must be neoprene or other equally durable elastomeric material approximately 1/8 inch thick. Exposed fasteners for factory color finished panels must be factory finished to match the color of the panels.

a. Screws - Screws for attaching anchor devices must not be less than No. 14
b. Bolts - Bolts must not be less than 1/4 inch diameter, shouldered or plain shank as required, with locking washers and nuts.
c. Structural Blind Fasteners - Blind screw-type expandable fasteners must not be less than 1/4 inch diameter. Blind (pop) rivets must not be less than 9/32 inch minimum diameter.

B301001 1.5.8 Sub-purlins

Cold formed supporting structural members/sub-purlins must have a minimum thickness of 0.059 inches and a minimum tensile yield strength of 50000 psi. Hot rolled structural members must have a minimum thickness of 0.25 inches and a minimum tensile yield strength of 36000 psi. Sub-purlins must be galvanized or shop painted, as required by the project program.

B301001 1.5.9 Factory Color Finish

Panels must have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish must consist of a baked-on topcoat with an appropriate prime coat. The exterior coating must be a nominal 2 mil thickness consisting of a topcoat of not less than 0.7 mil dry film thickness and the paint manufacturer's recommended primer of not less than 1.0 mil thickness. The interior color finish must consist of the same coating and dry film thickness as the exterior. The exterior color finish must meet the test requirements specified below.

a. Salt Spray test - A sample of the sheets must withstand a cyclic corrosion test for a minimum of 2016 hours in accordance with ASTM D 5894, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating must receive a rating of not less than 10, no blistering, as determined by ASTM D 714; 10, no rusting, as determined by ASTM D 610; and a rating of 6, over 21/16 to 1/8 inch failure at scribe, as determined by ASTM D 1654.
b. Formability Test - When subjected to testing in accordance with ASTM D 522 Method B, 1/8 inch diameter mandrel, the coating film must show no evidence of cracking to the naked eye.
c. Humidity Test - When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel must show no signs of blistering, cracking, creepage or corrosion.
d. Impact Resistance - Factory-painted sheet must withstand direct and reverse impact in accordance with ASTM D 2794 0.500 inch diameter hemispherical head indenter, equal to 1.5 times the metal thickness in mils, expressed in inch-pounds, with no cracking.
e. Abrasion Resistance Test - When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system must withstand a minimum of 2.83 cubic feet (80 liters) of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.
f. Specular Gloss - Where considerations for flight line visibility (or other considerations) mandate, finished roof surfaces must have a specular gloss value of 10 or less at an angle of 85 degrees or 30 plus or minus the value specified in the project program at 60 degrees when measured in accordance with ASTM D 523.
g. Pollution Resistance - Coating must show no visual effects

when covered spot tested in a 10 percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

B301001 1.5.10 Insulation

Thermal resistance of insulation must not be less than the R-values shown on the contract drawings. Determine R-values at a mean temperature of 75 degrees F in accordance with ASTM C 518.

a. Polyisocyanurate Rigid Board Insulation for Use Above a Roof Deck - Polyisocyanurate insulation must conform to ASTM C 1289, Type II.
b. Blanket Insulation - Blanket insulation must conform to ASTM C 991.
c. Glass Mat Gypsum Roof Board - Glass mat gypsum roof board for use above the deck or insulation for thermal protection must have a flame spread - 0, smoke developed - 0, be water resistant and have a compressive strength of 500 psi. Glass mat gypsum roof board must conform to ASTM C 1177/C 1177M.

B301001 1.5.11 Sealant

Sealants must be elastomeric type containing no oil or asphalt. Exposed sealant must be colored to match the applicable building color or clear and must cure to a rubber like consistency. Sealant placed in the roof panel standing seam ribs must be provided in accordance with the manufacturer's recommendations.

B301001 1.5.12 Vapor Retarder

a. Vapor Retarders as Integral Facing - Alloy conforming to ASTM B 209, temper as required for the forming operation, minimum 0.032 inch thick. Insulation facing must have a permeability of 0.02 perm or less when tested in accordance with ASTM E 96.
b. Vapor Retarders Separate from Insulation - Vapor retarder material must be polyethylene sheeting conforming to ASTM D 4397. A single ply of 10 mil polyethylene sheet; or, at the Contractor's option, a double ply of 6 mil polyethylene sheet must be used. A fully compatible polyethylene tape with equal or better water vapor control characteristics than the vapor retarder material must be provided. A cloth industrial duct tape in a utility grade must also be provided to use as needed to protect the vapor retarder from puncturing.
c. Slip Sheet for Use with Vapor Retarder - Slip sheet for use with vapor retarder must be a 5 lb. per 100 square feet rosin-sized, unsaturated building paper.

B301001 1.5.13 EPDM Rubber Boots

Flashing devices around pipe penetrations must be flexible, one-piece devices molded from weather-resistant EPDM rubber. Rubber boot material must be as recommended by the manufacturer. The boots must have base rings made of aluminum or corrosion

resisting steel that conform to the contours of the roof panel to form a weather-tight seal.

B301001 1.5.14 Prefabricated Curbs and Equipment Support

Prefabricated curbs and equipment supports must be of structural quality, hot-dipped galvanized or galvanized sheet steel, factory primed and prepared for painting with mitered and welded joints. Provide integral base plates and water diverter crickets. Minimum height of curb must be 8 inches above finish roof. Construct curbs to match roof slope and to provide a level top surface for mounting of equipment. Curb flange(s) must be constructed to match configuration of roof panels. Coordinate curb size prior to curb fabrication with the mechanical equipment to be supported. Coordinate strength requirements for equipment supports to include all anticipated loads. Flashings must not be rigidly attached to underline structure.

B301002 LOW SLOPE ROOF SYSTEMS

B301002 1.1 GENERAL REQUIREMENTS

a. Warranty (Except SSMRS) - Furnish the roofing system manufacturer's materials and workmanship warranty for the roofing system. The warranty period must not be less than 20 years from the date the Government acceptance of the work. The warranty must be issued directly to the Government and will not be limited in dollar value. The system warranty must include roofing membrane, insulation, flashings, accessories and attachments.
b. Wind Uplift - The complete roof covering assembly must be rated in accordance with FM P7825, capable of withstanding an uplift pressure as determined by ASCE-7, and FM I-49 for perimeter and flashing attachment.
c. Fire Safety - The complete roof covering assembly shall meet ASTM E 108, Class 1A or UL 790, Class A; and be listed as Fire-Classified roof deck construction in the UL Roofing Materials and Systems Directory (RMSD), or Class I roof deck construction in FM P7825. All components of the system must be UL labeled. Complete roof covering assembly must: 1) Be Class A or B rated in accordance with ASTM E 108 , FM 4470, or UL 790; and 2) Be listed as part of Fire-Classified roof deck construction in UL RMSD, or Class I roof deck construction in FM P7825c.
d. Traffic Pads - Provide on roof system to protect roof from foot traffic. Provide traffic pads from roof access to and around roof mounted mechanical equipment and underneath removable mechanical equipment access panels. Traffic pads must be of compatible material to roof.
e. Cool Roof - If required in RFP Part 2 or Part 3 comply with UFC 3-110-03, Roofing Chapter 1, Cool Roofs. Cool roof design must follow the requirements in UFC 3-110-03, *Roofing*, Chapter entitled "Cool Roofs".

B301002 1.2 BUILT-UP ASPHALT ROOFING (AGGREGATE SURFACED)

This paragraph covers the requirements for aggregate surfaced bituminous built-up roofing made up of glass felt, asphalt bitumen, and aggregate surfaced or modified bitumen cap sheet.

B301002 1.2.1 Materials

a. Asphalt - ASTM D 312, Type II, III or IV
b. Felts - Base Sheet (GB) – ASTM D 4601, Type II without perforations

   1) Ply Felt (GA) – ASTM D 2178, Type IV or VI

   2) Ventilating Base Sheet VB) – ASTM D 4897

   3) Flashing Felt (SBS Modified Base Sheet - MB) in accordance with ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade G (weighing 4.3(90 lbs./100sf), and a thickness of 130 mils) or Grade S (weighing 58 lbs./100sf and a thickness of 85 mils), ASTM D 6163 (with glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils) or S (weighing 58 lbs./100sf and a thickness of 85 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils) or S (weighing 70 lbs./100sf and a thickness of 115 mils).

   4) SBS Bitumen Cap Sheet (RSS) – ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils), ASTM D 6163 (with glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a thickness of 130 mils), ASTM D 6164 (with polyester reinforcing),
c. Primer - ASTM D 41
d. Asphalt Roof Cement - ASTM D 4586, Type II for vertical surfaces and Type I for horizontal surfaces.
e. Aggregate for Surfacing Built-up Roofing - ASTM D 1863
f. Fasteners - Provide metal fasteners of copper, aluminum or stainless steel, compatible with materials to be penetrated. Fasteners must be of sufficient length to achieve appropriate embedment or penetration into the substrate below.
g. Metal Discs - Flat discs or caps of zinc-coated steel not less than 28 gage and not less than 1-3/8 inches (35 mm) in diameter.
h. Traffic Pads - Preformed reprocessed rubber, compatible with the roof membrane, 1/4-inch (6.35 mm) minimum thickness, weighing not less than 1-1/2 pounds per square foot, to protect roof from foot traffic. Provide traffic pads around roof access and around roof mounted equipment and underneath removable mechanical equipment access panels.

B301002 1.2.2 FIELD QUALITY CONTROL

a. Tests for Surface Dryness - see paragraph B301002 1.2 for

Performance Verification and Acceptance Testing requirements.

B301002 1.3 ETHYLENE PROPYLENE DIENE TERPOLYMER (EPDM)

B301002 1.3.1 Materials

a. EPDM Sheet - ASTM D 4637. Ethylene Propylene Diene Monomer (EPDM), reinforced, 90 mil (2.3 mm) thick for fully adhered application. Seams must be sealed with seam tape versus liquid adhesive, unless previously approved by DOR.
b. Flashing and Flashing Accessories - Flashing, including perimeter flashing, flashing around roof penetrations, and prefabricated pipe seals, must be 0.06 inch (1.5 mm) minimum thick uncured EPDM sheet or 0.045 inch (1.1 mm) minimum thick cured EPDM.
c. Fasteners - Provide fasteners warranted by the roofing manufacturer for the EPDM sheet installation.
d. Roof Insulation - Provide rigid board insulation beneath the EPDM sheet as part of the warranted roof system, and compatible with the adhesive used in the installation.

B301002 1.4 MODIFIED BITUMINOUS MEMBRANE ROOFING

This paragraph covers the requirements for modified bituminous membrane sheet roofing, SBS modified for hot mopping or cold applied, with a minimum slope of 1/2 inch per foot. Provide a complete modified bitumen roofing system, to include insulation, flashings, felts, primers and adhesives as recommended for the installation either on a nailable (plywood or metal deck) or non-nailable (concrete) substrate, from the materials below. All work must follow the NRCA RoofMan guidelines and standards stated within this Section.

B301002 1.4.1 Materials

a. Asphalt - ASTM D 312, Type III or IV.
b. Ply Materials -

1) Ventilating Base Sheet (VB) – ASTM D 4897, Type II

2) Base Sheet (GB) – ASTM D 4601, ASTM D 1668, Type II without perforations

3) SBS Modified Base Sheet (MB) – ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade S weighing 58 lbs./100sf and a minimum thickness of 85 mils), ASTM D 6163 with glass fiber reinforcing), Type II, Grade S (weighing 58 lbs./100sf and a minimum thickness of 85 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade S (weighing 70 lbs./100sf and a minimum thickness of 115 mils).

4) SBS Interply Sheet: ASTM D 6162, ASTM D 6164, ASTM D 6163, Type I or II, Grade S, minimum 80 mils (2.0 mm)

thick.

5) SBS Bitumen Cap Sheet (RSS) – ASTM D 6162 (with combined polyester and glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a minimum thickness of 145 mils), ASTM D 6163 (with glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a minimum thickness of 145 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a minimum thickness of 145 mils). Provide polyester reinforced cap sheet on roofs expected to experience high levels of traffic, on roofs with congested equipment, where equipment is expected to receive regular service or high maintenance, and where other service conditions warrant.

c. Mineral Roofing Granules - Factory applied, requiring no further coating.
d. Primer - ASTM D 41
e. Asphalt Roof Cement - ASTM D 4586, Type II for vertical surfaces, Type I for horizontal surfaces.
f. Fasteners - Provide non-corrosive fasteners meeting the requirements of FM A/S4470.
g. Asphalt Adhesive - ASTM D 4479, Type III.
h. Reflective Coating - 100% Acrylic Elastomeric with Energy Star Rating exceeding the requirements of ASTM D-6083. Coating must be intended for use as a roof topcoat.

B301002 1.5 STRUCTURAL STANDING SEAM METAL ROOFING

See B301001 1.5.1 "Structural Standing Seam Metal Roof System" for SSSMR requirements.

B301003 ROOF INSULATION & FILL

Coordinate the insulation system with the mechanical design to suit the energy requirements of the facility.

B301003 1.1 MINERAL FIBER BLANKET INSULATION

This paragraph covers the requirements for mineral fiber blanket thermal insulation in attics and above ceilings.

B301003 1.1.1 Products

a. Blanket Insulation - ASTM C 665, Type I, II, or III, as appropriate for the installation, Class A, membrane-faced surface with a flame spread of 25 or less; and a smoke developed rating of 150 or less when tested in accordance with ASTM E 84. Indicate insulation R-values on the design drawings.
b. Blocking – Treated wood, metal, un-faced mineral fiber blankets in accordance with ASTM C665, Type I. Blocking around chimneys and other heat producing devices must be non-combustible and meet the requirements of ASTM E 136.
c. Vapor Retarder - 6 mil (minimum) thick polyethylene sheeting conforming to ASTM D 4397, with a water permeance

value of 1 perm or less when tested according with ASTM E 96.

B301003 1.2 ROOF AND DECK INSULATION

This paragraph covers the requirements for insulation materials used below the roofing systems.

B301003 1.2.1 Insulation Types

Roof insulation must have an R-value determined in accordance with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 90.1 and meet project energy goals and be one or an assembly of a maximum of three of the following materials and compatible with attachment methods for the specified insulation and roof system:

a. Expanded Perlite Board – ASTM C 728, minimum thickness of 3/4" boards, and 4' by 4' board size.
b. Polyisocyanurate Board – ASTM C 1289, with a minimum compressive strength of 138 kPa (20 psi), unless overlaid with another board with a comparable or greater compressive strength. Use insulation facer as recommended by the roofing material manufacturer. Board size is restricted to 4' by 4' when applied in direct contact with concrete deck.
c. Composite Boards – ASTM C 984 (Polyisocyanurate-perlite) or ASTM C 1050 (Polystyrene-wood fiberboard), Type III, Grade 1, Class A, or ASTM C 1289, Type V, oriented strand board or waferboard on one side and fibrous felt or glass fiber mat membrane or aluminum foil on the other.
d. Wood Fiber (high density) – ASTM C 208

B301003 1.2.2 Tapered Roof Insulation

On portions of the roof where the sloping of structure does not allow the minimum slopes, provide a factory tapered roof insulation system to provide positive drainage of roof system, and to include drainage around curbs, penetrations, and projections through the roof plane. For new construction, provide one layer of the tapered roof insulation assembly factory tapered to a slope not less than 1/2" per foot (13 mm per 300 mm). For re-roofing applications where slopes of 1/2" per foot (13 mm per 300 mm) cannot be achieved, provide a minimum of 1/4" per foot (6.35 mm per 300 mm) slope.

B301003 1.2.3 Protection Board

Provide for use as a thermal barrier (underlayment) or protection board for hot-mopped applications.

B301003 1.2.4 Glass Mat Gypsum Roof Board

ASTM C 1177, with a 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84.

B301003 1.2.5 Bitumens

a. Asphalt Primer - ASTM D 41
b. Asphalt - ASTM D 312, Type III or IV
c. Asphalt Roof Cement - ASTM D 4586, Type I for horizontal surfaces, Type II for vertical and sloped surfaces. Roof cement must be compatible with membrane materials.

B301003 1.2.6 Underlayment

a. Asphalt-Saturated Felt Base Sheet for Single Layer Application - ASTM D 4869, Type II or ASTM D 226, Type II (30 pounds).
b. Polymer-Modified Self-Adhering Bitumen Sheet, 40 mil (1.1 mm) minimum thickness. Provide at roof perimeter, valley and roof penetration locations as a minimum.

B301003 1.2.7 Seal at Penetrations

Provide pre-manufactured flashing components for use in single-ply roofing applications. Seal laps and penetrations to prevent moisture vapor penetration. Adhesives, sealants, prefabricated components and spray foam products may be required.

B301003 1.2.8 Fasteners

Fasteners must be flat, round or hexagonal steel (not less than 1-3/8"(35 mm) diameter) and 28 gage, or plastic plates (not less than 3 inches (75 mm) in diameter).

Fasteners in lightweight cellular concrete decks must penetrate at least 1 inch (25 mm) but not more than 1-1/2 inches (32 mm) into the deck. Withdrawal resistance from lightweight cellular concrete deck must not be less than 40 lbs.(18 kg) each, or 120 lbs. (54 kg) each in metal deck.

Fasteners in steel decks must be hardened fasteners or screws conforming to FM A/S4470 and listed in FM P7825 for Class I roof deck construction.

Fasteners must be place to withstand an uplift pressure required by the project program in the field of the roof and FM Loss Prevention Data Sheets (LPDS) 1-49 for perimeter component and flashing attachment.

Roofing Nails - Provide corrosion resistant ring shank nails of sufficient length to penetrate a minimum of 1 inch (25 mm) into wood nailers or so as to provide appropriate embedment in substrate below. Fasteners must conform to FM A/S4470, and be placed to withstand an uplift pressure of 90 psf (4.3 kPa) conforming to FM P7825, and FM 1-49 for perimeter fasteners.

B301003 1.2.9 Wood Nailers

Wood nailers must be pressure-preservative-treated in accordance with AWPA M2 Standards, permanently marked or branded, and installed flush with the top of the adjacent insulation board. Separate treated wood nailers from roofing metals with underlayment.

B301003 1.2.9.1 Fasteners

Provide stainless steel, double hot-dipped galvanized or other corrosion resistant fasteners recommended by the treatment manufacturer for use with treated wood.

B301004 FLASHINGS & TRIM

B301004 1.1 FLASHING AND SHEET METAL

This paragraph covers the requirements for flashing and sheet metal work including scuppers, splash pans, and sheet metal roofing. Provide flashing and sheet metal in accordance with roof manufacturer's printed installation instructions and in compliance with NRCA and SMACNA recommendations.

B301004 1.1.1 Materials

Furnish sheet metal items in minimum 8 to 10 foot (2.44 to 3.05 meter) lengths. Sheet metal items include the following: gutters, including hangers; downspouts; counter-flashings; gravel stops and fascias; cap, valley, stepped, base and eave flashings and related accessories.

a. Copper, Sheet and Strip - ASTM B 370, cold-rolled temper.
b. Lead-Coated Copper Sheet - ASTM B 101
c. Lead Sheet - Minimum weight 4 pounds per square foot (.19 kPa).
d. Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M. Galvanized steel items must have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.
e. Stainless Steel - ASTM A 167, Type 302 or 304, 2D finish, fully annealed, dead-soft temper.
f. Aluminum Alloy Sheet and Plate - ASTM B 209
g. Pre-Finished Aluminum - Provide trim, gravel stops and fascias of Pre-finished aluminum. Finish must be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.
h. Aluminum alloy, Extruded Bars, Rods, Shapes, and Tubes - ASTM B 221
i. Solder - ASTM B 32
j. Polyvinyl Chloride Reglet - ASTM D 1784, Type II
k. Asphalt Primer - ASTM D 41
l. Fasteners - Fasteners must be of the same or compatible metal with the item being fastened. Stainless steel fasteners must be used to fasten dissimilar materials.

B301004 1.1.2 Field Quality Control

Fabrication and installation of sheet metal items must be as follows:

a. Install work with watertight and hairline joints, without waves, warps, buckles, fastening stresses, or distortion, allowing for expansion and contraction.
b. Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry and free of defects and projections that could affect the application.
c. Provide sheet metal flashing in angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight.
d. Provide prefabricated inside and outside corners at all sheet metal intersection pieces. Minimum leg length must be 12 inches (300 mm), maximum length must be 18 inches (450 mm).
e. Fabricate sheet metal to conform to the contours of surfaces to which applied.
f. All sheet metal cap flashings must have waterproof membrane underlayment installed behind or below the metal components.
g. Provide conforming sheet metal closures at all flashing termination conditions.
h. Provide fastenings and accessories as required to provide a securely attached, watertight construction. Cleats must be a minimum of one gage heavier than the component to be attached.
i. Where sheet metal components are to be embedded in the roofing system, prime both sides of all metal flanges prior to installation.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited. The primary and secondary drainage systems must be sized in accordance with applicable Plumbing and Building Codes. Finish must be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.

B301006 ROOF OPENINGS AND SUPPORTS

B301006 1.1 GENERAL REQUIREMENTS

Provide flashings for roof openings and supports as recommended by the NRCA and as specified below:

When existing pitch pans cannot be avoided and must be utilized, insure pitch pan is a preformed pan with minimum 4-inch (100 mm) height and 2-inch (50 mm) flange with 2-inch (50 mm) clearance on all sides of the penetration. Fill bottom 1/3 with non-shrink grout. Fill remainder with

pourable elastomeric sealer sloped to drain. For round penetrations, provide a metal umbrella cap clamped to the penetration.

Assure all penetration flashings extend minimum 8 inches (200 mm) above the finished roof surface. Use round shapes to construct equipment supports. Equipment supports should be raised on a continuous curb a minimum of 14 inches (350 mm), but not less than as required by the NRCA.

B301006 1.2 ROOF HATCHES

Construct using NRCA approved techniques and details. Provide roof hatch where required by Occupational Safety and Health Administration (OSHA), or as access to roof when roof mounted equipment is used or other routine roof maintenance is required.

B301006 1.2.1 Construction

Provide insulated roof hatches of 14 gage galvanized steel with 22 gage galvanized steel liner or 18 gage aluminum liner, and have integral curb, flange and flashings for securing to roof deck. Hinge must be heavy-duty zinc plated steel with non-removable pins. Latching mechanism must be zinc-coated steel slam latch with inside and outside levers. Springs must be greased compression springs in telescopic tubes. Provide interior locking of roof hatch. Provide a safety rail or ladder extension. Size roof hatch to allow access of routine maintenance equipment, but not less than 2'-6" x 3'-0" (750 mm x 900 mm). Hatch and access ladders must conform to OSHA and other applicable safety standards.

B301006 1.3 GLAZED ROOF OPENINGS

This paragraph covers the requirements for skylights manufactured from glass-fiber or thermoplastic carbonate.

Skylights and other glazed roof openings must be used only to supplement interior lighting levels (generally in steep slope or vertical applications), and otherwise, are discouraged from use. Proper detailing is critical, and must be scrutinized closely to minimize the likelihood of future leaks at these locations.

B301006 1.3.1 Warranty

Furnish to the Government the manufacturer's complete warranty for materials, workmanship and installation. The warranty is for 10 years from the time of project completion. The warranty must guarantee, but will not be limited to, the following:

a. Light transmission and color of the panels will not change after exposure to heat of 300 degrees F (149 degrees C) for 25 minutes.
b. There is no delamination of the panel affecting appearance, performance, weatherability or structural integrity of the panels or the completed system.

c. There is no fiberbloom on the panel face.
d. Change in light transmission of no more than 6% in accordance with ASTM D 1003, and in color (yellowing index) no more than 10 points in comparison to the original specified value over a 10-year period.

B301006 1.3.2 Skylight Panels

Skylight panels must be constructed of glass-fiber reinforced polyester or extruded cellular thermoplastic polycarbonate materials. Glass-fiber reinforced panels must conform to ASTM D 3841 and to the requirements of American Architectural Manufacturers Association (AAMA) 1600/I.S.7.

a. Non-Combustible Grid Core - The aluminum I-beams must be 6063-T6 with provisions for mechanical interlocking of muntin-mullion and perimeter to provide full bonding surface to contact the face material. Panels must withstand 1200 degrees F (650 degrees C) for a minimum of one hour without collapse or exterior flaming.
b. Adhesive - The laminate adhesive must meet the following requirements:1) Tensile strength of 750 psi-in. in accordance with ASTM C 297.2) Shear strength must meet or exceed the following in accordance with ASTM D 1002:a) 540 psi (3723 kPa) at 50% relative humidity and 73 degrees F (23 degrees C).b) 800 psi (5516 kPa) under accelerated aging in accordance with ASTM D 1037 at room temperature.c) 250 psi (1724 kPa) under accelerated aging in accordance with ASTM D 1037 at 182 degrees F (83 degrees C).d) 1400 psi (9653 kPa) after 500-hour Oxygen Bomb in accordance with ASTM D 572.e) 100 psi (690 kPa) at 182 degrees F (83 degrees C).
c. Panel Construction - Panels must consist of fiberglass faces laminated to an aluminum I-beam grid core and must not deflect more than 1.9 inches (48 mm) at 30 psf (1.44 kPa) in 10 feet (3.048 meters) in accordance with ASTM E 72, without a supporting frame.

B301006 1.3.3 Thermoplastic Polycarbonate Panels

The glazing panels must meet the following requirements:

a. The interior flame spread classification must be Class I in accordance with ASTM E 84, with a smoke developed rating no greater than 70 in accordance with ASTM D 2843.
b. The exterior and interior faces must be an approved light transmitting panel with a CC1 fire rating classification in accordance with ASTM D 635.
c. Self-ignition must be greater than 1058 degrees F (570 degrees C) in accordance with ASTM D 1929.
d. Fire rated roof assembly translucent panels must be successfully evaluated for fire from exterior exposure in accordance with ASTM E 108 to meet Class 'A' rating, and be listed by an independent recognized listing laboratory.

B301006 1.4 GUARDS

Provide rails or guards as required by the OSHA, the International Building Code or other applicable safety standards.

B301090 OTHER ROOFING

B301090 1.1 LIGHTNING PROTECTION

Lightning protection component penetrations and attachments must be sealed and flashed and anchored in a permanent manner and in a manner to avoid the degradation of the watertight integrity of the roof system. Do not cut or otherwise disturb the roof membrane. Mastic seals in the plane of the roof are unacceptable. Anchor plates set in mastic must be set on roof surface cleaned of aggregate and loose material prior to mastic application.

B301090 1.2 ROOF DRAINS (EXISTING)

Where existing roof drains are to be reused in roof replacement construction, provide new, compatible flashing materials, a new drain clamping ring and new bolts for anchorage. Reuse of existing clamping ring and bolts is unacceptable.

B301090 1.3 VEGETATED ROOFS

Where vegetated roofs are specified, provide additional technical specification for Government approval. Refer to UFC 3-110-03 and Whole Building Design Guide section titled "Vegetated Roof Covering ".

-- End of Section --

FORMS

ROOFING SYSTEM COMPONENTS

1. Contract Number: _____

2. Building Number and Location: _____

3. NAVFAC Specification Number: _____

4. Deck Type: _____

5. Slope of Deck: _____

6. Insulation Type and Thickness:_____

7. Insulation Manufacturer: _____

8. Vapor Retarder (_____) Yes (_____) No

9. Vapor Retarder Type: _____

10. Roofing Description: _____

Manufacturer (Name, address, and phone no.): _____

_____

Type: _____

Method of attachment: _____

11. Statement of Compliance or Exception: _____

_____

_____

12. Date Roof Completed: _____

13. Warranty Period: _____

14. Roofing Contractor (Name and Address):

_____

_____

_____

15. Prime Contractor (Name and Address):

_____

_____

_____

Contractor's Signature _____ Date: _____

Inspector's Signature _____ Date: _____

Form page 1

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

FACILITY DESCRIPTION_____

BUILDING NUMBER:_____

CONTRACT NUMBER:_____

CONTRACTOR

CONTRACTOR:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

OWNER

OWNER:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

CONSTRUCTION AGENT

CONSTRUCTION AGENT:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

Warranty page 1

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

THE SSSMR SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY _____ FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE. THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY INCLUDES, BUT IS NOT BE LIMITED TO, THE FOLLOWING: THE ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL MEMBERS, METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SECUREMENT COMPONENTS, AND ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH ASTM E 1592. IN ADDITION, THE SYSTEM PANEL FINISHES, SLIP SHEET, INSULATION, VAPOR RETARDER, ALL ACCESSORIES, COMPONENTS, AND TRIM AND ALL CONNECTIONS ARE INCLUDED. THIS INCLUDES ROOF PENETRATION ITEMS SUCH AS VENTS, CURBS, SKYLIGHTS; INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS; EAVES, RIDGE, HIP, VALLEY, RAKE, GABLE, WALL, OR OTHER ROOF SYSTEM FLASHINGS INSTALLED AND ANY OTHER COMPONENTS SPECIFIED WITHIN THIS CONTRACT TO PROVIDE A WEATHERTIGHT ROOF SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATIONS THAT ARE PART OF THE SSSMR SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE ASSOCIATED WITH THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY WILL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY COVERS THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON _____ AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

_____

(Company President) (Date)

Warranty page 2

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND INSTALLER OF THE SSSMR SYSTEM, AND SUBMIT THEM ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).

2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.

3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.

4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.

5. FAILURE OF ANY PART OF THE SSSMR SYSTEM DUE TO ACTIONS BY THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE.

6. THIS WARRANTY APPLIES TO THE SSSMR SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS THAT IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.

**

Warranty page 3

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

**REPORTS OF LEAKS AND SSSMR SYSTEM DEFICIENCIES WILL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS WILL BE INITIATED IMMEDIATELY; A WRITTEN PLAN WILL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT WILL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE SSSMR SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.

IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED, THE PARTIES WILL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES WILL CONFER WITHIN TEN (10) DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE (1) NAME REMAINS. THE REMAINING PERSON WILL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., WILL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT WILL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

A FRAMED COPY OF THIS WARRANTY WILL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

Warranty page 4

SECTION C10

INTERIOR CONSTRUCTION
12/18

C10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

C10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C10 1.1.1 Industry Standards and Codes

Sealant, Waterproofing & Restoration Institute

C10 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, Architecture UFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

C10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory interior construction assemblies' performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control* at no additional cost to the Government.

C10 1.2.1 Slump and Compressive Strength Tests for Grout

Slump between 8 and 11 inches (200 and 275 mm). Provide minimum grout strength of 2000 PSI in 28 days, as tested in accordance with American Society for Testing and Materials (ASTM) C 1019.

C10 1.2.2 Door Closure Field Test for Demountable Partitions, Retractable Partitions, Operable Panels, and Accordion Partitions

Perform a flashlight test of all joints in partitions and partition to wall, floor, and ceiling. No light from a flashlight must be visible from the opposite side of the partition. Adjust partition at locations where light is visible, and re-test.

C10 1.2.3 Field Test for Sprayed Fire-Resistive Materials

Engage a qualified testing and inspection agency to prepare testing and adhesion reports to test for bond strength. Test bond strength in accordance with ASTM E 736 and be found to meet the requirements in UL's *Fire Resistance Directory* for coating materials.

C10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

C10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

Doors, door hardware, windows and glazing, cabinets and countertops, casework, and fireproofing/firestopping.

All structural elements necessary for construction

C10 1.5 SUSTAINABILITY

Provide products and systems in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design Build*.

C1010 PARTITIONS

For general use, metal studs and standard grade GWB, CMU with prime filler coat, or CMU/cast-in-place concrete with GWB or skim coat plaster are acceptable unless stated otherwise in the Project Program. Reinforce points where doorknobs can strike a wall and anchorage points for wall mounted equipment.

Provide control joints and installation techniques as recommended by the manufacturer. See PTS Section C30, *Interior Finishes*, for additional information.

Provide painted GWB with access panels at surfaces furred for HVAC, plumbing and other utility services and controls behind wall surfaces.

Acceptable systems where "IMPACT RESISTANCE" (areas subject to physical abuse or wear) is designated in the project program requirements for impact resistance systems include:

a. CMU/cast-in-place concrete with or without plaster or furred impact resistant GWB or surface applied impact resistant textured acrylic architectural coating system.
b. GWB/metal stud system reinforced for impact resistance with a double layer of gypsum board using at least one layer of impact resistant gypsum board to resist denting and puncturing on the impact surface. If wall is subjected to impact on both sides, both sides of the stud require a double layer of gypsum board. Structural, mechanical, and acoustical design requirements effect the metal stud/gypsum support configuration.

C101001 FIXED PARTITIONS

Provide fixed partitions, except where demountable or retractable partitions are specifically required by the "Room Requirements", to include wood or metal studs, GWB, plaster, masonry and cast-in-place concrete walls. Sound-rated partition assemblies must have a minimum Sound Transmission Coefficient (STC) as required by the project program. Construct sound-rated bulkheads above partition assemblies for continuity to the deck above.

C101001 1.1 CAST-IN-PLACE INTERIOR CONCRETE WALLS

Accomplish work in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*, American Concrete Institute (ACI) 117 and 301/301M. Concrete Mix Design must be suitable for the job conditions.

C101001 1.2 MASONRY PARTITIONS

Accomplish work in accordance with ACI 530.1/ American Society of Civil Engineers (ASCE) 6/The Masonry Society (TMS) 602 and associated ASTM Standards for concrete masonry wall construction.

C101001 1.2.1 Testing

Determine masonry strength in accordance with ACI 530.1. Where

fire-rated assemblies are indicated, provide concrete masonry units that have been tested in conformance with ASTM E 119. Provide certificate of compliance to the Designer of Record (DOR) that the materials and assemblies meet the fire ratings indicated on the drawings.

C101001 1.2.2 Masonry Units Types

C101001 1.2.2.1 Concrete Masonry Units

Units of modular dimensions and air, water or steam cured. Surfaces of units to be plastered or stuccoed must be sufficiently rough to provide bond and exposed surfaces of units must be smooth and of uniform texture.

a. Hollow Load-Bearing Units: ASTM C 90, Type I or II, made of lightweight or normal weight aggregate.
b. Hollow Non-Load-Bearing Units: ASTM C 129, Type I or II, made with lightweight or normal weight aggregate.
c. Special Shapes: Provide special shapes as necessary to complete the work.
d. Fire-Rated CMU: Products must be tested and approved by United Laboratories (UL) according to testing methods described in ASTM E 119, and listed as 2, 3 or 4-hour fire-rated.

C101001 1.2.2.2 Glazed Structural Clay Tile

Provide glazed tile of Grade S, Type I, conforming to ASTM C 126. Tile for fire-rated walls must have the percent of solid required for that rating.

C101001 1.2.2.3 Pre-Faced Concrete Masonry Units

Provide pre-faced concrete masonry units conforming to ASTM C 744, load-bearing or non-load-bearing, lightweight, Grade N, Type I.

C101001 1.2.2.4 Glass Masonry Units

Provide glass block units made of clear colorless glass with polyvinyl butyl edge coating. Provide all aggregates, horizontal and vertical joint reinforcing, panel anchors, and expansion strip as recommended by the glass block manufacturer.

C101001 1.2.3 Masonry Partition Materials

a. Mortar - Provide ASTM C 270, Type N or S for non-shear-wall interior masonry. For Glass Block use Type S, White Portland cement.
b. Portland Cement - ASTM C 150, Type I, II, or III.
c. Masonry Cement - ASTM C 91, Type N, S, or M.
d. Sand - ASTM C144.
e. Grout - ASTM C 476, Fine aggregate for grouting cells /

spaces 3" (75 mm) or less, or coarse aggregate for grouting cells / spaces greater than 3" (75 mm). Slump between 8 and 11 inches (200 and 275 mm). Provide minimum grout strength of 2000 PSI in 28 days, as tested in accordance with ASTM C 1019.

C101001 1.2.4 Masonry Accessories

a. Horizontal Joint Reinforcement – Fabricate from cold drawn steel wire, ASTM A 82. Wire must be hot-dipped galvanized after fabrication in accordance with ASTM A 153/ A 153M, Class B-2, 1.5 ounces of zinc per square foot (42.52 g / 0.0929 sq. meter).
b. Anchors and Wall Ties – Provide of stainless steel, ASTM A 167, Type 304, or zinc-coated steel.
c. Reinforcing Bars – ASTM A 615 / A 615M.

C101001 1.3 COLD-FORMED METAL FRAMING

Provide Cold-Formed Metal Framing in accordance with the provisions of UFC 1-200-01, *General Building Requirements*, and the International Building Code (IBC).

C101001 1.3.1 Studs

Galvanized steel, ASTM A 653 / A 653M, SS Grade 50, G60

C101001 1.3.2 Framing Accessories

Fabricate steel-framing accessories of the same material and finish used for framing members, with minimum yield strength of 33,000 psi (230 Mpa). Accessories include, but are not limited to, the following: bracing, bridging, blocking, web stiffeners, end and foundation clips, gusset plates, stud kickers, knee braces, girts, joist hangers, reinforcing and backer plates.

Provide permanent metal-to-metal contact separation from stud to electrical conduits, plumbing pipes, and other internal wall system components, such as electrical wires.

C101001 1.4 METAL SUPPORT ASSEMBLIES

Provide steel materials for metal support systems with galvanized coating in accordance with ASTM A 653/ A 653M, G60; aluminum coating ASTM A 463/ A 463M, T1-25; or a 55% aluminum-zinc coating ASTM A 792.

C101001 1.4.1 Suspended and Furred Ceiling Systems, and Wall Furring

ASTM C 841(for lath); ASTM C 645 (for GWB).

C101001 1.4.2 Non-load-Bearing Wall Framing / Furring

ML/SFA MLF (for lath); ASTM C 645, but not thinner than 0.0179 inch (0.4547 mm) thickness. Provide 0.0329 inch (0.8357 mm) minimum thickness for supporting wall hung items such as

cabinetwork, equipment and fixtures and for GWB.

C101001 1.5 ROUGH CARPENTRY

Unless otherwise noted, conceal all rough carpentry from view. All framing and board lumber shall be graded and marked by a recognized association or independent inspection agency. Certification of grade is acceptable in lieu of grade markings. Framing lumber such as studs, plates, caps, bucks and nailers must be of the minimum grade for the application in accordance with the grading rules for the local species of framing and board lumber.

C101001 1.5.1 Moisture Content

Air-dry or kiln dry lumber as follows:

a. Framing lumber and boards – 19% maximum
b. Timbers 5" and thicker – 25% maximum

C101001 1.5.2 Fire-retardant Treatment

Comply with AWPA C20 or AWPA C27.

C101001 1.5.3 Preservative Treated Lumber

Preservative treated lumber must be in accordance with AWPA Standards.

C101001 1.5.4 Structural Lumber

Provide of species and grade as listed in AF&PA 101 that have the following minimum allowable unit stresses: 1050 Fb, 700 Fc with 1,200,000 E (for engineered uses) but not less than required by structural calculations.

C101001 1.5.5 Plywood, Structural

PS-1, PS-2.

a. Plywood (Concealed) - C-D grade, exposure 1 durability classification, span rating of 24/16 or greater.
b. Plywood Shear Walls - Structural I, C-C or C-D grade, and a minimum thickness of 1/2 inch (12.5 mm), but not less than required by structural calculations.

C101002 DEMOUNTABLE PARTITIONS

This paragraph covers unitized/component based demountable walls/partitions and associated work, including tracks and anchoring systems. Requirements and configurations must be in accordance with the project requirements. Majority of the components and hardware must be provided by a single manufacturer and on the manufacturer's current General Services Administration (GSA) pricelist.

C101002 1.1 PERFORMANCE REQUIREMENTS

C101002 1.1.1 Product Construction

Panels and framework must be unitized/component based(not stick built), and non-progressive. All panel components including frames, glass frames, door frames, base trim, ceiling trim, and tracks must be cold-formed steel or extruded aluminum and powder coated. Panels must be a minimum of 2-1/4" thick, and must have panels available between 6"-48" with 1/16" minimum with nominal widths and filler panels available. Panels must have no more than a Â¼" reveal between adjacent panels or the use of connectors in the same finish of the skin. Panels must have integrated leveling devices and have a minimum of Â½" adjustability at the ceiling and 1" of adjustability at the floor. Walls must be capable of hanging any manufacturer's systems furniture. Walls must meet seismic requirements when applicable.

C101002 1.1.2 Surface Skin

Wall surfaces to be available including fabric, wood veneer, plastic laminate, painted MDF, glass, plexi-glass, resin, dry erase board, metal, and custom paint, with the option of being be segmented or monolithic. Surfaces all be interchangeable with the ability to apply a new skin/finish.

C101002 1.1.3 Door Assemblies

Doors must be a minimum of 1-3/4" thick and available as a hinged or pivot door with the option of being a single or double doors, and with or without glass. All hardware to be included. Door and Frame assemblies must be aligned and fitted, and securely anchored to partitions.

C101002 1.1.4 Glazing

Comply with the Federal Safety Standard for Architectural Glazing Materials and must be factory installed. Options may include clear, frosted, patterned, custom etched, back painted, and available for use on panels and doors.

C101002 1.1.5 Burning Characteristics and Fire Endurance

The system must have a Class 'A' (under 25) flame spread rating in conformance with ASTM E 84.

Provide fabric and lining with a flame spread rating of 25 or less, fuel contribution rating of 15 or less, and a smoke generation of 50 or less when tested in accordance with ASTM E 84.

C101002 1.1.6 Acoustical Performance

Sound-rated partition assemblies must have a minimum Sound Transmission Coefficient (STC) as required by the RFP Part 3, Project Program. STC ratings must be laboratory test and documentation must be provided.

C101002 1.1.7 Structural Performance

Panel deflection must not exceed 1/120th of the vertical span when tested in accordance with ASTM E 72.

C101002 1.1.8 Electrical Requirements

Modular power options must be available within solid wall cavities, base areas and frames and must have open accessibility before, during and after installation. Power must be accessible to power and data cabling, disconnection, and reconnection to accommodate wall disassembly and relocation. Power Supply to consist of an 8-wire system with 3,3,2 circuits and 2+1 grounding or a 10-wire system with 4-4-2 circuits and 2+2 grounding with isolated grounding available. Underwriters Laboratories (UL) Listed manufactured wiring system rated for 20amp 120V/208V or 120V/240V. The components must have a permanent label listing manufacturer, catalog number, CSA/UL listing. Component's wiring must not be "de populated" to impede future configurations. Electrical system must be capable of working with other manufacturer's products. Light switch and outlet devices must be provided by the manufacturer and be fully pre-wired and pre-installed at the factory. Cables must have a J-Box option for hardwiring any manufacturer's furniture power feed cable. Receptacles to indicate which circuit within the modular wiring zone to which they are connected. Receptacles may/may-not be pre-dedicated but must be able to easily be switched to suit the user circuit requirements. Additional power and/or data modules & hardwired outlets (e.g. fire, safety, thermostats) must have the option of being installed on any panel.

C101002 1.1.9 Installation

To include all materials, labor, equipment, and additional seismic bracing as necessary, needed for a turn-key installation. Existing Walls, ceilings, ceiling suspension systems, or floors must not be altered or damaged to accommodate function of partitions. Manufacturer or manufacturer's representative must take field measurements prior to fabrication.

C101002 1.1.10 Field Test

Perform field tests as required in Paragraph C30 1.2 PERFORMANCE VERIFICATION AND FIELD TESTING.

C101002 1.2 WIRE MESH PARTITIONS

Wire mesh partitions must be complete with all items necessary for a useable, and rigid installation. Provide pre-manufactured assemblies with pre-bolted connections. Wire mesh partition doors require a means

of locking. Key and cylinder locks are required for partition doors used daily.

C101002 1.2.1 Materials

a. Steel shapes, plates and bars – ASTM A 36/ A 36M.
b. Cold-formed steel – American Iron and Steel Institute (AISI) SG-673.
c. Wire mesh – Provide carbon steel wire with woven diamond mesh and intermediate crimping. Wire must be 10-gauge mesh for seasonal storage, 6 gage mesh for protection of equipment and tools.

C101003 RETRACTABLE PARTITIONS

This paragraph covers all retractable partitions and associated work, including tracks and anchoring systems. Wall assemblies above retractable partitions must provide a sound barrier equal to, or greater than, the sound rating of the partition.

C101003 1.1 PERFORMANCE REQUIREMENTS

The retractable partitions below must meet the following performance requirements.

C101003 1.1.1 Burning Characteristics

The system must have a Class 'A' (under 25) flame spread rating in conformance with ASTM E 84.

C101003 1.1.2 Fire Endurance

Provide fabric and lining with a flame spread rating of 25 or less, fuel contribution rating of 15 or less, and a smoke generation of 50 or less when tested in accordance with ASTM E 84.

C101003 1.1.3 Acoustical Performance

Sound-rated partition assemblies must have a minimum Sound Transmission Coefficient (STC) as required by the project program. Construct sound-rated bulkheads above partition assemblies for continuity to the deck above.

C101003 1.1.4 Electrical Requirements

Electrically powered partitions must be controlled by electrical switches located in the room where the partitions are stored. Electrical outlets must be tied to the building electrical power system through over-head or end-mount base feeds.

C101003 1.1.5 Door Closure Field Test

Perform field tests as required in Paragraph C30 1.2 PERFORMANCE VERIFICATION AND FIELD TESTING.

C101003 1.2 PARTITION MATERIALS

a. Aluminum Extrusions - ASTM B221, Alloy 3003
b. Steel Sheets - ASTM A 653 / A653M
c. Fabric Coating - CFFA-W-101-B, Type II

C101003 1.2.1 OPERABLE PANEL PARTITIONS

Operable panel partitions must be factory finished, supported from an overhead track without floor guides, and complete with hardware, track, and accessories necessary for operation.

a. Suspension System - must consist of steel or heavy duty extruded aluminum track connected to the structural system by threaded rods, and trolleys designed to support the weight of the partition. Provide steel track of 16 gage minimum, phosphate treated and finished, or zinc or cadmium coated, or provide extruded aluminum track with minimum thickness of 1/8 inch (3.2 mm). Tracks must have an integral ceiling guard. Trolleys must have at least two ball bearing nylon or steel tired wheels spaced according to manufacturer's design criteria and four at an end post.

C101003 1.2.2 ACCORDION PARTITIONS

Provide full accordion type partitions, factory finished, supported from overhead track without floor guides, and complete with hardware, track, and accessories necessary for operation.

Suspension System – must consist of steel or aluminum track and trolleys designed to support the weight of the partition. Provide steel track of 16 gage minimum, phosphate treated and finished, or zinc or cadmium coated, or provide extruded aluminum track with minimum thickness of 1/8 inch (3.2 mm). Tracks must have an integral ceiling guard. Trolleys must have at least two ball bearing nylon or steel tired wheels spaced according to manufacturer's design criteria and four at an end post.

C101003 1.2.3 CUBICLE TRACK AND HARDWARE

Provide heavy-duty ceiling surface mounted tracks except in ceiling heights over nine feet, hanger mounted tracks may be used, with stainless steel fasteners. Track bends must have a minimum radius of 18 inches.

C101003 1.2.3.1 Materials

a. Extruded Aluminum Track - ASTM B 221 and ASTM B 456; alloy 6063-TS, channel shape minimum 1-1/4 inch (32 mm) wide by 1-1/8 inch (29 mm) deep, 0.050 inch (1.27 mm) minimum wall thickness.
b. Carrier Unit - Provide silent type with double canted wheel carrier. Wheels must have nylon on stainless steel hooks with swivel to support curtain. Provide

2.2 carriers for every foot of track length plus one additional carrier.

C101004 INTERIOR GUARDRAILS & SCREENS

This paragraph covers assemblies to include interior guardrails associated with open sides of floors, but not stairs' handrails. Also included are screens and associated work to include tracks and anchoring systems.

C101004 1.1 MATERIALS

a. Structural Carbon Steel - ASTM A 36/ A 36M
b. Structural Tubing - ASTM A 500
c. Steel Pipe - ASTM A 53, Type E or S, Grade B
d. Aluminum Alloy products - Products must conform to ASTM B 209 for sheet plate, and ASTM B 221 for extrusions, and ASTM B 26/B 26M or ASTM B 108 for castings, as applicable.

C101004 1.2 FABRICATION FINISHES

C101004 1.2.1 Galvanizing

Hot-dip galvanize steel items to be exposed to water contact. Zinc-coat steel in the largest unit possible. Galvanize in accordance with ASTM A 123/ A 123M, ASTM A 153/ A 153M or ASTM A 653/ A 653M, G90, as applicable.

C101004 1.2.2 Non-Ferrous Metal Surfaces

Protect by plating, Class I anodic coatings, or 70% polyvinylidene fluoride organic coatings. See Section C30 for additional coatings/finish information.

C101004 1.3 GUARDRAILS

Design guardrails in accordance with the International Building Code (IBC), except delete the handrail design load reduction for code exceptions for residential, prisons, industrial, high hazard, and storage facilities. Provide materials in accordance with NAAMM PR, and provide the same size rail and post. Provide pipe collars of the same material and finish as the handrail and posts.

C101005 INTERIOR WINDOWS

For fixed interior windows, assemblies include frames, glazing, caulking, and other associated work. For other window types, see PTS Section B20, *Exterior Enclosure*. Glazing for windows specified under this section is located in C101007, "Interior Glazing."

C101005 1.1 ALUMINUM WINDOWS

Each window unit must be a complete factory assembled unit with or without glass installed. Fabrication of window units must comply with American Architectural Manufacturers Association (AAMA) 101.

a. Fixed Windows - Type F, LC25 for residential, or HC40 for non-residential (commercial).
b. Sliding Glass Pass Windows - Frames and glass channels must be of heavy type 6063-TS aluminum extrusions. Provide 1/4-inch (6.35 mm) clear tempered glass.
c. Bullet-Resistant Pass Windows - Conform to UL classification (1 through 8) as required by the installation. Provide fixed, bullet-resistant glazing with pass tray for installations requiring high levels of security.

C101005 1.2 VISION PANELS

a. Wood Windows

Wood windows must consist of complete units, including sash, glass, frame and hardware. Window units must meet the Grade 40 requirements of AAMA 101. Wood members that will receive a transparent finish must be in one piece, not finger-jointed.

b. Plastic Windows

Provide PVC windows, reinforcing members, welded corners, fasteners, hardware and anchors conforming to AAMA 101 or ASTM D 4099.

1) Windows must be fixed or operable, as stated in the project program.

2) Material and Color - Window (PVC) color must be a consistent color all the way through the material.

c. Hollow Metal Vision Panels – must meet the requirements of hollow metal frames, paragraph C102001.

C101005 1.3 BULLET RESISTANT WINDOWS

Windows must meet UL Classification, Rating Level 1 through 8, as required for the installation and stated in the project program. Each window must be a complete factory-assembled unit with glass factory or field installed.

C101005 1.3.1 Glazing

Provide as specified under this section, paragraph entitled "Interior Glazing."

C101005 1.3.2 Setting Materials

Provide types required for the glazing applicable setting method specified in the GANA Glazing Manual. If sealants are employed, use elastomeric sealants, ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT.

C101005 1.4 FINISHES

Finish exposed aluminum or steel window surfaces as follows:

a. Anodic Coating

Architectural Class I (0.7 mil or thicker), designation AA-M10-C22-A41, clear (natural) or A42, integral color or A44, electrolytically deposited color anodized.

b. Organic Coating

Provide a high-performance coating in accordance with AAMA 2605 with a total dry film thickness not less than 1.2 mils (0.03 mm).

C101006 GLAZED PARTITIONS & STOREFRONTS

This paragraph covers fixed interior glazed partitions, including interior storefronts with doors. Assemblies include frames, glazing, caulking, and other associated work. See Section B20, *Exterior Enclosure*, for aluminum storefront framing components and performance requirements.

C101006 1.1 GLASS

Refer to "Interior Glazing".

C101006 1.2 SETTING AND SEALING MATERIALS

Provide as specified in the *GANA Glazing Manual*, SIGMA TM-3000 and SIGMA TB-3001, and in accordance with manufacturers recommendations.

C101007 INTERIOR GLAZING

ASTM C 1036, unless specified otherwise. Provide patterned glass where required to obscure view into bathrooms and dressing rooms.

Provide setting and sealing materials, stops and gaskets as recommended by the glass or acrylic sheet manufacturer.

Glazing thickness indicated in the following paragraphs is the minimum acceptable thickness. Provide thicker glazing if required by the code or the manufacturer for the given application.

C101007 1.1 GLASS

C101007 1.1.1 Clear Glass

Type I, class I (clear), quality q4 or q5 for patterned glass.

C101007 1.1.2 Wire Glass

Provide glazing of Type II, Class I, Form I, Quality q8 mesh stainless steel, diamond pattern, 1/4 inch (6.35 mm) thick. Glass must comply with ASTM E 163.

C101007 1.1.3 Patterned Glass

Type II, Class 1 (translucent), Form 3 (patterned), quality q7 (decorative), Finish f2 (patterned two sides), 1/8 inch (3.2 mm).

C101007 1.1.4 Laminated Glass

Fabricate from two pieces of Type I, Class 1, quality q3 glass laminated together with a clear, 0.030 inch (0.75 mm) thick polyvinyl butyral interlayer. Total thickness must be nominally 1/4 inch (6.35 mm).

C101007 1.1.5 Bullet-Resistant Glass

Provide bullet resistant composite glazing panel listed by UL with a power rating corresponding to the installation prescribed, and in accordance with UL 752.

C101007 1.1.6 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (clear), quality q3.

C101007 1.2 PLASTIC GLAZING

C101007 1.2.1 Bullet-Resistant Plastic Sheet

Bullet resistant rating in accordance with UL 752, Class I, clear in color. Only use bullet-resistant plastic sheet on existing interior windows that cannot be removed and replaced.

C101007 1.2.2 Polycarbonate Sheet

American National Standards Institute (ANSI) Z97.1, Mar-resistant, Clear and smooth both sides when used for vision glazing; Translucent, textured both sides when used for obscure glazing. Mar-resistant sheet must have a change in haze of between 5 and 8 percent under silica carbide test, 1600 grams, ASTM D 673.

Provide warranty for polycarbonate sheet glazing for a period of 5-years that includes the following:

a. Warranty Type I, Class A (UV Stabilized) sheets against breakage;
b. Warranty Type III (coated and mar-resistant) sheets against breakage and coating delamination.
c. Warranty Type IV (coated sheet) against breakage and yellowing

C101008 INTERIOR JOINT SEALANT

Sealant joint design and application must be in accordance with the general requirements of *Sealants: A Professionals' Guide*from the Sealant, Waterproofing & Restoration Institute. Refer to manufacturers' recommendations for chemical resistance.

C101008 1.1 JOINT SEALANT TYPES FOR INTERIOR WORK

Sealants must be paintable, and must match the color of adjacent

surfaces.

a. Vertical Surfaces - ASTM C 920, Type M, Grade NS, Class 25, Use NT.
b. Horizontal Surfaces - ASTM C 920, ASTM D 1190 for traffic surfaces, Type M, Class 25, Use T.
c. Pools and pool decks – for vertical joints, Gun grade: ASTM C 920, Type M, Grade NS, Class 25, NT; for horizontal deck traffic joints pourable: ASTM C 920, Type M, Grade P, Class 25, T
d. Food Service – Use a Vinyl Acetate Homopolymer, or other low VOC, non-toxic sealant approved for use in food preparation areas.
e. Chemical Resistance - Ensure that all sealants are chemically compatible or resistant to adjacent materials, or materials that may come into contact with the sealants in the course of the building life.

C1020 INTERIOR DOORS

Provide door hardware as specified in "Interior Door Hardware" in this section.

C102001 STANDARD INTERIOR DOORS

This paragraph covers all standard interior wood or hollow metal doors with frames, hardware, locks, and finish.

C102001 1.1 STEEL DOORS

Hardware preparation must be in accordance with Steel Door Institute (SDI) 17, American National Standards Institute/Door and Hardware Institute (ANSI/DHI) A115 and ANSI/SDI 100. Doors must be hung in accordance with ANSI/SDI 100.

C102001 1.1.1 Standard Steel Doors

ANSI A 250.8, Level 1, (occasional use, low abuse types such as closet doors without locks); Level 2, (low use, moderate abuse types such as office/storeroom doors); Level 3, (moderate use, high abuse types such as BEQ sleeping room doors); Level 4, (high use, high abuse types such as corridors, stairways, assembly spaces, and main entry doors), with a physical performance level of 'A'. Maximum door undercut must not exceed 3/4 inch (19 mm).

C102001 1.1.2 Sound Insulated Doors and Frames

Provide sound insulated door and frame assemblies into rooms requiring wall assemblies to be sound insulated with a Sound Transmission Class (STC) rating as required.

C102001 1.1.3 Accessories

a. Shelves for Dutch doors must comply with SDI 111-B, and be of steel not lighter than 16 gage.
b. Provide stationary, sight-proof type louvers which comply with SDI 111-C. Use lightproof louvers if function of room

requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage.

C102001 1.2 STANDARD STEEL FRAMES

ANSI A 250.8. Form frames with welded corners for installation in masonry partitions and knock-down field assembled corners for installation in metal stud and GWB partitions. Set frames in accordance with SDI 105. Form stops and beads with 20-gauge steel.

Provide a minimum of three jamb anchors and base steel anchors per frame, zinc-coated or painted with rust-inhibitive paint, not lighter the 18 gauge. Secure frames to previously installed concrete or masonry with expansion bolts in accordance with SDI 11-F. Provide mortar infill of frames in masonry walls, and gypsum board compound infill at each jamb anchor in metal frame walls.

C102001 1.3 FINISHES

a. Factory-Primed Finish. Doors and frames in non-humid, non-corrosive environments must be factory primed with a rust inhibitive coating as specified in ANSI A 250.8. Factory prime doors on six sides of the door.
b. Zinc-Iron Alloy Coating (Galvanealed) and Factory Primed Finish
c. Fabricate interior doors and frames (for installation in such rooms as kitchens, laboratories, battery charging, utility rooms and humid areas such as shower/drying areas, areas with frequent floor mopping, or corrosive chemical atmospheres) from zinc coated steel, alloyed type, complying with ASTM A 653/ A 653M. Factory prime doors and frames as specified in ANSI A 250.8.
d. Manufacturer’s primer must be compatible with door finish system in C30, Interior Coatings.

C102001 1.4 WOOD DOORS

C102001 1.4.1 Wood Doors and Frames

Install wood doors and frames according to workmanship requirements of the Architectural Woodwork Institute Quality Standard 900-T-4 Custom Grade. Wood door frames may only be used in residential construction.

For non-residential buildings provide extra-heavy doors for stairways, building entrances, corridors, assembly spaces, and other high use interior doors. Provide heavy duty doors for other non-residential locations and for residential buildings.

Wood doors must be solid wood doors with wood core and solid wood edge bands. Vertical edge bands must be one piece or laminated two-piece solid lumber to match face veneer species for natural finish wood doors. Reinforce door at all hardware attachments to door with sound grade hardwood. Horizontal edge bands must be solid wood or structural composite lumber.

a. Stile and Rail Doors Provide premium or select grade

Ponderosa pine, Douglas Fir, White Pine, or Yellow Poplar stile and rail doors conforming to Window and Door Manufacturers Association (WDMA) I.S.6A-01. Doors must be premium grade, heavy duty or as required by the project program.

b. Interior Flush Doors - Flush doors must conform to WDMA I.S.6A-01. Doors must be premium grade, heavy duty, or otherwise as required by the project program. Provide WDMA I.S. 1A-04 SCLC-5 structural composite lumber core, or staved lumber core, or PC-5 particleboard core construction. Do not use particleboard cores where it is anticipated that hardware may be screw mounted to the doors. Provide hardwood or softwood veneers cut for the best presentation for natural finishing of doors. Set match veneers of all components of a door opening. Face veneers must be 1/20" thick before sanding.

c. Closet Doors – Provide flush, paneled, or louvered doors of premium or custom grade, conforming to WDMA I.S.1A-01, premium or custom grade, heavy duty. Doors must be hinged or sliding.

d. Acoustical Doors and Frames - WDMA I.S 1-A-2004 WDMA I.S.6A-01. Doors must be premium or custom grade, heavy duty as required by the project program. Provide acoustical doors in solid core, constructed for door, hardware, and frame to provide a Sound Transmission Class (STC) rating of 39 (minimum) when tested in accordance with ASTM E 90.

C102001 1.4.2 Wood Door Accessories

a. Door Louvers - Louver must comply with SDI 111-C. Louver frames must be 20-gage steel with louver blades minimum 24 gage.

b. Door Light Openings - Provide glazed openings with the manufacturer's standard wood moldings. Moldings for doors to receive a natural finish must be of the same species and color of the face veneer.

C102001 1.4.3 Fabrication

a. Marking - Each door must bear a stamp, brand or other identifying mark indicating quality and construction of the door.

b. Adhesives and Bonds - WDMA I.S. 1-A. Use Type I (water-proof) adhesive for assembly of interior doors and for the fabrication of stiles, rails, crossbands, and veneers. Adhesive for doors to receive a natural finish must be non-staining. Type II (water resistant) is allowed for fabrication of core parts.

C102001 1.4.4 Finishes

Unless required otherwise by the project program, typically provide natural finish wood doors. Factory prime and or seal on all six sides of doors.

a. Factory Finish - Provide doors finished at the factory as follows: Architectural Woodwork Institute (AWI) Quality Standards Section 1500, specification for Conversion varnish, alkyd urea catalyzed polyurethane, or acrylated UV curable epoxy. The coating must be AWI Quality Standards premium, medium rubbed sheen, with an open or closed grain effect. Poly-wrap prefinished wood doors at factory for shipping.
b. Field Finish - Prepare doors in accordance with WDMA I.S.1-A-2004. Factory prime or seal doors. Manufacturer's primer or sealer must be compatible with door finish system in Section C30, *Interior Finishes*.
c. Plastic Laminate Finish - Factory applied, National Electrical Manufacturers Association (NEMA) LD 3, 0.050 inch (1.27 mm) minimum thickness.

C102002 GLAZED INTERIOR DOORS

This paragraph covers all glazed interior doors with glass, frames, hardware and locking devices. See paragraph entitled "Interior Glazing" in this section for glazing options.

C102002 1.1 ALUMINUM DOORS, FRAMES AND STOREFRONT

Provide swing-type aluminum doors and frames complete with framing members, transoms, side-lites, and accessories. Fabricate of ASTM B 221, Alloy 6063-TS for extrusions.

C102002 1.2 FABRICATION

C102002 1.2.1 Aluminum Frames

Provide frames with removable glass stops and glazing beads to accommodate fixed glazing. Countersink screws for exposed fastenings. Jointing of framing members must obtain hairline fit, be reinforced, and mechanically secured.

C102002 1.2.2 Aluminum Doors

Doors must not be less than 1-3/4 inches (44 mm) thick, with a minimum wall thickness of 0.125 inch (3.2 mm), except beads and trim, 0.050 inch (1.27 mm). Full glazed stile and rail doors must have medium or wide stiles and rails. Maximum water leakage of the door and frame must be "no uncontrolled water penetrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation." Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.

C102002 1.2.3 Welding and Fastening

Locate welds and fasteners on unexposed surfaces, where possible. Exposed welds must be dressed smoothly. Exposed fasteners must have counter-sunk heads. Weld concealed reinforcements for

hardware in place. Hardware reinforcements must be of stainless steel or steel with a hot-dipped galvanized finish, and must be secured with stainless steel screws.

C102002 1.2.4 Finishes

Provide exposed aluminum surfaces with factory finish of anodic or organic coating. Anodic coatings must conform to AA 45, with an Architectural Class I finish, 0.7 mil or thicker. Organic coatings must be a baked enamel finish in accordance with AAMA 2605 with a total dry film thickness not less than 1.2 mil. Exposed fasteners to match the door finish.

C102003 FIRE DOORS

This paragraph covers all interior fire doors, including all necessary frames, hardware, closing devices, and alarms associated with the door.

C102003 1.1 FIRE AND SMOKE DOORS AND FRAMES

Provide in conformance with National Fire Protection Association (NFPA) 80 an NFPA 105. Fire doors and frames must bear the label of UL, Factory Mutual (FM) or WHI attesting to the rating required. Door and frame assemblies must be tested for conformance with NFPA 252 or UL 10C (for positive pressure). Wood fire doors must also comply with ASTM E 152.

Provide stainless steel astragals complying with NFPA 80 for fire-rated assemblies and NFPA 105 for smoke control assemblies.

C102004 SLIDING AND FOLDING DOORS

Provide paneled or louvered closet doors of premium or custom grade, conforming to WDMA I.S.6A-01, heavy duty. Doors must be sliding or bi-folding, as required by the program.

C102005 INTERIOR OVERHEAD DOORS

Refer to RFP PART 4, B20 Exterior Enclosure - "Overhead Roll-Up and Overhead Sectional Doors" for interior overhead door requirements. Design for ASCE 7 wind loading not required for interior overhead doors.

C102006 INTERIOR GATES

Any special type gate installed in the interior of a facility, including frames, hardware, hoisting devices, finish, and other associated work.

C102007 INTERIOR DOOR HARDWARE

C102007 1.1 DOOR HARDWARE

Provide the services of an Architectural Hardware Consultant (AHC), Certified Door Consultant (CDC), or an Electrified Hardware Consultant (EHC) to assist the Designer of Record in preparation of the door hardware schedule and product selection. The hardware consultant must

sign and seal the door hardware construction submittal. Provide, as far as feasible, locks, hinges, pivots, and closers from one lock, hinge, pivot, or closer manufacturer's make. All door hardware must be clearly and permanently marked by the manufacturer, on a location to be visible after installation. Modify hardware as necessary to provide features indicated or specified. For necessary hardware items not indicated in these specification sections, provide American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) grade 1 rated hardware.

C102007 1.1.1 Hardware for Fire Doors

All hardware provided must meet the requirements of NFPA 80 for Fire Doors and NFPA 101 for exit doors. Hardware must bear the label of Underwriter's Laboratories, Inc., and be listed in UL BMD or labeled and listed by another testing laboratory acceptable to the contracting officer. Comply with NFPA 105 for smoke control assemblies.

C102007 1.1.2 Hinges

BHMA A156.1, Grade 1, 4-1/2 x 4-1/2 inches (108 x 108 mm) with non-removable pin or anti-friction bearing hinges.

C102007 1.1.3 Locks and Latches

For non-residential buildings use Series 1000, Operational Grade 1, Security Grade 2 for stairways, building entrances, corridors, assembly spaces, and other high use interior doors. Use Series 4000, Grade 1 for non-residential locations not using Series 1000 hardware. For residential buildings use Series 4000, Grade 2 for interior doors.

a. Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2.
b. Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1, or Grade 2.

C102007 1.1.4 Combination Locks

BHMA A 156.2. Heavy-duty, mechanical combination lockset with 5 pushbuttons, standard-sized knob or lever, 3/4-inch (19 mm) deadlocking latch, 2-3/4 inch (70 mm) back-set. Provide deadbolt key override option. Safelock, Simplex, and Venn are acceptable manufacturers. Provide a hardware grade equivalent to Grade 1, series 4000. Provide a 5-year parts and labor warranty.

A door into a sensitive area must be fitted with a GSA-approved pedestrian door deadbolt meeting Federal Specification FF-L-2740 Heavy-duty, combination Electromechanical Deadbolt lock for pedestrian doors, with a drill resistant dial ring mounting plate, 2-3/4 inch (70 mm) back-set, with Automatic Lock Reset, High-Security combination scramble, and resistant to all forms of external manipulation and environmental attack. Three Modes of

Operation: 1) The Single Combination Mode allows access by dialing a six-digit combination. 2) The Dual Combination Mode allows access only when two separate codes are entered within 10 seconds of one another. 3) The Supervisory/Subordinate Mode allows access by a subordinate only after a supervisor code has been entered. Audit Feature: Lock must have a full complement of auditing features, including non-resettable openings log, and unsuccessful attempts log (audits after 3 unsuccessful attempts) that resets once the proper access code is entered. Lock must generate its own electrical energy with each turn of the dial, with no batteries or wires required. Lock must be designed to fit industry standard door mounting pattern.

C102007 1.1.5 Card Key System

Provide card key type access units for specialized entries as required by the program. Provide lithium battery powered, magnetic stripe keycard locksets that are ANSI/BHMA A156.13, Series 1000, Grade 1, mortise or ANSI/BHMA A156.2, Series 4000, Grade 1, cylindrical locks, tamper resistant, UL listed with 1 inch (25 mm) throw deadbolt, 3/4-inch (19 mm) throw latch bolt, auxiliary dead-locking latch, and 2-3/4 inch (68.75 mm) backset. The latch bolt and the dead bolt must be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks must be operated only by a correctly encoded keycard. Use of a newly issued keycard automatically re-keys the lock and voids the previous keycard. The lock must re-lock immediately after outside lever is turned and latch retracted. Locks must have memory that is capable of recording up to 140 entries into each room, identification of the keycard used to access the room, the date and time of entry. Entry information of the lock must be retrievable by a data key that can be inserted into the lock and then taken to the front desk printer to display information. Other components that are required for this system at the front desk are a personal or laptop computer, printer and encoder to program each key.

For exit device locks with card key access, provide mortise type, narrow stile exit devices with 24-volt DC, solenoid option for card key exterior access at aluminum storefront doors. Provide mortise type exit devices with 24-volt DC, solenoid option with alarm and remote exterior access for card key access at insulated hollow metal doors. The alarmed exit device must sound when exiting only.

System must be capable of accepting a minimum of 12 keycard access levels, security auditing and computer interfacing with the existing or new management system. Provide a single point of contact customer service representative accessible by telephone with a 10-digit telephone number without additional dialing hierarchies except that a maximum 4-digit extension is permissible. On-site service must be provided within 3 hours from request within the first 12 months of occupancy. Provide a 5-year parts and labor warranty.

C102007 1.1.6 Exit Devices

BHMA A 156.3, Grade 1. Provide touch bars in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.

C102007 1.1.7 Cylinders and Cores

Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores must have seven pin tumblers. Cylinders must be products of one manufacturer, and cores must be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets must have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

C102007 1.1.8 Keying System

Provide a master key system for the facility unless more than one tenant/tenant command resides in a facility. Provide a grand master keying system, or great, grand master keying system if multiple tenants or multiple buildings are required. Provide an extension of the existing keying system for existing facility additions. Name the manufacturer of the existing locks, and indicate if they have interchangeable cores. Provide construction interchangeable cores when subcontractors require keys during construction.

Coordinate a keying system meeting. The Contractor's Project Manager, Superintendent, Hardware Subcontractor, Electrical Subcontractor (if keying hardware is electric), Designer of Record, Contracting Officer, Public Works Base Hardware Specialist, and the Using Activity must attend this meeting to establish the keying system for the project. This meeting is intended to identify base limitations, the necessary security, and access control within the facility. The meeting must produce a marked up copy of the floor plan indicating the doors to receive locks and the doors to be keyed together, and any master keying or grand master keying

C102007 1.1.9 Keys

Furnish one file key, one duplicate key and one working key for each key exchange and for each master and grand master keying system.

C102007 1.1.10 Key Cabinet and Control System

BHMA A 156.5. Provide key cabinet with 25% more key hooks than required for interior and exterior doors.

C102007 1.1.11 Lock Trim

Cast, forged or heavy wrought construction and commercial plain

in design.

a. Knobs and Roses - Knobs and roses must meet test requirements of BHMA A 156.2 and BHMA A 156.13.
b. Lever Handles - Provide lever handles in lieu of knobs, as required by DoD Architectural Barriers Act (ABA) Standards. All lever handles must have the freewheeling feature.

C102007 1.1.12 Door Bolts

BHMA A 156.16. Provide automatic latching flush bolts for double doors with both door leafs active, BHMA A 156.3, Type 25.

C102007 1.1.13 Closers

BHMA A 156.4, Series C02000, Grade 1, with PT 4C, 1-1/2 inch piston, heavy duty forged arm, with full size cover.

C102007 1.1.14 Overhead Holders

BHMA A 156.8, Grade 1.

C102007 1.1.15 Closer Holder-Release Devices

BHMA A 156.15, Grade 1.

C102007 1.1.16 Door Protection Plates

Provide armor, mop, and kick plates conforming to BHMA A 156.6. Provide door kick plates on all doors with closers and doors leading to corridors or circulation spaces. Provide armor plates on all doors that receive cart traffic. Provide mop plates on all doors in rooms that have a mop-able floor finish.

C102007 1.1.17 Door Stops and Silencers

BHMA A 156.16, Type L03011, three per single door and four per double door.

C102007 1.1.18 Thresholds

BHMA A 156.21.

C102007 1.1.19 Door Gasketing

BHMA A 156.22. Use light-proof gasketing for room functions that require darkness and integral sound-proof gasketing on acoustically rated doors.

C102007 1.1.20 Finishes

Provide one of the following hardware finish systems, matching the exterior hardware finish system.

a. BHMA A156.18. Hardware must have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which must have aluminum paint finish, and except steel hinges which must have BHMA 652 finish (satin chromium plated). Hinges for exterior doors must be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish except where BHMA 630 is specified under paragraph entitled "Hardware Sets". Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to match the doors.

b. BHMA A156.18. Hardware must have BHMA 612 finish (satin bronze), unless specified otherwise. Surface door closers must have bronze paint finish. Steel hinges must have BHMA 639 finish (satin bronze plated). Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to match the doors. Hardware showing on interior of bathrooms, shower rooms, toilet rooms, washrooms, laundry rooms, and kitchens must have BHMA 629 finish (bright stainless steel) or BHMA 625 finish (bright chromium plated).

C102090 OTHER INTERIOR SPECIALTY DOORS

C102090 1.1 ACCESS DOORS

Provide manufactured access doors and frames of 16-gage steel minimum with concealed pivots or a continuous piano hinge and flush stainless steel cam latch. Finish with manufacturer's standard primer coat finish and paint to match the wall or ceiling unless a stainless steel finish is required in the Project Program. Provide UL Rated access doors in fire rated assemblies. Access panels located in furred wall spaces must have an inserted material to match adjacent wall surface. Size access doors large enough to allow convenient hand and tool access and operation of controls and equipment beyond the door. If maintenance of controls or equipment beyond the door requires removal, size access door to allow removal and reinstallation of new equipment through the access door. Provide access panels capable of receiving finish material inserts in visible wall locations of habitable spaces.

C102091 OTHER INTERIOR PERSONNEL DOORS

Interior personnel doors not described by the assembly categories listed above.

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES AND TOILET PARTITIONS

This paragraph covers assemblies for individual compartments, cubicles, toilet partitions and urinal screens.

C103001 1.1 TOILET PARTITIONS

FS A-A-60003. Provide toilet compartments at multi-fixture toilet rooms of Type I, Style B-Ceiling Hung, C-Overhead Braced, or F-Overhead braced-alcove. Reinforce panels to receive partition-mounted accessories. Steel and Plastic toilet partitions must have a recovered materials content of 20 to 30 percent.

C103001 1.2 URINAL SCREENS

FS A-A-60003. Type III, Style A, floor supported and wall hung or Style D, wall hung. Wall hung urinal screens must be secured with continuous flanges to urinal screen and wall.

C103001 1.3 HARDWARE AND FITTINGS

Chrome-plated or stainless steel door latches and coat hooks. Provide one coat hook per compartment door. Latches and hinges for handicapped compartments must comply with DoD ABA Standards.

C103001 1.4 FINISHES

Finishes must comply with FS A-A-60003. Use only one type of partition per building.

a. Metal toilet partitions and urinal screens must be made of stainless steel.
b. Solid plastic partitions (HDPE) must be fabricated of polymer resins (polyethylene) formed under high pressure forming a single component section one inch thick. Color must extend throughout the panel thickness.
c. Phenolic core panels.
d. Laminated plastic partitions are acceptable in low or limited use applications (one or two toilet stalls per toilet room).

C103002 TOILET AND BATH ACCESSORIES

This paragraph covers toilet and bath accessories including, but not limited to, soap dispensers, paper holders, towel receptacles, grab bars, and bathroom mirrors.

C103002 1.1 TOILET AND BATH ACCESSORIES

C103002 1.1.1 Toilet Tissue Dispensers

Provide surface or recessed mounted dispensers fabricated of stainless steel. Provide one horizontally or vertically mounted double-roll dispenser per toilet compartment, unless otherwise indicated.

C103002 1.1.2 Paper Towel Dispensers

Provide one per pair of sinks in toilet rooms without electric hand dryers, and one per room with electric hand dryers, unless otherwise indicated. Provide surface or recessed mounted towel

dispenser constructed of a minimum 0.7mm 0.03 inch Type 304 stainless steel.

C103002 1.1.3 Combination Paper Towel Dispenser / Waste Receptacle

Provide a recessed or semi-recessed type with a capacity of 400 sheets of C-fold, single-fold, or quarter-fold towel and be constructed of 22-gage stainless steel. Provide one per pair of sinks, unless otherwise indicated. Provide the towel compartment door with a tumbler key lock locking mechanism.

C103002 1.1.4 Sanitary Napkin Disposal Units

Units must be toilet partition or wall mounted of not less than 22 gage stainless steel, with top and bottom hinged access doors. Provide one in each Woman's toilet stall, unless otherwise indicated. Each unit must have leak-proof receptacle for disposable liners. Provide fifty disposable liners of the type standard with the manufacturer.

C103002 1.1.5 Medicine Cabinets

Provide units with plate or float glass mirrors on doors. Provide doors and frames of 16-gage steel with a continuous piano hinge and flush magnetic latch.

C103002 1.1.6 Towel Bars

Provide stainless steel towel bars with a minimum thickness of 0.015 inch (0.4 mm).

C103002 1.1.7 Grab Bars

Provide stainless steel grab bars in accordance wtih DoD ABA Standards.

C103002 1.1.8 Robe Hooks

Provide stainless steel two-hook shape with integral wall flange, with a projection not less than 1-5/8 inches (41 mm).

C103002 1.1.9 Mirrors

Provide one manufactured framed electro-copper plated mirror per sink, or one full-size mirror for all sinks, unless otherwise indicated.

C103002 1.1.10 Soap Dispensers

Provide one soap dispenser per two sinks, with mechanical action dispensing valve. Do not mount soap dispenser on mirror. Surface mounted liquid type must consist of a vertical Type 304 stainless steel tank with holding capacity of 1.2L (40 fluid ounces) with a corrosion-resistant all-purpose valve.

C103002 1.1.11 Electric Hand Dryer

Provide wall mount and electric hand dryer designed to operate at 110/125 volts, 60 cycles, single phase alternating current with a heating element core rating of a maximum 2100 watts. Provide dryer housing of single piece construction and of chrome plated steel. Provide one unit per three sinks, unless otherwise indicated.

C103003 MARKER BOARDS AND TACK BOARDS

This paragraph covers all marker boards, tack boards and fastening devices.

C103003 1.1 MATERIALS

a. Porcelain Enamel - Marker board writing surface must be composed of porcelain enamel fused to a nominal 28 gage thick steel sheet, laminated to a 1/4-inch (6.35 mm) thick core material with a steel or foil backing sheet.
b. Cork must be a continuous resilient sheet made from soft, clean, granulated cork, relatively free from hardback and dust and bonded with a binder suitable for the intended purpose. The cork sheet must have a tensile strength of not less than 40 PSI (275.8 kPa) when tested in accordance with ASTM F 152.
c. Tack-board Covers - Provide woven fabric or vinyl wall covering over cork tack surface.
d. Aluminum - Aluminum frame extrusions must be alloy 6063-T5 or 6063-T6, conform to ASTM B 221, and be a minimum of 0.06 inches (1.5 mm) thick.
e. Hardwood - Exposed hardwood for frames, cabinets and cases must be oak, walnut or mahogany, with a factory applied stain and lacquer finish.
f. Glass - Provide tempered glass in accordance with ANSI Z97.1 and in conformance with ASTM C 1048.

C103003 1.2 PRESENTATION BOARD

The presentation board must be a laminate covered wall-hung cabinet with lockable doors. Doors are to be attached to the cabinet with continuous piano hinges, and have a catch or closure to keep doors closed when not in use. The interior of the cabinet must contain a porcelain enamel marker board writing surface with chalk-tray, a flip chart that can be hung on an interior door panel, and fabric covered tack surface on the interior door panels.

a. Marker Board - Marker board must be a factory assembled, one-piece unit, and have a 28 gauge nominal steel porcelain enamel writing surface and a chalk-tray with end closure. Frame must be aluminum, powder-coated steel, oak, walnut or mahogany.
b. Tack Board - Tack boards must consist of a minimum 1/4-inch (6.35 mm) thick natural cork laminated to a minimum 1/4-inch (6.35 mm) thick hardboard, must have an oak or aluminum frame, and be vinyl or fabric covered. Covers must have a Class 'A' flame spread rating of 0-50, and a smoke developed rating of 0-450 in accordance with ASTM E 84.

C103004 IDENTIFYING DEVICES

This paragraph covers all signs, plaques, and traffic markers.

C103004 1.1 ASSEMBLIES

The signage system assemblies must consist of three primary elements; a structural rail (with coordinating rail joiners to increase sign height in the field), removable copy inserts, and interlocking end caps or frame, and trim.

C103004 1.1.1 Inserts

The signage rails must be designed as to accept ABS plastic signage inserts.

C103004 1.1.1.1 Insert Fabrication

The insert is the signage member to which message signage copy in the form of letters, numbers, and symbols must be applied, and must be interchangeable with similar sized rails of any other sign of equal or greater width and height. The ends of the rail and insert assembly must be enclosed by end caps of prefinished 6064T5 extruded aluminum. Inserts must be fabricated from 0.090 minimum ultra-violet resistant thickness extruded ABS Acrylic sheet core with 20.003 polycarbonate non-glare clear cap bonded to the core during the extrusion texturing process.

C103004 1.1.2 End Caps

End caps must be injection-molded ABS plastic with integral color. The end caps must be interchangeable to either end of each sign type, and any other similar sign of equal height. The end caps must be interlocking mechanically with the inserts, and rail, requiring no tools for assembly. End caps must utilize straight corners (instead of radius corners). Spring clips must be steel. Plastic spring clips are not acceptable.

C103004 1.1.3 Trim

Optional accessory top and bottom trim frames of prefinished (color as indicated) 6063T5 extruded aluminum must be provided to the signage types indicated.

C103004 1.1.4 Mounting

Mounting of the modular signage system must include surface mounting with screw-on applications for interior and exterior walls and on selected doors as indicated, at the locations indicated, and other mounting devices as indicated.

C103004 1.1.5 Graphics Application

a. Tactile Letters and Symbols

Chemically weld tactile letters and symbols to front surface of signage inserts where indicated and where required by DoD ABA Standards. Tactile letters and symbols must be sized as indicated.

b. Braille

Grade II Braille. Provide Grad II Braille inlaid strip as indicated to match sign color.

C103004 1.2 ALUMINUM ALLOY PRODUCTS

Provide ASTM B 209 for aluminum sheet or plate, ASTM B 221 for aluminum extrusions and ASTM B 26/B 26M or ASTM B 108 for aluminum castings. Provide aluminum extrusions at least 1/8-inch (3.2 mm) thick and aluminum plate or sheet at least 16 gage thick. Provide aluminum castings of solid aluminum cast certified by AA 46 alloy designation B443.0. Where anodic coatings are specified, alloy must conform to Aluminum Association's alloy designation 514.0 or A514.0.

C103004 1.2.1 Aluminum Finishes

Provide exposed aluminum finishes with either mill finish, factory finished with anodic coating or organic coating. Anodized finishes must conform to AA 45, Architectural Class I or II, with a coating thickness 0.7 mil or thicker. Organic coatings must be a baked enamel finish with a dry film thickness not less than 1.2 mils, conforming to AAMA 605.2.

C103004 1.3 STEEL PRODUCTS

Provide ASTM A 36/A 36M for structural steel, ASTM A 167 for sheet and plates.

C103004 1.4 CAST METAL

a. Cast Aluminum, ASTM B 108
b. Cast Bronze, ASTM B 62

C103004 1.5 GLASS

ASTM C 1036, Type 1, Class 1, Quality q3

C103004 1.6 FIBER-REINFORCED POLYESTER (FRP)

ASTM D 3841, Type II, Grade 1

C103004 1.7 ACRYLIC SHEET

ASTM D 4802, Type III

C103004 1.8 POLYCARBONATE SHEET

SAE AMS 3611

C103004 1.9 EXTERIOR POST AND PANEL SIGNS

C103004 1.9.1 Posts and Panels

Provide one-piece extruded aluminum posts with not less than 0.125 inch (3.2 mm) wall thickness. Posts must permit attachment of panel framing system. Provide cap for each post. Panel framing system must consist of aluminum extrusions and interlocking track components designed to interlock with concealed fasteners. Panels must be fabricated of rectangular extruded tubular aluminum with a minimum wall thickness of 0.125 inches. Panels must be removable and interchangeable. Posts must be embedded in solid concrete foundation.

C103004 1.9.2 Illumination

Provide concealed lighting within panel framing members. Provide T-12 slim-line lamps,. Ballast must be integrally mounted with high power factor and rated for use in up to minus 20 degrees F (minus 29 degrees C) ambient starting temperature.

C103005 LOCKERS

C103005 1.1 STEEL CLOTHING LOCKERS

C103005 1.1.1 FS AA-L-00486 (Rev J), enameled steel.

Provide ventilated, Single Tier Units (unless multi-tier permitted by Project Program), fully framed. Provide galvanized or galvaneal shelves and bottoms for all lockers, and fully galvanized or galvaneal lockers in locker spaces adjoining shower rooms. Provide full height door stiffeners.

C103006 SHELVING

Assemblies include all types of shelving with brackets and all supporting materials and finish, if required.

C103007 FIRE EXTINGUISHER CABINETS

Cabinet must be constructed of 16 gauge cold-rolled steel door panel / front, and a 22 gauge cold-rolled steel tub. Cabinet must be fire-rated if located in a fire rated wall assembly, and have a full-length piano hinge, and baked enamel finish. Provide a stainless steel cabinet door if cabinet is exposed to the environment. Size and locate fire extinguisher cabinets to encase extinguisher as required by NFPA 10 & 101.

C103008 COUNTERS

C103008 1.1 LAMINATE COVERED COUNTER TOPS

Fabricate with lumber and a core of exterior grade plywood (A-C Grade) or particleboard (ANSI A208.1, Grade 1-M-2 or better), glued and screwed to form an integral unit. Bond laminated plastic under pressure to exposed surfaces using manufacturer’s recommended glue.

a. Countertops must be constructed to meet "Custom" quality grade as defined in AWI Quality Standards.
b. Finish must meet NEMA LD 3, Grade PF 42 for plastic laminate.

C103008 1.2 ACRYLIC COUNTER TOPS

Provide 100% acrylic counter tops for use in non-residential construction.

Solid surfacing material must consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material must be homogenous, not coated or laminated. Superficial damage to a depth of 0.010 inch (.254 mm) must be repairable by sanding or polishing. Install with factory recommended fasteners/adhesives/sealant. Provide the following performance characteristics:

a. Tensile strength, ASTM D 638: 5800 psi minimum
b. Hardness, ASTM D 2583: Barcol Impressor 55 minimum
c. Flammability, ASTM E 84: Class I/A, flame spread 25 maximum; smoke developed 30 maximum
d. Thermal Expansion, ASTM D 696:.00002 in/in/F maximum
e. Boiling water resistance, NEMA LD 3: No effect
f. High temperature resistance, NEMA LD 3: No effect
g. Liquid absorption, ASTM D 570 (24 hours): 0.10 percent maximum
h. Mold and mildew growth, ASTM G 21: No growth, no effect
i. Bacteria growth, ASTM G 22: No growth, no effect
j. Sanitation, NSF 51: "Food Contact" approval for food area applications
k. Impact resistance, NEMA LD 3 (1/2 lb. ball drop): 1/4 inch material, 36 inch drop, no failure 1/2 inch material, 120 inch drop, no failure

C103009 CABINETS

This paragraph includes casework items that are permanently fixed in-place. Included are all cabinetry and millwork items with their associated accessories and anchoring devices.

C103009 1.1 WALL AND BASE CABINETS

Wall and base cabinets must be of the same construction and appearance, with solid ends and frame fronts, or with frames all around. Frames must not be less than 3/4 inch by 1 1/2 inches (19 mm by 38 mm) hardwood. All ends, bottoms, backs, and partitions must be hardwood plywood. Cabinet doors and drawer fronts must be a minimum 3/4 inch (19 mm) of either plywood or medium density fiberboard cores with solid edge bands.

C103009 1.1.1 Quality Standards

Wall and base cabinets must be constructed to meet "Custom" quality grade as defined in AWI Quality Standards, except where this specification exceeds AWI Custom.

C103009 1.1.2 Hardware

Provide cabinet hardware including two self-closing hinges for each door and two side-mounted metal drawer slides for each drawer and pulls for all doors and drawers as follows. All cabinet hardware exposed to view must be ANSI/BHMA 156.9, Grade 1, and comply with the following requirements:

a. Concealed Euro-Style, back mounted hinges with opening to 165 degrees and a self-closing feature at less than 90 degrees.
b. Drawer slides must have a static rating capacity of 100 lbs. (444 N).
c. Provide adjustable shelving standards with shelf support hardware for wall cabinets.
d. Provide heavy-duty magnetic latch and door and drawer catch

C103009 1.1.3 Finish

Provide plastic laminate (NEMA LD3) or transparent finish with sealer and varnish as selected by Designer of Record.

C103010 CASEWORK

This paragraph includes all built-in premanufactured metal cabinetry for specialized functions. Provide metal cabinetry for medical, dental, veterinary and medical research laboratories in accordance with Military Standard (MIL-STD) 1691. Facilities such as libraries and laboratories other than medical, dental, veterinary and medical research laboratories, at a minimum, all casework must conform to the following charts:

	U. S. Standard ThicknessGAUGE	(MILLIMETER)
Drawer fronts, backs, bodies, closure plates or scribe and filler strips less than 75 mm wide,filler strips less than 75 mm wide, sloping top, shelf reinforcement channel and shelves. Toe space or casework soffits and ceilings and ceilings under sloping tops.	20	0.89
Base pedestals, casework top sides, back, and bottom panels, closure scribe and filler strips 75 mm or more. Reinforcement for drawers with locks.	18	1.20

Table legs, spreaders and stretchers, when fabricated of cold rolled tubing. Metal for desks; except legs and aprons.Door exterior and interior panels, flush or glazed. Cross rails of base units. Front bottom rails, back bottom rails; rails may be1.49 mm 16 gauge thick. Uprights or posts. Top corner gussets.		
Aprons, apron division, reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm 18 gauge thick.reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm 18 gauge thick.	16	1.49
Drawer runners door tracks	14	1.88
	U. S. Standard ThicknessGAUGE	(MILLIMETER)
Base unit bottom corner gussets and leg sockets	12	2.64
Reinforcement for hinge reinforcement inside	11	3

doors and cabinets

	U. S. Standard ThicknessGAUGE	(INCH)
Drawer fronts, backs, bodies, closure plates or scribe and filler strips less than 75 mm wide,filler strips less than 75 mm wide, sloping top, shelf reinforcement channel and shelves. Toe space or casework soffits and ceilings and ceilings under sloping tops.	20	0.035
Base pedestals, casework top sides, back, and bottom panels, closure scribe and filler strips 75 mm or more. Reinforcement for drawers with locks. Table legs, spreaders and stretchers, when fabricated of cold rolled tubing. Metal for desks; except legs and aprons.Door exterior and interior panels, flush or glazed. Cross rails of base units. Front bottom rails, back bottom rails; rails may be1.49 mm 16 gauge thick. Uprights or posts. Top corner gussets.	18	0.047

	U. S. Standard ThicknessGAUGE	(INCH)
Aprons, apron division, reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed	16	0.059

without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm 18 gauge thick reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm 18 gauge thick.		
Drawer runners door tracks	14	1.88
Base unit bottom corner gussets and leg sockets	12	0.104
Reinforcement for hinge reinforcement inside doors and cabinets	12	3

C103011 CLOSETS

This paragraph includes all built-in closets with associated work and finishes.

C103012 FIRESTOPPING PENETRATIONS

This paragraph covers fire-stopping assemblies to include sleeves, caulking and flashing. See PTS Section D40, *Fire Protection*, for additional requirements.

C103012 1.1 FIRESTOPPING

Provide firestopping materials, supplied from a single domestic manufacturer, consisting of commercially manufactured, asbestos-free, nontoxic products that are FM Approval Guide approved, or UL listed, for use with applicable construction and penetrating items, complying with the following minimum requirements.

C103012 1.1.1 Fire Hazard Classification

Material must have a flame spread of 25 or less, and a smaoke developed rating of 50 or less, when tested in accordance with ASTM E84 or UL 723. Material must be an approved firestopping material as listed in UL Fire Resistance Directory or by a nationally recognized testing laboratory.

C103012 1.1.2 Toxicity

Material must be nontoxic and carcinogen free to humans at all stages of application or during fire conditions and must not contain hazardous chemicals or require harmful chemicals to clean material or equipment. Firestop material must be free from Ethylene Glycol, Polychlorinated Biphenyl (PCB), Methyl Ethyl Ketone (MEK), or other types of hazardous materials.

C103012 1.1.3 Firestopping Rating

Firestop systems must be UL Fire Resistance Directory listed or FM Approval Guide approved with "F" and "T" rating at least equal to the fire-rating of the fire wall or floor in which penetrating openings are to be protected.

C103012 1.1.3 Through-Penetrations

Firestopping materials for through-penetrations must provide "F", "T", and "L" fire resistance ratings in accordance with ASTM E814 or UL 1479.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

See PTS Section D40, *Fire Protection*, for additional requirements.

C103013 1.1 SPRAYED FIRE-RESISTIVE MATERIALS

C103013 1.1.1 Quality Assurance

A pre-installation conference must be held with the manufacturer’s approved installer prior to the application of the sprayed fire-resistive materials. See Paragraph C10 1.2 for field testing requirements for the fire-resistive material. Products provided must not contain asbestos to comply with 40 CFR 763.

C103013 1.1.2 Warranty

Provide manufacturer's standard materials and workmanship warranty stating that the manufacturer agrees to repair or replace materials that fail within 2 years, or as required by the project program, from date of Substantial Completion.

C103013 1.1.3 Material Composition

Provide sprayed fire-resistive material consisting of factory-mixed, dry formulation of gypsum or Portland cement binders and light-weight mineral or synthetic aggregates mixed with water at the Project site, or provide sprayed-fiber fire-resistive material consisting of factory-mixed, dry formulation of inorganic binders, mineral fibers, fillers, and additives conveyed in a dry state by pneumatic equipment and mixed with water at a spray nozzle to form a damp, as-applied product.

C103013 1.1.4 Physical Properties

a. Dry Density: 15 lb/cubic foot (240 kg/cubic meter) for referenced fire-resistance design to attain the ratings indicated, in accordance with ASTM E 605.
b. Thickness: Provide minimum average thickness required for fire-resistance design indicated according to the following criteria, but not less than 0.375 inch (9 mm), per ASTM E 605:

   1) Where the referenced fire-resistance design lists a thickness of 1 inch (25 mm) or greater, the minimum allowable individual thickness of sprayed fire-restive material is the design thickness minus 0.25 inch (6 mm).

   2) Where the referenced fire-resistance design lists a thickness of less than 1 inch (25 mm) but more than 0.375 inch (9 mm), the minimum allowable individual thickness of sprayed fire-resistive material is the greater of 0.375 inch (9 mm) or 75 percent of the design thickness.

   3) No reduction in design thickness is permitted for those fire-resistance designs whose fire-resistance ratings were established at densities of less than 15 lb/cubic foot (240 kg/cubic meter).
c. Bond Strength: 150 lb/sq. ft. (7.2 kPa) minimum in accordance with ASTM E 736.
d. Compressive Strength: 5.21 lb/sq. in. (35.9 kPa) as determined in accordance with ASTM E 761. Minimum thickness of sprayed fire-resistive material tested must be 0.75 inch (19 mm) and minimum dry density must be as specified, but not less than 15 lb/cubic foot (240 kg/cubic meter).
e. Corrosion Resistance: No evidence of corrosion in accordance with ASTM E 937.
f. Deflection: No cracking, spalling, or delaminating in accordance with ASTM E 759.
g. Effect of Impact on Bonding: No cracking, spalling, or delaminating in accordance with ASTM E 759.
h. Air Erosion: Maximum weight loss of 0.025 g/sq. foot (0.270 g/sq. meter) in 24 hours in accordance with ASTM E 859.
i. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics in accordance with ASTM E 84 by United Laboratories: flame-spread index of 10 or less and a smoke developed index of 0.
j. Fungal Resistance: No observed growth on specimens in

accordance with ASTM G 21.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide entrance mats at all entrances to the facility. Comply with Architectural Barriers Act (ABA) Standards for installed entrance mats and frames. Provide recessed entrance mats at building entrances with enclosed vestibule and surface applied entranceway mats or entranceway floor tiles at all other entrances. Entranceway mats and entranceway floor tile require the use of a transition edge where the mat adjoins other floor materials. Mat system must meet ASTM D-2047 coefficient of friction requirements of minimum 0.60 for accessible routes and be structurally capable of withstanding a uniform floor load of 300 lbs/sq. ft. (14 kPa). All portions of mat system must comply with ASTM E 648, Class I, Critical Radiant Flux, minimum 0.45 watts/m2 for flammability.

C103014 1.1 ROLL-UP MATS

Roll-up mats with tread rails spaced a maximum 2 inch (51 mm) on center and running counter to the traffic flow. Mats must allow debris to fall to sub-floor. Tread rails are connected by aluminum or vinyl hinges, with a continuous noise reducing vinyl cushion and an aluminum or vinyl edge around the perimeter. Roll-up mats must be recessed or surface mounted and provided with tread inserts:

C103014 1.1.1 CARPET INSERTS

Carpet insert fiber must be colorfast, solution dyed, anti-static, anti-microbial, and waterproof. Fiber must be 100% nylon or polypropylene, minimum 30 oz. per square yard. Each carpet fiber must be bonded to rigid ply backing to prevent fraying and supplied in continuous splice-free lengths.

C103014 1.1.2 VINYL OR RUBBER INSERTS

Vinyl or rubber inserts must be removable and be made from recycled materials wherever possible. Inserts must have serrated edges and textured surfaces for scraping purposes, bonded to a rigid vinyl or rubber tread insert.

C103014 1.1.3 RECESSED MAT THERMOPLASTIC FRAME PROPERTIES

Thermoplastic frame must be colorfast and UV-resistant. Tensile strength of frame must comply with ASTM D 638. Tensile impact of frame must comply with ASTM D 1822. Flexural strength of frame must comply with ASTM D 790. Shore D hardness of frame must comply with ASTM D 2240. Rockwell R hardness of frame must comply with ASTM D 785. Coefficient of thermal expansion of frame must comply with ASTM D 696.

C103014 1.1.4 RECESSED MAT ALUMINUM FRAME REQUIREMENTS

Aluminum frame and rail must comply with ASTM B 221, alloy 6063-T5. Frame must have butted corners and be factory coated with zinc chromate

or manufacturer's standard protective finish where surfaces are in contact with concrete. Provide standard mill finish, color anodized finish complying with AAMA 606.1, clear anodized finish complying with AAMA 607.1, or bronze complying with ASTM B455, alloy 385.

C103014 1.2 RECYCLED RUBBER TIRE TILES AND MATS

Recycled rubber tire tiles and mats must be made from recycled truck, bus and aircraft tires with sidewall cords and buffed to a chenille finish. Product is bonded to woven flexible backing to form 3/8 to 7/16 inch (9.5 to 11.1 mm) thick, 12 inch (300 mm) square tiles or 12 inch (300 mm) wide rolls up to 25 feet (7.5 m) long.

C103014 1.3 SURFACE MOUNTED/LOOSE-LAY ENTRANCE MATS

Loose-lay mats must have beveled vinyl or rubber transition edge and must have surface of carpet or vinyl/rubber surfaces. Edges must conform to ABA Standards. Mats must be easily removed yet remain adhered to floor to prevent mat from moving as pressure from walking is applied.

C103014 1.3.1 RUBBER OR VINYL MATS

Non-slip mats minimum of 3/8 inch (9.5 mm) thick with square edges for recessed installations or beveled edges for surface applications. Mats must be solid sheet (no perforations), perforated style or corrugated style with knob or flat base bottom surface. Provide surface texture to suite project requirements. Ensure mats are a prime quality compound free of calendaring and curing defects and resistant to weather aging and ozone in normal concentrations.

C103014 1.3.2 CARPET TYPE MATS

Nylon or polypropylene carpet bonded to 1/8 to 1/4 inch (3 to 6 mm) thick, flexible vinyl backing minimum3/8 inch (9.5 mm) thick overall. Carpet has anti-static, anti-staining, non-raveling and anti-microbial properties.

C103014 1.10 SURFACE APPLIED ENTRANCEWAY FLOOR TILE

Applied entranceway floor tiles must be in the form of carpet tiles, carpet tiles with vinyl or rubber scrubbing surfaces, or tiles of thermoplastic scrubbing surfaces only. Tiles must be installed in areas where permanent mat is required but slab is not recessed to receive permanent recess mat. Tiles must be securely installed without obvious seams, cleanable, dimensionally stable, and with maximum finished tile thickness of 1/2" above finished floor line. Carpet fibers must be 100% nylon or polypropylene, anti-static, anti-microbial, colorfast, solution dyed, mold and mildew resistant, and waterproof with minimum face weight of 30 oz/yd2. Thermoplastic only tiles must be PVC free and UV-resistant.

C103015 ORNAMENTAL METALWORK

Building components made from ornamental metals. Ornamental stair handrails

are included in B1010 EXTERIOR STAIRS and PTS C20, *Stairs*.

C103090 OTHER INTERIOR SPECIALTIES

This paragraph covers other interior specialties not described by other assembly categories listed previously.

C103090 1.1 PROJECTION SCREEN

Motorized projection screen must be wall, ceiling, or above ceiling mounting, and must have a 120V motor that is lubricated for life, quick reversal type, has overload protector, integral gears, and preset accessible limit switches. Screen must be flame retardant, mildew resistant and have black masked borders. Controls must be wall mounted with wiring concealed within the wall construction. Provide pull-down projection screens in lieu of motorized projection screens as approved by the Activity, as specified in the project program.

C103090 1.2 OTHER INTERIOR SPECIALTIES

Also see PTS Sections C20 and C30 for additional interior specialties not specified here.

-- End of Section --

SECTION C20

STAIRS
12/18

C20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

C20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C20 1.1.1 Industry Standards and Codes

AISC American Institute of Steel Construction

C20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):
UFC 3-101-01UFC 1-200-02	Architecture High Performance and Sustainable Building Requirements

C20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory stair performance via Performance Verification Testing, as detailed in this section of the RFP.

C20 1.2.1 Field Testing for Concrete

Field Quality Control Test Reports to be submitted to Designer of Record (DOR) must comply with American Concrete Institute (ACI) 301. If concrete is found to be below the strength required in the tests, remove and replace that concrete and all associated building components at no additional cost to the Government.

C20 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures,* and UFC 3-101-01, *Architecture*.

C20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specification*. In addition to the Z10 requirements the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Stairs, handrails.

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

Provide primed and painted steel stairs with concrete filled pans or cast-in-place concrete stairs for industrial and commercial construction. Design load must not be less than 100 PSF (4.8 kPa) for live load, and 300 pounds (136 kg) for concentrated loads. Required means of egress stairs must conform to to National Fire Protection Association (NFPA) 101. Provide steel guard and handrails.

C201001 1.1 STEEL STAIRS

Design must conform to AISC S335 or AISC S342L.

C201001 1.1.1 Materials

a. Structural Carbon Steel - American Society for Testing and Materials (ASTM) A 36/A 36M
b. Structural Tubing - ASTM A 500
c. Steel Pipe - ASTM A 47
d. Gratings - Gray cast iron ASTM A 48, Class 40
e. Metal plank grating, non-slip requirement, FS RR-G-1602 aluminum ASTM B 209, 6061-T6; steel ASTM A 653/ A 653M, G90.
f. Floor Plates, Patterned - ASTM A 786/A 786M, 14 gage.
g. Anchor Bolts - ASTM A 307

h. Galvanized Structural Steel - All steel exposed to the environment or direct water contact must be galvanized in accordance with ASTM A 123 /A123M, ASTM A153/A153M, and ASTM A653/A653M, Z275 (G90) coating. Galvanize all components after fabrication in accordance with ASTM A385. Fabricate all steel components in the largest units practical using bolted connections for field assembly. Repair damage to, or voids in, galvanizing in accordance with ASTM A780, Annex A1 or Annex A3.

C201001 1.2 ALUMINUM ALLOY PRODUCTS

Conform to ASTM B 209 for sheet plate, ASTM B 221 for extrusions and ASTM B 26/B 26M or ASTM B 108 for castings. Aluminum extrusions must be at least 1/8-inch (3.2 mm) thick and aluminum plate or sheet at least 0.050 inch (1.27 mm) thick.

C201001 1.3 FINISHES

C201001 1.3.1 Galvanizing

Hot-dip galvanizing: ASTM A 123/A123M, ASTM A 153/A 153M or ASTM A 653/A 653M, G90, as applicable.

C201001 1.3.2 Aluminum Finishes

Protect by plating, Class I anodic coatings, or 70% polyvinylidene fluoride organic coatings. See PTS Section C30, *Interior Finishes*, for additional coatings/finish information.

C201001 1.3.3 Safety Treads

NAAMM BG steel, Type W (welded).

C201001 1.3.4 Other Coatings

See PTS Section C30, *Interior Finishes*, for painted finishes.

C201001 1.4 CONCRETE STAIRS / STEPS

Provide interior or exterior concrete steps and stair with non-slip finish. For interior stairs, provide rubber or other finish treads. For exterior stairs, provide cast-in-place abrasive nosing. Provide steel guard and handrails as necessary. Fire stairs must comply with NFPA 101.

C201001 1.4.1 Materials

a. Concrete - ACI 211.1, ACI 301/301M, and ACI 318/318M, with a compressive strength of 3,000 psi (20,680 kPa) or greater. Concrete Mix Design shall be suitable for the job conditions.
b. Reinforcements - Bars, fabrics, connectors, and chairs must be galvanized.
c. Reinforcing Bars - ACI 301/301M

d. Welded Wire Fabric - ASTM A 185 or ASTM A 497
e. Cast Aluminum Safety Nosings – For exterior concrete stairs, provide safety nosings of cast aluminum with abrasive surfaces or with abrasive inserts.

C201001 1.5 WOOD STAIRS

Wood stairs area only permitted for residential construction. Provide wood treads of minimum 1-1/4 inch thickness, of clear red or white oak. Risers must be nominal one-inch finish lumber. Provide natural finish equivalent to one coat of sealer and two coats of varnish on all exposed surfaces.

C201002 FIRE ESCAPE STAIRS

Design fire escapes of the type and arrangement to conform to Fire Escape Stairs, of NFPA 101, *Life Safety Code*. Escape stairs must be of steel or aluminum, conforming to the requirements of this specification section.

C201090 STAIR HANDRAILS, GUARDRAILS, AND ACCESSORIES

C201090 1.1 HANDRAILS

Design handrails in accordance with the International Building Code (IBC), except delete the handrail design load reduction code exceptions for residential, prisons, industrial, high hazard, and storage facilities. NAAMM Pipe Railing Systems Manual, provide the same size rail and post. Provide series 300 stainless steel pipe collars. Factory coat all metal railings (except for ornamental metals such as brass, bronze, stainless steel, and nickel-silver) with a high performance coating in accordance with American Architectural Manufacturers Association (AAMA) 2605, with a minimum coating thickness of 1.2 mils unless otherwise noted.

C201090 1.1.1 Steel Handrails

Provide steel handrails, including inserts in concrete, steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Railings must be hot-dip galvanized and shop painted for exterior applications and primed and shop painted for interior applications. Railing may be unpainted hot-dip galvanized in industrial areas.

C201090 1.1.2 Aluminum Handrails

Provide aluminum pipe railing conforming to ASTM B 429 or square aluminum semi-hollow tube conforming to ASTM B 221. Railings must be coated with a high performance coating or anodized in accordance with AAMA 611, Class I.

C201090 1.1.3 Ornamental Handrails

Provide ornamental railings. Provide anchorage and fasteners as recommended by the product manufacturer. Railing system must conform to ASTM E 985, minimum concentrated test load

requirement.

C201090 1.1.4 Glass Handrails

Provide glass railings consisting of continuous 1/2-inch (13 mm) beveled tempered glass structural balusters with continuous railing cap and bottom shoe molding. Railing cap and shoe molding must be 6063-T52 aluminum, type 304 stainless steel, brass, or bronze.

C201090 1.1.5 Wood Handrails

Wood handrails area only permitted for residential construction. Provide wood handrails of pre-finished natural hardwood. Wood must be coated with hard acrylic finish to withstand indentations.

C201090 1.1.6 Fiber Reinforced Plastic (FRP) Handrails

Provide FRP handrail structural shapes manufactured by the pultrusion process with qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with American Society of Civil Engineers (ASCE) 7,29 Code of Federal Regulations (CFR) 1910.23, NFPA 101. Provide integral UV inhibitors within the resin, synthetic surfacing veil to help produce a resin rich surface, and UV resistant coating.

C201090 1.2 METAL LADDERS

C201090 1.2.1 Metal Ladders

Provide vertical ladders conforming to Section 7 of 29 CFR 1910.27.

C201090 1.2.2 Installation

Offset distance from the rungs to the finished wall surface not less than 7 inches (175 mm). Provide heavy clip angles riveted or bolted to the stringer and drilled for not less than two 1/2-inch (12 mm) diameter expansion bolts as indicated. Provide intermediate clip angles not over 48 inches (1200 mm) on center.

C201090 1.2.3 Ladder Cages

Where the height of the ladder is greater than 20 feet (6000 mm), provide a cage to conform to 29 CFR 1910.27.

a. Cage fabrication – Provide attachments for fastening bands to the side rails of ladders or directly to the structure.

-- End of Section --

SECTION C30

INTERIOR FINISHES
12/18

C30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

All interior finish products must be from manufacturers' standard running line offerings. Custom fabrications are not permitted unless otherwise noted.

C30 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

C30 1.1.1 Industry Standards And Codes

FLOOR COVERING INSTALLATION CONTRACTOR'S ASSOCIATION (FCICA)

FLOOR COVERING INSTALLATION BOARD (FCIB)

TILE COUNCIL OF NORTH AMERICA (TCNA)

C30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the

following significant UFC(s):UFC 3-101-01, Architecture UFC 3-120-10, Interior Design)

UFC 1-200-02 High Performance and Sustainable Building Requirements

C30 1.2 QUALITY ASSURANCE

C30 1.2.1 Paint Applicator's Qualifications

C30 1.2.1.1 Society for Protective Coatings (SSPC) QP 1 Certification

For the application of industrial coatings identified in the Project Program, all contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 1 prior to contract award, and must remain certified while accomplishing any surface preparation or coating application. The painting contractors and painting subcontractors must remain so certified for the duration of the project. If a contractor's or subcontractor's certification expires, the firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in contractor certification status.

C30 1.2.2 Aircraft Maintenance Hangar and Vehicle Maintenance Flooring Installer Qualifications

The Designer of Record must utilize UFGS Section 09 67 23.15, *Fuel Resistive Resinous Flooring, 3-Coat System* to provide the required installer qualifications for the floor coating system.

C30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory interior finish assemblies' performance via Performance Verification Testing, as detailed in this section of the RFP.

C30 1.3.1

Provide sample of textured ceiling application for Designer of Record (DOR) approval before resuming work. Sample must be used as a reference for remaining application.

C30 1.3.2

Provide sample of multicolor paint application for DOR approval before resuming work. Sample must be used as a reference for remaining application.

C30 1.3.3

Provide sample of terrazzo and/ or architectural cast-in-place concrete floor application for DOR approval before resuming work. Sample must be used as a reference for remaining application.

C30 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures,* UFC 3-101-01, *Architecture and UFC 3-120-10, Interior Design*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

Changes must not be made to the finishes that are submitted in the plans, specifications, and Structural Interior Design submittals and approved by the Government during the design phase unless changes are requested by the Government. In the event that revisions may be required because of unforeseen conditions such as discontinued product, the revisions must be approved by the DOR and then submitted to the Government Interior Designer for approval before substitutions can be made.

C30 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) and the NAVFAC Interior Designer must approve the following construction submittals as a minimum:

Paint, Finish materials, Finish colors

Installation drawings for floors with carpet, tile, stone, architectural cast-in-place concrete or terrazzo to include locations and details of seams, color and material transitions, details of divider strips, control joints, and crack control solutions.

Changes must not be made to the finishes that are submitted and approved by the Government during the design phase. In the event that revisions may be required because of unforeseen conditions such as discontinued product, the revisions must be approved by the DOR and

then submitted to the Government Interior Designer for approval before substitutions can be made.

C3010 WALL FINISHES

Provide moisture and mildew resistant interior wall finishes which are easily maintained, and suitable in accordance with industry standards for the architectural surface being finished. For painted wall finishes, refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS".

C301001 CONCRETE WALL FINISHES

C301001 1.1 SPECIAL OR ARCHITECTURAL FINISHES ON INTERIOR CONCRETE WALLS

Cast-in-place or pre-cast concrete wall finishes include, but are not limited to, abrasive blasted surfaces, colored surfaces, exposed aggregate, grooved surfaces, or tooled surfaces.

C301002 PLASTER WALL FINISHES

Veneer plaster must be gypsum plaster veneer finish on gypsum base finishes, or cement plaster veneer finish on concrete or masonry. Refer to Section C3040 for paint system and gloss level.

C301002 1.1 GYPSUM PLASTER

Provide gypsum neat plaster or high strength gypsum plaster base coat conforming to American Society for Testing and Materials (ASTM) C28. High strength gypsum plaster must have a compressive strength of not less than 2,500 psi, when tested dry in accordance with ASTM C472.

C301002 1.1.1

High strength gypsum gaging plaster finish coat must have a compressive strength of not less than 4,500 psi when tested dry in accordance with ASTM C472.

C301002 1.1.2

Provide gypsum molding plaster for ornamental plaster in accordance with ASTM C59.

C301002 1.1.3

Provide Keene's cement finish coat conforming to ASTM C61.

C301002 1.1.4

Provide acoustical gypsum plaster finish coat conforming to ASTM E1042 Type I or II Class A, noncombustible.

C301002 1.2 CEMENT PLASTER

C301002 1.2.1

Portland cement plaster base coat in accordance with ASTM C150, gray Portland cement. Use Type I when no special characteristics are required, Type II when plaster and stucco will be exposed to moderate sulfate (alkali) action, Type III when early strength is needed as in cold weather, and Type V when high resistance to sulfate is required.

C301002 1.2.2

Portland cement plaster finish coat in accordance with ASTM C150, gray Portland cement Type I when no special characteristics are required, Type II when plaster and stucco will be exposed to moderate sulfate (alkali) action, Type III when early strength is needed as in cold weather.

C301002 1.2.3

Factory-mixed finish coat according to the manufacturer's instructions.

C301002 1.3 ACRYLIC PLASTER COATING

High Performance (impact resistant) seamless interior acrylic coating system must be used as an interior wall finish over CMU that has been joint filled and smoothed with a water resistant manufactured recommended compound. Coating system to be mold and mildew resistant, have a minimum Barcoll Hardness Index of 38 and flame spread 15 or less per ASTM-E84 and have a minimum final film thickness of higher than 10 mils. Coating system must have been on the market and successfully used in commercial applications for a minimum of 10 years. Coating system must be applied by a manufacturer's factory trained applicator/installer.

C301003 GYPSUM WALLBOARD FINISHES

Conform to specifications, standards and requirements in accordance with Gypsum Association GA 214, GA 216 and GA 224. Provide asbestos free materials only. Provide Type X gypsum board in fire rated assemblies. Provide a foil back gypsum board when a vapor retarder is required.

C301003 1.1 REGULAR GYPSUM BOARD

ASTM C36/C36M and ASTM C1396/C1396M 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick in residential construction, and 5/8 inch (15.9 mm) thick in non-residential construction, tapered edges for exposed layers, square edges for concealed backer layers.

C301003 1.2 MOISTURE RESISTANT GYPSUM BOARD

ASTM C630/C630M, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick in residential construction, and 5/8 inch (15.9 mm) thick in non-residential construction. Use in humid areas or spaces but not as a substrate in tiled areas where wall tile is exposed to direct moisture contact or condensation accumulation.

C301003 1.3 FOIL BACKED GYPSUM BOARD

ASTM C1396/C1396M 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick in residential construction, and 5/8 inch (15.9 mm) thick in non-residential construction, tapered edges for layers exposed to view, square edges for concealed layers. Seal joints in foil backing to other panels and adjoining materials as recommended by the panel manufacturer.

Alternative to foil backed gypsum board in Secured Areas: Field applied foil faced barrier material is an acceptable alternative for pre manufactured foil backed gypsum board. Provide a continuous composite multilayer barrier with a woven polyethylene sheet sandwiched between two sheets of solid reflective aluminum surfaces. Shielding effectiveness tested in accordance with IEEE 229/ ASTM D4935. Install barrier in accordance with manufacturer's instructions.

C301003 1.4 CEMENTITIOUS BACKING UNITS

Provide cementitious backer units, 1/2 inch (12 mm) thick, in accordance with Tile Council of North America Handbook; use as a substrate for ceramic tile in wet areas that are exposed to direct moisture contact or condensation accumulation for areas including, but not limited to, tubs, shower enclosures, saunas, steam rooms, gang shower rooms, and shower drying rooms. Provide screws specifically designed for use with cement panels.

C301003 1.5 IMPACT RESISTANT GYPSUM BOARD

Reinforced gypsum panel with imbedded fiber mesh or polycarbonate resin thermoplastic backing, 5/8 inch (15.9 mm) thick, tapered edges, in accordance with Structural Failure Test; ASTM E695 or ASTM D2394 and Indentation Test; ASTM D5420 or ASTM D1037. Provide metal framing of 20-gauge minimum. Provide fasteners that meet manufacturer requirements and specifications. Impact resistant gypsum board must have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, ASTM E84. Finish with a high strength plaster veneer. Refer to PTS C10 for further requirements on impact resistant wall construction.

C301003 1.6 JOINT TREATMENT

ASTM C475, Joint compound must be specifically formulated and manufactured for use with and compatible with tape, substrate and fasteners as recommended by the manufacturer. Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Provide premanufactured joints at all structural expansion joints, crack control joints, and change of materials as recommended by the manufacturer and in accordance with GA 216.

C301003 1.7 FASTENERS

ASTM C514. Fasteners must be compatible with each type of gypsum board material as recommended by the gypsum board manufacturer and in accordance with GA 216 and GA 224.

C301003 1.8 ACCESSORIES

ASTM C1047. Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials. For predecorated gypsum board provide prefinished metal or plastic trim to match predecorated gypsum board. Install as recommended by GA 214, GA 216 and GA 224.

C301003 1.9 LEVEL OF FINISH

C301003 1.9.1

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Plenum areas above ceilings must be finished to GA 214, Level 1. Water resistant gypsum backing board, ASTM C630/C630M, to receive ceramic tile must be finished to GA 214, Level 2. Walls to receive a heavy-grade wall covering or have textured finish before painting must be finished to GA 214 Level 3. Walls without wall wash lighting to receive paint (MPI Gloss Level 2), light textures, or wall coverings must be finished to GA 214 Level 4. Unless otherwise specified, all gypsum board walls, partitions must be finished to GA 214 Level 5. Provide joint, fastener depression, and corner treatment. Do not use fiberglass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

C301003 1.9.2

Wherever gypsum board is to receive eggshell (MPI Gloss Level 3), semigloss (MPI Gloss Level 5), or gloss (MPI Gloss Level 6) paint finish, finish gypsum wall surface to GA 214 Level 5.

C301003 1.9.3

Where wall wash lighting will accent the flatness of the wall and surface irregularities in gypsum board joints, provide feature edge gypsum board and two coat joint compound fillers. Provide this special joint treatment at up lighting, down lighting and horizontal lighting at the end of a passageway wall.

C301004 TILE AND TERRAZZO WALL FINISHES

C301004 1.1 CERAMIC TILE WALL SYSTEM FINISHES

Provide ceramic tile wall systems as defined in the Tile Council of North America (TCNA) handbook for ceramic tile installations suitable for the service requirements listed. Install systems in accordance with Tile Council of North America Handbook and American National Standards Institute (ANSI) A108/A118 series standards. Colored epoxy grout with sealer must be provided. Coordinate with ceramic bath accessories for modularity. Include all trim pieces, caps, stops, and

returns to complete installation.

C301004 1.1.1

Ceramic Mosaic Wall Tile must be a minimum of 1/4 inch (6 mm) thick and installed from floor to ceiling, unless otherwise noted.

C301004 1.1.2

Wall tile must be glazed, matte glazed or unglazed finish. Refer to project program for tile type, pattern, and surface texture.

C301004 1.1.3

Porcelain wall tile must be through color, polished or unpolished. Refer to project program for tile type, pattern, and surface texture.

C301004 1.1.4

Provide wall tile color and style selections a minimum of one grade above base grade.

C301004 1.1.5

Provide Designer accent tile, accent strips and accessory ceramic tile shapes as an integral part of the ceramic wall tile system.

C301005 WALL COVERINGS

Wall coverings must be material designed specifically for the specified use. The wallcovering must contain a non-mercury based anti-microbial. The wallcovering must be the type made without the use of cadmium-based stabilizers. Wallcovering must have a Class A flame spread rating of 0-25 and smoke development rating of 0-50 when tested in accordance with ASTM E84. The wall preparation, trimming, adhesive and application must be according to the manufacturer’s printed directions. The manufacturer must approve the installers in writing. The material must be easily cleaned by traditional methods such as washing, wiping, or vacuuming. Primer and adhesive must be of a type recommended by the wallcovering manufacturer and must contain a non-mercury based anti-microbial. Adhesive must be strippable type. Do not apply wall coverings to the interior surface of exterior walls.

C301005 1.1 VINYL WALL COVERING

C301005 1.1.1

Vinyl wallcovering must be a vinyl coated woven or nonwoven fabric with germicidal additives and must conform to ASTM F793, Category V Type II, 13.1 to 22 ounces (371 g to 624 g) total weight per square yard and width of 54 inches (1370 mm). Provide ASTM F793, Category VI, Type III, 22 ounces (624 g) and above to cover rough textured walls such as masonry.

C301005 1.1.2

Provide a polyvinyl fluoride film, 0.0005 inch (0.012 mm) thick or thicker must be factory applied to the wall covering where additional resistance to staining and soiling from exposure to staining reagents or chemicals and resistance from abuse is required. The film must be transparent (clear), medium gloss.

C301005 1.2 FABRIC WALL COVERING

C301005 1.2.1

Fabric wallcovering must be woven material of Polyester or Polyolefin, or a combination of the two fibers with an acrylic backing. The face must be treated with a soil repellent finish. The material must be a minimum of 48 inches (1219 mm) wide. "Tackable" wall covering must be "self-healing" from tack penetration through the covering into the substrate. The material must be a minimum of 12 ounces (340 g) per square yard exclusive of backing. A tackable wall covering will not be required for smoother, less textured surface appearance.

C301005 1.2.2

Acoustical wallcovering must be textured, woven or non-woven material of polyester or polyolefin, or a combination of the two fibers with an acrylic backing. The material must be a minimum of 48 inches (1219 mm) wide and a minimum of 16 ounces (454 g) per square yard. The material must have an NRC rating of .15 on gypsum board in accordance with ASTM C423.

C301005 1.3 WALLCOVERING BORDER

Vinyl wallcovering border must be a vinyl coated woven or nonwoven fabric with germicidal additives and must conform to ASTM F793, Type I, 7 to 13 ounces (198 g to 368 g) or Type II, 13.1 to 22 ounces (371 g to 624 g) total weight per square yard.

C301005 1.4 SURFACE PREPARATION FOR UNEVEN WALLS

C301005 1.4.1

Wall liner must be a non-woven polyester cellulose blend having a minimum weight of 3.7 ounces (105 g) per square yard and a total minimum thickness of 0.013 inches (0.33 mm). Wall liner must have a Class A flame spread rating of 0-25 and smoke development rating of 0-50 when tested in accordance with ASTM E84. Use for masonry walls or walls with uneven surfaces.

C301005 1.4.2

For masonry or rough textured walls, use a veneer plaster finish to smooth the walls prior to wallcovering installation.

C301005 1.5 CORNER GUARDS

C301005 1.5.1

Corner guards must be 3/32 inch (2.4 mm) thick and must cover 1 inch (25 mm) each side of corner at right angles. Corner guards must be clear polycarbonate. Use in executive areas, office areas, and wall-covered areas subject to cart traffic as a minimum.

C301005 1.5.2

Corner guards must be 3/32 inch thick and must cover 2-1/2 inches (64 mm) each side of corner at right angles. Corner guards must be through color polycarbonate or rubber. Use in corridors or other high traffic areas.

If protective wall components from paragraphs C301090 - 1.5 and 1.6 are provided, corner guards must be from the same lot and color as protective wall components.

C301005 1.6 WAINSCOT CAP

C301005 1.6.1

Wainscot cap shall be satin-finished extruded aluminum approximately 3/4 inch (19 mm) high, feathered at bottom edge, with an approximate 3/16 inch (5 mm) exposed face on top edge, and grooved to receive the covering. Adhesive to install wainscot cap shall be of a type recommended by the manufacturer of the cap.

C301005 1.6.2

Wood wainscot cap must be 3-1/2 by 3/4 inch (89 mm by 19 mm) solid hardwood, Architectural Woodwork Institute (AWI) Custom grade, with painted or stained finish. Profile must be a molded shape.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Acoustical wall treatment must be acoustical panels, sound absorbing wall units, or acoustical wall systems. Acoustical panel system must include manufacturer's standard concealed fasteners, splines, tracks, and other components necessary to complete the installation. Fire rating for the complete composite system must be Class A, 200 or less smoke density and flame spread less than 25, when tested in accordance with ASTM E84.

C301006 1.1 ACOUSTICAL FABRIC COVERED WALL PANELS

C301006 1.1.1

Prefinished factory assembled wall panels must consist of, seamless fabric covered fiberglass or mineral fiber core system. Perimeter edges must be reinforced by an aluminum frame or a formulated resin edge hardener. Fabric covering must be stretched

free of wrinkles and then bonded to the edges and back or bonded directly to the panel face, edges, and back of panel a minimum distance standard with the manufacturer. Mounting must be by manufacturer's standard concealed spline, mechanical fasteners, magnetic fasteners, hook and loop or adhesive mounting.

C301006 1.1.2

Stretched fabric wall panel system must consist of continuous perimeter and butt seam mounting extrusions, site-fabricated and applied directly to the substrate. Facing fabric must be stretched over core materials and attached without adhesives, nails, tacks, screws or tapes so that fabric may be removed and replaced with framework in place.

C301006 1.1.3

Fabric must be seamless, 100% polyester or olefin or a blend of the two. Light fastness (fadeometer) must be approximately 40 hours in accordance with AATCC 16.

C301006 1.1.3.1

Non-woven, embossed texture, or needle punched 100 percent polyester, minimum 12 ounces (340 g) per linear yard. Tear strength must be minimum 25 pounds (11.25 kg) machine direction and minimum 40 pounds (18 kg) cross-machine direction in accordance with ASTM D1117. Tensile strength must be minimum 50 pounds (22.5 kg) machine direction and minimum 75 pounds (34 kg) cross-machine direction in accordance with ASTM D5034.

C301006 1.1.3.2

Woven, minimum 2-ply 100 percent polyester or olefin, minimum 12 ounces (340 g) per linear yard. Tear strength must be minimum 29 pounds (13 kg). Tensile strength must be 150 pounds (68 kg) minimum in accordance with ASTM D5034.

C301006 1.1.3.3

Perforated vinyl covering with fabric backing, minimum 20 ounces (567 g) per linear yard total weight.

C301006 1.2 ACOUSTICAL WALL PANELS

Aspen wood fibers bonded together with an inorganic hydraulic cement binder, formed in a continuous process under heat and pressure. Nominal overall panel thickness must be 1 inch (25 mm). Noise Reduction Coefficient must not be less than NRC 0.85 for Type C-40 and C-80 mounting.

C301090 OTHER WALL FINISHES

C301090 1.1 SOLID SURFACING WALL FINISHES

Solid surfacing material must consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material must be homogenous, not coated or laminated, meeting ANSI Z124.3 and ANSI Z124.6 requirements. Superficial damage to a depth of 0.010 inch (.254 mm) must be repairable by sanding or polishing. Provide manufacturer's full range of colors and patterns. Flammability, ASTM E84: Class I/A, flame spread 25 maximum; smoke developed 30 maximum.

C301090 1.1.1

If used in a shower, solid surfacing wall finishes must extend from top of shower pan to a minimum of 84 inches (2130 mm) or to underside of ceiling and must surround the shower enclosure. Wall finish must extend from top of tub to 84 inches (2130 mm) and must surround tub shower. If used in a kitchen, solid surfacing wall finish must extend from top of kitchen countertop to underside of wall cabinet.

C301090 1.1.2

Provide solid surfacing with factory recommended fasteners/adhesives/caulk to complete the installation.

C301090 1.2 PLASTIC LAMINATE WALL FINISHES

Plastic laminate used for wall applications must be commercial grade, high-pressure laminate with a #60 finish, approved for vertical applications. National Electrical Manufacturers Association (NEMA) LD 3.

C301090 1.2.1

The kitchen wall area between the counter top backsplash and the bottom of the wall cabinet must be plastic laminate. Laminate wall finish must include factory recommended fasteners/adhesives/caulk to complete the installation.

C301090 1.3 DECORATIVE PANELING SYSTEM

Architectural paneling system applied to interior walls shall include associated furring, fastening, and trim to complete the installation. Wood paneling system finish shall be factory or field applied.

C301090 1.4 WOOD TRIM AND DETAILING FINISHES

Decorative panels, chair rail, standing and running trim, must be of AWI custom grade hardwood with a painted or stained finish. Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for finish system. Chair rail must be a minimum of 3-1/2 inches (89 mm) high. Profile of chair rail must be a molded shape. Wood trim must include associated furring, fastening, adhesives and trim to complete the installation.

C301090 1.5 IMPACT RESISTANT PANEL OR WAINSCOT WALL FINISHES

The wall covering panel system, or wainscot, must be an impact-resistant acrylic PVC sheet of a minimum 0.060 inch (1.5 mm) thickness in 4 foot by 8 foot (1219 mm by 2438 mm) sheets. The system must be Class A (ASTM E84), Underwriters Laboratories (UL) listed, and chemical and stain resistant. It must include all accessories, such as top caps, joint covers, and inside and outside corners, necessary for a complete installation. A full range of colors and textures must be included. The wall panel system must have coordinating color and pattern options for all components within the system. The wall panel system must offer a 21 ounce (595 g) fabric backed vinyl wallcovering laminated to a 0.020 inch (.51 mm) rigid acrylic/PVC backing capped with 1 mil of protective film.

C301090 1.5.1

Impact Resistant Trim Finishes - Impact resistant chair or handrail system must be a formed rigid PVC product. Chair or handrail must be a minimum of 3 inches (76 mm) high and be mounted with concealed hardware. Chair or handrail system must be chemical, stain, and bacteria resistant. Chair rail must be UL classified, conforming to National Fire Protection Association (NFPA)Class A fire rating and ASTM D256-90b for impact strength of 30.2 ft-lbs/inch thick.

C301090 1.6 CORNER AND WALL GUARDS

Corner and wall guards must be high-impact formed polyvinyl chloride a minimum of 0.078 inch (2 mm) with concealed mounting hardware and end closure. If used with an impact resistant panels system, the guards must be from the same manufacturer as the impact resistant wall panel system, chair or hand rail system and must include all accessories necessary for a complete installation. A full range of styles, colors and textures must be included.

C3020 FLOOR FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for painted floor coatings.

C3020 1.1 RESILIENT SUBFLOOR PREPARATION

Have third party independent concrete slab testing agent verify that concrete slabs comply with ASTM F710. Minimum values must not be below the following: Concrete floor flatness must meet minimum flatness of FF 60 when tested in accordance to ASTM E1155 - 96(2008). Concrete levelness on slab on grade must meet minimum levelness of FL 45 when tested in accordance with ASTM E1155 - 96(2008). This requirement does not apply to elevated concrete slabs.

C3020 1.1.1 Floor Preparation

Prior to installation of flooring materials the concrete sub-floors are to be dry, free of curing compounds, sweeping compounds, sealers, hardeners, and other materials which could interfere with bonding of adhesive. If curing compounds, sweeping

compounds, bond breakers or sealers exist, they must be completely removed by mechanical means and methods, specifically grinding and shot blasting of concrete surface as necessary. Determine adhesion and dryness characteristics by performing bond and moisture tests. Prior to building being conditioned, perform a preliminary moisture test using in situ probe relative humidity testing as specified per ASTM F 2170.

C3020 1.1.2 Testing

All pre-installation moisture testing is to be performed by a qualified independent testing agency. Perform the following test as soon as building is enclosed, watertight, and conditioned, and a minimum of two months prior to floor covering installation.

a. Moisture Testing: Perform moisture and pH tests as recommended by the flooring and adhesive manufacturers. Perform test starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed floor covering manufacturer's requirements. In the absence of specific guidance from the flooring manufacturer the following must be the required minimum:

b. Perform concrete internal relative humidity testing using in situ probes in accordance with ASTM F 2170. Proceed with installation only after concrete reaches maximum 75 percent relative humidity level measurement.

C3020 1.1.3 Additional Preparation

If tested moisture levels exceed the allowable limits, shot blast the concrete subfloors to including grinding of areas not accessible to shot blasting equipment and install a 100% solids VOC free epoxy moisture and pH control system as recommended by the third party testing agent.

a. Install cement based self-leveling underlayment over epoxy moisture and pH control system to create a smooth substrate suitable for floor covering and approved by floor covering manufacturer for use with their products.

b. Correct conditions that will impair proper installation.

c. Fill cracks, joints and other irregularities in concrete with leveling compound.

d. Do not use adhesive for filling or leveling purposes.

C3020 1.1.4 Final Cleaning Prior to Flooring Finish Installation

Clean floor of oil, paint, dust, and deleterious substances. Leave floor dry and cured free of residue from existing curing or cleaning agents.

C302001 TILE FLOOR FINISHES

Provide ceramic tile floor systems as defined in the Tile Council of North America (TCNA) handbook for ceramic tile installation and materials for the service requirements listed. Provide installation and materials in accordance with ANSI A108/A118 series standards, except do not use organic adhesives. Provide manufacturer's full range of colors and styles. Tile must be a minimum of two grades above base grade.

Mortar must be Portland cement, ANSI A108.1A/1B/1C/ A118.1, Latex-Portland cement, ANSI A108.5/A118.4 or Epoxy ANSI A108.6/A118.3.

Grout must be factory sanded Portland cement, ANSI A108.10/A118.6, Latex-Portland cement, ANSI A108.10/A118.7 or Epoxy ANSI A108.6/A118.3. Provide tile joint grout sealer on white, light colored areas that are routinely exposed to water and liquid cleaning materials, entrance areas, and areas that require a high degree of stain resistance, and as required by the manufacturer. Provide chemical resistant epoxy resin for kitchens and other areas where high resistance to staining and absorption are required, ANSI A118.3.

Slip resistant tile must have a minimum Dynamic Coefficient of Friction (wet and dry) of 0.42, ANSI A137.1-2012. Tile must have smooth, non-slip or textured surface and a glazed or unglazed finish. Non-slip or textured surface required for tile in areas where there is excessive water or grease and oils such as kitchens, dining facilities, shower rooms, toilets, and in industrial and maintenance facilities.

C302001 1.1 CERAMIC MOSAIC UNGLAZED FLOOR TILES

Ceramic Mosaic unglazed floor tiles must be a minimum of 1/4 inch (6 mm) thick with a maximum of 1/16 inch (1.6 mm) grout width with cushioned edge. Tile must have less than a 0.5 percent water absorption rate, ASTM C373.

C302001 1.2 PORCELAIN FLOOR TILE

Porcelain floor tiles must be a minimum of 5/16 inch (8 mm) thick with a maximum of 1/4 inch (6 mm) grout width with cushioned edge. Tile must have a minimum breaking strength of 300 pounds (202 kg), ASTM C648 and a maximum absorption rate of 0.5%, ASTM C373. Tile must be color through, impervious, unglazed or glazed finish with an unpolished, semi-polished, polished, or textured surface.

C302001 1.3 QUARRY FLOOR TILE

Quarry floor tiles must be a minimum of 1/2 inch (12.7 mm) thick tiles with a maximum of 1/4 inch (6 mm) grout width. Tile must have a minimum breaking strength of 350 pounds (158 kg), ASTM C648 and a maximum absorption rate of 3%, ASTM C373. Use grout release for darker pigmented grout colors. Tile must have a maximum of 3.0 percent water absorption rate when tested in accordance with ASTM C373. Non-slip, abrasive grain or textured surface required for tile in areas where there is excessive water or grease and oils. Tile must consist of semi-vitreous, vitreous or clay material with smooth or textured surface and unglazed finish.

C302002 TERRAZZO FLOOR FINISHES

Refer to Project Program for special design requirements.

C302002 1.1 BONDED TERRAZZO

Provide terrazzo, bonded to concrete, consisting of a terrazzo topping over an underbed. Where structural movement is anticipated which may injure the terrazzo, use the sand cushion (floating) method. Provide cementitious terrazzo in accordance with the NTMA bonded terrazzo specification. Patterns must have three (3) colors with (18 gauge) minimum zinc "L" divider strips.

Applicator must be approved by the NTMA and must have a minimum of 5 years experience in the application of the materials to be used and must have a completed 8 successful installations within the past 2 years.

C302002 1.2 RESINOUS TERRAZZO

The resinous terrazzo flooring must be an epoxy terrazzo. All terrazzo, auxiliary products and materials and application techniques used must be approved by National Terrazzo and Mosaic Association (NTMA) and epoxy terrazzo manufacturer, whichever is more stringent, prior to use. These requirements must include, but are not limited to the following;

Epoxy Terrazzo Minimum Requirements:

The contractor must be a member of NTMA and must have a minimum 10 years of application experience and have completed a minimum 5 successful installations over the past five years of similar scope, complexity and minimum of 75 percent of the square footage.

Products must not contain VOC's or formaldehydes. Thickness 3/8" cast in place. Hardness: 60-85 per ASTM D-2240. Tensile Strength: 3,000 psi (min) per ASTM D-638. Compressive Strength: 10,000 psi (min) per ASTM D-695. Chemical Resistance: No deleterious effects per ASTM D-1308

Divider strips/control joints in the terrazzo must be aluminum or brass must occur directly above control joints in the subfloor and be a minimum 18 gauge "L" shape. A flexible crack suppression membrane (elastomeric) installed over entire floor slab surfaces, including all cracks in the subfloor. Flatness tolerance of the slab must be less than 0.25-in flatness variation over 10ft span. Fill areas with 100% epoxy solids with fine aggregates per manufacturer's recommendations for areas which do not meet the flatness tolerance mentioned above. The concrete surface must use shot blasting only (no alternate method to be used). The concrete slab is to be tested for moisture transmission using ASTM F2170 Probe Test. Concrete slabs must be shot-blasted and cleaned to receive epoxy terrazzo moisture vapor primer system as specified by manufacturer and NTMA, whichever is more stringent.

Maintain the ambient room and floor temperature at 60Â°F or above for a period extending 72 hours before, during and after floor installation. Concrete to receive epoxy terrazzo must have cured for at least 28 days

and be free of all curing compounds. Test concrete substrate to determine acceptable moisture levels prior to installation. Testing should be conducted according to ASTM F2170, Probe Test (determining relative humidity in concrete slabs using in situ probes). Concrete slabs must be shot-blasted and cleaned to receive epoxy terrazzo moisture vapor primer system as specified by manufacturer and NTMA, whichever is more stringent. The building must be enclosed and the HVAC system operational prior to and during each day of installation, the terrazzo contractor must verify that the dew point is at least 5Â° F (-15Â° C) less than the slab and air temperature.

Physical properties of the moisture migrating primer must have a maximum of 0.3 perms with 100% RH. Primer must be a material recommended by the resin manufacturer which will penetrate the pores of the substrate and bond with the topping to form a permanent monolithic bond between the substrate and the topping.

Five colors for various patterns and accents throughout the flooring area. Marble chips must not exceed #1 size. Provide a minimum of three 6" x 6" samples for each color and type of terrazzo for review prior to purchase and two 6" lengths of each type of divider strip. Use of post-industrial recycled marble or granite terrazzo chips. When completed, the terrazzo must show a minimum of 70% decorative aggregate chips on the surface.

The finished floor will be rinsed clean, allowed to dry and non-yellowing, slip-resistant & durable water based acrylic sealer. Confirm with user if high polish finish may be used in lieu of sealer. Coordinate with user sheen of polished finish. Use 100% epoxy solids flexible resin, tinted to match adjoining terrazzo matrix per manufacturer's specification.

For concrete slab requirements; See PTS A10-50 Slab on Grade, 1.1.1 Slab on Grade where Resinous Terrazzo Floor Finish is scheduled.

C302003 WOOD FLOORING

C302003 1.1 WOOD FLOORING SYSTEM

Wood strip flooring must be 3/4 inch (19 mm) thick by 2-1/4 inches (57 mm) face width, kiln dried, continuous tongue and groove and of standard lengths. Beech and birch must be second grade in accordance with NOFMA Grading Rules. Hard maple must be second and better in accordance with MFMA-01. Red and white oak must be select grade in accordance with NOFMA Grading Rules. Strip flooring must be marked with the trademark of the grading agency. The strip flooring must be NOFMA certified and installed in accordance with NOFMA publication *Installing Hardwood Flooring*. Nails must be as recommended by strip flooring manufacturer’s recommendations. Resilient pads must be pneumatic rubber, PVC, or polyurethane resilient mounts to fit the floor system. Moisture barrier must be 6 mil minimum thickness polyethylene.

C302003 1.1.1

Rooms where wood flooring is to be installed must have permanent

heating and air conditioning installed and working or adequate arrangements for ventilation and temperature controls starting not less than 3 days prior to beginning the installation of flooring and continuing throughout the remainder of the contract period.

C302003 1.1.2

Concrete slab must be level, steel troweled to a tolerance of 1/8 inch (3 mm) plus or minus in a 10 foot (3048mm) radius. Slab surface must be clean, dry, and approved by wood floor manufacturer prior to start of installation.

C302003 1.1.3

Unless otherwise approved, flooring must be laid parallel to the length of the area to be floored. Strips must be laid with close joints, snugly driven up but providing for expansion in accordance with humidity conditions expected during the life of the flooring. End joints must be so alternated that there will be at least two boards between end joints in the same plane and at least 6 inches between end joints in adjacent boards. Space for expansion must be left along perimeter walls and around fixed projections through the floor surface.

C302003 1.1.4

Flooring must be sanded to a smooth, even, uniform finish without burns in accordance with the flooring manufacturer’s recommendations. The flooring must be left clean and ready to receive the finishing materials. Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for floor finishes.

C302004 RESILIENT FLOOR FINISHES

All resilient flooring must meet or exceed applicable Architectural Barriers Act (ABA) Standards horizontal requirements. Install each type of flooring with recommended adhesive in accordance with the manufacturers' written instructions. Installers must be approved by the manufacturer in writing and must have a minimum of 3 yrs experience for each type of flooring to be installed. Provide and store a minimum of 2% total quantity for each type flooring, color and pattern within each building for future replacement and patching. Provide manufacturers full line of color and pattern selections, including multi-color patterns. Use the resilient floor finishes as identified in the Project Program or as directed below.

C302004 1.1 RESILIENT SHEET FLOORING SYSTEMS

C302004 1.1.1

Resilient linoleum sheet flooring must be made with natural raw materials including linseed oil, flour, and rosin or resin binders double calendared onto natural jute backing, ASTM F2034, Type I. Pattern and color must extend throughout thickness of material. Gage must be 0.10 inch (2.5 mm). Static load limit

must be 250 psi per ASTM F970. Seal linoleum using manufacturer's recommended sealer for commercial application. The manufacturer's technical representative must review and approve each typical sample application on-site prior to resuming the installation and must spot check each 1,196 square yards (1000 square meters) for quality control. Work must not commence on any portion of work until the manufacturer's technical representative renders approval on site. A manufacturer's 5-year warranty is required.

C302004 1.1.2

Resilient rubber sheet flooring must be commercial quality, dimensionally stable, wear resistant, firm and slip resistant with integral color. The rubber sheet flooring must be a three-layer construction consisting of a rubber wear layer, a cushioned layer, and a polyester backing. All components of the construction must be thoroughly vulcanized to prevent delamination. The rubber sheet flooring must conform to ASTM F1860-98 and require no wax maintenance.

C302004 1.1.3

Resilient homogeneous vinyl sheet flooring must be commercial quality, 0.080 inch (2.0 mm) overall nominal gauge with a minimum wear layer thickness of 0.066 inch (1.6 mm) and a minimum of 6 feet (1.83 m) wide. It must be non-layered, non-backed and include a protective urethane finish for ease of maintenance and conform to ASTM F1303, Type II Grade 1 Class A. Seams must be recess scribed and heat welded with patterned or solid color weld rods depending on the Contractor’s design intent to camouflage, blend or accent the seam lines. Resilient homogeneous vinyl sheet flooring must require no wax maintenance.

C302004 1.1.4

Resilient heterogeneous vinyl sheet flooring must be commercial quality, 0.080 inch (2.0 mm) overall nominal gauge with a minimum wear layer thickness of 0.066 inch (1.6 mm) and a minimum of 6 feet (1.83 m) or 12 feet (3.6 m) wide. It must include a protective urethane finish for ease of maintenance and conform to ASTM F1303, Type I Grade 1 Class A. Seams must be recess scribed and heat welded with patterned or solid color weld rods depending on the Contractor's design intent to camouflage, blend or accent the seam lines. Resilient heterogeneous vinyl sheet flooring must require no wax maintenance.

C302004 1.2 RESILIENT TILE FLOORING SYSTEM

C302004 1.2.1

Resilient vinyl composition tile (VCT) must be commercial grade, asbestos free, with a nominal overall gauge of 1/8 inch (3 mm) and a wear layer thickness of 1/8 inch (3 mm) nominal. The tile must be manufactured in accordance with ASTM F 1066, Type II, Comp. 1, Class 2, through pattern. Tile must be finished in

accordance with manufacturer’s written instructions.

C302004 1.2.2

Resilient static dissipative vinyl composition tile (SDT) must be of commercial grade, asbestos free, with a nominal overall gauge of 1/8-inch (3 mm) and a wear layer thickness of 1/8-inch (3 mm) nominal; with an antistatic additive. The SDT tile must conform to ASTM F1066, Class 2 through pattern. The flooring must be installed with recommended adhesive and accessories; and finished in accordance with the manufacturer's written instructions. Use SDT floors in computer areas or areas with sensitive electronic where the Project Program requires tile.

C302004 1.2.3

Resilient solid vinyl tile/plank must be 0.1 inch (2.5 mm) thick, with a vinyl wear layer of 0.040 inches (1.mm) and must be planks or square tiles. It must include a protective urethane finish for ease of maintenance and conform to ASTM E648, Type III, Class 1 and ASTM F1700, Class III. Provide vinyl flooring that is easily cleaned with off-the-shelf products. Surface finishes requiring manufacturer supplied or special order cleaning solutions are not acceptable. Vinyl flooring must have a marble, granite, stone, terrazzo or wood grain pattern. A manufacturer's 25-year min warranty is required. Products must meet the Buy American Act and be manufactured in ISO 9001 and ISO 14001 compliant factories.

C302004 1.2.4

Provide 100% synthetic rubber tile with color through, slip resistance formulation, with a minimum base thickness of 0.125 inch (3.2 mm) and a minimum stud height of 0.024 inch (0.6 mm). Rubber tile must conform to ASTM F1344, Class I and ASTM E648, Class 1. The product shall require no wax maintenance. A manufacturer's 10-year warranty is required for a raised round or square surface profile. A manufacturer's 5-year warranty is required for other surface textures with slip resistant formulation.

C302004 1.2.5

Resilient athletic rubber tile must be 100% synthetic heavy rubber or recycled crumb rubber tile, 3/8 inch (9 mm) thick. Rubber tile must conform to ASTM F1344 for recycled crumb rubber tile. The product must require no wax maintenance. A manufacturer’s 2-year warranty is required. Use rubber tile flooring in weight and exercise rooms.

C302004 1.2.6

Resilient linoleum tile must be made with natural raw materials including linseed oil, flour, and rosin or resin binders double calendared onto synthetic jute backing, ASTM F2034, Type I. Pattern and color must extend throughout thickness of material.

Gage must be 0.10 inch (2.5 mm). Static load limit must be 250 psi per ASTM F970. Seal linoleum using manufacturer's recommended sealer for commercial application. The manufacturer's technical representative must review and approve each typical sample application on-site prior to resuming the installation and must spot check each 1,196 square yards (1000 square meters) for quality control. Work must not commence on any portion of work until the manufacturer's technical representative renders approval on site. A manufacturer's 5-year warranty is required.

C302005 CARPETING

C302005 1.1 GENERAL

Installer(s) must be approved by the manufacturer in writing. Carpet manufacturer must be established and in good standing with the industry. A minimum of 5% total quantity for each color and pattern must be provided and stored within the building for future replacement patching.

C302005 1.2 CARPET PILE FIBER

Provide one of the following:

a. 100% premium branded, yarn-dyed, Type 6.6 continuous hollow filament nylon
b. 100% premium branded, solution-dyed, Type 6 or Type 6.6 continuous hollow filament nylon
c. 100% premium branded, combination yarn dyed and solution-dyed, Type 6 or Type 6.6 continuous hollow filament nylon

C302005 1.3 CARPET BACKING REQUIREMENTS

a. Provide manufacturer's standard high performance carpet backing.
b. Moisture resistant carpet backing must pass the 24-hour British Spill Test.
c. Moisture proof carpet backing must pass the 10,000 Impacts Test.
d. Provide moisture resistant carpet backing with an attached urethane cushion, minimum 18 lb. density.
e. Provide moisture proof carpet backing with integral high density cushion of thermoplastic, urethane, or PVC.

C302005 1.4 CARPET PERFORMANCE CHARACTERISTICS

a. Flammability: Carpet must meet the Critical Radiant Flux Classification of not less than 0.45 W/sq. cm. when tested in accordance with ASTM E648. Carpet must generate less than 450 rating when tested in accordance with ASTM E662
b. Static Control: Carpet must include a permanent static control system to control static build-up to less than 3.0 KV in accordance with AATCC-134.
c. Dimensional Stability: Carpet must be permanently dimensionally stable with no delamination of components or any edge raveling or zippering. Edge Ravel: Minimum 1 lb. loop pile only - ASTM D-7267; Delamination: Minimum 3.5 lb. per inch of width - ASTM D-

3936; Tuft Bind: Minimum 10 lb. average tuft bind for loop pile - ASTM D-1335; Tuft Bind: Minimum 8 lb. average tuft bind for (Modular Tile) loop pile - ASTM D-1335.

d. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC-165.

e. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) per AATCC-16.

f. Antimicrobial Activity: Not less than 0.08-inch (2-mm) halo of inhibition for gram-positive bacteria; not less than 0.04-inch (1-mm) halo of inhibition for gram-negative bacteria; no fungal growth, per AATCC-174.

g. Appearance Retention: Provide carpet with a medium scale (>3" repeat) or large scale (>6" repeat), multi-color pattern for excellent appearance retention and soil hiding characteristics. Heathered yarn without a pattern is unacceptable unless approved by the NAVFAC Interior Designer as an accent carpet.

h. Sustainability: Provide carpets with recycled fiber content, and renewable material content in the attached cushion or backing materials certified by an independent testing agency. Recycle Content of the Total Product Weight: Must be either Pre-consumer or Post-consumer content or a combination of these. Broadloom: minimum of 10%; Modular Tile: minimum of 30%.

i. Product Sustainability Certification: To achieve superior performance in multiple environmental attribute areas, carpet must have third party certification in accordance with NSF/ANSI 140 Sustainable Carpet Assessment Standard at a "Gold" level minimum. Carpet manufacturer must supply certificate as part of the procurement documentation.

j. Indoor Air Quality: Provide carpets that meet the criteria of the CRI "Green Label Plus" Indoor Air Quality Testing Program. Carpet adhesive VOC's must be less than 50 g/L..

k. Reclamation of existing carpet to be determined with potential vendor. When carpet is replaced, submit certification documentation from the reclamation facility to the Contracting Officer.

l. Written Warranty: Lifetime commercial warranty for texture retention and edge raveling, zippering, de-lamination is required. Seam preparation and adhesives must be recommended by the carpet manufacturer in accordance with the warranty. Submit a copy of the manufacturer's standard warranty to the Contracting Officer within 60 days of BOD. Government must be a beneficiary of the terms of this warranty.

m. Texture Appearance Retention Rating (TARR): The carpet should be evaluated using ASTM D-5252, Hexapod Drum Test, as the commercial carpet test procedure and TARR classification determined by ASTM D-7330. Carpet must meet TARR ratings specified below:

Space Definition	Traffic Classification	TARR Classification
Private Offices	Moderate	> 3.0 TARR
Training, Conference, etc.	Heavy	> 3.0 TARR
Open Office,	Severe	> 3.5 TARR

Corridors, Lobbies, etc.		

C302005 1.5 CARPET INSTALLATION

Install carpet by one of the following methods in accordance the manufacturer's recommendations and in accordance with the Carpet and Rug Institute, CRI-104, Standard for Installation Specification of Commercial Carpet, compatible with the construction, backing, and pattern characteristics of each carpet provided.

a. Direct Glue Down Carpet Installation
b. Double Glue Down Carpet and Pad Installation
c. Carpet with Attached-Cushion Installation
d. Preapplied releasable "dry" adhesive system installation.
e. Stretch-In Carpet Installation with tack strips and pad

C302006 MASONRY AND STONE FLOORING

C302006 1.1 UNIT MASONRY FLOORING SYSTEM

Unit masonry flooring system and coordinating base must be fired red clay brick, or chemical resistant brick unit masonry flooring. Provide unit masonry flooring systems in accordance with the Brick Industry Association recommendations and the Tile Council of America *Handbook for Ceramic Tile Installation*.

C302006 1.2 STONE FLOOR AND BASE FINISHES

C302006 1.2.1

Natural Stone Flooring and coordinating base must be of marble, granite, or travertine.

C302006 1.2.2

Aggregate Stone Tile and coordinating base must be a composite of marble or granite.

C302006 1.2.3

Install stone floor and base in accordance with the recommendations of the Marble Institute of America, the Indiana Limestone Institute of America, Inc. the National Building Granite Quarries Association, Inc. in addition to the Tile Council of America *Handbook for Ceramic Tile Installation*as applicable to the type of stone being installed.

C302007 WALL BASE FINISHES

Provide a wall base for transition between floor and wall finish. If no other type of base is required, provide rubber or vinyl straight base at carpet installations, rubber or vinyl cove base at exposed concrete or resilient tile floors, and a base to match the floor material at hard surface tile floors, or as required in the project program.

C302007 1.1 RESILIENT WALL BASE FINISHES

C302007 1.1.1

All rubber wall base must be 4 inch (100 mm) high and 1/8 inch (3.2 mm) thick as required unless indicated otherwise. The wall base must include inside and outside corners and must conform to ASTM F1861-98, Type TS. Provide wall base in rolls and not 4 foot lengths.

C302007 1.1.2

Flash-coved integral resilient sheet wall bases must be installed in accordance with the manufacturers' printed instructions to include a cove stick having a minimum radius of 3/4 inch (19 mm) and finished with an approved cap strip.

C302007 1.2 CARPET WALL BASE FINISHES

Carpet wall base finishes must consist of a strip of carpet matching or contrasting adjacent carpet, 4 inch (100 mm) high, with the top edge finished with an aluminum or vinyl edge profile; or an edge binding material matching the carpet.

C302007 1.3 WOOD BASE FINISHES

Wall base must be a minimum of 3-1/2 inches (90 mm) high and AWI custom grade hardwood molding with mitered inside and outside corners. Refer to C302008 – 1.1.2 for wood finishes.

C302007 1.4 STONE AND MARBLE BASE FINISHES

Stone and marble wall base must coordinate with the adjacent flooring and must be 4 inch (89 mm) and 3/4 inch (19 mm) thick.

C302007 1.5 TILE BASE FINISHES

Coordinate tile base with ceramic wall and floor tile for color, material match and modularity. Include all pre-manufactured trim pieces, special shapes, caps, stops, and returns to provide a complete installation. Provide coordinating wall, base and floor tile for curb construction at showers.

C302008 STAIR FINISHES

C302008 1.1 RESILIENT STAIR TREADS, RISERS AND LANDINGS

Refer to C302004 for resilient landing finishes. Provide rubber risers to match treads or one-piece tread/risers. Provide treads with raised

patterns and visually impaired nosing inserts as required.

C302008 1.2 PORCELAIN AND STONE STAIR TREADS, RISERS AND LANDINGS

Refer to C302001 and C302006 for porcelain and stone stair finishes. Provide treads with textured surfaces or raised patterns and visually impaired nosing inserts as required.

C302008 1.3 CARPETED STAIR TREADS, RISERS AND LANDINGS

Refer to C302005 for carpeted stair finishes. Provide dense padding on treads and nosings for increased appearance retention and durability.

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

Assemblies include floor toppings and membrane systems.

C302009 1.1 REFLECTIVE, CHEMICAL AND SLIP RESISTANT FLOOR SYSTEMS

C302009 1.1.1 Thin Film Floor Coating

The Designer of Record must utilize UFGS Section 09 67 23.15, *Fuel Resistive Resinous Flooring, 3-Coat System*, for the project specification submittal and for test patch, surface preparation, and installation requirements. Use MPI Product #212 "Thin Film Flooring System for Aircraft Maintenance Facilities" for product specifications.

C302009 1.1.2 Dry Shake Floor Topping

System must be a nonferrous, non-oxidizing metallic aggregate, dry-shake surface hardener system consisting of specially processed cementitious binder, plasticizer, and water-reducing admixtures, formulated and processed under the stringent quality control of the manufacturer. The hardener must be proportioned and sealed in standard moisture resistant bags. The manufacturer must guarantee their aggregate to be free of rust, corrosive materials, oil, petroleum, or other water-base materials when delivered. The manufacturer must replace any material found to contain any such materials, or any other material, which is deemed unsatisfactory. The manufacturer must provide a full-time technical representative, qualified in designing and adjusting concrete mixes, to assist in the application of the aggregate surface hardener system. A mono molecular surface evaporation retardant film, as recommended by ACI 305R and ACI 308R, must be provided for use under drying conditions, due to high concrete or ambient temperatures, low humidity, high winds, and so forth. This includes heated interiors during cold weather, to aid in maintaining concrete moisture during the early placement stages of the plastic concrete. Retarder must be certified by its manufacturer to be compatible with the surface hardener and shall be used in accordance with the manufacturer's recommendations. Curing and sealing materials and procedures must be as recommended by the manufacturer of the aggregate surface hardener system and ASTM C309 or ASTM C1315. All installation must be in

accordance with manufacturer's instructions. Coordinate the concrete mix design with the dry shake floor topping manufacturer to optimize bond of floor finish to slab. Spread topping mix with a mechanical spreader.

C302010 HARDENERS AND SEALERS

C302010 1.1 HARDENED AND SEALED CURE CONCRETE FLOORS

Harden and seal concrete floors in accordance with the finished floor manufacture requirements. Utilize other methods of concrete curing if the floor finish manufacturer does not recommend a chemical hardener or sealer. Concrete floors that can utilize a hardener-sealer and will be exposed to traffic must receive a minimum of two coats of hardener-sealer curing agent for dust protection. These hardener-sealer-cured floors must be finished with a curing agent that must penetrate the concrete to permanently seal the floor against moisture and the penetration of contaminants. The curing agent must be non-toxic, non-flammable, and non-combustible and must be installed in accordance with the manufacturer's printed instructions. The finished floor must be dust-free.

C302010 1.2 COLORED CONCRETE FLOORS

Colored concrete floors must include a colored pigment either applied as a topical dye; or a concrete topping with integral color pigment; or a dry shake pigment application, as required by the project program. Concrete floor must be trowel applied in a pattern, or must include grit for slip resistance.

C302011 RAISED ACCESS FLOORING

C302011 1.1 FLOORING SUPPORT SYSTEM

Design support system to allow for 360-degree clearance in laying out cable and cutouts for service to machines and so that panel and stringer together take up maximum of 2 inches (50 mm).

C302011 1.1.1 Pedestals, Shafts, and Caps

Provide pedestals of steel or aluminum, each capable of carrying 4,960 pounds (2250 kg) axial load without permanent deformation. Provide permanent factory applied corrosion resistant finish for pedestals made of ferrous materials. Provide base plate not less than 4 inch by 4 inch by 1/8 inches (100 mm by 100 mm by 3 mm) thick, welded to shaft of pedestal. Approved die-formed bases of equivalent load spreading capacity and bearing area may be provided in lieu of flat base plates. Provide shafts to support design loads. Provide Pedestal Caps designed to fit precisely over pedestal shafts and to interlock with panels and stringers to prevent tilting, rocking, or vibrating of panels when live load is applied. Provide pedestals with adjusting threads or other devices that will permit leveling of floor system with adjustment range of approximately 2 inches (50 mm). Provide lock nuts, set screws, or other locking devices to positively lock

final pedestal vertical adjustments in place, independent of floor panels. Do not use self-tapping screws, snap type connections, or spring-action lock-nuts. All adhesives used must be as recommended by the manufacturer.

C302011 1.1.2 Stringers

Fabricate from rolled or formed galvanized steel conforming to ASTM A591/A592M. Incorporate interlocking pedestal and stringers in pedestal stringer system, providing positive seating of panels to prevent tilting, rocking, or vibrating of panels when live load is applied. Provide stringers that can be added or removed after floor is in place. Fasten end of each stringer and mid-point of each four-foot stringer positively to pedestal heads, using manufacturer's standard screws. Provide screws that are removable from top.

C302011 1.2 FLOOR PANELS

Provide interchangeable 24 inch by 24 inch (610 mm by 610 mm) square module panels capable of supporting design loads. Panels must be of weight that can readily be removed and handled by one person using lifting tool furnished by access floor manufacturer. Panel finish surface to be Grade HW 120 high pressure plastic laminate conforming to NEMA LD. Use either factory attached carpet tile, factory attached - static dissipative grounded carpet tile or field installed carpet tile with seams overlapping the access floor grid panels or to transition areas where only part of the space is recessed for access floor.

a. Aluminum Panels - ASTM B85, SC84A, die-cast or extruded construction for rooms with MRI equipment.

b. Steel Panels - Die-formed construction. Weld flat steel top sheet to one or more formed steel stiffener sheets. Provide zinc-coating conforming to ASTM A591/A591M, Class C, with manufacturer's standard corrosive resistant electrically conductive epoxy paint finish . Wood, plastic and other combustible products are prohibited.

c. Cementitious or Concrete Filled Formed Steel Panels Entirely non-combustible steel shell and cementitious or concrete fill, corrosive resistant inside and out. Seal cut edges in accordance with manufacturer's recommendations.

d. All panels to be manufactured in USA and individually labeled "Made in USA"

C302011 1.2.1 Gravity Held Factory Finished Panels with Bolted Stringer Understructure

Fasten end of each stringer and mid-point of each four-foot stringer positively to pedestal heads, using manufacturer's standard screws. Provide corner lock system for all general office (bare for carpet tile) applications with screws that are removable from top.

C302011 1.3 GROUNDING

Ground access floor system for safety hazard and static suppression. Connection of access floor support system to building grounding electrodes is specified in another section of this RFP. Provide positive contact between components for safe, continuous electrical grounding of entire floor system. Total system resistance from wearing surface of floor to building grounding electrode must be within the range of 0.5 megohms to 20,000 megohms for computer rooms, electronics offices, data centers and control rooms, 0.2 megohms to 2.0 megohms for clean rooms and laboratories.

C302011 1.4 THRESHOLD(S)

Provide interior thresholds of nonferrous materials where flooring materials or floor levels change.

C302011 1.5 RAMPS

Provide ramps of required slip resistance and slope conforming to ABA Standards.

C302011 1.6 INSTALLATION

Install access floor system and accessories under supervision of the access flooring manufacturers authorized representative to insure rigid, firm installation free of vibration, rocking, rattle, squeaks, and other unacceptable performance. Install in accordance with the following;

a. Set pedestal in adhesive as recommended by the access flooring manufacturer to provide full bearing of the pedestal base on the sub floor.
b. Layout floor panel installation to keep the number of cut panels at the floor perimeter at a minimum. Scribe panel assemblies at the perimeter to provide a close fir with no voids greater than 1/18" where panels abut vertical surfaces. At spaces where access floor connects to the walls provide connection detail that seals the access floor to the wall to reduce air leakage.
c. Secure grid member to pedestal heads in accordance with access floor manufacturers instructions.
d. Thoroughly clean up dust, dirt and construction debris caused by floor installation.
e. Level installed access floor to within 0.060" of true level over the entire area and within 0.10" in any 10" distance.

C3030 CEILING FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS" for painted ceiling finishes.

C303001 ACOUSTICAL CEILING TILES AND PANELS

C303001 1.1 ACOUSTICAL CEILING PANELS

All acoustical ceiling panels must be 24 inch by 24 inch (610 mm by 610 mm), with a minimum light reflectance of .75 (except as noted), Class A, flame spread 25 or less and smoke development of 50 or less, ASTM E84. All acoustical ceiling panels must have minimum 60% recycled content except as noted. Acoustical ceiling panels must conform to ASTM E1264. Provide square edge except as noted.

C303001 1.1.1

For typical open office areas, conference rooms, executive offices, provide non-asbestos mineral composition acoustical ceiling panels of Type III with factory-applied standard washable painted finish or Type IV with factory-applied plastic membrane-faced vinyl, Form: 1, 2, or 3. Provide reveal edge tiles unless otherwise noted.

C303001 1.1.2

For typical humid areas such as toilets, kitchens, fitness and locker rooms, provide non-asbestos mineral or glass composition acoustical ceiling panels bonded with ceramic, moisture resistant thermo-setting resin, or other moisture resistant material with factory-applied standard washable painted finish; and recycled content: minimum of 40%.

C303001 1.1.3

For areas with very high humidity, heavy soiling, staining, impact abrasion, or limited security concerns, such as bachelor's quarters, laundry rooms, or maintenance shops, provide Type V, Steel or Type VII, aluminum faces with white baked on enamel finish, and non-asbestos mineral composition absorbent backing.

C303001 1.1.4

For areas requiring a concealed grid system, provide non-asbestos mineral composition acoustical ceiling panels of Type III with factory-applied standard washable painted finish or Type IV with factory-applied plastic membrane-faced vinyl, Form: 1, 2, or 3; Size: 12 inch by 12 inch by 5/8 inch (305 mm by 305 mm by 19 mm), Edge: for concealed grid installation.

C303001 1.1.5

Provide NRC and CAC ratings as follows:

Type of space	Minimum NRC	Minimum CAC
Open Office Areas, Auditoriums	.70	35-39
Conference Rooms,	.60	35-39

Classrooms		
Activity spaces, Lobbies, Corridors	.60	35-39
Executive and Private Offices	.60	35-39
Toilets	.50	35-39
Kitchens	.50	35-39
Fitness/Locker Rms	.50	35-39
All other spaces	.50	35-39

Base the tested NRC value on Mounting Type E-400 of ASTM E795.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Conform to specifications, standards and requirements in accordance with Gypsum Association GA 214, GA 216 and GA 224. Provide asbestos free materials only. Provide featured edge gypsum board on all gypsum surfaces that flatness of joints will be visible, such as up-lighted ceilings, window lighted ceilings, and as recommended by the manufacturer. Provide Type X gypsum board in fire rated assemblies.

C303002 1.1 REGULAR GYPSUM BOARD

ASTM C36/C36M and ASTM C1396/C1396M, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick, tapered edge. Provide 5/8 inch (15.9 mm) for all projects except for single family residential, which may utilize 1/2 inch (12.7 mm) if other requirements, such as sound control, are met.

C303002 1.2 MOISTURE RESISTANT GYPSUM BOARD

ASTM C630/C630M, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick, tapered edges. Use for ceilings in humid areas. Do not use as a substrate in tiled areas where tile will be exposed to direct moisture contact or condensation accumulation. Support moisture resistant gypsum board at 12 inches (305 mm) on center. Provide 1/2 inch (12.7 mm) for single-family residential projects only. Provide 5/8 inch (15.9 mm) for all other projects.

C303002 1.3 FOIL BACKED GYPSUM BOARD

ASTM C1396/C1396M 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick in

residential construction, and 5/8 inch (15.9 mm) thick in non-residential construction, tapered edges for layers exposed to view, square edges for concealed layers. Seal joints in foil backing to other panels and adjoining materials as recommended by the panel manufacturer.

Alternative to foil backed gypsum board in Secured Areas: Field applied foil faced barrier material is an acceptable alternative for pre manufactured foil backed gypsum board. Provide a continuous composite multilayer barrier with a woven polyethylene sheet sandwiched between two sheets of solid reflective aluminum surfaces. Shielding effectiveness tested in accordance with IEEE 229/ ASTM D4935. Install barrier in accordance with manufactures instructions

C303002 1.4 CEMENTITIOUS BACKING UNITS

ANSI A108.11 and ANSI A118.9, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick; use for adhesive applied ceramic tile in wet areas (tubs, shower enclosures, saunas, steam rooms, gang shower rooms, or for shower areas with a veneer plaster finish. Support cementitious backing units at 12 inches (305 mm) on center. Provide screws specifically designed for use with cement panels.

C303002 1.5 IMPACT RESISTANT GYPSUM BOARD

Reinforced gypsum panel with imbedded fiber mesh or polycarbonate resin thermoplastic backing, 5/8 inch (15.9mm) thick, tapered edges, in accordance with Structural Failure Test; ASTM E695 or ASTM D2394 and Indentation Test; ASTM D5420 or ASTM D1037. For use whenever gypsum board partitions are allowed for barracks, training facilities, and industrial facilities. Provide metal framing of 20-gauge minimum. Provide fasteners that meet manufacturer requirements and specifications. Impact resistant gypsum board must have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, ASTM E84. Finish with a high strength veneer plaster.

C303002 1.6 TEXTURED CEILING FINISH SYSTEM

Applied textured ceiling finish must be plaster based. Refer to paragraph "C301002 – 1.1 GYPSUM PLASTER" for finish requirements.

C303002 1.7 JOINT TREATMENT

ASTM C475, Joint compound must be specifically formulated and manufactured for use with and compatible with tape, substrate and fasteners as recommended by the manufacturer. Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Provide premanufactured joints at all structural expansion joints, crack control joints, and change of materials as recommended by the manufacturer and in accordance with GA 216.

C303002 1.8 FASTENERS

ASTM C514, Fasteners must be compatible with each type of gypsum board material as recommended by the gypsum board manufacturer and in

accordance with GA 216 and GA 224.

C303002 1.9 ACCESSORIES

ASTM C1047, Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials. Install as recommended by GA 214, GA 216 and GA 224.

C303002 1.10 LEVEL OF FINISH

C303002 1.10.1

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Ceilings to receive a heavy-grade wall covering or heavy textured finish before painting must be finished to GA 214, Level 3. Ceilings without critical lighting to receive flat paints, light textures, or wall coverings must be finished to GA 214, Level 4. Unless otherwise specified, all gypsum board walls, partitions and ceilings must be finished to GA 214, Level 5. Provide joint, fastener depression, and corner treatment. Do not use fiberglass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

C303002 1.10.2

Wherever gypsum board is to receive eggshell, semigloss or gloss paint finish, or where severe, up or down lighting conditions occur, finish gypsum wall surface to GA 214 Level 5. In accordance with GA 214 Level 5, apply a thin skim coat of joint compound to the entire gypsum board surface, after the two-coat joint and fastener treatment is complete and dry.

C303003 PLASTER CEILING FINISHES

C303003 1.1 VENEER PLASTER CEILING FINISHES SYSTEM

Veneer plaster ceilings must be gypsum plaster veneer finish to gypsum base finishes. Refer to Section C3040 for paint system and gloss level. Provide gypsum neat plaster, gypsum ready-mixed plaster, or high strength gypsum plaster base coat conforming to ASTM C28. High strength gypsum plaster must have a compressive strength of not less than 2,500 psi, when tested dry in accordance with ASTM C472.

C303004 WOOD CEILINGS

Not Used.

C303005 SUSPENSION SYSTEMS

C303005 1.1 EXPOSED SUSPENDED ACOUSTICAL CEILING GRID

Provide 24 inch by 24 inch (610 mm by 610 mm) aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish must be factory applied white baked enamel. Provide manufacturer's hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106 inch (2.7 mm) diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16 inch (4.76 mm) galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/A580M, composition 302 or 304, condition annealed stainless steel, 0.106 inches (2.7 mm) in diameter over high humidity areas such as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, nonstaining and ASTM C636). Recycled content must be a minimum of 25%.

C303005 1.2 CONCEALED SUSPENDED ACOUSTICAL CEILING GRID

Provide 12 inch by 12 inch (305 mm by 305 mm) aluminum or steel non-corroding intermediate-duty concealed grid system for lay-in acoustical panels (ASTM C635). Finish must be factory applied white baked enamel. Provide manufacturer’s wall or edge molding. Hang grid system as recommended by manufacturer but no less than with 0.106 inch (2.7 mm) diameter wires (ASTM A641A, A641M, Class 1), or with one by 3/16 inch (4.76mm) galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A366M (with an electrodeposited zinc coating, Type RS). Install suspended grid system with acoustical sealant (ASTM C843, nonstaining) and in accordance with ASTM C636. Recycled content must be a minimum of 25%.

C303005 1.3 SUSPENDED AND FURRED CEILING SYSTEMS

ASTM C841 (for lath); ASTM C645 (for GWB).

Provide steel materials for metal support systems with galvanized coating per ASTM A653/A653M, G60; aluminum coating ASTM A463/A463M, T1-25; or a 55% aluminum-zinc coating. Provide suspended ceiling framing in accordance with ASTM C754, except framing members must be 16 inches (400mm) unless otherwise noted.

C303006 METAL STRIP CEILINGS

Not Used.

C303090 OTHER CEILING AND CEILING FINISHES

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

Apply coatings directly to all non-prefinished surfaces of the interior construction. Comply with Master Painters Institute requirements for surface degradation analysis, surface preparation, paint and coating selection, paint application restrictions for substrate materials, and paint application.

C304001 GENERAL REQUIREMENTS

All paint must be suitable in accordance with the Master Painter Institute (MPI) standards for the interior architectural surface being finished. The current MPI, "Approved Product List" as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Select paint systems for the project in accordance with the MPI Architectural Painting Decision Tree available on the Whole Building Design Guide. Use this interactive MPI Decision Tree website to identify applicable paint system(s) for the project. The MPI Decision Tree identifies paint systems for each interior or exterior coated surface in "Normal" or "Aggressive" environmental conditions and generally lists the applicable paint systems in descending order of performance. The paint system at the top of each substrate list generally indicates the highest performing acceptable coating system.

Choose the "Aggressive" environmental conditions in the MPI Decision Tree for exterior systems that are used in moist humid conditions, abrasive conditions, chemical exposure conditions, or within five miles proximity of the ocean or a body of water. Also use "Aggressive " environmental conditions in interior spaces that are exposed to in moist humid conditions, abrasive conditions, chemical exposure conditions, such as bathrooms, shower rooms, kitchens, chemical storage area, swimming pools, laundry, sanitary areas, commercial kitchens, industrial production areas, and hospital operating rooms provide paint systems that comply with the MPI Decision Tree "Aggressive" environmental conditions.

Comply with the following rules when determining the appropriate paint or coating system from the MPI Decision Tree:

a. Some of these paint systems are identified with a "NAVFAC Anchor". This "NAVFAC Anchor" indicates the minimum performing system that NAVFAC will accept for that substrate and environmental conditions.

b. When multiple "NAVFAC Anchors" are indicated on a certain substrate and environmental condition, provide the "NAVFAC Anchor" paint or coating system that is most appropriate for the facility use.

c. If only one MPI Decision Tree choice is available for a certain substrate and environmental condition with no indicated NAVFAC preference, provide that sole option for NAVFAC projects.

d. If the MPI Decision Tree provides multiple choices and no NAVFAC preference is denoted, refer to the Additional RFP Requirements below to determine level of performance.

e. If the MPI Decision Tree does not identify all paint system applicable to the facility, utilize the *MPI Architectural Painting, Exterior Systems Manual* to identify other appropriate paint systems for the project. Utilize the "Premium Grade" systems and comply with all limitations stated in the MPI "Approved Product List" for each paint product. Products having an MPI VOC Range E3 must be given preferential consideration over lower VOC Ranges. Use higher performing paint systems unless the lower performing paint system can

be justified based on a lifecycle cost to include surface preparation, application, disposal, environmental impact, and required recoating cycles. Only use paint products that have been tested for MPI'S "DETAILED PERFORMANCE" or "EVALUATED PERFORMANCE ". Do not use products that have only been tested for "INTENDED USE".

f. If an "Aggressive" environmental condition option is not available in the MPI Decision Tree for a certain substrate, use the "Normal" environmental condition option.

g. Refer to the Additional Exterior Paint and Coating System Requirements below for further system requirements.

Paints and coatings must comply with Master Painters Institute Green Performance Standard GPS-1-12 which is available at the following website; http://www.specifygreen.com/EvrPerf/EnvironmentalPerformance.html. Provide Interior flat intermediate and topcoats of a maximum of 50 g/L VOC and interior non-flat intermediate and topcoats of a maximum 150 g/L VOC. Choose paints that provide performance and are environmentally friendly by using total VOC budgeting to analyze the total impact of all flat, non-flat and special purpose coatings on the project.

C304001 1.1 MPI GLOSS LEVELS

Gloss levels must comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufactures' description of his product. The MPI Gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. G1 is not used by Navy.

The MPI Decision Tree indicates a default gloss level for each paint system, however consider the appearance, anticipated conditions, and need for cleaning when choosing the correct gloss level for each coated surface of the project. Comply with the following guidance in choosing the appropriate gloss level.

a. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas.

b. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when human contact with the wall is expected but limited, and for dark accent colors.

c. Use G5 Semigloss for walls, doors and trim for high durability and clean ability and when a surface is expected to have routine human contact.

d. Use G6 Gloss only in special situations such as piping identification or special effects.

The MPI Gloss and Sheen Standard values are measured per ASTM D523, and are as follows:

Gloss Level Number	Gloss@ 60 Degrees	Sheen@85 Degrees
Gloss Level 1(G1) – Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2(G2) – "Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3(G3) – "Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4(G4) – "Satin-like"	Max. 20-35 units	Min. 35 units
Gloss Level 5(G5) – Semi-Gloss	35-70 units	
Gloss Level 6(G6) – Gloss	70-85 units	
Gloss Level 7(G7) – High Gloss	More than 85 units	

C304001 1.2 MPI SYSTEM DESIGNATIONS AND ABBREVIATIONS

The MPI coating system number in each Division is found in either the *MPI Architectural Painting Specification Manual* or the *Maintenance Repainting Manual* and defined as an interior system (INT/RIN).

a. INT designates an interior coating system for new surfaces.
b. RIN designates an interior coating system used in repainting projects or over existing coating systems.
c. DSD – the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the *MPI Maintenance Repainting Manual*. Degree of Surface Degradation designates the MPI Standard for description and appearance of existing condition of surfaces to be painted. This DSD classification is used to determine the proper surface preparation necessary for painting.

C304001 1.3 SURFACE PREPARATION

Comply with the "Interior Surface Preparation" section of the *MPI Architectural Painting Specification Manual* or the "Interior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All suggestive language such as "may" or "should" are deleted from the standard and "must" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or 'required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments. Notwithstanding MPI requirements, clean interior ferrous metal to a SSPC SP 10 level (near white) that have aggressive chemical environments (SSPC Zones 3A, 3B, 3C, 3D, and 3E) or waterfront exposure to open structures (SSPC Zones 2A or 2B). Examples of these types of facilities are indoor water training facilities, indoor swimming pools, and open or mostly open waterfront maintenance buildings/ waterfront warehouses/ canopies.

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. For existing buildings, use MPI *Maintenance Repainting Manual* to determine the coatings that need to be removed. Remove deteriorated or loose coatings before repainting begins. Oil and grease must be removed prior to mechanical cleaning. Cleaning must be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with

surfaces to be painted with water-thinned paints, must be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

C304001 1.4 ADDITIONAL INTERIOR PAINT AND COATING SYSTEMS

In addition to the MPI Decision Tree, comply with the following paint system requirements:

C304001 1.4.1 PAVEMENT COATINGS

(1) INT 3.2 Concrete Horizontal Surfaces

Normal Environmental Conditions; Pigmented

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23.00 20, *Pavement Markings.*

C304001 1.4.2 DRESSED LUMBER

Provide Pigmented systems for Composite Wood Doors (Fiberboard) and trim. Do not use Normal/ Aggressive; Clear and Normal/ Aggressive Stain finishes.

C304007 SPECIAL COATINGS TO WALLS

C304007 1.1 HIGH PERFORMANCE ARCHITECTURAL COATING (HIPAC)

HIPAC must be a durable, organic system applied to a continuous (seamless) high-build film and cure to a hard glaze finish. They must be resistant to continuous heat and humidity, abrasion, staining, chemicals, and biological growth. Coating must be installed as a complete system, and as recommended by the manufacturer and have a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E84.

C304007 1.1.1

Two-component, epoxy-polyamide must be chemical and corrosion-resistant, adhesive, alkali-resistant, and water-tolerant for metal, wood, concrete, masonry surfaces, and painted surfaces where high gloss or glaze type finish, extreme workability and resistance to abrasion and stains is required. Minimum dry film thickness is 3 mils for each of two coats. Furnish Gloss or Semigloss finish. Maximum volatile organic compounds (VOC) must be 340 grams/liter.

C304007 1.1.2

Single Component, Moisture-Curing Urethane must be a flexible, abrasion- and impact-resistant, use for floors, walls, machinery, equipment and other surfaces where good abrasion resistance, color retention, gloss retention, graffiti resistance and good resistance to acids, alkalis, solvents, strong cleaners and

sanitizers, fuel and chemicals are necessary. Can also be used on concrete floors, brick and masonry surfaces (properly conditioned), metals (properly primed), and wood (properly prepared and sealed.) Minimum dry film thickness is 3 mils for each of 3 coats. Use Type I, Aliphatic, for exterior use except for oily or resinous exterior wood surfaces. Use Type II, Aromatic, for interior use.

C304007 1.2 IMPACT RESISTANT WALL FINISHES

Provide textured acrylic architectural coating system: a seamless textured acrylic water-based coating system, having a thickness of at least 20 mils, on surfaces scheduled to receive it. System must be composed of pure acrylic polymers, silica dioxide, ethylene dioxide and pigments. System must have a Barcoll Hardness Index of 38.0 or greater, smoke contribution of 7.0 or less, and have water vapor permeability of 27.5 English Perms or greater when tested in accordance with ASTM E96. (MPI 42) Coating system must have been on the market and successfully used in commercial applications for a minimum of 10 years.

C304007 1.2.1 CMU Application

High Performance seamless interior acrylic coating system must be used as an interior wall finish over CMU that has been joint-filled and smoothed with a water resistant manufactured recommended compound. Coating system to be mold and mildew resistant, flame spread 15 or less per ASTM-E84 and have a minimum final film thickness of 7 mils.

C304007 1.2.2 Gypsum Wallboard Application

High Performance seamless interior acrylic coating system must be used as an interior wall finish over gypsum wallboard. Do not prime or seal the drywall except as specifically recommended by the texture acrylic coating manufacturer. Coating system to be mold and mildew resistant, flame spread 8.5 or less per ASTM-E84 and have a minimum final film thickness of 20 mils.

C304007 1.2.3 Installation

Finish may only be installed by factory-qualified applicators in accordance with the manufacturer's printed instructions and recommendations, to fulfill warranty requirements. All coating system components must be products of the same manufacturer.

A minimum of one sample wall application must be provided. Edges at door and window frames must be feathered; hard edges are unacceptable. Upon approval of the sample wall by the project manager, the application must serve as a standard for the remaining work.

The manufacturer's certified representative shall provide an on-site training demonstration of the application and care of the finish for the end-user's facility manager or other representatives.

-- End of Section --

SECTION D10

CONVEYING
12/18

D10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

Comply with the requirements of UFC 1-200-01, *DoD Building Code* (*General Building Requirements)*.

D10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are **not** found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website, are listed below for basic designation identification. Refer to the UMRL for full reference standard title and current document date. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

D10 1.1.1 Industry Standards and Codes

Although some the following references are listed in the UMRL, they are repeated here for emphasis.

References publications in this RFP that refer to the "authority having jurisdiction" must be interpreted to mean the "Contracting Officer."

AMERICAN GEAR MANUFACTURERS' ASSOCIATION (ANSI/AGMA)

6035	Design, Rating and Application of Industrial Globoidal Wormgearing

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B4.1	Preferred Limits and Fits for Cylindrical Parts

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	Minimum Design Load for Buildings and Other Structures

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A17.1	Safety Code for Elevators and Escalators
ASME A17.2	Guide for Inspection of Elevators, Escalators and Moving Walks
ASME A18.1	Safety Standard for Platform Lifts and Stairway Chairlifts
ASME B20.1	Safety Standards for Conveyors and Related Equipment
ASME B30.10	Hooks
ASME B30.2	Safety Standard for Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A27	Mild to Medium Strength Carbon Steel Castings for General Application
ASTM A36	Structural Steel
ASTM A434	Standard Specification for Steel Bars, Alloy, Hot-Wrought or Cold-finished, Quenched and Tempered
ASTM A521	Standard Specification for Steel, Closed Impression Die Forgings for General Industrial Use.
ASTM A563	Standard Specification for Carbon and Alloy Steel Nuts (NOT in Spec TEXT)

ASTM A1023/A	Standard Specification for Stranded Carbon Steel Wire Ropes for General Purposes (NOT in Spec TEXT)
ASTM E1417	Standard Practice for Liquid Penetrant Examination (NOT in Spec TEXT)

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	Structural Welding Code Steel (NOT in Spec TEXT)

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 70	National Electric Code

RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC)

RSCS	Specification for Structural Joints Using High-Strength Bolts

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J995	Mechanical and Material Requirements for Steel Nuts
SAE J123	Surface Discontinuities on Bolts, Screws, and Studs in Fatigue Applications

D10 1.1.2 Government Standards

NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

UFC 3-490-06	Elevators
NAVFAC P-307	Management of Weight Handling Equipment

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

T9074-AS-GIB-010/271	Requirements for Nondestructive

Testing Methods.

US NATIONAL ARCHIVES AND RECORDS - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (NARA/ OSHA) - Code of Federal Regulations (CFR)

29 CFR, Part 1910.23	Guarding Floor and Wall Openings and Holes
29 CFR, Part 1910.27	Fixed Ladders
29 CFR, Part 1910.179	Overhead and Gantry Cranes
29 CFR, Part 1910.306	Specific Purpose Equipment and Installations

U.S. DEPARTMENT OF DEFENSE (DOD) UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(UFC 1-200-01 is a hub document that provides general building requirements and references other critical UFCs. A reference to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs listed in the document.)
UFC 1-200-02	High Performance and Sustainable Building Requirements

D10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory Conveying systems performance via Performance Verification Testing, as detailed in this section of the RFP.

D10 1.2.1 Testing and Inspections for Elevators

a. Conduct all testing and inspections in the presence of both the Elevator Specialist and a NAVFAC Certified Elevator Inspector. The Elevator Inspector must complete, sign and post the results of all tests and inspection results after successful completion of inspection and testing. The Contractor is responsible for all costs involved with reinspection and retesting required to correct discrepancies discovered during testing and the subsequent retesting required, including all costs and expenses incurred by the Government Furnished Inspector.
b. Testing Materials and Instruments

Provide testing materials and instruments required for final inspection, including a current equipment calibration certification.

c. Field Tests for Elevators

In addition to the tests required by AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) A17.1 AND ASME A17.2, perform the following:

(1) Endurance Tests - Test each elevator for a period of one hour continuous run, with specified rated load in the car. Restart the one hour test period from beginning, following any shutdown or failure. During the test run, stop car at each floor in both directions of travel for standing period of 10 seconds per floor. Meet the requirements for Rated Speed, Leveling, Temperature Rise, and Motor Amperes testing specified herein throughout the duration of the Endurance test.

(2) Speed Tests - Determine actual speed of each elevator in both directions of travel with rated load and with no load in elevator car. Minimum acceptable elevator speed is the Rated speed specified. Maximum acceptable elevator speed is 110 percent of Rated speed.

(3) Leveling Tests - Test elevator car leveling devices for landing accuracy of plus or minus 1/4-inch (6 mm) at each floor with no load in car, symmetrical load in car, and with rated load in car in both directions of travel. Car sill must be level with landing sills.

(4) Temperature Rise Tests - Determine temperature rise of elevator hoisting motor, motor-generator, exciter, and booster during full-load test run for one hour minimum. Under these conditions, maximum acceptable temperature rise must not exceed acceptable temperature rise indicated on manufacturer's data plate. Start test only when equipment is within 9 degrees F (5 degrees C) of ambient temperature.

(5) Motor Ampere Tests - Measure and record motor amperage when motor is running and elevator is lifting at rated load and speed. Measure and record motor amperage at beginning and end of Endurance test. Test results must not exceed nameplate amperage when motor is running and elevator is lifting at rated load speed.

(6) Balance Load for Electric Elevators Tests - Perform electrical and mechanical balance load tests of car and counterweight.

(7) Automatic Shutoff Valve Tests - For hydraulic elevators, test the automatic shutoff valve twice. Once at beginning of acceptance test and again at conclusion of one-hour Endurance test to ensure consistent performance of shutoff valve, regardless of temperature of equipment and

oil.

(8) Perform miscellaneous tests called for in this Section.

D10 1.2.2 Crane System and Monorail with Hoist/Trolley System Installation and Certification

Provide verification of satisfactory conveying systems performance via Inspection and Testing, as detailed in this section of the RFP. Erect and install the crane or monorail system, complete in accordance with the approved submittals and in condition to successfully perform the inspections, operational tests, and acceptance tests listed below. In addition, provide statements and certifications listed below.

a. Certification

The following certifications are required to be submitted and approved prior to acceptance load testing.

(1) Load Chain or Wire Rope - Submit wire rope or chain manufacturer's certification of minimum wire rope or load chain breaking force for each hoist.

(2) Overload Test Certificate - Submit a statement that the crane or monorail system and hoist/trolley can be periodically load tested at up to 125 percent of rated load.

(3) Loss of Power Test Certificate - Submit a statement that the crane or monorail system can be subjected to loss of power testing without damage (See paragraph entitled "Load Test").

(4) Hazardous Material Certificate - Submit a statement that the crane or monorail system contains no asbestos, lead paint, polychlorinated biphenyl's (PCB's), elemental mercury and that chromates have been avoided where feasible.

(5) Hook Proof Test - Submit a statement that load and suspension hooks have been proof tested and satisfy the acceptance criteria of ASME B30.10.

(6) Welding Certifications

(a) Submit a statement that all welders, welding operators, weld inspectors and welding procedures meet the requirements of AMERICAN WELDING SOCIETY (AWS) D14.1 for all work performed in manufacturing the cranes.

(b) Submit a statement that all welders, welding operators, weld inspectors, and welding procedures meet the requirements of AWS D1.1 for all field welds.

(7) Design Review by Professional Engineer - Submit a statement that non-commercial component design and any modifications to commercial products have been reviewed by a professional

engineer. Indicate on the certificate, the name, state of licensure and license number of the professional engineer.

(8) Crane Runway Rail - For runway rails provided as part of this contract, submit survey data and a statement that the runway rails are in accordance with the requirements of CRANE MANUFACTURERS' ASSOCIATION OF AMERICA (CMAA) 70, Table 1.4.2-1, or MH 27.1, Figure 1, as applicable.

(9) Frequency Allocation Application - Complete the technical section of the Application for Equipment Frequency Allocation, Form DD 1494, addressing the radio equipment provided, submitted by the manufacturer of the radio control equipment being furnished under this contract.

b. Inspection and Testing

After erection, jointly inspect the crane or monorail system and associated components to determine compliance with specifications and approved submittals with representatives of the Contracting Officer and of the end user's Weight Handling Equipment (WHE) Certifying Official. The WHE certifying official is the designated representative of the supported command empowered to designate lifting and handling equipment acceptable for use. Provide a report of the inspection indicating the crane or monorail system is considered ready for operational tests

(1) Operational Tests - After erection and inspection, test the crane or monorail system and hoist/trolley as specified herein. Test the systems in service to determine that each component operates as specified, is properly installed and adjusted, and is free from defects in material, manufacture, installation, and workmanship. Rectify all deficiencies disclosed by testing and retest the system or component under load to prove the system is operational. Furnish loads for testing, operating personnel, instruments, and all other necessary apparatus.

(2) Test Data - Record test data on appropriate test record forms suitable for retention for the life of the crane or monorail system. Record operating and startup current measurements for electrical equipment (motors) using appropriate instrumentation (i.e., clamp-on ammeters). In addition, note, investigate, and correct high temperatures or abnormal operation of any equipment or machinery. Record function speeds during each test cycle.

(3) Hook Measurement

(a) Measure hook for hook throat spread before and after load test. Establish a throat dimension base measurement by installing two tram points and measuring the distance between these tram points. Record this base dimension. Measure the distance between tram points after load test. Any twist or increase in the throat opening from the base measurement will be cause for rejection.

(b) Hook Identification - Uniquely identify each hook and nut or

eye pin (and swivel eye bar as applicable) with some type of permanent marking in order to provide positive traceability to the non-destructive test report. Mark hooks in low stress areas using low stress marking methods.

(4) Load and Suspension Hook Inspection - Non-Destructive Test (NDT) the entire hook, eye pin (and swivel eye bar as applicable) for defects. No linear indications greater than 1/16 inch (1.6 mm) is the acceptance criterion. Acceptance criteria for external hook threads may be based on the acceptance criteria in SAE standard J123. Use magnetic particle method in accordance with NAVAL SEA SYSTEMS COMMAND (NAVSEA) Technical Publication T9074-AS-GIB-010/271 for NDT. American Society for Testing and Materials (ASTM) A275 may be used with the following restrictions: DC yokes (including switchable AC/DC yokes used in the DC mode) and permanent magnet yokes must not be used; automatic powder blowers or any other form of forced air other than from a hand-held bulb must not be used for the application or removal of dry magnetic particles; arc strikes shall be removed; and equipment ammeters must have an accuracy of +/- 5 percent of full scale (equipment ammeter accuracy other than that stated is acceptable provided the MT procedure states that a magnetic field indicator is used to establish and verify adequate field strength for all aspects of the inspection). For hooks of non-magnetic material, use liquid penetrant (PT) method in accordance with ASTM E 1417 or T9074-AS-GIB-010/271 for NDT. For PT testing of hooks containing stainless steels, titanium, or nickel-based alloys, total halogens, and sulphur used in the NDT process must be controlled as specified in T9074-AS-GIB-010/271. If NDT cannot be performed on surfaces inside small holes (e.g. hook/nut captivation roll pin holes), visually inspect those surfaces to the maximum extent practical. Perform NDT prior to load tests.

(5). Non-Destructive Test Quality Assurance Requirements.

(a) The magnetic particle inspection report must include a letter from the performing vendor certifying that the vendor meets the requirements of ASTM E543. Provide current certification, within one year of the date the NDT was performed.

(b) In addition, include report procedures, for review, including technique sheets specific to the types, shapes, and sizes of the parts being examined (e.g., shank hook, eye hook, duplex hook, eye pin, swivel eye bar). Describe the orientation of the hook or pin to the magnetizing equipment in the procedures.

(c) Indicate review by an independent Level III examiner certified in the applicable NDT method and not an employee of the NDT vendor in the procedures.

(d) In lieu of a., b., and c. above, state in the NDT report that non-destructive testing was performed per Crosby Quality Control Procedure No. 0120, Revision 16, and Technique Sheet No. 319N, Revision 1, or Gunnebo Johnson Quality System Procedure

QSP-69, Revision A.

(6) No-Load Test

(a) Hoist: Lower and raise each load hook through the hoist range. Operate at various speeds in both directions. Operate each load hook slowly the full operating lift distance into the hoist primary limit switch or stop and verify satisfactory operation of hoist, upper limit switch or stop, and lower limit switch or stop. Verify that a minimum of two wraps remain on the drum for wire rope hoists and that the load chain is slack on the dead end side for chain hoists when the lower limit switch is engaged. If the hoist is equipped with slow down limits, verify proper operation during the hook travel test. For electric or air powered hoists with primary and secondary limit switches, bypass the primary upper limit switch and check for proper operation of the backup limit switch. For electric hoists, verify all power to hoist is removed upon actuation of backup limit switch, and the keyswitch reenergizes hoist and allows operation in the down direction only. Operate the hoist at gradually increasing speed to full speed in the up direction until the primary upper limit switch activates. Verify that the hoist stops prior to secondary limit switch operation. Operate the hoist at gradually increasing speed to full speed in the up direction with the primary limit switch bypassed until the secondary upper limit switch is activated. Verify that the hoist stops prior to the load block contacting any portion of the hoist frame. For hoists with two electromechanical brakes, remove power to the crane and observe the proper timing sequence in the application of the primary and secondary brake.

(b) Trolley: Operate the trolley the full length of the monorail or crane bridge rails in both directions. Check the existence of OSHA required 2 inch side and 3 inch overhead clearances during the trolley operation check. Operate at all various speeds in each direction. Verify proper trolley brake operation, if equipped. Slowly contact all trolley stops with the bumpers to verify even bumper contact and that there will be no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed. Contact the trolley stops with the bumpers at full rated speed, unpowered, and verify structural integrity and that there was no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed.

(c) Bridge (if equipped): Operate the crane assembly the full length of the crane runway in both directions. Check the existence of OSHA required 2 inch side and 3 inch overhead clearances during the bridge operation check. Operate at all available speeds in each direction. Verify proper bridge brake operation, if equipped. Slowly contact all bridge end stops with crane bumpers to verify even bumper contact and structural integrity and that there will be no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed. Contact the runway stops with the bumpers at full

rated speed, unpowered, and verify structural integrity and that there was no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed.

(7) Rated Load Speed Test - Test at 100 percent (plus 0 percent minus 5) of rated capacity. If the crane is equipped with multiple trolleys that are used to achieve the rated load of the crane (e.g., two 2,000 pound trolleys which together allow for a 4,000 pound maximum capacity), then perform this bridge rated load speed test with the multiple trolleys loaded simultaneously.

(a) With the hoist loaded to rated capacity, raise and lower the load and record maximum and minimum load speeds in each direction. Also record the voltage and steady state motor amperage draw in both directions at maximum speed. Verify that the hoisting and lowering speeds are provided as specified. Verify slow speed operation (if equipped).

(b) If the capacity overload limit activates during lifting of the rated load (typical of the adjustable type), verify that the drive stops and the load can only be lowered. Bypass capacity overload device utilizing keyswitch and continue with test.

(c) With the hoist loaded to rated capacity and the load lifted a minimum distance, operate the trolley along the crane bridge, or monorail and record maximum and minimum load speeds in each direction. Also record the steady state motor amperage draw in both directions at maximum speed. Verify that the trolley speeds are provided as specified. Further, verify that the trolley comes to a stop from maximum speed in each direction within a distance (in feet) equal to 10 percent of rated capacity high speed (in feet per minute). Verify slow speed operation (if equipped).

(d) With the hoist loaded to rated capacity and the load lifted a minimum distance, operate crane bridge (if equipped) along the crane runway and record maximum and minimum load speeds in each direction. Also record the steady state motor amperage draw in both directions at maximum speed. Verify that the bridge speeds are provided as specified. Further, verify that the crane bridge comes to a stop from maximum speed in each direction within a distance (in feet) equal to 10 percent of rated capacity high speed (in feet per minute). Verify slow speed operation (if equipped).

(e) With the hoist loaded to rated capacity and the load lifted a minimum distance, operate the swing function (if equipped) at maximum and minimum radius and record maximum and minimum load speeds in each direction. If swing function is powered, record the steady state motor amperage draw in both directions at maximum speed. Verify that the swing speeds are provided as specified. Further, verify that the boom comes to a stop and retains its position. Verify slow speed operation (if equipped).

(8) Rated Load Deflection Test - Test at 100 Percent (plus 0 percent minus 5) of rated capacity.

(a) With the unloaded trolley moved to one end of the bridge or monorail, measure the height of a point near the midpoint of a bridge crane, near the midpoint of the longest unsupported length of a monorail.

(b) With the hoist loaded to rated capacity, move the trolley to the midpoint of the bridge, midpoint of the longest unsupported length of a monorail. Repeat the measurement taken in step a. Record the difference between the measurements taken in step a. and step b.

(c) Verify that the difference recorded in step b. is less than 1/888 of the span for top running and cambered underunning girder bridge cranes, 1/600 of the span for uncambered underrunning bridge cranes, 1/450 of the longest unsupported length for monorails. Patented track deflection may not exceed 1.25 inch regardless of span.

(d) For bridge cranes, move the unloaded bridge crane over a runway structural support, move the trolley to the opposite end of the bridge, and measure the height of a point near the midpoint of the longest unsupported length of runway. Hoist a load at rated capacity a minimum distance, move the trolley to the end of the bridge nearest the structural support, and travel the bridge to the midpoint of the longest unsupported length of runway. Repeat the measurement. Record the difference between the measurements. Verify that the difference is less than 1/450 of the unsupported span length for patented rail and underrunning runways, or 1/600 of the longest unsupported length for top running rolled shape runways. Patented track deflection may not exceed 1.25 inch regardless of span.

(9) Load Test - Test at 125 Percent (plus 0 percent minus 5) of rated capacity. If the crane is equipped with multiple hoists or trolleys that are used to achieve the rated load of the crane (e.g., two 2,000 pound trolleys which together allow for a 4,000 pound maximum capacity), then perform these tests with the multiple hoists or trolleys loaded simultaneously. During load testing, only lift the test load a minimum height as necessary to perform the specified tests.

(a) If the capacity overload limit activates during lifting of the test load (typical of the adjustable type), verify that the drive stops and the load can only be lowered. Bypass capacity overload device utilizing keyswitch and continue with test

(b) Hoist Static Test: Raise test load approximately 12 inches (300 mm) above the floor and hold for 10 minutes. Rotate load and hook 360 degrees clockwise and counter-clockwise to check bearing operation. Observe for load lowering that may occur indicating possible malfunction of hoisting components or brakes. Lower the test load to the floor until the hoist line is slack.

(c) Hoist Dynamic Test: Raise the test load using all available speeds. Lower the load back to the floor using all speeds.

Visually observe smooth control and acceleration/deceleration between speeds. Stop the test load at least once while hoisting and once while lowering at highest speed and observe that the brake stops and holds the load. Repeat the above cycle for at least 15 minutes.

(d) Load Brake Test (for powered hoists equipped with mechanical load brake and single holding brake):

1. Raise test load no more than 5 feet (1.5 meters). With the hoist controller in the neutral position, release the holding brake. The load brake must hold the test load.

2. Raise test load the minimum amount to perform the following test. Again, with the holding brake in the released position, start the test load down slowly and return the controller to the neutral position as the test load lowers. The load brake must stop and hold the test load.

3. Document the method used to release the holding brake. Brake release method must be recorded to enable repeating that method during later periodic load testing by the end user. Methods of releasing the holding brake vary from hoist to hoist depending upon the design of the brake and hoist and must be specified by the crane manufacturer prior to testing.

(e) Trolley: With test load hoisted to a minimum height, operate the trolley the full distance of the monorail or crane bridge in both directions using slow speed. Verify satisfactory operation. Verify proper brake operation, if equipped.

(f) Bridge (if equipped): With test load hoisted to a minimum height and the trolley at one end of the bridge, operate the crane assembly the full length of the crane runway. Move the trolley to the opposite end of the bridge, then operate the crane assembly the full length of the crane runway in the opposite direction. Verify satisfactory operation and that bridge trucks move without binding. Verify proper brake operation, if equipped.

(g) Loss of Power Test: Raise the test load approximately 3 feet (900 mm) and while lowering test load, disconnect main power to hoist and return the hoist controller to neutral. Load must stop. Repeat the test for the trolley, bridge and swing functions, as applicable.

c. Field Test Reports.

(1) Brake Adjustment Records. Provide a brake adjustment record for each brake on the crane or monorail system that contains the adjusted air gap, measured brake lining thickness, measured torque spring length, as well as the manufacturer provided range of acceptable measurement for each. Submit the brake adjustment records on the official form, which can be obtained from the Contracting Officer upon request.

(2) Field Test Record. Upon successful completion of all testing, submit a copy of the completed test record and all test data.

(3) After the crane has passed the acceptance test, complete a control system parameter record for the crane including all control system parameters, and explanation of their functions, and their final settings. Designate each control system parameter as either used or unused.

D10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*, UFC 3-101-01, *Architecture* and UFC 3-301-01, *Structural Engineering*. Provide design submittals that include the following items:

a. Elevators and Weight Handling Equipment (WHE):

(1) Drawings. Show the design of the track beam system, including weight handling equipment curves and switches, principal dimensions, details of structural connections, all component details, and electrical one-line diagrams. Show clearances between elevator and/ or crane structure and building and identify interferences. Provide weight handling equipment wheel load diagrams and hook configuration.

(2) Specification. Provide edited version(s) of the UFGS elevator and weight handling equipment specification(s) that are applicable to this project. Edit the UFGS's in accordance with restrictions of RFP Part 4 - PTS Section Z10 and refer to Part 2 Section 01 33 10.05 20, *Design Submittal Procedures* for format and further specification requirements. Do not add or delete requirements to the UFGS for weight handling equipment unless specifically approved by Navy Crane Center. Edit UFGS for weight handling equipment only to add project specific information such as capacity and hook height. Submit the applicable UFGS as a part of the Contractor originated design submittal, DO NOT submit RFP Part 4 - D10 as part of the design submittal.

If this RFP includes a type of elevator and weight handling equipment that is not covered in this D10 PTS Section and is specified in a Prescriptive Specification located RFP Part 5, include this Prescriptive Specification in the Contractor's design submittal without modification.

(3) Catalog Cuts. Include catalog cuts in addition to the UFGS sections for all major components. Mark and highlight all catalog cuts to identify all the specific components that are applicable to the project.

D10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS section Z10, *General Performance Technical Specifications*. In addition to the Z10

requirements, the Designer of Record (DOR) will approve the following construction submittals as a minimum:

a. Construction Submittals for Vertical Transportation Equipment (VTE)

(1) Elevator Construction Submittals

In addition to the submittal requirements of ASME A17.1, provide the following submittals:

Detail drawings must include dimensioned layouts in plan and elevation showing the arrangement of elevator equipment, accessories, supporting systems, anchorage of equipment and anchorage forces from seismic, gravity, impact, etc. loads, clearances for maintenance and operation; and details on hoistway, doors and frames, operation and signal stations, controllers, motors, guide rails and brackets, and points of interface with normal power, fire alarm system, HVAC or exhaust systems, and interface with emergency power systems. Drawings must show any revised building electrical system required to make supplied elevator system function as specified. Drawings must contain complete wiring diagrams showing electrical connections and other details required to demonstrate sequence of operations and functions of system devices. Drawings must include the appropriate sizing of electrical protective devices, which are frequently different from National Electrical Code standard sizes.

Submit one set of wiring diagrams in plastic or glass cover, framed and mounted in elevator machine room. Deliver other sets to Contracting Officer. Coded diagrams are not acceptable unless adequately identified.

(2) Construction Submittals for Facility Electronic Operation and Maintenance Support Information (eOMSI):

Submit final submittals for eOMSI Submittal. After approval by the DOR and sign-offs by the elevator inspector, assimilate construction submittals into the OMSI manuals required under Part 2 Section 01 78 24.00 20, *Facility Electronic Operation and Maintenance Support Information*.

b. Construction Submittals for Weight Handling Equipment (WHE):

(1) Drawings. Submit to DOR for approval, the construction submittal and drawings described below. After DOR approval submit to the Government for approval or surveillance as required in Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures.* Manufacturer's catalog data will suffice for standard commercial products. Each assembly and subassembly drawing must include an integral Bill of Materials or must be followed by a consecutively numbered drawing with the applicable Bill of Materials.

(a) General Arrangement Drawings. Show in plan, elevation and end view the crane or monorail system assembly and each major component, including runways for underrunning cranes to demonstrate proper interface with the facility building. Show all major features

including: clearances, lifts, speeds, hook approaches (on all sides), maximum wheel loads (without impact), electrical or pneumatic power supply, and general locations of components such as: hoists, trolleys, brakes, motors, speed reducers, and control panels (including size). Indicate torque value or tightening method (e.g. turn of the nut) for bolts on the drawing. In addition, show estimated weights for major components (girders, trolleys, runway beams, control panels and end trucks) and the completely assembled crane. Provide approximate locations of center of gravity and location of lifting points for completely assembled crane and for each major component with the design drawings.

(b) Structural Drawings. Show fabrication details including all weldments, fastener joints, structural components, and list of materials for fabricated crane girders (including end stops), fabricated trolleys and fabricated end trucks on these drawings. Specify the type of structural bolted connection (i.e. slip critical, snug-tightened, or pretensioned) on the drawing.

(c) Mechanical Drawings. Show the layout of mechanical equipment on cranes and monorail systems on the drawings, in particular drive arrangements (including assembled components). On pneumatically powered cranes, show the layout of pneumatic equipment, including control panel enclosures, motors, brakes, limit switches, piping and valves on the drawings. The drawings must also include:

1. Complete schematic diagram of pneumatic systems with narrative of any special description of operation. All components shown on schematics must have labels that correspond to the nameplates that will be on the crane. Pipe material and size must be included.

2. Rating and types of over-pressure protective devices.

3. Complete assembly diagrams including a component material list. Show on the drawings the layout of pneumatic equipment on the crane including: motors, brakes, limit switches, conduits, and piping systems.

(d) Electrical Drawings. Show the layout of electrical equipment on cranes and monorail systems, including control panel enclosures, motors, brakes, limit switches, conduits, disconnects, and conductor systems on the drawings. The drawings must also include:

1. Complete schematic diagram with narrative of any special description of operation. All components shown on schematics must have labels that correspond to the nameplates that will be on the crane. Wiring type, size, and temperature ratings must be included on schematic diagrams. Remove all optional equipment not included in this project from the schematic diagrams.

2. Motor nameplate data (including all information called for in NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70, Section 430.7 (A) items 1 through 7)

3. Rating and types of over-current protective devices.

4. Complete assembly (wiring) diagrams including a component material list. Show on the drawings, the layout of electrical equipment on the crane, including control panel enclosures, motors, brakes, limit switches, conduits, and conductor systems.

5. Layout diagrams showing component placement in control panel enclosures.

(2) Product Data. Provide manufacturer's catalog data for all major components of cranes and monorail systems. Mark-up or supplement the catalog cuts with additional sheets to clearly identify the model or size, selected options, features, and/or modifications to demonstrate compliance with specification requirements. Catalog cuts which show modifications beyond the standard options and all supplemental pages must bear original signatures and dates of the equipment manufacturer's authorized representative. Clearly identify the item on the catalog cuts and each supplemental sheet to which it applies.

(a) Structural Product Data. Submit product data for Bridge End Trucks, Trolley Frame, Patented Track, Runway and Bridge Rails and Support System, and End Stops.

(b) Mechanical Product Data. Submit product data for Speed Reducers, Brakes (including electrical information), Bearings, Couplings, Load Blocks, Hoist/Trolley (if procured as a packaged unit), Hose Reels, Oilers, Pressure Regulators and Bumpers.

(c) Electrical Product Data. Submit product data for Variable Frequency Drives, Motors, Electrical Enclosures, Runway Electrification and Collectors, Limit Switches, Bridge to Trolley Electrification, Pendant or Radio Control Station, Warning and Pilot Devices, Disconnect Switches, and Fuses and Circuit breakers.

(3) Design Data. Provide calculations that demonstrate compliance with all design requirements. Design data will not be approved if their evaluation/review is dependent on data or information not previously approved. List and define all variables at the beginning of each calculation section; variables must be in accordance with required references. Include sufficient information in the design data, so that they may be approved without reference to detail (shop) drawings.

When there is one hoist on one monorail system, the monorail system rated capacity and the hoist rated capacity will be equal. When there is more than one hoist on the monorail system, the rated capacity of the monorail track beam system must be designed equal to the sum of the two hoists rated capacities. An exception to this is that if the two hoists are separated by positive track beam stops and distance so that the track beam is strength-wise essentially two independent track beam systems.

(a) Structural Calculations. Submit calculations verifying the sizing of any track, track suspension device and additional supports, which are not the runway or monorail system manufacturer's standard cataloged product. Include support reactions and recommended method of connecting/attaching the support. Provide calculations verifying

compliance with Section 3 of CMAA No.70 or No. 74 or Section 6 of MH 27.1. In addition to Load Cases 1 and 2 of CMAA No. 70 and 74, the following load combinations are also required in the crane design calculations:

1. CMAA Case 3: Test Loads. The crane will be periodically tested up to 125% of rated capacity. Combined stresses for the following load combinations must be calculated to ensure structural adequacy during testing:

DL (DLFB) + TL (DLFT) + LL (1 + HLF) + IFD + SK

Test Loads (Stress Level 3). In this calculation use LL = 1.25 x rated capacity. Do not consider the test and extraordinary loads in the fatigue analysis. Formula abbreviations correspond to principal loads as defined in CMAA #70 and 74, Section 3.3. The subscripts T and B refer to trolley and bridge, respectively.

2. CMAA Case 4: Seismic Load. Provide seismic analysis in accordance with AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) 7-05. Consider loading condition in an event while the crane is operating at rated capacity without lowering or dropping the load.

3. Calculations verifying design of runway and bridge rail stops and bumpers in accordance with the dynamic requirements of Association for Iron and Steel Technology (AIST) TR-06.

4. For cranes that operate outdoor without wind protection, calculations determining the wind speed that will cause the crane travel, trolley, and rotate functions to drive through the brake with the brakes set, and, for rail mounted or wheel mounted cranes, the wind speed that will cause the crane to slide on the rail or runway surface with the brakes set.

(b) Mechanical Calculations. Calculations verifying compliance with Section 4 of CMAA #70, regardless of crane type, for any non-commercial items.

(c) Electrical Calculations

1. Minimum required horsepower for each drive motor - Motor power rating must be based upon the formulae given in CMAA #70 regardless of crane type. For hoist motor sizing calculations, the factor "Kc" must not be less than 1.0. For bridge and trolley drive motor sizing calculations, the factor "E" must be the published gear reducer efficiency ratings. For the bridge drive the minimum acceleration rate must be 4 seconds and 2 seconds for simulated plugging (deceleration). For the trolley drive the minimum acceleration rate must be 3 seconds and 1.5 seconds for simulated plugging. Calculations are not required for packaged hoists, but packaged hoists must still meet acceleration and deceleration requirements.

2. Overcurrent protection.

3. Conductor sizing and Conduit fill calculations (using tables from

NFPA 70, Chapter 9 or manufacturer's data sheets).

4. Protective device coordination study showing proper coordination for any overcurrent devices that have the same rating as another overcurrent device upstream

5. Transformer sizing.

6. Drive controller sizing for hoist motors.

(4) Facility Electronic Operation and Maintenance Data, Documents, and Training Information. Submit the WHE's operation and maintenance data, document, and training information to be incorporated in the Part 2 Section 01 78 24.00 20, *Electronic Facility Operation and Maintenance Support Information*(eOMSI) submittal. Make a copy of the eOMSI submittal available at the acceptance test. Include in the eOMSI submittal a table of contents, operation instructions, preventive maintenance instructions including maintenance, training materials, and programming instructions for the adjustable frequency drives, parts information, a drawing list, design drawings, lubrication drawing supply list, catalog cuts, photographs as needed to explain maintenance or repair procedures, and calculations. Provide maintenance instructions to include recommended maintenance procedures and component manufacturer's installation and maintenance manuals and lubrication instructions. Include detailed crane operating and safety instructions in the operating instructions. Parts information must include information on purchased sub-assemblies and components, including manufacturer's original part number, and detailed drawings of Contractor-designed parts. Break-out the parts information into the smallest replacement part.

(5) Provide onsite training for unique critical job skills associated with the crane or attachments

(6) Field Test Reports. Submit a copy of all Field Reports.

D1010 ELEVATORS AND LIFTS

Comply with the *ITG FY13-01 Elevator Design* for the design and construction of elevators.

D1010 1.1 QUALIFICATION OF MANUFACTURER AND INSTALLER

Provide elevator by manufacturer regularly engaged in the manufacture of elevator systems. Manufacturer must either install elevator system or provide letter of endorsement certifying that installer is acceptable to manufacturer. Installer is required to be regularly engaged in installation and maintenance of elevator systems.

If the project is located in the State of Hawaii, perform work involving the installation or repair of elevator equipment under the supervision of a person who is licensed in elevator repair in the State of Hawaii or who possesses the equivalent experience. Furnish data to the Contracting Officer for verification that the person exercising

direct supervision of the work possesses such experience.

D101001 GENERAL CONSTRUCTION ITEMS

Comply with ASME A17.1 AND ASME A17.2 in their entirety, and additional requirements specified herein. Install in accordance with manufacturer's instructions, ASME A17.1, DoD Architectural Barriers Act (ABA) and Deputy Secretary of Defense (DEPSECDEF) Memorandum (dated October 31, 2011), and NFPA 70. Do not cut or alter Structural Members. Restore damaged or defaced work to original condition. Include recesses, cutouts, slots, holes, patching, grouting, and refinishing to accommodate installation. Use core drilling to drill new holes in concrete ensuring that no existing reinforcing is cut. Finish work to be straight, level, and plumb. During installation, protect machinery and equipment from dirt, water, or mechanical damage. At completion, clean all work, and repair any prefinished items that have been damaged during the performance of the work.

Elevators that are intended to carry personnel other than one (1) operator must be classified as a passenger elevator. Passenger elevators that are intended to carry furniture or equipment, must have an oversized cab. Refer to the Project Program for the type of elevator required.

D101001 1.1 TRAFFIC ANALYSIS

Provide a traffic analysis in accordance with criteria established by a nationally recognized elevator manufacturer's association and conduct interviews with the User to determine the following:

a. Passenger or Freight
b. Rated load
c. Rated speed
d. Travel length
e. Number of stops
f. Number of hoistway openings
g. Car platform, car inside, and hoistway door opening dimensions
h. Hoistway Door Types
i. Car Door type
j. For Freight Elevators, identify Class Loading Type - Class A, B, or C, to handle loads as indicated on the project program.

D101001 1.2 ELEVATOR MACHINE ROOM

Provide a machine room for every elevator. Locate the elevator machine and controller in the Elevator Machine Room.

D101002 PASSENGER ELEVATORS

D101002 1.1 HOISTWAY AND CAR EQUIPMENT

D101002 1.1.1 Car and Counterweight Guide Rails and Fastenings

Paint rail shanks with one coat of black enamel. Only T-section type guide rail is acceptable.

D101002 1.1.2 Pit Channel

Provide pit channel for anchorage of main guide rail brackets and also for anchorage of counterweight guide rail brackets and buffer for electric elevators. Each channel must span distance between guides. Fully grout both pit channels on completion of guide rail and buffer installation.

D101002 1.1.3 Pit "STOP" Switch

Provide push/pull type pit "STOP".

D101002 1.1.4 Wiring and Traveling Cables

Suspend cables by means of self-tightening webbed devices.

D101002 1.2 CAR AND LANDING DOOR EQUIPMENT

D101002 1.2.1 Infrared Curtain Unit

Provide Infrared Curtain Unit (ICU) with multiple infrared beams that protect to the full height of the door opening. Extend minimum coverage from 2 inches (50 mm) off the floor to 70 inches (1778 mm) above floor level.

D101002 1.2.2 Hoistway Entrance Frames

Provide 14 gage (1.8 mm) thick #4 brushed stainless steel door frame unless directed otherwise by Contracting Officer. Solidly grout uprights of entrance ways to height of 5 feet (1500 mm).

D101002 1.2.3 Car and Hoistway Landing Sills

Car and Hoistway Landing Sill - Provide one piece cast solid white bronze or nickel silver entrance sill. Use same material for hoistway and car entrance sills. Solidly grout under full length of sill.

D101002 1.3 IN-CAR AND LANDING FIXTURES

D101002 1.3.1 Car and Hall Buttons

Provide recessed vandal-resistant push buttons of minimum 3/4-inch (19 mm) size satin-finish stainless steel with illuminating jewel center.

D101002 1.3.2 Position and Direction Indicators

Provide position and direction indicators in car and at each landing.

D101002 1.3.3 Direction Audible Signals

Provide audible signals in car and at each landing.

D101002 1.4 CAR AND CAB EQUIPMENT

D101002 1.4.1 Roller Guides

Provide coil-spring loaded roller guide assemblies in adjustable mountings on each side of car and counterweight frames in accurate alignment at top and bottom of frames.

D101002 1.4.2 Certificate Window

Provide 4 inch (100 mm) high by 6 inch (150 mm) wide certificate window in car operating panel for elevator inspection certificate.

D101002 1.4.3 Cab Ventilation

Provide natural and forced ventilation with two-speed fan.

D101002 1.4.4 Protection Pads and Mounting Hooks

Provide stainless-steel hooks and fire retardant protective pads for one elevator in a set.

D101002 1.4.5 Car Enclosure

Car Shell Return Panels, Entrance Columns, Cove Base, and Transom: Provide 14 gage (1.9 mm) minimum non perforated steel. Apply sound-deadening mastic on all exterior components.

Provide finishes for the elevator cab interior that are appropriate for the type of facility. Finishes must not exceed the flame spread rates mandated by ASME A17.1.

D101002 1.4.6 Car Size

Provide at least one elevator of a size and arrangement to accommodate an ambulance stretcher in the open, horizontal position. The minimum size of the ambulance stretcher used to design the elevator must be 24 inch by 84 inch (609.6 mm by 2133.6 mm) with not less than 5 inch (127 mm) radius corners. Identify all stretcher accessible elevators with the international symbol for emergency medical services (Star of Life).

D101002 1.5 ELEVATOR CONTROLLER

D101002 1.5.1 Non-proprietary Controller

Provide micro-processor controllers from controller manufacturers who provide generic controllers that are designed to function with all or most manufacturers elevator equipment. The manufacturer of the controller must engage solely in the manufacture and sale of controllers to the elevator industry and not engage in the elevator installation, service, or maintenance. The follow controller manufactures comply with this requirement:

a. Elevator Controls Corporation, 3525 La Grande Boulevard, Sacramento, CA 95823

b. G.A.L. Manufacturing Corporation, 50 East 153th Street, Bronx, New York 10451

c. Motion Control Engineering, Inc., 11354 Whiterock Road, Rancho Cordova, CA 95742-6522

d. Virginia Controls, Inc., 2513 Mechanicsville Turnpike, Richmond, VA 23223

e. Computerized Elevator Control Corporation (Swift), 24 Empire Blvd., Moonachie, NJ 07074-1303

The following are required features of the generic micro-processor controllers and manufacturers training:

a. On-Board Diagnostic Panel

(1) Provide a non-proprietary micro-processor controller for each individual elevator and group controller. Provide an on-board diagnostic control and LCD display panel that allows unrestricted access to the comprehensive range of adjustable parameters necessary to perform installation, adjusting, service, maintenance, and testing of the elevator.

(2) Provide LCD displays with the capability to display, monitor, and diagnose any and all fault logs, fault history, trouble calls, and diagnostics. Provide three (3) copies of the complete manufacturer's software program, with complete software documentation, that must enable the same level of unrestricted access to all controllers of the same make and model, regardless of the installation date or location.

b. External Port - For each individual elevator and group controller, provide a USB port or an RS 232 port that allows connection to an on-site portable laptop computer. Provide the same level of unrestricted access as the on-board diagnostic panel.

c. Repair Requirements - For repair of the microprocessor control system(s), provide maintenance tools, supporting computer software, and software documentation required for complete maintenance of elevator system including diagnostics and adjustments. On-board diagnostic panels must not require recharging to maintain their memory or authorization for use. Software must not require periodic reprogramming, or reauthorization. Store programs in non-volatile memory.

d. Training - The elevator controller manufacturer must offer and conduct technical support and factory training that is available to all state licensed elevator service providers qualified to bid on navy elevator maintenance service contracts. Include in the factory training all aspects of the installation, service, and

maintenance of the elevator controller.

D101002 1.6 OPERATIONAL CONTROLS

D101002 1.6.1 Independent Service

Provide exposed key-operated switch in car operating panel to enable independent service.

D101002 1.6.2 Hoistway Access Switches

Provide key-operated hoistway access switch to permit limited movement of car at terminal floors for car positioning, operative only when "INSPECTION" switch in car operating panel is in the "INSPECTION" position. Locate switch 6 feet (1800 mm) above floor level, within 12 inches (300 mm) of hoistway entrance frame or with only ferrule exposed when located in entrance frame.

D101002 1.6.3 Emergency Commandeering Service

Provide momentary pressure "ON-OFF" key switch and indicator light at all landings. Provide indicator lights that automatically illuminate during emergency service. Key must be removable only when key is in "OFF" position. Provide in accordance with ASME A17.1.

D101002 1.6.4 Keys for Elevator Key Switches

Provide minimum of twelve keys per unique cylinder used on all key switches for single elevator.

D101002 1.7 MAINTENANCE AND DIAGNOSTIC COMPONENTS

D101002 1.7.1 Maintenance and Diagnostic Tools

Provide all special tools and software necessary to service and maintain each elevator; deliver at time of final acceptance. Provide one of each tool for each elevator machine room.

D101002 1.8 ADDITIONAL REQUIREMENTS FOR HYDRAULIC ELEVATORS

D101002 1.8.1 Hydraulic System

Provide hydraulic system which operates at a maximum working pressure of less than 500 psig.

a. Scavenger Pump Unit - Provide a scavenge oil reservoir, with strainer and transfer pump. Provide a manual-reset pit flood switch to prevent pump operation if pit is flooded. Anchor pump and oil reservoir to the pit floor.
b. Pressure Piping and Accessories - Provide ASTM A 53/A 53M or ASTM A 106/A 106M, Schedule 80, black steel piping with ASME B16.9 or ASME B16.11 fittings for supply piping. Provide welded or threaded forged pipe fittings that are located between the pump control valve body and the

cylinder inlet. Extend Schedule 80 piping from the pump control valve body, inside the pump unit, to the hydraulic cylinder in the hoistway. Provide dielectric union at each end of the "pump to cylinder" oil supply line. Provide hangers or supports for all piping.

c. Oil Temperature Device - Provide means to maintain oil temperature between 80 and 120 degrees F (27 and 49 degrees C) regardless of ambient temperature.

D101002 1.8.2 Cylinder-Plunger Unit

Provide a plunger of single-piece seamless steel construction. Provide threaded 1/4-inch (6 mm) bleeder valve at top of cylinder just below packing gland. Telescopic or inverted cylinder-plunger units are not acceptable. Provide cylinder with self-stabilizing mount that will support and hold cylinder plumb without the need for stabilization means at the bottom of the cylinder.

D101002 1.8.3 Automatic Shutoff Valve

Provide automatic shut-off valve in oil supply line as close to cylinder inlet as possible. Provide threaded pipe connections to the valve. Provide manual lowering feature on valve. Provide exposed adjustments of automatic shut-off valve with means of adjustment sealed by certified elevator inspector after being set to correct position and tested.

D101002 1.8.4 Well Casing

Line well with steel casing, minimum 1/4-inch (6 mm) wall with welded 1/2-inch (10 mm) steel bottom, set plumb. Install cylinder well casing plumb using spider bob method.

a. PVC Liner - Provide Schedule 80 PVC pipe liner with bottom cap and couplings; joints sealed watertight using PVC pipe manufacturer's recommended adhesive or heat welding methods. Provide liner inside diameter not less than 3-inch (76 mm) larger than elevator cylinder maximum outside diameter. Set PVC liner into well casing, centered and plumb. PVC liner may be provided as a manufacture’s applied liner or as a separate component.
b. Cylinder Installation - Install Cylinder plumb into PVC.
c. Cylinder Evacuation Tube - Provide a 3/4-inch (19 mm) PVC evacuation tube with strainer located within 6 inch (152 mm) of bottom of liner. Provide top of test tube with removable cap to exclude foreign matter.
d. Pressure Test - Test liner-cylinder assembly as a sealed unit. Provide safety relief valve set to relieve at 10 psig (69 kPag); 4.5 inch (114 mm) diameter dial pressure gage scaled for 0 to 50 psig (0 to 175 kPag) and calibrated to 0.5 percent accuracy; and an air pressure admission throttling and shutoff valve. Perform air pressure test in the presence of the Elevator Inspector. For safety, pressure test must only be performed when liner and cylinder are fully inserted and assembled in the well

casing. Perform the test from remote location outside of the elevator pit.

e. Secure cylinder/PVC liner assembly as recommended by cylinder manufacturer.

f. Seal - Seal gap between steel well casing and PVC liner with foam insert strong enough to retain and support final grouting. Provide 3000 psi (21 MPa) grout to a minimum of 4 inch (102 mm) thickness and level top of final grouting with pit floor.

g. Containment - Protect exposed portions of hydraulic elevator oil supply line that are installed below ground, including portions encapsulated in concrete, or covered by construction, with continuous Schedule 80 PVC containment.

h. Provide layout diagram, foundation support details, and foundation loads.

D101003 FREIGHT ELEVATORS

D101003 1.1 FREIGHT ELEVATOR REQUIRMENTS

Code compliance and all other general compliance items for freight elevators must be as for passenger elevators, except for such items deleted, altered or added to by the Project Program.

D101003 1.2 ADDITIONAL REQUIREMENTS FOR FREIGHT ELEVATORS

a. Guides - In addition to ASME A17.1, for freight elevators with greater than 10,000 pound (4545 Kg) capacity, slide guides are permitted in lieu of roller guides.

b. Horizontal Buck Board Wall Protection – Provide 2-1/2 inch (63 mm) thick (minimum) x 12 inch (304 mm) high (minimum) #2 oak protection boards on all side walls of the elevator at a height to prevent damage from fork lift traffic.

D101004 WHEELCHAIR LIFT

Comply with ASME A18.1, *Safety Standard for Platform Lifts and Stairway Chairlifts*.

D101005 DUMBWAITERS

Comply with ASME A17.1, *Code for Elevators and Escalators*.

D1020 WEIGHT HANDLING EQUIPMENT

Cranes and monorail systems must be designed, fabricated, assembled, shop tested, delivered, installed, inspected, field tested, and made ready for use in accordance with these RFP requirements, the applicable UFGS specification, the reference standards, and building codes. Build the crane or monorail system to the design drawings of a registered professional engineer. This PTS section is designed to provide requirements for all of the most commonly used building cranes types. Equipment provided must meet the paragraphs entitled BASIC REQUIREMENTS FOR CRANES AND MONORAIL WITH HOIST/TROLLEYS below, requirements of paragraphs entitled OVERHEAD CRANES for the crane type provided below, requirements of paragraphs entitled HOISTS for the hoist type

provided as stated below, and the applicable UFGS specification section.

D102001 BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS

D102001 1.1 SAFETY

Comply with ARCHIVES AND RECORDS (NARA/ OSHA) 29 CFR, Part 1910.179, *Overhead and Gantry Cranes*and the mandatory (shall or must) and advisory (should) safety requirements of ASME B30.2, B30.11, B30.16 and B30.17, as applicable depending upon crane type.

D102001 1.2 MATERIALS

Provide material free from defects and imperfections that might affect the serviceability and appearance of the finished product. Provide new and unused materials that conform to the following standards.

a. Ductile Materials. All components directly supporting the load must be of ductile materials. These components include, but are not limited to all hoist drive gear reducer housings, motor frames and end bells (except for C-face mounted components of packaged hoists), flanged adapters, and brake wheels and discs. For the purposes of this specification ductile is defined as having a minimum elongation of 5% in 2 inches. Furthermore, provide all shafts, keys, gears, torque carrying coupling components, and wire rope drum of steel.
b. Structural Steel conforms to ASTM A36, A572 or A992.
c. Cast Steel conforms to ASTM A27 or ASTM A148.
d. Ductile Cast Iron conforms to ASTM A536.
e. Forged steel conforms to ASTM A668 or ASTM A521, grade as applicable.
f. Steel shafts conform to ASTM A434.
g. Aluminum castings conform to ASTM B26 or ASTM B108.
h. Welding materials for crane fabrication conform to AWS D14.1
i. Welding materials for the facility must conform to AWS D1.1.

D102001 1.3 TOLERANCES

Provide tolerances in accordance with the RFP requirements and the standards referenced herein.

D102001 1.4 OPERATING ENVIRONMENT

Provide pendant or radio controlled cranes and monorail systems designed to operate on electric or pneumatic or hand power as indicated in the Project Program. Design indoor equipment for an environment with an ambient temperature range of 40 Â°F to 105 Â°F. Design outdoor equipment for an environment typical of the installation location, including protection against adverse temperature, humidity, ultraviolet radiation, wet weather, salt air, corrosive atmosphere, and include features necessary to prevent in-service or premature age related failure.

D102001 1.5 APPLICABLE DESIGN STANDARD

Design cranes and monorail systems in accordance with CMAA #70, CMAA #74, MH 27.1, 29 CFR 1910.179, 29 CFR 1910.306, paragraph (b), ASME B30.2, ASME B30.11, ASME B30.16, ASME B30.17, ASCE 7 and other requirements specified herein. Design packaged hoist in accordance with ASME HST. A packaged hoist is defined as a hoist where the components are mounted via c, d, or p-face flanges as opposed to base mounted. All packaged hoists must be produced by established manufacturers. Furnish and install runway electrification or air distribution system as well as runways for underhung cranes, monorails as part of this specification. Provide the hook work envelope to be the maximum practical consistent with good design.

Choose rated speed of all crane functions from the SLOW or MEDIUM speeds provided in CMAA 70 or CMAA 74 for the crane configuration and rated capacity and to agree with the Project Program stated end User requirements. Provide minimum function speeds to be 1/10 rated speeds.

D102001 1.6 COMPONENTS

A standard commercial product/assembly is defined as an item that is advertised for sale in current commercial literature and is being sold in substantial quantities on the open market in the course of normal business operations. Nominal quantities, as normally associated with models, samples, prototypes, or experimental units are not acceptable under this definition. The Contractor may utilize standard commercial products/assemblies in the design of the crane provided such components meet the requirements of this specification. Component selection must be substantiated by means of manufacturer's published ratings, selection method, or pro-rating. All components and assemblies furnished must be new and unused.

D102001 1.7 STRUCTURAL DESIGN

Structural design must conform to American Institute of Steel Construction (AISC) Steel Construction Manual, CMAA No. 70, CMAA No. 74 or MH27.1, 29 CFR Part 1910.179, ASME B30.2, 29 CRF Part 1910.23 and 1910.27, ASCE 7-05, and other requirements specified herein.

D102001 1.7.1 Space Envelope

Design cranes and monorail systems to operate in the space and match the runway dimensions indicated in building design drawings. Provide the maximum practical hook work envelope to be consistent with good design, but not less than indicated in the Project Program.

D102001 1.7.2 Structural Fastener Tightening

All bridge girder to end truck connection fasteners and any other fasteners critical to the structural integrity of the cranes must be installed and tightened in accordance with one of the methods in the RCSC Specification for Structural Joints using High Strength Bolts.

D102001 1.7.3 Welding

All welding procedures, nondestructive testing requirements and welder qualifications must be in accordance with the requirements of AWS D14.1 for crane and monorail system fabrication and D1.1 for building interface welds.

D102001 1.7.4 Wheel Loads

Maximum wheel loads (without impact), as well as column loads and moments due to dead load and the rated capacity live loads, with the trolley in any position, must not cause greater shear or moment in runway girders and/or supporting structures than that produced by the design crane or monorail system load and spacing shown in the facility final design. Building designs/drawings will be provided to the Contractor for planning the design, shipping and erection of components.

D102001 1.7.5 Patented Track Monorail, Runway Systems and Bridge Girders

Provide monorails, underrunning runway systems and bridge girders for underrunning hoists with patented steel track, specially designed, fabricated and heat treated in accordance with MH 27.1, minimum Duty Service Classification C.

Utilize the runway or monorail (be supported from) the structural supports indicated on the facility final design. The track system and track suspension are the sole responsibility of the runway track supplier. However, design in accordance with the requirements of this RFP. Design and construct the suspension system to ensure no impairment of the strength of track or the structural support. Locate hanger or suspension at each track splice joint. Provide bracing to hold track sections in rigid alignment at all joints.

a. Sway Bracing - Brace track laterally and longitudinally to prevent damaging sway from loading conditions (dynamic, impact, seismic, etc).

b. Cataloged Products - If possible, provide track manufacturer's standard cataloged devices for connection of the track to the indicated supporting structures. If track manufacturer's cataloged devices are not provided for this suspension system, submit complete shop drawings and calculations for each custom suspension device for review and approval.

c. Suspension of Curves and Switches - Provide steel framing (structural supports), in addition to that indicated, as required by the track curve and switch manufacturer to support curves and switches. The additional steel framing must be the sole responsibility of the track supplier.

D102001 1.7.6 Wind Force Countermeasures for Outdoor Cranes

Provide wind brakes for each function (e.g. travel, trolley,

rotate) of outdoor operating cranes where design calculations show that the function brake(s) are not sufficient to prevent inadvertent movement during crane operation in the event of worst case anticipated wind forces. Provide a securing method for each function (e.g. travel, trolley, rotate) of cranes stowed outdoors where design calculations show that the function brake(s) and additional wind brakes are not sufficient to prevent inadvertent movement during stowed condition in the event of worst case anticipated wind forces.

D102001 1.8 MECHANICAL DESIGN

The mechanical design of the cranes must conform to minimum of CMAA 70, Class C, MH 27.1, Duty Service Classification C, ASME B30.2, ASME B30.11, ASME B30.17 and other requirements specified herein. All drives which are not directâ€'connected with shafts in line must be driven through gears. Do not rely upon retaining rings for axial retention of sheave pins or bearings on pins and axles and they are permitted only on standard commercial assemblies. Do not rely on press fits for transmission of torque, except in travel drives. Cotter pins are permitted only for locking nuts to prevent loosening and for retaining pins in standard commercial brake assemblies. Conform enclosed gearing to ANSI/ AMERICAN GEAR MANUFACTURERS' ASSOCIATION (AGMA) 6013, 6034, or 6035, as permitted. Design open gearing in accordance with ANSI/AGMA 2001.

D102001 1.8.1 Design Factors

Design cranes and monorails using the following factors:

a. Compute stresses and ratings, except as modified herein, using the locked rotor torque or horsepower of the driving motor.

b. For wire rope drum and related component calculations, the line pull off the drum must be taken as that necessary to balance rated motor torque.

c. Design the hoist drive, except the wire rope, to withstand the setting of the hoist brake(s) under a full speed lowering condition with either no-load or rated load on the hook whichever load condition represents the worst case scenario.

d. Unless otherwise specified, design or select all mechanical components, including fasteners, to provide design factors of 4.0 and 5.0 based on material yield and ultimate tensile strengths respectively at rated load. Furthermore, except where stated otherwise, those components that are subjected to momentary peak loads (due to starting, braking, or locked rotor torque) must be designed to limit the peak stresses to 0.75 of the material yield strength, except that peak compressive stresses must be limited to 0.90 of the material yield strength.

e. Design the load suspension parts of hand chain operated hoists including load chain so that the static stress calculated for the rated load do not exceed 25% of the minimum ultimate tensile

strength.

f. Design shafts and axles subjected to reversing stresses for fatigue loading per CMAA #70, regardless of crane configuration. Do not consider shaft loading resulting from the setting of brakes in the fatigue evaluation.

D102001 1.8.2 Mechanical and Threaded Fasteners and Tightening

All fasteners used in securing mechanical or electrical-mechanical (i.e., brakes) components to their foundations must be tightened to accepted torque values from standard tables based on the lubricant used. The fasteners must be lubricated and not be installed "dry". Where self-locking nuts are used, the prevailing torque of the locking element must be accounted for. Nominally tighten all mechanical fasteners to 70% of the fastener yield strength, except in applications where component manufacturers prescribe specific fastener torque requirements.

Fasten all flange-mounted components and all mechanical connections subjected to calculable loads with SAE J429, Grade 5 or Grade 8 fasteners, ASTM F436 washers, and SAE J995 Grade 5 or Grade 8 nuts. Mounting fasteners from flange-mounted components, including keeper bars, may be installed into tapped holes provided that adequate thread engagement is provided to develop the full tensile strength of the fastener. Provide all nuts with a minimum of one thread pitch of the bolt protruding above the nut top surface. Size fastener connections neglecting any benefit from shear bars or dowel pins.

D102001 1.8.3 Hoist Load Chain or Wire Rope

Provide uncoated load chain. Provide uncoated wire rope that conforms to XIP or XXIP, 6x36, IWRC per ASTM 1023/A. Minimum design factor of 5 to 1 must be provided based on ratio of minimum chain or wire rope breaking force to the calculated load on the chain or wire rope when the hoist is assumed loaded to rated capacity. Certification from hoist manufacturer of provided chain's proof test at 150% of the hoist's rated load divided by the number of chain parts supporting the load for at least 10 minutes without deformation or wire rope's breaking force must be submitted to Contracting Officer and approved prior to final acceptance of hoist. Do not paint, galvanize or coat the load chain or wire rope. Wedge sockets are not permitted as terminal fittings on wire rope. Hoisting rope dead end connections to equalizer bar (if used) or hoist frame must be by means of poured socket connections or swaged fittings installed in a manner that develops the full breaking strength of the hoisting rope. Provide forged steel sockets. Anchor hoisting rope ends on the drum by means of swaged fittings or by clamping. Clamped hoisting rope ends must be neatly and securely seized with wire. Maintain a minimum of two full wraps of rope at the dead end(s) of the drum with the block in its lowest indicated position.

D102001 1.8.4 Load Block and Hook

Construct load blocks of steel. Design the load block to preclude the wire rope from being cut, pinched, crushed, or chafed in case of two-blocking or unloading of the wire rope. Construct load blocks so that hooks and hook nuts can be removed without re-reeving the hoist. Hooks must be able to rotate freely with 125% of rated load and employ a thrust bearing rated at no less than 150% of the rated load. Clearly mark hoist capacity in pounds on both sides of the load blocks.

Provide single barb forged carbon steel (conforming to ASTM A668 or ASTM A521 with a material longitudinal elongation of not less than 18% and a safety factor of no less than 5:1), swivel type hook in accordance with ASME B30.10. Proof test hooks in accordance with ASME B30.10 for a minimum of 10 minutes without deformation. Secure hook nuts to hooks by a commercial standard removable and reusable means (tack-welding is prohibited). Size hook throat opening for users' needs. Provide hook with spring loaded steel safety latch for closing the hook throat opening. Do not paint or coat the hook or hook nut. Permanently mark hook and hook nut with a unique identification number traceable to each other and to the NDT certification. Locate unique hook and nut markings to be visible when the hook and nut are assembled on the hook block. Mark in a low stress area using low stress marking methods.

D102001 1.8.5 Wire Rope Sheaves

Provide forged steel sheaves. The minimum pitch diameters of running and equalizer sheaves must be in accordance with HST-4 for packaged hoist. Do not paint contact surfaces of sheaves. Machine or grind the grooves to contour and rim toughen them to not less than 320 BHN. Sheave groove depth must not be less than 1.15 times the hoisting rope diameter. Mount all rotating sheaves on bearings.

D102001 1.8.6 Wire Rope Drum

The drum must be a one-piece steel weldment; finish-machined after all welding and stress relieving has been completed. Include in the drum integral stub shafts or shaft hubs for through shafts as required. Design the drum such that all hoisting rope is wound in a single layer. Do not mount drums in a 3 bearing configuration. Provide drums that are grooved, with grooves that are helical and machined right and left hand. Minimum drum groove depth must be .375 x rope diameter and drum groove pitch must be 1.14 x rope diameter or rope diameter plus 1/8 inch, whichever is smaller. Provide 18 times wire rope diameter for the minimum pitch diameter of drum.

D102001 1.8.7 Gearing

Provide enclosed (gear reducer) type gearing, except that the final drive may be open gearing. Do not use shafts with three or more bearing supports. Utilize standard commercial products for

gear reducers. Provide enclosed reducers with a convenient means of lubricant level indication, oil sampling and draining. Provide base mounted reducers with a ball valve for draining. Hoist gearing must be spur, helical, or herringbone type only, except for high speed gearing which must be helical or herringbone. Provide spur gears only on open type drum gear-pinion sets (if applicable). Travel drive gearing may be spur, helical, herringbone or spiral bevel. Shaft mounted gear reducers may be used for travel and trolley drives only. Torque arms must be other than threaded rod type and must be designed and installed so that no eccentric loads are imposed on them. Provide enclosed gearing that complies with ANSI/AGMA 6013, 6034, or 6035, as permitted. Design open gearing in accordance with ANSI/AGMA 2001. If the design uses a drum gear, fabricate the gear to be removable from the drum. Provide guards on all gearing not enclosed in gear cases that may constitute a hazard under normal operating conditions, and include guards with provisions for lubrication and inspection.

D102001 1.8.8 Hoist Brakes

See HOISTS, in this section for hoist brake requirements by hoist type.

D102001 1.8.9 Travel Brakes

Provide powered trolley and bridge drives with end mounted electro-mechanical or pneumatic brakes that are spring applied, electrically or air pressure released. Manual and push bridges and trolleys do not require braking. Travel brakes must have a torque rating of at least 50 percent for indoor cranes and have a torque rating of at least 100 percent for outdoor cranes. The torque setting must be adjustable. Provide brakes capable of stopping within a distance in feet equal to 10% of the rated speed in feet per minute when traveling at rated speed with rated load. Equip brakes with a manual self-return to ON brake release. Provide brake housings with easy access for wear and setting inspection.

D102001 1.8.10 Travel Drives

The bridge and trolley drives must be A-4 type.

D102001 1.8.11 Shafts, Axles, and Pins

All shafts, axles, and pins must be steel. Top running bridge and trolley axles must be of the rotating type.

D102001 1.8.12 Wheels

Underrunning wheels must be flanged. Provide double flanged for top running bridge and trolley wheels. All wheels must be straight tread and rolled to shape or roll forged to provide properties in congruence with ASTM A504. Do not make wheels by casting, fabrication from plate steel or hollow stamping. Rim

toughen wheels that run on standard runway rails to not less than 320 BHN. Heat treat wheels that run on patented track beam to have minimum tread hardness of 375 BHN. Design bridge and trolley wheels to be compatible with their respective runway's profile. Provide wheel sizing and flange-to-rail head clearances in accordance with MH 27.1 and CMAA recommendations.

Equip bridge and trolley wheels of top running cranes and trolleys with rail sweeps. Provide a means to prevent bridge end truck and trolley from dropping more than one inch in case of wheel or axle failure.

D102001 1.8.13 Bumpers

Provide bumpers of the elastomeric, hydraulic or spring type on trolleys (or ends of bridge girders) and bridge end trucks. Design bumpers to withstand rated load at rated speed IAW AIST TR-6. Fully mate bumpers with the end stops and crane bumpers where applicable. Mount bumpers to provide proper clearance when bumpers are fully compressed. Where practical, mount bumpers to provide for easy removal of the travel wheels. Ensure trolley and bridge end truck frames are designed so that travel wheels do not contact the end stops. Design and install bumpers per the requirements of ASME B30 with a means of retaining the bumper in case of broken or loosened mounting connection(s).

D102001 1.8.14 Keys and Keyseats

Provide parallel type and machined key/keyseat assemblies. Install the key/ keyset assembly in a manner that preclude any possibility of a key shifting out of its intended position.

D102001 1.8.15 Fits

Interference fit all gears, pinions, couplings, brake drums, wire rope drums, wheels, other similar components to their respective shaft or axle. Interference fits must conform to the force fit requirements prescribed in ANSI B4.1 and must be medium drive fits unless length of engagement, material, or loading indicates otherwise. Alternatively, in bridge and trolley drives, keyless hub-to-shaft connections must be permitted where minimum potential interface fits capable of transmitting maximum torque (not less than 200% rated motor torque) is provided. The individual component manufacturers must endorse these interference fits. Fit bearings, bushings, and seals in accordance with the manufacturer's recommendations. Where multiple interference fitted components are installed on a single shaft from the same end, there must be clearance between each component's bore and the portion of the shaft from the installation end up to its mounting location. Fits of components within standard commercial assemblies, such as gear reducers and electric motors, must comply with the applicable industry standards or with the manufacturer's standard practice if industry standard criteria are not available.

D102001 1.8.16 Bearings

Provide anti-friction type bearings, except those subject to a small rocker motion. Use permanently lubricated sealed bearings wherever practical. Provide an easily accessible means of lubrication for bearings not considered lifetime lubricated by the manufacturer. Supply inner races for all antifriction bearings, except that bearings without inner races are permitted as part of packaged hoist unit. If a pedestal bearing is used to support the drum, the bearing housing must be steel.

D102001 1.8.17 Bushings and Thrust Washers

Fit all connections, including equalizer sheaves or bars, subject only to small rocking motion with bronze bushings and/or thrust washers, as applicable. Groove bushings to distribute lubricant.

D102001 1.8.18 Painting of System

Protect all parts of the cranes against corrosion. Clean, prime, and finish paint all surfaces normally painted at the Contractor's plant as specified hereinafter. Do not paint, coat, or galvanize the following surfaces: load chain, hoisting rope, load hook, suspension hook, load hook nut, suspension hook nut, load chain sheave (sprocket), wire rope contact areas of sheaves and drum, trolley and travel wheel treads, gear teeth, load bearing surfaces of travel rails, machined surfaces that are bearing surfaces, lubrication fittings, corrosion resistant steel, bronze, anodized aluminum, name plates, flange mounting faces, other items not normally painted, and wheel tread contact surfaces of runway beams. Provide painting systems and scheme as follows:

a. Paint Systems. Provide primer coat and the finish coat of paint that is smooth, even and free of runs, sags, orange peel, or other defects. Take precautions to avoid painting surfaces specified as non-painted. Any painted over grease fittings must be replaced; they may not be cleaned and reused. Provide a painting system that consists of anti-corrosive primer and topcoat(s) appropriate for the intended environmental conditions. The primer and topcoat(s) must be compatible with each other, the substrate, and be products of the same manufacturer. Apply primer and topcoat(s) in accordance with the manufacturer's recommended process. The use of paint containing lead or mercury is prohibited. Identify the primer and finish coats in the technical manual or drawings.

b. Painting Scheme. The painting scheme is as follows:

(1) Paint crane structural beams, hook block, and end trucks brilliant yellow.

(2) Paint sides of hook blocks to have additional gloss black diagonal safety striping.

(3) Paint faying surfaces of slip-critical structural bolted connections, both interior and exterior, with coatings as specified in RCSC Specification for Structural Joints Using High Strength Bolts".

(4) Clean and repaint any painted surfaces damaged during erection.

(5) Paint other components not specified above. The color and coating may be in accordance with the component manufacturer's standards.

D102001 1.8.19 Identification Plates

Provide two capacity plates with permanent lettering, one for each side of the bridge, monorail. Indicate the rated hoisting capacity of the hook in pound units on the plates and securely attach each plate. Size lettering to be easily read from the floor. Beneath the rated capacity the following information must be included:

Naval Facilities Engineering Command

Contract Number

Manufacturer's name, address, crane model number and crane serial number

Voltage of AC or DC power supply, and phase and frequency of AC power supply, if applicable.

D102001 1.8.20 Direction Identification

Provide cardinal direction indication letters centered on the bottom of each trolley where space permits. Denote North, South, East, and West and reflect the travel directions given on the controller. Size lettering to be easily read from the floor.

D102001 1.8.21 Unique Identifier Tag

In accordance with FEDERAL ACQUISITION REGULATIONS (FAR) 252.211-7003, assign a unique identifier to the crane. Attach the Unique Identification Tag to the outside of the main electrical disconnect panel.

D102001 1.9 ELECTRICAL DESIGN

Electrical design must conform to CMAA #70, CMAA #74, MH 27.1, ASME B30.2, ASME B30.16, as applicable, NFPA 70, NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION (NEMA) ICS 7, NEMA ICS 8, and other requirements specified herein. Each drive mechanism must be provided with a separate and independent drive unit with a circuit breaker branch circuit protection device capable of being locked in the open position. Design the electrical system to allow simultaneous motions of the main hoist and all traversing functions, and ancillary loads.

Design the crane to operate on the designated power supply.

Provide disconnecting means for cranes and monorail hoists in accordance with NEC 610.32. Disconnecting means provided for cranes must be a lever arm type switch (rotary type switches are not acceptable) located in a separate enclosure on the crane. Configure crane disconnects such that when the disconnect is secured, there are no energized conductors in any associated control panels.

Provide a separate runway disconnecting means in accordance with NEC 610.31. Runway disconnect switches for runways or monorails longer than 50 feet must be at the midpoint of the runway as much as possible.

Feed all control circuits from a single phase, air cooled, double-wound transformer. Furnish and install all electric drive equipment on the crane, including motors, brakes, switches, controllers, panels, items associated with the pendant, wiring system, cables, and electrification. All contactors and relays must have appropriate MOVs or R-C surge absorbers installed across the respective device's coil. Do not mix power and control cables in the same conduit in order to prevent interference where feasible.

D102001 1.9.1 Electrical Assembly

Install electrical wiring, conduit, and components in accordance with the requirements of NFPA 70. As a minimum, comply with the following items:

a. Install all electrical connections in accordance with NFPA 70 sections 110.14 or 430.9, as applicable, or as recommended by the device manufacturer.

b. If used, properly size crimped terminal lugs for the wire and install using the device(s) - e.g., crimping tool and indenter - recommended by the terminal lug manufacturer.

c. Identify all spare conductors, and insulate their ends to preclude accidental contact with energized equipment.

d. Adhesive-backed wiring tie wraps and cable-clamping devices cannot be used unless they are secured with fasteners, in addition to the adhesive.

e. Bond all panel doors, back sheets, and panel boards with flexible bonding straps.

f. Remove paint from termination points, or install "cut" washers to insure proper grounding of equipment at bonding straps and equipment grounding conductors.

g. Wrap wiring around sharp edges, such as panel doors, to protect sleeves (e.g., "spiral wrap") and prevent wiring insulation damage from chafing, cutting or abrasion.

h. Control panels cannot be used as raceways for conductors not terminating within the panel.

i. Use bushings or chafing protection gear on all panel conduit entries.

j. Mount only equipment that needs to be viewed or accessed from the panel door (i.e. dataloggers, key switches, pilot lights, etc.) on the panel door.

k. Tie wraps are prohibited as a permanent mounting means on festoon loops.

l. Flexible metal conduit may be used in lieu of ferrous rigid metal conduit for lengths of three feet or less when flexible connections are needed for motors and lighting.

m. Excluding conduit directly connected to dynamic breaking resistors, raceways must maintain a 12-inch clearance between the raceway and dynamic braking resistors.

n. Route a separate grounding wire, sized in accordance with Section 250-122 of NFPA 70, with all ungrounded conductors.

o. Number or tag all wiring at all connection points.

p. Label power conductors which are shielded as to the conductor size.

q. Plug all unused conduit openings.

r. Terminate all conductors on terminal blocks; splices are not acceptable, with the following exceptions:

(1) Motor and brake connections may be made using split-bolts or lugged and connected with nuts, bolts, flat washers and lock washers in lieu of installing a terminal block in the motor connection box.

(2) Wire-nuts are not permitted except where making connections for lighting ballasts. Secure wire nut connections such that during operation of the crane they will not loosen.

(3) Provide encoder conductors with a continuous run from the encoder to the drive. Use fiber optic cable if the length of cable required between a drive and its respective encoder is longer than 150 feet.

(4) Wire terminals with more than one wire must be rated by the manufacturer for use with multiple wires.

D102001 1.9.2 Enclosures

Provide enclosures for control panels and auxiliary devices in

accordance with Underwriters Laboratories (UL) or CSA listed metallic NEMA type 12 for indoor cranes or NEMA Type 4X stainless steel for all outdoor cranes as defined by NEMA Standards Publication Number 250. Design enclosures with appropriate heating and/or cooling accessories to maintain a climate within the panel that provides an appropriate internal temperature environment for proper operation of the drives. Condensation inside the control panels is not acceptable. Provide industrial grade electrical components and located so they are easily accessible for inspection and maintenance.

D102001 1.9.3 Wiring System

Unless otherwise specified, provide interconnecting wiring of copper stranded construction complying with Table 310-13 of NFPA 70. Aluminum conductors are prohibited. Aluminum connectors are allowed if they are rated for use with copper conductors (marked AL/CU). All conductors connected to or routed above resistors must have at least 8 inches clearance, with the exception of type SA and FEPB insulation shown in NFPA 70 (National Electric Code (NEC)) Table 610-14(a) for 125Â°C maximum temperature. Size motor branch circuit conductors to have an ampacity not less than 150% of the motor full load current rating and to be no smaller than 12 AWG. Conductors must be selected and de-rated based on maximum ambient temperature. Continuous loads such as utility, heating, lighting, and air conditioning must be multiplied by 2.25 to determine ampacity in order to permit application of NFPA 70 NEC 610-14 (e) for crane supply conductors. Provide raceways of ferrous rigid metal conduit.

D102001 1.9.4 Drive Mechanism Electric Motors

Provide electric drive mechanism motors that conform to NEMA MG 1. Hoist, bridge and trolley drive motors must be AC inverter duty, totally enclosed non-ventilated (TENV) or totally enclosed fan cooled (TEFC), squirrel cage induction type. All motors must have a 60-minute duty rating minimum. Provide motor insulation of a minimum of Class F, but with a Class B temperature rise. Furnish motors located outdoors with anti-condensation heaters.

Equip motors with thermal trip type over-temperature protection. Provide automatic resetting type temperature sensors installed integral to the motor windings. Activation of any integral motor over-temperature device energizes a red indicating FAULT light mounted on the crane and de-energizes the individual function as follows:

a. Hoists: hoisting direction only

b. Traverse Functions: motion in either direction.

The red indicating fault light remains energized until the over-temperature device resets.

D102001 1.9.5 Hoist, Trolley, Bridge Electric Controls

Comply with the following hoist, trolley and bridge controls requirements:

a. Provide static reversing, adjustable frequency controllers for all functions. Provide all controllers with a keypad or other interface allowing the end user to view/change parameters and view drive faults. Hoist drives are required to be selected such that the continuous rating of the controller is not less than 130% of the calculated motor full load current based on CMAA #70 paragraph 5.2.9.1.1.1, regardless of crane configuration, NFPA 70 NEC Table 430.250, and NEMA ICS7. Equip all hoist drives with a motor overtorque limit to lock out the hoist and prevent gross overload of the associated hoist. Set the overtorque limit such that an overload test can be performed without tripping the overtorque fault. All controllers must be from the same manufacturer. Each electric drive requires dynamic braking. Provide infinitely variable type speed control for each function. Design controls such that the maximum speed of each function is limited to 25% of rated speed when a slow speed switch is actuated on the operator's controller. Energize a yellow/amber light mounted on the crane while in slow speed mode.

b. Set all function brakes only after the associated controller decelerates the drive motor to a controlled stop. Size all controllers to provide sufficient starting torque to initiate motion of that crane drive mechanism from standstill with 0 to 125% of rated load on the hook and not produce any rollback. The hoist controller must enable the drive motor to develop full torque continuously at zero speed. Motors must operate smoothly at all speeds without torque pulsations, and only be energized within the frequency range of 50-60 Hz at rated speed. With respect to AC control wiring, no neutral wire must pass through the contacts of a control relay or contactor, i.e., a device must not be shut off or disengaged by breaking the device's neutral conductor.

D102001 1.9.6 Transients and Harmonic Protection

Provide varistors for transient protection internal to the controller. Minimum harmonics protection must consist of a reactor connected in series with each controller's line (input) terminals. Rate all reactors for continuous duty operation based upon motor nameplate amperes and design for 60 HZ operation. For a drive motor branch circuit that exceeds 100 feet in length, connect a reactor in series with the controller load (output) terminals to provide standing wave protection.

D102001 1.9.7 Drive Faults

Energize a red indicating FAULT light visible to the operator for drive faults.

D102001 1.9.8 Brake Controls

Release each drive mechanism's electro-mechanical brake only upon movement of the electric drive's controller from the OFF position and verification of motor torque, and set only after the electric drive's controller is returned to the OFF position and motors have regeneratively slowed to a controlled stop.

D102001 1.9.9 Main Line Contactors

Provide a main line contactor. Control energization of the main line contactor by a POWER-OFF/POWER-ON pushbutton on the control station. Except for the POWER OFF-POWER ON circuit, the control circuit including directional contactors must not be energized without energization of the mainline contactor. Provide black POWER-ON pushbutton and equipped with a guard to prevent accidental actuation. Provide red POWER -OFF mushroom-head pushbutton with no guard for quick and easy access.

D102001 1.9.10 Electrical Overload Protection

Protection must not be less than required by NEMA ICS 8, CMAA #70, MH 27.1, and NFPA 70. Use circuit breakers or fuses for protection. Individually protect motor branch circuits by circuit breakers capable of being locked in the open position to isolate that function without use of a portable lockout device. Calculate the circuit breaker size using the motor full load current from NEC 430, Part XIV (Tables).

D102001 1.9.11 Operator Controls

Comply with the following operator control requirements:

a. Control cranes from a radio control station where permitted, or pendant pushbutton station if radio frequency control is not desired (see project program for control configuration). Legibly mark and arrange operator controllers in accordance with ASME B30 guidance, except label traverse functions of bridge cranes with ordinal directions (NORTH, SOUTH, EAST, WEST) to agree with direction labels on the cranes. Provide all pushbuttons and levers with spring returns to the OFF position upon operator's release. Also provide a maintained two-position selector switch for slow speed selection and an ON/OFF switch for flood lights, if equipped. Equip operator stations to accept keys enabling a user to lock out the station from use.

b. Suspend pendant pushbutton stations by a 1/8 inch minimum stainless steel wire rope strain lead from an independent festoon system. Provide strain relief hardware consisting of a stainless steel wire mesh cable grip. The pendant pushbutton station must be a rubber molded enclosure. Provide pendant cable of type SOO.

c. Include an identical back-up transmitter unit for each radio control system. Provide portable transmitters that weigh not more than eight pounds each (including the batteries and antenna), with an adjustable belt or harness to support it when worn by the operator. Ensure that only one transmitter at a time can control

the crane and assure interference from one crane's controller does not affect operation of the other cranes in the building. Each transmitter includes: individual spring return joystick motion control levers for each function; a maintained contact, keyed switch, marked ON-OFF, for portable transmitter unit power; one or more LEDs indicating POWER ON, TRANSMITTING and LOW BATTERY; a red emergency STOP mushroom pushbutton; a 25% speed selector switch; a maintained switch to control the floodlights (if equipped); and a separate auxiliary pushbutton for a crane warning device (horn).

d. Design the remote radio control system to meet the requirements of NEMA ICS 8, Part 9. Each radio remote control lever must be in the OFF position before the associated crane function can begin. Choose the system frequency to be within the unlicensed FCC Part 15 range, unless licensed frequency is required by the end User. Maintain a continuous status signal between each control unit and the associated receiver. Provide a contact monitoring board with each crane radio system receiver.

e. Use rechargeable type batteries in the radio transmitter. Provide a minimum of three sets of batteries (one for each transmitter plus one on recharge). There must be no significant loss in systems efficiency and function at the end of eight hours of continuous battery use. Provide a battery charger.

D102001 1.9.12 Pendant Conductor System

Operate the pendant controller on its own independent festoon system. The festoon cables must consist of flat cables suspended from carriers riding on a rigid I-beam or similar type beam. The pendant controller must be capable of traveling the entire length of the bridge. Festoon loops must not extend below the high hook position. Provide at least 20% of the conductors to be spare at the time of crane acceptance. Pendant festoon systems must move independently of the trolley.

D102001 1.9.13 Indicator Lights and Warning Devices

Comply with indicator lights and warning device requirements as follows:

a. Install indicator lights and beacons with LED type lights sized to be visible from the operator's location. Provide a white light to indicate that power is available on the load side of the crane disconnect, a blue light to indicate that the main line contactor is energized, a yellow/amber slow speed light, and a red fault warning light to indicate a drive fault or motor over-temperature. Design light to use 115 VAC voltage. Provide nameplates with lettering of sufficient size to be easily read from the floor. The nameplates must read in their respective order "POWER AVAILABLE", "POWER ON", "SLOW SPEED", and "FAULT".

b. Install a lamp test pushbutton on the outside of the control panel to allow for simultaneously energizing all lights in this

section for testing purposes.

c. Provide a wind indicating device for outdoor cranes. This device must either provide a visible or audible alarm to the crane operator(s) when the wind velocity exceeds a preset limit. Assure that the chosen device does not conflict with any other previously listed indication/warning.

D102001 1.9.14 Overtravel Limit Switches

Comply with the overtravel limit switch requirements as follows:

a. See requirements in paragraph entitled HOIST for numbers and types of overtravel limit switches required by hoist type.

b. Hoist Limit Switch Settings. Set each primary upper limit switch at the maximum practical hook height but not lower than high hook position. Set the secondary upper limit switch not lower than the hook height of the primary upper limit switch setting plus the primary runout distance, but not less than the secondary runout distance below the lowest contact point of the hoist or trolley structure (two-block condition). (The runout distances are defined as the load block maximum drift, after switch activation, in the hoisting direction at rated speed with no load on the hook. Primary and secondary runout distances are associated with the primary and secondary upper limit switches, respectively.)

c. Hoist Slow-Down Limit Switches. Slow down limit switches may be used, set below the primary upper limit switch, to automatically decrease the hoisting speed to a predetermined slow speed before tripping the primary upper limit switch. The runout distances would then be defined as the load block maximum drift, after slow down switch activation, in the hoisting direction at slow speed with no load on the hook.

D102001 1.9.15 Runway Electrification

Comply with the following runway electrification requirements

a. Provide a runway electrification system to power the crane and connect it to the crane runway disconnect. Refer to the facility final design for the length of the system. Runway electrification for crane must be of the flat festooned type or enclosed safety bar type (see project program) with four continuous copper conductors. Ground the crane through the runway electrification system. Provide electrical work in accordance with Section D50, *Electrical*.

b. Rigid runway electrification systems must include all necessary hardware to the crane or monorail system from a wall or column mounted disconnect switch. Provide discreet rail type rigid runway electrification systems such that sections can be easily replaced if damaged and have insulating covers. Make outdoor rigid runway electrification systems with stainless steel

or be coated specifically to prevent corrosion and use UV resistant insulating covers. Design rigid runway electrification systems for a dusty environment, consisting of three power conductors and an equipment grounding conductor. Color the ground runway conductor green, if individual conductor bars are used (not a 4-conductor system).

c. For overhead cranes, install a guard if normal crane operations could result in the hook block or wire rope contacting the conductors.

d. Provide heavy duty sliding shoe type design for collectors and specifically design to match conductor contact surface. Collector arms must be insulated, spring loaded and must permit sufficient lateral and vertical movement to allow for imperfect track and for misalignment relative to the crane. Provide two collector shoes (tandem design) for each conductor; each collector shoe to be rated for its branch circuit current, or higher so as to provide redundancy.

e. Utilize flat cables suspended from carriers riding on an I-beam or C-track for festooned type electrification systems. Select the conductors so as to be of the longest length without splices. Fabricate conductors from copper. Provide a minimum of 20% of the festoon control circuit conductors for each electrification system to be spares at the time of crane acceptance. Festooned cable loops must not extend below the high hook position. Provide UL or CSA listed materials.

f. Size runway conductors for simultaneous motions of the main hoist plus all traverse crane functions plus any ancillary loads. When more than one crane makes use of the same runway electrification, size the system to accommodate simultaneous operations of the main hoist plus all traverse functions of all cranes at once.

D102001 1.9.16 Bridge-to-Trolley Electrification

Utilize flat cables suspended from carriers riding on an I-beam or C-track for festooned type electrification systems from bridge-to-trolley. Select the conductors so as to be of the longest length without splices. Fabricate conductors from copper. Provide a minimum of 20% of the festoon control circuit conductors for each electrification system to be spares at the time of crane acceptance. Electrically powered trolleys are required to be grounded through this conductor system. Festooned cable loops must not extend below the high hook position. Provide UL or CSA listed materials.

D102001 1.9.17 Nameplates

Provide nameplates for all electrical control equipment such as contactors, relays, transformers, etc., and all electrical panels. As a minimum, identify the associated function and system designation on each nameplate. Retain all electrical component

nameplates, markings, etc. provided by the original manufacturer.

D102001 1.9.18 Electrical Outlets

For cranes with maintenance walkways, provide a minimum of one 120 VAC duplex outlet on the crane. Mount the outlet on the outside of the control panel(s). Incorporate ground-fault circuit-interrupter protection and a circuit breaker with a minimum rating of 15 amps for protection of circuit supplying receptacles.

D102001 1.9.19 Flood Lights

Provide flood lights where the crane, hoist or trolley cast a shadow on workstations. Select flood lights to match the building lighting color and intensity. Evenly space the light bulbs along the crane to provide a minimum illumination level of 50 foot-candles at three feet above the finished floor. Provide all light fixtures rated for rough service, vibration resistant, and designed to prevent any material from falling from the fixture. Equip the lights with safety cables to prevent the fixtures from falling to the floor if dropped while being serviced. For cranes with maintenance walkways, locate the lights to be serviceable from the walkway(s). Provide a switch on the operator's controller to operate the floodlights.

D102001 1.9.20 Capacity Overload Protection

Provide overload limiting for each hoist motor circuit separate from the hoist drive overtorque limit specified in paragraph above entitled HOIST, TROLLEY, BRIDGE CONTROLS. The device must have a maintained keyed override located on the control panel that can be deactivated during overload testing. When an overload is detected limit the hoist function to the lowering direction only. Resetting of the overload must only be accomplished by moving the hoist in the down direction or by cycling power. Initially set the overload limit at 100% and ensure that it is adjustable from 80% to 150% of rated capacity.

D102001 1.9.21 Hour Meter

Provide a non-resettable hour meter, connected across the main line contactor, readable from the exterior of the main control panel, to indicate the elapsed number of hours the crane is energized. Additionally, provide non-resettable hour meters for each function, readable from the exterior of the main control panel, connected to each function's brake contactors to indicate the running time of each individual function.

D102001 1.10 PNEUMATIC DESIGN

Pneumatic design must conform to CMAA #70, MH 27.1, ASME B30.2, ASME B30.16, ASME HST-5, ASME HST-6 as applicable, and other requirements specified herein. The pneumatic power for the crane must be fed from a junction with a quarter-turn to off valve, accessible to the crane or

monorail system operator, capable of being locked in the off position. Disconnect valves for runways or monorails longer than 50 feet must be at the midpoint of the runway as much as possible. The pneumatic supply system must have capacity to allow simultaneous motions of all hoisting and traversing functions. Design the crane to operate on the designated pressure and flow rate. Configure disconnect valves such that when a valve is secured, there are no other sources of air supply to any part of the crane.

D102001 1.10.1 Pneumatic Assembly

Perform Installation of all pneumatic piping and components as stated below:

a. Install all pneumatic piping and connections as recommended by the device manufacturer.

b. Use rigid metal piping of the correct pressure rating for all piping runs. Flexible lines may be used in lieu of rigid metal piping for lengths of three feet or less when flexible connections are needed between components. Flexible lines must be rated for the system pressure.

c. Number or tag piping at all connection points.

d. Pressure test piping runs to ensure that they are free of leaks prior to connection to cranes.

e. Provide system fittings, piping and connectors exposed to the outdoor environment of corrosion resistant material.

D102001 1.10.2 Drive Mechanism Pneumatic Motors

Provide pneumatic drive mechanism motors with adequate power and starting torque and operate without perceptible vibration at any of the hoist loads or speeds within the rated load and speed capacity. The hoist motor may be either axial piston or rotary vane type.

D102001 1.10.3 Overload Protection

Equip the hoist with overload protection to prevent gross overload and any resulting damage to the crane or monorail system. The device must allow load testing at up to 125% of rated capacity. If adjustable, initially set the overload limit at 100% of rated capacity. Limit hoist operation to the lowering direction only when an overload occurs.

D102001 1.10.4 Operator Controls

Comply with the following operator control requirements:

a. Provide an operator station suspended from the hoist/trolley unit. Pull cord or rod controls are not desired. Legibly mark and arrange control stations functions in accordance with ASME

B30 guidance, except that traverse functions of OETs are labeled with ordinal directions (NORTH, SOUTH, EAST, WEST) to agree with direction labels on the cranes. Spring return all levers to the OFF position upon operator's release.

b. Suspend operator station by a 1/8 inch minimum stainless steel wire rope from the hoist/trolley unit structure.

D102001 1.10.5 Overtravel Limit Switches

Provide a lift limiting device so that the load hook, either loaded or empty, at any operating speed, will not allow the load block to contact the hoist frame. Install a stop or other device to prevent the load hook from being lowered beyond the hoist design limit of travel.

D102001 1.10.6 Runway Air Supply

Comply with the following runway air supply requirements:

a. Provide a runway air supply system, including retractable hose reel, to power the crane and connect it to the crane runway disconnect. Refer to the Project Program for the operating length of the system.

b. Pneumatic supply emergency shut-off devices must be readily accessible from the floor, and located within proximity to the crane runway, monorail track system.

c. Size runway air supply piping for simultaneous motions of all crane functions plus any ancillary loads. When more than one crane makes use of the same runway air supply, size the system to accommodate simultaneous operations of all functions of all cranes at once.

D102001 1.10.7 Nameplates

Provide nameplates for all pneumatic control equipment. As a minimum, identify the associated functions and system designations on each nameplate. Retain all pneumatic component nameplates, markings, etc. provided by the original manufacturer.

D102001 1.10.8 Hour Meter

Provide a non-resettable meter in the air supply calibrated to indicate the elapsed number of hours the crane is operating.

D102001 1.10.9 Pressure and Flow Regulation

Provide a device to limit inlet pressure and air flow in line between the air supply and the crane air inlet, mounted at the level of the hoist. The device(s) must ensure pressure does not exceed the rated pressure at the hoist and that the crane or monorail system functions at the desired speed and capacities. The device must allow sufficient air flow and pressure to operate

the brake release mechanism.

D102001 1.10.10 Moisture Separator/ Oiler

Provide a device in the supply line to the crane or monorail to remove moisture and add lubrication to the incoming air supply.

D102002 OVERHEAD CRANES

In accordance with the project program, provide an overhead top running multiple girder bridge cranes, single girder top running bridge crane, single girder underrunning bridge crane, monorail system, or hoist with the required equipment quantity, span, runway length, capacity and hook height needed to fulfill the mission of the end user.

D102002 1.1 TOPRUNNING MULTIPLE GIRDER CRANE

Provide a top running multiple girder crane with hoist and trolley complete, tested and ready for operation. The crane, hoist and trolley must be electrically, pneumatically or manually powered in compliance with the Project Program. Crane, hoist, trolley, equipment, materials, installation, examination, inspection, and workmanship must meet the applicable requirements of ASME B30.2 and CMAA 70, Class C minimum, as modified and supplemented by this specification. Provide the following girder crane components in addition to the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above.

D102002 1.1.1 Bridge Girders

Provide welded box section type bridge girders for spans greater than 40 feet. For spans less than 40 feet, open web girders may be used. Minimize splices in the bridge girder and avoid splices in locations of high stress. Provide full penetration welds at splices. Design bridge girders to be end notched to fit over the end truck.

D102002 1.1.2 Bridge Rails

Select bridge rails from the sizes listed in CMAA #70, Table 4.13.3-4; do not use solid stock material (square, round or rectangular) for bridge rails. Select the rails so that the allowable wheel loads are not exceeded by the design rated load on the hoist. Attach the rails to the bridge girders with pairs of adjustable rail clips spaced not more than 36 inches apart designed per the wheel loading design. Secure the rail clips to the top flange of the bridge girder by welding. If rail joints cannot be avoided due to the length of the span, the joints must be staggered and located directly over girder diaphragms. Provide rail joint gaps less than 1/32 of an inch. Weld creep bars in place at each end of the rail. Locate bridge rails above the shear center of the girder.

D102002 1.1.3 Walkways

Where necessary to access maintainable features, provide full length maintenance walkways on both girders with crossovers at the end trucks to allow movement between girders. At least one walkway must have a means of boarding the crane and must match the elevation and position of the access platforms located in the building.

D102002 1.1.4 Hoist and Trolley

Provide electric, air-powered, or manual hoist and trolley in compliance with the general requirements of paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the specific requirements of HOISTS below.

D102002 1.1.5 Bridge and Trolley End Trucks

Provide end trucks of box section design with wheels centered between the webs. Commercially available end trucks that are not box section may be used for bridge spans less than 40 feet. Equip end trucks for the bridge and trolley with rail sweeps that conform to ASME B30.2 extending below the rail head designed to move an obstruction.

D102002 1.1.6 Drop Lugs

Provide safety lugs or drop lugs to prevent bridge and trolley end trucks from dropping more than one inch or derailing in the event of wheel or axle failure.

D102002 1.1.7 End Stops

Provide end stops on the building runway and bridge girders designed and installed in accordance with AIST TR-13 to resist crane bumper and trolley bumper dynamic forces specified in AIST TR-6. Do not bolt end stops to the bridge rails.

D102002 1.1.8 Major Component Attachments for Lifting and Handling

Design and fabricate major components (e.g. bridge girders, end trucks, and trolleys) with structural or mechanical attachment points (lifting lugs, safety hoist rings, hoist rings or approved equivalent) when they are to be lifted or handled by suspended rigging.

D102002 1.2 TOP RUNNING BRIDGE, UNDERRUNNING HOIST SINGLE GIRDER CRANE

Provide a top running bridge, underrunning hoist/trolley crane with hoist and trolley complete, tested and ready for operation. The crane, hoist and trolley must be electrically, pneumatically or manually powered in compliance with the Project Program. Crane, hoist, trolley, equipment, materials, design, installation, examination, inspection, and workmanship must be in accordance with the applicable requirements, ("shall" or "must" statements) and recommendations ("should" statements), ASME B30.17, and MH 27.1, Duty Class C, as modified and supplemented by this specification. Provide the following bridge/

girder crane components in addition to the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above.

D102002 1.2.1 Bridge Girder

Provide bridge girders for single girder cranes not to exceed 50 feet in any single span. Provide a bridge girder of specially designed trackage in accordance with MH 27.1 Duty Class C, e.g., patented track beam constructed from welded steel components. Minimize splices in the bridge girder and avoid splices in locations of high stress. Provide full penetration welds at splices. Design bridge girders to be end notched to fit over the end truck.

D102002 1.2.2 Hoist and Trolley

Provide electric, air-powered, or manual hoist and trolley in compliance with the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the specific requirements of HOISTS below.

D102002 1.2.3 Bridge End Trucks

Provide end trucks of box section design with wheels centered between the webs except that commercially available end trucks that are not box section may be used for bridge spans less than 40 feet. Equip end trucks with rail sweeps that conform to ASME B30.17 extending below the rail head designed to move an obstruction.

D102002 1.2.4 Drop Lugs

Provide safety lugs or drop lugs or a functionally equivalent feature on the trolley frame and end truck frames to prevent a drop of more than one inch in the event of wheel or axle failure.

D102002 1.2.5 Trolley Stops

Provide extended wrap-around trolley frame plates or similar to contact the end stops. The trolley wheels must not contact the end stops.

D102002 1.2.6 End Stops

Provide end stops on the bridge runway designed and installed in accordance with AIST TR-13 to resist crane bumper dynamic forces specified in AIST TR-6. Trolley end stops may be the standard product of the bridge girder manufacturer.

D102002 1.2.7 Major Components Attachments for Lifting and Handling

Design and fabricate major components (e.g. bridge girders, end trucks, and trolleys) with structural or mechanical attachment

points (lifting lugs, safety hoist rings, hoist rings or approved equivalent) when they are to be lifted or handled by suspended rigging

D102002 1.3 UNDERRUNNING BRIDGE, UNDERUNNING HOIST, SINGLE GIRDER CRANE

Provide an underrunning single girder bridge crane with underrunning hoist and trolley complete, tested and ready for operation. The crane, hoist and trolley must be electrically, pneumatically or manually powered in compliance with the Project Program. Crane, hoist, trolley (carrier), end trucks, equipment, materials, installation, examination, inspection, and workmanship must be in accordance with the applicable requirements of ASME B30.11, and MH 27.1, Duty Class C, as modified and supplemented by this specification. Crane girder and runway tracks must be patented track. Provide the following bridge/girder crane components in addition to the general requirements in the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS components above.

D102002 1.3.1 Bridge Girder

Provide bridge girders for single girder cranes not exceed 50 feet (except top running multiple girder cranes) in any single span. Provide a bridge girder of specially designed trackage in accordance with MH 27.1 Duty Class C, e.g., patented track beam constructed from welded steel components. Minimize splices in the bridge girder and avoid splices in locations of high stress. Provide full penetration welds at splices.

D102002 1.3.2 Runway Rails

Provide runway rails in accordance with MH 27.1 of length and span to meet the requirements of the facility final design. Attachment to overhead structures or building columns must be as shown in the Project Program without exceeding design loads.

D102002 1.3.3 Hoist and Trolley

Provide electric, air-powered, or manual hoist and trolley in compliance with the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the specific requirements **HOISTS** below.

D102002 1.3.4 Drop Lugs

Provide safety lugs or drop lugs or a functionally equivalent feature on the trolley frame and end truck frames to prevent a load drop of more than one inch or derailing in the event of wheel or axle failure.

D102002 1.3.5 Stops

Provide extended wrap-around trolley frame plates or similar to contact the trolley end stops. The trolley wheels must not contact the end stops. End stops on the bridge and trolley runway

may be the standard product of the runway and bridge girder manufacturer.

D102003 MONORAILS

Provide a monorail system with hoist and trolley complete, tested and ready for operation. The hoist and trolley must be electric, pneumatic, manual or push operation as indicated in the Project Program. Crane, hoist, trolley, equipment, materials, installation, examination, inspection, and workmanship must be in accordance with the applicable requirements of ASME B30.11 and MH 27.1, Duty Class C, as modified and supplemented by this RFP. Monorail must be patented track. In addition to the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above, the following design requirements apply:

D102003 1.1 HOIST AND TROLLEY

Provide electric, air-powered, or manual hoist and trolley in compliance with general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the specific requirements of HOIST below.

D102003 1.2 MONORAIL BEAM

Provide the monorail beam of specially designed trackage in accordance with MH 27.1 Duty Class C, e.g., patented track beam. Provide standard catalog devices for connection of the track to the indicated supporting structures. If track manufacturer's catalog devices are not provided for this suspension system, complete shop drawings and calculations for each custom suspension device must be submitted for review.

D102003 1.3 DROP LUGS

Provide safety lugs (drop stops) or a functionally equivalent feature on the trolley frame to limit trolley drop to 1 inch in the event of wheel or axle failure.

D102003 1.4 TROLLEY STOPS

Provide trolley stops to stop trolley motion at both ends of the monorail. Extended wrap-around trolley frame plates or similar to contact the end stops. The trolley wheels must not contact the end stops.

D102003 1.5 END STOPS

End stops may be the standard design of the monorail manufacturer.

D102004 HOIST

Comply with the packaged hoist units design requirements of ASME HST-1 (electric chain), HST-2 (hand chain), HST-4 electric wire rope), HST-5 (pneumatic chain) or HST-6 (pneumatic wire rope), with modifications as specified herein. Comply with the safety requirements of ASME B30.16 on all hoists.

D102004 1.1 CAPACITY

Provide the hoist minimum rated load capacity as required by the Project Program. Mark the hoist capacity in pounds on both sides of the hoist or load block. Size lettering to be easily read from the floor.

D102004 1.2 ELECTRIC POWERED WIRE ROPE HOIST(S)

Provide electric wire rope hoists to comply with "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and ASME HST-4, Class H3 or higher, except as modified and supplemented herein. Provide double-reeved wire rope type hoist reeving systems.

D102004 1.2.1 Hoist Brakes

Equip each hoist with one electro-mechanical brake plus a mechanical load brake, each with a minimum torque rating of 125% of the rated motor torque. Provide adjustable brake torque settings on the electro-mechanical brakes. The electromechanical brake and mechanical load brake each must be able to independently stop and hold the maximum test load. Electro-mechanical hoist brakes must be provided with a manual, self-return to ON, release mechanism. Maintained OFF, release mechanisms are not permitted. Design all electro-mechanical hoist brakes to permit easy access for inspection and adjustment.

D102004 1.2.2 Hoist Limits

Provide electric powered wire rope hoist(s) limits as follows:

a. Provide two upper limit switches. Provide geared control circuit type primary switches (rope guide actuated limit switches are not acceptable). When the primary upper limit is reached, the operator must still be able to lower the block out of the upper limit switch. Lowering of the block must automatically reset the primary limit switch. The hoist secondary upper limit switch must be a mechanical block actuated control circuit type limit switch. The block actuated switch must remove all power from the affected hoist drive motor and brake independent of the hoist drive controller, utilizing a hoist line contactor, and set the brake when the secondary upper limit is reached. Provide a spring-returned three position keyed bypass switch on the hoist control panel to bypass the hoist limits. The far right position must allow resetting of the secondary upper limit switch prior to resuming operation. During resetting of the secondary limit, the hoist must operate in the lowering direction only. The far left position must allow bypassing of the primary upper limit switch to allow the secondary limit switch to be tested on a periodic basis. The center position of the bypass switch must be the NORMAL position with neither upper limit being bypassed.
b. Provide a geared control circuit type hoist lower limit switch. When the lower limit is reached, the operator must

still be able to raise the block. Automatically reset the limit switch when the block is raised.

D102004 1.3 ELECTRIC POWERED CHAIN HOIST(S)

Provide electric powered chain hoists to comply with "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and ASME HST-1, Class H3 or higher, except as modified herein and supplemented herein.

D102004 1.3.1 Hoist Brakes

Equip the hoist with one electro-mechanical brake plus a mechanical load brake, each with a minimum torque rating of 131.25% of the rated motor torque. Provide adjustable brake torque setting on electro-mechanical brakes. The electromechanical brake and mechanical load brake each must be able to independently stop and hold the maximum test load. Provide electro-mechanical hoist brakes with a manual, self-return to ON, release mechanism. Maintained OFF, release mechanisms are not permitted. Design all electro-mechanical hoist brakes to permit easy access for inspection and adjustment.

D102004 1.3.2 Chain Container

Equip chain hoists of 10 foot (3 meters) lift or more with a fabric or corrosion resistant metal load chain container.

D102004 1.3.3 Overtravel Limits

Provide a mechanical block actuated control circuit type upper limit switch or a chain stop with a geared upper limit switch to prevent two blocking of the hoist.

D102004 1.3.3.1 Block Actuated Switch

Provide a block actuated switch that does the following:

a. Remove all power from the affected hoist drive motor and brake independent of the hoist drive controller, utilizing a hoist line contactor, and set the hoist brake.
b. Include a spring-returned reset switch on the operator's controller to allow resetting the switch to resume hoist operation. When the spring-returned switch is activated but prior to exiting the limit switch, the hoist must operate only in the lowering direction.

D102004 1.3.3.2 Geared Upper Limit Switch

Provide a geared upper limit switch that does the following:

a. Provide a control circuit type and when reached,

allow the operator to lower the block out of the limit. Automatically reset the limit switch when the block is lowered.

b. b. Include a spring-returned keyed bypass switch on the hoist control panel to bypass the limit for functional testing of the chain stop.

D102004 1.3.3.3 Geared Lower Limit Switch

Provide a geared control circuit type hoist lower limit switch or chain stop. When the lower limit is reached, the operator must still be able to raise the block. Automatically reset the limit switch when the block is raised. If a geared lower limit switch is provided, then a chain stop is still required to prevent the load chain from running out of the hoist at its fully extended position.

D102004 1.4 PNEUMATIC POWERED WIRE ROPE HOIST(S)

Provide pneumatic powered wire rope hoists that comply with all "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and ASME HST-6 Duty Class A4. Provide double-reeved wire rope hoist type reeving system.

D102004 1.4.1 Hoist Brakes

Equip the hoist with a braking system that can stop and hold 125% of the rated hoist capacity. The hoist braking system must be able to prevent uncontrolled lowering of the load in the event of a loss of air supply. Provide hoist brakes with a manual, self-return to ON, release mechanism. Maintained OFF, release mechanisms are not permitted. Design hoist brakes to permit easy access for inspection and adjustment.

D102004 1.5 PNEUMATIC POWERED CHAIN HOIST(S)

Provide hoist or hoist/trolley unit that complies with all "should" and "shall" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and the American Society of Mechanical Engineers (ASME) HST-5, Duty Cycle A4.

D102004 1.5.1 Hoist Brake

Design the hoist braking system to prevent an uncontrolled lowering of the load in the event of a loss of air supply, and can stop and hold 131.25% of rated capacity. Provide hoist brakes with a manual, self-return to ON, and release mechanism. Maintained OFF, release mechanisms are not permitted. Design hoist brakes to permit easy access for inspection and adjustment.

D102004 1.5.2 Chain Container

Equip chain hoists of 10 foot (3 meters) lift or more with a fabric or corrosion resistant metal load chain container

D102004 1.6 MANUAL HOIST WITH TROLLEY

Provide hoist or hoist/trolley unit that complies with all "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and ASME HST-2.

D102004 1.6.1 Hoist Brake

Provide a hoist mechanical load brake that can stop and hold 125% of rated capacity.

D102004 1.6.2 Chain Container

Equip chain hoists of 10 foot (3 meters) lift or more with a fabric or corrosion resistant metal load chain container

D102004 1.6.3 Hoist Overload Limiting Device

Equip the hoist with a means to prevent destructive overloads.

D1030 ESCALATORS AND MOVING WALKS

Comply with ASME A17.1 and ASME A17.2.

D103001 ESCALATORS

Comply with ASME A17.1 and ASME A17.2.

D103002 MOVING WALKS

Comply with ASME A17.1 and ASME A17.2.

D109002 CONVEYORS

Comply with ASME B20.1, *Safety Standards for Conveyors and Related Equipment*.

SECTION D20

PLUMBING
12/18

D20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D20 1.1 NARRATIVE

Use this section in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation.

This section includes the construction of interior plumbing systems. This section covers installations inside the facility and out to the five foot line. See Section G30, *Site Civil/Mechanical Utilities*, for continuation of systems beyond the five foot line.

D20 1.2 PLUMBING DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

D20 1.2.1 Government Standards

Federal Energy Management Program (FEMP)

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-401-01, Mechanical Engineering UFC 3-420-01, Plumbing Systems)
UFC 1-200-02	High Performance and Sustainable Building Requirements

UFC 4-010-06 Cybersecurity of Facility Related Control Systems

D20 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-401-01, *Mechanical Engineering*.

D20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Fixtures, equipment, and OMSI information for all equipment and fixtures.

D20 1.5 QUALITY CONTROL

Upon completion of the installation test all systems in accordance with the IPC.

D2010 PLUMBING FIXTURES

Provide EPA's "WaterSense" labeled fixtures where available.

D201001 WATER CLOSETS

D201001 1.1 FLUSH VALVE WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Provide self-closing metering type flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control must conform to UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Flush valve not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.2 DUAL FUNCTION FLUSH VALVE WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Provide self-closing metering type dual function flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control must conform with UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Dual function flush valve must provide a flush of 0.8 to 1.1 GPF (3.0 to 4.2 LPF) or 1.28 GPF (4.8 LPF). Maximum flush volume not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances

in accordance with ABA Standards.

D201001 1.3 FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. EPA "WaterSense" labeled. Provide ASME A112.19.5 trim. Water flushing volume of the water closet not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.4 DUAL FUNCTION FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Dual function flush tank water closet providing a dual flush of 0.8 to 1.1 GPF (3.0 to 1.6 LPF) or 1.28 GPF (4.8 LPF). Maximum flush tank volume not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201002 URINALS

D201002 1.1 FLUSH VALVE URINALS

ASME A112.19.2, white vitreous china, wall-mounted, wall outlet, siphon jet, integral trap, extended side shields. EPA "WaterSense" labeled. Provide large diaphragm (not less than 2.625 inches (66 mm) upper chamber inside diameter at the point where the diaphragm is sealed between the upper and lower chambers) flush valve of chrome plated cast brass conforming to ASTM B 584, including vacuum breaker and angle (control-stop) valve. Maximum flush valve volume not to exceed 0.5 gallons per flush (1.9 lpf). Provide ASME A112.19.5 trim and ASME 112.6.1M concealed chair carriers. Provide self-closing metering type flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control in conformance with UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Select and install urinals and appurtenances in accordance with the ABA Standards.

D201002 1.2 WATERLESS URINALS

ASME A112.19.2, white vitreous china, wall-mounted, wall outlet, non-water using, integral drain line connection, with sealed replaceable cartridge or integral liquid seal trap insert. The urinal and trap assembly must maintain a sufficient barrier of a biodegradable immiscible liquid to provide the trap seal and inhibit the backflow of sewer gases. For urinals that use a replaceable cartridge, provide four additional cartridges for each urinal installed. Provide an additional quart of biodegradable liquid for each urinal installed. Provide ASME A112.6.1M concealed chair carriers. Install and test in accordance with the manufacturers' recommendations. Drain lines that connect to the urinal outlet must not be made of copper tube or pipe. Select and install urinal and appurtenances in accordance with ABA Standards. Slope the sanitary sewer branch line for waterless urinals a minimum of 1/4-inch per foot. Provide manufacturer's operating manual and on-site

training for the proper care and maintenance of the urinal.

D201003 LAVATORIES

D201003 1.1 COUNTERTOP LAVATORIES

Unless integral bowl is specified elsewhere, lavatories to be white, ASME A112.19.2 vitreous china lavatories with minimum dimensions of 19 inches (483 mm) wide x 18 inches (457 mm) front to rear, and self-rimming type. Provide ASME 112.18.1 copper alloy centerset faucets unless self closing metering or automatic control is specified in ESR section D20. Automatic faucet systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Provide EPA "WaterSense" labeled faucets. Provide with aerator, adjustable P-traps, and perforated grid strainers, unless pop-up drain fittings are specified in ESR section D20.

D201003 1.2 WALL-MOUNTED LAVATORIES

ASME A112.19.1, white enameled cast-iron or ASME A112.19.2 white vitreous china with ASME A112.6.1M concealed arm carrier support, with minimum dimensions of 19 inches wide by 18 inches (483 mm wide by 457 mm) front to rear. Provide ASME 112.18.1 copper alloy centerset faucets unless self closing metering or automatic control is specified in ESR section D20. Automatic faucet systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Provide EPA "WaterSense" labeled faucets. Provide with aerator, adjustable P-traps, and perforated grid strainers, unless pop-up drain fittings are specified in ESR section D20.

D201003 1.3 HANDICAPPED LAVATORIES

Same as Paragraphs 1.1 or 1.2, except height and appurtenances to be in accordance with ABA Standards.

D201004 SINKS

D201004 1.1 COUNTERTOP SINKS

ASME A112.19.3 sink, 20 gage stainless steel with integral mounting rim, minimum dimensions of 33 inches (840 mm) wide for two compartment or 21 inches (560 mm) wide for one compartment by 21 inches (560 mm) front to rear, with ledge back and undersides coated with sound dampening material. Provide top-mounted ASME A112.18.1 copper alloy faucets, swing spout with aerator, and stainless steel drain outlets with cup strainers. Provide adjustable P-trap with drain piping to vertical vent stack. If specified in ESR section D20, provide UL 430 waste disposer unit in right compartment.

D201004 1.2 SERVICE SINKS

ASME A112.19.1, white enameled cast-iron or ASME A112.19.2 white vitreous china, wall mounted and floor supported by wall outlet cast-iron P-trap, minimum dimensions of 22 inches (560 mm) wide by 20 inches (508 mm) front to rear with 10 inch (254 mm) splashback, and stainless

steel rim guard. Provide ASME A112.18.1 copper alloy back-mounted combination faucets with vacuum breaker and 0.75 inch (20 mm) external hose threads.

D201004 1.3 MOP SINKS

Pre-cast terrazzo floor-mounted mop sink, 36 inches x 36 inches x 12 inches (914 mm x 914 mm x 305 mm), made of marble chips cast in white Portland cement to a compressive strength of not less than 3000 PSI (20.7 mPa) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with terrazzo. Provide stainless steel rim guard for mop sink. Provide chrome-plated exposed hot and cold water faucets ASME A112.18.1 wall-mounted copper alloy faucets swing spout with 3/4 inch (20 mm) hose connection, vacuum breaker, and pail hook. Provide mop hanger on wall above sink suitable for four mops.

D201004 1.4 LAUNDRY SINKS

IAPMO Z124.6, plastic, two compartment, minimum dimensions of 40 inches wide by 21 inches (1016 mm wide by 533 mm) front to rear, with floor-supported steel mounting frame secured to wall. Provide ASME A112.18.1 copper alloy centerset faucets, swing spout with aerator, and stainless steel drain outlets with cup strainers, and 1.5 inch (40 mm) adjustable P-trap with drain piping to vertical vent stack.

D201005 SHOWERS/TUBS

D201005 1.1 ONE PIECE BATH AND SHOWER MODULES

IAPMO Z124, made of white fiberglass reinforced plastic (FRP) or acrylic with slip-resistant bathing surfaces, integral grab bar, and three walls integrally molded in one piece. Provide outlet at left or right as necessary to suit module arrangement. Provide pop-up drain fittings and adjustable P-trap. Provide diverter type bathtub and shower supply fittings with body mounted from behind the wall. Provide tub fill over-rim spout with diverter.

D201005 1.2 SHOWER STALLS

IAPMO Z124, made of white solid acrylic pressure molded fiberglass reinforced plastic (FRP) shower stalls. Stalls to be scratch-resistant, waterproof and reinforced with integral grab bar, and three walls integrally molded in one piece. Provide diverter type shower supply fittings with body mounted from behind the wall.

D201005 1.3 SHOWER FLOORS

Precast terrazzo or Acrylic Shower Floors: Terrazzo must be made of marble chips cast in white Portland cement to produce a compressive strength of not less than 3000 psi (20.7 MPa) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with terrazzo.

D201005 1.4 BATHTUBS

ASME A112.19.1 white enameled cast-iron or porcelain steel bathtubs, recessed type, minimum dimensions of 60 inches (1524 mm) wide by 30 inches (762 mm) front to rear by 16 inches (406 mm) high with drain outlet for above-the-floor drain installation. Provide diverter type bathtub and shower supply fittings with body mounted from behind the wall. Provide tub overfill rim spout with diverter.

D201005 1.5 SHOWER SUPPLY FITTINGS

ASME A112.18.1, ball joint, self-cleaning, adjustable spray pattern shower heads, connected to concealed pipe connected to copper alloy pressure balance single control type mixing valves with front access integral screwdriver stops. Provide EPA "WaterSense" labeled showerhead. Anchor the mixing valves and the pipe to each showerhead in wall to prevent movement.

D201005 1.6 HANDHELD SHOWER HEAD

ASSE 1014, adjustable spray hand-held shower head with swivel fitting, 60 inch (1524 mm) minimum flexible chrome plated copper alloy hose and in-line vacuum breaker. Provide push button flow control if specified in ESR section D20. Provide 25 inch (635 mm) grab bar with sliding spray holder that locks at any height.

D201006 DRINKING FOUNTAINS AND COOLERS

D201006 1.1 DRINKING FOUNTAINS

Wall mounted drinking fountain, constructed of white enameled cast iron with bubbler and push button control. Mount handicapped fixture at a height and provide appurtenances in accordance with ABA Standards.

D201006 1.2 ELECTRIC WATER COOLERS

AHRI 1010, wall-mounted, bubbler style, air-cooled condensing unit, 8.0 gph (.5 L per second) minimum capacity, stainless steel splash receptor, double wall heat exchanger, and all stainless steel cabinet. Provide ASME A112.6.1M concealed wall hangers with thru-bolts and back plates. Mount handicapped fixture and provide appurtenances in accordance with ABA Standards.

D201090 EMERGENCY FIXTURES

Pressure-compensated tempering valve is required for emergency fixtures, with leaving water temperature setpoint adjustable throughout the range 60 to 95 degrees F (15.5 and 35 degrees C) unless cold water supply meets temperature criteria.

Provide packaged, UL listed, alarm system; including an amber strobe lamp, horn with externally adjustable loudness and horn silencing switch, mounting hardware, and waterflow switch, assembled and prewired for waterproof service within NEMA Type 3 or 4 enclosures or for explosion proof service within NEMA Type 7 or 9 enclosures.

D201090 1.1 EMERGENCY SHOWER

ISEA Z358.1, wall-mounted self-cleaning, non-clogging 10 inch (250 mm) diameter stainless steel deluge shower head with elbow, one inch (25 mm) full-flow stay-open ball valve with pull rod and 8 inch (200 mm) diameter ring or triangular handle, one inch (25 mm) interconnecting fittings.

D201090 1.2 EMERGENCY EYE & FACE WASH

ISEA Z358.1, wall-mounted self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor. Provide copper alloy control valves.

D201090 1.3 COMBINATION EMERGENCY SHOWER & EYEWASH

ISEA Z358.1, column mounted on a floor flange. Design combination unit so components can be operated individually from a common fixture supply line. Provide a self-cleaning, non-clogging 10 inch (250 mm) diameter stainless steel deluge shower head with elbow, full flow stay-open ball valve with pull rod and 8 inch (200 mm) diameter ring or triangular handle one inch (25 mm) interconnecting fittings. Provide a self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor. Provide copper alloy control valves.

D2020 DOMESTIC WATER DISTRIBUTION

D202001 PIPES & FITTINGS

D202001 1.1 COPPER

Use copper tubing and fittings for pipe sizes 4 inches (100 mm) or smaller. Use type L tubing above ground with solder fittings. For buried piping, use type K tubing with solder fittings.

D202001 1.2 CHLORINATED POLYVINYL CHLORIDE (CPVC)

When specified in ESR section D20, provide CPVC pipe, fittings, and solvent cement meeting requirements of ASTM D 2846/D 2846M for sizes 4 inches (100 mm) and smaller. Provide transition union connections or threaded gate valve between metallic piping and CPVC piping.

D202002 VALVES & HYDRANTS

D202002 1.1 VALVES

Provide valves at water supplies to fixtures and to provide ease of maintenance.

D202002 1.2 HOSE BIBBS & HYDRANTS

Use non-freeze wall hydrants where the winter design temperature is at or below freezing. Hose bibbs are acceptable for use elsewhere.

D202002 1.2.1 Hose bibbs

Angle type, copper alloy hose bibbs with vacuum breaker.

D202002 1.2.2 Wall Hydrants

Non-freeze, ASSE 1019, cast bronze, with vacuum breaker, locking shield and tee-handle.

D202003 DOMESTIC WATER EQUIPMENT

D202003 1.1 BACKFLOW PREVENTERS

Provide backflow prevention devices that are approved by the State or local regulatory agencies. If there are no State or local regulatory agency requirements, provide backflow prevention devices that are listed by the Foundation for Cross-Connection Control & Hydraulic Research (FCCHR), or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention devices and assemblies. Provide freeze protection for aboveground exterior applications in areas where the winter design temperature is at or below freezing.

D202003 1.2 WATER HEATERS

Provide heaters complete with control system, gauges and ASME rated combination pressure and temperature relief valve. Heaters must meet the performance requirements of ASHRAE 90.1-2013 Table 7.8. Automatic storage type heaters must meet the Energy Star product definition specified in https://www.energystar.gov/products/spec and product to be Energy Star certified. For storage type water heaters, provide ASME code stamped tanks for domestic hot water. Lining must meet NSF 61.

D202003 1.2.1 Electric Water Heaters

Electric water heaters with double heating element meeting requirements of UL 174 for water heaters with less than 120 gallons of storage and 200,000 btuh input. Provide water heater meeting requirements of UL 1453 for commercial water heaters with 120 gallons of storage or more and 200,000 btuh input or more. Provide water heaters equipped with glass-lined steel tanks, high efficiency type, insulated with polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 90 and 160 degrees F (32 and 71 degrees C). Water heater warranty must be a minimum of 5 years. In accordance with FEMP requirements, heaters with storage capacity of 55 gallons (209 liters) or less and maximum energy input of 12 kW must have a minimum energy factor (EF) of 0.93 or higher and an annual energy usage of 4,721 kWh or less tested in accordance with U.S. Department of Energy (DOE) test procedure (10 CFR 430, Subpart B, Appendix E). Heaters with storage capacity of greater than 55 gallons (209 liters) and maximum energy input of 12 kW must have a minimum energy factor (EF) of 0.92 and an annual energy usage of 4,773 kWh or less tested in accordance with U.S. Department of Energy (DOE) test procedure (10 CFR 430, Subpart B, Appendix E).

D202003 1.2.2 Gas-Fired Water Heaters

High efficiency storage type water heaters meeting requirements of CSA/AM Z21.10.1 for water heaters with less than 120 gallons of storage and input ratings of 75,000 btuh or less. Provide water heater meeting requirements of CSA/AM Z21.10.3 for commercial water heaters with 120 gallons of storage or more and input ratings above 75,000 btuh. Water heaters must meet AGA requirements. Provide water heaters equipped with glass-lined steel tanks, polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 110 and 160 degrees F (43 and 71 degrees C). Water heater warranty must be a minimum of 5 years. Provide vent in accordance with NFPA 54.

D202003 1.2.3 Oil-Fired Water Heaters

UL 732 oil-fired water heaters with glass-lined steel tanks, high efficiency type, insulated with polyurethane foam insulation, replaceable anodes, with adjustable range thermostat to allow hot water settings between 110 and 160 degrees F (43 and 71 degrees C). Provide vent in accordance with NFPA 58. Design oil-fired water heater system in accordance with NFPA 31.

D202003 1.2.4 Electric Instantaneous Water Heaters (Tankless)

UL 499, heater(s) of the modulating, under the sink, point-of-use type. Output temperature must be adjustable from 40 degrees F to 160 degrees F. Heating elements must be field replaceable. Unit(s) must have a minimum 5-year warranty.

D202003 1.2.5 Steam Heat Exchangers

Double wall copper tube domestic water heating elements constructed with air gap to atmosphere between the two walls using steam as the heating medium exterior of the heating elements. Provide posted operating instructions for water heaters.

D202003 1.2.6 Storage Tanks

AWWA D100, glass- or cement-lined vertical steel tanks, minimum of 125 psig (862 kPa) (gage) working pressure.

D202003 1.3 PUMPS

D202003 1.3.1 Inline Pumps

In-line circulator for service water distribution system. Factory assembled and tested pumps constructed of materials suitable for hot domestic water service.

D202003 1.3.2 Base Mounted Pumps

Potable water service, base mounted, end suction pumps with

mechanical seals and drip-proof electric motors.

D202003 1.4 DOMESTIC WATER PRESSURE BOOSTER SYSTEM

Factory assembled, tested, and certified by a single manufacturer who assumes undivided responsibility for the system to include providing start-up services, two days instruction and furnishing related operations and maintenance manuals. Provide each building with its own system. Each system will consist of a minimum of two pumps mounted on a single, welded structural steel base. Provide bladder type low-flow accumulator storage tank, lead-lag pump alternator selector switches and all related controls and alarms required for safe and proper system operation. Provide constant speed or variable frequency drive pump operation.

D202003 1.5 EXPANSION TANKS

Steel expansion tank with potable water rated polypropylene or butyl lined diaphragm at water heater.

D202003 1.6 WATER METERS

See PTS G30, Site Civil/Mechanical Utilities, for water meter requirements.

D202003 1.7 MASTER THERMOSTATIC MIXING VALVES

ASSE 1017.

D202004 INSULATION & IDENTIFICATION

D202004 1.1 PIPING INSULATION

Mineral fiber insulation on domestic hot water supply and recirculation piping. Insulate domestic cold water piping with cellular glass insulation.

D202004 1.2 PIPING & EQUIPMENT IDENTIFICATION

In addition to the requirements in Section Z10, *General Performance Technical Specification*, provide engraved brass, laminated plastic, or engraved anodized aluminum nameplates for valves. Stop valves in supplies to fixtures will not require nameplates. Identify above ground pipe with the type of service and direction of flow. Letter size, lengths and colors to be in accordance with ANSI A13.1.

D202005 SPECIALTIES

D202005 1.1 WASHING MACHINE CONNECTOR BOX

Recessed wall box fabricated of PVC plastic. Provide bronze dual washing machine valve with single lever shut-off.

D202005 1.2 VALVE BOXES

For each buried valve provide cast-iron, ductile-iron box of a suitable size. Provide cast-iron or ductile-iron cover for the box with the word "WATER" cast on the cover.

D202005 1.3 WATER HAMMER ARRESTORS

PDI WH 201, water hammer arrestors in lieu of air chambers.

D202005 1.4 ICEMAKER CONNECTOR BOX

Recessed wall box fabricated of PVC plastic. Provide bronze shut-off valve.

D202090 OTHER DOMESTIC WATER SUPPLY

D202090 1.1 SUPPORTS

Provide piping supports. If a supported floor slab is used, support all piping located below the building from the building support slab.

D202090 1.2 INSPECTIONS

Prior to initial operation, inspect piping system for compliance with drawings, specifications, and manufacturer's submittals.

D202090 1.3 DISINFECTION

Upon completion of the installation, disinfect all systems.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

D203001 1.1 PIPING AND FITTINGS

Cast iron hub and spigot pipe and fittings, rubber compression gasket joints or cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661 may be provided. Equip plastic piping with approved firestopping devices as required by code.

D203001 1.2 CLEANOUTS

Provide cleanouts. Utilize material consistent with the piping system materials. Do not locate sanitary cleanouts within occupied spaces, with the exception of toilet and janitor spaces.

D203002 VENT PIPE & FITTINGS

Cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661. Equip PVC piping with approved firestopping devices as required by code. Single drainage/vent stack systems (such as Philadelphia system) and mechanical air

admittance valves are not acceptable.

D203003 FLOOR DRAINS

Flush strainer or extended rim type. Provide in mechanical rooms, restrooms, fire pump room, laundry room, and plumbing chase areas. Also provide floor drains in specific areas of subsistence buildings and cold-storage buildings as identified in UFC 3-420-01. Provide floor sinks in kitchens. Provide floor sinks where required for interior air handling unit condensate drains. Install condensate and drain piping to avoid interference with equipment access and prevent trip hazards.

D203004 SANITARY & VENT EQUIPMENT

D203004 1.1 PUMPS

D203004 1.1.1 Sump Pumps

Factory assembled and tested submersible type pumps for operation under water.

D203004 1.1.2 Sewage Pumps

FS A-A-50555, single or duplex type to meet demand. For duplex types, provide with automatic controls to alternate the operation from one pump to the other.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTINGS

Cast iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661 may be used. Equip PVC piping with approved firestopping devices as required by code.

D204002 ROOF DRAINS

ASME A112.6.4, with dome and integral flange. Provide a device for making a watertight connection between roofing and flashing.

D204003 RAIN WATER DRAINAGE EQUIPMENT

Where required by building design, provide expansion joint(s) of proper size to receive the conductor pipe. The expansion joint must consist of a heavy cast-iron housing, brass or bronze sleeve.

D204004 INSULATION & IDENTIFICATION

Provide flexible elastomeric cellular, faced phenolic foam, or cellular glass insulation on all drainage piping that may be subject to condensation. Provide a vapor retarder. Identify aboveground pipe with the type of service and direction of flow. Letter size, lengths and colors to be in accordance with ANSI A13.1.

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

D209001 1.1 NATURAL GAS PIPING

Conform to requirements of the local natural gas utility and ASME B31.8, *Gas Transmission and Distribution Piping Systems*, for exterior piping. Conform to requirements of NFPA 54, *National Fuel Gas Code*, for interior gas piping. Provide meter and pressure regulator in accordance with the requirements of the local utility. Provide earthquake valve where required by code.

D209002 ACID WASTE SYSTEMS

Acid-resistant DWV pipe, fittings, and couplings with mechanical, bell and spigot, or fusion type joints. Material for buried piping and aboveground piping must be silicon-iron composition. Borosilicate glass pipe and fitting may be provided for aboveground piping where acid composition dictates, except vent piping through and above roofs must be silicon-iron composition. Provide cleanouts and drains as specified for DWV piping, except material must be silicon-iron composition.

D209003 INTERCEPTORS

D209003 1.1 OIL INTERCEPTOR

Oil interceptor, where required, with a minimum flow capacity to meet system demand.

D209003 1.2 GREASE INTERCEPTORS

Provide in accordance with PDI G 101.

D209005 COMPRESSED AIR SYSTEM (NON-BREATHING)

D209005 1.1 AIR COMPRESSOR

Factory packaged electric motor driven, duplex air compressor including manufacturer’s standard air filter, oil filter, and plug drain. Air compressor, aftercooler, and receiver must be factory packaged as a unit. Receiver tank must meet requirements of ASME PBVC Sec. VIII D1, labeled and rated for 200 PSI (1.38 MPa) gage, equipped with required valves and trimmings, including gage and automatic drain valve and ASME BPVC pressure safety relief valve. Size air compressor and receiver in accordance with the Compressed Air and Gas Institute (CAGI) guidelines. Locate air compressor away from noise sensitive areas.

D209005 1.2 REFRIGERATED AIR DRYER

Low-pressure compressed air dryer of the mechanical refrigeration type, equipped with an automatic temperature shutdown switch to prevent freezing, a regenerative air-to-air exchanger (as standard with the manufacturer), and a main compressed air cooling exchanger. Refrigeration system must use non-CFC refrigerant and must cool

compressed air to dry the air. Dryer operating pressure not less than 125 PSI (862 kPa) gage. Size the dryer based on system pressure, the entire system air flow, and providing air with a dew point 5 degrees F (-15 degrees C) lower than the most stringent equipment or outlet requirement. The pressure drop of the dryer must not exceed 2 PSI (13.8 kPa) gage.

D209005 1.3 COMPRESSED AIR PIPING SYSTEM

Piping in conformance with the requirements of ASME B31.1 for materials, assembly, and testing. Provide steel, black seamless schedule 40 carbon steel piping material meeting requirements ASTM A 53/A 53M with threaded fittings or copper tubing meeting requirements of ASTM B 88, Type K or Type L, hard drawn, Class 1, with wrought copper or bronze fittings. Provide compressed air drops in locations to facilitate work required with quick disconnects throughout the work areas to allow connection of such as pneumatic tools and air guns. Equip each air drop with a filter/moisture separator, pressure gauge, air pressure regulator, and a quick-disconnect.

-- End of Section --

SECTION D30

HVAC
12/18

D30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Specifications (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D30 1.1 NARRATIVE

This section includes the construction of interior mechanical systems. This section covers installations inside the facility and out to the five foot line. See Section G30, *Site Civil/Mechanical Utilities*, for continuation of systems beyond the five-foot line.

D30 1.2 MECHANICAL DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

D30 1.2.1 Government Standards

Federal Energy Management Program (FEMP)

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-401-01, Mechanical Engineering UFC 3-420-01, Plumbing Systems)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-440-01	Facility-Scale Renewable Energy Systems

UFC 4-010-06	Cybersecurity of Facility Related Control Systems

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 01 78 24.00 20	Electronic Facility Operation and Maintenance Support Information
UFGS 23 05 93	Testing, Adjusting, and Balancing for HVAC
UFGS 23 09 00	Instrumentation and Control for HVAC
UFGS 23 09 23.02	BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems
UFGS 23 09 13	Instrumentation and Control Devices for HVAC
UFGS 23 81 23.00 20	Computer Room Air Conditioning Units
UFGS 25 05 11	Cybersecurity of Facility Related Control Systems

D30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

a. Verification of satisfactory HVAC system performance must be via Performance Verification Testing, as detailed in this section.
b. The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.
c. The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Perform and evaluate test methods, procedures, and test values in accordance with appropriate standards, and the manufacturer's recommendations. Place equipment in service only after completion of required tests and evaluation of the test results have been completed. Supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Perform acceptance tests and inspections on Computer Room Air Conditioning Units, Direct Digital Control System, and HVAC Testing/Adjusting/Balancing.

D30 1.4 HVAC COMMISSIONING

Commission the HVAC systems per the Commissioning Plan as required by Part 2 Section 019100.15 20, *Total Building Commissioning*. HVAC system

commissioning must coordinate with and incorporate the testing, reporting, training & O&M documentation requirements of UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC;* UFGS 23 09 00, *Instrumentation and Control for HVAC;* UFGS 23 09 23.02, *BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems* and UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*.

D30 1.5 DESIGN SUBMITTALS

Submit design Submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-401-01, *Mechanical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 01 78 24.00 20, *Facility Electronic Operation and Maintenance Support Information*

UFGS 23 09 00, *Instrumentation and Control for HVAC*

UFGS 23 09 23.02, *BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems*

UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*

UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC*

UFGS 48 14 13.00 20, *Solar Liquid Flat Plate and Evacuated Tube Collectors*

D30 1.6 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Solar hot water heating system fixtures and equipment, and OMSI information for all equipment and fixtures.

D30 1.7 MOTORS

High efficiency single-phase fractional-horsepower alternating-current motors, corresponding to the applications listed in NEMA MG 11. Select polyphase motors based on high efficiency characteristics relative to

the applications as listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium induction motors with continuous ratings must meet or exceed energy efficient ratings in accordance with Table 12-10 of NEMA MG 1. Provide controllers for 3-phase motors rated 1 hp (0.75 kW) and above with phase voltage monitors designed to protect motors from phase loss and over/under-voltage. Provide means to prevent automatic restart by a time adjustable restart relay. For packaged equipment, provide controllers including the required monitors and timed restart. Provide reduced voltage starters for all motors 25 hp and larger.

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

Conform to requirements of International Mechanical Code for piping. Conform to requirements of NFPA 31 for testing. Provide the complete oil supply system to the facility, including any applications and permits.

D301001 1.1 OIL SUPPLY SYSTEM PIPING & EQUIPMENT

ASTM A 53/A 53M or ASTM A 106/A 106M piping with associated ASME fittings or ASTM B 88, type L or M copper tubing with ASME B16.26 flared fittings or compression type fittings. Provide welded fittings on piping below grade. Pumps that are not part of the burner assembly must be positive displacement type. Provide oil filter prior to oil entering appliance or pump. Storage tanks must meet the requirements of NFPA 31.

D301002 GAS SUPPLY SYSTEM

D301002 1.1 NATURAL GAS PIPING

Conform to requirements of the local natural gas utility and ASME B31.8, *Gas Transmission and Distribution Piping Systems*, for exterior piping. Conform to requirements of NFPA 54, *National Fuel Gas Code*, for interior gas piping. Provide meter and pressure regulator in accordance with the requirements of the local utility. Provide earthquake valve where required by code. Provide the complete natural gas system to the facility, including any applications and permits.

D301002 1.2 MATERIALS AND EQUIPMENT

D301002 1.2.1 Aboveground Within Buildings

Black steel meeting requirements of ASTM A 53/A 53M, Schedule 40, and associated ASME fittings threaded ends for sizes 2 inches (50 mm) and smaller; otherwise, plain end beveled for butt welding.

D301002 1.3 PRESSURE TESTS

Pressure test in accordance with NFPA 54 at 1.5 times maximum working pressure, but in no case less than 50 PSI (350 kPa).

D301002 1.4 PROPANE PIPING

If required, provide the same as specified for natural gas and comply with NFPA 58.

D301002 1.4.1 Underground

Polyethylene (PE) pipe conforming to ASTM D 2513 for 100 PSI (690 kPa) (gage) working pressure. Standard Dimension Ratio must be 11.5 maximum. Provide detectable aluminum plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of direct buried piping. Tape must be detectable by an electronic detection instrument. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for gas lines. Polyethylene fittings must be ASTM D 2683 socket fittings or ASTM D 2513 molded butt-fusion fittings.

D301002 1.5 PROPANE TANKS

If not provided by the propane provider, the tank material and installation must comply with NFPA 58.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

Refer to Section G30, *Site Civil/Mechanical Utilities*

D301004 HOT WATER SUPPLY SYSTEM (FROM CENTRAL PLANT)

Refer to Section G30, *Site Civil/Mechanical Utilities*

D301005 SOLAR ENERGY SUPPLY SYSTEM

Design and build each solar domestic hot water heating system meeting the requirements of UFC 3-440-01 *Facility-Scale Renewable Energy Systems*. Each system must be fully integrated with the building DDC controls system.

Provide complete solar domestic hot water system designed and built by a single contractor who specializes in solar heated water systems. System must be designed, built, and tested by this contractor who is responsible for the provided system to operate as proposed. This design-build contractor must be endorsed in writing, prior to system design, by the manufacturer of the solar plate collectors provided for this solicitation.

The solar domestic hot water system designer must work with the building designers to optimize the roof area, slope and orientation available for solar domestic hot water. Coordinate with other solar systems utilizing the roof area such as photovoltaic systems.

Provide solar liquid flat plate collector systems to comply with the requirements specified in UFGS Section 48 14 13.00 20, *Solar Liquid Flat Plate and Evacuated Tube Collectors.*

D3020 HEAT GENERATING SYSTEMS

D302001 BOILERS

If required, provide Boiler(s) type for the load capacity of the building as indicated in ESR Section D30. Include all equipment efficiencies on the equipment schedules on the drawings.

D302001 1.1 REQUIREMENTS

Design and test boiler in accordance with ASME CSD-1 (Controls and Safety Devices), ASME BPVC SEC IV (Boiler and Pressure Vessel Code), NFPA 54, NFPA 70 and ANSI Z21.13/CSA 4.9. Install boiler in accordance with NBBI NB-23 PART 1. The boiler must meet the requirements of the UL 795, ANSI Z83.3, and ASME CSD. Design oil-fired boiler system in accordance with NFPA 31. Hot water boilers to meet the following thermal (Et) or combustion (Ec) efficiencies: Natural Gas-fired Hot Water rated at 88 - 732 kW (300,000 to 2,500,000 Btuh) capacity, Et = 80 percent; Natural Gas-fired Hot Water rated greater than 732 kW (2,500,000 Btuh) capacity, Ec = 82 percent; #2 Oil-fired Water rated at 88 - 732 kW (300,000 to 2,500,000 Btuh) capacity, Et = 82 percent; #2 Oil-fired Water rated greater than 732 kW (2,500,000 Btuh) capacity, Ec = 84 percent.

D302001 1.2 BOILER BURNER

Provide burners of the make, model and type certified and approved by the manufacturer of the boiler being provided. Provide burner controls and flame safety equipment conforming to either ASME CSD-1 or NFPA 58 as dictated by the input.

D302001 1.3 BOILER TRIM AND CONTROL EQUIPMENT

D302001 1.3.1 Boiler Controls

Mount controls, including operating switches, indicating lights, gages, alarms, motor starters, fuses, and circuit elements of the control systems, on a single control panel mounted on the burner or separate from the burner. Locate the separate panel at the side of the boiler or in a freestanding control cabinet away from the front of the boiler. When using BACnet communication protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet Direct Digital Control System in specifications UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13.

D302001 1.3.2 Boiler Trim

Comply with ASME BPVC SEC IV, ASME CSD-1, and additional appurtenances as specified herein.

D302001 1.3.3 Pressure Gages

Provide pressure gages with a scale equivalent to 1.5 times the outlet water pressure on supply water piping and return water piping.

D302001 1.3.4 Thermometers

Provide thermometers with a scale equivalent to 1.5 times the outlet water temperature on supply water piping and return water piping.

D302001 1.3.5 Drain Trapping

Provide drain valve and piping to a floor drain.

D302001 1.3.6 Air Vent Valve

Provide with screwed connection, stainless steel disk, and stainless steel seats to vent entrapped air.

D302001 1.4 STEAM BOILERS

Provide steam boilers meeting the requirements of hot water boilers, except as follows. Steam boilers to meet the following thermal (Et) or combustion (Ec) efficiencies: Natural Gas-fired Steam (excluding natural draft) rated at 88 kW (300,000 Btuh) capacity and larger, Et = 79 percent; Natural Draft Steam rated at 88 kW (300,000 Btuh) capacity and larger, Et = 77 percent; #2 Oil-fired Steam rated at 88 kW (300,000 Btuh) capacity and larger, Et = 81 percent.

D302001 1.4.1 Pressure Gages

Provide pressure gages with a scale equivalent to 1.5 times the outlet water pressure on boiler feedwater supply piping and condensate return water piping. Provide boiler steam pressure gage with scale equivalent to 1.5 times the boiler rated working pressure.

D302001 1.4.2 Thermometers

Provide thermometers with a scale equivalent to 1.5 times the outlet water temperature on boiler feedwater piping and return water piping.

D302001 1.5 BOILER STACK AND ACCESSORIES

Provide pre-manufactured, multi-wall stacks complying with NFPA 54 or NFPA 58 and UL-listed. Provide flue gas thermometer and mount in flue gas outlet.

D302001 1.6 BOILER STARTUP AND OPERATIONAL TESTS

D302001 1.6.1 Boiler Cleaning

Prior to startup, clean boiler(s) in accordance with ASME *Boiler and Pressure Vessel Code*and manufacturer's recommendations.

D302001 1.6.2 Operational Tests

Furnish the services of an engineer or technician approved by the boiler manufacturer for installation, startup, operational and

safety testing. Demonstrate proper operability of combustion control, flame safeguard control, and safety interlocks.

D302002 FURNACES

Provide manufacturer's standard, self-contained, indirect, forced-air type. Furnace and furnace components to be completely factory-assembled and consist of a heat exchanger; burner; centrifugal blower, a sheet metal cabinet-type casing with provisions for duct, vibration isolators, and all required operating, limit, and safety controls. Furnace casing to be factory insulated and compatible with the operating temperatures. Furnace to be provided with removable service panels which allow access to all internal components requiring cleaning, servicing, or adjustment. Provide a 24 volt control transformers, high temperature limit, and fan time delay relay. Design to supply heated air through a ducted system. If required in ESR D30, provide cooling evaporator coil module with cabinet suitable for use with furnace.

D302002 1.1 GAS-FIRED FURNACES

Furnace conforming to ANSI Z21.47/CSA 2.3. Furnace design to be certified by the AMERICAN GAS ASSOCIATION LABORATORIES (AGA). If a conventional type furnace is required in ESR D30, and the capacity is less than 65.9 kW (225,000 Btuh), the furnace must have a minimum AFUE of 78 percent. FEMP requires gas-fired warm air furnaces with a capacity greater than 65.9 kW (225,000 Btuh) have a minimum thermal efficiency of 80 percent at the maximum rated capacity. For residential applications, Energy Star requires warm air furnaces with capacity less than 65.9 kW (225,000 Btuh) have a minimum AFUE of 90 percent for US South applications, and a minimum AFUE of 95 percent for US North applications. Refer to Energy Star "Furnaces Key Product Criteria" for identification of US North and US South applications.

D302002 1.1.1 Gas-Burning Components

Gas-burning equipment to include the gas burners, ignition equipment, gas-control valve, gas piping, gas-pressure regulating valve, when applicable, and accessories necessary for a fully automatic system that is listed in CSA Directory. Gas-fired units equipped with programming controls to be furnished both with high and with low gas supply pressure switches in the fuel supply piping.

D302002 1.1.2 Ignition System

Ignition systems to be automatic electric ignition with electrically-ignited proven pilots. Continuous pilots are not permitted. Burner to be designed in accordance with NFPA 54 and located so that parts are protected against overheating. Provisions to be made in the burner housing for inspection of the pilot flame.

D302002 1.2 OIL-FIRED FURNACES

Furnace conforming to UL 727. Oil-fired furnaces with a capacity less than 65.9 kW (225,000 Btuh) require a minimum AFUE of 78 percent. FEMP

requires oil-fired warm air furnaces with a capacity greater than 65.9 kW (225,000 Btuh) have a minimum thermal efficiency of 81 percent at the maximum rated capacity. For residential applications, Energy Star requires oil-fired warm air furnaces with capacity less than 62.9 kW 225,000 Btuh have a minimum AFUE of 85 percent.

D302002 1.2.1 Oil-Burning Components

The equipment to include the oil burner motor, ignition equipment safety devices, and accessories necessary for a full automatic system that conforms to UL 296. Oil-fired units equipped with programming controls to be furnished with low oil-pressure switches in the fuel supply piping. Oil-fired units not equipped with programming controls to be equipped with a delayed opening oil shutoff valve. The valve must automatically delay delivery of oil to the burner until such time as the combustion air fan and, when applicable, the induced draft fan is operating at rated speed.

D302002 1.2.2 Ignition System

Ignition systems for oil-fired units to be of the direct-electrical spark type or interrupted type in accordance with UL 296.

D302003 FUEL-FIRED UNIT HEATERS

D302003 1.1 GAS-FIRED UNIT HEATERS

ANSI Z83.8 and AGA label. Equip each heater with individually adjustable package discharge louver. Provide with thermostat.

D302003 1.2 INFRARED HEATERS

ANSI Z83.8 and AGA label.

D302004 AUXILIARY EQUIPMENT

D302004 1.1 HEAT EXCHANGERS

Steam to hot water converter as required for the application. Provide factory assembled, u-tube units constructed in accordance with ASME BPVC for steam or hot water. Factory assembled, plate type heat exchangers may be provided for hot water.

D302004 1.2 CONDENSATE RETURN UNITS

Floor-mounted receiver and duplex pump unit.

D302005 EQUIPMENT THERMAL INSULATION

Insulate hot water pumps and equipment as suitable for the temperature and service in rigid block, semi-rigid board, or flexible unicellular insulation to fit as closely as possible to equipment.

D3030 COOLING GENERATING SYSTEMS

If coatings are indicated in ESR Section D30, provide with copper tube/copper fin construction or immersion applied, baked phenolic or other approved coating that passes the 3000 hour salt spray resistance test using the ASTM B117 procedure. Field applied coatings are not acceptable.

D303001 CHILLED WATER SYSTEMS

D303001 1.1 AIR-COOLED CHILLERS

Provide air-cooled chillers of type indicated in Project Program and meet the requirements of AHRI 550/590. For electric air cooled chillers use minimum full load and part load efficiency ratings specified by ASHRAE 90.1-2013 Table 6.8.1-3. Provide control panel with the manufacturers' standard controls and protection circuits. If DDC system is required in project, provide a control interface for remote monitoring of the chiller's operating parameters, functions and alarms from the DDC control system central workstation. When using BACnet communication protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet DDC system in specifications UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13.

D303001 1.1.1 Stages

Provide continuous variable speed compressor adjustment to match actual load, or minimum of four stages of unloading at 25 percent per stage minimum for reciprocating, centrifugal, and scroll chillers. Provide reciprocating units with hot gas bypass.

D303001 1.1.2 Pressure Control

Provide head pressure control for cold temperature operation. Provide freeze protection for chiller and piping.

D303001 1.1.3 Coil Construction

Provide copper tube, aluminum fins for condenser coils. Provide manufacturer's optional louvered covers or hail guards for condenser coils to provide protection against vandalism, debris, or hail.

D303001 1.2 WATER-COOLED CHILLERS

Self-contained chiller meeting the requirements of AHRI 550/590. For electric water cooled positive displacement chillers less than 300 tons use minimum full load and part load efficiency ratings specified by ASHRAE 90.1-2013 Table 6.8.1-3. For electric water cooled positive displacement chillers greater than 300 tons and electric water cooled centrifugal chillers, use minimum full load and part load efficiency ratings specified by FEMP, which is located at the following DOE FEMP webpage: http://energy.gov/eere/femp/covered-product-category-water-cooled-electric-chillers . Provide control panel with the manufacturers' standard controls and protection circuits. If DDC system is required in project, provide a control interface for remote

monitoring of the chiller's operating parameters, functions and alarms from the DDC control system central workstation. Provide automatic capacity-reduction system for stable operation from 100 to 10 percent of full load capacity. When using BACnet protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet DDC system in specifications 23 09 00, 23 09 23.02 and 23 09 13.

D303001 1.3 COOLING TOWERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic impregnated materials must not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooling Tower performance must meet or exceed that listed in ASHRAE 90.1. Construct as indicated in ESR Section D30 with fill material of PVC formed sheets. Provide stainless steel hardware. Provide vibration cutout switch interlocked with the fan motor. Provide 2-speed or adjustable frequency drive fan motors. Provide work platform(s) at all locations in the tower that require periodic maintenance. For multi-cell installations, provide isolation valves on inlets and outlets of each cell. Provide eliminators in the tower outlet to limit drift loss to not over 0.002 percent of the circulating water rate for counterflow towers, or 0.005 percent of the circulating water rate for cross-flow towers. Eliminators to be constructed of not less than 3/8 inch (10 mm) lumber or polyvinyl chloride (PVC).

D303001 1.4 CLOSED CIRCUIT COOLERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic impregnated materials must not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooler performance must meet or exceed that listed in ASHRAE 90.1. Provide stainless steel hardware. Provide vibration cutout switch interlocked with the fan motor. Provide 2-speed or adjustable frequency drive fan motors. Meet OSHA safety requirements for stairs and handrails.

D303002 DIRECT EXPANSION SYSTEMS

If coatings are indicated in ESR Section D30, provide with copper tube/copper fin construction or immersion applied, baked phenolic or other approved coating that passes the 3000 hour salt spray resistance test using the ASTM B117 procedure. Field applied coatings are not acceptable.

D303002 1.1 HEAT PUMPS

D303002 1.1.1 Air to Air

Air-cooled, split system heat pumps with ducted air distribution. Provide units factory assembled, designed, tested, and rated in accordance with AHRI 210/240 or AHRI 340/360. Equipment to be Energy Star Qualified, and heat pumps must include the Energy Star label affixed to the equipment. For small (less than 65,000 Btuh) air-cooled heat pumps, Energy Star requires a minimum 14 SEER, 11 EER, and 8.0 HSPF. For medium (65,000 to 135,000 Btuh) air-cooled heat pumps, Energy Star requires a minimum 11.3 EER,

11.4 IEER, and 3.35 COP. For large (136,000 to 240,000 Btuh) air-cooled heat pumps, Energy Star requires a minimum 10.9 EER, 11 IEER, and 3.35 COP. Provide manufacturer's minimum recommended clearance around condensing units. Size refrigerant piping in accordance with the manufacturer's recommendations. Insulate refrigerant piping suction lines and condensate drain.

D303002 1.1.2 Water Source

Factory assembled, designed, tested, and rated in accordance with AHRI/ISO 13256-1 or AHRI/ISO 13256-2. Unit must be AHRI/ISO 13256-1 or AHRI/ISO 13256-2 certified, or listed in the AHRI/ISO 13256-1 or AHRI/ISO 13256-2 directory. In compliance with FEMP/Energy Star requirements, water-to-air closed loop units to have a minimum EER of 17.1 and COP of 3.6. Water-to-air open loop units to have minimum EER of 21.1 and COP of 4.1. Water-to-water closed loop units to have a minimum EER of 16.1 and minimum heating performance COP of 3.1; water-to-water open loop units to have a minimum EER of 20.1 and a minimum heating performance COP of 3.5.

D303002 1.1.3 Ground-Coupled

Factory assembled, designed, tested, and rated in accordance with AHRI/ISO 13256-1 or AHRI/ISO 13256-2. Unit must be AHRI/ISO 13256-1 or AHRI/ISO 13256-2 certified, or listed in the AHRI/ISO 13256-1 or AHRI/ISO 13256-2 directory. Ground-coupled heat pumps must be connected to the heat exchanger by a closed loop ground source vertical well field. In compliance with FEMP/Energy Star requirements, water-to-air closed loop units to have a minimum EER of 17.1 and minimum heating performance COP of 3.6. Water-to-water closed loop units to have a minimum EER of 16.1 and minimum heating performance COP of 3.1. Design and install each well field in accordance with IGSHPA and ASHRAE Standards.

D303002 1.2 CONDENSING UNITS

Air-cooled, split system air conditioner with ducted air distribution. Provide units factory assembled, designed, tested, and rated in accordance with AHRI 210/240 or AHRI 340/360. Condensing units with capacities greater than or equal to 135,000 Btuh to meet the minimum efficiency requirements specified by ASHRAE 90.1-2013 Table 6.8.1-1 "Electrically Operated Unitary Air Conditioners and Condensing Units". Provide manufacturer's minimum recommended clearance around condensing units. Size refrigerant piping in accordance with the manufacturer's recommendations.

D303002 1.3 DX VARIABLE AIR VOLUME (VAV) UNITS

Direct expansion equipment to be specifically designed and manufactured for VAV applications. Central air handling units, VAV boxes/zone dampers and zone controls are to be provided by the same manufacturer.

D303002 1.3.1 Changeover-Bypass VAV Units

Provide the changeover-bypass VAV system with a constant-volume supply fan, and duct mounted zone control damper units with integral control boxes, designed for use with DX VAV packaged systems. A bypass duct and bypass damper diverts (bypasses) supply air not required by the zones back to the return duct by modulating the bypass damper to maintain the supply duct static pressure setpoint. Airflow through the evaporator coil must not be modulated.

D303002 1.3.2 Variable Air Volume Units

Provide the variable air volume (VAV) system with a variable speed supply fan, variable speed compressors, and pressure independent zone VAV boxes/units. The supply fan varies speed to modulate the supply airflow to maintain the supply duct static pressure setpoint, while the variable speed compressors modulate to maintain discharge air temperature setpoints as the airflow through the evaporator coil is modulated.

D303002 1.4 DUCTLESS SPLIT SYSTEM

Air-cooled, ductless split system. Provide units factory assembled, designed, tested, and rated in accordance with ARI 210/240. Provide manufacturer's minimum recommended clearance around heat pump or condensing units. Size refrigerant piping in accordance with the manufacturer's recommendations. Insulate refrigerant piping suction lines and condensate drain.

D303002 1.4.1 Light Commercial Air Conditioner, Three-Phase, Ductless Split Systems

In order to meet Energy Star requirements, ductless split system air conditioners smaller than 65,000 Btuh require a minimum SEER of 14 and EER of 12; ductless split system air conditioners that have an electric resistance heating section (or no heating) and are sized from 65,000 Btuh up to 240,000 Btuh to have an EER of 11.7 and an IEER of 11.8; all other air conditioners sized from 65,000 Btuh up to 240,000 Btuh to have an EER of 11.5 and IEER of 11.6.

D303002 1.4.2 Light Commercial Heat Pump, Three-Phase, Ductless Split Systems

In order to meet Energy Star requirements, ductless split system heat pumps smaller than 65,000 Btuh require a minimum SEER of 14, EER of 11, and HSPF of 8.2; ductless split system heat pumps that have an electric resistance heating section (or none) and are sized from 65,000 Btuh up to 135,000 Btuh to have an EER of 11.3, an IEER of 11.4, and a COP of 3.35 (rated at 47 deg F); ductless split system heat pumps that have an electric resistance heating section (or none) and are sized from 135,000 Btuh up to 240,000 Btuh to have an EER of 10.9, an IEER of 11, and a COP of 3.25 (rated at 47 deg F).

D303002 1.5 VARIABLE REFRIGERANT FLOW SYSTEMS

Provide a complete system consisting of VRF heat pump units, branch circuit controllers, VRF fan coil units, and associated controls. Provide inverter driven heat pump units that utilize R410A refrigerant. In order to meet Energy Star requirements, heat pumps smaller than 65,000 Btuh require a minimum SEER of 14, EER of 11, and HSPF of 8.2; heat pumps that have an electric resistance heating section (or none) and are sized from 65,000 Btuh up to 135,000 Btuh to have an EER of 11.3, an IEER of 11.4, and a COP of 3.35 (rated at 47 deg F); heat pumps that have an electric resistance heating section (or none) and are sized from 135,000 Btuh up to 240,000 Btuh to have an EER of 10.9, an IEER of 11, and a COP of 3.25 (rated at 47 deg F). On the branch circuit controllers, include multiple branch connections allowing for simultaneous heating and cooling utilizing hot gas refrigerant or sub-cooled liquid. The total capacity of the branch controllers must be between 50 and 150 percent of the rated capacity.

Size and install refrigerant piping in strict compliance with the manufacturer's requirements. Refrigerant piping must be clean, dry, and leak free. Prior to installation all refrigerant pipes must remain sealed. During installation and prior to filling, use nitrogen to maintain cleanliness and prevent oxidation and scaling while brazing. Install each system to provide proper oil return. Refrigerant piping must be copper, ACR type, ASTM B280. All joints must be sil-brazed. All thicknesses of piping must remain the same throughout the system. Individually pressure test and commission each refrigerant circuit. Perform pressure testing using nitrogen at 1-1/2 times the system operating pressure. Design each system to meet Refrigerant Piping and Heat Transfer Components ASME B31.9, Building Services Piping Code and design to allow for expansion and contraction.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

D304001 1.1 DUCTWORK

Except as specified herein, provide ductwork constructed, braced, reinforced, installed, supported, and sealed in accordance with SMACNA standards.

D304001 1.1.1 Flexible Ducts

Use insulated flexible duct only for connections to air distribution devices to adapt to minor offsets. Flexible duct must be UL 181 listed and in conformance with SMACNA 1966 duct construction standards with a minimum R value of 4. Limit flexible ductwork to maximum of 5 feet (1.5 meters) in length.

D304001 1.1.2 Flexible Connections

Provide flexible connectors between fans and ducts.

D304001 1.1.3 Volume Dampers

Provide manual volume dampers in each branch take-off from the main duct to control air quantity except for primary supply ductwork on VAV systems. Dampers must conform to SMACNA 1966 duct construction standards and must be seal class "A" construction.

D304001 1.1.4 Fire Dampers

Fire dampers must be rated in accordance with UL 555. Fire dampers must be dynamic type rated for closure against a moving airstream. Provide fire dampers that do not intrude into the air stream when in the open position.

D304001 1.1.5 Smoke Dampers

Smoke dampers must be rated in accordance with UL 555S.

D304001 1.1.6 Sound Attenuators

Fabricated attenuators that will reduce the rated sound pressure level of the fan down to at least 65 decibels in the 250 Hz (third octave band) center frequency by using a reference sound source calibrated in decibels of sound power at 10 to 12 watts. Maximum permissible pressure drop must not exceed 0.63 inch of water (157 Pa).

D304001 1.2 LOUVERS & HOODS

D304001 1.2.1 Louvers

Louvers must bear AMCA ratings seal for air performance and water penetration in accordance with AMCA 500L and AMCA 511. Louvers must be constructed of anodized aluminum alloy or stainless steel. Provide birdscreens.

D304001 1.2.2 Hoods

Hoods must be constructed of anodized aluminum alloy or stainless steel. Provide with birdscreens.

D304001 1.3 GRILLES, REGISTERS, & DIFFUSERS

Factory-finished grilles, registers, and diffusers. Exterior and exposed edges must be rolled, or otherwise stiffened and rounded.

D304001 1.4 INSULATION

Provide external thermal insulation for all ductwork. Insulate ductwork in concealed spaces with blanket flexible mineral fiber. Insulate ductwork in Mechanical Rooms and exposed locations with rigid mineral fiber insulation.

Provide insulation with factory applied all-purpose jacket with integral vapor retarder. In exposed locations, provide a jacket with white surface suitable for painting. Flame spread/smoke developed rating for all insulation must not exceed 25/50. Minimum insulation

thickness must be the minimum thickness required by ASHRAE 90.1. Insulate the backs of all supply air diffusers with blanket flexible mineral fiber insulation.

D304001 1.5 VAV BOXES

Pressure-independent type variable air volume units rated in accordance with AHRI 880. Boxes must not be allowed to fully shut-off. Provide each box with a heating coil unless not required by space reheat or heating. Provide electronic controls.

D304001 1.6 VARIABLE AIR VOLUME VAV FAN-POWERED UNITS

Pressure-independent, fan powered, VAV units rated in accordance with AHRI 880 and UL listed. Provide each box with a heating coil. Provide electronic controls with speed controller, discharge volume control damper(s), and return/recirculation air frame and filter. If discharge dampers are not provided with the unit, coordinate installation with the sheet metal contractor. Insulate in accordance with ASHRAE 90.1.

D304002 STEAM DISTRIBUTION SYSTEMS

D304002 1.1 STEAM PIPING

ASTM A 106/A 106M or ASTM A 53/A 53M Grade B, Schedule 40, black steel, electric-resistance welded or seamless.

D304002 1.2 CONDENSATE RETURN PIPING

ASTM A 106/A 106M or ASTM A 53/A 53M, Grade B, Schedule 80, black steel, electric-resistance welded or seamless.

D304002 1.3 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304002 1.4 INSULATION

Insulate steam and condensate return piping with mineral fiber or cellular glass insulation with all-purpose jacket.

D304002 1.5 STEAM PRESSURE REDUCING STATION

For each building, provide steam pressure reducing station(s).

D304002 1.6 STEAM TRAPS

Provide steam traps and accessories in accordance with UFC 3-401-01.

D304003 HOT WATER DISTRIBUTION SYSTEMS

D304003 1.1 HOT WATER PIPING

Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

D304003 1.2 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304003 1.3 COPPER FITTINGS

ASME B16.18 cast bronze solder joint type or ASME B16.22 wrought copper solder joint type.

D304003 1.4 ISOLATION VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building(s). Locate valves in valve boxes.

D304003 1.5 INSULATION

Insulate hot water piping with mineral fiber insulation with factory-applied all-purpose jacket. Provide aluminum metal wrap over insulation for all exterior piping.

D304003 1.6 VALVES

Provide shut off valves, appropriately sized relief valves, and appropriately sized balancing valves as necessary to balance water flows, protect components and isolate equipment for service and repairs.

D304003 1.7 APPURTENANCES

Provide appurtenances such as air separators, expansion tanks, suction diffusers, strainers, and other required features to allow for proper operation of hot water systems.

D304003 1.8 TEST PORTS

Provide test ports in piping at inlet and outlet of all major system components including boilers, pumps, and other equipment as required.

D304005 GLYCOL DISTRIBUTION SYSTEMS

Provide as specified for Chilled Water Distribution Systems see D304006.

D304006 CHILLED / CONDENSER WATER DISTRIBUTION SYSTEMS

D304006 1.1 ABOVEGROUND CHILLED AND CONDENSER WATER PIPING

Aboveground chilled water piping must be electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

D304006 1.2 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304006 1.3 COPPER FITTINGS

ASME B16.18 cast bronze solder joint type or ASME B16.22 wrought copper solder joint type.

D304006 1.4 ISOLATION VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building(s). Locate valves in valve boxes.

D304006 1.5 INSULATION

Insulate chilled water pumps and accessories for the temperature and service in rigid block, semi-rigid board, or flexible unicellular insulation to fit as closely as possible to equipment. Insulate above ground chilled water piping with cellular glass insulation (ASTM C 552, Type II, and Type III). Flexible unicellular insulation may be used on small piping runouts. Insulate condenser water piping with mineral fiber insulation. Provide all-purpose jacket with vapor retarder. Provide aluminum metal wrap over insulation for all exterior piping.

D304006 1.6 VALVES

Provide shut off valves, appropriately sized relief valves, and appropriately sized balancing valves as necessary to balance water flows, protect components and isolate equipment for service and repairs.

D304006 1.7 TEST PORTS

Provide test ports in piping at inlet and outlet of all major system components including chillers, pumps, and other equipment as required.

D304007 EXHAUST SYSTEMS

D304007 1.1 FANS

AMCA 210 certified, with AMCA seal. Fan bearings must have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets. Provide direct-drive type fans with means for verifying operation via the building DDC system or with speed controllers

D304007 1.2 IN-LINE FANS

UL-Listed centrifugal fans.

D304007 1.3 WALL FANS

Propeller fans with fan guards. Provide centrifugal fans with backdraft dampers and wall bracket.

D304007 1.4 ROOFTOP FANS

UL-Listed centrifugal fans with roof curb.

D304007 1.5 UTILITY SETS

AMCA 210 with AMCA seal.

D304007 1.6 BATHROOM FANS

UL 507 and UL-listed, Home Ventilating Institute (HVI) certified and with AMCA seal for ceiling installation.

D304007 1.7 RANGE HOODS

UL 507 and UL-listed, with AMCA seal, range hood with light over stove. Minimum fan capacity must be 160 cfm with maximum sound level of 5.6 sones.

D304008 AIR HANDLING UNITS

AMCA 210 certified fans with AMCA seal. Fan bearings must have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets.

D304008 1.1 CENTRAL STATION AIR HANDLERS

Modular construction, double wall air handling units with minimum of 1 inch (25 mm) casing insulation. Provide AHRI 430 certified fans and AHRI certified coils. Provide stainless steel, positive draining condensate drain pan. For 100 percent outside air units provide capability for cooling, heating, dehumidification and reheat.

D304008 1.1.1 Ultraviolet Disinfection System

For central station air handling units provide an ultra violet c-band (UVC) disinfection system for mold, bacteria and odor control in each air handler that has a chilled water or DX cooling coil. Irradiation-emitters and fixtures are to be installed in sufficient quantity and in such an arrangement so as to provide an equal distribution of UVC energy on the coil and in the drain pan. To maintain energy efficiency, the UVC energy produced must be of the lowest possible reflected and shadowed losses. Energy Efficiency - high efficiency electronic type power supplies matched to the emitter. Intensity - The minimal UVC energy striking the leading edge (if installed upstream) or

trailing edge (if installed downstream) of all the coil fins must not be less than 820 ÂµW/cm2 at the closest point and through placement, not less than 60 percent of that value at the farthest point. Equal amounts are to strike the drain pan, either directly or indirectly through reflection. The foregoing sets the placement and minimum quantity of fixtures to be installed. Installation - install emitters and fixtures at right angles to the conforming lines of the coil fins, such that through incident angle reflection, UVC energy bathes all surfaces of the coil and drain pan as well as all of the available line of sight airstream. Provide one complete set of spare bulbs.

D304008 1.1.2 Dedicated Outside Air System (DOAS)

Provide package or modular air handling unit specifically designed for conditioning 100% outside air. Provide controls and hardware necessary for controlling ventilation air to the point of use at a specific dry bulb temperature and relative humidity. Provide with supply and exhaust/return fan with heat recovery element if called for. Provide with DX or chilled water cooling/dehumidification coil. Provide with modulating hot refrigerant gas or hot water reheat coil.

D304090 OTHER DISTRIBUTION SYSTEMS

D304090 1.1 PUMPS

Centrifugal circulating pumps with motor, motor starter, and motor enclosure conforming to the appropriate NEMA standards. Provide suction diffusers on base-mounted pumps. Insulate pumps used for hot service and chilled water service.

D304090 1.1.1 In-Line Pumps

Pumps constructed of manufacturer's standard materials suitable for chilled, condenser, and hot water heating systems.

D304090 1.1.2 Base Mounted Pumps

Single stage end suction pumps suitable for chilled, condenser, and hot water heating systems.

D304090 1.2 VARIABLE FREQUENCY DRIVES (VFD)

Factory-assembled variable frequency drive control systems for variable speed control. Provide all air handling unit and pump VFD's from the same manufacturer. Each VFD must include motor starter, motor disconnects and controls as required for a complete system. Units must be UL-listed and comply with the National Electric Code.

Provide the following accessories:

Disconnect switch

Control circuit transformer, with primary and secondary fuses

Manual bypass

System hand-off-auto switch with provisions for remote start/stop of the system.

System initialized light

Run light

Failure alarm

LCD digital display with numeric keypad

Provide a control interface for remote monitoring of VFD functions and alarms from the DDC control system computer.

D304090 1.3 AIR SEPARATORS

ASME rated air separators with tangential inlet and outlet connections and automatic air vent.

D304090 1.4 SOLIDS SEPARATORS

Provide centrifugal solids separator with automatic drain in open systems.

D304090 1.5 EXPANSION TANKS

ASME rated expansion tanks with polypropylene or butyl diaphragm or compression tanks as indicated in UFC 3-401-01.

D304090 1.6 MAKE-UP WATER STATION

Provide station consisting of a water pressure-reducing valve and a relief valve in the make-up water line to the chilled and hot water systems to maintain the operating pressure. Provide a 3/4 inch (20 mm) globe valve by-pass around this pressure reducing station. Provide reduced pressure backflow preventer upstream of the by-pass.

D304090 1.7 GLYCOL MAKE-UP STATION

If required, provide a glycol makeup system to maintain system proper operating mixture.

D304090 1.8 CONDENSATE DRAIN PIPING

ASTM B 88, Type M or L, hard drawn copper.

D304090 1.9 CONDENSATE DRAIN INSULATION

Insulate condensate drain piping with flexible cellular insulation.

D304090 1.10 CHEMICAL TREATMENT

If required, Provide chilled and hot water systems with automatic chemical treatment system for the control of pH, scale formation, and corrosion inhibition. Provide shot-type feeders for manual chemical feed. Feeders must be rated for use with pressures up to 130 PSI (900 kPa) (gage). Provide condenser water systems with automatic chemical treatment systems that monitor conductivity, and pH, and provide for water metering and bleed-off. Provide chemicals in accordance with EPA and equipment manufacturer's recommendations.

D304090 1.11 PIPING IDENTIFICATION

Provide piping identification labels or Stencil names or code letters for piping systems in clearly visible letters and symbols. Provide arrow-shaped markings to indicate direction of flow.

D304090 1.12 PIPE SLEEVES

Provide pipe sleeves at each wall and floor penetration. The sleeve must be of a material suitable to protect the carrier pipe (two pipe sizes larger) and sealed with an appropriate flexible material. Provide fire stopping in fire rated walls in accordance with IBC.

D304090 1.13 SYSTEM FLUSHING

Thoroughly flush hydronic systems prior to system startup. Isolate coils during initial flushing until water is clear.

D304090 1.14 HEAT TAPE

UL-Listed, self-regulating, heat tape on piping subject to freezing.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

See D302004 for gas fired unit heaters.

D305002 1.1 STEAM

UL-Listed, factory assembled, unit heaters.

D305002 1.2 HOT WATER

UL-Listed, factory assembled, unit heaters.

D305002 1.3 CABINET UNIT HEATER

UL-Listed, factory assembled, heaters.

D305003 FAN COIL UNITS

UL-Listed, factory assembled and tested fan coils, AHRI 440 and AHRI certified.

D305004 FIN TUBE RADIATION

D305004 1.1 FIN TUBE RADIATORS AND CONVECTORS

Provide fin tube radiators and convectors with copper tubes and aluminum fins. Provide normally open, spring return control valves.

D305005 ELECTRIC HEATING

D305005 1.1 UNIT HEATERS

Factory assembled, UL-1025, unit heaters.

D305005 1.2 BASEBOARD HEATERS

Factory assembled, UL-1042, heaters.

D305005 1.3 WALL HEATERS

Factory assembled, UL-1025, cabinet heaters.

D305005 1.4 INFRARED HEATERS

Factory assembled, UL-Listed and labeled heaters.

D305006 PACKAGE UNITS

D305006 1.1 ROOFTOP AIR HANDLERS

Factory packaged units in accordance with AHRI 430 and suitable for outdoor installation. Provide with manufacturer's roof curb.

D305006 1.2 DUCT HEATER

Factory assembled, UL-listed heaters. Provide control cabinet and heating coil.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROLS

Provide one of the following as directed in ESR Section D30.

a. Provide Direct Digital Controls (DDC) to comply with the requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC; 09 23.02, BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems* and 23 09 13, *Instrumentation and Control Devices for HVAC*.
b. Provide a partial direct digital control (DDC) system that will communicate with the existing DDC system. If using BACnet protocol, comply with the requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC; 09 23.02, BACnet*

Direct Digital Control Systems for HVAC and Other Building Control Systems and 23 09 13, *Instrumentation and Control Devices for HVAC.* Notwithstanding any other provisions of this Contract, no other product will be acceptable other than that indicated in ESR Section D30. Provide a distributed control system. Integrate all new DDC points on the existing server providing a seamless logical flow from the existing facilities to the new integrated facility.

c. Provide and integrate Direct Digital Controls (DDC) in accordance with Part 3 Chapter 6 D306001 1.1 DIRECT DIGITAL CONTROLS in compliance with requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC; 09 23.02, BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems; 09 13, Instrumentation and Control Devices for HVAC* and UFGS 25 10 10, *Utility Monitoring and Control System (UMCS) Front End and Integration.*

The Designer of Record must use UFGS Sections 23 09 00, 23 09 23.02 and 23 09 13 if using BACnet protocol, and submit the edited specification sections as a part of the project design submittal.

Design requirements must be in accordance with all specification notes and the BAS Owner must be identified and designated early in the design documentation.

System must include stand alone digital controllers, a communication network, and a workstation computer with control software. Provide stand-alone control routines that operate without connection to the network during a loss of communication. Provide trending, scheduling and alarm tables (may be included with the sequence of operation). Provide reset routines (based on outdoor air temperature or zone demand) for hot water loop temperature setpoints and supply air static pressure control. Use alarming and trending services during performance testing or commissioning. Alarm every sequence routine when out-of-limits or control/response failure occurs. Display all graphic floor plans, equipment graphics, DDC ladder diagrams, and sequence of operations graphic pages.

All 120-volt wiring must comply with NFPA 70. All 24-volt wiring must comply with the IMC and terminal device manufacturer’s recommendations.

Provide training on the installed system according to the maximum training days in UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13. Demonstrate all operator workstation functions requiring BACnet services, i.e., navigating through the graphic displays, trending, alarming and monitoring of the new controls system from the existing operator workstation using only the existing application software and without the need to launch other applications or logon to other vendor applications.

D306001 1.2 ELECTRONIC CONTROLS

If required, provide programmable thermostats with built in keypads for scheduling of day and night temperatures with two setback periods per day. Provide independent summer and winter programs. Thermostats must

have temporary and manual override of schedule and battery backup.

D3070 SYSTEMS TESTING AND BALANCING

D3070 1.1 HVAC SYSTEM

Provide HVAC systems testing and balancing that complies with the requirements specified in UFGS Specification Section 23 05 93, *Testing, Adjusting, and Balancing for HVAC*. The Designer of Record must prepare UFGS Specification Section 23 05 93, as a part of the project specification and include the prepared specification section in the design submittal for the project.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

D309001 1.1 SEISMIC DESIGN

Provide in accordance with UFC 3-401-01, *Mechanical Engineering*.

D309002 REFRIGERATION SYSTEMS

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

D309090 1.1 ENERGY RECOVERY WHEELS

Total energy (enthalpy) type energy recovery wheels (heat wheels). Media must be aluminum or a lightweight polymer coated with a corrosion-resistant finish. Etched or oxidized surfaces are not acceptable. Heat transfer surfaces must be coated with a non-migrating (permanently bonded) absorbent specifically developed for the selective transfer of water vapor. Equal sensible and latent recovery efficiencies must be documented through a certification program conducted in accordance with ASHRAE 84 and AHRI 1060. The energy recovery wheel must have an insulated housing of double wall construction, rotor seals that are specifically designed to limit cross-contamination, and a rotation detector. Should rotation stop, the rotation detector must alarm the HVAC control system. Filter sections must be readily accessible for maintenance.

D309090 1.2 HEAT PIPES

Factory fabricated, assembled and tested heat pipes with counter-flow arrangement. Provide hermitically sealed, seamless aluminum tube cores with extended surfaces. Heat exchanger frame must be constructed of not less than 16-gage galvanized steel and fitted with intermediate tube supports, and flange connections. Provide tube end covers and a partition of galvanized steel to separate exhaust and supply air streams without cross-contamination. A refrigerant must be used as the working fluid. Type I refrigerants are not allowed.

-- End of Section --

SECTION D40

FIRE PROTECTION
12/18

D40 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D40 1.1 DESIGN GUIDANCE

Provide the design and installation of fire protection systems in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification.*

D40 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC:
UFC 3-600-01	Fire Protection Engineering for Facilities
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 4-010-06	Cybersecurity of Facility Related Control Systems

D40 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Items found not to be

in compliance must be removed, or corrective measures taken, to assure compliance with the referenced standard.

Submit Qualifications, Training Plans, and Test Plans and Procedures indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

D40 1.2.1 Qualified Workers

D40 1.2.1.1 Fire Protection Designer of Record

Services and qualifications of the FPDOR must be as specified in UFC 3-600-01 and UFC 3-600-10N. The FPDOR must review and approve all fire protection engineering submittals.

D40 1.2.1.2 Fire Protection Engineering Technicians

Workers required herein to be certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician in the Fire Protection Engineering Technology program must be thoroughly trained and experienced, and completely familiar with the specified requirements and the methods needed for proper performance of the work in this section. All documentation required to be submitted for record and/or approval must include the NICET engineering technician's signature, along with the technician's current NICET certification number, certification subfield, and level.

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician as specified in Section 6 D40 of Part 3.

D40 1.2.1.3 Qualified System Installers

Fire Suppression System and Fire Alarm System installers must be regularly engaged in the installation of the type and complexity of system specified in the Contract documents, and have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

Installers of Chlorinated Poly Vinyl Chloride (CPVC) sprinkler systems must be certified by the manufacturer and maintain a copy of their certification on hand at all times.

D40 1.2.1.4 Fire Protection QC Specialist

The Fire Protection (FP) QC Specialist must be a U.S.

Registered Fire Protection Engineer (FPE) and be an integral part of the Prime Contractor's Quality Control Organization. This FPE cannot have any business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this project. The Fire Protection Designer of Record (FPDOR) may serve as the FPQC Specialist provided the following qualifications are met.

a. Qualifications/Experience: The FPQC Specialist must have obtained their professional registration by successfully completing the Fire Protection Engineering discipline examination. This FPE shall have a minimum of 5 years full time and exclusive experience in every aspect of facility design and construction as it relates to fire protection, which includes, but is not limited to, building code analysis, life safety code analysis, design of automatic detection and suppression systems, passive fire protection design, water supply analysis, and a multi-discipline coordination reviews, and construction surveillance.
b. Area of Responsibility: The FPQC Specialist is responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The FPQC Specialist is responsible for assuring that life safety and fire protection features are provided in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression and standpipe systems, and emergency and exit lighting fixtures.
c. Construction Surveillance: The FPQC Specialist must visit the construction site as necessary to ensure life safety and fire protection systems are being constructed, applied, and installed in accordance with the approved design documents, approved construction submittals, and manufacturer's requirements. Frequency and duration of the field visits are dependent upon particular system components, system complexity, and phase of construction. At a minimum, field visits must occur just prior to installation of suspended ceiling system to inspect the integrity of passive fire protection features and fire suppression system piping, preliminary inspections of fire alarm/detection and suppression systems, and final acceptance testing of fire alarm/detection and

suppression systems. The FPQC Specialist must prepare a written report detailing compliance of any outstanding submittal review comments, summarizing the results of all tests, detailing all discrepancies discovered, corrective action taken, all forms as required by the respective NFPA codes, and recommendations/certifications for acceptance. Forward one copy of the report with attachments to the Naval Facilities Engineering Command Fire Protection Engineer.

D40 1.2.2 Performance Verification Testing

Operational tests are required on all systems to demonstrate compliance with contract requirements and respective NFPA codes, International Building Code and as noted below. Test procedures must be in full compliance with the respective NFPA codes, the equipment manufacturer recommendations, and UFC 3-600-10N. Provide all personnel, equipment, and materials for tests. Return trips to witness repeat acceptance tests due to failure of previous tests will be at the Contractor’s expense.

D40 1.2.2.1 Preliminary Inspections and Final Acceptance Testing

The FPQC Specialist must personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPQC Specialist must submit a signed certificate to the QC Manager that systems are ready for final inspection and testing. The Naval Facilities Engineering Command Fire Protection Engineer will witness formal tests and approve all systems before they are accepted. The QC Manager must submit the request for formal inspection at least 15 days prior to the date the inspection is to take place. The QC Manager must provide 10 days advance notice to the Contracting Officer and the activity Fire Inspection Office of scheduled final inspections.

D40 1.2.2.2 Final Life Safety/Fire Protection Certification

The FPQC Specialist must provide certification that all life safety and fire protection systems have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification is to summarize all life safety and fire protection features, and must bear the professional seal of the FPQC Specialist.

D40 1.2.2.3 System Manufacturers Representatives

The systems manufacturer technical representative must be present for the final inspection and test for the following systems: fire alarm and detection, fire pump, carbon

dioxide, foam generating and clean agent extinguishing.

D40 1.2.2.4 Fire Suppression Water Supply and Equipment

Inspect fire hydrants prior to backfilling the trench surrounding the fire hydrants. Provide a report, including pictures, to the Contracting Officer.

Conduct fire pump tests in the presence of the pump, controller, and engine manufacturer technical representatives. The fire pump manufacturer's representative must also be present for the preliminary test of the fire pump system.

D40 1.2.2.5 Kitchen Hood Fire Extinguishing Systems

The kitchen hood fire extinguishing system must contain water for the actual performance testing. The nozzles may be bagged in order to minimize damage from water spray.

D40 1.2.2.6 Spray-Applied Fire Proofing and Fire Stopping

See Section C1030 for requirements.

D40 1.2.3 Training

Provide training for the active systems within 6 weeks of final acceptance of the systems. Schedule the training at least 2 weeks in advance.

D40 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures* and UFC 3-600-10N, *Fire Protection Engineering*.

D40 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

All fire protection engineering submittals including:

a. Shop Drawings. Provide shop drawings for all systems.
b. Product Data. Provide product data for all equipment.
c. Design Data. Provide design data for all system calculations.
d. Test Reports
e. Certificates

D4010 FIRE ALARM AND DETECTION SYSTEMS

D401001 FIRE ALARM DISTRIBUTION

D401001 1.1 REMOTE ANNUNCIATORS

Remote annunciators must have a minimum 80 character alphanumeric display with alarm acknowledge, alarm silence, and reset functions.

D401001 1.2 TRANSMITTED SIGNALS

Provide the following signals to be sent to the fire alarm receiving station:

a. Sprinkler Water Flow
b. Smoke Detector
c. Manual Pull Station
d. Supervisory (i.e., valve tamper switch, fire pump loss of power, fire pump phase reversal)
e. Duct Smoke Detector
f. Fire Pump Running
g. Sleeping Room Smoke Detector

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT

The design point of connection to the existing water supply requires the approval of the Contracting Officer. The FP DOR must conduct additional flow tests after contract award prior to any design submissions. Conduct tests under the supervision of the Contracting Officer.

D4040 SPRINKLERS

D404001 SPRINKLERS & RELEASING DEVICES

D404001 1.1 DESCRIPTION

Provide a dry pipe system for areas subject to freezing. Loading docks may be protected with dry-type sidewall sprinklers supplied by the wet-pipe system.

D404001 1.2 REQUIREMENTS

Utilize upright sprinklers with ordinary temperature rating and color to match finish in normally occupied rooms without a finished ceiling (i.e., laboratories, and other spaces with exposed ceilings).

D4090 OTHER FIRE PROTECTION SYSTEMS

D409001 CARBON DIOXIDE SYSTEMS

Supply system must include storage cylinders, racks, manifolds, beam scales, and associated equipment. Arrange the primary cylinders for automatic discharge upon activation of the main control, and the secondary cylinders for discharge both manually and upon no discharge from the primary cylinders.

D409002 FOAM GENERATING EQUIPMENT

D409002 1.1 SYSTEM CRITERIA

Foam fire protection systems must incorporate the necessary elements for foam storage, pumping, piping, proportioning, delivery, and detection, activation and alarm systems.

D409002 1.2 SYSTEM OPERATION

Once activated, foam system(s) must operate until shut down manually. Provide separate circuits from the releasing control panel to each zone of initiating devices. Transmission of signals from more than one zone over a common circuit is prohibited.

D409002 1.3 AFFF CONCENTRATE PUMPS

The foam concentrate pump must be positive displacement, electric motor driven, drip proof, 240/480 volts, 60 Hz AC. System operation must be fully automatic, with manual over-ride and manual shutdown.

D409002 1.4 FOAM CONCENTRATE STORAGE TANK

Provide a gage or unbreakable sight glass to permit visual determination of level of tank contents, unless liquid level is clearly visible through shell of tank.

D409002 1.5 LOW-LEVEL LOW-EXPANSION FOAM SYSTEM

D409002 1.5.1 Discharge Devices

Where used the low-level AFFF nozzle system must utilize the Viking Grate Nozzle TM, Model GN 200 (or equivalent that is acceptable to the NAVFAC Chief Fire Protection Engineer for this use).

D409002 1.5.2 Test Header

Where used a foam system test header connection with integral gate valves must be located at each foam system riser. Install sufficient 2-1/2 inch (65 mm) male National Standard hose threads, with cap and chain, to allow testing of the riser at the design flow rate. Provide a wall escutcheon plate with "FOAM TEST HEADER" in raised letters cast in plate.

D409002 1.6 AUTOMATIC WATER CONTROL VALVE ASSEMBLY (DELUGE VALVE)

Where used, the water control valve must be an electrically actuated type. Valve must be resettable without opening the valve. Solenoid valve to be of the normally closed, de-energized type, which opens when energized upon receipt of an electrical signal from the releasing control panel to which it is connected. Solenoid valves used with diaphragm-type valves must be rated for a maximum pressure differential of 175 psi (1207 kPa). Water control valves used for low-level foam systems shall be capable of recycling to the closed position at an adjustable speed. Valves located in hazardous locations must be

approved for the hazard classification of the area where located.

D409002 1.7 FOAM SYSTEM RELEASING CONTROL SYSTEM

D409002 1.7.1 Manual Releasing Stations

Where used the units must be dual-action type located inside a clear plastic tamper cover that requires lifting prior to actuating the station. Any lettering on the cover must be "FOAM"; the words "fire" or "fire alarm" are not allowed on the cover. The station must not require the breaking of glass to actuate. Operating instructions are to be clearly marked on the station cover. Unit must be compatible with the control panel to which it is connected. Operation of a station must result in immediate release of the foam system for that space.

D409002 1.7.2 Flame Detectors

Where used flame detectors must operate on the infrared (IR) principle. Detector must employ three IR sensors to provide multi-spectrum detection. Each detector to have a manufacturer's swivel mounting bracket. Locate a permanent engraved rigid plastic or metal label at each detector with detector aiming information (degrees horizontal and vertical) for the corresponding detector.

D409002 1.7.3 Abort Switch

Where used a foam release abort switch must be installed adjacent to each manual releasing station and at the releasing panel and be properly labeled (Minimum 1Â½ inch high lettering stating: "CONTINUOUS OPERATION OF SWITCH WILL ABORT FOAM FLOW UNTIL SYSTEM IS RESET". Switch must be deadman type which when depressed ceases flow of foam solution (both water and foam concentrate). Upon release of the switch, the system must return to its previous operational state. Switch and wiring must be supervised.

D409003 CLEAN AGENT SYSTEMS

D409003 1.1 SYSTEM INSTALLATION

The system must be supplied and installed by a factory-authorized distributor. The distributor must be trained by the manufacturer to design, install, test, and maintain the system and be able to provide proof of training upon request.

D409003 1.2 RELEASING CONTROL SYSTEM

Where provided manual release stations must be dual-action type located inside a clear plastic tamper cover that requires lifting prior to actuating the station. The words "fire" or "fire alarm" are not allowed on the cover. The station must not require the breaking of glass to actuate. Operating instructions are to be clearly marked on the station cover. Unit must be compatible with the control panel to which it is connected. Operation of a station must result in immediate release of

the clean agent system for that space.

D409004 HOOD & DUCT FIRE PROTECTION

Exhaust hoods with grease extractors listed by UL or FM are not required to have protection downstream of the grease extractor.

-- End Of Section --

SECTION D50

ELECTRICAL
12/18

D50 GENERAL

RFP Part 3, including the Engineering System Requirements (ESR) provides project specific requirements. The RFP Part 4, Performance Technical Specifications (PTS), provides generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

D50 1.1 NARRATIVE

This section covers installations inside the facility and out to the five-foot line. See PTS Section G40, *Site Electrical*, for continuation of systems beyond the five-foot line.

D50 1.2 ELECTRICAL DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

When all product Quality Control information is included in the Unified Facility Criteria (UFC) and there are requirement options identified in the ESR, then the Uniformat Level 4 titles (and possible subtitles) are included without additional verbiage. One example of this is D501090, OTHER SERVICE AND DISTRIBUTION.

D50 1.2.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-501-01, Electrical Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-580-10	Navy and Marine Corps Intranet

	(NMCI) Standard Construction Practices
UFC 4-010-06	Cybersecurity of Facility Related Control Systems

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 25 05 11	Cybersecurity of Facility Related Control Systems
UFGS 26 08 00	Apparatus Inspection and Testing
UFGS 26 20 00	Interior Distribution System
UFGS 26 23 00	Low-Voltage Switchgear
UFGS 26 24 13	Switchboards
UFGS 26 29 23	Variable Frequency Drive Systems Under 600 Volts
UFGS 26 32 13.00 20	Single Operation Generator Sets
UFGS 26 33 53.00 20	Uninterruptible Power Supply (UPS)
UFGS 26 35 43	400-Hertz (Hz) Solid State Frequency Converters
UFGS 26 36 23.00 20	Automatic Transfer Switches
UFGS 26 41 00	Lightning Protection System
UFGS 26 51 00	Interior Lighting
UFGS 27 10 00	Building Telecommunications Cabling Systems
UFGS 28 20 00.00 20	Electronic Security System (ESS), Commercial

D50 1.3 QUALITY ASSURANCE

Submit Qualifications, Certifications, and Test Plans indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

The Designer of Record is responsible for approving the submittals listed below.

D50 1.3.1 Qualified Testing Organization

Engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization must be independent of the supplier, manufacturer, and installer of the equipment. The organization must be a first-tier subcontractor.

Submit name and qualifications of organization. Organization must have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization must have a calibration program, and test instruments used must be calibrated in accordance with NETA ATS.

Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments must be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

D50 1.3.2 NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers are allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

D50 1.3.3 Qualified PV Installer

Installation of photovoltaic (PV) systems must be performed by experienced and trained installers. At minimum the PV installation supervisor must hold a "PV Installer Certification" as issued by the North American Board of Certified Energy Practitioners (NABCEP) and hold a Certified Solar Roofing Professional (CSRP) credential issued by RISE "Roof Integrated Solar Energy Inc".

D50 1.3.4 Qualified Telecommunications Worker

All installers assigned to the installation of telecommunications systems or any of its components must be Building Industry Consulting Services International (BICSI) Registered Cabling Installation Technicians or have a minimum of 3 years’ experience in the installation of the specified copper and fiber optic cable and components. Include names and locations of two projects successfully completed using optical fiber and copper communications cabling systems. Include written certification from users that systems have performed satisfactorily for not less than 18 months. Include specific experience in installing

and testing structured telecommunications distribution systems using optical fiber and Category 5e cabling systems.

D50 1.3.5 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

D50 1.3.5.1 Warning Labels

Provide arc flash warning labels in accordance with UFC 3-560-01, *Electrical Safety, O & M*.

D50 1.3.5.2 Field-Required Nameplates

Provide laminated plastic nameplates for each switchboard, switchgear, panelboard, equipment enclosure, motor controller, relay, and switch. Each nameplate must identify the function and, when applicable, the position. Provide melamine plastic nameplates, 0.125 inch (3 mm) thick, white with black center core. Surface to be matte finish with square corners. Accurately align lettering and engrave into the core. Minimum size of nameplates is 1-inch by 2-1/2 inches (25 mm by 65 mm). Minimum size of lettering is 0.25 inch (6.35 mm) high normal block style.

D50 1.3.6 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer must have a calibration program that assures that all test instruments are maintained within rated accuracy.

D50 1.3.7 Electrical System Startup and Testing

Submit test plans for approval. Tailor test plans to the systems provided.

As part of the test plan, list make and model and provide functional description of the test instruments and accessories and describe the setup of the tests to be conducted. Test instruments must be capable of measuring and recording or displaying test data at a higher resolution and greater accuracy than specified for the equipment's performance.

D50 1.3.7.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

D50 1.3.7.2 Performance Verification Testing

Perform in-service demonstration that all circuits and devices are in operating condition. Tests must confirm that each item of control equipment will function not less than

five times. Provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, test all systems in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. Assure that all test instruments are maintained within rated accuracy. Dated calibration labels are to be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations and that conforms to NETA ATS for each piece of Electrical Distribution Equipment and System requiring Performance Verification Testing.

The following items identify specific test requirements. Additional test requirements are contained in the applicable UFGS.

a. Panelboards - Field test each GFI and AFI circuit breaker with a UL 1436-certified outlet circuit tester to verify correct operation.
b. Motor controllers – Test motor controllers in accordance with NETA ATS.
c. Surge Protective Devices (SPD) -

   1) Inspect for physical damage and compare nameplate data with the drawings and specifications, if applicable. Verify from the nameplate data that the SPD equipment is appropriate for the system voltage.

   2) Verify lead length between the SPD equipment and the circuit connection is less than one foot.

   3) Verify wiring between the SPD equipment and the circuit connection does not include high-inductance coils or sharp bends.

   4) Confirm circuit breaker used for SPD circuit connection is sized in accordance with SPD manufacturer's requirements.

   5) Ensure SPD equipment is grounded in accordance with SPD manufacturer's requirements. Check the ground lead on each device for individual attachment to the ground bus or electrode.

   6) Check tightness of connections in accordance with NETA ATS.

   7) For SPD equipment with visual indications of proper operation, verify that it displays normal operating characteristics.
d. Busway – Conduct standard tests for busway in accordance with NETA ATS.

e. Receptacles – Test GFI receptacles with a UL 1436-certified outlet circuit tester to verify correct operation.
f. Lighting - Aim photocell switches and locate light level sensors in accordance with the manufacturer's recommendations. Verify that equipment operates in accordance with user's requirements and in accordance with manufacturer’s recommendations. Fluorescent lamps on electronic dimming ballast control must be burned in at full light output for 100 hours before dimming.
g. Telecommunication - Test telecommunications systems in accordance with applicable EIA/TIA requirements.
h. Public address and intercommunications systems - Tests must include originating and accepting messages at each station, at proper volume levels, without cross-talk or noise from other links or non-designated units. Utilize the phonetically balanced monosyllabic work intelligibility test in accordance with ANSI S3.2 (ASA 85). In order to be acceptable, a score of at least 75 percent must be obtained for each system test.
i. Community Antenna Television Systems - Confirm design and installation is in compliance with NCTA-02, 47 CFR 76.605 and in accordance with FCC proof of performance requirements. Test plan must ensure that the system meets technical, operational, and performance specifications. Test plan is to include testing for signal leakage.
j. Electronic security systems (ESS) – Test ESS in accordance with UFGS requirements.
k. Grounding systems – Test the grounding system in accordance with NETA ATS.
l. Lightning protection - Upon completion of the installation, furnish the UL Lightning Protection Inspection Certificate certified to NFPA 780 for the system.
m. Emergency lighting - Test emergency lighting that is intended for means of egress in accordance with NFPA 101, Section 5-9. Confirm the emergency lighting system operates for a minimum of 90 minutes and emergency illumination satisfies NFPA 101, Section 5-9, specified levels.
n. Photovoltaic Energy System - Provide test plan that meets the requirements of IEC 62446. Test plan must include expected performance values. Compare system performance to expected performance and include at a minimum solar irradiance, DC energy, AC energy, ambient air temperature and PV cell temperature. Measure and report system performance for at least one full day. If the performance monitoring of the installed array indicates the array is not meeting its required performance predictions it must be corrected at the Contractor's expense. Following correction, performance monitoring must again be

performed until the array meets required performance predictions. Measurements made under actual installation and temperature must be normalized to Standard Test Conditions (STC).

1) Verify that non-current carrying metal parts are grounded.

2) Verify that all components are labeled.

3) Verify mounting supports are installed properly and all fasteners are installed correctly and torqued to manufacturer's instructions.

4) Test open circuit voltage of each string in full sunlight.

5) Submit startup and testing report.

D50 1.3.7.3 Acceptance Tests and Inspections

The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.

The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Test methods, procedures, and test values must be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in NETA ATS are not required unless otherwise specified. Place equipment in service only after completion of required tests and evaluations of the test results have been completed. Contractor must supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Perform acceptance tests and inspections on Diesel-Electric Generators, Uninterruptible Power Supply (UPS) Systems, 400-Hertz Motor Generator Sets, 400-Hertz Solid State Frequency Converters, Automatic Transfer Switches, and Switchboards and Switchgear.

D50 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-501-01, *Electrical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

UFGS 26 08 00, *Apparatus Inspection and Testing*

UFGS 26 20 00, *Interior Distribution System*

UFGS 26 23 00, *Low-Voltage Switchgear*

UFGS 26 24 13, *Switchboards*

UFGS 26 29 23, *Variable Frequency Drives System Under 600 Volts*

UFGS 26 31 00, *Solar Photovoltaic (PV) Components*

UFGS 26 32 13.00 20, *Single Operation Generator Sets*

UFGS 26 33 53.00 20, *Uninterruptible Power Supply (UPS)*

UFGS 26 35 43, 400-*Hertz (Hz) Solid State Frequency Converters*

UFGS 26 36 23.00 20, *Automatic Transfer Switches*

UFGS 26 41 00, *Lightning Protection System*

UFGS 26 51 00, *Interior Lighting*

UFGS 27 10 00, *Building Telecommunications Cabling Systems*

UFGS 28 20 00.00 20, *Electronic Security System (ESS), Commercial*

D50 1.4.1 Sustainable Design Submittal

Submit sustainable design submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*.

D50 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the PTS Section Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Electrical Equipment, OMSI information for equipment, and Quality Assurance Submittals listed above.

Provide certification that all adjustable protective device settings have been set in accordance with the coordination study for the as-built equipment and configuration.

D50 1.5.1 Sustainable Construction Submittal

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

Provide pad mounted distribution transformers in accordance with PTS Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

When a switchboard is required, the Designer of Record must utilize UFGS Section 26 24 13 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

When low voltage switchgear is required, the Designer of Record must utilize UFGS Section 26 23 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

When digital metering is required for connection to the Direct Digital Controls (DDC) system, the Designer of Record must utilize UFGS Section 26 24 13 to specify the digital metering requirements and submit the edited specification section as a part of the design submittal for the project.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

D501004 PANELBOARDS

Provide panelboards that comply with UL 67 and UL 50. UL 869A applies if used as service entrance equipment. Panelboards for non-linear loads must be UL listed, including heat rise tested, in accordance with UL 67, except with the neutral assembly installed and carrying 200 percent of the phase bus current during testing.

Provide molded case circuit breakers in accordance with UL 489. Ground fault circuit interrupting circuit breakers must comply with UL 943. Arc fault circuit breakers must comply with UL 489 and UL 1699.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case circuit breakers in accordance with UL 489. UL 869A applies if used as service entrance equipment. Provide with solid neutral when grounded conductor is present.

D501006 MOTOR CONTROLLERS

Provide motor controllers that comply with UL 508 and NEMA ICS 2. Provide

disconnecting means capable of being locked out for machines and other equipment to prevent unexpected startup or release of stored energy in accordance with 29 CFR 1910.147.

D501006 1.1 VARIABLE FREQUENCY DRIVES (VFD)

When Variable Frequency Drives are required, the Designer of Record must utilize UFGS Section 26 29 23 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

D501090 OTHER SERVICE AND DISTRIBUTION

D501090 1.1 SURGE PROTECTIVE DEVICE (SPD)

D501090 1.2 BUSWAY

Provide busway that complies with NEMA BU 1 and UL 857.

D5020 LIGHTING AND BRANCH WIRING

D502001 BRANCH WIRING

Provide wiring and connections for special outlets where required.

All homerun circuits must contain no more than 3 phase conductors.

Provide switches that comply with NEMA WD-1 and UL 20.

D502002 LIGHTING EQUIPMENT

Install in accordance with manufacturer's recommendations and the additional requirements for "Severe Seismic Disturbance" contained in ASTM E 580. Fixture support wires must conform with ASTM A 641/A 641M, galvanized regular coating, soft temper.

D502002 1.1 BALLASTS

Electronic ballasts must include a 5-year warranty.

D503001 TELECOMMUNICATIONS SYSTEMS

When a Telecommunications system is required, the Designer of Record must utilize UFGS Section 28 10 00.00, Building Telecommunications Cabling Systems for the project specification and submit the edited specification section as a part of the design submittal for the project.

D503002 PUBLIC ADDRESS SYSTEMS

D503004 TELEVISION SYSTEMS

D503004 1.2 COMMUNITY ANTENNA SYSTEM (CATV)

When a CATV system is required, the Designer of Record must utilize UFGS Section 28 10 00.00, Building Telecommunications Cabling Systems for the project specification and submit the edited specification section as a part of the design submittal for the project.

D503005 SECURITY SYSTEMS

D503005 1.1 ELECTRONIC SECTURITY SYSTEMS (ESS)

When an ESS system is required, the Designer of Record must utilize UFGS Section 28 20 00.00 20, *Electronic Security System (ESS), Commercial*, for the project specification and submit the edited specification section as a part of the design submittal for the project.

D503005 1.2 PROTECTED DISTRIBUTION SYSTEMS (PDS)

Provide Protected Distribution Systems in accordance with UFC 3-580-10 and IA PUB-5239-22, Information Assurance Protected Distribution System (PDS) Guide Book.

.

D503006 INDUSTRIAL CONTROL SYSTEMS (ICS)

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

D509002 EMERGENCY LIGHTING AND POWER

D509002 1.1 EMERGENCY LIGHTING

D509002 1.2 EMERGENCY GENERATORS

When an emergency generator is required, the Designer of Record must utilize UFGS Section 26 32 13.00 20 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

D509002 1.3 AUTOMATIC TRANSFER AND BYPASS/ISOLATION SWITCHES

When an Automatic Transfer Switch is required, the Designer of Record must utilize UFGS Section 26 36 23.00 20 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

D509002 1.4 UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEM

When a UPS system is required, the Designer of Record must utilize UFGS Section 26 33 53.00 20 and submit the edited specification section as a part of the design submittal for the project.

D509003 GROUNDING SYSTEMS

D509004 LIGHTNING PROTECTION

When a lightning protection system is required the designer of record must utilize UFGS section 26 41 00 and submit the edited specification section as a part of the design submittal for the project.

D509005 ELECTRIC HEATING

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

D509007 PHOTOVOLTAIC ENERGY SYSTEM

When a photovoltaic system is required, provide a grid tied photovoltaic energy system including roof mounted crystalline photovoltaic panels, combiner boxes, inverters, and support system. The Designer of Record must utilize UFGS Section 26 31 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

D509007 1.1 CODES AND STANDARDS

The PV system hardware and services must meet or exceed all applicable local, State and utility requirements, conform to the applicable codes and standards, and have passed the listing and qualification tests, listed below. (Comply with the most recent version of each document).

a. IEEE 1262 "Recommended Practice for Qualification of Photovoltaic Modules".
b. PowerMark certification for PV modules.
c. IEEE Standard 928-1986, Recommended Criteria for Terrestrial Photovoltaic Power Systems (PV system performance criteria).
d. IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems.
e. Underwriters Laboratories 1741 (UL Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources).
f. Underwriters Laboratories 1703 (UL Standard for Listing Photovoltaic Modules).
g. Certification of PV Equipment: All PV modules, inverters, and electrical components must be listed or recognized by an appropriate and recognized United States Safety Laboratory (for example: UL or ETL).

D509007 1.2 PHOTOVOLTAIC ROOFTOP APPLICATION ANALYSIS

Provide a comprehensive "Photovoltaic Application Analysis" with a detailed description of system, application, site shading conditions

and expected kW output of the rooftop photovoltaic applications. Utilize the Solmetric Suneye or the Solar Pathfinder shading analyzers to analyze the effects of the existing site shading conditions. Analysis must include estimated PV output in kWh per year. Coordinate rooftop application analysis with other equipment that is required to be placed on the roof to determine space available and proper solar orientation for photovoltaic equipment.

D509007 1.3 TECHNICAL REQUIREMENTS

The Contractor work responsibilities include at a minimum: system design, equipment selection, and PV system installations. System must be individually capable of providing peak power output of at least proposed PV system size, 208 or 480 volt, 3-phase, 4-wire power.

Configure system to allow automatic operation without operator intervention. Design system and specify equipment to minimize maintenance requirements. System must include metering incorporated with current AMI network (Advanced Metering Infrastructure) and planned energy metering projects.

Locate the inverter(s) disconnects and associated electrical equipment in an area that is accessible, weather-protected, and secure from vandalism and personal injury.

Mount disconnects and over current devices in approved boxes, enclosures, or panel boards. Disconnects and switches must be DC rated when used in DC applications. Bond metal enclosures and boxes to the grounding conductor.

At a minimum, electrical meters must capture the following data on individual system performance (minimum solar irradiance, DC power, AC real power, AC current, AC voltage, and power factor (recommend ION 8600 for AC); ambient air temperature, PV cell temperature, kW, and kWh). This data must be captured at hourly intervals for a minimum one year. Units of temperature, power, and current are to be in Fahrenheit, Watts, and Amps respectively.

Transformers, if required, must have a minimum efficiency based on factory test results of not less than the efficiency indicated in 10 CFR 431, Subpart K, paragraph 431.196(b). Transformers must be housed in NEMA 4X enclosures.

Layout of modules on roof must meet the requirements of NFPA-1 including labeling, roof access, and roof pathways. Coordinate roof venting requirements with fire protection engineer.

Mounting structures must be corrosion resistant to marine environment.

Provide permanent plaque or directory at each building service and power source identifying all other building services and power sources.

Refer to RFP Part 4, PTS B30 *Roofing*for additional layout and installation requirements.

D509007 1.4 OPERATORS MANUALS AND TRAINING

Operators manuals for each system component must include detailed instructions on how to operate the system, programming and installation instructions, emergency operating procedures, default program values and set points, listing of field programmed variables and set points, equipment wiring diagrams, product model number, with Name, Address and Telephone number of local representative, and starting, operating, and shut down procedures. Include normal and emergency shut down procedures, schedule of maintenance work, if any, recommended cleaning agents and methods, replacement parts list, including internal fuses, and warranty information.

Provide a formal 2-hour on-site training session instructing operators in the operation and maintenance of the new system, including operation and maintenance of inverters, disconnects and other system components. Instruct personnel in removal and installation of panels, including wiring and all connections. At the time of training furnish, for the equipment specified, operation and maintenance manuals, record drawings and recommended spare parts lists identifying components adequate for competitive supply procurement for operation and maintenance of system.

D509007 1.5 FIELD QUALITY CONTROL

Schedule connection of the photovoltaic system with the Contracting Officer such that the Contracting Officer can be present when the photovoltaic system is tied to the grid.

Provide test plan that meets the requirements of IEC 62446. Test plan must include expected values for testing. Provide test results.

Tests must include the following:

a. Verify that non-current carrying metal parts are grounded.
b. Verify that all components are labeled.
c. Verify mounting supports are installed properly, and all fasteners are installed correctly and torqued to manufacturer's instructions.
d. Test open circuit voltage of each string in full sunlight.
e. Test output of inverter. Measure solar irradiance. Perform calculations to show inverter output is consistent with the expected performance.

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

D509090 1.1 400 HERTZ SYSTEMS

The Designer of Record must utilize UFGS Section 26 35 43 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

--End Of Section--

SECTION E10

EQUIPMENT
12/18

E10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

E10 1.1 GENERAL REQUIREMENTS

Where required by the project program, obtain the services of equipment specialists to specify any audiovisual, shop, fitness equipment, or other specialty equipment. Equipment specialists must not have any affiliation with the product specified. All specialty equipment must be installed by qualified installers regularly engaged in installing the specialty equipment. Systems furnishings installers must be the systems furniture manufacturer's dealer of record.

E10 1.2 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

E10 1.2.1 Industry Standards and Codes

Loading Dock Equipment Manufacturers' Association (LODEM)

E10 1.2.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-

	Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, Architecture UFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

E10 1.3 PERFORMANCE VERIFICATION AND COMPLIANCE TESTING

Provide verification of satisfactory special equipment and furnishing systems performance via Performance Verification Testing, as detailed in this section of the RFP.

E10 1.3.1 Field Tests for Dock Leveling Equipment

a. Roll-over Tests - Move roll-over load of 20,000 pounds (9,072 kg) over the dock leveler between the bed of a freight carrier and the building loading dock surface for ten cycles. With the ramp extension retracted and the ramp platform leveled with the building loading dock surface, run a 20,000 pound (9,072 kg) roll-over load over the ramp in various directions for 20 cycles. No permanent deformation or hydraulic fluid leakage must occur subsequent to examination after these tests.

b. Drop Tests - Twice, drop test the dock leveler at the indicated rated capacity as follows: With the load on the platform and the load resting on a vehicle carrier bed not less than 10 inches (254 mm) above loading dock surface, pull the carrier or pull away from the lip, leaving the loading ramp unsupported. The measured vertical drop of the dock leveler taken at the point where the lip rests on the vehicle carrier must not exceed 4 inches (102 mm) during each of the drop tests. Inspect the loading ramp after each drop and ensure no damage or distortion to the mechanical, electrical, or structural components. There must be no leakage from the hydraulic system.

c. Acceptance Tests - Perform an acceptance test in the presence of the dock leveler manufacturer and the Contracting Officer subsequent to the roll-over load and drop tests. Conduct operation of the equipment through all of its motions and specified checks as follows: (a) extend lip to rest on a variety of freight carriers with beds up to 12 inches (305 mm) above and below deck level; (b) test 102 mm (4 inches) drop limitation with 7,000 pound (3,175 kg) load on ramp, evenly distributed; (c)test level compensation with the ramp, loaded with a minimum of 7,000 pounds (3,175 kg); and (d) test proper compensation (float) for various compression of counter-springs, with ramp loaded and unloaded.

E10 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-120-10, *Interior Design*.

E10 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Field tests of equipment, vault door, loading dock equipment, kitchen equipment and unit kitchens.

Energy efficiency ratings for food service equipment, as applicable.

E1010 COMMERCIAL EQUIPMENT

E101005 SECURITY & VAULT EQUIPMENT

E101005 1.1 VAULT AND DOORS

Design the Vault ("Weapons Storage Area" (WSA) or "Armory", or other title according to the project program) space in accordance with criteria in Military Handbook (MIL-HDBK) 1013/1A to provide at least 10 minutes of delay time against low and medium threat severity levels of forced entry. The space is required to be built to the construction standards described in MIL-HDBK-1013/1A for Class A vaults. The reinforced concrete must have minimum 28-day compressive strength of at least 3000 PSI (20,684 kPa) and the floor, walls, and ceiling/roof components of this space must all be cast in place and at least 8 inches (200 mm) thick. The door into the vault must be a General Services Administration (GSA)-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Provide door manufacturer's modified standard or custom Day Gate, designed for use with the vault door furnished, for access control and weapons issue. Except for the door opening, penetrations and openings through the structural "security" envelope of the floor, walls, and ceiling/roof of the Vault that are 96 sq. inches (618 sq. cm) or greater with the least dimension greater than 6 inches (150 mm) are not allowed. PTS Section D50, *Electrical*, includes requirements for Intrusion Detection System (IDS) within the space and for Security Lighting at the outside of the Vault Door to the space.

E101005 1.1.1 Set-backs

Where the perimeter walls of the WSA spaces are part of the facility exterior walls, the vault walls must be set back from the exterior part of the exterior wall to allow at least 4 inches (100 mm) for the normal wall facing to cover the vault walls.

E101005 1.1.2 Egress

Where a WSA space exceeds 1000 square feet (90 sq m) in floor area, or will have more than eight occupants, the space must have a minimum of 2 exits for safety purposes. When more than one entrance / exit is required, each must be equipped with a Security Vault Door, with only one used for normal entry access.

E101005 1.2 SECURITY VAULT DOOR

Security Vault Door must be GSA-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Provide GSA-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Door(s) for normal or special entry access must be Class 5, either Type IIR- right opening swing without optical device or Type IIL- left opening swing without optical device as determined by design arrangement, Style K- Key change combination lock, Design S- single lock.

Where a second or additional door is required for safety purposes, door(s) for exit only must be Class 5, either Type IR- right opening swing with optical device or Type IL- left opening swing with optical device as determined by design arrangement, Style K- Key change combination lock, Design B- no exterior hardware.

E101005 1.3 DAY GATE

Provide vault door manufacturer's modified standard or custom day gate designed for use with vault door furnished, for access control and weapons issue. Day gate construction must be minimum 10 gage (3.4 mm) steel flattened and expanded metal welded to a 1 inch (25 mm) minimum steel channel or angle welded frame; expanded metal pattern must be 1 inch by 1-3/4 inch (25 by 45 mm) diamond grid. Maximum clearance between sides, top and bottom of the day gate and the vault door-frame and floor must be 1 inch (25 mm) when the day gate is closed. Provide gate hinged on same side as the vault door, swinging to 180 degrees into the vault from closed to open positions. Provide day gate with locking device operable from both sides; the outside by key and the inside by key, knob, lever, or deadbolt; the inside locking device must either be positioned so that it is not accessible from the outside or it must be operable by key only. Day gate must include an issue port opening, cover with locking mechanism, and shelf. The issue port must be a framed opening welded to the day gate frame with a hinged door cover. The hinged door must be minimum 18 gage (1.2 mm) steel and must be lockable from the inside only. The opening must be 8 inches (200 mm) high and 12 inches (300 mm) wide; tolerances are plus or minus 0.125 inch (3.2 mm). When the issue port is closed, the hinged door cover must match the opening to within 0.0625 inch (1.6 mm). The shelf must be minimum 16 gage (1.5 mm) stainless steel, 12 inches (300 mm) deep by 12 inches (300 mm) wide to match the port opening, and must be capable of withstanding a vertical force of 100 lbf (445 N) at any point without deformation. Provide the manufacturer’s standard painted finish to match that of the vault door. The day gate must not interfere with the operation of vault door inner escape device.

E1020 INSTITUTIONAL EQUIPMENT

Institutional equipment includes items that are normally found in hospitals, laboratories, auditoriums, and libraries.

E102001 MISCELLANEOUS COMMON FIXED & MOVABLE EQUIPMENT

This section must include fixed workbenches, hazardous and non-hazardous shop materials cabinetry, shop tools, and other fixed and movable equipment.

E102009 AUDIO-VISUAL EQUIPMENT

E102009 1.1 CEILING MOUNT FOR PROJECTOR

Provide the ceiling mounted hardware for a digital projector, to be coordinated with support blocking (see PTS Section C10, *Interior Construction*) and electrical and data connections (see Section D50, *Electrical*).

E1030 VEHICULAR EQUIPMENT

E103002 LOADING DOCK EQUIPMENT

This paragraph covers the requirements for dock bumpers, truck-trailer restraining devices, and industrial, mechanical and electro-hydraulic dock levelers of a fixed hinged type. All loading dock equipment must be Navy certified.

Provide a Loading Dock Equipment System for the protection of service docks and for the loading and unloading of service vehicles.

E103002 1.1 DOCK LEVELERS

Based on the performance requirements of the project program, provide American National Standards Institute (ANSI) MH30.2 (see LOEDM) steel tread plate lip and platform, hinged and supported from beneath by steel framework that contains lifting, positioning, and lowering assembly. The design must permit washing with water and detergents, and operation in an ambient temperature from 0 degrees F to plus 110 degrees F (-18 degrees C to plus 43 degrees C). Minimum roll over capacity must not be less than 20,000 pounds (9,072 kg).

E103002 1.1.1 Height Adjustment

Provide a ramp with a minimum incline adjustment of 24 inches (600 mm). Divide 12 inches (300 mm) above and 12 inches (300 mm) below the platform height.

E103002 1.1.2 Loading Ramp Compensation

a. Freight Carrier Out of Level - Allow a minimum correction of one inch for each 18 inches (450 mm) and maximum of 4-inch (100 mm) correction of ramp width over the width of the ramp.
b. Loading and Unloading of the Freight Carrier - When the lip is extended, provide a 4-inch (100 mm) compensation for carrier spring deflection to allow full contact between the

lip and the carrier bed.

E103002 1.1.3 Safety Devices

a. Electro-hydraulic System - Provide a device to automatically prevent a drop of more than 4 inches (100 mm) of the lip should the freight carrier move away from the dock leaving the lip unsupported.
b. Mechanical System - Provide a three-position safety system to limit platform fall to dock level and 4 and 8 inches (100 and 200 mm) below dock level.
c. Dock Bumpers - Provide laminated rubber, tire fabric or equivalent dock bumpers along the length of the loading dock.

E103002 1.1.4 Operation

a. Mechanical Control - Mechanical chain activated, with extension-spring operation and counter-balance non-manual, raising and lowering system.
b. Electro-Hydraulic Control - Provide dock leveler with pushbutton control, heavy-duty dust tight and oil tight rated in accordance with National Electrical Manufacturers Association (NEMA) ICS 2, Part ICS2-216 for alternating current.
c. Construction and Materials - The entire live load carrying surface of the ramp and rear attachment must not be less than 1/4-inch(6 mm) thick, 55,000 PSI (379,200 kPa) minimum yield strength, low alloy, non-skid steel tread plate.
d. Toe Guards - Provide sides or edges of the ramps which rise above the surrounding loading dock with sheet carbon steel skirts or toe guards of minimum 14 gage nominal thickness.

E103002 1.1.5 Electro-Hydraulic Lift System

Provide a complete and separate system for each dock leveler. Design system to withstand not less than 150 percent of the design operating pressure. Provide hose, fittings, pipe and tubing with working pressures based upon a minimum 4 to 1 safety factor of bursting pressure.

E103002 1.1.6 Electrical Requirements

National Fire Protection Association (NFPA) 70, NEMA ICS 2, NEMA ICS 6 and NEMA MG 1

a. Motor - Conform to NEMA MG 1 and continuous duty or 60-minute time rated, industrial type, single speed rated for operating conditions.
b. Control - NEMA ICS 2, size 0 controller for heavy industrial service.
c. Transformer - Totally enclosed, self-cooled, dry type transformer. Incorporate circuit breakers with ground fault interrupting protection conforming to Underwriters Laboratories (UL) 943.

E103002 1.1.7 Structural Warranty

Present a manufacturer's warranty certifying the leveler against operational malfunction or structural failure, or both, for a period of 10 years from the date of acceptance by the Government. Warranty may exclude failure through overloading evidenced by member breakage or residual deformation; but it must not exclude breakage of welds or fastenings, fatigue breakage of components, or wear of moving parts. Provide warranty to cover the full costs of repairs, or replacements in case of a nonrepairable failure.

E103002 1.1.8 Accessories

a. Dock Truck or Trailer Restraining Device - Provide self-aligning device, with a positive restraining force of not less than 18,000 pounds (8,165 kilograms). Device must service all truck or trailers with Interstate Commerce Commission (ICC) bars located between 12 and 30 inches (300 and 750 mm) above ground level.

E103003 WAREHOUSE EQUIPMENT

This paragraph covers the requirements for storage racks, heavy duty shelving, material handling conveyors, and other warehouse equipment. See the project program.

E103004 AUTOMOTIVE SHOP EQUIPMENT

This paragraph covers the requirements for automotive vehicle lifts meeting the requirements of ANSI/ALI ALCTV-1998 standards, and other automotive shop equipment such as pneumatic liquids delivery systems. See the project program.

E1040 GOVERNMENT FURNISHED EQUIPMENT

Refer to the project program.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide Food Service Equipment and the kitchen design in accordance with FC 4-722-01N, *Navy and Marine Corps Dining Facilities*. This paragraph covers the items of commercial food service equipment. Included are items used for liquid and solid food storage, food preparation, cooking, display, serving, and clean up equipment. Provide 180 degree F (82 degree C) hot water or chemical treatment for sinks, dishwashers, pot washers, and exhaust ventilator wash down systems.

Provide products that meet or exceed the specified energy efficiency requirements of FEMP designated or Energy Star qualified products. Submit documentation certifying that products conform to Public Law 109-58 by meeting or exceeding Energy Star or FEMP efficiency requirements as defined at "Energy-Efficient Products" at http://femp.energy.gov/procurement.

Indicate the Energy Efficiency Rating.

E109002 1.1 COMMERCIAL FOOD SERVICE EQUIPMENT

E109002 1.1.1 Equipment Materials

Fabricate custom and commercial equipment in accordance with NSP 2.

a. Stainless Steel Sheets - American Society for Testing and Materials (ASTM) A167, 18-8 Composition, Type 302 or 304 or 316, non-magnetic, with a No. 4 finish on the exposed face.
b. Tubing - ASTM A 270
c. Framing and Cross Bracing - ASTM A 276, Type 302 or Type 304 or Type 316
d. Copper Tubing –

1) Tube - ASTM B 88, Type K, annealed, for buried or embedment in concrete, and Type L, hard drawn, for above grade installation.

2) Fittings - ANSI B16.18, above grade, American Society of Mechanical Engineers (ASME) B16.22 or ASME B16.26, above or below grade.

e. Welded Joints - Use tungsten inert gas process. Use filler metal compatible with the material being welded. Make all visible welds ductile and of same color as adjoining surfaces. Coat welds in hidden areas that are not finished by grinding and polishing and the accompanying discoloration in the factory with a metallic-based paint to prevent progressive corrosion. Grind exposed welded joints flush with the adjoining material and finish and polish to match the adjoining surface. Grind off excess metal and smooth to a No. 4 finish. Remove imperfections such as pits, runs, sputter, cracks, low spots, voids and buckle.

Penetrate entire thickness for the entire length of the joint; make joints flat, continuous and homogeneous with the sheet metal without reliance on straps under seams or spot welding. When stainless steel is joined to dissimilar metals, use stainless steel for fastening devices and welding material.

f. Solder - ASTM B 32, 95.5 tin-antimony solder or other lead-free solder for contact with potable water or food. Provide ASTM B 32, alloy grade 50B for temperatures up to 150 degrees Fahrenheit (65 degrees Celsius).

E109002 1.1.2 Custom-Fabricated Counters, Dishwasher Counters, and Sinks

Fabricate of 14 gage (1.8 mm) stainless steel, with all shop seams and water tight welded corners ground smooth, and polished. Pitch all flat surfaces to drain and eliminate any chance of standing water. Counters and sinks must be furnished complete

with integral stainless steel backsplashes, side splashes, and legs with adjustable feet.

a. Sinks - Provide integral sinks in accordance with the requirements of NSF 2, and ASTM A112.19.3M. Provide minimum of 0.75 inch (19 mm) radius on all corners.

E109002 1.1.3 Exhaust Ventilators

Exhaust ventilators must conform to NFPA 96, UL 710, and SMACNA DCS. Fabricate exhaust ventilators of minimum 18 gage stainless steel in segments not longer than 12'-0". Provide centrifugal grease-extracting design to remove 95% of matter from the air with non-removable extracting baffles located in the plenum chamber. Exhaust ventilators must provide integral make-up air system in accordance with NFPA 96. Provide automatic wash-down cycle and fan control on adjacent wall.

a. Fire Damper - Provide mechanically driven damper and damper control. Activate by heat-sensing thermostat set to react to a temperature of 350 degrees F (177 degrees C) in exhaust duct at exhaust ventilators.
b. Fire Protection System - Provide a pre-engineered wet system in accord with NFPA 96.

E109002 1.1.4 Pre-Fabricated Walk-in Refrigerators and Freezers

Provide walk-in units manufactured for food service use conforming to NSF 7, UL 207, and UL 471. Provide refrigeration unit complying with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15. Outside compressors, if used, require winter controls, housing, and crankcase heater. Provide monitoring system to alarm abnormally low or high temperatures, and personnel safety alarm. If the unit utilizes the floor of the facility as an interior surface of the unit, it must be insulated and separated from adjacent floors.

E109002 1.1.5 Food Waste Disposer - ASTM F917

E109002 1.1.6 Beverage Dispenser, Non-Carbonated, Refrigerated - ASTM F918

E109002 1.1.7 Food Slicing Machine - ASTM F919

E109002 1.1.8 Food Mixing Machine - ASTM F952

E109002 1.1.9 Powdered Iced Tea Dispenser - ASTM F1023

E109002 1.1.10 Frying and Braising Pan, Tilting - ASTM F1047

E109002 1.1.11 Food Cutter - ASTM F1126

E109002 1.1.12 Food Waste Pulper - ASTM F1150

E109002 1.1.13 Cooker, Steam - ASTM F1217

E109002 1.1.14 Ovens, Microwave - ASTM F1360

E109002 1.1.15 Vegetable Peeling Machine - ASTM F1371-04

E109002 1.1.16 Combination Oven - ASTM F1495

E109002 1.1.17 Food Processor - ASTM F1568

E109002 1.1.18 Kettle, Steam Jacketed (20-200 gal) Floor or Wall Mounted - ASTM F1602

E109002 1.1.19 Kettle, Steam Jacketed (32 oz-20 gal), Table Mounted - ASTM F1603

E109002 1.1.20 Freezer, Ice Cream, Soft Serve - ASTM F1604

E109002 1.1.21 Griddle, Single or Double Sided - ASTM F1919

E109002 1.1.22 Deep Fat Fryers - ASTM F1963

E109002 1.1.23 Dough Divider/Rounder - ASTM F1966

E109002 1.1.24 Dishwashing Machines

a. Hot Water Sanitizing Rack Type, ASTM F857
b. Hot Water Sanitizing Single Tank, ASTM F858
c. Hot Water Sanitizing, Multi-Tank, ASTM F859
d. Hot Water Sanitizing, Multi-Tank, Conveyor, ASTM F860
e. Chemical Sanitizing, Stationary Rack, ASTM F953
f. Chemical Sanitizing, Fresh Water Rinse, ASTM F1022
g. Hot Water Sanitizing, Oval Conveyor, Multi-tank, ASTM F1237

E109002 1.1.25 Pot and Pan Washing Machines

a. Heat Sanitizing, Oscillating Arm Type, ASTM F1202
b. Heat Sanitizing, Rotary Conveyor, ASTM 1203
c. Heat Sanitizing, Rack Type, Rotary Spray, ASTM F1114

E109002 1.2 RESIDENTIAL OR LIGHT COMMERCIAL ELECTRIC KITCHEN EQUIPMENT

E109002 1.2.1 Cooking Top

Conform to UL 197 and UL 858.

E109002 1.2.2 Freezer

UL 250, minimum 14 cubic feet (0.39 cubic meters), frost-free.

E109002 1.2.3 Refrigerator

UL 250, refrigerator with frost-proof freezer, minimum 14.6 cubic feet (0.41 cubic meters).

E109002 1.2.4 Freestanding Ice Maker

UL listed and NSF approved; self-contained, air-cooled model, minimum ice production of 355 pounds (161 kg) per 24 hours, and a minimum bin storage capacity of 180 pounds (82 kg) of ice cubes.

E109002 1.2.5 Griddle

UL 197 and NSF 2, built-in counter-top model. Minimum capacity must be 260 pancakes or 420 hamburgers 4 ounces (110 g) per hour.

E109002 1.2.6 Microwave Oven

UL 923, minimum 1 cubic foot (0.03 cubic meter) capacity.

E109002 1.2.7 Oven

UL 858, self-cleaning and built-in.

E109002 1.2.8 Trash Compactor

UL 1086, under-counter model with storage compartment and 20 gallon (75 liter) trash disposal bag capacity.

E109002 1.2.9 Kitchen Exhaust Hood

NFPA 96 and NSF 2, factory fabricated of minimum 18 gage stainless steel.

E109002 1.2.10 Range Hood

UL 858, vented or non-vented with two-speed fan.

E109002 1.2.11 Dishwasher

UL 921 or UL 749 with detergent dispenser. For heavy-duty dishwasher, provide stainless steel commercial grade with approximately 300-dish per hour and 540 glasses per hour ratings.

E109002 1.2.12 Residential Garbage Disposal

UL 430, stainless steel, continuous feed with minimum 1/2 or 3/4 hp motor. Optional 1 hp motor for heavy usage.

E109005 UNIT KITCHENS

E109005 1.1 UNIT KITCHENS

Provide complete unit kitchens with countertops, sinks, faucets, appliances, and accessories. Comply with DoD Architectural Barriers Act (ABA) Standards in units for the disabled. Provide high pressure laminate or natural wood finish.

E109005 1.2 UNIT KITCHEN COMPONENTS

a. Cabinets - American National Standards Institute/Kitchen Cabinet Manufacturers Association (ANSI/KCMA) A161.1 wood and plywood cabinetry with drainers and cabinet doors.

1) Provide 3/4-inch (19 mm) solid wood for face framing, drawer fronts, and shelves up to 36 inch (91.44 cm) wide. Cabinet body members require spline, biscuit, dowel or dado joining.

2) Provide 1/2-inch (12.8 mm) solid wood for drawer boxes with dovetail or dowelled joints.

3) Provide 3/8-inch (9 mm) plywood for cabinet box and toe board.

4) Provide cabinet doors of High Pressure Laminate covered medium density fiberboard or stile and rail doors.

b. Countertop - Provide ASTM 2124.3 and ASTM 2124.6, solid polymer countertop and 3-1/2 inch (89 mm) backsplash.

c. Sink and Faucet - Provide ANSI A112.18.1M, NSF International Standard 61 sink and faucet. Section 9 for sink and faucet. Provide large 22 gauge stainless steel sink with basket strainer in w with water stopper. Faucet must be a washerless cartridge system.

d. Refrigerator-Freezer – 5 cubic foot minimum undercounter refrigerator freezer. Provide interior light, defrost, adjustable shelving, adjustable thermostat features, and zero degree freezer.

e. Microwave Oven/Ventilation Hood Combination. Provide 1.4 cubic foot 900 watt minimum, microwave/hood above cooktop. Ductless hood must be convertible to ducted at the project site.

f. Cooktop – Provide drop-in 2 burner black ceramic cooktop with 1200 watt elements.

g. Dishwasher – Provide 24 inch wide Energy Star Large capacity dishwasher.

h. Accessories.

1) Back wall shield and end wall shields when against an end wall.

2) Countertop fluorescent lighting.

3) Drawer slides rated for 100 pound capacity.

4) Door hinges to be adjustable, self-closing, and configured to allow screw application to cabinet door from two directions.

E109090 OTHER SPECIALIZED FIXED AND MOVABLE EQUIPMENT

Specialized fixed and moveable equipment not described by the other assembly categories.

E109090 1.1 WEAPONS RACKS

Weapons Storage Racks may be purchased or may be steel fabrications. Comply with OPNAVINST 5530.13c and standard operating procedure for the

facility.

E109090 1.2 GEAR DRYING CAGES

Drying cages (racks) for SCUBA gear may be purchased or may be fabrications. Comply with standard operating procedures for the facility.

-- End of Section --

SECTION E20

FURNISHINGS
12/18

E20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

E20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award:

E20 1.1.1 Industry Standards and Codes

E20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, Architecture UFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

E20 1.2 GENERAL REQUIREMENTS

Provide the services of an Interior Designer, certified by the National Council for Interior Design Qualification (NCIDQ), or a state and/or jurisdiction Certified, Registered, or Licensed Interior Designer prepare both the Furniture, Fixtures, & Equipment (FF&E) and the Structural Interior Design (SID) Package, attend and participate, in entirety, all kick-off meetings, design meetings, to include, but not limited to, design charettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package. Provide the services of equipment specialists to specify the audiovisual, shop, or specialty equipment. The Interior Designer and any specialists must not be affiliated with any furniture dealership/vendor or manufacturer. The Government Interior Designer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer.

Systems furnishings installers must be the systems furniture manufacturer's approved dealer of record. In addition, installation dealers must be located within a 100 mile radius of the project site unless approved by the government Interior Designer.

[Re-purpose/ recycle existing furniture if not relocated by the government. Provide verification that the existing furniture was not disposed of at the landfill.]

E20 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-120-10, *Interior Design*.

E20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Art work and FF&E Package

E2010 FIXED FURNISHINGS

E201001 FIXED ARTWORK

E201002 WINDOW TREATMENTS

Provide interior window coverings, associated hardware and controls at each exterior window and at any interior view window where privacy may be required. Refer to the Project Program for size, pattern and style of window treatments. At a minimum, functional window coverings such as blinds or solar shades are required on all projects.

E201002 1.1 BLINDS

Venetian blinds must be one-inch horizontal room-darkening commercial grade aluminum at a minimum thickness of 0.2mm (.008") (after coating) with a minimum of 45.72 slats per meter (15 slats per foot). Provide blinds at each exterior window and at any interior window where privacy may be required. Provide and install one full size sample for review and approval.

E201002 1.2 SHADES

Provide energy efficient solar shading systems for exterior windows. The system must maintain visibility while reducing glare, solar heat gain during the summer and heat loss during the winter. Openness configuration must be no more than 5% for most areas. The system fabrics and components must be dimensionally stable and must be manufactured to withstand fading, fire, mildew, and soiling.

E201002 1.3 DRAPERIES AND HARDWARE

Draperies must be manufactured under General Services Administration (GSA) contract as part of FF&E. Drapery can be accordion-fold, ripple-fold, or pinch-pleat with associated hardware suitable for the project requirements. All draperies must meet the National Fire Protection Association (NFPA) Code 701 California Fire Marshall's flame retardant requirements.

E201003 SEATING (FIXED)

E201003 1.1 AUDITORIUM, LECTURE AND CLASSROOM SEATING

The system must permit the standards to be installed on radial lines from a common center for which concentric circles are determined with each row of units utilizing common middle standards. Standards in each row must be placed laterally so the aisle-end standards will be in alignment as indicated on seating layout drawing. The angle of inclination of backs must be adjusted for variations in sightlines. Mechanical attachment of components must be of sufficient flexibility so that when permanently assembled they will compensate for the changing dimensions laterally between standards caused by convergence toward the center. Seat and back attachments must absorb inaccuracies in lateral spacing of standards at point of attachment caused by unevenness of floor. Varying lateral dimensions of backs and seats must be in accordance with approved seating layout. Minimum width of seating unit must be 20 inches and may be used only to complete a specific row dimension.

E201003 1.2 FIXED TABLES FOR AUDITORIUM, LECTURE AND CLASSROOMS

Provide worksurfaces mounted to tubular steel, sheet steel, or cast iron floor standards. The standards must be formed to fit the floor incline so that the standards will be vertical. The feet must be formed to eliminate tripping hazards and have holes for bolt attachment to the floor. Provide riser standards, cantilevered standards and aisle and end standards as required. Provide communications, data and power

routing as required. Provide a high-pressure plastic laminate over medium density particleboard for the worksurfaces with coordinating vinyl or resin edge detail.

E2020 MOVABLE FURNISHINGS

Furnishings, Fixtures, and Equipment (FF&E) must include furniture, shop equipment, audiovisual equipment, and specialty equipment. Weapon racks, drying cages, and lockers are not considered FF&E. FF&E must be fully integrated with the building systems and finishes. FF&E may also include specialty items for which the customer activity must be responsible for specifying.

Design and provide as required FF&E for all areas as developed during client programming. Design an FF&E package and prepare supporting plans and procurement data in accordance with the general interior design requirements in UFC 3-120-10.

E2020 1.1 FF&E PACKAGE

FF&E Package: Design and provide a fully usable and complete facility to include a FF&E movable furnishings package from Government supply sources according to Federal Acquisition Regulations. The FF&E will include, but not limited to, systems and modular furniture, training and conference furniture, seating, tables, artwork, decorative window covering, specialty furniture and equipment, dormitory room furnishings, and accessories. Naval Supply Systems Command (NAVSUP) Blanket Purchase Agreements (BPA) must be used whenever possible. The government will provide separate funding for the FF&E package. Construction funds will not be used. The FF&E Package must include shipping, freight, handling, installation and the Handling and Administration Rate (HAR) percentage as applied to the final FF&E total cost.

E2020 1.1.1 Authorization

The government will provide separate funding for procurement of the FF&E package. Upon receipt of required funding, the Contractor must be authorized by the Contracting Officer as a planned line item modification to the contract/task order to procure all FF&E using predominately negotiated Federal contracts. The amount of the modification will be the actual cost of these items from the Federal price schedules or NAVSUP BPAs, including any freight and installation charges from the furniture supplier as well as the Contractor's FF&E Handling and Administration Rate (HAR). The HAR includes all of the prime Contractor's effort related to storage, coordination, handling, administration of subcontractors, and all other associated costs and profit for the procurement of FF&E. The prime Contractor will propose in the contract/task order solicitation the FF&E HAR. The Contractor's proposed HAR may not exceed 5% of the total FF&E costs, as noted on the bid schedule. No other charges, expenses, fees, or markups will be authorized.

The government Interior Designer will approve the final FF&E

submittal. The FF&E package will be presented to the Contracting Officer and the Contractor must provide the FF&E exactly as specified and approved.

The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer and other information to use when accessing the government supply sources.

E2020 1.2 PURCHASE AND INSTALLATION

Coordinate the building completion date with the installation dealer specified in the FF&E Package. The Contractor or Contractor's representative is responsible for the following: issuing purchase orders, receiving acknowledgements, sending copies of purchase orders to the installation dealer(s) specified in the FF&E package, and providing necessary deposits to furniture manufacturers.

The FF&E installation dealer(s) is responsible for the following: Receiving and installing all FF&E specified in the FF&E package, coordinating delivery and installation with the Contractor, inspecting for damage, providing delivery receipts to the Contractor, filing necessary freight claims, hanging artwork, bulletin boards, etc., removing packaging material, cleaning up the site upon completion, and adhering to Contractor's safety requirements.

E2020 1.2.1 Use of GSA Schedules and Blanket Purchase Agreements (BPAs)

The prime Contractor or FF&E dealer will be authorized to purchase supplies or services from the Navy Furniture BPAs for FF&E requirements, under the terms of the contract. The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer and other information to use when accessing the government supply sources or BPAs.

E2020 1.2.2 Deposits

The Contractor must anticipate providing a deposit of between 30% to 50% of the furniture costs when placing their order.

Manufacturer price increases must be anticipated. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates. Any costs incurred due to manufacturer price increases will be the burden of the Contractor.

E2020 1.2.3 Davis Bacon Wages

Davis Bacon wages do not apply to the FF&E installer from the government supply sources. The workforce for the FF&E installation and delivery must be separate and distinct from the labor workforce performing under the construction contract.

E2020 1.2.4 Sales Tax

Exemptions for certain State or Local taxes may be available to the Contractor and/or its subcontractors. The Contractor must take maximum advantage of all exemptions, including obtaining a resale permit, from State and Local taxation authorities whether available to it directly or available to the Contractor based on an exemption afforded the government. The responsibility for paying applicable taxes rests with the contractor. State and local taxes applicable to the FF&E line will be included with the subcontractor's quote, if applicable.

E2020 1.2.5 Bonds

FF&E line item is not considered construction and the prime Contractor will not be required to secure any additional bond for the award of the FF&E line item unless otherwise indicated in the RFP. If any additional bond is required for the FF&E line item it is to be included in the prime Contactor’s FF&E HAR.

E2020 1.2.6 Unique Item Identification (IUID) and Validation

Unique item identification and valuation is a system of marking and valuing items delivered to DoD that enhances logistics, contracting, and financial business transactions. The IUID policy is mandatory for all DoD contracts that require the delivery of items. An item is a single article or a single unit formed by a grouping of subassemblies, components or constituent parts. Provide DoD Unique item identification, valuation and delivery of data for all required FF&E items for which the government's unit acquisition cost is $5,000 or more.

E2020 1.2.7 Buy American Act and Trade Agreement Act

All supplies under the FF&E line item are subject to the Buy American Act and Trade Agreement Act (TAA). The GSA contracts and NAVSUP Blanket Purchase Agreements are required to comply with the Buy American Act and TAA.

E2020 1.2.8 Small Business Requirements

The FF&E is subject to the Contractor's Small Business Goals however the government requires the furniture be purchased from NAVSUP Blanket Purchase Agreements (BPA). Most manufacturers on the Office Furniture BPA are large business and most manufacturers on the Dorm and Quarters BPA are small business. Installation dealers are small business. Under the terms of the BPA, the FF&E must be ordered directly through the GSA manufacturer. Using pass-through companies to achieve Small Business Goals will not provide the Contractor credit unless they manufacturer 20% or provide 50% of the service purchased. The government will not incur additional costs to use small business.

E2020 1.2.9 Installation

The FF&E package includes the installation of all furniture and furnishings as specified in the FF&E package. The installation dealer specified in the FF&E package will receive, store, if required, transport to the project site, off load, inside deliver, unpack, assemble, place/install, clean, if required, and dispose of all the trash for all furniture and furnishings. The Contractor's Interior Designer will be responsible for specifying installation services and warehousing, as required, for all collateral equipment. It is the Contractor's responsibility to coordinate the building completion, occupancy, and furniture installation dates with the installation dealer specified in the FF&E package. Any costs associated with storing or delaying furniture shipments is the responsibility of the Contractor.

E2020 1.2.10 Installation Warranty

Install all movable furnishings in accordance with the manufacturer’s instructions and warranty requirements. All movable furnishings must be level and aligned and all doors, drawers and accessories must be level and aligned to open, close and otherwise operate smoothly and securely. All systems furniture must be installed by the systems furniture manufacturer’s dealer of record and not the General Contractor. Repair, to the customer’s satisfaction, any/all damage to any facility finish that is a result of the furniture installation and correct all punch list items for the furniture/furnishings.

E2020 1.2.11 Ordering Documentation

Provide two copies of all ordering documentation to the Contracting Officer including Factory Order number (FO) and warranty information.

E2020 1.2.12 Post Award Changes

After award of the FF&E line item modification, any request to change the FF&E items must be submitted on the Contracting Officer. The FF&E modification has been accepted, priced, and negotiated based on specific line items as detailed in the final package. Those items have been agreed to considering color, specific type and quality of material, price, sustainability, life cycle, and dealership service. The Government will expect and require the Contractor to provide exactly those items. Should changes become necessary, careful consideration is required to ensure that equivalent quality, price and other aspects of the item are maintained. Otherwise, price adjustments must be negotiated. The Contracting Officer will obtain approval from the Government Interior Designer/Collateral Equipment Manager in consultation with the client for any changes to the FF&E.

Post award FF&E manufacturer's price increases are the responsibility of the Contractor and will not be transferred to the government. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to

coincide with building completion dates.

E2020 1.3 BEST VALUE DETERMINATION

A best value determination is required by Federal Acquisition Regulation (FAR) 8.404 when placing orders against Federal Supply Schedules for the selection of furniture and furnishings. A Best Value Determination (BVD) must also be provided for FF&E installation services. Best Value is defined in FAR 2.101 as ensuring that the order to be placed under a Federal Supply Schedule results in the lowest overall cost alternative (considering price, special features, administrative costs and client's needs) to meet the government's needs.

The Contractor's Interior Designer is responsible for the following written BVD justifications:

$3,000 or less: For any procurement in the FF&E package with a value of $3,000 or less, the Interior Designer may utilize any BPA holder. If the BPA holders cannot supply the item, then any other manufacturer may be utilized.

Greater than $3,000 and $150,000 or less: for any procurement in the FF&E package with a value greater than $3,000 and $150,000 or less, the Contractor's Interior Designer must always review pricing from at least three manufacturers as well as UNICOR. In addition to the review of published list prices, the Contractor's Interior Designer must confirm the pricing with the vendor. Manufacturer's quotes are NOT required. The BVD form must be completed and submitted for all FF&E procurements greater than $3,000 and $150,000 or less.

Greater than $150,000: The Contractor's Interior Designer must solicit proposals from all BPA holders under the applicable group for FF&E procurements greater than $150,000. UNICOR must always be solicited. The Contractor's Interior Designer must develop performance criteria and project requirements based on a generic design for the BPA holders and UNICOR to develop a price and performance proposal. The BVD form must be completed and submitted for all FF&E procurements greater than $150,000 and manufacturer's quotes and a summary of all proposals must be attached.

Federal Prison Industries (UNICOR) must be considered as part of all BVDs. This must be done by sending an email with the requirements and evaluation criteria if they are not comparable in one or more areas of price, quality, and time of delivery, the designer can specify product under NAVSUP BPA or GSA schedule.

The best value determination must address issues such as space planning; human factors data related to anthropometrics (reach, clearance, adjustability), space, and acoustics; ergonomics; product quality (including construction and materials); sustainability features, product warranties; history of the product and/or manufacturer; ability to service products through dealers or others within a certain geographical range of the project; price (including freight); aesthetics; appropriateness; and lighting, power and

telecommunications systems management and/or coordination as related to the facility (when applicable); and other project specific factors as identified and/or required. Emphasis must be to create a fully integrated design solution by providing quality products to meet the functional needs of the customer. Customer preferences must be considered. The focus must be on the best overall value. Use the GSA Best Value Determination forms provided in Part 6 of this RFP as guidelines for information to be provided.

E202001 MOVABLE ART WORK

Provide artwork for wall installation as part of the FF&E Submittal according to the project program. Installation of artwork to be completed by installation dealer specified in the approved FF&E package. Type of artwork to be determined by client requirements and budget as described in the Project Program for the project. Install framed artwork 63 inches (1600 mm) on center above finished floor. Include security mounting hardware as required.

E202002 MODULAR PREFABRICATED FURNITURE

E202002 1.1 FURNITURE SYSTEMS

Provide products that meet the NAVFAC performance specifications for systems furniture. The Government Interior Designer must approve any other systems furniture manufacturer. The typical workstation must maximize each allocated space with worksurfaces and overhead closed storage with a surface to accommodate a Government provided computer. An attached articulated keyboard/mouse tray must be selected or provided. Provide a monitor lift if required by the project program.

Powered raceways that will accommodate data and voice wire management must be completely coordinated with all facility systems. The Contractor's Interior Designer must ensure the coordination of all electrical/data and furniture locations. Use of power poles will not be permitted to power FF&E. Provide and coordinate all telecommunication receptacles and outlet requirements (i.e. RJ 11/45 receptacles and cover plates) with the Contractor's Interior Designer and the systems furniture installer. Hardwire all pre-wired furniture with the building systems, and coordinate all Information technology (IT) and telephone connections.

E202002 1.2 MODULAR FREESTANDING FURNITURE AND WORKSTATIONS

Provide products that meet the NAVFAC performance specifications for modular freestanding furniture including wood. Provide modular furniture with electrical/data cable trays and grommet holes for private offices and smaller work areas. An attached articulated keyboard/mouse tray (and monitor lift if required by the project program) must be selected. Provide wood surfaces as appropriate. Include accommodation for a Government provided computer and printer.

E202003 FREESTANDING FURNITURE

E202003 1.1 SEATING

E202003 1.1.1 Task Seating

Provide task seating that is fully ergonomic and coordinated by finish and scale to the workstation. Seating specifications to include: adjustable arms, back, height, and seat pan; 5 star base, appropriate castors for floor surface, lumbar support and availability in a minimum of two (2) sizes. Task seating can be from the same manufacturer as the systems or major furniture supplier or other seating manufacturer as approved by the government Interior Designer, provided it is determined to be a BPA "Best Value".

E202003 1.1.2 Lounge, Reception and Guest Seating

Provide lounge, reception and guest seating with upholsteries consistent with the Project Program. Seating must be easily reupholstered or have removable covers.

E202003 1.1.3 Training Room Seating

Provide seating with passive ergonomic features in that the seat and back offers some synchronized movement to allow the person seated to change positions. The support can be legs, sled base or single pedestal with 5 star base and casters as determined by user requirements. Provide high density stack chairs or nesting chairs as required. Provide attached, storable tablet arm as required.

E202003 1.2 STORAGE AND FILING

Provide freestanding storage units, file cabinets and file safes to accommodate the specific and unique storage requirements of the user. Coordinate closely with storage provided in PTS Section E10, *Equipment*, for high density filing.

E202003 1.3 CHILD DEVELOPMENT CENTERS

Provide all child care and classroom furnishings such as cribs, rocking chairs, feeding chairs, tables, seating, toy storage, book display storage, activity centers, freestanding floor activity toys, and any other required furnishings. Outdoor structural play equipment may be required. The cribs must be of stainless steel construction. The chairs and tables must be appropriately sized for each age group.

E202003 1.4 TRAINING/CONFERENCE ROOM FURNISHINGS

E202003 1.4.1 Tables

Provide single or multi-person worksurfaces or tables as determined from user requirements. Where computers are used, provide tables with wire management capability or pre-wired tables to accommodate data/telecommunications requirements. Powered raceways that will accommodate data and voice wire management must be completely coordinated with all facility

systems. The Contractor's Interior Designer must ensure the coordination of all electrical/data and furniture locations. Provide and coordinate all telecommunication receptacles and outlet requirements, hardwire all pre-wired furniture with the building systems and coordinate all IT and telephone connections.

E202003 1.4.2 Movable Presentation Furnishings

Provide audio-visual carts, lecterns, multi-media presentation cabinets to accommodate power/data requirements.

E202003 1.5 DINING ROOM FURNISHINGS

E202003 1.5.1 Cafeteria, Dining Hall Furnishings

Provide stackable seating and associated dollies for transport and storage, tables with folding or fixed legs or flip tops, and associated mobile carts for transport and storage, and trash and recycling containers.

E202003 1.5.2 Executive Dining Furnishings

Provide premium quality dining furnishings to include tables, chairs, buffet and serving units, hutches and cabinets as require by the Project Program.

E202004 RUGS & ACCESSORIES

E202004 1.1 RUGS

Provide Area or Accent rugs. Refer to the Project Program for requirements.

E202004 1.2 LAMPS

Provide decorative lamps. Refer to the Project Program for requirements.

E202004 1.3 INTERIOR LANDSCAPING

Provide artificial plants of a variety of sizes and 'species' to provide interior landscaping, including planters or containers for artificial plants to coordinate with the interior finishes and furnishings of the project.

E202004 1.4 OTHER DECORATIVE ITEMS

Refer to the Project Program for requirements.

E202090 OTHER MOVABLE FURNISHINGS

E202090 1.1 MISCELLANEOUS ITEMS

E202090 1.1.1 Containers

Provide waste receptacles, recycling containers, and ash urns as required.

E202090 1.1.2 Accessories

Provide clocks, wall mounted or freestanding literature and coat racks, and mirrors as required.

E202090 1.1.3 Small Equipment

Provide small appliances such as coffee pots, microwaves, refrigerators, washers, dryers, and icemakers, as required.

E202090 1.1.4 Special Equipment

Provide mailroom work and storage tables, mail sorter units, carts and equipment tables as required.

-- End of Section --

SECTION F10

SPECIAL CONSTRUCTION
12/18

F10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

F10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

F10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, Architecture UFC 3-301-01, Structural Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements

F10 1.2 PERFORMANCE VERTIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory special construction system performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction*

Quality Control.

F10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

F10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

All structural elements necessary for construction.

For a pre-engineered metal building, provide shop drawings showing engineering data and complete building drawings, signed and sealed by a registered professional engineer.

F1010 SPECIAL STRUCTURES

F101001 METAL BUILDING SYSTEMS

F101001 1.1 DESIGN REQUIREMENTS

The metal building manufacturer must be accredited in accordance with all Parts of the Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems (AC472) by the International Accreditation Service, Inc. Design the Metal Building System in accordance with the Metal Building Manufacturers Association (MBMA) Low Rise Manual.

All structural design must comply with the provisions of PTS Section B10, Superstructure. The steel structure must be as designed by the structural engineer. If used for thrust bracing, tie rods must be concrete encased. Design framed openings structurally.

F101001 1.1.1 Additional Roof Design Requirements

a. Roof Decking – In addition to any other load requirements, roof decking must be designed to support a 200-pound (91 kg) concentrated load at mid-span on a 12-inch (300 mm) wide section of deck.
b. When used as a diaphragm, roof decks must be designed in accordance with SDEI DDM.

F101001 1.1.2 Deflection

a. Structural Members

1) Maximum deflection of main framing members and for roof

members must not exceed values required by the International Building Code (IBC).

2) Purlins and Roof Panels: The deflection due to live, snow, or wind must not exceed L/180. The Basis of Design must establish that the roof when deflected under dead plus live or snow loads will not result in a negative gradient. Maximum deflections must be based on sheets continuous across two or more supports with sheets unfastened and free to deflect. Provide bracing of purlin compression flanges as required to resist applied loading.

b. Wall Panels - Maximum deflection of wall panels due to wind loads must be as required by the IBC and UFC.

F101001 1.2 WALL AND ROOF MATERIALS

F101001 1.2.1 Aluminum/Zinc-Coated Steel Sheet

American Society for Testing and Materials (ASTM) A792/ A792M, AZ 55.

F101001 1.2.2 Aluminum Sheet

Alloy 3004 Alclad conforming to ASTM B209.

F101001 1.3 FRAMING AND STRUCTURAL MEMBERS

F101001 1.3.1 Steel

ASTM A992 / A992M, ASTM A529/ A529M, ASTM A572/ A572M, or ASTM A588/ A588M.

F101001 1.3.2 Aluminum

ASTM B221 or ASTM C308.

F101001 1.3.3 Structural Tube

ASTM A500 or ASTM B221.

F101001 1.4 MISCELLANEOUS ITEMS

F101001 1.4.1 Fasteners

Fasteners must be compatible with the materials they are fastening to, be gasketed when exposed to weather to prevent leaks, and must provide both shear and tensile strengths not less than 750 pounds (3,336 N) per fastener. The main fastening system must use concealed fasteners, however, when exposed fasteners are needed, color fasteners must be color coated to match wall/roof panels.

F101001 1.4.2 Light Transmitting Roof Panels (Non-Insulated)

ASTM D3841, Type II, Grade 1

F101001 1.4.3 Insulation

Blanket-type fiberglass insulation with a factory applied facing on one side and having a permeance rating of 0.05 or less in accordance with ASTM E96.

a. Flame Spread Rating 75 or less, and a Smoke Developed Rating of 150 or less when tested in accordance with ASTM E84.
b. Insulation R-value in accordance with ASTM C236 as determined by energy use analysis or identified in the RFP.

F101001 1.5 FINISH

Factory Color Finish - Provide factory applied baked coatings to the exterior and interior of metal wall panels and metal accessories. Provide exterior finish top coat of 70 percent inorganic pigments with 0.8 mil dry film thickness (DFT). Provide exterior primer standard with panel manufacturer but not less than 0.8 mil DFT over the color topcoat and edge coating for projects within 300 feet (91 meters) of a water shoreline or industrial environments. Field apply 70 percent PVDF clear coat to unfinished panel edges or field cut panels. Interior finish exposed to sun or rain must be the same coating and DFT as the exterior coating. Interior finish protected from sun or rain exposure must receive 1.0 mil DFT coating of siliconized polyester (SMP) resin coating with organic or blended pigments and manufacturer's standard primer.

F1030 SPECIAL CONSTRUCTION SYSTEMS

F103001 VAULTS

This paragraph is for prefabricated vaults. See PTS Section E10, Equipment, for vault doors and day gates.

-- End of Section --

SECTION F20

SELECTIVE BUILDING DEMOLITION
12/18

F20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

F20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website , are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

F20 1.1.1 Industry Standards

Refer to UMRL for reference designation identification.

F20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 1-200-02, High Performance and Sustainable Building Requirements UFC 3-201-01, Civil Engineering UFC 3-101-01, Architecture)
UFC 3-810-01N	Navy and Marine Corps Environmental Engineering for Facility Construction

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 01 57 19	Temporary Environmental Controls
UFGS 01 57 19.01 20	Supplementary Temporary Environmental Controls
UFGS 02 82 16.00 20	Engineering Control of Asbestos Containing Materials
UFGS 02 82 33.13 20	Removal/Control and Disposal of Paint with Lead
UFGS 02 83 13.00 20	Lead in Construction
UFGS 02 84 16	Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury
UFGS 02 84 33	Removal and Disposal of Polychlorinated Biphenyls (PCBs)
UFGS 02 85 00.00 20	Mold Remediation
UFGS 31 21 13	Radon Mitigation

U.S. ARMY CORPS of ENGINEERS (USACE)

EM 385 -1-1	Safety -- Safety and Health Requirements or latest edition including changes

F20 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards prior to acceptance of the work. Items found not to be in compliance must be removed, or corrective measures taken, to assure compliance with the referenced standard. Disposal of materials must be as specified and performed in a manner to protect workers and existing structures to remain.

F20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE CRITERIA

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional

requirements.

F20 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-810-01N, *Navy and Marine Corps Environmental Engineering for Facility Construction*.

F20 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements and if applicable to this project, the Designer of Record (DOR) must obtain governing body approval for the construction submittals contained in the following UFGS sections and USACE Safety Manual as a minimum:

UFGS 01 57 19, *Temporary Environmental Controls*

UFGS 01 57 19.01 20, *Supplementary Temporary Environmental Controls*

UFGS 02 82 16.00 20, *Engineering Control of Asbestos Containing Materials*

UFGS 02 82 33.13 20, *Removal/Control and Disposal of Paint with Lead*

UFGS 02 83 13.00 20, *Lead in Construction*

UFGS 02 84 16, *Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury*

UFGS 02 84 33, *Removal and Disposal of Polychlorinated Biphenyls (PCBs)*
UFGS 02 85 00.00 20, *Mold Remediation*

UFGS 31 21 13, *Radon Mitigation* EM 385-1-1, *Safety and Health Requirements*, latest edition including changes

a. Engineering Safety Survey

b. Demolition Plan/ Deconstruction Plan

F2010 BUILDING ELEMENTS DEMOLITION

All demolition materials and appurtenances must be properly disposed of in accordance with all applicable regulations. Maximize the use of deconstruction and recycling services. Before demolition can commence, any hazardous materials must be abated in accordance with the requirements of the ESR and other parts of the RFP. Provide a Demolition Plan/ Deconstruction

Plan that is based on a Registered Engineers Survey in accordance with EM 385-1-1 and has been approved by the DOR. Obtain approval from the Contracting Officer for the proposed demolition plan and work/outage schedule prior to demolition activities.

F2010 1.1 GENERAL DEMOLITION

The work includes demolition, salvage of identified items and materials and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Materials that cannot be removed daily must be stored in areas specified in the approved Demolition Plan as described in Part 2 Section 01 57 19.

F2010 1.2 UTILITIES

Remove existing utilities and terminate in a manner conforming to the nationally recognized code covering the specific utility. Disturbance to utilities cannot cause a failure to utilities to remain operational, unless a planned outage is approved by the FEAD/ROICC and coordinated with on-site personnel.

F2010 1.3 DUST CONTROL

Perform dust control activities in accordance with approved Dirt and Dust Control Plan as described in Part 2 Section 01 57 19.

F2010 1.4 TRAFFIC CONTROL

Where pedestrian, vehicle, aircraft safety is endangered, use traffic barricades.

F2010 1.5 WEATHER PROTECTION

For portions of the building to remain, protect building interior, materials, and equipment from weather at all times.

F2010 1.6 BURNING

Perform burning operations in accordance with ESR Section F20.

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

Perform substructure or superstructure demolition work in accordance with ESR Section F20.

F201002 EXTERIOR CLOSURE

Perform exterior closure demolition work in accordance with ESR Section F20.

For occupied buildings ensure openings to the exterior are secured by the end of the work shift.

F201003 ROOFING

Perform roofing demolition work in accordance with ESR Section F20.

For removal and re-roofing projects, remove only as much roofing as can be re-covered by the end of the work shift.

F201004 INTERIOR CONSTRUCTION & FINISHES

Perform interior construction & finishes demolition in accordance with ESR Section F20.

F201005 CONVEYING SYSTEMS

Perform conveying systems demolition in accordance with ESR Section F20.

F201006 MECHANICAL SYSTEMS

Perform mechanical systems demolition in accordance with ESR Section F20.

F201007 ELECTRICAL SYSTEMS

Perform electrical systems demolition in accordance with ESR Section F20.

F201008 EQUIPMENT & FURNISHINGS

Perform special equipment and furnishing demolition in accordance with ESR Section F20.

F201009 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

Perform non-hazardous selective building demolition in accordance with ESR Section F20.

F2020 HAZARDOUS COMPONENTS ABATEMENT

Perform work in accordance with specification and plans provided in Parts 5 and 6.

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

The PQP must perform independent inspections, testing and verification of the hazardous components work as indicated in ESR Section F20 and the approved work plans as described in Part 2 Section 01 57 19. The PQP must be appropriately licensed in the state in which the work will be performed.

F2020 1.2 FURNISHINGS

The government must remove all uncontaminated furnishings and equipment from the work area prior to the start of the work.

F2020 1.3 OZONE DEPLETING SUBSTANCES (ODS)

Perform ozone depleting substances (ODS) related work as indicated in the RFP and in accordance with Section 01 57 19.

F2020 1.4 DISPOSAL

All waste materials will become the property of the Contractor and must be transported, disposed of and recycled in accordance with the approved disposal plan as described in Part 2 Section 01 57 19.

F202001 *SUBSTRUCTURE & SUPERSTRUCTURE*

F202002 *EXTERIOR CLOSURE*

F202003 *ROOFING*

F202004 *INTERIOR CONSTRUCTION & FINISHES*

F202005 *CONVEYING SYSTEMS*

F202006 *MECHANICAL SYSTEMS*

F202007 *ELECTRICAL SYSTEMS*

F202008 *EQUIPMENT & FURNISHINGS*

F202009 *OTHER HAZARDOUS SELECTIVE BUILDING DEMOLITION*

Perform all other building components abatement work in accordance with ESR Section F20.

-- End of Section --

SECTION G10

SITE PREPARATION
12/18

G10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

G10 1.1.1 Industry Standards and Codes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

Refer to UMRL for reference designation identification.

G10 1.1.2 Government Standards

CORPS OF ENGINEERS (COE)

COE EM 385-1-1	Safety and Health Requirements Manual

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-

	Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 1-200-02, High Performance and Sustainable Building Requirements UFC 3-201-01, Civil Engineering UFC 3-220-01, Geotechnical Engineering)
UFC 3-810-01N	Navy and Marine Corps Environmental Engineering for Facility Construction

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 31 23 00.00 20	Excavation and Fill
UFGS 01 57 19	Temporary Environmental Controls
UFGS 01 57 19.01 20	Supplemental Temporary Environmental Controls
UFGS 02 61 13	Excavation and Handling of Contaminated Material
UFGS 02 61 23	Removal and Disposal of PCB Contaminated Soils
UFGS 02 65 00	Underground Storage Tank Removal

G10 1.2 PERFORMANCE VERIFICATION AND ACCEPTABLE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements. Verify earthwork performance via testing detailed in the paragraph, "Field Quality Control", in UFGS Section 31 23 00.00 20, *Excavation and Fill*.

G10 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-201-01, *Civil Engineering*, and UFC 3-220-01, *Geotechnical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text

are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR is required to edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 31 23 00.00 20, *Excavation and Fill.*

Provide sustainability submittals in accordance with Part 2 Section 01 33 29.05 20 *Sustainability Reporting for Design-Build*.

G10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) is required to approve the following construction submittals as a minimum:

Submittals in Part 2 Section 01 57 19, *Temporary Environmental Controls.*

Submittals in UFGS Section 01 57 19.01 20, *Supplemental Temporary Environmental Controls*.

Submittals in UFGS Section 02 61 13, *Excavation and Handling of Contaminated Material* Submittals in UFGS Section 31 23 00.00 20, *Excavation and Fill*.

Submittals in UFGS Section 02 61 23, *Removal and Disposal of PCB Contaminated Soils.*

Submittals in UFGS Section 02 65 00, *Underground Storage Tank Removal.*

Waste Management Plan in accordance with Part 2 Section 01 74 19.05 20, *Construction and Demolition Waste Management for Design-Build*.

Provide sustainability submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*.

G10 1.5 GEOTECHNICAL REPORT

G10 1.5.1 Subsurface Soils Information

Provided subsurface soil information is included for the Contractor's information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP is intended for proposal preparation and preliminary design only. Perform, at the Contractor's expense, such subsurface exploration, investigation, testing, and analysis for the design and construction of the site improvements.

G10 1.5.2 Contractor-provided Geotechnical Engineer

The Contractor-provided Geotechnical Engineer is required to be experienced with soil conditions in the region where the project site is located. The Geotechnical Engineer is required to evaluate the RFP data, obtain and evaluate additional data to support the design and construction, and prepare a Geotechnical Report.

Coordinate work by the Contractor-provided Geotechnical Engineer at the project location with the Contracting Officer so as not to interfere with normal base operations. A minimum of two weeks prior to the Foundation Work Design submittal, provide the Contractor's Geotechnical Report (a searchable Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report will become the property of the Government. Provide the geotechnical reports generated during construction, such as pile driving results and analysis, to the Contracting Officer. In addition, provide a searchable Adobe Acrobat PDF version and two printed copies for record keeping purposes.

G10 1.5.3 Contractor-Provided Geotechnical Report

Submit a written Geotechnical report based upon Government-provided subsurface investigation data and additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. Include in the Geotechnical Report all requirements listed in UFC 3-220-01, *Geotechnical Engineering*, paragraph entitled "Section 1803 Geotechnical Investigations"; in addition, include the following:

a. The project site description, vicinity map and site map indicating the location of borings and any other sampling locations. Provide 24 hour groundwater observations for at least 20 percent of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.

b. Results of field and laboratory testing, whether Government or Contractor-provided. Address existing subsurface conditions, selection and design of the foundation and floor slab, underground construction including utility installation and other site specific requirements (such as soil stabilization and slope stability).

c. Engineering analysis, discussion and recommendations Addressing:

1) Settlement analysis - Limit settlement in accordance with UFC 3-220-01 *Geotechnical Engineering* and EM 1110-1-1904 "Settlement Analysis".

2) Bearing Capacity analysis.

3) Foundation selection (shallow, deep, special) and construction considerations; dimensions, and installation procedures.

4) Site preparation (earthwork procedures and equipment, compaction requirements, building slab preparation, soil sensitivity to weather and equipment, groundwater influence on construction, mitigation of expansive soils or liquefaction potential, and dewatering requirements).

5) Sheeting and shoring considerations.

6) Pavement design calculations with parameters defined, actual or assumed, and recommended thicknesses and materials.

7) Infiltration rate.

8) Haul routes and stockpile locations for earthwork.

9) Calculations to support conclusions and recommendations.

10) Present recommendations on a structure-by-structure basis.

A registered Geotechnical Engineer is required to sign the Geotechnical Report.

Accompany the submitted report with a cover letter identifying any report recommendations proposed to be adopted into the design which are interpreted by the Contractor as a changed condition to the Geotechnical or Pavement related requirements of the RFP.

G10 1.5.4 Geotechnical Site Data required in Design Drawings

The Contractor's final design drawings must include the Government-provided subsurface data presented in the RFP, as well as additional borings and laboratory test result data performed by the Contractor. The data provided is required to include:

a. Logs of Borings and related summary of laboratory test results and groundwater observations. Provide 24 hour groundwater observations for at least 20 percent of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.

b. Indicate the locations of borings on the drawings. Revise the design drawings to reference the Contractor's Geotechnical Report as being a basis for design.

G1010 SITE CLEARING

G1010 1.1 GENERAL

Clear and grub project site for project construction.

G1010 1.2 BURNING

Where burning is permitted, adhere to the federal, state, and local regulations.

G101001 CLEARING

G101001 1.1 CLEARING

Clear trees, shrubs, brush and vegetation for construction of the project. Clearing includes the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared.

G101001 1.2 PRESERVATION

Preserve and protect trees, shrubs and vegetation not directly impacted by the construction in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls,* and PTS Section G205005, paragraph 1.1 *Existing Plant Material to Remain or be Transplanted*.

G101002 TREE REMOVAL

Remove and dispose of trees to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a subbase.

G101003 STUMP REMOVAL

Remove stumps to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a subbase.

G101004 GRUBBING

Within the clearing limits, remove and dispose of logs, shrubs, brush, matted roots, roots larger than 2 inches (50 mm) in diameter, and other debris to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions made by grubbing with satisfactory material and compact to make the new surface conform to the adjacent surface of the ground.

G101005 SELECTIVE THINNING

G101005 1.1 TREE THINNING

Trim trees to remain of dead branches 1-1/2 inches (38 mm) or more in diameter. Cut limbs and branches in accordance with ANSI A300.

G101006 DEBRIS DISPOSAL

Prevent spillage on pavements, streets, or adjacent areas. Dispose of surplus and unsuitable material off of Government property.

G1020 SITE DEMOLITION & RELOCATIONS

G1020 1.1 GENERAL

Demolition work includes the demolition, removal and legal disposal of existing construction debris to accommodate the new construction. Take precautions to prevent damages to existing utilities, construction and materials not scheduled for demolition, repair or replacement; repair damages to the construction and materials to the satisfaction of the Contracting Officer and at no additional cost to the Government.

G1020 1.2 AUTHORIZATION

Do not begin demolition until the Demolition Plan has been approved by, and authorization is received from, the Contracting Officer.

G1020 1.3 TITLE TO MATERIALS

Whenever possible, salvage or recycle features demolished in lieu of disposing of as waste in a landfill. Existing features to be demolished which are not salvageable or reused become the property of the Contractor, and must be removed from the project site. The Government will not be responsible for the condition, loss of, or damage to, such property after contract award. Materials and equipment cannot be viewed by prospective purchasers or sold on the site.

G1020 1.4 REUSE OF MATERIALS AND EQUIPMENT

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses.

G1020 1.5 SALVAGED MATERIALS AND EQUIPMENT

Deliver salvaged materials and equipment that are to be removed by the Contractor and that are to remain the property of the Government to a storage site on the installation, in accordance with instructions of the Contracting Officer.

G102001 BUILDING MASS DEMOLITION

Refer to Section F20, *Selective Building Demolition*, for additional information.

G102002 ABOVEGROUND SITE DEMOLITION

G102002 1.1 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of a building or on pavements and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water for dust control if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements to control the spread of debris that may result in foreign object damage potential to aircraft.

G102002 1.2 PROTECTION

G102002 1.2.1 Traffic Control

Where pedestrian and driver safety is endangered in the area of removal work, provide traffic control in accordance with FHWA Manual on Uniform Traffic Control Devices (MUTCD).

G102002 1.2.2 Foreign Object Damage (FOD)

Remove potential FOD debris and waste materials on or adjacent to operational airfield pavements due to the Contractor's operations. Install a temporary barricade at the Contractor's expense. The barricade is required to include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

G102002 1.2.3 Existing Work

Protect existing work that is to remain in place, be reused, or remain the property of the Government. At no additional expense to the Government, repair items that are damaged during performance of the work to original condition, or replace with new. Do not overload pavements to remain.

G102002 1.3 PAVING AND SLABS

Remove concrete and asphaltic concrete paving and slabs as required for construction of project. Remove the existing aggregate base in areas to receive new pavement to the depth of the proposed pavement section below new finish grade. Remove the existing aggregate base in areas not to receive new pavement to a depth of 8 inches (200 mm) below existing adjacent grade and break remaining pavement (if any) to allow drainage. Provide neat sawcuts at limits of pavement removal; protect sawcuts so that new pavement butts against the existing without feathering.

G102003 UNDERGROUND SITE DEMOLITION

G102003 1.1 UTILITY TERMINATION

Terminate utilities in accordance with state and local rules and regulations; the nationally recognized code; and the requirements of the utility provider covering the specific utility; UFC 3-201-01, *Civil Engineering*; and approved by the Contracting Officer.

G102003 1.2 PROTECTION OF EXISTING UTILITIES

Protect existing utilities to remain. Where removal of existing utilities and pavement is required, provide approved barricades, temporary covering of exposed areas, and temporary services or connections. Repair damage to existing utilities to remain at no additional expense to the Government.

G102004 BUILDING RELOCATION

Refer to Section F20, *Selective Building Demolition*, for additional information.

G102005 UTILITY RELOCATION

Repair relocated items that are damaged or replace damaged items with new undamaged items at no additional expense to the Government.

G102006 FENCING RELOCATION

Remove and replace post foundations. Repair relocated items that are damaged or replace damaged items with new undamaged items at no additional expense to the Government. Refer to Section G204001 for requirements for new fence systems.

G102007 SITE CLEANUP

Remove rubbish and debris from the installation daily; do not allow accumulations inside or outside the building(s) or on pavements. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

G102007 1.1 SPILLS

In the event of a spill or release of hazardous substances, pollutant, contaminant or oil, notify the Contracting Officer immediately. Take immediate containment actions to minimize the effect of any spill or leak in accordance with the ESR and the approved spill work plan as described in Part 2 Section 01 57 19, *Temporary Environmental Controls*. Perform clean up at no additional expense to the Government.

G1030 SITE EARTHWORK

G1030 1.1 GENERAL

This section includes the design and construction requirements for earthwork and grading related to construction of the roadways, parking, paved areas and other related sitework. Refer to Section A10, *Foundations*, for earthwork related to construction of structures, including building, footings, foundations, retaining walls, slabs, tanks, and utility appurtenances.

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, *Excavation and Fill*, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Provide site grading in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.

G103001 1.1 ELEVATIONS

Establish finish floor elevations in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*, and UFC 3-101-01, *Architecture*.

G103001 1.2 SITE GRADING

Grade the site such that associated storm water runoff does not adversely affect surrounding sites. Preserve natural topographic features to minimize the impact on the existing drainage patterns at and adjacent to the site.

G103001 1.3 FINISHED SURFACES

Provide finish grading with drainage towards new and existing drainage features and with no resulting low spots that hold water or that direct runoff towards new or existing facilities or site amenities.

G103001 1.4 RODENT AND VEGETATION CONTROL

Prevent and eliminate standing water.

G103002 COMMON EXCAVATION

Preserve natural topographic features to minimize cut and fill requirements. Unsuitable material and surplus excavation becomes the property of the Contractor, and must be disposed of as indicated in the Project Program.

G103003 ROCK EXCAVATION

If blasting is allowed, conduct it in accordance with EM 385-1-1 and Federal, state, and local safety regulations. Provide blasting mats and use non-electric blasting caps. Notify the Contracting Officer 24 hours prior to blasting.

Do not make requests for additional compensation for degree of hardness or difficulty encountered in removal of material. Unsuitable material and surplus excavation becomes the property of the Contractor, and must be disposed of as indicated in the Project Program.

G103004 FILL & BORROW

G103004 1.1 SOURCES

Where sufficient topsoil and satisfactory materials are not available on the project site, provide suitable borrow materials.

G103004 1.2 REQUIREMENTS FOR OFF SITE SOIL

Test off-site soil in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*, section titled "Requirements for Off Site Soil".

G103004 1.3 UNSATISFACTORY SOIL MATERIALS

Remove uncontaminated unsatisfactory soil materials from the site. Unsatisfactory materials are materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, backfills from previous construction or material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3

inches. The Contracting Officer shall be notified of any contaminated materials.

G103004 1.4 TOPSOIL

Refer to Section G2050, "Landscaping". Remove unsatisfactory, existing topsoil from the site in accordance with the Project Program.

G103005 COMPACTION

Provide compaction in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*, and the recommendations of the Contractor's Geotechnical Engineer, whichever is greater.

G103006 SOIL STABILIZATION

Provide soil stabilization designed to function as required by site conditions in accordance with the State Highway specifications and standards in the state where the project is located. Apply and install geosynthetics in accordance with the manufacturer's written instructions.

G103007 SLOPE STABILIZATION

Provide slope stabilization methods in accordance with the State Highway specifications and standards in the state where the project is located. Design and install manufactured products, gabions, geogrids, rock anchors in accordance with the manufacturer's written instructions.

G103008 SOIL TREATMENT

G103008 1.1 TERMITE CONTROL

Refer to Section A1010 1.2, "Termite Control".

G103009 SHORING

Provide sheeting, shoring, bracing, cribbing and underpinning in accordance with the Army Corps of Engineer's Safety and Health Requirements Manual (COE EM 385-1-1), UFC 3-220-01, *Geotechnical Engineering*, UFC 3-301-01, *Structural Engineering*, and other Federal, State and local codes and requirements.

Provide protection of existing structures.

G103010 TEMPORARY DEWATERING

The design of the temporary dewatering system is required to account for soil conditions, rainfall, fluctuations in the groundwater elevations and the potential settlement impact on adjacent facilities due to dewatering. Provide dewatering in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*. While the excavation is open, maintain the water level continuously, at least 1.0 foot (0.30 m) below the working level.

French drains, sumps, ditches or trenches are not allowed within 3 feet (0.9 m) of the foundation of any structure without written approval of the Government's Civil/Geotechnical Reviewer.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

G103011 1.1 TEMPORARY EROSION & SEDIMENT CONTROL

Develop and implement temporary erosion and sediment control measures and other Best Management Practices (BMPs) prior to or in conjunction with commencement of earthwork in accordance with the state Erosion and Sediment Control Laws and Regulations. Remove non-permanent erosion control measures after vegetation is fully established.

G103011 1.2 MAINTENANCE

Maintain temporary erosion control measures in accordance with state Erosion and Sediment Control Laws and Regulations throughout the project until areas are fully stabilized.

G103090 OTHER SITE EARTHWORK

G103090 1.1 HISTORIC AND ARCHAEOLOGIC ARTIFACTS

Refer to Part 2 Section 01 50 00.05 20, *Temporary Facilities and Controls for Design-Build*.

G103090 1.2 PIPELINE CASING UNDER RAILROADS OR PAVEMENTS

Where required by code or local practice provide casing for piping under railroads or pavements. The Contractor is responsible for obtaining permits from government and nongovernment owners/agencies as required to perform the work.

G103090 1.3 TOPSOIL AND SEED

Provide topsoil and seed according to UFGS Section 31 23 00.00 20, *Excavation and Fill*, except when landscaping is required.

G1040 HAZARDOUS WASTE REMEDIATION

Perform work in accordance with specification and plans provided in Parts 5 and 6.

G1040 1.1 DISPOSAL

Manage, transport and dispose of waste materials in accordance with specification and plans provided in Parts 5 and 6.

-- End of Section --

SECTION G20

SITE IMPROVEMENTS
12/18

G20 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G20 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of Contract award.

G20 1.1.1 Industry Standards and Codes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

AMERICAN SOD PRODUCERS ASSOCIATION (ASPA)

U.S CONSUMER PRODUCT SAFETY COMMISSION, PUBLICATION NO. 325

Refer to UMRL for reference designation identification.

G20 1.1.2 Government Standards

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191	Fencing and Wire and Post Metal (and Gates, Chain-link Fence Fabric, and Accessories)

FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements) (A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 1-200-02, High Performance and Sustainable Building Requirements UFC 3-201-01, Civil Engineering UFC 3-201-02, Landscape Architecture UFC 3-210-01, Low Impact Development UFC 3-220-01, Geotechnical Engineering
UFC 3-250-01	Pavement Design for Roads and Parking Areas
UFC 3-270-01	Asphalt Maintenance and Repair
UFC 3-270-02	Asphalt Crack Repair
UFC 3-270-03	Concrete Crack and Partial Depth Spall Repair
UFC 3-270-04	Concrete Repair
UFC 4-022-02	Selection and Application of Vehicle Barriers
UFC 4-022-03	Security Fences and Gates

G20 1.2 QUALITY ASSURANCE

G20 1.2.1 Qualifications of Tree Location Contractor

Contractor is required to be a professional tree moving company holding Landscape Contractor's license in the state where the work is to be performed and have a minimum ten years of tree relocation experience. Contractor must be a Certified Arborist certified by the International Society of Arboriculture. Arborist is required to oversee all tree moving operations during construction.

G20 1.2.2 Qualifications of New Landscape Contractor

Construction company must hold a Landscape Contractor's license in the state where the work is to be performed and have a minimum five years of landscape construction experience.

G20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the

design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

Verify satisfactory performance via Performance Verification, as detailed in this section of the RFP. Verify satisfactory performance also via testing as detailed in the paragraph, Field Quality Control, in UFGS Specification Sections utilized.

G20 1.3.1 Subgrade Preparation Performance Verification

Perform subgrade preparation in accordance with PTS Section G10. If required by the Designer of Record, perform proof rolling. Perform proof rolling in the presence of the Contracting Officer. Rutting or pumping of material is required to be undercut and replaced with satisfactory soil materials as defined in Section G10, *Site Preparation*.

G20 1.3.2 Base Course Performance Verification

G20 1.3.2.1 Aggregate Base Course

a. Sampling: ASTM D75/D75M.
b. Gradation: ASTM C136.
c. Thickness: Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square yards (418 square meters); minimum 2 tests.
d. Density: ASTM D1556 or ASTM D6938. One field test for every 1000 square yards (836 square meters); minimum 2 tests. ASTM D1557, Method A, B or C; one laboratory test for the project.
e. Visual: Provide smooth surface with no ruts.

G20 1.3.2.2 Other Types of Base Courses

For other types of base courses, provide field testing in accordance with the SHS.

G20 1.3.3 Bituminous Concrete Pavement Performance Verification

- Visual: Provide finished surface that is uniform in texture and appearance and free of cracks and creases.
- Sampling: ASTM D979.
- Job Mix: Determine gradation and bitumen content. One sample for every 400 tons (362,500 kilograms); minimum 1 test.
- Thickness: ASTM D3549. Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm) for bituminous base course and plus or minus 0.25 inches (6 mm) for bituminous surface course. One test for every 500 square yards (418 square meters); minimum 2 tests.
- Surface Smoothness: Test surface smoothness by using a

10 foot (3 meter) straightedge in transverse and longitudinal directions to pavement. Acceptable tolerances are plus or minus 0.25 inches (6 mm) for bituminous base and surface courses.

- Density: Conduct field density of in-place compacted pavement in accordance with ASTM D2950 and correlated with ASTM D1188 or ASTM D2726/D2726M. One field test for every 1000 square yards (836 square meters); minimum 2 tests. One laboratory test for the project.

G20 1.3.4 Portland Cement Concrete Pavement Performance Verification

- Visual: Provide finished surface that is uniform in texture and appearance and free of cracks.
- Sampling: ASTM C31/C31M.
- Thickness: Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square feet (418 square meters); minimum 2 tests.
- Surface Smoothness: Test surface smoothness by using a 12 foot (3.6 meter) straightedge in transverse and longitudinal directions to pavement. Provide finished surfaces of the pavements with no abrupt change of 0.71 inch (18 mm) or more.
- Strength: Samples for strength tests of each mix design of concrete placed each day are required to be taken not less than once a day, nor less than once for each 100 cubic yards (120 cubic meters) of concrete, nor less than once for each 5000 square feet (500 square meters).

1) Compressive Strength: ASTM C39/C39M. Make five test cylinders for each set of tests. Test two cylinders at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Determine each strength test result by the average of two cylinders from the same concrete sample tested at 28 days. If the average of any three consecutive strength test results is less than f'c or if any strength test result falls below f'c by more than 500 psi, take a minimum of three ASTM C42/C42M core samples from the in-place work represented by the low test cylinder results and test. Consider the concrete represented by core test structurally adequate if the average of three cores is equal to at least 85 percent of f'c and if no single core is less than 75 percent of f'c. Retest locations represented by erratic core strengths.

2) Flexural Strength: ASTM C78/C78M. Make four test specimens for each set of tests. Test two specimens at 28 days, and the other two at 90 days. Concrete strength will be considered satisfactory when the minimum of the 90-day test results equals or exceeds the specified 90-day flexural strength, and no individual strength test is less than the design strength. If the ratio of the 28-day strength test to the specified 90-day strength is less than 65 percent,

make necessary adjustments for conformance.

- Remove concrete not meeting strength criteria and provide new acceptable concrete at no expense to the Government. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

G20 1.3.5 Concrete Joint Performance Verification

Install a test section of 500 linear feet (150 m) at start of sealing operation for each sealant to be used. Obtain approval of test section by Contracting Officer prior to installing additional joint seal. Reject joint sealer that fails to cure properly, or fails to bond to joint walls, or reverts to uncured state or fails in cohesion, or shows excessive air voids, blisters, or has surface defects, swells, or other deficiencies, or is not recessed within indicated tolerances. Remove rejected sealer and reclean and reseal joints.

G20 1.3.6 Topsoil Performance Verification

Prior to planting design, provide a commercial soil analysis. Amend planting areas based on the soil test's interpretation, amendment type, and quantity recommendations (including soil nutrients and texture, with percentages shown). Use additional topsoil only in areas where soil analysis shows that the existing soil is inadequate for growth of plant materials.

G20 1.3.7 Final Inspection for Planting and Irrigation

Request the final inspection in writing at least 10 days prior to the last day of the planting and irrigation Establishment Period. The Landscape Contractor must attend the inspection with the Contracting Officer and document the inspection. The Landscape Architect-of-Record must also attend the inspection and provide the Contracting Officer with a letter certifying that the planting and irrigation is installed per the plans and irrigation coverage is correct and appropriate for optimum plant survival. At the end of the Establishment Period, remove stakes and guy cables.

G20 1.3.8 Landscape and Irrigation Establishment Period and Guarantee

Guarantee transplanted trees, newly planted vegetation and irrigation systems for a period of one year after the Contracting Officer's final acceptance. This acceptance, and the submittal of irrigation as-builts and controller charts, begins the Establishment Period. Replace trees, shrubs, and ground covers that die or have 20 percent or more of their crowns that die during planting operations or the guarantee period with healthy plants of the same species or variety during the appropriate planting season. The Landscape Architect-of-Record must, along with the Contracting Officer, attend, approve and document the start of the Establishment Period and document quarterly and final inspections. The Landscape Architect of Record must document quarterly and final inspections by submitting written reports with photographs to the Contracting Officer. During this

period, perform tasks including, but not limited to: watering, mowing, overseeding, fertilizing, mulching, pruning, weeding, eradicating pests (rodents, rabbits, insects, mammals and fungus), restaking, adjusting guy wires, adjusting irrigation systems, maintaining erosion control materials, removing dead or broken branches by pruning in accordance with ANSI A300 Part 1, maintaining edging of planter beds, checking for girdling of trees, removal of trash and debris, and replenishing mulch to assure plant material is in a healthy and thriving condition or replace plant material at Contractor's expense. Reseed broadcast seeded or hydro-seeded areas that do not achieve the 95-percent coverage by the end of the Establishment Period by the same method and maintain an additional 120 days to ensure coverage requirements are met. Maintain turf in a manner that promotes proper health, growth, rich natural green color, and a neat, uniform, manicured appearance, free of bare areas, ruts, holes, weeds, pests, dead vegetation, debris, and unwanted vegetation that present an unsightly appearance. Mow weekly during the growing season and remove excess clippings.

G20 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with UFC 1-200-01, *DoD Building Code*(*General Building Requirements)*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-201-01, *Civil Engineer*ing.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR is required to edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

32 11 16.13, *Sand-Clay [Base] [Subbase] Course*

32 11 16.16, *[Base Course for Rigid] [and Subbase Course for Flexible] [Subbase Course for Pervious] Paving*

32 11 24, *Graded Crushed Aggregate Base Course for [Pervious][Flexible] Pavement*

32 11 26.16, *Bituminous Concrete Base Course*

32 11 33, *Cement Stabilized [Base] [Subbase] Course at Airfields and Roads*

32 11 36.13, *Lean Concrete Base Course*

32 12 17, *Hot Mix Bituminous Pavement*

32 13 13.06, *Portland Cement Concrete Pavement for Roads and Site Facilities*

32 13 43, *Pervious Concrete Paving*

32 16 15, *Concrete Block Pavements*

Provide sustainability submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*.

G20 1.5 CONSTRUCTION SUBMITTALS

Submit a transplanting plan for projects which include transplanting trees. Submit the plan showing existing and proposed locations of transplanted trees. Include in the plan delineate methods and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. Include also in the plan equipment, anti-desiccant, and pesticides to be used. Provide a listing of the plant material to be transplanted by common name and botanical name as listed under "Nomenclature" in ANSI Z60.1; classification; caliper; and height.

Provide sustainability submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design Build*.

G20 1.5.1 Transplanting Plan

Submit a transplanting plan for projects which include transplanting trees. Submit the plan showing existing and proposed locations of transplanted trees. Include in the plan delineate methods and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. Include also in the plan equipment, anti-desiccant, and pesticides to be used. Provide a listing of the plant material to be transplanted by common name and botanical name as listed under "Nomenclature" in ANSI Z60.1; classification; caliper; and height.

G20 1.5.2 As-Builts

Submit a complete set of irrigation as-builts to the Contracting Officer, to include the recording of measurements onto a record set of full-size project irrigation plans. Indicate measurements for locating water meters, pressure supply lines at 100 foot (30 m) intervals, backflow prevention devices, rain/freeze sensors, valves (including quick couplers and hose bibbs), controllers (and control wire, if routed separately from pressure supply line); dimensioned from two permanent points of reference, such as building corners, sidewalks, and other permanent features.

G20 1.6 ANTITERRORISM (AT) STANDARDS

Incorporate the minimum AT standards indicated in UFC 4-010-01, *DoD Minimum Antiterrorism Standard for Buildings*.

G20 1.7 PROJECT LIMITATIONS

Prior to the start of design, determine the exact limit-of-work line

for the project periphery, considering items such as, but not limited to, utility work, landscape areas, and laydown areas. See PTS G2050 for limits of landscape areas.

G2010 ROADWAYS

G2010 1.1 PAVEMENT DESIGN

Provide geometric and pavement design, including minimum pavement sections, in accordance with UFC 3-201-01, *Civil Engineering*, and the State Department of Transportation. Provide pavement calculations in accordance with FC 1-300-09N, *Navy and Marine Corps Design Procedures*. Provide any required additional pavement design to provide a complete and useable facility.

For pavements subject to aircraft traffic or aircraft ground support equipment traffic consult Government Civil Reviewer for design criteria and requirements. State Department of Transportation standards are not acceptable for airfield pavements.

G2010 1.2 PAVEMENT AESTHETICS

Provide surfaces consistent in color and finish.

G2010 1.3 TRAFFIC CONTROL DEVICES

Provide and install new traffic control devices (i.e., signs and markings) in accordance with the United States Department of Transportation Federal Highway Administration's *Manual on Uniform Traffic Control Devices* and their standard, "Rigid Sign Supports". Also provide new traffic control devices along/in the existing streets adjacent to the project site as necessary to provide complete traffic control to the new facilities.

G2010 1.4 EXISTING UTILITY STRUCTURES

Adjust existing utility structures to meet the new finished pavement grades as required.

G201001 BASES & SUBBASES

Prepare subgrade in accordance with Section G10, *Site Preparation*. Use geotextiles for separation or reinforcement in accordance with manufacturer's instructions. Provide base course under paved areas in accordance with the State Highway specifications (SHS) in the state where the project is located.

Place base course in accordance with the SHS for that particular base course and in layers of equal thickness with no compacted layer more than 6 inches (150 mm) thick. Compact base course at optimum moisture content to 100 percent ASTM D 1557 maximum dry density.

Where SHS are not available or applicable, the Designer of Record must utilize the UFGS Specification Sections referenced under paragraph 1.1.2 entitled "Government Standards" for the project specification. Submit these specifications in edited form as a part of the design submittal for the

project.

G201002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the SHS and standards or as specified in UFC 3-201-01, *Civil Engineering*, whichever is more stringent. Where the SHS do not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of the SHS for a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete.

G201003 PAVED SURFACES

Where SHS are not available or applicable, the Designer of Record must utilize the UFGS Specification Sections referenced under paragraph 1.1.2 entitled "Government Standards" for the project specification. Submit these specifications in edited form as a part of the design submittal for the project.

G201003 1.1 PAVEMENT MIX

G201003 1.1.1 Bituminous Concrete Pavement

Provide bituminous concrete pavement in accordance with the standard mix of the SHS based on the pavement design and vehicle loading indicated in this RFP.

G201003 1.1.1.1 Bituminous Concrete Placement

Provide bituminous concrete placement, including minimum temperature during placement, joints, and maximum lift thickness in accordance with the SHS. Compact bituminous concrete in accordance with the SHS, modified to 96 percent of maximum laboratory density.

G201003 1.1.2 Portland Cement Concrete Pavement

If reinforced, provide the welded wire fabric in conformance to ASTM A185. Provide bar reinforcement in conformance to ASTM A615/A615M, Grade 400 (Grade 60).

Provide concrete in accordance with the standard mix of the SHS for the design strength required by UFC 3-201-01, *Civil Engineering*, plus allowable deviations. Unless noted otherwise in Part 3 or Part 6, provide a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete.

If required for sustainability goal, provide Portland cement concrete pavement with a Solar Reflectance Index (SRI) greater than or equal to 29.

G201003 1.2 JOINTS FOR PORTLAND CEMENT CONCRETE PAVEMENT

Provide joints in accordance with SHS and UFC 3-250-01, *Pavement Design for Roads and Parking Areas*. Install joints in a manner and at such time to prevent random or uncontrolled cracking. Locate joints to form

a regular rectangular pattern. Wherever curved pavement edges occur, make joints to intersect tangents to curve at right angles.

G201003 1.2.1 Expansion Joints

Provide thickened edge expansion joints at the intersection of two rigid pavements. Use preformed joint filler, ASTM D1751. Provide filler that is compatible with joint sealer material. Hold preformed joint filler in position during concreting operations.

G201003 1.2.2 Isolation Joints

Provide thickened edge isolation joints by placing a 1/2-inch (12 mm) preformed joint filler (ASTM D 1751) around each structure that extends into or through the pavement before concrete is placed at that location.

G201003 1.2.3 Contraction Joints

Saw joint lines within specified tolerance, straight, and extend for width of transverse joint, and for entire length of longitudinal joint.

G201003 1.2.4 Construction Joints

If an emergency stop occurs remove the concrete back to location of transverse joint and install a construction joint.

G201003 1.2.5 Joint Sealants

ASTM D5893/D5893M; provide single component cold-applied silicone. Provide a self-leveling and non-acid curing silicone sealant.

G201003 1.2.6 Preformed Compression Seals

Use preformed compression seals in areas where silicone joint sealant does not perform, such as areas subject to water inundation, blasts, or constant/repeated fuel spillage.

ASTM D 2628. ASTM D 2835, for lubricant.

G201003 1.3 PRIME COAT

Use prime coat in accordance with the SHS. Use emulsified asphalt for prime coat materials.

G201003 1.4 TACK COAT

Tack coat is required for bituminous pavement overlays and on vertical cut faces of pavement patches. Provide tack coat in accordance with the SHS.

G201003 1.5 PAVEMENT PATCHES

Provide pavement patches for existing pavements where required for installation of utility trenches. Sawcut 12 inches beyond edge of trench. Provide thicknesses of pavement materials equal to or greater than the existing pavement section.

For spalls or repairs of existing concrete pavement, perform repairs in conformance with UFC 3-270-03, *Concrete Crack and Partial Depth Spall Repair*, and UFC 3-270-04, *Concrete Repair*. Provide spall repair materials that are either Rapid Setting Cementitious Concrete (RSCC), epoxy concrete, or polymer-modified Portland Cement (non-sag mortar) products specially formulated for spall repairs, with a proven record (in service at least three years) of satisfactory use under loading and environmental conditions similar to those at the location of intended use. Provide a manufacturer's data sheet and certificate supporting the satisfactory use to the Contracting Officer with the design. A product manufacturer's representative is required to be present during the initial two days of product application to verify that manufacturer's instructions for use are adhered to by the Contractor. Give the Contracting Officer 7 days notice prior to the initial application in order to be present.

G201004 MARKING & SIGNAGE

G201004 1.1 MARKING

Provide pavement markings in accordance with the SHS. Design materials for life expectancy of at least 3 years under an average daily traffic count per lane of approximately 9000 vehicles. Water based paints must have durability rating of at least 4 when determined in the wheel path area.

Provide a half-rate initial marking application on bituminous pavements. Provide the remaining application at the end of the normal curing period.

G201004 1.2 SIGNAGE

Provide signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

G201005 GUARDRAILS & BARRIERS

G201005 1.1 GUARDRAILS

Provide guard (guide) rails in accordance with the SHS. Where the SHS do not include materials for guardrails, provide guardrails in accordance with the *AASHTO Roadside Design Guide*.

G201005 1.2 BOLLARDS

For bollards to prevent damage, provide minimum 4 feet height, 4 inch diameter steel pipe filled with concrete, painted, and embedded in a portland cement concrete foundation.

For bollards located at building entries or other high-visibility areas provide decorative bollards matching the design of the facility or consistent with the Base Exterior Architecture Plan (BEAP) and the Installation Appearance Plan.

Bollards for security are specified in Section G204004, "Security Structures".

G201006 RESURFACING

Adjust rims of existing utility structures to match proposed grades after resurfacing.

G201006 1.1 SLURRY SEAL

ASTM D 3910 and in accordance with the SHS.

G201006 1.2 BITUMINOUS CONCRETE OVERLAY

Remove old pavement by cold milling to depths required to provide new surface and leave underlying materials intact. Clean the pavement of excessive dirt, clay or other foreign matter with power brooms and hand brooms immediately prior to the milling operation.

Repair or replace damaged utility structures, valve boxes, or pavement that is torn, cracked, gouged, rutted, broken or undercut at no additional expense to the Government.

Provide bituminous concrete overlay produced from hot or cold recycling of the milled material or from virgin materials in accordance with the provisions of UFC 3-201-01, *Civil Engineering*, and the standard mix of the SHS based on the pavement design and vehicle loading as indicated in this RFP.

G201006 1.3 CRACK SEALING

Use fiber reinforced crack sealer for sealing cracks in asphalt pavement after milling and prior to resurfacing. Provide crack sealing conforming to the following requirements in UFC 3-270-01, *Asphalt Maintenance and Repair*, and UFC 3-270-02, *Asphalt Crack Repair*.

G2020 PARKING LOTS

Refer to Section G2010.

G2020 1.1 PERMEABLE PAVEMENT

Provide permeable concrete pavers of solid interlocking paving units complying with ASTM C936, resistant to freezing and thawing when tested according to ASTM C67, and made from normal-weight aggregates. If required for sustainability goal, provide permeable concrete pavers with a Solar Reflectance Index (SRI) greater than or equal to 29.

Provide pervious concrete in accordance with UFGS Section 32 13 43,

Pervious Concrete Paving.

Do not use asphalt-surfaced porous pavement.

G202001 BASES & SUBBASES

Refer to Section G201001.

G202002 CURBS & GUTTERS

Refer to Section G201002.

G202003 PAVED SURFACES

Refer to Section G201003.

G202004 MARKING & SIGNAGE

Refer to Section G201004. Provide water-based paints only.

Mark to denote traffic lanes and parking spaces; mark in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.

G202005 GUARDRAILS & BARRIERS

Refer to Section G201005.

G202005 1.1 WHEELSTOPS

Provide precast concrete wheelstops.

G202006 RESURFACING

Refer to Section G201006.

G2030 PEDESTRIAN PAVING

Locate new sidewalks such that they maintain continuity of pedestrian traffic to and from the existing sidewalks adjacent to the site(s).

G203001 BASES & SUBBASES

Provide as required by local standards or geotechnical report; refer to Section G201001.

G203003 PAVED SURFACES

G203003 1.1 SIDEWALKS

Provide sidewalks of Portland cement concrete pavement with 4 inches (100 mm) thick minimum or permeable pavement. Provide concrete and permeable pavement in accordance with Section G201003 and G2020, respectively. For PCC sidewalks, provide a broomed finish. Provide sidewalks of at least 5 feet (1.5 meters) wide, except that sidewalks

connecting entry points of housing units to the housing unit's parking are required to be at least 36 inches (900 mm) wide. In housing areas, offset sidewalks paralleling streets to maintain a minimum grassed separation of 5 feet (1.5 meters) from the back face of the curb to the closest edge of the sidewalk.

Unless indicated otherwise, provide a transverse slope of 1/48. Limit variation in cross section to 0.25 inch in 5 feet (6 mm in 1.50 m).

Submit samples boards in accordance with ESR G2050 and PTS G2050 and finish schedule on final plans.

G203003 1.1.1 Joints for PCC Pavement Sidewalks

Provide contraction joints spaced at intervals equivalent to the width of the sidewalk. Provide 0.5 inch (13 mm) thick transverse expansion joints at changes in direction where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space expansion joints every 50 feet (15 m) maximum. Provide isolation joints by placing a 1/2-inch (12 mm) preformed expansion joint filler around each structure that extends into or through the sidewalk before concrete is placed at that location.

G203003 1.2 CONCRETE PAVERS

ASTM C936. Install in accordance with manufacturers recommendations.

G203003 1.3 HANDICAPPED RAMPS

Provide handicapped ramps of PCC pavement with an exposed aggregate finish, truncated domes, or as required by the SHS at roadway intersections.

G203004 GUARDRAILS & BARRIERS

Refer to Section G201005.

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

G204001 1.1 CHAIN LINK FENCE

Provide chain link fence designated as security fencing in accordance with paragraph G204001 - 1.3.

Provide chain link fence fabric that is at least 9 gauge (3 mm) steel wire mesh material (before coating) with mesh openings not larger than 2 inches (51 mm). Do not use aluminum fabric, posts or accessories. Install fence in accordance with ASTM F567 and the manufacturer's written installation instructions.

G204001 1.1.1 Tensions Wires and Top Rails

Provide rails in accordance with FS RR-F-191/3, Class 1, steel

pipe, Grade A.

G204001 1.1.2 Gates

Provide gates in accordance with FS RR-F-191/2 with posts and fabric as specified for fence.

G204001 1.1.3 Posts and Braces

Provide posts and braces in accordance with FS RR-F-191/3, Class 1, steel pipe, Grade A. Brace each gate, terminal and end post with truss rods.

G204001 1.1.4 Fencing Accessories

Provide fencing accessories in accordance with FS RR-F-191/4. If PVC coating is required, provide accessories with PVC color coating similar to that specified for chain-link fabric or framework.

G204001 1.2 ORNAMENTAL FENCE

G204001 1.3 SECURITY FENCE

Provide security fencing systems in accordance with UFC 4-022-03, *Security Fences and Gates*, and this RFP.

G204001 1.3.1 Chain Link Security Fence

Provide chain link fence in accordance with paragraph G204001 - 1.1, excepted as noted otherwise. Ensure that the fabric has twisted and barbed selvage at the top and bottom. Do not provide top rails. Locate posts and structural supports on the inner side of the fencing. Install outriggers facing outward except when the fence is mounted directly on the property line.

G204001 1.3.2 Signage

Provide signage at a minimum of 200 foot (61 m) intervals along the entire perimeter.

G204001 1.3.3 Drainage Culverts and Utility Openings

Provide protective measures to prevent access through culverts, storm drains, sewers, air intakes, exhaust tunnels and utility openings or across drainage ditches or swales in accordance with UFC 4-022-03.

G204001 1.4 OPENINGS IN PERIMETER AND SECURITY FENCING

Do not cover, block or lace openings in perimeter fencing and security fencing with material which would prevent a clear view of personnel, vehicles or material in the outer or inner vicinity of the fence line.

G204001 1.5 FENCE GROUNDING

Ground and bond the fence in accordance with the National Electric Safety Code (NESC) - IEEE C2 and UFC 4-022-03. Ground fencing on either side of every gate and at other locations when the fencing is near and parallel to high tension power lines. Grounding is also required at intervals of 1000 feet (305 meters) to 1500 feet (457 meters) when the fencing runs through isolated areas and at lesser distances depending on the proximity of the fencing to public roads, highways and buildings where the fencing is around or within explosive storage, production, operating or handling areas.

G204001 1.6 ENCLOSURES FOR UTILITY EQUIPMENT

Where fencing is used to provide an enclosure for utility equipment, ensure a minimum clearance is provided no less than 3 feet (900 mm) around the equipment to permit maintenance access and ventilation. Provide stone, gravel or concrete paving within the enclosure.

G204002 RETAINING WALLS AND FREESTANDING WALLS

Provide retaining walls to permanently resist soil pressures as well as live loads. Provide wall drainage to minimize lateral loading and protect wall materials against degradation.

G204003 EXTERIOR FURNISHINGS

Refer to ESR G20 and other portions of the RFP for exterior furnishings required on this project. Permanently attach site furnishings to concrete pads. Provide site furnishings in conformance with the Base Exterior Architecture Plan (BEAP) and or Installation Appearance Plan for each Activity. If no product guidance is given, coordinate material, finish and color with architecture (fiberglass and aluminum are not acceptable) and provide to the greatest extent possible, materials with industrial recycled content, preferably from regionally local manufacturers.

G204003 1.1 PICNIC AND PASSIVE RECREATION AREAS

Include tables, with attached benches, on concrete bases sloped to drain and permanent barbecue grill(s) for picnic areas. Additionally, provide separate receptacles for trash, recycling and barbecue ashes. Permanently attach site furnishings to concrete paving extending a minimum of 12 inches (300 mm) past the furnishing, with the exception of picnic tables and benches, which require concrete paving extending 2 feet (600mm) minimum on all sides. Set the elevation of the finished concrete plus 1 inch (25 mm) above adjacent grade.

G204003 1.2 TRASH RECEPTACLES

Provide trash receptacles with drain hole and stationary or self-closing lids with anchor chains secured to the receptacle to protect the contents from weather. Design receptacles to hold heavy-duty plastic or galvanized steel liners of the same manufacturer. Consider potential weight of full containers when deciding on 'top loading' or 'side loading' receptacles. Include a concrete pad 12 inches (300 mm)

larger on all sides than the size of the trash receptacle base.

G204003 1.3 BENCH

Minimum 6 feet (1.8 meter) length to match trash and recycling receptacle material & color, installed a minimum of 18 inches (450 mm) above finish grade, permanently installed with anchor bolts or in-ground. For benches located in nonpaved areas, provide concrete pads extending a minimum 2 feet (0.6 meters) beyond the edge of the seat portion of the bench (or both front and back if accessible from either).

G204003 1.4 RECYCLING RECEPTACLES

Provide recycling receptacles, single-piece with separate slots for cans, bottles, newspaper. Match height, material, and style of the trash receptacle.

G204003 1.5 BARBEQUE

Minimum 12 inches (300 mm) x 18 inches (450 mm) with heavy-duty grill and hinged stainless steel lid, factory primed and painted with rust-resistant paint. Install so coal height is a minimum of 36 inches (0.91 meter) above finish grade.

G204003 1.6 HOT ASH RECEPTACLE

Minimum 28 square inches (181 square centimeters) x 42 inches (1.1 meter) high pre-cast reinforced concrete with drain hole with steel ash grate and cast in "Hot Coals Only" logos on each side with white letters on a red background.

G204004 SECURITY STRUCTURES

Where identified for project elsewhere in this RFP, provide active and passive vehicle barriers to effectively stop or detect penetration by explosive-laden vehicles through the perimeter of a protected area in accordance with UFC 4-022-02, *Selection and Application of Vehicle Barriers*. When vehicle barriers are included in the project, refer to Part 5 of the RFP for additional requirements.

G204005 SIGNAGE

Provide facility signage in accordance with local code, the Installation and Appearance Guide, the Base Exterior Architectural Plan (BEAP) and this RFP.

Size messages and graphics on signs according to the functional viewing distance. Typically, at least 1 inch (25 mm) of letter height per 25 feet (7.62 meters) of viewing distance is required for readability.

Refer to Section G201004, "Marking & Signage" for traffic signage.

G204007 PLAYING FIELDS

G204007 1.1 PLAYGROUNDS

Design playgrounds and provide surfacing and equipment in accordance with this RFP and U.S. Consumer Products Safety Commission Publication 325 and ASTM F1487. Border tot-lots and play-lots with reinforced concrete curbing to a depth appropriate to the safety surfacing utilized. Provide shade and wind protection where these elements may significantly limit the use of the facilities. For tot-lots and play-lots provide separated areas with appropriately sized equipment and materials to serve their developmental levels. Separate areas by a buffer zone, which can be an area of shrubs, hardscape or benches. Provide signage to give guidance to adults as to the age appropriateness of the equipment.

G204007 1.1.1 Tot Lots

Design each "tot lot" to accommodate children from ages 2 through 5 to provide a variety of play activities and motor skill development opportunities which include, as a minimum:

For multi-activity structures provide a minimum of two platforms and two slides, one wheel chair accessible, swing set for young children, paired spring mounted 'riders' or other similar apparatus. Locate at least two benches with backs on concrete bases for convenience to, and observation of, the tot-lot.

G204007 1.1.2 Play Lots

Design each "play lot" to accommodate children from ages 5 to 12 to provide a wider range of activities and opportunities for greater motor skills development and improvement. These include, as a minimum:

For a multi-activity structure, provide a minimum of three platforms and two slides, one wheel chair accessible. A swing set, or other similar apparatus. Locate at least two benches with backs on concrete bases for convenience to, and observation of, the play-lot.

G204007 1.1.3 Equipment

Provide tot lot and play lot equipment that is factory finished institutional quality, in compliance with ASTM F1487, the United States Consumer Products Safety Commission's *Guidelines for Public Playgrounds*, and the UFC 3-201-01, *Civil Engineering*. Use only equipment that has been approved by International Play Equipment Manufacturers Association (IPEMA) and installed by a National Playground Contractors Association (NPCA) Contractor.

Site tot lot and play lot equipment to provide use and no encroachment zones in accordance with ASTM F1487. A use zone is a clear, unobstructed area under and around play equipment where a child would be expected to land when jumping or falling from a piece of play equipment. Requirements for use zones vary for the age group and for different pieces of equipment. Show all use zones for play equipment on the site plan to ensure there is no

conflict between play activities on the ground and swinging or jumping from the equipment. The No-encroachment zone is an additional area beyond the use zone where children using the equipment can be expected to move about and should have no encroaching obstacles. This area varies according to the types of adjacent equipment, and their orientation to one another.

G204007 1.1.4 CCA-Treated Lumber

Do not use chromated copper arsenate (CCA) treated lumber in recreational facilities for children.

G204007 1.1.5 Playground Safety Surface

Provide a playground safety surface, in accordance with ASTM F355 and ASTM F1292, throughout use zones and under play equipment in tot lots and play lots. Natural wood products and decomposed granite are not allowed for surfacing. Loose fill surfacing must be a minimum of 4 inches (100 mm) below the top of edging. Consider local climate, soil conditions, location and size of area, type of activity, age of users, and intensity of use when choosing surfacing material. Provide soil separator fabric between playground loose-fill material and subgrade soil. Design play areas with permeable surface and adequate drainage. Drain to sump a minimum of 20 feet out from the playground curbing or to storm drain.

G204007 1.2 PLAYING FIELDS

Provide playing surfaces in accordance with this RFP. Use synthetic turf systems approved by the reviewing Government Landscape Architect or Civil Engineer.

G204090 OTHER SITE IMPROVEMENTS

Provide other site improvements in conformance to the BEAP or Installation Appearance Plan and to the requirements of UFC 4-010-01.

G204090 1.1 DUMPSTER PADS AND ENCLOSURES

Provide 200 mm (8 inch) thick non-reinforced portland cement concrete pavement dumpster pads sized larger than what is required to accommodate the specific dumpsters to be used at the site. Make the concrete pad large enough to accommodate the front wheels of the carrying truck.

Select the dumpster enclosure's materials and style to complement the adjacent buildings and facilities. Provide walls be at least 1.83 meters (6 feet) in height. Where possible, orient the openings of enclosures away from building entrances and main streets.

G2050 LANDSCAPING

Landscape area is defined as permeable areas within the project boundaries not covered by buildings, roads, parking lots, sidewalks, and other non-

permeable areas. Provide landscape improvements to all site areas disturbed by construction.

G2050 1.1 DESIGN

Design landscaped areas in accordance with Presidential Executive Order 13148 of April 2000, with a goal to reduce fertilizers, pesticides, and water use. The intent is to achieve a base-wide ratio of 20 percent maximum non-native plants and 80 percent minimum locally or regionally native plants. Do not use plants deemed invasive by the project state or region's Exotic Pest Plant Council, State Department of Agriculture or local chapter of the American Society of Landscape Architects as a threat to ecosystems or agriculture. Select only plant species which require little or no supplemental irrigation after the initial establishment period. Only nursery-grown plants are acceptable. Cover non-paved site areas disturbed by construction operations with plant material or inorganic mulch. Stabilized soil, decomposed granite, and organic mulch are not acceptable as ground covers. Provide landscape architectural work in accordance with UFC 3-201-02, *Landscape Architecture*. For projects with planting or irrigation areas, utilize the design services of a Landscape Architect licensed in the state of the project. The Landscape Architect of Record must visit the site at least once prior to design, twice during construction, and quarterly during the Establishment Period, including the Establishment Period start and completion. The Landscape Architect of Record must attend the kickoff partnering meeting and CDWs. Courtyards and plazas are to be designed by the Landscape Architect. For the CDW, provide a Site Analysis Plan to demonstrate the design thought process. It is the Contractor's responsibility to coordinate between disciplines including architecture, civil engineering, electrical engineering, mechanical engineering, fire protection, and landscape architecture. Coordinate location of utilities, structures, and equipment. For projects in dry climates (arid and semi-arid), eliminate or minimize the use of turf, except when needed for active or passive recreation.

The Landscape Architect-of-Record is required to submit 5 sample boards of landscape materials. Sample boards to include but not limited to colors, finishes, textures of hardscape paving, walls, signs, monument piers, inorganic mulches, organic mulches, and other site improvements. Include cut sheets of proposed plant material.

G205001 FINE GRADING AND SOIL PREPARATION

See Section G10, *Site Preparation*. Provide 4 inches (102 mm) of topsoil with appropriate soil amendments, as recommended by a current soil composition test, for areas to be planted with turf grass.

G205002 EROSION CONTROL MEASURES

See Section G10, Site Preparation.

G205003 TOP SOIL AND PLANTING BEDS

See paragraph titled, G205005 PLANTINGS.

G205004 SEEDING, SPRIGGING, AND SODDING

Hydroseed areas that are to be seeded and are larger than 1,000 square feet (92.90 square meters). Select hydroseed mix composition that is appropriate for surrounding land use and compatible and consistent with local application rates, seed availability and established practice in the project area. If project dates are unknown, specify required planting dates or alternative species for different seasons. Apply seed at a time best suited for germination of the selected species. Seeded areas are required to achieve a 95-percent coverage of the selected species and be weed free at the end of the Establishment Period.

G205005 PLANTINGS

G205005 1.1 EXISTING PLANT MATERIAL TO REMAIN OR BE TRANSPLANTED

Preserve existing trees to the greatest extent possible. Identify preserved trees on the plans with tree species, caliper and dripline. Tag trees to be saved with plastic or vinyl tape tied to the tree caliper. Protect existing trees by fencing planting areas to remain from compaction and other damage with a barrier of metal poles a maximum 8 feet (2.4 meter) on center with plastic netting to a minimum of 10 feet (3.0 meter) radius from outside of the tree's trunk. Where tree drip lines are greater than 10 feet (3.0 meter) from the tree's trunk, locate barrier fencing at the drip line of the tree. Install signs on each Tree Protection Zone fence indicating that the barrier is not allowed to be taken down or moved without the participation of a Certified Arborist. Ensure that the details and specifications clearly state that none of the following activities occur within the tree protection barricade: driving, parking, storing materials, dumping waste, concrete washout, adding fill soil, trenching, removing soil, grubbing, or other disturbance to the tree or the associated roots. Do not allow debris from tree or stump removal operations to fall on or otherwise damage plants that are not scheduled for removal. Do not remove plastic tape and barrier fencing until planting operations are ready to begin and or instructed by the Contracting Officer. Replace existing trees to remain or to be transplanted that are unhealthy, that die, or have 20 percent or more of their crowns that die during the establishment period with healthy plants of the same species or variety during the appropriate planting season. During the landscape establishment period, replace trees, turf, shrubs, and ground cover that are damaged or destroyed during construction operations by the Contractor at no additional cost to the Government. At the direction of the Contracting Officer, remove the existing tree and stump and replace it with trees of the same genus and species equal to the total caliper of the existing tree. Provide replacement trees that are 4 inch (100 mm) minimum caliper. Replace shrubs with 5 gallon (18.9 liter) size container, ground cover with flat containers planted at 8 inches (200 mm) on center, and turf with sod, all of the same genus and species.

G205005 1.2 UTILITIES

Do not place trees within 10 feet (3 meter) of above or below-grade utility line or structure. Within roadway sightlines, height of mature shrubs is limited to 3 feet (1 m) and trees must be limbed up a minimum

of 6 feet (2 m) so their mature growth does not obstruct views from vehicle intersections or points of vehicle ingress or egress. Coordinate utilities between the Landscape Architect and appropriate disciplines.

G205005 1.3 RECYCLING

Green waste: Contact the Public Works Department for potential green waste collection and hauling by the Government. Separate green waste not collected by the Government from construction debris and deliver to the base's or local landfill's green waste recycling area. Quantify and report diverted waste to the Contracting Officer.

G205005 1.4 PLANTING

G205005 1.4.1 Plant Quantities

Provide trees at the minimum rate of one (1) tree per 1,000 square feet (92.9 square meters) of Landscape Area. Provide trees for parking areas at a minimum of one (1) tree per every 5 parking spaces around the parking perimeter and one (1) tree per every 10 parking spaces within the parking area. Provide a minimum of one (1) tree in each end aisle planter. Total minimum quantities may be reduced only by the reviewing Government Landscape Architect. Tree quantities reduced by the Government Landscape Architect will be included on the ADD/DEDUCT List by the Contracting Officer. For bioretention areas, provide minimum quantities of trees, shrubs, and ground covers in accordance with State regulations. Provide a minimum tree size of 24 inch (600 mm) box/2 inch (50 mm) caliper, or if within an anti-terrorism zone provide a minimum size of 36 inch (910 mm) box/3 inch (76 mm) caliper. For trees within concrete or other non-permeable paved areas, allow a minimum non-paved planting area of 4 feet by 8 feet (1.2 m by 2.4 m) per tree.

For dry climates (arid and semi-arid) only: Plant a minimum of 40 percent of the landscaped areas with shrubs and groundcover so that at 50 percent plant maturity, they form mass plantings. Utilize a minimum ratio of 60 percent 5 gallon (18.9 liter) shrubs or groundcover and 40 percent 1 gallon (3.79 liter) shrubs or groundcover. The remaining 60 percent of the landscape area may be inorganic mulch, planted or a combination thereof. For inorganic mulch, provide 3 inch (76 mm) depth of 3/4-inch (19 mm) and smaller rock, and for larger than 3/4-inch (19 mm) size, assure complete ground surface coverage. Provide plant material calculation summary matrix on planting plan.

For other climate zones: Plant the majority of shrubs at major entrances to buildings and at other important planting zones that are specific to each site. The overall design intent is to plant mostly trees and turf, with shrubs and ground covers used sparingly, to reduce maintenance costs while still providing for functional planting requirements (e.g., soil stabilization, energy conservation, force protection, and aesthetics). Provide a minimum size 3 gallon (11.4 liter) container for shrubs and 1

gallon (3.79 liter) container for ground covers.

G205005 1.4.2 Plant Quality

Provide plants that comply with ANSI Z60.1 and ANSI A300, Part 1, current editions. Plants must be in a healthy, disease and pest free condition. Provide seed, sod, and sprigs that are State Certified.

G205005 1.4.3 Plant Selection

The reviewing Government Landscape Architect has final approval authority on selected plant material. Species deemed unsuitable for planting by the Government Landscape Architect will not be allowed.

G205005 1.4.4 Plant Installation

Perform planting operations, including but not limited to planting soil mixes and fertilization, in accordance with local established practices and agricultural extension service recommendations. Stake or guy new or transplanted trees with three stakes [2 inch x 2 inch x 8 feet (50 mm x 50 mm x 2.4 m) hardwood], or three guy cables [five-strand, 3/16 inch (5 mm) diameter galvanized steel cable]. Install linear tree root barriers at the edge of paving where trees are planted within 10 feet (3 m) of sidewalks, curbs, walls, columns, and other hard surface areas. Do not encircle tree root balls with root barriers.

G205005 1.4.5 Edging Materials and Mulching Materials

Provide 3/16 inch (5 mm) minimum thick by 5 inch (127 mm) minimum deep aluminum edging or 6 inch (150 mm) by 6 inch (150 mm) minimum, concrete edging dividing turf and planting beds and dividing planted and non-planted inorganic mulch areas. Provide stake type and spacing for aluminum edging per manufacturer's recommendations. Plastic edging is not allowed. Mulch planted areas not mulched with inorganic mulch with a 3-inch (75 mm) depth of organic shredded hardwood mulch. For inorganic mulch where rock cobble size is greater than half of the profile depth, provide Â¾ inch (19 mm) comparable color and shape rock mulch in bottom half of profile. For dry climates only, organic mulch must be shredded redwood bark unless approved otherwise by the reviewing Government Landscape Architect. Mulches (organic and inorganic) must not be subject to sloughing off on sloped sites. Submit samples of mulches to the reviewing Government Landscape Architect for approval prior to installation. Decomposed granite is not allowed. Provide a 3-inch (75 mm) depth of organic shredded hardwood mulch between plants used to form a mass (in dry climates, mulch in the remainder of planting beds with inorganic mulch). Install mulching materials prior to the start of the Establishment Period.

G205005 1.4.6 Fertilizer

Fertilize transplanted trees, new trees, shrubs, ground covers, turf, perennials and ornamental grasses as recommended by local agricultural extension services.

G205005 1.4.7 Weed Fabric and Erosion Control Fabric

Provide a weed barrier fabric of sheet polypropylene or polyester fabric specifically designed for weed control purposes beneath planted or mulched non-planted areas. Treat fabric for protection against deterioration due to ultraviolet radiation. Provide fabric that is a minimum 99 percent opaque to prevent photosynthesis and seed germination from occurring, yet allowing air, water and nutrients to pass through to the roots. Minimum weight must be 5 ounces per square yard (0.11 kg per square meter) with a minimum thickness of 20 mils (0.50 mm) with a 20 year minimum guarantee. Provide a biodegradable product designed specifically for erosion control on sloped areas 3 (horizontal):1 (vertical) and steeper in slope. Do not place weed fabric over the root balls of trees.

G205005 1.4.8 Drainage

Provide for proper grading and drainage of turf and planting areas. Provide sub-surface drainage where soil or other conditions do not allow surface drainage. Do not drain roof gutters into planter areas.

G205007 IRRIGATION SYSTEMS

G205007 1.1 IRRIGATION

Where an irrigation system is required per other parts of this RFP, provide a permanent, below-grade system. Provide 100 percent sprinkler head to head coverage. Provide pop-up heads in turf and landscape zones when adjacent to walks, roads, parking lots, or in sparsely planted landscape areas where pedestrians may circulate. Provide pop-up heads project-wide on high-traffic sites such as, but not limited to, dining, housing, entertainment, daycare, education and recreation facilities. For dry climates, provide deep root watering systems for trees. Verify adequate water pressure for irrigation purposes and provide booster pumps and or pressure regulation as required. Provide minimum 18 inch (450 mm) cover over pressurized (mainline) PVC irrigation pipe and 12 inch (300 mm) cover over non-pressurized (lateral line) PVC irrigation pipe. 1/2-inch (13mm) pipe is not allowed. Provide pressurized (mainline) pipe in conformance with ASTM D1785, PVC 1120, Schedule 40. Provide non-pressurized (lateral) pipe in conformance with ASTM D2241, PVC 1120 SDR 21, Class 200. Test the entire system in the presence of the Contracting Officer and Landscape Architect-of-Record to ensure proper performance. Provide irrigation components that are commercial or institutional quality. Provide rain shut-off device and watertight splices. Provide sprinkler heads, bodies and nozzles of the same manufacturer. Irrigation heads on the same valve must have nozzles with matched precipitation rates.

G205007 1.2 OPERATION AND CONTROL

Assure systems automatically operate on an "irrigation window" between 2000-0530. Provide compatible and fully functional control if a central control system exists on base. Otherwise, provide evapotranspiration-measuring control with flow meter and master valve with controller capable of indicating visible or auditory notification, such as a blinking light or beeping sound, of system shut-off.

G205007 1.3 ZONING

Provide separate control valves for differing plant species coefficients, landscape coefficients, and solar exposures, for areas with differing irrigation head types or differing precipitation rates, and top and bottom of slopes. Provide a separate irrigation backflow prevention device and water meter. Turf, trees, and shrubs/groundcover are not allowed on the same valve. Provide separate concrete valve box with cast iron lid and valve ID for each valve and wire splice. Provide quick coupling valves at 100 feet (30 m) on center. Provide in-head check valves for sloped areas with 0.5 feet (150 mm) or more in elevation change.

G205007 1.4 TEMPORARY IRRIGATION

Provide ultra-violet resistant pipe and fittings for above-grade, temporary irrigation. Only non-pressure pipe is allowed above grade. Install irrigation systems intended to remain in place longer than one year below grade.

G205007 1.5 NON-POTABLE IRRIGATION

Provide lavender-colored pipe, sprinkler head and quick coupler caps, valve tags, signage, and associated filtration equipment.

G205007 1.5.1 Controller Charts

Provide one chart for each new controller or existing re-sequenced controller. The chart must be an actual plan reduced to fit inside maximum dimensions of the controller housing. Use black line print for chart and a different color to indicate each station area of coverage. After chart is completed and approved for final acceptance, seal chart between two 20 mil (0.5 mm) pieces of clear plastic. Affix the chart to the inside of the controller cabinet door using approved mastic or fastening system. Provide one additional copy of the chart in electronic format. Additionally, provide the installation with a maintenance plan and schedule as part of the turn-over items.

-- End of Section --

SECTION G30

SITE CIVIL/MECHANICAL UTILITIES
1218

G30 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G30 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of Contract award.

G30 1.1.1 Industry Standards and Codes

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

G30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 1-200-02, High Performance and Sustainable Building Requirements UFC 3-201-01, Civil Engineering UFC 3-230-01, Water Storage,

Distribution, and Transmission UFC 3-240-01, Wastewater Collection UFC 3-240-01, Mechanical Engineering UFC 3-600-01, Fire Protection Engineering for Facilities)

UFC 3-460-01 Design: Petroleum Fuel Facilities

G30 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Remove items found not to be in compliance, or take corrective measures, to assure compliance with the referenced standard. Perform field tests and provide labor, equipment and incidentals required for testing.

G30 1.2.1 Materials

Provide new materials that bear the label of the standardizing agency whenever standards have been established and label service is normally and regularly furnished by the agency. Equipment provided must be listed and suitably labeled for the specified purpose, environment, and application and installed in accordance with manufacturer’s recommendations.

G30 1.2.2 Additional Work

Provide such other labor and materials as are required for a complete and usable system in accordance with the requirements of the criteria listed, regardless of whether such materials and associated labor are called for elsewhere in this RFP.

G30 1.2.3 Qualifications of Well Drillers for Water Supply Wells

If required by the state waterworks' regulations, the well driller must be certified by the state and remain certified while constructing the well.

G30 1.2.4 Qualifications of Coating Contractors for Water Storage Tanks

Contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 5 for the inspection firm prior to Contract award, and remain certified while accomplishing any surface preparation or coating application. The Coating Inspector must also be certified to Level II for exterior and Level III for interior coatings prior to and during the project.

G30 1.2.5 Qualifications of Oil Interceptor Manufacturers

Manufacturers must have five years of experience producing packaged oil interceptor units of similar size.

G30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

Verify satisfactory utility system performance via Performance Verification Testing, as detailed in this section of the RFP. Verify satisfactory performance also via testing as detailed in the paragraph, "Field Quality Control", in UFGS Specification Sections utilized.

G30 1.3.1 Water Supply Well Performance Verification

Upon completion of the permanent well, conduct performance testing for well capacity, drawdown and pump equipment. Conduct water quality testing in accordance with AWWA A100 and its appendices and state regulations.

G30 1.3.2 Water Distribution System Verification Testing

Provide testing on water mains and service lines in accordance with the state waterworks' regulations and the following:

a. Ductile Iron and other materials: AWWA C600.
b. PVC: AWWA C605.

Where water mains and water service lines provide fire service, test in accordance with NFPA 24.

Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete.

G30 1.3.3 Fire Distribution System Verification Testing

Test water mains and water service lines providing fire service or water and fire service in accordance with NFPA 24. The additional water added to the system must not exceed the limits given in NFPA 24.

G30 1.3.4 Water Booster Pump Station Verification Testing

Test the water booster pump station in accordance with state regulations. Conduct testing on discharge and site piping in accordance with tests for water distribution mains; see G30, paragraph 1.3.2. Test pumps, controls, and alarms, in operation, under design conditions to ensure proper operation of equipment.

G30 1.3.5 Sanitary Sewer Distribution System Verification Testing

Provide testing on sewer mains and laterals in accordance with state regulations.

G30 1.3.5.1 VISUAL TEST

Perform a visual inspection of the existing sewer before making a connection to the existing sewer line. Verify existing sewer line does not connect to or drain to the storm drainage system. Visually inspect downstream manholes connecting the existing sewer as well as the upstream and downstream manholes where the point of connection will be made to verify that there is no potential for cross connection to the storm sewer system. Perform visual inspection in the presence of the Contracting Officer and Public Works PW6 field support. Obtain approval from the Contracting Officer before making the connection.

Perform a dye check from the project to the first manhole on the next active sewer branch main downstream from the sewer branch main used as the project point of connection. Continue testing until the dye visually confirms the design connection is appropriate. Utilize a nontoxic non-staining sewer tracing dye. During the test monitor the storm drainage system downstream from the project, via either manholes or outfalls for any sign of cross connection.

Perform a smoke test on the project sewer. Testing will verify that project storm drainage inlets or drains have not been connected to the sanitary sewer.

These tests must be observed by the Contracting Officer and the utility operator's inspector.

G30 1.3.5.2 Leakage Tests

Test lines for leakage by either infiltration tests or exfiltration tests, or by low-pressure air tests. Prior to testing for leakage, backfill trench up to at least lower half of pipe. To prevent pipeline movement during testing, place additional backfill around pipe sufficient to prevent movement, but leaving joints uncovered to permit inspection. The leakage allowance is indicated in AWWA C 600 for ductile iron pipelines; AWWA C 605 for polyvinyl chloride pipelines; and the state sewerage regulations, whichever is more stringent. When leakage or pressure drop exceeds the allowable amount make satisfactory correction and retest pipeline section in the same manner. Correct visible leaks regardless of leakage test results.

a. Exfiltration Tests:

ASTM C 969M (ASTM C 969) and perform calculations in accordance with its Appendix.

b. Low-pressure Air Tests:

i. Pipelines: ASTM C 924M (ASTM C 924) and perform calculations in accordance with its Appendix.

ii. PVC plastic pipelines: UBPPA UNI-PUB-6 and perform calculations in accordance with its Appendix.

Deflection of pipe in the installed pipeline under external loads must not exceed 4.5 percent of the average inside diameter of pipe, in accordance with ASTM D 2412.

G30 1.3.5.3 TV Inspection for Sanitary Sewer

Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs will become the property of the Government.

Provide TV inspections of sanitary sewer mains in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators performing the work.

Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, deflection and leakage tests on a section of line (manhole to manhole) prior to performing TV.

Complete post-installation TV inspection in the presence of the Contracting Officer or designated representative.

The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot.

Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360 degree view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual wenches, power winches, TV cable and powered rewinds or other devices that do not

obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line.

Once video recording has commenced, the recording must be continuous, without interruption, until the termination manhole is reached.

Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies.

Keep computer printed location records (Television Inspection Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints.

Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted.

Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting Officer, review the submittal items to ensure compliance with the quality criteria set forth in this specification. Provide a copy of such video along with the Television Inspection Logs and Digital photographs to the Contracting Officer within five business days of completion of the video-inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.

G30 1.3.5.4 Sanitary Sewer Manholes Verification Testing

Provide a visual inspection of manholes for proper grade and water tightness. Provide testing on sanitary sewer manholes in accordance with state regulations. At minimum, perform hydraulic testing in accordance with ASTM C 969/C 969M.

G30 1.3.5.5 Wastewater Pump Station Verification Testing

Test the wastewater pump station in accordance with state regulations. Conduct testing on discharge piping and force main in accordance with tests for water distribution mains; see G30, paragraph 1.3.2. Test pumps, controls, and alarms, in operation, under design conditions to ensure proper operation of equipment.

G30 1.3.6 Storm Sewer System Verification Testing

G30 1.3.6.1 Deflection Test

Deflection of pipe in the installed pipeline under external loads must not exceed 4.5 percent of the average inside diameter of pipe, in accordance with ASTM D 2412.

G30 1.3.6.2 TV Inspection for Storm Sewer Under Pavements

Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs become the property of the Government.

Provide TV inspections of storm sewer lines in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators that perform the work.

Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, and deflection test on a section of line (manhole to manhole) prior to performing TV.

Complete post-installation TV inspection in the presence of the Contracting Officer or designated representative.

The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot.

Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360 degree view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual wenches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line.

Once video recording has commenced, the recording must be

continuous, without interruption, until the termination manhole is reached.

Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies.

Keep computer printed location records (Television Inspection Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints.

Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted.

Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting Officer, review the submittal items to ensure compliance with the quality criteria set forth in this specification. Provide a copy of such video along with the Television Inspection Logs and Digital photographs to the Contracting Officer within five business days of completion of the video -inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.

G30 1.3.9 Liquid Fuel Distribution Piping Verification Testing

Acceptance standards must be in accordance with ASME B31.3 paragraph 341.3.2, Chapter VI.

G30 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine CorpsDesign Procedures*, UFC 3-201-01, *Civil Engineering*, and UFC 3-401-01, *Mechanical Engineering*.

Provide sustainability submittals in accordance with Part 2 Section 01 33 29.05 20 *Sustainability Reporting for Design-Build*.

G30 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

Test reports.

Provide sustainability submittals in accordance with Part 2 Section 01 33 29.05 20 *Sustainability Reporting for Design-Build*.

G30 1.6 COORDINATION

To the extent that site work is indicated on the RFP drawings, verify that the locations and inverts of site utility lines are coordinated with building utility lines. Make adjustments to the locations and inverts indicated on the RFP drawings in accordance with codes and standards.

G30 1.7 ANTITERRORISM (AT) STANDARDS

Incorporate the minimum AT standards indicated in UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

G30 1.8 BACKFLOW PREVENTION

Submit backflow prevention training certificates and backflow preventer devices certification in accordance with Part 2 Section 01 50 00.05 20, *Temporary Facilities and Controls for Design-Build*.

G30 1.9 WATER STORAGE TANK

Submit a certificate signed by a registered professional engineer providing a (1) description of the entire tank and foundation structural design loading conditions; (2) description of structural design methods and codes used in establishing allowable stresses and safety factors; (3) statement that the structural design has been checked by experienced engineers specializing in hydraulic structures to ensure that design calculations for member sizes, dimensions and fabrication processes are as prescribed by ACI and AWWA standards; and (4) certification that the completed work was inspected in accordance with AWWA D100 or AWWA D103.

G30 1.10 NACE CERTIFIED CATHODIC PROTECTION SPECIALIST QUALIFICATIONS

Submit qualifications of specialist prior to site welding. Submit documentation of current NACE certification.

G30 1.11 EXCAVATION, BACKFILLING AND COMPACTION OF UTILITIES

Refer to Section G10, *Site Preparation*.

G30 1.12 DELIVERY, STORAGE AND HANDLING OF MATERIALS

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, valves, and hydrants free of dirt and debris. Handle in a manner to ensure delivery to the trench in sound undamaged condition. Take

special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench.

G3010 WATER SUPPLY

G3010 1.1 WATER SYSTEM DESIGN

Determine domestic and fire demands for the facility and verify the design of all components of the domestic and fire protection supply systems. Design and construct the water system in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* the state waterworks' regulations, and the utility provider's requirements. Design the water supply systems to provide required flows and maintain residual pressures based upon peak demands.

If the new water system is an extension of an existing water system, obtain static pressure, residual pressure and flow characteristics of the existing distribution system by actual field tests. Conduct flow and pressure tests and provide design calculations that show the existing lines are capable of handling the additional flows. Connect the new water system to the nearest existing fitting or water line capable of handling the additional flows.

Design the connections to the water system including the meter assemblies and backflow-preventing devices in accordance with the requirements of the Activity or utility provider and the state waterworks regulations.

Wherever possible, locate valve boxes and other utility access structures out of paved areas.

G301001 WELL SYSTEMS

Design and construct the potable water well system in accordance with AWWA A100 and its appendices; the state waterworks' regulations, and the system owner's preferences and requirements.

G301001 1.1 WATER METER

Provide a water meter on the well pump discharge piping aboveground in a pump enclosure or in a meter vault underground. Provide type of water meter and remote reading capability in accordance with system owner's preferences and requirements: AWWA C700, displacement type; AWWA C701, turbine type; or AWWA C702, compound type.

G301001 1.2 TEST HOLE

Drill test hole(s) at the well site before construction of the permanent well to determine the existing site-specific geologic and hydrologic conditions and groundwater-quality parameters. A test hole may be incorporated into the finished construction provided it meets the requirements for a finished well. Seal test holes not used in finished construction as recommended in accordance with AWWA C654 and the state waterworks' regulations. Upon completion of test hole,

provide recommendations for permanent wells and submit data obtained at each well site. Include with the recommendations the appropriate depth, details of construction, length and location of screens, screen openings, gravel size, grout, and an estimation of the quantity of water that can be obtained from each water-bearing stratum and from each completed well. Submit electric log, a drillers log drawn to scale with coarseness and fineness modulus of each strata, time penetration log (time to drill through each formation), and sieve analysis to substantiate recommendations.

G301001 1.3 WELL CONSTRUCTION

G301001 1.3.1 Well Development

Provide well development in accordance with AWWA A100 and the state waterworks' regulations.

G301001 1.3.2 Disinfection

Disinfect well, equipment, and material in accordance with AWWA C654 and the state waterworks' regulations. Provide a sanitary seal for the well to prevent contamination until the pump foundation and pump are installed on the well.

G301001 1.4 ABANDONMENT OF EXISTING WELLS

Abandon and seal existing wells in accordance with AWWA A100 and the state waterworks' regulations.

G301002 POTABLE WATER DISTRIBUTION

G301002 1.1 WATER SYSTEM DESIGN

Provide materials, equipment, labor, testing, and miscellaneous related items for water distribution mains and service lines to the facility and connections to the existing water system in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission*; the utility provider's requirements; and the state waterworks' regulations; whichever is more stringent.

Determine available flow at the residual pressure at each point of connection by conducting flow tests in accordance with AWWA M17 and NFPA 291.

Provide water main piping, service lines, fittings, valves, accessories and other materials in compliance with the American Water Works Association (AWWA) standards for a minimum system working pressure of 150 psi (1050 kPa).

G301002 1.2 WATER DISTRIBUTION MAINS

For underground applications, utilize ductile iron or PVC piping for water mains 12 inches (300 mm) in diameter and less. Utilize ductile iron piping for water mains deeper than 10 feet (3.0 m) or larger than 12 inches (300 mm) in diameter.

For aboveground applications, utilize flanged ductile iron pipe for water mains.

G301002 1.2.1 Materials

a. Ductile Iron Pressure Pipe

1) Pipe: AWWA C151, Pressure Class 350.

2) Fittings: AWWA C110 or AWWA C153.

3) Interior Lining: AWWA C104.

4) Exterior Protection (if required): AWWA C105, polyethylene encasement.

b. PVC Pressure Pipe

1) Pipe: AWWA C900, Pressure Class 150.

2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).

c. Flanged Ductile Iron Pipe

1) Pipe: AWWA C115 and its appendices.

2) Fittings: AWWA C110 or AWWA C153.

3) Lining: AWWA C104.

G301002 1.2.2 Installation

a. Ductile Iron: AWWA C600.
b. PVC: AWWA C605.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be blue for potable water systems and purple for nonpotable, reclaimed water, and irrigation lines. Terminate tracer wire above grade at valve boxes and at exterior of building.

G301002 1.2.3 Connections to Existing Water Lines

Make connections to existing water lines after approval from the system owner is obtained and with a minimum interruption of service on the existing line. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.

G301002 1.3 WATER SERVICE LINES

Utilize copper tubing or PVC piping for water service lines less than 4

inches (100 mm) in diameter. Utilize ductile iron pipe or PVC pressure pipe for water service lines 4 inches (100 mm) and 6 inches (150 mm) in diameter; see G301002, paragraph 1.2, "Water Distribution Mains" for additional requirements for ductile iron and PVC piping.

G301002 1.3.1 Materials

a. Copper Tubing

1) Pipe: ASTM B 88/B 88M, Type K.

2) Fittings for Solder-Type Joint: ANSI B16.8 or ASME B16.22.

3) Fittings for Compression-Type Joint: ASME B16.26, flared tube type.

b. PVC Pressure Pipe

1) Pipe: ASTM D1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.

2) Fittings: ASTM D 2466.

3) Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.

G301002 1.3.2 Service Connections

Connect service lines 2-inch (50 mm) diameter or less to the main by a corporation stop and install a gate valve on service line below the frostline.

a. Ductile-iron water mains: AWWA C600.
b. PVC water mains: UBPPA UNI-PUB-8 and the recommendations of AWWA M23, Chapter 9, "Service Connections."

G301002 1.3.3 Installation

Install pipe, fittings and accessories in accordance with manufacturer's instructions.

a. Metallic Piping: in accordance with requirements of AWWA C600.
b. PVC: ASTM D 2774 and ASTM D 2855.

G301002 1.4 CORROSION PROTECTION

G301002 1.4.1 Insulating Joints

Provide insulating joints to prevent contact between dissimilar metals at the joint between adjacent sections of piping in accordance with the pipe manufacturer's recommendations. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

To prevent the possibility of bi-metallic corrosion, wrap service lines of dissimilar metal to the water mains and the attendant corporation stops with polyethylene or dielectric tape for a minimum clear distance of 3 feet (900 mm) from the main.

G301002 1.5 VALVES

Install valves with the same diameter and have the same joint ends as the mains to which they are installed. Provide each type of valve from one manufacturer.

G301002 1.5.1 Gate Valves

G301002 1.5.1.1 Location

Install valves at new points of connection. At a minimum, locate valves to ensure that no more than two fire hydrants will be out of service in the event of a single break in a water main. Locate valves outside of pavement and heavy traffic areas whenever possible.

G301002 1.5.1.2 Gate Valves 3-inch (75 mm) and Larger in Diameter

a. Valves (20-inch and smaller in diameter): AWWA C509 or AWWA C515, nonrising stem and of one manufacturer.
b. Valves (greater than 20-inch in diameter): AWWA C500.
c. Valves for Indicator Post: AWWA C509 or AWWA C500, as indicated above, with indicator post flange in accordance with requirements of UL 262.
d. Interior Coating: AWWA C550.

G301002 1.5.1.3 Gate Valves Smaller than 3-inch (75 mm) in Diameter

MSS SP-80, Class 150, solid wedge. Provide valves with flanged or threaded end connections, with unions on both sides of the valve and a handwheel operator.

G301002 1.5.1.4 Valve Box

Provide a cast iron, adjustable, valve box for each gate valve on buried piping. Provide valve boxes of a size suitable for the valve on which it is to be used with a minimum diameter of 5-1/4 inches (130 mm). Provide a round head and cast the word "WATER" on the lid.

G301002 1.5.2 Check Valves

Provide check valves sized 2-inches (50 mm) to 24-inches (600 mm) as swing-check type (AWWA C508) and with a protective epoxy interior coating conforming to AWWA C550. For underground applications, provide check valve in a valve vault.

G301002 1.5.3 Air Release, Air/Vacuum, and Combination Air Valves

AWWA C512 and AWWA M51.

G301002 1.5.4 Corporation Stops

If service lines 2—inch diameter or less are tapping water mains, provide corporation stops. Provide ground key type, bronze corporation stops, ASTM B61 or ASTM B62.

G301002 1.5.5 Installation of Valves

Make and assemble joints to valves as specified for making and assembling the same type of joints between pipe and fittings.

G301002 1.6 WATER METERS

Provide water meter and remote reading as required by the utility provider and in accordance with AWWA standards.

G301002 1.7 BACKFLOW PREVENTION

Provide backflow prevention and cross connection control in accordance with AWWA M-14 and governing local/state plumbing codes and waterworks' regulations.

G301002 1.8 FIRE HYDRANTS

Provide fire hydrants from one manufacturer and in accordance with UFC 3-600-01, *Fire Protection Engineering*. Coordinate with the project's fire protection designer of record. Provide protection for fire hydrants located in areas subject to vehicle damage. Provide fire hydrants with National Standard threads on hose and pumper connections. Provide a 6 inch (150 mm) inlet, two 2.5 inch (62 mm) hose connections and one pumper connection sized to accommodate local fire department equipment requirements. Paint hydrants with at least one coat of primer and two coats of enamel paint. Barrel and bonnet colors must be in accordance with UFC 3-600-01. Stencil hydrant number and main size on the hydrant barrel using black stencil paint.

a. Dry Barrel Fire Hydrants: AWWA C502 with frangible sections.
b. Wet Barrel Fire Hydrants: AWWA C503 or UL 246, "Wet Barrel" design, with breakable features.
c. Installation: Install hydrants with the pumper connection facing the adjacent paved surface. If there are two, paved adjacent surfaces, contact the Contracting Officer for further direction.

G301002 1.9 THRUST RESTRAINT

Provide thrust restraint for all piping, valves, fittings, and other appurtenances of the water distribution system.

Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.

G301002 1.10 DISINFECTION

Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with the state waterworks' regulations and AWWA C651.

G301003 POTABLE WATER STORAGE

G301003 1.1 POTABLE WATER STORAGE TANKS

Provide potable water storage facilities in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* and the state waterworks' regulations.

An elevated, steel water storage tank must be in accordance with AWWA D100. A ground, steel water storage tank must be in accordance with AWWA D100 for welded tanks and AWWA D103 for bolted tanks.

G301003 1.2 TANK ACCESSORIES

Provide piping and valves in accordance with G301002. Install an altitude valve in a valve vault with appropriate shut off valves and check valve.

G301003 1.3 TANK COATINGS

Utilize primer, intermediate coat and topcoat materials from one manufacturer. Secondary materials, produced or specifically recommended by the coating system manufacturer, may be used. Contrasting colors between coats are required.

G301003 1.3.1 Interior Coating System

Provide a commercially available interior coating system that is certified in accordance with AWWA D102, ICS-No. 2 or ICS-No. 5, and with NSF 61 and is in accordance with the state waterworks' regulations.

The color of the final coat must be approved in writing by the Contracting Officer before application begins.

Apply coatings at the following specified thickness:

Coat	Minimum DFT (mils)	Maximum DFT (mils)
Primer	3	5
Intermediate	3	5
Top	3	5
Total Systems	9	15

G301003 1.3.2 Exterior Coating System

Provide a commercially available, zinc/epoxy/polyurethane exterior coating system that is certified in accordance with AWWA D102, OCS-No. 6 and is in accordance with the state waterworks' regulations.

The color of the final coat must be approved in writing by the Contracting Officer before application begins.

Apply coatings at the following specified thickness:

Coat	Minimum DFT (mils)	Maximum DFT (mils)
Primer	3	5
Intermediate	3	5
Top	2	3
Total Systems	8	13

G301004 FIRE PROTECTION WATER DISTRIBUTION

G301004 1.1 GENERAL REQUIREMENTS

Refer to portions of Section G301002 and Section D40, *Fire Protection*. Provide water main piping, service lines, fittings, valves, accessories and other materials in compliance with the American Water Works Association (AWWA) standards for a minimum system working pressure of 200 psi (1380 kPa).

G301004 1.2 DETECTOR CHECKS

UL 312; detector check includes bypass meter, piping, gate valves, check valve and connections to detector check valve. Set valve to allow minimal water flow through bypass meter when major water flow is required.

G301004 1.3 FIRE DEPARTMENT CONNECTIONS

UL 405.

G301004 1.4 INDICATOR POSTS

UL 789.

G301005 FIRE PROTECTION WATER STORAGE

Design and construct Fire Protection Water Storage systems in accordance with UFC 3-600-01 and NFPA 22.

G301006 NON-POTABLE WATER DISTRIBUTION

Refer to G301002; note that system disinfection is not required.

G301007 PUMPING STATIONS

If a pump station is allowed, provide a packaged booster pump station including pumps, piping, valves, sensors, controls, and accessories to maintain the water system pressure in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* and the state waterworks' regulations.

The packaged booster pump station must have an Underwriter's Laboratories (UL) label indicating compliance of the equipment under the packaged pumping systems UL listing category. This label must be inclusive of the entire station with enclosure so as to demonstrate compliance with the National Electrical Code requirements for working clearances and wiring procedures.

Interior coatings of pumps, piping, valves and other accessories must be a National Standard Foundation (NSF) Standard 61 certified material for potable water.

G301008 PACKAGED WATER TREATMENT PLANTS

Provide packaged water treatment plants in accordance with UFC 3-230-03, *Water Treatment;* for pipeline materials and the state waterworks' regulations for treatment plant requirements.

G3020 SANITARY SEWER

G3020 1.1 GENERAL REQUIREMENTS

Design and construct the gravity sanitary sewage collection system in accordance with UFC 3-240-01, *Wastewater Collection;* and the state sewer collection and treatment regulations. Connect the new sanitary sewage collection system to the nearest existing sanitary manholes or sanitary line adjacent to the project site. Provide design calculations that show the existing system is capable of handling the additional flows.

In areas where chemicals and other substances may be stored (including mechanical and electrical rooms), eliminate floor drains or make provisions to prevent spills from entering the sanitary sewer system. If there is process flow from equipment, discharge can be hard piped, with air gap, to the sanitary sewer.

Wherever possible, locate manholes and other utility access structures out of paved areas.

G302001 SANITARY SEWER PIPING

G302001 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items to provide sanitary sewage lines for collection and services from the buildings.

G302001 1.2 GRAVITY SEWER PIPING

For gravity sanitary sewer mains and laterals, utilize Ductile Iron, PVC or Polypropylene sewer pipe and fittings. Use Ductile Iron under roadways or at depths greater than 10 feet (3.0 m). PVC and Polypropylene may only be used under roadways or at depths greater than 10 feet (3.0 m) when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

G302001 1.2.1 Materials

a. PVC Gravity Sewer Pipe

1) Piping and Fittings: ASTM D3034 or ASTM F679, SDR 35.

2) Joints: ASTM D3212 and ASTM F477.

b. Ductile Iron Gravity Sewer Pipe

1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.

2) Fittings: AWWA C110 or AWWA C153.

3) Joints: AWWA C111.

4) Interior Coating: AWWA C104.

5) Exterior Protection (if required): AWWA C105, polyethylene encasement.

c. Dual Wall and Triple Wall Polypropylene Sewer Pipe 12 inches to 60 inches

1) Piping and Fittings: ASTM F2736 and ASTMF2764/F2764M.

2) Joints: ASTM D3212 and ASTM F477.

G302001 1.2.2 Connections to Existing Lines

Obtain approval from the Contracting Officer before making a connection to an existing line. Conduct work so that there is minimum interruption of service on existing line and provide a new manhole at the connection point.

G302001 1.2.3 Installation

Install pipe, fittings and accessories in accordance with manufacturer's instructions.

a. PVC and Dual and Triple Wall Polypropylene: ASTM D2321. Do not use ASTM D2321 Class IV or V materials for bedding,

haunching or initial backfill materials.
b. Ductile Iron: AWWA C600.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.

G302001 1.3 PIPING FOR CLEANOUTS

G302001 1.3.1 Materials

a. Cast-Iron Soil Pipe for Cleanouts

1) Pipe: ASTM A 74, service.

2) Joints: ASTM C 564 compression-type rubber gaskets.

3) Exterior Protection (if required): AWWA C105, polyethylene encasement.

G302001 1.3.2 Installation

Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

G302002 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items for the sanitary manholes in accordance with the following:

a. Set manhole rim elevations flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
b. ASTM C 923/C923M resilient connectors for making joints between manhole and pipes entering manhole.
c. Provide drop manholes when a gravity sewer pipe enters a manhole at an elevation of 24 inches (610 mm) or more above the manhole invert.

G302002 1.2 PRECAST CONCRETE MANHOLES

ASTM C 478/C 478M; base and first riser must be monolithic.

Precast manhole sections must have:

a. ASTM C 990/C 990M butyl gaskets;
b. ASTM C 443/C 443M rubber O-ring joints; or
c. ASTM C 443, Type B gaskets.

G302002 1.3 CAST-IN-PLACE CONCRETE MANHOLES

Reinforced concrete; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading. Provide concrete work in accordance with ACI 301/301M and ACI 350-01; provide a minimum compressive strength of 4000 psi (28 MPa).

G302002 1.4 MANHOLE FRAMES AND COVERS

Frame and cover must be cast gray iron, ASTM A48/A48M, Class 35B, cast ductile iron, ASTM A536, Grade 65-45-12, or reinforced concrete, ASTM C478 ASTM C478M. Provide frame and cover adequate to accommodate the imposed live load. Stamp or cast the words "Sanitary Sewer" into covers so that it is plainly visible.

G302002 1.5 MANHOLE STEPS

a. Zinc-coated steel: 29 CFR 1910.27.
b. Plastic or rubber coating pressure molded to steel: ASTM D 4101, copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness must be 70 plus or minus 5.

Aluminum steps or rungs are not allowed.

Steps are not required in manholes less than 4 feet (1.2 m) deep.

G302002 1.6 MANHOLE CONSTRUCTION

Where a new manhole is constructed on an existing line, remove existing pipe to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of manhole wall, but not protruding into the manhole. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete, no parging will be allowed on interior manhole walls.

G302002 1.7 CONNECTIONS TO EXISTING MANHOLES

Center pipe connections to existing manholes on the manhole. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the manhole in a manner that causes the least damage to the walls.

G302002 1.8 CLEANOUTS

Construct cleanouts of cast iron soil pipe and fittings; see G302001, paragraph 1.3.

G302003 LIFT STATIONS AND PUMPING STATIONS

G302003 1.1 GENERAL REQUIREMENTS

If a pump station is allowed, provide materials, equipment, labor, testing and miscellaneous related items for a packaged lift or pump station system for the facility in compliance with the UFC 3-240-01, *Wastewater Collection*; the state sewerage regulations; and the utility provider's requirements.

G302003 1.2 SUBMERSIBLE PUMPS

Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter.

Provide submersible sewage pumps, with guide rail system. Include ASTM A48/A48M, Class 25, nonclog, cast-iron impeller; and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.3 GRINDER PUMPS

Provide grinder-type sewage pumps, with guide rail system. Include stainless steel or bronze impeller and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.4 SUCTION LIFT PUMPS

Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter.

Provide dry-chamber-mounting, vacuum-primed, nonclog sewage pumps located in dry compartment above wet pit. Include ASTM A48/A48M, Class 25, nonclog, cast iron impeller; mechanical or stuffing box seals; pedestal mounted motor; and suction piping extending to bottom of wet pit.

Provide suction-lift pumps capable of automatic rapid self priming and re-priming at the "lead pump on" elevation. Suction piping must not exceed 25 feet (7.6 meters) in total length. Priming lift at the "lead pump on" elevation must include a safety factor of at least 4 feet (1.2 meters) from the maximum allowable priming lift for the specific equipment at design operating conditions. The combined total of dynamic suction-lift at the "pump off" elevation and the required net positive suction head at design operating conditions must not exceed 22 feet (6.7 meters).

G302003 1.5 PUMP MOTOR

Provide pump motor sized to accommodate pump operation along the entire impeller curve.

G302003 1.6 STATION PIPING WITHIN WET WELL AND VALVE VAULT

G302003 1.6.1 Piping Less than 4-Inch (100 mm) in Diameter

a. PVC Pressure Pipe

1) Pipe: ASTM D 1785, Schedule 80.

2) Fittings: Schedule 80 socket fittings, ASTM D 2467; Schedule 80 threaded fittings, ASTM D 2464.

G302003 1.6.2 Piping 4 inch (100 mm) Diameter and Larger

a. Flanged Ductile Iron Pipe

1) Pipe: AWWA C115 and its appendices.

2) Fittings: AWWA C110 or AWWA C153.

3) Lining: AWWA C104.

G302003 1.7 FORCE MAINS

G302003 1.7.1 Force Mains for Submersible and Suction Lift Pumps

Force mains must be at least 4 inches (100 mm) in diameter and be constructed of either ductile iron or PVC pressure pipe.

a. Ductile Iron Pressure Pipe

1) Pipe: AWWA C151, Pressure Class 350.

2) Fittings: AWWA C110 or AWWA C153.

3) Interior Lining: AWWA C104.

4) Exterior Protection (if required): AWWA C105, polyethylene encasement.

b. PVC Pressure Pipe

1) Pipe: AWWA C900, Pressure Class 150. AWWA C905.

2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).

G302003 1.7.2 Force Mains for Grinder Pumps

Utilize PVC pressure pipe for force mains less than 4 inches (100 mm) in diameter :

a. PVC Pressure Pipe

1) Pipe: ASTM D 1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.

2) Fittings: ASTM D 2466.

3) Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.

G302003 1.8 PIPING ACCESSORIES

G302003 1.8.1 Insulating Joints

Provide between pipes of dissimilar metals a rubber gasket or other approved insulating joint or dielectric coupling to effectively prevent metal-to-metal contact between adjacent sections of piping.

G302003 1.8.2 Accessories

Provide flanges, connecting pieces, transition glands, transition sleeves, and other adapters as required.

G302003 1.8.3 Flexible Flanged Coupling

Provide flexible flanged coupling for sewage as indicated. Use flexible flanged coupling designed for a working pressure of 350 psi (2400 kPa).

G302003 1.9 VALVES

Provide shutoff and check valves on the discharge line of each pump. Locate the check valve between the shutoff valve and the pump. Locate valves in accordance with state sewerage regulations. Check valves must be suitable for the material being handled and placed on the horizontal portion of the discharge piping except for ball check valves, which may be placed in the vertical run. Provide valves capable of withstanding normal pressure and water hammer. Use valves from one manufacturer.

G302003 1.9.1 Shut Off Valves

G302003 1.9.1.1 Shut Off Valves Less than 4 Inch (100 mm) in Diameter

PVC ball valves.

G302003 1.9.1.2 Shut Off Valves 4 Inch (100 mm) and Larger in Diameter

AWWA C509 or AWWA C515, nonrising stem, and flanged. Provide valves with handwheels that open by counterclockwise rotation of the valve stem. Provide epoxy coating in accordance with AWWA C550.

G302003 1.9.2 Check Valves

G302003 1.9.2.1 Check Valves Less than 4-Inch (100 mm) in Diameter

Neoprene ball check valve with integral hydraulic sealing flange, designed for a hydraulic working pressure of 175

psi (1200 kPa).

G302003 1.9.2.2 Check Valves 4-Inch (100 mm) and Larger in Diameter

AWWA C508, flanged. Provide a nonclog, swing check valve rated for not less than 175 psig (1200 kPa) working pressure capable of passing 3-inch (75 mm) diameter solids.

G302003 1.9.3 Air Relief Valves

Provide air relief valves at high points in the force main to prevent air locking in accordance with AWWA M51. Provide vacuum relief valves to relieve negative pressures on force mains.

G302003 1.10 IDENTIFICATION TAGS AND PLATES

Provide valves with tags or plates numbered and stamped for their usage. Use plates and tags of brass or nonferrous material and mounted or attached to the valve.

G302003 1.11 THRUST RESTRAINT

Provide thrust restraint for force mains, valves and other features of the wastewater distribution system.

Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.

G302003 1.12 STATION CONTROL SYSTEM

G302003 1.12.1 Operating Controls

G302003 1.12.2 Alarm Controls

Provide alarms for pumping and lift stations; at minimum provide alarms for high level, power failure, pump failure, unauthorized entry or any cause of station malfunction. Provide alarms as required by the pump manufacturer to obtain warranty.

G302003 1.12.3 Telemetry

If required, provide a telemetry system in accordance with state sewer collection and treatment regulations and system owner's requirements to relay alarms to a facility that is manned 24 hours a day.

G302003 1.13 UNDERGROUND ENCLOSURES

G302003 1.14 STATION ACCESSORIES

G302003 1.14.1 Ventilation

Provide covered wet wells with provisions for air displacement

venting to the outside. Provide galvanized ASTM A 53/A 53M pipe with insect screening.

Provide adequate ventilation for pump stations.

G302003 1.14.2 Metering

Provide devices for measuring wastewater flow at pumping stations. Provide indicating, totalizing and recording flow measurement at pumping stations with a 1200 gpm (76 l/s) or greater design peak hourly flow. For smaller stations, provide elapsed time meters in conjunction with pumping rate tests.

G302003 1.14.3 Pipe and Valve Supports

Use schedule 40 galvanized steel piping conforming to ASTM A 53/A 53M for pipe and valve supports. Provide either ANSI B16.3 or ANSI B16.11 galvanized threaded fittings.

G302003 1.14.4 Miscellaneous Metals

Use stainless steel bolts, nuts, washers, anchors, and supports for installation of equipment.

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

Provide packaged wastewater treatment facilities in accordance with UFC 3-240-02, *Domestic Wastewater Treatment;* for pipeline materials and the state sewer collection and treatment regulations for treatment plant requirements.

G302005 SEPTIC TANKS

Provide septic tanks in accordance with the state and treatment regulations and the International Private Sewage Disposal Code 2000.

G302006 DRAIN FIELDS

Provide drain fields in accordance with the state and treatment regulations and the International Private Sewage Disposal Code 2000.

G302090 OTHER SANITARY SEWER

G302090 1.1 OIL INTERCEPTOR

Refer to G303090.

G3030 STORM SEWER

Provide materials, equipment, labor, testing, and miscellaneous related items to provide storm drainage collection system to drain the site. Design and construct the storm sewer collection system in accordance with UFC 3-201-01, *Civil Engineering*; the utility provider's requirements; and the state stormwater management laws and regulations. Design project site to prevent stormwater runoff in excess of the capacity of the existing utility system.

G303001 STORM SEWER PIPING

G303001 1.1 PIPING

Storm sewer piping 12 inches (300 mm) and larger in diameter must be reinforced concrete, ductile iron or corrugated steel; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

Utilize perforated PVC or HDPE for subsurface drainage piping.

G303001 1.1.1 Materials

a. PVC Pipe

1) Piping and Fittings: ASTM D3034, SDR 35.

2) Joints: ASTM D3212 and ASTM F477.

b. Ductile Iron Pipe

1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.

2) Fittings: AWWA C110 or AWWA C153.

3) Joints: AWWA C111.

4) Interior Coating: AWWA C104.

5) Exterior Protection (if required): AWWA C105, polyethylene encasement.

c. Reinforced Concrete Pipe

1) Circular Pipe: ASTM C76/C76M. Provide required Class based on design information and methods in ASTM C76/C76M. Class III minimum.

2) Elliptical Pipe: ASTM C507/C507M. Provide required Class based on design information and methods in ASTM C76/C76M.

3) Joints:

a) ASTM C990/C990M butyl gaskets;

b) ASTM C 443/C 443M rubber O-ring joints; or

c) AASHTO M 198, Type B preformed plastic gaskets.

d. Corrugated Aluminum Pipe

1) Piping: ASTM B745/B745M.

2) Joints: Coupling bands conforming to ASTM B745/B745M.

3) Coating: Fully bituminous coated in accordance with ASTM A849. For applications where piping is part of a piped storm sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.

e. Corrugated Steel Pipe

1) Piping: ASTM A760/A760M.

2) Joints: Coupling bands conforming to ASTM A760/A760M.

3) Coating: Fully bituminous coated in accordance with ASTM A849. For applications where piping is part of a piped storm sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.

f. Polyethylene (PE) Pipe

1) Piping 12 inches to 60 inches and Fittings: ASTM 2648/F2648M and AASHTO M 294 Type S, corrugated.

2) Joints: ASTM F477 and ASTM D3212

g. Dual and Triple Wall Polypropylene (PP) Pipe

1) Piping 12 inches to 60 inches and Fittings: ASTM F2736, ASTM F2764/F2764M, ASTM F2881 and AASHTO M 330 Type S or D

2) Joints: ASTM F477 and ASTM D3212

h. Perforated PVC Pipe: ASTM D 2729.

i. Perforated PE Pipe

1) Piping and Fittings: AASHTO M 294, Type SP, corrugated.

2) Joints: AASHTO M 294, Soiltight.

G303001 1.1.2 Installation

Install piping in accordance with manufacturer's recommendations and the following standards:

1. PVC, PE and Dual and Triple Wall PP: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.
2. Ductile Iron: AWWA C600.
3. Reinforced Concrete: ACPA 01-102 and 01-103.
4. Corrugated Aluminum: ASTM B 788/B 788M.
5. Corrugated Steel: ASTM A 798/A 798M.
6. Perforated PVC and Perforated PE: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping

below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.

G303001 1.2 PIPING FOR CLEANOUTS

G303001 1.2.1 Materials

a. Cast-Iron Soil Pipe for Cleanouts

1) Pipe: ASTM A 74, service.

2) Joints: ASTM C 564 compression rubber gaskets.

3) Exterior Protection (if required): AWWA C105, polyethylene encasement.

G303001 1.2.2 Installation

Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.

G303002 STORM SEWER STRUCTURES

G303002 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items for the drainage structures in accordance with the following:

a. Set structure rim elevations flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
b. Provide resilient connectors for making joints between manhole and pipes entering manhole in conformance with ASTM C 923/C 923M.
c. Provide precast or cast-in-place concrete drainage structures, except cast-in-place concrete is required for airfield drainage structures, headwalls and gutters.

G303002 1.2 PRECAST CONCRETE INLETS

Provide work and materials in accordance with requirements of the State Highway Specifications (SHS) and standards where the project is located.

G303002 1.3 CAST-IN-PLACE CONCRETE DRAINAGE STRUCTURES

Provide work and materials in accordance with drainage structures indicated in the State Highway Specifications (SHS) and standards where the project is located.

For airfield drainage structures, provide work and materials in accordance with FAA ACA 150/5370-10B.

G303002 1.4 DRAINAGE STRUCTURE FRAMES AND COVERS

Frame and cover for gratings must be cast gray iron, ASTM A48/A48M, Class 35B; cast ductile iron, ASTM A536, Grade 65-45-12; or cast aluminum, ASTM B26/B26M, Alloy 356.OT6. Provide frame and cover to accommodate the imposed live loads. Stamp or cast the words "Storm Sewer" into covers so that it is plainly visible.

For airfield drainage structures, fabricate frames and covers of standard commercial grade steel welded by qualified welders in accordance with AWS D1.1/D1.1M. Provide covers of rolled steel floor plate having an approved anti-slip surface. Steel frames and covers must be hot dipped galvanized after fabrication. At the contractor's option, ductile iron covers and frames may be used for airfield drainage structures if designed for a minimum proof load of 100,000 pounds (45,000 kg) in lieu of the steel frames and covers. Provide covers of the same material as the frames (i.e. ductile iron frame with ductile iron cover, galvanized steel frame with galvanized steel cover). Perform proof loading in accordance with ASTM A 48/A 48M. Physically stamp proof loads into the cover. Provide the Contracting Officer copies of previous proof load test results performed on the same frames and covers as proposed for this Contract. Modify the top of the structure to accept the ductile iron structure in lieu of the steel structure indicated. The finished structure must be level and non-rocking, with the top flush with the surrounding pavement.

G303002 1.5 DRAINAGE STRUCTURE STEPS

a. Zinc-coated steel: 29 CFR 1910.27.
b. Plastic or rubber coating pressure molded to steel: ASTM D 4101, copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness must be 70 plus or minus 5.

Aluminum steps or rungs are not allowed.

Steps are not required in structures less than 4 feet (1.2 m) deep.

G303002 1.6 DRAINAGE STRUCTURE CONSTRUCTION

Where a new structure is constructed on an existing line, remove existing pipe to construct the structure. Cut existing pipe so that pipe ends are approximately flush with the interior face of structure wall, but not protruding into the structure.

G303002 1.7 CONNECTIONS TO EXISTING STRUCTURES

Center pipe connections to existing structures on the structure. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the structure in a manner that causes the least damage to the walls.

G303002 1.8 CLEANOUTS

Construct cleanouts of cast iron soil pipe and fittings; see G303001,

paragraph 1.2.

G303003 LIFT STATIONS

A stormwater pump station(s) will not be allowed.

G303004 CULVERTS

Provide reinforced concrete or corrugated steel piping for culverts 12 inches (300 mm) and larger in diameter; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP. See G303001, paragraphs 1.1.1 and 1.1.2 for material and installation requirements.

Provide flared end sections of the same material as the pipe material.

Provide erosion control in accordance with the State Erosion and Sedimentation Control Standards or EPA guidance where State Standards are unavailable.

G303005 HEADWALLS

Provide cast-in-place concrete headwalls in accordance with the State Highway Specification (SHS) and standards where the project is located.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Refer to Section G103011.

G303007 STORMWATER MANAGEMENT

G303007 1.1 STORMWATER COLLECTION AND STORAGE

Provide permanent stormwater management (i.e., detention and retention ponds, LID and other drainage features) to control stormwater runoff in accordance with UFC 3-201-01, *Civil Engineering*, UFC 3-210-10, *Low Impact Development*, FC 1-300-09N *Navy and Marine Corps Design Procedures*, State and local stormwater management Laws and Regulations and project sustainability goals. Integrate permanent stormwater management features into the site design in accordance with UFC 3-201-01, *Civil Engineering*.

Parking areas, roads, walks, courtyards, training areas and similar site features may not be used to detain or retain stormwater. Manage stormwater within detention or retention ponds and the LID features indicated in Part 3 of this RFP. Prevent upstream and downstream property damage.

G303090 OTHER STORM SEWER

G303090 1.1 OIL INTERCEPTOR

Provide an oil interceptor to remove free oil from oil-in-water mixtures originating from proposed facility operations. Provide grit

protection upstream of the oil interceptor.

Provide an oil interceptor utilizing coalescing media and conforming to the guidelines of the American Petroleum Institute (API).

Provide materials or a coating system which protects the interceptor from the oil-in-water mixture, atmosphere, and in-situ soil conditions.

Use an interceptor with a completely removable cover.

G3040 HEATING DISTRIBUTION

G304001 OVERHEAD HOT WATER SYSTEMS

G304001 1.1 PIPING & FITTINGS

Hot water piping must be ASTM A 53, Type E (electric-resistance welded), Grade A or B), or Type S (seamless, Grade A or B); black steel, Weight Class XS (Extra Strong). ASTM A 106, Grade A or B, black steel, Schedule 80 may be used.

G304001 1.2 INSULATION

Mineral fiber, calcium silicate, or cellular glass pipe insulation with aluminum jacket which matches existing or surrounding insulation. Paint jacket to suit Base Architectural Plan. The minimum insulation thickness must be in accordance with the following table:

Table 1 Insulation Thickness for Hot Water Systems

Nominal Pipe Diameterinches (mm)	Mineral Fiberinches (mm)	Calcium Silicateinches (mm)	Cellular Glassinches (mm)
1.00 (25)	1.5 (38)	1.5 (38)	1.5 (38)
1.5 (38)	1.5 (38)	1.5 (38)	1.5 (38)
2.0 (51)	1.5 (38)	1.5 (38)	1.5 (38)
2.5 (64)	1.5 (38)	1.5 (38)	1.5 (38)
3.0 (76)	1.5 (38)	1.5 (38)	1.5 (38)
4.0 (100)	2.0 (51)	2.5 (64)	1.5 (38)
5.0 (125)	2.0 (51)	2.5 (64)	1.5 (38)
6.0 (150)	2.5 (64)	2.5 (64)	1.5 (38)
8.0 (200)	2.5 (64)	2.5 (64)	1.5 (38)
10.0 (250)	2.5 (64)	2.5 (64)	1.5 (38)

12.0 (300)	2.5 (64)	2.5 (64)	1.5 (38)
14.0 (350)	2.5 (64)	2.5 (64)	1.5 (38)
16.0 (400)	2.5 (64)	2.5 (64)	1.5 (38)
18.0 (450)	2.5 (64)	2.5 (64)	1.5 (38)

G304001 1.3 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G304001 1.4 SUPPORTS

MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G304002 OVERHEAD STEAM SYSTEMS

G304002 1.1 PIPING & FITTINGS

G304002 1.1.1 Steam Piping

ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight Class XS (Extra Strong) for threaded end connections. ASTM A 106, Grade A or B, black steel, Schedule 40 may be used for pipe sizes through 9 inches (250 mm), and minimum pipe wall thickness of 0.35 inches (9.5 mm) for pipe sizes 12 inches (300 mm) and larger for welding end connections. Provide Schedule 80 for threaded end connections.

G304002 1.1.2 Condensate Piping

ASTM A 53, Type E (electric-resistance welded), Grade A or B), or Type S (seamless, Grade A or B); black steel, Weight Class XS (Extra Strong). ASTM A 106, Grade A or B, black steel, Schedule 80 may be used.

G304002 1.2 INSULATION

Fibrous glass, calcium silicate, or cellular glass pipe insulation with aluminum jacket which matches existing or surrounding insulation. Paint jacket to suit Base Architectural Plan. The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Steam Systems

Nominal Pipe	Fibrous	Calcium	Cellular

Diameterinches (mm)	Glassinches (mm)	Silicateinches (mm)	Glassinches (mm)
1.00 (25)	3.5 (90)	4.0 (100)	*
1.5 (38)	3.5 (90)	4.0 (100)	*
2.0 (51)	3.5 (90)	4.0 (100)	*
2.5 (64)	3.5 (90)	4.0 (100)	*
3.0 (76)	4.0 (100)	4.5 (115)	*
4.0 (100)	4.0 (100)	4.5 (115)	*
5.0 (125)	4.5 (115)	5.0 (125)	*
6.0 (150)	4.5 (115)	5.0 (125)	*
8.0 (200)	5.0 (125)	6.0 (150)	*
10.0 (250)	5.0 (125)	6.0 (150)	*
12.0 (300)	5.0 (125)	6.0 (150)	*
14.0 (350)	5.0 (125)	6.0 (150)	*
16.0 (400)	5.0 (125)	6.0 (150)	*
18.0 (450)	5.0 (125)	6.0 (150)	*

* Cellular glass pipe insulation having an insulating efficiency not less than that of the specified thickness of calcium silicate may be provided.

Table 2 Insulation Thickness for Condensate Systems

Nominal Pipe Diameterinches (mm)	Mineral Fiberinches (mm)	Fibrous Glassinches (mm)
1.00 (25)	2.5 (64)	*
1.5 (38)	2.5 (64)	*
2.0 (51)	2.5 (64)	*
2.5 (64)	2.5 (64)	*
3.0 (76)	3.0 (76)	*

4.0 (100)	3.0 (76)	*
5.0 (125)	3.5 (90)	*
6.0 (150)	3.5 (90)	*
8.0 (200)	3.5 (90)	*
10.0 (250)	3.5 (90)	*
12.0 (300)	3.5 (90)	*
14.0 (350)	3.5 (90)	*
16.0 (400)	3.5 (90)	*
18.0 (450)	3.5 (90)	*

* Fibrous glass pipe insulation having an insulating efficiency not less than that of the specified thickness of mineral fiber may be provided.

G304002 1.3 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G304002 1.4 SUPPORTS

MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G304003 UNDERGROUND HOT WATER SYSTEMS

G304003 1.1 PIPING & FITTINGS

Direct buried, factory pre-fabricated, pre-insulated, piping systems must consist of a service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket. Provide factory fabricated fittings and components. Field insulation of fittings is not allowed.

G304003 1.2 INSULATION

The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Drainable/Dryable Systems

Nominal Pipe Diameterinches (mm)	Parocinches (mm)	Epitherminches (mm)	Kaylo-10 Thermo-12 Super Caltempinches

			(mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)
6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)
18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

Table 2 Insulation Thickness for Water Spread Limiting Systems

Nominal Pipe Diameterinches (mm)	Calcium Silicateinches (mm)	Polyurethaneinches (mm)
1.00 (25)	N/A	N/A
1.5 (38)	N/A	N/A
2.0 (51)	N/A	N/A
2.5 (64)	N/A	N/A
3.0 (76)	1.00 (25)	1.23 (31)
4.0 (100)	1.00 (25)	1.23 (31)
5.0 (125)	N/A	N/A
6.0 (150)	1.5 (38)	1.34 (34)

8.0 (200)	2.0 (51)	1.21 (30)
10.0 (250)	2.5 (64)	1.31 (33)
12.0 (300)	2.0 (51)	1.29 (33)
14.0 (350)	N/A	N/A
16.0 (400)	N/A	N/A
18.0 (450)	N/A	N/A

G304003 1.3 UHDS DESIGN

Design and provide direct buried, factory-prefabricated, pre-insulated main hot water piping, including piping in manholes. Asbestos cement or plastic conduit is not acceptable. The Underground Heat Distribution System (UHDS) representative must be certified in writing by the UHDS manufacturer to be technically qualified and experienced in the installation of the system. Provide a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the UHDS manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years. The certificate must include verification information.

G304003 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in valve boxes. Valves must be ASME class 150.

G304003 1.5 EXPANSION

Compensate for piping expansion by utilizing expansion loops.

G304004 UNDERGROUND STEAM DISTRIBUTION SYSTEMS

G304004 1.1 PIPING & FITTINGS

Direct buried, factory pre-fabricated, pre-insulated, steam and condensate piping systems mustl consist of a steel service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket. Provide factory fabricated fittings and components. Field insulation of fittings is not allowed.

G304004 1.2 INSULATION

The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Drainable/Dryable Systems

Nominal Pipe Diameterinches (mm)	Parocinches (mm)	Epitherminches (mm)	Kaylo-10 Thermo-12 Super Caltempinches (mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)
6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)
18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

Table 2 Insulation Thickness for Water Spread Limiting Systems

Nominal Pipe Diameterinches (mm)	Calcium Silicateinches (mm)	Polyurethaneinches (mm)
1.00 (25)	N/A	N/A
1.5 (38)	N/A	N/A
2.0 (51)	N/A	N/A
2.5 (64)	N/A	N/A
3.0 (76)	1.00 (25)	1.23 (31)
4.0 (100)	1.00 (25)	1.23 (31)

5.0 (125)	N/A	N/A
6.0 (150)	1.5 (38)	1.34 (34)
8.0 (200)	2.0 (51)	1.21 (30)
10.0 (250)	2.5 (64)	1.31 (33)
12.0 (300)	2.0 (51)	1.29 (33)
14.0 (350)	N/A	N/A
16.0 (400)	N/A	N/A
18.0 (450)	N/A	N/A

Table 3 Insulation Thickness for Condensate Return Systems

Nominal Pipe Diameterinches (mm)	Parocinches (mm)	Epitherminches (mm)	Kaylo-10 Thermo-12 Super Caltempinches (mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)
6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)
18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

G304004 1.3 UHDS DESIGN

Design and provide direct buried, factory-prefabricated, pre-insulated main steam and condensate piping in separate conduits and including piping in manholes. Asbestos cement or plastic conduit is not acceptable. The UHDS representative must be certified in writing by the UHDS manufacturer to be technically qualified and experienced in the installation of the system. Provide a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the UHDS manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years. The certificate must include verification information.

G304004 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in manholes. Valves must be ASME class 150.

G304004 1.5 EXPANSION

Compensate for piping expansion by utilizing expansion loops. Locate anchors outside manholes.

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

G304005 1.1 MANHOLE CONSTRUCTION

Manholes must be constructed of reinforced, 3000 psi (206.8 bar) concrete and extend a minimum of 6 inches (300 mm) above grade. Depth must be as required to maintain proper pipe slopes. Construct manhole floor and sides in one monolithic pour. Provide galvanized steel or sectioned aluminum, open grate or solid cover as indicated in ESR Section G30. Provide ventilation openings for solid cover. Provide steel ladder with non-slip surfaces and anchored to the wall. Manhole floor and walls must be watertight. Provide sleeves or core drill openings for pipes with modular mechanical seals. Provide sump pit for pump.

G304005 1.2 VALVE BOX CONSTRUCTION

Cast-iron or ductile-iron box of a suitable size. Provide cast-iron or ductile-iron cover for the box with word(s) describing the utility cast on the cover.

G304005 1.3 MANHOLE SUMP PUMPS

Vertical sump pump. Operating temperature design must be 195 degrees F (93 degrees C) minimum. Provide with 2-pole float control.

G304090 OTHER HEATING DISTRIBUTION

G304090 1.1 WARNING & IDENTIFICATION TAPE

Polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be white for steam systems.

G304090 1.2 CORROSION PROTECTION

Provide a cathodic protection system for the underground piping system. System must be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer must obtain soil data and existing system conditions. Corrosion engineer must supervise, inspect and test the installation and performance of the cathodic protection system. Test stations must be post mounted and placed at the manhole or nearby building. Test stations must be located at each end of each cathodically protected section.

G3050 COOLING DISTRIBUTION

G305001 OVERHEAD COOLING SYSTEMS

G305001 1.1 PIPING & FITTINGS

G305001 1.1.1 Chilled and Condenser Water Piping

Chilled and condenser water piping must be electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

G305001 1.1.2 Steel Pipe Fittings

For piping 2 inch (50 mm) and smaller, provide ANSI/ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME/ANSI B16.9 butt-welding fittings or ASME/ANSI B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger. Grooved joint pipe coupling systems of appropriate pressure rating are acceptable in lieu of welded or screwed fittings.

G305001 1.1.3 Copper Fittings

Provide ANSI B16.18 cast bronze solder joint type or ASME/ANSI B16.22 wrought copper solder joint type.

G305001 1.2 INSULATION

Mineral fiber, Urethane, cellular glass, Faced Phenolic Foam, or Flexible Cellular pipe insulation with aluminum jacket in accordance with ESR Section G30. The minimum insulation thickness must be in accordance with the following table:

Table 1 Insulation Thickness for Cold Water Systems

Nominal Pipe Diameterinches (mm)	Mineral Fiberinches (mm)	Urethaneinches (mm)	Cellular Glassinches (mm)	Faced Phenolic Foaminches (mm)	Flexible Cellularinches (mm)
1.00 (25)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
1.5 (38)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
2.0 (51)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
2.5 (64)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
3.0 (76)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
4.0 (100)	1.5 (38)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
5.0 (125)	1.5 (38)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
6.0 (150)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
8.0 (200)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
10.0 (250)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
12.0 (300)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
14.0 (350)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
16.0 (400)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
18.0 (450)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)

G305001 1.3 SUPPORTS

Provide MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G305001 1.4 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G305002 UNDERGROUND COOLING SYSTEMS

G305002 1.1 PIPING & FITTINGS

Direct buried, factory-prefabricated, pre-insulated, chilled water piping systems. Fittings and accessories must be designed and factory-

fabricated to prevent moisture from entering into the system. Backfill and install to meet the requirements of the piping system manufacturer.

G305002 1.2 VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in valve boxes.

G305090 OTHER COOLING DISTRIBUTION

G305090 1.1 EXPANSION

Compensate for piping expansion by utilizing expansion loops. Locate anchors outside manholes.

G305090 1.2 WARNING & IDENTIFICATION TAPE

Polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording.

G305090 1.3 CORROSION PROTECTION

Provide a cathodic protection system for the underground chilled water and condenser water piping system. System must be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer must obtain soil data and existing system conditions. Corrosion engineer must supervise, inspect and test the installation and performance of the cathodic protection system. Test stations must be post mounted and placed at the manhole or nearby building. Test stations must be located at each end of each cathodically protected section.

G3060 FUEL DISTRIBUTION

G306001 LIQUID FUEL DISTRIBUTION PIPING

Underground pipe lines shall be fuel grade double-walled pipe with monitoring sumps where pipe transitions to above ground. Sumps shall be sealed and shall have constant electronic monitoring.

G306001 1.1 MATERIALS

Fuel piping must be ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel or API SPEC 5L, seamless, submerged-arc weld or gas metal-arc weld, Grade B, black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight Class XS (Extra Strong) for threaded end connections.

For underground fuel distribution lines, provide nondetectable warning tape for the full length of each run of piping. Warning tape to be

color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for fuel lines.

G306003 LIQUID FUEL STORAGE TANKS

G306003 1.1 STORAGE TANKS

Double wall in accordance with UL 2085. Provide secondary containment and leak monitoring with a capacity to meet the system requirements. Provide with overfill and spill containment, overfill protection and vents.

G306003 1.2 FUEL PUMPS

Fuel pumps must comply with NEMA MG 1, NFPA 70, and be designed for use with hydrocarbon fuels and working pressure of 275 psig (1896 kilopascals) at 100 degrees F (38 degrees C).

G306003 1.3 FUEL METERS

Continuous duty, positive displacement type, with electronic thermal compensation capability, suitable for outdoor installation, and designed for use with hydrocarbon fuels and working pressure of 275 psig (1896 kilopascals) at 100 degrees F (38 degrees C).

G306004 LIQUID FUEL DISPENSING TANKS

Double wall in accordance with UL 2085 with secondary containment and leak monitoring with a capacity to meet the system requirements. Provide with overfill and spill containment, overfill protection, vents, tank mounted dispenser with filter, vacuum breaker, safety breakaway, hose and nozzle.

G306006 GAS DISTRIBUTION PIPING (NATURAL & PROPANE)

G306006 1.1 STEEL PIPE

Gas piping must be ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight Class XS (Extra Strong) for threaded end connections.

G306006 1.2 POLYETHYLENE (PE)

PE pipe and heat fusion fittings must conform to ASTM D 2513, Grade PE2406 or PE3408.

G306007 GAS STORAGE TANKS

G306007 1.1 PROPANE STORAGE TANKS

ASME labeled tank in accordance with NFPA 58 with a capacity to meet the system requirements.

G306009 OTHER GAS DISTRIBUTION

G306009 1.1 WARNING & IDENTIFICATION TAPE

Detectable aluminum foil, plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identifying buried piping. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for gas lines.

-- End of Section --

SECTION G40

SITE ELECTRICAL UTILITIES
12/18

G40 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

G40 1.1 NARRATIVE

This section covers installations exterior to the facility outside the five foot line. See PTS Section D50, *Electrical and Communications*, for continuation of systems inside the five foot line, into and inside the building.

G40 1.2 ELECTRICAL DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

When all product Quality Control information is included in the Unified Facility Criteria (UFC) and there are requirement options identified in the ESR, then the Uniformat Level 4 titles (and possible subtitles) are included without repetition of requirements. One example of this is G401008, GROUNDING SYSTEMS.

G40 1.2.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-501-01, Electrical Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements

UFC 3-570-02N	Electrical Engineering Cathodic Protection

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 11 13.00 20	Primary Unit Substation
UFGS 26 11 16	Secondary Unit Substations
UFGS 26 12 19.10	Three-Phase Pad-Mounted Transformers
UFGS 26 12 21	Single-Phase Pad-Mounted Transformers
UFGS 26 13 00	SF6/High-Firepoint Fluids Insulated Pad-Mounted Switchgear
UFGS 26 23 00	Low Voltage Switchgear
UFGS 26 24 13	Switchboards
UFGS 26 27 14.00 20	Electricity Metering
UFGS 26 56 00	Exterior Lighting
UFGS 33 71 01	Overhead Transmission and Distribution
UFGS 33 71 02	Underground Electrical Distribution
UFGS 33 82 00	Telecommunications Outside Plant

G40 1.3 QUALITY ASSURANCE

Submit qualifications, certifications, and Test Plans indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

The Designer of Record is responsible for approving the submittals listed below.

G40 1.3.1 Qualified Testing Organization

Engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the

electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization must be independent of the supplier, manufacturer, and installer of the equipment. The organization must be a first tier subcontractor.

a. Submit name and qualifications of organization. Organization must have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization must have a calibration program, and test instruments used must be calibrated in accordance with NETA ATS.
b. Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments must be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

G40 1.3.2 NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers are allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

G40 1.3.3 Qualified Medium Voltage Electrician

All workers on medium voltage electrical crews must have 5 years experience working medium voltage systems on similar projects involving the same or higher voltage.

G40 1.3.4 Qualified Cable Splicer (Medium Voltage Cable)

The cable splicer/terminator must have a certification from the National Cable Splicing Certification Board (NCSCB) in the field of splicing and terminating shielded medium voltage (5 kV to 35 kV) power cable using pre-manufactured kits (pre-molded, heat-shrink, cold-shrink). Submit proof of certification for the individuals that will be performing cable splicer and termination work 30 days before splices or terminations are to be made.

G40 1.3.5 Qualified PV Installer

Installation of photovoltaic systems must be performed by experienced and trained installers. At minimum the PV installation supervisor must hold a "PV Installer Certification" as issued by the North American Board of Certified Energy Practitioners or hold a Certified Solar Roofing Professional

(CSRP) credential issued by RISE "Roof Intergrated Solar Energy Inc".

G40 1.3.6 Qualified Cable Splicer (Telecommunications)

Certification must include the training, and experience of the individual on specific type and classification of telecommunications cable to be provided under this contract.

G40 1.3.7 Qualified Cable Installer and Splicer (Fiber Optic Cable)

Certification must include the training, and experience of the individual on specific type and classification of Fiber Optic media to be provided under this contract.

G40 1.3.8 Qualified Fiber Optic (FO) Cable Manufacturer

The FO media manufacturer must have a minimum of 3 years experience in the manufacturing, assembly, and factory testing of FO media that complies with RUS REA Bull 1753F-601 (PE-90). Manufacturer must provide a list of customers with 3 years of maintenance logs documenting experience with government customers.

G40 1.3.9 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

G40 1.3.9.1 Warning Labels

Each enclosure of electrical equipment, including substations, pad-mounted transformers, pad-mounted switches, pad-mounted sectionalizing termination cabinets, and switchgear, must have a warning label identifying the enclosure as 1) containing energized electrical equipment and 2) an arc flash hazard. Provide arc flash warning labels in accordance with UFC 3-560-01, *Electrical Safety, O & M*.

G40 1.3.10 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer's calibration program must ensure that all test instruments are maintained within rated accuracy.

G40 1.3.11 Electrical System Startup and Testing

Submit test plans for approval. Tailor test plans to the systems provided.

The test plan must list make and model and provide functional description of the test instruments and accessories and must describe the setup of the tests to be conducted. Test instruments

mustl be capable of measuring and recording or displaying test data at a higher resolution and greater accuracy than specified for the equipment's performance.

G40 1.3.11.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

G40 1.3.11.2 Performance Verification Testing

Perform in-service demonstration that all circuits and devices are in operating condition. Tests must confirm that each item of control equipment will function not less than five times. Provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, test all systems in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. Assure that all test instruments are maintained within rated accuracy. Dated calibration labels must be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations and that conforms to NETA ATS for each piece of Electrical Distribution Equipment and System requiring Performance Verification Testing.

The following items identify specific test requirements. Additional test requirements are contained in the applicable UFGS.

a. Cable – Test cable in accordance with the manufacturer's recommendations and NETA ATS. Adhere to precautions and limits as specified in the applicable NEMA/ICEA Standard for the specific cable.
b. Grounding - Test ground systems in accordance with the manufacturer's recommendations and NETA ATS.
c. Site Lighting - Contractor's Quality Control (CQC) representative must perform a field survey of site lighting systems in accordance with IESNA for acceptance. Show that the lighting system operates in accordance with the user’s requirements and is in accordance with designed levels. Provide certification that the measured lighting levels conform to the design requirements.
d. Telecommunications wiring - Test all cables in accordance with industry standards.

G40 1.3.11.3 Acceptance Tests and Inspections

The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and procedures and perform the acceptance tests and inspections. Test

methods, procedures, and test values must be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in NETA ATS are not required unless otherwise specified. Place equipment in service only after completion of required tests and evaluation of the test results have been completed. Contractor must supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing.

Specific test requirements are contained in the UFGS for equipment.

G40 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-501-01, *Electrical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS Section Z10, *General Performance Technical Specifications*.

UFGS 26 11 13.00 20, *Primary Unit Substation*

UFGS 26 11 16, *Secondary Unit Substations*

UFGS 26 12 19.10, *Three-Phase Pad-Mounted Transformers*

UFGS 26 12 21, *Single-Phase Pad-Mounted Transformers*

UFGS 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad-Mounted Switch Gear*

UFGS 26 23 00, *Low-Voltage Switchgear*

UFGS 26 24 13, *Switchboards*

UFGS 26 27 14.00 20, *Electricity Metering*

UFGS 26 56 00, *Exterior Lighting*

UFGS 33 71 01, *Overhead Transmission and Distribution*

UFGS 33 71 02, *Underground Electrical Distribution*

UFGS 33 82 00, *Telecommunications Outside Plant*

G40 1.4.1 Sustainable Design Submittal

Submit sustainable design submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*.

G40 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the PTS Section Z10 requirements, the Designer of Record (DOR) must approve the following construction submittals as a minimum:

OMSI Information for Electrical Equipment (if OMSI Manual for the entire project is not already required); all "G" item submittals listed in the submittals of the specifications sections identified in the Design Submittals paragraph above; and all "G" item submittals listed for Government Surveillance in Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*.

Provide certification that all adjustable protective device settings have been set in accordance with the coordination study for the as-built equipment and configuration.

G40 1.5.1 Sustainable Construction Submittal

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*.

G4010 ELECTRICAL DISTRIBUTION

G401001 SUBSTATIONS

When secondary unit substations are required, the Designer of Record must utilize UFGS Section 26 11 16, *Secondary Unit Substation*, UFGS Section 26 23 00, *Low-Voltage Switchgear*, and UFGS Section 26 24 13, *Switchboards*, for the project specification, and must submit the edited specification section as a part of the design submittal for the project.

G401002 TRANSFORMERS

When transformers are required, the Designer of Record must utilize UFGS Section 26 12 19.10, *Three-Phase Pad Mounted Transformers*, UFGS Section 26 12 21, *Single-Phase Pad Mounted Transformers*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G401003 SWITCHES, CONTROLS AND DEVICES

When switches or control devices are required, the Designer of Record must utilize UFGS Section 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad Mounted Switchgear*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G401004 OVERHEAD ELECTRIC CONDUCTORS

Power line conductors must be strung in accordance with manufacturer's standard sag and tension recommendations.

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Wood poles must comply with ANSI 05.1 and RUS 1728F-700. Pressure treat poles in accordance with AWPA C1 and AWPA C4 as referenced in RUS 1728F-700. The quality of each pole must be ensured with "WQC" (wood quality control) brand on each piece or by an approved inspection agency report. Do not use creosote treated poles, lodgepole pine, and western larch pine poles.

Concrete poles must comply with ANSI loadings for distribution poles.

Determine the size of poles required, class, height and other data, to meet requirements of the pole line. Provide wood, steel, or fiberglass crossarms in accordance with industry and local standards. Insulators, cutouts and associated equipment must be determined by the Designer of Record to meet system requirements.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Route underground cables to minimize splices. Cable pulling tensions must not exceed the maximum pulling tension recommended by the cable manufacturer. Medium voltage cable termination must be suitable for the location installed and meet IEEE Std. 48 Class 1 requirements.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Concrete manholes and handholes to be standard type precast concrete. Composite/Fiberglass handholes must be polymer concrete reinforced with a heavy weave fiberglass reinforcing. Provide manholes and handholes with load ratings suitable for the location installed.

G401008 GROUNDING SYSTEMS

G401009 METERING

When metering is required the Designer of Record must utilize UFGS section 26 27 14.00 20 for the project specification and submit the edited specification section as part of the design submittal for the project.

G401010 CATHODIC PROTECTION SYSTEMS

Provide cathodic protection systems in accordance with UFC 3-570-02N.

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

G4020 SITE LIGHTING

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Comply with ANSI/ASHRAE/IES 90.1 for all exterior lighting applications and controls. Comply with UFC 3-530-01 for reduction of light pollution.

Provide SPD at panelboards that include circuits feeding exterior lighting systems.

Coordinate the design and luminaire selection with the landscape designer. Such coordination must ensure the location of poles do not conflict with tree locations.

When exterior lighting is required the Designer of Record must utilize UFGS section 26 56 00 for the project specification and submit the edited specification section as part of the design submittal for the project.

G402002 SPECIAL SECURITY LIGHTING SYSTEM

G402003 OTHER AREA LIGHTING

G402004 LIGHTING POLES

Poles must meet International Building Code for street lighting poles, and AASHTO loadings for highway and sports lighting poles taking into account the effective projected areas of the luminaries provided. Provide direct set or anchor-base type poles designed for use with underground supply conductors.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide in accordance with Paragraph G401006.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide handholes and underground conduits for site lighting in accordance with Paragraph G401007.

G402007 GROUNDING SYSTEMS

G4030 SITE COMMUNICATION AND SECURITY

When Site Communications and Security are required, the Designer of Record must utilize UFGS Section 33 82 00.00, Telecommunications Outside Plant for the project specification and submit the edited specification section as a part of the design submittal for the project.

G403003 CABLES AND WIRING

Provide underground copper cable pair in accordance with RUS 345-67. Provide aerial cable in accordance with RUS 345-67 except that it must be suitable for aerial installation and must be Figure 8 distribution wire with 6,000 pound (26,700 N) Class A galvanized steel or 6,000 pound (26,700 N) aluminum-clad steel strand. Screen-compartmental core cable must be filled cable meeting the requirements of RUS 345-67. Fiber optic media must meet all performance requirements of EIA/TIA-568-A and the physical requirements of ICEA S 87-640 and EIA/TIA-598-A.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide in accordance with paragraph G401007.

G403005 TOWERS, POLES AND STANDS

Provide in accordance with paragraph G401005.

G403009 GROUNDING SYSTEMS

G403010 INDUSTRIAL CONTROL SYSTEMS (ICS)

G4090 OTHER ELECTRICAL UTILITIES

G409007 PHOTOVOLTAIC ENERGY SYSTEM

When a photovoltaic system is required, provide a grid tied, photovoltaic system, including structural support system, crystalline photovoltaic panels, combiner boxes, and inverters. The Designer of Record must utilize UFGS Section 26 31 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G409007 1.1 CODES AND STANDARDS

Provide PV system hardware and services that meet or exceed all applicable local, State and utility requirements, conform to the applicable codes and standards, and have passed the listing and qualification tests, listed below. (Comply with the most recent version of each document).

a. IEEE 1262 "Recommended Practice for Qualification of Photovoltaic Modules".
b. PowerMark certification for PV modules.
c. IEEE Standard 928-1986, Recommended Criteria for Terrestrial Photovoltaic Power Systems (PV system performance criteria).
d. IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems.
e. Underwriters Laboratories 1741 (UL Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources).

f. Underwriters Laboratories 1703 (UL Standard for Listing Photovoltaic Modules).
g. Certification of PV Equipment: All PV modules, inverters, and electrical components are required to be listed or recognized by an appropriate and recognized United States Safety Laboratory (for example: UL or ETL).

G409007 1.2 PHOTOVOLTAIC APPLICATION ANALYSIS

Provide a comprehensive "Photovoltaic Application Analysis" with a detailed description of system, application, site shading conditions and expected kW output of the photovoltaic application. Utilize the Solmetric Suneye or the Solar Pathfinder shading analyzers to analyze the effects of the existing site shading conditions. Include estimated PV output in kWh per year in the analysis.

G409007 1.3 TECHNICAL REQUIREMENTS

Work responsibilities include at a minimum: system design, equipment selection, and PV system installations. Provide system individually capable of providing peak power output of at least proposed PV system size, 208 or 480 volt, 3-phase, 4-wire power.

The final System configuration must allow automatic operation without operator intervention. Design system and specify equipment to minimize maintenance requirements. System must include metering that is integrated with current AMI network (Advanced Metering Infrastructure) and planned energy metering projects.

Locate inverter(s) disconnects and associated electrical equipment in an area that is accessible, weather-protected, and secure from vandalism and personal injury.

Mount disconnects and over current devices in approved boxes, enclosures, or panel boards. Provide DC rated disconnects and switches when used in DC applications. Bond metal enclosures and boxes to the grounding conductor.

At a minimum, electrical meters must capture the following data on individual system performance (minimum solar irradiance, DC power, AC real power, AC current, AC voltage, and power factor (recommend ION 8600 for AC); ambient air temperature, PV cell temperature, kW, and kWh). This data must be captured at hourly intervals for a minimum one year. Units of temperature, power, and current must be in Fahrenheit, Watts, and Amps respectively.

Transformers, if required, must have a minimum efficiency based on factory test results of not less than the efficiency indicated in 10 CFR 431, Subpart K, paragraph 431.196(b). Transformers must be housed in NEMA 4X enclosures.

Mounting structures must be corrosion resistant to marine environment.

Provide permanent plaque or directory at each building service and power source identifying all other building services and power sources.

-- End of Section --

SECTION Z10

GENERAL PERFORMANCE TECHNICAL SPECIFICATION
12/18

Z10 GENERAL

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

Z10 1.1 NARRATIVE

All Performance Technical Specification (PTS) sections must be used in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation. This PTS section provides general requirements for the other PTS sections of this RFP and is used in conjunction with the other PTS sections.

Refer to Part 2 Section 01 33 10.05 20, *Design Submittal Procedures* for the Order of Precedence of the RFP Parts. Requirements listed in the Project Program take precedence over the PTS sections requirements; therefore, requirements identified in the Project Program eliminate options related to that requirement in the PTS sections.

Z10 1.2 DESIGN GUIDANCE

Provide work in compliance with the following design standards and codes, as a minimum. Government standards listed in this RFP take precedence over industry standards.

The PTS Sections reference published standards, the titles of which can be found in the *Unified Master Reference List (UMRL)*on the Whole Building Design Guide at the Unified Facilities Guide Specification (UFGS) Website . The publications referenced form a part of this specification to the extent referenced. The publications are referred to in the section text by the basic designation only. Industry standards, codes, and Government standards referenced in the section text, and not found in the UMRL, are listed at the beginning of the PTS sections.

The advisory provisions of all referenced codes, standards, and specifications must be mandatory; substitute words such as "must", or "required" for words such as "should", "may", or "recommended," wherever they appear. The results of these wording substitutions incorporate these code and standard statements as requirements. Reference to the "authority having jurisdiction" for variance from criteria must be interpreted to mean the "Chief Engineer, NAVFAC" and

for contractual obligations on this project must be interpreted to mean the "Contracting Officer". Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

The following list of codes and standards is not comprehensive and is augmented by other codes and standards referenced and cross-referenced in the RFP.

Z10 1.2.1 INDUSTRY CODES

INTERNATIONAL BUILDING CODE (IBC) as modified by UFC 1-200-01. UFC 1-200-01 applies the IBC to the project and references other commercial standards and UFC criteria that become part of the contract.

Z10 1.2.2 INDUSTRY REQUIREMENTS

WHOLE BUILDING DESIGN GUIDE (WBDG)

WHOLE BUILDING DESIGN GUIDE, Ensure Occupant Safety and Health (Systems Safety Engineering) at http://www.wbdg.org/design/ensure_health.php

Z10 1.2.3 GOVERNMENT STANDARDS

Z10 1.2.3.1 UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(UFC 1-200-01 is a hub document that provides general building requirements and references other critical UFCs. A reference to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs listed therein.)
UFC 1-200-02	High Performance and Sustainable Building Requirements
FC 1-300-09N	Navy and Marine Corps Design Procedures

Z10 1.2.3.2 FEDERAL STANDARDS

Architectural Barriers Act Standards with DEPSECDEF Memorandum 31 Oct 2008, "Access for People with Disabilities"

Occupational Safety and Health Administration (OSHA)

Z10 1.3 MATERIALS AND EQUIPMENT REQUIREMENTS IDENTIFICATION

Z10 1.3.1 MATERIALS STANDARD

Refer to the Project Program for identification of Government Furnished Equipment.

The equipment items must be supported by service organizations that are convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

Materials, equipment, fixtures, and other appurtenances must comply with applicable Underwriters Laboratories, (UL) Inc., American National Standards Institute, Inc., and National Electrical Manufacturer's Association standards or applicable standards of a similar independent testing organization. All materials must be new, and must bear the label of Underwriters Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency. All equipment provided must be listed and labeled suitable for the specified purpose, environment, and application and installed in accordance with manufacturer’s recommendations. Insulation must be asbestos free.

Z10 1.3.2 EQUIPMENT NAMEPLATE IDENTIFICATION

Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

Z10 1.3.3 FIELD-APPLIED NAMEPLATES

Provide laminated plastic nameplates for each piece of equipment. Each nameplate must identify the function and, when applicable, the number designation of that piece of equipment as used in the design documents. Provide melamine plastic nameplates, 0.125 inch (3 mm) thick, white with black center core.

Z10 1.4 COMMISSIONING

Commission the building systems identified in Part 3 Chapter 2.0 "Project Objectives", paragraph titled "Building Commissioning". Refer to Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control* for the Commissioning Authority's required qualifications and responsibilities. Test reports must be certified by the Commissioning Authority (CA), that work is in compliance with requirements of the RFP.

Z10 1.5 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTS

Verification of satisfactory construction and system performance must be via Performance Verification Testing, Acceptance Tests, and submittal of test reports certified by the Designer of Record (DOR), that work is in compliance with requirements of the RFP. The Government reserves the right to witness all Performance Verification and

Acceptance Tests, review data, and request other such additional inspections and repeat tests as necessary to ensure that the work and provided services conform to the stated requirements. Contractor must pay the cost of all testing.

Refer to each PTS section to identify Performance Verification and Acceptance Testing required by the work specified in that PTS section.

Z10 1.6 SUBMITTALS

Contractor's design submittals that combines design and construction submittals, must jointly comply with Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures* and 01 33 10.05 20, *Design Submittal Procedures*. Contractor's construction submittals that are submitted separate from the design submittals must comply with Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*.

Refer to "Construction Quality Control" in Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures* and 01 45 00.05 20, *Design and Construction Quality Control* to define reviewing and approving Authority of design and construction submittals.

Utilize the same materials and equipment that are approved and provided for an initial facility design, on all follow-on facilities that use the same design with-in this contract. Once the initial facility design is approved by the Government, the Contractor must obtain Government approval to change materials and equipment when designing and constructing follow-on facilities utilizing the same design.

Z10 1.6.1 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and other discipline-specific guidelines listed in the applicable PTS sections.

Part 2 Section 01 33 10.05 20, *Design Submittal Procedures* requires the use of UFGS sections in the development of the Contractor originated specification. The Designer of Record (DOR) must edit the UFGS sections for the project and submit the edited specification as a part of the design submittal. The DOR must edit the UFGS as follows:

(1) Prepare UFGS Specifications as part of the project specification,

(2) Delete only portions of the UFGS specification that are not applicable to the project,

(3) Edit only the bracketed choices that are within the UFGS specification text,

(4) Edit blank bracketed options to include requirements that exercise prudence and adherence to acceptable industry standards,

(5) Comply with the directions, directives, and requirements of all UFGS Criteria Notes. The UFGS Criteria Notes are typically bordered on the top and bottom by a line of asterisks to highlight their location.

(6) If proprietary information is provided or required to streamline the construction submittal process, include proprietary information in the edited UFGS sections and added to the end of each UFGS section. Confirm that the proprietary products, materials, and systems listed in the specifications are in compliance with the requirements of the RFP.

Z10 1.6.2 CONSTRUCTION SUBMITTALS

Submit for approval to the Designer of Record (DOR), construction submittals, product data, manufacturer's information, shop drawings, and test reports on all materials and systems installed in the project, unless the DOR designates submittal for QC approval. Refer to each PTS section for further construction submittal requirements relating to the work identified in that particular PTS section. Some PTS sections reference UFGS sections that will require more construction submittals for DOR approval than is stated above. Refer to Part 2 Section 01 33 00.05 20 for the list of construction submittals reserved for Government Approval and Government Surveillance.

--End of Section--

PART 5 – PRESCRIPTIVE SPECIFICATIONS

02 82 16	Removal and Disposal of Asbestos Materials (Camp Lejeune Complex)
02 82 33.12	Preparation of Surfaces Coated with Contaminated Paint
02 82 33.13	Removal and Disposal of Materials Coated with Lead-Containing Paint
07 26 23.19	Brownfield Membrane and Vent Systems
07 61 15.00 20	Aluminum Standing Seam Roofing
08 91 00	Metal Wall Louvers
23 05 93.00 22	Testing, Adjusting, and Balancing for Mechanical Systems
23 09 00.00 22	Instrumentation and Control for HVAC
23 09 13.00 22	Instrumentation and Control Devices for HVAC
23 09 23.02 22	BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems
23 24 00	Hydronic Pipe Cleaning and Flushing Procedures
25 05 11	Cybersecurity for Facility-Related Control Systems
27 10 00.00 22	Building Telecommunications Cabling Systems
33 82 00.00 22	Telecommunications Outside Plant

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SECTION 02 82 16

REMOVAL AND DISPOSAL OF ASBESTOS MATERIALS
(CAMP LEJEUNE COMPLEX)

03/10

PART 1 GENERAL

1.1 APPLICABLE NORTH CAROLINA LAW

North Carolina State General Statues 130A, Article 19-444-452 and 10A North Carolina Administrative Chapter (NCAC) 41C .0600 through .0611.

1.1.1 N.C. (DHHS-HHCU) Asbestos Accreditation

All personnel involved in asbestos removal shall be currently accredited for asbestos removal by N.C. (DHHS-HHCU). An application for accreditation may be requested from the State of North Carolina, Health Hazards Control Unit, Department of Health and Human Services, Division of Public Health,; 1912 Mail Service Center, Raleigh, NC 27699-1912; (919) 707-5950. Out of State accreditation will not be accepted.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z88.2	(1992) Respiratory Protection

ASTM INTERNATIONAL (ASTM)

ASTM C 732	(1995) Aging Effects of Artificial Weathering on Latex Sealants
ASTM D 1331	(1989; R 1995) Surface and Interfacial Tension of Solutions of Surface-Active Agents
ASTM E 84	(2000a) Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials
ASTM E 119	(1998) Fire Tests of Building Construction and Materials
ASTM E 736	(1992) Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members

ASTM E 1368	(1997) Visual Inspection of Asbestos Abatement Projects

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.103	Respiratory Protection
29 CFR 1926.59	Hazard Communication
29 CFR 1926.1101	Asbestos
40 CFR 61, SUBPART A	General Provisions
40 CFR 61, SUBPART M	National Emission Standard for Hazardous Air Pollutants

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos Containing Materials in Buildings
EPA SW-846	(Third Edition; Update IV) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

UNDERWRITERS LABORATORIES (UL)

UL 586	(1996; Rev thru Aug 1999) High-Efficiency, Particulate, Air Filter Units

1.3 DEFINITIONS

1.3.1 Asbestos Containing Material (ACM)

All building materials that have more than 1% of chrysotile, amosite, crocidolite, tremolite, anthopyhlite, or any other form of asbestos in the serpentine or anthobole class.

1.3.2 Action Level/Permissive Exposure Limit (PEL)

An airborne concentration of asbestos fibers, in the breathing zone of a worker equaling 0.1 fibers per cubic centimeter of air calculated as an 8-hour time weighted average.

1.3.3 Amended Water

Water containing a wetting agent or surfactant with a surface tension of 29 dynes per square centimeter when tested in accordance with ASTM D 1331 shall be utilized. In the event where wetting operations are suspended due to freezing temperatues, the operator or abatement contractor shall record the temperature on Form DHHS 3787..

1.3.4 Area Sampling

Sampling of asbestos fiber concentrations within the asbestos control area and outside the asbestos control area which approximates the concentrations of asbestos in the theoretical breathing zone but is not

actually collected in the breathing zone of an employee.

1.3.5 Asbestos

The term asbestos includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite and any of these minerals that has been chemically treated or altered. Materials are considered to contain asbestos if the asbestos content is more than 1% of the material by area.

1.3.6 Asbestos Control Area

That area where asbestos removal operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris. Two examples of an asbestos control area are: a full containment and a "glovebag."

1.3.7 Asbestos Fibers

Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.

1.3.8 Asbestos Permissible Exposure Limit

0.1 fibers per cubic centimeter of air as an 8-hour time weighted average as defined by 29 CFR 1926.1101 or other federal legislation having legal jurisdiction for the protection of workers health.

1.3.9 Background

Normal airborne asbestos concentration in an area similar to the asbestos abatement area but in an uncontaminated (with asbestos) state.

1.3.10 Contractor

The Contractor is that individual, or entity under contract to the Navy to perform the herein listed work.

1.3.11 Encapsulants

Specific materials in various forms used to chemically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulants as follows which must comply with performance requirements as specified herein.

a. Removal Encapsulant (can be used as a wetting agent)

b. Bridging Encapsulant (used to provide a tough, durable surface coating to asbestos containing material)

c. Penetrating Encapsulant (used to penetrate the asbestos containing material down to substrate, encapsulating all asbestos fibers)

d. Lock-Down Encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces from which asbestos containing material has been removed)

1.3.12 Friable Asbestos Material

Material that contains more than 1% asbestos by area and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry.

1.3.13 Full Containment

Those engineering control techniques described in 29 CFR 1926.1101 for major asbestos removal, renovation and demolition operations.

1.3.14 Glovebag Technique

Those asbestos removal and control techniques put forth in 29 CFR 1926.1101.

1.3.15 HEPA Filter Equipment

High efficiency particulate air (HEPA) filtered vacuum and/or exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall retain 99.97 percent of particles 0.3 microns or larger as indicated in UL 586.

1.3.16 Navy Industrial Hygienist (NIH)

That industrial hygienist employed by the Navy to monitor, sample, and/or inspect the work separate from the original construction contract. The NIH can be either a Federal civil servant or a private consultant as determined by the Navy. In some instances the NIH shall perform assigned duties vicariously through a trained subordinate but only with the specific consent of the Contracting Officer.

1.3.17 Nonfriable Asbestos Material

Material that contains asbestos in which the fibers have been temporarily locked in by a bonding agent, coating, binder, or other material so that the asbestos is well bound and will not normally release asbestos fibers during any appropriate use, handling, storage or transportation. It is understood that asbestos fibers will be released under other conditions such as demolition or removal.

1.3.18 PCM - Phased Contrast Microscopy

A method of analyzing air samples for fibers using a light microscope.

1.3.19 PLM - Polarized Light Microscopy

A method of analyzing bulk samples for asbestos in which the sample is illuminated with polarized light (light which vibrates in only one plane) and viewed under a light microscope.

1.3.20 Personal Sampling

Air sampling to determine asbestos fiber concentrations within the breathing zone of a specific employee, performed in accordance with 29 CFR 1926.1101.

1.3.21 Supervising Air Monitor (SAM)

That supervising air monitor hired by the Contractor to perform the herein listed industrial hygiene tasks. In some instances, the SAM can perform this role vicariously through a trained subordinate, but only with the specific consent of the Contracting Officer. Under N.C. Statue, the SAM must make a site visit on any project exceeding 10 days and once every 30 days thereafter.

1.3.22 TEM

Refers to Transmission Electron Microscopy (TEM). Technique whereby a beam of electrons is transmitted through an ultra think specimen, interacting with the specimen as it passes through. An image is formed from the interaction of the electrons transmitted through the specimen; the image is magnified and focused onto an imaging device, such as a fluorescent screen, on a layer of photographic film, or to be detected by a sensor such as a CCB camera.

1.3.23 Time Weighted Average (TWA)

The TWA is an 8-hour time weighted average airborne concentration of asbestos fibers. At least three full shift samples per person are required to establish that person's TWA exposure.

1.3.24 Wetting Agent

That specific agent used to reduce airborne asbestos levels by physically bonding asbestos fibers to material to be removed. An equivalent wetting agent must have a surface tension of at least 29 dynes per square centimeter as tested in accordance with ASTM D 1331. In the event where wetting operations are suspended due to freezing temperatures, the operator or abatement contractor shall record the temperature on Form DHHS 3787.

1.4 REQUIREMENTS

1.4.1 Description of Work

The work covered by this section includes the handling of asbestos containing materials which are encountered during repair, construction and demolition projects and describes some of the resultant procedures and equipment required to protect workers and occupants of the building or area, or both, from contact with airborne asbestos fibers. The work also includes the disposal of the generated asbestos containing materials. The asbestos work includes the demolition and removal of asbestos containing material located in identified areas in Part 6. Under normal conditions non-friable or chemically bound materials containing asbestos would not be considered hazardous; however, this material will release airborne asbestos fibers during demolition and removal and therefore must be handled in accordance with North Carolina Regulations.

1.4.2 N. C. (DHHS-HHCU) North Carolina Department of Health and Human Services - Health Hazards Control Unit

Obtain necessary permits in conjunction with asbestos removal, hauling, and disposition, and furnish timely notification of such actions required by federal, state, regional, and local authorities. A permit is only required when you will be abating more than 260 linear feet, 160 square

feet, or 35 cubic feet of an asbestos-containing building material. Also, if mechanical means of removing non-friable asbestos is utilized the contractor will need to provide permit. Notify the N.C. (DHHS-HHCU) and the Contracting Officer in writing 10 days prior to the commencement of work. Submit a copy of the permit to the Contracting Officer.

1.4.2.1 N.C. (DHHS-HHCU) mailing address is:

Health Hazards Control Unit
N.C. Department of Health and Human Services
Division of Public Health
1912 Mail Service Center
Raleigh, NC 27699-1912
Phone: (919) 733-0820

1.4.2.2 Changes in Work

Changes in Work which affect items on the attached form shall be covered by an amended form submitted to the same address.

1.4.3 Safety and Health Compliance

In addition to detailed requirements of this specification, comply with those applicable laws, ordinances, criteria, rules, and regulations of federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.1101, 40 CFR 61, SUBPART A, 40 CFR 61, SUBPART M. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the Contracting Officer shall apply.

1.4.4 Respiratory Protection Program

Establish and implement a respirator program as required by ANSI Z88.2 and 29 CFR 1910.103.

1.4.5 Supervising Air Monitor (SAM)

Conduct personal area/environmental air sampling and training under the direction of a North Carolina accredited supervising air monitor. For the purpose of this contract, the Contractor shall retain the services of a SAM to perform the Contractor's industrial hygiene tasks.

1.5 SUBMITTALS

Submit 4 copies of the following in accordance with Section 01 33 00.05 20, "Construction Submittal Procedures."

SD-06 Test Reports

Air sampling results

Pressure differential recordings for local exhaust system

Clearance sampling

SD-07 Certificates

Asbestos hazard abatement plan (Abatement Design)

SD-11 Closeout Submittals

Asbestos Waste Shipment Record N.C. (DHHS-HHCU) Form 3787

Daily log

North Carolina permit

Modifications to the North Carolina permit

Asbestos Inspection Reporting Form

Closeout submittals shall be submitted within 60 days of asbestos activity completion.

1.5.1 Asbestos Hazard Abatement Plan (NC Abatement Design)

An asbestos abatement design shall be prepared by a N.C. accredited asbestos abatement designer for each individually permitted removal of more than 260 linear feet, 160 square feet, or 35 cubic feet of regulated asbestos containing materials. The plan shall be prepared, signed, and sealed, including accreditation number and date, by an accredited abatement designer. The respirator program and air monitoring strategies portion of this plan shall be prepared by the supervising air monitor. Such plan shall include but not be limited to the precise personal protective equipment to be used, the location of asbestos control areas including clean and dirty areas, buffer zones, showers, storage areas, change rooms, removal method, interface of trades involved in the construction, sequencing of asbestos related work, disposal plan, type of wetting agent and asbestos sealer to be used, locations of local exhaust equipment, planned air monitoring strategies, and a detailed description of the method to be employed in order to control pollution. The plan shall also include (both fire and medical emergency) response plans. The Contractor and designer shall meet with the Contracting Officer prior to beginning work, to discuss in detail the asbestos plan, including work procedures and safety precautions. The plan will be enforced as if an addition to the specification. Any changes required in the specification as a result of the plan shall be identified specifically in the plan. The plan shall comply with all federal and state requirements and this specification, and shall serve as the North Carolina Abatement Design. Submit a copy of plan to the Contracting Officer.

1.5.2 Air Sampling Results

Complete fiber counting and provide results to the SAM for review within 16 hours. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of the acceptable limits. Submit sampling results to the Contracting Officer and the affected Contractor employees within 3 working days, signed by the employee performing air

sampling, the employee that analyzed the sample, and the SAM.

1.5.3 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external of the enclosure and operate it continuously, 24 hours a day, until the enclosure of the asbestos control area is removed. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. Submit pressure differential recordings for each work day to the SAM for review and to the Contracting Officer within 24 hours from the end of each work day. Notify the Contractor and the Contracting Officer immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.01 fibers per cubic centimeter or background whichever is higher. In no circumstance shall levels exceed 0.1 fibers per cubic centimeter.

1.5.4 Asbestos Waste Shipment Record N.C. (DHHS-HHCU) Form 3787

Record and report, to the Contracting Officer, the amount of asbestos containing material removed and released for disposal. Deliver the report for the previous day at the beginning of each day shift with amounts of material removed during the previous day reported in linear feet or square feet as described initially in this specification and in cubic feet for the amount of asbestos containing material released for disposal. Use "Asbestos Waste Shipment Record N.C. (DHHS-HHCU) Form 3787 for this report. A copy of the (DHHS-HHCU) Form 3787 must accompany any asbestos waste shipment to the Base sanitary landfill.

1.5.5 Daily Log

A daily log documenting work practices, sample locations, and all other asbestos related job conditions shall be maintained, by the testing lab and be available for Government examination throughout the course of work. At the completion of testing, a copy of this log shall be immediately delivered to the Government.

1.5.6 North Carolina Permit

Submit one copy of the North Carolina Permit before beginning abatement activities to the Contracting Officer.

1.5.7 Modifications to the North Carolina Permit

Submit a copy of all permit modifications to the Contracting Officer. These must be received before they become effective. The Contractor is responsible for proper permit modification notification to the State. Modifications may be delivered to the Contracts Office or transmitted by facsimile to (910) 411-5899.

1.5.8 Asbestos Inspection Reporting Form

This Asbestos Inspection Reporting Form is included at the end of this section and shows the homogeneous areas involved with this project. The Contractor shall mark the line "confirmed ACM from this HA:" as either "Abated" or "Managed in Place." Abated shall be defined as removed. If

an HA is partially abated, approximate the percentage of asbestos removed and mark in the comments area. Provide any other descriptive data, such as rooms/areas removed or rooms/areas where asbestos not removed. The intent of this requirement is to report "as built" conditions. The Contractor is not required to perform any additional asbestos surveys or inspections as a result of this paragraph. Include this report with drawing of abated areas with other closeout documentation.

1.6 PRE-ABATEMENT MEETING

The Contractor and designer shall meet with the Contracting Officer prior to beginning work, to discuss in detail the asbestos plan, including work procedures and safety precautions.

1.7 ASBESTOS INSPECTION REPORTING FORM AND ASBESTOS SAMPLE REPORTING FORM

These two forms are included at the end of this section for informational purposes. They do not define or modify the scope of work.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Shall conform to current USEPA requirements, shall contain no toxic or hazardous substances as defined in 29 CFR 1926.59, and shall conform to the following performance requirements. Use of encapsulants is generally restricted to the surface of the temporary enclosure and to areas that are not to be refinished such as attics and crawlspaces. The proposed use of encapsulants shall be included in the abatement design.

2.1.1 Removal Encapsulants

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Life Expectancy - 20 years	ASTM C 732, Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E96/E96M

2.1.2 Lock-down Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E 84
Life Expectancy - 20 years	ASTM C 732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3	ASTM E 119

Requirement	Test Standard
hour test (Tested with fireproofing over encapsulant applied directly to steel member)	
Bond Strength - 100 pounds of force/ foot (Tests compatibility with cementitious and fibrous fire-proofing)	ASTM E 736

2.1.3 Plastic Sheet

Plastic sheet, polyethylene, 6 mil minimum thickness, unless otherwise specified, in sizes to minimize the frequency of joints. All asbestos material or debris will be at least double bagged or wrapped in two layers of 6 mil poly sheeting.

2.1.4 Tape

Capable of sealing joints of adjacent sheets or plastic sheets and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water.

2.1.5 Disposal Bags

Bags shall be a minimum of 6 mil thick polyethylene. Affix a warning and Department of Transportation (DOT) label to each bag or use bags with the approved warnings and DOT labeling preprinted on the bag.

2.1.6 Warning Labels

Provide labels conforming to 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
BREATHING ASBESTOS DUST MAY
CAUSE SERIOUS BODILY HARM

PART 3 EXECUTION

3.1 DISPOSAL SITE

CAMP LEJEUNE SANITARY LANDFILL
982 PINEY GREEN ROAD
CAMP LEJEUNE, NC 28542
(910) 451-5011

Base Sanitary Landfill shall be used for disposal of all asbestos waste. The Base Sanitary Landfill is approved and is available for use by the Contractor providing the following requirements are satisfied:

a. The Contracting Officer must be informed at least five working

days in advance of the anticipated delivery date of the asbestos material to the Landfill. On larger projects, the notification should be accompanied by a cubic yard estimate of the anticipated volume, updated weekly if the disposal period extends for more than one week. The Government will be responsible for digging the trenches and covering the debris at the end of the working day. Debris will not be accepted before 8:00 AM or after 10:00 AM, except in an emergency situation.

b. Asbestos will be accepted only if adequately wet and double bagged in heavy-duty 6 mil plastic bags which are clearly marked "Asbestos." If a Contractor desires to handle the asbestos in a manner other than double-bagged, written application, along with a description of the proposed deviation, must be submitted to the OICC and Landfill Manager for approval.

c. Asbestos insulated piping with the asbestos insulation intact will be accepted if the following requirements are met:

1. The pipe is cut in eight foot or shorter lengths

2. Each section of pipe is double wrapped, sealed, and labeled as asbestos.

3. All pipe is palletized on a 7/8-inch, 4- by 8-foot sheet of plywood. The whole pallet is banded with a minimum of three 1-inch wide metal bands with the coupling on top and wrapped with 6-mil plastic. The pallet is not higher than 3-inches.

d. All asbestos, except palletized pipe will be off loaded and placed in the trench pipe hand.

e. Asbestos disposal is restricted to one designated location in the Landfill and the landfill operators must be informed of and direct each delivery. Asbestos shall be disposed of from 0800 to 1000 hours daily, except holidays and weekends. Trucks hauling asbestos must be properly covered with tarpaulins or equivalent. Trucks not covered properly must be parked until the Contracting Officer approves corrective actions.

f. The Contractor will ensure asbestos contaminated material delivered to the Base Sanitary Landfill contain no free liquids. Free liquids are defined as material which fails the EPA SW-846 free liquids test.

g. The Contractor will include all asbestos waste shipment records (DHHS-HHCU Form 3787) that are filled out completely with the correct information, to the project manager after abatement job is completed.

3.2 EQUIPMENT

Make available to the Contracting Officer or the Contracting Officer's Representative, two complete sets of personal protective equipment as required herein for entry to the asbestos control area at all times for

inspection of the asbestos control area. Provide equivalent training to the Contracting Officer or a designated representative as provided to Contractor employees in the use of the required personal protective equipment. Provide manufacturer's certificate of compliance for all equipment required to contain airborne asbestos fibers.

3.2.1 Respirators

Comply with 29 CFR 1926.1101.

3.3 WORK PROCEDURE

Remove all friable and non-friable ACM in accordance with all Federal, State, and local Marine Corps regulations. Ensure that the asbestos abatement plan is followed throughout all aspects of the abatement process.

3.3.1 Furnishings

Furniture and equipment will be removed from the area of work by either the Government or the contractor before asbestos work begins. Refer to RFP documents for additional information.

3.3.2 Pipe Insulation

Pipe may be removed with the asbestos insulation in place by wrapping the entire length of pipe and associated insulation with double thickness 6 mil plastic secured with duct tape. Mechanically cutting of asbestos containing insulation is prohibited. When using the "candy-stripe" method the abatement contractor must use glovebag operations to establish an "asbestos free" area to cut the pipe into appropriate lengths. Cut piping simultaneously into lengths suitable for transportation to disposal area, but no greater than 8 feet in length. Continuously wet the cutting site during the process. As soon as a length of pipe is completely cut loose, cover exposed ends with double thickness 6 mil plastic secured with duct tape. If the pipe is to remain in service, the removed pipe must be replaced in accordance with this Specification, with a pipe of the same size that is removed.

3.3.2.1 Attic Insulation

In those buildings indicated on the drawings, attic insulation consisting of any combination of blown-in or batt fiberglass or rockwool material, has been contaminated with asbestos materials, and is to be removed as contaminated asbestos material. The insulation material shall be wet with a fine mist of amended water. The material shall be placed immediately in double thickness 6 mil plastic bags for disposal as asbestos waste.

3.3.2.2 Contaminated Soil

In those buildings so indicated on the drawings, asbestos materials are located in the building crawl spaces and deterioration of the asbestos material has resulted in contamination of the soil under the building. Under the indicated area of these buildings, asbestos material and 2 inches of soil shall be removed and one sheet of plastic, 6 mils thick, spread over the area with seams lapped a minimum of 4 inches. Sand shall be placed a minimum of 2 inches thick over the plastic. Removal shall occur just prior to clean-up operations. All debris in the crawl space

shall be disposed of with the soil as asbestos materials. Workers shall be equipped with respirators and protective clothing during the removal of soil and debris.

3.3.2.3 Non-Organic Bound (NOB) Asbestos Materials

These kind of materials include floor tile, mastic, caulking, roofing material, and other non-friable material. Materials are to be adequately wet before removal and double bagged with a 6 mil poly bag. Ensure that bags have been labeled properly before they are taken to the Base Landfill.

3.3.3 Air Sampling

Sampling of airborne concentrations of asbestos fibers shall be performed in accordance with 29 CFR 1926.1101 and as specified herein. Sampling performed in accordance with 29 CFR 1926.1101 shall be performed by the SAM. Sampling performed for environmental and quality control reasons shall be performed by the SAM. Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those results obtained by the Contractor, the Government results shall prevail.

3.3.3.1 Sampling During Asbestos Work

The SAM shall provide personal and area sampling as indicated in 29 CFR 1926.1101 and governing environmental regulations. Thereafter, provided the same type of work is being performed, provide area sampling at least once every work shift close to the work inside the containment, outside the clean room entrance to the containment, and at the exhaust opening of the local exhaust system. Also, where an enclosure is not provided, conduct area monitoring of airborne asbestos fibers during the work shift at the designated limits of the asbestos work area at such frequency as recommended by the SAM and conduct personal samples of each worker engaged in asbestos handling (removal, disposal, transport and other associated work). If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter whichever is lesser outside of the containment area, stop work, evacuate personnel in adjacent areas or provide personnel with approved protective equipment at the discretion of the Contracting Officer. This sampling may be duplicated by the government at the discretion of the Contracting Officer. If the air sampling results obtained by the government differ from those obtained by the Contractor, the government results shall prevail. If adjacent areas are contaminated as determined by the Contracting Officer, clean the contaminated areas, monitor, and visually inspect the area as specified herein.If sampling outside the containment shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately. In areas where the construction of a containment is not required, after initial TWAs are established and provided the same type of work is being performed, provide sampling at the designated limits of the asbestos work

area at such frequency as recommended by the SAM. Where glovebag methods are used, perform personal and area air sampling at locations and frequencies thatwill accurately characterize the evolving airborne asbestos levels.

3.3.3.2 Sampling After Final Clean-Up (Clearance Sampling) For All Areas Unless Noted Otherwise

Provide area sampling of asbestos fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 and establish an air borne asbestos concentration of less than 70 structures per square millimeter after final clean-up but before removal of the containment or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the SAM shall perform a visual inspection, in accordance with ASTM E 1368, to insure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Use transmission electron microscopy (TEM) to analyze clearance samples and report the results in accordance with current NIOSH criteria. The asbestos fiber counts from these samples shall be less than 70 structures per square millimeter or be not greater than the background, whichever is greater. Should any of the final samples indicate a higher value, the Contractor shall take appropriate actions to re-clean the area and shall repeat the sampling and TEM analysis at the Contractor's expense.

3.3.3.3 Sampling After Final Clean-Up (Clearance Sampling)

Refer to PART 6 Asbestos Reports for sampling areas. Provide area sampling of asbestos fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 and establish an air borne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the containment or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the SAM shall perform a visual inspection, in accordance with ASTM E 1368, to insure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Should any of the final samples indicate a higher value, the Contractor shall take appropriate actions to re-clean the area and shall repeat the sampling and analysis at the Contractor's expense.

3.3.4 Lock Down

Prior to removal of plastic barriers and after pre-clearance clean up of gross contamination, a visual inspection by the SAM, of all areas affected by the removal of the asbestos contaminated materials for any visible fibers, shall be conducted and approved by the SAM. A post removal (lock down) encapsulant shall then be spray applied to ceiling, walls, floors and other areas exposed in the removal area. The exposed area shall include but not be limited to plastic barriers, furnishings and articles to be discarded as well as dirty change room, air locks for bag removal and decon chambers.

3.3.5 Site Inspection

While performing asbestos removal work, the Contractor shall be subject to on-site inspection by the Contracting Officer who may be assisted by or

represented by safety or industrial hygiene personnel. If the work is found to be in violation of this specification, the Contracting Officer or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. Standby time required to resolve the violation shall be at the Contractor's expense.

3.4 CLEAN-UP AND DISPOSAL

3.4.1 Housekeeping

Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. Do not blow down the space with compressed air. When asbestos removal is complete, all asbestos waste is removed from the work-site, final clean-up is completed, and final air sampling results are reported, the SAM will certify the area as safe and the Conrracting Officer will approve the abatement completion, before the signs can be removed. After final clean-up and acceptable airborne concentrations are attained but before the HEPA unit is turned off and the containment removed, remove all pre-filters on the building HVAC system and provide new pre-filters. Dispose of filters as asbestos-contaminated materials. Reestablish HVAC mechanical, and electrical systems in proper work ing order. The Contracting Officer will visually inspect all surfaces within the containment for residual material or accumulated dust or debris. The Contractor shall re-clean all areas showing dust or residual materials. If re-cleaning is required, air sample and establish an acceptable asbestos airborne concentration after re-cleaning. The SAM will provide written certification that the work area is safe within all standards as referenced within this contract before unrestricted entry is permitted. The Government shall have the option to perform monitoring to certify the areas are safe before entry is permitted.

3.4.2 Title to Materials

All materials resulting from demolition work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of as specified in applicable local, state, and Federal regulations and herein. All building materials that are cross contaminated must be disposed of as an ACM at Base Landfill.

3.4.3 Disposal of Asbestos

3.4.3.1 Procedure for Disposal

Collect asbestos waste, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed fiberproof, waterproof, non-returnable containers (e.g. double plastic bags 6 mils thick, cartons, drums or cans). Wastes within the containers must be wetted to insure the security of the material in case of container breeching. Affix a warning and Department of Transportation (DOT) label to each bag or use at least 6 mil thick bags with the approved warnings and DOT labeling preprinted on the bag. For temporary storage, store sealed impermeable bags in asbestos waste drums or skids. An area for interim storage of asbestos waste-containing drums or skids will be

assigned by the Contracting Officer or his authorized representative. Procedure for haul ing and disposal shall comply with 40 CFR 61, SUBPART M, state, regional, and local standards.

3.4.3.2 Disposal Material Shall Contain No Free Liquid

The Contractor will ensure asbestos contaminated material delivered to the Base Sanitary Landfill contain no free liquids. Free liquids are defined as material which fails the EPA SW-846 Free Liquids Test.

-- End of Section --

SECTION 02 82 33.12

PREPARATION OF SURFACES COATED WITH CONTAMINATED PAINT

01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z88.2	(1992) Respiratory Protection

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.57	Ventilation
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead Exposure in Construction
29 CFR 1926.103	Respiratory Protection
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 261	Identification and Listing of Hazardous Waste

UNDERWRITERS LABORATORIES (UL)

UL 586	(1996; Rev thru Aug 1999) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, "30 micrograms per cubic meter of air" refers to the action level.

1.2.2 Area Monitoring

Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

1.2.3 Physical Boundary

Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area."

1.2.4 Certified Industrial Hygienist (CIH)

As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

1.2.5 Change Rooms and Shower Facilities

Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

1.2.6 Decontamination Room

Room for removal of contaminated personal protective equipment (PPE).

1.2.7 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

1.2.8 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

1.2.9 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.

1.2.10 Lead Control Area

An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-contaminated paint removal operations. The lead control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

1.2.11 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following

formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.2.12 Personal Monitoring

Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

1.3 QUALITY ASSURANCE

1.3.1 Medical Examinations

Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1926.59. The examination will not be required if adequate records show that employees have been examined as required by 29 CFR 1926.59 within the last year.

1.3.1.1 Medical Records

Maintain complete and accurate medical records of employees for a period of at least 40 years or for the duration of employment plus 20 years, whichever is longer.

1.3.2 CIH Responsibilities

a. Certify training.

b. Review and approve materials coated with lead-contaminated paint Removal Work Plan for conformance to the applicable referenced standards.

c. Inspect lead-contaminated paint removal work for conformance with the approved plan.

d. Direct monitoring.

e. Ensure work is performed in strict accordance with specifications at all times.

f. Ensure hazardous exposure to personnel and to the environment are adequately controlled at all times.

g. Review and approve "Hazardous Waste Management Plan."

1.3.3 Training

Train each employee performing paint removal, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62.

1.3.3.1 Training Certification

Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

1.3.4 Respiratory Protection Program

a. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least every 6 months thereafter as required by 29 CFR 1926.62.

b. Establish and implement a respiratory protection program as required by ANSI Z88.2, 29 CFR 1926.103, 29 CFR 1926.62, and 29 CFR 1926.55.

1.3.5 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1926.59.

1.3.6 Hazardous Waste Management

The Hazardous Waste Management plan shall comply with applicable requirements of federal, state, and local hazardous waste regulations and address:

a. Identification of hazardous wastes associated with the work.

b. Estimated quantities of wastes to be generated and disposed of.

c. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes consisting of lead chips and/or dust not intact lead-coated materials. Include the facility location and a 24-hour point of contact. Furnish two copies of state hazardous waste permits .

d. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures to be implemented.

g. Work plan and schedule for waste containment, removal and disposal. Wastes shall be cleaned up and containerized daily.

h. Cost for hazardous waste disposal according to this plan.

1.3.7 Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.62. Submit matters

regarding interpretation of standards to the Contracting Officer for resolution before starting work. Where specification requirements and the referenced documents vary, the most stringent requirement shall apply.

1.3.8 Pre-Construction Conference

Along with the CIH, meet with the Contracting Officer to discuss in detail the materials coated with lead-contaminated paint removal work plan, including work procedures and precautions for the work plan.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00.05 20, "Construction Submittal Procedures."

SD-03 Product Data

Vacuum filters

Respirators

SD-06 Test Reports

Monitoring Results

SD-07 Certificates

Qualifications of CIH

Testing laboratory qualifications

Rental equipment notification

Preparation of Surfaces Coated with Lead-Contaminated Paint Work Plan with CIH approval (signature, date, and certification number)

Respiratory protection program

Hazard communication program

EPA approved hazardous waste treatment or disposal facility for lead disposal

Hazardous waste management plan

Vacuum filters

SD-11 Closeout Submittals

Completed and signed hazardous waste manifest from treatment or disposal facility

Certification of medical examinations

Employee training certification

1.4.1 Qualifications of CIH

Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification.

1.4.2 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

1.4.3 Preparation of Surfaces Coated with Lead-Contaminated Paint Work Plan

Submit a detailed job-specific plan of the work procedures to be used in the preparation of surfaces coated with lead-contaminated paint. The plan shall include a sketch showing the location, size, and details of lead control areas, location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation system. Include in the plan, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of lead related work, collected wastewater and paint debris disposal plan, air sampling plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area. Include air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion of the plan.

1.4.4 Air Monitoring

Submit monitoring results to the Contracting Officer within 3 working days, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

1.5 EQUIPMENT

Furnish the Contracting Officer with two complete sets of personal protective equipment daily, as required herein, for entry into and inspection of the removal work within the lead controlled area. Personal protective equipment shall include fitted respirators and disposable whole body covering, including appropriate foot, head, and hand protection. PPE shall remain the property of the Contractor.

1.5.1 Respirators

Furnish appropriate respirators approved by the NIOSH, Department of Health and Human Services, for use in atmospheres containing lead dust.

Respirators shall comply with the requirements of 29 CFR 1926.62.

1.5.2 Special Protective Clothing

Furnish personnel who will be exposed to lead-contaminated dust with appropriate disposable protective whole body clothing, head covering, gloves, and foot coverings. Furnish appropriate disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CIH.

1.5.3 Rental Equipment Notification

If rental equipment is to be used during lead-contaminated paint handling and disposal, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Contracting Officer.

1.5.4 Vacuum Filters

UL 586 labeled HEPA filters.

PART 2 PRODUCTS

2.1 PAINT PREPARATION PRODUCTS

Submit applicable Material Safety Data Sheets for Surface Preparation products used. Ust the least toxic product.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Notification

Notify the Contracting Officer 20 days prior to the start of any surface preparation work.

3.1.2 RESERVED

3.1.3 Protection of Existing Work to Remain

Perform surface preparation work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

3.1.4 Boundary Requirements

Provide physical boundaries around the lead control area by roping off the area or providing curtains, portable partitions or other enclosures to ensure that airborne concentrations of lead will not reach 30 micrograms per cubic meter of air outside of the lead control area.

3.1.5 Furnishings

The Contractor shall cover all Government furniture and equipment located in the work area before lead-contaminated paint surface preparation work begins.

3.1.6 Heating, Ventilating and Air Conditioning (HVAC) Systems

Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead control areas. Seal intake and exhaust vents in the lead control area with 6-mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead control area.

3.1.7 Change Room and Shower Facilities

Provide clean change rooms and shower facilities within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.

3.1.8 Mechanical Ventilation System

a. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.

b. To the extent feasible, use local exhaust ventilation connected to HEPA filters or other collection systems, approved by the industrial hygienist. Local exhaust ventilation systems shall be designed, constructed, installed, and maintained in accordance with ANSI Z9.2.

3.1.9 Personnel Protection

Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been given appropriate training and protective equipment.

3.1.10 Warning Signs

Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.2 WORK PROCEDURES

The work shall include removal of materials coated with lead containing paint. Remove dirt, dust, rust, caulking, splinters, loose particles, grease, oil, disintegrated coatins, mildew, mold, and othe substances deleterious to coating performance. Sand, spackle, and treat defects to render them smooth. Defects are defined as scratches, nicks, cracks, gouges, spills, alligatoring, previous runs, chalking, and irregularities due to partial peeling of previous coatings. Sand edges of adjacent soundly-ahdered existing coatings so they are tapered as smooth as practical. On interior surfaces, edges may be filled smooth with joint compound in lieu of sanding. The Contractor is advised of these conditions and shall be responsible for compliance with all EPA, Federal, State and Local Requirements.

3.2.1 Personnel Exiting Procedures

Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any

clothing or equipment worn during the work day:

a. Vacuum themselves off.

b. Remove protective clothing in the decontamination room, and place them in an approved impermeable disposal bag.

c. Shower.

d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

3.2.2 Monitoring

Monitoring of airborne concentrations of lead shall be in accordance with 29 CFR 1926.62 and as specified herein. Air monitoring, testing, and reporting shall be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH.

a. The CIH or the IH Technician under the direction of the CIH shall be on the jobsite directing the monitoring, and inspecting the lead-contaminated paint removal work to ensure that the requirements of the Contract have been satisfied during the entire removal of materials coated with lead-contaminated paint operation.

b. Take personal air monitoring samples on employees who are anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air monitoring samples, signed by the CIH, within 72 hours after the air samples are taken. Notify the Contracting Officer immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

3.2.2.1 Monitoring During Surface Preparation Work

Perform personal and area monitoring during the surface preparation operation. Sufficient area monitoring shall be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air at all times. If the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air, work shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Contracting Officer immediately. The CIH shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Removal work shall resume when approval is given by the CIH. The Contractor shall control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. As a minimum, conduct area monitoring daily on each shift in which lead paint removal operations are performed in areas immediately adjacent to the lead control area. For outdoor operations, at least one sample on each shift shall be taken on the downwind side of the lead control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas.

The CIH shall certify that the area has been cleaned of lead contamination.

3.3 CLEANUP AND DISPOSAL

3.3.1 Cleanup

Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the surface preparation operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner and wet mopping the area.

3.3.2 Certification

The CIH shall certify in writing that the inside and outside the lead control area agressive air monitoring samples are less than 30 micrograms per cubic meter of air, the respiratory protection for the employees was adequate, the work procedures were performed in accordance with 29 CFR 1926.62, and that there were no visible accumulations of lead-contaminated paint and dust on the worksite. Do not remove the lead control area or roped-off boundary and warning signs prior to the Contracting Officer's receipt of the CIH's certification. Reclean areas showing dust or residual paint chips.

3.3.3 Disposal

Dispose of removed materials and associated waste in compliance with Environmental Protection Agency (EPA), Federal, State, and Local requirements and the approved work plans for removal and disposal.

a. Materials (except metals) coated with lead-contaminated paint which is well adhered shall be disposed of in the Base Sanitary Landfill, provided all Base and Landfill requirements are complied with. Comply with the land disposal restriction notification requirements of 40 CFR 258.

b. All debris, paint chips, and dust will be considered a hazardous waste. Dispose of this material off Base in an approved hazardous waste facility.

3.3.4 Testing of Lead-Contaminated Paint Residue

Test lead-contaminated paint residue and debris in accordance with 40 CFR 261 for hazardous waste. A composite sample of dust and debris collected after removal is complete must be tested for lead using EPA Protocol Total Charagteristic Leachate Procedure (TCLP) Test. If the results are less than five parts per million, the debris shall be disposed in the Base Sanitary Landfill. If the results are equal to or greater than five parts per million, the debris shall be disposed in an approved hazardous waste facility.

3.4 PAYMENT FOR HAZARDOUS WASTE

Payment for disposal of hazardous waste shall not be made until a signed copy of the manifest from the disposal facility certifying the amount of

hazardous waste delivered is returned and a copy is furnished to the Government.

-- End of Section --

SECTION 02 82 33.13

REMOVAL AND DISPOSAL OF MATERIALS COATED WITH LEAD-CONTAINING PAINT

01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z88.2	(1992) Respiratory Protection

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.57	Ventilation
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead Exposure in Construction
29 CFR 1926.103	Respiratory Protection
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 261	Identification and Listing of Hazardous Waste

UNDERWRITERS LABORATORIES (UL)

UL 586	(1996; Rev thru Aug 1999) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, "30 micrograms per cubic meter of air" refers to the action level.

1.2.2 Area Monitoring

Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

1.2.3 Physical Boundary

Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area."

1.2.4 Certified Industrial Hygienist (CIH)

As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

1.2.5 Change Rooms and Shower Facilities

Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

1.2.6 Decontamination Room

Room for removal of contaminated personal protective equipment (PPE).

1.2.7 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

1.2.8 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

1.2.9 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.

1.2.10 Lead Control Area

An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint removal operations. The lead control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

1.2.11 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following

formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.2.12 Personal Monitoring

Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

1.3 QUALITY ASSURANCE

1.3.1 Medical Examinations

Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1926.59. The examination will not be required if adequate records show that employees have been examined as required by 29 CFR 1926.59 within the last year.

1.3.1.1 Medical Records

Maintain complete and accurate medical records of employees for a period of at least 40 years or for the duration of employment plus 20 years, whichever is longer.

1.3.2 CIH Responsibilities

a. Certify training.

b. Review and approve materials coated with lead-containing paint Removal Work Plan for conformance to the applicable referenced standards.

c. Inspect lead-containing paint removal work for conformance with the approved plan.

d. Direct monitoring.

e. Ensure work is performed in strict accordance with specifications at all times.

f. Ensure hazardous exposure to personnel and to the environment are adequately controlled at all times.

1.3.3 Training

Train each employee performing paint removal, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62.

1.3.3.1 Training Certification

Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

1.3.4 Respiratory Protection Program

a. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least every 6 months thereafter as required by 29 CFR 1926.62.

b. Establish and implement a respiratory protection program as required by ANSI Z88.2, 29 CFR 1926.103, 29 CFR 1926.62, and 29 CFR 1926.55.

1.3.5 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1926.59.

1.3.6 Hazardous Waste Management

The Hazardous Waste Management plan shall comply with applicable requirements of federal, state, and local hazardous waste regulations and address:

a. Identification of hazardous wastes associated with the work.

b. Estimated quantities of wastes to be generated and disposed of.

c. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes consisting of lead chips and/or dust not intact lead-coated materials. Include the facility location and a 24-hour point of contact. Furnish two copies of state hazardous waste permit applications .

d. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures to be implemented.

g. Work plan and schedule for waste containment, removal and disposal. Wastes shall be cleaned up and containerized daily.

h. Cost for hazardous waste disposal according to this plan.

1.3.7 Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.62. Submit matters regarding interpretation of standards to the Contracting Officer for resolution before starting work. Where specification requirements and the

referenced documents vary, the most stringent requirement shall apply.

1.3.8 Pre-Construction Conference

Along with the CIH, meet with the Contracting Officer to discuss in detail the materials coated with lead-containing paint removal work plan, including work procedures and precautions for the work plan.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00.05 20, " Construction Submittal Procedures

SD-03 Product Data

Vacuum filters

Respirators

SD-06 Test Reports

Monitoring Results

SD-07 Certificates

Qualifications of CIH

Testing laboratory qualifications

Materials coated with lead-containing paint removal work plan

Rental equipment notification

CIH approval of work plan (signature, date, and certification number)

Respiratory protection program

Hazard communication program

EPA approved hazardous waste treatment or disposal facility for lead disposal

Hazardous waste management plan

Vacuum filters

SD-11 Closeout Submittals

Completed and signed hazardous waste manifest from treatment or disposal facility

Certification of medical examinations

Employee training certification

1.4.1 Qualifications of CIH

Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification.

1.4.2 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

1.4.3 Materials Coated with Lead-Containing Paint Removal Work Plan

Submit a detailed job-specific plan of the work procedures to be used in the removal of materials coated with lead-containing paint. The plan shall include a sketch showing the location, size, and details of lead control areas, location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation system. Include in the plan, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of lead related work, collected wastewater and paint debris disposal plan, air sampling plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area. Include air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion of the plan.

1.4.4 Air Monitoring

Submit monitoring results to the Contracting Officer within 3 working days, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

1.5 REMOVAL

1.5.1 Title to Materials

Materials resulting from demolition work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of in accordance with Section 02 41 00, "Demolition," except as specified herein.

1.6 EQUIPMENT

Furnish the Contracting Officer with two complete sets of personal protective equipment daily, as required herein, for entry into and inspection of the removal work within the lead controlled area. Personal

protective equipment shall include fitted respirators and disposable whole body covering, including appropriate foot, head, and hand protection. PPE shall remain the property of the Contractor.

1.6.1 Respirators

Furnish appropriate respirators approved by the NIOSH, Department of Health and Human Services, for use in atmospheres containing lead dust. Respirators shall comply with the requirements of 29 CFR 1926.62 and 29 CFR 1926.103.

1.6.2 Special Protective Clothing

Furnish personnel who will be exposed to lead-contaminated dust with appropriate disposable protective whole body clothing, head covering, gloves, and foot coverings. Furnish appropriate disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CIH.

1.6.3 Rental Equipment Notification

If rental equipment is to be used during lead-containing paint handling and disposal, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Contracting Officer.

1.6.4 Vacuum Filters

UL 586 labeled HEPA filters.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Notification

Notify the Contracting Officer 20 days prior to the start of any removal work.

3.1.2 Lead Control Area Requirements

a. Establish a lead control area by completely enclosing with containment screens the area or structure where materials coated with lead-containing paint removal operations will be performed.

or

a. Contain removal operations by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust.

3.1.3 Protection of Existing Work to Remain

Perform removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

3.1.4 Boundary Requirements

Provide physical boundaries around the lead control area by roping off the area or providing curtains, portable partitions or other enclosures to ensure that airborne concentrations of lead will not reach 30 micrograms per cubic meter of air outside of the lead control area.

3.1.5 Furnishings

The Government will remove furniture and equipment from the work area before lead-containing paint removal work begins.

3.1.6 Heating, Ventilating and Air Conditioning (HVAC) Systems

Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead control areas. Seal intake and exhaust vents in the lead control area with 6-mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead control area.

3.1.7 Change Room and Shower Facilities

Provide clean change rooms and shower facilities within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.

3.1.8 Mechanical Ventilation System

a. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.

b. To the extent feasible, use fixed local exhaust ventilation connected to HEPA filters or other collection systems, approved by the industrial hygienist. Local exhaust ventilation systems shall be designed, constructed, installed, and maintained in accordance with ANSI Z9.2.

3.1.9 Personnel Protection

Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been given appropriate training and protective equipment.

3.1.10 Warning Signs

Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.2 WORK PROCEDURES

The work shall include removal of materials coated with lead containing

paint. Materials shall be removed with coating adhered and intact. No sanding, sandblasting or other procedures which may cause lead containing particles to become airborne shall be used for demolition. The Contractor is advised of these conditions and shall be responsible for compliance with all EPA, Federal, State and Local Requirements.

3.2.1 Painted Cabinets, Wood Trim, Drywall, Windows, and Doors

Remove all painted cabinets, wood trim, drywall, windows, and doors with coating intact. Perform removal of materials coated with lead-containing paint in accordance with approved procedures. Use procedures and equipment required to limit occupational environmental exposure to lead when materials coated with lead-containing paint are removed in accordance with 29 CFR 1926.62, except as specified herein.

3.2.2 Personnel Exiting Procedures

Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:

a. Vacuum themselves off.

b. Remove protective clothing in the decontamination room, and place them in an approved impermeable disposal bag.

c. Shower.

d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

3.2.3 Monitoring

Monitoring of airborne concentrations of lead shall be in accordance with 29 CFR 1926.62 and as specified herein. Air monitoring, testing, and reporting shall be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH.

a. The CIH or the IH Technician under the direction of the CIH shall be on the jobsite directing the monitoring, and inspecting the lead-containing paint removal work to ensure that the requirements of the Contract have been satisfied during the entire removal of materials coated with lead-containing paint operation.

b. Take personal air monitoring samples on employees who are anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air monitoring samples, signed by the CIH, within 72 hours after the air samples are taken. Notify the Contracting Officer immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

3.2.3.1 Monitoring During Removal Work

Perform personal and area monitoring during the entire removal operation. Sufficient area monitoring shall be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air at all times. If the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air, work shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Contracting Officer immediately. The CIH shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Removal work shall resume when approval is given by the CIH. The Contractor shall control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. As a minimum, conduct area monitoring daily on each shift in which lead paint removal operations are performed in areas immediately adjacent to the lead control area. For outdoor operations, at least one sample on each shift shall be taken on the downwind side of the lead control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. The CIH shall certify that the area has been cleaned of lead contamination.

3.3 MATERIALS COATED WITH LEAD-CONTAINING PAINT REMOVAL

Manual or power sanding of interior and exterior surfaces is not permitted. Remove materials coated with lead containing paint within the areas designated on the drawings. Take whatever precautions are necessary to minimize damage to the underlying substrate or adjacent surfaces to remain.

3.4 CLEANUP AND DISPOSAL

3.4.1 Cleanup

Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner and wet mopping the area.

3.4.2 Certification

The CIH shall certify in writing that the inside and outside the lead control area air monitoring samples are less than 30 micrograms per cubic meter of air, the respiratory protection for the employees was adequate, the work procedures were performed in accordance with 29 CFR 1926.62, and that there were no visible accumulations of lead-contaminated paint and dust on the worksite. Do not remove the lead control area or roped-off boundary and warning signs prior to the Contracting Officer's receipt of the CIH's certification. Reclean areas showing dust or residual paint chips.

3.4.3 Testing of Lead-Containing Paint Residue

Test lead containing paint residue in accordance with 40 CFR 261 for hazardous waste. A composite sample of dust and debris collected after removal is complete must be tested for lead using EPA protocol Total Characteristic Leachate Procedure (TCLP) Test. If the results of that test are less than five parts per million (PPM), it may be disposed of at

the Base Landfill. If the results are greater than five PPM, it will be considered a hazardous waste and disposed of accordingly.

3.4.4 Disposal

Dispose of removed materials and associated waste in compliance with Environmental Protection Agency (EPA), Federal, State, and Local requirements and the approved work plans for removal and disposal.

a. Materials (except metals) coated with lead-containing paint which is well adhered shall be disposed of in the Base Sanitary Landfill, provided all Base and Landfill requirements are complied with. Comply with the land disposal restriction notification requirements of 40 CFR 258.

b. All debris, paint chips, and dust may be considered a hazardous waste. Dispose of this material (if TCLP = 5ppm) off Base in an approved hazardous waste facility.

-- End of Section --

SECTION 07 26 23.19

BROWNFIELD MEMBRANE AND VENT SYSTEMS
12/16

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

Provide gas vapor barrier system with prefabricated composite venting system to mitigate the passage of gas or vapor and install without defects, damage or failure.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A742/A742M	(2013) Standard Specification for Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe
ASTM D1693	(2015) Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics
ASTM D4068	(2015) Chlorinated Polyethylene Sheeting for Concealed Water-Containment Membrane
ASTM D412	(2006a; R 2013) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D413	(1998; R 2013) Rubber Property - Adhesion to Flexible Substrate
ASTM D543	(2014) Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
ASTM D6392	(2012) Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
ASTM D751	(2006; R 2011) Coated Fabrics
ASTM D822	(2001; R 2006) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
ASTM E154/E154M	(2008a; R 2013; E 2013) Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground

	Cover
ASTM E96/E96M	(2014) Standard Test Methods for Water Vapor Transmission of Materials

NSF INTERNATIONAL (NSF)

NSF/ANSI 61	(2015) Drinking Water System Components - Health Effects

1.3 SEQUENCING AND SCHEDULING

Specification subparagraph text.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Delegated Design

SD-03 Product Data

Membrane And Vent System; G

Submit manufacturer's product data, with complete general and specific installation instructions, details, recommendations, and limitations.

SD-04 Samples

Gas Vapor Barrier; G

SD-07 Certificates

Qualifications

1.5 QUALITY CONTROL

1.5.1 Qualifications

The gas vapor barrier manufacturer must have produced at least 22 million square feet of gas vapor barrier, with at least 22 million square feet installed. At the time of bid, submit written certification that installer has current approved applicator status with gas vapor membrane manufacturer

1.5.2 Manufacturer Qualifications

Gas vapor membranes and all accessory products shall be provided by a single manufacturer with a minimum of 25 years experience in the direct production and sales of gas vapor systems.

1.5.3 Installer Qualifications

A firm that is trained and approved by the gas vapor barrier system manufacturer for installation of the gas vapor barrier system required for this Project. The installing company should have at least three (3) years experience in work of the type required by this section, who can comply with manufacturer's warranty requirements.

1.5.4 Pre-Installation Conference

A pre-installation conference shall be held at the site prior to commencement of field installation to establish procedures to maintain required working conditions and to coordinate this work with related and adjacent work. Verify that final gas vapor barrier components and system details comply with gas vapor barrier manufacturer's current installation requirements and recommendations. Pre-con meeting attendees should include representatives for the government, inspection firm, Contractor, gas vapor installer/applicator, concrete subcontractor, excavating/backfill contractor, and plumbing, mechanical and electrical subcontractors if work penetrates the gas vapor membrane.

1.5.5 Independent Inspection

Contractor shall engage an independent inspection service to monitor gas vapor membrane material installation compliance with the project contract documents and manufacturer's published literature and site specific details. Independent Inspection Firm shall be an approved company participating with the gas vapor membrane manufacturer's Certified Inspection Program. Inspection service shall produce reports and digital photographs documenting each inspection. Reports shall be made available to the Contracting Officer, gas vapor membrane installer, gas vapor membrane material manufacturer, and Designer. Inspections should include substrate examination, beginning of gas vapor membrane installation, periodic intervals, and final inspection prior to concrete or backfill placement against the gas vapor barrier.

1.6 Delegated Design

Vapor intrusion mitigation membrane and venting systems shall meet the performance requirements herein. Design responsibility for these assemblies has been delegated to the Contractor and shall incorporate the specific section properties and functional capabilities of the selected product series and manufacturer. Submit calculations and shop drawings.

Supplement shop drawings with computations for the design and installation of vapor intrusion mitigation membrane and venting systems and appurtenant accessories to be utilized. Tie general manufacturer data to project specific conditions.

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver materials in factory sealed and labeled packaging. Sequence

deliveries to avoid delays, while minimizing on-site storage. Handle and store following manufacturer's instructions, recommendations and material safety data sheets. Protect from construction operation related damage, as well as, damage from weather, excessive temperatures and prolonged sunlight. Remove damaged material from site and dispose of in accordance with applicable regulations.

Do not allow material to freeze in containers.

Remove and replace liquid materials that cannot be applied within their stated shelf life.

1.7 COORDINATION

Coordinate application of gas vapor barrier with installation of other construction.

1. Positively secure plumbing, electrical, mechanical, and structural items to be under or passing through the gas vapor barrier in their proper positions and appropriately protected prior to membrane application.

2. Install gas vapor barrier before placement of reinforcing steel. When not possible, mask all exposed reinforcing steel prior to membrane application.

1.8 PROJECT/SITE CONDITIONS

1.8.1 Environmental Requirements

Apply gas vapor barrier system within the range of ambient and substrate temperatures recommended by manufacturer. Do not install gas vapor barrier system to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.

Do not install gas vapor barrier system in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.

Maintain adequate ventilation during application and curing of gas vapor barrier system materials.

Ambient temperature shall be within manufacturer's specifications. If winter conditions apply, we recommend the use of space heaters and necessary cover (i.e. visqueen) to bring the ambient temperature to at least +45°F until the protection course and structural slab reinforcing or a mudslab protection course has been placed.

Surface preparation shall be per manufacturer's specification.

1.9 WARRANTY

The materials manufacturer must provide a written one year standard material indicating the material conforms to its product specifications and is free of material defects. Factors affecting the results obtained from using this product including weather, equipment utilized, construction, workmanship and other variables are all beyond the

manufacturer's control.

Under this product warranty, manufacturer must provide replacement material, at no charge, for any product proven not to meet the material properties listed in the published product literature This warranty is in lieu of any and all other warranties expressed or implied (including any implied warranty of merchantability or fitness for a particular use), and manufacturer shall have no further liability of any kind including liability for consequential or incidental damages resulting from any defects or delays caused by replacement or otherwise.

PART 2 PRODUCTS

2.1 MEMBRANE AND VENT SYSTEM

Submit manufacturer's product data, with complete general and specific installation instructions, details, recommendations, and limitations.

2.2 MATERIALS

Fluid applied gas vapor barrier system; a single course, high build, polymer modified asphaltic emulsion. Water borne and spray shall be applied at ambient temperatures. Provide a minimum thickness of 60 dry mils; non-toxic and odorless.

2.2.1 Gas Vapor Barrier Physical Properties

GAS VAPOR MEMBRANE	**TEST METHOD**	**VALUE**
Acid Exposure (10 percent, H2SO4 for 90 days)	ASTM D543	Less than 1 percent weight change
Diesel (1000 mg/l), Naphthalene (5000 mg/l) and Acetone (500 mg/l) Exposure for 7 days	ASTM D543	"Less than 1 percent weight changeLess than 1 percent tensile strength change"
Radon Permeability	"Tested by US Dept. of Energy"	"Zero permeability to Radon (222Rn)"
Bonden Seam Strength Tests	ASTM D6392	Passed
Micro Organism Resistance (Soil Burial) - average weight change		Passed
Methane Permeability		Passed
Oil Resistance Test- average weight change, average tensile strength change, average tensile stress change, average elongation change, bonded seams, methane permeability	ASTM D543	Passed

GAS VAPOR MEMBRANE	TEST METHOD	VALUE
Acid Exposure (10 percent, H2SO4 for 90 days)	ASTM D543	Less than 1 percent weight change
Heat Aging- average tensile strength change, average tensile stress change, average elongation change, bonded seams	ASTM D4068	Passed
Dead Load Seam Strength	City of Los Angeles	Passed
"Environmental Stress-Cracking"	ASTM D1693	Passed
PCE Diffusion Coefficient	Tested at 6,000 mg/m3	2.74 x 10-14 m2/sec
TCE Diffusion Coefficient	Tested at 20,000 mg/m3	8.04 x 10-14 m2/sec
Soil Burial	ASTM E154/E154M	Passed
Water Vapor Permeability	ASTM E96/E96M	0.24 perms
Water Vapor Transmission	ASTM E96/E96M	0.10 grains/h-ft2

POTABLE WATER	TEST METHOD	VALUE
Toxicity Test		"Passed. CCR Bioassay-FlatheadMinnow"
Potable Water Containment	NSF/ANSI 61	"NSF Certified for tanks >300,000 gal"
Hydrostatic Head Resistance	ASTM D751	Tested to 138 feet or 60 psi

POTABLE WATER	TEST METHOD	VALUE
"Freeze-Thaw Resistance(100 Cycles)"	ASTM A742/A742M	Meets criteria. No spalling or disbondment
Accelerated Weathering & Ultraviolet Exposure	ASTM D822	No adverse effect after 500 hours
Elongation	ASTM D412	1,332 percent - 0 diameter reinforcement, 90 percent recovery
Tensile Strength	ASTM D412	58 psi without reinforcement
"Tensile Bond Strength to Concrete"	ASTM D413	2,707 lbs/ft2 uplift force

2.3 GAS VAPOR BARRIER

All gas vapor barrier materials must be provided by the manufacturer or shall have manufacturer's written approval for substitution. Submit product samples of the following for approval:

A. Low profile vapor extraction system.

1. End outlet.

2. Interior footing sleeves.

3. Fabric reinforced tape.

B. 20 mil high density polypropylene geomembrane

1. Tape 3 inches wide - covering cold joints, cracks form tie holes, etc.

C. Asphalt latex spray applied gas vapor barrier membrane.

D. 105 mil non-woven polypropylene needle punched protection course.

PART 3 EXECUTION

3.1 EXAMINATION

The installer must examine conditions of substrates and other conditions under which this section work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected and are acceptable for compliance with manufacturer requirements. General substrate conditions acceptable for the gas vapor barrier installation are listed below. For conditions not covered in this Section, contact the gas vapor barrier manufacturer for guidance.

3.1.1 Soil Substrates

1. Compact sub-grade to a minimum relative compaction of 90 percent or as specified by the Contract Documents with finished surface smooth, uniform, free of debris and standing water.

2. Stones or dirt clods greater than 1/4 inch are to be removed. Aggregate sub-bases must be rolled flat, free from any protruding sharp edges.

3. Penetrations must be prepared in accordance with manufacturer's specifications. All form stakes that penetrate the membrane shall be of steel reinforcing bars which shall be bent over and left in the slab.

4. Trenches are to be cut to accommodate gas vapor barrier membrane and protection course with perpendicular to sloped sides and maximum obtainable compaction. Finish grade and compact the adjoining grade.

5. Provide excavated walls vertical or sloped back, free of roots and protruding rocks.

6. Soil sterilant applications should at the sterilant manufacturer's recommended rate.

3.1.2 Wood Timber Shoring

Wood lagging shoring should extend to the lowest level of the gas vapor membrane installation with any voids or cavities exterior of the lagging timbers filled with compacted soil or cementitious grout. Interior surface of lagging boards should be planar and tight together with gaps less than 1 inch. Gaps in excess of 1 inch should be filled with cementitious grout, compacted soil, wood, extruded polystyrene (40 psi min.) Do not use plywood or other surface treatment over large lagging gaps that leave the cavity void.

3.1.3 Cut Rock Face or Auger Cast Caisson Shoring Walls

Interior surface of cut rock and concrete auger pile retention walls should be planar without irregular surface conditions, voids, and sharp transitions that would leave a void space to the outside of the gas vapor barrier installation. Irregular rock, void pockets, cracks, sharp concave transitions should be completely filled or smoothed with cementitious grout, shotcrete, or other approved solid material

3.1.4 Mechanical or Other Penetrations

Mechanical, structural, or architectural materials that will pass through the plane of the gas vapor membrane shall be properly installed and secured in their final position prior to installation of the gas vapor barrier membrane and vent system.

1. At masonry joints, cold joints, and form joints, provide a struck smooth surface. Prepare penetrations in accordance with manufacturer's specifications.

2. Completely grout all cracks or cold joints greater than 1/16 inch with non-shrink grout. Install reinforcing tape over all cold joints, cracks and form tie holes (after holes and cracks are grouted).

3.2 PREPARATION

3.2.1 Protection

Protect adjacent work areas and finish surfaces from damage over spraying during product applications.

3.2.2 Surface Preparation

The application surface shall be prepared and provided to the applicator in accordance with manufacturer's specifications listed below:

Remove dirt, debris, oil, grease, cement laitance, or other foreign matter which will impair or negatively affect the performance of the gas vapor barrier and venting system.

Protect adjacent work areas and finish surfaces from damage or over spraying during product applications.

3.3 INSTALLATION OF GAS COLLECTION/VENT SYSTEM

Roll out low profile vapor extration system per approved layout. Provide prefabricated sleeves or end outlets where venting penetrates interior footing. At points of intersections, cut away geotextile to produce rectangular flaps. Interlock exposed dimple board in a Lego-like fashion. Fold flaps of geotextile in a manner so that the dimple board is covered completely. Secure geotextile folds with fiber reinforced tape so that the geotextile is completely impermeable to sand fill. Use end outlet to attach to a solid (non-perforated 2 inches diameter PVC pipe at penetration through building foundation. Seal/grout piping at penetrations through foundation using approved methods.

3.4 INSTALLATION OF CONCRETE

Seal around penetrations in accordance with manufacturer instructions.

Provide a 3/4 inch minimum cant of gas vapor barrier membrane, or other suitable material as approved by the manufacturer, at all horizontal to vertical transitions and other inside corners of 120 degree or less. Allow to cure overnight before the application of gas vapor barrier membrane.

Delineate a test area on site with a minimum dimension of 10 feet by 10 feet. Apply gas vapor barrier membrane to a thickness of 60 mils and let it cure for 24 hours. Observe for blisters. If minor or no blistering occurs, proceed to the next step. If significant blistering does occur, apply a thin (10 mil) tack coat of gas vapor barrier membrane "A" side without catalyst to the entire concrete surface and allow to cure before proceeding.

Spray apply gas vapor barrier membrane to a 60 mil minimum dry thickness. Increase thickness to 100 dry mils if shotcrete is to be applied directly to membrane. If a second coat is required, remove any standing water from the membrane before proceeding with the second application. Non-horizontal surfaces: Spray on non-horizontal surfaces should begin at the bottom and work towards the top. This method allows the product to adhere to the surface before hitting catalyst runoff.

Do not penetrate the membrane. Keep membrane free of dirt and debris and traffic until a protective cover is in place. It is the responsibility of the Contractor to insure that the membrane and the protection system are not penetrated.

After membrane has cured and checked for proper thickness and flaws, install protection material pursuant to manufacturer's instructions.

1. Perform all testing or inspection prior to placing protection course.

3.5 INSTALLATION

Roll out geomembrane on substrate and overlap seams a minimum of 6 inches. Lay geomembrane tight at all inside corners. Apply a thin 20 mil gas vapor spray applied within the seam overlap. Line trenches with

geomembrane extending at least 6 inches onto adjoining sub-grade if slab and footings are to be sprayed separately.

Spray apply gas vapor barrier membrane onto geomembrane to a 60 mil minimum dry thickness. Increase thickness to 100 dry mils if shotcrete is to be applied directly to membrane. If a second coat is required, remove any standing water from the membrane before proceeding with the second application.

Do not penetrate membrane. Keep membrane free of dirt, debris and traffic until a protective cover is in place. It is the responsibility of the Contractor to insure that the membrane and the protection system are not penetrated.

Perform all testing and inspections prior to placing protection course.

3.6 SEALING AROUND PENETRATIONS

3.6.1 Option 1

Clean all penetrations. Sand metal penetrations clean with emory cloth.

Cut the geomembrane around penetrations so that it lays flat on the sub-grade. Lay geotextile tight at all inside corners. Apply a thin 20 mil gas vapor barrier membrane within the seam overlap then lap detailing fabric around penetrations extending 3 inches around the base of penetration.

At the base of penetration Install a minimum 3/4 inch thick membrane cant of gas vapor barrier membrane, or other suitable material as approved by manufacturer. Extend the membrane at a 60 mil thickness 3 inches around the base of penetration and up the penetration a minimum of 3 inches. Allow to cure overnight before the application of membrane.

Spray apply gas vapor barrier membrane to an 60 mils minimum dry thickness around the penetration, completely encapsulating the collar assembly and to a height of one and 1 1/2 inches minimum above the membrane. Spray-apply gas vapor barrier membrane to surrounding areas as specified for the particular application.

Allow gas vapor barrier membrane to cure completely.

Wrap penetration with polypropylene cable tie at a point 2 inches above the base of the penetration. Tighten the cable tie firmly so as to squeeze, but not cut, the cured membrane collar.

3.6.2 Option 2

Clean all penetrations. Sand metal penetrations clean with emory cloth.

Cut the geomembrane around penetrations so that it lays flat on the sub-grade. Lay geomembrane tight at all inside corners. Apply a thin (20 mil) of gas vapor barrier membrane within the seam overlap then lap Detailing Fabric around penetrations extending 3 inches around the base of penetrations.

Spray-apply gas vapor barrier membrane to surrounding areas as specified

for the particular application to a 60 mil minimum dry thickness. At the base of penetration Install a minimum 3/4 inch thick membrane cant of gas vapor barrier membrane, or other suitable material as approved by manufacturer. Extend the membrane at 60 mil thickness up the penetration a minimum of 3 inches.

Spray apply the membrane at an 60 mil thickness 3 inches around the base of penetration and up the penetration, completely encapsulating the collar assembly, to a height of one and 1 1/2 inches minimum above the membrane.

Allow gas vapor barrier membrane to cure completely.

Wrap penetration with polypropylene cable tie at a point 2 inches above the base of the penetration. Tighten the cable tie firmly so as to squeeze, but not cut, the cured membrane collar.

3.7 FIELD QUALITY CONTROL

The membrane must be cured at least overnight before inspecting for dry-thickness, holes, shadow shrinkage, and any other membrane damage. When thickness or integrity is in question the membrane should be tested in the proper manner as described below. However, over- sampling defeats the intent of inspections. Inspectors should always use visual and tactile measurement to guide them. Areas suspected of being too thin to the touch should be measured with the gauges to determine the exact thickness.

3.7.1 On Concrete and Other Hard Surfaces

Membrane may be checked for proper thickness with a blunt-nose depth gauge, taking one reading every 500 square feet. Record the readings. Mark the test area for repair, if necessary. If necessary, test areas are to be patched over with gas vapor barrier membrane to a 60 mils minimum dry thickness, extending a minimum of 1 inch beyond the test perimeter.

3.7.2 On Dirt and Other Soft Substrates

Samples may be cut from the membrane and geomembrane sandwich to a maximum area of 2 square inches. Measure the thickness with a mil-reading caliper, per 500 sq. feet. Deduct the geomembrane thickness of 20 mils to determine the thickness of membrane. Mark the test area for repair.

Patch voids left by sampling with detailing fabric underlay beneath the existing membrane with HDPE side up and a minimum of 2 inches overlap. Apply a thin tack coat of gas vapor barrier membrane under the geomembrane patch. Then spray or trowel-apply gas vapor barrier membrane to a 60 mils minimum dry thickness, extending at least 3 inches beyond geotextile patch.

3.7.3 Smoke Testing for Holes

Smoke test the membrane for holes and other breaches in accordance with the manufacturer's written instructions.

-- End of Section --

SECTION 07 61 15.00 20

ALUMINUM STANDING SEAM ROOFING
04SEPT2018

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA ADM-105	(2005; Errata 2005) Aluminum Design Manual
AA ASM-35	(2000) Specifications for Aluminum Sheet Metal Work in Building Construction, Construction Manual Series Section 5

AMERICAN FOREST & PAPER ASSOCIATION (AF&PA)

AF&PA T101	(2005) National Design Specification (NDS) for Wood Construction

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG03-3	(2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

ASTM INTERNATIONAL (ASTM)

ASTM B117	(2011) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B209	(2010) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B209M	(2010) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM D1654	(2008) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D2247	(2011) Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D226/D226M	(2009) Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D2565	(1999; R 2008) Xenon Arc Exposure of Plastics Intended for Outdoor Applications

ASTM D4214	(2007) Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films
ASTM D522	(1993a; R 2008) Mandrel Bend Test of Attached Organic Coatings
ASTM D523	(2008) Standard Test Method for Specular Gloss
ASTM D714	(2002; R 2009) Evaluating Degree of Blistering of Paints
ASTM D968	(2005; R 2010) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM E1592	(2005) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
ASTM E330	(2002; R 2010) Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E84	(2012) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM G152	(2006) Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G153	(2004; R 2010) Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM 1646	Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
ASTM1680	Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA Details	(2003) NRCA Roof Perimeter Flashing Systems Construction Details for Class 1 Roof Construction

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1793	(2012) Architectural Sheet Metal Manual, 7th Edition

METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)

MBMA RSDM	(2000) Metal Roofing Systems Design Manual

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)

NRCA 0409	(2006) Architectural Sheet Metal and Metal Roofing Manual
NRCA RoofMan	(2012) The NRCA Roofing Manual

PORCELAIN ENAMEL INSTITUTE (PEI)

PEI 1001	(1996) Specification for Architectural
Porcelain Enamel (ALS-100)	Ref Title
PEI CG-3	(2005) Color Guide for Architectural Porcelain Enamel

UNDERWRITERS LABORATORIES (UL)

UL 580	(2006; Reprint Jul 2009) Tests for Uplift Resistance of Roof Assemblies
UL Bld Mat Dir	(2012) Building Materials Directory

FM GLOBAL (FM)

FM 4471	(2010) Class I PAnel Roofs

1.2 DEFINITIONS

1.2.3 Pre-Formed

Formed to the final, less field-formed seam, profile and configuration in the factory.

1.2.5 Roofing System

The roofing system is defined as the assembly of roofing components, including roofing panels, flashing, fasteners, and accessories which, when assembled properly result in a watertight installation.

1.3 SYSTEM DESCRIPTION

1.3.1 Design Requirements

a. Provide continuous length panels with no joints or seams, except where indicated. Individual panels shall be removable for replacement of damaged material.

b. There shall be no exposed or penetrating fasteners except where shown on the approved shop drawings. Fasteners into wood shall be stainless steel sheet metal screws with full length threads. Fasteners into steel shall be stainless steel or cadmium plated stainless steel screws inserted into predrilled holes. Length and diameter of screws shall be sufficient to meet the design loads with a suitable factor of safety for the material to which the roofing components are attached. Calculate fastener capacity in accordance with AISI SG03-3, AA ADM-105 or AF&PA T101 as applicable.

c. Roof panel standing seam shall include a capillary break and be mechanically locked closed by the manufacturer's locking tool. The seam shall include a continuous sealant when required by the manufacturer to withstand the rainfall and wind specified in paragraph entitled "Manufacturer's Requirements."

d. Roof panel anchor clips shall be concealed and designed to allow for thermal movement of the panels, except where specific fixed points are indicated.

e. The system shall resist the positive and negative loads specified herein in accordance with "Sheet Building Sheathing Design Guide" of the AA ADM-105. Determine capacity in accordance with principles of ASTM E330 modified as follows:

(1) Test panels shall be production material of the type proposed for use. Use either full length or partial length panels with attachment representative of the main part of the roof.

(2) Test specimens shall be five panels wide, span one or more supports, and shall have no end or edge attachment or seals that will restrict crosswise movement of the panels under load. Do not bridge longitudinal seams with tape or film that can restrict separation.

(3) Panels shall be tested to failure. Report load at failure.

f. Panels shall support walking loads without excessive distortion or telegraphing of the structural supports. Panels shall support a 115 kilogram 250 pound load concentrated on a 2500 square millimeter (mm) four square inch area at the center of the panel without buckling or permanent distortion.

1.3.2 Performance Requirements

1.3.2.1 Static pressure air infiltration (Roof panels)

Pressure Leakage Rate per ASTM E1680:
a. 1.57 PSF 0.0012 cfm/ sq. ft.
b. 6.24 PSF 0.0001 cfm/ sq. ft.

c. 20.0 PSF 0.0011 cfm/ sq. ft.

1.3.2.2 Static pressure water infiltration (Roof panels)

Text Pressure Result per ASTM E1646:
a. 5 Gal. / Hr. per S.F. and Static NO LEAKAGE
b. Pressure of 20.0 PSF for 15 Minutes NO LEAKAGE

1.3.2.3 Tests

Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results withing the range or test data. Extrapolations for conditions outside test range are not acceptable.

1.3.2.4 Water penetration (dynamic pressure):

No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord with principles of AAMA 501.1.

1.3.2.5 Wind and wind driven rain resistance

No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord wiht principles of AAMA 501.1.

1.3.2.6 Roof pressures

The installed roof system assembly shall show that it can resist the calculated roof pressure in section 1.11.B in accordance with the test results of TAS 125.

1.3.2.7 Water penetration in low slope application

No water penetration or panel movement when subject to 6" head of water for 6 hours when tested in accordance with the ASTM E2140 and when subject to 6" head of water for 7 days when tested in accordance with the TAS 114 appendix

1.3.2.8 Hydrostatic Head Resistancee

No water penetration when tested according to ASTM E2140. Submit Leakage test report upon completion of installation.

1.3.2.9 Wind Uplift Resistance

Provide metal roof panel system that conform to the requirements of ASTM E1592 and UL580. Uplift force due to wind action governs the design for panels. Submit wind uplift test report prior to commencing installation. Submit licensed Wind uplift calculations engineer's and substantiating data to validate any non-rated roof system. Base wind uplift measurements on a design wind speed of 209 km/h 150mph in accordance with ASCE 7 and/or other

applicable building code requirements. Metal roof panels and component materials must also comply with the requirements in FM4471 as part of a panel roofing system as listed in Factory Mutual Guide (FMG) "Approval Guide" for class 1 or noncombustible construction, as applicable. Identify all materials with FMG Markings.

1.3.2.10 Standing Seam Water - Stop test:

Comply with ASTM E1680, ASTM E1646, AAMA 501.1, and ASTM E2140.

1.3.2.11 Fire Test

When required comply with ASTM E108 or UL 790.

1.4 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Roofing panels

Gutter / Downspout System

Submit drawings as necessary to supplement the instructions and diagrams. Drawings shall include design and erection drawings containing an isometric view of the roof showing the design uplift pressures and dimensions of edge, ridge and corner zones. Show typical and special conditions including flashings, accessory installation, materials and thicknesses, all dimensions, anchoring methods, sealant locations, sealant tape locations, fastener layout, sizes, spacing, provisions for thermal movement, terminations, penetrations, and attachments. Details of installation shall be in accordance with the manufacturer's Standard Instructions and details or the SMACNA 1793. The manufacturer's technical engineering department shall approve the drawings before they are submitted.

SD-03 Product Data

Roofing panels

Attachment clips

Closures

Accessories

Underlayment

Fasteners

Pressure Sensitive Tape

Gaskets

Sealing

Insulation Compounds

Sample warranty certificate

Submit for all materials to be provided. Submit data sufficient to indicate conformance to specified requirements.

SD-04 Samples

Roofing panels

Submit a 300 mm 12 inch long section of typical panel in color selected.

When colors are not indicated, submit samples of not less than six different manufacturer's standard colors for selection.

Accessories

Submit each type of accessory item used in the project including, but not limited to: each type of anchor clip, closures, fasteners and leg clamps.

SD-05 Design Data

Load calculations

SD-06 Test Reports

Structural performance

Panel finish

Lekage Test Reports

Wind Uplift Test Report

Factory Finish and Color Performance Requirements

Submit reports of the tests required by this section.

Manufacturer's field inspection

Submit manufacturer's technical representative's inspection reports as required in paragraph entitled "Manufacturer's Field Inspection."

SD-07 Certificates

Technical representative

Qualification of Installer

Submit documentation proving the installer is factory-trained, has

the specified experience and is authorized by the manufacturer to install the products specified.

Coil stock compatibility Self-Adhering

Provide certification of coil compatibility with roll forming machinery to be used for forming panels without warping, waviness, and rippling not part of panel profile; to be done without damage, abrasion or marking of finish coating.

Self-adhering rubberized asphaltic membrane

Qualification of Manufacturer

Qualifications of Applicator

SD-08 Manufacturer's Instructions

Sealant

Submit manufacturer's sealant requirements for making the standing seam watertight when subjected to 125 mm 5 inches of rainfall per hour simultaneous with 200 km/h 124 mph winds.

Installation manual

Submit manufacturer's printed installation manual/instructions and standard details.

SD-11 Closeout Submittals

Information card

For each roofing installation, submit a typewritten card or photoengraved aluminum card containing the information listed on Form 1 located at the end of this section.

1.5 LOAD CALCULATIONS

Submit load calculations for the following by a structural engineer registered as a Professional Engineer in any jurisdiction verifying that the system supplied meets the design loads indicated. Coordinate calculations with manufacturer's test results.

a. Wind load uplift design pressure at roof locations specified in paragraph entitled "Wind Loads."

b. Clip spacing and allowable load per clip calculations.

c. The fastening of clips to structure or intermediate support spacing.

d. Intermediate support spacing and fastening to structure when required.

e. Allowable panel span at anchorage spacing indicated.

f. Safety factor used in determining loading.

1.6 QUALITY ASSURANCE

1.6.1 Preroofing Conference

After submittals are received and approved but before roofing and insulation work, including associated work, is preformed, the Contractor shall hold a preroofing conference to review the following:

a. The drawings and specifications

b. Procedure for on site inspection and acceptance of the roofing substrate and pertinent structural details relating to the roofing system

c. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components secured to the roofing

d. Safety requirements.

The preroofing conference shall be attended by the Contractor and personnel directly responsible for the roofing and insulation installation, mechanical andelectrical work, and the roofing manufacturer's technical representative. Conflicts among those attending the preroofing conference shall be resolved and confirmed in writing before roofing work, including associated work, is begun. Prepare written minutes of the preroofing conference and submit to the Contracting Officer.

1.6.2 Manufacturer's Technical Representative

The representative shall have authorization from manufacturer to approve field changes and be thoroughly familiar with the products and with installations in the geographical area where construction will take place. The manufacturer's representative shall be an employee of the manufacturer with at least 5 years experience in installing the roof system. The representative shall be available to perform field inspections and attend meetings as required herein, and as requested by the Contracting Officer. When the project is in progress, the roofing system manufacturer shall provide the following:

1.6.2.1 Work Progress

Keep the Owner informed as to the progress and quality of the work as observed. Photographic Inspection Report to be turned in on a weekly basis to the Owner.

1.6.2.2 Inspections

Provide job site inspections a minimum of THREE days a week.

1.6.2.3 Reports

Report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.

1.6.2.4 Confirmation of work done

Confirm after completion that manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.6.2.5 Annual Inspection

The roofing manufacturer must inspect the roof on an annual basis and submit an annual inspection report to Public Works at MC Base Camp Lejeune and MCAS New River.

1.6.2.6 Manufacturer Inspector

The manufacturer's inspector must be a full time employee of the manufacturer with a minimum 5 years experience inspecting the specified roof sysetm. A signed copy to attest to the full time employ and tenure of the inspector by the president of the manufacturing company will accompany submittals.

1.6.3 Qualification of Installer

The roofing system installer shall be factory-trained, approved by the metal roofing system manufacturer to install the system, and shall have a minimum of five (5) years experience as an approved applicator with that manufacturer. The applicator shall have applied five installations of similar size and scope to this project within the previous 3 years.

1.6.4 Single Source

Provide roofing panels, clips, closures and other accessories from a single manufacturer. Provide the most recent design of the manufacturer to operate as a complete system for the intended use.

1.6.5 Manufacturer

The SSMRS shall be the product of a metal roofing industry recognized SSMRS manufacturer who has been in the practice of manufacturing SSMRS for a period of not less than 5 years and who has been involved in at least 5 projects similar in size and complexity to this project.

1.6.6 Qualifications for Welding Work

Welding procedures must conform to AWS D1.1/D1.1Mfor steel or AWS D1.2/D1.2M for aluminum.
Operators are permitted to make only those types of weldments for which each is specifically qualified.

1.6.7 Field Verification

Prior to the preparation of drawings and fabrication, verify location of roof framing, roof openings and penetrations, and any other special conditions. Indicate all special conditions and measurements on final shop drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle preformed panels, bulk roofing products and other manufactured items in a manner to prevent damage or deformation.

1.7.1 Delivery

Provide adequate packaging to protect materials during shipment. Do not uncrate materials until ready for use except for inspection. Immediately upon arrival of materials at jobsite, inspect materials for damage, dampness, and staining. Replace damaged or permanently stained materials that cannot be restored to like-new condition with new material. If materials are wet, remove moisture, restack and protect panels until used.

1.7.2 Handling

Handle material carefully to avoid damage to surfaces, edges and ends.

1.7.3 Storage

Stack materials stored on the site on platforms or pallets and cover with tarpaulins or other suitable weathertight coverings which prevent water trapping or condensation. Store panels so that water which might have accumulated during transit or storage will drain off. Do not store the panels in contact with materials that might cause staining, such as mud, lime, cement, fresh concrete or chemicals. Protect stored panels from wind damage.

1.8 Warranty

Furnish manufacturer's no dollar limit materials and workmanship warranty for the roofing system. The warranty period shall be not less than 30 years from the date of Government acceptance of the work. The warranty shall be issued directly to the Government. The warranty shall provide that if within the warranty period the metal roofing system becomes non-watertight or shows evidence of corrosion, perforation, peeling paint, rupture or excess weathering due to deterioration of the roofing system resulting from defective materials or workmanship the repair or replacement of the defective materials and correction of the defective workmanship shall be the responsibility of the roofing system manufacturer. Repairs that become necessary because of defective materials and workmanship while roofing is under warranty shall be performed within 7 days after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the manufacturer. Contractor shall also provide a 30 year contractor installation warranty. Provide coverage for damage to the roofing system caused by sustained winds having a velocity of: 130 mph or less.

1.8.1 Applications over existing structures

130 mph or less.

1.8.2 New construction

150 mph or less.

PART 2 PRODUCTS

2.1 ROOFING PANELS

2.1.1 Material

3004 aluminum, ASTM B209M ASTM B209 and AA ADM1.

2.1.1.1 Thickness

1.0 mm 0.040 inch minimum.

2.1.1.2 Finish

Exposed Coil-Coated Finish: 2-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Manufacturers' approved applicator to prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
Coating system shall provide nominal 1.0 mil (0.025 mm) dry film thickness, consisting of primer and color coat.

Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

2.1.1.3 Texture

Smooth with raised intermediate ribs for added stiffness.

2.1.1.4 Color

As selected from the Manufacturer full array of offered colors and textures.

2.1.1.5 Configuration

a. Provide panels of continuous lengths from ridge to eaves or from top to eaves on shed roof designs. Panels from coil stock shall be formed without warping, waviness or ripples not a part of the panel profile, and shall be free of damage to the finish coating system.

b. Provide panels with UNLIMITED thermal movement.

c. Profile: 2 3/8" high seam at 16" o.c.; mechanically seamed "T" seam; continuous length, no splicing; Concealed 16 GA one piece stainless steel clip not to come in contact with seam sealant.

d. Panel/Cap configuration must have a total of four (4) layers of aluminum surrounding anchor clip for prevention of water infiltration and increased system strength deisgned to limit potential for panel blow-off.

e. Profile of panel shall have mesas every two (2) inches on center continuous throughout the panel which are a minimum of one and one half (1-1/2) inches wide.

f. Seam must be two and three-eighths (2 3/8) inches minimum height for added upwared pressures and aesthetic appeal. Seam shall have continuous

anchor reveals to allow anchor clips to resist positive and negative loading and allow unlimited expansion and contraction of panels due to thermal changes. Integral (not mechanically sealed) seams are unacceptable.

g. Seam cap: Snap on cap shall be a minimum of 1" wide "T" shaped of continuous length up to forty five (45) feet according to job conditions and field seamed by means of manufacturer's standard seaming machine.

h. Cap shall be designed to receive two (2) heads of continuous hot applied gasketing sealant, which will be applied independent of of anchor clip, to allow unlimited thermal movement of panel without serious damage to cap sealant.

i. Stiffening ribs : Located in flat of panel to minimize oil canning and telegraphing of structural members.

j. Replaceability: Panels shall be of a symmetical design with snap on, mechanically seamed cap configuration such that individual panels may be removable for replacement without removing adjacenet panels and uncrimping the existing seam (Panels will be removed by replacing the batten seam cap only to maintain the structural integrity of the panel and seam. Uncrimping and recrimping a mechanical seam is unacceptable.

k. Panel ends shall be panned at ridge, headwall, and hip conditions, or where applicable.

l. Panel length: Full length without joints, including bends.

2.2 ATTACHMENT CLIPS

Series 300 non-magnetic stainless steel. Provide stainless steel, one piece clips. Size, shape, thickness and capacity must meet the thickness and design load criteria specified. Two piece clips are unacceptable.

2.3 ACCESSORIES

Sheet metal flashings, trim, moldings, closure strips, caps, preformed crickets, equipment curbs, gutters,down spouts, and other similar sheet metal accessories provided in conjunction with preformed metal panels shall be of the same material and finish as panels, except that such items which will be concealed after installation may be provided without the finish if they are aluminum or stainless steel. Provide ridge and rib closures, as specified. Metal shall be of thickness not less than that of panels. Molded closure strips shall be closed-cell synthetic rubber, neoprene, or polyvinyl chloride premolded to match configurations of preformed metal panels. Thermal spacer blocks and other thermal barriers at concealed fasteners shall be as recommended by the roofing panel manufacturer.

2.3.1 Closures

2.3.1.1 Ridge Closure

Metal-clad foam or metal closure with foam secondary closure matching panel configuration for installation on surface of roof panel between panel ribs at ridge and headwall roof panel flashing conditions and terminations. Foam material shall not absorb water.

2.3.1.2 Rib Closure

Aluminum, closed-cell or solid-cell synthetic rubber, neoprene or polyvinyl chloride pre-molded to match configuration of rib opening. Material for closures shall not absorb water.

2.3.2 Fasteners

Series 300 stainless steel with composite metal and neoprene composition washers. Fasteners for attachment to structural supports and fasteners for attachment of panels shall be as approved and in accordance with manufacturer's recommendation. Unless specified otherwise herein, fasteners shall be either self-tapping screws, bolts and nuts, or self-locking bolts. Design fastening system to withstand design loads indicated. Fasteners shall not be over-torqued and shall develop full capacity of attachment clips.

2.3.2.1 Screws

Concealed fasteners: Corrosion resistant steel screws, #10 minimum diameter x length appropriate for substrate, hex washer head or pancake head. Use self-drilling, self-tapping for metal substrate or A-point for plywood substrate.
Exposed fasteners: 3xx series stainless steel screws (cadmium or zinc coatings are not acceptable) with neoprene sealing washer, or 1/8-inch-(3-mm-) diameter stainless steel rivets.

2.3.2.2 Bolts

Provide not less than 6 mm 1/4 inch diameter, shouldered or plain shank as required, with proper nuts.

2.3.2.3 Automatic End-Welded Studs

Provide shouldered type with a shank diameter of not less than 5 mm 3/16 inch and cap or nut for holding covering against the shoulder.

2.3.2.4 Explosive Driven Fasteners

Provide fasteners to be driven with explosive actuated tools and with a shank diameter of not less than 13 mm 1/2 inch for fastening to steel and not less than 25 mm one inch for fastening to concrete.

2.3.2.5 Rivets

Blind rivets shall be aluminum with 5 mm 3/16 inch nominal diameter shank or stainless steel with 3 mm 1/8 inch nominal diameter shank. Rivets shall be threaded stem type if used for other than fastening trim. Rivets with hollow stems shall have closed ends.

2.3.3 Sealant

Elastomeric type containing no oil or asphalt. Exposed sealant shall cure to a rubberlike consistency. Concealed sealant shall be the non-hardening type. Seam sealant shall be factory-applied, non-skinning, non-drying, and shall conform to the roofing manufacturer's recommendations.

Silicone-based sealants shall not be used in contact with finished metal panels and components unless approved otherwise by the Contracting Officer.

2.3.4 Sealant Tape

Polyvinyl chloride closed cell foam tape or composed of 99 percent solids in a base of butyl polyisobutylene rubber with the following properties and characteristics:

a. Webbing and Elongation: 100 percent minimum at 25 degrees C 77 degrees F

b. Adhesion: Excellent to surfaces used

c. U-V light exposure: No effect

d. Ozone: No effect

e. Weathering: 1000 hours in QUV Test Apparatus - Excellent, no cracking, bleeding, or significant changes.

f. Moisture Transmission: 0.05 to 0.15 grams per 62500 square mm 100 square inches in 24 hours.

g. Service Temperature Tests: Bending over 13 mm 1/2 inchmandrel at minus 50 degrees C minus 60 degrees F with no cracking. Expose sealed typical metal lap joint to plus 176 degrees C plus 350 degrees F for 24 hours with no significant loss of original properties.

h. Reaction to Metals: Non-corrosive to metals

2.4 UNDERLAYMENT FOR WOOD SUBSTRATES

Apply Self-adhering rubberized asphaltic membrane over the entire roof area. Minimum of 1 mm 40 mils thick, high temperature as recommended by the standing seam manufacturer for use over entire roof and flashing conditions. Products shall meet or exceed the performance criteria of ASTM D1970/D197M.

2.5 LABORATORY TESTS FOR PANEL FINISH

Previously manufactured panels of the same type and finish as proposed for the project shall have been tested by an approved testing laboratory to ensure conformance to specifications. The term "appearance of base metal" refers to the aluminum base metal. Panels shall meet the following test requirements.

2.5.1 Salt Spray Test

Panels shall withstand a salt spray test for a minimum of 1000 hours in accordance with ASTM B117, including the scribe requirement in the test. Immediately upon removal of the panel from the test, coating shall receive a rating of 10, no blistering, as determined by ASTM D714; and a rating of 7, 2 mm 1/16 inch failure at scribe, as determined by ASTM D1654, Rating Schedule No. 1.

2.5.2 Formability Test

For formability test, when subjected to a 180 degree bend over a 3 mm 1/8 inch diameter mandrel in accordance with ASTM D522, exterior coating film shall show only microchecking of the exterior film and there shall be no loss of adhesion.

2.5.3 Accelerated Weathering Test

Panels shall withstand an accelerated weathering test for a minimum of 2000 hours in accordance with ASTM G152, ASTM G153 or ASTM D2565 without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Protective coating that can be readily removed from the base metal with a penknife blade or similar instrument shall be considered to indicate loss of adhesion.

2.5.4 Chalking Resistance

After the 2000-hour weatherometer test, exterior coating shall not chalk greater than No. 8 rating when measured in accordance with ASTM D4214 test procedures.

2.5.5 Abrasion Resistance Test for Color Coating

When subjected to the falling sand test in accordance with ASTM D968, coating system shall withstand a minimum of 100 liters of sand per 0.025 mm mil of coating thickness before appearance of base metal.

2.5.6 Humidity Test

When subjected to a humidity cabinet test in accordance with ASTM D2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage, or corrosion.

2.5.7 Fire Hazard

The finish on factory-fabricated panels shall have a flame spread rating of not more than 25 when tested in accordance with ASTM E84.

2.5.8 Gloss

The gloss of the finish shall be 30 plus or minus 5 at an angle of 60 degrees, when measured in accordance with ASTM D523.

2.5.9 Glare Resistance

Surfaces of panels that will be exposed to the exterior shall have a specular reflectance of not more than 10 when measured in accordance with ASTM D523 at an angle of 85 degrees. Requirements specified under "Formability Test" will be waived if necessary to conform to this requirement.

2.6 LINER PANELS

Fabricate liner panels of the same material as roof panels, and formed or patterned to prevent waviness and distortion. Liner panels shall have a factory applied, 0.025 mm one mil thick minimum painted coating on the inside face, and a prime coat on the liner side.

2.7 Retrofit Framing Over Existing Roofs

2.7.1 Shop Drawings

Show roof framing system with accessories in plan, sections and details. Include complete drawing/description of each framing component and fastener, including metal thickness and finishes, connection details, anchorage details, and special fabrication provisions. Indicate relationships with adjacent and interfacing work. Indicate fastener types and spacing; and provide fastener pullout values.

2.7.2 Product Data

Include manufacturer's detailed material and system description, engineering performance data and finish specifications. Indicate fastener types and spacing; and required fastener pullout values.

2.7.3 Design Loads

Submit copy of manufacturer's minimum design load calculations according to ASCE 7. All loading types shall be considered: dead, live, snow, wind, and seismic.

2.7.4 System Certification

Provide statement certifying the proposed system's capacity to safely resist the calculated design loads. Statement shall be provided by a registered professional engineer and co-signed by an officer of the manufacturing company.

2.7.5 Warranties

Owner shall receive one (1) warranty from manufacturer of each roof framing system covering all of the following criteria. Ten (10) year material coverage. Warranty shall commence on date of substantial completion.
Owner shall receive one (1) warranty from the installer of the roof framing systems covering installation and workmanship for a period of three (3) years from date of substantial completion.

2.7.6 Notched Purlin Type Framing System

Shall be 16 gauge minimum galvanized steel meeting all requirements of STM A653, Grade 33 (minimum) with a hot dipped galvanized coating per ASTM A924, class G90.
Notched purlin profile shall be a stiffened zee shape with notched bottom flange and web to match the profile of the existing metal panel. The top flange shall be one and three quarters (1 ¾) inch wide (minimum) to provide for attachment of the standing seam panel clips.
The web height of the notched purlin shall be as required for installation over the existing metal panels, and to accomplish the panel lap detail for replacement standing seam roof panels as detailed on drawings.t

2.7.7 Framing System Installation

Install notched purlin type framing system over existing standing seam roof panels. Locate new framing directly above existing purlin locations, per manufacturer's recommendations.
All details will be shown on manufacturer's shop drawings; install framing

system in accordance with approved shop drawings and manufacturer's product data, within specified erection tolerances.
Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and components.
Limit exposed fasteners to extent indicated on shop drawings.
Attach framing system to existing roof structure using fasteners of size and spacing as determined by manufacturer's design analysis to resist all specified design loads.
Installed system shall be true to line and plane and free of dents, and physical defects.
Maximum variation from true planes or lines shall be one quarter (1/4) inch in twenty (20) feet and three eighths (3/8) inch in forty (40) feet or more. Remove damaged work and replace with new, undamaged components.
Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish. Remove all miscellaneous materials and debris from roof.

2.8 Standing Seam System over existing Roof Shingles

2.8.1 Demolition

Demolish all the roofing system to the existing substrate, including but not limited to shingles, asphalt paper, flashing, ridge caps, gutters, downspouts, fascia, etc.

2.8.2 Repair existing substrate

Remove all substrate items (Tongue and grove wood boards - Field Verify) that are damaged and / or are not structuraly sound. Match existing materials, shapes and thicknesses.

2.8.3 Re-Deck

Install over the entire existing substrate one layer of 5/8" thick CDX plywood. Fasten as necessary per engineering design.

PART 3 EXECUTION

3.1 EXAMINATION

Examine surfaces to receive standing seam metal roofing and flashing. Provide plumb and true surfaces, clean, even, smooth and as dry as possible. Ensure that surfaces are free from defects and projections which might affect the installation. Report unsuitable conditions to Contracting Officer.

3.2 PROTECTION OF DISSIMILAR METALS

Where an aluminum component is in contact with, fastened to, or contacted by drainage from dissimilar metals other than stainless steel, give such dissimilar metals one of the following treatments:

a. A heavy brush coat of primer followed by two coats of aluminum metal

and masonry paint.

b. A heavy coat of alkali-resistant bituminous paint.

c. Separate contact surfaces with non-absorptive tape or gasket.

3.2.1 Contact with Masonry

Where aluminum is in contact with masonry, concrete, or plaster, apply a heavy coat of alkali-resistant bituminous paint.

3.2.2 Contact with Wood

Where aluminum is in contact with wood or other absorptive material subject to wetting, or with wood treated with a preservative not compatible with aluminum, seal joints with sealing compound and apply one heavy brushcoat of aluminum pigmented bituminous paint.

3.3 INSTALLATION

Install in accordance with approved manufacturer's erection instructions shop drawings, and diagrams, except as specified otherwise herein. Provide panels in full and firm contact with clips. Obtain approval prior to installation on prefinished panels cut in the field, and factory applied coverings or coatings that were repaired after being abraded or damaged during handling or installation. Make repairs with material of same color as weather coating. Completely seal openings through panels. Correct defects or errors in materials in an approved manner. Replace materials which cannot be corrected in an approved manner with new materials. Provide molded closure strips where indicated and where necessary for weathertight construction. [Use shims as required to ensure clip line is true.] Use a spacing gage at each row of panels to ensure that panel width is not stretched or shortened. [Provide one layer of asphalt-saturated felt placed perpendicular to roof slope covered by one layer of rosin-sized building paper placed parallel to roof slope with side laps down slope and attached with roofing nails. Overlap side end laps 75 mm 3 inches, offset seams in building paper with seams in felt.]

3.3.1 Roof Panels

Apply roofing panels with standing seams parallel to slope of roof. Provide roofing panels in full lengths from ridge to eaves (top to eaves on shed roofs), with no transverse joints except at the junction of ventilators, curbs, skylights, chimneys, and similar openings. Form interlocking rib type panel seams in the field with an automatic mechanical seamer approved by the manufacturer. Attach panels to structure with concealed clips which are incorporated into the panel seams. Clip attachment shall allow roof to move freely and independently of the structure, except at fixed points as indicated.
All "Curving, S-Curbing, and Tapering" shall be mechanically done only. Curved panels must be mechanically factory curved to the exact radius of each curved roof area. Tapered panels must be formed from a single piece of metal. Performance tests must be applicable for the greatest panel width. Any other method shall not be allowed.
Provide Manufacturer's methods for lifting of large panels to prevent panel deformation during its installation. Use manufacturer's spreader bar where applicable to prevent kinking and damage to panels. Field formed panels shall be done with the same factory machinery and methods. For projects

requiring field forming (i.e. if panel length exceeds 80'), the manufacturer must use the same equipment used in factory to form the panels onsite. Manufacturer must engage a factory authorized service representative to form the panels onsite.

3.3.2 Flashings

Provide flashing and related closures and accessories in connection with preformed metal panels [as indicated] and as necessary to provide a weathertight installation. Install flashing to ensure positive water drainage away from roof penetrations. Flash and seal roof at ridge, eaves and rakes, at projections through roof, and elsewhere as necessary. Accomplish placement of closure strips, flashing, and sealing material in an approved manner that will ensure complete weathertightness. Details of installation which are not indicated shall be in accordance with the NRCA Details, SMACNA 1793, AA ASM-35, panel manufacturer's printed instructions and details of the approved shop drawings. Installation shall allow for expansion and contraction of flashing.

3.3.3 Flashing Fasteners

Fastener spacings shall be in accordance with the panel manufacturer's recommendations and as necessary to withstand the indicated design loads. Install fasteners in roof valleys as recommended by the manufacturer of the panels. Install fasteners in straight lines within a tolerance of 13 mm 1/2 inch in the length of a bay. Drive exposed penetrating type fasteners normal to the surface and to a uniform depth to seat gasketed washers properly and drive so as not to damage factory applied coating. Exercise extreme care in drilling pilot holes for fastenings to keep drills perpendicular and centered. Do not drill through sealant tapes. After drilling, remove metal filings and burrs from holes prior to installing fasteners and washers. Torque used in applying fasteners shall not exceed that recommended by the manufacturer. Remove panels deformed or otherwise damaged by over-torqued fastenings, and provide new panels.

3.3.4 Closure/Closure Strips

Set closure/closure strips in joint sealant material.

3.4 CLEANING

Clean exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from roofs on completion to prevent discoloration and harm to the panels and flashing. Remove grease and oil films, excess sealants handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks.

3.5 MANUFACTURER'S FIELD INSPECTION

Manufacturer's technical representative shall visit the site as necessary during the installation process to assure panels, flashings, and other components are being installed in a satisfactory manner. Manufacturer's technical representative shall perform a field inspection during the first 20 squares of roof panel installation and at substantial completion prior to issuance of warranty, as a minimum, and as otherwise requested by the Contracting Officer. Additional inspections shall not exceed one for each

100 squares of total roof area with the exception that follow-up inspections of previously noted deficiencies or application errors shall be performed as requested by the Contracting Officer. Each inspection visit shall include a review of the entire installation to date. After each inspection, a report, signed by the manufacturer's technical representative, shall be submitted to the Contracting Officer noting the overall quality of work, deficiencies and any other concerns, and recommended corrective actions in detail. Notify Contracting Officer a minimum of 2 working days prior to site visit by manufacturer's technical representative.

3.6 COMPLETED WORK

Completed work shall be plumb and true without oil canning, dents, ripples, abrasion, rust, staining, or other damage detrimental to the performance or aesthetics of the completed roof assembly.

3.7 INFORMATION CARD

For each roof, provide a typewritten card, laminated in plastic and framed for interior display or a photoengraved 0.8 mm thick 0.032 inch thick aluminum card for exterior display. Card to be 220 by 280 mm 8 1/2 by 11 inches minimum and contain the information listed on Form 1 at end of this section. Install card near point of access to roof, or where indicated. Send a photostatic paper copy to [LANTNAVFACENGCOM, Code 1613, 1510 Gilbert Street, Norfolk, VA 23511-2699] [NORTHNAVFACENGCOM, Code 103A, 10 Industrial Highway, Mail Stop #82, Lester, PA 19113-2090] [PACNAVFACENGCOM, Code 102, Pearl Harbor, HI 96860-7300] [SOUTHNAVFACENGCOM, Code 0535, P.O. Box 190010, North Charleston, SC 29419-9010] [SOUTHWESTNAVFACENGCOM, Code 133SB, 1220 Pacific Highway, San Diego, CA 92132-5190].

3.8 SCHEDULE

Some metric measurements in this section are based on mathematical conversion of English unit measurements, and not on metric measurement commonly agreed to by the manufacturers or other parties. The English and metric units for the measurements shown are as follows:

PRODUCTS	ENGLISH UNITS	METRIC UNITS
a. Sheet Aluminum	0.040 inch	1.0 mm
b. Panels	12 inches	300 mm
- vertical legs	2 inches	50 mm
- stiffening ribs	4 inches	100 mm
c. Screws	No. 14	0.242 mm
	No. 12	0.216 mm
d. Bolts	1/4 inch	6 mm
e. Studs	3/16 inch	1/2

SECTION 08 91 00

METAL WALL LOUVERS
05/11 MCBCL 27SEP2018

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)

AMCA 500-D	(2012) Laboratory Methods of Testing Dampers for Rating
AMCA 511	(2010) Certified Ratings Program for Air Control Devices

ALUMINUM ASSOCIATION (AA)

AA DAF45	(2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 2603	(2015) Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
AAMA 2604	(2013) Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
AAMA 2605	(2013) Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
AAMA 611	(2014) Voluntary Specification for Anodized Architectural Aluminum

ASTM INTERNATIONAL (ASTM)

ASTM A1008/A1008M	(2016) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
ASTM A653/A653M	(2015; E 2016) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or

	Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B209M	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B221M	(2013) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Wall louvers, including material specification, size thickness and dimensions of each product, and method of installation and attachment, matching the tested installation. Calculations veryfing the anchor system of the louver to the structure. Provide testing laboratory cetrifications.

SD-03 Product Data

Metal Wall Louvers

SD-04 Samples

Wall louvers

1.3 DELIVERY, STORAGE, AND PROTECTION

Deliver materials to the site in an undamaged condition. Carefully store materials off the ground to provide proper ventilation, drainage, and protection against dampness. Louvers shall be free from nicks, scratches, and blemishes. Replace defective or damaged materials with new.

1.4 DETAIL DRAWINGS

Show all information necessary for fabrication and installation of wall louvers. Indicate materials, sizes, thicknesses, fastenings, and profiles.

1.5 COLOR SAMPLES

Colors of finishes for wall louvers shall closely approximate colors indicated. Where color is not indicated, submit the manufacturer's standard colors to the Contracting Officer for selection.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Galvanized Steel Sheet

ASTM A653/A653M, coating designation Z275 G90.

2.1.2 Aluminum Sheet

ASTM B209M ASTM B209, alloy 3003 or 5005 with temper as required for forming.

2.1.3 Extruded Aluminum

ASTM B221M ASTM B221, alloy 6063-T5 or -T52.

2.1.4 Stainless Steel

Type 302 or 304, with 2B finish.

2.1.5 Cold Rolled Steel Sheet

ASTM A1008/A1008M, Class 1, with matte finish. Use for interior louvers only.

2.2 METAL WALL LOUVERS

Weather resistant type, stationary louvers with horizontally mounted drainable blades. Miami-Dade County Protocols Compliance: TAS-201 Large and Small Missile Impact Test. TAS-202 Uniform Static Air Pressure Test. TAS-203 Cyclic Wind Pressure Test - Maximum Design Pressure Rating +/- 120 psf (5.75 kPa). Provide with weather resistant type, with bird screens and made to withstand the stated wind loads. Wall louvers shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500-l. The rating shall show a water penetration of 0.10 or less ounce per square foot of free area at a free velocity of 366 meters 1200 feet per minute.

2.2.1 Extruded Aluminum Louvers

Frame: Frame Depth: 6 inches (152 mm), nominal. Wall Thickness: 0.081 inch (2.1 mm), nominal. Material: Extruded aluminum, Alloy 6063-T6. Blades: Style: Drainable, horizontally mounted. Wall Thickness: 0.081 inch (2.1 mm), nominal. Material: Extruded aluminum, Alloy 6063-T6. Minimum Assembly Size: 12 inches wide by 12 inches high (305 mm x 305 mm). Maximum factory assembly size: 88" x 120" (2236 x 3048). Maximum field assembly size: Unlimited width by 120" (3048) high. Unlimited height by 88 (2236) width in vertical configuration.

2.2.2 Seismic Loads

Louvers shall be factory engineered to withstand the specified seismic loads. Minimum design loads shall be calculated to comply with ASCE - 7, or l

2.2.3 Mullions and Mullion Covers

Same material and finish as louvers. Provide mullions where indicated for all louvers more than 1500 mm 5 feet in width at not more than 1500 mm 5 feet on centers. Provide mullions covers on both faces of joints between louvers.

2. Aluminum Blank-Off Panels: 0.040 (1 mm) aluminum sheet, factory installed with removable fasteners and neoprene gaskets.
Insulated Aluminum Blank-Off Panels: 0.040 (1 mm) aluminum sheet, 1 inch (25 mm) aluminum skin insulated core, factory installed with removable fasteners and neoprene gaskets.
Insulated Aluminum Blank-Off Panels: 0.040 (1 mm) aluminum sheet, 2 inch (51 mm) aluminum skin insulated core, factory installed with removable fasteners and neoprene gaskets.
Aluminum Filter Racks: Formed channel racks to accept standard thick filters. Unused bottom portion blanked off with 0.040 inch (1 mm) aluminum sheet. Filter: 1 inch (25 mm) thick. Filter: 2 inch (51 mm) thick.
Security Bars: Location: Front. Location: Rear. Construction: Aluminum, 3/4 inch x 1/2 inch (19 mm x 13 mm), welded to louver.
Bird Screen: Aluminum: Aluminum, 5/8 inches by 0.040 inch (16 mm by 1 mm), expanded and flattened. Aluminum: Aluminum, 1/2 inch mesh x 0.063 inch (13 mm mesh x 1.6 mm), inter-crimp. Frame: Removable. Re-wirable.
Insect Screens: Aluminum: 18-16 mesh, mill finish, .011 inch (0.3 mm) wire. Frame: Aluminum.
Extended Sills: Extruded aluminum, Alloy 6063-T6. Minimum nominal thickness 0.060 inch (1.5 mm). Formed Aluminum, Alloy 3003. Minimum nominal thickness 0.081 inch (2.1 mm).

2.3 FASTENERS AND ACCESSORIES

Provide stainless steel screws and fasteners for aluminum louvers and zinc-coated or stainless steel screws and fasteners for steel louvers. Provide other accessories as required for complete and proper installation.

2.4 FINISHES

2.4.1 Aluminum

Exposed aluminum surfaces shall be factory finished with an anodic coating. Color shall be. Louvers for each building shall have the same finish.

2.4.1.1 Anodic Coating

Clean exposed aluminum surfaces and provide an anodized finish conforming to AA DAF45 and AAMA 611. Finish shall be:

b. Architectural Class I (0.0175 mm 0.7 mil or thicker), designation AA-M10-C22-A44, electrolytically deposited color anodized.

2.4.1.2 Organic Coating

Clean and prime exposed aluminum surfaces. Provide a high-performance finish in accordance with AAMA 2605 with total dry film thickness of not less than 0.03 mm 1.2 mil, color as selected.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Wall Louvers

Install using stops or moldings, flanges, strap anchors, or jamb fasteners as appropriate for the wall construction and in accordance with manufacturer's recommendations.

3.1.2 Door Louvers

Install louvers in wood doors by using metal "Z" or "L" moldings. Fasten moldings to door with screws.

3.1.3 Screens and Frames

Attach frames to louvers with screws or bolts.

3.2 PROTECTION FROM CONTACT OF DISSIMILAR MATERIALS

3.2.1 Copper or Copper-Bearing Alloys

Paint copper or copper-bearing alloys in contact with dissimilar metal with heavy-bodied bituminous paint or separate with inert membrane.

3.2.2 Aluminum

Where aluminum contacts metal other than zinc, paint the dissimilar metal with a primer and two coats of aluminum paint.

3.2.3 Metal

Paint metal in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.2.4 Wood

Paint wood or other absorptive materials that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

-- End of Section --

SECTION 23 05 93.00 22

TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS
09/19

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACOUSTICAL SOCIETY OF AMERICA (ASA)

ASA S1.11 PART 1	(2014) American National Standard Electroacoustics – Octave-Band and Fractional-Octave-Band Filters – Part 1: Specifications
ASA S1.4	(1983; Amendment 1985; R 2006) Specification for Sound Level Meters (ASA 47)

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA)

AMCA 203	(1990; R 2011) Field Performance Measurements of Fan Systems

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 62.1	(2010) Ventilation for Acceptable Indoor Air Quality
ASHRAE HVAC APP IP HDBK	(2015) HVAC Applications Handbook, I-P Edition
ASHRAE HVAC APP SI HDBK	(2015) HVAC Applications Handbook, SI Edition

ASSOCIATED AIR BALANCE COUNCIL (AABC)

AABC MN-1	(2016; 7th ed) National Standards for Total System Balance

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

RCBEA GUIDE	(2004) NASA Reliability Centered Building and Equipment Acceptance Guide

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB MASV	(2006) Procedural Standards for Measurements and Assessment of Sound and Vibration

NEBB PROCEDURAL STANDARDS	(2015) Procedural Standards for TAB (Testing, Adjusting and Balancing) Environmental Systems

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1780	(2002) HVAC Systems - Testing, Adjusting and Balancing, 3rd Edition
SMACNA 1858	(2004) HVAC Sound And Vibration Manual - First Edition
SMACNA 1972 CD	(2012) HVAC Air Duct Leakage Test Manual - 2nd Edition

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 82	Protection of Stratospheric Ozone

1.2 DEFINITIONS

a. AABC: Associated Air Balance Council

b. COTR: Contracting Officer's Technical Representative

c. DALT: Duct air leakage test

d. DALT'd: Duct air leakage tested

e. Duct System: When applied to DALT, this phrase means "complete duct system", inclusive of all ductwork, plenums, mains, branches, fittings and duct-mounted components and appurtenances, e.g. manual balancing dampers, control dampers, access doors, fire dampers, duct-mounted coils, etc. up to, but excluding air-handling equipment (e.g. AHUs, DOAUs, ERUs, VAVs) and flexible duct.

f. HVAC: Heating, ventilating, and air conditioning; or heating, ventilating, and cooling

g. NEBB: National Environmental Balancing Bureau

h. Out-of-tolerance data: Pertains only to field acceptance testing of Final DALT or TAB report. When applied to DALT work, this phrase means "a leakage rate measured during DALT field acceptance testing which exceeds the leakage rate allowed by Appendix D REQUIREMENTS FOR DUCT AIR LEAK TESTING." When applied to TAB work this phrase means "a measurement taken during TAB field acceptance testing which does not comply with the requirements indicated in the paragraph WORKMANSHIP."

i. Season of maximum heating load: The time of year when the outdoor temperature at the project site remains within plus or minus 11.1 degrees Celsius plus or minus 20 degrees Fahrenheit of the project site's winter outdoor design temperature, throughout the period of TAB data recording.

j. Season of maximum cooling load: The time of year when the outdoor

temperature at the project site remains within plus or minus 3 degrees Celsius plus or minus 5 degrees Fahrenheit of the project site's summer outdoor design temperature, throughout the period of TAB data recording.

k. Season 1, Season 2: Depending upon when the project HVAC is completed and ready for TAB, Season 1 is defined, thereby defining Season 2. Season 1 could be the season of maximum heating load, or the season of maximum cooling load.

l. Sound measurements terminology: Defined in AABC MN-1, NEBB MASV, or SMACNA 1858 (TABB).

m. TAB: Testing, adjusting, and balancing

n. TAB'd: Testing/Adjusting/Balancing procedures performed

o. TAB Agency: TAB Firm
p. TABB: Testing Adjusting and Balancing Bureau

1.2.1 Similar Terms

In some instances, terminology differs between the Contract and the TAB Standard primarily because the intent of this Section is to use the industry standards specified, along with additional requirements listed herein to produce optimal results.

The following table of similar terms is provided for clarification only. Contract requirements take precedent over the corresponding AABC, NEBB, or TABB requirements where differences exist.

SIMILAR TERMS

Contract Term	AABC Term	NEBB Term	TABB Term
TAB Standard	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems	Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems	HVAC Systems Testing, Adjusting, and Balancing
TAB supervisor or Team Supervisor	TAB Engineer	TAB Supervisor	TAB Supervisor
Systems Readiness Check	Construction Phase Inspection	Field Readiness Check & Preliminary Field Procedures	Field Readiness Check & Prelim. Field Procedures

1.3 WORK DESCRIPTION

The work includes duct air leakage testing (DALT) and testing, adjusting, and balancing (TAB) of [new][and existing] heating, ventilating, and cooling (HVAC) air[and water] distribution systems including equipment and performance data, ducts, and piping which are located within, on, under, between, and adjacent to buildings.

Perform TAB in accordance with the requirements of the TAB procedural standard recommended by the TAB trade association that approved the TAB Firm's qualifications. Comply with requirements of AABC MN-1, NEBB PROCEDURAL STANDARDS, or SMACNA 1780 (TABB) as supplemented and modified by this specification section. All recommendations and suggested practices contained in the TAB procedural standards are considered mandatory.

Conduct DALT and TAB of the indicated existing systems and equipment and submit the specified DALT and TAB reports for approval. Conduct DALT testing in compliance with the requirements specified in SMACNA 1972 CD, except as supplemented and modified by this section. Conduct DALT and TAB work in accordance with the requirements of this section.

1.3.1 Air Distribution Systems

Test, adjust, and balance (TAB) system[s] in compliance with this section. Obtain Contracting Officer's written approval before applying insulation to exterior of air distribution systems as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

1.3.2 Water Distribution Systems

TAB system[s] in compliance with this section. Obtain Contracting Officer's written approval before applying insulation to water distribution systems as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS. At Contractor's option and with Contracting Officer's written approval, the piping systems may be insulated before systems are TAB'd.

Terminate piping insulation immediately adjacent to each flow control valve, automatic control valve, or device. Seal the ends of pipe insulation and the space between ends of pipe insulation and piping, with waterproof vapor barrier coating.

After completion of work under this section, insulate the flow control valves and devices as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

1.3.3 Domestic Hot Water Distribution Systems

TAB system[s] in compliance with this section. Obtain Contracting Officer's written approval before applying insulation to water distribution systems as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS. At Contractor's option and with Contracting Officer's written approval, the piping systems may be insulated before systems are TAB'd.

Terminate piping insulation immediately adjacent to each flow control valve, automatic control valve, or device. Seal the ends of pipe insulation and the space between ends of pipe insulation and piping, with

waterproof vapor barrier coating.

After completion of work under this section, insulate the flow control valves and devices as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

1.3.4 Related Requirements

Requirements for price breakdown of HVAC TAB work are specified in Section 01 20 00.05 20 PRICE AND PAYMENT PROCEDURES FOR DESIGN-BUILD.

Requirements for construction scheduling related to HVAC TAB work are specified in Section 01 32 17.00 20 COST LOADED NETWORK ANALYSIS SCHEDULES (NAS).

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Reports of Existing Conditions; G

Independent TAB Agency and Personnel Qualifications; G

Pre-Field Engineering Report; G

SD-06 Test Reports

Completed Pre-Final DALT Report; G

Certified Final DALT Report; G

Certified Final TAB Report for Proportional Balancing; G

Certified Final TAB Report for Season 1; G

Certified Final TAB Report for Season 2; G

SD-07 Certificates

Independent TAB Agency and Personnel Qualifications; G

Advance Notice of Pre-Final DALT Field Work; G

Advance Notice of TAB Field Work for Proportional Balancing; G

Advance Notice of TAB Field Work for Season 1; G

Advance Notice of TAB Field Work for Season 2 G

1.5 QUALITY ASSURANCE

1.5.1 Independent TAB Agency and Personnel Qualifications

To secure approval for the proposed agency, submit information certifying that the TAB agency is a first tier subcontractor who is not affiliated with any other company participating in work on this contract, including design, furnishing equipment, commissioning, or construction. Further, submit the following, for the agency, to Contracting Officer for approval:

a. Independent AABC or NEBB or TABB TAB agency:

TAB agency: AABC registration number and expiration date of current certification; or NEBB certification number and expiration date of current certification; or TABB certification number and expiration date of current certification.

b. TAB Agency Team Members

TAB agency employees approved to accomplish work on this contract must be permanent employees of the TAB agency. No other personnel are allowed to perform TAB work on this contract.

TAB team supervisor: Name and copy of AABC or NEBB or TABB TAB supervisor certificate and expiration date of current certification.

TAB team field leader: Name and copy of AABC or NEBB or TABB TAB certificate, and documented evidence, including a list of projects, roles performed, and associated dates, that the team field leader has satisfactorily performed full-time supervision of TAB work in the field for not less than 3 years immediately preceding this contract's bid opening date.

TAB team field technicians: Names and documented evidence, including a list of projects, roles performed, and associated dates, that each field technician has satisfactorily assisted a TAB team field leader in performance of TAB work in the field for not less than one year immediately preceding this contract's bid opening date.

Current certificates: Registrations and certifications are current, and valid for the duration of this contract. Renew Certifications which expire prior to completion of the TAB work, in a timely manner so that there is no lapse in registration or certification. TAB agency or TAB team personnel without a current registration or current certification are not to perform TAB work on this contract.

c. Replacement of TAB team members: Replacement of members may occur if each new member complies with the applicable personnel qualifications and each is approved by the Contracting Officer.

1.5.2 TAB Standard

Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1,

NEBB PROCEDURAL STANDARDS, or SMACNA 1780 unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard are considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practical, to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations.

All quality assurance provisions of the TAB Standard such as performance guarantees are part of this contract. For systems or system components not covered in the TAB Standard, TAB procedures must be developed by the TAB Specialist. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are considered mandatory, including the latest requirements of ASHRAE 62.1.

1.5.3 Project/Site Conditions

1.5.3.1 [DALT and]TAB Services to Obtain Existing Conditions

Conduct [DALT and]TAB of the indicated existing systems and equipment and submit the specified [DALT and]TAB reports of existing conditions for approval. Conduct this [DALT and]TAB work in accordance with the requirements of this section.

1.5.4 Sequencing and Scheduling

1.5.4.1 Projects with Phased Construction

This specification section is structured as though the HVAC construction, and thereby the TAB work, will be completed in a single phase. When the construction is completed in phases, the [DALT work and]TAB work must be planned, completed, and accepted for each construction phase.

1.5.4.2 DALT and TAB Submittal and Work Schedule

Comply with requirements specified in Appendix C: DALT AND TAB SUBMITTAL AND WORK SCHEDULE included at the end of this section.

1.5.5 Subcontractor Special Requirements

Perform all work in this section in accordance with the paragraph SUBCONTRACTOR SPECIAL REQUIREMENTS in Section 01 30 00 ADMINISTRATIVE REQUIREMENTS, stating that all contract requirements of this section must be accomplished directly by a first tier subcontractor. No work may be performed by a second tier subcontractor.

1.5.6 Instrument Calibration Certificates

It is the responsibility of the TAB firm to provide instrumentation that meets the minimum requirements of the standard under which the TAB Firm's qualifications are approved for use on a project. Instrumentation must be in proper operating condition and must be applied in accordance with the

instrumentation's manufacturer recommendations.

All instrumentation must bear a valid NIST traceable calibration certificate during field work and during government acceptance testing. All instrumentation must be calibrated within no later than one year of the date of TAB work or government acceptance testing field work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 WORK DESCRIPTIONS OF PARTICIPANTS

Comply with requirements of this section as specified in Appendix A WORK DESCRIPTIONS OF PARTICIPANTS.

3.1.1 PRE-FIELD ENGINEERING REPORT

Comply with the requirements specified in Appendix B REPORTS - DALT and TAB included at the end of this section.

3.2 PRE-DALT/TAB MEETING

Meet with the Contracting Officer's technical representative (COTR)[and the designing engineer of the HVAC systems] to develop a mutual understanding relative to the details of the DALT work and TAB work requirements. Ensure that the TAB supervisor is present at this meeting. Requirements to be discussed include required submittals, work schedule, and field quality control.

3.3 DALT PROCEDURES

3.3.1 Prerequisite for DALT Field Work

Complete the following prior to starting DALT field work:

a. Receive approval of the SD-01 Preconstruction Submittals.

b. Installation and sealing in conformance with Section 23 00 00 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS, except as supplemented and modified by this section, of those duct systems to be DALT'd.

c. All work items and inspections indicated by the TAB Team Supervisor that need to be accomplished before DALT field work can be performed.

d. Furnish the TAB Team Supervisor a copy of the ductwork sheet metal shop or design drawings indicating the completed duct systems available for DALT.

3.3.2 Instruments, Consumables and Personnel

Provide instruments, consumables and personnel required to accomplish the DALT field work. Follow the same basic procedure specified below for TAB Field Work, including maintenance and calibration of instruments,

selection of appropriate instruments to meet the accuracy requirements of measurements, accuracy of measurements, preliminary procedures, field work, workmanship and treatment of deficiencies. Calibrate and maintain instruments in accordance with manufacturer's written procedures.

3.3.3 Advance Notice of Pre-Final DALT Field Work

On completion of the installation of each duct system indicated to be DALT'd, notify the Contracting Officer in writing prior to the COTR's duct selection field visit.

3.3.4 Ductwork To Be DALT'd

All duct systems are subject to DALT including supply, return, outside air, exhaust, and relief with exception of transfer air. From each duct system indicated as subject to DALT, the COTR will randomly select sections of each completed duct system for testing by the Contractor's TAB Firm. The sections selected will not exceed 20 percent of the total measured linear footage of duct systems indicated as subject to DALT. Sections of duct systems subject to DALT will include 20 percent of main ducts, sub-main ducts, branch main ducts, branch ducts and plenums.

It is acceptable for an entire duct system to be DALT'd instead of disassembling that system in order to DALT only the 20 percent portion specified above.

It is acceptable to DALT the entire duct systems for 20 percent of the total quantity of similar units (i.e. WSHPs less than 5 tons cooling capacity, VAVs, and FCUs) instead of testing 20 percent of the linear footage of duct systems for each of these units.

Sealing of all selected duct systems is prohibited, with exception of temporary end caps and connection for test apparatus, from time Contractor is notified of selections until DALT measurements are recorded.

3.3.5 DALT Testing

Perform DALT on the duct sections of each duct system as selected by the COTR. Use the duct class, seal class, leakage class and the leak test pressure data indicated [on the drawings][in Appendix D], to comply with the procedures specified herein and in SMACNA 1972 CD.

In spite of specifications of SMACNA 1972 CD to the contrary, DALT ductwork of construction class of 746 Pa 3-inch water gauge static pressure and below if indicated to be DALT'd. Complete DALT work on the COTR selected ductwork within 48 hours after the particular ductwork was selected for DALT. Separately conduct DALT work for large duct systems to enable the DALT work to be completed in 48 hours.

3.3.6 Completed Pre-Final DALT Report

After completion of the DALT work, prepare a Pre-final DALT Report meeting the additional requirements specified in Appendix B REPORTS - DALT and TAB. Data required by those data report forms shall be furnished by the TAB team. Prepare the report neatly and legibly; the Pre-final DALT report shall provide the basis for the Final DALT Report.

TAB supervisor shall review, approve and sign the Pre-Final DALT Report and submit this report within two days of completion of DALT field work. Verbally notify the COTR that the field check of the Pre-Final DALT Report data can commence.

Further, if any data on the Pre-final DALT report form for a given duct section is out-of-tolerance, report the failure, notify the COTR, and resolve all deficiencies. Repairs shall be applied to similar conditions in all untested duct systems. For each failed duct section, DALT shall be conducted on one additional duct section as selected by the COTR.

3.3.7 Quality Assurance - COTR DALT Field Acceptance Testing

In the presence of the COTR and TAB team field leader, verify for accuracy Pre-final DALT Report data selected by the COTR. For each duct system, this acceptance testing shall be conducted on a maximum of 50 percent of the duct sections DALT'd.

Further, if any Acceptance Testing Measurement for a given duct section is out-of-tolerance, report the failure, and resolve all deficiencies. Repairs shall be applied to similar conditions in all untested duct systems. For each failed duct section, DALT shall be conducted on one additional duct section as selected by the COTR.

3.3.8 Additional COTR Field Acceptance Testing

If any of the duct sections checked for a given system are determined to have a leakage rate measured that exceeds the leakage rate allowed by SMACNA Leak Test Manual for an indicated duct construction class and sealant class, terminate data checking for that section. The associated Pre-final DALT Report data for the given duct system will be disapproved. Make the necessary corrections and prepare a revised Pre-final DALT Report. Reschedule a field check of the revised report data with the COTR.

3.3.9 Certified Final DALT Report

On successful completion of all field checks of the Pre-Final DALT Report data for all systems, the TAB Supervisor shall assemble, review, approve, sign and submit the Final DALT Report in compliance with Appendix B REPORTS - DALT and TAB to the Contracting Officer for approval.

3.4 TAB PROCEDURES

3.4.1 Prerequisite for TAB Field Work

Complete the following prior to starting TAB field work:

a. All DALT field work and obtain approval of the Certified Final DALT Report.

b. All work items and inspections indicated by the TAB Team Supervisor that need to be accomplished before TAB field work can be performed.

c. Enclosure of the building envelope according to the contract documents with final construction completed, the Air Barrier Pressure Test completed, and the Air Leakage Test Reports and Diagnostic Test Reports submitted and approved in accordance with Specification

Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS.

d. Approval of the manufacturer's equipment start-up forms for each piece of equipment to be TAB'd.

e. Prerequisite TAB requirements of Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

3.4.2 TAB Field Work

Provide instruments and consumables required to accomplish the TAB work. Calibrate and maintain instruments in accordance with manufacturer's written procedures.

Test, adjust, and balance systems until measured flow rates (air and water flow) are in compliance with the paragraph WORKMANSHIP. Conduct TAB work, including measurement accuracy, and sound measurement work in conformance with the AABC MN-1 and or NEBB PROCEDURAL STANDARDS and NEBB MASV or SMACNA 1780 (used by TABB), and SMACNA 1858 sound measurement procedures, except as supplemented and modified by this section. The only measurement data which can be deferred until Season 1 and Season 2 is that data which would be affected in terms of accuracy due to outside ambient conditions and is reported in TAB Report for Season 1 and for Season 2. TAB Report for Proportional Balancing may include data for Season 1 when measured within seasonal limitations.

3.4.3 Preliminary Procedures

Use the approved pre-field engineering report, in addition to all applicable requirements within this section, as instructions and procedures for accomplishing TAB field work. TAB engineer is to locate, in the field, test ports required for testing. It is the responsibility of the Contractor to provide and install test ports as required by the TAB engineer.

3.4.4 TAB Air Distribution Systems

3.4.4.1 Air Handling Units

Air handling unit systems including fans (air handling unit fans, exhaust fans and winter ventilation fans), coils, ducts, plenums, mixing boxes, terminal units, variable air volume boxes, and air distribution devices for supply air, return air, outside air, mixed air relief air, and makeup air.

3.4.4.2 Rooftop Air Conditioning

Rooftop air conditioning systems including fans, coils, ducts, plenums, and air distribution devices for supply air, return air, and outside air.

For refrigeration compressors/condensers/condensing units/evaporators, report data as required by NEBB, AABC, and TABB standard procedures, including refrigeration operational data.

3.4.4.3 Heating and Ventilating Units

Heating and ventilating unit systems including fans, coils, ducts, plenums, roof vents, registers, diffusers, grilles, and louvers for supply air, return air, outside air, and mixed air.

3.4.4.4 [Makeup Air][Dedicated Outside Air System][and][Energy Recovery]Units

[Makeup air][Dedicated Outside Air System][and][Energy Recovery]unit systems including fans, coils, ducts, plenums, registers, diffusers, grilles, and louvers for supply air, return air, outside air, and exhaust air.

3.4.4.5 Return Air Fans

Return air fan system including fan ducts, plenums, registers, diffusers, grilles, and louvers for supply air, return air, outside air, and mixed air.

3.4.4.6 Fan Coils

Fan coil unit systems including fans, coils, ducts, plenums, and air distribution devices for supply air, return air, and outside air.

3.4.4.7 Exhaust Fans

Exhaust fan systems including fans, ducts, plenums, grilles, and hoods for exhaust air.

3.4.5 TAB Water Distribution Systems

3.4.5.1 Chilled Water

Chilled water systems including chillers, condensers, cooling towers, pumps, coils, system balance valves and flow measuring devices.

For water chillers, report data as required by AABC, NEBB and TABB standard procedures, including refrigeration operational data.

3.4.5.2 Heating Hot Water

Heating hot water systems including boilers, hot water converters (e.g., heat exchangers), pumps, coils, system balancing valves and flow measuring devices.

3.4.5.3 Dual Temperature Water

Dual temperature water systems including boilers, converters, chillers, condensers, cooling towers, pumps, coils, and system balancing valves, and flow measuring devices.

3.4.5.4 Domestic Hot Water System

Domestic hot water systems including boilers, water heaters, pumps, system balancing valves, and flow measuring devices.

3.4.6 TAB Equipment with Thermal Energy Transfer Components

Perform capacity tests to verify that the thermal energy transfer components, devices, and equipment meet the indicated design capacity. Describe the procedure performed for each test. Water temperatures shall be measured through immersion into fluid stream. Report all design data, actual field measurements, and calculations for all components, devices and equipment below.

3.4.6.1 Units with Coils

Report heating and cooling performance capacity tests for hot water, chilled water, direct-expansion, and steam coils:

a. For units with capacities greater than 26,370 Watts 7.5 tons (90,000 BTU/H) cooling, such as factory manufactured units, central built-up units and rooftop units, determine the apparent air-side coil capacity by calculations utilizing direct measurement of airflow via Pitot tube duct traverse, single point measurements of entering and leaving wet and dry bulb temperatures for cooling capacity and dry bulb temperature only for heating capacity. Calculate water-side coil capacity utilizing direct measurements of water flow rate, and entering and leaving water temperatures. Measure and record coil water pressure drop.

b. For units with capacities of 26370 Watts 7.5 tons (90,000 BTU/H) or less, such as fan coil units, duct mounted reheat coils associated with VAV terminal units, and unitary units, such as through-the-wall heat pumps, determine the apparent air side coil capacity by calculations using single point measurement of entering and leaving wet and dry bulb temperatures for cooling capacity and dry bulb temperature only for heating capacity.

3.4.6.2 Units with Heat Recovery Devices

Report heating and cooling energy recovery performance tests for energy recovery devices (wheels, coils, fixed plate, etc.).

Report total cooling capacity, heating capacity and energy recovery effectiveness. For outside air and exhaust airstreams measure and report airflows, and entering and leaving wet and dry bulb temperatures across heat recovery device. For water-side calculations, utilize direct measurements of water flow rate and entering and leaving water temperatures. Measure and record water pressure drops.

3.4.6.3 Thermal Energy Transfer Equipment

Report heating and/or cooling performance capacity tests for thermal energy transfer equipment (boilers, chillers, cooling towers, etc.) as applicable.

Measure and report water flow rate, water-side pressure drops, and entering and leaving water temperature. Report capacity.

3.4.7 TAB Building Pressure

Record building differential pressure for all sides of the building on each floor where openings exist to obtain differential pressure measurements. Report all system setup parameters affecting building

pressure measurement (e.g. exhaust/relief, outdoor air) and indicate wind speed during time of building pressure measurements. Measure in maximum [and minimum] building systems configuration.

[Record room differential pressure for the following locations: [_____][,_____]. Measurements must occur during system setup as follows: [_____]

3.4.8 Sound Measurement Work

3.4.8.1 Areas To Be Sound Measured

In the following spaces, measure and record the sound power level for each octave band listed in ASHRAE HVAC APP SI HDBK ASHRAE HVAC APP IP HDBK Noise Criteria:

a. All HVAC mechanical rooms, including machinery spaces and other spaces containing HVAC power drivers and power driven equipment.

b. All spaces sharing a common barrier with each mechanical room, including rooms overhead, rooms on the other side of side walls, and rooms beneath the mechanical room floor.

[c. AHU No. 1 System: Rooms: [_____]

][d. [_____] System: Rooms: [_____]

][e. [_____] System: Rooms: [_____]

3.4.8.2 Procedure

Measure sound levels in each room, when unoccupied except for the TAB team, with all HVAC systems that would cause sound readings in the room operating in their noisiest mode. Record the sound level in each octave band. Attempt to mitigate the sound level and bring the level to within the specified ASHRAE HVAC APP SI HDBK ASHRAE HVAC APP IP HDBK noise criteria goals, if such mitigation is within the TAB team's control. State in the report the ASHRAE HVAC APP SI HDBK ASHRAE HVAC APP IP HDBK noise criteria goals. If sound level cannot be brought into compliance, provide written notice of the deficiency to the Contractor for resolution or correction.

3.4.8.3 Timing

Measure sound levels at times prescribed by AABC or NEBB or TABB.

3.4.8.4 Meters

Measure sound levels with a sound meter complying with ASA S1.4, Type 1 or 2, and an octave band filter set complying with ASA S1.11 PART 1. Use measurement methods for overall sound levels and for octave band sound levels as prescribed by NEBB.

3.4.8.5 Calibration

Calibrate sound levels as prescribed by AABC or NEBB or TABB, except that calibrators emitting a sound pressure level tone of 94 dB at 1000 hertz

(Hz) are also acceptable.

3.4.8.6 Background Noise Correction

Determine background noise component of room sound (noise) levels for each (of eight) octave bands as prescribed by AABC or NEBB or TABB.

3.4.9 TAB Work on Performance Tests Without Seasonal Limitations

3.4.9.1 Sound Measurements

Comply with the paragraph SOUND MEASUREMENT WORK, specifically, the requirement that a room must be operating in its noisiest mode at the time of sound measurements in the room. The maximum noise level measurements could depend on seasonally related heat or cooling transfer equipment.

3.4.10 TAB Work on Performance Tests With Seasonal Limitations

3.4.10.1 Performance Tests

In addition to the TAB proportional balancing work on the air distribution systems and the water distribution systems, accomplish TAB work on the HVAC systems which directly transfer thermal energy. TAB the operational performance of the [heating systems] [and] [cooling systems] in accordance with the paragraph TAB EQUIPMENT WITH THERMAL ENERGY TRANSFER COMPONENTS.

3.4.10.2 Season Of Maximum Load

Visit the contract site for at least two TAB work sessions for Season 1 and Season 2 field measures. Visit the contract site during the season of maximum heating load and isit the contract site during the season of maximum cooling load, the goal being to TAB the operational performance of the heating systems and cooling systems under their respective maximum outdoor environment-caused loading. During the seasonal limitations, TAB the operational performance of the heating systems and cooling systems.

3.4.10.3 Ambient Temperatures

On each TAB report form used for recording data, record the outdoor and indoor ambient dry bulb temperature range and the outdoor and indoor ambient wet bulb temperature range within which the report form's data was recorded. Record these temperatures at beginning and at the end of data taking.

3.4.10.4 Sound Measurements

Comply with the paragraph SOUND MEASUREMENT WORK, specifically, the requirement that a room must be operating in its noisiest mode at the time of sound measurements in the room. The maximum noise level measurements could depend on seasonally related heat or cooling transfer equipment.

3.4.11 Workmanship

Conduct TAB work on the HVAC systems until measured flow rates are within plus or minus 5 percent of the design flow rates as specified or indicated on the contract documents. rther, balance air distribution systems until measured outside air flow rates are within plus 10 percent and minus 0

percent of design flow rates and measured exhaust air flow rates are within plus 0 percent and minus 10 percent of design flow rates as specified or indicated on the contract documents, except so not violate code minimum airflow requirements. For air terminals with volumetric flow rates 50 CFM or less, conduct TAB work until measured flow rates are within the greater of: plus 10 or minus 10 percent, or plus 3 CFM or minus 3 CFM. This TAB work includes adjustment of balancing valves, balancing dampers, and sheaves. Further, this TAB work includes changing out fan sheaves and pump impellers if required to obtain air and water flow rates specified or indicated. If, with these adjustments and equipment changes, the specified or indicated design flow rates cannot be attained, contact the Contracting Officer for direction.

Conduct TAB field acceptance testing verifying measured data falls within the range of plus 5 to minus 5 percent of the TAB Report data. Further, verify measured volumetric flow rates for air terminals 50 CFM or less fall within the greater of: plus 10 or minus 10 percent, or plus 3 CFM or minus 3 CFM from design flow rates.

3.4.12 Design/Construction Deficiencies

Strive to meet the intent of this section to maximize the performance of the equipment as designed and installed. However, if deficiencies in equipment design or installation prevent TAB work from being accomplished within the range of design values specified in the paragraph WORKMANSHIP, provide written notice as soon as possible to the Contractor and the Contracting Officer describing the deficiency and recommended correction.

Within 3 working days after the TAB Agency has encountered any design or installation deficiencies, the TAB Supervisor must submit written notification directly to the Contracting Officer, with a separate copy to the Contractor, of all such deficiencies. Provide in this submittal a complete explanation, including supporting documentation, detailing deficiencies. Where deficiencies are encountered that are believed to adversely impact successful completion of:

a. TAB Field Work: the TAB Agency must issue notice and request direction in the notification submittal.

b. COTR TAB Field Acceptance Testing[or Commissioning]: the TAB Agency must issue notice and the Contractor must, within 5 working days of the TAB Agency notice, submit written notification directly to the Contracting Officer, with a separate copy to the TAB Agency, of all such deficiencies, the intended or implemented corrective action, the planned or actual date(s) for completion of each corrective action.

The Contractor must submit notification of construction deficiencies in accordance with the paragraph titled INFORMATION FOR THE CONTRACTING OFFICER in Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL. This notification is in lieu of other notification within this section.

Responsibility for correction of installation deficiencies is the Contractor's. If a deficiency is in equipment design, call the TAB team supervisor for technical assistance. Responsibility for reporting design deficiencies to Contractor is the TAB team supervisor's.

3.4.13 TAB Reports

Additional requirements for TAB Reports are specified in Appendix B REPORTS - DALT and TAB

3.4.14 Quality Assurance - COTR TAB Field Acceptance Testing

3.4.14.1 TAB Field Acceptance Testing

Field acceptance testing of performance capacity data from TAB work with seasonal limitations is to be performed during comparable outdoor conditions as those during the TAB work for the approved Final TAB Report for Season 1 and for Season 2, respectively, as determined by the COTR.

During the field acceptance testing, verify, in the presence of the COTR, random selections of data (water, air quantities, air motion, temperature, pressure[, sound level readings]) recorded in the TAB Report. Points and areas for field acceptance testing are to be selected by the COTR. Measurement and test procedures are the same as required for TAB work for the TAB Report.

Field acceptance testing includes verification of TAB Report data recorded for the following equipment groups:

Group 1: All chillers, boilers, cooling towers, pumps, return fans, computer room units, energy recovery units, and air handling units (rooftop and central stations).

Group 2: 25 percent of the terminal units (e.g.: VAV boxes, water source heat pumps, fan coil units, etc.) and associated diffusers and registers.

Group 3: 25 percent of the supply diffusers, registers, grilles associated with air handling equipment (e.g.: AHUs, water source heat pumps, fan coil units, etc.).

Group 4: 25 percent of the return grilles, return registers, exhaust grilles and exhaust registers.

Group 5: 25 percent of the supply fans and exhaust fans.

3.4.14.2 Additional COTR TAB Field Acceptance Testing

If any of the acceptance testing measurements for a given equipment group is found out of tolerance, terminate data verification for all affected data for that group. The affected data for the given group will be disapproved. Make the necessary corrections and prepare a revised TAB Report. Reschedule acceptance testing of the revised report data with the COTR.

3.4.14.3 Prerequisite for Approval

Compliance with the field acceptance testing requirements of this section is a prerequisite for the final Contracting Officer approval of the Final TAB Report submitted and of the acceptance of the facility for occupancy.

3.5 MARKING OF SETTINGS

Upon the final TAB work approval, permanently mark the settings of HVAC

adjustment devices including valves, gauges, splitters, and dampers so that adjustment can be restored if disturbed at any time. Label variable frequency drives with final frequency (Hz) and control setpoint. Provide permanent markings clearly indicating the settings on the adjustment devices which result in the data reported on the submitted TAB report.

3.6 MARKING OF TEST PORTS

The TAB team is to permanently and legibly mark and identify the location points of the duct test ports. If the ducts have exterior insulation, make these markings on the exterior side of the duct insulation. Show the location of test ports on the as-built mechanical drawings with dimensions given where the test port is covered by exterior insulation.

3.7 APPENDICES

Appendix A WORK DESCRIPTIONS OF PARTICIPANTS
Appendix B REPORTS - DALT and TAB
Appendix C DALT AND TAB SUBMITTAL AND WORK SCHEDULE
Appendix D REQUIREMENTS FOR DUCT AIR LEAK TESTING

Appendix A

WORK DESCRIPTIONS OF PARTICIPANTS

The Contractor is responsible for ensuring compliance with all requirements of this specification section. However, the following delineation of specific work items is provided to facilitate and co-ordinate execution of the various work efforts by personnel from separate organizations.

1. Contractor

a. HVAC documentation: Provide pertinent contract documentation to the TAB Firm, to include the following: the contract drawings and specifications; copies of the approved submittal data for all HVAC equipment, air distribution devices, and air/water measuring/balancing devices; the construction work schedule; and other applicable documents requested by the TAB Firm. Provide the TAB Firm copies of contract revisions and modifications as they occur.

b. Schedules: Ensure the requirements specified in Appendix C "DALT and TAB Submittal and Work Schedule" are met.

c. Pre-DALT / TAB meeting: Arrange and conduct the Pre-DALT and TAB meeting. Ensure that a representative is present for the sheet metal contractor, the mechanical contractor, the electrical contractor, and the automatic temperature controls contractor.

d. Advance Notice: Monitor the completion of the duct systems' installation and provide the Advance Notice for Pre-Final DALT field work as specified.

e. Coordinate Support: Provide and coordinate support personnel required by the TAB Firm in order to accomplish the DALT and TAB field work. Support personnel may include factory representatives, HVAC controls installers, HVAC equipment mechanics, sheet metal workers, pipe fitters, and insulators. Ensure support personnel are present at the work site at the times required.

f. Correct Deficiencies: Ensure the resolution of Construction Deficiencies are provided as specified herein. Refer to the paragraph DESIGN/CONSTRUCTION DEFICIENCIES. Correct each deficiency as soon as practical with the Contracting Officer, and submit revised schedules and other required documentation.

g. Pre-TAB Field Work: Complete check out and debugging of HVAC equipment, ducts, and controls prior to the TAB engineer arriving at the project site to begin the TAB work. Debugging includes searching for and eliminating malfunctioning elements in the HVAC system installations, and verifying all adjustable devices are functioning as designed. Include as pre-TAB field work items, the deficiencies pointed out by the TAB team supervisor in the design review report.

   Prior to the TAB field team's arrival, ensure completion of the applicable inspections and work items listed in the TAB team supervisor's DALT and TAB Work Procedures Summary.

h. Give Notice of Testing: Submit advance notice of proportional balancing, Season 1, and Season 2 TAB field work.

i. Insulation work: Insulatiom must not be installed on ducts to be DALT'd until DALT field acceptance testing on the subject ducts is complete.

Ensure the duct and piping systems are properly insulated and vapor sealed upon the successful completion and acceptance of the DALT and TAB work.

j. Duct Concealment: Ducts to be DALT'd must not be concealed until DALT field acceptance testing on the subject ducts is complete.

2. TAB Team Supervisor

a. Overall management: Supervise and manage the overall TAB team work effort, including preliminary and technical DALT and TAB procedures and TAB team field work.

b. Schedule: Ensure the requirements specified in Appendix C "DALT and TAB Submittal and Work Schedule" are met.

c. Submittals: Provide the submittals specified herein.

d. Pre-DALT/TAB meeting: Attend meeting with Contractor. Ensure TAB personnel that will be involved in the TAB work under this contract attend the meeting.

e. Pre-Field Engineering Report: Submit typed report described in Appendix B "Reports - DALT and TAB".

f. Support required: Specify the technical support personnel required from the Contractor other than the TAB agency; such as factory representatives for temperature controls or for complex equipment. Inform the Contractor in writing of the support personnel needed and when they are needed. Furnish the notice as soon as the need is anticipated, either with the Pre-Field Engineering Report or during the DALT or TAB field work.

Ensure the Contractor is properly notified and aware of all support personnel needed to perform the TAB work. Maintain communication with the Contractor regarding support personnel throughout the duration of the TAB field work, including the TAB field acceptance testing checking.

Ensure all inspections and verifications necessary to start DALT field work and TAB field work are completely and successfully conducted before DALT and TAB field work is performed.

g. Technical Assistance: Provide technical assistance to the DALT and TAB field work.

h. Deficiencies Notification: Ensure the notifications of Construction Deficiencies are provided as specified herein. Comply with requirements of the paragraph DESIGN/CONSTRUCTION DEFICIENCIES.

i. Procedures: Develop the required TAB procedures for systems or system components not covered in the TAB Standard.

3. TAB Team Field Leader

a. Field manager: Manage, in the field, the accomplishment of the work specified in Part 3, EXECUTION.

b. Full time: Be present at the contract site when DALT field work or TAB field work is being performed by the TAB team; ensure day-to-day TAB team work accomplishments are in compliance with this section.

c. Prerequisite HVAC work: Do not bring the TAB team to the contract site until notification that all work items and inspections identified to the Contractor by the TAB team supervisor are completed, with all work items certified by the Contractor to be working as designed, reaches the office of the TAB Agency.

Appendix B

REPORTS - DALT and TAB

All submitted documentation must be typed, neat, and organized. All reports must have a title page, a certification page, sequentially numbered pages throughout, and a table of contents. Tables, lists, and diagrams must be titled. Generate and submit for approval the following documentation:

1. Pre-Field Engineering Report

a. DALT and TAB Procedures Summary

Submit a detailed narrative describing all aspects of the DALT and TAB field work to be performed. Clearly distinguish between DALT information and TAB information. Include the following:

(1) A list of the intended procedural steps for the DALT and TAB field work from start to finish. Indicate how each type of data measurement will be obtained. Include what Contractor support personnel are required for each step, and the tasks they need to perform.

(2) A list of the project's submittals that are needed by the TAB Firm in order to meet this Contract's requirements.

(3) The data presentation forms to be used in the report, with the preliminary information and initial design values filled in.

(4) A list of DALT and TAB instruments to be used, edited for this project, to include the instrument name and description, manufacturer, model number, scale range, published accuracy, most recent calibration date, and what the instrument will be used for on this project.

(5) A thorough checklist of the work items and inspections that need to be accomplished before DALT field work can be performed.

(6) A thorough checklist of the work items and inspections that need to be accomplished before the [Season 1]TAB field work can be performed.

[(7) A thorough checklist of the work items and inspections that need to be accomplished before the Season 2 TAB field work can be performed.

] (8) The checklists specified above shall be individually developed and tailored specifically for the work under this contract. Refer to NEBB PROCEDURAL STANDARDS, Section III, "Preliminary TAB Procedures" under the paragraphs titled, "Air Distribution System Inspection" and "Hydronic Distribution System Inspection" for examples of items to include in the checklists.

b. Design Review Report:

Review the contract specifications and drawings to verify that the TAB work can be successfully accomplished in compliance with the requirements of this section. Verify the presence and location of permanently installed test ports and other devices needed, including gauge cocks, thermometer wells, flow control devices, circuit setters, balancing valves, manual volume dampers, and required straight duct and pipe runs for accurate measurements.

Submit a typed report describing omissions and deficiencies in the HVAC system's design that would preclude the TAB team from accomplishing the DALT work and the TAB work requirements of this section. Provide a complete explanation including supporting documentation detailing the design deficiency. If no deficiencies are evident, state so in the report.

c. TAB Schematic Drawings

The schematic drawings to be used in the required reports, may include building floor plans, mechanical room plans, duct system plans, equipment elevations, and diagrams. Indicate intended TAB measurement locations, including where test ports need to be provided by the Contractor.

Show the following information on TAB Schematic Drawings:

(1) A unique number or mark for each piece of equipment or terminal.

(2) Air quantities at air terminals.

(3) Air quantities and temperatures from air handling unit schedules.

(4) Water quantities and temperatures from thermal energy transfer equipment schedules.

(5) Water quantities and heads from pump schedules.

(6) Water flow measurement fittings and balancing fittings.

d. Instrument Calibration Certificates

e. List of TAB Related Submittals
Prepare a list of the submittals from the Contract Submittal Register that relate to the successful accomplishment of all TAB. Ensure that the location and details of ports, terminals, connections, etc., necessary to perform TAB are identified on the submittals.

2. Pre-Final DALT Report

Report the data for the Pre-Final DALT Report meeting the following requirements:

a. Procedures: Describe how actual field test procedures differed from the previously approved DALT Procedures Summary.

b. Report format: Submit a comprehensive report for the DALT field work data using data presentation forms equivalent to the "Air Duct Leakage Test Summary Report Forms" located in the SMACNA 1972 CD. All form

data must be recorded for each test iteration of each duct section selected. Report forms for each test must indicate either "Pass" or "Fail". In addition, submit in the report, a marked duct shop drawing which identifies each section of duct tested with assigned node numbers for each section. Node numbers shall be included in the completed report forms to identify each duct section.

c. Calculations: Include a copy of all calculations prepared in determining the duct surface area and the allowable leakage of each duct test section.

d. Instruments: Include in the DALT reports copy(s) of the calibration curve for each of the DALT test orifices used for testing. List the types of instruments actually used to measure the data. Include in the listing each instrument's unique identification number, calibration date, and calibration expiration date. Instruments are to be calibrated within one year of the date of use in the field; instrument calibration is to be traceable to the measuring standards of the National Institute of Standards and Technology.

e. TAB Supervisor Approval: Include on the submitted report the typed name of the TAB supervisor and the dated signature of the TAB supervisor.

3. Certified Final DALT Report

On successful completion of all COTR field checks of the Pre-final DALT Report data for all systems, the TAB Supervisor shall assemble, review, sign and submit the Final DALT Report containing all Pre-Final DALT Reports to the Contracting Officer for approval.

4. TAB Reports

Submit TAB Reports for Proportional Balancing, Season 1, and Season 2 in the following manner:

a. Procedure Summary: Submit a copy of the approved DALT and TAB Procedures Summary. When applicable, provide notations describing how actual field procedures differed from the procedures listed.

b. Report format: Submit the completed data forms approved in the Pre-Field Engineering Report completed by TAB field team, reviewed, approved and signed by the TAB supervisor. Include a table of contents identifying by page number the location of each report. Report forms and report data shall be typewritten. Handwritten report forms or report data are not acceptable.

c. Schematic Drawings: Provide updated drawings and diagrams with final installed locations of all terminals and devices, any numbering changes, and actual test locations including duct traverse and static pressure measurement locations.

d. Air Static Pressure Profiles: Report static pressure profiles for air duct systems including: [AHU-1][RTAC-1][MUA-1][_____]. Report static pressure data for all supply, return, relief, exhaust and outside air ducts for the systems listed. The static pressure report data shall include, in addition to AABC or NEBB or TABB required data, the

following:

(1) Report supply fan, return fan, relief fan, and exhaust fan inlet and discharge static pressures.

(2) Report static pressure drop across chilled water coils, DX coils, hot water coils, steam coils, electric resistance heating coils and heat reclaim devices installed in unit cabinetry or the system ductwork.

(3) Report static pressure drop across outside air, return air, and supply air automatic control dampers, both proportional and two-position, installed in unit cabinetry.

(4) Report static pressure drop across air filters, acoustic silencers, moisture eliminators, air flow straighteners, air flow measuring stations or other pressure drop producing specialty items installed in unit cabinetry, or in the system ductwork. Examples of these specialty items are smoke detectors, white sound generators, RF shielding, wave guides, security bars, blast valves, small pipes passing through ductwork, and duct mounted humidifiers.

Do not report static pressure drop across duct fittings provided for the sole purpose of conveying air, such as elbows, transitions, offsets, plenums, manual dampers, and branch takes-offs.

(5) Report static pressure drop across outside air and relief/exhaust air louvers.

(6) Report static pressure readings of supply air, return air, exhaust/relief air, and outside air in duct at the point where these ducts connect to each air moving unit.

e. Duct Traverses: Report duct traverses for main [and branch main]supply, return, exhaust, relief and outside air ducts. This shall include all ducts, including those which lack 7 1/2 duct diameters upstream and 2 1/2 duct diameters downstream of straight duct unobstructed by duct fittings/offsets/elbows. Report all individual velocities on the duct traverses taken. Evaluate the suitability of the duct traverse measurement based on satisfying the qualifications for a pitot traverse plane as defined by AMCA 203, "Field Measurements", Section 8, paragraph 8.3, "Location of Traverse Plane". Report duct traverses for all entering and leaving unit airflows for all air handling equipment exceeding 944 L/S 2,000 cfm. Illustrate in an Equipment Diagram representative of the actual installation.

f. Open Paths: Ensure all required air and hydronic system open paths are identified.

g. Instruments: List the types of instruments actually used to measure the TAB data. Include in the listing each instrument's unique identification number, calibration date, and calibration expiration date.

Instrumentation, used for taking wet bulb temperature readings shall provide accuracy of plus or minus 5 percent at the measured face velocities.

h. Performance Curves: Include in the TAB Reports, factory pump curves and fan curves for pumps and fans TAB'd on the job, and manufacturer equipment data curves or tables correlating pressure drop and water flow rate.

i. Calibration Curves: The TAB Supervisor shall include, in the TAB Reports, a factory calibration curve for installed flow control balancing valves, flow venturis and flow orifices TAB'd on the job.

j. Supporting Documents: Provide copies of any request for information (RFIs) with the RFI responses, summaries of implemented change order(s), meeting minutes with participants, telephone transcripts with participants, electronic mail with addresses, and other documentation substantiating any deviations of the reported data from the initial contract design documents. Include this documentation in an appendix to the TAB report with sequential numbering of each separate document for reference to the data presentation forms.

k. Data From TAB Field Work: After completion of the TAB field work, prepare the TAB field data for TAB supervisor's review and approval signature, using the reporting forms approved in the Pre-Field Engineering Report. Data required by those approved data report forms shall be furnished by the TAB team. Record final hydronic differential pressure setpoint, hydronic system fill pressure, glycol percentage, pumps and fan motor frequency in maximum, fan motor frequency in minimum, fan brake horsepower, calibration coefficients, and factors, and primary air static pressure setpoint. Except as approved otherwise in writing by the Contracting Officer, the TAB work and thereby the TAB report shall be considered incomplete until the TAB work is accomplished to within the accuracy range specified in the paragraph WORKMANSHIP.

l. System configuration: Clearly identify system configurations and conditions affecting data for all reported data. Include all system operational parameters such as device positioning, system diversity, modes of operation, and setpoints necessary to setup and duplicate system cconfiguration.

Appendix C

DALT AND TAB SUBMITTAL AND WORK SCHEDULE

Perform the following items of work in the order listed adhering to the dates schedule specified below. Include the major items listed in this schedule in the project network analysis schedule required by Section[01 32 17.05 20 COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS) FOR DESIGN-BUILD.

Submit Independent TAB Agency and TAB Personnel Qualifications: Within [42] [_____] calendar days after date of contract award.

Submit the Pre-Field Engineering Report: Within [28] [_____] days after receipt of the approved Independent TAB Agency and TAB Personnel Qualifications.

Meet with the COTR at the Pre-DALT/TAB Meeting: Within [14] [_____] calendar days.

(1) Prior to commencement of ductwork installation.

(2) Prior to the ductwork installation preparatory meeting per specification section[01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL].

[Conduct measurements and submit the Record of Existing Facility Conditions: within [28] [_____] days after receipt of approved Pre-Final Engineering Report.

] Advance Notice of Pre-Final DALT Field Work: After the completed installation of the HVAC duct system to be DALT'd, submit to the Contracting Officer an Advance Notice of Pre-Final DALT Field Work.

Ductwork Selected for DALT: Within 14 calendar days after receiving an acceptable Advance Notice of Pre-Final DALT Field Work, the Contracting Officer's technical representative (COTR) will select the project ductwork sections to be DALT'd.

DALT Field Work: Within 48 hours of COTR's selection, complete DALT field work on selected project ductwork.

Submit Pre-Final DALT Report: Within two working days after completion of DALT field work, submit Pre-final DALT Report. Separate Pre-final DALT reports may be submitted to allow phased testing from system to system.

Quality Assurance - COTR DALT Field Checks: Upon approval of the Pre-final DALT Report, the COTR's DALT field check work shall be scheduled with the Contracting Officer.

Submit Final DALT Report: Within [14] [_____] calendar days after successful completion of all DALT Work Field Checks

[TAB field work for Season 1 may be accomplished concurrent with TAB field work for proportional balancing, when the ambient temperature is

within Season 1 limits. When accomplished concurrently, Season 1 TAB Report submittal and Season 1 Quality Assurance shall be concurrent with the Proportional Balancing work items.

] Advance Notice of TAB Field Work for Proportional Balancing: At a minimum of [14] [_____] calendar days prior to TAB Field Work, submit advance notice of TAB field work for proportional balancing.

TAB Field Work for Proportional Balancing: At a minimum of [84] [_____] calendar days prior to Beneficial Occupancy Date (BOD), accomplish TAB field work for proportional balancing[, and Season 1, if concurrent].

Submit TAB Report for Proportional Balancing: Within [14] [_____] calendar days after completion of TAB field work for proportional balancing[, and Season 1, if concurrent].

Proportional Balancing Quality Assurance - COTR TAB Field Acceptance Testing: [30] [_____] calendar days after TAB report for proportional balancing[, and Season 1, if concurrent,] is approved by the Contracting Officer, conduct TAB field acceptance testing.

Complete TAB Work for Proportional Balancing: Prior to BOD, complete all TAB work [except Season 1 and Season 2 TAB work] and submit Final TAB Report for Proportional Balancing.

[When not accomplished concurrent with TAB field work for proportional balancing, accomplish the following seasonal items of work:

Advance Notice of Season 1 TAB Field Work: At a minimum of [14] [_____] calendar days prior to Season 1 TAB Field Work, submit advance notice of Season 1 TAB field work.

Season 1 TAB Field Work: At a minimum of [84] [_____] calendar days prior to BOD, and when the ambient temperature is within Season 1 limits, accomplish Season 1 TAB field work.

Submit Season 1 TAB Report: Within [14] [_____] calendar days after completion of Season 1 TAB field work.

Season 1 Quality Assurance - COTR TAB Field Acceptance Testing: [30] [_____] calendar days after Season 1 TAB report is approved by the Contracting Officer, conduct Season 1 TAB field acceptance testing. Advance Notice of Season 2 TAB Field Work: At a minimum of [126] [_____]calendar days after CCD, submit Advance Notice of Season 2 TAB Field Work.

[Season 2 TAB Field Work: Within [14] [_____] calendar days after date of advance notice of Season 2 TAB field work and when the ambient temperature is within Season 2 limits, accomplish Season 2 TAB field work.

Submit Season 2 TAB Report: Within [14] [_____] calendar days after completion of Season 2 TAB field work.

Season 2 Quality Assurance - COTR TAB Field Acceptance Testing: [28] [_____] calendar days after the Season 2 TAB report is approved by the

Contracting Officer, conduct Season 2 field acceptance testing.

Complete Season 2 TAB Work: Within [14] [_____] calendar days after the completion of Season 2 TAB field data check, complete all TAB work.

]

Appendix D

REQUIREMENTS FOR DUCT AIR LEAK TESITNG

[Refer to design drawings for the Duct Construction and Leakage Testing Table][

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[Package Rooftop w/VAV Unit No. [1] [_____]]	[Package Rooftop w/VAV Unit No. [2] [_____]]	[Package Rooftop w/CV Unit No. [1] [_____]]	[Package Rooftop w/CV Unit No. [2] [_____]]
Duct System Static Pressure, in millimeters W.C.	for Supply	[100] [_____]	[100] [_____]	[50] [_____]	[50] [_____]
	for Return	[50] [_____]	[50] [_____]	[25] [_____]	[25] [_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[50] [_____]	[50] [_____]	[25] [_____]	[25] [_____]
System Oval/Round Duct and Rectangular Duct SMACNA Seal Class	for Supply	A	A	A	A
	for Return	A	A	A	A
	for Exhaust	A	A	A	A
	for Outside Air	A	A	A	A

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[Package Rooftop w/VAV Unit No. [1] [_____]]	[Package Rooftop w/VAV Unit No. [2] [_____]]	[Package Rooftop w/CV Unit No. [1] [_____]]	[Package Rooftop w/CV Unit No. [2] [_____]]
System Oval/Round Duct SMACNA Leak Class	for Supply	[3] [_____]	[3] [_____]	[6] [_____]	[6] [_____]
	for Return	[6] [_____]	[6] [_____]	[12] [_____]	[12] [_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[6] [_____]	[6] [_____]	[12] [_____]	[12] [_____]
System Rectangular Duct SMACNA Leak Class	for Supply	[6] [_____]	[6] [_____]	[12] [_____]	[12] [_____]
	for Return	[12] [_____]	[12] [_____]	[24][_____]	[24][_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[12] [_____]	[12] [_____]	[24] [_____]	[24] [_____]
Duct Test Pressure, in millimeters W.C.	for Supply	[100] [_____]	[100] [_____]	[50] [_____]	[50] [_____]
	for Return	[50] [_____]	[50] [_____]	[25] [_____]	[25] [_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[50] [_____]	[50] [_____]	[25] [_____]	[25] [_____]

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[AHU w/ Economizer & CV Unit No. [1] [_____]]	[AHU w/ Economizer & CV Unit No. [2] [_____]]	[Series VAV Terminal Boxes Unit No. [1] [_____]]	[Exhaust Systems Unit No. [1] [_____]]
Duct System Static Pressure, in millimeters W.C.	for Supply	[50] [_____]	[50] [_____]	[13] [_____]	n/a
	for Return	[25] [_____]	[25] [_____]	[13] [_____]	n/a
	for Exhaust	[13] [_____]	[13] [_____]	n/a	[25] [_____]
	for Outside Air	[25] [_____]	[25] [_____]	n/a	n/a
System Oval/Round Duct and Rectangular Duct SMACNA Seal Class	for Supply	A	A	A	A
	for Return	A	A	A	A
	for Exhaust	A	A	A	A
	for Outside Air	A	A	A	A
System Oval/Round Duct SMACNA Leak Class	for Supply	[6] [_____]	[6] [_____]	8	n/a
	for Return	[8] [_____]	[8] [_____]	8	n/a
	for Exhaust	[8] [_____]	[8] [_____]	n/a	[8] [_____]
	for Outside Air	[8] [_____]	[8] [_____]	n/a	n/a

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[AHU w/ Economizer & CV Unit No. [1] [_____]]	[AHU w/ Economizer & CV Unit No. [2] [_____]]	[Series VAV Terminal Boxes Unit No. [1] [_____]]	[Exhaust Systems Unit No. [1] [_____]]
System Rectangular Duct SMACNA Leak Class	for Supply	[12] [_____]	[12] [_____]	16	n/a
	for Return	[16] [_____]	[16] [_____]	16	n/a
	for Exhaust	[16] [_____]	[16] [_____]	n/a	[16] [_____]
	for Outside Air	[16] [_____]	[16] [_____]	n/a	n/a
Duct Test Pressure, in millimeters W.C.	for Supply	[50] [_____]	[25] [_____]	[13] [_____]	n/a
	for Return	[25] [_____]	[25] [_____]	[13] [_____]	n/a
	for Exhaust	[13] [_____]	[13] [_____]	n/a	[25] [_____]
	for Outside Air	[25] [_____]	[25] [_____]	n/a	n/a

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[Package Rooftop w/VAV Unit No. [1] [_____]]	[Package Rooftop w/VAV Unit No. [2] [_____]]	[Package Rooftop w/CV Unit No. [1] [_____]]	[Package Rooftop w/CV Unit No. [2] [_____]]
Duct System Static Pressure, in inches W.C.	for Supply	[4] [_____]	[4] [_____]	[2] [_____]	[2] [_____]
	for Return	[2] [_____]	[2] [_____]	[1] [_____]	[1] [_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[2] [_____]	[2] [_____]	[1] [_____]	[1] [_____]
System Oval/Round Duct and Rectangular Duct SMACNA Seal Class	for Supply	A	A	A	A
	for Return	A	A	A	A
	for Exhaust	A	A	A	A
	for Outside Air	A	A	A	A
System Oval/Round Duct SMACNA Leak Class	for Supply	[3] [_____]	[3] [_____]	[6] [_____]	[6] [_____]
	for Return	[6] [_____]	[6] [_____]	[8] [_____]	[8] [_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[6] [_____]	[6] [_____]	[8] [_____]	[8] [_____]

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[Package Rooftop w/VAV Unit No. [1] [_____]]	[Package Rooftop w/VAV Unit No. [2] [_____]]	[Package Rooftop w/CV Unit No. [1] [_____]]	[Package Rooftop w/CV Unit No. [2] [_____]]
System Rectangular Duct SMACNA Leak Class	for Supply	[6] [_____]	[6] [_____]	[12] [_____]	[12] [_____]
	for Return	[12] [_____]	[12] [_____]	[16][_____]	[16][_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[12] [_____]	[12] [_____]	[16] [_____]	[16] [_____]
Duct Test Pressure, in inches W.C.	for Supply	[4] [_____]	[2] [_____]	[50] [_____]	[2] [_____]
	for Return	[2] [_____]	[2] [_____]	[1] [_____]	[1] [_____]
	for Exhaust	[_____]	[_____]	[_____]	[_____]
	for Outside Air	[2] [_____]	[2] [_____]	[1] [_____]	[1] [_____]

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[AHU w/ Economizer & CV Unit No. [1] [_____]]	[AHU w/ Economizer & CV Unit No. [2] [_____]]	[Series VAV Terminal Boxes Unit No. [1] [_____]]	[Exhaust Systems Unit No. [1] [_____]]
Duct System Static Pressure, in inches W.C.	for Supply	[2] [_____]	[2] [_____]	[1] [_____]	n/a
	for Return	[1] [_____]	[1] [_____]	[1] [_____]	n/a
	for Exhaust	[1] [_____]	[1] [_____]	n/a	[1] [_____]
	for Outside Air	[1] [_____]	[1] [_____]	n/a	n/a
System Oval/Round Duct and Rectangular Duct SMACNA Seal Class	for Supply	A	A	A	A
	for Return	A	A	A	A
	for Exhaust	A	A	A	A
	for Outside Air	A	A	A	A
System Oval/Round Duct SMACNA Leak Class	for Supply	[6] [_____]	[6] [_____]	8	n/a
	for Return	[8] [_____]	[8] [_____]	8	n/a
	for Exhaust	[8] [_____]	[8] [_____]	n/a	[8] [_____]
	for Outside Air	[8] [_____]	[8] [_____]	n/a	n/a

Appendix D					
REQUIREMENTS FOR DUCT AIR LEAK TESTING					
		SYSTEMS			
		[AHU w/ Economizer & CV Unit No. [1] [_____]]	[AHU w/ Economizer & CV Unit No. [2] [_____]]	[Series VAV Terminal Boxes Unit No. [1] [_____]]	[Exhaust Systems Unit No. [1] [_____]]
System Rectangular Duct SMACNA Leak Class	for Supply	[12] [_____]	[12] [_____]	16	n/a
	for Return	[16] [_____]	[16] [_____]	16	n/a
	for Exhaust	[16] [_____]	[16] [_____]	n/a	[16] [_____]
	for Outside Air	[16] [_____]	[16] [_____]	n/a	n/a
Duct Test Pressure, in inches W.C.	for Supply	[2] [_____]	[2] [_____]	[1] [_____]	n/a
	for Return	[1] [_____]	[1] [_____]	[1] [_____]	n/a
	for Exhaust	[1] [_____]	[1] [_____]	n/a	[1] [_____]
	for Outside Air	[1] [_____]	[1] [_____]	n/a	n/a

]

-- End of Section --

SECTION 23 09 00.00 22

INSTRUMENTATION AND CONTROL FOR HVAC
11/19

PART 1 GENERAL

1.1 SUMMARY

Provide a complete Direct Digital Control (DDC) system, except for the Front End which is existing and new system integration being performed by the Government, suitable for the control of the heating, ventilating and air conditioning (HVAC) and other building-level systems as indicated and shown and in accordance with Section 23 09 13.00 22 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC, Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS for BACnet or Niagara BACnet systems, and other referenced Sections.

1.1.1 System Requirements

Provide systems meeting the requirements this Section and other Sections referenced by this Section, and which have the following characteristics:

a. The system implements the control sequences of operation shown in the Contract Drawings using DDC hardware to control mechanical and electrical equipment

b. The system meet the requirements of this specification as a stand-alone system and does not require connection to any other system.

c. Control sequences reside in DDC hardware in the building. The building control network is not dependent upon connection to a Utility Monitoring and Control System (UMCS) Front End or to any other system for performance of control sequences. To the greatest extent practical, the hardware performs control sequences without reliance on the building network.

d. The hardware is installed such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.

e. All necessary documentation, configuration information, programming tools, programs, drivers, and other software are licensed to and otherwise remain with the Government such that the Government or their agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor, Vendor or Manufacturer.

f. Sufficient documentation and data, including rights to documentation and data, are provided such that the Government or their agents can execute work to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor, Vendor or Manufacturer.

g. Hardware is installed and configured such that the Government or their agents are able to perform repair, replacement, and upgrades of

individual hardware without further interaction with the Contractor, Vendor or Manufacturer.

h. All Niagara Framework components have an unrestricted interoperability license with a Niagara Compatibility Statement (NiCS) following the Tridium Open NiCS Specification and have a value of "ALL" for "Station Compatibility In", "Station Compatibility Out", "Tool Compatibility In" and "Tool Compatibility Out". Note that this will result in the following entries in the license file:
    accept.station.in="*"
    accept.station.out="*"
    accept.wb.in="*"
    accept.wb.out="*"

1.1.2 End to End Accuracy

Select products, install and configure the system such that the maximum error of a measured value as read from the DDC Hardware over the network is less than the maximum allowable error specified for the sensor or instrumentation.

1.1.3 Verification of Dimensions

After becoming familiar with all details of the work, verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.1.4 Drawings

The Government will not indicate all offsets, fittings, and accessories that may be required on the drawings. Carefully investigate the mechanical, electrical, and finish conditions that could affect the work to be performed, arrange such work accordingly, and provide all work necessary to meet such conditions.

1.2 RELATED SECTIONS

Related work specified elsewhere:

a. Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS for BACnet systems with or without Niagara Framework.

b. Section 23 09 13.00 22 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

c. Section 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS

d. Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 135	(2016) BACnet—A Data Communication Protocol for Building Automation and Control Networks
ASHRAE FUN IP	(2017) Fundamentals Handbook, I-P Edition
ASHRAE FUN SI	(2017) Fundamentals Handbook, SI Edition

CONSUMER ELECTRONICS ASSOCIATION (CEA)

CEA-709.1-D	(2014) Control Network Protocol Specification
CEA-709.3	(1999; R 2015) Free-Topology Twisted-Pair Channel Specification

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41	(1991; R 1995) Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2018) Enclosures for Electrical Equipment (1000 Volts Maximum)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14; TIA 17-15; TIA 17-16; TIA 17-17) National Electrical Code
NFPA 90A	(2018) Standard for the Installation of Air Conditioning and Ventilating Systems

TRIDIUM, INC (TRIDIUM)

Niagara Framework	(2012) NiagaraAX User's Guide
Tridium Open NiCS	(2005) Understanding the NiagaraAX Compatibility Statement (NiCS)

UNDERWRITERS LABORATORIES (UL)

UL 5085-3	(2006; Reprint Nov 20121) Low Voltage Transformers - Part 3: Class 2 and Class 3 Transformers
UL 508A	(2018; Reprint Jul 2018) UL Standard for Safety Industrial Control Panels

1.4 DEFINITIONS

The following list of definitions includes terms used in Sections referenced by this Section and are included here for completeness.The definitions contained in this Section may disagree with how terms are defined or used in other documents, including documents referenced by this Section. The definitions included here are the authoritative definitions for this Section and all Sections referenced by this Section.

After each term the protocol related to that term is included in parenthesis.

1.4.1 Alarm Generation (All protocols)

Alarm Generation is the monitoring of a value, comparison of the value to alarm conditions and the creation of an alarm when the conditions set for the alarm are met. Note that this does NOT include delivery of the alarm to the final destination (such as a user interface).

1.4.2 Building Automation and Control Network (BACnet) (BACnet)

The term BACnet is used in two ways. First meaning the BACnet Protocol Standard - the communication requirements as defined by ASHRAE 135 including all annexes and addenda. The second to refer to the overall technology related to the ASHRAE 135 protocol.

1.4.3 BACnet Advanced Application Controller (B-AAC) (BACnet)

A hardware device BTL Listed as a B-AAC, which is required to support BACnet Interoperability Building Blocks (BIBBs) for scheduling and alarming, but is not required to support as many BIBBs as a B-BC.

1.4.4 BACnet Application Specific Controller (B-ASC) (BACnet)

A hardware device BTL Listed as a B-ASC, with fewer BIBB requirements than a B-AAC. It is intended for use in a specific application.

1.4.5 BACnet Building Controller (B-BC) (BACnet)

A hardware device BTL Listed as a B-BC. A general-purpose, field-programmable device capable of carrying out a variety of building automation and control tasks including control and monitoring via direct digital control (DDC) of specific systems and data storage for trend information, time schedules, and alarm data. Like the other BTL Listed controller types (B-AAC, B-ASC etc.) a B-BC device is required to support the server ("B") side of the ReadProperty and WriteProperty services, but unlike the other controller types it is also required to support the client ("A") side of these services. Communication between controllers requires that one of them support the client side and the other support the server side, so a B-BC is often used when communication between controllers is needed.

1.4.6 BACnet Broadcast Management Device (BBMD) (BACnet)

A communications device, typically combined with a BACnet router. A BBMD forwards BACnet broadcast messages to BACnet/IP devices and other BBMDs connected to the same BACnet/IP network. Each IP subnet that is part of a BACnet/IP network must have at least one BBMD. Note there are additional restrictions when multiple BBMDs share an IP subnet.

1.4.7 BACnet/IP (BACnet)

An extension of BACnet, Annex J, defines the use of a reserved UDP socket to transmit BACnet messages over IP networks. A BACnet/IP network is a collection of one or more IP subnets that share the same BACnet network number. See also paragraph BACNET BROADCAST MANAGEMENT DEVICE.

1.4.8 BACnet Internetwork (BACnet)

Two or more BACnet networks, connected with BACnet routers. In a BACnet Internetwork, there exists only one message path between devices.

1.4.9 BACnet Interoperability Building Blocks (BIBBs) (BACnet)

A BIBB is a collection of one or more ASHRAE 135 Services intended to define a higher level of interoperability. BIBBs are combined to build the BACnet functional requirements for a device in a specification. Some BIBBs define additional requirements (beyond requiring support for specific services) in order to achieve a level of interoperability. For example, the BIBB DS-V-A (Data Sharing-View-A), which would typically be used by a front-end, not only requires the client to support the ReadProperty Service, but also provides a list of data types (Object / Properties) which the client must be able to interpret and display for the user.

In the BIBB shorthand notation, -A is the client side and -B is the server side.

The following is a list of some BIBBs used by this or referenced Sections:	
DS-COV-A	Data Sharing-Change of Value (A side)
DS-COV-B	Data Sharing-Change of Value (B side)
NM-RC-B	Network Management-Router Configuration (B side)
DS-RP-A	Data Sharing-Read Property (A side)
DS-RP-B	Data Sharing-Read Property (B side)
DS-RPM-A	Data Sharing-Read Property Multiple (A Side)
DS-RPM-B	Data Sharing-Read Property Multiple (B Side)
DS-WP-A	Data Sharing-Write Property (A Side)
DM-TS-B	Device Management-Time Synchronization (B Side)
DM-UTC-B	Device Management-UTC Time Synchronization (B Side)
DS-WP-B	Data Sharing-Write Property (B side)
SCHED-E-B	Scheduling-External (B side)

The following is a list of some BIBBs used by this or referenced Sections:	
DM-OCD-B	Device Management-Object Creation and Deletion (B side)
AE-N-I-B	Alarm and Event-Notification Internal (B Side)
AE-N-E-B	Alarm and Event-Notification External (B Side)
T-VMT-I-B	Trending-Viewing and Modifying Trends Internal (B Side)
T-VMT-E-B	Trending-Viewing and Modifying Trends External (B Side)

1.4.10 BACnet Network (BACnet)

In BACnet, a portion of the control Internetwork consisting of one or more segments connected by repeaters. Networks are separated by routers.

1.4.11 BACnet Operator Display (B-OD) (BACnet)

A basic operator interface with limited capabilities relative to a B-OWS. It is not intended to perform direct digital control. A B-OD profile could be used for LCD devices, displays affixed to BACnet devices, handheld terminals or other very simple user interfaces.

1.4.12 BACnet Segment (BACnet)

One or more physical segments interconnected by repeaters (ASHRAE 135).

1.4.13 BACnet Smart Actuator (B-SA) (BACnet)

A simple actuator device with limited resources intended for specific applications.

1.4.14 BACnet Smart Sensor (B-SS) (BACnet)

A simple sensing device with limited resources.

1.4.15 BACnet Testing Laboratories (BTL) (BACnet)

Established by BACnet International to support compliance testing and interoperability testing activities and consists of BTL Manager and the BTL Working Group (BTL-WG). BTL also publishes Implementation Guidelines.

1.4.16 BACnet Testing Laboratories (BTL) Listed (BACnet)

A device that has been listed by BACnet Testing Laboratory. Devices may be certified to a specific device profile, in which case the listing indicates that the device supports the required capabilities for that profile, or may be listed as "other".

1.4.17 Binary (All protocols)

A two-state system where an "ON" condition is represented by a high signal level and an "OFF" condition is represented by a low signal level.

'Digital' is sometimes used interchangeably with 'binary'.

1.4.18 Broadcast (BACnet)

Unlike most messages, which are intended for a specific recipient device, a broadcast message is intended for all devices on the network.

1.4.19 Building Control Network (BCN) (All protocols)

The network connecting all DDC Hardware within a building (or specific group of buildings). In general, networks within the building, all controllers and equipment will be BACnet MS/TP, unless noted otherwise.

1.4.20 Building Point of Connection (BPOC) (All protocols)

A FPOC for a Building Control System. (This term is being phased out of use in preference for FPOC but is still used in some specifications and criteria. When it was used, it typically referred to a piece of control hardware. The current FPOC definition typically refers instead to IT hardware.)

1.4.21 Commandable (All protocols)

See Overridable.

1.4.22 Commandable Objects (BACnet)

Commandable Objects have a Commandable Property, Priority_Array, and Relinquish_Default Property as defined in ASHRAE 135, Clause 19.2, Command Prioritization.

1.4.23 Configurable (All protocols)

A property, setting, or value is configurable if it can be changed via hardware settings on the device, via the use of engineering software or over the control network from the front end, and is retained through (after) loss of power.

In a Niagara Framework BACnet system, a property, setting, or value is configurable if it can be changed via one or more of:

1) via BACnet services (including proprietary BACnet services)
2) via hardware settings on the device
3) via the Niagara Framework

Note this is more stringent than the ASHRAE 135 definition.

1.4.24 Control Logic Diagram (All protocols)

A graphical representation of control logic for multiple processes that make up a system.

1.4.25 Device (BACnet)

A Digital Controller that contains a BACnet Device Object and uses BACnet to communicate with other devices.

1.4.26 Device Object (BACnet)

Every BACnet device requires one Device Object, whose properties represent the network visible properties of that device. Every Device Object requires a unique Object Identifier number on the BACnet Internetwork. This number is often referred to as the device instance or device ID.

1.4.27 Device Profile (BACnet)

A collection of BIBBs determining minimum BACnet capabilities of a device, defined in ASHRAE 135. Standard device profiles include BACnet Advanced Workstations (B-AWS), BACnet Building Controllers (B-BC), BACnet Advanced Application Controllers (B-AAC), BACnet Application Specific Controllers (B-ASC), BACnet Smart Actuator (B-SA), and BACnet Smart Sensor (B-SS).

1.4.28 Digital Controller (All protocols)

An electronic controller, usually with internal programming logic and digital and analog input/output capability, which performs control functions.

1.4.29 Direct Digital Control (DDC) (All protocols)

Digital controllers performing control logic. Usually the controller directly senses physical values, makes control decisions with internal programs, and outputs control signals to directly operate switches, valves, dampers, and motor controllers.

1.4.30 EMCS (All Protocals)

Term has been replaced by UMCS. See Paragraph "UMCS (All protocols".)

1.4.31 EMCS Network (All Protocals)

Term has been replaced by UMCS. See Paragraph "UMCS Network (All protocols)".

1.4.32 Field Controllers

Field controllers typically have a greater capability for input/output and customization, do not have integral actuators, are mounted in an enclosure not on the equipment and are used for equipment such as VAV air handlers.

1.4.33 Field Point of Connection (FPOC) (All protocols)

The FPOC is the point of connection between the UMCS IP Network and the field control network (either an IP network, a non-IP network, or a combination of both). The hardware at this location which provides the connection is generally an IT device such as a switch, IP router, or firewall.

In general, the term "FPOC Location" means the place where this connection occurs, and "FPOC Hardware" means the device that provides the connection. Sometimes the term "FPOC" is used to mean either and its actual meaning (i.e. location or hardware) is determined by the context in which it is used.

1.4.34 Fox Protocol (Niagara Framework)

The protocol used for communication between components in the Niagara Framework. By default, Fox uses TCP port 1911.

1.4.35 Gateway (All protocols)

A device that translates from one protocol application data format to another. Devices that change only the transport mechanism of the protocol - "translating" from TP/FT-10 to Ethernet/IP or from BACnet MS/TP to BACnet over IP for example - are not gateways as the underlying data format does not change. Gateways are also called Communications Bridges or Protocol Translators.

A Niagara Framework Supervisory Gateway is one type of Gateway.

1.4.36 Global ID

An identification number assigned to each Supervisory Building Controller. The Global ID includes assigned MSTP Trunk Instance Numbers and a range of BACnet Instance Numbers to be used for the Field Controllers. The Global ID is assigned by Public Works.

1.4.37 IEEE 802.3 Ethernet (All protocols)

A family of local-area-network technologies providing high-speed networking features over various media, typically Cat 5, 5e or Cat 6 twisted pair copper or fiber optic cable.

1.4.38 Internet Protocol (IP, TCP/IP, UDP/IP) (All protocols)

A communication method, the most common use is the World Wide Web. At the lowest level, it is based on Internet Protocol (IP), a method for conveying and routing packets of information over various LAN media. Two common protocols using IP are User Datagram Protocol (UDP) and Transmission Control Protocol (TCP). UDP conveys information to well-known "sockets" without confirmation of receipt. TCP establishes connections, also known as "sessions", which have end-to-end confirmation and guaranteed sequence of delivery.

1.4.39 Input/Output (I/O) (All protocols)

Physical inputs and outputs to and from a device, although the term sometimes describes network or "virtual" inputs or outputs. See also "Points".

1.4.40 I/O Expansion Unit (All protocols)

An I/O expansion unit provides additional point capacity to a digital controller

1.4.41 IP subnet (All protocols)

A group of devices which share a defined range IP addresses. Devices on a common IP subnet can share data (including broadcasts) directly without the need for the traffic to traverse an IP router.

1.4.42 JACE (Niagara Framework)

Java Application Control Engine. See paragraph NIAGARA FRAMEWORK SUPERVISORY GATEWAY

1.4.43 Local-Area Network (LAN) (All protocols)

A communication network that spans a limited geographic area and uses the same basic communication technology throughout.

1.4.44 Local Display Panels (LDPs) (All protocols)

A DDC Hardware with a display and navigation buttons, and must provide display and adjustment of points as shown on the Points Schedule and as indicated.

1.4.45 MAC Address (All protocols)

Media Access Control address. The physical device address that identifies a device on a Local Area Network.

1.4.46 Master-Slave/Token-Passing (MS/TP) (BACnet)

Data link protocol as defined by the BACnet standard. Multiple speeds (data rates) are permitted by the BACnet MS/TP standard.

1.4.47 Monitoring and Control (M&C) Software (All protocols)

The UMCS 'front end' software which performs supervisory functions such as alarm handling, scheduling and data logging and provides a user interface for monitoring the system and configuring these functions.

1.4.48 Network Number (BACnet)

A site-specific number assigned to each network. This network number must be unique throughout the BACnet Internetwork.

1.4.49 Niagara Framework (Niagara Framework)

A set of hardware and software specifications for building and utility control owned by Tridium Inc. and licensed to multiple vendors. The Framework consists of front end (M&C) software, web based clients, field level control hardware, and engineering tools. While the Niagara Framework is not adopted by a recognized standards body and does not use an open licensing model, it is sufficiently well-supported by multiple HVAC vendors to be considered a de-facto Open Standard.

1.4.50 Niagara Framework Supervisory Gateway (Niagara Framework)

DDC Hardware component of the Niagara Framework. A typical Niagara architecture has Niagara specific supervisory gateways at the IP level and other (non-Niagara specific) controllers on field networks (TP/FT-10, MS/TP, etc.) beneath the Niagara supervisory gateways. The Niagara specific controllers function as a gateway between the Niagara framework protocol (Fox) and the field network beneath. These supervisory gateways may also be used as general purpose controllers and also have the capability to provide a web-based user interface.

Note that different vendors refer to this component by different names. The most common name is "JACE"; other names include (but are not limited to)"EC-BOS", "FX-40", "TMN", "SLX" and "UNC".

1.4.51 Object (BACnet)

An ASHRAE 135 Object. The concept of organizing BACnet information into standard components with various associated Properties. Examples include Analog Input objects and Binary Output objects.

1.4.52 Object Identifier (BACnet)

A grouping of two Object properties: Object Type (e.g. Analog Value, Schedule, etc.) and Object Instance (in this case, a number). Object Identifiers must be unique within a device.

1.4.53 Object Instance (BACnet)

See paragraph OBJECT IDENTIFIER

1.4.54 Object Properties (BACnet)

Attributes of an object. Examples include present value and high limit properties of an analog input object. Properties are defined in ASHRAE 135 ; some are optional and some are required. Objects are controlled by reading from and writing to object properties.

1.4.55 Operator Configurable (All protocols)

Operator configurable values are values that can be changed from a single common front end user interface across multiple vendor systems.

For Niagara Framework Systems, a property, setting, or value is Operator Configurable when it is configurable from a Niagara Framework Front End.

1.4.56 Override (All protocols)

Changing the value of a point outside of the normal sequence of operation where the change has priority over the sequence and where there is a mechanism for releasing the change such that the point returns to the normal value. Overrides persist until released or overridden at the same or higher priority but are not required to persist through a loss of power. Overrides are often used by operators to change values, and generally originate at a user interface (workstation or local display panel).

1.4.57 Packaged Equipment (All protocols)

Packaged equipment is a single piece of equipment provided by a manufacturer in a substantially complete and operable condition, where the controls (DDC Hardware) are factory installed, and the equipment is sold and shipped from the manufacturer as a single entity. Disassembly and reassembly of a large piece of equipment for shipping does not prevent it from being packaged equipment. Package units may require field installation of remote sensors. Packaged equipment is also called a "packaged unit".

Note industry may use the term "Packaged System" to mean a collection of

equipment that is designed to work together where each piece of equipment is packaged equipment and there is a network that connects the equipment together. A "packaged system" of this type is NOT packaged equipment; it is a collection of packaged equipment, and each piece of equipment must individually meet specification requirements.

1.4.58 Packaged Unit (All protocols)

See packaged equipment.

1.4.59 Performance Verification Test (PVT) (All protocols)

The procedure for determining if the installed BAS meets design criteria prior to final acceptance. The PVT is performed after installation, testing, and balancing of mechanical systems. Typically the PVT is performed by the Contractor in the presence of the Government.

1.4.60 Physical Segment (BACnet)

A single contiguous medium to which BACnet devices are attached (ASHRAE 135).

1.4.61 Plant Controllers

Plant controllers are typically used to control various equipment in mechanical rooms such as pumps, heat exchangers, and chillers.

1.4.62 Polling (All protocols)

A device periodically requesting data from another device.

1.4.63 Points (All protocols)

Physical and virtual inputs and outputs. See also paragraph INPUT/OUTPUT (I/O).

1.4.64 Proportional, Integral, and Derivative (PID) Control Loop (All protocols)

Three parameters used to control modulating equipment to maintain a setpoint. Derivative control is often not required for HVAC systems (leaving "PI" control).

1.4.65 Proprietary (BACnet)

Within the context of BACnet, any extension of or addition to object types, properties, PrivateTransfer services, or enumerations specified in ASHRAE 135. Objects with Object_Type values of 128 and above are Proprietary Objects. Properties with Property_Identifier of 512 and above are proprietary Properties.

1.4.66 Protocol Implementation Conformance Statement (PICS) (BACnet)

A document, created by the manufacturer of a device, which describes which portions of the BACnet standard may be implemented by a given device. ASHRAE 135 requires that all ASHRAE 135 devices have a PICS, and also defines a minimum set of information that must be in it. A device as

installed for a specific project may not implement everything in its PICS.

1.4.67 Repeater (All protocols)

A device that connects two control network segments and retransmits all information received on one side onto the other.

1.4.68 Router (All protocols)

A device that connects two ASHRAE 135 networks and controls traffic between the two by retransmitting signals received from one side onto the other based on the signal destination. Routers are used to subdivide a BACnet internetwork and to limit network traffic. Examples include joining a BACnet Ethernet LAN to a BACnet MS/TP LAN. If a router is connected directly to the MCEN, it must be listed on the approved DIACAP equipment list and must be Marine Corps DADMS listed and approved.

1.4.69 Segment (All protocols)

A 'single' section of a control network that contains no repeaters or routers. There is generally a limit on the number of devices on a segment, and this limit is dependent on the topology/media and device type.

1.4.70 Standard BACnet Objects (BACnet)

Objects with Object_Type values below 128 and specifically enumerated in Clause 21 of ASHRAE 135. Objects which are not proprietary. See paragraph PROPRIETARY.

1.4.71 Standard BACnet Properties (BACnet)

Properties with Property_Identifier values below 512 and specifically enumerated in Clause 21 of ASHRAE 135. Properties which are not proprietary. See Proprietary.

1.4.72 Standard BACnet Services (BACnet)

ASHRAE 135 services other than ConfirmedPrivateTransfer or UnconfirmedPrivateTransfer. See paragraph PROPRIETARY.

1.4.73 Supervisory Building Controller

The Supervisory Building Controller is used to coordinate all equipment in a building, input scheduling, and is used as a connection point for transferring configuration files to the other controllers. The SBC must communicate with other controllers and equipment through a BACnet MS/TP bus. Depending on approvals and capabilities, the SBC may be used as a point of connection between the Camp Lejeune UMCS network (IP) and the building level control network (BACnet MS/TP).

Provide a five year service license on all Supervisory Controllers. Provide a reserve of 10 percent of additional points and additional devices on the Supervisory Controller license at the final project acceptance.

1.4.74 UMCS (All protocols)

UMCS stands for Utility Monitoring and Control System. The term refers to all components by which a project site monitors, manages, and controls real-time operation of HVAC and other building systems. These components include the UMCS "front-end" and all field building control systems connected to the front-end. The front-end consists of Monitoring and Control Software (user interface software), browser-based user interfaces and network infrastructure.

The network infrastructure (the "UMCS Network"), is an IP network connecting multiple building or facility control networks to the Monitoring and Control Software.

The UMCS at Camp Lejeune is an enterprise system that actively receives energy and building condition information from multiple sources and provides load shedding, electric metering, alarming, trending, scheduling, set point adjustment and device status of all supervisory building controllers for maintenance personnel. The UMCS receives real time electrical utility pricing data and automatically manages to Camp Lejeune's energy target. The existing UMCS consists of two servers, 1) Johnson Controls Incorporated (JCI) Metasys Extended Architecture (ADX server), and 2) Niagara AX supervisor (JCI FX web supervisor). Both of the systems communicate over the MCEN and either may be used to fulfill the requirements of this specification.

1.4.75 UMCS Network (All protocols)

The UMCS Network connects multiple building or facility control networks to the Monitoring and Control Software.

1.4.76 Writable Property (BACnet)

A Property is Writable when it can be changed through the use of one or more of the WriteProperty services defined in ASHRAE 135, Clause 15 regardless of the value of any other Property. Note that in the ASHRAE 135 standard, some Properties may be writable when the Out of Service Property is TRUE; for purposes of this Section, Properties that are only writable when the Out of Service Property is TRUE are not considered to be Writable.

1.5 PROJECT SEQUENCING

TABLE I: PROJECT SEQUENCING lists the sequencing of submittals as specified in paragraph SUBMITTALS (denoted by an 'S' in the 'TYPE' column) and activities as specified in PART 3 EXECUTION (denoted by an 'E' in the 'TYPE' column). TABLE I does not specify overall project milestone and completion dates[; these dates are specified in the contract documents][_____].

a. Sequencing for Submittals: The sequencing specified for submittals is the deadline by which the submittal must be initially submitted to the Government. Following submission there will be a Government review period as specified in Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES. If the submittal is not accepted by the Government, revise the submittal and resubmit it to the Government within [14][_____] days of notification that the submittal has been rejected. Upon resubmittal there will be an additional Government review period. If the submittal is not accepted the process repeats until the submittal is accepted by the Government.

b. Sequencing for Activities: The sequencing specified for activities indicates the earliest the activity may begin.

c. Abbreviations: In TABLE I the abbreviation AAO is used for 'after approval of' and 'ACO' is used for 'after completion of'.

TABLE I. PROJECT SEQUENCING
(FOR NAVY PROJECTS WITH AN ACCEPTANCE ENGINEER)

ITEM #	TYPE	DESCRIPTION	SEQUENCING (START OF ACTIVITY OR DEADLINE FOR SUBMITTAL)
1	S	Existing Conditions Report	
2	S	DDC Contractor Design Drawings	
3	S	Manufacturer's Product Data	
4	S	Pre-construction QC Checklist	
5	E		AAO #1 thru #4
6	E	Start-Up and Start-Up Testing	ACO #5
7	S	Post-Construction QC Checklist	[[_____] days]ACO #6
8	S	Programming Software Configuration Software Niagara Framework Engineering Tool Niagara Framework Wizards	[[_____] days]ACO #6
9	S	Draft As-Built Drawings	[[_____] days]ACO #6
10	S,E	PVT Testing Activities	As indicated in PART 3 of this Section.
11	S	PVT Report	As indicated in PART 3 of this Section.
12	S	Controller Application Programs Controller Configuration Settings Niagara Framework Supervisory Gateway Backups	[[_____] days]AAO #11
13	S	Final As-Built Drawings	[[_____] days]AAO #11

TABLE I. PROJECT SEQUENCING (FOR NAVY PROJECTS WITH AN ACCEPTANCE ENGINEER)			
ITEM #	TYPE	DESCRIPTION	SEQUENCING (START OF ACTIVITY OR DEADLINE FOR SUBMITTAL)
14	S	O&M Instructions	AAO #13
15	S	Training Documentation	[_____] days before scheduled start of #16
16	E	Training	AAO #14 and #15
17	S	Closeout QC Checklist	ACO #16

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29.05 20 SUSTAINABILITY REPORTING FOR DESIGN-BUILD. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

DDC Contractor Design Drawings; G

Draft As-Built Drawings; G

Final As-Built Drawings; G

SD-03 Product Data

Programming Software; G

Controller Application Programs; G

Configuration Software; G

Controller Configuration Settings; G

Manufacturer's Product Data; G

Niagara Framework Supervisory Gateway Backups; G

[Niagara Framework Engineering Tool; G]

Niagara Framework Wizards; G

SD-05 Design Data

Boiler Or Chiller Plant Gateway Request

SD-06 Test Reports

[Existing Conditions Report

Start-Up Testing Report; G

PVT Procedures; G

PVT Report; G

Pre-Construction Quality Control (QC) Checklist; G

Post-Construction Quality Control (QC) Checklist; G
]

Control Contractor’s Performance Verification Testing Plan; G

Equipment Supplier’s Performance Verification Testing Plan; G

Endurance Testing Results; G

Performance Verification Test Report; G

Bus Waveform Report; G

SD-07 Certificates

Contractor Qualifications

SD-10 Operation and Maintenance Data

Operation and Maintenance (O&M) Instructions; G

Training Documentation; G

SD-11 Closeout Submittals

Enclosure Keys; G

Password Summary Report; G

Closeout Quality Control (QC) Checklist; G

1.7 DATA PACKAGE AND SUBMITTAL REQUIREMENTS

Technical data packages consisting of technical data and computer software (meaning technical data which relates to computer software) which are specifically identified in this project and which may be defined/required in other specifications must be delivered strictly in accordance with the CONTRACT CLAUSES and in accordance with the Contract Data Requirements List, DD Form 1423. Data delivered must be identified by reference to the particular specification paragraph against which it is furnished. All submittals not specified as technical data packages are considered 'shop drawings' under the Federal Acquisition Regulation Supplement (FARS) and must contain no proprietary information and be delivered with unrestricted

rights.

1.8 SOFTWARE FOR DDC HARDWARE AND GATEWAYS

Provide all software related to the programming and configuration of DDC Hardware and Gateways as indicated. License all Software to the MCB Camp Lejeune, NCfor unrestricted use and reproduction on same. Software keys and "dongles" are not permitted. The term "controller" as used in these requirements means both DDC Hardware and Gateways.

1.8.1 Configuration Software

For each type of controller, provide the configuration tool software in accordance with Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS. Submit hard copies of the software user manuals for each software with the software submittal.

Submit Configuration Software on CD-ROM as a Technical Data Package. Submit [_____] hard copies of the software user manual for each piece of software.

1.8.2 Controller Configuration Settings

For each controller, provide copies of the installed configuration settings as source code compatible with the configuration tool software for that controller in accordance with Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS.

Submit Controller Configuration Settings on CD-ROM as a Technical Data Package. Include on the CD-ROM a list or table of contents clearly indicating which files are associated with each device. Submit [2][_____] copies of the Controller Configuration Settings CD-ROM.

1.8.3 Programming Software

For each type of programmable controller, provide the programming software in accordance with Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS. Submit hard copies of software user manuals for each software with the software submittal.

Submit Programming Software on CD-ROM as a Technical Data Package. Submit [_____] hard copies of the software user manual for each piece of software.

1.8.4 Controller Application Programs

For each programmable controller, provide copies of the application program as source code compatible with the programming software for that controller in accordance with Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS.

Submit Controller Application Programs on CD-ROM as a Technical Data Package. Include on the CD-ROM a list or table of contents clearly indicating which application program is associated with each device. Submit [2][_____] copies of the Controller Application Programs CD-ROM.

1.8.5 Niagara Framework Supervisory Gateway Backups

For each Niagara Framework Supervisory Gateway, provide a backup of all software within the Niagara Framework Supervisory Gateway, including configuration settings. This backup must be sufficient to allow the restoration of the Niagara Framework Supervisory Gateway or the replacement of the Niagara Framework Supervisory Gateway.

Submit backups for each Niagara Framework Supervisory Gateway on CD-ROM as a Technical Data Package. Mark each backup indicating clearly the source Niagara Framework Supervisory Gateway.

1.8.6 Niagara Framework Engineering Tool (for all Niagara Framework system)

Provide a Niagara Framework Engineering Tool in accordance with Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS. Submit software user manuals with the Niagara Framework Engineering Tool submittal.

Submit the Niagara Framework Engineering Tool on CD-ROM as a Technical Data Package. Submit [_____] hard copies of the software user manual for the Niagara Framework Engineering Tool.

1.9 BOILER OR CHILLER PLANT GATEWAY REQUEST

If requesting the use of a gateway to a boiler or chiller plant as indicated in Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS, submit a Boiler or Chiller Plant Gateway Request describing the configuration of the boilers or chillers including model numbers for equipment and controllers, the sequence of operation for the units, and a justification for the need to operate the units on a shared non-BACnet network.

1.10 CONTRACTOR QUALIFICATIONS

Submit documentation certifying the controls Contractor performing the work has completed at least three DDC systems installations of a similar design to this project, and programmed similar sequences of operation for at least two years. Personnel performing the installation, programming, checkout, commissioning and training must, at a minimum, have obtained all certifications required by the manufacturer for the tasks they are performing. Tasks include any activity required to execute and complete the contracted work. Certifications for each person must be submitted prior to the beginning of the contracted work. Certifications must be made available at any time upon the request from Camp Lejeune.

1.11 QUALITY CONTROL CHECKLISTS

The QC Checklist for Niagara Framework Based BACnet Systems in APPENDIX A of this Section must be completed by the Contractor's Chief Quality Control (QC) Representative and submitted as indicated.

The QC Representative must verify each item indicated and initial in the space provided to indicate that the requirement has been met. The QC Representative must sign and date the Checklist prior to submission to the Government.

1.11.1 Pre-Construction Quality Control (QC) Checklist

Complete items indicated as Pre-Construction QC Checklist items in the QC Checklist. Submit [four][_____] copies of the Pre-Construction QC Checklist.

1.11.2 Post-Construction Quality Control (QC) Checklist

Complete items indicated as Post-Construction QC Checklist items in the QC Checklist. Submit [four][_____] copies of the Post-Construction QC Checklist.

1.11.3 Closeout Quality Control (QC) Checklist

Complete items indicated as Closeout QC Checklist items in the QC Checklist. Submit [four][_____] copies of the Closeout QC Checklist.

PART 2 PRODUCTS

Provide products meeting the requirements of Section 23 09 13.00 22 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC, Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS for BACnet or Niagara BACnet systems, other referenced Sections, and this Section.

2.1 GENERAL PRODUCT REQUIREMENTS

Units of the same type of equipment must be products of a single manufacturer. Each major component of equipment must have the manufacturer's name and address, and the model and serial number in a conspicuous place. Materials and equipment must be standard products of a manufacturer regularly engaged in the manufacturing of these and similar products. The standard products must have been in a satisfactory commercial or industrial use for two years prior to use on this project. The two year use must include applications of equipment and materials under similar circumstances and of similar size. DDC Hardware not meeting the two-year field service requirement is acceptable provided it has been successfully used by the Contractor in a minimum of two previous projects. The equipment items must be supported by a service organization. Items of the same type and purpose must be identical, including equipment, assemblies, parts and components.

2.2 PRODUCT DATA

Provide manufacturer's product data sheets documenting compliance with product specifications for each product provided under Section 23 09 13.00 22 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC, Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS, or this Section. Provide product data for all products in a single indexed compendium, organized by product type.

For all BACnet hardware: for each manufacturer, model and version (revision) of DDC Hardware provide the Protocol Implementation Conformance Statement (PICS) in accordance with Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS.

2.3 OPERATION ENVIRONMENT

Unless otherwise specified, provide products rated for continuous

operation under the following conditions:

a. Pressure: Pressure conditions normally encountered in the installed location.

b. Vibration: Vibration conditions normally encountered in the installed location.

c. Temperature:

(1) Products installed indoors: Ambient temperatures in the range of 0 to 50 degrees C 32 to 112 degrees F and temperature conditions outside this range normally encountered at the installed location.

(2) Products installed outdoors or in unconditioned indoor spaces: Ambient temperatures in the range of [-37 to +66 degrees C -35 to +151 degrees F] [_____] and temperature conditions outside this range normally encountered at the installed location.

d. Humidity: 10 to 95 percent relative humidity, noncondensing and humidity conditions outside this range normally encountered at the installed location.

2.4 WIRELESS CAPABILITY

For products incorporating any wireless capability (including but not limited to radio frequency (RF), infrared and optical), provide products for which wireless capability can be permanently disabled at the device. Optical and infrared capabilities may be disabled via a permanently affixed opaque cover plate.

2.5 ENCLOSURES

Provide each digital controller, including gateways, in a factory fabricated enclosure. Enclosures supplied as an integral (pre-packaged) part of another product are acceptable. Provide enclosures meeting the following minimum requirements:

a. Provide with a hinged lockable door and an offset removable metal back plate, except controllers integral with terminal units, like those mounted on VAV boxes. Provide like-keyed locks for all hinged panels provided and a set of two Enclosure Keys for each lockable enclosure on a single ring per enclosure with a tag identifying the enclosure the keys operate.

b. Provide each enclosure with a main external power on/off switch located inside the cabinet.

c. Provide each enclosure with a separate 120VAC duplex convenience receptacle.

d. Provide each enclosure surge and transient power protection. Surge protection is not required for small terminal unit controllers such as VAV controllers.

2.5.1 Outdoors

For enclosures located outdoors, provide enclosures meeting NEMA 250 [Type 3][Type 4] requirements.

Enclosures, control panels and controllers located outdoors must be able to withstand extreme ambient conditions, without malfunction or failure, whether or not the controlled equipment is running. If necessary, provide a thermostatically controlled panel heater in freezing locations, and an internal ventilating fan in locations exposed to direct sunlight.

2.5.2 Mechanical and Electrical Rooms

For enclosures located in mechanical or electrical rooms, provide enclosures meeting NEMA 250 [Type 2][Type 4] requirements.

For enclosures located in mechanical rooms containing steam service or equipment, provide enclosures meeting NEMA 250 Type 4 requirements.

2.5.3 Other Locations

For enclosures in other locations including but not limited to occupied spaces, above ceilings, and in plenum returns, provide enclosures meeting NEMA 250 Type 1 requirements.

2.6 WIRE AND CABLE

Provide wire and cable meeting the requirements of NFPA 70 and NFPA 90A in addition to the requirements of this specification and referenced specifications.

2.6.1 Terminal Blocks

For terminal blocks which are not integral to other equipment, provide terminal blocks which are insulated, modular, feed-through, clamp style with recessed captive screw-type clamping mechanism, suitable for DIN rail mounting, and which have enclosed sides or end plates and partition plates for separation.

2.6.2 Control Wiring for Binary Signals

For Control Wiring for Binary Signals, provide 18 AWG (1.02 mm diameter) 18 AWG copper or thicker wire rated for 300-volt service.

2.6.3 Control Wiring for Analog Signals

For Control Wiring for Analog Signals, provide in accordance with the control manufacturer's recommendations and the following: Provide18 AWG (1.02 mm diameter) 18 AWG or thicker, copper, single- or multiple-twisted wire meeting the following requirements:

a. minimum 50 mm (2 inch) 2 inch lay of twist

b. 100 percent shielded pairs

c. at least 300-volt insulation

d. each pair has a 20 AWG tinned-copper drain wire and individual overall pair insulation

e. cables have an overall aluminum-polyester or tinned-copper cable-shield tape, overall 20 AWG tinned-copper cable drain wire, and overall cable insulation.

2.6.4 MS/TP Communication Bus

a. Provide system manufacturer's recommended or preferred cabling.

b. Follow cable manufacturer's recommendations or requirements based on the cable usage, such as outdoors and/or underground.

c. Splices in communication cable are not allowed. Segments of communication cable between field devices must be solid lengths with no splices.

2.6.5 Conduit

Conduit for controls less than 100 volts must be colored blue. Junction box cover plates for controls must be blue. Fittings and boxes do not need to be blue.

2.6.6 Power Wiring for Control Devices

For 24-volt circuits, provide insulated copper 18 AWG or thicker wire rated for 300 VAC service. For 120-volt circuits, provide 14 AWG or thicker stranded copper wire rated for 600-volt service.

2.6.7 Transformers

Provide UL 5085-3 approved transformers. Select transformers sized so that the connected load is no greater than 80 percent of the transformer rated capacity.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

3.1.1 Existing Conditions Survey

Perform a field survey, including testing and inspection of the equipment to be controlled and submit an Existing Conditions Report documenting the current status and its impact on the Contractor's ability to meet this specification. For those items considered nonfunctional, document the deficiency in the report including explanation of the deficiencies and estimated costs to correct the deficiencies. As part of the report, define the scheduled need date for connection to existing equipment. Make written requests and obtain Government approval prior to disconnecting any controls and obtaining equipment downtime.

Submit [four][_____] copies of the Existing Conditions Report.

3.1.2 Existing Equipment Downtime

Make written requests and obtain Government approval prior to disconnecting any controls and obtaining equipment downtime.

3.1.3 Existing Control System Devices

Inspect, calibrate, and adjust as necessary to place in proper working order all existing devices which are to be reused.

3.2 INSTALLATION

Fully install and test the control system in accordance Section 23 09 13.00 22 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC, Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS for BACnet or Niagara BACnet systems, and this Section.

3.2.1 Pre-Installation Meeting

Prior to starting the installation, meet with the Contracting Officer's Technical Representative (COTR) and the BAS owner to develop a mutual understanding relative to the details of the DDC system requirements. Requirements to be discussed include required submittals, work schedule, and field quality control.

3.2.2 Dielectric Isolation

Provide dielectric isolation where dissimilar metals are used for connection and support. Install control system in a matter that provides clearance for control system maintenance by maintaining access space required to calibrate, remove, repair, or replace control system devices. Install control system such that it does not interfere with the clearance requirements for mechanical and electrical system maintenance.

3.2.3 Penetrations in Building Exterior

Make all penetrations through and mounting holes in the building exterior watertight.

3.2.4 Device Mounting Criteria

Install devices in accordance with the manufacturer's recommendations and as indicated and shown. Provide a weathershield for all devices installed outdoors. Provide clearance for control system maintenance by maintaining access space required to calibrate, remove, repair, or replace control system devices. Provide clearance for mechanical and electrical system maintenance; do not not interfere with the clearance requirements for mechanical and electrical system maintenance. All devices must be mounted only to the cabinet backplane with adequate space allowed for serviceability and proper heat dissipation from devices.

3.2.5 Labels and Tags

Key all labels and tags to the unique identifiers shown on the As-Built drawings. For labels exterior to protective enclosures provide engraved plastic labels mechanically attached to the enclosure or DDC Hardware. Labels inside protective enclosures may be adhesive labels. Provide white labels with bold black block lettering. For tags, provide plastic or metal tags mechanically attached directly to each device or attached by a metal chain or wire.

a. Label all Enclosures and DDC Hardware.

b. Label each control panel, control device, actuator and sensor.

c. Label exterior of control actuator indicating the (full) open and (full) closed positions.

d. Components mounted above a ceiling or service hatch must also have the component identification visible from below. Examples: A VAV controller,or exhaust fan relay, identification would be included on the ceiling grid, or service hatch, in the area of the controller.

e. Tag Airflow measurement arrays (AFMA) with flow rate range for signal output range, duct size, and pitot tube AFMA flow coefficient.

f. Tag duct static pressure taps at the location of the pressure tap

3.2.6 Surge and Transient Protection

3.2.6.1 Power-Line Surge Protection

Provide surge suppressors on the incoming power at each direct digital controller or grouped terminal controllers and must be installed externally to the device or devices being protected. Surge suppressors are to be rated in accordance with UL 1449, have a fault indicating light, and conform to the following:

a. The device must be a transient voltage surge suppressor, hard-wire type individual equipment protector for 120 VAC/1 phase/2 wire plus ground.

b. The device must react within 5 nanoseconds and automatically reset.

c. The voltage protection threshold, line to neutral, must be no more than 211 volts.

d. Provide the device with an independent secondary stage equal to or greater than the primary stage joule rating.

e. The primary suppression system components must be pure silicon avalanche diodes.

f. The secondary suppression system components must be silicon avalanche diodes or metal oxide varistors.

g. Procide device with an indication light to indicate the protection components are functioning.

h. All system functions of the transient suppression system must be individually fused and not short circuit the AC power line at any time.

i. Provide device with an EMI/RFI noise filter with a minimum attenuation of 13 dB at 10 kHz to 300 MHz.

j. The device must comply with IEEE C62.41.1 and IEEE C62.41.2, Class "B" requirements and be tested according to IEEE C62.45.

k. The device is to be capable of operating between minus 20 degrees F and plus 122 degrees F.

3.2.6.2 Surge Protection for Transmitter and Control Wiring

Provide surge and transient protection for DDC controllers and DDC network related devices connected to phone lines, network communication lines, lines from exterior equipment, and lines from other buildings including mechanical buildings in accordance with the following:

a. The device must provide continuous, non-interrupting protection, and automatically reset after safely eliminating transient surges.

b. The protection must react within 5 nanoseconds using only solid-state silicon avalanche technology.

c. Install the device at the distance recommended by its manufacturer.

3.2.7 Basic Cybersecurity Requirements

3.2.7.1 Passwords

For all devices with a password, change the password from the default password. Do not use the same password for more than one device. Coordinate selection of passwords with Contracting Officer. Provide a Password Summary Report documenting the password for each device and describing the procedure to change the password for each device.

Provide [two][_____] hardcopies of the Password Summary Report, each copy in its own sealed envelope.

3.2.7.2 Wireless Capability

Unless otherwise indicated, disable wireless capability (including but not limited to radio frequency (RF), infrared and optical) for all devices with wireless capability. Optical and infrared capabilities may be disabled via a permanently affixed opaque cover plate. Password protecting a wireless connections does not meet this requirement; the wireless capability must be disabled.

3.2.7.3 IP Network Physical Security

Install all IP Network media, to include all power and signal wire, in rigidconduit. Install all IP devices including but not limited to IP-enabled DDC hardware and IP Network Hardware in lockable enclosures.

3.2.8 Wiring Criteria

a. Run circuits operating at more than 100 volts in rigid or flexible conduit, metallic tubing, covered metal raceways, or armored cable.

b. Run all control wiring in rigid or flexible conduit, metallic tubing, or covered metal raceways, unless noted otherwise. All control wiring located inside mechanical rooms to be in conduit or metallic tubing. All conduit and junction box covers to be blue in color."

c. Do not run binary control circuit wiring in the same conduit as power wiring over 100 volts. Where analog signal wiring requires conduit, do not run in the same conduit with AC power circuits or control circuits operating at more than 100 volts.

d. Provide circuit and wiring protection required by NFPA 70.

e. Minimum conduit size is 3/4-inch, except 1/2-inch may be used from last junction box to the terminal device. Maximum conduit fill is 40 percent or the cable manufacturer's recommended amount whichever is less. Provide plastic end sleeves at all conduit terminations to protect wiring from burrs.

f. Do not bury aluminum-sheathed cable or aluminum conduit in concrete.

g. Input/output identification: Permanently label each field-installed wire, cable, and pneumatic tube at each end with descriptive text using a commercial wire marking system. Labels is to fully encircle the wire, cable, or tube. The single line text is to run parallel to the wire, cable, or tube and must be repeated so as to be viewable without twirling or twisting the wire. Locate the markers within 2 inches of each termination. Include on the label the type of network and destination of cable (ex. BACnet/AHU-1). Match the names and I/O number to the project's point list. Similarly label all power wiring serving control devices, including the word "power" and panel board and circuit number, or transformer location in the label. Number each pneumatic tube every six feet. Label all terminal blocks with alpha/numeric labels. All wiring and the methods must be in accordance with UL 508A.

h. Permanently display controller wiring diagram for each controller on the inside of the control cabinet door. Diagram must be neatly lettered and taped or adhered with sticky back label.

i. Conduit identification: Label all conduits at 36 inches from terminations, boxes, or bends. Labels to be 3/8 inches, black lettering on white background, and indicate what system the conduit contains. Label is to be visible and legible from at least three sides with a minimum dimension of 1.9 inches x 4 inches. Conduit that includes power circuits are to be labeled with source panel and circuit, and destination cabinet or equipment.

j. Each terminal device is to have its own terminal conduit run. Device boxes or devices are not be used as "pass thru" for wiring.

k. Run conduit to equipment and devices tight to walls, and ceilings. Avoid conduit on the floor, i.e. conduit must not block access to or past equipment. Flex conduit is to be used only when EMT or rigid conduit is not able to satisfy the application such as a transition to a sensor or equipment. Limit Flex conduit to a maximum length of 3 ft.

l. For controller power, provide new 120 VAC circuits with ground if not defined on the electrical drawings. Provide each circuit with a dedicated breaker and run wiring in its own conduit, separate from any control wiring. Connect the controller's ground wire to the electrical panel ground. Conduit grounds are not acceptable.

m. Power the Supervisory Building Controllers (SBC) from a dedicated transformer for the SBC only. Each control cabinet must have a dedicated 24 volt transformer. The 120 VAC power branch circuit are to be dedicated to the DDC control system. Factory provided transformers in equipment must be used as a source of power only for the control devices intended by the equipment manufacturer.

n. Surge Protection: Install surge protection according to manufacturer's

instructions. Multiple controllers fed from a common power supply may be protected by a common surge protector, properly sized for the total connected devices.

o. Make all terminations in panels at a terminal block if not connected directly to a panel device, ie Field Controller, Supervisory Controller. No wire nuts are allowed in panels. High and low voltage wires must not land on the same terminal block unless they are separated and of a different color and/or clearly identified.

p. Grounding: Ground controllers and cabinets to a good earth ground as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Conduit grounding is not acceptable. All grounding must have a direct path to the building earth ground. Ground sensor drain wire shields at the controller end.

q. Correct all associated MS/TP and SA bus wiring, termination, end of line, and ground loop problems.

r. Run wiring in panel enclosures in covered wire track.

s. Control cabinets and wiring boxes must be clean of all debris.

t. Low voltage cable must not be supported directly from "all thread" rod. If cabling/wiring is permitted to be run without conduit/raceway it must be supported using a retaining device such as a bridle ring or J hook, and where appropriate connected to the all thread rod using a standoff device. Openly installed cabling/wiring must be approved by Camp Lejeune Public Works Department.

u. For serviceability, allow a minimum of 2 inches of exposed wire or cable from any termination point, i.e. between Panduit and field controller terminations.

3.2.9 Network and Telephone Communication Lines

When telephone lines or network connections by the Government are required, provide the Contracting Officer at least 120 days advance notice of need. Provide one inch conduit and two (2)green Cat 6 cables from the point of connection of the BAS to the point of connection to the MCEN (most likely in the telephone equipment room). Cables must be terminated and tested.

3.2.10 Interface With Existing UMCS

Provide 16 hours of assistance to the Government with interfacing the BAS to the Base wide UMCS. The Government will make the final connection of the BAS to the MCEN. This 16 hours does not include completion or corrections to the installed BAS as defined in the contract documents. This 16 hours is for assisting the interface and for making revisions to the BAS that may be needed outside of the contract requirements. As-Built control drawings must be available for the UMCS operator performing the interfacing.

3.3 DRAWINGS AND CALCULATIONS

Provide drawings in the form and arrangement indicated and shown. Use the

same abbreviations, symbols, nomenclature and identifiers shown. Assign a unique identifier as shown to each control system element on a drawing. When packaging drawings, group schedules by system. When space allows, it is permissible to include multiple schedules for the same system on a single sheet. Except for drawings covering all systems, do not put information for different systems on the same sheet.

Provide a title sheet for the control system drawing set. Include the project title, project location, contract number, the controls contractor preparing the drawings, an index of the control drawings in the set, and a legend of the symbols and abbreviations used throughout the control system drawings. The Title Block of each drawing must include the Drawing revision, i.e. Submittal, Revision 1, Revision 2, As-Built, etc., including the date.

Submit hardcopy drawings on [ISO A1 841 by 594 mm 34 by 22 inches][or][A3 420 by 297 mm 17 by 11 inches] sheets, and electronic drawings in PDF and in [AutoCAD 2016] format. In addition, submit electronic drawings in editable Excel format for all drawings that are tabular, including but not limited to the Point Schedule and Equipment Schedule.

a. Submit DDC Contractor Design Drawings consisting of each drawing indicated with pre-construction information depicting the intended control system design and plans. Submit DDC Contractor Design Drawings as a single complete package: [_____] hard copies and [_____] copies on CD-ROM.

b. Submit Draft As-Built Drawings consisting of each drawing indicated updated with as-built data for the system prior to PVT. Submit Draft As-Built Drawings as a single complete package: [_____] hard copies and [_____] copies on CD-ROM.

c. Submit Final As-Built Drawings consisting of each drawing indicated updated with all final as-built data. Final As-Built Drawings as a single complete package: [_____] hard copies and [_____] copies on CD-ROM.

3.3.1 Sample Drawings

Sample drawings in electronic format are available at the Whole Building Design Guide page for this section: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-23-09-00 These drawings may prove useful in demonstrating expected drawing formatting and example content and are provided for illustrative purposes only. Note that these drawings do not meet the content requirements of this Section and must be completed to meet project requirements.

3.3.2 Drawing Index and Legend

Provide an HVAC Control System Drawing Index showing the name and number of the building, military site, State or other similar designation, and Country. In the Drawing Index, list all Contractor Design Drawings, including the drawing number, sheet number, drawing title, and computer filename when used. In the Design Drawing Legend, show and describe all symbols, abbreviations and acronyms used on the Design Drawings. Provide a single Index and Legend for the entire drawing package.

3.3.3 Thermostat and Occupancy Sensor Schedule

Provide a thermostat and occupancy sensor schedule containing each thermostat's unique identifier, room identifier and control features and functions as shown. Provide a single thermostat and occupancy sensor schedule for the entire project.

3.3.4 Valve Schedule

Provide a valve schedule containing each valve's unique identifier, size, flow coefficient Kv (Cv), pressure drop at specified flow rate, spring range, positive positioner range, actuator size, close-off pressure to torque data, dimensions, and access and clearance requirements data. In the valve schedule include actuator selection data supported by calculations of the force required to move and seal the valve, access and clearance requirements. Provide a single valve schedule for the entire project.

3.3.5 Damper Schedule

Provide a damper schedule containing each damper's unique identifier, type (opposed or parallel blade), nominal and actual sizes, orientation of axis and frame, direction of blade rotation, actuator size and spring ranges, operation rate, positive positioner range, location of actuators and damper end switches, arrangement of sections in multi-section dampers, and methods of connecting dampers, actuators, and linkages. Include the AMCA 511 maximum leakage rate at the operating static-pressure differential for each damper in the Damper Schedule. Provide a single damper schedule for the entire project.

3.3.6 Project Summary Equipment Schedule

Provide a project summary equipment schedule containing the manufacturer, model number, part number, descriptive name, firmware version, serial number, physical location (e.g. Building 4, room 112 overhead), and power requirements (e.g. AC/DC voltage and power draw) for each control device, hardware and component provided under this specification. Provide a single project equipment schedule for the entire project.

3.3.7 Equipment Schedule

Provide system equipment schedules containing the unique identifier, manufacturer, model number, part number and descriptive name for each control device, hardware and component provided under this specification. Provide a separate equipment schedule for each HVAC system.

3.3.8 Occupancy Schedule

Provide an occupancy schedule drawing containing the same fields as the occupancy schedule Contract Drawing with Contractor updated information. Provide a single occupancy schedule for the entire project.

3.3.9 DDC Hardware Schedule

Provide a single DDC Hardware Schedule for the entire project and including following information for each device.

3.3.9.1 DDC Hardware Identifier

The Unique DDC Hardware Identifier for the device.

3.3.9.2 HVAC System

The system "name" used to identify a specific system (the name used on the system schematic drawing for that system).

3.3.9.3 BACnet Device Information

3.3.9.3.1 Device Object Identifier

Assign unique device "Object_Identifier" property numbers or device instances for each device on the BACnet internetwork. Provide for future modification of the device instance number. Instance numbers must be field assignable.

3.3.9.3.2 Device Object Name Property Text

Each object on the Camp Lejeune UMCS has a unique point name, which is made up of the object or short name stored in the controller and the equipment identifier, which is stored in the supervisory building controller (SBC). The long point name combines this object name with the name stored in the SBC that describes the controller or location of the object. The device object name property field must support 32 minimum printable characters. The point name follows the general convention:

Building.Equipment.Object Name

Example: HP512.AHU-3.DA-T. See Attachments one through three for equipment names, object names, object groupings, and area names.

3.3.9.3.3 Object Name Property Text (Other than Device Objects)

The object name identifies the specific point. Only object names on the approved Camp Lejeune list must be used. From the example above, the point name is: "DA-T". See Attachment for the approved Camp Lejeune list. The object name property field must support 32 minimum printable characters.

3.3.9.3.4 Object Description

The controller must also store an alpha numeric description of the object name. The controller must support a minimum of 30 printable characters. From the example above the object description is: "Discharge Air Temperature".

3.3.9.3.5 List of Attachments

The following attachments can be found at the end of this specification.

Attachment 1 - Equipment Names
Attachment 2 - Object Names
Attachment 3 - Object Grouping

3.3.9.3.6 Setpoints

All setpoints must be BACnet exposed for auto discovery purposes if needed.

3.3.9.3.7 Plant Controllers

Equipment such as VFD's, chillers, and boilers must have hardwired enable(start/stop) and status points from the plant controller. VFD's must also have a hardwired speed command. Software points are not allowable. Additionally, this equipment must have a BACnet interface for monitoring.

3.3.9.3.8 Network Number

The Network Number for the device.

3.3.9.3.9 MAC Address

The MAC Address for the device. For MS/TP networks, assign addresses from 0-127. Do not use the controls manufacturer reserved addresses for field controllers. This is typically 0-3. Also the BACnet Instance ID for MAC Address 127, Trunk 1, is reserved for the Supervisory controller. Supervisory Controller Global ID and instance numbers are to be obtained from Camp Lejeune Public Works Operations to ensure duplicates do not occur. Point of Contact:

Public Works Division/EMCS
1005 Michael Road/Building 1005
MCB Camp Lejeune, NC 28547
(910) 450-7846

3.3.9.3.10 BTL Listing

The BTL Listing of the device. If the device is listed under multiple BTL Profiles, indicate the profile that matches the use and configuration of the device as installed.

3.3.9.3.11 Proprietary Services Information

If the device uses non-standard ASHRAE 135 services as defined and permitted in Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS, indicate that the device uses non-standard services and include a description of all non-standard services used. Describe usage and content such that a device from another vendor can interoperate with the device using the non-standard service. Provide descriptions with sufficient detail to allow a device from a different manufacturer to be programmed to both read and write the non-standard service request:

a. read: interpret the data contained in the non-standard service and;

b. write: given similar data, generate the appropriate non-standard service request.

3.3.9.3.12 Alarming Information

Indicate whether the device is used for alarm generation, and which types of alarm generation the device implements: intrinsic, local algorithmic, remote algorithmic.

3.3.9.3.13 Scheduling Information

Indicate whether the device is used for scheduling.

3.3.9.3.14 Trending Information

Indicate whether the device is used for trending, and indicate if the device is used to trend local values, remote values, or both.

3.3.9.4 Niagara Station ID

The Niagara Station ID for each Niagara Framework Supervisory Gateway

3.3.10 Points Schedule

Provide a Points Schedule in tabular form for each HVAC system, with the indicated columns and with each row representing a hardware point, network point or configuration point in the system.

a. When a Points Schedule was included in the Contract Drawing package, use the same fields as the Contract Drawing with updated information in addition to the indicated fields.

b. When Point Schedules are included in the contract package, items requiring contractor verification or input have been shown in angle brackets ("<" and ">"), such as <___> for a required entry or <value> for a value requiring confirmation. Complete all items in brackets as well as any blank cells. Do not modify values which are not in brackets without approval.

Points Schedule Columns must include:

3.3.10.1 Point Name

The abbreviated name for the point using the indicated naming convention. All points must adhere to the Camp Lejeune standard naming conventions.

3.3.10.2 Description

A brief functional description of the point such as "Supply Air Temperature".

3.3.10.3 DDC Hardware Identifier

The Unique DDC Hardware Identifier shown on the DDC Hardware Schedule and used across all drawings for the DDC Hardware containing the point.

3.3.10.4 Settings

The value and units of any setpoints, configured setpoints, configuration parameters, and settings related to each point.

3.3.10.5 Range

The range of values, including units, associated with the point, including but not limited to a zone temperature setpoint adjustment range, a sensor measurement range, occupancy values for an occupancy input, or the status

of a safety.

3.3.10.6 Input or Output (I/O) Type

The type of input or output signal associated with the point. Use the following abbreviations for entries in this column:

a. AI: The value comes from a hardware (physical) Analog Input

b. AO: The value is output as a hardware (physical) Analog Output

c. BI: The value comes from a hardware (physical) Binary Input

d. BO: The value is output as a hardware (physical) Binary Output

e. PULSE: The value comes from a hardware (physical) Pulse Accumulator Input

f. NET-IN: The value is provided from the network (generally from another device). Use this entry only when the value is received from another device as part of scheduling or as part of a sequence of operation, not when the value is received on the network for supervisory functions such as trending, alarming, override or display at a user interface.

g. NET-OUT: The value is provided to another controller over the network. Use this entry only when the value is transmitted to another device as part of scheduling or as part of a sequence of operation, not when the value is transmitted on the network for supervisory functions such as trending, alarming, override or display at a user interface.

3.3.10.7 Object and Property Information

The Object Type and Instance Number for the Object associated with the point. If the value of the point is not in the Present_Value Property, then also provide the Property ID for the Property containing the value of the point. Any point that is displayed at the front end or on an LDP, is trended, is used by another device on the network, or has an alarm condition must be documented here.

3.3.10.8 Niagara Station ID

The Niagara Station ID of the Niagara Framework Supervisory Gateway the point is mapped into.

3.3.10.9 Network Data Exchange Information (Gets Data From, Sends Data To)

Provide the DDC Hardware Identifier of other DDC Hardware the point is shared with.

3.3.10.10 Override Information (Object Type and Instance Number)

For each point requiring an Override and not residing in a Niagara Framework Supervisory Gateway, indicate if the Object for the point is Commandable or, if the use of a separate Object was specifically approved by the Contracting Officer, provide the Object Type and Instance Number of

the Object to be used in overriding the point.

3.3.10.11 Alarm Information

For Niagara BACnet systems: Indicate the Alarm Generation Type and Notification Class Object Instance Number for each point requiring an alarm. (Note that not all alarms will have a Notification Class Object.)

3.3.10.12 Configuration Information

Indicate the means of configuration associated with each point. For points in a Niagara Framework Supervisory Gateway, indicate the point within the Niagara Framework Supervisory Gateway used to configure the value. For other points:

a. For Operator Configurable Points indicate BACnet Object and Property information (Name, Type, Identifiers) containing the configurable value. Indicate whether the property is writable always, or only when Out_Of_Service is TRUE.

b. For Configurable Points indicate the BACnet Object and Property information as for Operator Configurable points, or identification of the configurable settings from within the engineering software for the device or identification of the hardware settings on the device.

3.3.11 Riser Diagram

The Riser Diagram of the Building Control Network may be in tabular form, and must show all DDC Hardware and all Network Hardware, including network terminators. For each item, provide the unique identifier, common descriptive name, physical sequential order (previous and next device on the network), room identifier and location within room. If applicable, show connections to existing networks and include the existing network in the riser diagram. Include surge protection device locations on the riser when the field controller communication trunk is leaving or entering a building. A single riser diagram must be submitted for the entire system.

3.3.12 Control System Schematics

Provide control system schematics in the same form as the control system schematic Contract Drawing with Contractor updated information. Provide a control system schematic for each HVAC system. Include the following:

a. Location of each input and output device,specify room # for remote devices.

b. Flow diagram for each piece of HVAC equipment

c. Name or symbol for each control system component, such as V-1 for a valve

d. Setpoints, with differential or proportional band values

e. Written sequence of operation for the HVAC equipment

f. Valve and Damper Schedules, with normal (power fail) position

g. Control cabinet general layout, include all devices, point count, point connection terminal numbers, and cable type (18/2, 18/3, etc); 24VAC VA power requirement for all devices including those powered from the cabinet.

3.3.13 Control Logic Diagrams

Provide HVAC equipment control logic diagrams. Indicate required electrical interlocks. Logic diagram schematics must include 120 VAC and low voltage devices in each panel. Logic diagram schematics must also include all field devices (sensors, relays actuators, etc) and any connection point to controlled equipment or devices.

3.3.14 Controller, Motor Starter and Relay Wiring Diagram

Provide controller wiring diagrams as functional wiring diagrams which show the interconnection of conductors and cables to each controller and to the identified terminals of input and output devices, starters and package equipment. Show necessary jumpers and ground connections and the labels of all conductors. Identify sources of power required for control systems and for packaged equipment control systems back to the panel board circuit breaker number, controller enclosures, magnetic starter, or packaged equipment control circuit. Show each power supply and transformer not integral to a controller, starter, or packaged equipment. Show the connected volt-ampere load and the power supply volt-ampere rating. Provide wiring diagrams for each HVAC system.

3.4 CONTROLLER TUNING

Tune each controller in a manner consistent with that described in the ASHRAE FUN SI ASHRAE FUN IP and in the manufacturer's instruction manual. Tuning must consist of adjustment of the proportional, integral, and where applicable, the derivative (PID) settings to provide stable closed-loop control. Each loop must be tuned while the system or plant is operating at a high gain (worst case) condition, where high gain can generally be defined as a low-flow or low-load condition. Upon final adjustment of the PID settings, in response to a change in controller setpoint, the controlled variable must settle out at the new setpoint with no more than two (2) oscillations above and below setpoint. Upon settling out at the new setpoint the controller output must be steady. With the exception of naturally slow processes such as zone temperature control, the controller must settle out at the new setpoint within five (5) minutes. Set the controller to its correct setpoint and record and submit the final PID configuration settings with the O&M Instructions and on the associated Points Schedule.

3.5 START-UP

3.5.1 Start-Up Test

Perform the following startup tests for each control system to ensure that the described control system components are installed and functioning per this specification.

Adjust, calibrate, measure, program, configure, set the time schedules, and otherwise perform all necessary actions to ensure that the systems function as indicated and shown in the sequence of operation and other

contract documents.

3.5.1.1 Systems Check

An item-by-item check must be performed for each HVAC system

3.5.1.1.1 Step 1 - System Inspection

a. Confirm all mechanical installation work is success fully completed and started up by the appropriate personnel.

b. With the system in unoccupied mode and with fan hand-off-auto switches in the OFF position, verify that power and main air are available where required and that all output devices are in their failsafe and normal positions. Compile a list of output devices and document device normal position and date verified.

c. Inspect each local display panel and each M&C Client to verify that all displays indicate shutdown conditions.

d. Confirm each controller works properly in stand-alone mode by disconnecting the BACnet bus.

3.5.1.1.2 Step 2 - Calibration Accuracy Check

Perform a two-point accuracy check of the calibration of each HVAC control system sensing element and transmitter by comparing the value from the test instrument to the network value provided by the DDC Hardware. Use digital indicating test instruments, such as digital thermometers, motor-driven psychrometers, and tachometers. Use test instruments with accuracy at least twice as accurate as the specified sensor accuracy and with calibration traceable to National Institute of Standards and Technology standards. Check the first check point in the bottom one-third of the sensor range, and the second in the top one-third of the sensor range. Verify that the sensing element-to-DDC readout accuracies at two points are within the specified product accuracy tolerances, and if not recalibrate or replace the device and repeat the calibration check. Compile a list of each sensor and document the sensor reading, initial measured value, sensor calibrated value and sensor calibration date.

3.5.1.1.3 Step 3 - Actuator Range Check

With the system running, apply a signal to each actuator through the DDC Hardware controller. Verify proper operation of the actuators and positioners for all actuated devices and record the signal levels for the extreme positions of each device. Vary the signal over its full range, and verify that the actuators travel from zero stroke to full stroke within the signal range. Where applicable, verify that all sequenced actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other. For valve actuators and damper actuators, perform the actuator range check under normal system pressures. Compile a list of each device and document the span for that device, span setting, and adjustment date.

3.5.1.2 Weather Dependent Test

Perform weather dependent test procedures in the appropriate climatic season.

3.5.2 Start-Up Testing Report

Submit [4] [_____] copies of the Start-Up Testing Report. The report may be submitted as a Technical Data Package documenting the results of the tests performed and certifying that the system is installed and functioning per this specification, and is ready for the Performance Verification Test (PVT). Include lists compiled during Start-Up tests.

3.6 PERFORMANCE VERIFICATION TESTING

3.6.1 General

PVT testing must demonstrate compliance of controls work with contract document requirements and must be performed by the Controls Contractor and Equipment Suppliers.

3.6.2 Performance Verification Testing and Commissioning

PVT testing is a Government quality assurance function that includes systems trending and field tests. Commissioning is a quality control function that is the Commissioning Team’s responsibility to the extent required by this contract.

3.6.3 Performance Verification Testing of Equipment with Packaged Controls

Controls Contractor and Equipment Supplier(s) must share and coordinate PVT testing responsibilities for equipment provided with on-board factory packaged controls such as boiler controllers, dedicated outside air systems (DOAS’s), and packaged pumping systems.

3.6.3.1 Controls Contractor Responsibilities

The Controls Contractor must provide a PVT Plan separate from Equipment Supplier’s performance verification testing plan, perform endurance testing, and perform PVT testing concurrent with Equipment Suppliers’ testing for equipment provided with on-board factory packaged controls to demonstrate the following:

a. Equipment enabling and disabling.

b. Equipment standard and optional control points necessary to accomplish functionality regardless if specified in contract documents or not.

c. Equipment standard and optional alarms critical to safe operation regardless if specified in contract documents or not.

d. All control points added by Controls Contractor in addition to onboard factory packaged controls regardless if specified in contract documents or not.

Refer to paragraphs titled “Performance Verification Test Plan” and “Endurance Testing” for additional information.

3.6.3.2 Equipment Supplier Responsibilities

Each Equipment Supplier must provide PVT Plans separate from Controls Contractor’s plans and perform PVT testing concurrent with Controls Contractor’s testing for their equipment provided with on-board factory packaged controls to demonstrate the following:

a. Equipment standard and optional control features necessary to accomplish functionality regardless if specified in contract documents or not.

b. Equipment standard and optional operation modes necessary to accomplish functionality regardless if specified in contract documents or not.

c. Equipment standard and optional alarm conditions for safe operation regardless if specified in contract documents or not.

Refer to all paragraphs under paragraph titled “Performance Verification Testing” except for section titled “Endurance Testing” for additional information.

3.6.4 Sequencing of Performance Verification Testing Activities

PVT activities must be sequenced with major activities listed below for Test and Balance (TAB) Contractor, Equipment Suppliers, Commissioning Specialists, and others to demonstrate fully functioning systems. Major activities as applicable to this contract must be sequenced as indicated in TABLE II: SEQUENCING OF PVT TESTING ACTIVITIES

TABLE II: SEQUENCING OF PVT TESTING ACTIVITIES

SEQUENCE	ITEM
1	Submission, review, and approval of Control Contractors PVT Plans.
2	Submission, review, and approval of Equipment Suppliers PVT Plans.
3	Submission, review, and approval of certified final Test and Balance Report.
4	Conduct endurance testing.
5	Submission, review, and approval of all of the Commissioning Specialists completed functional performance tests.
6	Submission, review, and approval of endurance testing.
7	Request Contracting Officer to allow beginning of Government-witnessed PVT testing.
8	Contracting Officers approval to begin PVT testing.

TABLE II: SEQUENCING OF PVT TESTING ACTIVITIES	
SEQUENCE	ITEM
9	Conduct PVT field work.
10	Governments verbal approval of PVT field work for all systems.
11	Conduct Test and Balance verification field work.
12	Governments written approval of Test and Balance verification field work.
13	Governments written approval of PVT field work for all systems.
14	Facility acceptance recommendation.
15	Submission, review, and approval of Control Contractors PVT Report.
16	Submission, review, and approval of Equipment Suppliers PVT Report.
17	Conduct endurance testing within 10 months of beneficial occupancy.
18	Submission, review, and approval of endurance testing within 10 months of beneficial occupancy.
19	Conduct PVT field work within 10 months of beneficial occupancy.

3.6.4.1 PVT Testing for Multi-Phase Construction

For air moving systems except outside air systems serving multiple phases, all major activities listed in TABLE II through Government’s verbal approval of Test and Balance verification field work can be completed by phase if all ductwork construction is completed for that phase.

For primary systems such as chilled water systems, HVAC heating hot water systems, and outside air systems serving multiple phases, all major activities listed listed in TABLE II through Government’s verbal approval of Test and Balance verification field work for all air moving systems served by that primary system for that phase must be completed prior to conducting PVT field work for that primary system.

3.6.5 Control Contractor's Performance Verification Testing Plan

Submit a detailed PVT Plan of the proposed control systems testing in this contract for approval prior to its use. Develop and use a single PVT Plan for each system with a unique control sequence. Systems sharing an identical control sequence can be tested using copies of the PVT Plan intended for these systems.

PVT Plans must include system-based, step-by-step test methods demonstrating system performs in accordance with contract document requirements. The Government may provide sample PVT Plans upon request. PVT Plans must include the following:

a. Control sequences from contract documents segmented such that each control algorithm, operation mode, and alarm condition is immediately followed by numbered test methods required to initiate a response, expected response, space for comments, and “pass" or "fail” indication for each expected response.

b. PVT Plans with control sequences from contract documents that are not segmented into parts will not be accepted.

c. Indication where assisting personnel are required such as Mechanical Contractor.

d. Signature and date lines for the Contractor's PVT administrator, Contractor's quality assurance representative, and Contracting Officer's representative acknowledging completion of testing.

3.6.6 Performance Verification Testing Sample Size

PVT testing sample sizes will be as follows:

a. 100-Percent of the following systems:

(1) primary systems including, but not limited to, chilled water and HVAC heating hot water systems

(2) air handling unit systems including all associated fans except for remote exhaust air fans

(3) DOAS’s including all associated fans except for remote exhaust air fans

b. 20-Percent of each set of systems with a shared identical control sequence for systems such as:

(1) air terminal units

(2) exhaust air fans

(3) terminal equipment such as fan coil units and unit heaters

3.6.6.1 Selection of Systems to Test

For sample sets less than 100-percent, the Government will choose which systems will be tested. The Government may require additional testing if previous testing results are inconsistent or demonstrate improper system control as follows:

a. An additional 25-percent after five-percent failure rate of first sample set.

b. 100-percent after any failures occurring in additional sample set.

3.6.7 Conducting Performance Verification Testing

At least 15 days prior to preferred test date, request the Contracting Officer to allow the beginning of Government-witnessed PVT testing. Provide an estimated time table required to perform testing of each

system. Furnish personnel, equipment, instrumentation, and supplies necessary to perform all aspects of testing. Testing personnel must be regularly employed in the testing and calibration of control systems. After receipt of Contracting Officer’s approval to begin testing, perform PVT testing using project's as-built (shop) control system drawings, project's design drawings, and approved PVT Plans.

During testing, identify deficiencies that do not meet contract document requirements. Deficiencies must be investigated, corrected with corrections documented, and re-tested at a later date following procedures for the initial PVT testing. The Government may require re-testing of any control system components affected by the original failed test.

3.6.8 Endurance Testing

3.6.8.1 General

Conduct endurance testing for each system subject to PVT testing beginning when indicated in “Sequencing of Performance Verification Testing Activities”. Systems must be operating as normally anticipated during occupancy throughout endurance testing.

3.6.8.2 Hardware

Use hardware provided in this contract for testing.

If insufficient buffer capacity exists to trend the entire endurance test, upload trend data during the course of endurance testing to ensure all trend data is retained. Lost trend data will require retesting of all control points for affected system(s).

3.6.8.3 Endurance Testing Results Format

Submit endurance testing results for each tested system in a graphical format complete with clear indication of value(s) for y-axis, value for x-axis, and legend identifying each trended control point. The number of control points contained on a single graph must be such that all control points can be clearly visible. Control points must be logically grouped such that related points appear on a single graph. In addition, submit a separate comma separated value (CSV) file of raw trend data for each trended system. Each trended control point in CSV file must be clearly identified.

For control points recorded based on change of value, change of value for recording data must be clearly identified for each control point.

3.6.8.4 Endurance Testing Start, Duration, and Frequency

Trending of all control points for a given system must start at an identical date and time regardless of the basis of data collection. Duration of all endurance tests must be at least one-week.

Unless specified otherwise for control points recorded based on time, frequency of data collection must be 15-minutes. Frequency of data collection for specific types of control points is as follows:

3.6.8.4.1 Points Trended at One Minute Intervals

a. Temperature for supply air, return air, mixed air, supply water, and return water

b. Temperature for outside air, supply air, return air and exhaust air entering and leaving energy recovery device

c. Flow for supply air, return air, outside air, chilled water, and HVAC heating hot water

d. Flow for exhaust air associated with energy recovery

e. Relative humidity for outside air and return air

f. Relative humidity for outside air, supply air, return air and exhaust air entering and leaving energy recovery device

g. Command and status for control dampers and control valves

h. Speed for fans and pumps

i. Pressure for fans and pumps

3.6.8.4.2 Points Trended at 15 Minute Intervals

a. Temperature and relative humidity for zones

b. Temperature and relative humidity for outside air not associated with energy recovery

c. Command and status for equipment

d. Pressure relative to the outside for facility

3.6.8.5 Trended Control Points

Trended control points for each system must demonstrate each system performs in accordance with contract document requirements. Trended control points must include, but not be limited to, control points listed in contract document points list.

Minimum control points that are required to be trended for selected systems are listed below. These control points must be trended as applicable to this contract in addition to control points necessary to demonstrate systems perform in accordance with contract document requirements and those listed in contract document’s points list.

3.6.8.5.1 Air-Cooled Chiller Chilled Water System.

a. Chiller(s) command and status

b. Chiller isolation valve(s) command and status

c. Chilled water pump(s) actual speed

d. Chilled water pump(s) setpoint and actual differential pressure

e. Minimum flow bypass control valve command

f. Minimum system flow setpoint and actual flow

g. Chilled water supply setpoint and actual temperature

h. Chilled water return actual temperature

i. Chilled water actual flow

j. Outside air actual dry-bulb temperature

3.6.8.5.2 HVAC Heating Hot Water System with Boiler.

a. Boiler(s) command and status

b. Boiler(s) isolation valve command and status

c. HVAC heating hot water pump(s) actual speed

d. HVAC heating hot water pump(s) setpoint and actual differential pressure

e. Minimum flow bypass control valve command

f. Minimum system setpoint and actual flow

g. HVAC heating hot water supply setpoint and actual temperature

h. HVAC heating hot water return actual temperature

i. HVAC heating hot water actual flow

j. Outside air actual dry-bulb temperature

3.6.8.5.3 Air Handling Unit with Relief Air Fan

a. Outside air actual dry-bulb temperature

b. Outside air actual relative humidity

c. Outside air setpoint and actual airflow

d. Minimum outside air control damper command

e. Economizer outside air control damper command

f. Facility setpoint and actual relative pressure

g. Return air actual dry-bulb temperature

h. Return air actual relative humidity

i. Return air control damper command

j. Relief air control damper command

h. Relief air fan actual speed

i. Mixed air setpoint and setpoint and actual temperature

j. Preheat coil leaving air setpoint and actual temperature

k. Preheat coil control actuator command

l. Cooling coil leaving air setpoint and actual temperature

m. Cooling coil control valve command

n. Supply air fan actual speed

o. Discharge air actual temperature

p. Supply air fan setpoint and actual static pressure

3.6.8.5.4 Dedicated Outside Air System (DOAS)

a. Outside air actual dry-bulb temperature

b. Outside air actual relative humidity

c. Outside air isolation damper command and status

d. Outside air setpoint and actual airflow

e. Energy recovery wheel command, status, and actual speed

f. Energy recovery wheel’s OA bypass control damper command and status

g. Energy recovery wheel’s defrost cycle command and status

h. Energy recovery wheel’s OA discharge air actual dry-bulb temperature

i. Energy recovery wheel’s OA discharge air actual relative humidity

j. Preheat coil leaving air setpoint and actual temperature

h. Preheat coil control actuator command

i. Cooling coil leaving air setpoint and actual temperature

j. Cooling coil control valve command

k. Supply air fan actual speed

l. Reheat coil control valve command

m. Discharge air setpoint and actual temperature

n. Supply air fan setpoint and actual static pressure

o. Facility setpoint and actual relative pressure

p. Return air actual dry-bulb temperature

q. Return air actual relative humidity

r. Energy recovery wheel’s EA bypass control damper command and status

s. Energy recovery wheel’s EA discharge air actual dry-bulb temperature

t. Energy recovery wheel’s EA discharge air actual relative humidity

u. Exhaust air fan actual speed

v. Exhaust air isolation damper command and status

3.6.8.5.5 Series Fan-Powered Supply Air Terminal Units

a. Zone setpoint and actual dry-bulb temperature

b. Zone actual relative humidity

c. Control damper command

d. Fan command and status

e. Heating coil valve command

f. Airflow actual value

g. Leaving air actual temperature

3.6.8.6 Endurance Testing Sample Size

Endurance Testing sample sizes ware as follows:

a. 100-Percent of the following systems:

(1) primary systems including, but not limited to, chilled water and HVAC heating hot water systems

(2) air handling unit systems including all associated fans except for remote exhaust air fans

(3) DOAS’s including all associated fans except for remote exhaust air fans

b. 25-Percent of each set of systems with a shared identical control sequence for systems such as:

(1) air terminal units

(2) exhaust air fans

(3) terminal equipment such as fan coil units and unit heaters

3.6.8.6.1 Selection of Systems to Test

For sample sets less than 100-percent, the Government will choose which systems will be tested. The Government may require additional testing if previous testing results are inconsistent or demonstrate improper system control as follows:

a. An additional 25-percent after five-percent failure rate of first sample set.

b. 100-percent after any failures occurring in additional sample set.

3.6.9 Performance Verification Test Report

Submit a PVT Report after receiving Government's written approval of PVT field work that is intended to document test results and final control system sequences and settings prior to turnover. The PVT Report must contain the following:

a. Executive summary that briefly discusses results of each system's endurance testing and PVT testing and conclusions for each system.

b. Endurance testing for each system.

c. Completed PVT Plan for each system used during testing that includes hand written field notes and participant signatures.

d. Blank PVT Plan for each system approved prior to testing that is edited to reflect changes occurring during testing. Edits must be typed and must reflect changes to control sequences from contract documents, must reflect changes to numbered test methods required to initiate a response, and must reflect changes to expected response. Only one blank PVT Plan is required for each set of systems sharing an identical control sequence, such as air terminal units, exhaust air fans, fan coil units and unit heaters.

e. Written certification that the installation and testing of all systems are complete and meet all contract document requirements.

3.6.10 Bus Waveform Report

Provide printed wave form of the MS/TP bus(es). Use an oscilloscope to test and record the wave form of each bus. Provide testing voltage and timing in the report. Testing device is to run on battery during testing and not connected to building power source. This wave form is useful in identifying and troubleshooting bus problems such as inappropriate taps, grounds, end of line terminations and poor connections. Identify each graphic with bus name, location, date and time, and instrument used. Include the resistor sizes needed at each Bus End of Line (EOL). Include a list of the EOL devices. Inconsistant waveforms must be investigated and improved to ASHRAE 135 industry standard for MSTP Physical Layer.

3.6.11 Performance Verification Testing Acceptance Testing Season One

After acceptance of the PVT Report, demonstrate proper and stable operation of the DDC System. During the field acceptance testing, verify, in the presence of the COTR and BAS owner, random selections of sequences reported in the PVT Report. Equipment, controllers, devices, and sequences for field acceptance testing are to be selected by the COTR.

As-built control drawings must be for use and verification at acceptance testing. Field acceptance testing includes verification of the PVT for the following equipment groups:

Group 1: All pumps, chillers, boilers, return fans, computer room units, and air handling units (rooftop and central stations).

Group 2: 25 percent of terminals such as VAV and fan coil units.

Group 3: 25 percent of supply fans, and exhaust fans.

If any of the acceptance testing is found to not operate correctly, terminate verification for the given group. Make the necessary corrections and prepare a revised PVT Report. Reschedule acceptance testing of the revised report with the COTR. After the PVT has been accepted, submit the revised controller files and BACnet Building Controller database.

3.6.12 Performance Verification Testing Acceptance Testing Season Two

A minimum of 3 months after initial acceptance of the DDC system and in the opposite season of heating or cooling, demonstrate proper and stable operation of the DDC system. During the field acceptance testing, verify, in the presence of the COTR and BAS owner, random selections of sequences reported in the PCT Report. Equipment, controllers, devices, and sequences for field acceptance testing are to be selected by the COTR. Field acceptance testing includes verification of the PVT for the following equipment groups:

Group 1: All pumps, chillers, boilers, return fans, computer room units, and air handling units (rooftop and central stations).

Group 2: 25 percent of terminals such as VAV and fan coil units.

Group 3: 25 percent of supply fans, and exhaust fans.

If any of the acceptance testing is found to not operate correctly, terminate verification for the given group. Make the necessary corrections and prepare a revised PVT Report. Reschedule acceptance testing of the revised report with the COTR. After the PVT has been accepted, submit the revised controller files and BACnet Building Controller database.

3.7 OPERATION AND MAINTENANCE (O&M) INSTRUCTIONS

Provide Operation and maintenance data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA and 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI). Provide HVAC Control System Operation and Maintenance Manuals which include:

a. "Data Package 3" as indicated in Section 01 78 23 OPERATION AND MAINTENANCE DATA for each piece of control equipment.

b. "Data Package 4" as described in Section 01 78 23 OPERATION AND MAINTENANCE DATA for all air compressors.

c. HVAC control system sequences of operation formatted as indicated.

d. Procedures for the HVAC system start-up, operation and shut-down including the manufacturer's supplied procedures for each piece of equipment, and procedures for the overall HVAC system.

e. As-built HVAC control system detail drawings formatted as indicated.

f. Routine maintenance checklist. Provide the routine maintenance checklist arranged in a columnar format, where the first column lists all installed devices, the second column states the maintenance activity or that no maintenance required, the third column states the frequency of the maintenance activity, and the fourth column is used for additional comments or reference.

g. Qualified service organization list, including at a minimum company name, contact name and phone number.

h. Start-Up Testing Report.

i. Performance Verification Test (PVT) Procedures and Report.

j. All updated field controller files and BACnet Building Controller database modified during the acceptance and warranty periods, or as a result of a latend defect.

k. A written statement entitled "software Updgrades" stating software and firmware patches and updates will be provided upon request at no additional cost to the Governemnt for a minimum of two years from project acceptance. Include a table of all DDC system software and firmware provided under this contract, listing the original release dates, version numbers, part numbers, and serial numbers.

Submit [2] [_____] copies of the Operation and Maintenance Instructions, indexed and in booklet form. The Operation and Maintenance Instructions may be submitted as a Technical Data Package.

3.8 MAINTENANCE AND SERVICE

Provide services, materials and equipment as necessary to maintain the entire system in an operational state as indicated for a period of one year after successful completion and acceptance of the Performance Verification Test. Minimize impacts on facility operations.

a. The integration of the system specified in this section into a Utility Monitoring and Control System must not, of itself, void the warranty or otherwise alter the requirement for the one year maintenance and service period. Integration into a UMCS includes but is not limited to establishing communication between devices in the control system and the front end or devices in another system.

b. The changing of configuration properties must not, of itself, void the warranty or otherwise alter the requirement for the one year maintenance and service period.

3.8.1 Description of Work

Provide adjustment and repair of the system including the manufacturer's required sensor and actuator (including transducer) calibration, span and

range adjustment.

3.8.2 Personnel

Use only service personnel qualified to accomplish work promptly and satisfactorily. Advise the Government in writing of the name of the designated service representative, and of any changes in personnel.

3.8.3 Scheduled Inspections

Perform two inspections at six-month intervals and provide work required. Perform inspections in January and July. During each inspection perform the indicated tasks:

a. Perform visual checks and operational tests of equipment.

b. Clean control system equipment including interior and exterior surfaces.

c. Check and calibrate each field device. Check and calibrate 50 percent of the total analog inputs and outputs during the first inspection. Check and calibrate the remaining 50 percent of the analog inputs and outputs during the second major inspection. Certify analog test instrumentation accuracy to be twice the specified accuracy of the device being calibrated. Randomly check at least 25 percent of all binary inputs and outputs for proper operation during the first inspection. Randomly check at least 25 percent of the remaining binary inputs and outputs during the second inspection. If more than 20 percent of checked inputs or outputs failed the calibration check during any inspection, check and recalibrate all inputs and outputs during that inspection.

d. Run system software diagnostics and correct diagnosed problems.

e. Resolve any previous outstanding problems.

3.8.4 Scheduled Work

This work must be performed during regular working hours, Monday through Friday, excluding Federal holidays.

3.8.5 Emergency Service

The Government will initiate service calls when the system is not functioning properly. Qualified personnel must be available to provide service to the system. A telephone number where the service supervisor can be reached at all times must be provided. Service personnel must be at the site within 24 hours after receiving a request for service. The control system must be restored to proper operating condition as required per Section 01 78 00 CLOSEOUT SUBMITTALS.

3.8.6 Operation

After performing scheduled adjustments and repairs, verify control system operation as demonstrated by the applicable tests of the performance verification test.

3.8.7 Records and Logs

Keep dated records and logs of each task, with cumulative records for each major component, and for the complete system chronologically. Maintain a continuous log for all devices, including initial analog span and zero calibration values and digital points. Keep complete logs and provide logs for inspection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished for the control system.

3.8.8 Work Requests

Record each service call request as received and include its location, date and time the call was received, nature of trouble, names of the service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials to be used, the time and date work started, and the time and date of completion. Submit a record of the work performed within 5 days after work is accomplished.

3.8.9 System Modifications

Submit recommendations for system modification in writing. Do not make system modifications, including operating parameters and control settings, without prior approval of the Government.

3.9 TRAINING

Conduct a training course for [_____] operating staff members designated by the Government in the maintenance and operation of the system, including specified hardware and software. Conduct 8 hours of training at the project site within 30 days after successful completion of the performance verification test. The Government reserves the right to make audio and visual recordings (using Government supplied equipment)of the training sessions for later use. Provide audiovisual equipment and other training materials and supplies required to conduct training. A training day is defined as 8 hours of classroom instruction, including two 15 minute breaks and excluding lunchtime, Monday through Friday, during the daytime shift in effect at the training facility.

3.9.1 Training Documentation

Prepare training documentation consisting of:

a. Course Attendee List: Develop the list of course attendees in coordination with and signed by the ControlsHVAC shop supervisor.

b. Training Manuals: Provide training manuals which include an agenda, defined objectives for each lesson, and a detailed description of the subject matter for each lesson. When presenting portions of the course material by audiovisuals, deliver copies of those audiovisuals as a part of the printed training manuals. As-Built control drawings must be used for training.

3.9.2 Training Course Content

For guidance in planning the required instruction, assume that attendees will have a high school education, and are familiar with HVAC systems. During the training course, cover all of the material contained in the

Operating and Maintenance Instructions, the layout and location of each controller enclosure, the layout of one of each type of equipment and the locations of each, the location of each control device external to the panels, the location of the compressed air station, preventive maintenance, troubleshooting, diagnostics, calibration, adjustment, commissioning, tuning, and repair procedures. Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system. Present the results of the performance verification test and the Start-Up Testing Report as benchmarks of HVAC control system performance by which to measure operation and maintenance effectiveness.

3.9.3 Training Documentation Submittal Requirements

Submit hardcopy training manuals and all training materials on CD-ROM. Provide one hardcopy manual for each trainee on the Course Attendee List and [2][_____] additional copies for archive at the project site. Provide [2][_____] copies of the Course Attendee List with the archival copies. Training Documentation may be submitted as a Technical Data Package.

APPENDIX A

QC CHECKLIST FOR NIAGARA FRAMEWORK BASED BACNET SYSTEMS		
This checklist is not all-inclusive of the requirements of this specification and should not be interpreted as such. Instructions: Initial each item in the space provided (|____|) verifying that the requirement has been met.		
This checklist is for (circle one:) Pre-Construction QC Checklist Submittal Post-Construction QC Checklist Submittal Close-out QC Checklist Submittal		
Items verified for Pre-Construction, Post-Construction and Closeout QC Checklist Submittals:		
1	All DDC Hardware is numbered on Control System Schematic Drawings.	|____|
2	Signal lines on Control System Schematic are labeled with the signal type.	|____|
3	Local Display Panel (LDP) Locations are shown on Control System Schematic drawings.	|____|
Items verified for Post-Construction and Closeout QC Checklist Submittals:		
4	All sequences are performed as specified using DDC Hardware.	|____|
5	Training schedule and course attendee list has been developed and coordinated with shops and submitted.	|____|
Items verified for Closeout QC Checklist Submittal:		
6	Final As-built Drawings, including all Points Schedule drawings, accurately represent the final installed system.	|____|
7	Programming software has been submitted for all programmable controllers.	|____|
8	All software has been licensed to the Government.	

QC CHECKLIST FOR NIAGARA FRAMEWORK BASED BACNET SYSTEMS		
9	O&M Instructions have been completed and submitted.	|____|
10	Training course has been completed.	|____|
11	All DDC Hardware is installed on a BACnet ASHRAE 135 network using either MS/TP in accordance with Clause 9 or IP in accordance with Annex J.	|____|
12	All DDC Hardware is BTL listed.	|____|
13	Communication between DDC Hardware is only via BACnet using standard services, except as specifically permitted by the specification. Non-standard services have been fully documented in the DDC Hardware Schedule.	|____|
14	Scheduling, Alarming, and Trending have been implemented using Niagara Framework objects and services, and BACnet Instrinsic Alarming as indicated.	|____|
15	All Properties indicated as required to be Writable are Writable and Overrides have been provided as indicated	|____|
	_____ _____	
	(QC Representative Signature) (Date)	

-- End of Section --

SECTION 23 09 13.00 22

INSTRUMENTATION AND CONTROL DEVICES FOR HVAC
11/19

PART 1 GENERAL

1.1 SUMMARY

This section provides for the instrumentation control system components excluding direct digital controllers, network controllers, gateways etc. that are necessary for a completely functional automatic control system. When combined with a Direct Digital Control (DDC) system, the Instrumentation and Control Devices covered under this section must be a complete system suitable for the control of the heating, ventilating and air conditioning (HVAC) and other building-level systems as specified and indicated.

a. Install hardware to perform the control sequences as specified and indicated and to provide control of the equipment as specified and indicated.

b. Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.

c. Install and configure hardware such that the Government or their agents are able to perform repair, replacement, and upgrades of individual hardware without further interaction with the installing Contractor.

1.1.1 Verification of Dimensions

After becoming familiar with all details of the work, verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.1.2 Drawings

The Government will not indicate all offsets, fittings, and accessories that may be required on the drawings. Carefully investigate the mechanical, electrical, and finish conditions that could affect the work to be performed, arrange such work accordingly, and provide all work necessary to meet such conditions.

1.2 RELATED SECTIONS

Related work specified elsewhere.

Section 01 30 00.05 20 ADMINISTRATIVE REQUIREMENTS FOR DESIGN-BUILD

Section 23 00 00 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS

Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC

Section 23 21 13.00 20 LOW TEMPERATURE WATER (LTW) HEATING SYSTEM

Section 23 64 26 CHILLED, CHILLED-HOT, AND CONDENSER WATER PIPING SYSTEMS

Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA)

AMCA 500-D	(2018) Laboratory Methods of Testing Dampers for Rating
AMCA 511	(2010) Certified Ratings Program for Air Control Devices

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C12.1	((2014; Errata 2016) Electric Meters - Code for Electricity Metering

ASME INTERNATIONAL (ASME)

ASME B16.15	(2013) Cast Copper Alloy Threaded Fittings Classes 125 and 250
ASME B16.18	(2018) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.22	(2013) Standard for Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.26	(2013) Standard for Cast Copper Alloy Fittings for Flared Copper Tubes
ASME B16.34	(2017) Valves - Flanged, Threaded and Welding End
ASME B40.100	(2013) Pressure Gauges and Gauge Attachments
ASME BPVC SEC VIII D1	(2017) BPVC Section VIII-Rules for Construction of Pressure Vessels Division 1

ASTM INTERNATIONAL (ASTM)

ASTM A269/A269M	(2015a) Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM A536	(1984; R 2014) Standard Specification for Ductile Iron Castings
ASTM B32	(2008; R 2014) Standard Specification for

	Solder Metal
ASTM B75/B75M	(2011) Standard Specification for Seamless Copper Tube
ASTM B88	(2016) Standard Specification for Seamless Copper Water Tube
ASTM D635	(2018) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
ASTM D638	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM D792	(2013) Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D1238	(2013) Melt Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D1693	(2015) Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics

FLUID CONTROLS INSTITUTE (FCI)

FCI 70-2	(2013) Control Valve Seat Leakage

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 142	(2007; Errata 2014) Recommended Practice for Grounding of Industrial and Commercial Power Systems - IEEE Green Book

INTERNATIONAL SOCIETY OF AUTOMATION (ISA)

ISA 7.0.01	(1996) Quality Standard for Instrument Air

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C12.20	(2015; E 2018) Electricity Meters - 0.1, 0.2, and 0.5 Accuracy Classes
NEMA 250	(2018) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA/ANSI C12.10	(2011) Physical Aspects of Watthour Meters - Safety Standards

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA

	17-14; TIA 17-15; TIA 17-16; TIA 17-17) National Electrical Code
NFPA 90A	(2018) Standard for the Installation of Air Conditioning and Ventilating Systems

UNDERWRITERS LABORATORIES (UL)

UL 94	(2013; Reprint Sep 2017) UL Standard for Safety Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
UL 555	(2006; Reprint Aug 2016) UL Standard for Safety Fire Dampers
UL 555S	(2014; Reprint Aug 2016) UL Standard for Safety Smoke Dampers
UL 1820	(2004; Reprint May 2013) UL Standard for Safety Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics
UL 5085-3	(2006; Reprint Nov 20121) Low Voltage Transformers - Part 3: Class 2 and Class 3 Transformers

1.4 SUBMITTALS

Submittal requirements are specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

1.5 DELIVERY AND STORAGE

Store and protect products from the weather, humidity, and temperature variations, dirt and dust, and other contaminants, within the storage condition limits published by the equipment manufacturer.

1.6 INPUT MEASUREMENT ACCURACY

Select, install and configure sensors, transmitters and DDC Hardware such that the maximum error of the measured value at the input of the DDC hardware is less than the maximum allowable error specified for the sensor or instrumentation.

1.7 SUBCONTRACTOR SPECIAL REQUIREMENTS

Perform all work in this section in accordance with the paragraph entitled CONTRACTOR SPECIAL REQUIREMENTS in Section 01 30 00.05 20 ADMINISTRATIVE REQUIREMENTS FOR DESIGN-BUILD.

PART 2 PRODUCTS

2.1 EQUIPMENT

2.1.1 General Requirements

All products used to meet this specification must meet the indicated requirements, but not all products specified here will be required by every project. All products must meet the requirements both Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC and this Section.

2.1.2 Operation Environment Requirements

Unless otherwise specified, provide products rated for continuous operation under the following conditions:

2.1.2.1 Pressure

Pressure conditions normally encountered in the installed location.

2.1.2.2 Vibration

Vibration conditions normally encountered in the installed location.

2.1.2.3 Temperature

a. Products installed indoors: Ambient temperatures in the range of 0 to 50 degrees C 32 to 112 degrees F and temperature conditions outside this range normally encountered at the installed location.

b. Products installed outdoors or in unconditioned indoor spaces: Ambient temperatures in the range of [-37 to +66 degrees C-35 to +151 degrees F] [_____] and temperature conditions outside this range normally encountered at the installed location.

2.1.2.4 Humidity

10 to 95 percent relative humidity, non-condensing and also humidity conditions outside this range normally encountered at the installed location.

2.2 WEATHERSHIELDS

Provide weathershields constructed of galvanized steel painted white, unpainted aluminum, aluminum painted white, or white PVC.

2.3 TUBING

2.3.1 Polyethylene Tubing

Provide flame-resistant, multiple polyethylene tubing in flame-resistant protective sheath with mylar barrier, or unsheathed polyethylene tubing in rigid metal, intermediate metal, or electrical metallic tubing conduit for areas where tubing is exposed. Single, unsheathed, flame-resistant polyethylene tubing may be used where concealed in walls or above ceilings and within control panels. Do not provide polyethylene tubing for systems indicated as critical and smoke removal systems. Tubing may be used in systems with working pressure of 206 kPa 30 psig or less including tubing used for devices such as air filter status, duct pressure and duct pressure safety limits. Provide compression or brass barbed push-on type fittings. Provide extruded seamless polyethylene tubing conforming to the following:

a. Minimum Burst Pressure Requirements: 690 kPa at 24 degrees C 100 psig at 75 degrees F to 172 kPa at 66 degrees C 25 psig at 150 degrees F.

b. Stress Crack Resistance: ASTM D1693, 200 hours minimum.

c. Tensile Strength (Minimum): ASTM D638, 7584 kPa 1100 psi.

d. Flow Rate (Average): ASTM D1238, 0.30 decigram per minute.

e. Density (Average): ASTM D792, 921 kg per cubic meter 57.5 pounds per cubic feet.

f. Burn rate: ASTM D635.

g. Flame Propagation: UL 1820, less than 1.5 meters 5 feet ASTM D635.

h. Average Optical Density: UL 1820, less than 0.15 ASTM D635.

2.4 WIRE AND CABLE

Provide wire and cable meeting the requirements of NFPA 70 and NFPA 90A in addition to the requirements of this specification and referenced specifications.

2.4.1 Terminal Blocks

For terminal blocks which are not integral to other equipment, provide terminal blocks which are insulated, modular, feed-through, clamp style with recessed captive screw-type clamping mechanism, suitable for DIN rail mounting, and which have enclosed sides or end plates and partition plates for separation.

2.4.2 Control Wiring for Binary Signals

For Control Wiring for Binary Signals, provide 18 AWG (1.02 mm diameter) 18 AWG copper or thicker wire rated for 300-volt service.

2.4.3 Control Wiring for Analog Signals

For Control Wiring for Analog Signals, provide 18 AWG (1.02 mm diameter) 18 AWG or thicker, copper, single- or multiple-twisted wire meeting the following requirements:

a. Minimum 50 mm (2 inch) 2 inch lay of twist.

b. 100 percent shielded pairs.

c. At least 300-volt insulation.

d. Each pair has a 20 AWG tinned-copper drain wire and individual overall pair insulation.

e. Cables have an overall aluminum-polyester or tinned-copper cable-shield tape, overall 20 AWG tinned-copper cable drain wire, and overall cable insulation.

2.4.4 Power Wiring for Control Devices

For 24-volt circuits, provide insulated copper 18 AWG or thicker wire rated for 300 VAC service. For 120-volt circuits, provide 14 AWG or thicker stranded copper wire rated for 600-volt service.

2.4.5 Transformers

Provide UL 5085-3 approved transformers. Select transformers sized so that the connected load is no greater than 80 percent of the transformer rated capacity.

2.5 AUTOMATIC CONTROL VALVES

Provide valves with stainless-steel stems and stuffing boxes with extended necks to clear the piping insulation. Provide valves with bodies meeting ASME B16.34 or ASME B16.15 pressure and temperature class ratings based on the design operating temperature and 150 percent of the system design operating pressure. Unless otherwise specified or indicated, provide valves meeting FCI 70-2 [Class III leakage rating][Class IV leakage rating]. Provide valves rated for modulating or two-position service as indicated, which close against a differential pressure indicated as the Close-Off pressure and which are Normally-Open, Normally-Closed, or Fail-In-Last-Position as indicated.

2.5.1 Valve Type

2.5.1.1 Liquid Service 150 Degrees F or Less

Use either globe valves or ball valves except that butterfly valves may be used for sizes 100 mm 4 inch and larger.

2.5.1.2 Liquid Service Above 150 Degrees F

a. Two-position valves: Use either globe valves or ball valves except that butterfly valves may be used for sizes 100 mm 4 inch and larger.

b. Modulating valves: Use globe valves except that butterfly valves may be used for sizes 100 mm 4 inch and larger.

2.5.1.3 Steam Service

Use globe valves except that butterfly valves may be used for sizes 100 mm 4 inch and larger.

2.5.2 Valve Flow Coefficient and Flow Characteristic

2.5.2.1 Two-Way Modulating Valves

Provide the valve coefficient (Kv) (Cv) indicated. Provide equal-percentage flow characteristic for liquid service except for butterfly valves. Provide linear flow characteristic for steam service except for butterfly valves.

2.5.2.2 Three-Way Modulating Valves

Provide the valve coefficient (Kv) (Cv) indicated. Provide linear flow

characteristic with constant total flow throughout full plug travel.

2.5.3 Two-Position Valves

Use full line size full port valves with maximum available (Kv) (Cv).

2.5.4 Globe Valves

2.5.4.1 Liquid Service Not Exceeding 66 Degrees C 150 Degrees F

a. Valve body and body connections:

(1) Valves 38 mm 1-1/2 inches and smaller: brass or bronze body, with threaded or union ends.

(2) Valves from 51 mm to 76 mm 2 inches to 3 inches inclusive: brass, bronze, or iron bodies. 51 millimeters2 inch valves with threaded connections; 63 to 76 mm 2-1/2 to 3 inches valves with flanged connections.

b. Internal valve trim: Brass or bronze.

c. Stems: Stainless steel.

d. Provide valves compatible with a solution of 50 percent ethylene or propylene glycol.

2.5.4.2 Liquid Service Not Exceeding 121 Degrees C 250 Degrees F

a. Valve body and body connections:

(1) Valves 38 mm 1-1/2 inches and smaller: brass or bronze body, with threaded or union ends.

(2) Valves from 51 mm to 76 mm 2 inches to 3 inches inclusive: brass, bronze, or iron bodies. 51 millimeters2 inch valves with threaded connections; 63 to 76 mm 2-1/2 to 3 inches valves with flanged connections.

b. Internal trim: Type 316 stainless steel including seats, seat rings, modulation plugs, valve stems, and springs.

c. Provide valves with non-metallic parts suitable for a minimum continuous operating temperature of 121 degrees C 250 degrees F or 28 degrees C 50 degrees F above the system design temperature, whichever is higher.

d. Provide valves compatible with a solution of 50 percent ethylene or propylene glycol

2.5.4.3 Hot water service 121 Degrees C 250 Degrees F and above

a. Provide valve bodies conforming to ASME B16.34 Class 300. For valves 25 mm 1 inch and larger provide valves with bodies which are carbon steel, globe type with welded ends. For valves smaller than 25 mm 1 inch provide valves with socket-weld ends. Provide valves with virgin polytetrafluoroethylene (PTFE) packing. Provide valve and actuator

combinations which are normally closed.

b. Internal trim: Type 316 stainless steel including seats, seat rings, modulation plugs, valve stems, and springs.

2.5.4.4 Steam Service

For steam service, provide valves meeting the following requirements:

a. Valve body and connections:

(1) Valves 38 mm 1-1/2 inches and smaller: complete body of brass or bronze, with threaded or union ends.

(2) Valves from 51 mm to 76 mm 2 inches to 3 inches inclusive: body of brass, bronze, or carbon steel.

(3) Valves 100 mm 4 inches and larger: body of carbon steel. 50 mm 2 inch valves with threaded connections; valves 63 mm2-1/2 inches and larger with flanged connections.

b. Internal Trim: Type 316 stainless steel including seats, seat rings, modulation plugs, valve stems, and springs.

c. Valve sizing: sized for [103.4 kPa] [15 psig] [_____] inlet steam pressure with a maximum [83 kPa] [12 psi] [_____] differential through the valve at rated flow, except where indicated otherwise.

2.5.5 Ball Valves

2.5.5.1 Liquid Service Not Exceeding 66 Degrees C 150 Degrees F

a. Valve body and connections:

(1) Valves 38 mm 1-1/2 inches and smaller: bodies of brass or bronze, with threaded or union ends.

(2) Valves from 51 mm to 76 mm 2 inches to 3 inches inclusive: bodies of brass, bronze, or iron. 50 mm 2 inch valves with threaded connections; valves from 63 to 76 mm 2-1/2 to 3 inches with flanged connections.

b. Ball: Stainless steel or nickel-plated brass or chrome-plated brass.

c. Seals: Reinforced Teflon seals and EPDM O-rings.

d. Stem: Stainless steel, blow-out proof.

e. Provide valves compatible with a solution of 50 percent ethylene or propylene glycol.

2.5.6 Butterfly Valves

Provide butterfly valves which are threaded lug type suitable for dead-end service and modulation to the fully-closed position, with carbon-steel bodies or with ductile iron bodies in accordance with ASTM A536. Provide butterfly valves with non-corrosive discs, stainless steel shafts supported by bearings, and EPDM seats suitable for temperatures from -28.9

to +121.1 degrees C -20 to +250 degrees F. Provide valves with rated Kv Cv of the Kv Cv at 70 percent (60 degrees) open position. Provide valves meeting FCI 70-2 Class VI leakage rating.

2.5.7 Pressure Independent Control Valves (PICV)

Provide pressure independent control valves which include a regulator valve which maintains the differential pressure across a flow control valve. Pressure independent control valves must accurately control the flow from 0-100 percent full rated flow regardless of changes in the piping pressure and not vary the flow more than plus or minus 5 percent at any given flow control valve position when the PICV differential pressure lies between the manufacturer's stated minimum and maximum. The rated minimum differential pressure for steady flow must not exceed 34.5 kPa 5 psid across the PICV. Provide either globe or ball type valves meeting the indicated requirements for globe and ball valves. Provide valves with a flow tag listing full rated flow and minimum required pressure drop. Provide valves with factory installed Pressure/Temperature ports ("Pete's Plugs") to measure the pressure drop to determine the valve flow rate.

2.5.8 Duct-Coil and Terminal-Unit-Coil Valves

For duct or terminal-unit coils provide control valves with either screw type or solder-type ends.

2.6 DAMPERS

2.6.1 Damper Assembly

Provide single damper sections with blades no longer than 1.2 m 48 inches and which are no higher than 1.8 m 72 inches and damper blade width of 203 mm 8 inches or less. When larger sizes are required, combine damper sections. Provide opposed blade dampers for rectangular applications 10 inches and taller. Provide single blade dampers for round dampers and rectangular dampers less than 10 inches. Provide dampers made of steel, or other materials where indicated and with assembly frames constructed of 2.8 mm 0.07 inch minimum thickness [galvanized][stainless][aluminum] steel channels with mitered and welded corners. Steel channel frames constructed of 1.5 mm 0.06 inch minimum thickness are acceptable provided the corners are reinforced.

a. Flat blades must be made rigid by folding the edges. Blade-operating linkages must be within the frame so that blade-connecting devices within the same damper section must not be located directly in the air stream.

b. Damper axles must be 13 mm 1/2 inch minimum, plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically must be supported by thrust bearings.

c. Provide dampers which do not exceed a pressure drop through the damper of 10 Pa 0.04 inches water gauge at 5 m/s 1000 ft/min in the wide-open position. Provide dampers with frames not less than 50 mm 2 inch in width. Provide dampers which have been tested in accordance with AMCA 500-D.

2.6.2 Operating Linkages

For operating links external to dampers, such as crank arms, connecting rods, and line shafting for transmitting motion from damper actuators to dampers, provide links able to withstand a load equal to at least 300 percent of the maximum required damper-operating force without deforming. Rod lengths must be adjustable. Links must be brass, bronze, zinc-coated steel, or stainless steel. Working parts of joints and clevises must be brass, bronze, or stainless steel. Adjustments of crank arms must control the open and closed positions of dampers.

2.6.3 Damper Types

2.6.3.1 Flow Control Dampers

Provide opposed blade type dampers for outside air, return air, relief air, exhaust, face and bypass dampers as indicated on the Damper Schedule. Blades must have interlocking edges. The channel frames of the dampers must be provided with jamb seals to minimize air leakage. Unless otherwise indicated, dampers must meet AMCA 511 Class 1A requirements. Outside air damper seals must be suitable for an operating temperature range of -40 to +75 degrees C -40 to +167 degrees F. Dampers must be rated at not less than 10 m/s 2000 ft/min air velocity.

2.6.3.2 Mechanical Rooms and Other Utility Space Ventilation Dampers

Provide utility space ventilation dampers as indicated. Unless otherwise indicated provide AMCA 511 class 3 dampers. Provide dampers rated at not less than 7.6 m/s 1500 ft/min air velocity.

2.6.3.3 Smoke Dampers

Provide smoke-damper and actuator assemblies which meet the current requirements of NFPA 90A, UL 555, and UL 555S. For combination fire and smoke dampers provide dampers rated for 121 degrees C 250 degrees F Class II leakage per UL 555S.

2.7 SENSORS AND INSTRUMENTATION

Unless otherwise specified, provide sensors and instrumentation which incorporate an integral transmitter. Sensors and instrumentation, including their transmitters, must meet the specified accuracy and drift requirements at the input of the connected DDC Hardware's analog-to-digital conversion.

2.7.1 Analog and Binary Transmitters

Provide transmitters which match the characteristics of the sensor. Transmitters providing analog values must produce a linear 4-20 mAdc, 0-10 Vdc signal corresponding to the required operating range and must have zero and span adjustment. Transmitters providing binary values must have dry contacts rated at 1A at 24 Volts AC.

2.7.2 Network Transmitters

Sensors and Instrumentation incorporating an integral network connection are considered DDC Hardware and must meet the DDC Hardware requirements of

23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS when used in a BACnet network.

2.7.3 Temperature Sensors

Provide the same sensor type throughout the project. Temperature sensors may be provided without transmitters. Where transmitters are used, the range must be the smallest available from the manufacturer and suitable for the application such that the range encompasses the expected range of temperatures to be measured. The end to end accuracy includes the combined effect of sensitivity, hysteresis, linearity and repeatability between the measured variable and the end user interface (graphic presentation) including transmitters if used.

2.7.3.1 Sensor Accuracy and Stability of Control

2.7.3.1.1 Conditioned Space Temperature

Plus or minus 0.3 degrees C 0.5 degree F over the operating range.

2.7.3.1.2 Unconditioned Space Temperature

a. Plus or minus 0.6 degrees C 1 degree F over the range of -1 to +55 degrees C 30 to 131 degrees F AND

b. Plus or minus 2 degrees C 4 degrees F over the rest of the operating range.

2.7.3.1.3 Duct Temperature

Plus or minus 0.3 degrees C 0.5 degree F

2.7.3.1.4 Outside Air Temperature

a. Plus or minus 1 degree C 2 degrees F over the range of -35 to +55 degrees C -30 to +130 degrees F AND

b. Plus or minus 0.6 degrees C 1 degree F over the range of -1 to +40 degrees C 30 to 130 degrees F.

2.7.3.1.5 High Temperature Hot Water

Plus or minus 2 degrees C 3.6 degrees F.

2.7.3.1.6 Chilled Water

Plus or minus 0.4 degrees C 0.8 degrees F over the range of 2 to 18 degrees C 35 to 65 degrees F.

2.7.3.1.7 Dual Temperature Water

Plus or minus 1 degree C 2 degrees F.

2.7.3.1.8 Heating Hot Water

Plus or minus 1 degree C 2 degrees F.

2.7.3.1.9 Condenser Water

Plus or minus 1 degree C 2 degrees F.

2.7.3.2 Transmitter Drift

The maximum allowable transmitter drift: 0.1 degrees C 0.25 degrees F per year.

2.7.3.3 Point Temperature Sensors

Point Sensors must be encapsulated in epoxy, series 300 stainless steel, anodized aluminum, or copper.

2.7.3.4 Temperature Sensor Details

2.7.3.4.1 Room Type

Provide the sensing element components within a decorative protective cover suitable for surrounding decor.

2.7.3.4.2 Duct Probe Type

Ensure the probe is long enough to properly sense the air stream temperature.

2.7.3.4.3 Duct Averaging Type

Continuous averaging sensors must be one foot in length for each 0.1 square m 1 square foot of duct cross-sectional area, and a minimum length of 1.5 m 5 feet.

2.7.3.4.4 Pipe Immersion Type

Provide minimum 7.6 cm 3 inch immersion. Provide each sensor with a corresponding pipe-mounted sensor well, unless indicated otherwise. Sensor wells must be stainless steel when used in steel piping, and brass when used in copper piping.

2.7.3.4.5 Outside Air Type

Provide the sensing element rated for outdoor use

2.7.4 Relative Humidity Sensor

Relative humidity sensors must use bulk polymer resistive or thin film capacitive type non-saturating sensing elements capable of withstanding a saturated condition without permanently affecting calibration or sustaining damage. The sensors must include removable protective membrane filters. Where required for exterior installation, sensors must be capable of surviving below freezing temperatures and direct contact with moisture without affecting sensor calibration. When used indoors, the sensor must be capable of being exposed to a condensing air stream (100 percent relative humidity) with no adverse effect to the sensor's calibration or other harm to the instrument. The sensor must be of the wall-mounted or duct-mounted type, as required by the application, and must be provided with any required accessories. Sensors used in duct

high-limit applications must have a bulk polymer resistive sensing element. Duct-mounted sensors must be provided with a duct probe designed to protect the sensing element from dust accumulation and mechanical damage. Relative humidity (RH) sensors must measure relative humidity over a range of 0 percent to 100 percent with an accuracy of plus or minus [2][3] percent. RH sensors must function over a temperature range of 4.4 to 57.2 degrees C 40 to 135 degrees F and must not drift more than 1 percent per year.

2.7.5 Carbon Dioxide (CO2) Sensors

Provide photometric type CO2 sensors with integral transducers and linear output. Carbon dioxide (CO2) sensors must measure CO2 concentrations between 0 to 2000 parts per million (ppm) using non-dispersible infrared (NDIR) technology with an accuracy of plus or minus 50 ppm and a maximum response time of 1 minute. The sensor must be rated for operation at ambient air temperatures within the range of 0 to 50 degrees C 32 to 122 degrees F and relative humidity within the range of 20 to 95 percent (non-condensing). The sensor must have a maximum drift of 2 percent per year. The sensor chamber must be manufactured with a non-corrosive material that does not affect carbon dioxide sample concentration. Duct mounted sensors must be provided with a duct probe designed to protect the sensing element from dust accumulation and mechanical damage. The sensor must have a calibration interval no less than 5 years.

2.7.6 Differential Pressure Instrumentation

2.7.6.1 Differential Pressure Sensors

Provide Differential Pressure Sensors with ranges as indicated or as required for the application. Pressure sensor ranges must not exceed the high end range indicated on the Points Schedule by more than 50 percent. The over pressure rating must be a minimum of 150 percent of the highest design pressure of either input to the sensor. The accuracy must be plus or minus 1 percent of full scale. The sensor must have a maximum drift of 2 percent per year

2.7.6.2 Differential Pressure Switch

Provide differential pressure switches with a user-adjustable setpoint which are sized for the application such that the setpoint is between 25 percent and 75 percent of the full range. The over pressure rating must be a minimum of 150 percent of the highest design pressure of either input to the sensor. The switch must have two sets of contacts and each contact must have a rating greater than it's connected load. Contacts must open or close upon rise of pressure above the setpoint or drop of pressure below the setpoint as indicated.

2.7.7 Flow Sensors

2.7.7.1 Airflow Measurement Array (AFMA)

2.7.7.1.1 Airflow Straightener

Provide AFMAs which contain an airflow straightener if required by the AFMA manufacturer's published installation instructions. The straightener must be contained inside a flanged sheet metal casing, with the AFMA

located as specified according to the published recommendation of the AFMA manufacturer. In the absence of published documentation, provide airflow straighteners if there is any duct obstruction within 5 duct diameters upstream of the AFMA. Air-flow straighteners, where required, must be constructed of 3 mm 0.125 inch aluminum honeycomb and the depth of the straightener must not be less than 40 mm 1.5 inches.

2.7.7.1.2 Resistance to Airflow

The resistance to air flow through the AFMA, including the airflow straightener must not exceed 20 Pa 0.085 inch water gauge at an airflow of 10 m/s 2,000 fpm. AFMA construction must be suitable for operation at airflows of up to 25 m/s 5000 fpm over a temperature range of 4 to 49 degrees C 40 to 120 degrees F.

2.7.7.1.3 Outside Air Temperature

In outside air measurement or in low-temperature air delivery applications, provide an AFMA certified by the manufacturer to be accurate as specified over a temperature range of [-29 to +49 degrees C-20 to +120 degrees F] [_____].

2.7.7.1.4 Pitot Tube AFMA

Each Pitot Tube AFMA must contain an array of velocity sensing elements. The velocity sensing elements must be of the multiple pitot tube type with averaging manifolds. The sensing elements must be distributed across the duct cross section in the quantity and pattern specified or recommended by the published installation instructions of the AFMA manufacturer.

a. Pitot Tube AFMAs for use in airflows over 3.0 m/s 600 fpm must have an accuracy of plus or minus 5 percent over a range of 2.5 to 12.5 m/s 500 to 2500 fpm.

b. Pitot Tube AFMAs for use in airflows under 3.0 m/s 600 fpm must have an accuracy of plus or minus 5 percent over a range of 0.6 to 12.5 m/s 125 to 2500 fpm.

2.7.7.1.5 Electronic AFMA

Each electronic AFMA must consist of an array of velocity sensing elements of the resistance temperature detector (RTD) or thermistor type. The sensing elements must be distributed across the duct cross section in the quantity and pattern specified or recommended by the published application data of the AFMA manufacturer. Electronic AFMAs must have an accuracy of plus or minus 5 percent over a range of 0.6 to 12.5 m/s 125 to 5,000 fpm and the output must be temperature compensated over a range of 0 to 100 degrees C 32 to 212 degrees F.

2.7.7.1.6 Fan Inlet Measurement Devices

Fan inlet measurement devices cannot be used unless indicated on the drawings or schedules.

2.7.7.2 Orifice Plate

Orifice plate must be made of an austenitic stainless steel sheet of 3. mm

0.125 inch nominal thickness with an accuracy of plus or minus 1 percent of full flow. The orifice plate must be flat within 0.1 mm 0.002 inches. The orifice surface roughness must not exceed 0.5 µm 20 micro-inches. The thickness of the cylindrical face of the orifice must not exceed 2 percent of the pipe inside diameter or 12.5 percent of the orifice diameter, whichever is smaller. The upstream edge of the orifice must be square and sharp. Where orifice plates are used, concentric orifice plates must be used in all applications except steam flow measurement in horizontal pipelines.

2.7.7.3 Flow Nozzle

Flow nozzle must be made of austenitic stainless steel with an accuracy of plus or minus 1 percent of full flow. The inlet nozzle form must be elliptical and the nozzle throat must be the quadrant of an ellipse. The thickness of the nozzle wall and flange must be such that distortion of the nozzle throat from strains caused by the pipeline temperature and pressure, flange bolting, or other methods of installing the nozzle in the pipeline must not cause the accuracy to degrade beyond the specified limit. The outside diameter of the nozzle flange or the design of the flange facing must be such that the nozzle throat must be centered accurately in the pipe.

2.7.7.4 Venturi Tube

Venturi tube must be made of cast iron or cast steel and must have an accuracy of plus or minus 1 percent of full flow. The throat section must be lined with austenitic stainless steel. Thermal expansion characteristics of the lining must be the same as that of the throat casting material. The surface of the throat lining must be machined to a plus or minus 1.2 µm 50 micro inch finish, including the short curvature leading from the converging entrance section into the throat.

2.7.7.5 Annular Pitot Tube

Annular pitot tube must be made of austenitic stainless steel with an accuracy of plus or minus 2 percent of full flow and a repeatability of plus or minus 0.5 percent of measured value. The unit must have at least one static port and no less than four total head pressure ports with an averaging manifold.

2.7.7.6 Insertion Turbine Flowmeter

Provide dual axial turbine flowmeter with all installation hardware necessary to enable insertion and removal of the meter without system shutdown. All parts must meet or exceed the pressure classification of the pipe system it is installed in. Insertion Turbine Flowmeter accuracy must be plus or minus 0.5 percent of rate at calibrated velocity., within plus or minus of rate over a 10:1 turndown and within plus or minus 2 percent of rate over a 50:1 turndown. Repeatability must be plus or minus 0.25 percent of reading. The meter flow sensing element must operate over a range suitable for the installed location with a pressure loss limited to 1 percent of operating pressure at maximum flow rate. The flowmeter ,must include either dry contact pulse outputs, 4-20mA, 0-10Vdc or 0-5Vdc outputs. The turbine rotor assembly must be constructed of Series 300 stainless steel and use Teflon seals.

2.7.7.7 Vortex Shedding Flowmeter

Vortex Shedding Flowmeter accuracy must be within plus or minus 0.8 percent of the actual reading over the range of the meter. Steam meters must contain density compensation by direct measurement of temperature. Mass flow inferred from specified steam pressure are not acceptable. The flow meter body must be made of austenitic stainless steel and include a weather tight NEMA 4X electronics enclosure. The vortex shedding flowmeter body must not require removal from the piping in order to replace the shedding sensor.

2.7.7.8 Ultrasonic Flow Meter

Provide Ultrasonic Flow Meters complete with matched transducers, self aligning installation hardware and transducer cables. Ultrasonic transducers must be optimized for the specific pipe and process conditions for the application. The flow meter accuracy must plus or minus 1 percent of rate from 0.3 to 12 meters/sec 0 to 40 ft/sec. The flowmeter must include either dry contact pulse outputs, 4-20mA, 0-10Vdc or 0-5Vdc output.

2.7.7.9 Insertion Magnetic Flow Meter

Provide insertion type magnetic flowmeters with all installation hardware necessary to enable insertion and removal of the meter without system shutdown. All parts must meet or exceed the pressure classification of the pipe system it is installed in. Flowmeter accuracy must be no greater than plus or minus 1 percent of rate from 0.6 to 6 meters/sec 2 to 20 feet/sec. Wetted material parts must be 300 series stainless steel. The flowmeter must include either dry contact pulse outputs, 4-20mA, 0-10Vdc or 0-5Vdc outputs.

2.7.7.10 Positive Displacement Flow Meter

The flow meter must be a direct reading, gerotor, nutating disc or vane type displacement device rated for liquid service as indicated. A counter must be mounted on top of the meter, and must consist of a non-resettable mechanical totalizer for local reading, and a pulse transmitter for remote reading. The totalizer must have a six digit register to indicate the volume passed through the meter in gallons, and a sweep-hand dial to indicate down to 1 L 0.25 gallons. The pulse transmitter must have a hermetically sealed reed switch which is activated by magnets fixed on gears of the counter. The meter must have a bronze body with threaded or flanged connections as required for the application. Output accuracy must be plus or minus 2 percent of the flow range. The maximum pressure drop at full flow must be 34 kPa 5 psig.

2.7.7.11 Flow Meters, Paddle Type

Sensor must be non-magnetic, with forward curved impeller blades designed for water containing debris. Sensor accuracy must be plus or minus 1 percent of rate of flow, minimum operating flow velocity must be 0.3 meters/second 1 foot per second. Sensor repeatability and linearity must be plus or minus 1 percent. Materials which will be wetted must be made from non-corrosive materials and must not contaminate water. The sensor must be rated for installation in pipes of 76 mm to 1 m 3 to 40 inch diameters. The transmitter housing must be a NEMA 250 Type 4 enclosure.

2.7.7.12 Flow Switch

Flow switch must have a repetitive accuracy of plus or minus 10 percent of actual flow setting. Switch actuation must be adjustable over the operating flow range, and must be sized for the application such that the setpoint is between 25 percent and 75 percent of the full range. The switch must have Form C snap-action contacts, rated for the application. The flow switch must have non flexible paddle with magnetically actuated contacts and be rated for service at a pressure greater than the installed conditions. Flow switch for use in sewage system must be rated for use in corrosive environments encountered.

2.7.7.13 Gas Flow Meter

Gas flow meter must be diaphragm or bellows type (gas positive displacement meters) for flows up to 19.7 L/sec 2500 SCFH and axial flow turbine type for flows above 19.7 L/sec 2500 SCFH, designed specifically for natural gas supply metering, and rated for the pressure, temperature, and flow rates of the installation. Meter must have a minimum turndown ratio of 10 to 1 with an accuracy of plus or minus 1 percent of actual flow rate. The meter index must include a direct reading mechanical totalizing register and electrical impulse dry contact output for remote monitoring. The electrical impulse dry contact output must not require field adjustment or calibration. The electrical impulse dry contact output must have a minimum resolution of 3 cubic meters 100 cubic feet of gas per pulse and must not exceed 15 pulses per second at the design flow.

2.7.8 Electrical Instruments

Provide Electrical Instruments with an input range as indicated or sized for the application. Unless otherwise specified, AC instrumentation must be suitable for 60 Hz operation.

2.7.8.1 Current Transducers

Current transducers must accept an AC current input and must have an accuracy of plus or minus [0.5] [2] percent of full scale. The device must have a means for calibration. Current transducers for variable frequency applications must be rated for variable frequency operation.

2.7.8.2 Current Sensing Relays (CSRs)

Current sensing relays (CSRs) must provide a normally-open contact with a voltage and amperage rating greater than its connected load. Current sensing relays must be of split-core design. The CSR must be rated for operation at 200 percent of the connected load. Voltage isolation must be a minimum of 600 volts. The CSR must auto-calibrate to the connected load or be adjustable and field calibrated. Current sensors for variable frequency applications must be rated for variable frequency operation.

2.7.8.3 Voltage Transducers

Voltage transducers must accept an AC voltage input and have an accuracy of plus or minus 0.25 percent of full scale. The device must have a means for calibration. Line side fuses for transducer protection must be provided.

2.7.8.4 Energy Metering

2.7.8.4.1 Watt or Watthour Transducers

Watt transducers must measure voltage and current and must output kW or kWh or both kW and kWh as indicated. kW outputs must have an accuracy of plus or minus 0.5 percent over a power factor range of 0.1 to 1. kWh outputs must have an accuracy of plus or minus 0.5 percent over a power factor range of 0.1 to 1.

2.7.8.4.2 Watthour Revenue Meter (with and without Demand Register)

All Watthour revenue meters must measure voltage and current and must be in accordance with ANSI C12.1 with an ANSI C12.20 Accuracy class of [0.5] [0.2] and must have pulse initiators for remote monitoring of Watthour consumption. Pulse initiators must consist of form C contacts with a current rating not to exceed two amperes and voltage not to exceed 500 V, with combinations of VA not to exceed 100 VA, and a life rating of one billion operations. Meter sockets must be in accordance with NEMA/ANSI C12.10. Watthour revenue meters with demand registers must output instantaneous demand in addition to the pulse initiators.

2.7.8.4.3 Steam Meters

Steam meters must be the vortex shedding type, with pressure compensation, a minimum turndown ratio of 10 to 1, and an output signal of 4-20 ma, pulsed, or BACnet MS/TP, all compatible with the DDC system.

2.7.8.4.4 Hydronic BTU Meters

The BTU meter is to be supplied with wall mount hardware and be capable of being installed remote from the flow meter. The BTU meter must include an LCD display for local indication of energy rate and for display of parameters and settings during configuration. Each BTU meter must be factory configured for its specific application and be completely field configurable by the user via a front panel keypad (no special interface device or computer required). The unit must output Energy Rate, Energy Total, Flow Rate, Supply Temperature, and Return Temperature. An integral transmitter is to provide a linear analog or configurable pulse output signal representing the energy rate; and the signal must be compatible with building automation system DDC Hardware to which the output is connected.

2.7.9 pH Sensor

The sensor must be suitable for applications and chemicals encountered in water treatment systems of boilers, chillers and condenser water systems. Construction, wiring, fittings and accessories must be corrosion and chemical resistant with fittings for tank or suspension installation. Housing must be polyvinylidene fluoride with O-rings made of chemical resistant materials which do not corrode or deteriorate with extended exposure to chemicals. The sensor must be encapsulated. Periodic replacement must not be required for continued sensor operation. Sensors must use a ceramic junction and pH sensitive glass membrane capable of withstanding a pressure of 689 kPa at 66 degrees C 100 psig at 150 degrees F. The reference cell must be double junction configuration. Sensor range must be 0 to 12 pH, stability 0.05, sensitivity 0.02, and repeatability of plus or minus 0.05 pH value, response of 90 percent of full scale in one second and a linearity of 99 percent of theoretical electrode output measured at 24 degrees C 76 degrees F.

2.7.10 Oxygen Analyzer

Oxygen analyzer must consist of a zirconium oxide sensor for continuous sampling and an air-powered aspirator to draw flue gas samples. The analyzer must be equipped with filters to remove flue air particles. Sensor probe temperature rating must be 435 degrees C 815 degrees F. The sensor assembly must be equipped for flue flange mounting.

2.7.11 Carbon Monoxide Analyzer

Carbon monoxide analyzer must consist of an infrared light source in a weather proof steel enclosure for duct or stack mounting. An optical detector/analyzer in a similar enclosure, suitable for duct or stack mounting must be provided. Both assemblies must include internal blower systems to keep optical windows free of dust and ash at all times. The third component of the analyzer must be the electronics cabinet. Automatic flue gas temperature compensation and manual/automatic zeroing devices must be provided. Unit must read parts per million (ppm) of carbon monoxide in the range of [_____] to [_____] ppm and the response time must be less than 3 seconds to 90 percent value. Unit measurement range must not exceed specified range by more that 50 percent. Repeatability must be plus or minus 1 percent of full scale with an accuracy of plus or minus 1 percent of full scale.

2.7.12 Occupancy Sensors

Occupancy sensors must have occupancy-sensing sensitivity adjustment and an adjustable off-delay timer with a setpoint of 15 minutes. Adjustments accessible from the face of the unit are preferred. Occupancy sensors must be rated for operation in ambient air temperatures ranging from 5 to 35 degrees C 40 to 95 degrees F or temperatures normally encountered in the installed location. Sensors integral to wall mount on-off light switches must have an auto-off switch. Wall switch sensors must be decorator style and must fit behind a standard decorator type wall plate. All occupancy sensors, power packs, and slave packs must be UL listed. In addition to any outputs required for lighting control, the occupancy sensor must provide an output for the HVAC control system.

2.7.12.1 Passive Infrared (PIR) Occupancy Sensors

PIR occupancy sensors must have a multi-level, multi-segmented viewing lens and a conical field of view with a viewing angle of 180 degrees and a detection of at least 6 m 20 feet unless otherwise indicated or specified. PIR Sensors must provide field-adjustable background light-level adjustment with an adjustment range suitable to the light level in the sensed area, room or space. PIR sensors must be immune to false triggering from RFI and EMI.

2.7.12.2 Ultrasonic Occupancy Sensors

Ultrasonic sensors must operate at a minimum frequency 32 kHz and must be designed to not interfere with hearing aids.

2.7.12.3 Dual-Technology Occupancy Sensor (PIR and Ultrasonic)

Dual-Technology Occupancy Sensors must meet the requirements of both PIR and Ultrasonic Occupancy Sensors.

2.7.13 Vibration Switch

Vibration switch must be solid state, enclosed in a NEMA 250 Type 4 or Type 4X housing with sealed wire entry. Unit must have two independent sets of Form C switch contacts with one set to shutdown equipment upon excessive vibration and a second set for monitoring alarm level vibration. The vibration sensing range must be a true rms reading, suitable for the application. The unit must include either displacement response for low speed or velocity response for high speed application. The frequency range must be at least 3 Hz to 500 Hz. Contact time delay must be 3 seconds. The unit must have independent start-up and running delay on each switch contact. Alarm limits must be adjustable and setpoint accuracy must be plus or minus 10 percent of setting with repeatability of plus or minus 2 percent.

2.7.14 Conductivity Sensor

Sensor must include local indicating meter and must be suitable for measurement of conductivity of water in boilers, chilled water systems, condenser water systems, distillation systems, or potable water systems as indicated. Sensor must sense from 0 to 10 microSeimens per centimeter (µS/cm) for distillation systems, 0 to 100 µS/cm for boiler, chilled water, and potable water systems and 0 to 1000 µS/cm for condenser water systems. Contractor must field verify the ranges for particular applications and adjust the range as required. The output must be temperature compensated over a range of 0 to 100 degrees C 32 to 212 degrees F. The accuracy must be plus or minus 2 percent of the full scale reading. Sensor must have automatic zeroing and must require no periodic maintenance or recalibration.

2.7.15 Compressed Air Dew Point Sensor

Sensor must be suitable for measurement of dew point from -40 +27 degrees C -40 +80 degrees F over a pressure range of 0 to 1 MPa 0 to 150 psig. The transmitter must provide both dry bulb and dew point temperatures on separate outputs. The end to end accuracy of the dew point must be plus or minus 2.8 degrees C 5 degrees F and the dry bulb must be plus or minus 0.6 degrees C 1 degree F. Sensor must be automatic zeroing and must require no normal maintenance or periodic recalibration.

2.7.16 NOx Monitor

Monitor must continuously monitor and give local indication of boiler stack gas for NOx content. It must be a complete system designed to verify compliance with the Clean Air Act standards for NOx normalized to a 3 percent oxygen basis and must have a range of from 0 to 100 ppm. Sensor must be accurate to plus or minus 5 ppm. Sensor must output NOx and oxygen levels and binary output that changes state when the NOx level is above a locally adjustable NOx setpoint. Sensor must have normal, trouble and alarm lights. Sensor must have heat traced lines if the stack pickup is remote from the sensor. Sensor must be complete with automatic zero and span calibration using a timed calibration gas system, and must not require periodic maintenance or recalibration.

2.7.17 Turbidity Sensor

Sensor must include a local indicating meter and must be suitable for measurement of turbidity of water. Sensor must sense from 0 to 1000

Nephelometric Turbidity Units (NTU). Range must be field-verified for the particular application and adjusted as required. The output must be temperature compensated over a range of 0 to 100 degrees C 32 to 212 degrees F. The accuracy must be plus or minus 5 percent of full scale reading. Sensor must have automatic zeroing and must not require periodic maintenance or recalibration.

2.7.18 Chlorine Detector

The detector must measure concentrations of chlorine in water in the range 0 to 20 ppm with a repeatability of plus or minus 1 percent of full scale and an accuracy of plus or minus 2 percent of full scale. The Chlorine Detector transmitter must be housed in a non-corrosive NEMA 250 Type 4X enclosure. Detector must include a local panel with adjustable alarm trip level, local audio and visual alarm with silence function.

2.7.19 Floor Mounted Leak Detector

Leak detectors must use electrodes mounted at slab level with a minimum built-in-vertical adjustment of 3 mm 0.125 inches. Detector must have a binary output. The indicator must be manual reset type.

2.7.20 Temperature Switch

2.7.20.1 Duct Mount Temperature Low Limit Safety Switch (Freezestat)

Duct mount temperature low limit switches (Freezestats) must be manual reset, low temperature safety switches at least 3 meters 1 foot long per square meter square foot of coverage which must respond to the coldest 450 mm 18 inch segment with an accuracy of plus or minus 2 degrees C 3.6 degrees F. The switch must have a field-adjustable setpoint with a range of at least -1 +10 degrees C 30 to 50 degrees F. The switch must have two sets of contacts, and each contact must have a rating greater than its connected load. Contacts must open or close upon drop of temperature below setpoint as indicated and must remain in this state until reset.

2.7.20.2 Pipe Mount Temperature Limit Switch (Aquastat)

Pipe mount temperature limit switches (aquastats) must have a field adjustable setpoint between 15 and 32 degrees C 60 and 90 degrees F, an accuracy of plus or minus 2 degrees C 3.6 degrees F and a 5 degrees C 10 degrees F fixed deadband. The switch must have two sets of contacts, and each contact must have a rating greater than its connected load. Contacts must open or close upon change of temperature above or below setpoint as indicated.

2.7.21 Damper End Switches

Each end switch must be a hermetically sealed switch with a trip lever and over-travel mechanism. The switch enclosure must be suitable for mounting on the duct exterior and must permit setting the position of the trip lever that actuates the switch. The trip lever must be aligned with the damper blade.

End switches integral to an electric damper actuator are allowed as long as at least one is adjustable over the travel of the actuator.

2.7.22 Air Quality Sensors

Provide full spectrum air quality sensors using a hot wire element based on the Taguchi principle. The sensor must monitor a wide range of gaseous volatile organic components common in indoor air contaminants like paint fumes, solvents, cigarette smoke, and vehicle exhaust. The sensor must automatically compensate for temperature and humidity, have span and calibration potentiometers, operate on 24 VDC power with output of 0-10 VDC, and have a service rating of 0 to 60 degrees C 32 to 140 degrees F and 5 to 95 percent relative humidity.

2.8 OUTPUT DEVICES

2.8.1 Actuators

Actuators must be electric (electronic). All actuators must be normally open (NO), normally closed (NC) or fail-in-last-position (FILP) as indicated. Normally open and normally closed actuators must be of mechanical spring return type. Electric actuators must have an electronic cut off or other means to provide burnout protection if stalled. Actuators must have a visible position indicator. Electric actuators must provide position feedback to the controller as indicated. Actuators must smoothly and fully open or close the devices to which they are applied. Electric actuators must have a full stroke response time in both directions of 90 seconds or less at rated load. Electric actuators must be of the foot-mounted type with an oil-immersed gear train or the direct-coupled type. Where multiple electric actuators operate from a common signal, the actuators must provide an output signal identical to its input signal to the additional devices. All actuators must be rated for their operating environment. Actuators used outdoors must be designed and rated for outdoor use and not require a weatherproof enclosure. Actuators under continuous exposure to water, such as those used in sumps, must be submersible.

Actuators incorporating an integral network connection are considered DDC Hardware and must meet the DDC Hardware requirements of Section 23 09 23.02 22 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS.

2.8.1.1 Valve Actuators

Valve actuators must provide shutoff pressures and torques as indicated on the Valve Schedule.

2.8.1.2 Damper Actuators

Damper actuators must provide the torque necessary per damper manufacturer's instructions to modulate the dampers smoothly over its full range of operation and torque must be at least 7.3 Nm/square m 6 inch-pounds/1 square foot of damper area for opposed blade dampers and 10.9 Nm/square m 9 inch-pounds/1 square foot of damper area for parallel blade dampers.

2.8.1.3 Electric Actuators

Each actuator must have distinct markings indicating the full-open and full-closed position Each actuator must deliver the torque required for

continuous uniform motion and must have internal end switches to limit the travel, or be capable of withstanding continuous stalling without damage. Actuators must function properly within 85 to 110 percent of rated line voltage. Provide actuators with hardened steel running shafts and gears of steel or copper alloy. Fiber or reinforced nylon gears may be used for torques less than 16 inch-pounds.

a. Two-position actuators must be single direction, spring return, or reversing type. Two position actuator signals may either be the control power voltage or line voltage as needed for torque or appropriate interlock circuits.

b. Modulating actuators must be capable of stopping at any point in the cycle, and starting in either direction from any point. Actuators must be equipped with a switch for reversing direction, and a button to disengage the clutch to allow manual adjustments. Provide the actuator with a hand crank for manual adjustments, as applicable. Modulating actuator input signals can either be a 4 to 20 mAdc or a 0-10 VDC signal.

c. Floating or pulse width modulation actuators are acceptable for non-fail safe applications unless indicated otherwise provided that the floating point control (timed actuation) must have a scheduled re-calibration of span and position no more than once a day and no less than once a week. The schedule for the re-calibration should not affect occupied conditions and be staggered between equipment to prevent falsely loading or unloading central plant equipment.

2.8.2 Relays

Relays must have contacts rated for the intended application, indicator light, and dust proof enclosure. The indicator light must be lit when the coil is energized and off when coil is not energized.

Control relay contacts must have utilization category and ratings selected for the application. Each set of contacts must incorporate a normally open (NO), normally closed (NC) and common contact. Relays must be rated for a minimum life of one million operations.

2.9 USER INPUT DEVICES

User Input Devices, including potentiometers, switches and momentary contact push-buttons. Potentiometers must be of the thumb wheel or sliding bar type. Momentary Contact Push-Buttons may include an adjustable timer for their output. User input devices must be labeled for their function.

2.10 MULTIFUNCTION DEVICES

Multifunction devices are products which combine the functions of multiple sensor, user input or output devices into a single product. Unless otherwise specified, the multifunction device must meet all requirements of each component device. Where the requirements for the component devices conflict, the multifunction device must meet the most stringent of the requirements.

2.10.1 Current Sensing Relay Command Switch

The Current Sensing Relay portion must meet all requirements of the Current Sensing Relay input device. The Command Switch portion must meet all requirements of the Relay output device except that it must have at least one normally-open (NO) contact.

Current Sensing Relays used for Variable Frequency Drives must be rated for Variable Frequency applications unless installed on the source side of the drive. If used in this situation, the threshold for showing status must be set to allow for the VFD's control power when the drive is not enabled and provide indication of operation when the drive is enabled at minimum speed.

2.10.2 Space Sensor Module

Space Sensor Modules must be multifunction devices incorporating a temperature sensor and one or more of the following as specified and indicated on the Space Sensor Module Schedule:

a. A temperature indicating device.

b. A User Input Device which must adjust a temperature setpoint output.

c. A User Input Momentary Contact Button and an output to the control system indicating zone occupancy.

d. A three position User Input Switch labeled to indicate heating, cooling and off positions ('HEAT-COOL-OFF' switch) and providing corresponding outputs to the control system.

e. A two position User Input Switch labeled with 'AUTO' and 'ON' positions and providing corresponding output to the control system..

f. A multi-position User Input Switch with 'OFF' and at least two fan speed positions and providing corresponding outputs to the control system.

Space Sensor Modules cannot contain mercury (Hg).

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 General Installation Requirements

Perform the installation under the supervision of competent technicians regularly employed in the installation of DDC systems.

All material and equipment must be installed in accordance with the manufacturer's recommendations for the intended purpose. Maintain a copy of the manufacture's recommendations on the Contruction Site. Use the more stringent methods when manufacturer's recommendations, and plans & specification requirements differ. Use the "Preferred" method when alternative methods are given. The word "should" will be considered to mean "must". Bring any conflicts between manufacturer's recommendations and plans & specification requirements to the Government's attention. Install all equipment level and plumb.

3.1.1.1 Device Mounting Criteria

All devices must be installed in accordance with manufacturer's recommendations and as specified and indicated. Control devices to be installed in piping and ductwork must be provided with required gaskets, flanges, thermal compounds, insulation, piping, fittings, and manual valves for shutoff, equalization, purging, and calibration. Strap-on temperature sensing elements must not be used except as specified. Spare thermowells must be installed adjacent to each thermowell containing a sensor and as indicated. Devices located outdoors must have a weathershield.

3.1.1.2 Labels and Tags

Match labels and tags to the unique identifiers indicated on the As-Built drawings. Label all enclosures and instrumentation. Tag all sensors and actuators in mechanical rooms. Tag airflow measurement arrays to show flow rate range for signal output range, duct size, and pitot tube AFMA flow coefficient. Tag duct static pressure taps at the location of the pressure tap. Provide plastic or metal tags, mechanically attached directly to each device or attached by a metal chain or wire. Labels exterior to protective enclosures must be engraved plastic and mechanically attached to the enclosure or instrumentation. Labels inside protective enclosures may attached using adhesive, but must not be hand written.

3.1.2 Weathershield

Provide weathershields for sensors located outdoors. Install weathershields such that they prevent the sun from directly striking the sensor and prevent rain from directly striking or dripping onto the sensor. Install weather shields with adequate ventilation so that the sensing element responds to the ambient conditions of the surroundings. When installing weathershields near outside air intake ducts, install them such that normal outside air flow does not cause rainwater to strike the sensor.

3.1.3 Room Instrument Mounting

Mount room instruments, including but not limited to wall mounted non-adjustable space sensor modules and sensors located in occupied spaces, [1.5][1.2] meters [60][48] inches above the floor unless otherwise indicated. Install adjustable devices to be ADA compliant unless otherwise indicated on the Room Sensor Schedule:

a. Space Sensor Modules for Fan Coil Units may be either unit or wall mounted but not mounted on an exterior wall.

b. Wall mount all other Space Sensor Modules.

3.1.4 Indication Devices Installed in Piping and Liquid Systems

Provide snubbers for gauges in piping systems subject to pulsation. For gauges for steam service use pigtail fittings with cock. Install thermometers and temperature sensing elements in liquid systems in thermowells. Provide spare Pressure/Temperature Ports (Pete's Plug) for all temperature and pressure sensing elements installed in liquid systems

for calibration/testing.

3.1.5 Occupancy Sensors

Provide a sufficient quantity of occupancy sensors to provide complete coverage of the area (room or space). Occupancy sensors are to be ceiling mounted. Install occupancy sensors in accordance with NFPA 70 requirements and the manufacturer's instructions. Do not locate occupancy sensors within 2 m 6 feet of HVAC outlets or heating ducts, or where they can "see" beyond any doorway. Installation above doorway(s) is preferred. Do not use ultrasonic sensors in spaces containing ceiling fans. Install sensors to detect motion to within 600 mm 2 feet of all room entrances and to not trigger due to motion outside the room. Set the off-delay timer to [15][_____] minutes unless otherwise indicated. Adjust sensors prior to beneficial occupancy, but after installation of furniture systems, shelving, partitions, etc. For each controlled area, provide one hundred percent coverage capable of detecting small hand-motion movements, accommodating all occupancy habits of single or multiple occupants at any location within the controlled room.

3.1.6 Switches

3.1.6.1 Temperature Limit Switch

Provide a temperature limit switch (freezestat) to sense the temperature at the location indicated. Provide a sufficient number of temperature limit switches (freezestats) to provide complete coverage of the duct section but no less than 3 m 1 foot in length per square meter square foot of cross sectional area. Install manual reset limit switches in approved, accessible locations where they can be reset easily. Install temperature limit switch (freezestat) sensing elements in a side-to-side (not top-to-bottom) serpentine pattern with the relay section at the highest point and in accordance with the manufacturer's installation instructions.

3.1.6.2 Hand-Off Auto Switches

Wire safety controls such as smoke detectors, freeze protection thermostats, and emergency shut down switches to protect the equipment during both hand and auto operation.

3.1.7 Temperature Sensors

Install temperature sensors in locations that are accessible and provide a good representation of sensed media. Installations in dead spaces are not acceptable. Calibrate and install sensors according to manufacturer’s instructions. Select sensors only for intended application as designated or recommended by manufacturer.

3.1.7.1 Room Temperature Sensors

Mount the sensors on interior walls to sense the average room temperature at the locations indicated. Avoid locations near heat sources such as copy machines or locations by supply air outlet drafts. Mount the center of all user-adjustable sensors [1.5 m 5 feet above the finished floor][1370 mm 54 inches above the floor to meet ADA requirements][at the height[s] indicated]. Non user-adjustable sensors can be mounted as indicated in paragraph ROOM INSTRUMENT MOUNTING.

3.1.7.2 Duct Temperature Sensors

3.1.7.2.1 Probe Type

Place tip of the sensor in the middle of the airstream or in accordance with manufacturer's recommendations or instructions.Provide a gasket between the sensor housing and the duct wall. Seal the duct penetration air tight. When installed in insulated duct, provide enclosure or stand off fitting to accommodate the thickness of duct insulation to allow for maintenance or replacement of the sensor and wiring terminations. Seal the duct insulation penetration vapor tight.

3.1.7.2.2 Averaging Type

Weave the sensing element in a serpentine fashion from side to side perpendicular to the flow, across the duct or air handler cross-section, using durable non-metal supports in accordance with manufacturer's installation instructions. Avoid tight radius bends or kinking of the sensing element. Prevent contact between the sensing element and the duct or air handler internals. Provide a duct access door at the sensor location. The access door must be hinged on the side, factory insulated, have cam type locks, and be as large as the duct will permit, maximum 18 by 18 inches. For sensors inside air handlers, the sensors must be fully accessible through the air handler's access doors without removing any of the air handler's internals.

3.1.7.3 Immersion Temperature Sensors

Provide thermowells for sensors measuring piping, tank, or pressure vessel temperatures. Locate wells to sense continuous flow conditions. Do not install wells using extension couplings. When installed on insulated piping, provide stand enclosure or stand off fitting to accommodate the thickness of the pipe insulation and allow for maintenance or replacement of the sensor or wiring terminations. Where piping diameters are smaller than the length of the wells, provide wells in piping at elbows to sense flow across entire area of well. Wells must not restrict flow area to less than 70 percent of pipe area. Increase piping size as required to avoid restriction. Provide the sensor well with a heat-sensitive transfer agent between the sensor and the well interior ensuring contact between the sensor and the well.

3.1.7.4 Outside Air Temperature Sensors

Provide outside air temperature sensors on the building's north side with a protective weather shade that does not inhibit free air flow across the sensing element, and protects the sensor from snow, ice, and rain. Location must not be near exhaust hoods and other areas such that it is not influenced by radiation or convection sources which may affect the reading. Provide a shield to shade the sensor from direct sunlight.

3.1.8 Air Flow Measurement Arrays (AFMA)

Locate Outside Air AFMAs downstream from the Outside Air filters.

Install AFMAs with the manufacturer's recommended minimum distances between upstream and downstream disturbances. Airflow straighteners may be used to reduce minimum distances as recommended by the AFMA

manufacturer.

3.1.9 Duct Static Pressure Sensors

Locate the duct static pressure sensing tap at 75 percent of the distance between the first and last air terminal units as indicated on the design documents. If the transmitter output is a 0-10Vdc signal, locate the transmitter in the same enclosure as the air handling unit (AHU) controller for the AHU serving the terminal units. If a remote duct static pressure sensor is to be used, run the signal wire back to the controller for the air handling unit.

3.1.10 Relative Humidity Sensors

Install relative humidity sensors in supply air ducts at least 3 m 10 feet downstream of humidity injection elements.

3.1.11 Meters

3.1.11.1 Flowmeters

Install flowmeters to ensure minimum straight unobstructed piping for at least 10 pipe diameters upstream and at least 5 pipe diameters downstream of the flowmeter, and in accordance with the manufacturer's installation instructions.

3.1.11.2 Energy Meters

Locate energy meters as indicated. Connect each meter output to the DDC system, to measure both instantaneous demand/energy and other variables as indicated.

3.1.12 Dampers

3.1.12.1 Damper Actuators

Provide spring return actuators which fail to a position that protects the served equipment and space on all control dampers related to freeze protection or force protection. For all outside, makeup and relief dampers provide dampers which fail closed. Terminal fan coil units, terminal VAV units, convectors, and unit heaters nay be non-spring return unless indicated otherwise. Do not mount actuators in the air stream. Do not connect multiple actuators to a common drive shaft. Install actuators so that their action seal the damper to the extent required to maintain leakage at or below the specified rate and so that they move the blades smoothly throughout the full range of motion.

3.1.12.2 Damper Installation

Install dampers straight and true, level in all planes, and square in all dimensions. Dampers must move freely without undue stress due to twisting, racking (parallelogramming), bowing, or other installation error. External linkages must operate smoothly over the entire range of motion, without deformation or slipping of any connecting rods, joints or brackets that will prevent a return to it's normal position. Blades must close completely and leakage must not exceed that specified at the rated static pressure. Provide structural support for multi-section dampers.

Acceptable methods of structural support include but are not limited to U-channel, angle iron, corner angles and bolts, bent galvanized steel stiffeners, sleeve attachments, braces, and building structure. Where multi-section dampers are installed in ducts or sleeves, they must not sag due to lack of support. Do not use jackshafts to link more than three damper sections. Do not use blade to blade linkages. Install outside and return air dampers such that their blades direct their respective air streams towards each other to provide for maximum mixing of air streams.

3.1.13 Valves

Install the valves in accordance with the manufacturer's instructions.

3.1.13.1 Valve Actuators

Provide spring return actuators on all control valves where freeze protection is required. Spring return actuators for terminal fan coil units, terminal VAV units, convectors, and unit heaters are not required unless indicated otherwise.

3.1.14 Thermometers and Gauges

3.1.14.1 Thermometers

Mount devices to allow reading while standing on the floor or ground, as applicable.

3.1.15 Wire and Cable

Provide complete electrical wiring for the Control System, including wiring to transformer primaries. Wire and Cable must be installed without splices between control devices and in accordance with NFPA 70 and NFPA 90A. Instrumentation grounding must be installed per the device manufacturer's instructions and as necessary to prevent ground loops, noise, and surges from adversely affecting operation of the system. Test installed ground rods as specified in IEEE 142. Cables and conductor wires must be tagged at both ends, with the identifier indicated on the shop drawings. Electrical work must be as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and as indicated. Wiring external to enclosures must be run in raceways

Install control circuit wiring not in raceways in a neat and safe manner. Wiring must not use the suspended ceiling system (including tiles, frames or hangers) for support. Where conduit or raceways are required, control circuit wiring must not run in the same conduit/raceway as power wiring over 50 volts. Run all circuits over 50 volts in conduit, metallic tubing, covered metal raceways, or armored cable.

-- End of Section --

SECTION 23 09 23.02 22

BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS
11/19

PART 1 GENERAL

1.1 SUMMARY

Provide a complete Direct Digital Control (DDC) system, except for the front end which is existing and new system integration being performed by the Government, suitable for the control of the heating, ventilating and air conditioning (HVAC) and other building-level systems as specified and shown and in accordance with Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

1.1.1 System Requirements

Provide a system meeting the requirements of both Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC and this Section and with the following characteristics:

a. Except for Gateways, the control system must be an open implementation of BACnet technology using ASHRAE 135 and Fox as the communications protocols. The system must use standard ASHRAE 135 Objects and Properties and the Niagara Framework. The system must use standard ASHRAE 135 Services and the Niagara Framework exclusively for communication over the network. Gateways to packaged units must communicate with other DDC hardware using ASHRAE 135 or the Fox protocol exclusively and may communicate with packaged equipment using other protocols. The control system must be installed such that any two ASHRAE 135 devices on the Internetwork can communicate using standard ASHRAE 135 Services.

b. Install and configure control hardware to provide ASHRAE 135 Objects and Properties or Niagara Framework Objects as indicated and as needed to meet the requirements of this specification.

c. Use Niagara Framework hardware and software exclusively for scheduling, trending, and communication with a front end (UMCS). Use Niagara Framework or standard BACnet Objects and services for alarming. Use the Fox protocol for all communication between Niagara Framework Supervisory Gateways; use the ASHRAE 135 protocol for all other building communication. Niagara Framework Supervisory Gateway must serve web pages as specified.

d. Use Niagara Framework AX supervisor (JCI FX web supervisor) or Johnson Controls Incorporated (JCI) Metasys Extended Architecture (ADX server).

1.1.2 Verification of Specification Requirements

Review all specifications related to the control system installation and advise the Contracting Officer of any discrepancies before performing any work. If Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC or any other Section referenced in this specification is not included in the project specifications advise the Contracting Officer and either obtain

the missing Section or obtain Contracting Officer approval before performing any work.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 135	(2016) BACnet—A Data Communication Protocol for Building Automation and Control Networks

BACNET INTERNATIONAL (BTL)

BTL Guide	(v.49; 2017) BACnet Testing Laboratory Implementation Guidelines

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 802.3	(2018) Ethernet

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-485	(1998a; R 2012) Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems

TRIDIUM, INC (TRIDIUM)

Niagara Framework	(2012) NiagaraAX User's Guide
Tridium Open NiCS	(2005) Understanding the NiagaraAX Compatibility Statement (NiCS)

U.S. FEDERAL COMMUNICATIONS COMMISSION (FCC)

FCC Part 15	Radio Frequency Devices (47 CFR 15)

UNDERWRITERS LABORATORIES (UL)

UL 916	(2007; Reprint Aug 2014) Standard for Energy Management Equipment

1.3 DEFINITIONS

For definitions related to this section, see Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

1.4 SUBMITTALS

Submittal requirements related to this Section are specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

PART 2 PRODUCTS

All products used to meet this specification must meet the indicated requirements, but not all products specified here will be required by every project. All products must meet the requirements both Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC and this Section.

2.1 NETWORK HARDWARE

2.1.1 BACnet Router

All BACnet Routers must be BACnet/IP Routers and must perform layer 3 routing of ASHRAE 135 packets over an IP network in accordance with ASHRAE 135 Annex J and Clause 6. The router must provide the appropriate connection to the IP network and connections to one or more ASHRAE 135 MS/TP networks. Devices used as BACnet Routers must meet the requirements for DDC Hardware, and except for Niagara Framework Supervisory Gateways, devices used as BACnet routers must support the NM-RC-B BIBB.

2.1.2 BACnet Gateways

In addition to the requirements for DDC Hardware, the BACnet Gateway must be a Niagara Framework Supervisory Gateway or must meet the following requirements:

a. It must perform bi-directional protocol translation from one non-ASHRAE 135 protocol to ASHRAE 135. BACnet Gateways must incorporate a network connection to an ASHRAE 135 network (gateway must be MS/TP, BACnet over IP is not permitted within the DDC system) and a separate connection appropriate for the non-ASHRAE 135 protocol and media.

b. It must retain its configuration after a power loss of an indefinite time, and must automatically return to their pre-power loss state once power is restored.

c. It must allow bi-directional mapping of data between the non-ASHRAE 135 protocol and Standard Objects as defined in ASHRAE 135. It must support the DS-RP-B BIBB for Objects requiring read access and the DS-WP-B BIBB for Objects requiring write access.

d. It must support the DS-COV-B BIBB.

Although Gateways must meet DDC Hardware requirements, except for Niagara Framework Supervisory Gateways, they are not DDC Hardware and must not be used when DDC Hardware is required. (Niagara Framework Supervisory Gateways are both Gateways and DDC Hardware.)

2.1.3 Ethernet Switch

Ethernet Switches must autoconfigure between 10,100 and 1000 megabits per second (MBPS).

2.1.4 Emergency Shut Down Switches (ATFP)

Anti Terrorism Force Protection emergency shut down switches must be two action to prevent accidental initiation, such as a mushroom push button with a cover.

2.1.5 Notebook Computer

Provide a notebook computer, complete with the project's installed DDC software, applications database, final archived field controller programs and Supervisory controller database, and graphics to fully troubleshoot and program the project's devices. Provide the notebook computer with ballistic nylon carrying case with shoulder strap with all necessary cables and interface hardware needed for setup and direct communication with the controllers and control system components. Direct communication must not be through the Supervisory controller. At a minimum the notebook computer is to include: Common Access Card Reader, Windows based operating system, minimum 2.7 GHz processor with 3 MB Cache, discrete switchable graphics card with minimum 1 GB dedicated memory, 1 Terabyte hard drive, 6 32 GB DDR3 RAM, 2 USB 3.0 ports, 10/100/1000 network interface card, 802.11 b/g/n WLAN, 17-inch display, keyboard with numeric keypad, 6-hour battery with charger, internal or external 8X DVD+/-R/RW drive with double layer support with DVD creator software, and Microsoft Office Home and Business bundled software. Provide all original licenses, installation media, documentation, and recovery CDs capable of restoring the original configuration. Provide a means to connect the notebook computer directly to the installed field bus. Provide the manufacturer's 3-year accidental damage protection with 3-day on site response for 2 year warranty with the Government listed as the warranty owner. Provide (1) notebook computer per project identified in RFP package.

2.1.5.1 Notebook Computer DDC Software

Provide the workstation software with the manufacturer's installation CDs and licenses. Configure the software according to the DDC system manufacturer's specifications, cybersecurity requirements, and in agreement with BACnet Operator Workstation (B-OWS) device standards found in ASHRAE 135, Annex L. The workstation software must permit complete monitoring, modification, archiving, programming, and troubleshooting interface with the DDC system including supervisory controller and field controllers. The operator interface with the software is to be menu-driven with appropriate displays and menu commands to manipulate the DDC system's objects, point data, operating schedules, control routines, system configuration, trends, alarms, messages, graphics, and reports. Trends must be capable of graphic display in real time, with variables plotted as functions of time. Each alarmed point is to be capable of displaying its alarm history, showing when it went into alarm, if and when it was acknowledged, and when it went out of alarm. The modification of DDC system parameters and object properties must be accomplished with "fill in the blank" and/or "point and drag" methods. Download modifications to the appropriate controllers at the operator's request.

2.2 CONTROL NETWORK WIRING

a. BACnet MS/TP communications wiring must be in accordance with ASHRAE 135. The wiring must use shielded, three wire (twisted-pair with reference) cable with characteristic impedance between 100 and 120 ohms. Distributed capacitance between conductors must be less than 100 pF per meter 30 pF per foot.

b. Building Control Network Backbone IP Network must use Ethernet media. Ethernet cables must be CAT-5e at a minimum and meet all requirements of IEEE 802.3.

2.3 DIRECT DIGITAL CONTROL (DDC) HARDWARE

2.3.1 General Requirements

All DDC Hardware must meet the following requirements:

a. It must be locally powered and must incorporate a light to indicate the device is receiving power.

b. It must conform to the BTL Guide

c. It must be BACnet Testing Laboratory (BTL) Listed.

d. The Manufacturer's Product Data submittal for each piece of DDC Hardware must include the Protocol Implementation Conformance Statement (PICS) for that hardware as specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

e. It must communicate and be interoperable in accordance with ASHRAE 135 and have connections for BACnet IP or MS/TP control network wiring.

f. Other than devices controlling terminal units or functioning solely as a BACnet Router, it must support DS-COV-B, DS-RPM-A and DS-RPM-B BIBBs.

g. Devices supporting the DS-RP-A BIBB must also support the DS-COV-A BIBB.

h. Application programs, configuration settings and communication information must be stored in a manner such that they persist through loss of power:

   (1) Application programs must persist regardless of the length of time power is lost.

   (2) Configured settings must persist for any loss of power less than 2,500 hours.

   (3) Communication information, including but not limited to COV subscriptions, event reporting destinations, Notification Class Object settings, and internal communication settings, must persist for any loss of power less than 2,500 hours.

i. Internal Clocks:

   (1) Clocks in DDC Hardware incorporating a Clock must continue to function for 120 hours upon loss of power to the DDC Hardware.

   (2) DDC Hardware incorporating a Clock must support the DM-TS-B or DM-UTC-B BIBB.

j. It must have all functionality indicated and required to support the application (Sequence of Operation or portion thereof) in which it is used, including but not limited to providing Objects or Niagara Framework Points as specified and as indicated on the Points Schedule.

k. In addition to these general requirements and the DDC Hardware Input-Output (I/O) Function requirements, all DDC Hardware must also

meet any additional requirements for the application in which it is used (e.g. scheduling, alarming, trending, etc.).

l. It must meet FCC Part 15 requirements and have UL 916 or equivalent safety listing.

m. Except for Niagara Framework Supervisory Gateways, Device must support Commandable Objects to support Override requirements as detailed in PART 3 EXECUTION

n. User interfaces which allow for modification of Properties or settings must be password-protected.

o. Devices communicating BACnet MS/TP must meet the following requirements:

(1) Must have a configurable Max_Master Property.

(2) DDC Hardware other than hardware controlling a single terminal unit must have a configurable Max_Info_Frames Property.

(3) Must respond to any valid request within 50 msec with either the appropriate response or with a response of "Reply Postponed".

(4) Must use twisted pair with reference and shield (3-wire media) wiring, or twisted pair with shield (2-wire media) wiring and use half-wave rectification.

p. Devices communicating BACnet/IP must use UDP Port 0xBAC0. Devices with configurable UDP Ports must default to 0xBAC0.

q. All Device IDs, Network Numbers, and BACnet MAC addresses of devices must be fully configurable without limitation, except MS/TP MAC addresses may be limited by ASHRAE 135 requirements.

r. Except for Niagara Framework Supervisory Gateways, DDC Hardware controlling a single terminal unit must have:

(1) Objects (including the Device Object) with an Object Name Property of at least 8 characters in length.

(2) A configurable Device Object Name.

(3) A configurable Device Object Description Property at least 16 characters in length.

s. Except for Objects in either Niagara Framework Supervisory Gateways or DDC Hardware controlling a single terminal unit, all Objects (including Device Objects) must:

(1) Have a configurable Object Name Property of at least 12 characters in length.

(2) Have a configurable Object Description Property of at least 24 characters in length.

t. For programmable DDC Hardware, provide and license to the project site

all programming software required to program the Hardware in accordance with Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

u. For programmable DDC Hardware, provide copies of the installed application programs (all software that is not common to every controller of the same manufacturer and model) as source code compatible with the supplied programming software in accordance with Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC. The submitted application program must be the complete application necessary for controller to function as installed and be sufficient to allow replacement of the installed controller with another controller of the same type.

2.3.2 Hardware Input-Output (I/O) Functions

DDC Hardware incorporating hardware input-output (I/O) functions must meet the following requirements:

2.3.2.1 I/O Point Limitation

The total number of I/O hardware points used by a single stand-alone digital controller, including I/O expansion units, must not exceed 64, except for complex individual equipment or systems. Place I/O expansion units in the same cabinet as the digital controller. The field controller must have one spare Configurable Output and one spare Universal Input available per system upon project completion, i.e. AHU, ERU, DOAS, HW System, CHW System and other building primary systems. VAV controllers and programmable thermostats are excluded.

2.3.2.2 Analog Inputs

DC Hardware analog inputs (AIs) must be implemented using ASHRAE 135 Analog Input Objects and perform analog to digital (A-to-D) conversion with a minimum resolution of 8 bits plus sign or better as needed to meet the accuracy requirements specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC. Signal conditioning including transient rejection must be provided for each analog input. Analog inputs must be capable of being individually calibrated for zero and span. Calibration via software scaling performed as part of point configuration is acceptable. The AI must incorporate common mode noise rejection of at least 50 dB from 0 to 100 Hz for differential inputs, and normal mode noise rejection of at least 20 dB at 60 Hz from a source impedance of 10,000 ohms.

2.3.2.3 Analog Outputs

DDC Hardware analog outputs (AOs) must be implemented using ASHRAE 135 Analog Output Objects and perform digital to analog (D-to-A) conversion with a minimum resolution of 8 bits plus sign, and output a signal with a range of 4-20 mAdc or 0-10 Vdc. Analog outputs must be capable of being individually calibrated for zero and span. Calibration via software scaling performed as part of point configuration is acceptable. DDC Hardware with Hand-Off-Auto (H-O-A) switches for analog outputs must provide for overriding the output to 0 percent and to 100 percent. Provide a dedicated analog output to each output device, such as variable frequency driven pump motors in an alternating arrangement.

2.3.2.4 Binary Inputs

DDC Hardware binary inputs (BIs) must be implemented using ASHRAE 135 Binary Input Objects and accept contact closures and must ignore transients of less than 5 milli-second duration. Protection against a transient 50VAC must be provided.

2.3.2.5 Binary Outputs

DDC Hardware binary outputs (BOs) must be implemented using ASHRAE 135 Binary Output Objects and provide relay contact closures or triac outputs for momentary and maintained operation of output devices. DDC Hardware with H-O-A switches for binary outputs must provide for overriding the output open or closed.

2.3.2.5.1 Relay Contact Closures

Closures must have a minimum duration of 0.1 second. Relays must provide at least 180V of isolation. Electromagnetic interference suppression must be provided on all output lines to limit transients to 50 Vac. Minimum contact rating must be 0.5 amperes at 24 Vac.

2.3.2.5.2 Triac Outputs

Triac outputs must provide at least 180 V of isolation. Minimum contact rating must be 0.5 amperes at 24 Vac.

2.3.2.6 Pulse Accumulator

DDC Hardware pulse accumulators must be implemented using either an ASHRAE 135 Accumulator Object or an ASHRAE 135 Analog Value Object where the Present_Value is the totalized pulse count. Pulse accumulators must accept contact closures, ignore transients less than 5 msec duration, protect against transients of 50 VAC, and accept rates of at least 20 pulses per second.

2.3.2.7 ASHRAE 135 Objects for Hardware Inputs and Outputs

The requirements for use of ASHRAE 135 objects for hardware input and outputs includes devices where the hardware sensor or actuator is integral to the controller (e.g. a VAV box with integral damper actuator, a smart sensor, a VFD, etc.)

2.3.2.8 Integrated H-O-A Switches

Where integrated H-O-A switches are provided on hardware outputs, controller must provide means of monitoring position or status of H-O-A switch. This feedback may be provided via the Niagara Framework or via any valid BACnet method, including the use of proprietary Objects, Properties, or Services.

2.3.2.9 Motor Run Status

Unless otherwise noted, provide current switches to indicate run status of pumps and fans. Sensitivity of the switch on belt driven equipment should distinguish between loaded motor and unloaded motor such as a fan with a broken belt.

2.3.3 Local Display Panel (LDP)

The Local Display Panels (LDPs) must be DDC Hardware with a display and navigation buttons or a touch screen display, and must provide display and adjustment of Niagara Framework points or ASHRAE 135 properties as indicated on the Points Schedule and as specified. LDPs must be either BTL Listed as a B-OD, B-OWS, B-AWS, or be an integral part of another piece of DDC Hardware listed as a B-BC. For LDPs listed as B-OWS or B-AWS, the hardware must be BTL listed and the product must come factory installed with all applications necessary for the device to function as an LDP.

The adjustment of values using display and navigation buttons must be password protected.

2.3.4 Expansion Modules and Tethered Hardware

A single piece of DDC Hardware may consist of a base unit and also:

a. An unlimited number of hardware expansion modules, where the individual hardware expansion modules are designed to directly connect, both mechanically and electrically, to the base unit hardware. The expansion modules must be commercially available as an optional add-on to the base unit.

b. A single piece of hardware connected (tethered) to a base unit by a single cable where the cable carries a proprietary protocol between the base unit and tethered hardware. The tethered hardware must not contain control logic and be commercially available as an optional add-on to the base unit as a single package.

   Note that this restriction on tethered hardware does not apply to sensors or actuators using standard binary or analog signals (not a communications protocol); sensors or actuators using standard binary or analog signals are not considered part of the DDC Hardware.

Hardware capable of being installed stand-alone, or without a separate base unit, is DDC Hardware and must not be used as expansion modules or tethered hardware.

2.3.5 Supervisory Control Requirements

2.3.5.1 Alarm Generation Hardware

Non-Niagara Framework DDC Hardware used for alarm generation must meet the following requirements:

a. Device must support the AE-N-I-B BIBB

b. The Recipient_List Property must be Writable for all Notification Class Objects used for alarm generation.

c. For all Objects implementing Intrinsic Alarming, the following Properties must be Writable:

   (1) Time_Delay
   (2) High_Limit

(3) Low_Limit
(4) Deadband
(5) Event_Enable
(6) If the issue date of this project specification is after 1 January 2016, Time_Delay_Normal must be writable.

d. It is preferred, but not required, that devices support the DM-OCD-B BIBB on all Notification Class Objects. It is also preferred, but not required that devices supporting the DM-OCD-B BIBB accept any valid value as an initial value for properties of Notification Class Objects.

2.3.6 Niagara Framework Supervisory Gateway

Any device implementing the Niagara Framework is a Niagara Framework Supervisory Gateway and must meet these requirements. In addition to the general requirements for all DDC Hardware, Niagara Framework Supervisory Gateway Hardware must:

a. Be direct digital control hardware.

b. Have an unrestricted interoperability license and its Niagara Compatibility Statement (NiCS) must follow the Tridium Open NiCS Specification.

c. Manage communications between a field control network and the Niagara Framework Monitoring and Control Software, and between itself and other Niagara Framework Supervisory Gateways. Niagara Framework Supervisory Gateway Hardware must use Fox protocol for communication with other Niagara Framework Components, regardless of the manufacturer of the other components.

d. Be fully programmable using the Niagara Framework Engineering Tool and must support the following:

(1) Time synchronization, Calendar, and Scheduling using Niagara Scheduling Objects

(2) Alarm generation and routing using the Niagara Alarm Service

(3) Trending using the Niagara History Service and Niagara Trend Log Objects

(4) Integration of field control networks using the Niagara Framework Engineering Tool

(5) Configuration of integrated field control system using the Niagara Framework Engineering Tool when supported by the field control system

e. Meet the following minimum hardware requirements:

(1) Two 10/100/1000 Mbps Ethernet Port(s)

(2) One or more MS/TP ports.

(3) Central Processing Unit of 600 Mhz or higher.

(4) Embedded operating system.

f. Submit a backup of each Niagara Framework Supervisory Gateway as specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC. The backup must be sufficient to restore a Niagara Framework Supervisory Gateway to the final as-built condition such that a new Niagara Framework Supervisory Gateway loaded with the backup is indistinguishable in functionality from the original.

2.4 Niagara Framework Engineering Tool

The Niagara Framework Engineering Tool must be Niagara Workbench or an equivalent Niagara Framework engineering tool software and must:

a. Have an unrestricted interoperability license and its Niagara Compatibility Statement (NiCS) must follow the Tridium Open NiCS Specification.

b. Be capable of performing network configuration for Niagara Framework Supervisory Gateways and Niagara Framework Monitoring and Control Software.

c. Be capable of programming and configuring of Niagara Framework Supervisory Gateways and Niagara Framework Monitoring and Control Software.

d. Be capable of discovery of Niagara Framework Supervisory Gateways and all points mapped into each Niagara Framework Supervisory Gateway and making these points accessible to Niagara Framework Monitoring and Control Software.

PART 3 EXECUTION

3.1 CONTROL SYSTEM INSTALLATION

3.1.1 Building Control Network (BCN)

Install the Building Control Network (BCN) as a single BACnet Internetwork consisting of a single IP network as the BCN Backbone and zero or more BACnet MS/TP networks. Note that in some cases there may only be a single device on the BCN Backbone.

Except for the IP Network and as permitted for the non-BACnet side of Gateways, use exclusively ASHRAE 135 networks.

3.1.1.1 Building Control Network IP Backbone

Install IP Network Cabling in conduit. Install Ethernet Switches in lockable enclosures. Install the Building Control Network (BCN) IP Backbone such that it is available at the Facility Point of Connection (FPOC) location to be determined during construction. When the FPOC location is a room number, provide sufficient additional media to ensure that the Building Control Network (BCN) IP Backbone can be extended to any location in the room.

Use UDP port 0xBAC0 for all BACnet traffic on the IP network. (Note that in a Niagara Framework system there may not be BACnet traffic on the IP

Network)

3.1.1.2 BACnet MS/TP Networks

When using MS/TP, provide MS/TP networks in accordance with ASHRAE 135 and in accordance with the ASHRAE 135 figure "Mixed Devices on 3-Conductor Cable with Shield" (Figure 9-1.4 in the 2012 version of ASHRAE 135). Ground the shield at the BACnet Router and at no other point. Ground the reference wire at the BACnet Router through a 100 ohm resistor and do not ground it at any other point. In addition:

a. Provide each segment in a doubly terminated bus topology in accordance with TIA-485.

b. Provide each segment with 2 sets of network bias resistors in accordance with ASHRAE 135, with one set of resistors at each end of the MS/TP network.

c. Use 3 wire (twisted pair and reference) with shield media for all MS/TP media installed inside. Use fiber optic isolation in accordance with ASHRAE 135 for all MS/TP media installed outside buildings, or between multiple buildings.

d. For 18 AWG cable, use segments with a maximum length of 1200 m4000 ft. When using greater distances or different wire gauges comply with the electrical specifications of TIA-485.

e. For each controller that does not use the reference wire provide transient suppression at the network connection of the controller if the controller itself does not incorporate transient suppression.

f. Install no more than 32 devices on each MS/TP segment. Do not use MS/TP to MS/TP routers.

g. Connect each MS/TP network to the BCN backbone via a Niagara Framework Supervisory Gateway configured as a BACnet Router.

h. For BACnet Routers, configure the MS/TP MAC address to 0. Assign MAC Addresses to other devices consecutively beginning at 1, with no gaps.

i. Configure the Max_Master Property of all devices to be 31.

3.1.1.3 Building Control Network (BCN) Installation

Provide a building control network meeting the following requirements:

a. Install all DDC Hardware connected to the Building Control Network.

b. Where multiple pieces of DDC Hardware are used to execute one sequence, install all DDC Hardware executing that sequence on a single MS/TP network dedicated to that sequence.

c. Traffic between BACnet networks must be exclusively via BACnet routers.

d. Use the Fox protocol for all traffic both originating and terminating at Niagara Framework components. Use the Fox protocol for all traffic

originating or terminating at a Niagara Framework UMCS (including traffic to or from a future UMCS). All other traffic, including traffic between ASHRAE 135 devices and traffic between Niagara Framework Supervisory Gateways and ASHRAE 135 devices must be in accordance with ASHRAE 135.

3.1.2 DDC Hardware

Install all DDC Hardware that connects to an IP network in lockable enclosure. Install other DDC Hardware that is not in suspended ceilings in [lockable]enclosures. For all DDC hardware with a user interface, coordinate with site and Section 25 05 11 CYBER SECURITY FOR FACILITY-RELATED CONTROL SYSTEMS to determine proper passwords and configure passwords into device.

a. Except for zone sensors (thermostats), install all Tethered Hardware within 2 m 6 feet of its base unit.

b. Install and configure all BTL-Listed devices in a manner consistent with their BTL Listing such that the device as provided still meets all requirements necessary for its BTL Listing.

c. Install and configure all BTL-Listed devices in a manner consistent with the BTL Device Implementation Guidelines such that the device as provided meets all those Guidelines.

3.1.2.1 Device Identifiers, Network Addresses, and IP Addresses

a. Do not use any Device Identifier or Network Number already used by another BACnet system at the project site. Coordinate Device IDs and Network Numbers with the installation. The installation POC is Camp Lejeune Public Works.

b. Coordinate device IP addresses with installation. The installation POC is Camp Lejeune Public Works.

3.1.2.2 ASHRAE 135 Object Name Property and Object Description Property

Configure the Object_Names and Object_Descriptions properties of all ASHRAE 135 Objects (including Device Objects) as indicated on the Points Schedule (Point Name and Point Description) and as specified. At a minimum:

a. Except for DDC Hardware controlling a single terminal unit, configure the Object_Name and Object_Description properties of all Objects (including Device Objects) as indicated on the Points Schedule and as specified.

b. In DDC Hardware controlling a single terminal unit, configure the Device Object_Name and Device Object_Description as indicated on the Points Schedule and as specified.

When Points Schedule entries exceed the length limitations in the device, notify Contracting Officer and provide recommended alternatives for approval.

3.1.2.3 Niagara Framework Point Names and Descriptions

Configure the names and descriptions of all Points in Niagara Framework Supervisory Gateways as indicated on the Points Schedule and as specified.

3.1.2.4 Niagara Station IDs

Ensure that Niagara Station IDs of new Niagara Framework Supervisory Gateways are maintained as unique within UMCS front-end, including ensuring they do not conflict with any existing Niagara Station ID.

3.1.2.5 Hand-Off-Auto (H-O-A) Switches

Provide Hand-Off-Auto (H-O-A) switches as specified and as indicated on the Points Schedule. Provide H-O-A switches that are integral to the controller hardware, an external device co-located with (in the same enclosure as) the controller, integral to the controlled equipment, or an external device co-located with (in the same enclosure as) the controlled equipment.

a. For H-O-A switches integral to DDC Hardware, meet the requirements specified in paragraph DIRECT DIGITAL CONTROL (DDC) HARDWARE.

b. For external H-O-A switches used for binary outputs, provide for overriding the output open or closed.

c. For eternal H-O-A switches used for analog outputs, provide for overriding to 0 percent or 100 percent.

3.1.2.6 Emergency Shut Down Switches (ATFP)

Quantity and location as shown on the drawings. Switches must be hardwired such that all fans and dampers that circulate air between rooms, or between inside and outside must shut down/close regardless of equipment HOA switch position. ATFP circuit must be energized to allow equipment to operate; i.e. activation of the emergency shut down switch will de-energize the circuit and open relays at the equipment. Additionally, activation of the switch must signal the DDC system to shut all air moving equipment off/closed and initiate an alarm. Reset of the DDC system must be manual.

3.1.2.7 Local Display Panels

Provide LDPs to display and override values of points in a Niagara Framework Supervisory Gateway or ASHRAE 135 Object Properties as indicated on the Points Schedule. Install LDPs displaying points for anything other than a terminal unit in the same room as the equipment. For LDPs using WriteProperty to commandable objects to implement an override, write values with priority 9.

3.1.2.8 MS/TP Slave Devices

Configure all MS/TP devices as Master devices. Do not configure any devices to act as slave devices.

3.1.2.9 Change of Value (COV) and Read Property

a. To the greatest extent possible, configure all devices to support the SubscribeCOV service (the DS-COV-B BIBB). At a minimum, all devices

supporting the DS-RP-B BIBB, other than devices controlling only a single terminal unit, must be configured to support the DS-COV-B BIBB.

b. Whenever supported by the server side, configure client devices to use the DS-COV-A BIBB.

3.1.2.10 Engineering Units

Configure devices to use English (Inch-Pound) engineering units as follows:

a. Temperature in degrees F

b. Air or natural gas flows in cubic feet per minute (CFM)

c. Water in gallons per minute (GPM)

d. Steam flow in pounds per hour (pph)

e. Differential Air pressures in inches of water column (IWC)

f. Water, steam, and natural gas pressures in PSI

g. Enthalpy in BTU/lb

h. Heating and cooling energy in MBTU (1MBTU = 1,000,000 BTU))

i. Cooling load in tons (1 ton = 12,000 BTU/hour)

j. Heating load in MBTU/hour (1MBTU = 1,000,000 BTU)

k. Electrical Power: kilowatts (kW)

l. Electrical Energy: kilowatt-hours (kWh)

3.1.2.11 Occupancy Modes

Use the following correspondence between value and occupancy mode whenever an occupancy state or value is required:

a. OCCUPIED mode: a value of one
b. UNOCCUPIED mode: a value of two
c. WARM-UP/COOL-DOWN (PRE-OCCUPANCY) mode: a value of three

Note that elsewhere in this Section the Schedule Object is required to also support a value of four, which is reserved for future use. Also note that the behavior of a system in each of these occupancy modes is indicated in the sequence of operation for the system.

3.1.2.12 Use of BACnet Objects

Except as specifically indicated for Niagara Framework Objects, Use only standard non-proprietary ASHRAE 135 Objects and services to accomplish the project scope of work as follows:

a. Use Analog Input or Analog Output Objects for all analog hardware I/O. Do not use Analog Value Object for analog hardware I/O).

b. Use Binary Input or Binary Output Objects for all binary hardware I/O. Do not use Binary Value Objects for binary hardware I/O.

c. Use Analog Value Objects for analog setpoints.

d. Use Accumulator Objects or Analog Value Objects for pulse inputs.

e. For occupancy modes, use Multistate Value Objects and the correspondence between value and occupancy mode specified in paragraph OCCUPANCY MODES.

f. Use a combination of Niagara Framework Alarm Extensions and Alarm Services, Intrinsic Alarming, and Notification Class Objects for alarm generation.

g. For all other points shown on the Points Schedule as requiring an ASHRAE 135 Object, use the Object type shown on the Points Schedule or, if no Object Type is shown, use a standard Object appropriate to the point.

3.1.2.12.1 Niagara Framework Objects

Points in the Niagara Framework Supervisory Gateway, even if used in a sequence or are shown on the Points Schedule, are not required to be exposed as BACnet Objects unless they are required to be available on the network by another device or sequence of operation (i.e. there is some other reason they are needed).

Use a Niagara Framework Supervisory Gateway as specified for all scheduling and trending. Use a Niagara Framework Supervisory Gateway as specified for all alarming except for intrinsic alarming.

3.1.2.13 Use of Standard BACnet Services

Except as noted in this paragraph, for all DDC Hardware (including Niagara Frameworks Supervisory Gateways when communicating with non-Niagara Framework DDC Hardware) use Standard BACnet Services as defined in this specification (which excludes some ASHRAE 135 services) exclusively for application control functionality and communication.

DDC Hardware that cannot meet this requirement may use non-standard services provided they can provide identical functionality using Standard BACnet Services when communicating with BACnet devices from a different vendor. When implementing non-standard services, document all non-standard services in the DDC Hardware Schedule as specified and as specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.2.14 Device Application Configuration

a. For every property, setting or value shown on the Points Schedule or otherwise indicated as Configurable, provide a value that is retained through loss of power and can be changed via one or more of:

(1) BACnet services (including proprietary services)

(2) Hardware settings on the device

(3) The Niagara Framework

b. For every property, setting or value in non-Niagara Framework Hardware shown on the Points Schedule or otherwise indicated as Operator Configurable, provide a value that is retained through loss of power and can be changed via one or more of:

(1) A Writable Property of a standard BACnet Object

(2) A Property of a standard BACnet Object that is Writable when Out_Of_Service is TRUE and Out_Of_Service is Writable.

(3) Using some other method supported by a Niagara Framework Supervisory Gateway

c. Configure Niagara Framework Supervisory Gateways such that the property, setting or value is configurable from a Niagara Framework Front End.

d. For every property, setting or value in a Niagara Framework Supervisory Gateway which is shown on the Points Schedule or otherwise indicated as Operator Configurable, configure the value to be configurable from within the Niagara Framework such that it can be configured from a system graphic page at a Niagara Framework Front End.

3.1.2.15 Niagara Framework Engineering Tool

Use the Niagara Framework Engineering Tool to fully discover the field control system and make all field control system information available to the Niagara Framework Supervisory Gateway. Ensure that all points on the points schedule are available to the front end via the Fox protocol.

3.1.3 Scheduling, Alarming, Trending, and Overrides

3.1.3.1 Scheduling

Configure schedules in Niagara Framework Supervisory Gateway using Niagara Schedule Objects as indicated on the Points Schedule and as specified. When the schedule is controlling occupancy modes in DDC Hardware other than a Niagara Framework Supervisory Gateway use the indicated correspondence between value and occupancy mode.

3.1.3.2 Alarm Configuration

Configure alarm generation and management as indicated on the Points Schedule and as specified. Configure alarm generation in Niagara Framework Supervisory Gateways using Niagara Framework Alarm Extensions and Alarm Services or in other DDC Hardware (not Niagara Framework Supervisory Gateways) using ASHRAE 135 Intrinsic Alarming. Configure alarm management and routing for all alarms, including those generated via intrinsic alarming in other devices, in the Niagara Framework Supervisory Gateway such that the alarms are able to be accessed from the Niagara Framework Front End.

Where Intrinsic Alarming is used, configure intrinsic alarming as specified in paragraph "Configuration of ASHRAE 135 Intrinsic Alarm Generation". Configure a Niagara Framework Supervisory Gateway to provide a means to configure the intrinsic alarm parameters such that the

Intrinsic Alarm is configurable from the front end via the Niagara Framework.

3.1.3.3 Configuration of ASHRAE 135 Intrinsic Alarm Generation

Intrinsic alarm generation must meet the following requirements:

Configure alarm generation as indicated on the Points Schedule and as specified using Intrinsic Alarming in accordance with ASHRAE 135 or Algorithmic Alarming in accordance with ASHRAE 135. Alarm generation must meet the following requirements:

a. Send alarm events as Alarms (not Events).

b. Use the ConfirmedNotification Service for alarm events.

c. For alarm generation, support two priority levels for alarms: critical and non-critical. Configure the Priority of Notification Class Objects to use Priority 112 for critical and 224 for non-critical alarms.

d. Number of Notification Class Objects for Alarm Generation:

(1) If the device implements non-critical alarms, or if any Object in the device supports Intrinsic Alarms, then provide a single Notification Class Object specifically for (shared by) all non-critical alarms.

(2) If the device implements critical alarms, provide a single Notification Class Object specifically for (shared by) all critical alarms.

(3) If the device implements both critical and non-critical alarms, provide both Notification Class Objects (one for critical, one for non-critical).

(4) If the device controls equipment other than a single terminal unit, provide both Notification Class Objects (one for critical, one for non-critical) even if no alarm generation is required at time of installation.

e. For all intrinsic alarms configure the Limit_Enable Property to set both HighLimitEnable and LowLimitEnable to TRUE. If the specified alarm conditions are for a single-sided alarm (only High_Limit used or only Low_Limit used) assign a value to the unused limit such that the unused alarm condition will not occur.

f. For all objects supporting intrinsic alarming, even if no alarm generation is required during installation, configure the following Properties as follows:

(1) Notification_Class to point to the non-Critical Notification Class Object in that device.

(2) Limit_Enable to enable both the HighLimitEnable and LowLimitEnable

(3) Notify_Type to Alarm

g. Configure the Recipient_List Property of the Notification Class Object to point to the Niagara Framework Supervisory Gateway managing the alarm.

3.1.3.4 Trending

Perform all trending using a Niagara Framework Supervisory Gateway using Niagara Framework History Extensions and Niagara Framework History Service exclusively.

3.1.3.5 Overrides

Provide an override for each point shown on the Points Schedule as requiring an override. Use the Niagara Framework for all overrides to points in Niagara Framework Supervisory Gateways. For overrides to other points, provide an override to a point in a Niagara Framework Supervisory Gateway via the Niagara Framework where the Niagara Framework Supervisory Gateway overrides the other point as specified.

Unless otherwise approved, provide Commandable Objects to support all Overrides in non-Niagara Framework Supervisory Gateway DDC Hardware. With specific approval from the contracting officer, Overrides for points which are not hardware outputs and which are in DDC hardware controlling a single terminal unit may support overrides via an additional Object provided for the override. No other means of implementing Overrides may be used.

a. Where Commandable Objects are used, ensure that WriteProperty service requests with a Priority of 10 or less take precedence over the SEQUENCE VALUE and that WriteProperty service request with a priority of 11 or more have a lower precedence than the SEQUENCE VALUE.

b. For devices implementing overrides via additional Objects, provide Objects which are NOT Written to as part of the normal Sequence of Operations and are Writable when Out_Of_Service is TRUE and Out_Of_Service is Writable. Use this point as an Override of the normal value when Out_Of_Service is TRUE and the normal value otherwise. Note these Objects may be modified as part of the sequence via local processes, but must not be modified by local processes when Out_Of_Service is TRUE.

3.1.4 BACnet Gateways

The requirements in this paragraph do not permit the installation of hardware not meeting the other requirements of this section. All control hardware installed under this project must meet the requirements of this specification, including control hardware provided as part of a package unit or as part of HVAC equipment specified under another section. Except as indicated in paragraph Gateways for Boiler or Chiller Plants, all package units must be provided with a BACnet interface meeting the requirements of this Section. Only use gateways to connect to pre-existing control devices, and to boiler or chiller plants as indicated.

3.1.4.1 General Gateway Requirements

Provide BACnet Gateways to connect non-BACnet control hardware in accordance with the following:

a. Configure gateways to map writable data points in the controlled equipment to Writable Properties of Standard Objects, or to Niagara Framework points, as indicated in the Points Schedule and as specified.

b. Configure gateway to map readable data points in the controlled equipment to Readable Properties of Standard Objects, or to Niagara Framework points, as indicated in the Points Schedule and as specified.

c. Configure gateway to support the DS-COV-B BIBB for all points mapped to BACnet Objects.

d. Do not use non-BACnet control hardware for controlling built-up units or any other equipment that was not furnished with factory-installed controls. (Note: A Niagara Framework Supervisory Gateway is BACnet control hardware.)

e. Do not use non-BACnet control hardware for system scheduling functions.

3.1.4.2 Gateways for Boiler or Chiller Plants

A non-BACnet network of multiple boilers or multiple chillers with a single gateway is permitted only when all the following conditions are met:

a. All units are from the same manufacturer.

b. All units are co-located in the same room, and the network connecting them is fully contained in that room.

c. Units are operating using a common "plant" sequence of operation which stages the units in a manner that requires operational parameters be shared between them and which cannot be accomplished with a single lead-lag command from a third-party controller.

d. A request for use of a boiler or chiller plant gateway has been submitted and approved in accordance with Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

Connect one network port on the gateway to the Building Control Backbone IP Network or to a BACnet MS/TP network and the other port to the boiler or chiller network.

3.1.4.3 Gateways for Application Other than Boiler and Chiller Plants

In addition to the General Gateway Requirements, provide BACnet Gateways to non-BACnet control hardware other than boiler and chiller plants in accordance with the following

a. Each gateway must communicate with and perform protocol translation for non-BACnet control hardware controlling one and only one package unit.

b. Connect one network port on the gateway to the Building Control Backbone IP Network or to a BACnet MS/TP network and the other port to the single piece of controlled equipment.

c. Non-BACnet network wiring connecting the gateway to the package unit must not exceed 3 meters 10 feet in length and must connect to exactly two devices: the controlled equipment (packaged unit) and the gateway.

-- End of Section --

SECTION 23 24 00

HYDRONIC PIPE CLEANING AND FLUSHING PROCEDURES

08/10

PART 1 GENERAL

1.1 PERFORMANCE REQUIREMENTS

Cleaning and flushing shall remove organic soil, hydrocarbons, flux, pipe mill varnish, pipe compounds, iron oxide, and like deleterious substances. Removal of tightly adherent mill scale is not required.

1.2 DELIVERY, STORAGE, AND HANDLING

Handle and store detergent to protect equipment, environment and persons. Store detergent according to manufacturer's recommendations.

1.3 ENVIRONMENTAL REQUIREMENTS

All chemicals shall be acceptable for discharge into sanitary sewer.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Cleaning Detergent

Water Treatment Chemicals and Chemical Supplier

PART 2 PRODUCTS

2.1 MATERIALS

The cleaning compound/detergent shall be an alkaline phosphate or non-phosphate detergent/surfactant/specific to remove organic soil, hydrocarbons, flux, pipe mill varnish, pipe compounds, iron oxide, and like deleterious substances, with or without inhibitor, suitable for system wetted metals without deleterious effects.

Cleaning compound/detergent shall not contain corrosion inhibitors such as sodium nitrite, molybdate, etc. The only corrosion inhibitor that may be used in conjunction with detergent is sodium sulfite (an oxygen scavenger).

Suggested detergent is trisodium phosphate.

Sodium sulfite, sodium lauroly sarcosinate, and dipotossium phosphate are used for water treatment.

PART 3 EXECUTION

3.1 PROTECTION

Do not exceed service factor amperage on pump motor.

3.1.1 Special Techniques

a. Use existing steam heating system to maintain a water temperature of 120F.

b. Close terminal unit service valves and open bypass valve. Flushing bypass should connect upstream of the terminal unit supply service valve and downstream of the return service valve. If necessary, provide temporary piping or hose to bypass terminal unit. Remove any component which may be damaged. In lieu of providing a bypass, three-way valves may be driven 100 percent to bypass. If three-way valves are utilized, do not close service valves.

c. Fill system with water and detergent solution to manufacture's specified water/detergent concentration, heat to 120F. Test both systems to determine system volume using fluorescent dye and fluorometric analysis.

d. Operate system pump, hot water pump and circulate solution for a minimum of 48 hrs, while maintaining 120 F. From bottom of air/solids separator, bleed water as necessary while filling system thru standard fill station ensuring to maintain the manufacturer's specified water/detergent concentration. Modulate drain to maintain system pressure. Do not exceed service factor amperage on pump motor. Throttle discharge valve as necessary. The pump start up strainer shall remain in place. Periodically clean the pump strainer. Also, periodically check and clean terminal unit strainers during the 48 hours of cleaning.

e. Open terminal device service valves, three-way valves, and close bypass valves. Flush each terminal device. Ensure to clean all strainers before opening terminal device service valves. Repeat "Step d" for the terminal devices for a minimum of 48 hour.

f. Drain system and thoroughly flush with fresh water. Demonstrate to Government that system water runs clear. Coordinate with Construction Manager to provide sample water opacity.

g. Clean all strainers. Remove pump startup strainer.

h. The water shall be treated to the following chemical parameters:

Sodium sulfite:	30-100 ppm
Sodium lauroyl sarcosinate:	30-100 ppm
pH:	8.5 - 9.5 (use Dipotassium Phosphate as pH buffer)

The water chemical levels shall be retested in one day, one week and four weeks following initial treatment. If the chemical levels are not within the range specified above, additional treatment shall be conducted to bring the levels within range.

Prepare a report documenting the water system volume, pH, and sulfite concentration levels for the initial treatment and the subsequent three retests and necessary treatment. Submit report to government contracting officer and the Camp Lejeune mechanical design branch.

Provide material safety data sheets (MSDS) for treatment chemicals and permanently locate a copy in each mechanical room.

Provide one plastic sign no smaller than 12"x12" square with engraved lettering ½" in height. Sign shall be located in the mechanical room. It shall be hung on the wall in an area with an unobstructed view and near the respective chemical shot feeder.

The sign shall state the respective system volume (determined from testing and verified by hand calculations) and the following:

"This hydronic system is treated to the following chemical parameters:

Sodium sulfite:	30-100 ppm
Sodium lauroyl sarcosinate:	30-100 ppm
pH*:	8.5 - 9.5

System Volume:

*use Dipotassium Phosphate as pH buffer"

-- End of Section --

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Preparing Activity: USACE

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References are in agreement with UMRL dated October 2017
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SECTION 25 05 11

CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS
11/17

****
NOTE: This guide specification covers the requirements for cybersecurity for facility-related control systems.

Adhere to UFC 1-300-02 **Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.**

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be as a Criteria Change Request (CCR)**.**
****

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Note: Facility-related control systems are a subset of control systems that are used to monitor and control equipment and systems related to DoD real property facilities (e.g., building control systems, utility control systems, electronic security systems, and fire and life safety systems). This section includes Cybersecurity requirements to be included on every DOD project which includes a facility-related control system. This Section does not provide general requirements for a control system, nor are the requirements in this section sufficient to procure a control system. This section must be used in conjunction with another controls system specification. For example, for a HVAC controls project, this section should be used in conjunction with Section 23 09 00 and related sections.

Requirements and activities in this section must be coordinated with the other relevant control specification sections.

This section includes requirements in support of the DOD Risk Management Framework (RMF) for implementing cybersecurity. Refer to UFC 4-010-06, Cybersecurity for Facility-Related Control Systems for requirements on incorporating cybersecurity into control system design and for general information on the RMF process as it applies to control systems. Assistance for control system cybersecurity is available from the following Service organizations:

Army: Control System Cybersecurity Center of Expertise,
Huntsville Engineering and Support Center

Navy: Naval Facilities Engineering Command, Command Information Office (CIO)

Air Force: Civil Engineer Maintenance, Inspection, and Repair Team (CEMIRT) ICS Branch, Tyndall AFB

Marine Corps: Contact Navy POC for Marine Corps POC information

Since this Section covers a wide range of control systems, and those systems often have different capabilities and requirements, there are requirements identified in this Section which need extensive designer input or decisions.

Many designer selections in this Section will require coordination with the project site, System Owner, Authorizing Official or a subject matter expert in the specific control systems being installed.

****

****

NOTE: This Section is for use on control systems with no impact rating higher than LOW. If the project includes systems where there systems with impact ratings of MODERATE or HIGH, this specification must be modified to include those additional requirements.

Systems of different types at the same impact level may have different requirements based on the specific needs and capabilities of the control system. This is addressed in this Guide Specification by indicating when requirements apply to a specific system type.
Systems of the same type may have different requirements. This may be due to those systems having different impact levels or due to system-specific requirements for systems at the same

impact level.

If a project includes multiple systems, it's critical that it be clear which requirements apply to which systems. This can be done by a) using a single Section and specifying the applicability of requirements or b) using multiple Sections. Which approach to employ depends on the needs of the project and the preferences of the specifier and project manager. If using multiple sections use the fourth level specification numbering to differentiate the Sections and indicate in each which systems the Section applies to.

****

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NOTE: This specification makes use of SpecsIntact Tailoring Options.

Services tailoring options:
Army
Air Force

Control system type tailoring options:
HVAC Control Systems
Electronic Security Systems (ESS)

****

PART 1 GENERAL

****

NOTE: This subpart points the contractor to the locations of STIGs and SRGs, as this Section requires the contractor to meet available STIGs or SRGs. It's not necessary for the designer/specifier to review the STIGs or SRGs for applicability. The contractor is responsible for determining which STIGs or SRGs are applicable and for meeting the relevant requirements.

****

Many subparts in this Section contain text in curly braces ("{" and "}") indicating which cybersecurity control and control correlation identifier (CCI) the requirements of the subpart relate to. The text inside these curly braces is for Government reference only, and enables coordination of the requirements of this Section with the RMF process throughout the design and construction process. Text in curly braces are not contractor requirements.

This Section refers to Security Requirements Guide (SRGs) and Security Technical Implementation Guide (STIGs). STIGs and SRGs are are available online at the Information Assurance Support Environment (IASE) website at http://iase.disa.mil/stigs/Pages/index.aspx. Not all control system components have applicable STIGs or SRGs.

[1.1 CONTROL SYSTEM APPLICABILITY

****
NOTE: If multiple versions of this Section are used on a single project, keep this subpart and list all the systems to which this specific version of the Section applies.
****

There are multiple versions of this Section associated with this project. Different versions have requirements applicable to different control systems. This specific Section applies only to the following control systems: [_____].

]1.2 RELATED REQUIREMENTS

All Sections containing facility-related control systems or control system components are related to the requirements of this Section. Review all specification sections to determine related requirements.

1.3 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.
****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 135	(2016; INT 1 2016; ERTA 1 2016) BACnet—A Data Communication Protocol for Building Automation and Control Networks

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 802.1x	(2010) Local and Metropolitan Area

	Networks - Port Based Network Access Control

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST FIPS 201-2	(2013) Personal Identity Verification (PIV) of Federal Employees and Contractors

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 8551.01	(2014) Ports, Protocols, and Services Management (PPSM)
DTM 08-060	(2008) Policy on Use of Department of Defense (DoD) Information Systems - Standard Consent Banner and User Agreement

1.4 DEFINITIONS

1.4.1 Computer

As used in this Section, a computer is one of the following:

a. a device running a non-embedded desktop or server version of Microsoft Windows

b. a device running a non-embedded version of MacOS

c. a device running a non-embedded version of Linux

d. a device running a version or derivative of the Android OS, where Android is considered separate from Linux

e. a device running a version of Apple iOS

1.4.2 Network Connected

A component is network connected (or "connected to a network") only when the device has a network transceiver which is directly connected to the network and implements the network protocol. A device lacking a network transceiver (and accompanying protocol implementation) can never be considered network connected. Note that a device connected to a non-IP network is still considered network connected (an IP connection or IP address is not required for a device to be network connected).

Any device that supports wireless communication is network connected, regardless of whether the device is communicating using wireless.

1.4.3 User Account Support Levels

The support for user accounts is categorized in this Section as one of three levels:

1.4.3.1 FULLY Supported

Device supports configurable individual accounts. Accounts can be created, deleted, modified, etc. Privileges can be assigned to accounts.

1.4.3.2 MINIMALLY Supported

Device supports a small, fixed number of accounts (perhaps only one). Accounts cannot be modified. A device with only a "User" and an "Administrator" account would fit this category. Similarly, a device with two PINs for logon - one for restricted and one for unrestricted rights would fit here (in other words, the accounts do not have to be the traditional "user name and password" structure).

1.4.3.3 NOT Supported

Device does not support any Access Enforcement therefore the whole concept of "account" is meaningless.

1.4.4 User Interface

Generally, a user interface is hardware on a device allowing user interaction with that device via input (buttons, switches, sliders, keyboard, touch screen, etc.) and a screen. There are three types of user interfaces defined in this Section: Limited Local User Interface, Full Local User Interface and Remote User Interface. In this Section, when the term "User Interface" is used without specifying which type, it refers only to Full Local User Interface and Remote User Interface (NOT to Limited Local User Interface).

1.4.4.1 Limited Local User Interface

A Limited Local User Interface is a user interface where the interaction is limited, fixed at the factory, and cannot be modified in the field. The user must be physically at the device to interact with it.

Examples of Limited Local User Interface include thermostats (Space Sensor Modules as defined in Section 23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC).

1.4.4.2 Full Local User Interface

A Full Local User Interface is a user interface where the interaction and displays are field-configurable.

Examples of a Full Local User Interface include local applications on a computer and user interfaces to Variable Speed Drives.

1.4.4.3 Remote User Interface

A Remote User Interface is a user interface on a Client device allowing user interaction with a different Server device. The user need not be physically at the Server device to interact with it.

Examples of Remote User Interfaces include web browsers and Local Display Panels as defined in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

1.5 ADMINISTRATIVE REQUIREMENTS

1.5.1 Coordination

****

NOTE: This subpart deals with coordination requirements for the contractor, and does not

indicate coordination that must be done by the designer/specifier. In addition to the normal project coordination, authorization for wireless use, alternate account lock permissions and devices with multiple IP connections may be impacted by site (or Service) policies and need to be coordinated with the appropriate Government representatives before authorization is provided.

****

Coordinate the execution of this Section with the execution of all other Sections related to control systems as indicated in the paragraph RELATED REQUIREMENTS. Items that must be considered when coordinating project efforts include but are not limited to:

a. If requesting permission for wireless communication, the Wireless Communication Request submittal must be approved prior to control system device selection and integration.

b. If requesting permission for alternate account lock permissions, the Device Account Lock Exception Request must be approved prior to control system device selection and integration.

c. If requesting permission for the use of a device with multiple IP connections, the Multiple IP Connection Device Request must be approved prior to control system device selection and integration.

d. Wireless testing may be required as part of the control system testing. See requirements for the Wireless Communication Test Report submittal.

e. If the Device Audit Record Upload Software is to be installed on a computer not being provided as part of the control system, coordination is required to identify the computer on which to install the software.

f. Cybersecurity Interconnection Schedule must be coordinated with other work that will be interconnected to, and interconnections must be approved by the Government before relying on them for system functionality.

g. Cybersecurity testing support must be coordinated across control systems and with the Government cybersecurity testing schedule.

h. Passwords must be coordinated with the indicated contact for the project site.

i. If applicable, HTTP web server certificates must be obtained from the indicated contact for the project site.

j. Contractor Computer Cybersecurity Compliance Statements for each contractor using contractor owned computers.

1.6 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

An "S" following a submittal item indicates that the submittal is required for the Sustainability eNotebook to fulfill federally mandated sustainable requirements in accordance with Section 01 33 29 SUSTAINABILITY REPORTING.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.
****

****
NOTE: All submittals in this Guide Specification require Government approval and must have a "G" designation.

Government review of submittals in this Section impact Cybersecurity, and must be coordinated with the appropriate Cybersecurity experts to ensure appropriate review and the identification of issues or concerns that may affect the cybersecurity posture of the system or the ability of the system to receive an RMF authorization.
****

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Wireless Communication Request; G[, [_____]]

Device Account Lock Exception Request; G[, [_____]]

Multiple IP Connection Device Request; G[, [_____]]

Contractor Computer Cybersecurity Compliance Statements; G[, [_____]]

Contractor Temporary Network Cybersecurity Compliance Statements; G[, [_____]]

SD-02 Shop Drawings

User Interface Banner Schedule; G[, [_____]]

Network Communication Report; G[, [_____]]

Cybersecurity Riser Diagram; G[, [_____]]

Control System Inventory Report; G[, [_____]]

Cybersecurity Interconnection Schedule; G[, [_____]]

SD-03 Product Data

Control System Cybersecurity Documentation; G[, [_____]]

SD-06 Test Reports

Wireless Communication Test Report; G[, [_____]]

SD-07 Certificates

Software Licenses; G[, [_____]]

SD-11 Closeout Submittals

Password Summary Report; G[, [_____]]

Software Recovery And Reconstitution Images; G[, [_____]]

Device Audit Record Upload Software; G[, [_____]]

1.7 QUALITY CONTROL

[1.7.1 Regulatory Requirements

****

NOTE: If there are regulatory requirements related to a control system, specify those in the control system specification. If there are regulatory requirements related to cybersecurity for a control system they can be specified here.
Regulatory requirements specified here must indicate which system or systems they apply to, DO NOT include requirements here that are not directly linked to a specific control system.

For typical UMCS or building control system projects there will not be requirements to include here.

****

For the [_____] control system: [_____].

][1.7.2 [Certifications][Qualifications]

****

NOTE: If there are contractor qualification or certification requirements related to the control system, specify those in the control system specification. If there are contractor qualifications or certifications specifically related to cybersecurity they can be specified here.

Use care when including requirements here, as many cybersecurity certifications are IT-centric and do not apply to control systems.

Requirements specified here must indicate which system or systems they apply to, DO NOT include requirements here that are not directly linked to a specific control system.

For typical UMCS or building control system projects there will not be requirements to include here.

****

For the [_____] control system: [_____].

][1.7.3 Pre-Construction Testing

****

NOTE: If there are cybersecurity Pre-Construction Testing requirements, include them here.

For a LOW-LOW-LOW Impact system pre-construction testing will generally not be required. For systems with a MODERATE or HIGH impact there may be some pre-construction testing requirements based on the specific needs of the project site.

Requirements specified here must indicate which system or systems they apply to, DO NOT include requirements here that are not directly linked to a specific control system.

****

For the [_____] control system: [_____].

][1.8 DELIVERY, STORAGE, AND HANDLING

****

NOTE: If there are delivery, storage or handling requirements, include them here.

For a LOW-LOW-LOW Impact system delivery, storage and handling requirements will generally not be needed. For systems with a MODERATE or HIGH impact there may be some requirements based on the specific needs of the project site.

****

[_____]

]1.9 CYBERSECURITY DOCUMENTATION

[1.9.1 Cybersecurity Interconnection Schedule

****

NOTE: The Cybersecurity Interconnection Schedule is used in two situations:

1) The control system communicates with a separately authorized system or an unauthorized system. In this case, include a Cybersecurity Interconnection Schedule in the design showing the following interconnection details: Name/description of other system, POC for the other system, type of data/information.

2) The control system is a sub-part of a larger system and will communicate with and integrate to the larger system (and will be part of the same authorization as the larger system). In this case, the control system design must include requirements for the expected communication between the sub-system and the larger system. The Cybersecurity Interconnection Schedule will not be a design drawing, but will still be a contractor submittal.

If neither of these situations apply (if the system is stand-alone with no connection or integration to another system), remove the bracketed text requiring the Cybersecurity Interconnection Schedule, and remove the Cybersecurity Interconnection Schedule from the SUBMITTALS paragraph of this Section.

If Case 1 applies, keep the bracketed text referring to Foreign Destination and POC for Destination, otherwise remove this text.

In situations where both cases apply, a single submittal will serve both purposes.

Note that this submittal does not create a requirement for interconnections, but documents interconnection details in accordance with other requirements.

****

{For Reference Only: This subpart (and its subparts) relates to CA-3(b), CCI-00258}

Provide a completed Cybersecurity Interconnection Schedule documenting connections between the installed system and other systems. Provide the following information for each device communicating between systems: Device Identifier, Device Description, Transport layer Protocol, Network Address, Port (if applicable), MAC (Layer 2) address (if applicable), Media, Application Protocol, Service (if applicable), Descriptive Purpose of communication. [For communication with other authorized systems also provide the Foreign Destination and POC for Destination.] If other control system Sections used on this project include submittals documenting this information, provide copies of those submittals to meet this requirement.

In addition to the requirements of Section 01 33 00 SUBMITTAL PROCEDURES, provide the Cybersecurity Interconnection Schedule as an editable Microsoft Excel file (a template Cybersecurity Interconnection Schedule in Excel format is available at http://www.wbdg.org/FFC/NAVGRAPH/graphtoc.pdf.)

]1.9.2 Network Communication Report

****

NOTE: Control system specifications should include requirements related to protocol and documentation. In the design cybersecurity documentation required by the UFC, document what, if any, protocol requirements are included in the control system specification (CCI-002103). Also document any requirements or submittals related to network communication, such as Points Schedules (CCI-002105).

****

{For Reference Only: This subpart (and its subparts) relates to CA-9; CCI-002102, CCI-002103, CCI-002104, CCI-002105 and also the submittal requirements associated with CM-6, CM-7 and SC-41}

Provide a network communication report. For each networked controller, document the communication characteristics of the controller including communication protocols, services used, and a general description of what information is communicated over the network. For each controller using IP, document all TCP and UDP ports used. If other control system Sections used on this project include submittals documenting this information, provide copies of those submittals to meet this requirement.

In addition to the requirements of Section 01 33 00 SUBMITTAL PROCEDURES, provide the Network Communication Report as an editable Microsoft Excel file.

1.9.3 Control System Inventory Report

****

NOTE: Select whether the inventory report must include non-networked devices.

Unless specifically required by the project, keep the first bracketed text to require inventory of only networked devices and remove the later

bracketed text requiring inventory of non-networked devices, input devices and output devices.

****

{For Reference Only: This subpart (and its subparts) relates to CM-8(a), CP-12, SI-17, IA-3; CCI-000389, CCI-000392, CCI-000398, CCI-002855, CCI-002856, CCI-002857, CCI-002773, CCI-002774, CCI-002775, CCI-000777, CCI-000778, CCI-001958}

Provide a Control System Inventory report using the Inventory Spreadsheet listed under this Section at http://www.wbdg.org/FFC/NAVGRAPH/graphtoc.pdf documenting all [networked devices, including network infrastructure devices][devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators)]. For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.

In addition to the requirements of Section 01 33 00 SUBMITTAL PROCEDURES, provide the Control System Inventory Report as an editable Microsoft Excel file.

1.9.4 Software Recovery and Reconstitution Images

****

NOTE: This requirement covers disk images to allow recovery and reconstitution of applications on computers. As described in UFC 4-010-06 Cybersecurity for Facility-Related Control Systems, as-built documentation (including copies of custom programming and device settings) must be required in the Section specifying the control system itself.

This requirement covers computers only. If recovery images of other control system devices (controllers) are needed, that should be specified in the relevant control system Section or added here. Use caution when adding a requirement for controllers here as not all systems have the same capabilities and a general requirement here could result in a conflicting or impractical requirement.

If the contractor is installing software on a Government Furnished computer to which they may not have sufficient permissions, include the bracketed text and indicate a POC for assistance with creating the image.

****

{For Reference Only: This subpart (and its subparts) relates to CP-10; CCI-000550, CCI-000551, CCI-000552}

For each computer on which software is installed under this project, provide a recovery image of the final as-built computer. This image must allow for bare-metal restore such that restoration of the image is sufficient to restore system operation to the imaged state without the need for re-installation of software.[

If additional user permissions are required to meet this requirement, coordinate the creation of the image with [_____].]

1.9.5 Cybersecurity Riser Diagram

****
NOTE: Select or specify the format for the riser diagram.
****

{For Reference Only: This subpart (and its subparts) relates to PL-2(a); CCI-003051, CCI-003053}

Provide a cybersecurity riser diagram of the complete control system including all network and controller hardware. If the control system specifications require a riser diagram submittal, provide a copy of that submittal as the cybersecurity riser diagram. Otherwise, provide a riser diagram in [one-line format][one-line format overlayed on a facility schematic][tabular format][_____].

1.9.6 Control System Cybersecurity Documentation

****
NOTE: The following enumerates very detailed requirements for documentation; requirements that would be impossible to meet for some control devices. The requirements are broken out in the sub paragraphs:

1) Requirements to be met by all software running on computers
2) Requirements to be met by HVAC control devices
3) Requirements to be met by [fill in the blank] control devices
4) Default requirements for control system devices (when not covered in 1-3 above)

If the project incorporates devices other than HVAC devices, and the general requirements in sub-paragraph 4 are not satisfactory, add requirements to subparagraph 3. If multiple different requirements are needed (e.g. the project incorporates a micro-grid and and an electronic security system, both with specific requirements) add additional paragraphs similar to paragraph 3. Leave the "devices not otherwise covered" at the end of the list and do not edit those requirements.

Note that within HVAC devices, a further distinction is made between devices that FULLY support accounts and those that do not. This distinction is a surrogate to account for the range of capabilities and complexity among various HVAC control devices.
****

This subpart (and its subparts) relates to SA-5 (a),(b),(c); CCIs: CCI-003124, CCI-003125, CCI-003126, CCI-003127, CCI-003128, CCI-003129, CCI-003130, CCI-003131}

Provide a Control System Cybersecurity Documentation submittal containing the indicated information for each device and software application.

1.9.6.1 Software Applications

For all software applications running on computers provide:

a. administrator documentation that describes secure configuration of the software {relates to CCI-003124}

b. administrator documentation that describes secure installation of the software {relates to CCI-003125}

c. administrator documentation that describes secure operation of the software {relates to CCI-003124}

d. administrator documentation that describes effective use and maintenance of security functions or mechanisms for the software {relates to CCI-003127}

e. administrator documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the software {relates to CCI-003128}

f. user documentation that describes user-accessible security functions or mechanisms in the software and how to effectively use those security functions or mechanisms {relates to CCI-003129}

g. user documentation that describes methods for user interaction which enables individuals to use the software in a more secure manner {relates to CCI-003130}

h. user documentation that describes user responsibilities in maintaining the security of the software {relates to CCI-003131}

1.9.6.2 For HVAC Control System Devices

1.9.6.2.1 HVAC Control System Devices FULLY Supporting User Accounts

For all HVAC Control System Devices which FULLY support user accounts, provide:

a. Documentation that describes secure configuration of the device {for reference only: relates to CCI-003124}

b. Documentation that describes secure operation of the device {for reference only: relates to CCI-003124}

c. Documentation that describes effective use and maintenance of security functions or mechanisms for the device {for reference only: relates to CCI-003127}

d. Documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device {for reference only: relates to CCI-003128}

e. Documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security

functions or mechanisms; or a specific indication that there are no user-accessible security functions or mechanisms in the device {for reference only: relates to CCI-003129}

f. Documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {for reference only: relates to CCI-003130}

1.9.6.2.2 All Other HVAC Control System Devices

For all HVAC Control System Devices which do not FULLY support user accounts, provide:

a. Documentation that describes secure configuration of the device; or a specific indication that there are no secure configuration steps that apply {for reference only: relates to CCI-003124}

b. Documentation that describes effective use and maintenance of security functions or mechanisms for the device; or a specific indication that there are no security functions or mechanisms in the device {for reference only: relates to CCI-003127}

c. For devices which include a user interface, documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {for reference only: relates to CCI-003130}

[1.9.6.3 [_____] Control System Devices

****

NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.

****

[_____]

]1.9.6.4 Default Requirements for Control System Devices

****

NOTE: Do not edit these requirements. If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.

****

For control system devices where Control System Cybersecurity Documentation requirements are not otherwise indicated in this Section, provide:

a. Documentation that describes secure configuration of the device {for reference only: relates to CCI-003124}

b. Documentation that describes secure installation of the device {for reference only: relates to CCI-003125}

c. Documentation that describes secure operation of the device {for reference only: relates to CCI-003124}

d. Documentation that describes effective use and maintenance of security functions or mechanisms for the device {for reference only: relates to CCI-003127}

e. Documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device {for reference only: relates to CCI-003128}

f. Documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms {for reference only: relates to CCI-003129}

g. Documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {for reference only: relates to CCI-003130}

h. Documentation that describes user responsibilities in maintaining the security of the device {for reference only: relates to CCI-003131}

1.10 SOFTWARE UPDATE LICENSING

****

NOTE: The installation may procure its own software update licensing or contract and thus needs less than 5 years. Alternatively the installation may require longer than five years (although this will likely increase the costs significantly). Coordinate with the installation to determine if they have any specific requirement; if they don't then keep the 5 year requirement.

Note that this requirement may already exist in the control system specifications, in which case it can removed from this Section (or kept in this Section and removed from the control system specification).

****

{For Reference Only: This subpart (and its subparts) relates to SI-2 (a),(c); CCI-001227, CCI-002605}

In addition to all other licensing requirements, all software licensing must include licensing of the following software updates for a period [of no less than 5 years][___]:

a. Security and bug-fix patches issued by the software manufacturer.

b. Security patches to address any vulnerability identified in the National Vulnerability Database at http://nvd.nist.gov with a Common Vulnerability Scoring System (CVSS) severity rating of MEDIUM or higher.

Provide a single Software Licenses submittal with documentation of the software licenses for all software provided

1.11 CYBERSECURITY DURING CONSTRUCTION

****

NOTE: The requirements in this subpart do not tie to cybersecurity specific cybersecurity controls or CCIs as tightly as most other requirements in this Section. They are included to provide a basic level of "cyber hygiene" during the construction process, and the controls that they are related to are still noted for reference.

****

{For Reference Only: This subpart (and its subparts) relates to AC-18, SA-3, CCI-00258}

In addition to the control system cybersecurity requirements indicated in this section, meet following requirement throughout the construction process.

1.11.1 Contractor Computer Equipment

Contractor owned computers may be used for construction. When used, contractor computers must meet the following requirements:

1.11.1.1 Operating System

The operating system must be an operating system currently supported by the manufacturer of the operating system. The operating system must be current on security patches and operating system manufacturer required updates.

1.11.1.2 Anti-Malware Software

The computer must run anti-malware software from a reputable software manufacturer. Anti-malware software must be a version currently supported by the software manufacturer, must be current on all patches and updates, and must use the latest definitions file. All computers used on this project must be scanned using the installed software at least once per day.

1.11.1.3 Passwords and Passphrases

The passwords and passphrases for all computers must be changed from their default values. Passwords must be a minimum of eight characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.11.1.4 Contractor Computer Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Computer Cybersecurity Compliance Statements for each company using contractor owned computers. Contractor Computer Cybersecurity Compliance Statements must use the template published at http://www.wbdg.org/FFC/NAVGRAPH/graphtoc.pdf. Each Statement must be signed by a cybersecurity representative for the relevant company.

1.11.2 Temporary IP Networks

****

NOTE: The allowance of connection to "Government furnished IP networks provided for this purpose" covers the case of there being a "guest" network the contractor can use. This is likely not available in many cases, but is covered here for the instances in which it is offered by the project site.

****

Temporary contractor-installed IP networks may be used during construction. When used, temporary contractor-installed IP networks must meet the following requirements:

1.11.2.1 Network Boundaries and Connections

The network must not extend outside the project site and must not connect to any IP network other than IP networks provided under this project or Government furnished IP networks provided for this purpose. Any and all network access from outside the project site is prohibited.

1.11.3 Government Access to Network

Government personnel must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification

1.11.4 Temporary Wireless IP Networks

In addition to the other requirements on temporary IP networks, temporary wireless IP (WiFi) networks must not interfere with existing wireless network and must use WPA2 security. Network names (SSID) for wireless networks must be changed from their default values.

1.11.5 Passwords and Passphrases

The passwords and passphrases for all network devices and network access must be changed from their default values. Passwords must be a minimum 8 characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.11.6 Contractor Temporary Network Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Temporary Network Cybersecurity Compliance Statements for each company implementing a temporary IP network. Contractor Temporary Network Cybersecurity Compliance Statements must use the template published at http://www.wbdg.org/FFC/NAVGRAPH/graphtoc.pdf. Each Statement must be signed by a cybersecurity representative for the relevant company. If no temporary IP networks will be used, provide a single copy of the Statement indicating this.

1.12 CYBERSECURITY DURING WARRANTY PERIOD

All work performed on the control system after acceptance must be performed using Government Furnished Equipment or equipment specifically and individually approved by the Government.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 ACCESS CONTROL REQUIREMENTS

3.1.1 User Accounts

****

NOTE: Ensure that control system specifications define roles (such as operator with view-only, operator with control, control system admin) for applications which FULLY support accounts. Different devices, particularly those with very different functions and residing at different places in the system architecture, may require different account roles.

DO NOT ALLOW AN INTERFACE THAT DOES NOT SUPPORT ACCOUNTS TO HAVE THE CAPABILITY TO ALTER THE CONTROL SYSTEM.

The determination of whether a device has a STIG or SRG, and the installation and configuration of devices in accordance with relevant STIGs or SRGs are contractor responsibilities. The designer/specifier is not expected to identify relevant STIGs or SRGs

****

{For Reference Only: This subpart (and its subparts) relate to AC-2(a)and AC-3; CCI-002110, CCI-000213.}

Any device supporting user accounts (either FULLY or MINIMALLY) must limit access to the device according to specified limitations for each account. Install and configure any device having a STIG or SRG in accordance with that STIG or SRG.

3.1.1.1 Computers

All computers must FULLY support user accounts.

3.1.1.2 For HVAC Control System Devices

Devices with web interfaces must either FULLY support user accounts or have their web interface disabled. Field devices with full local user interfaces allowing modification of data must at least MINIMALLY support user accounts.

[3.1.1.3 [_____] Control System Devices

****

NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are

covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.

****

[_____]

]3.1.1.4 Default Requirements for Control System Devices

****

NOTE: Do not edit these requirements (beyond selection of bracketed text). If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.

****

****

NOTE: Select the appropriate minimum account support for web interfaces.

Select the appropriate minimum account support for local user interfaces allowing modification of data. In general, keep "at least MINIMALLY" unless otherwise required for the project.

Keep or include user account requirements for read-only interfaces. If keeping the requirement, select the appropriate user account support. In general either remove this text (to allow read-only interfaces with no accounts) or keep "at least MINIMALLY" unless otherwise required for the project.

Unless specifically required by the project DO NOT keep bracketed text requiring all devices to at least MINIMALLY support accounts as this increases system complexity and cost and requires operation and maintenance staff to maintain passwords for all devices.

****

For control system devices where User Account requirements are not otherwise indicated in this Section:

a. Devices with web interfaces must either [FULLY][at least MINIMALLY] support user accounts or have their web interface disabled.

b. Field devices with full local user interfaces allowing modification of data must [at least MINIMALLY][FULLY] support user accounts.

[c. Field devices with read-only full local user interfaces must [at least MINIMALLY][FULLY] support user accounts.

][d. All devices must at least MINIMALLY support user accounts.

]3.1.2 Unsuccessful Logon Attempts

****

NOTE: Note that most field devices that only MINIMALLY support accounts (e.g. a Local Display Panel) cannot be locked. Keep the bracketed text requiring that these devices lock ONLY if this is a specific project requirement. If keeping this text, include requirements on when the interface must lock and how to unlock. Some unlocking conditions to consider are: network command or a physical button which is protected by a locked enclosure.

Note that a requirement for a HIGH availability at the front end may preclude locking out an account for failed logon attempts. If the system includes high availability user interfaces which should not be locked, include the bracketed text exempting high availability interfaces and keep the bracketed table. Indicate in the table the exempt interfaces, their location and action to take for each in lieu of locking the screen.

****

{For Reference Only: This subpart (and its subparts) relate AC-7 (a), AC-7 (b); CCI-000043, CCI-000044, CCI-001423, CCI-002236, CCI-002237, CCI-002238}

Except for high availability user interfaces indicated as exempt, devices must meet the indicated requirements for handling unsuccessful logon attempts.

3.1.2.1 Devices MINIMALLY Supporting Accounts

****

NOTE: Indicate whether devices minimally supporting accounts must lock based on unsuccessful logon attempts.

Generally, for LOW Impact control systems, locking is not required - keep the first bracketed text to indicate so.

Use care when requiring that devices minimally supporting account lock to specify a reasonable requirement that will not introduce an additional O&M burden.

****

Devices which MINIMALLY support accounts [are not required to lock based on unsuccessful logon attempts][must lock the user input when [_____] and must support unlocking of the user input when [_____]].

3.1.2.2 Devices FULLY Supporting Accounts

****

NOTE: Select or indicate the number and time period

for unsuccessful logon attempts to lock an account.
****

Devices which FULLY support accounts must meet the following requirements. If a device cannot meet these requirements, document device capabilities to protect from subsequent unsuccessful logon attempts and propose alternate protections in a Device Account Lock Exception Request submittal. Do not implement alternate protection measures without explicit permission from the Government.

a. It must lock the user account when [three][_____] unsuccessful logon attempts occur within a [15 minute][_____] interval.

b. Once an account is locked, the account must stay locked until unlocked by an administrator.

c. Once the indicated number of unsuccessful logon attempts occurs, delay further logon prompts by 5 seconds.

3.1.2.3 High Availability Interfaces Exempt from Unsuccessful Logon Attempts Requirements

****
NOTE: Indicate whether or not there are high availability interfaces which are exempt from unsuccessful logon attempts requirements. If there are, specify them in the table provided.
****

[There are no high availability interfaces which are exempt from unsuccessful logon attempts requirements.][The following high availability interfaces are exempt from unsuccessful logon attempts requirements:

High Availability Interfaces Exempt from Unsuccessful Logon Attempts Requirements		
User Interface	**Location**	**Action to take in lieu of locking screen**
[_____]	[_____]	[_____]
[_____]	[_____]	[_____]
[_____]	[_____]	[_____]

]

3.1.3 System Use Notification

****
NOTE: Note that the point of restricting the requirement to devices "connected to the network" is to exclude things like a thermostat that has a PIN to lockout changes but isn't networked.
****

{For Reference Only: This subpart (and its subparts) relates to AC-8; CCI-000048, CCI-002247, CCI-002243, CCI-002244, CCI-002245, CCI-002246, CCI-000050, CCI-002248}

Web interfaces must display a warning banner meeting the requirements of DTM 08-060.

Devices which are connected to a network and have a user interface must display a warning banner meeting the requirements of DTM 08-060 if capable of doing so. Devices which are connected to a network and have a user interface but are not capable of displaying a banner must have a permanently affixed label displaying an approved banner from DTM 08-060.Labels must be machine printed or engraved, plastic or metal, designed for permanent installation, must use a font no smaller than 14 point, and must provide a high contract between font and background colors.

3.1.3.1 User Interface Banner Schedule

Provide a User Interface Schedule using the format indicated showing each user interface provided and how the information banner requirement has been implemented for each user interface.

User Interface Schedule Format (with sample entries)			
User Interface Description	**User Interface Location**	**Type of User Interface**	**Banner Implementation**
Sample 1	Room 1	Remote	DTM 08-060 Banner "A" Displayed at Logon
Sample 2	Room 2	Limited Local	DTM 08-060 Banner "B" on Affixed Label
Sample 3	Room 3	Full Local	DTM 08-060 Banner "B" Displayed on Screen

3.1.4 Permitted Actions Without Identification or Authentication

****

NOTE: These requirements are specifically about user actions, not actions taken automatically by control system components.

Notes concerning how this requirement addresses cybersecurity:

1) **This requirement indicates that there are no actions that can be taken without identification and authentication for any user interface where account support is required.**
2) **This requirement does not limit actions taken by a user on a user interface that does not support accounts, but other requirements limit this to READ-ONLY interfaces.**
3) **Thus the "permitted actions" referred to by control AC-14 are "viewing read-only information from devices which are not required to have user accounts."**

****

{For Reference Only: This subpart (and its subparts) relates to AC-14; CCI-000061, CCI-000232}

The control system must require identification and authentication before allowing any actions by a user acting from a user interface which MINIMALLY or FULLY supports accounts.

3.1.5 Wireless Access

****

NOTE: Avoid wireless to the greatest extent possible. Wireless may be considered for retrofits where running wires would be prohibitive, but other technologies (such as powerline carrier) should be considered first.

In general, contractors should never install a wireless network which carries the IP protocol. The Air Force may allow wireless IP networks to be installed in some instances, when it is installed in accordance with existing site requirements - coordinate with the project site to determine if this is required and remove the bracketed text if not required.

Note that contractors may (where permitted and supported) USE a government provided wireless IP network.

****

{For Reference Only: This subpart (and its subparts) relates to AC-18; CCI-001438, CCI-001439, CCI-002323, CCI-001441}

Unless explicitly authorized by the Government, do not use any wireless communication. Any device with wireless communication capability is considered to be using wireless communication, regardless of whether or not the device is actively communicating wirelessly, except when wireless communication has been physically permanently disabled (such as through the removal of the wireless transceiver).

3.1.5.1 Wireless IP Communications

[Unless specifically approved and installed in accordance with the project site requirements, d][D]o not install wireless IP networks, including: do not install a wireless access point; do not install or configure an ad-hoc wireless network; do not install or configure a WiFi Direct communication.

When explicitly authorized by the Government, wireless IP communication may be used to communicate with an existing wireless network.

3.1.5.2 Non-IP Wireless Communication

When non-IP wireless communication is explicitly authorized by the Government, use the maximum level of encryption supported by the specific protocol employed and select signal strength and radiated power to the minimum necessary for reliable communication.

3.1.5.3 Wireless Communication Request

****

NOTE: The wireless communication request submittal will be used to authorize specific use of wireless communication, and to indicate whether or not testing of the signal strength is required. In general, testing is not required for a LOW impact system.

There may be project site or Service policies that govern the use of wireless. Before authorizing wireless use coordinate with the relevant Service and project site representatives.

****

Provide a report documenting the proposed use of wireless communication prior to beginning construction using the Wireless Communication Request Schedule at http://www.wbdg.org/FFC/NAVGRAPH/graphtoc.pdf.

For each device proposed to use wireless communication show: the device identifier, a description of the device, the location of the device, the device identifiers of other devices communicating with the device, the protocol used for communication, encryption type and strength, RF Frequency, Radiated Power in dBm (decibel with a milliwatt reference), free-space range, and the expected as-installed range.

3.1.5.4 Wireless Communication Testing

****

NOTE: Select or enter appropriate name for the system-level test of the control system.

Select or indicate the wireless network test boundary.

****

As part of [Performance Verification Testing (PVT)][Functional Performance Testing {FPT}][___], conduct testing of wireless communication for all devices indicated on the approved Wireless Communication Request as requiring testing.

To test wireless communication, test for wireless network reception at multiple points along the wireless test boundary in the vicinity of the wireless device, and record whether a network connection can be established at each point. The wireless test boundary is [the building exterior walls][the facility fence line][_____]. If wireless testing is required, provide a Wireless Communication Test Report documenting the testing points and results at each point for each wireless device.

3.2 CYBERSECURITY AUDITING

****

NOTE: Auditing within the control system is a complex requirement. For standard information systems, DoD has extensive auditing requirements, which largely cannot be met within a typical control system. For more information on auditing, see UFC 4-010-06, Cybersecurity for Facility-Related Control Systems

DoD requires (see AU-2) the capability to audit the following events :

a. ***Successful and unsuccessful attempts to access, modify, or delete privileges, security objects, security levels, or categories of information (e.g. Classification levels)*** **- generally only applicable to computers.**

b. ***Successful and unsuccessful logon attempts*** **- generally only applicable to computers and devices FULLY supporting accounts.**

c. ***Privileged activities or other system level access*** **- generally only applicable to computers.**

d. ***Starting and ending time for user access to the system*** **- generally only applicable to computers and devices FULLY supporting accounts.**

e. ***Concurrent logons from different workstations*** **- generally only applicable to computers and devices with web interfaces.**

f. ***Successful and unsuccessful accesses to objects*** **- generally only applicable to computers.**

g. ***All program initiations*** **- generally only applicable to computers; for a controller, this is covered under kernel module actions, below.**

h. ***All direct access to the information system*** **- generally only for computers.**

i. ***All account creations, modifications, disabling, and terminations*** **- generally only applicable to devices that FULLY support accounts.**

j. ***All kernel module load, unload, and restart*** **- this could apply to computers or devices.**

DoD also requires that the selection of which events get audited is under the control of the Information System Security Manager (ISSM).

DoD requires (see AU-3) that audit records contain the following:

type of event
time of the event
location of the event
source of the event
result of the event
the identity of any individuals or subjects associated with the event.

Note that much of this information will be not applicable for field control system devices.

DoD requires that all devices in the system be capable of auditing events, but allows the ISSM to select which devices must perform auditing (see AU-12 (b)).

Note that there is a large gap between what is theoretically required in terms of a capability ("audit all events at all devices") vs. what is practical and reasonable to implement in a specific control system. The designer needs to provide input on what can and cannot be done in terms of what devices in the system can perform auditing, and what events can they audit.

Require implementation for what is possible but do not require unreasonable requirements. Be prepared to document/explain impractical requirements if required by the System Owner (SO) or Authorizing Official (AO)

Control System Alarms:
Control system alarms should have similar requirements. The designer should specify what alarms should be generated, which devices should perform alarm generation, the accuracy of alarm timestamps, response to alarm generation failures (e.g. loss of communication with a field device), and sufficient storage capacity at the front end to maintain alarm/event logs for a specified period of time. These requirements should be defined in the relevant control system specifications, not in this Section.

****

3.2.1 Audit Events, Content of Audit Records, and Audit Generation

{For Reference Only: This subpart (and its subparts) relates to AU-2(a),(c),(d), AU-3, AU-12; CCI-000123, CCI-001571, CCI-000125, CCI-001485, CCI-000130, CCI-000131, CCI-000132, CCI-00133, CCI-000134, CCI-001487, CCI-000169, CCI-001459, CCI-000171, CCI-000172, CCI-001910}

For devices that have STIG/SRGs related to audit events, content of audit records or audit generation, comply with the requirements of those STIG/SRGs.

3.2.1.1 Computers

For each computer, provide the capability to select audited events and the content of audit logs. Configure computers to audit the indicated events, and to record the indicated information for each auditable event

3.2.1.1.1 Audited Events

Configure each computer to audit the following events:

a. Successful and unsuccessful attempts to access, modify, or delete

privileges, security objects, security levels, or categories of information (e.g. classification levels)

a. Successful and unsuccessful logon attempts

b. Privileged activities or other system level access

c. Starting and ending time for user access to the system

d. Concurrent logons from different workstations

e. Successful and unsuccessful accesses to objects

f. All program initiations

g. All direct access to the information system

h. All account creations, modifications, disabling, and terminations

i. All kernel module load, unload, and restart

3.2.1.1.2 Audit Event Information To Record

Configure each computer to record, for each auditable event, the following information (where applicable to the event):

a. What type of event occurred

b. When the event occurred

c. Where the event occurred

d. The source of the event

e. The outcome of the event

f. The identity of any individuals or subjects associated with the event

3.2.1.2 For HVAC Control System Devices

3.2.1.2.1 HVAC Control System Devices FULLY Supporting User Accounts

For devices FULLY supporting accounts, provide the capability to select audited events, and the contents of audit logs. Configure devices to audit the following events:

a. Successful and unsuccessful logon attempts to the device

b. Starting and ending time for user access to the device

c. All account creations, modifications, disabling, and terminations

d. All device shutdown and startup

Configure the device to record for each event the following information (as applicable): the type of event, when the event occurred and the identity of any individuals or subjects associated with the event

3.2.1.2.2 Other HVAC Control System Devices

There are no requirements to perform auditing at HVAC field devices that do not FULLY support accounts.

[3.2.1.3 [_____] Control System Devices

****
NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.
****

[_____]

]3.2.1.4 Default Requirements for Control System Devices

****
NOTE: Do not edit these requirements (beyond selection of bracketed text). If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.
****

For control system devices where Audit Events, Content of Audit Records, and Audit Generation are not otherwise indicated in this Section:

3.2.1.4.1 Devices Which FULLY Support Accounts

For each device which FULLY supports accounts, provide the capability to select audited events and the content of audit logs. Configure devices to audit the indicated events, and to record the indicated information for each auditable event

3.2.1.4.1.1 Audited Events

Configure each device to audit the following events:

a. Successful and unsuccessful attempts to access, modify, or delete privileges, security objects, security levels, or categories of information (e.g. classification levels)

a. Successful and unsuccessful logon attempts

b. Privileged activities or other system level access

c. Starting and ending time for user access to the system

d. Concurrent logons from different workstations

e. All account creations, modifications, disabling, and terminations

f. All kernel module load, unload, and restart

3.2.1.4.1.2 Audit Event Information To Record

Configure each computer to record, for each auditable event, the following information (where applicable to the event):

a. what type of event occurred

b. when the event occurred

c. where the event occurred

d. the source of the event

e. the outcome of the event

f. the identity of any individuals or subjects associated with the event

3.2.1.4.2 Devices Which Do Not FULLY Support Accounts

For each Device which does not FULLY support accounts configure the device to audit all device shutdown and startup events and to record for each event the type of event and when the event occurred.

3.2.2 Audit Storage Capacity and Audit Upload

****

NOTE: Select or indicate duration and rate of audit record generation for field devices. Unless there is a known need, do not add requirements for computer storage capability.

****

{For Reference Only: This subpart (and its subparts) relates to AU-4; CCI-001848, CCI-001849}

a. For devices that have STIG/SRGs related to audit storage capacity (CCI-001848 or CCI-001849) comply with the requirements of those STIG/SRGs.

b. For non-computer control system devices capable of generating audit records, provide [60][_____] days worth of secure local storage, assuming [10][_____] auditable events per day.[

c. For computers, provide storage for at least [_____] audit records.]

3.2.2.1 Device Audit Record Upload Software

****

NOTE: Select or indicate desired export target for audit upload software.

Select and indicate where upload software is to be installed, if it is to be installed. If there is no front end on which to install the software and there are no computers installed under this project onto which is should be loaded remove both sets of

bracketed text.

Note that this software may not be required if there are no devices other than computers which audit events.

****

For each non-computer device required to audit events, provide, and license to the Government, software implementing a secure mechanism of uploading audit records from the device to a computer and of exporting the uploaded audit records as a [Microsoft Excel file][comma separated value text file][Microsoft Excel file or comma separated value text file][_____]. Where different devices use different software, provide software of each type required to upload audit logs from all devices.

[Install device audit record upload software on the furnished front end computer in [_____].][Install device audit record upload software on [_____].]Submit copies of device audit record upload software. If there are no non-computer devices requiring auditing, provide a document stating this in lieu of this submittal.

3.2.3 Response to Audit Processing Failures

****

NOTE: The requirement that audit processing failures notify a person implies that this control can only be met at a computer with network access, not by a control device within the control system. The action taken should be "overwrite oldest audit records" if possible; it should almost certainly never be "shut down information system". Provide a POC to notify, either the Security Controls Assessor (SCA) or the Information System Security Officer (ISSO). Provide a default action.

****

{For Reference Only: This subpart (and its subparts) relates to AU-5; CCI-000139, CCI-000140, CCI-001490}.

Front end computers associated with auditing must, in the case of a failure in the auditing system, notify [_____] via [e-mail][_____]. In case of an audit failure, if possible, continue to collect audit records by [overwriting existing audit records][_____].

3.2.4 Time Stamps

{For Reference Only: This subpart (and its subparts) relates to AU-8; CCI-000159, CCI-001889, CCI-001890}

3.2.4.1 Computers

****

NOTE: Note that the timing requirement for computers may require communication through a firewall to allow NTP or SNTP to get time updates.

****

Computers generating audit records must have internal clocks capable of providing time with a resolution of 1 second. Clocks must not drift more

than 10 seconds per day.

Configure the system so that each computer generating audit records maintains accurate time to within 1 second.

3.2.4.2 For HVAC Control System Devices

****

NOTE: For HVAC Control Systems, the timing requirements inherent in the control systems and specified in Section 23 09 23.01 LONWORKS DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS, Section 23 09 23.02 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS, and Section25 10 10 UTILITY MONITORING AND CONTROL SYSTEM (UMCS) FRONT END AND INTEGRATION should be sufficient.

Unless otherwise required, keep the first bracketed text ("Time stamp requirements for HVAC Control Systems are as indicated in the HVAC Control System specifications.") and remove the timing requirements in the second bracketed text.

Note that HVAC control devices may not be able to meet the timing requirements in the second set of bracketed text.

****

[Time stamp requirements for HVAC Control Systems are as indicated in the HVAC Control System specifications.][Devices generating audit records must have internal clocks capable of providing time with a resolution of 1 second. Clocks cannot drift more than 10 seconds per day. Configure the system so that each device generating audit records maintains accurate time to within 1 second.]

[3.2.4.3 [_____] Control System Devices

****

NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.

****

****

NOTE: Indicate the control system and select or indicate the timing requirements for that control system.

****

[_____][Time stamp requirements for [_____] Control Systems are as indicated in the Control System specifications.][Devices generating audit

records must have internal clocks capable of providing time with a resolution of 1 second. Clocks cannot drift more than 10 seconds per day. Configure the system so that each device generating audit records maintains accurate time to within 1 second.]

]3.2.4.4 Default Requirements for Control System Devices

****
NOTE: Do not edit these requirements (beyond selection of bracketed text). If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.
****

For control system devices where Time Stamps requirements are not otherwise indicated in this Section: Devices generating audit records must have internal clocks capable of providing time with a resolution of 1 second. Clocks must not drift more than 10 seconds per day. Configure the system so that each device generating audit records maintains accurate time to within 1 second.

3.3 REQUIREMENTS FOR LEAST FUNCTIONALITY

****
NOTE: The control system should be designed to have the least capability possible while still meeting the minimum needs of the government. This means disabling unnecessary functionality. Do not install unnecessary software. Ensure that unnecessary accounts, maintenance passwords, etc. are all changed, disabled, or removed.

For systems other than HVAC control systems: Consider disallowing unrequested user interfaces and consider disallowing networked sensors/actuators where they are not required.
****

{For Reference Only: This subpart (and its subparts), along with the network communication report submittal specified elsewhere in this section, relates to CM-6 (a), (c), CM-7, CM-7 (1)(b), SC-41; CCI-000363, CCI-000364, CCI-000365, CCI-001588, CCI-001755, CCI-000381, CCI-000380, CCI-00382, CCI-001761, CCI-001762, CCI-002544, CCI-002545, CCI-002546.}

For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), install and configure the device in accordance with that STIG or SRGs.

For HVAC Control Systems: Do not provide devices with user interfaces where one was not required. Do not use a networked sensor or actuator where a non-networked sensor or actuator would suffice.

For Other Control Systems: [Do not provide devices with user interfaces where one was not required.] [Do not use a networked sensor or actuator where a non-networked sensor or actuator would suffice.]

3.3.1 Non-IP Control Networks

When control system specifications require particular communication protocols, use only those communication protocols and only as specified. Do not implement any other communication protocol, or use any protocol on ports other than those specified.

When control system specifications do not indicate requirements for communication protocols, use only those protocols required for operation of the system as specified.

3.3.2 IP Control Networks

Do not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Do not use ports, protocols and services that are not specified in the control system specifications or required for operation of the control system.

3.4 SAFE MODE AND FAIL SAFE OPERATION

****

NOTE: The designer should determine, based on the criticality of the controlled equipment, what conditions to consider and which actions, if any, including possible alarm requirements, the control system should take when these conditions are true. This should include external conditions (e.g. loss of off-site utility power), internal conditions (e.g. network or sensor failure), and operator input (e.g. manual command to a safe mode of operation). This should all be specified in the control logic (e.g. sequence of operations), in particular by addressing normal/failed positions of output devices, including default positions upon loss of network, and in the overall system design. Where high reliability is required, the analysis should consider the addition of redundant equipment to the design. See also guidance on SC-24 (Fail in Known State), guidance on SI-17 (Fail-Safe Procedures) and the MINIMUM CYBERSECURITY DESIGN REQUIREMENTS in UFC 4-010-06, Cybersecurity for Facility-Related Control Systems.

Note that any requirements in the control system needed to meet CP-12 (Safe Mode) or SI-17 (Fail-Safe Procedures) should be specified in existing specifications and design, for example, redundant AHUs in the mechanical design and sequences of operation. Any specific requirements for CP-12 or SI-17 should be addressed in those sections, not in this UFGS.

****

{For Reference Only: This subpart (and its subparts) relates to CP-12, SI-17; CCI-002855, CCI-002856, CCI-002857, CCI-002773, CCI-002774, CCI-002775}

For all control system components with an applicable STIG or SRG, configure the component in accordance with all applicable STIGs and SRGs.

3.5 IDENTIFICATION AND AUTHENTICATION

3.5.1 User Identification and Authentication

{For Reference Only: This subpart (and its subparts) relates to IA-2,(1),(12); CCI-000764, CCI-000765, CCI-001953, CCI-001954}

a. Devices that FULLY support accounts must uniquely identify and authenticate organizational users.

b. Devices which allow network access to privileged accounts must implement multifactor authentication for network access to privileged accounts.

3.5.1.1 HVAC Control Systems Devices

Identification and Authentication for network access to privileged accounts must be implemented by either accepting and electronically verify Personal Identity Verification (PIV) credentials or inheriting identification and authentication from the operating system.

3.5.1.2 Electronic Security System Devices

****
NOTE: Select whether to require PIV, or allow alternate mechanisms.
****

Identification and Authentication for network access to privileged accounts must be implemented by [accepting and electronically verifying Personal Identity Verification (PIV) credentials][or][inheriting identification and authentication from the operating system][or][_____].

[#### 3.5.1.3 [_____] Control System Devices

****
NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.
****

[_____]

]#### 3.5.1.4 Default Requirements for Control System Devices

****
NOTE: Select whether to require PIV, or allow alternate mechanisms.

Do not edit these requirements (beyond selection of bracketed text). If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.
****

For control system devices where User Identification and Authentication requirements are not otherwise indicated in this Section, User Identification and Authentication for network access to privileged accounts must be implemented by [accepting and electronically verify Personal Identity Verification (PIV) credentials][or][inheriting identification and authentication from the operating system][or][_____].

3.5.2 Authenticator Management

{For Reference Only: This subpart (and its subparts) relates to IA-5 (b),(c),(e),(g),(1),(11); CCI-000176, CCI-001544, CCI-001989, CCI-000182, CCI-001610, CCI-000192, CCI-000193, CCI-000194, CCI-000205, CCI-001619, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-000195, CCI-001615, CCI-000196, CCI-000197, CCI-000199, CCI-000198, CCI-001616, CCI-001617, CCI-000200, CCI-001618, CCI-002041, CCI-002002, CCI-002003}

3.5.2.1 Authentication Type

3.5.2.1.1 For HVAC Control System Devices

****
NOTE: Coordinate with the project site to determine the appropriate authenticator type for software.
****

Unless otherwise indicated:

a. Software which FULLY supports accounts and which runs on a computer must use [password-based authentication or hardware token-based authentication][password-based authentication][hardware token-based authentication].

b. Other devices which FULLY support accounts must use password-based authentication.

c. Devices MINIMALLY supporting accounts must use password-based authentication.

[3.5.2.1.2 [_____] Control System Devices

****
NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.
****

[_____]

]3.5.2.1.3 Default Requirements for Control System Devices

****
NOTE: Do not edit these requirements (beyond selection of bracketed text). If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.
****

****
NOTE: Indicate required authenticator type. Unless specifically required by the project, do not require all devices that FULLY support accounts to use hardware token-based authentication.
****

For control system devices where Authentication Type requirements are not otherwise indicated in this Section:

a. Software which FULLY supports accounts and which runs on a computer must use [password-based authentication or hardware token-based authentication][password-based authentication][hardware token-based authentication].

b. Other devices which FULLY support accounts must use [either password-based authentication or hardware token-based authentication][password-based authentication][hardware token-based authentication].

c. Devices MINIMALLY supporting accounts must use [either password-based authentication or hardware token-based authentication][password-based authentication][hardware token-based authentication].

3.5.2.2 Password-Based Authentication Requirements

3.5.2.2.1 Passwords for Computers

All computers supporting password-based authentication must enforce the following requirements:

a. Minimum password length of 12 characters

b. Password must contain at least one uppercase character.

c. Password must contain at least one lowercase character.

d. Password must contain at least one numeric character.

e. Password must contain at least one special character.

f. Password must have a minimum lifetime of 24 hours.

g. Password must have a maximum lifetime of 60 days. When passwords expire, prompt users to change passwords. Do no lock accounts due to expired passwords.

h. Password must differ from previous five passwords, where differ is defined as changing at least 50 percent of the characters.

i. Passwords must be cryptographically protected during storage and transmission.

3.5.2.2.2 Passwords for Non-Computer Devices FULLY Supporting Accounts

All non-computer devices FULLY supporting accounts and supporting password-based authentication must enforce the following requirements:

a. Minimum password length of twelve (12) characters

b. Password must contain at least one uppercase character.

c. Password must contain at least one lowercase character.

d. Password must contain at least one numeric character.

e. Password must contain at least one special character.

f. Password must have a maximum lifetime of sixty (60) days. When passwords expire, prompt users to change passwords. Do no lock accounts due to expired passwords.

g. Password must differ from previous five (5) passwords, where differ is defined as changing at least fifty percent of the characters.

h. Passwords must be cryptographically protected during storage and transmission.

3.5.2.2.3 Passwords for Web Interfaces

Passwords for connecting to a web interface supporting password-based authentication must enforce the following requirements:

a. Minimum password length of 12 characters

b. Password must contain at least one uppercase character.

c. Password must contain at least one lowercase character.

d. Password must contain at least one numeric character.

e. Password must contain at least one special character.

f. Password must have a maximum lifetime of 60 days. When passwords expire, prompt users to change passwords. Do no lock accounts due to expired passwords.

g. Password must differ from previous five passwords, where differ is defined as changing at least 50 percent of the characters.

h. Passwords must be cryptographically protected during storage and transmission.

3.5.2.2.4 Passwords for Devices Minimally Supporting Accounts

****

NOTE: Indicate minimum password requirements for devices MINIMALLY supporting accounts. Use as large a value as practical, but use caution to pick a number that is supportable by the components.

Never allow a minimum length less than four characters. For HVAC control systems, simple Local Display Panels may not support more than four characters, and keeping four as the minimum is generally recommended.

****

Devices minimally supporting accounts must support passwords with a minimum length of [four][_____] characters.

3.5.2.2.5 Password Configuration and Reporting

****

NOTE: Provide a POC for password coordination. This will generally be a supervisor or other senior member of the project site maintenance organization.

The Password Summary Report is needed by the project site DPW. This report is required to be delivered as hardcopy in a sealed envelope to keep passwords more confidential.

****

For all devices with a password, change the password from the default password. Coordinate selection of passwords with [_____]. Do not use the same password for more than one device unless specifically instructed to do so. Provide a Password Summary Report documenting the password for each device and describing the procedure to change the password for each device.

Do not provide the Password Summary Report in electronic format. Provide [two][_____] hardcopies of the Password Summary Report, each copy in its own sealed envelope.

3.5.2.3 Hardware Token-Based Authentication Requirements

Devices supporting hardware token-based authentication must use Personal Identity Verification (PIV) credentials for the hardware token.

3.5.3 Authenticator Feedback

{For Reference Only: This subpart relates to IA-6; CCI-000206}

Devices must never show authentication information, including passwords, on a display. Devices that momentarily display a character as it is entered, and then obscure the character, are acceptable. For devices that have STIGs or SRGs related to obscuring of authenticator feedback (CCI-000206), comply with the requirements of those STIGS/SRGs.

3.5.4 Device Identification and Authentication

****

NOTE: Indicate whether certificates for HTTPS will be provided by a Government POC, and if so who will provide them. Coordinate this requirement with the

project site, and with thecontrol system specification as this may already be specified there.

Wireless IP communication needs to be explicitly permitted via the wireless communication request submittal, and requires an existing Government-provided WiFi network. If a WiFi network is available for potential contractor use, include the bracketed text requiring wireless IP authentication and coordinate with the IT staff to indicate the authentication mechanism. If no WiFi network will be available, remove this bracketed text.

****

{For Reference Only: This subpart (and its subparts) relates to IA-3; CCI-000777, CCI-000778, CCI-001958}

All computers must use IEEE 802.1x for authentication to the network. All web servers running on computers must use HTTPS[and must implement HTTPS using web server certificates obtained from [_____]].[When wireless IP devices are permitted, they must use [_____] for authentication.]

3.5.4.1 For HVAC Control System Devices

****

NOTE: Indicate whether certificates for HTTPS will be provided, and if so who will provide them.

Unless otherwise required, if the project allows the Niagara Framework, require Fox Protocol components to support 802.1x.

If widely supported, require Ethernet devices to meet 802.1x. Note many IP-based controller do not support 802.1x, so only include this requirement if confident it can be sufficiently supported or if it is a specific project requirement.

Do not require Network Security with BACnet without determining both a) that it is a specific project requirement, and b) that it can be met by multiple vendors.

****

Devices using Fox Protocol must use HTTPS[using a web server certificate obtained from [_____]]. [Devices using Fox Protocol must support IEEE 802.1x.][Devices using Ethernet must support IEEE 802.1x.][Devices using BACnet must support Network Security as specified in Clause 24 of ASHRAE 135.]

[3.5.4.2 [_____] Control System Devices

****

NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.

****

[_____]

]3.5.4.3 Default Requirements for Control System Devices

****

NOTE: Do not edit these requirements (beyond selection of bracketed text). If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.

If widely supported, require Ethernet devices to meet 802.1x. Note many IP-based controller do not support 802.1x, so only include this requirement if confident it can be sufficiently supported or if it is a specific project requirement.

Indicate whether certificates for HTTPS will be provided, and if so who will provide them.

****

For control system devices where Device Identification and Authentication requirements are not otherwise indicated in this Section: [Devices using Ethernet must support IEEE 802.1x.]Devices using HTTP as a control protocol must use HTTPS[using a web server certificate obtained from [_____]] instead.

3.5.5 Cryptographic Module Authentication

****

NOTE: As of October 2017 there are no known STIGs/SRGs related to this requirement which apply to HVAC control systems.

****

{For Reference Only: This subpart (and its subparts) relates to IA-7; CCI-000803}

For devices that have STIG/SRGs related to cryptographic module authentication (CCI-000803), comply with the requirements of those STIG/SRGs.

3.6 EMERGENCY POWER

****

NOTE: A long term alternate power supply is almost never required by the control system itself, this will usually be required (if at all) by tenant requirements or by the overall system design and should seldom be added as an ad-hoc requirement. Control systems for underlying systems with alternate power should use that alternate power

source.

A UPS may be desired for specific control system components where rapid recovery after a power outage is required, or where the control system itself is necessary for restoration of power. Again, this should be driven by mission requirements and control system specifications should already require adequate system restoration after loss of power. If there are specific requirements for either short-term (UPS) or long-term (generator or alternate power source), include them as part of the design and in the relevant specification sections rather than adding requirements to this section.

Note that use of small local UPSes creates additional maintenance burdens due to the requirements for periodic battery replacement and may ultimately result in a less reliable system.

Brackets are provided here for the EXTREMELY RARE case in which emergency power requirements must be specified here. In most cases, keep the bracketed text indicating emergency power requirements are in accordance with the control system and equipment specifications.

****

{For Reference Only: This subpart (and its subparts) relates to PE-11,(1); CCI-02955, CCI-000961}

[Emergency power is specified in the control system and equipment specifications.][_____]

3.7 DURABILITY TO VULNERABILITY SCANNING

****

NOTE: In general, it won't be possible to assume that devices will respond to a scanning tool. There might be specific cases where it is desirable for devices to provide specific responses to specific tools. If so, add the appropriate requirements to indicate the scanning tools and response information.

For computers, select whether the computer must respond in specific ways to scans. If so, keep the bracketed text and define specific scanning tools and response. If not, remove the bracketed text.

****

{For Reference Only: This subpart (and its subparts) relates to RA-5 (a),(b),(c),(d); CCI-001054, CCI-001055, CCI-0010156, CCI-001641, CCI-001643, CCI-001057, CCI-001058, CCI-001059}

All IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality.

[Computers must respond to scans from [_____] by responding with a

[_____].]For control system devices other than computers:

3.7.1 HVAC Control System Devices Other Than Computers

HVAC control system devices other than computers are not required to respond to scans.

[3.7.2 [_____] Control System Devices Other Than Computers

****
NOTE: Use this bracketed subpart if needed to add requirements for a specific control system type (e.g. lighting, electrical distribution etc), similar to how HVAC control system devices are covered above.

If adding a new control system type, submit a Criteria Change Request with the relevant requirements to have that system included in the published UFGS.
****

****
NOTE: Select whether control system devices must respond to scans and, if so, indicate the tools and the response required.
****

[_____] control system devices other than computers [must respond to scans from [_____] by responding with a [_____]][are not required to respond to scans].

]3.7.3 Default Requirements for Control System Devices

****
NOTE: Do not edit these requirements (beyond selection of bracketed text). If these requirements do not apply to a specific control system used on the project, include requirements for that control system using the bracketed subpart provided above.
****

****
NOTE: Select whether control system devices must respond to scans and, if so, indicate the tools and the response required.
****

Non-computer control system devices where Durability to Vulnerability Scanning requirements are not otherwise indicated in this Section [must respond to scans from [_____] by responding with a [_____]][are not required to respond to scans].

3.8 FIPS 201-2 REQUIREMENT

****
NOTE: Select brackets to indicate if any systems require devices using PIV to be on the FIPS 201-2 approved product list.

Many control systems will not be able to meet a requirement for devices to be on the FIPS 201-2 approved product lists. Only require this when necessary.

****

{For Reference Only: This subpart (and its subparts) relates to SA-4 (10); CCI-003116}

Devices in the following systems which implement PIV must be on the NIST FIPS 201-2 approved product list: [NONE][electronic security systems(ESS)][_____].

3.9 DEVICES WITH CONNECTION TO MULTIPLE IP NETWORKS

Except for Ethernet switches, do not use more than one physical connection to IP networks on the same device unless doing so is both required by the project specifications and the specific application is approved. If a device with multiple IP connections is required, provide a Multiple IP Connection Device Request using the Multiple IP Connection Device Request Schedule at http://www.wbdg.org/FFC/NAVGRAPH/graphtoc.pdf to request approval for each device.

3.10 SYSTEM AND COMMUNICATION PROTECTION

3.10.1 Denial of Service Protection, Process Isolation and Boundary Protection

****

NOTE: Implementation of boundary protection is typically outside the scope of the controls contractor. The site IT staff should implement boundary protection via rules (e.g. a firewall) isolating the control system from the wider network. This is true even for a control system which will be later integrated to a larger system; the field point of connection (FPOC) should be configured to allow the minimum traffic necessary for operation. Critical to this is the Cybersecurity Interconnection Schedule, which defines what traffic must be allowed through the boundary for the proper operation of the system.

Note that reducing the dependence on the network helps mitigate threats caused by a weak boundary defense.

****

{For Reference Only: This subpart (and its subparts) relates to SC-5, SC-39, SC-7(a); CCI-001093, CCI-002385, CCI-002386, CCI-002430, CCI-001097}

To the greatest extent practical, implement control logic in non-computer hardware and without reliance on the network.

[3.10.2 Cryptographic Protection

****

NOTE: With regard to cryptography, there are 3

possibilities to consider:
1. The control system contains no classified information and no cryptography is required. In that case, there are no UFGS requirements.
2. The control system contains no classified information, but the Authorizing Official has determined that cryptography is required. Select text requiring cryptography.
3. The control system contains classified information. First, confirm that the system truly needs to contain classified information - if this is only to fulfil some reporting requirement, consider removing the information from the CS and meeting the reporting requirement via some other means. If the requirement for cryptography cannot be eliminated, select text requiring cryptography.
In generally, the need for cryptography should be avoided, or at least minimized. (Note that even for systems where cryptography is required, it may not be required at every node and interconnection in the system.)

If cryptography is required, select whether to require it everywhere, only on the IP network, or only at specific locations within the system.
****

{For Reference Only: This subpart (and its subparts) relates to SC-13; CCIs: CCI-002449, CCI-002450}

For devices that have STIG/SRGs related to cryptographic protection (CCI-002450), comply with the requirements of those STIG/SRGs. Ensure that [all][IP][_____] network traffic is encrypted using NSA-approved cryptography; provision of digital signatures and hashing, and FIPS-validated cryptography.

]3.11 SYSTEM AND INTEGRATION INTEGRITY

3.11.1 Malicious Code Protection

{For Reference Only: This subpart (and its subparts) relates to SI-3(c); CCI-001241, CCI-002623}

For all computers installed under this project, install and configure malware protection software in accordance with the relevant STIGs.

[3.11.2 Information System Monitoring

****
NOTE: Delete this subpart unless specifically required for the project. If required, indicate requirements for the monitoring of the control system.
****

{For Reference Only: This subpart relates to SI-4 (a),(b); CCI-001253, CCI-002645}

[_____]

]3.12 FIELD QUALITY CONTROL

3.12.1 Tests

****

NOTE: Coordinate with the entity performing cybersecurity testing to determine support requirements for cybersecurity testing.

Some possible values to consider:

1) A control system with no IP devices: 1-2 days.

2) A control system with IP devices: 5 days

3) If the system includes a new front-end (server): +5 additional days

****

In addition to testing and testing support required by other Sections, provide a minimum of [_____] hours of technical support for cybersecurity testing of control systems.

-- End of Section --

SECTION 27 10 00.00 22

BUILDING TELECOMMUNICATIONS CABLING SYSTEM
06/17

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D709	(2016) Standard Specification for Laminated Thermosetting Materials

ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION (ECIA)

ECIA EIA/ECA 310-E	(2005) Cabinets, Racks, Panels, and Associated Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA S-83-596	(2016) Indoor Optical Fiber Cables
ICEA S-90-661	(2012) Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cables for Use in General Purpose and LAN Communications Wiring Systems Technical Requirements

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)

NECA/BICSI 568	(2006) Standard for Installing Building Telecommunications Cabling

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA WC 66	(2013) Performance Standard for Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pairs

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2017) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-1152	(2009) Requirements for Field Test

	Instruments and Measurements for Balanced Twisted-Pair Cabling
TIA-455-21	(1988a; R 2012) FOTP-21 - Mating Durability of Fiber Optic Interconnecting Devices
TIA-492AAAA	(2009b) 62.5-um Core Diameter/125-um Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
TIA-526-14	(2015c) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
TIA-526-7	(2015a) OFSTP-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
TIA-568-C.0	(2009; Add 1 2010; Add 2 2012) Generic Telecommunications Cabling for Customer Premises
TIA-568-C.1	(2009; Add 2 2011; Add 1 2012) Commercial Building Telecommunications Cabling Standard
TIA-568-C.2	(2009; Errata 2010; Add 2 2014; Add 1 2016) Balanced Twisted-Pair Telecommunications Cabling and Components Standards
TIA-568-C.3	(2008; Add 1 2011) Optical Fiber Cabling Components Standard
TIA-569	(2015d) Commercial Building Standard for Telecommunications Pathways and Spaces
TIA-570	(2012c) Residential Telecommunications Infrastructure Standard
TIA-606	(2012b; Add 1 2015) Administration Standard for the Telecommunications Infrastructure
TIA-607	(2011b) Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
TIA/EIA-598	(2014d) Optical Fiber Cable Color Coding
TIA/EIA-604-10	(2002a) FOCIS 10 Fiber Optic Connector Intermateability Standard - Type LC
TIA/EIA-604-12	(2000) FOCIS 12 Fiber Optic Connector Intermateability Standard Type MT-RJ

TIA/EIA-604-2	(2004b; R 2014) FOCIS 2 Fiber Optic Connector Intermateability Standard
TIA/EIA-604-3	(2004b; R 2014) Fiber Optic Connector Intermateability Standard (FOCIS), Type SC and SC-APC, FOCIS-3

U.S. FEDERAL COMMUNICATIONS COMMISSION (FCC)

FCC Part 68	Connection of Terminal Equipment to the Telephone Network (47 CFR 68)

UNDERWRITERS LABORATORIES (UL)

UL 1286	(2008; Reprint Feb 2015) Office Furnishings
UL 1666	(2007; Reprint Jun 2012) Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
UL 1863	(2004; Reprint Sep 2016) UL Standard for Safety Communication Circuit Accessories
UL 444	(2008; Reprint Apr 2015) Communications Cables
UL 467	(2013) Grounding and Bonding Equipment
UL 50	(2015) UL Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations
UL 514C	(2014; Reprint Dec 2014) Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 723	(2008; Reprint Aug 2013) Test for Surface Burning Characteristics of Building Materials
UL 969	(1995; Reprint Sep 2014) Standard for Marking and Labeling Systems

1.2 RELATED REQUIREMENTS

Section 01 33 00 SUBMITTAL PROCEDURES, Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and Section 33 82 00.00 22 TELECOMMUNICATIONS, OUTSIDE PLANT (OSP) apply to this section with additions and modifications specified herein.

Contact Camp Lejeune Base Telephone (aka Telecommunications Support Division or TSD)for special requirements on classified service cabling and color, unofficial service, under slab cabling, using water block, and any item not covered in this document.

Buildings with Special Network Requirements such as Secured Internet

Protocol, Classified networks, Commercial network, Charter cable, MCCS.org, Boingo, and Naval Blue Network may require additional guidance outside this specification. Secured areas or secured networks in non-secured areas may require Protected Distribution System which is also outside this specification. Classified networks may require shielded twisted pair, distinct color, and has separation requirements outside this specification, and shall be in accordance with current CNSSAM TEMPEST RED/BLACK Installation documentation. In these cases contact Telecommunications Support Division G-6 MCIEAST-MCB CAMLEJ for additional guidance at (910) 451-9439 or (910) 451-4760.

Contact AHJ for special requirements on classified service, unofficial service, under slab cabling, using water block, and any item not covered in this document.

1.3 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in this specification shall be as defined in TIA-568-C.1, TIA-568-C.2, TIA-568-C.3, TIA-569, TIA-606 and IEEE 100 and herein.

1.3.1 Main Distribution Frame (MDF)

A physical structure at a central location for terminating permanent backbone cables to interconnect with service provider (SP) equipment at the activity minimum point of presence. The MDF generally includes vendor specific components to support voice and data circuits, building surge protector assemblies, main cross connect blocks, equipment support frames, and fire rated plywood backboard. Depending upon local site conditions, the MDF and BDF may be the same space.

1.3.2 Building Distribution Frame (BDF)

A structure with terminations for connecting backbone, campus, and horizontal cabling. The BDF generally includes a cross connect, equipment support frame or lockable terminal cabinet, cable supports, and fire rated plywood backboard. The BDF shall include building protector assemblies when used for campus backbone or SP cabling.

1.3.3 Intermediate Distribution Frame (IDF)

An intermediate termination point for horizontal wiring and cross connections within telecommunications rooms. Shall be connected to MDF with both fiber and copper. Secure Internet Protocol (SIPR) vault or cabinet is considered an IDF.

1.3.4 Communications Room (CR) (telephone room TR or Distribution Room DR)

An enclosed space for communications equipment, terminations, and cross connect wiring for horizontal cabling. Telecommunications Room (TR) and Communications Room (CR) are used interchangeably in this section and are considered to have the same meaning.

1.3.5 Campus Distributor (CD)

A distributor from which the campus backbone cabling emanates. (International expression for main cross-connect (MC) also known as central

office or Area Distribution Node.)

1.3.6 Building Distributor (BD)

A distributor in which the building backbone (customer owned outside plant) cables terminate and at which connections to the campus backbone cables may be made. (International expression for intermediate cross-connect (IC).)

1.3.7 Floor Distributor (FD)

A distributor used to connect horizontal cable and cabling subsystems or equipment. (International expression for horizontal cross-connect (HC).)

1.3.8 Telecommunications Room (TR)

An enclosed space for housing telecommunications equipment, cable, terminations, and cross-connects. The room is the recognized cross-connect between the backbone cable and the horizontal cabling.

1.3.9 Entrance Facility (EF) (Telecommunications) (can be same as communications room)

An entrance to the building for both private and public network service cables (including wireless) including the entrance point at the building wall and continuing to the equipment room.

1.3.10 Equipment Room (ER) (Telecommunications) (can be same as communications room)

An environmentally controlled centralized space for telecommunications equipment that serves the occupants of a building. Equipment housed therein is considered distinct from a telecommunications room because of the nature of its complexity.

1.3.11 Open Cable

Cabling that is not run enclosed in a raceway as defined by NFPA 70. This refers to cabling that is "open" to the space in which the cable has been installed and is therefore exposed to the environmental conditions associated with that space, such as wire basket tray, cable tray, J-hooks, D-rings, or bridal rings. D rings should only be used in the communications room for cable management and J-hooks/bridal rings shall not be used.

1.3.12 Open Office

A floor space division provided by furniture, moveable partitions, or other means instead of by building walls, normally over 100 square feet.

1.3.13 Pathway

A physical infrastructure utilized for the placement and routing of telecommunications cable.

1.4 SYSTEM DESCRIPTION

The building telecommunications cabling and pathway system shall include

permanently installed backbone and horizontal cabling, horizontal and backbone pathways, service entrance facilities, work area pathways, telecommunications outlet assemblies, conduit, raceway, and hardware for splicing, terminating, and interconnecting cabling necessary to transport telephone data, and other communications systems (including LAN A/V, intercom, PA, CATV, CCTV, and WiFi) between equipment items in a building. The horizontal system shall be wired in a star topology from the telecommunications work area to the floor distributor/IDF or building distributor/MDF or campus distributor or communications room at the center or hub of the star. The backbone cabling and pathway system includes intrabuilding and interbuilding interconnecting cabling, pathway, and terminal hardware. The intrabuilding backbone provides connectivity from the floor distributors to the building distributors or to the campus distributor and from the building distributors to the campus distributor as required. The backbone system shall be wired in a star topology with the campus distributor (Area Distribution Node) at the center or hub of the star. The interbuilding backbone system provides connectivity between the campus distributors and is specified in Section 33 82 00.00 22 TELECOMMUNICATIONS OUTSIDE PLANT (OSP). Provide telecommunications pathway systems referenced herein as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. The telecommunications contractor must coordinate with MCB CL Base Telephone (TSD) concerning access to and configuration of telecommunications spaces. The telecommunications contractor may be required to coordinate work effort within the telecommunications spaces with the electrical sub and general contractor, ROICC and MCB CL Base Telephone (TSD).

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Telecommunications drawings; G

Telecommunications Space Drawings; G

In addition to Section 01 33 00 SUBMITTAL PROCEDURES, provide shop drawings in accordance with paragraph SHOP DRAWINGS.

SD-03 Product Data

Telecommunications cabling (backbone and horizontal); G

Patch panels; G

Telecommunications outlet/connector assemblies; G

Equipment support frame; G

Connector blocks; G

Submittals shall include the manufacturer's name, trade name, place of manufacture, and catalog model or number. Include performance and characteristic curves. Submittals shall also include applicable federal, military, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified in paragraph REGULATORY REQUIREMENTS and as required in Section 01 33 00 SUBMITTAL PROCEDURES.

SD-06 Test Reports

Telecommunications cabling testing; G

SD-07 Certificates

Telecommunications Contractor Qualifications; G

Key Personnel Qualifications; G

Manufacturer Qualifications; G

Test plan; G

SD-09 Manufacturer's Field Reports

Factory reel tests; G

SD-10 Operation and Maintenance Data

Telecommunications cabling and pathway system Data Package 5; G

SD-11 Closeout Submittals

Record Documentation; G

1.5.1 Additional Submittal Requirements

All submittals of material, equipment and design must be approved by the Telecommunications Support Division (TSD) prior to installing any telecommunications wiring, equipment, or power to support communications.

1.6 QUALITY ASSURANCE

1.6.1 Shop Drawings

In exception to Section 01 33 00 SUBMITTAL PROCEDURES, submitted plan drawings shall be a minimum of 11 by 17 inches in size using a minimum scale of 1/8 inch per foot. Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size, and capacity. Submittals shall also include

applicable federal, military, industry, and technical society publication references.

1.6.1.1 Telecommunications Drawings

Provide registered communications distribution designer (RCDD) approved, drawings in accordance with TIA-606. The identifier for each termination and cable shall appear on the drawings. Drawings shall depict final telecommunications installed wiring system infrastructure in accordance with TIA-606. The drawings should provide details required to prove that the distribution system shall properly support connectivity from the EF telecommunications and ER telecommunications, CD's, BD's, and FD's to the telecommunications work area outlets. Provide a plastic laminated schematic of the as-installed telecommunications cable system showing cabling, CD's, BD's, FD's, and the EF and ER for telecommunications keyed to floor plans by room number. Mount the laminated schematic in the EF telecommunications space as directed by the Contracting Officer. The following drawings shall be provided as a minimum:

a. T1 - Layout of complete building per floor - Building Area/Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways. Layout of complete building per floor. The drawing indicates location of building areas, serving zones, vertical backbone diagrams, telecommunications rooms, access points, pathways, grounding system, and other systems that need to be viewed from the complete building perspective.

b. T2 - Serving Zones/Building Area Drawings - Drop Locations and Cable Identification (ID'S). Shows a building area or serving zone. These drawings show drop locations, telecommunications rooms, dedicated electrical, access points and detail call outs for common equipment rooms and other congested areas.

c. T4 - Typical Detail Drawings - Faceplate Labeling, Firestopping, Americans with Disabilities Act (ADA), Safety, Department of Transportation (DOT). Detailed drawings of symbols and typicals such as faceplate labeling, faceplate types, faceplate population installation procedures, detail racking, and raceways.

1.6.1.2 Telecommunications Space Drawings

Provide T3 drawings in accordance with TIA-606 that include telecommunications rooms plan views, pathway layout (cable tray, racks, ladder-racks, etc.), mechanical/electrical layout, and cabinet, rack, backboard and wall elevations. Drawings shall show layout of applicable equipment including incoming cable stub or connector blocks, building protector assembly, outgoing cable connector blocks, mechanical/electrical, patch panels and equipment spaces and cabinet/racks. Drawings shall include a complete list of equipment and material, equipment rack details, proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operation. Drawings may also be an enlargement of a congested area of T1 or T2 drawings.

1.6.2 Telecommunications Contractor Qualifications

Work under this section shall be performed by and the equipment shall be provided by the approved telecommunications contractor and key personnel.

Qualifications shall be provided for: the telecommunications system contractor, the telecommunications system installer, and the supervisor (if different from the installer). A minimum of 30 days prior to installation, submit documentation of the experience of the telecommunications contractor and of the key personnel.

1.6.2.1 Telecommunications Contractor

The telecommunications contractor shall be a firm which is regularly and professionally engaged in the business of the applications, installation, and testing of the specified telecommunications systems and equipment. The telecommunications contractor shall demonstrate experience in providing successful telecommunications systems within the past 3 years of similar scope and size. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for the telecommunications contractor. Also IAW Section on QC Specialists; a Telecommunications Systems QC Specialist may be required on site, full time with 10 years minimum experience in telecom installation and experience. Specialist shall be very familiar with UFGS Divisions 27, 28, 33 concerning communications systems work and installation.

1.6.2.2 Key Personnel

Provide key personnel who are regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. There may be one key person or more key persons proposed for this solicitation depending upon how many of the key roles each has successfully provided. Each of the key personnel shall demonstrate experience in providing successful telecommunications systems within the past 3 years.

Supervisors and installers assigned to the installation of this system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel.

In lieu of BICSI certification, supervisors and installers assigned to the installation of this system or any of its components shall have a minimum of 3 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for each of the key personnel. Documentation for each key person shall include at least two successful system installations provided that are equivalent in system size and in construction complexity to the telecommunications system proposed for this solicitation. Include specific experience in installing and testing telecommunications systems and provide the names and locations of at least two project installations successfully completed using optical fiber and copper telecommunications cabling systems. All of the existing telecommunications system installations offered by the key persons as successful experience shall have been in successful full-time service for at least 18 months prior to the issuance date for this solicitation. Provide the name and role of the key person, the title, location, and completed installation date of the referenced project, the referenced project owner point of contact information including name, organization, title, and telephone number, and

generally, the referenced project description including system size and construction complexity.

Indicate that all key persons are currently employed by the telecommunications contractor, or have a commitment to the telecommunications contractor to work on this project. All key persons shall be employed by the telecommunications contractor at the date of issuance of this solicitation, or if not, have a commitment to the telecommunications contractor to work on this project by the date that the bid was due to the Contracting Officer.

Note that only the key personnel approved by the Contracting Officer in the successful proposal shall do work on this solicitation's telecommunications system. Key personnel shall function in the same roles in this contract, as they functioned in the offered successful experience. Any substitutions for the telecommunications contractor's key personnel requires approval from The Contracting Officer.

1.6.2.3 Minimum Manufacturer Qualifications

Cabling, equipment and hardware manufacturers shall have a minimum of 3 years experience in the manufacturing, assembly, and factory testing of components which comply with TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3.

1.6.3 Test Plan

Provide a complete and detailed test plan for the telecommunications cabling system including a complete list of test equipment for the components and accessories for each cable type specified, 60 days prior to the proposed test date. Include procedures for certification, validation, sample report, and testing.

1.6.4 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70, manufacturer recommendations/installation manual, best known industry practices, and industry standards, unless more stringent requirements are specified or indicated.

1.6.5 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section. Modification of manufacturer's standard products such as painting

faceplates is not authorized.

1.6.5.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.6.5.2 Material and Equipment Manufacturing Date

Products manufactured more than 1 year prior to date of delivery to site shall not be used, unless specified otherwise.

1.7 DELIVERY AND STORAGE

Provide protection from weather, moisture, extreme heat and cold, dirt, dust, and other contaminants for telecommunications cabling and equipment placed in storage.

1.8 ENVIRONMENTAL REQUIREMENTS

Connecting hardware shall be rated for operation under ambient conditions of 32 to 140 degrees F and in the range of 0 to 95 percent relative humidity, noncondensing. All telecommunications spaces shall follow TIA-569 design.

1.9 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.10 MAINTENANCE

1.10.1 Operation and Maintenance Manuals

Commercial off the shelf manuals shall be furnished for operation, installation, configuration, and maintenance of products provided as a part of the telecommunications cabling and pathway system, Data Package 5. Submit operations and maintenance data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA and as specified herein not later than 2 months prior to the date of beneficial occupancy. In addition to requirements of Data Package 5, include the requirements of paragraphs TELECOMMUNICATIONS DRAWINGS, TELECOMMUNICATIONS SPACE DRAWINGS, and RECORD DOCUMENTATION. Ensure that these drawings and documents depict the as-built configuration. Also provide copies of all telecommunications manuals to TSD.

1.10.2 Record Documentation

Provide T5 drawings including documentation on cables and termination hardware in accordance with TIA-606. T5 drawings shall include schedules to show information for cut-overs and cable plant management, patch panel layouts and cover plate assignments, cross-connect information and connecting terminal layout as a minimum. T5 drawings shall be provided in hard copy format and on electronic media (PDF and AutoCAD 2016 format).

Provide the following T5 drawing documentation as a minimum:

a. Cables - A record of installed cable shall be provided in accordance with TIA-606. The cable records shall include only the required data fields in accordance with TIA-606. Include manufacture date of cable with submittal.

b. Termination Hardware - A record of installed patch panels, cross-connect points, distribution frames, terminating block arrangements and type, and outlets shall be provided in accordance with TIA-606. Documentation shall include the required data fields as a minimum in accordance with TIA-606.

PART 2 PRODUCTS

2.1 COMPONENTS

Components shall be UL or third party certified. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations, submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard. Provide a complete system of telecommunications cabling and pathway components using star topology. Provide support structures and pathways, complete with outlets, cables, connecting hardware and telecommunications cabinets/racks. Cabling and interconnecting hardware and components for telecommunications systems shall be UL listed or third party independent testing laboratory certified, and shall comply with NFPA 70 and conform to the requirements specified herein.

2.2 TELECOMMUNICATIONS PATHWAY

Provide telecommunications pathways in accordance with TIA-569 and as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Provide system furniture pathways in accordance with UL 1286.

2.2.1 Pathways Aboard Camp Lejeune Greater Area, Including MCAS New River

Pathway shall be conduit, cable tray, or modular access flooring that provides protection for cabling. Under floor duct, free laying and wireway shall not be used. Cantilever-type center hung tray or Poke-Thru devices shall not be used. J-hooks/D-rings/bridal rings and other open face type cable pathways are not authorized except in minor renovations or to continue like existing system. Provide grounding and bonding as required by TIA-607. Cable tray wiring shall comply with NFPA 70. All conduits entering the communications room should be grouped and consolidated. Conduits can be "Home Run" or stubbed to cable tray using approved pull boxes after every 180 degrees of bends, all shall have bonding bushing/plastic insert, and shall extend down from the ceiling to 3 to 4 inches of the ladder rack or 3 to 4 inches onto the backboard, and will be bonded to the TMGB or TGB by a minimum number 6 green sheathed stranded conductors. All penetrations will be sealed in accordance with code (fire-stopping). A minimum of two 3 inch conduits overhead will be

installed between the main communications room and other communication rooms (IDFs), if installed below slab they are considered OSP and fall under Section 33 82 00.00 22 TELECOMMUNICATIONS, OUTSIDE PLANT (OSP). Distribution Enclosures shall not be used as a pull box and will only be approved for their intended use.

2.2.2 Work area Pathways

Comply with TIA-569, except minimum 1 1/4 inch diameter conduit will be used. System furniture pathways shall comply with UL 1286. In system furniture that blocks access to or is distant from the communications wall outlets: each system furniture desk/cubical shall be equipped with system furniture communications outlets that are plugged into the communications wall outlets. All ports should be extended into the furniture.

2.2.3 Pull Boxes

Construct of galvanized sheet steel with screw-fastened covers. Minimum size of boxes shall be not less than 5 inches wide by 5 inches in length by 2 7/8 inches deep for individual 1 1/4 inch diameter conduit; minimum size of boxes shall be not less than 12"W x 48"L x 5"D for 3" conduit, 15"W x 60"L x 8"D for 4" conduit per TIA-569. Provide pull boxes where length of conduit exceeds 100 feet or where there are more than two 90 degree bends, or equivalent. Align conduit ends on opposite sides of pull boxes as in a pull through, do not turn or change direction in pull boxes. Provide pull boxes in straight lengths of conduit. Electrical pull points, LC, LB, condulets, distribution enclosures, and splice boxes, are not pull boxes and are not authorized.

2.3 TELECOMMUNICATIONS OUTLET BOXES

Communications outlet boxes shall be placed in all work areas and any areas that can be converted to work areas; so any furniture package configuration will have a connection with a 6' base cord. Recommended practice is 6" to the left or right of (the outside edge of) electrical outlet box in workable office areas or any area that could be converted into workable office area such as a large storage closet; also any conference room should have one floor box and one box just above the ceiling. Boxes shall be standard type 5 inches square by 2-7/8 inches deep for CAT6 with 1-1/4 inch diameter side knock-outs, with a single gang plaster ring. Mount flush in finished walls or just above ceiling tile at height indicated by drawings. Outlet boxes for wall-mounted telephones shall be 2 by 4 by 2-1/8 inches deep with 1 CAT6 cable terminated in a standard CAT6 studded wall phone plate; mounted at ADA required height. Outlet boxes for work counter area shall be mounted at a height 48 inches above finished floor. Outlet boxes installed for CCTV, Wireless access points, and CATV shall contain 2 CAT 6 cables. Outlet boxes installed in floor shall be communications floor boxes large enough to support a surge of users with proper cable protection and ports that are in multiples of 4 and not parallel to the floor. For raised access flooring, boxes shall be below the floor with an access cover flush with the floor. Tombstones or boxes below floor that require removal of the floor panels to access are not allowed. Floor boxes and under slab cabling should not be used on the first floor or in wet areas. Tele electric poles or furniture managed pathways fed from above the wet area should be used. Multi-user Telecommunications Outlet Assembly i.e. Multimedia Outlet Assemblies (MUTOA) should be placed where best suited for the furniture used in open office spaces and maintain clearance more than 6" from electrical or 2nd MUTOA for proper operation.

2.4 TELECOMMUNICATIONS CABLING

Cabling shall be UL listed for the application and shall comply with TIA-568-C.0, TIA-568-C.1, TIA-568-C.2, TIA-568-C.3 and NFPA 70. Provide a labeling system in accordance with the manufacturer and local AHJ guidance for cabling as required by TIA-606 and UL 969. Confirm labeling is compatible with Base Telephone requirements. Ship cable on reels or in boxes bearing manufacture date for unshielded/shielded twisted pair (UTP/STP) in accordance with ICEA S-90-661 and optical fiber cables in accordance with ICEA S-83-596 for all cable used on this project. Cabling manufactured more than 12 months prior to date of installation shall not be used.

2.4.1 Backbone Cabling

2.4.1.1 Backbone Copper

Copper backbone and riser cable shall be solid conductor, 24 AWG, 100 ohm, 25 to 100 -pair, Category 3, UTP, in accordance with ICEA S-90-661, TIA-568-C.1, TIA-568-C.2 and UL 444, formed into 25 pair binder groups covered with a gray thermoplastic jacket and overall metallic shield if required for additional protection. Cable shall be imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) at regular length marking intervals in accordance with ICEA S-90-661. Sufficient pair count of CAT 3 or 5, as required shall be installed between the MDF and each of the IDF's. Provide plenum (CMP), riser (CMR), or general purpose (CM or CMG) communications rated cabling in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70. Any backbone copper run in under slab conduit shall be rated for outdoor use in accordance with AHJ and have lightning protection at both ends.

2.4.1.2 Backbone Optical Fiber

Provide in accordance with ICEA S-83-596, TIA-568-C.3, UL 1666 and NFPA 70. Cable shall be imprinted with fiber count, fiber type and aggregate length at regular intervals not to exceed 40 inches.

Provide the number of strands indicated, (but not less than 12 strands between the main telecommunication room and each of the other telecommunication rooms or secure racks), of single-mode(OS1), tight buffered fiber optic cable.

Provide tight buffered fiber optic multimode, 62.5/125-um diameter(OM1) cable, conforming to TIA-492AAAA as indicated (but not less than 12 strands of multimode between the main communication room and each of the other communications rooms and secure racks).

Provide plenum (OFNP), riser (OFNR), or general purpose (OFN or OFNG) rated non-conductive, fiber optic cable in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70. The cable cordage jacket, fiber, unit, and group color shall be in accordance with TIA/EIA-598.

Provide plenum (OFNP), riser (OFNR), or general purpose (OFN or OFNG) rated non-conductive, fiber optic cable in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70. The cable cordage jacket, fiber, unit, and group color shall be in accordance

with TIA/EIA-598.

2.4.2 Horizontal Cabling

Provide horizontal cable in compliance with NFPA 70 and performance characteristics in accordance with TIA-568-C.1.

2.4.2.1 Horizontal Copper

Provide a minimum of four horizontal copper cables to each work area outlet (faceplate), UTP, 100 ohm in accordance with TIA-568-C.2, UL 444, ANSI/NEMA WC 66, ICEA S-90-661. Provide four each individually twisted pair, minimum size 24 AWG conductors, Category 6 or 6A, with a green thermoplastic jacket for all unclassified ports (color and cable type for classified services shall be in accordance with current CNSSAM TEMPEST RED/BLACK Installation documentation including Table 1 below). Cable shall be imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) and length marking at regular intervals in accordance with ICEA S-90-661. Provide plenum (CMP), riser (CMR), or general purpose (CM or CMG) communications rated cabling in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70. Cables installed in conduit within and under slabs are not recommended but can be used if approved by local AHJ and shall be UL listed and labeled for wet locations in accordance with NFPA 70. Contact AHJ for special requirements on classified service, unofficial service, under slab cabling, using water block, and any item not covered in this document.

Table 1 - (U/FOUO) Cable Color Scheme

Classification Level	Cable Color
Unclassified	Green
Collateral Confidential	Blue
Collateral Secret	Red
Collateral Top Secret	Orange
Special Category	Yellow

2.4.2.2 Horizontal Optical Fiber

Provide optical fiber horizontal cable in accordance with ICEA S-83-596 and TIA-568-C.3. Cable shall be tight buffered, multimode, 62.5.125-um diameter, OM1 or single-mode, 8/125-um diameter, OS1. Cable shall be imprinted with manufacturer, flammability rating and fiber count at regular intervals not to exceed 40 inches.

Provide plenum (OFNP), riser (OFNR), or general purpose (OFN or OFNG) rated non-conductive, fiber optic cable in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70.

Cables installed in conduit within and under slabs shall be UL listed and labeled for wet locations in accordance with NFPA 70. The cable jacket shall be of single jacket construction with color coding of cordage jacket, fiber, unit, and group in accordance with TIA/EIA-598.

2.4.3 Work Area Cabling

2.4.3.1 Work Area Copper

Provide work area copper cable in accordance with TIA-568-C.2, with a green on odd numbered and green on even numbered thermoplastic jacket for unclassified services (classified color code shall be in accordance with current CNNSSAM TEMPEST RED/BLACK Installation documentation).

Communications CAT6 twisted pair shall have a minimum of 12 inch slack cable loosely coiled into the communications outlet boxes. Minimum manufacturer's bend radius for each type of cable shall not be exceeded. All communications work area outlet boxes should have 4 cables to a double gang box (no rough in or empty conduit for future use allowed).

2.4.3.2 Work Area Optical Fiber

Provide optical work area cable in accordance with TIA-568-C.3.

2.5 TELECOMMUNICATIONS SPACES

Provide connecting hardware and termination equipment in the telecommunications entrance facility and telecommunication equipment rooms to facilitate installation as shown on design drawings for terminating and cross-connecting permanent cabling. Provide telecommunications interconnecting hardware color coding in accordance with TIA-606.

Space shall be a minimum 8' x 10' unless a local waiver is provided by the AHJ (authority having jurisdiction) which is the Telecommunications Support Division (TSD) aboard Camp Lejeune. Communications room could be much larger depending on building size, usable square footage served, and customer requirements. Communications rooms shall be centrally located unless there are multiple Communication rooms, and then each room should be centrally located within the area served. Communications Rooms shall not share or be on a wet wall. Generally, the space should be sized to approximately 1.1 percent of the area it serves. For example, a 10,000 sq feet (929 sq m) area should be served by a minimum of one 10 ft x 11 feet (3 m x 3.4 m) Communications room. Access to Rooms shall be from a common area such as a hallway and door shall swing out. Additional/Multiple communications rooms are required if the usable floor space to be served exceeds 10,000 square feet, or the cable length between the horizontal cross-connect and the communications outlet, including slack and vertical distance, exceeds 295 feet. Multiple communications rooms and IDFs shall be stacked and connected by a minimum of two 3 inch conduits overhead. If under slab it is considered Outside Plant and 3 way 4" shall be used per Section 33 82 00.00 22 TELECOMMUNICATIONS, OUTSIDE PLANT (OSP) with proper surge protection at both ends. The minimum clear height in the room shall be 2.4 m (8 ft) without obstructions. The height between the finished floor and the lowest point of the ceiling should be a minimum of 3 m (10 ft) to accommodate overhead pathways. The flooring shall be sealed concrete to reduce dust and static electricity; no carpet or VCT tile. Two separate dedicated 20 amp electrical outlet will be installed above or behind but not attached to each communications equipment rack. Dedicated

outlets and conduits shall be installed on the longest farthest wall from the door, same wall as the communications backboard. OSP conduits shall be to the far left of the communications backboard while facing it. There should not be an electrical panel within the communications room unless it serves only the room, and it should be located as close to the door as possible. The room requires a lockable door keyed or key padded to restrict access to MCIEAST-MCB G-6 personnel only. Room shall not have any windows or skylights. At least one wall, where the point of presence is located, and two adjacent walls should be covered with fire rated plywood backboard for mounting equipment; additional boards may be needed for mounting additional equipment. Light, as measured within the communications room, should be a minimum of 500 lx (50 foot-candles). Lighting design should seek to minimize shadows within the telecommunications room (minimum two light fixtures). Equipment not related to the support of the communications room (e.g., piping, ductwork, pneumatic tubing) shall not be installed in, pass through, or enter the telecommunications room. Equipment related to the support of the communications room (e.g., piping, ductwork, HVAC drains, dedicated power) shall be installed in support of the communications equipment and not pose a drip/moisture/trip hazard and be usable as intended.

2.5.1 Backboards

Provide void-free, interior grade A-C plywood 3/4 inch thick 4 by 8 feet as indicated. Backboards shall be fire rated by manufacturing process. Fire stamp shall be clearly visible. Backboards shall be provided on a minimum of one telecom wall, two adjacent walls, and anywhere mounting is needed in the telecommunication spaces.

2.5.2 Equipment Support Frame

Provide in accordance with ECIA EIA/ECA 310-E and UL 50. Steel construction shall be treated to resist corrosion.

a. Bracket, wall mounted (for buildings with very low jack/pair count and no secured electronic equipment requirement), 8 gauge aluminum minimum. Provide hinged bracket compatible with 19 inches panel mounting and must be in a secured communications room.

b. Racks, wall or floor mounted modular type, 16 gauge steel construction minimum, treated to resist corrosion. Provide rack with vertical and horizontal cable management channels, top and bottom cable troughs, grounding lug and a surge protected power strip with 6 duplex 20 amp receptacles. Racks shall be large enough to support all telephone/data equipment required plus 25 percent spare and shall have a maximum of 7' height. Rack shall be compatible with 19 inches panel mounting and must be in a secured communications room.

c. Cabinets, freestanding modular type, 16 gauge steel or 11 gauge aluminum construction minimum, treated to resist corrosion. Cabinet shall have removable and lockable side panels, front and rear doors, and have adjustable feet for leveling. All cabinets shall be keyed to current TSD key and large enough to support all telephone/data equipment required in the building plus 25% for future expansion. Dedicated electrical outlets should be installed within the cabinet. A backboard for mounting equipment is still needed when a cabinet is installed. Cabinet shall be mounted to the far right of the board to allow space for OSP cable, lightning protection, and bus bar to be

installed on the board's far left. Dedicated power shall be within the cabinet on the backboard. Cabinet shall be vented in the roof and rear door. Cabinet shall have cable access in the roof and base and be compatible with 19 inches panel mounting. Provide cabinet with grounding bar, 550 CFM fan with filter and a surge protected power strip with 6 duplex 20 amp receptacles. All cabinets shall be keyed alike.

d. Cabinets, wall-mounted modular type, 16 gauge steel or 11 gauge aluminum construction minimum, treated to resist corrosion. Cabinet shall have have lockable front and rear doors, louvered side panels, 250 CFM fan, ground lug, and top and bottom cable access. Cabinets shall be no smaller than 24"W X 48"H X 30"D, shall be keyed to current TSD key, and large enough to support all telephone/data equipment required in the building plus 25% for future expansion. Dedicated electrical outlets should be installed within the cabinet. A backboard for mounting equipment is still needed when a cabinet is installed. Cabinet shall be mounted to the far right of the board to allow space for OSP cable, lightning protection, and bus bar to be installed on the board's far left. Cabinet shall be compatible with 19 inches panel mounting. All cabinets shall be keyed alike. A surge protected power strip with 6 duplex 20 amp receptacles shall be provided within the cabinet.

2.5.3 Connector Blocks

Voice riser shall be terminated on angled insulation displacement connector (IDC), Type 110, 50 pair, 89D style mounted blocks, compatible with industry standard 110 blade punch down tool, designed for Category 3 and higher systems. Provide 50 pair blocks for the number of riser and backbone cables terminated plus 25 percent spare. Also provide sufficient blocks for cross connects for all IDFs. Blocks shall be mounted on an 89D style bracket on a frame, in rack or in cabinet.

2.5.4 Building Protector Assemblies

Building protector assembly is required on all OSP cables and shall have 710 type connector blocks for connection to the exterior cable at full capacity. M150-66 type IDC for connection to the voice cross connect blocks. 110 type IDC is not approved on building protector assembly. For Central office Area Distribution Nodes a R399 type central office protector shall be used.

2.5.5 Cable Guides

Provide cable guides specifically manufactured for the purpose of routing cables, wires and patch cords horizontally and vertically on 19 inches equipment racks, cabinets, and telecommunications backboards. Cable guides of ring or bracket type devices mounted on rack, cabinet, panels, and backboard for horizontal cable management and individually mounted for vertical cable management. Mount cable guides with screws, or nuts and lockwashers. Cable guides are not to be used outside of the communications room.

2.5.6 Patch Panels

Provide ports for the number of horizontal and backbone cables terminated on the panel plus 25 percent spare. Provide pre-connectorized SC type

optical fiber and CAT 6 copper patch cords for patch panels. Provide patch cords as complete assemblies of various appropriate lengths and with matching connectors as specified. Provide fiber optic patch cables with crossover orientation in accordance with TIA-568-C.3. Patch cords shall meet minimum performance requirements specified in TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3 for cables, cable length and hardware specified. Classified service may require shielded jack sets and panels as approved by AHJ.

2.5.6.1 Modular to 110 Block Patch Panel

Provide in accordance with TIA-568-C.1 and TIA-568-C.2. Panels shall be third party verified and shall comply with EIA/TIA Category 6/6A requirements. Panel shall be constructed of 0.09 inches minimum aluminum and shall be cabinet/rack mounted and compatible with an ECIA EIA/ECA 310-E 19 inches equipment rack. Panel shall provide 48 non-keyed, 8-pin modular dual molded (8P8C) ports, wired to T568A. Patch panels shall terminate the building cabling on Type 110 IDCs and shall utilize a printed circuit board interface. The rear of each panel shall have incoming cable strain-relief and routing guides. DO NOT USE ZIP TIES. Panels shall have each port factory numbered and be equipped with laminated plastic nameplates above each port.

2.5.6.2 Fiber Optic Patch Panel

Provide panel for maintenance and cross-connecting of optical fiber cables. Panel shall be constructed of 16 or 18 gauge steel or 11 gauge aluminum minimum and shall be cabinet/rack mounted and compatible with a ECIA EIA/ECA 310-E 19 inches equipment rack. Each panel shall provide multimode/single-mode adapters as required in duplex SC in accordance with TIA/EIA-604-3 with zirconia ceramic alignment sleeves. Provide dust cover for unused adapters. The rear of each panel shall have a cable management tray a minimum of 8 inches deep with removable cover, incoming cable strain-relief and routing guides. Panels shall have each adapter factory numbered and be equipped with laminated plastic nameplates above each adapter. When populating the panel working left to right start with OSP feed, SM ISO to IDF, MM ISO to IDF, lastly row to row within same comm room.

2.5.7 Optical Fiber Distribution Panel

Cabinet/rack mounted optical fiber distribution panel (OFDP) shall be constructed in accordance with ECIA EIA/ECA 310-E utilizing 16 or 18 gauge steel or 11 gauge aluminum minimum. Panel shall be divided into two sections, distribution and user. Distribution section shall have strain relief, routing guides, splice tray and shall be lockable. User section shall have a cover for patch cord protection. Each panel shall provide multimode and single-mode pigtails and adapters as required. Provide adapters as duplex SC with zirconia ceramic alignment sleeves. Provide dust covers for adapters. Provide patch cords as specified in the paragraph PATCH PANELS. When populating the panel working left to right start with OSP feed, SM ISO to IDF, MM ISO to IDF, lastly row to row within same communications room.

2.6 TELECOMMUNICATIONS OUTLET/CONNECTOR ASSEMBLIES

2.6.1 Outlet/Connector Copper

Outlet/connectors shall comply with FCC Part 68, TIA-568-C.1, and

TIA-568-C.2. UTP outlet/connectors shall be UL 1863 listed, non-keyed, 8-pin modular, dual molded 8P8C, constructed of high impact rated thermoplastic housing and shall be third party verified and shall comply with TIA-568-C.2 Category 6 requirements. Provide indicated color (normally ivory or white at work area and black in communications room). Should match electrical face plate color and type. Outlet/connectors provided for UTP cabling shall meet or exceed the requirements for the cable provided. Outlet/connectors shall be terminated using a Type 110 IDC PC board connector, color-coded for both T568A and T568B wiring. Each outlet/connector shall be wired T568A. UTP outlet/connectors shall comply with TIA-568-C.2 for 750 mating cycles. UTP outlet/connectors installed in outdoor or marine environments shall be jell-filled type containing an anti-corrosive, memory retaining compound. Shielded STP cable outlet connectors differ and are used in secured areas, coordinate with AHJ.

2.6.2 Optical Fiber Adapters(Couplers)

Provide optical fiber adapters suitable for duplex SC in Accordance with TIA/EIA-604-3 with zirconia ceramic alignment sleeves, as indicated. Provide dust cover for adapters. Optical fiber adapters shall comply with TIA-455-21 for 500 mating cycles.

2.6.3 Optical Fiber Connectors

Provide in accordance with TIA-455-21. Optical fiber connectors shall be duplex SC in accordance with TIA/EIA-604-3 with zirconia ceramic ferrule, epoxyless crimp style compatible with 62.5/125 multimode and 8/125 single-mode fiber. The connectors shall provide a maximum attenuation of 0.3 dB at 850/1300 and 1310/1550 nm with less than a 0.2 dB change after 500 mating cycles.

2.6.4 Cover Plates

Telecommunications cover plates shall comply with UL 514C, and TIA-568-C.1, TIA-568-C.2, ; flush or oversized design constructed of high impact thermoplastic material, ivory or white in color to match color of receptacle/switch cover plates specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Color may be different for classified networks, Red and Grey. Provide labeling in accordance with the paragraph LABELING in this section. Additionally, it shall be labeled as to its function with a green computer icon on all even ports and a green phone icon on all the odd ports for unclassified service (classified color code shall be in accordance with current CNNSSAM TEMPEST RED/BLACK Installation documentation).

2.7 MULTI-USER TELECOMMUNICATIONS OUTLET ASSEMBLY (MUTOA)

Provide MUTOA(s) in accordance with TIA-568-C.1. Ensure proper separation from other networks and power.

For Modular Furniture, provide horizontal cabling from the MUTOA to an adaptor plate in the Modular Furniture. The MUTOA should be limited to serving a maximum of six work areas with 2 cables each for a total of 12 cables.

2.8 TERMINAL CABINETS

Construct of zinc-coated sheet steel, 36 by 24 by 6 inches deep, as indicated. Trim shall be fitted with hinged door and locking latch. Doors shall be maximum size openings to box interiors. Boxes shall be provided with 5/8 inch backboard with two-coat varnish finish. Match trim, hardware, doors, and finishes with panelboards. Provide label and identification systems for telecommunications wiring and components consistent with TIA-606.

2.9 GROUNDING AND BONDING PRODUCTS

Provide in accordance with UL 467, TIA-607, and NFPA 70. Components shall be identified as required by TIA-606. Provide ground rods, bonding conductors, and grounding busbars as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. The preferred ground for the Telephone Main Grounding Bus (TMGB) bar will be to the Main electrical Distribution Panel (MDP) bus bar and building steel. In most cases, but not all; a #6 AWG bonding conductor is recommended for telecommunications. All grounding and bonding conductors within the Telecommunications room will be green sheathed copper conductor, stranded, and labeled as suitable for use as such and tagged "DO NOT REMOVE". All grounding and bonding conductors running out of the Telecommunications room should be protected in conduit or attached to the outside of the cable tray and sized according to references. The minimum size of the TMGB shall be no smaller than 4" by 10" by 1/4 inch thick; bus bar should be factory made and factory drilled, not fabricated or drilled onsite. All bonding and grounding terminations shall be irreversible and secured with a double hole crimp termination. Do not exceed minimum bend radius on bonding and grounding conductors. Mount Bus Bar to far left of telecomm backboard at approximately 70" AFF.

2.10 FIRESTOPPING MATERIAL

Provide as specified in Section 07 84 00 FIRESTOPPING.

2.11 MANUFACTURER'S NAMEPLATE

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.12 FIELD FABRICATED NAMEPLATES

ASTM D709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inches thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inches high normal block style.

2.13 TESTS, INSPECTIONS, AND VERIFICATIONS

2.13.1 Factory Reel Tests

Provide documentation of the testing and verification actions taken by manufacturer to confirm compliance with TIA-568-C.1, TIA-568-C.2,

TIA-568-C.3, TIA-526-7 for single mode optical fiber, and TIA-526-14 for multimode optical fiber cables.

PART 3 EXECUTION

3.1 INSTALLATION

Install telecommunications cabling and pathway systems, including the horizontal and backbone cable, pathway systems, telecommunications outlet/connector assemblies, and associated hardware in accordance with NECA/BICSI 568, TIA-568-C.1, TIA-568-C.2, TIA-568-C.3, TIA-569, NFPA 70, manufacturer instructions, current industry best practices, and UL standards as applicable. Provide cabling in a star topology network. Provide residential cabling in a star wiring architecture from the distribution device as required by TIA-570. Pathways and outlet boxes shall be installed as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Standard type 5" x 5" x 2 7/8" square box with a single gang plaster ring shall be used except in concrete or concrete masonry units where a standard 4 11/16" square or a floor box will be used. Mount flush in finished walls at height indicated by drawings and with proper clearances from other networks and power systems. Depth of boxes shall be large enough to allow manufacturer's recommended conductor bend radii, normally 2 7/8" depth. Install telecommunications cabling with copper media in accordance with the following criteria to avoid potential electromagnetic interference between power and telecommunications equipment. The interference ceiling shall not exceed 3.0 volts per meter measured over the usable bandwidth of the telecommunications cabling (normal minimum clearance distances of 4 feet from motors, generators, frequency converters, transformers, x-ray equipment or uninterrupted power system, 300 mm (12 in) from power conduits and cable systems, 125 mm (5 inches) from fluorescent or high frequency lighting system fixtures). Cabling shall be run with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

3.1.1 Cabling

Install UTP/STP, and optical fiber telecommunications cabling system as detailed in TIA-568-C.1, TIA-568-C.2, TIA-568-C.3 and TIA-570 for residential cabling. Screw terminals shall not be used except where specifically indicated on plans. Use an approved insulation displacement connection (IDC) tool kit for copper cable terminations. Do not untwist Category 6 UTP cables more than ½" (12 mm) from the point of termination to maintain cable geometry. Provide service loop on each end of the cable, minimum 10' (3 meters) in the telecommunications room, 6" (150mm) in or close to the work area outlet for UTP. Do not exceed manufacturers' cable pull tensions for copper and optical fiber cables. Provide a device to monitor cable pull tensions. Do not exceed 25 pounds pull tension for four pair copper cables. Do not chafe or damage outer jacket materials. Use only lubricants approved by cable manufacturer. Do not over cinch cables, or crush cables with staples. Only hook and loop fasteners are allowed on Category 6/6A cable and optical fiber cable. DO NOT USE ZIP TIES. For UTP cable, bend radii shall not be less than four times the cable diameter. Cables shall be terminated; no cable shall contain unterminated elements (See NFPA 70 abandoned cabling). Cables shall not be spliced. Label cabling in accordance with paragraph LABELING in this section.

3.1.1.1 Open Cable

Use only where specifically indicated on plans or use in cable trays, or below raised floors in approved pathway (cable free laid on floor is not authorized). Install in accordance with TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3. Do not exceed cable pull tensions recommended by the manufacturer. Copper cable not in a wireway or pathway shall be suspended a minimum of 8 inches above ceilings by cable supports no greater than 60 inches apart. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items. Placement of cable parallel to power conductors shall be avoided, if possible; a minimum separation of 12 inches shall be maintained when such placement cannot be avoided.

Plenum cable shall be used where open cables are routed through plenum areas. Cable routed exposed under raised floors shall be plenum rated. Plenum cables shall comply with flammability plenum requirements of NFPA 70. Install cabling after the flooring system has been installed in raised floor areas. Cable 6 feet long shall be neatly coiled not less than 12 inches in diameter below each feed point in raised floor areas.

3.1.1.2 Backbone Cable

a. Copper Backbone Cable. Install intrabuilding backbone copper cable, in minimum 2-way 3 inch conduit or larger in indicated pathways, between the campus distributor, located in the telecommunications entrance facility or room, the building distributors and the floor distributors located in telecommunications rooms and telecommunications equipment rooms as indicated on drawings.

b. Optical fiber Backbone Cable. Install intrabuilding backbone optical fiber in indicated pathways (normally in one of multiple interducts installed in conduit so as to maximize pathways). Do not exceed manufacturer's recommended bending radii and pull tension. Prepare cable for pulling by cutting outer jacket 10 inches leaving strength members exposed for approximately 10 inches. Twist strength members together and attach to pulling eye. Vertical cable support intervals shall be in accordance with manufacturer's recommendations.

3.1.1.3 Horizontal Cabling

Install horizontal cabling as indicated in the specification and on drawings. Do not untwist Category 6 UTP cables more than one half inch from the point of termination to maintain cable geometry. Provide slack cable in the form of a figure eight or large service loop on each end of the cable (prevent inductance caused by small coils), 10 feet in the telecommunications room, and 12 inches in the work area outlet.

3.1.2 Pathway Installations

Provide in accordance with TIA-569 and NFPA 70, except that 1 1/4 inch diameter conduit from cable tray or telecommunication room backboard to each work area outlet is required. Provide building pathway as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

Conceal conduit within finished walls, ceilings, and floors (not in wet areas). Keep conduit minimum 12 inches away from parallel runs of electrical power equipment, flues, steam, light ballast, and hot water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and

where conduit is visible after completion of project. Run conduits in crawl spaces as if exposed. Install no more than two 90 degree bends for a single horizontal cable run. All bends/turns in conduits will be in straight runs of conduit; a pull box shall be installed after every 180 degrees of bends or 100'; in no case will a turn be made within a pull box. The minimum size for a pull box for a single 1¼" conduit will be 5" long by 5" wide by 2 7/8" deep, and for a 3" conduit 30"W x 54"L x9"D. All conduits should contain a bushing at the end to protect the cable from damage and required bonding. Pull points, LC, LB, condulets, and consolidation points are not authorized.

Under floor cabling, under floor duct, and conduit under floor slabs should be avoided in the Camp Lejeune Greater area due to wet area close to coastal waters.

3.1.3 Service Entrance Conduit, Overhead

Provide service entrance overhead as specified in this section and Section 26 20 00 INTERIOR DISTRIBUTION SYSTEMS.

Ensure entrance fitting or weather head is sized to ensure min bend radius for largest cable is maintained.

3.1.4 Service Entrance Conduit, Underground

Provide service entrance underground as specified in this section and Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

Underground portion shall be encased in minimum of 3 inches of concrete extending from the building entrance to OSP demarcation point and shall be a minimum of 18 inches below slab or grade. Location of entrance conduit in communications room shall be to the left of the longest furthest wall from the door.

3.1.5 Cable Tray Installation

Install cable tray as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Only CMP and OFNP type cable shall be installed in a plenum.

A continuous stranded bonding conductor shall be run on the outside along the tray tapped to each section to ensure bonding. Remove all sharps from cable tray and pathways. Ensure bonding is on the pathway so as not to obstruct horizontal cabling. Maintain proper clearance and work space per TIA-569 and TEMPEST.

3.1.6 Work Area Outlets

3.1.6.1 Terminations

Terminate UTP cable in accordance with TIA-568-C.1, TIA-568-C.2 and wiring configuration as specified. Terminate fiber optic cables in accordance with TIA-568-C.3.

All work areas will contain a minimum of two communications face plates. Any work area larger than 80 sq feet will require additional face plates to service any work location in the room within 6 feet of a faceplate. This also applies to any area that could be converted to work space in the

future. Recommend a communications outlet box be placed 6" to the left or right of every electrical outlet box in workable office areas or any area that could be converted into workable office area such as a storage closet; All work area face plates will contain four category 6 jacks terminated with T568A configuration unless otherwise approved by AHJ. MUTOAs contain 12 cables and may require additional clearance and power.

3.1.6.2 Cover Plates

As a minimum, each outlet/connector shall be labeled as to its function and a unique number to identify cable link in accordance with the paragraph LABELING in this section. (For secured networks contact AHJ as shielded twisted pair and color coded face plates may be necessary.)

3.1.6.3 Cables

Unshielded/shielded twisted pair and fiber optic cables shall have a minimum of 12 inches of slack cable loosely coiled into the telecommunications outlet boxes or in cable tray as close as possible to outlet box. Minimum manufacturer's bend radius for each type of cable shall not be exceeded.

3.1.6.4 Pull Cords

Pull cords shall be installed in conduit serving telecommunications outlets that do not have cable installed (this is not normal as all outlets should be cabled).

3.1.6.5 Multi-User Telecommunications Outlet Assembly (MUTOA)

Run horizontal cable per specifications and terminate cables in a MUTOA in each system furniture zone. MUTOAs shall not be located in ceiling spaces, or any obstructed area. MUTOAs shall not be installed in furniture unless that unit of furniture is permanently secured to the building structure. MUTOAs shall be located in an open work area so that each furniture cluster is served by at least one MUTOA. The MUTOA shall be limited to serving a maximum of six work areas with 2 cables each for a total of 12 cables/12 ports. Maximum work area cable length requirements shall also be taken into account. MUTOAs must be labeled to include the maximum length of work area cables. MUTOA labeling is in addition to the labeling described in TIA-606, or other applicable cabling administration standards. Work area cables extending from the MUTOA to the work area device must also be uniquely identified and labeled.

3.1.7 Telecommunications Space Termination

Install termination hardware required for Category 6 and optical fiber system. A single punch manufacture approved insulation displacement tool shall be used for terminating copper cable to insulation displacement connectors.

3.1.7.1 Connector Blocks

Connector blocks shall be cabinet/rack mounted, as approved by the AHJ, in orderly rows and columns. Adequate vertical and horizontal wire routing areas shall be provided between groups of blocks. Install in accordance with industry standard wire routing guides in accordance with TIA-569.

3.1.7.2 Patch Panels

Patch panels shall be mounted in equipment cabinets/racks with sufficient ports to accommodate the installed cable plant plus 25 percent spares.

a. Copper Patch Panel. Copper cable entering a patch panel shall be secured to a rear cable manager with hook and loop ties as recommended by the manufacturer to prevent movement of the cable.

b. Fiber Optic Patch Panel. Fiber optic cable loop shall be 3 feet in length provided as recommended by the manufacturer. The outer jacket of each cable entering a patch panel shall be secured to the panel to prevent movement of the fibers within the panel, using clamps or brackets specifically manufactured for that purpose.

3.1.7.3 Equipment Support Frames

Install in accordance with TIA-569:

a. Bracket, wall mounted. Mount bracket to right on plywood backboard in accordance with manufacturer's recommendations. Mount rack so height of highest panel does not exceed 78 inches above floor. Mount so there is sufficient space remaining on backboard to mount lightning protection, bonding, and cable managers or install additional backboards.

b. Racks, floor mounted modular type. Permanently anchor rack to the floor in accordance with manufacturer's recommendations. Install sections of ladder rack anchored to telephone rack/cabinet and at least two walls.

c. Cabinets, freestanding modular type. Permanently anchor to the floor in accordance with manufacturer's recommendations. When cabinets are connected together, remove adjoining side panels for cable routing between cabinets. Mount rack mounted fan and 19" power/surge strip in cabinet. Install sections of ladder rack anchored to telephone rack/cabinet and at least two walls.

d. Cabinets, wall-mounted modular type. Mount cabinet to right on plywood backboard in accordance with manufacturer's recommendations. Mount cabinet so height of highest panel does not exceed 78 inches above floor. Mount so there is sufficient space remaining on backboard to mount lightning protection, bonding, and cable managers or install additional backboards.

3.1.8 Electrical Penetrations

Seal openings around electrical penetrations through fire resistance-rated wall, partitions, floors, or ceilings as specified in Section 07 84 00 FIRESTOPPING.

3.1.9 Grounding and Bonding

Provide in accordance with TIA-607, NFPA 70 and as specified in this section and Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM except only two hole irreversible compression lugs will be accepted.

3.2 LABELING

3.2.1 Labels

Provide labeling in accordance with TIA-606 except jacks will be numbered in a logical, sequential, clockwise numbering system from 1 to X with a closet designator. Example would be 145 C 146, would be the 145th & 146th jacks from the C telecom room. All labels shall be numbered with manufacturer's labeling system (not fabricated) and be equipped with laminated plastic cover. All terminations that are not to work area outlets should be in the last patch panel locations and labeled accordingly i.e. DDC, FACP, Elevator, Wall phones, or Wireless access points.

3.2.2 Cable

Cables shall be labeled using color labels on both ends with identifiers in accordance with TIA-606.

3.2.3 Termination Hardware

Workstation outlets and patch panel connections shall be labeled using manufacturing labeling system, color coded labels with identifiers in accordance with this section and TIA-606. Coordinate with Base Telephone.

3.3 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria. Painting shall be as specified in Section 09 90 00 PAINTS AND COATINGS.

3.3.1 Painting Backboards

Camp Lejeune no longer paints backboards as fire rated plywood is available. Manufactured fire retardant backboard shall be used, so as not to increase flame spread and smoke density and must be appropriately labeled.

3.4 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets.

3.5 TESTING

3.5.1 Telecommunications Cabling Testing

Perform telecommunications cabling inspection, verification, and performance tests on both Backbone and Horizontal cabling in accordance with TIA-568-C.1, TIA-568-C.2, TIA-568-C.3 and AHJ local guidance. Test equipment shall conform to TIA-1152. Perform optical fiber field inspection tests via attenuation measurements on factory reels and provide results along with manufacturer certification for factory reel tests. Remove failed cable reels from project site upon attenuation test failure.

3.5.1.1 Inspection

Visually inspect all telecommunications cabling jacket materials for UL or third party certification markings. Inspect cabling terminations in telecommunications rooms and at workstations to confirm color code for T568A pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1, TIA-568-C.2, TIA-568-C.3, and TIA-570 for residential cabling. Visually confirm Category 6 marking of outlets, cover plates, outlet/connectors, cable physical damage, and patch panels.

3.5.1.2 Verification Tests

Backbone copper cabling shall be tested for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors, and between conductors and shield, if cable has overall shield. Test operation of shorting bars in connection blocks. Test cables after all terminations are complete but prior to being cross-connected.

For multimode optical fiber, perform optical fiber end-to-end attenuation tests in accordance with TIA-568-C.3 and TIA-526-14 using Tier 1 Option with power meter and light source for optical fiber. Validate/troubleshoot failures with Tier 2 Option. For single-mode optical fiber of sufficient distance (normally OSP), perform optical fiber end-to-end attenuation tests in accordance with TIA-568-C.3 and TIA-526-7 using Tier 2 Option, OTDR for single-mode optical fiber. Perform verification acceptance tests.

3.5.1.3 Performance Tests

Provide summary in .pdf (hard and soft copy) detailed tester results in test format .flw (soft copy only), and fiber power meter/OTDR reports (summary hard copy and detailed soft copy). All Test reports should have a building or project number on it. The final QC and certification of installation will be performed by TSD after the contractor has provided passing and acceptable results on all test and as-built drawings showing all telecommunications outlets and their numbers to include any empty conduit or ports coiled in overhead for future use and all building automated system ports such as DDC, Elevator, FACP, or WAPs. Test results that are marginal may not be accepted. Also fiber tests that pass the link budget but exceed tolerance on any connector or splice are considered a failure. All discrepancies must be repaired and retested.

Perform testing for each outlet and MUTOA as follows:

a. Perform Category 6 link tests in accordance with TIA-568-C.1 and TIA-568-C.2. Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay, and delay skew.

b. Optical fiber Links. Perform optical fiber end-to-end link tests in accordance with TIA-568-C.3.

3.5.1.4 Final Verification Tests

Perform verification tests for all copper and optical fiber systems after the complete telecommunications cabling and workstation outlet/connectors are installed.

a. Voice Tests. These tests assume that dial tone service has been installed (normally only done for FACP, Elevator, or emergency phones).

Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and DSN telephone call.

b. Data Tests. These tests assume the Information Technology Staff has a network installed and are available to assist with testing (normally this is only done for VTC, CCTV). Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

-- End of Section --

SECTION 33 82 00.00 22

TELECOMMUNICATIONS OUTSIDE PLANT (OSP)
06/17

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM B1	(2013) Standard Specification for Hard-Drawn Copper Wire
ASTM B8	(2011) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D709	(2016) Standard Specification for Laminated Thermosetting Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms
IEEE C2	(2017) National Electrical Safety Code

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA S-87-640	(2016) Optical Fiber Outside Plant Communications Cable; 4th Edition
ICEA S-98-688	(2012) Broadband Twisted Pair Telecommunication Cable, Aircore, Polyolefin Insulated, Copper Conductors Technical Requirements
ICEA S-99-689	(2012) Broadband Twisted Pair Telecommunication Cable Filled, Polyolefin Insulated, Copper Conductors Technical Requirements

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C62.61	(1993) American National Standard for Gas Tube Surge Arresters on Wire Line

Telephone Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2017) National Electrical Code

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-455-107	(1999a) FOTP-107 Determination of Component Reflectance or Link/System Return Loss using a Loss Test Set
TIA-455-46A	(1990) FOTP-46 Spectral Attenuation Measurement for Long-Length, Graded-Index Optical Fibers
TIA-455-78-B	(2002) FOTP-78 Optical Fibres - Part 1-40: Measurement Methods and Test Procedures - Attenuation
TIA-472D000	(2007b) Fiber Optic Communications Cable for Outside Plant Use
TIA-492AAAA	(2009b) 62.5-um Core Diameter/125-um Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
TIA-492AAAB	(2009a) 50-Um Core Diameter/125-Um Cladding Diameter Class IA Graded-Index Multimode Optical Fibers
TIA-492CAAA	(1998; R 2002) Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers
TIA-492E000	(1996; R 2002) Sectional Specification for Class IVd Nonzero-Dispersion Single-Mode Optical Fibers for the 1550 nm Window
TIA-526-14	(2015c) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
TIA-526-7	(2015a) OFSTP-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
TIA-568-C.1	(2009; Add 2 2011; Add 1 2012) Commercial Building Telecommunications Cabling Standard
TIA-568-C.2	(2009; Errata 2010; Add 2 2014; Add 1 2016) Balanced Twisted-Pair

	Telecommunications Cabling and Components Standards
TIA-568-C.3	(2008; Add 1 2011) Optical Fiber Cabling Components Standard
TIA-569	(2015d) Commercial Building Standard for Telecommunications Pathways and Spaces
TIA-590	(1997a) Standard for Physical Location and Protection of Below Ground Fiber Optic Cable Plant
TIA-606	(2012b; Add 1 2015) Administration Standard for the Telecommunications Infrastructure
TIA-607	(2011b) Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
TIA-758	(2012b) Customer-Owned Outside Plant Telecommunications Infrastructure Standard
TIA/EIA-455	(1998b) Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components
TIA/EIA-455-204	(2000) Standard for Measurement of Bandwidth on Multimode Fiber
TIA/EIA-598	(2014d) Optical Fiber Cable Color Coding

U.S. DEPARTMENT OF AGRICULTURE (USDA)

RUS 1755	Telecommunications Standards and Specifications for Materials, Equipment and Construction
RUS Bull 1751F-630	(1996) Design of Aerial Plant
RUS Bull 1751F-640	(1995) Design of Buried Plant, Physical Considerations
RUS Bull 1751F-643	(2002) Underground Plant Design
RUS Bull 1751F-815	(1979) Electrical Protection of Outside Plant
RUS Bull 1753F-201	(1997) Acceptance Tests of Telecommunications Plant (PC-4)
RUS Bull 1753F-401	(1995) Splicing Copper and Fiber Optic Cables (PC-2)
RUS Bull 345-50	(1979) Trunk Carrier Systems (PE-60)

RUS Bull 345-65	(1985) Shield Bonding Connectors (PE-65)
RUS Bull 345-72	(1985) Filled Splice Closures (PE-74)
RUS Bull 345-83	(1979; Rev Oct 1982) Gas Tube Surge Arrestors (PE-80)

UNDERWRITERS LABORATORIES (UL)

UL 497	(2001; Reprint Jul 2013) Protectors for Paired Conductor Communication Circuits
UL 510	(2005; Reprint Jul 2013) Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape
UL 83	(2014) Thermoplastic-Insulated Wires and Cables

1.2 RELATED REQUIREMENTS

Section 27 10 00.00 22 BUILDING TELECOMMUNICATIONS CABLING SYSTEM, Section 33 71 01.00 22 OVERHEAD TRANSMISSION AND DISTRIBUTION, and Section 33 71 02.00 22 UNDERGROUND ELECTRICAL DISTRIBUTION apply to this section with additions and modifications specified herein.

1.3 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in this specification shall be as defined in TIA-568-C.1, TIA-568-C.2, TIA-568-C.3, TIA-569, TIA-606, and IEEE 100 and herein.

1.3.1 Campus Distributor (CD)

A distributor from which the campus backbone cabling emanates. (International expression for main cross-connect - (MC).) On Camp Lejeune the main cross-connect is established in Area Distribution Nodes (ADN), network operation centers (NOC), or telephone central office serving predesignated areas of the base. Designers should not design any new main cross-connects without approval from TSD (Telecommunications Support Division aka Base Telephone). The campus backbone is outside plant (OSP) back to TSD and a network operations center.

1.3.2 Entrance Facility (EF) (Telecommunications)

An entrance to the building for both private and public network service cables (including antennae, CATV, CCTV, IDS) including the entrance point at the building wall and continuing to the entrance room or space.

1.3.3 Entrance Room (ER) (Telecommunications)

A centralized space for telecommunications equipment that serves the occupants of a building. Equipment housed therein is considered distinct from a telecommunications room because of the nature of its complexity but could be combined within the communications room if additional space needed is allotted.

1.3.4 Building Distributor (BD)

A distributor in which the building backbone cables terminate and at which connections to the campus backbone cables may be made. (International expression for intermediate cross-connect - (IC).)

1.3.5 Pathway

A physical infrastructure utilized for the placement and routing of telecommunications cable.

1.4 SYSTEM DESCRIPTION

The telecommunications outside plant consists of cable, conduit, manholes, splices, protection, riser points, load coils, etc. required to provide signal paths from the closest point of presence (demarcation) to the new facility, including free standing frames or backboards, interconnecting hardware, terminating cables, lightning and surge protection modules at one or both ends of the cable, installed from the entrance facility in building to designated demarcation point. The work consists of providing, testing and making operational cabling, interconnecting hardware and lightning and surge protection necessary to form a complete outside plant telecommunications system for continuous use. The telecommunications contractor must coordinate with TSD concerning layout and configuration of the EF telecommunications and OSP. The telecommunications contractor may be required to coordinate work effort for access to the EF telecommunications and OSP with TSD.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

a. Submittals shall include the manufacturer's name, trade name, place of manufacture, and catalog model or number. Submittals shall also include applicable federal, military, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified in paragraph "Regulatory Requirements" and as required for certificates in Section 01 33 00 SUBMITTAL PROCEDURES.

b. Commercial off-the-shelf manuals shall be provided for operation, installation, configuration, and maintenance of products provided as a part of the communications outside plant (OSP). Submit operations and maintenance data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA and as specified herein not later than 2 months prior to the date of beneficial occupancy. In addition to requirements of Data package 5, include the requirements of paragraphs "Telecommunications Outside Plant Shop Drawings" and "Telecommunications Entrance Facility Drawings".

SD-02 Shop Drawings

Telecommunications Outside Plant; G

Telecommunications Entrance Facility Drawings; G

In addition to Section 01 33 00 SUBMITTAL PROCEDURES, provide shop drawings in accordance with paragraph SHOP DRAWINGS.

SD-03 Product Data

Wire and cable; G

Cable splices, and connectors; G

Closures; G

Building protector assemblies; G

Protector modules; G

Cross-connect terminal cabinets; G

Spare Parts; G

Submittals shall include the manufacturer's name, trade name, place of manufacture, and catalog model or number. Submittals shall also include applicable federal, military, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified in paragraph REGULATORY REQUIREMENTS and as required for certificates in Section 01 33 00 SUBMITTAL PROCEDURES.

SD-06 Test Reports

Pre-installation tests; G

Acceptance tests; G

Outside Plant Test Plan; G

SD-07 Certificates

Telecommunications Contractor Qualifications; G

Key Personnel Qualifications; G

Minimum Manufacturer's Qualifications; G

SD-08 Manufacturer's Instructions

Building protector assembly installation; G

Cable tensions; G

Fiber Optic Splices; G

Submit instructions prior to installation.

SD-09 Manufacturer's Field Reports

Factory Reel Test Data; G

SD-10 Operation and Maintenance Data

Telecommunications outside plant (OSP), Data Package 5; G

Commercial off-the-shelf manuals shall be provided for operation, installation, configuration, and maintenance of products provided as a part of the telecommunications outside plant (OSP). Submit operations and maintenance data in accordance with Section 01 78 23, OPERATION AND MAINTENANCE DATA and as specified herein not later than 2 months prior to the date of beneficial occupancy. In addition to requirements of Data package 5, include the requirements of paragraphs TELECOMMUNICATIONS OUTSIDE PLANT SHOP DRAWINGS and TELECOMMUNICATIONS ENTRANCE FACILITY DRAWINGS.

SD-11 Closeout Submittals

Record Documentation; G

In addition to other requirements, provide in accordance with paragraph RECORD DOCUMENTATION.

1.5.1 ADDITIONAL SUBMITTAL REQUIREMENTS

All submittals of material, equipment and design must be approved by the TSD Office prior to installing any telecommunications cabling and equipment.

1.6 QUALITY ASSURANCE

Ensure compliance with Section 01 45 00.00 20 QUALITY CONTROL.

1.6.1 Shop Drawings

Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size, and capacity. Submittals shall also include applicable federal, military, industry, and technical society publication references.

1.6.1.1 Telecommunications Outside Plant Shop Drawings

Provide Outside Plant Design in accordance with TIA-758, RUS Bull 1751F-630 for aerial system design, and RUS Bull 1751F-643 for underground duct system design and for direct buried system design. Provide T0 shop drawings that show the physical and logical connections from the perspective of an entire campus, such as actual building locations, exterior pathways and campus backbone cabling on plan view drawings, major

system nodes, and related connections on the logical system drawings in accordance with TIA-606. Drawings shall include wiring and schematic diagrams for fiber optic and copper cabling and splices, copper conductor gauge and pair count, load coils, fiber pair count and type, pathway duct and innerduct arrangement, associated construction materials, and any details required to demonstrate that cable system has been coordinated and will properly support the switching and transmission system identified in specification and drawings. Provide Registered Communications Distribution Designer (RCDD) approved drawings of the telecommunications outside plant. Update existing telecommunication Outside Plant T0 drawings to include information modified, deleted or added as a result of this installation in accordance with TIA-606. The telecommunications outside plant (OSP) shop drawings shall be included in the operation and maintenance manuals.

1.6.1.2 Telecommunications Entrance Facility Drawings

Provide T3 drawings for EF Telecommunications in accordance with TIA-606 that include telecommunications entrance facility plan views, pathway layout (cable tray, racks, ladder-racks, etc.), mechanical/electrical layout, and cabinet, rack, backboard and wall elevations. Drawings shall show layout of applicable equipment including incoming cable connector blocks, building protector assembly, outgoing cable connector blocks, patch panels and equipment spaces and cabinet/racks. Drawings shall include a complete list of equipment and material, equipment rack details, proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operation. Drawings may also be an enlargement of a congested area of T1 or T2 drawings. Provide T3 drawings for EF Telecommunications as specified in the paragraph TELECOMMUNICATIONS SPACE DRAWINGS of Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEMS. The telecommunications entrance facility shop drawings shall be included in the operation and maintenance manuals.

1.6.2 Telecommunications Qualifications

Work under this section shall be performed by and the equipment shall be provided by the approved telecommunications contractor and key personnel. Qualifications shall be provided for: the telecommunications system contractor, the telecommunications system installer, the supervisor (if different from the installer), and the cable splicing and terminating personnel. A minimum of 30 days prior to installation, submit documentation of the experience of the telecommunications contractor and of the key personnel.

1.6.2.1 Telecommunications Contractor Qualifications

The telecommunications contractor shall be a firm which is regularly and professionally engaged in the business of the applications, installation, and testing of the specified telecommunications systems and equipment. The telecommunications contractor shall demonstrate experience in providing successful telecommunications systems that include outside plant and broadband cabling within the past 3 years. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for the telecommunications contractor. Each of the key personnel shall demonstrate experience in providing successful telecommunications systems in accordance with TIA-758 within the past 3 years.

1.6.2.2 Key Personnel Qualifications

Provide key personnel who are regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. There may be one key person or more key persons proposed for this solicitation depending upon how many of the key roles each has successfully provided. Each of the key personnel shall demonstrate experience in providing successful telecommunications systems within the past 3 years.

Cable splicing and terminating personnel assigned to the installation of this system or any of its components shall have training in the proper techniques, shall be Building Industry Consulting Services International (BICSI) Certified Cabling Installation Technicians, Installer Level 2, or have a minimum of 3 years current consecutive experience in the installation of the specified copper and fiber optic cable and components for products used.

Supervisors and installers assigned to the installation of this system or any of its components shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for each of the key personnel. Documentation for each key person shall include at least two successful system installations provided that are equivalent in system size and in construction complexity to the telecommunications system proposed for this solicitation. Include specific experience in installing and testing telecommunications outside plant systems, including broadband cabling, and provide the names and locations of at least two project installations successfully completed using optical fiber and copper telecommunications cabling systems. All of the existing telecommunications system installations offered by the key persons as successful experience shall have been in successful full-time service for at least 18 months prior to the issuance date for this solicitation. Provide the name and role of the key person, the title, location, and completed installation date of the referenced project, the referenced project owner point of contact information including name, organization, title, and telephone number, and generally, the referenced project description including system size and construction complexity.

Indicate that all key persons are currently employed by the telecommunications contractor, or have a commitment to the telecommunications contractor to work on this project. All key persons shall be employed by the telecommunications contractor at the date of issuance of this solicitation, or if not, have a commitment to the telecommunications contractor to work on this project by the date that the bid was due to the Contracting Officer.

Note that only the key personnel approved by the Contracting Officer in the successful proposal shall do work on this solicitation's telecommunications system. Key personnel shall function in the same roles in this contract, as they functioned in the offered successful experience. Any substitutions for the telecommunications contractor's key personnel requires approval from the Contracting Officer.

1.6.2.3 Minimum Manufacturer's Qualifications

Cabling, equipment and hardware manufacturers shall have a minimum of 3 years experience in the manufacturing, assembly, and factory testing of components which comply with, TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3. In addition, cabling manufacturers shall have a minimum of 3 years experience in the manufacturing and factory testing of cabling which comply with ICEA S-87-640, ICEA S-98-688, and ICEA S-99-689.

1.6.3 Outside Plant Test Plan

Prepare and provide a complete and detailed test plan for field tests of the outside plant including a complete list of test equipment for the copper conductor and optical fiber cables, components, and accessories for approval by Telecommunications Support Division (aka Base Telephone) via the Contracting Officer. Include a cut-over plan with procedures and schedules for relocation of facility station numbers without interrupting service to any active location. Submit the plan at least 30 days prior to tests for Contracting Officer approval. Provide outside plant testing and performance measurement criteria in accordance with TIA-568-C.1 and RUS Bull 1753F-201. Include procedures for certification, validation, and testing that includes fiber optic link performance criteria.

1.6.4 Standard Products

Provide materials and equipment that are standard products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship and shall be the manufacturer's latest standard design that has been in satisfactory commercial or industrial use for at least 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Products supplied shall be specifically designed and manufactured for use with outside plant telecommunications systems. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section. Product submission must be approved for use by TSD via Contracting Officer prior to install.

1.6.4.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is provided.

1.6.4.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

1.6.5 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the TSD via the Contracting Officer. Equipment,

materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated by references or AHJ. Because references are living documents use of most current version shall be enforced.

1.6.5.1 Independent Testing Organization Certificate

In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.7 DELIVERY, STORAGE, AND HANDLING

Ship cable on reels in 5000 feet length with a minimum overage of 10 percent for 25, 50 or 100 pair configuration and 1250 feet length for larger cables. Radius of the reel drum shall not be smaller than the minimum bend radius of the cable. Wind cable on the reel so that unwinding can be done without kinking the cable. Two meters of cable at both ends of the cable shall be accessible for testing. Attach permanent label on each reel showing length, cable identification number, cable size, cable type, and date of manufacture. Provide water resistant label and the indelible writing on the labels. Apply end seals to each end of the cables to prevent moisture from entering the cable. Reels with cable shall be suitable for outside storage conditions when temperature ranges from minus 40 degrees C to plus 65 degrees C, with relative humidity from 0 to 100 percent. Equipment, other than cable, delivered and placed in storage shall be stored with protection from weather, humidity and temperature variation, dirt and dust, or other contaminants in accordance with manufacturer's requirements.

1.8 MAINTENANCE

1.8.1 Record Documentation

Provide the activity responsible for telecommunications system maintenance and administration (TSD via the Contracting Officer) a single complete and accurate set of record documentation for the entire telecommunications system for each structure with respect to this project.

Provide record documentation as specified in Section 27 10 00.00 22 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

Provide T5 drawings including documentation on cables and termination hardware in accordance with TIA-606. T5 drawings shall include schedules to show information for cut-overs and cable plant management, patch panel layouts, cross-connect information and connecting terminal layout as a minimum. T5 drawings shall be provided in both hard copy format and on electronic media using Windows based computer cable management software. A licensed copy of the cable management software including documentation, shall be provided. Update existing record documentation to reflect campus distribution T0 drawings and T3 drawing schedule information modified, deleted or added as a result of this installation. Provide the following T5 drawing documentation as a minimum:

a. Cables - A record of installed cable shall be provided in accordance with TIA-606. The cable records shall include the required data fields

for each cable and complete end-to-end circuit report for each complete circuit from the assigned outlet to the entry facility for the soft copy in accordance with TIA-606. Include manufacture date of cable with submittal.

b. Termination Hardware - Provide a record of installed patch panels, cross-connect points, campus distributor and terminating block arrangements and type in accordance with TIA-606. Documentation shall include the required data fields as a minimum in accordance with TIA-606.

Provide record documentation as specified in Section 27 10 00.00 22 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

1.8.2 Spare Parts

In addition to the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA, provide a complete list of parts and supplies, with current unit prices and source of supply, and a list of spare parts recommended for stocking. Spare parts shall be provided no later than the start of field testing.

1.9 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Products supplied shall be specifically designed and manufactured for use with outside plant telecommunications systems. All product data must be supplied in the submittal process and no product can be used without approval from TSD via the Contracting Officer.

2.2 TELECOMMUNICATIONS ENTRANCE FACILITY

2.2.1 Building Protector Assemblies

Building protector assembly (BEP) shall be self-contained and have interconnecting hardware (710 input and 66 output) for connection to all Outside Plant rated cabling at full capacity. Provide and follow manufacturers instructions for building protector assembly installation. If Multiple BEPs are used, arrange and connect with lowest count high and to left and highest to bottom right. Provide copper cable interconnecting hardware as specified in Section 27 10 00.00 22 BUILDING TELECOMMUNICATIONS CABLING SYSTEM. There will be no service loops or splicing of copper cable outside of the building protector assembly within the telecommunications room (pigtail BEPs are not authorized).

2.2.2 Protector Modules

Provide in accordance with UL 497 three-electrode gas tube type, 5 pin, rated for the application. Provide gas tube protection modules in accordance with RUS Bull 345-83 and shall be heavy duty, A>10kA, B>400,

C>65A where A is the maximum single impulse discharge current, B is the impulse life and C is the AC discharge current in accordance with ANSI C62.61. The gas modules shall shunt high voltage to ground, fail short, and be equipped with an external spark gap and heat coils in accordance with UL 497. Provide the number of surge protection modules equal to the number of pairs of exterior cable of the building protector assembly. Recommend 4B1E type.

2.2.3 Fiber Optic Terminations

Provide fiber optic cable terminations as specified in 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM. Ensure terminations within the Fiber Distribution Center (FDC) are logical left to right and top to bottom (OSP SM/Backbone SM then MM/Row to Row SM then MM).

2.2.4 Pathways

Underground applications for single buildings: provide a minimum of (3) four inch ducts (copper, fiber, maintenance duct... in that order), one of which (fiber)contains (2)- three cell fabric inner duct. The (3) four inch ducts shall enter the Main Communications Room (entrance facility) to the far left of the communications backboard (longest farthest wall from the door) and shall be 3-6 inches above floor and 3-6 inches away from wall, aligned parallel to the communications backboard wall. The underground ducts must have 3" concrete encasing, with 24 inches minimum backfill below grade from the Communications Entrance Facility to the maintenance hole that will be providing service to the building (Demarcation point).

For campus distribution between maintenance holes, ducts may need to be 5" to support larger cables, also there will be no less than 4, and up to xx ducts as needed for distribution to the area serviced. All new ducts will include bell ends and terminators flush with MH walls sealed water tight. Both ends of new duct shall be plugged with compression plugs or duct seal around cables (no expanding foam). All new pathway shall be visibly marked and provided on area map with GPS coordinates. All ducts shall be installed as straight through runs between holes and shall not cross each other allowing a straight pull through. All duct banks where fiber cables are installed shall include fabric innerduct to maximize the pathway.

For direct buried applications (only in remote areas where there is no manhole duct systems and none is in project contract), provide a minimum of three (3) four inch ducts from the Communications Entrance Facility to outside the bldg foot print past any obstructions, footers, or sidewalks by at least 5 feet into clear soil/entryway, 24 inches below grade. The ducts will be plugged at both ends and clearly marked on outside end. For distribution to demarcation, between handholes, and riser points cables need to be 36" below grade with metal locating tape at 24" below grade. Cables need to be in HDDPE direct bored, HDDPE direct buried, concrete encased in conduit, or concrete encased split duct under all roadways and pavement. All new cables need to be provided on area map with GPS coordinates for riser points or hand holes. Handholes and maintenance holes shall be traffic rated (MIN tier 22). Handhole size min 4'x4'x4'. Maintenance hole size 6'x7'x8'and all penetrations should be splayed.

If utility pathway conflicts necessitate placement of a manhole below the typical/normal depth (6-12 inches), the roof of the manhole shall be placed at normal depth and riser extensions shall be used to increase the depth of the manhole. If a deep collar is unavoidable and the depth of the collar

will exceed 24 inches, the Designer shall obtain written permission from TSD (Base Telephone) and ensure that the collar is equipped with permanent galvanized steps (rungs). Also do not drill hole in bottom of maintenance/handhole for grounding rod, use grounding ribbon built into the concrete structure itself that is in full contact with the ground.

2.3 CLOSURES

2.3.1 Copper Conductor Closures

2.3.1.1 Aerial Cable Closures

Provide cable closure assembly consisting of a frame with clamps, a lift-off polyethylene cover, cable nozzles, and drop wire rings. Closure shall be suitable for use on Figure 8 cables. Closures shall be free breathing and suitable for housing either straight-through type or branch type splices of non-pressurized communications cables and shall be sized as indicated. The closure shall be constructed with ultraviolet resistant PVC.

NOTE: The installation of aerial cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

2.3.1.2 Underground Cable Closures

a. Aboveground: Provide aboveground closures constructed of not less than 14 gauge steel and acceptable for pole or stake mounting in accordance with RUS 1755.910. Closures shall be sized and contain a marker as indicated. Covers shall be secured to prevent unauthorized entry. PVC type closures are to be used in beach areas. All pedestals shall contain a minimum 4 foot x 3/8 inch pigtailed ground rod.

b. Direct burial: Provide buried closure suitable for enclosing a straight, butt, and branch splice in a container into which can be poured an encapsulating compound. Closure shall have adequate strength to protect the splice and maintain cable shield electrical continuity in the buried environment. Encapsulating compound shall be reenterable and shall not alter the chemical stability of the closure. Provide filled splice cases in accordance with RUS Bull 345-72.

NOTE: The installation of a direct buried closure aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized; all closures shall be in a riser point, handhole, or manhole.

c. In vault or manhole: Provide underground closure suitable to house a straight, butt, and branch splice in a protective housing into which air can be pumped for flash testing. Closure shall be of suitable thermoplastic or stainless steel material supplying structural strength necessary to pass the mechanical and electrical requirements in a vault or manhole environment. Heat shrinkable type closures shall not be used. Provide filled splice cases in accordance with RUS Bull 345-72.

2.3.2 Fiber Optic Closures

2.3.2.1 Aerial

Provide aerial closure that is free breathing and suitable for housing splice organizer of non-pressurized cables. Closure shall be constructed

from heavy PVC with ultraviolet resistance.

NOTE: The installation of new aerial cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

2.3.2.2 Direct Burial

Provide buried closure suitable to house splice organizer in protective housing into which can be poured an encapsulating compound. Closure shall have adequate strength to protect the splice and maintain cable shield electrical continuity, when metallic, in buried environment. Encapsulating compound shall be reenterable and shall not alter chemical stability of the closure.

NOTE: The installation of a direct buried closure aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized; all closures shall be in a riser point, handhold, or manhole.

2.3.2.3 In Vault or Manhole

Provide underground closure suitable to house splice organizer in a protective housing into which air can be pumped for flash testing. Closure shall be of thermoplastic material supplying structural strength necessary to pass the mechanical and electrical requirements in a vault or manhole environment. Provide 60' slack coils on fiber in every 3rd manhole/handhole or in any which a turn is made.

2.4 PAD MOUNTED CROSS-CONNECT TERMINAL CABINETS

Provide in accordance with RUS 1755.910 and the following:

a. Constructed of 14 gauge steel.

b. Equipped with a double set of hinged doors with closed-cell foam weatherstripping. Doors shall be locked and contain a marker as indicated.

c. Equipped with spool spindle bracket, mounting frames, binding post log, jumpering instruction label, and load coil mounting provisions.

d. Complete with cross connect modules to terminate number of pairs as indicated.

e. Sized as indicated.

2.5 CABLE SPLICES, AND CONNECTORS

2.5.1 Copper Cable Splices

In vaults or manholes or entrance protectors provide multi-pair, in-line fold back to maximize length of accessible conductors for maintenance or single pair, in-line splices of a moisture resistant, three-wire insulation displacement connector held rigidly in place to assure maximum continuity in accordance with RUS Bull 1753F-401. Cables greater than 25 pairs shall be spliced using multipair splicing connectors, which accommodate 25 pairs of conductors at a time (typical 710). Provide correct connector size to accommodate the cable gauge of the supplied cable. Provide enough cable

slack suitable for splicing operations to maximize length of accessible conductors for maintenance operations. In above ground splices use three wire insulation displacement single pair connectors no matter what size the cable. In longer runs of copper provide proper load coils to balance the load as needed to ensure line quality in accordance with RUS Bull 1753F-201.

2.5.2 Copper Cable Splice Connector

Provide splice connectors with a polycarbonate body and cap and a tin-plated brass contact element. Connector shall accommodate 19 to 26 AWG solid wire with a maximum insulation diameter of 0.065 inch and shall only be installed with manufacturer recommended crimp/cut tool. Fill connector with sealant grease to make a moisture resistant connection, in accordance with RUS Bull 1753F-401.

2.5.3 Fiber Optic Cable Splices

Provide fiber optic cable splices and splicing materials for fusion methods at locations shown on the construction drawings. The splice insertion loss shall be 0.3 dB maximum when measured in accordance with TIA-455-78-B using an Optical Time Domain Reflectometer (OTDR). Splices shall be designed for a return loss of 40.0 db max for single mode fiber when tested in accordance with TIA-455-107. Physically protect each fiber optic splice by a splice kit specially designed for the splice. Provide enough cable slack suitable for splicing operations, but in no case less than 30 feet at each end.

2.5.4 Fiber Optic Splice Organizer

Provide splice organizer suitable for housing fiber optic splices in a neat and orderly logical fashion. Splice organizer shall allow for a minimum of 3 feet of fiber for each fiber within the cable to be neatly stored without kinks or twists. Splice organizer shall accommodate individual strain relief for each splice and allow for future maintenance or modification, without damage to the cable or splices. Provide splice organizer hardware, such as splice trays, protective glass shelves, and shield bond connectors in a splice organizer kit.

2.5.5 Shield Connectors

Provide connectors with a stable, low-impedance electrical connection between the cable shield and the bonding conductor in accordance with RUS Bull 345-65.

2.6 CONDUIT

Provide conduit as specified in Section 33 71 02.00 22 UNDERGROUND ELECTRICAL DISTRIBUTION.

2.7 PLASTIC INSULATING TAPE

Tape shall be premium quality, heavy-duty, weather-resistant designed for use on electrical and telecommunications applications and UL 510 compliant.

2.8 WIRE AND CABLE

2.8.1 Copper Conductor Cable

Solid copper conductors, covered with an extruded solid insulating compound. Insulated conductors shall be twisted into pairs which are then stranded or oscillated to form a cylindrical core. For special high frequency applications, the cable core shall be separated into compartments. Cable shall be completed by the application of a suitable core wrapping material, a corrugated copper or plastic coated aluminum shield, and an overall extruded jacket. Telecommunications contractor shall verify distances between splice points, slack required, and pair count required prior to ordering cable. Gauge of conductor shall be determined by the distance from the central office. In all cases the installed cable shall be of the same gauge as the cable it is being spliced into at the Demarcation point. The cable range available is; numbers of pairs specified; 19 gauge (6 to 400 pairs), 22 gauge (6 to 1200 pairs), 24 gauge (6 to 2100 pairs), and 26 gauge (6 to 3000 pairs). **26 AWG is not used on Camp Lejeune** Copper conductors shall conform to the following: All outside plant copper conductor cable available in PE-39 type shall be used; PE-89 is only approved for large pair counts when PE-39 is not manufactured due to large count.

2.8.1.1 Underground

Provide filled cable (type PE-39/89) meeting the requirements of ICEA S-99-689, RUS 1755.390, and RUS 1755.890. Provide enough cable slack suitable for splicing operations, but in no case less than 10 feet.

2.8.1.2 Aerial

Provide filled cable meeting the requirements of ICEA S-99-689, ICEA S-98-688, and RUS 1755.390 except that it shall be suitable for aerial installation and shall be Figure 8 distribution wire with 6,000 pound Class A galvanized steel or 6,000 pound aluminum-clad steel strand.

2.8.1.3 Screen

Provide screen-compartmental core cable filled cable meeting the requirements of ICEA S-99-689 and RUS 1755.390.

2.8.2 Fiber Optic Cable

Provide single-mode, 8/125-um, 0.10 aperture 1310 nm fiber optic cable in accordance with TIA-492CAAA, and single-mode, 8/125-um, 0.10 aperture 1550 nm fiber optic cable in accordance with TIA-492E000 and multimode 62.5/125-um, 0.275 aperture fiber optic cable in accordance with TIA-492AAAA, TIA-472D000, and ICEA S-87-640 including any special requirements made necessary by a specialized design. Provide a minimum of 24 optical fibers or more as indicated by drawings but never less without a waiver from local authority having jurisdiction. Fiber optic cable shall be specifically designed for outside use with preferred double jacket (if buried), single armor, loose buffer construction, and must be shielded. Provide fiber optic color code in accordance with TIA/EIA-598. Provide minimum 60' slack coil in every 3rd MH or any one where a turn is made.

NOTE: The installation of Multi-mode OSP Fiber Optic cables aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized; except as Backbone Underground Cabling between Communications Rooms within the same building, which is allowed, but not recommended.

2.8.2.1 Strength Members

Provide central/non-central, non-metallic/metallic strength members with sufficient tensile strength for installation and residual rated loads to meet the applicable performance requirements in accordance with ICEA S-87-640. The strength member is included to serve as a cable core foundation to reduce strain on the fibers, and shall not serve as a pulling strength member.

2.8.2.2 Shielding or Other Metallic Covering

Provide continuous, conductive or locatable, single tape covering and shield in accordance with ICEA S-87-640 on all cables.

2.8.2.3 Performance Requirements

Provide fiber optic cable with optical and mechanical performance requirements in accordance with ICEA S-87-640.

2.8.3 Grounding and Bonding Conductors

Provide grounding and bonding conductors in accordance with RUS 1755.200, TIA-607, IEEE C2, and NFPA 70. Solid bare copper wire meeting the requirements of ASTM B1 for sizes No. 8 AWG and smaller and stranded bare copper wire meeting the requirements of ASTM B8, for sizes No. 6 AWG and larger. Conductors should be installed so as not to exceed minimum bend radius and shall be attached to most suitable bond available at location. Do not install field modified ground rods in maintenance holes that already have factory grounding. Insulated conductors shall have 600-volt, Type TW insulation meeting the requirements of UL 83.

2.9 T-SPAN LINE TREATMENT REPEATERS

Provide as indicated. Repeaters shall be pedestal mounted with pressurized housings, sized as indicated and shall meet the requirements of RUS Bull 345-50.

2.10 POLES AND HARDWARE

Provide poles and hardware as specified in Section 33 71 01.00 22 OVERHEAD TRANSMISSION AND DISTRIBUTION.

2.11 CABLE TAGS IN MANHOLES, HANDHOLES, AND VAULTS

Provide tags for each telecommunications cable or wire located in manholes, handholes, and vaults. Cable tags shall be stainless steel or polyethylene and labeled in accordance with TIA-606. Coordinate actual cable tag information with TSD. Handwritten labeling is unacceptable.

2.11.1 Stainless Steel

Provide stainless steel, cable tags 1 5/8 inches in diameter 1/16 inch thick minimum, and circular in shape. Tags shall be die stamped with numbers, letters, and symbols not less than 0.25 inch high and approximately 0.015 inch deep in normal block style.

2.11.2 Polyethylene Cable Tags

Provide tags of polyethylene that have an average tensile strength of 3250

pounds per square inch; and that are 0.08 inch thick (minimum), non-corrosive non-conductive; resistive to acids, alkalis, organic solvents, and salt water; and distortion resistant to 170 degrees F. Provide 0.05 inch (minimum) thick black polyethylene tag holder. Provide a one-piece nylon, self-locking tie at each end of the cable tag. Ties shall have a minimum loop tensile strength of 175 pounds. The cable tags shall have black block letters, numbers, and symbols one inch high on a yellow background. Letters, numbers, and symbols shall not fall off or change positions regardless of the cable tags orientation.

2.12 BURIED WARNING AND IDENTIFICATION TAPE

Provide fiber optic media marking and protection in accordance with TIA-590. Provide color, type and depth of tape as specified in paragraph BURIED WARNING AND IDENTIFICATION TAPE in Section 31 23 00.00 20 EXCAVATION AND FILL.

2.13 GROUNDING BRAID

Provide grounding braid that provides low electrical impedance connections for dependable shield bonding in accordance with RUS 1755.200. Braid shall be made from flat tin-plated copper properly attached to factory ground in maintenance/handhole, TMGB, building steel, electrical bus, or approved grounding rods in riser points.

2.14 MANUFACTURER'S NAMEPLATE

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.15 FIELD FABRICATED NAMEPLATES

Provide laminated plastic nameplates in accordance with ASTM D709 for each patch panel, protector assembly, rack, cabinet and other equipment or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

2.16 TESTS, INSPECTIONS, AND VERIFICATIONS

2.16.1 Factory Reel Test Data

Test 100 percent OTDR test of FO media at the factory in accordance with TIA-568-C.1 and TIA-568-C.3. Use TIA-526-7 for single mode fiber and TIA-526-14 Method B for multi mode fiber measurements. Calibrate OTDR to show anomalies of 0.2 dB minimum. Enhanced performance filled OSP copper cables, referred to as Broadband Outside Plant (BBOSP), shall meet the requirements of ICEA S-99-689. Enhanced performance air core OSP copper cables shall meet the requirements of ICEA S-98-688. Submit test reports, including manufacture date for each cable reel and receive approval before delivery of cable to the project site.

PART 3 EXECUTION

3.1 INSTALLATION

Install all system components and appurtenances in accordance with manufacturer's instructions, IEEE C2, NFPA 70, and as indicated. Provide all necessary interconnections, services, and adjustments required for a complete and operable telecommunications system from designated demarcation point to building entrance facility, to include lightning protection terminations at one or both ends of the cable as required per paragraph: SYSTEM DESCRIPTION.

3.1.1 Contractor Damage

Promptly repair indicated utility lines or systems damaged during site preparation and construction. Damages to lines or systems not indicated, which are caused by Contractor operations, shall be treated as "Changes" under the terms of the Contract Clauses. When Contractor is advised in writing of the location of a nonindicated line or system, such notice shall provide that portion of the line or system with "indicated" status in determining liability for damages. In every event, immediately notify Base Telephone via the Contracting Officer of damage.

3.1.2 Cable Inspection and Repair

Handle cable and wire provided in the construction of this project with care. Inspect cable reels for cuts, nicks or other damage. Damaged cable shall be replaced or repaired to the satisfaction of the Contracting Officer. Reel wraps shall remain intact on the reel until the cable is ready for placement.

3.1.3 Direct Burial System

Installation shall be in accordance with RUS Bull 1751F-640. Under railroad tracks, paved areas, and roadways install cable in conduit encased in concrete. Slope ducts to drain. Excavate trenches by hand or mechanical trenching equipment after proper locates and pothole methods are used. Provide a minimum cable cover of 36 inches below finished grade for both fiber and copper cable. Trenches shall be not less than 6 inches wide and in straight lines between cable markers. Do not use cable plows. Bends in trenches shall have a radius of not less than 36 inches. Where two or more cables are laid parallel in the same trench, space laterally at least 3 inches apart. When rock is encountered, remove it to a depth of at least 3 inches below the cable and fill the space with sand or clean earth free from particles larger than 1/4 inch. Do not unreel and pull cables into the trench from one end. Cable may be unreeled on grade and lifted into position. Provide color, type and depth of warning tape as specified in paragraph BURIED WARNING AND IDENTIFICATION TAPE in Section 31 23 00.00 20 EXCAVATION AND FILL. Fiber optic cable will not be direct buried, it will be installed in a smooth wall HDPE type duct.

3.1.3.1 Cable Placement

a. Prior to design and installation of any copper or optical fiber cable systems, cable routes and pathways must be approved by the Base Telephone via Contracting Officer. Manhole layouts (butterflies) shall be provided for review and approval. Cable route shall include which conduits are to be used for which cables using a logical bottom up and

straight run approach.

b. Separate cables crossing other cables or metal piping from the other cables or pipe by not less than 3 inches of well tamped earth. Do not install circuits for communications under or above traffic signal loops.

c. Cables shall be in one piece without splices between connections except where the distance exceeds the lengths in which the cable is furnished.

d. Avoid bends in cables of small radii and twists that might cause damage. Do not bend cable and wire in a radius less than 10 times the outside diameter of the cable or wire.

e. Leave a horizontal slack of approximately 10 feet in the ground on each end of cable runs, on each side of connection boxes, and at points where connections are brought aboveground. Where cable is brought aboveground, leave additional slack to make necessary connections. (For fiber, provide a minimum of 30 feet at each end.)

3.1.3.2 Identification Slabs (Markers)

Provide a marker at each change of direction of the cable, over the ends of ducts or conduits which are installed under paved areas and roadways and over each splice. Identification markers shall be of concrete, approximately 20 inches square by 6 inches thick.

3.1.3.3 Backfill for Rocky Soil

When placing cable in a trench in rocky soil, the cable shall be cushioned by a fill of sand or selected soil at least 2 inches thick on the floor of the trench before placing the cable or wire. The backfill for at least 4 inches above the wire or cable shall be free from stones, rocks, or other hard or sharp materials which might damage the cable or wire. If the buried cable is placed less than 24 inches in depth, a protective cover of concrete shall be used.

3.1.4 Cable Protection

Provide direct burial cable protection in accordance with NFPA 70 and as specified in Section 33 71 02.00 22 UNDERGROUND ELECTRICAL DISTRIBUTION. Galvanized conduits which penetrate concrete (slabs, pavement, and walls) shall be PVC coated and shall extend from the first coupling or fitting outside either side of the concrete minimum of 6 inches per 12 inches burial depth beyond the edge of the surface where cable protection is required; all conduits shall be sealed on each end. Where additional protection is required, cable may be placed in galvanized iron pipe (GIP) sized on a maximum fill of 40 percent of cross-sectional area, or in concrete encased 4 inches PVC pipe. Conduit may be installed by jacking or trenching. Trenches shall be backfilled with earth and mechanically tamped at 6 inches lift so that the earth is restored to the same density, grade and vegetation as adjacent undisturbed material.

3.1.4.1 Cable End Caps

Cable ends shall be sealed at all times with coated heat shrinkable end caps. Cables ends shall be sealed when the cable is delivered to the job site, while the cable is stored and during installation of the cable. The

caps shall remain in place until the cable is spliced or terminated. Sealing compounds and tape are not acceptable substitutes for heat shrinkable end caps. Cable which is not sealed in the specified manner at all times will be rejected.

3.1.5 Underground Duct

Provide underground duct and connections (terminators and bell ends) to existing manholes or handholes, as specified in Section 33 71 02.00 22 UNDERGROUND ELECTRICAL DISTRIBUTION with any additional requirements as specified herein. Minimum size of ducts shall be 4 inch and minimum number will be three (3) into any building.

3.1.6 Reconditioning of Surfaces

Provide reconditioning of surfaces as specified in Section 33 71 02.00 22 UNDERGROUND ELECTRICAL DISTRIBUTION.

3.1.7 Penetrations

Caulk and seal cable access penetrations in walls, ceilings and other parts of the building. Seal openings around electrical penetrations through fire resistance-rated wall, partitions, floors, or ceilings in accordance with Section 07 84 00 FIRESTOPPING.

3.1.8 Cable Pulling

Test duct lines with a mandrel (SHALL BE WITNESSED BY GOVERNMENT) and swab out to remove foreign material before the pulling of cables. Avoid damage to cables in setting up pulling apparatus or in placing tools or hardware. Do not step on cables when entering or leaving the manhole. Do not place cables in ducts other than those shown without prior written approval of Base Telephone via the Contracting Officer. Roll cable reels in the direction indicated by the arrows painted on the reel flanges. Set up cable reels on the same side of the manhole as the conduit section in which the cable is to be placed. Level the reel and bring into proper alignment with the conduit section so that the cable pays off from the top of the reel in a long smooth bend into the duct without twisting. Under no circumstances shall the cable be paid off from the bottom of a reel. Check the equipment set up prior to beginning the cable pulling to avoid an interruption once pulling has started. Use a cable feeder guide of suitable dimensions between cable reel and face of duct to protect cable and guide cable into the duct as it is paid off the reel. As cable is paid off the reel, lubricate and inspect cable for sheath defects. When defects are noticed, stop pulling operations and notify the Contracting Officer to determine required corrective action. Cable pulling shall also be stopped when reel binds or does not pay off freely. Rectify cause of binding before resuming pulling operations. Provide cable lubricants recommended by the cable manufacturer. Avoid bends in cables of small radii and twists that might cause damage. Do not bend cable and wire in a radius less than 10 times the outside diameter of the cable or wire.

3.1.8.1 Cable Tensions

Obtain from the cable manufacturer and provide to the Contracting Officer, the maximum allowable pulling tension. This tension shall not be exceeded.

3.1.8.2 Pulling Eyes

Equip cables 1.25 inches in diameter and larger with cable manufacturer's factory installed pulling-in eyes. Provide cables with diameter smaller than 1.25 inches with heat shrinkable type end caps or seals on cable ends when using cable pulling grips. Rings to prevent grip from slipping shall not be beaten into the cable sheath. Use a swivel of 3/4 inch links between pulling-in eyes or grips and pulling strand.

3.1.8.3 Installation of Cables in Manholes, Handholes, and Vaults

Do not install cables utilizing the shortest route, but route along those walls providing the longest route and the maximum spare cable lengths. Do not install slack coils in copper unless approved or requested by AHJ. Fiber slack coils should be min 60' in every 3rd MH or any MH where a turn is made. Form cables to closely parallel walls, not to interfere with duct entrances, and support cables on brackets and cable insulators at a maximum of 4 feet. Install cable or cables in corresponding ducts entering and exiting the manholes in straight lines, do not cross ducts or manhole. In existing manholes, handholes, and vaults where new ducts are to be terminated, or where new cables are to be installed, modify the existing installation of cables, cable supports, and grounding as required with cables arranged and supported as specified for new cables. Identify each cable with corrosion-resistant embossed metal tags. All fiber optic cables will be installed in fabric innerduct measuring min 1 inch (or larger) with min of three cells (but should maximize pathways).

3.1.9 Aerial Cable Installation

Pole installation shall be as specified in Section 33 71 01.00 22 OVERHEAD TRANSMISSION AND DISTRIBUTION. Where physical obstructions make it necessary to pull distribution wire along the line from a stationary reel, use cable stringing blocks to support wire during placing and tensioning operations. Do not place ladders, cable coils, and other equipment on or against the distribution wire. Wire shall be sagged in accordance with the data shown. Protect cable installed outside of building less than 8 feet above finished grade against physical damage.

NOTE: The installation of aerial cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

3.1.9.1 Figure 8 Distribution Wire

Perform spiraling of the wire within 24 hours of the tensioning operation. Perform spiraling operations at alternate poles with the approximate length of the spiral being 15 feet. Do not remove insulation from support members except at bonding and grounding points and at points where ends of support members are terminated in splicing and dead-end devices. Ground support wire at poles to the pole ground.

3.1.9.2 Suspension Strand

Place suspension strand as indicated. Tension in accordance with the data indicated. When tensioning strand, loosen cable suspension clamps enough to allow free movement of the strand. Place suspension strand on the road side of the pole line. In tangent construction, point the lip of the suspension strand clamp toward the pole. At angles in the line, point the suspension strand clamp lip away from the load. In level construction

place the suspension strand clamp in such a manner that it will hold the strand below the through-bolt. At points where there is an up-pull on the strand, place clamp so that it will support strand above the through-bolt. Make suspension strand electrically continuous throughout its entire length, bond to other bare cables suspension strands and connect to pole ground at each pole.

3.1.9.3 Aerial Cable

Keep cable ends sealed at all times using cable end caps. Take cable from reel only as it is placed. During placing operations, do not bend cables in a radius less than 10 times the outside diameter of cable. Place temporary supports sufficiently close together and properly tension the cable where necessary to prevent excessive bending. In those instances where spiraling of cabling is involved, accomplish mounting of enclosures for purposes of loading, splicing, and distribution after the spiraling operation has been completed.

NOTE: The installation of aerial cabling aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

3.1.10 Cable Splicing

3.1.10.1 Copper Conductor Splices

Perform splicing in accordance with manufacturer, best known practices, and requirements of RUS Bull 1753F-401 except that direct buried splices and twisted and soldered splices are not allowed. Exception does not apply for pairs assigned for carrier application.

3.1.10.2 Fiber Optic Splices

Fiber optic splicing shall be in accordance with manufacturer's recommendation and shall exhibit an insertion loss not greater than 0.2 dB for fusion splices.

NOTE: The installation of Mechanical Fiber Optic Splices aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station, New River is not authorized.

3.1.11 Surge Protection

All cables and conductors, except fiber optic cable, which serve as communication lines through off-premise lines, shall have surge protection (710 input/66 output) installed at each end which meet the requirements of RUS Bull 1751F-815.

3.1.12 Grounding

Provide grounding and bonding in accordance with RUS 1755.200, TIA-607, IEEE C2, and NFPA 70. Ground exposed noncurrent carrying metallic parts of telephone equipment, cable sheaths, cable splices, and terminals.

3.1.12.1 Telecommunications Master Ground Bar (TMGB)

The TMGB is the hub of the basic telecommunications grounding system providing a common point of connection for ground from outside cable, CD,

and equipment. Establish a TMGB for connection point for cable stub shields to connector blocks and CD protector assemblies as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. The TMGB will at a minimum be 4 inches by 10 inches by 1/4 inch as shown in TIA-607.

3.1.12.2 Incoming Cable Shields

Shields shall not be bonded across the splice to the cable stubs at the main distribution frame. Ground shields of incoming cables in the EF Telecommunications to the TMGB.

3.1.12.3 Campus Distributor Grounding

a. Protection assemblies: Mount CD protector assemblies directly on the telecommunications backboard. Connect assemblies mounted on each vertical frame with No. 6 AWG copper conductor to provide a low resistance path to TMGB.

b. TMGB connection: Connect TMGB to TGB with copper conductor with a total resistance of less than 0.01 ohms.

3.1.13 Cut-Over

All necessary transfers and cut-overs, shall be accomplished by the telecommunications contractor except government owned cables with active service which must be done by TSD.

3.2 LABELING

3.2.1 Labels

Provide labeling for new cabling and termination hardware located within the facility in accordance with TIA-606. Handwritten labeling is unacceptable. Stenciled lettering for cable and termination hardware shall be provided using either thermal ink transfer process or laser printer. Actual information on labels shall be obtained from TSD via contracting office.

3.2.2 Cable Tag Installation

Install cable tags for each telecommunications cable or wire located in manholes, handholes, and vaults including each splice. Tag new wire and cable provided under this contract and existing wire and cable which are indicated to have splices and terminations provided by this contract. The labeling of telecommunications cable tag identifiers shall be in accordance with TIA-606. Tag legend shall be as indicated. Do not provide handwritten letters. Install cable tags so that they are clearly visible without disturbing any cabling or wiring in the manholes, handholes, and vaults.

3.2.3 Termination Hardware

Label patch panels, distribution panels, connector blocks and protection modules using color coded labels with identifiers in accordance with TIA-606.

3.3 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets.

3.4 FIELD QUALITY CONTROL

Provide the Contracting Officer 10 working days notice prior to each test. Provide labor, equipment, and incidentals required for testing. Correct defective material and workmanship disclosed as the results of the tests. Furnish a signed copy of the test results to the Contracting Officer within 3 working days after the tests for each segment of construction are completed. Perform testing as construction progresses and do not wait until all construction is complete before starting field tests.

3.4.1 Pre-Installation Tests

Perform the following tests on cable at the job site before it is removed from the cable reel. For cables with factory installed pulling eyes, these tests shall be performed at the factory and certified test results shall accompany the cable.

3.4.1.1 Cable Capacitance

Perform capacitance tests on all pairs within a cable to determine if cable capacitance is within the limits specified.

3.4.1.2 Loop Resistance

Perform DC-loop resistance on all of the pairs within a cable to determine if DC-loop resistance is within the manufacturer's calculated resistance.

3.4.1.3 Pre-Installation Test Results

Provide results of pre-installation tests to the Contracting Officer at least 5 working days before installation is to start. Results shall indicate reel number of the cable, manufacturer, size of cable, pairs tested, and recorded readings. When pre-installation tests indicate that cable does not meet specifications, remove cable from the job site.

3.4.2 Acceptance Tests

Perform acceptance testing in accordance with RUS Bull 1753F-201 and as further specified in this section. Provide personnel, equipment, instrumentation, and supplies necessary to perform required testing. Notification of any planned testing shall be given to the Contracting Officer at least 14 days prior to any test unless specified otherwise. Testing shall not proceed until after the Contractor has received written Contracting Officer's approval of the test plans as specified. Test plans shall define the tests required to ensure that the system meets technical, operational, and performance specifications. The test plans shall define milestones for the tests, equipment, personnel, facilities, and supplies required. The test plans shall identify the capabilities and functions to be tested. Provide test reports to TSD via Contracting officer in soft and hard copy in .pdf or .xls form showing all field tests performed, upon completion and testing of the installed system. Measurements shall be tabulated on a pair by pair or strand by strand basis. Blank forms can be provided from Base Telephone upon request.

3.4.2.1 Copper Conductor Cable

Perform the following acceptance tests in accordance with TIA-758:

a. Wire map (pin to pin continuity)

b. Continuity to remote end

c. Crossed pairs

d. Reversed pairs

e. Split pairs

f. Shorts between two or more conductors

g. Grounded pairs.

3.4.2.2 Fiber Optic Cable

Test fiber optic cable in accordance with TIA/EIA-455 and as further specified in this section. Two optical tests shall be performed on all optical fibers: Optical Time Domain Reflectometry (OTDR) Test, and Attenuation Test. These tests shall be performed on the completed end-to-end spans which include the near-end pre-connectorized single fiber cable assembly, outside plant as specified, outside plant field un-terminated at demarcation point, and the far-end pre-connectorized single fiber cable assembly.

a. OTDR Test: The OTDR test shall be used to determine the adequacy of the cable installations by showing any irregularities, such as discontinuities, micro-bendings or improper splices for the cable span under test. Hard copy fiber signature records shall be obtained from the OTDR for each fiber in each span and shall be included in the test results. The OTDR test shall be measured in both directions. A reference length of fiber, 1000 feet minimum, used as the delay line shall be placed before the new end connector and after the far end patch panel connectors for inspection of connector signature. Conduct OTDR test and provide calculation or interpretation of results in accordance with TIA-526-7 for single-mode fiber and TIA-526-14 for multimode fiber. Splice losses shall not exceed 0.2 db.

b. Attenuation Test: End-to-end attenuation measurements shall be made on all fibers, in both directions, using a 850 & 1300 for 62.5 multi-mode fiber and 1310 & 1550 for single mode nanometer light source at one end and the optical power meter on the other end to verify that the cable system attenuation requirements are met in accordance with TIA-455-46A for multimode and TIA-526-7 for single-mode fiber optic cables. The measurement method shall be in accordance with TIA-455-78-B. Attenuation losses shall not exceed 0.5 db/km at 1310 nm and 1550 nm for single-mode fiber. Attenuation losses shall not exceed 5.0 db/km at 850 nm and 1.5 db/km at 1300 nm for multimode fiber.

c. Bandwidth Test: The end-to-end bandwidth of all multimode fiber span links shall be measured by the frequency domain method. The bandwidth shall be measured in both directions on all fibers. The bandwidth measurements shall be in accordance with TIA/EIA-455-204.

3.4.3 Soil Density Tests

a. Determine soil-density relationships for compaction of backfill material in accordance with ASTM D1557, Method D.

b. Determine soil-density relationships as specified for soil tests in Section 31 23 00.00 20 EXCAVATION AND FILL.

-- End of Section --