

Memorandum of Addendum #1

January 9, 2021

To: **General Contractors**

From: **Paul Bonsall**
ADW Architects, p.a.

Re: **Addendum No. 1**
Sampson County 911 & ES Facilities
Clinton, NC
ADW Job No. 20003

NOTICE TO CONTRACTORS

This Addendum #1 has become a part of the drawings and project manual for the above project.

Each Contractor shall be responsible for notifying their sub-contractors of the information contained herein.

Revised or newly issued drawing contained in this Addendum #1 shall supersede and take precedence over any conflicting information in any previously issued drawings. Revised or newly issued project manual sections contained in this Addendum #1 shall supersede and take precedence over any conflicting information in any previously issued project manual sections.

Each Contractor shall bear all expenses resulting from the use of substitutions which may be included in this addendum, including the cost of work in general, structural, fire protection, plumbing, mechanical, and electrical trades required due to the substitution and the cost of any Architect's services made necessary by the substitutions.

Project Manual

Issue No. 1:

The following Project Manual Sections have been **replaced** in their entirety. A revised copy of each section is included in this Addendum #1 (Revision 2):

GENERAL

Section 00 41 13 - Bid Form - Stipulated Sum - Single Prime

ARCHITECTURAL

Section 09 51 00 – Acoustical Ceilings

Section 10 14 00 – Signage

FIRE PROTECTION

Section 21 22 00 – Clean Agent Fire Extinguishing Systems

ELECTRICAL

Section 26 05 26 – Grounding and Bonding for Electrical Systems

Section 26 05 36 – Cable Trays for Electrical Systems

Section 26 32 13 – Engine Generators

Section 26 41 13 – Lightning Protection for Structures

Section 26 43 13 – Surge-Protective Devices (SPDs) for Low-Voltage Electrical Power Circuits (1kV or Less)

Section 27 53 19 – Emergency Responder Radio Antenna/Repeater System

Issue No. 2:

The following Project Manual Section has been **deleted** in its entirety:

Section 13 60 00 – Emergency Vehicle Exhaust Capture System

Issue No. 3:

Section 09 21 16 – Gypsum Board Assemblies:

Replace paragraph 2.2.E.1 in with the following:

1. Exterior Gypsum Soffit and Ceiling Board: ASTM C 1396/C 1396M, with core type and in thickness indicated and with manufacturer's standard edges.
 - a. Product: G-P Gypsum Corp; ToughRock Fireguard C Soffit Board, or equal products by National Gypsum, U.S. Gypsum, CertainTeed, or American Gypsum.
 - b. Install manufacturer's recommended taping system over joints.

Issue No. 4:

Section 09 21 16 – Gypsum Board Assemblies:

Modify paragraph 2.2.B to **add** the following:

3. Moisture Resistant Gypsum Board: Use as indicated for interior walls, ceilings, and soffits. ASTM C 1396/C 1396M, Section 7, with core type and in thickness indicated and with manufacturer's standard edges.
 - a. Product: G-P Gypsum Corp; ToughRock Mold-Guard Gypsum Board, or equal products by National Gypsum, U.S. Gypsum, CertainTeed, or American Gypsum.
 - b. Install manufacturer's recommended taping system over joints.

Issue No. 5:

Section 00 21 13 – Instructions to Bidders:

Add form AIA A701-2018 which is included in the Addendum #1.

Drawings

Issue No. 1:

The following sheets have been **replaced** in their entirety. A revised copy of each drawing is included in this Addendum #1 (Revision 2):

ARCHITECTURAL

Sheet A105 – Roof Plan, Revision 1, dated 12/17/2020
Sheet A500 - Enlarged Toilet Plans and Details, dated 12/4/2020
Sheet A501 - Enlarged Toilet Plans and Elevations, Revision 1, dated 12/17/2020
Sheet A502 - Toilet Elevations and Details, dated 12/4/2020
Sheet A503 - Toilet Elevations and Details, dated 12/4/2020
Sheet A600 – Door, Frame and Hardware Schedules, dated 12/4/2020
Sheet A601 – Window Elevations and Details, dated 12/4/2020
Sheet A700 – Finish Legend, Schedule, Notes & Codes, dated 12/4/2020
Sheet A701 – Overall Finish Floor Plan, dated 12/4/2020
Sheet A702 – Main Building Finish Floor Plan, dated 12/4/2020
Sheet A703 – EMS Wing Finish Floor Plan, dated 12/4/2020
Sheet A704 – 911 Finish Floor Plan, dated 12/4/2020
Sheet A705 – Interior Details, dated 12/4/2020
Sheet A711 – Signage Plan, Revision 1, dated 12/17/2020
Sheet A712 – Signage Details, Revision 1, dated 12/17/2020
Sheet A800 – Overall Reflected Ceiling Plan, Revision 1, dated 12/17/2020
Sheet A801 – Main Building RCP, Revision 1, dated 12/17/2020
Sheet A802 – EMS Wing RCP, Revision 1, dated 12/17/2020
Sheet A803 – 911 Building RCP, Revision 1, dated 12/17/2020
Sheet A900 – Casework Elevations, dated 12/4/2020
Sheet A901 – Casework Elevations, dated 12/4/2020
Sheet A902 – Casework Sections, dated 12/4/2020

STRUCTURAL

Sheet S001 – General Notes and Abbreviations, dated 12/4/2020

MECHANICAL

Sheet M101 – Partial Floor Plan - Mechanical, Revision 1, dated 12/17/2020

Sheet M102 – Partial Floor Plans - Mechanical, Revision 1, dated 12/17/2020

Sheet M104 – Partial Roof Plans - Mechanical, Revision 1, dated 12/17/2020

ELECTRICAL

Sheet E010 – Electrical Site Plan, Revision 1, dated 12/17/2020

Sheet E011 – Floor Plan – Site Grounding, dated 12/4/2020

Sheet E013 – Site Plan Grounding, dated 12/4/2020

Sheet E014 – Grounding Details, Revision 1, dated 12/17/2020

Sheet E304 – Area 1 and Area 2 Equipment Connections Roof Plans, dated 12/4/2020

Sheet E501 – Enlarged Plans – Electrical, Revision 1, dated 12/17/2020

Sheet E601 – Electrical Details, dated 12/4/2020

Sheet E603 – Electrical Details, dated 12/4/2020

Sheet E701 – Power Riser Diagram, Revision 1, dated 12/17/2020

Sheet E803 – Power Riser Schedules, dated 12/4/2020

Issue No. 2:

Sheet G131 – Wall Type Descriptions: Wall Type A11: **Change** Note “a.” to read as follows:

- a. 5/8” Tile Backer Board to 6” above ceiling height, 5/8” Moisture Resistant Gypsum Board above, Ceramic Wall Tile to ceiling height, both sides.

Issue No. 3:

Sheet G131 – Wall Type Descriptions: Wall Type B4: **Change** Note “a.” to read as follows:

- a. 5/8” Moisture Resistant Gypsum Board to 6” above ceiling height.

Attachments:

Project Manual:

Section 00 21 13 – Instructions to Bidders: AIA A701-2018

Section 00 41 13 - Bid Form - Stipulated Sum - Single Prime, Addendum 1 (Revision 2)

Section 09 51 00 – Acoustical Ceilings, Addendum 1 (Revision 2)

Section 10 14 00 – Signage, Addendum 1 (Revision 2)

Section 21 22 00 – Clean Agent Fire Extinguishing Systems, Addendum 1 (Revision 2)

Section 26 05 26 – Grounding and Bonding for Electrical Systems, Addendum 1 (Revision 2)
Section 26 05 36 – Cable Trays for Electrical Systems, Addendum 1 (Revision 2)
Section 26 32 13 – Engine Generators, Addendum 1 (Revision 2)
Section 26 41 13 – Lightning Protection for Structures, Addendum 1 (Revision 2)
Section 26 43 13 – Surge-Protective Devices (SPDs) for Low-Voltage Electrical Power Circuits (1kV or Less), Addendum 1 (Revision 2)
Section 27 53 19 – Emergency Responder Radio Antenna/Repeater System, Addendum 1 (Revision 2)

Drawings:

Sheet A105 – Roof Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet A500 - Enlarged Toilet Plans and Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet A501 - Enlarged Toilet Plans and Elevations, Revision 2/Addendum 1, dated 01/09/2021
Sheet A502 - Toilet Elevations and Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet A503 - Toilet Elevations and Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet A700 – Finish Legend, Schedule, Notes & Codes, Revision 2/Addendum 1, dated 01/09/2021
Sheet A701 – Overall Finish Floor Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet A702 – Main Building Finish Floor Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet A703 – EMS Wing Finish Floor Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet A704 – 911 Finish Floor Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet A705 – Interior Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet A711 – Signage Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet A712 – Signage Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet A800 – Overall Reflected Ceiling Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet A801 – Main Building RCP, Revision 2/Addendum 1, dated 01/09/2021
Sheet A802 – EMS Wing RCP, Revision 2/Addendum 1, dated 01/09/2021
Sheet A803 – 911 Building RCP, Revision 2/Addendum 1, dated 01/09/2021
Sheet A900 – Casework Elevations, Revision 2/Addendum 1, dated 01/09/2021
Sheet A901 – Casework Elevations, Revision 2/Addendum 1, dated 01/09/2021
Sheet A903 – Casework Sections, Revision 2/Addendum 1, dated 01/09/2021
Sheet S001 – General Notes and Abbreviations, Revision 2/Addendum 1, dated 01/09/2021
Sheet M101 – Partial Floor Plan - Mechanical, Revision 2/Addendum 1, dated 01/09/2021
Sheet M102 – Partial Floor Plans - Mechanical, Revision 2/Addendum 1, dated 01/09/2021
Sheet M104 – Partial Roof Plans - Mechanical, Revision 2/Addendum 1, dated 01/09/2021
Sheet E010 – Electrical Site Plan, Revision 2/Addendum 1, dated 01/09/2021
Sheet E011 – Floor Plan – Site Grounding, Revision 2/Addendum 1, dated 01/09/2021
Sheet E013 – Site Plan Grounding, Revision 2/Addendum 1, dated 01/09/2021
Sheet E014 – Grounding Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet E304 – Area 1 and Area 2 Equipment Connections Roof Plans, Revision 2/Addendum 1, dated 01/09/2021
Sheet E501 – Enlarged Plans – Electrical, Revision 2/Addendum 1, dated 01/09/2021

Sheet E601 – Electrical Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet E603 – Electrical Details, Revision 2/Addendum 1, dated 01/09/2021
Sheet E701 – Power Riser Diagram, Revision 2/Addendum 1, dated 01/09/2021
Sheet E803 – Power Riser Schedules, Revision 2/Addendum 1, dated 01/09/2021

Cc: \ Owner's Representative
Invited Bidders

End of Addendum #1

AIA[®] Document A701[™] – 2018

Instructions to Bidders

for the following Project:

(Name, location, and detailed description)

Sampson County 911 and Emergency Services Facilities
530 Commerce Street
Clinton, NC 28328

THE OWNER:

(Name, legal status, address, and other information)

Sampson County
406 County Complex Road
Building C
Clinton, NC 28328

THE ARCHITECT:

(Name, legal status, address, and other information)

ADW Architects, P.A.
2815 Coliseum Centre Drive, Suite 500
Charlotte, NC 28217

TABLE OF ARTICLES

1	DEFINITIONS
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8	ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612[™]–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:

(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:

(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.

(Insert the complete AIA Document number, including year, and Document title.)

- .2 AIA Document

(Paragraphs deleted)

- A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.

(Insert the complete AIA Document number, including year, and Document title.)

- .5 Drawings – See Project Manual Section 00 01 15 – List of Drawings

Number	Title	Date
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- .6 Specifications – See Project Manual Section 00 01 10 – Table of Contents

Section	Title	Date	Pages
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- .7 Addenda:

Number	Date	Pages
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- .8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[
(Paragraphs deleted)

☒] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Project Manual Section 00 73 00	Supplemental Conditions	12.17.2020	8

(Paragraphs deleted)

.9 Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

SECTION 00 41 13 - BID FORM – STIPULATED SUM – SINGLE PRIME Addendum 1 (Revision 2)

PROJECT: Sampson County 911 and Emergency Services Facility
530 Commerce Road, Clinton, North Carolina.

NAME OF BIDDER: _____.

BUSINESS ADDRESS: _____.

LICENSE NO. _____ **DATE** _____.

This Contractor hereby proposes to furnish all materials, labor and equipment necessary to provide the Owner with a completed project as described in these specifications and as shown, detailed, or noted on the drawings listed herein and to include all allowances and any information provided in addenda as indicated on this proposal form.

A. CONTRACT PRICE:

Total Base Bid:

_____ (\$ _____)

B. ALTERNATES: As described on Drawings and in Specifications.

<i>Alternate No. 1</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 2</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 3</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 4</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 5</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 6</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 7</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 8:</i>	_____	<i>(Add)</i>	+\$ _____
<i>Alternate No. 9:</i>	_____	<i>(Add)</i>	+\$ _____

C. UNIT PRICES:

The undersigned quotes the following unit prices to be utilized in making adjustments to the Contract sum should the addition or omission of work required by the Contract Documents be necessary. Amount listed for unit prices will apply throughout the life of the Contract.

UP #1	Removal of Unsuitable Material and Replacement with Suitable Fill from the Owner's Stockpile, per cubic yard.	\$ _____
UP #2	Dewatering Trenches and Permanent French Drain, per lineal foot of French Drain.	\$ _____
UP #3	2000 P.S.I. Lean Concrete Fill for Footings per cubic yard.	\$ _____
UP #4	Chemical Drying, per square yard of treated area.	\$ _____
UP #5	Chemical Stabilization, per square yard of treated area.	\$ _____

D. TIME OF COMPLETION:

The undersigned further agrees to begin work immediately upon receipt of the "Notice to Proceed" with an adequate force, carry the work forward as expeditiously as possible, and complete the work in Four Hundred Twenty (420) days.

E. QUALIFICATIONS AND CLARIFICATIONS:

Contractor shall obtain any clarifications with the Owner in writing prior to the bid date. Bid qualifications are not permitted.

F. ADDENDA:

Contractor shall acknowledge receipt of all Addenda to the drawings and specifications by affixing his signature in the spaces provided below:

	Date	Signature
Addendum No. 1	_____	_____
Addendum No. 2	_____	_____
Addendum No. 3	_____	_____
Addendum No. 4	_____	_____
Addendum No. 5	_____	_____

G. LISTING OF MAJOR SUBCONTRACTORS:

Plumbing Contractor: _____

Mechanical Contractor: _____

Electrical Contractor: _____

H. CONTRACTOR'S LICENSE:

The undersigned further states that he is a duly licensed Contractor, for the type of work proposed, in the State of North Carolina, and that all fees, permits, etc., pursuant to the submission of this proposal have been paid in full.

Respectfully submitted this _____ day of _____, 2020.
Signature of Contractor or
Authorized Agent:

Name: _____

Title: _____

Address: _____

Phone: _____

License: _____

Witness: _____

Title: _____

Date: _____

Note:

- Bids will be received until 2:00 pm, Wednesday, January 27, 2021 at the Sampson County Administration Building, 406 County Complex Road, Clinton, NC, 28328.*

SECTION 09 51 00 - ACOUSTICAL CEILINGS Addendum 1 (Revision 2)

PART 1 - GENERAL

1.1 SCOPE:

The work covered by this section consists of furnishing all labor and materials for the complete installation of acoustical tile ceilings.

1.2 QUALITY ASSURANCE:

- A. In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations published by the Ceilings and Interior Systems Contracting Association and the requirements of ASTM C636 (latest edition).
- B. Seismic Loads: Design and size components to withstand seismic loads in accordance with the local governing building code, for the seismic design category as indicated on the structural drawings.

1.3 SUBMITTALS:

- A. Prior to installation, submit the following to the Architect for review:
 - 1. Submit manufacturer's project specifications and installation instructions for each type of acoustical panel and suspension system required, including certified laboratory test reports and other data necessary to show compliance with these specifications.
 - 2. Include manufacturer's recommendations for cleaning and refinishing acoustical panels, including precautions against materials and methods which may be detrimental to finishes and acoustical performances.
 - 3. Shop drawings, showing layout of each type of ceiling system in relation to surrounding structure, mechanical work (which shall include, but not be limited to, duct work and piping), lighting and electrical work, and any other pertinent fixtures and equipment. Drawings shall also show location of accessible panels. The reproduction of Architect's Drawings as the basis of these shop drawings will not be acceptable.
 - 4. Physical Samples: Furnish one sample of each type of ceiling board or tile and exposed grid in finish and pattern specified.

1.4 JOB CONDITIONS:

- A. Do not install interior acoustical panel ceilings until space enclosed and weatherproof, and until work above ceilings completed, and unit ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Ceiling Panels: 2 unopened boxes for each type indicated.

- B. This material shall not be available to the contractor for replacement goods within the building warranty period.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING:

A. Ceiling panel:

1. ACT-1: (TYPE 1# Ceiling Types per Reflected Ceiling Plan Legend.)
Basis of design: Beveled Tegular edge lay-in 24" x 24" x 5/8" with a 9/16" ceiling grid suspension system.
 - a. Armstrong; Dune Beveled Tegular edge lay-in, No. 1775 (White), 24" x 24" x 5/8" Beveled tegular lay-in, (White), 24" x 24" x 5/8" with 9/16" Superfine Exposed Grid.
 - b. CertainTeed; SMH-190 Sand Micro Narrow Beveled Tegular edge lay-in, (White), 24" x 24" x 5/8" New Line.
 - c. USG; Olympia Micro. #4231, FLB (Fineline Beveled Edge), (White), 24" x 24" x 5/8" with 9/16" USG Centricitee™ DXT™, White
2. ACT-2: (TYPE 2# Ceiling Types per Reflected Ceiling Plan Legend.)
Basis of design: Vinyl faced Square edge lay-in 24" x 24" x 5/8" with a 15/16" ceiling grid aluminum suspension system.
 - a. Armstrong Clean Room V L, Unperforated No. 868, Square edge lay-in (White), 24" x 24" x 5/8"
 - b. USG "Clean Room" with Clima Plus No. 56099, Square edge lay-in (White), 24" x 24" x 5/8" New Line
 - c. CertainTeed "Vinyl Shield A" No. 1102-CRF-1, (White), 24" x 24" x 5/8"
3. ACT-3: (Type 3# Ceiling Types per Reflected Ceiling Plan Legend)
Basis of design: 2'x2' acoustical ceiling in back of house areas with square edge and 15/16" white grid.
 - a. Armstrong; Cortega, 15/16" square lay-in. No. 770, (White). 24" x 24" x 5/8"
 - b. USG Radar: No. 2110 (White). 24" x 24" x 5/8.
 - c. CertainTeed; Baroque, No BET – 157, (White). 24" x 24" x 5/8.

B. Suspension System:

1. Exposed grid suspension system designed to accommodate ceiling board.
2. Suspension system shall conform to ASTM C635-78 and installation shall be in accordance with ASTM C636-76.
3. The suspension system shall support the ceiling panels with a maximum deflection of 1/360 of span. Exposed finish shall be white unless otherwise noted. The system shall include, but not be limited to, the following:
 - a. Material:
 - 1) Components shall be formed from commercial quality cold-rolled steel electrogalvanized.
 - 2) High Use Kitchen/Decontamination room applications ACT-2 (Vinyl Faced Tiles): Components shall be formed from commercial quality aluminum construction for maximum corrosion resistance and non-magnetic environments. (Specify for use in commercial kitchens and decontamination rooms only)
 - b. Main Tee: Double web design; with cross tee holes at 6" O.C.; with hanger wire

holes at 2" O.C.; with an integral reversible splice.

- 1) 9/16" exposed face for non-rated assemblies.
 - 2) 15/16" exposed face for non-rated assemblies.
 - 3) 15/16" exposed face Fire Guard for rated assemblies.
- c. Cross Tee: Double web design; with web extended to form a positive interlock between cross tee webs through intersecting tee web holes; with the lower flange extended and offset to provide a flush level intersection.
 - d. Wall molding of a channel or angle shape with an exposed face.

2.2 OTHER MATERIALS:

- A. All other materials, not specifically described but required for a complete and proper installation of the suspended acoustical ceiling, shall be as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

- A. Prior to all work of this Section, carefully inspect the installed work of all other Trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that suspended acoustical ceiling may be installed in accordance with the original design, all codes and regulations, the manufacturer's current recommendations and the approved submittals.
- C. In the event of discrepancy, immediately notify the Architect.
- D. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 COORDINATION WITH MECHANICAL AND ELECTRICAL:

- A. Coordinate with the requirements of other Trades. Use all means necessary to interface with adjacent materials.
- B. Where recessed lighting fixtures are installed in suspension system, consult with the fixture manufacturer prior to preparation of shop drawings so that the work of this Section shall be installed ready to receive the lighting fixtures. Modify the suspension system members adjacent to fixture locations as approved by the Architect and to the extent necessary to accommodate the fixtures.
- C. In the event lighting fixtures or air distribution or return air equipment other than those specified should be substituted under their respective Sections and/or Drawings and should the substituted fixtures require more extensive modifications, the Contractor shall make such required additional modifications and any additional cost shall be paid by the Contractor.
- D. Where wide or deep air conditioning ducts above suspended acoustical ceilings interfere with suspension hangers, provide independent framing below the duct work to support the ceiling as an obligation under this Section. Framing shall meet the approval of the Architect. Framing shall be supported from floor or roof structure above and shall in no case be attached to the duct work, piping or conduit.

3.3 SUSPENDED CEILING INSTALLATION:

- A. Comply with ASTM C 636 as applicable to acoustical panel ceilings, except to extent more stringent requirements indicated or required for compliance with governing regulations or fire resistance ratings.
- B. Suspend ceiling hangers from building structural members only, and only as indicated.
 - 1. Secure to structure, including intermediate framing members, by attaching to metal clips designed for type of member involved, or where possible, by looping and wire-tying directly to members.
- C. Space hangers not more than 4'-0" o.c. along each member supported directly from hangers, unless otherwise shown, and provide hanger not more than 6" from ends of each member.
- D. For the support of light fixtures, the fixture load shall be supported by supplemental hangers within 6" of each corner, or the fixture shall be supported separately.

3.4 MOLDINGS:

- A. Cope exposed flanges of intersecting members so that flange faces will be flush.
- B. Install edge moldings of type indicated at edges of each acoustical panel ceiling area, and at locations where edge of panel would otherwise be exposed after completion of work.
- C. Secure moldings to building construction by fastening through holes drilled in vertical leg. Space holes not more than 3" from each end and not more than 16" o.c. Draw-up fasteners for tight set against vertical surfaces.
- D. Miter corners of moldings accurately to provide hairline joints.
- E. Level moldings with ceiling suspension system, to level tolerance of 1/8" in 12'-0".

3.5 ACOUSTICAL PANEL INSTALLATION:

- A. Plan each layout to balance border widths at opposite edges of each ceiling area. Avoid use of less-than-half width units wherever possible. Comply with Architect's reflected ceiling plans to greatest extent possible.
- B. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members.
- C. Scribe and cut panels for accurate fit at borders and at interruptions and penetrations by other work through ceilings.

3.6 CLEANING AND PROTECTION:

- A. Clean exposed surfaces of acoustical panels and of trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- B. Institute required protection for acoustical panel ceilings, including temperature and humidity

limitations and dust control, so that work will be without damage and deterioration at time of substantial completion.

END OF SECTION 09 51 00

SECTION 10 14 00 – SIGNAGE Addendum 1 (Revision 2)

PART 1 - GENERAL

1.01 SUMMARY:

- A. This section includes the following types of signs:
 - 1. Interior Plastic Plaques.
 - 2. Exterior Plastic Plaques
 - 3. Cast Aluminum Letter Signage
 - 4. Applied Vinyl Signs
 - 5. Metal Informational Signs
 - 6. Metal County Seals
 - 7. Bronze Dedication Plaque
 - 8. Rated Wall Marking
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 22 sections for labels, tags, and nameplates for plumbing equipment.
 - 2. Division 23 sections for labels, tags, and nameplates for mechanical equipment.
 - 3. Division 26 sections for labels, tags, and nameplates for electrical equipment.
 - 4. Civil drawings for Accessible Parking Signage and Painted Directional Arrows.
 - 5. Section 01 58 00 – Project Identification for the Project Sign

1.02 SUBMITTALS:

- A. General:
 - 1. Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Product Data:
 - 1. Product data for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
- D. Color Charts: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.
- E. Samples of Interior Plaques: Two actual-sized samples of interior plaques showing compliance with requirements.

1.03 QUALITY ASSURANCE:

- A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.
- B. Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.

- C. Design Concept: The drawings indicate sizes, profiles, and dimensional requirements of signs and are based on the specific types and models indicated. Sign units by other manufacturers may be considered provided deviations in dimensions and profiles do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Subject to compliance with requirements, provide products by one of the following:
1. Manufacturers of Cast Letters:
 - a. Andco Industries Corp.
 - b. ASI Sign Systems, Inc.
 - c. Gemini, Inc.
 - d. Leeds Architectural Letters, Inc.
 - e. Spanjer Brothers, Inc.
 - f. Vomar Products, Inc.
 - g. Signage Industries, Inc.
 - h. 2/90 Signage Systems
 - i. Mohawk Sign Systems
 - j. Signcraft USA
 2. Manufacturers of Interior and Exterior Plastic Plaques:
 - a. Andco Industries Corp.
 - b. ASI Sign Systems, Inc.
 - c. Leeds Architectural Letters, Inc.
 - d. Signage Industries, Inc.
 - e. 2/90 Signage Systems
 - f. Mohawk Sign Systems
 - g. Rite Lite Signs, Inc.
 - h. Signcraft USA

2.02 MATERIALS:

- A. Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thick nesses indicated, with a minimal flexural strength of 16,000psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg F.
- B. Aluminum Sheet: Provide aluminum sheet of alloy and temper recommended by the sign manufacturer for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209 for 5005-H15.
- C. Fasteners: Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.
- D. Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into masonry work.
- E. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.

2.03 FINISHES:

- A. Baked-Enamel Finish: AA-M4xC12C42R1x (Mechanical Finish: Manufacturer's standard, other non-directional textured; Chemical Finish: Chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting.
 - 1. Organic Coating: Thermosetting-modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with a minimum dry film thickness of 1.5 mils, medium gloss.
 - a. Color: Selected from manufacturer's standard colors
- 2.05 INTERIOR PLASTIC PLAQUES: Sign Types 1 through 8, 15, 16, 17, and 27
 - A. Plaques: Plaque signs shall be a modular type signage system. Signs shall be fabricated of acrylic.
 - 1. Material: Factory-painted matte finish acrylic plastic laminated to acrylic back, thickness and size as shown; 1/2" radius corners.
 - B. Window Signs: Window signs shall consist of acrylic back laminated to matte finish acrylic plastic face with message slots as detailed for insertion of changeable message strips. Thickness and size of signs shall be as shown. Corners of signs shall be 1/2" radius.
 - C. Mounting: 1/16-inch-thick double-sided vinyl foam tape.
 - D. Tactile Graphics: Signage shall be tactile (Perceptible to touch); comply with ANSI A117.1, paragraph 4.28. Letters, numbers, and pictograms on tactile signs shall be raised 1/32 inch minimum. Tactile letters and numbers shall be Helvetica Regular and 5/8 inch high. Raised characters and symbols shall be accompanied by Grade 11 Braille. The Contractor shall be responsible for the translations into Braille. Letters shall contract with their background.
 - 1. Graphics Application: Signage graphics shall be relieved 1/32 inch minimum from plaque first surface by photomechanical stratification process. Cut and adhered graphics will not be acceptable.
 - E. Messages: See signage locations and details on sheets A711 and A712.
- 2.06 EXTERIOR PLASTIC PLAQUES: Sign Types 9, 13, 14, and 15
 - A. Provide materials to match the interior signs as indicated above, except modified as recommended by the manufacturer to withstand exterior local weather conditions for not fewer than 10 years without discoloration, delamination, or detachment from its substrate mounting.
- 2.07 CAST ALUMINUM LETTER SIGNAGE: Sign Type 25 and used on Type 22 and 23
 - A. Cast Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
 - 1. Character Material: Cast Aluminum.
 - 2. Character Height: As indicated on Drawings.
 - 3. Finishes: Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color selected by the Architect from the RAL K5 Classic 2018 color palette.
 - 4. Overcoat: Manufacturer's standard baked-on clear coating.
 - 5. Mounting: Concealed studs
- 2.08 APPLIED VINYL SIGNS: Sign Types 10, 11, 12, and 18
 - A. UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings.
- 2.09 METAL INFORMATIONAL SIGNS: Sign Types 24.
 - A. Base materials:

1. Painted aluminum with pressure-applied letters and graphics. The paint shall be flat, opaque acrylic polyurethane as recommended by manufacturer of substrate and graphic media.
2. Graphics and Copy: Pressure applied non-reflective letters/symbols.
3. Letters shall be digitally produced, and cut by computer-driven processes from 3M Scotchcal Electrocut 7725 film.
4. The inside corners of the letters shall be rounded using the largest radius consistent with acceptable appearance. Minimum radius shall be 1/8 inch on a 3 inch letter. Use pre-spacing tape as recommended by manufacturer of sheeting as a carrier for letters, numerals and symbols.

2.10 METAL COUNTY SEALS: Sign Type 19

- A. Provide wall mounted signage to match the Sampson County Seal. Sign shall be installed as recommended by manufacturer for exterior installation.
- B. Mounting: Concealed studs for substrates encountered.
- C. Finishes: Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in two colors selected by the Architect from the RAL K5 Classic 2018 color palette.
- D. County Seals shall be 7'-0" in diameter and manufactured of not less than 1/4" thick front plate aluminum with lettering and other graphics cut out of the front plate to expose a back plate of not less than 1/4" plate aluminum. The perimeter edge of the front plate shall be turned back 2".
- E. The seals shall be made with uniform faces, sharp corners, and precisely formed lines and profiles.
- F. Submit draft of proposed sign for review prior to fabrication to allow Owner to make any revisions.
- G. The seals and their support systems shall be designed to withstand wind and seismic loads indicated in the Structural Drawings. The seals shall be constructed to allow no visible deformation under applicable wind loads. The structural design shall be provided by a Professional Engineer registered in the State of North Carolina.

2.11 BRONZE DEDICATION PLAQUE: Sign Type 21

- A. Provide castings free from pits, scale, sand holes, and other defects. Comply with requirements specified for metal, border style, background texture, and finish and in required thickness, size, shape, and copy.
- B. Border Style: Raised flat band.
- C. Background Texture: Manufacturer's standard pebble texture.
- D. Mounting: Concealed studs for substrates encountered.
- E. See drawings for details regarding each type of cast sign.
- F. Submit draft of proposed sign for review prior to fabrication to allow Owner to make any revisions.

2.12 MARKING FIRE AND SMOKE ASSEMBLIES

- A. Sign applied directly on indicated substrate to identify fire and smoke assemblies, including preparatory treatment as required.
- B. Sign Material: Stenciled-on paint or preprinted, self-adhesive decals.
- C. Font: Minimum 3 inches high characters in a contrasting color, with minimum 0.375-inch wide strokes.
- D. Text: "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS, 1-HOUR FIRE BARRIER - PROTECT ALL OPENINGS, 2-HOUR FIRE BARRIER - PROTECT ALL OPENINGS, SMOKE BARRIER - PROTECT ALL OPENINGS" as applicable.
- E. Permanently identify both sides of each fire and smoke assembly indicated on Drawings. Place signs in accessible, concealed floor, floor-ceiling, or attic space at maximum 15

- feet from end of wall and at maximum intervals of 30 feet measured horizontally along the assembly. Locate signs for greatest visibility in the space.
- F. Stenciled signage;
1. Stencils must be die-cut.
 2. Must finish without under-spray or over-spray of the stencil.
 3. Must finish without drips.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Locate signs where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- B. Interior Plaques: Attach panel signs to wall surfaces using the methods indicated below:
1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces.
 2. Concealed Mounting: Mount the plaques by inserting threaded studs into tapped lugs on the back of the plaque. Set in predrilled holes filled with quick-setting cement.
 3. Cement Mounting: Mount plaques using exposed fasteners with rosettes attached through the face of the plaque into the wall surface.

3.02 CLEANING AND PROTECTION:

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10 14 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes clean-agent extinguishing systems and the following:
 - 1. Piping and piping specialties.
 - 2. Extinguishing-agent containers.
 - 3. Extinguishing agent.
 - 4. Detection and alarm devices.
 - 5. Control and alarm panels.
 - 6. Accessories.
 - 7. Connection devices for and wiring between system components.
 - 8. Connection devices for power and integration into building's fire alarm system.

1.3 DEFINITIONS

- A. ATS: Acceptance Testing Specifications.
- B. EPO: Emergency Power Off.

1.4 SYSTEM DESCRIPTION

- A. Clean-agent fire-extinguishing system shall be an engineered system for total flooding of the hazard area including the room cavity below the ceiling and below the raised floor.

1.5 PERFORMANCE REQUIREMENTS

- A. Design clean-agent extinguishing system and obtain approval from authorities having jurisdiction. Design system for Class A, B, or C fires as appropriate for areas being protected and include safety factor. Use clean agent indicated and in concentration suitable for normally occupied areas.
- B. Performance Requirements: Discharge HFC 227ea within 10 seconds and maintain 7.1 percent concentration by volume at 70 deg F for 10-minute holding time in hazard areas.
 - 1. HFC 227ea concentration in hazard areas greater than **9.0** percent immediately after discharge or less than 5.8 percent throughout holding time will not be accepted without written authorization from Owner and authorities having jurisdiction.

2. System Capabilities: Minimum 620-psig calculated working pressure and 360-psig initial charging pressure.
- C. Cross-Zoned Detection: Devices located in two separate zones. Sound alarm on activating single-detection device, and discharge extinguishing agent on actuating single-detection device in other zone.
- D. Verified Detection: Devices located in single zone. Sound alarm on activating single-detection device, and discharge extinguishing agent on actuating second-detection device.
- E. System Operating Sequence: As follows:
 1. Actuating First Detector: Visual indication on annunciator panel, energize audible alarm and visual alarms (slow pulse), shut down air-conditioning and ventilating systems serving protected area, close doors in protected area, and send signal to fire alarm system.
 2. Actuating Second Detector: Visual indication on annunciator panel, energize audible and visual alarms (fast pulse), shut down power to protected equipment, start time delay for extinguishing-agent discharge for **30** seconds, and discharge extinguishing agent. On agent discharge, release pre-action valve to allow water to fill sprinkler system.
 3. Extinguishing-agent discharge will operate audible alarms and strobe lights inside and outside the protected area.
- F. Manual stations shall immediately discharge extinguishing agent when activated.
- G. Operating abort switches will delay extinguishing-agent discharge while being activated, and switches must be reset to prevent agent discharge. Release of hand pressure on the switch will cause agent discharge if the time delay has expired.
- H. EPO: Will terminate power to protected equipment immediately on actuation.
- I. Low-Agent Pressure Switch: Initiate trouble alarm if sensing less than set pressure.
- J. Power Transfer Switch: Transfer from normal to stand-by power source.

1.6 SUBMITTALS

- A. Product Data: For the following:
 1. Extinguishing-agent containers.
 2. Extinguishing agent.
 3. Discharge nozzles.
 4. Control panels.
 5. Detection devices.
 6. Manual stations.
 7. Switches.
 8. Alarm devices.
 9. Pipe hangers and supports.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Include design calculations. Include the following for hazard-area enclosure, drawn to scale:

1. Plans, elevations, sections, details, and attachments to other work. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: Power, signal, and control wiring.
3. Design Calculations: For weight, volume, and concentration of extinguishing agent required for each hazard area.
4. Reflected Ceiling Plans: Show ceiling penetrations, ceiling-mounted items, and the following:
 - a. Extinguishing-agent containers, piping, discharge nozzles, detectors, and accessories.
 - b. Method of attaching hangers to building structure.
 - c. Other ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
5. Occupied Work Area Plans: Show the following:
 - a. Controls and alarms.
 - b. Extinguishing-agent containers, piping and discharge nozzles if mounted in space, detectors, and accessories.
 - c. Equipment and furnishings.
6. Access Floor Space Plans: Show the following:
 - a. Extinguishing-agent containers, piping, discharge nozzles, detectors, and accessories.
 - b. Method of supporting piping.
- C. Permit Approved Drawings: Working plans, prepared according to NFPA 2001, that have been approved by authorities having jurisdiction. Include design calculations.
- D. Field quality-control test reports.
- E. Maintenance Data: For components to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of clean-agent extinguishing systems that are similar to those indicated for this Project in material, design, and extent.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of clean-agent extinguishing systems and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.
 - 1. Detection Devices: Not less than 20 percent of amount of each type installed.
 - 2. Container Valves: Not less than 10 percent of amount of each size and type installed.
 - 3. Nozzles: Not less than 20 percent of amount of each type installed.
 - 4. Extinguishing Agent (Supply Reserve): Not less than 100 percent of amount installed in largest hazard area. Include pressure-rated containers with valves.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles were titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 piping applications Article retained for applications of pipe, tube, fitting, and joining materials.
- B. Piping, Valves, and Discharge Nozzles: Comply with types and standards listed in NFPA 2001, Section "Distribution," for charging pressure of system.

2.3 PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, Type S, Grade B or ASTM A 106, Grade B; Schedule 40, or Schedule 80, seamless steel pipe.
 - 1. Threaded Fittings:
 - a. Malleable-Iron Fittings: ASME B16.3, Class 300.
 - b. Flanges and Flanged Fittings: ASME B16.5, Class 300, unless Class 600 is indicated.
 - 2. Forged-Steel Welding Fittings: ASME B16.11, Class 3000, socket pattern.
 - 3. Grooved-End Fittings: FMG approved and NRTL listed, ASTM A 47/A 47M malleable iron or ASTM A 536 ductile iron, with dimensions matching steel pipe and ends factory grooved according to AWWA C606.

- B. Plain-End, Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
 - 1. Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper alloy, pressure.
 - 2. Bronze Flanges and Flanged Fittings: ASME B16.24, Class 300.
- C. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, unless thickness or specific material is indicated.
- D. Flange Bolts and Nuts: ASME B18.2.1, carbon steel.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Steel, Keyed Couplings: UL 213, AWWA C606, approved or listed for clean-agent service, and matching steel-pipe dimensions. Include ASTM A 536, ductile-iron housing, rubber gasket, and steel bolts and nuts.

2.4 VALVES

- A. General: Brass; suitable for intended operation.
- B. Container Valves: With rupture disc or solenoid and manual-release lever, capable of immediate and total agent discharge and suitable for intended flow capacity.
- C. Valves in Sections of Closed Piping and Manifolds: Fabricate to prevent entrapment of liquid, or install valve and separate pressure relief device.
- D. Valves in Manifolds: Check valve; installed to prevent loss of extinguishing agent when container is removed from manifold.

2.5 EXTINGUISHING-AGENT CONTAINERS

- A. Description: Steel tanks complying with ASME Boiler and Pressure Vessel Code: Section VIII, for unfired pressure vessels. Include minimum working-pressure rating that matches system charging pressure, valve, pressure switch, and pressure gage.
 - 1. Finish: **Manufacturer's standard color**, enamel, or epoxy paint.
 - 2. Manifold: Fabricate with valves, pressure switches, and connections for multiple storage containers.
 - 3. Manifold: Fabricate with valves, pressure switches, selector switch, and connections for main- and reserve-supply banks of multiple storage containers.
 - 4. Storage-Tank Brackets: Factory- or field-fabricated retaining brackets consisting of steel straps and channels; suitable for container support, maintenance, and tank refilling or replacement.

2.6 FIRE-EXTINGUISHING CLEAN AGENT

A. Clean Agent: HFC 227ea, heptafluoropropane.

1. Manufacturers:

- a. Cerberus Pyrotronics.
- b. Chemetron Fire Systems.
- c. Fike Corporation.
- d. Kidde-Fenwal, Inc.
- e. Modular Protection Corp.

2.7 DISCHARGE NOZZLES

A. Equipment manufacturer's standard one-piece brass or aluminum alloy of type, discharge pattern, and capacity required for application.

2.8 MANIFOLD AND ORIFICE UNIONS

A. Description: NRTL-listed device with minimum 2175-psig pressure rating, to control flow and reduce pressure of IG-541 gas in piping.

1. 2 inch and Smaller: Piping assembly with orifice, sized for system design requirements.
2. 2-1/2 inch and Larger: Piping assembly with nipple, sized for system design requirements.

2.9 CONTROL PANELS

A. Description: FMG approved or NRTL listed, including equipment and features required for testing, supervising, and operating fire-extinguishing system.

B. Power Requirements: 120/240-V ac; with electrical contacts for connection to system components and fire alarm system, and transformer or rectifier as needed to produce power at voltage required for accessories and alarm devices.

C. Enclosure: NEMA ICS 6, Type 1, enameled-steel cabinet.

1. Mounting: **Surface.**

D. Supervised Circuits: Separate circuits for each independent hazard area.

1. Detection circuits equal to the required number of zones, or addressable devices assigned to the required number of zones.
2. Manual pull-station circuit.
3. Alarm circuit.
4. Release circuit.
5. Abort circuit.
6. EPO circuit.

E. Provide the following control-panel features:

1. Electrical contacts for shutting down fans, activating dampers, and operating system electrical devices.
2. Automatic switchover to standby power at loss of primary power.
3. Storage container, low-pressure indicator.
4. Service disconnect to interrupt system operation for maintenance with visual status indication on the annunciator panel.

F. Standby Power: Lead-acid or nickel-cadmium batteries with capacity to operate system for 72 hours and alarm for minimum of 15 minutes. Include automatic battery charger, with varying charging rate between trickle and high depending on battery voltage, that is capable of maintaining batteries fully charged. Include manual voltage control, dc voltmeter, dc ammeter, electrical contacts for connection to control panel, and suitable enclosure.

2.10 DETECTION DEVICES

A. Description: Comply with NFPA 2001 and NFPA 72, and include the following types:

1. Ionization Detectors: Comply with UL 268, dual-chamber type, having sampling and referencing chambers, with smoke-sensing element.
2. Photoelectric Detectors: Comply with UL 268, consisting of LED light source and silicon photodiode receiving element.
3. Remote Air-Sampling Detector System: Includes air-sampling pipe network, a laser-based photoelectric detector, a sample transport fan, and a control unit.
 - a. Comply with UL 268 and NRTL listed, operating at 24-V dc, nominal.
 - b. Pipe Network: CPVC tubing connects control unit with calibrated sampling holes.
 - c. Smoke Detector: Particle-counting type with continuous laser beam. Sensitivity adjustable to a minimum of four preset values.
 - d. Sample Transport Fan: Centrifugal type, creating a minimum static pressure of 0.05-inch wg at all sampling ports.
 - e. Control Unit: Multi-zone unit as indicated on Drawings. Provides same system power supply, supervision, and alarm features as specified for the control panel plus separate trouble indication for airflow and detector problems.
 - f. Signals to the Central Fire Alarm Control Panel: Any type of local system trouble is reported to the central fire alarm control panel as a composite "trouble" signal. Alarms on each system zone are individually reported to the central fire alarm control panel as separately identified zones.

2.11 MANUAL STATIONS

- A. General Description: **Semi-recessed** FMG approved or NRTL listed, with clear plastic hinged cover, 120-V ac or low voltage compatible with controls. Include contacts for connection to control panel.
- B. Manual Release: "MANUAL RELEASE" caption, and red finish. Unit can manually discharge extinguishing agent with operating device that remains engaged until unlocked.

- C. Abort Switch: "ABORT" caption, momentary contact, with green finish.
- D. EPO Switch: "EPO" caption, with yellow finish.

2.12 SWITCHES

- A. Description: FMG approved or NRTL listed, where available, 120-V ac or low voltage compatible with controls. Include contacts for connection to control panel.
 - 1. Low-Agent Pressure Switches: Pneumatic operation.
 - 2. Power Transfer Switches: Key-operation selector, for transfer of release circuit signal from main supply to reserve supply.
 - 3. Door Closers: Magnetic retaining and release device or electrical interlock to cause the door operator to drive the door closed.

2.13 ALARM DEVICES

- A. Description: FMG approved or NRTL listed, low voltage, and surface mounting, unless otherwise indicated.
- B. Horns: 90 to 94 dBA.
- C. Strobe Lights: Translucent lens, with "FIRE" or similar caption.

2.14 ELECTRICAL POWER AND WIRING

- A. Electrical power, wiring, and devices are specified in Division 26.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with hazard-area leakage requirements, installation tolerances, and other conditions affecting work performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PIPING APPLICATIONS

- A. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.
- B. Fittings Working Pressure: 620 psig minimum.
- C. Flanged Joints: Class 300 minimum.

- D. 2 inch and Smaller: ASTM B 88, L copper tube; copper, solder-joint fittings; and brazed joints.
- E. 2 inch and Smaller: Schedule 40, steel pipe; malleable-iron threaded fittings; and threaded joints.
- F. 2-1/2 inch and 3 inch: ASTM B 88, Type L copper tube; copper, solder-joint fittings; and brazed joints.
- G. 2-1/2 inch and 3 inch: Schedule 40, steel pipe; forged-steel welding fittings; and welded joints.
- H. 2-1/2 inch and 3 inch: Schedule 40, steel pipe; steel, grooved-end fittings; steel, keyed couplings; and grooved joints.

3.3 PIPING APPLICATIONS

- A. Piping between Storage Containers and Orifice Union:
 - 1. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.
 - 2. Fittings Working Pressure: 2175 psig minimum.
 - 3. Flanged Joints: Class 600 minimum.
 - 4. All Sizes: Schedule 80, steel pipe; forged-steel welding fittings; and welded joints.
- B. Piping Downstream from Orifice Union:
 - 1. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.
 - 2. Fittings Working Pressure: 1000 psig minimum.
 - 3. Flanged Joints: Class 300 minimum.
 - 4. All Sizes: Schedule **80**, steel pipe; forged-steel welding fittings; and welded joints.

3.4 CLEAN-AGENT EXTINGUISHING PIPING INSTALLATION

- A. Install clean-agent extinguishing piping and other components level and plumb and according to manufacturers' written instructions.
- B. Refer to Division 21 Section "Common Work Results for Fire Suppression" for basic pipe installation and joint construction.
- C. Grooved Piping Joints: Groove pipe ends according to AWWA C606 dimensions. Assemble grooved-end steel pipe and steel, grooved-end fittings with steel, keyed couplings and lubricant according to manufacturer's written instructions.
- D. Install extinguishing-agent containers anchored to substrate.
- E. Install pipe and fittings, valves, and discharge nozzles according to requirements listed in NFPA 2001, Section "Distribution," and in ASME B31.1.
 - 1. Install valves designed to prevent entrapment of liquid or install pressure relief devices in valved sections of piping systems.

2. Support piping using supports and methods according to NFPA 13.
3. Install seismic restraints for extinguishing-agent containers and piping systems.
4. Install control panels, detection system components, alarms, and accessories, complying with requirements of NFPA 2001, Section "Detection, Actuation, and Control Systems," as required for supervised system application.

3.5 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to extinguishing-agent containers to allow service and maintenance.
- C. Connect electrical devices to control panel and to building's fire alarm system. Electrical power, wiring, and devices are specified in Division 28 Section "Fire Detection and Alarm."

3.6 LABELING

- A. Install labeling on piping, extinguishing-agent containers, other equipment, and panels according to NFPA 2001.
- B. Install signs at entry doors for protected areas to warn occupants that they are entering a room protected with a clean-agent fire extinguishing system.
- C. Install signs at entry doors to advise persons outside the room the meaning of the horn(s), bell(s), and strobe light(s) outside the protected space.

3.7 FIELD QUALITY CONTROL

- A. Comply with operating instructions and procedures of NFPA 2001, Section "Approval of Installations." Include the following tests and inspections to demonstrate compliance with requirements:
 1. Check mechanical items.
 2. Inspect extinguishing-agent containers and extinguishing agent, and check mountings for adequate anchoring to substrate.
 3. Check electrical systems.
 4. Check enclosure integrity. Comply with NFPA 2001, Section "Enclosure Inspection," and Appendix C, "Enclosure Integrity Procedure."
 5. Perform functional pre-discharge test.
 6. Perform system functional operational test including, EPO, abort, and manual release.
 7. Check remote monitoring operations.
 8. Check control-panel primary power source.
 9. Perform "puff" test on piping system, using nitrogen.
- B. Perform field-acceptance tests of each clean-agent extinguishing system when installation is complete. Perform system testing only after hazard-area enclosure construction has been completed and openings sealed. Comply with operating instructions and procedures of

NFPA 2001, Section "Approval of Installations." Include the following to demonstrate compliance with requirements:

1. Perform functional predischARGE test.
 2. Perform system functional operational test.
 3. Check remote monitoring operations.
 4. Check control-panel primary power source.
 5. Perform "puff" test on piping system, using nitrogen.
- C. Correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment that cannot be corrected or does not perform as specified and indicated, then retest to demonstrate compliance. Repeat procedure until satisfactory results are obtained.
1. Report test results promptly and in writing to Architect and authorities having jurisdiction.
- D. Perform the following field tests and inspections and prepare test reports:
1. After installing clean-agent extinguishing piping system and after electrical circuitry has been energized, test for compliance with requirements.
 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Sections "Inspection and Test Procedures" and "System Function Tests." Certify compliance with test parameters.
 3. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 4. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.
 5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Remove and replace malfunctioning units and retest as specified above.

3.8 CLEANING

- A. Each pipe section shall be cleaned internally after preparation and before assembly by means of swabbing, using a suitable nonflammable cleaner. Pipe network shall be free of particulate matter and oil residue before installing nozzles or discharge devices.

3.9 SYSTEM FILLING

- A. Preparation:
1. Verify that piping system installation is completed and cleaned.
 2. Check for complete enclosure integrity.
 3. Check operation of ventilation and exhaust systems.
- B. Filling Procedures:

1. Fill extinguishing-agent containers with extinguishing agent and pressurize to indicated charging pressure.
2. Install filled extinguishing-agent containers.
3. Energize circuits.
4. Adjust operating controls.

3.10 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain clean-agent extinguishing systems. Refer to Division 01.

END OF SECTION 21 22 00

**SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS Addendum 1
(Revision 2)**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
 - 1. Test wells.
 - 2. Ground rods.
 - 3. Grounding arrangements and connections for separately derived systems.
 - 4. Grounding for sensitive electronic equipment.
- C. Qualification Data: For testing agency and testing agency's field supervisor.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
 - 1. Instructions for periodic testing and inspection of grounding features at test wells, ground rings, and grounding connections for separately derived systems based on NETA MTS and NFPA 70B.
 - a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
 - b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction or because of adjacent surface material.
- B. Bare Copper Conductors:
 1. Solid Conductors: ASTM B 3.
 2. Stranded Conductors: ASTM B 8.
 3. Tinned Conductors: ASTM B 33.
 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 5. Bonding Conductor: **Sized per TIA 607 and R56 for distance and resistance**, stranded conductor.
 6. Bonding Jumper: **Tinned-copper, stranded conductors**, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
 7. Tinned Bonding Jumper: **Tinned-copper, stranded conductors**, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
- C. Bare Grounding Conductor and Conductor Protector for Wood Poles:
 1. **No. 2 AWG minimum**, soft-drawn copper.
 2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.
- D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches (6 by 50 mm) in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad; 3/4 inch diameter by 10 feet length (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors:
 - 1. **Indoor: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger, unless otherwise indicated.**
 - 2. **Outdoor: Install solid conductor for No. 2 AWG and smaller, and stranded conductors for No. 1 AWG and larger, unless otherwise indicated.**
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
 - 1. **Bury at least 30 inches minimum or below frost line (whichever is greater) below grade.**
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.
- C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus on insulated spacers **2 inch minimum**, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: **Welded connections at all locations.**
 - 3. Connections to Ground Rods at Test Wells: **Exothermic Welded connections below grade. Above ground requires irreversible crimp.**
 - 4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
 - 8. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
- C. **Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment: provide No. 4 AWG minim Size per R56 table 5-3. (When installed in metallic conduit the conduit shall be bonded on both ends). insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.**
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are **30 inches** below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.
1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 3. Use **exothermic-welded connectors for outdoor locations**
- F. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- B. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Test completed grounding system at the service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 - c. **The ground resistance shall be less than 5 ohms per TIA 607 and R56.**
 - 3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. **Report measured ground resistances that exceed the following values:**
 - 1. **Power and Lighting Equipment or System with Capacity 500 kVA and Less: 100 milli-ohms.**
 - 2. **Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 100 milli-ohms.**
 - 3. **Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 100 milli-ohms.**
 - 4. **Power Distribution Units or Panelboards Serving Electronic Equipment: 100 milli-ohms.**
- D. **Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.**

END OF SECTION 26 05 26

SECTION 26 05 36 - CABLE TRAYS FOR ELECTRICAL SYSTEMS **Addendum 1 (Revision 2)**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes steel, aluminum, stainless-steel, and fiberglass cable trays and accessories.

1.3 SUBMITTALS

- A. Product Data: Include data indicating dimensions and finishes for each type of cable tray indicated.
- B. Shop Drawings: For each type of cable tray.
 - 1. Show fabrication and installation details of cable tray, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths, and fittings.
- C. Coordination Drawings: Floor plans and sections, drawn to scale. Include scaled cable tray layout and relationships between components and adjacent structural, electrical, and mechanical elements. Show the following:
 - 1. Vertical and horizontal offsets and transitions.
 - 2. Clearances for access above and to side of cable trays.
 - 3. Vertical elevation of cable trays above the floor or bottom of ceiling structure.
- D. Field quality-control reports.
- E. Operation and Maintenance Data: For cable trays to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain cable tray components through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store indoors to prevent water or other foreign materials from staining or adhering to cable tray. Unpack and dry wet materials before storage.
- B. Steel cable tray shall be stored in a well-ventilated, dry location. Unpack and dry wet materials before storage.
- C. PVC-coated and Field-painted cable tray shall be stored indoors. Protect cable tray from scratching and marring of finish. Unpack and dry wet materials before storage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper B-Line, Inc.
 - 2. MONO-SYSTEMS, Inc.
 - 3. MPHusky.

2.2 MATERIALS AND FINISHES

- A. Cable Trays, Fittings, and Accessories: Steel, complying with NEMA VE 1.
 - 1. Factory-standard primer, ready for field painting; with cadmium-plated hardware according to ASTM B 766.
 - 2. Mill galvanized before fabrication, complying with ASTM A 653/A 653M, G90 (Z275) coating; with hardware galvanized according to ASTM B 633.
 - 3. Electrogalvanized before fabrication, complying with ASTM B 633; with hardware galvanized according to ASTM B 633.
 - 4. Hot-dip galvanized after fabrication, complying with ASTM A 123/A 123M, Class B2; with Type 316 stainless-steel hardware.
 - 5. PVC coating applied in a fluidized bed or by electrostatic spray; with Type 316 stainless-steel hardware.
 - 6. Epoxy-resin paint over paint manufacturer's recommended primer and corrosion-inhibiting treatment; with Type 316 stainless-steel hardware.
- B. Cable Trays, Fittings, and Accessories: Aluminum, complying with NEMA VE 1, Aluminum Association's Alloy 6063-T6 for rails, rungs, and cable trays, and Alloy 5052-H32 or

Alloy 6061-T6 for fabricated parts; with Type 316 stainless-steel splice-plate fasteners, bolts, and screws

- C. Cable Trays, Fittings, and Accessories: Stainless steel, Type 304 or 316, complying with NEMA VE 1.
- D. Cable Trays, Fittings, and Accessories: Fiberglass, complying with NEMA FG 1 and UL 568. Splice-plate fasteners, bolts, and screws shall be fiberglass-encapsulated stainless steel. Design fasteners so that no metal is visible when fully assembled and tightened. Fastener encapsulation shall not be damaged when torqued to manufacturer's recommended value.
- E. Sizes and Configurations: Refer to the Cable Tray Schedule on Drawings for specific requirements for types, materials, sizes, and configurations.
 - 1. Center-hanger supports may be used only when specifically indicated.

2.3 CABLE TRAY ACCESSORIES

- A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.
- B. Covers: Solid, Louvered, Ventilated-hat, or 2-in-3 pitch cover type of same materials and finishes as cable tray.
- C. Barrier Strips: Same materials and finishes as cable tray.
- D. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

2.4 WARNING SIGNS

- A. Lettering: 1-1/2-inch- (40-mm-) high, black letters on yellow background with legend "WARNING! NOT TO BE USED AS WALKWAY, LADDER, OR SUPPORT FOR LADDERS OR PERSONNEL."
- B. Materials and fastening are specified in Division 26 Section "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

- A. Perform design and production tests according to NEMA VE 1.

PART 3 - EXECUTION

3.1 CABLE TRAY INSTALLATION

- A. Comply with recommendations in NEMA VE 2. Install as a complete system, including all necessary fasteners, hold-down clips, splice-plate support systems, barrier strips, hinged horizontal and vertical splice plates, elbows, reducers, tees, and crosses.
- B. Remove burrs and sharp edges from cable trays.

- C. Fasten cable tray supports to building structure and install restraints.
 - 1. Place supports so that spans do not exceed maximum spans on schedules.
 - 2. Construct supports from channel members, threaded rods, and other appurtenances furnished by cable tray manufacturer. Arrange supports in trapeze or wall-bracket form as required by application.
 - 3. Support bus assembly to prevent twisting from eccentric loading.
 - 4. Manufacture center-hung support, designed for 60 percent versus 40 percent eccentric loading condition, with a safety factor of 3.
 - 5. Locate and install supports according to NEMA VE 1.
 - D. Make connections to equipment with flanged fittings fastened to cable tray and to equipment. Support cable tray independent of fittings. Do not carry weight of cable tray on equipment enclosure.
 - E. Install expansion connectors where cable tray crosses building expansion joint and in cable tray runs that exceed dimensions recommended in NEMA VE 1. Space connectors and set gaps according to applicable standard.
 - F. Make changes in direction and elevation using standard fittings.
 - G. Make cable tray connections using standard fittings.
 - H. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Fire-Stopping".
 - I. Sleeves for Future Cables: Install capped sleeves for future cables through fire-stop-sealed cable tray penetrations of fire and smoke barriers.
 - J. Workspace: Install cable trays with enough space to permit access for installing cables.
 - K. Install barriers to separate cables of different systems, such as power, communications, and data processing; or of different insulation levels, such as 600, 5000, and 15,000 V.
 - L. After installation of cable trays is completed, install warning signs in visible locations on or near cable trays.
- 3.2 CABLE INSTALLATION
- A. Install cables only when cable tray installation has been completed and inspected.
 - B. Fasten cables on horizontal runs with cable clamps or cable ties as recommended by NEMA VE 2. Tighten clamps only enough to secure the cable, without indenting the cable jacket. Install cable ties with a tool that includes an automatic pressure-limiting device.
 - C. On vertical runs, fasten cables to tray every 18 inches (457 mm). Install intermediate supports when cable weight exceeds the load-carrying capacity of the tray rungs.

- D. In existing construction, remove inactive or dead cables from cable tray.
- E. Install covers after installation of cable is completed.

3.3 CONNECTIONS

- A. **Ground cable trays according to manufacturer's written instructions and per R56, the more stringent shall apply.**
- B. Install an insulated equipment grounding conductor with cable tray, in addition to those required by NFPA 70.

3.4 FIELD QUALITY CONTROL

- A. After installing cable trays and after electrical circuitry has been energized, survey for compliance with requirements. Perform the following field quality-control survey:
 - 1. Visually inspect cable insulation for damage. Correct sharp corners, protuberances in cable tray, vibration, and thermal expansion and contraction conditions, which may cause or have caused damage.
 - 2. Verify that the number, size, and voltage of cables in cable tray do not exceed that permitted by NFPA 70. Verify that communication or data-processing circuits are separated from power circuits by barriers.
 - 3. Verify that there is no intrusion of such items as pipe, hangers, or other equipment that could damage cables.
 - 4. Remove deposits of dust, industrial process materials, trash of any description, and any blockage of tray ventilation.
 - 5. Visually inspect each cable tray joint and each ground connection for mechanical continuity. Check bolted connections between sections for corrosion. Clean and retorquer in suspect areas.
 - 6. Check for missing or damaged bolts, bolt heads, or nuts. When found, replace with specified hardware.
 - 7. Perform visual and mechanical checks for adequacy of cable tray grounding; verify that all takeoff raceways are bonded to cable tray.
- B. Report results in writing.

3.5 PROTECTION

- A. Protect installed cable trays.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by cable tray manufacturer.

3. Install temporary protection for cables in open trays to protect exposed cables from falling objects or debris during construction. Temporary protection for cables and cable tray can be constructed of wood or metal materials until the risk of damage is over.

END OF SECTION 26 05 36

SECTION 26 32 13 - ENGINE GENERATORS **Addendum 1 (Revision 2)**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes packaged engine-generator sets for emergency and standby power supply with the following features:
 - 1. Diesel engine.
 - 2. Unit-mounted cooling system.
 - 3. Unit- and Remote-mounting control and monitoring.
 - 4. Performance requirements.
 - 5. Outdoor enclosure.
- B. Related Sections include the following:
 - 1. Division 26 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.3 DEFINITIONS

- A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
 - 1. Thermal damage curve for generator.
 - 2. Time-current characteristic curves for generator protective device.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.

2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and for designing vibration isolation bases.
 3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
 4. Wiring Diagrams: Power, signal, and control wiring.
- C. Qualification Data: For installer, manufacturer, and testing agency.
- D. Source quality-control test reports.
1. Certified summary of prototype-unit test report.
 2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
 3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
 4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
 5. Report of sound generation.
 6. Report of exhaust emissions showing compliance with applicable regulations.
 7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
- G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
1. Maintenance Proximity: Not more than one hours' normal travel time from Installer's place of business to Project site.
 2. Engineering Responsibility: Preparation of data for vibration isolators of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL), and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- D. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Comply with ASME B15.1.
- G. Comply with NFPA 37.
- H. Comply with NFPA 70.
- I. Comply with NFPA 99.
- J. Comply with NFPA 110 requirements for Level 1 emergency power supply system.
- K. Comply with UL 2200.
- L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.
- M. Noise Emission: Comply with applicable state and local government requirements for maximum noise level due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify Construction Manager and Owner no fewer than seven days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Construction Manager's and Owner's permission.
- B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 1000 feet (300 m).

1.7 COORDINATION

- A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate size and location of roof curbs, equipment supports, and roof penetrations for remote radiators. These items are specified in Division 07 Section "Roof Accessories."

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: 5 years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.10 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
 2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
 3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Caterpillar; Engine Div. (Basis of design, compliance for substitutions, including size, space requirements/availability, ratings, etc. shall be the responsibility of the electrical

contractor. Any costs associated with re-design to accommodate substitutions shall be at the EC's expense.)

2. MTU
3. Onan/Cummins Power Generation; Industrial Business Group.
4. **Kohler Power Systems.**
5. **Generac**

2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
 1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.
- C. Capacities and Characteristics:
 1. Power Output Ratings: Nominal ratings as indicated.
 2. Output Connections: Three-phase, four wire.
 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
- D. Generator-Set Performance:
 1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.
 - a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.
 2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
 3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
 4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.
 - a. Provide permanent magnet excitation for power source to voltage regulator.
10. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

- A. Fuel: Fuel oil, Grade DF-2.
- B. Rated Engine Speed: 1800 rpm.
- C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).
- D. Lubrication System: The following items are mounted on engine or skid:
 1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
 2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- E. Engine Fuel System:
 1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
 2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

- F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.
- G. Governor: Adjustable isochronous, with speed sensing.
- H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.
 - 1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 - 2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 - 3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 - 4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
 - 5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
 - a. Rating: 100-psig maximum working pressure with coolant at 300 deg F, and noncollapsible under vacuum.
 - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- I. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
 - 1. Minimum sound attenuation of 25 dB at 500 Hz.
 - 2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be 85 dBA or less.
- J. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- K. Starting System: 24-V electric, with negative ground.
 - 1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum.
 - 2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
 - 3. Cranking Cycle: 60 seconds at 32 degrees F at firing speed.

4. Battery: Adequate capacity within ambient temperature range to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:
 - a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
 - b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
 - c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
 - d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
 - e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
 - f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

- A. Comply with NFPA 30.
- B. Base-Mounted Fuel Oil Tank: Comply with UL 142, factory-fabricated fuel tank assembly, with integral, float-controlled transfer pump and the following features:
 1. Containment: Integral rupture basin with a capacity of 150 percent of nominal capacity of tank.

- a. Leak Detector: Locate in rupture basin and connect to provide audible and visual alarm in the event of tank leak.
2. Tank Capacity: As required for an uninterrupted period of **75 hours'** operation at 100 percent of rated power output of engine-generator system without being refilled.
3. Pump Capacity: Exceeds maximum flow of fuel drawn by engine-mounted fuel supply pump at 110 percent of rated capacity, including fuel returned from engine.
4. Low-Level Alarm Sensor: Liquid-level device operates alarm contacts at 25 percent of normal fuel level.
5. High-Level Alarm Sensor: Liquid-level device operates alarm and redundant fuel shutoff contacts at midpoint between overflow level and 100 percent of normal fuel level.
6. Piping Connections: Factory-installed fuel supply and return lines from tank to engine; local fuel fill, vent line, overflow line; and tank drain line with shutoff valve.
7. Redundant High-Level Fuel Shutoff: Actuated by high-level alarm sensor in day tank to operate a separate motor device that disconnects day-tank pump motor. Sensor shall signal solenoid valve, located in fuel suction line between fuel storage tank and day tank, to close. Both actions shall remain in shutoff state until manually reset. Shutoff action shall initiate an alarm signal to control panel but shall not shut down engine-generator set.

2.5 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.
- D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel.
- E. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and

monitoring section of panel shall be isolated from power sections by steel barriers. Panel features shall include the following:

1. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6. Power bus shall be copper. Bus, bus supports, control wiring, and temperature rise shall comply with UL 891.
 2. Current and Potential Transformers: Instrument accuracy class.
- F. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
1. AC voltmeter.
 2. AC ammeter.
 3. AC frequency meter.
 4. DC voltmeter (alternator battery charging).
 5. Engine-coolant temperature gage.
 6. Engine lubricating-oil pressure gage.
 7. Running-time meter.
 8. Ammeter-voltmeter, phase-selector switch(es).
 9. Generator-voltage adjusting rheostat.
 10. Fuel tank derangement alarm.
 11. Fuel tank high-level shutdown of fuel supply alarm.
 12. Generator overload.
- G. Indicating and Protective Devices and Controls:
1. AC voltmeter.
 2. AC ammeter.
 3. AC frequency meter.
 4. DC voltmeter (alternator battery charging).
 5. Engine-coolant temperature gage.
 6. Engine lubricating-oil pressure gage.
 7. Running-time meter.

8. Ammeter-voltmeter, phase-selector switch(es).
 9. Generator-voltage adjusting rheostat.
 10. Start-stop switch.
 11. Overspeed shutdown device.
 12. Coolant high-temperature shutdown device.
 13. Coolant low-level shutdown device.
 14. Oil low-pressure shutdown device.
 15. Fuel tank derangement alarm.
 16. Fuel tank high-level shutdown of fuel supply alarm.
 17. Generator overload.
- H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.
- I. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals.
- J. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.
1. Overcrank shutdown.
 2. Coolant low-temperature alarm.
 3. Control switch not in auto position.
 4. Battery-charger malfunction alarm.
 5. Battery low-voltage alarm.
- K. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.
1. Engine high-temperature shutdown.
 2. Lube-oil, low-pressure shutdown.
 3. Overspeed shutdown.
 4. Remote emergency-stop shutdown.

5. Engine high-temperature prealarm.
 6. Lube-oil, low-pressure prealarm.
 7. Fuel tank, low-fuel level.
 8. Low coolant level.
- L. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.
- M. Emergency-Stop Switch: Push button shall be protected from accidental operation.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.
1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
 2. Trip Settings: Selected to coordinate with generator thermal damage curve.
 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
 4. Mounting: Adjacent to or integrated with control and monitoring panel.
- B. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:
1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
 3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

- C. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H or Class F.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F. Enclosure: Dripproof.
- G. Instrument Transformers: Mounted within generator enclosure.
- H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.
 - 1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.
- I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.
- J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.
- K. Subtransient Reactance: 12 percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

- A. Description: Vandal-resistant, sound-attenuated, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.
- B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range.
 - 1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
 - 2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

2.9 VIBRATION ISOLATION DEVICES

- A. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.
1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
 2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.10 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.11 SOURCE QUALITY CONTROL

- A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.
- B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:
1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
 2. Full load run.
 3. Maximum power.
 4. Voltage regulation.
 5. Transient and steady-state governing.
 6. Single-step load pickup.
 7. Safety shutdown.
 8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.

9. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.
- B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.
- B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.
- C. Install packaged engine generator with restrained spring isolators having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases.
- D. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in Division 23 Sections. Drawings indicate general arrangement of piping and specialties.
- B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.
- C. Connect engine exhaust pipe to engine with flexible connector.
- D. Connect fuel piping to engines with a gate valve and union and flexible connector.
- E. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- F. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 IDENTIFICATION

- A. Identify system components according to Division 23 Section "Identification for HVAC Piping and Equipment" and Division 26 Section "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- C. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 - 1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
 - 3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
 - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
 - b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
 - c. Verify acceptance of charge for each element of the battery after discharge.
 - d. Verify that measurements are within manufacturer's specifications.
 - 4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
 - 5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
 - 6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
 - 7. Exhaust Emissions Test: Comply with applicable government test criteria.

8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
 9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
 10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations on the project site, and compare measured levels with required values.
- E. Coordinate tests with tests for transfer switches and run them concurrently.
- F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.
- G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- J. Remove and replace malfunctioning units and retest as specified above.
- K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
- L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- M. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.
1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 MANUFACTURER'S START-UP

- A. An outline detailing all start-up activities to be performed by the manufacturer shall be provided to the Owner, Owner's representative, and Engineer.
- B. In addition to detailed items required as part of the start-up, the outline shall include verification of settings and operations of all protective relays, alarms, shutdowns, controls, interlocks, and interfaces for the generator and associated components such as motorized louvers, exhaust fans, batteries, heaters, paralleling switchgear, ATS's, monitoring systems, etc.
- C. The outline shall be submitted a minimum of 2 months prior to the scheduled delivery date to allow for incorporation into the project schedule.
- D. The start-up outline shall state anticipated durations for each activity.
- E. Where required, the start-up outline shall list specific items to be performed by others.
- F. The manufacturer shall provide written documentation showing each start-up activity has been completed. Site testing and commissioning shall not begin until this record documentation has been provided by the manufacturer.

3.7 SITE TESTING

- A. IF ANY TESTS REQUIRED BY THIS SECTION EXCEED THE CAPABILITIES OR RECOMMENDATIONS OF THE GENERATOR SET MANUFACTURER, THOSE LIMITATIONS SHALL BE EXPLICITLY STATED IN THE VENDOR'S PROPOSAL.
- B. The manufacturer shall be required to participate in all site testing (including independent third party commissioning) as specified herein and as required by the Owner's Commissioning Agent (CxA). The Vendor's proposal shall include the minimum testing specified herein and a separate line item shall list cost and time assumptions for work associated with the detailed commissioning plan to be provided by the Owner's CxA.
- C. Perform battery tests as follows:
 - 1. Equalize batteries according to battery manufacturer's written instructions and record individual cell voltages.
 - 2. Measure charging voltage and voltages between battery terminals for full-charging and float charging conditions.
 - 3. Test for contact integrity of all connections. Perform an integrity load test and a capacity load test.
 - 4. Verify acceptance of charge for each element of the battery after discharge.

5. Verify that measurements are within the battery manufacturer's specifications.
- D. The site testing listed below shall be with the generators operating in parallel as a single generator plant. All load required for the testing shall be via manufacturer supplied portable resistive load bank(s), 4.5 MW total.
- E. A cold, single-step, full rated reactive load at 0.8 power factor shall be applied to, and accepted by, the generator plant within the time requirements of NFPA 110.
- F. An uninterrupted, 8-hour, full load test (reactive), at 0.8 power factor, shall be conducted. The following data shall be recorded at 15 minute intervals:
 1. Time stamp
 2. Output voltage (line-to-line and line-neutral)
 3. Output current (each phase)
 4. Output frequency
 5. Total kW output
 6. Total kVA output
 7. Power factor
 8. Engine RPM
 9. Coolant temperature
 10. Oil temperature
 11. Oil pressure
 12. Fuel pressure
 13. Ambient temperature
- G. Voltage regulation shall be calculated.
 1. $V_{\text{regulation}} = 100\% \times (V_{\text{no load}} - V_{\text{full load}}) / V_{\text{no load}}$
- H. The following transient tests shall be performed and recorded:
 1. No load to 25% load to no load
 2. No load to 50% load to no load
 3. No load to 75% load to no load
 4. No load to 100% load to no load

5. 25% load to 50% load to 25% load
 6. 25% load to 75% load to 25% load
 7. 25% load to 100% load to 25% load
 8. 50% load to 75% load to 50% load
 9. 50% load to 100% load to 50% load
 10. 75% load to 100% load to 75% load
- I. At the end of site testing and commissioning, an oil sample shall be taken and analyzed. The results shall be provided with the final report as specified below.
 - J. Test all alarms and safety shutdown devices for proper operation and annunciation.
 - K. Check for exhaust leaks, oil leaks, fuel leaks, excessive vibration, etc.
 - L. Verify generator pitch with an oscilloscope and verify all generators are matched where applicable.
 - M. Measure sound levels at several locations periodically during testing and verify compliance with requirements listed in Part 2 of these specifications.
 - N. At the end of site testing and commissioning, the manufacturer or authorized dealer shall provide a complete and neatly compiled report with all alarm setpoints, relay settings, recordings, measurements, calculations, findings, etc. in both hard copy and electronic format. This report may be incorporated into reports by the Engineer or CxA, but does not relieve the manufacturer from the requirement of providing a separate report.
 - O. All consumables necessary for the test shall be furnished by the generator manufacturer or authorized dealer. These shall include, but not be limited to, load bank and cables, fuel, oil, coolant, and filters.
 - P. All fluid levels shall be checked at the end of site testing and commissioning.
 - Q. The condition of all filters items shall be checked at the end of site testing and commissioning and replaced by the generator manufacturer or authorized dealer as needed.
- 3.8 DEMONSTRATION
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 26 32 13

SECTION 26 41 13 - LIGHTNING PROTECTION FOR STRUCTURES **Addendum 1 (Revision 2)**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. General provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes lightning protection for building elements. Specification is provided for performance specification and shall be used to provide a contract price for lightning protection system. Contractor shall provide a UL master label lightning protection system for the building including all required conductors, equipment, raceways and design.

1.3 DEFINITIONS

- A. LPI: Lightning Protection Institute.
- B. NRTL: National recognized testing laboratory.

1.4 SUBMITTALS

- A. Product Data: For air terminals and mounting accessories.
- B. Shop Drawings: Detail lightning protection system, including air-terminal locations, conductor routing and connections, and bonding and grounding provisions. Include indications for use of raceway, data on how concealment requirements will be met, and calculations required by NFPA 780 for bonding of grounded and isolated metal bodies.
- C. Qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include data on listing or certification by an NRTL or LPI.
- D. Certification, signed by Contractor, that roof adhesive for air terminals is approved by manufacturers of both the terminal assembly and the single-ply membrane roofing material.
- E. Field inspection reports indicating compliance with specified requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who is an NRTL or who is certified by LPI as a Master Installer/Designer.
- B. Listing and Labeling: As defined in NFPA 780, "Definitions" Article.

1.6 COORDINATION

- A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

- B. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and Installer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Automatic Lightning Protection.
 - 2. ERICO International Corporation.
 - 3. Harger Lightning Protection, Inc.
 - 4. Heary Bros. Lightning Protection Co. Inc.
 - 5. Independent Protection Co.
 - 6. Robbins Lightning Inc.
 - 7. Thompson Lightning Protection, Inc.

2.2 LIGHTNING PROTECTION SYSTEM COMPONENTS

- A. Comply with UL 96.
- B. Roof-Mounting Air Terminals: NFPA **Class II, aluminum**, solid, unless otherwise indicated.
 - 1. Single-Membrane, Roof-Mounting Air Terminals: Designed for single-membrane roof materials.
- C. Stack-Mounting Air Terminals: Stainless steel.
- D. Ground Rods, Ground Loop Conductors, and Concrete-Encased Electrodes: Comply with Division 26 Section "Grounding and Bonding for Electrical Systems" and with standards referenced in this Section.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install lightning protection components and systems according to UL 96A and NFPA 780.
- B. Install conductors with direct paths from air terminals to ground connections. Avoid sharp bends and narrow loops.
- C. Conceal the following conductors:

1. System conductors.
 2. Down conductors.
 3. Interior conductors.
 4. Conductors within normal view from exterior locations at grade within 200 feet of building.
 5. Notify Architect at least 48 hours in advance of inspection before concealing lightning protection components.
- D. Cable Connections: Use approved exothermic-welded connections for all conductor splices and connections between conductors and other components, except those above single-ply membrane roofing.
- E. Air Terminals on Single-Ply Membrane Roofing: Comply with adhesive manufacturer's written instructions.
- F. Bond extremities of vertical metal bodies exceeding 60 feet in length to lightning protection components.
- G. A counterpoise installation based on requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" may be used as a ground loop required by NFPA 780, provided counterpoise conductor meets or exceeds minimum requirements in NFPA 780.
1. Bond ground terminals to counterpoise conductor.
 2. Bond grounded metal bodies on building within 12 feet of ground to counterpoise conductor.
 3. Bond grounded metal bodies on building within 12 feet of roof to counterpoise conductor.
- H. Bond lightning protection components with intermediate-level interconnection loop conductors to grounded metal bodies of building at 60-foot intervals.

3.2 CORROSION PROTECTION

- A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.
- B. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.

3.3 FIELD QUALITY CONTROL

- A. UL Inspection: Provide inspections as required to obtain a UL Master Label for system.

END OF SECTION 26 41 13

SECTION 26 43 13 - SURGE-PROTECTIVE DEVICES (SPDs) FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS (1kV OR LESS) **Addendum 1 (Revision 2)**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to Power riser diagram for more information on the number and types of SPDs required. All SPDs are to be **Normal Mode type and approved to be utilized on Motorola R56 Systems.**

1.2 SUMMARY

- A. This Section includes SPDs for low-voltage power (1kV or less), control, and communication equipment.

1.3 DEFINITIONS

- A. ATS: Acceptance Testing Specifications.
- B. SPD: Surge-Protective Device.
- C. VPR: Voltage Protection Ratings

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.
- B. Product Certificates: For transient voltage suppression devices, signed by product manufacturer certifying compliance with the latest editions of the following standards:
 - 1. UL 1283.
 - 2. UL 1449.
- C. Qualification Data: For testing agency.
- D. Field quality-control test reports, including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Failed test results and corrective action taken to achieve requirements.
- E. Operation and Maintenance Data: For transient voltage suppression devices to include in emergency, operation, and maintenance manuals.

- F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Source Limitations: Obtain surge-protective devices and accessories through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, dimensional requirements, and electrical performance of SPDs and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with IEEE C62.41, "IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits," and test devices according to IEEE C62.45, "IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits."
- F. Comply with NEMA LS 1, "Low Voltage Surge Protection Devices."
- G. Comply with the latest editions of UL 1283, "Electromagnetic Interference Filters," and UL 1449, "Surge-Protective Devices."

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.
- B. Service Conditions: Rate surge-protective devices for continuous operation under the following conditions, unless otherwise indicated:
1. Maximum Continuous Operating Voltage: **Shall not be greater than 115 percent of nominal system operating voltage.**
2. Operating Temperature: 30 to 120 deg F.
3. Humidity: 0 to 85 percent, non-condensing.

4. Altitude: Less than 20,000 feet above sea level.

1.7 COORDINATION

- A. Coordinate location of field-mounted surge-protective devices to allow adequate clearances for maintenance.
- B. Coordinate surge-protective devices with Division 26 Section "Electrical Power Monitoring and Control."

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge-protective devices which fail in materials or workmanship within five years from date of Substantial Completion.
- B. Special Warranty for Cord-Connected, Plug-in Surge-Protective Devices: Manufacturer's standard form in which manufacturer agrees to repair or replace electronic equipment connected to circuits protected by surge-protective devices.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following

- 1. ASCO or approved equal.**

2.2 SERVICE ENTRANCE SPDs (TYPE 1 SPDs)

- A. Surge-Protective Device Description: Modular design with field-replaceable modules, sine-wave-tracking type with the following features and accessories:
 1. Fuses, rated at 200-kA interrupting capacity.
 2. Fabrication using bolted compression lugs for internal wiring.
 3. Integral disconnect switch.
 4. Redundant suppression circuits.
 5. Redundant replaceable modules.
 6. Arrangement with copper bus bars and for bolted connections to phase buses, neutral bus, and ground bus.
 7. Arrangement with wire connections to phase buses, neutral bus, and ground bus.

8. LED indicator lights for power and protection status.
 9. Audible alarm, with silencing switch, to indicate when protection has failed.
 10. One set of dry contacts rated at 5-A and 250-VAC, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
 11. Surge-event operations counter.
- B. Peak Single-Impulse Surge Current Rating: 240 kA per phase.
- C. Connection Means: Permanently wired, integral or external as indicated on the drawings.
- D. **Protection modes and UL 1449 VPR for 3-phase, 4-wire, grounded wye circuits with voltages of 480Y/277, 208Y/120, or 600Y/347 as indicated on the drawings shall be as follows:**
1. **Line to Neutral: 1200 V for 480Y/277, 800 V for 208Y/120, 1500 V for 600Y/347.**
- E. **Protection modes and UL 1449 VPR for 240/120-V, single-phase, 3-wire circuits shall be as follows:**
1. **Line to Neutral: 800 V.**
- F. **Protection modes and UL 1449 VPR for 240/120-V, 3-phase, 4-wire circuits with high leg shall be as follows:**
1. **Line to Neutral: 800 V, 1200 V from high leg.**
- G. Protection modes and UL 1449 VPR for 3-phase, 3-wire delta circuits with voltages of 240, 480, or 600 as indicated on the drawings shall be as follows:
1. Line to Line: 2000 V for 480 V, 1200 V for 240 V, 2500 V for 600 V.
 2. Line to Ground: 2000 V for 480 V, 1200 V for 240 V, 2500 V for 600 V.
- 2.3 PANELBOARD SURGE-PROTECTIVE DEVICES (TYPE 2 SPDs)
- A. Surge-Protective Device Description: Modular design with field-replaceable modules, sign-wave-tracking type with the following features and accessories:
1. Fuses, rated at 200-kA interrupting capacity.
 2. Fabrication using bolted compression lugs for internal wiring.
 3. Integral disconnect switch.
 4. Redundant suppression circuits.
 5. Redundant replaceable modules.
 6. Arrangement with wire connections to phase buses, neutral bus, and ground bus.

7. LED indicator lights for power and protection status.
 8. Audible alarm, with silencing switch, to indicate when protection has failed.
 9. One set of dry contacts rated at 5-A and 250-VAC, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
 10. Surge-event operations counter.
- B. Peak Single-Impulse Surge Current Rating: 160 kA per phase.
- C. Protection modes and UL 1449 VPR for 3-phase, 4-wire, grounded wye circuits with voltages of 480Y/277, 208Y/120, or 600Y/347 as indicated on the drawings shall be as follows:
1. Line to Neutral: 1200 V for 480Y/277, 800 V for 208Y/120, 1500 V for 600Y/347.
 2. Line to Ground: 1200 V for 480Y/277, 900 V for 208Y/120, 1500 V for 600Y/347.
 3. Neutral to Ground: 1000 V for 480Y/277, 700 V for 208Y/120, 1200 V for 600Y/347.
- D. Protection modes and UL 1449 VPR for 240/120-V, single-phase, 3-wire circuits shall be as follows:
1. Line to Neutral: 800 V.
 2. Line to Ground: 900 V.
 3. Neutral to Ground: 700 V.
- E. Protection modes and UL 1449 VPR for 240/120-V, 3-phase, 4-wire circuits with high leg shall be as follows:
1. Line to Neutral: 800 V, 1200 V from high leg.
 2. Line to Ground: 900 V.
 3. Neutral to Ground: 700 V.
- F. Protection modes and UL 1449 VPR for 3-phase, 3-wire delta circuits with voltages of 240, 480, or 600 as indicated on the drawings shall be as follows:
1. Line to Line: 2000 V for 480 V, 1200 V for 240 V, 2500 V for 600 V.
 2. Line to Ground: 1800 V for 480 V, 1200 V for 240 V, 2000 V for 600 V.

2.4 SURGE-PROTECTIVE DEVICES FOR ELECTRONIC-GRADE PANELBOARDS (TYPE 2A SPDs)

- A. Surge Protection Device Description: Sine-wave-tracking type, panel-mounted design with the following features and accessories:
1. LED indicator lights for power and protection status.

2. Audible alarm, with silencing switch, to indicate when protection has failed.
 3. One set of dry contacts rated at 5-A and 250-VAC, for remote monitoring of protection status.
 4. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
- B. Peak Single-Impulse Surge Current Rating: 160 kA per phase.
- C. **Protection modes and UL 1449 VPR for 3-phase, 4-wire, grounded wye circuits with voltages of 480Y/277, 208Y/120, or 600Y/347 as indicated on the drawings shall be as follows:**
1. **Line to Neutral: 1200 V for 480Y/277, 800 V for 208Y/120, 1200 V for 600Y/347.**
- D. **Protection modes and UL 1449 VPR for 240/120-V, single-phase, 3-wire circuits shall be as follows:**
1. **Line to Neutral: 800 V.**
- E. **Protection modes and UL 1449 VPR for 240/120-V, 3-phase, 4-wire circuits with high leg shall be as follows:**
1. **Line to Neutral: 800 V, 1200 V from high leg.**
- F. **Protection modes and UL 1449 VPR for 3-phase, 3-wire delta circuits with voltages of 240, 480, or 600 as indicated on the drawings shall be as follows:**
1. **Line to Line: 2000 V for 480 V, 1200 V for 240 V, 2500 V for 600 V.**
- 2.5 PLUG-IN SURGE-PROTECTIVE DEVICES (TYPE 3 SPDs)
- A. Description: Non-modular, plug-in surge-protective devices with at least four 15-A, 120-V ac, NEMA WD 6, Configuration 15-15R receptacles, suitable to plug into a NEMA WD 6, Configuration 15-15R receptacle; with the following features and accessories:
1. LED indicator lights for power and protection status (Direct plug-in).
 2. LED indicator lights for power, protection status, reverse polarity and open outlet ground (Cord connected).
 3. Circuit breaker and thermal fusing. When protection is lost, circuit opens.
 4. Close-coupled direct plug-in or cord connected with 15-foot line cord as indicated on the drawings.
- B. Peak Single-Impulse Surge Current Rating: 33 kA per phase.
- C. Protection modes and UL 1449 VPR shall be as follows:
1. Line to Neutral: 475 V.

2.6 ENCLOSURES

- A. NEMA 250, with type matching the enclosure of panel or device being protected.

PART 3 - EXECUTION

3.1 INSTALLATION OF SURGE-PROTECTIVE DEVICES

- A. Install devices at service entrance on load side, with ground lead bonded to service entrance ground.
- B. Install devices for panelboard and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
 - 1. Provide multi-pole circuit breaker as a dedicated disconnect for the SPD, unless otherwise indicated. Amperage rating and conductor sizes shall be per the manufacturer's requirements. Where a conflict exists between the drawings and the manufacturer, the manufacturer's requirements shall supersede the drawings.

3.2 PLACING SYSTEM INTO SERVICE

- A. Do not energize or connect service entrance equipment or panelboards to their sources until surge protection devices are installed and connected.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust equipment installation, including connections, and to assist in field testing. Report results in writing.
 - 1. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. Testing: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports:
- C. Testing: Perform the following field tests and inspections and prepare test reports:
 - 1. After installing surge protection devices, but before electrical circuitry has been energized, test for compliance with requirements.
 - 2. Complete startup checks according to manufacturer's written instructions.
 - 3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.
- D. Remove and replace malfunctioning units and retest as specified above.

SURGE-PROTECTIVE DEVICES (SPDs)
FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS (1kV OR LESS)

SECTION 26 43 13

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transient voltage suppression devices. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 26 43 13

SECTION 27 53 19 - EMERGENCY RESPONDER RADIO ANTENNA/REPEATER SYSTEM
Addendum 1 (Revision 2)

PART 1 GENERAL

1.0 **This system is to comply with R56.**

1.01 SUMMARY

- A. Furnish, install, and test a complete and operating Emergency Responder Radio Antenna/Repeater System.

1.02 SECTION INCLUDES

- A. This Section includes the requirements for an Emergency Responder Radio Antenna/Repeater System for the purposes of assuring reliable communications by providing a minimum signal strength and minimum voice quality in 95% of all areas of the building.
- B. Components Include
 1. Bi-directional amplifiers ("BDA" or "BDAs")
 2. Donor antenna
 3. Indoor coverage antennas
 4. Distributed Antenna System ("DAS")
 5. Coaxial cable
 6. Splitters and directional couplers
 7. Backup power
 8. All other equipment and components necessary for a complete and functioning Emergency Responder Radio Antenna/Repeater System.

1.03 RELATED CODES AND STANDARDS

- A. All aspects of system design, installation, testing and maintenance shall comply with the current versions of the following:
 1. NFPA 1 – The National Fire Code (including Annex O from 2009)
 2. NFPA 70 – The National Electrical Code
 3. NFPA 101, Life Safety Code
 4. NFPA 72-07 National Fire Alarm Code
 5. FCC 47 CFR Part 90.219: Private Land Mobile Radio, Use of Signal Boosters
 6. Section 510 International Fire Code
 7. TSB-88-B, The Telecommunications Industry Association's (TIA) Technical Service Bulletin 88
 8. Equipment manufacturers' installation and maintenance specifications
- B. The requirements established by the AHJ in effect at the time of system installation supersede the specifications in this section. It is the contractor's responsibility to assure the installed system complies with all currently applicable local, national and industry codes as adopted by the AHJ.

1.04 DEFINITIONS

A. Definitions:

1. Authority Having Jurisdiction (“AHJ”): The local authority responsible for establishing requirements for Emergency Responder Radio Coverage Systems consistent with local codes and policies.
2. Critical Areas: Spaces within a building that require an extra assurance of radio coverage. These areas include emergency command centers, fire pump rooms, exit stairs, exit passageways, elevator lobbies, standpipe cabinets and other areas deemed critical by the AHJ.
3. Contractor: The entity bidding the project.
4. Owner: The entity who commissioned the project and will own the finished building.
5. Bi-Directional Amplifier or “BDA”: An electronic device designed to provide amplification of uplink and downlink channels of radio services. These devices can be configured for operation on specific narrow-band frequencies, on a specific frequency band or on multiple frequency bands.
6. Distributed Antenna System (“DAS”): A network typically consisting of coaxial cable, fiber cable, splitters, taps, couplers and antennas designed for delivering radio signals to and from spatially separated antenna nodes or other intentional radiators, such as leaky coaxial cable, within a building or area where traditional off-air signal delivery is compromised.
7. Backup Power Supply: A secondary power source to support uninterrupted system operation in case of a failure of the primary power source. This system is configured to automatically transfer its load upon failure and restoration of the primary power source.
8. Donor Antenna: An antenna installed and directed to intercept over-the-air downlink and uplink radio signals on one or more channels from a specific base station or fixed repeater facility. A donor antenna usually is located on a roof or other location where reliable signal reception can be achieved. This antenna conveys radio signals delivered to and from a distributed antenna system.
9. Emergency Responder Radio Coverage System: A two-way radio communication system installed to assure the effective operation of radio communications systems specifically for fire, emergency medical services or law enforcement agencies within a structure where radio reception may otherwise be too weak for reliable communications.
10. Delivered Audio Quality Definitions (“DAQ”): This is a universal standard adopted from TSB-88-B and often cited in system designs and specifications.
 - a. DAQ 1: Unusable, speech present but unreadable.
 - b. DAQ 2: Understandable with considerable effort. Frequent repetition due to noise/distortion.
 - c. DAQ 3: Speech understandable with slight effort. Occasional repetition required due to noise/distortion.
 - d. DAQ 3.4: Speech understandable with repetition only rarely required. Some noise/distortion
 - e. DAQ 4: Speech easily understood. Occasional noise/distortion.
 - f. DAQ 4.5: Speech easily understood. Infrequent noise/distortion.
 - g. DAQ 5: Speech easily understood.
11. Active System Components: System components, such as amplifiers, that require power. These components typically are utilized to provide amplification or “gain” to signals on the system.
12. Passive System Components: These components introduce signal loss in an RF system. Splitters, combiners, taps, directional couplers and cable are examples of passive system components.

13. Passive InterModulation (“PIM”): Unwanted signals generated due to non-linear connections or junctions in an RF path.
14. FCC: Federal Communications Commission
15. OET 65 Standards: FCC's Bulletin 65 provides Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
16. Public Safety/First Responder: Public Safety or First Responder agencies which are charged with the responsibility of responding to emergency situations. These include, but are not limited to: law enforcement departments, fire departments, and emergency medical companies.
17. RF: Radio Frequency

1.05 Design Approval

Plans shall be submitted and approved by the AHJ prior to installation. The Owner will submit the proposed design along with the full building plans as part of its Scheduled Plan Review. The following information shall be provided by the system designer/Contractor:

1. Detailed drawings showing the location of the amplification equipment and associated antenna systems.
 - a. System Block Diagram including the donor antenna(s), BDA(s), passive components and in-building antennas. Include the RF link budget.
 - b. Overlay of the system design on building floor plan drawings
2. Manufacturer's data sheets on all equipment to be installed.

1.06 PERFORMANCE REQUIREMENTS

A. Frequencies

1. *Two* sets of frequencies are to be utilized on the system.
2. The following FCC-licensed facilities are to be carried on the system:

	Downstream/ Base-to-mobile	Upstream/ Mobile-to-base	Channel
FCC Call Sign	Frequency	Frequency	Bandwidth

3. Transmissions on each set of frequencies must individually meet the coverage, minimum signal and minimum voice quality requirements.
4. Frequency Changes: Equipment selected for this system must be capable of being configured to different frequency pairs in the Public Safety frequency bands. These changes may later be necessary due to future additions or optimization of radio systems maintained by the AHJ.
5. It is the responsibility of the contractor to confirm the frequencies in use with the AHJ before proceeding with the system installation.

B. Minimum Received Signal Levels

1. Downstream signals: -95 dBm; The minimum signal strength that shall be received inside the building.
2. Upstream signals: -95 dBm; The minimum signal strength that shall be received at the Authority's repeater site.
3. Received signals in the building and at the Authority's repeater facility shall have a minimum Signal-to-Noise ratio of 15 dB.
4. Minimum received signal levels must be maintained regardless of seasonal and occasional signal path propagation conditions including those caused by weather and seasonal foliage changes.

5. Donor antennas utilized for the system must be directional and directed toward the respective repeater(s).
6. The minimum isolation between the donor antenna and system antennas shall be 15 dB or higher as necessary to prevent system oscillation based on the operating parameters required to meet the minimum coverage requirements.

C. Coverage

1. Signals at or above the minimum levels are to be receivable to and from 95% of all areas within the building. Spaces or rooms defined as critical areas require 99% coverage. For purposes of this Section, 95% coverage is considered to be all areas of the building.
2. The contractor is responsible for providing a system design and installation that provides enhancement only to those areas of the building where existing off-air service does not meet the minimum levels as described above. Signal strength surveys to confirm coverage enhancement requirements are the responsibility of the contractor. Care must be taken in engineering a system that will not cause interference to the Authority's radio system outside the building.

D. Equipment Locations

1. BDA: Wall space has been allocated for system electronic and headend components in the upper level Telecommunication Room (I.T.), (T.R.). The wall space is 4 feet wide by 8 feet tall.
2. Donor Antenna(s): A preferred antenna location on the building roof has been specified by the owner. The contractor is responsible for providing and installing the antenna(s), mounting hardware, roof penetration and conduit from the antenna mast to the Fire Control Room. Provide a 4" conduit from the room housing the BDA to the roof. At the roof level provide a weather-head on the conduit. Coordinate roof penetrations and sealing with the General Contractor.
3. Electronic components, including secondary power, shall be designed for operation in a NEMA 4 non-vented weather tight box. These components must be capable of reliable operation at temperatures ranging from -22 degrees F to +120 degrees F (-30 degrees C to +50 degrees C) minimum.

E. System Power Source

1. A dedicated, 120-volt, 20 A circuit has been specified as primary power for the BDA or any other required electronic components located in the Telecommunication Room (I.T.), (T.R.). If additional power is required at this or other locations such must be clearly specified as part of the submitted system design. The electrical contractor shall include the cost of additional power sources in the bid.
2. A secondary automatic transfer power source for all active electronic components in the system shall be provided. Supplier shall provide battery back-up for 24 hours of operation minimum. When the back-up system includes a generator, provide a UPS to support the 100 percent operation of the system for a minimum of two (2) hours. The emergency generator system serves the UPS system and shall provide power to the UPS system for a minimum of 24 hours. If the back-up system does not include a generator provide a UPS system to support the 100 percent operation of the system for a minimum of twenty-four (24) hours.

F. Mode of Operation

The system shall be designed for continuous, always-on service. A malfunction alarm for the BDA shall be provided and connected to the building fire alarm system.

G. System Frequency Response

All cable and passive electronic components shall have a minimum pass band of 400 – 2700 MHz. Systems that utilize a higher band, 698-2700 MHz shall be permitted if the band falls within that range.

H. Survivability

1. Physical Protection: All wiring and cabling, with the exception of radiating cable and antenna jumper cables measuring less than 2 feet in length, shall be installed in conduit.
2. All exposed cable, including flexible jumper cables, shall be plenum rated, utilizing a jacket of non-halogenated, fire retardant polyolefin.
3. Survivability levels shall be verified with local AHJ prior to construction. A survivability level of 2 (2 hour rated cabling) is required unless otherwise indicated by the AHJ.

I. Compatibility

Provide class-A BDA.

J. RF Exposure

The system shall meet the RF exposure guidelines of FCC Bulletin OET 65.

1.07 SUBMITTALS

A. Submittal Requirements with Bid Response

1. Product Data: Submit the manufacturer datasheets for the following components:
 - a. Donor Antennas
 - b. Coverage Antennas and/or Radiating Cable
 - c. Coaxial Cable and Connectors
 - d. Passive Devices including Splitters, Taps, Combiners and Couplers
 - e. Bi-Directional Amplifiers (BDA)
 - f. Secondary Power Supplies
 - g. Surge Protection
2. Shop Drawings
 - a. System Block Diagram including the donor antenna(s), BDA(s), passive components and in-building antennas. Include the RF link budget for Uplink and Downlink Path. Provide all assumptions.
 - b. Overlay of the system design on building floor plan drawings
 - c. Overlay on floor plan drawings of the predicted signal strength within the coverage area indicating, at a minimum, the -95 dBm downlink (base to mobile) signal strength for all coverage areas.
 - d. Building elevation and plan views depicting the location of any outdoor antennas associated with the proposed system. Include the antenna centerline height above building, orientation, mounting method, cabling, conduit route and the location of all external grounding connections.
 - e. BDA and Secondary Power Supply installation. Include plan and elevation views indicating equipment dimensions, mounting methods, enclosure type, cable and conduit routing, voltage required, power required, label locations and required clearance from other equipment. Identify each piece of equipment by brand, model number and equipment type.
 - f. Drawings and block diagrams are to be provided in AutoCAD format and accompanied by two (2) printed copies.
 - g. Shop drawings shall be 8.5 inch x 11 inch or greater, scaled or dimensioned, with dimensions or scale clearly noted. Floor plan drawings shall be 24 inch x 36 inch minimum with drawings scaled to legible size.

- h. All components shall be consistently named or labeled for reference in other drawings, diagrams and tables.
- 3. Other Submissions
 - a. Specify antenna grounding and surge protection in accordance with NEC Article 810 and these specifications.
 - b. Specify the backup/secondary power source, and include calculations to ensure the backup power requirements as specified in this standard are met.
 - c. List of Individuals Responsible for the system design, planning and installation along with their qualifications and experience.
- B. Submittal Requirements Prior to the Start of System Installation
 - 1. Documentation confirming the latest information from the AHJ of the frequencies to be supported by the system.
 - 2. List of any approved system design changes required since the original bid and the reason for each change. This list includes any design changes required for approval by the AHJ.
 - 3. Updated Product Data, Shop Drawings and Diagrams reflecting any changes.
 - 4. Bill of Materials ("BOM")
 - 5. Provide the names, addresses, and telephone numbers of service organizations that carry stock of repair parts for the system to be installed.
 - 6. System Installation Schedule as approved by the Owner, General Contractor and AHJ.
- C. Submittal Requirements at Project Close Out
 - 1. As-Built Drawings of all items required and in the formats listed in item A and B above.
 - 2. Test Reports
 - a. In-Building Coverage Test Results
 - b. Donor Antenna Isolation
 - c. Spectrum Analysis Report demonstrating only the intended frequencies are being carried on the system.
 - d. Spectrum Analysis Report demonstrating no spurious oscillations, PIM or other intermodulation products are being produced that would affect other services or system performance.
 - e. Sweep test results of all coaxial cable runs
 - f. System Malfunction Alarm and its connection to the fire alarm panel.
 - 3. Record of system operating parameters including:
 - a. Signal levels received at the donor antenna
 - b. Signal levels at the input and output of the BDA
 - c. BDA Gain Settings
 - 4. Operation and Maintenance Data: Submit hardware and software manuals for all products including all features and operating parameters.
 - 5. Warranty Documents:
 - a. Submit for all manufactured components utilized in the system
 - b. Submit Manufacturer's Extended Warranty
 - c. Submit Contractor's System Warranty
 - 6. Submit the agenda for the training class along with copies of handouts to be utilized in the class.
 - 7. Compile the items listed in this section into a single Operations and Maintenance Manual to be provided in electronic format. Include drawings and block diagrams in Adobe Acrobat (.pdf) and in AutoCAD format. Include a section containing a copy of the latest maintenance, testing and reporting requirements of the AHJ.

1.08 QUALITY ASSURANCE

A. Minimum Qualifications of Personnel

1. Engineering and Design:

- a. A valid Professional Engineering Certification and Certification of in-building system training issued by the manufacturer of the equipment being installed or
- b. Approval issued by the AHJ
- c. Include GROL requirement as stated by the latest IFC code.

2. Installer Qualifications:

- a. Minimum five years of experience installing systems of similar scope and complexity
- b. Certified by the manufacturer of the BDA equipment to be installed

B. All equipment shall be UL listed and labeled, and in accordance with applicable NEMA and ANSI Standards.

C. All parts of racks and enclosures shall be welded or assembled with paint piercing ground washers, grounding strip and bonding jumper.

1.09 WARRANTY

The contractor shall warrant system performance as specified in this section for one year starting on the date of final system acceptance.

1.10 MAINTENANCE AND ANNUAL TESTING

A. The contractor shall provide the first full year of maintenance for the system. The term of this maintenance period begins on the date of final system acceptance.

B. Maintenance shall include

1. 24-hour by 7-day emergency response within two hours after notification
2. Annual testing

C. Annual Tests

1. BDA Operating Parameters:

- a. Record signal and power levels
- b. Review self-diagnostics and other items as recommended by the manufacturer
- c. Note any parameter changes from previous tests, investigate causes

2. Backup/Secondary Power Supply

- a. Record voltage and charging of batteries before testing under load
- b. Test batteries under full load for at least one hour or until the integrity of the batteries can be determined.

3. Test system malfunction alarm and its connection to the fire alarm panel

4. Maintain documentation on-site with a backup copy off-site.

PART 2 PRODUCTS

1.02 MANUFACTURERS

Subject to compliance with the requirements of this Section, manufacturers of the products that may be utilized in the system include, but are not limited to, the following:

1. CommScope/Andrew
2. Cobham
3. PCTEL
4. Times Microwave
5. RFS – Radio Frequency Systems
6. Microlab/FXR
7. Bird Technologies
8. EMR Corp.
9. Galtronics
10. ADRF
11. Notifier

1.03 SYSTEM COMPONENTS

A. Donor Antennas

1. Electrical:
 - a. Frequency band: covering the frequencies specified by the AHJ.
 - b. VSWR \leq 1.5:1
 - c. Gain: \geq 10.0 dBi
 - d. Maximum Input Power: 100 watts
 - e. Polarization: Vertical
 - f. Front-to-back ratio: \geq 15 dB
 - g. Vertical Beamwidth: \leq 30 degrees
 - h. Horizontal Beamwidth: \leq 60 degrees
 - i. Impedance: 50 Ω
2. Mechanical:
 - a. Connector: 50 Ω type N Female
 - b. Mounting: Mast on a non-penetrating mount utilizing concrete block ballast
 - c. Grounding/Bonding: **Pursuant to NFPA 70 NEC Article 810 requirements and comply with R56, the more stringent shall apply.**
3. Environmental:
 - a. Temperature: -40°C to +60°C
 - b. Lightning Protection: Direct Ground
 - c. Maximum Rated Wind Velocity: 125 mph
4. Antenna Cable:
 - a. All exposed cable shall have a UV stable black jacket for protection from sunlight
 - b. Cable feed to the BDA shall be ½” copper corrugated outer conductor foam dielectric coax.
 - c. Weatherproofing: exposed connectors protected from the effects of weather
 - d. Rigid conduit between the Donor location and BDA location shall be provided and installed by the contractor.

B. Omni-Directional In-Building Coverage Antennas

- a. Frequency band: 698-900 MHz
 - b. $VSWR \leq 1.8:1$
 - c. Gain: ≥ 1.0 dBi
 - d. Maximum Input Power: 25 watts
 - e. Polarization: Vertical
 - f. Vertical Beamwidth: ≥ 65 degrees
 - g. Horizontal Beamwidth: 360 degrees
 - h. PIM: < -150 dBc
 - i. Impedance: 50Ω
 - 2. Mechanical:
 - a. Connector: 50Ω type N Female
 - b. Mounting: ceiling mount or securely mounted above ceiling
 - 3. Environmental:
 - a. Temperature: -20°C to $+70^{\circ}\text{C}$
 - b. Plenum rated
- C. Directional Coverage Antennas
- 1. Electrical
 - a. Frequency band: 698-900 MHz
 - b. $VSWR \leq 1.8:1$
 - c. Gain: ≥ 1.0 dBi
 - d. Maximum Input Power: 25 watts
 - e. Polarization: Vertical
 - f. Vertical Beamwidth: ≥ 65 degrees
 - g. Horizontal Beamwidth: 90 degrees - 180 degrees nominal
 - h. PIM: < -150 dBc
 - i. Impedance: 50Ω
 - 2. Mechanical:
 - a. Connector: 50Ω type N Female
 - b. Mounting: ceiling or wall mount
 - 3. Environmental:
 - a. Temperature: -20°C to $+70^{\circ}\text{C}$
 - b. Plenum rated
- D. Radiating Cable
- 1. Material:
 - a. Nominal size: $\frac{1}{2}$ " or $\frac{7}{8}$ "
 - b. Outer conductor: Corrugated copper
 - c. Slot Design: milled, two rows
 - d. Jacket Material: Non-halogenated, fire retardant polyolefin
 - e. Dielectric Material: Foam PE

- f. Inner Conductor Material: Copper wire, copper tube or Copper-clad aluminum wire
 - g. Mounting: Minimum clearance of 2" from walls or other structure, secured at intervals and with hardware pursuant to manufacturer's specifications
 - 2. Electrical
 - a. Frequency Range: 30 – 2650 MHz
 - b. Impedance: $50\Omega \pm 1$
 - 3. Environmental:
 - 4. Temperature: -20°C to +80°C

- E. Foam Dielectric Cable
 - 1. Material:
 - a. Nominal size: ½" or 7/8"
 - b. Outer conductor: Corrugated copper
 - c. Dielectric Material: Foam PE
 - d. Inner Conductor Material: Copper wire, copper tube or Copper-clad aluminum wire
 - 2. Electrical
 - a. Frequency Range: 30 – 2650 MHz
 - b. Impedance: $50\Omega \pm 1$
 - 3. Environmental:
 - 4. Temperature: -20°C to +80°C

- F. Splitters, Combiners, Couplers, Taps, Coax Jumpers and Connectors:
 - 1. Electrical
 - a. Frequency Range: 698 – 2700 MHz
 - b. $VSWR \leq 1.3:1$
 - c. Maximum Input Power: ≥ 50 watts
 - d. PIM: < -150 dBc
 - e. Impedance: 50Ω
 - 2. Mechanical:
 - a. Connector: 50Ω type N Female
 - 3. Environmental:
 - a. Temperature: -20°C to +70°C

- G. BDA: Bi-Directional Amplifiers utilized on the system must meet the following requirements:
 - 1. Electrical
 - a. Frequency agility: The unit shall have the capability to change operating frequencies within the 700 – 800 MHz Public Safety Band as may be required due to licensing changes of the AHJ or actions of the FCC.

- b. Alarming Functions: The BDA shall be linked to the building's fire alarm panel and configured to signal an alarm in the event of a failure with the BDA or donor antenna system.
 - c. The BDA shall have received FCC Certification prior to installation.
 - d. The system must be compatible with both analog and digital transmissions.
 - e. Automatic gain and level controls shall be integrated into the BDA with a minimum dynamic range of 60 dB, less any gain reduction setting.
 - 2. Mechanical
 - a. All BDA components shall be housed in a single, NEMA4 cabinet. The cabinet must be waterproof and capable of dissipating all heat without the use of ventilation.
 - b. The BDA cabinet shall be painted fire engine red and display the following labeling in bright yellow letters: "RADIO REPEATER" unless alternate labeling is specified by the AHJ.
 - c. The name and telephone number of the vendor responsible for system maintenance also must be marked on the cabinet.
 - d. If the BDA is not located in the same room as the fire alarm panel, a sign shall be placed at the fire alarm panel with the name and telephone number of the local Fire Department indicating that they shall be notified of any failures that extend past two hours.
 - e. The cabinet shall be securely locked to prevent unauthorized access.
 - 3. Environmental
 - a. The BDA, as installed in the approved NEMA4 cabinet, shall be designed for operating in temperatures ranging from -22 degrees F to +120 degrees F (-30 degrees C to +50 degrees C).
- H. Power Supplies: At least two (2) independent and reliable power supplies shall be provided, one primary and one secondary.
- 1. Primary Power: The primary power source shall be supplied from a dedicated 20 Ampere branch circuit. The presence of primary power shall be monitored by the BDA monitoring system and provide notification upon loss of primary power.
 - 2. Secondary Power: The secondary power source shall be capable of operating the in-building radio system for at least 24 hours of 100% system operation. This system shall utilize a dedicated battery system or a self-starting generator with dedicated storage batteries.
 - a. The battery system shall automatically charge in the presence of the external/primary power input.
 - b. The secondary power system shall be engaged automatically upon loss of primary power.
 - c. The secondary power system shall be contained in one NEMA 4 enclosure.
 - d. An alarm shall be configured to signal failure of the battery charging system or if the battery charge falls below 70% of capacity.
 - 3. Environmental
 - a. The secondary power system, as installed in the approved NEMA4 cabinet, shall be designed for operating in temperatures ranging from -22 degrees F to +120 degrees F (-30 degrees C to +50 degrees C).

PART 3 EXECUTION

3.1 INSTALLATION

- A. System Signal Wires, Power Conductors and Cables
 1. Wires and cables shall enter each equipment enclosure, cabinet or rack in such a manner that all doors or access panels can be opened and closed unobstructed by cables.
 2. Routing and Interconnection
 - a. Wires or cables routed between cabinets, racks, and other equipment shall be installed in an approved conduit or cable tray that is secured to the building structure.
 3. All cable shall be sweep tested for detection of any faults prior to and after installation. Sweep results shall be recorded for future reference.
 4. Coaxial cable shall be carefully installed in strict compliance with the manufacturers' recommended procedures with special attention given to pulling tensions, bending radius and proper support.
 5. Coaxial antenna cabling, except for radiating cable, shall be installed in its own metallic conduit.
 6. All equipment, cable and components shall be installed and connected according to the OEM's specifications to insure correct installation and system performance.
 7. Coordinate all roof penetrations with Owner and/or roofing contractor.

3.2 GROUNDING

- A. Ground and bond cable shields and equipment per Manufacturer's requirements and NFPA 70 NEC requirements and **comply with R56, the more stringent shall apply.**
- B. The Donor antenna mast shall be grounded per NFPA 70 NEC requirements. Grounding blocks and surge protection shall be provided for outside coaxial cabling.

3.3 ACCEPTANCE TESTING

- A. An initial set of system Commissioning Tests shall be performed for the Owner prior to final Acceptance Testing with the AHJ. The commissioning tests will include all tests outlined in Part 1.07 C.2., "Submittal Requirements at Project Closeout", "Test Reports".
- B. Tests shall be made using frequencies close to the frequencies used by the appropriate emergency services. If testing is done on the actual frequencies, then this testing must be coordinated with the local Department unit. All testing must be done on frequencies authorized by the FCC. A valid FCC license will be required if testing is done on frequencies different from the licensed department frequencies.
- C. Final Acceptance Test Procedures

Acceptance testing shall consist of the following tests or those tests as may be directed by the AHJ and local County emergency response.

 1. Coverage Testing: For testing system signal strength and quality, the testing shall be based on the delivered audio quality (DAQ) system. A DAQ level below 3.4 shall be considered a failed test for a given grid cell. See Part 1.04, DEFINITIONS for descriptions of each DAQ level.

- a. Each floor of the building shall be divided into 20 grid divisions. Increase to 40 if there is a failure. Critical areas tested separately.
 - b. The tests will be conducted by using a calibrated portable two-way radio of the latest brand and model as currently in use by the local Department.
 - c. Small scale drawings (11 inch x 17 inch maximum) of the structure shall be provided by the Contractor for use and documentation of the test results. The plans shall show each floor divided into the grids as described above, and the results of any pre-testing. Each grid shall be labeled to indicate the DAQ result from the final acceptance testing.
 - d. DAQ tests shall be made with the antenna held in a vertical position at 3 to 4 feet above the floor to simulate a typical portable radio worn on the belt or turnout coat pocket.
 - e. A test location shall be selected near the center of each grid square. Once the test location of a grid area is selected, prospecting for a better spot within the area is permitted only within three feet (3') in any direction of the selected test location.
 - f. The two-way radio will be utilized to transmit voice transmissions to verify communications to and from the outside area covered by the Department's radio system. For each grid location, the DAQ of the transmission shall be determined.
 - g. A maximum of two non-adjacent areas will be allowed to fail the DAQ test.
 - h. In the event that three or more of the grid test locations fail the test, the floor may be re-tested by creating a new grid consisting of 80 equal areas and test locations selected within each area. In testing the new grid, a maximum of four non-adjacent areas may fail the test. If the system fails the 80 area test, then the system must be revised to meet the coverage requirement.
2. Isolation and Spectrum Analysis Testing:
 - a. Measurement of the isolation between the donor antenna(s) and the system antennas shall be performed utilizing a spectrum analyzer and appropriate signal generator.
 - b. A Spectrum Analysis Report demonstrating only the intended frequencies are being carried on the system.
 - c. Spectrum Analysis Report demonstrating no spurious oscillations or intermodulation products are being produced that would affect other services or system performance.
 3. Other tests as requested by the AHJ.

END OF SECTION



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

ROOF PLAN

DATE 12.04.2020
PROJECT NO 20003

REVISIONS		
NUM.	DATE	DESCRIPTION:
REV1	12/17/20	REVISION 01
REV2	01/09/21	REV2/ADD1

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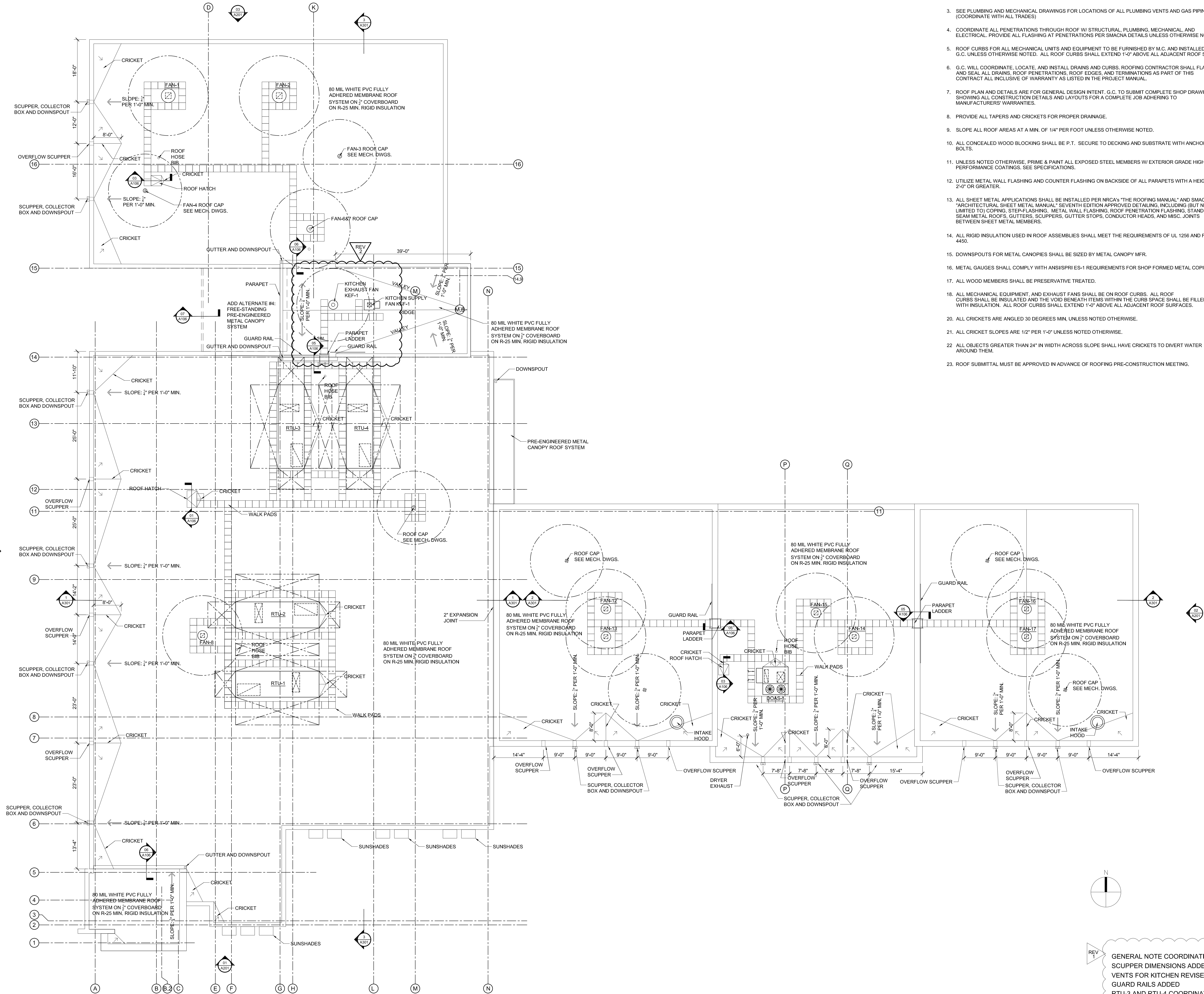
SEAL

SHEET NUMBER

A105

ROOF GENERAL NOTES

- ALL DIMENSIONS TO BE FIELD VERIFIED. DO NOT SCALE DRAWINGS. IF DIMENSIONS ARE IN QUESTION, OBTAIN CLARIFICATION FROM ARCHITECT.
- COORDINATE EXHAUST FAN AND MECHANICAL UNIT LOCATIONS WITH MECHANICAL AND ELECTRICAL CONTRACTORS.
- SEE PLUMBING AND MECHANICAL DRAWINGS FOR LOCATIONS OF ALL PLUMBING VENTS AND GAS PIPING (COORDINATE WITH ALL TRADES)
- COORDINATE ALL PENETRATIONS THROUGH ROOF W/ STRUCTURAL, PLUMBING, MECHANICAL, AND ELECTRICAL. PROVIDE ALL FLASHING AT PENETRATIONS PER SMACNA DETAILS UNLESS OTHERWISE NOTED.
- ROOF CURBS FOR ALL MECHANICAL UNITS AND EQUIPMENT TO BE FURNISHED BY M.C. AND INSTALLED AND FLASHED BY G.C. UNLESS OTHERWISE NOTED. ALL ROOF CURBS SHALL EXTEND 1'-0" ABOVE ALL ADJACENT ROOF SURFACES.
- G.C. WILL COORDINATE, LOCATE, AND INSTALL DRAINS AND CURBS. ROOFING CONTRACTOR SHALL FLASH AND SEAL ALL DRAINS, ROOF PENETRATIONS, ROOF EDGES, AND TERMINATIONS AS PART OF THIS CONTRACT ALL INCLUSIVE OF WARRANTY AS LISTED IN THE PROJECT MANUAL.
- ROOF PLAN AND DETAILS ARE FOR GENERAL DESIGN INTENT. G.C. TO SUBMIT COMPLETE SHOP DRAWINGS SHOWING ALL CONSTRUCTION DETAILS AND LAYOUTS FOR A COMPLETE JOB ADHERING TO MANUFACTURERS WARRANTIES.
- PROVIDE ALL TAPERS AND CRICKETS FOR PROPER DRAINAGE.
- SLOPE ALL ROOF AREAS AT A MIN. OF 1/4" PER FOOT UNLESS OTHERWISE NOTED.
- ALL CONCEALED WOOD BLOCKING SHALL BE P.T. SECURE TO DECKING AND SUBSTRATE WITH ANCHOR BOLTS.
- UNLESS NOTED OTHERWISE, PRIME & PAINT ALL EXPOSED STEEL MEMBERS W/ EXTERIOR GRADE HIGH PERFORMANCE COATINGS. SEE SPECIFICATIONS.
- UTILIZE METAL WALL FLASHING AND COUNTER FLASHING ON BACKSIDE OF ALL PARAPETS WITH A HEIGHT OF 2'-0" OR GREATER.
- ALL SHEET METAL APPLICATIONS SHALL BE INSTALLED PER NRCA'S "THE ROOFING MANUAL" AND SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL" SEVENTH EDITION APPROVED DETAILING, INCLUDING (BUT NOT LIMITED TO) COPING, STEP FLASHING, METAL WALL FLASHING, ROOF PENETRATION FLASHING, STANDING SEAM METAL ROOFS, GUTTERS, SCUPPERS, GUTTER STOPS, CONDUCTOR HEADS, AND MISC. JOINTS BETWEEN SHEET METAL MEMBERS.
- ALL RIGID INSULATION USED IN ROOF ASSEMBLIES SHALL MEET THE REQUIREMENTS OF UL 1256 AND FMG 4450.
- DOWNSPOUTS FOR METAL CANOPIES SHALL BE SIZED BY METAL CANOPY MFR.
- METAL GAUGES SHALL COMPLY WITH ANSI/SPRI ES-1 REQUIREMENTS FOR SHOP FORMED METAL COPINGS.
- ALL WOOD MEMBERS SHALL BE PRESERVATIVE TREATED.
- ALL MECHANICAL EQUIPMENT, AND EXHAUST FANS SHALL BE ON ROOF CURBS. ALL ROOF CURBS SHALL BE INSULATED AND THE VOID BENEATH ITEMS WITHIN THE CURB SPACE SHALL BE FILLED WITH INSULATION. ALL ROOF CURBS SHALL EXTEND 1'-0" ABOVE ALL ADJACENT ROOF SURFACES.
- ALL CRICKETS ARE ANGLED 30 DEGREES MIN. UNLESS NOTED OTHERWISE.
- ALL CRICKET SLOPES ARE 1/2" PER 1'-0" UNLESS NOTED OTHERWISE.
- ALL OBJECTS GREATER THAN 24" IN WIDTH ACROSS SLOPE SHALL HAVE CRICKETS TO DIVERT WATER AROUND THEM.
- ROOF SUBMITTAL MUST BE APPROVED IN ADVANCE OF ROOFING PRE-CONSTRUCTION MEETING.

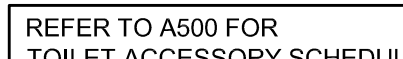
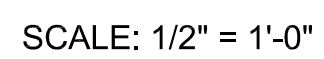
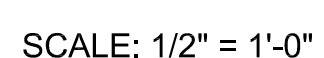
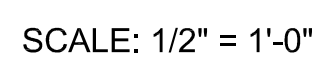
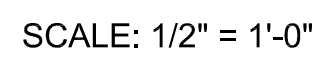




ENLARGED TOILET PLANS AND ELEVATIONS

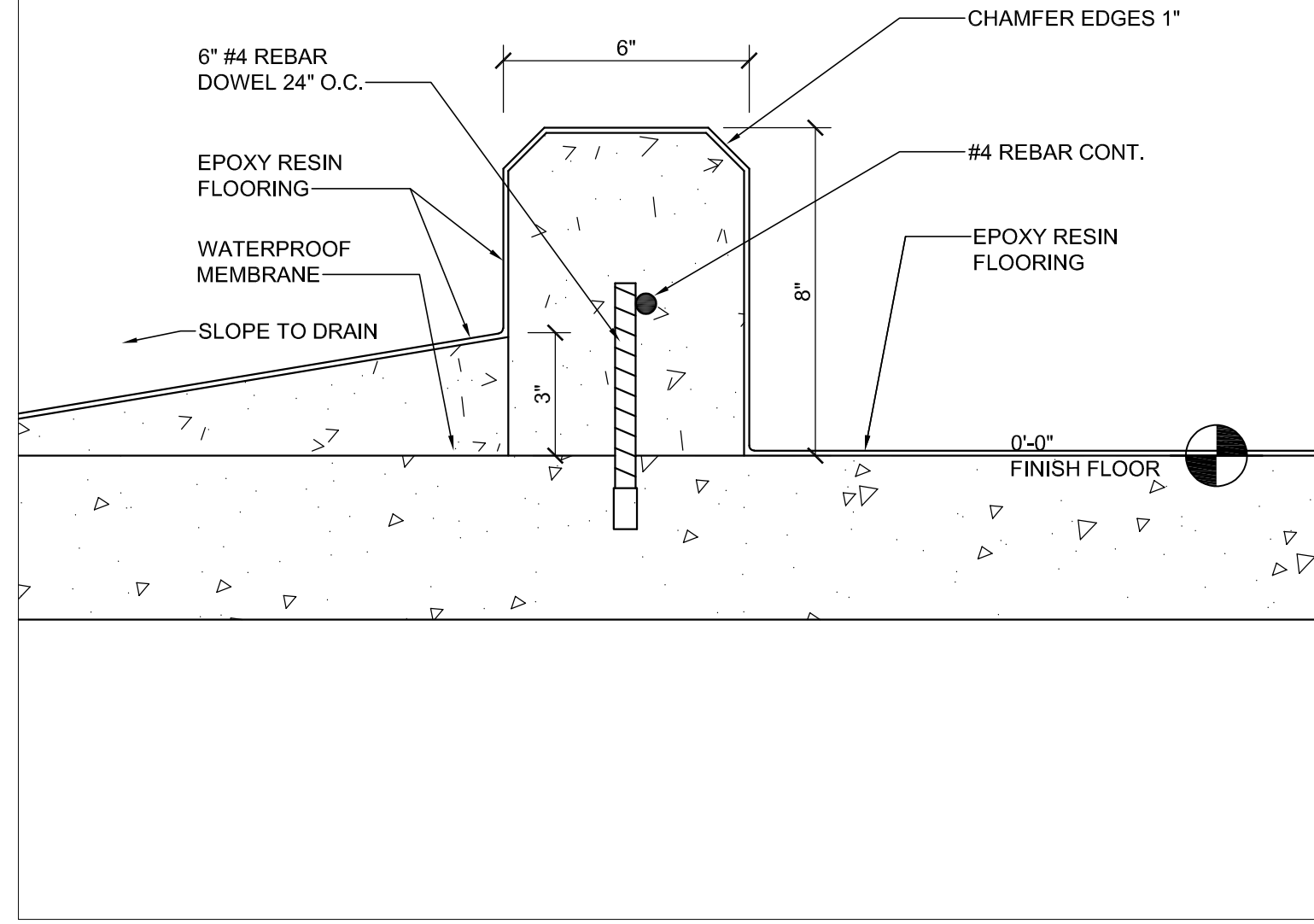
REVISIONS		
NUM.	DATE	DESCRIPTION:
REV1	12/17/20	REVISION 1
REV2	01/09/21	REV2/ADD1

SHEET NUMBER 7/1001



ENLARGED TOILET PLAN	SCALE: 1/2" = 1'-0"	2
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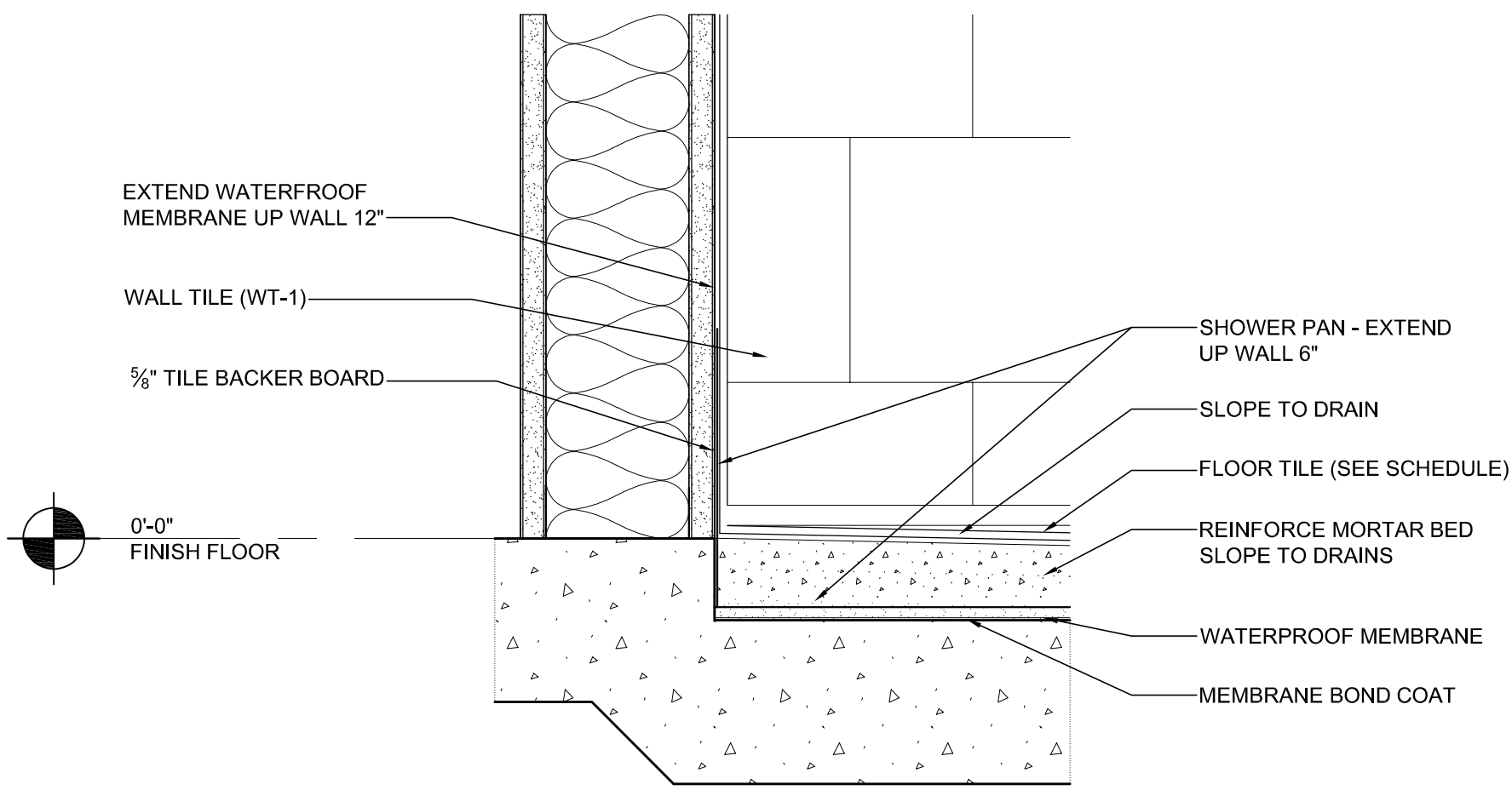




BACKBOARD WASH CURB DETAIL

SCALE: 3" = 1'-0"

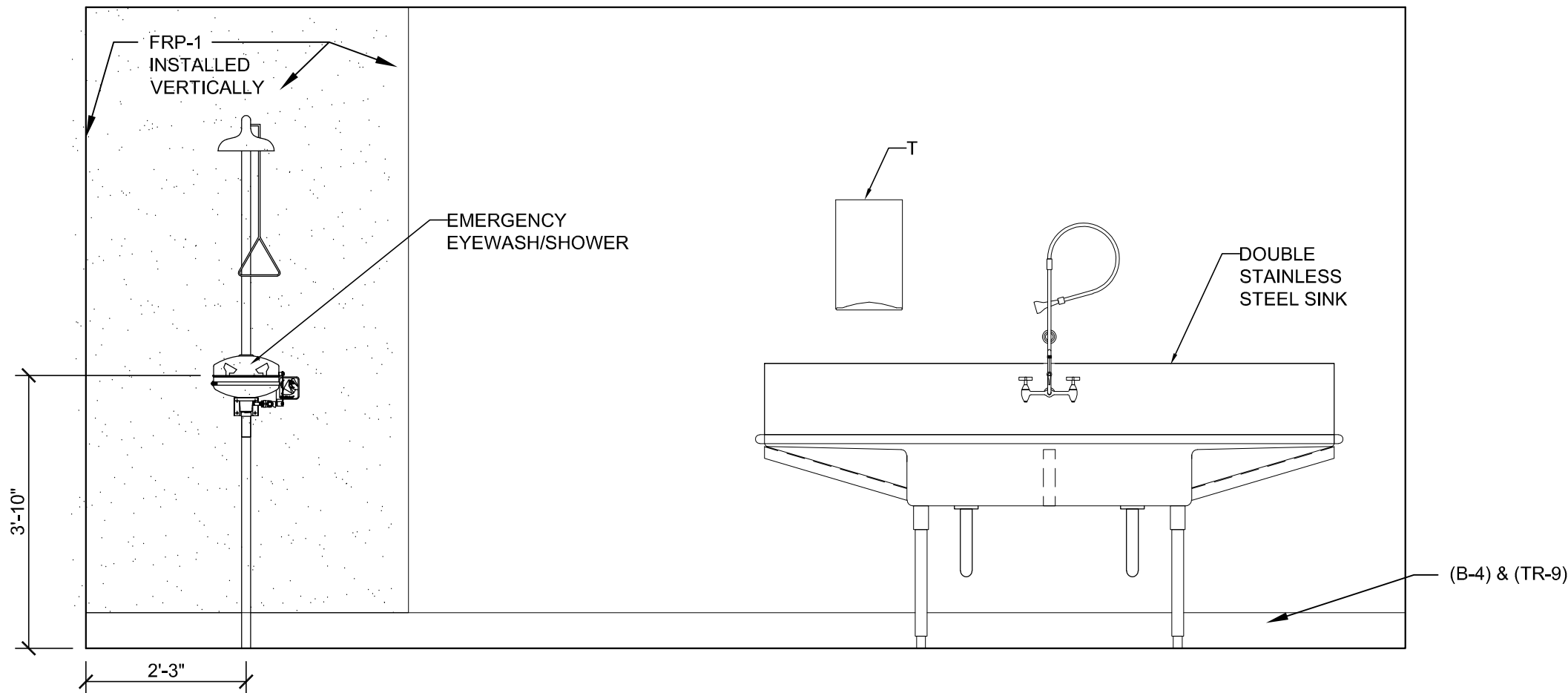
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SHOWER DETAIL

SCALE: 3" = 1'-0"

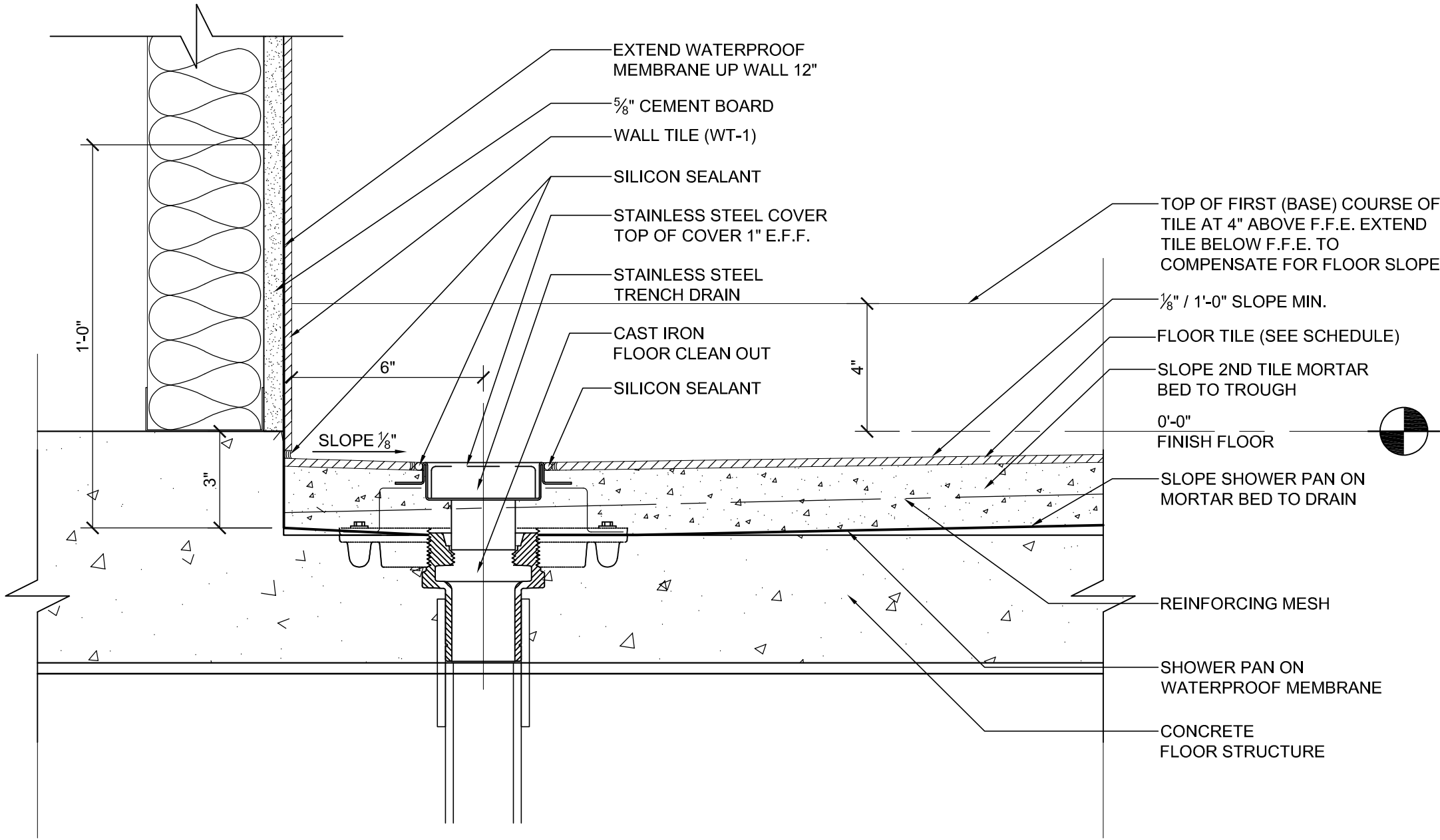
8



DECONTAMINATION ROOM ELEVATION

SCALE: 1/2" = 1'-0"

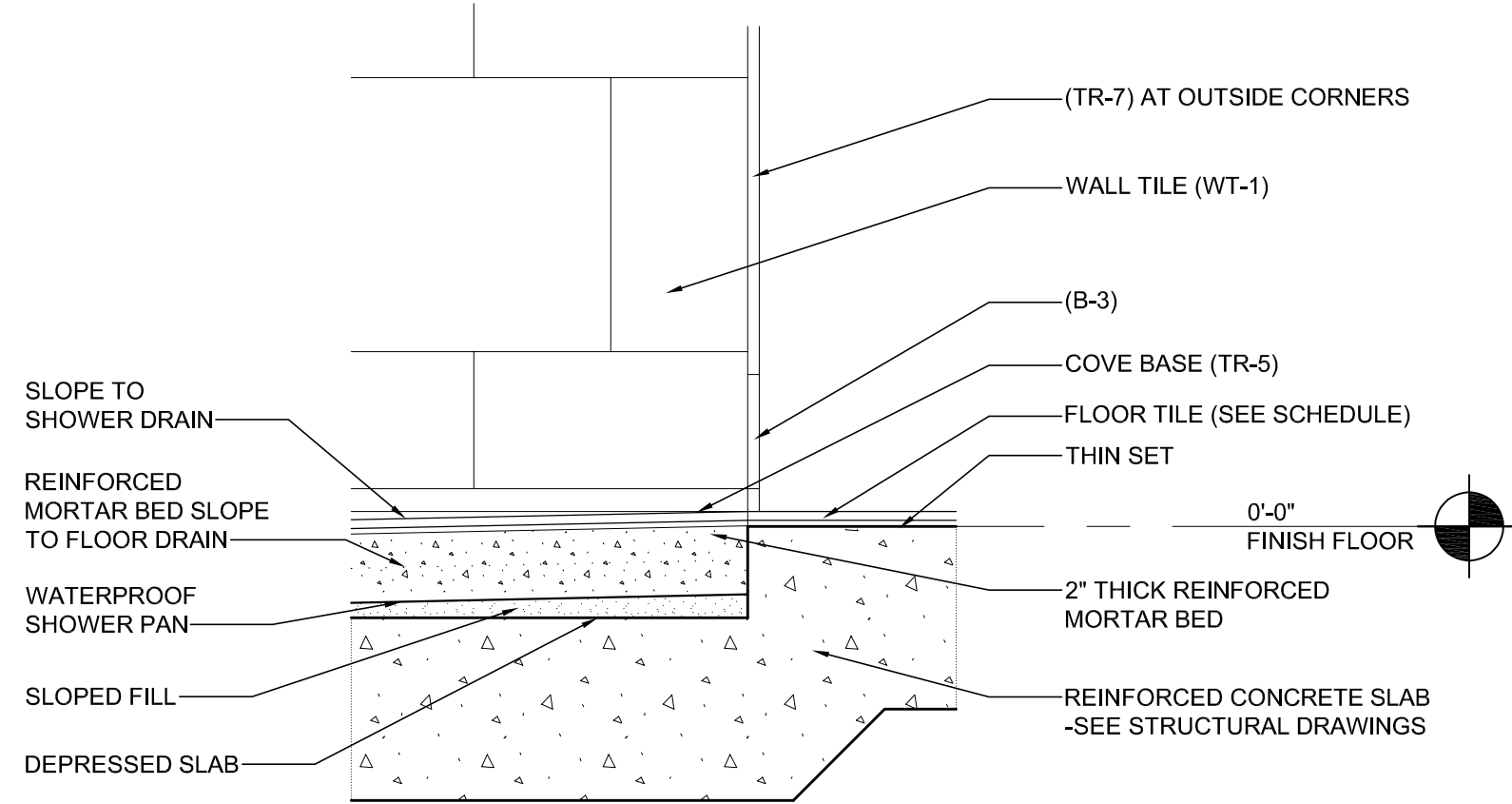
7



SHOWER DETAIL

SCALE: 3" = 1'-0"

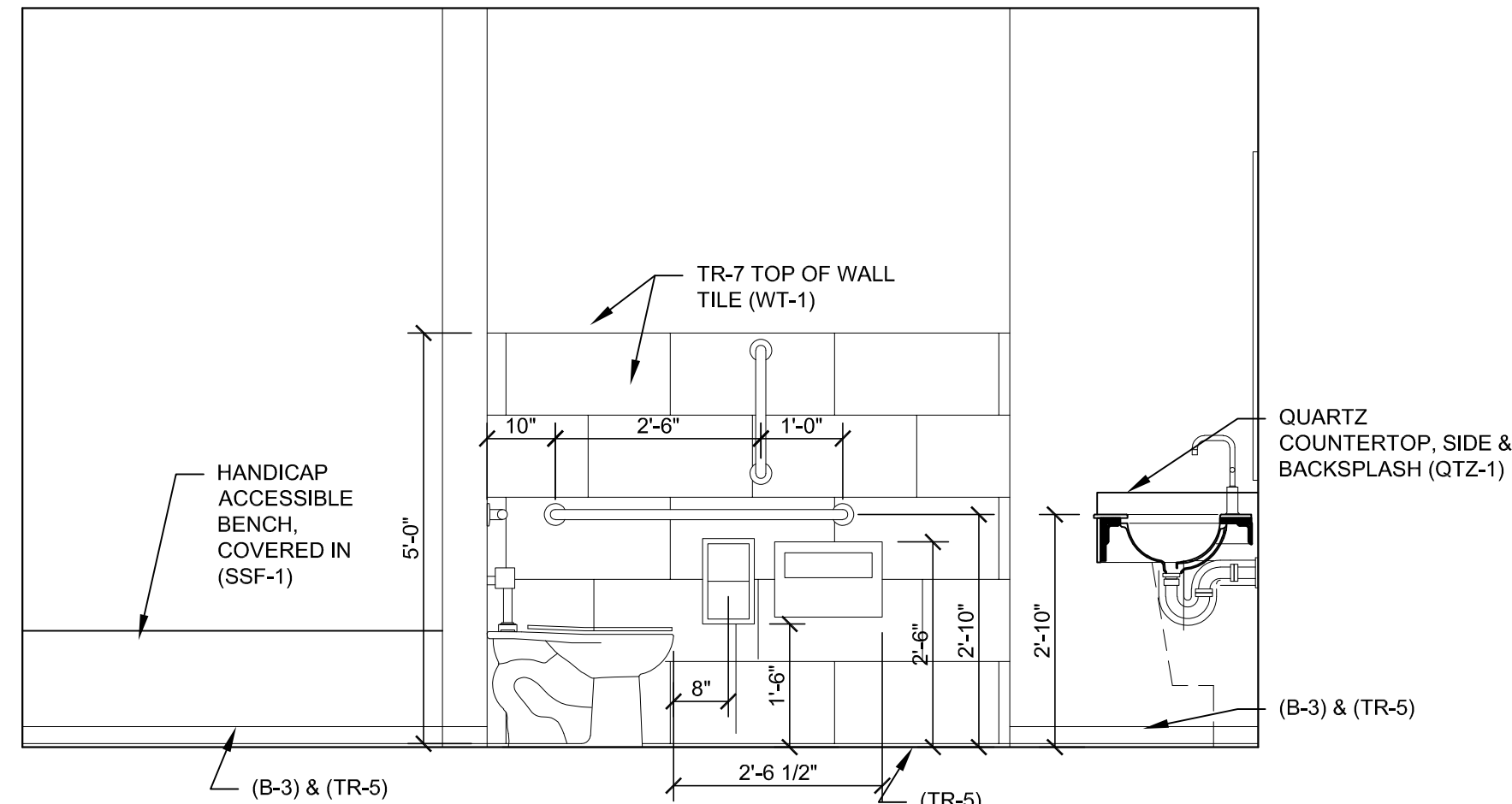
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SHOWER DETAIL

SCALE: 3" = 1'-0"

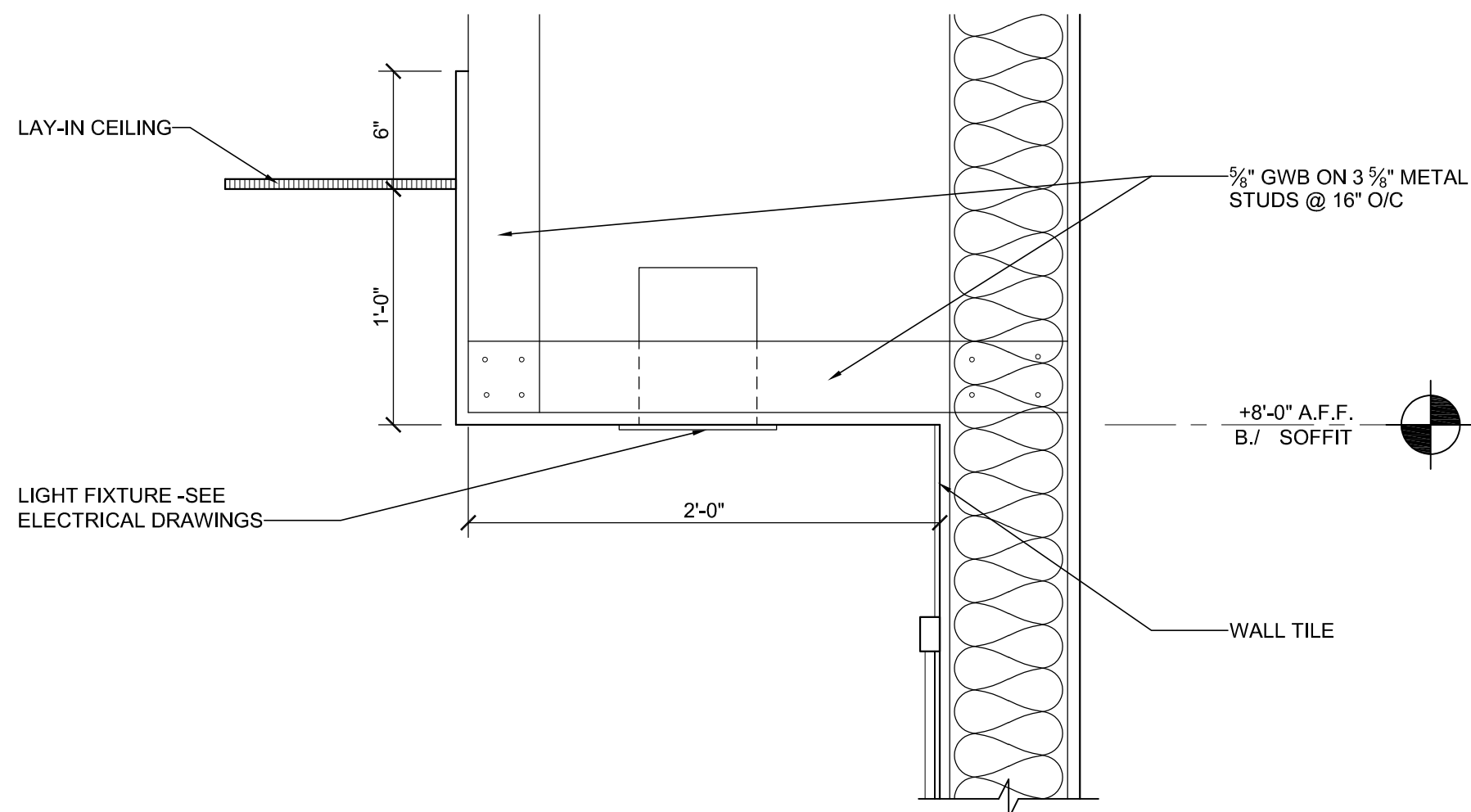
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ENLARGED TOILET ELEVATION

SCALE: 1/2" = 1'-0"

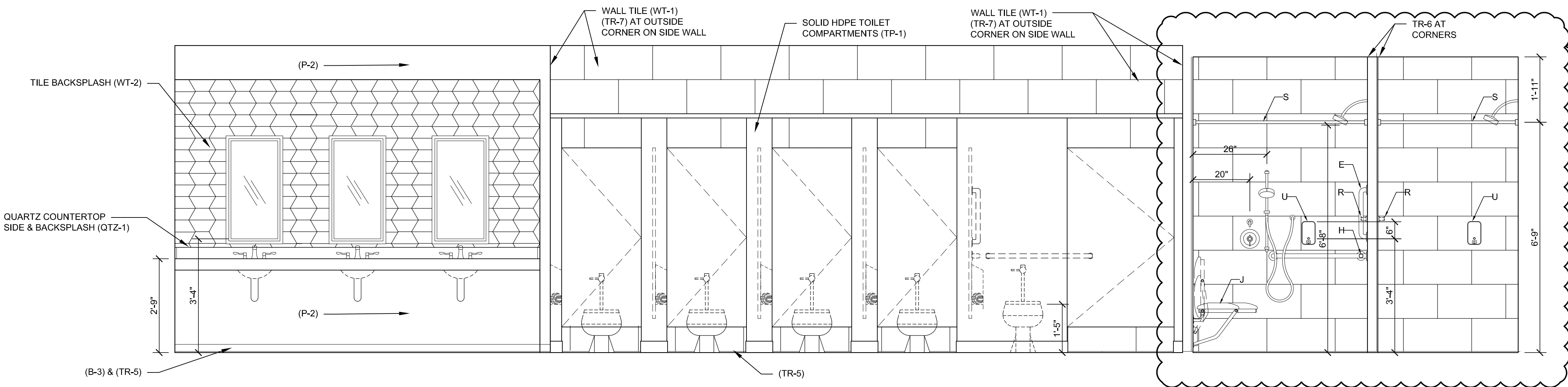
3



LAVATORY CASEWORK SECTION

SCALE: 1 1/2" = 1'-0"

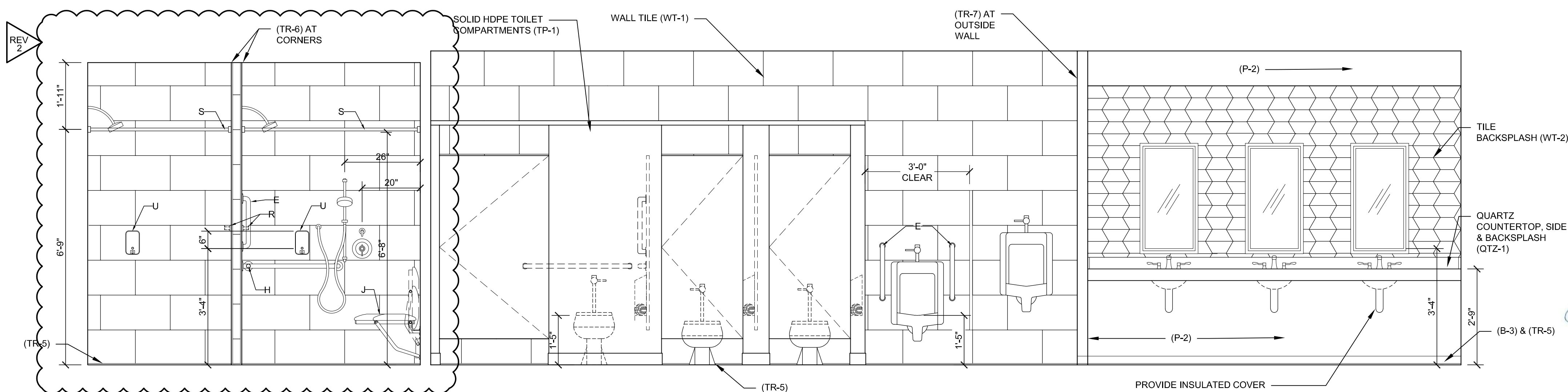
4



ENLARGED TOILET ELEVATION

SCALE: 1/2" = 1'-0"

2



ENLARGED TOILET PLAN

SCALE: 1/2" = 1'-0"

1

SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

TOILET ELEVATIONS
AND DETAILS

DATE 12.04.2020
PROJECT NO 20003

REVISIONS
NUM. DATE DESCRIPTION:
REV2 01/09/21 REV2/ADD1

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SHEET NUMBER

A502



SAMPSON
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CLINTON,
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CONSTRUCTION
DOCUMENTS

TOILET ELEVATIONS
AND DETAILS

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
REV2	01/09/21	REV2/ADD1

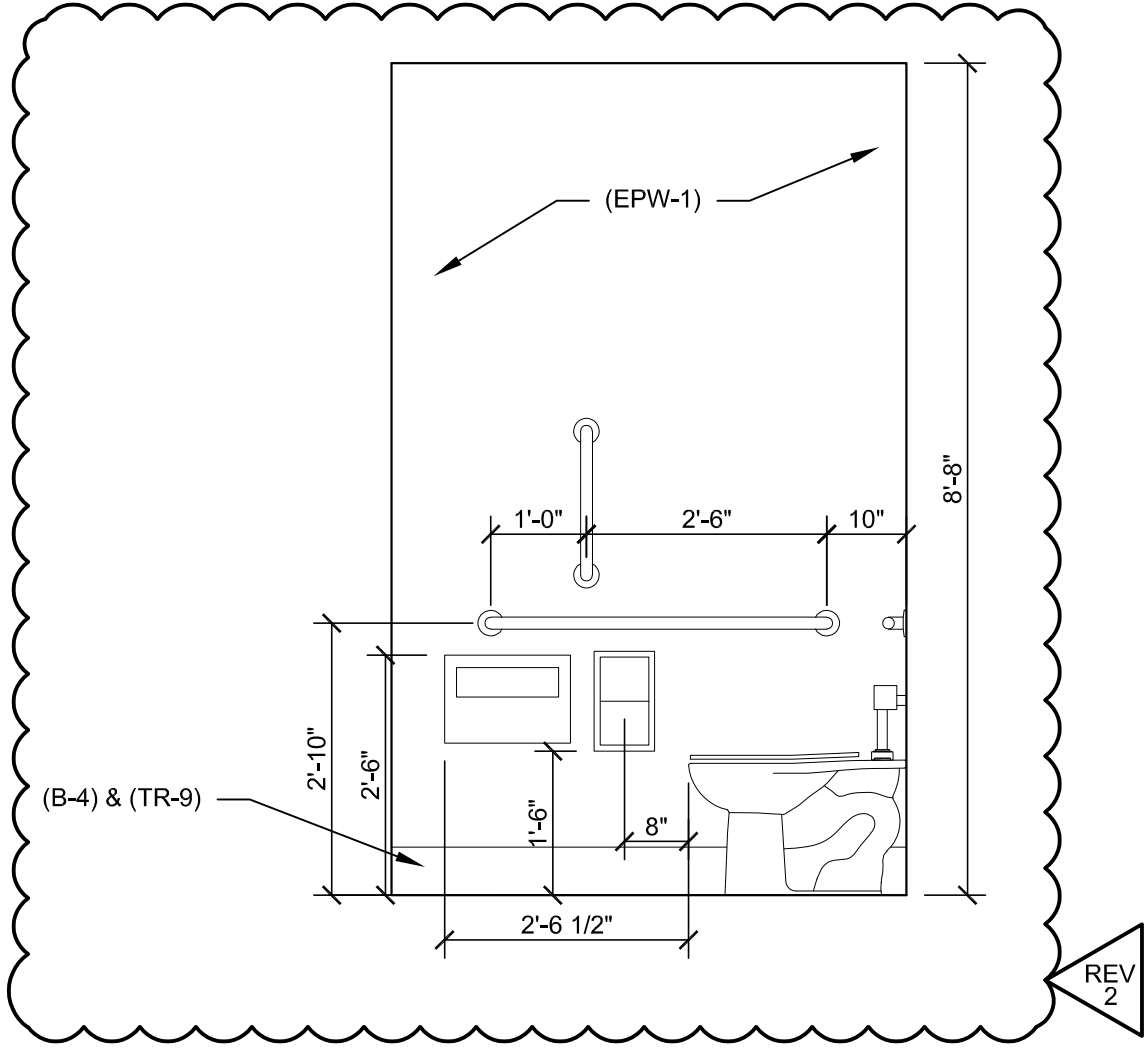
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SEAL

SHEET NUMBER

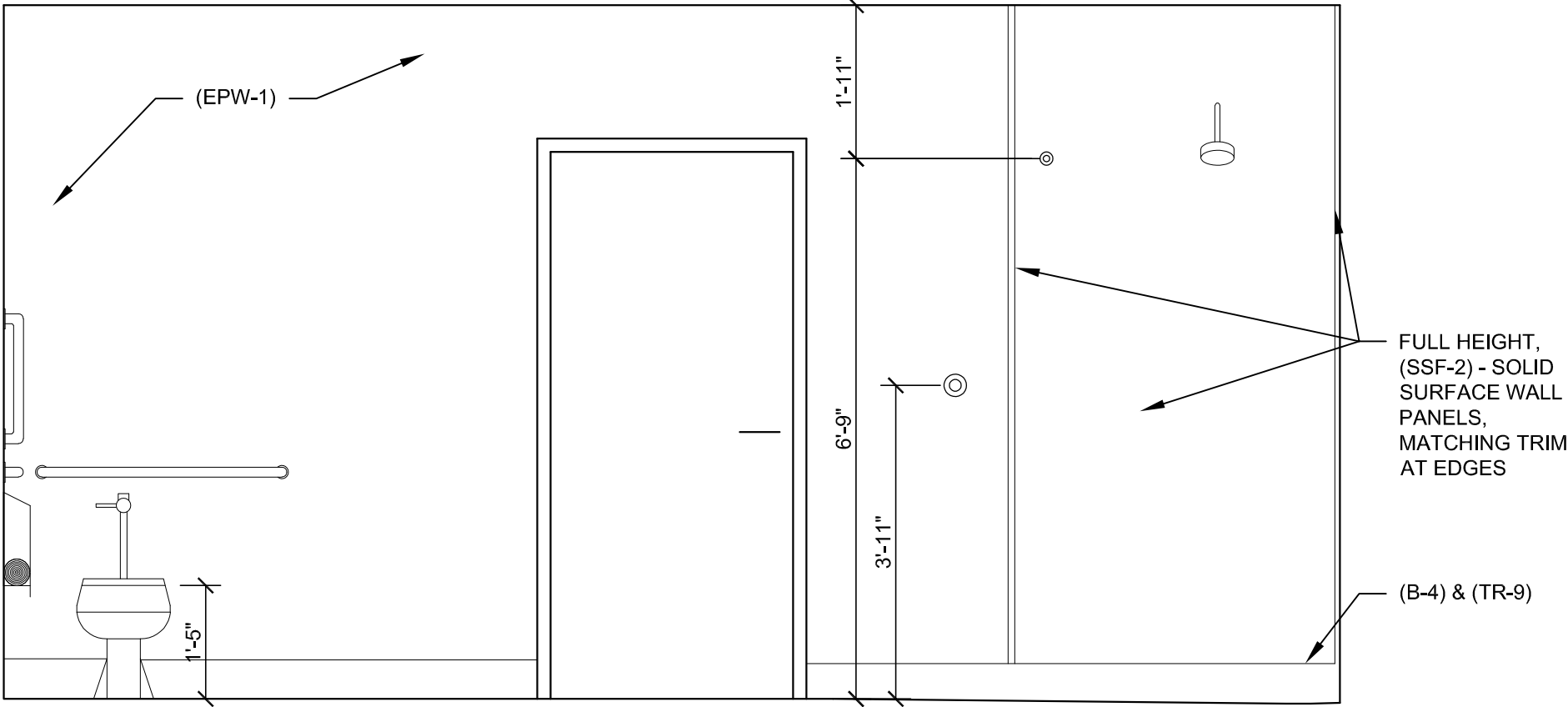
A503



ENLARGED TOILET ELEVATION

SCALE: 1/2" = 1'-0"

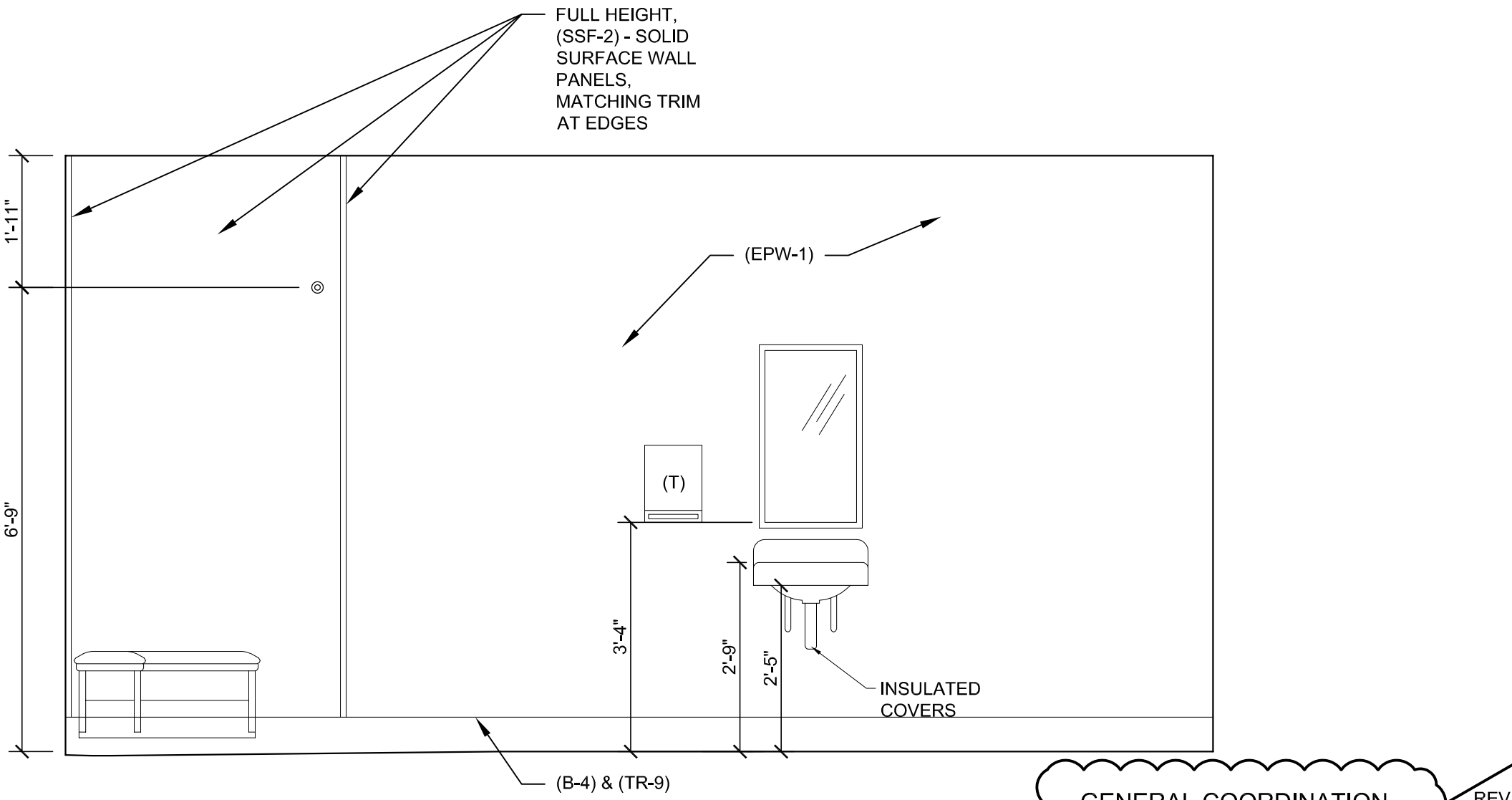
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ENLARGED TOILET ELEVATION

SCALE: 1/2" = 1'-0"

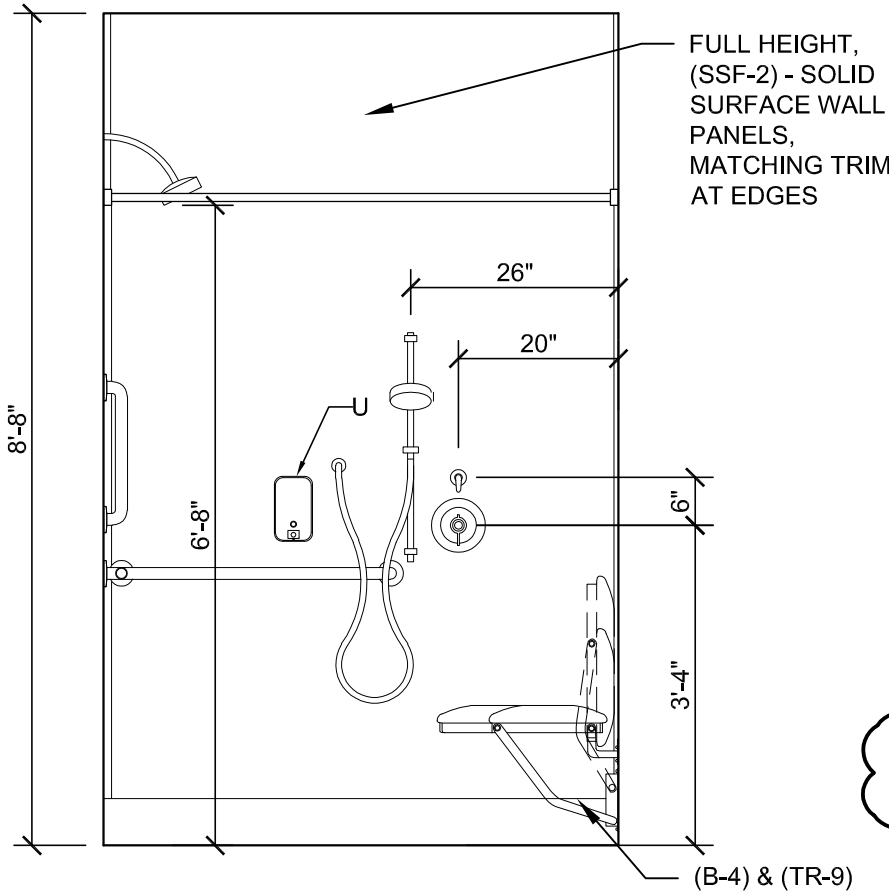
3



ENLARGED TOILET ELEVATION

SCALE: 1/2" = 1'-0"

2



ENLARGED TOILET ELEVATION

SCALE: 1/2" = 1'-0"

1



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

DOOR, FRAME, AND HARDWARE SCHEDULES & DETAILS

DATE 12.04.2020
PROJECT NO 20003
REVISIONS
NUM. DATE DESCRIPTION:
REV2 01/09/21 REV2/ADD1

GENERAL COORDINATION

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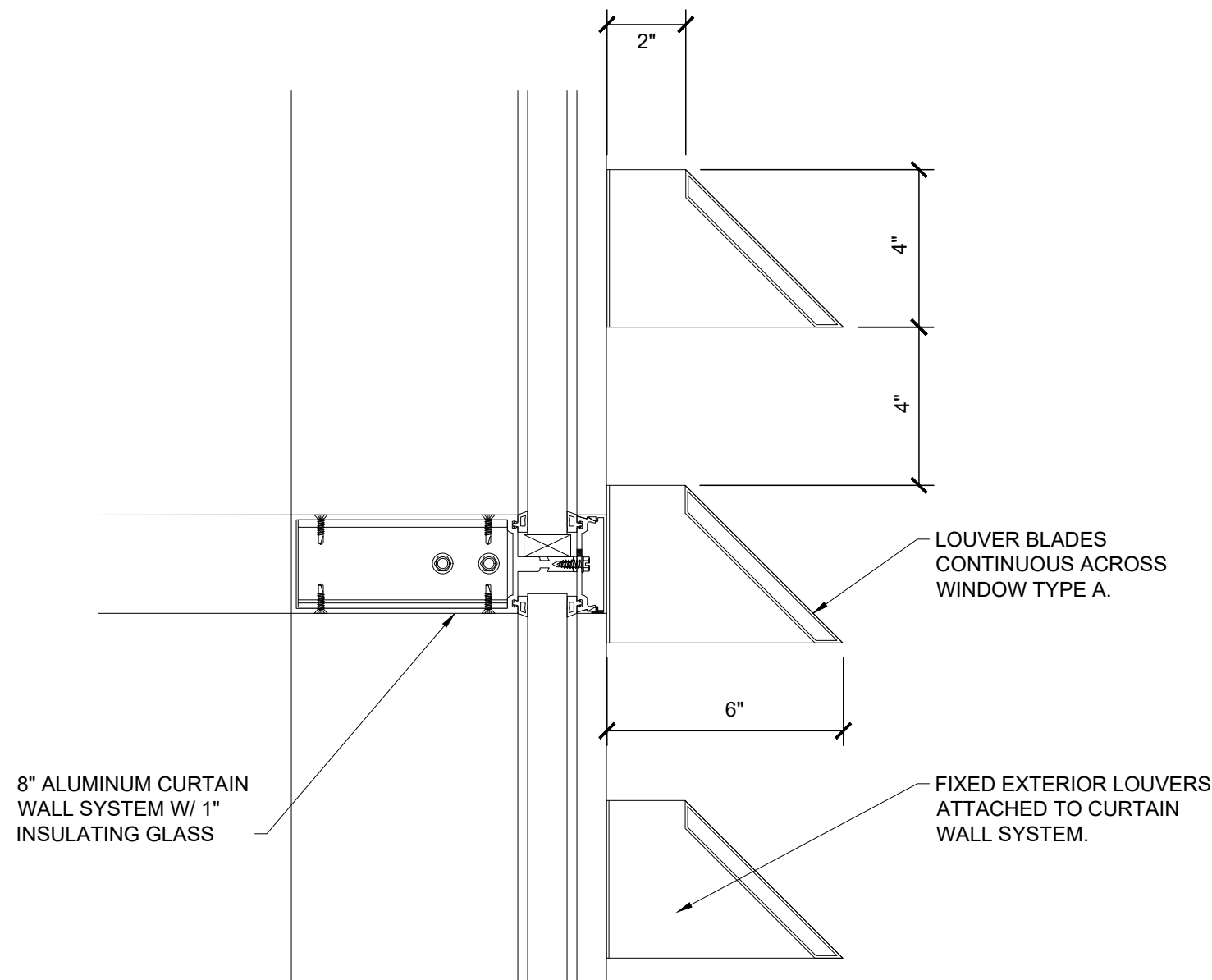


SHEET NUMBER

A600

DOOR, FRAME, AND HARDWARE SCHEDULE

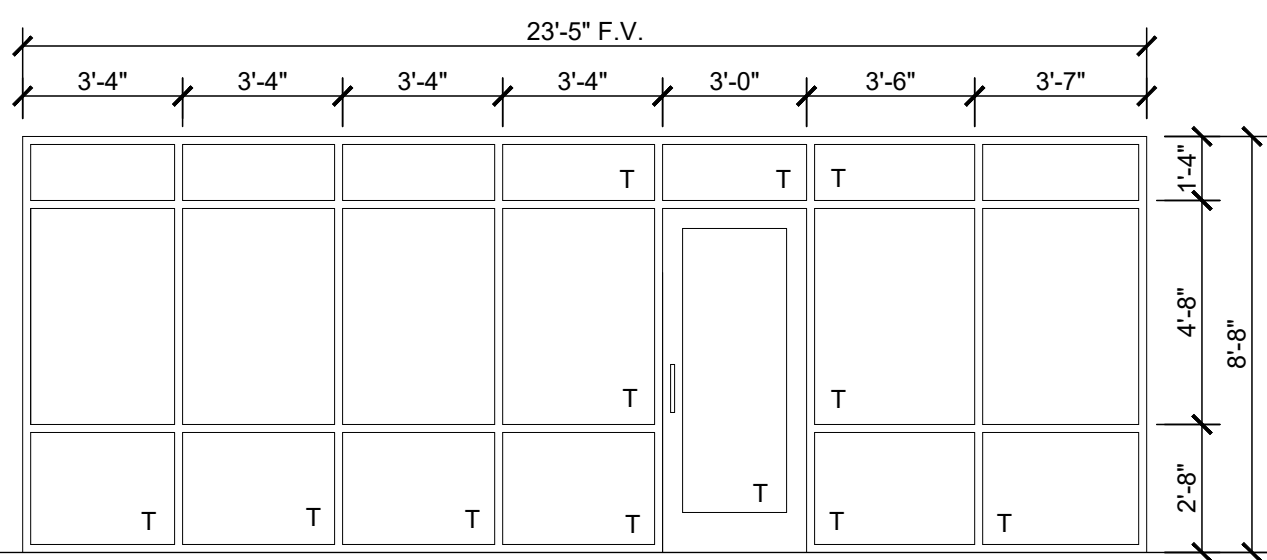
DOOR NUMBER	ROOM NAME	DOOR							FRAME						REMARKS	FIRE LABEL
		SIZE			DOOR			HDW SET	MAT	TYPE	GLAZ	SILL	JAMB	HEAD		
WIDTH	HEIGHT	THICK	TYPE	MAT	GLAZ	MAT	TYPE								GLAZ	SILL
001	LOBBY	3'-6"	7'-0"	1 3/4"	1	ALUM	G-3	1.0	ALUM	A	G-3	J1	H1	B,A,E		
002	STORAGE	3'-0"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
003	PUBLIC TOILET	3'-0"	7'-0"	1 3/4"	3	SCW		18.0	HM	A		J2	H2			
004	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	5.0	HM	A		J2	H2	D		
005	WORK ALCOVE	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	22.0	HM	A		J2	H2			
006	ADMINISTRATIVE ASSISTANT	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
008	E.M. DIRECTOR	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
009	E.M.S. OPERATIONS CHIEF	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
010	STORAGE	3'-0"	7'-0"	1 3/4"	3	SCW		29.0	HM	A		J2	H2			
011A	CONFERENCE	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	23.0	HM	A		J2	H2			
011B	CONFERENCE	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	22.0	HM	A		J2	H2			
012	ADMINISTRATIVE ASSISTANT	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
013	E.M. OPERATIONS	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
014	DEPUTY FIRE MARSHAL	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
015	FIRE MARSHAL PLAN REVIEW	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	22.0	HM	A		J2	H2			
017	MEDICAL DIRECTOR	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
018	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	8.0	HM	A		J2	H2	A		
019	TRAINING OFFICER	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
020A	TRAINING	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	10.0	HM	A		J2	H2	A		
020B	TRAINING	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	10.0	HM	A		J2	H2	A		
021	SCENARIO TRAINING	3'-0"	7'-0"	1 3/4"	3	SCW		22.0	HM	A		J2	H2			
022	A.V. CONTROL I.T.	PR 3'-0"	7'-0"	1 3/4"	3	SCW		32.0	HM	D		J2	H2			
023	SCENARIO A.V. CONTROL	3'-0"	7'-0"	1 3/4"	3	SCW		23.0	HM	A		J2	H2			
024A	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-2	9.0	HM	A		J2	H2	A	1/3 HR	
024B	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	5.0	HM	A		J2	H2	A,B		
025A	SECURE VESTIBULE	3'-0"	7'-0"	1 3/4"	3	SCW		5.0	HM	A		J2	H2	A,D		
025B	SECURE VESTIBULE	3'-0"	7'-0"	1 3/4"	2	IHM		3.0	HM	B		J4	H4	A,B,D	1 1/2 HR	
026	LAUNDRY	3'-0"	7'-0"	1 3/4"	3	SCW		25.0	HM	A		J2	H2		1/3 HR	
029	WOMEN'S TOILETS	3'-0"	7'-0"	1 3/4"	3	SCW		15.0	HM	A		J2	H2	C		
030	WOMEN'S LOCKERS	3'-0"	7'-0"	1 3/4"	3	SCW		15.0	HM	A		J2	H2	C		
032	MEN'S TOILETS	3'-0"	7'-0"	1 3/4"	3	SCW		15.0	HM	A		J2	H2	C		
033	MEN'S LOCKERS	3'-0"	7'-0"	1 3/4"	3	SCW		15.0	HM	A		J2	H2	C		
035	FIRE MARSHAL RECORDS STOR.	3'-0"	7'-0"	1 3/4"	3	SCW		31.0	HM	A		J2	H2			
036	DEPUTY FIRE MARSHAL	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
037	FIRE MARSHAL EVIDENCE STOR.	3'-0"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
038	FIRE MARSHAL/ASST E.M. DIRECTOR	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
039	E.M. PLANNING	3'-0"	7'-0"	1 3/4"	3	SCW		22.0	HM	A		J2	H2			
041	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	5.0	HM	A		J2	H2	A,D		
042	INFORMATION TECHNOLOGY	3'-0"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
043	E.M. SAFETY	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
044	ELECTRICAL	3'-6"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
045	MECHANICAL	3'-6"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
046A	CONFERENCE	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	22.0	HM	A		J2	H2			
046B	CONFERENCE	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	12.0	HM	A		J2	H2	D		
047	E.M. FINANCE/LOGISTICS	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
048	E.M. LIASION	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
049	AMATEUR RADIO	3'-0"	7'-0"	1 3/4"	3	SCW		25.0	HM	A		J2	H2			
050	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	5.0	HM	A		J2	H2	A,D		
051	GENERAL STORAGE	3'-0"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
052	DRY GOODS STORAGE	3'-0"	7'-0"	1 3/4"	3	SCW		22.0	HM	A		J2	H2			
053A	KITCHEN/BREAK ROOM	3'-6"	7'-0"	1 3/4"	4	SCW		26.0	HM	A		J2	H2			
053B	KITCHEN/BREAK ROOM	3'-6"	7'-0"	1 3/4"	1	ALUM	G-3	1.0	ALLUM	G	G-3	J1	H1	A,B,D		
055A	STAFF LOBBY	3'-0"	7'-0"	1 3/4"	3	SCW		11.0	HM	A		J3	H3	A,B,D		
055B	STAFF LOBBY	3'-6"	7'-0"	1 3/4"	1	ALUM	G-3	1.0	ALLUM	F	G-3	J1	H1	A,B,D		
057A	E.M. EQUIPMENT STORAGE	3'-6"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
057B	E.M. EQUIPMENT STORAGE	PR 3'-0"	7'-0"	1 3/4"	2	IHM		33.0	HM	E		J3	H3	B,G		
058A	E.O.C./MULTI-PURPOSE	3'-6"	7'-0"	1 3/4"	4	SCW	G-1	10.0	HM	A		J2	H2	A		
058B	E.O.C./MULTI-PURPOSE	3'-6"	7'-0"	1 3/4"	4	SCW	G-1	10.0	HM	A		J2	H2	A		
059	E.O.C. STORAGE	PR 3'-0"	7'-0"	1 3/4"	3	SCW		32.0	HM	D		J2	H2			
060A	DAYROOM	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	25.0	HM	A		J2	H2			
060B	DAYROOM	3'-0"	7'-0"	1 3/4"	3	SCW		13.0	HM	A		J2	H2	D	1/3 HR	
061	JANITOR	3'-0"	7'-0"	1 3/4"	3	SCW		30.0	HM	A		J2	H2			
062A	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-2	9.0	HM	A		J2	H2	A	1/3 HR	
062B	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	5.0	HM	A		J2	H2	A,D		
063	REPORT WRITING	3'-0"	7'-0"	1 3/4"	3	SCW		21.0	HM	A		J2	H2		1/3 HR	
064A	SECURE VESTIBULE	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	5.0	HM	A		J2	H2	A,D		
064B	SECURE VESTIBULE	3'-0"	7'-0"	1 3/4"	2	IHM		3.0	HM	B		J4	H4	A,B,D	1 1/2 HR	
065	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
067	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
068	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
069	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
070	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
071	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
072	SHIFT SUPERVISOR'S BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
073	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
074A	SHIFT SUPERVISOR	3'-0"	7'-0"	1 3/4"	3	SCW		21.0	HM	A		J2	H2		1/3 HR	
074B	SHIFT SUPERVISOR	3'-0"	7'-0"	1 3/4"	3	SCW		21.0	HM	A		J2	H2			
075	BEDROOM	3'-0"	7'-0"	1 3/4"	3	SCW		17.0	HM	A		J2	H2			
101	SECURE VESTIBULE	3'-0"	7'-0"	1 3/4"	2	HM		11.0	HM	B		J5	H5	A,D	1 HR	
102	CORRIDOR	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	5.0	HM	A		J2	H2	A,D		
104	DEPUTY 911 DIRECTOR	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
105	911 DIRECTOR	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
106	CORRIDOR	3'-0"	7'-0"	1 3/4"	1	ALUM	G-1	12.0	ALUM	J	G-1	J1	H1	D		
107A	CONFERENCE/SHIFT BRIEFING RM.	3'-0"	7'-0"	1 3/4"	4	SCW	G-1	12.0	HM	A		J2	H2	D		
107B	CONFERENCE/SHIFT BRIEFING RM.	6'-0"	7'-0"	1 1/4"	8	ALUM	G-4	10.0	HM	K	G-4	J2	H2	H		
108	ADDRESSING/ Q.A. ASSISTANT	3'-0"	7'-0"	1 3/4"	3	SCW		20.0	HM	A		J2	H2			
110	ACCESSIBLE UNISEX SHOWER/TLT	3'-0"	7'-0"	1 3/4"	3	SCW		19.0	HM	A		J2	H2	C		
111	UNISEX SHOWER/TOILET	3'-0"	7'-0"	1 3/4"	3	SCW		18.0	HM	A		J2	H2	C		
112	CORRIDOR	3'-0"	7'-0"	1 3/4"	1	ALUM	G-1	14.0	ALUM	L	G-1	J1	H1	D		
115	SHIFT SUPERVISORS' OFFICE	3'-0"	7'-0"	1 3/4"	1	ALUM	G-1	20.0	ALUM	M	G-1	J1	H1			
116	FILE ROOM	3'-0"	7'-0"	1 3/4"	3	SCW		23.0	HM	A		J2	H2			
117	CORRIDOR	3'-0"	7'-0"	1 3/4"	1	ALUM	G-1	6.0	ALUM	N	G-1	J1	H1	A,D		
118A	911 DISP. TRAINING ROOM	3'-0"	7'-0"	1												



FIXED EXTERIOR LOUVER DETAIL

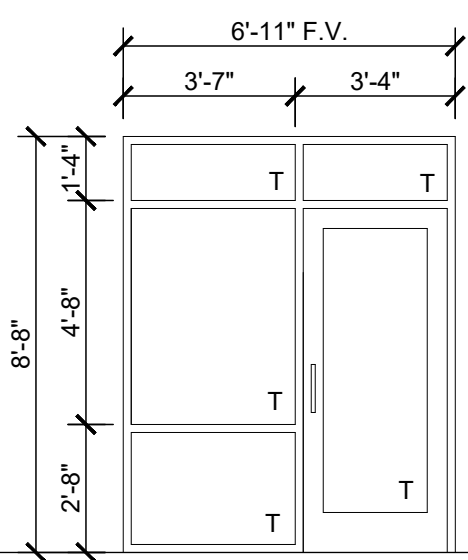
SCALE: 3" = 1'-0"

2



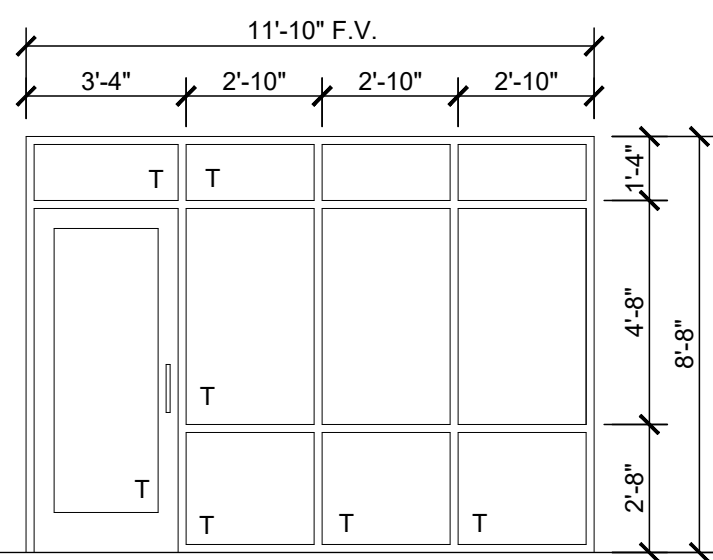
O

ALUMINUM STOREFRONT
SYSTEM W/ 1/2" TEMPERED
GLASS
T = TEMPERED GLASS



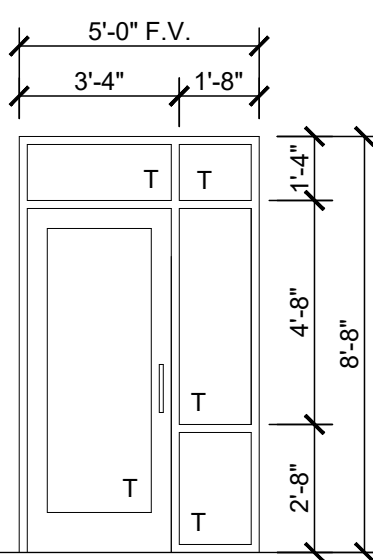
N

ALUMINUM STOREFRONT
SYSTEM W/ 1/2" TEMPERED
GLASS
T = TEMPERED GLASS



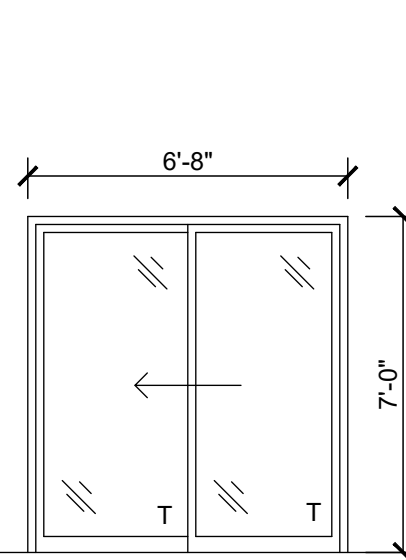
M

ALUMINUM STOREFRONT
SYSTEM W/ 1/2" TEMPERED
GLASS
T = TEMPERED GLASS



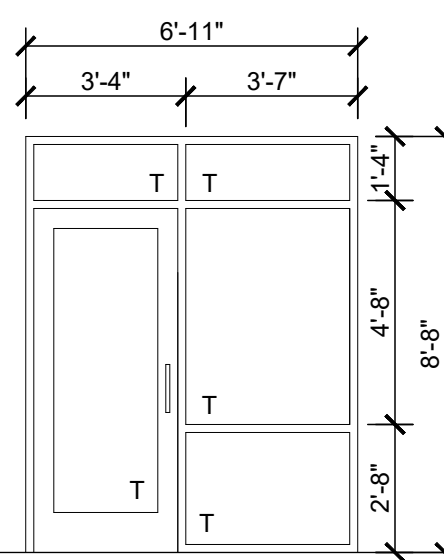
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ALUMINUM STOREFRONT
SYSTEM W/ 1/2" TEMPERED
GLASS
T = TEMPERED GLASS



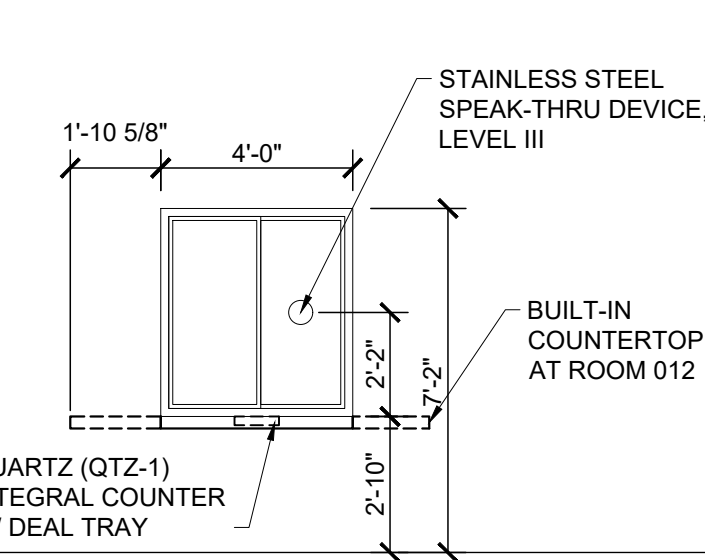
K

ALUMINUM SLIDING DOOR W/
DOUBLE PANED 1/2" TEMPERED
GLASS W/ INTERNAL BLINDS
T = TEMPERED GLASS



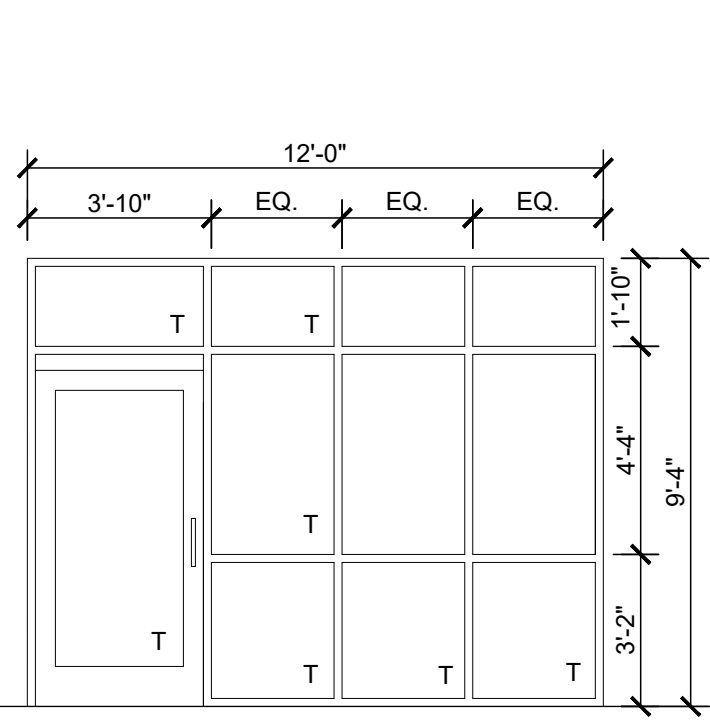
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ALUMINUM STOREFRONT
SYSTEM W/ 1/2" TEMPERED
GLASS
T = TEMPERED GLASS



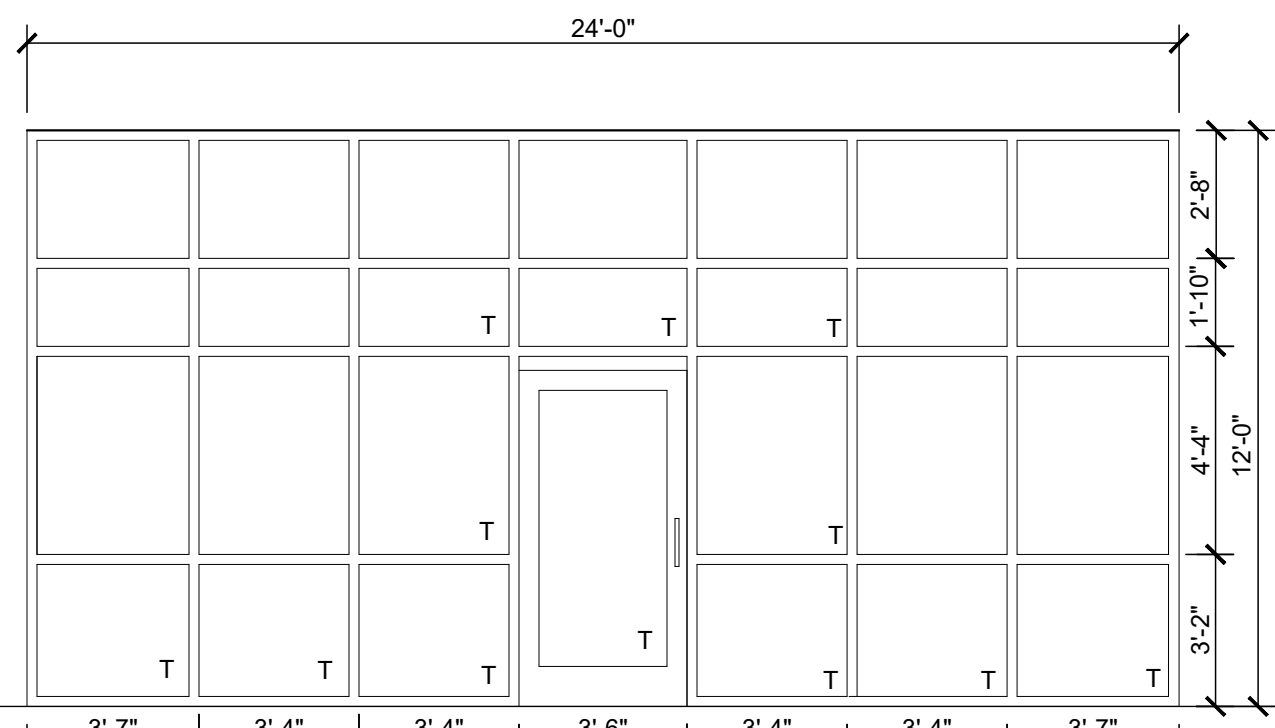
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LEVEL 3 BULLET RESISTANT
SLIDING TRANSACTION
WINDOW SYSTEM AND
FRAME



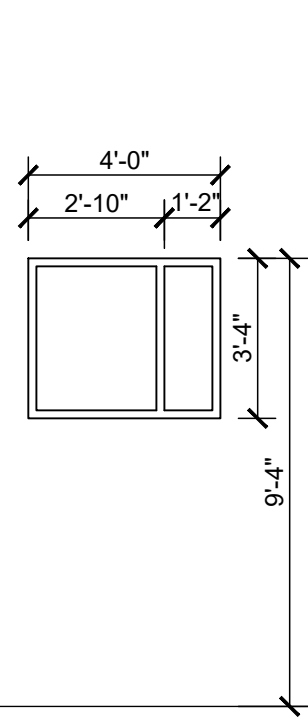
G

ALUMINUM STOREFRONT
SYSTEM W/ 1" INSULATING
GLASS
T = TEMPERED GLASS



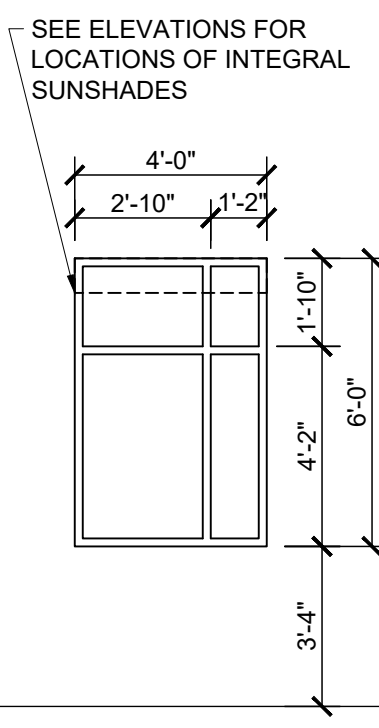
F

8" DEEP CURTAIN
WALL SYSTEM W/ 1" INSULATING
GLASS
T = TEMPERED GLASS



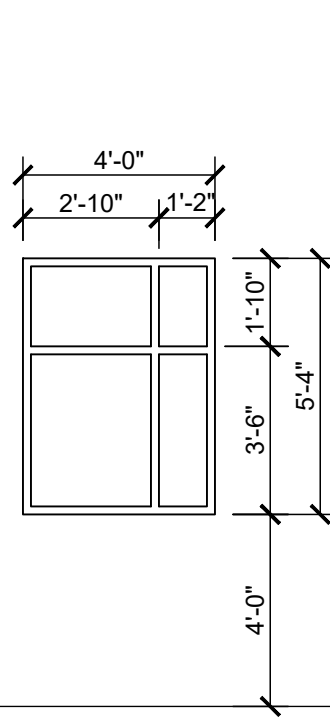
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ALUMINUM STOREFRONT
SYSTEM W/ 1" INSULATING
GLASS



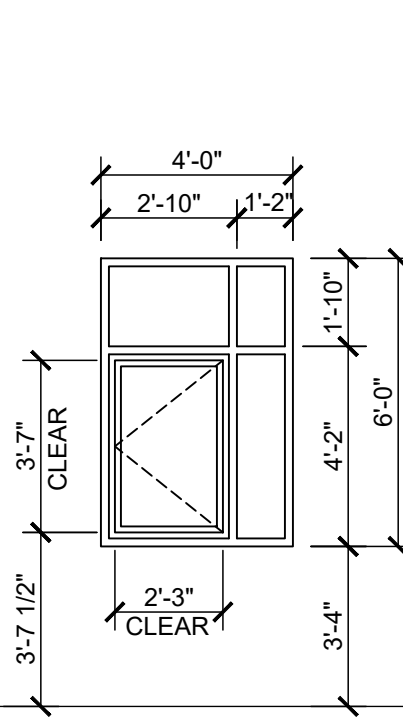
D

ALUMINUM STOREFRONT
SYSTEM W/ 1" INSULATING
GLASS



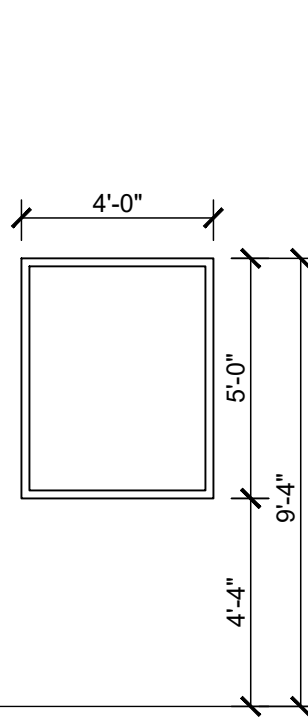
D1

LEVEL IV
BULLET RESISTANT
WINDOW SYSTEM AND FRAME



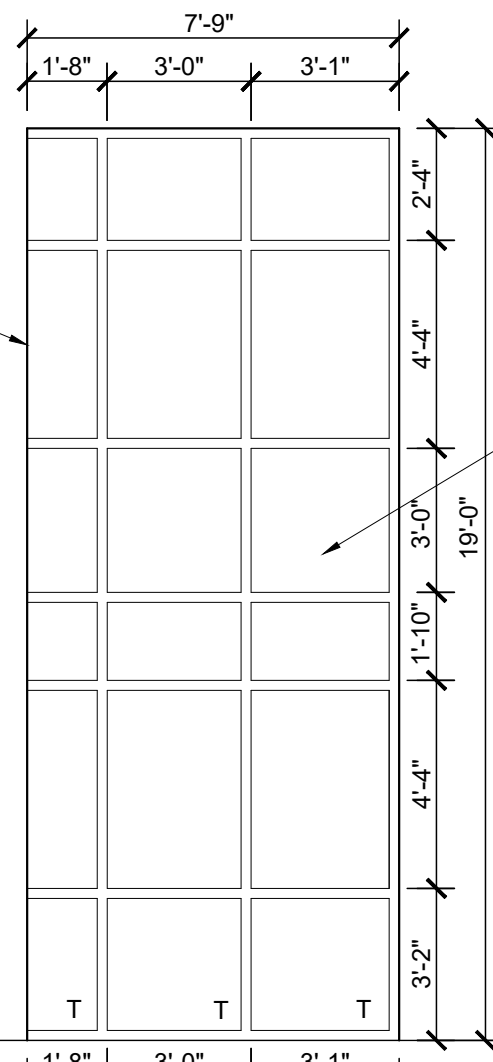
D2

LEVEL IV BULLET RESISTANT
WINDOW SYSTEM AND FRAME
WITH NON-B.R. OPERABLE
ALUMINUM CASEMENT INSERT
WITH LEVEL 2 (1") B.R.
GLASS-CLAD POLYCARBONATE
GLASS



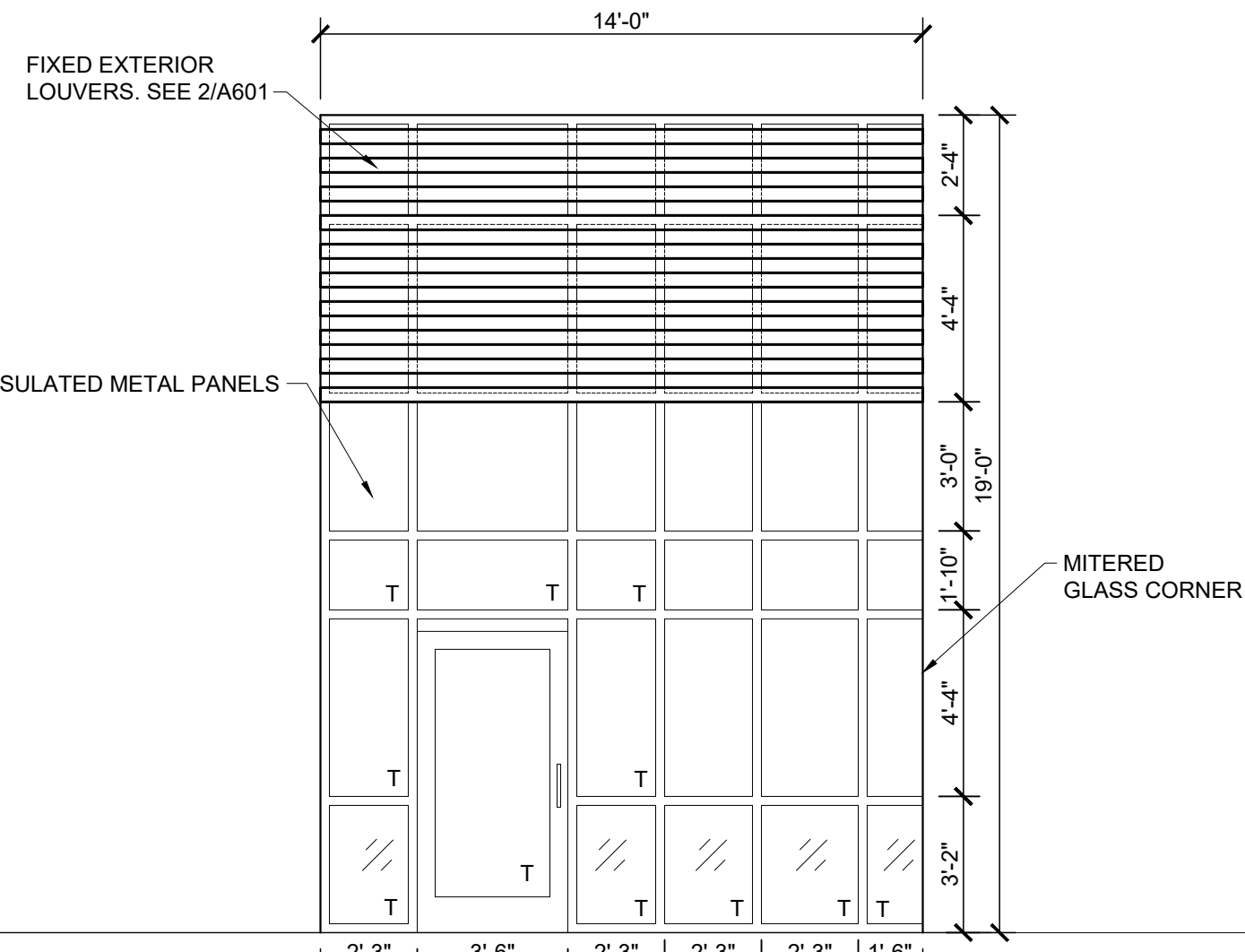
C

ALUMINUM STOREFRONT
SYSTEM W/ 1" INSULATING
GLASS



B

8" DEEP CURTAIN
WALL SYSTEM W/ 1" INSULATING
GLASS
T = TEMPERED GLASS



A

8" DEEP CURTAIN
WALL SYSTEM W/ 1" INSULATING
GLASS
T = TEMPERED GLASS

WINDOW ELEVATIONS

SCALE: 1/4" = 1'-0"

1

SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

WINDOW ELEVATIONS
AND DETAILS

DATE 12.04.2020
PROJECT NO 20003
REVISIONS
NUM. DATE DESCRIPTION:
REV2 01/09/21 REV2/ADD1

GENERAL COORDINATION

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SEAL

SHEET NUMBER

A601



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON, NORTH CAROLINA

OVERALL FINISH FLOOR PLAN

DATE: 12.04.2020
PROJECT NO: 20003

REVISIONS

NO.	DATE	DESCRIPTION
2 REV	01/09/21	REV2/ADD1

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SHEET NUMBER

A701





SAMPSON COUNTY 911 & ES FACILITIES

CLINTON, NORTH CAROLINA

MAIN BUILDING FINISH FLOOR PLAN

DATE: 12.04.2020
PROJECT NO: 20003

REVISIONS

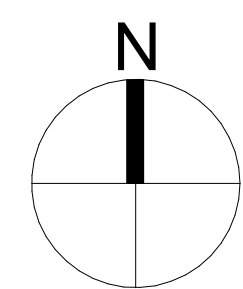
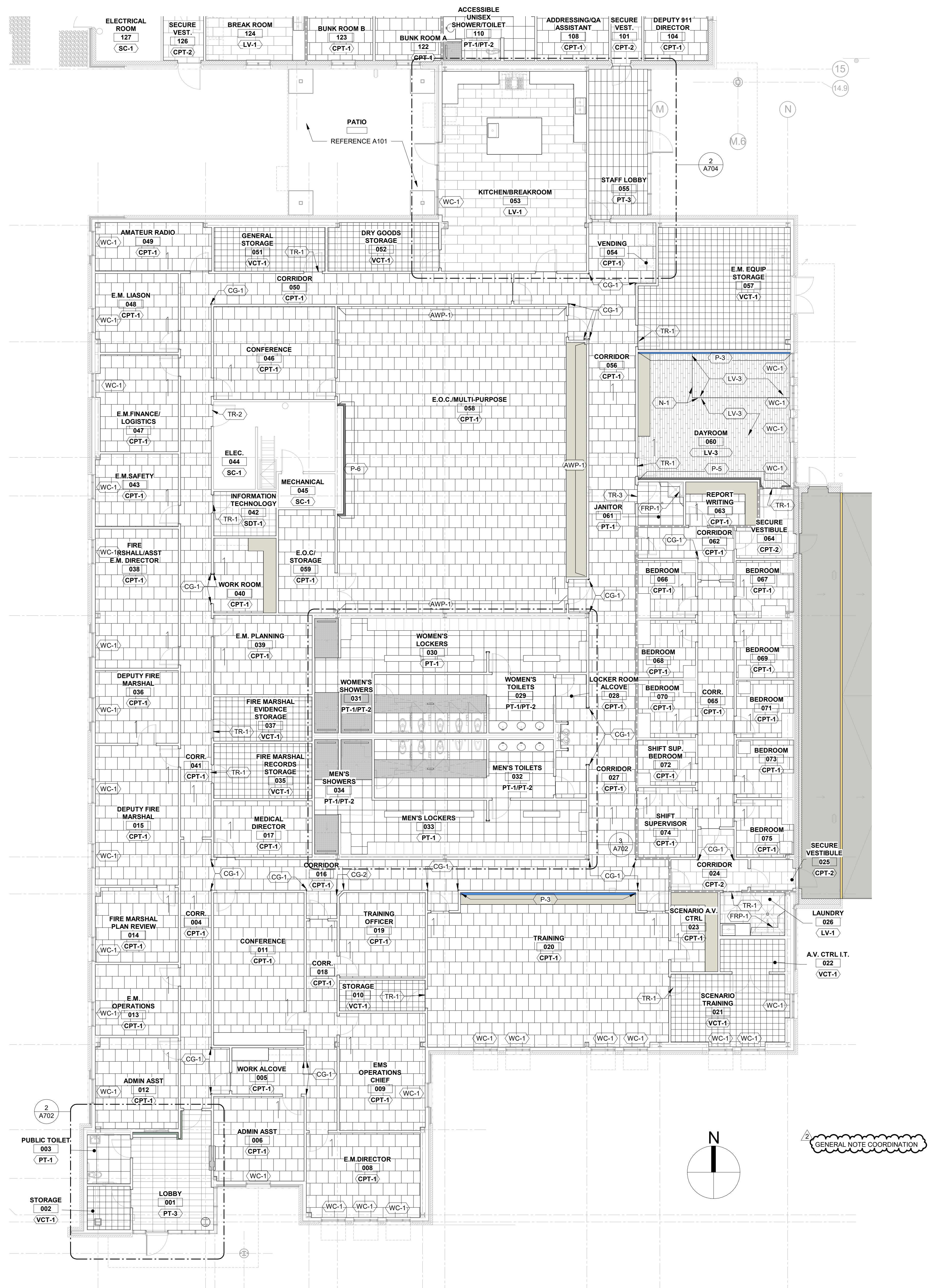
NO.	DATE	DESCRIPTION
2 REV	01/09/21	REV2/ADD1

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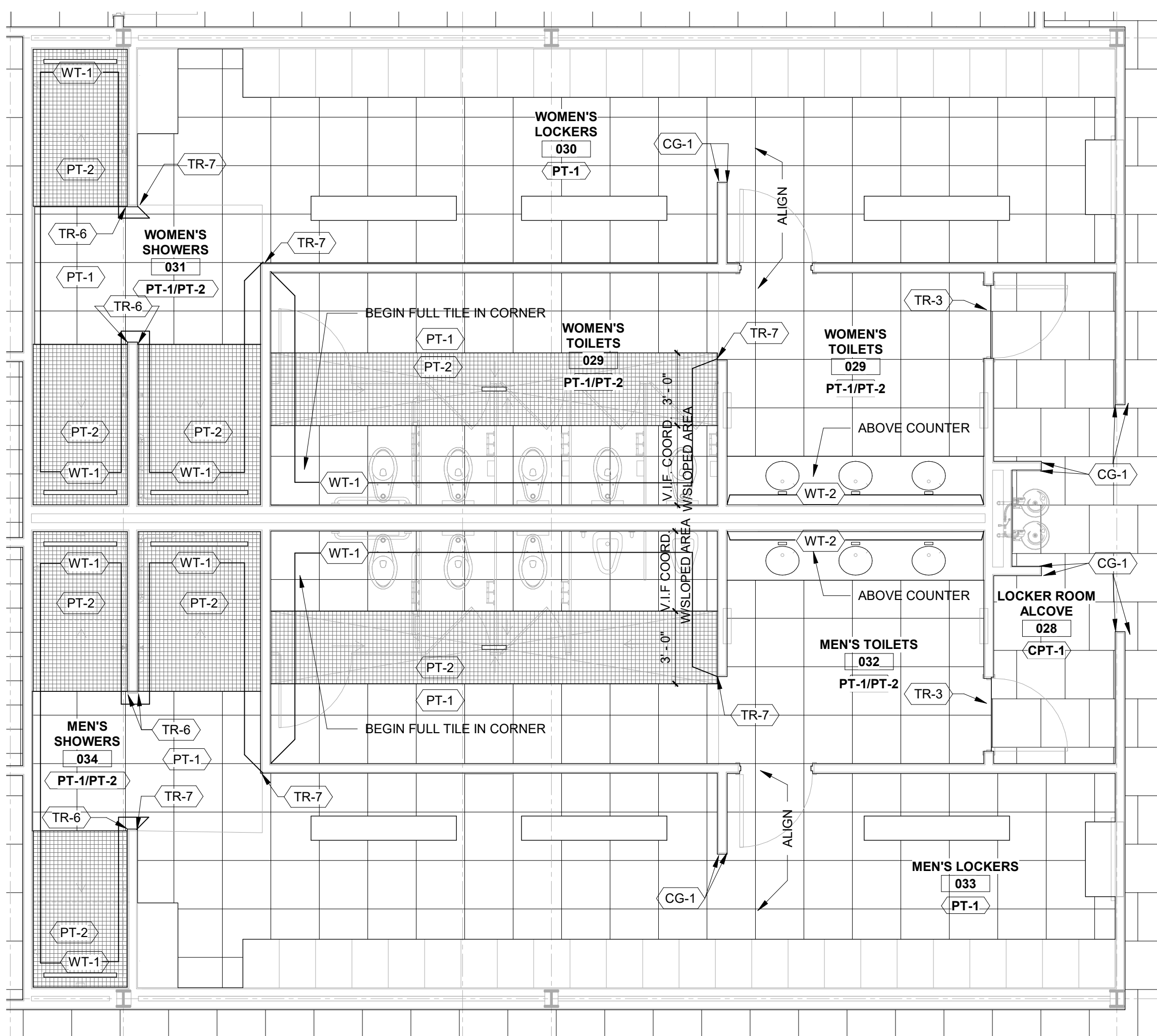


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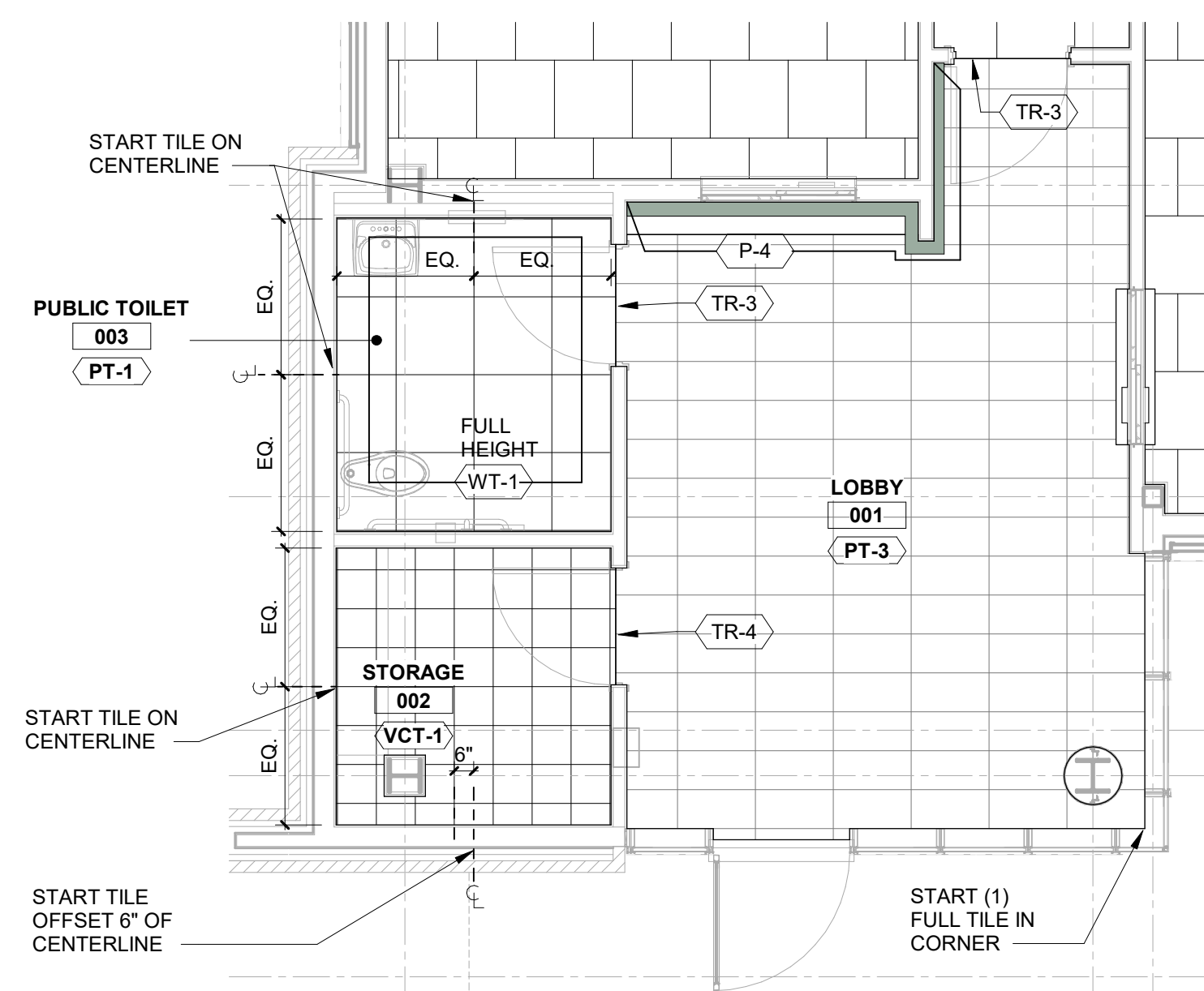
A702



GENERAL NOTE COORDINATION



ENLARGED - FINISH FLOOR PLAN - WOMEN'S & MEN TLT. & SHOWERS 1/4" = 1'-0" 3



ENLARGED - FINISH PLAN - TOILET & LOBBY 1/4" = 1'-0" 2

MAIN FINISH FLOOR PLAN 1/8" = 1'-0" 1



SAMPSON
COUNTY 911 &
ES FACILITIES

CLINTON, NORTH
CAROLINA

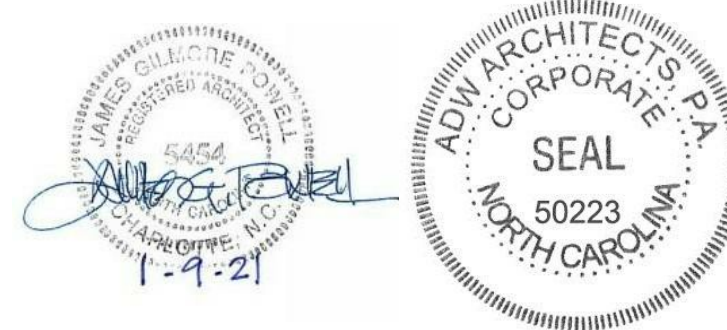
EMS WING FINISH FLOOR
PLAN

DATE: 12.04.2020
PROJECT NO: 20003

REVISIONS

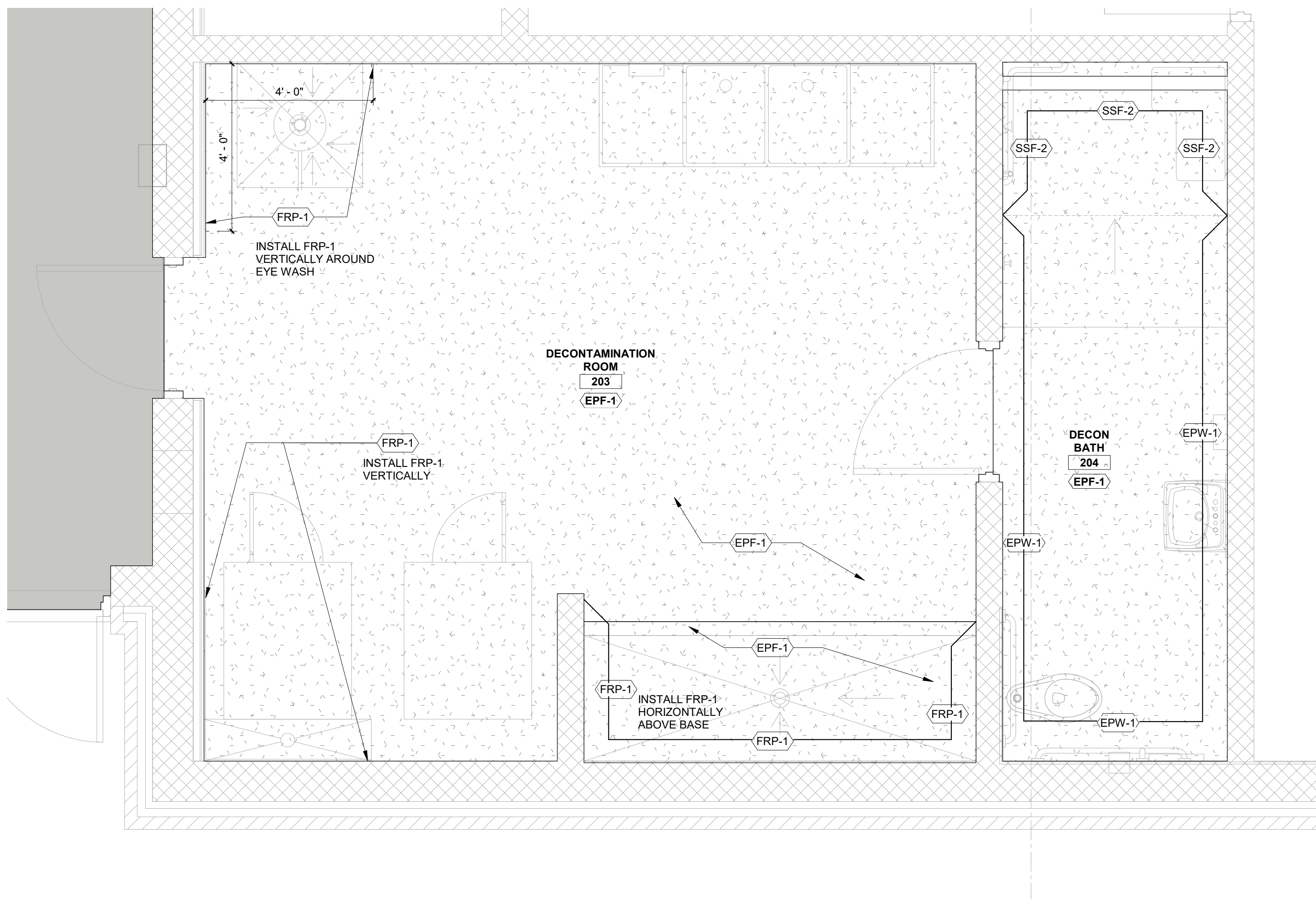
NO.	DATE:	DESCRIPTION:
2 REV	01/09/21	REV2/ADD1

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SHEET NUMBER

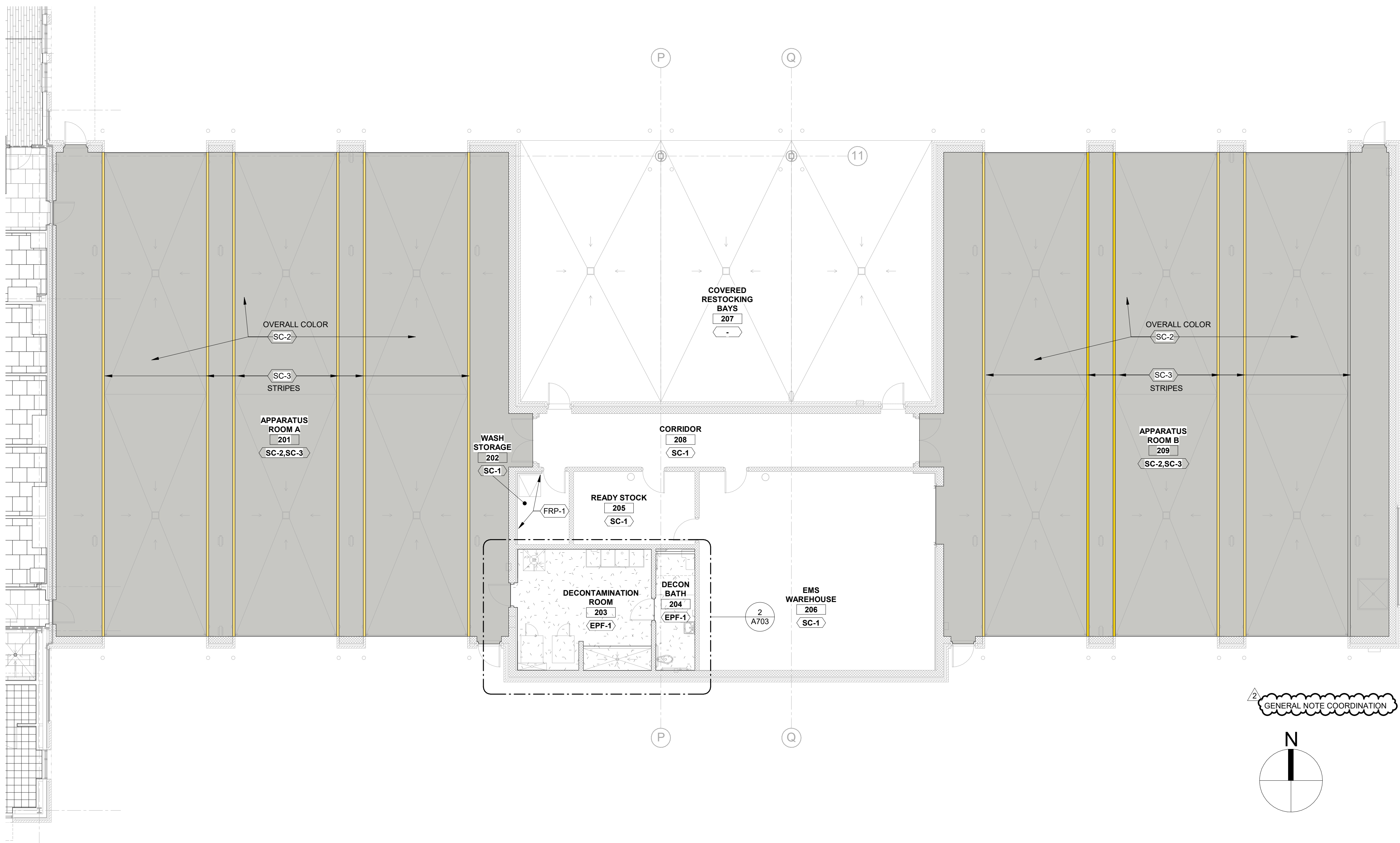
A703



ENLARGED FINISH FLOOR PLAN - DECON 203 & DECON BATH 204

1/2" = 1'-0"

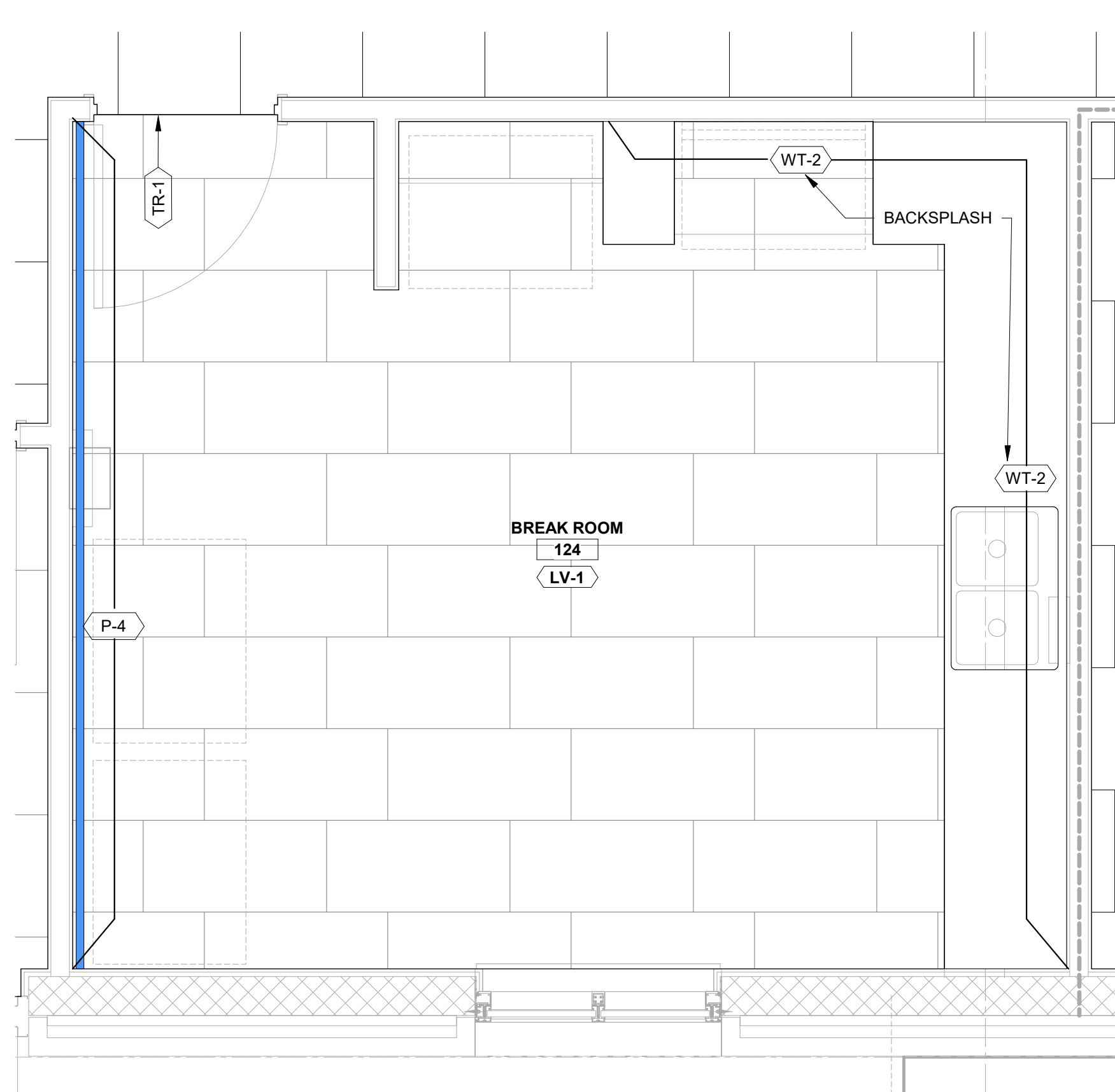
2



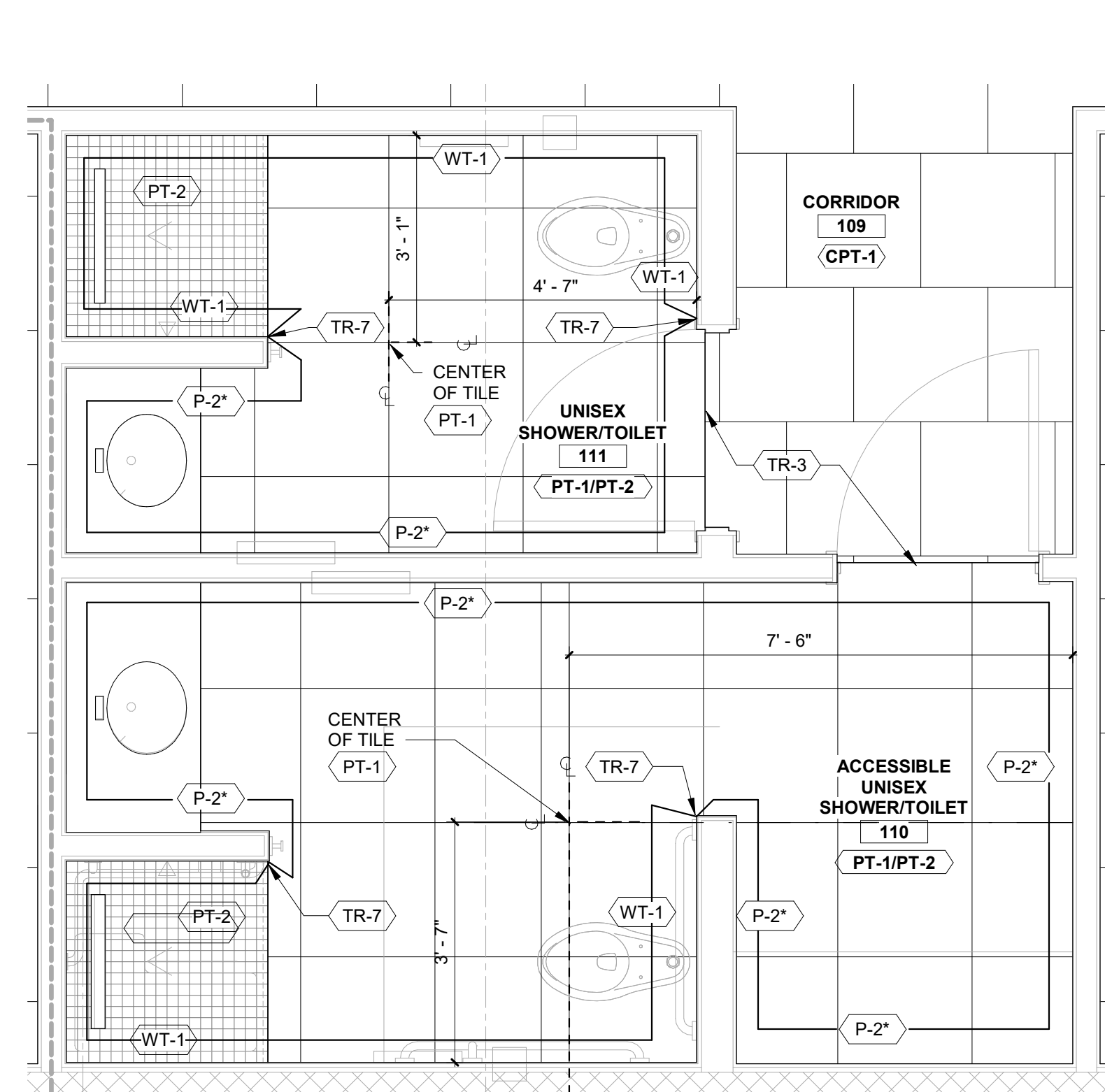
EMS FINISH FLOOR PLAN

1/8" = 1'-0"

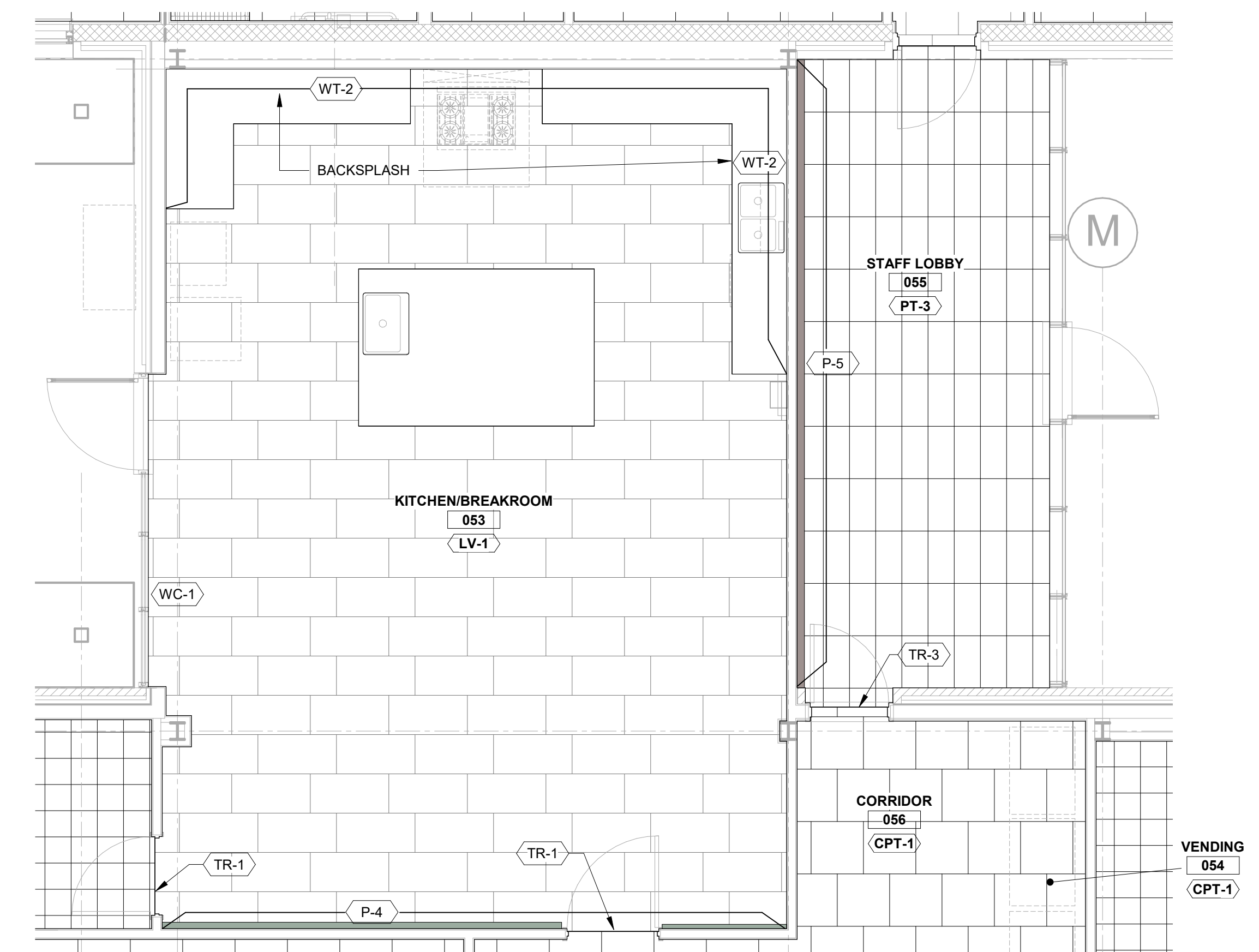
1



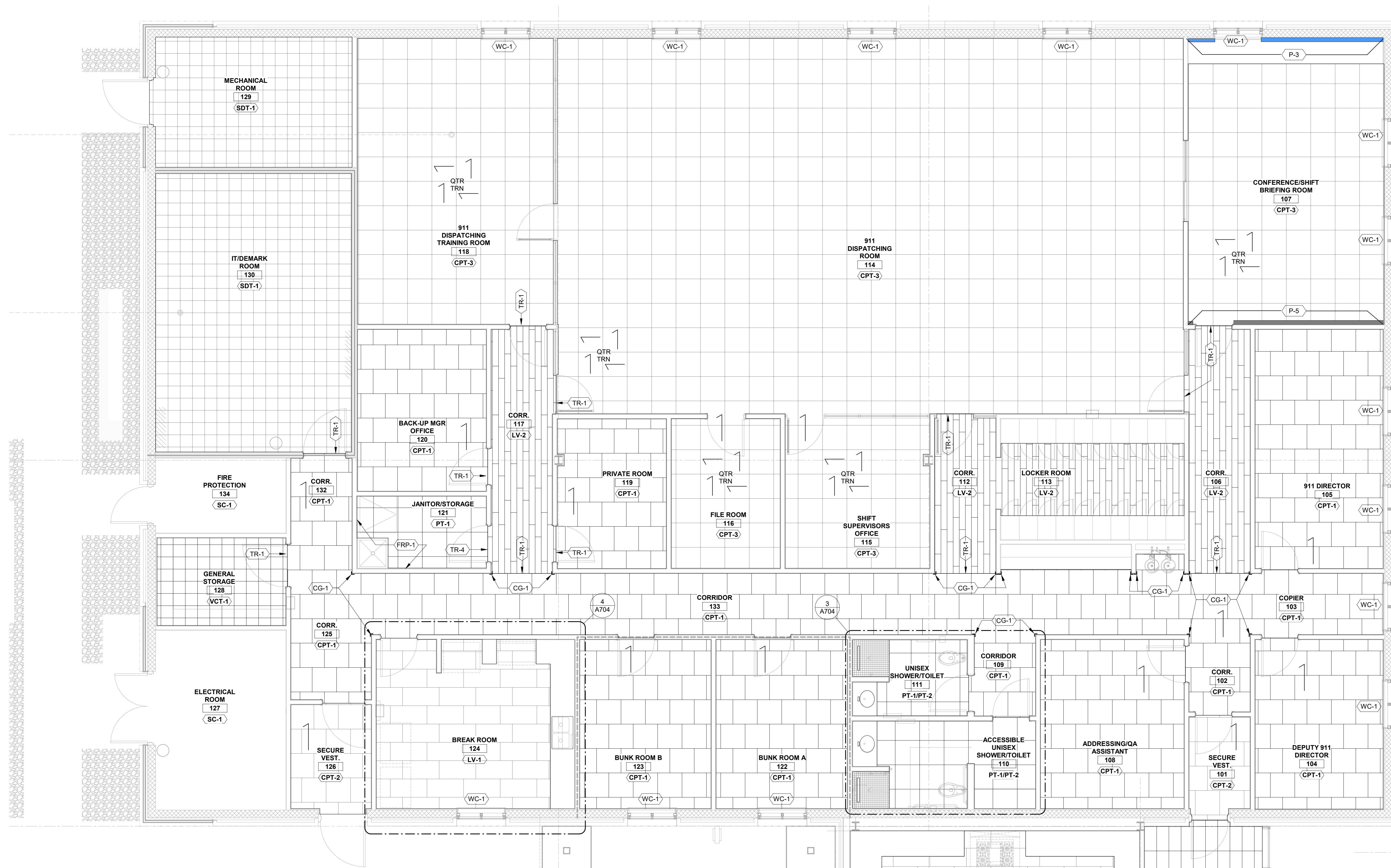
ENLARGED FINISH FLOOR PLAN - BREAK 124 | 1/2" = 1'-0" 4



ENLARGED FINISH FLOOR PLAN - 110 & 111 | 1/2" = 1'-0" 3



ENLARGED - FINISH FLOOR PLAN - KIT/BREAK 053 & STAFF LOBBY 055 | 1/4" = 1'-0" 2



911 FINISH FLOOR PLAN | 1/4" = 1'-0" 1



SAMPSON COUNTY 911 & ES FACILITIES

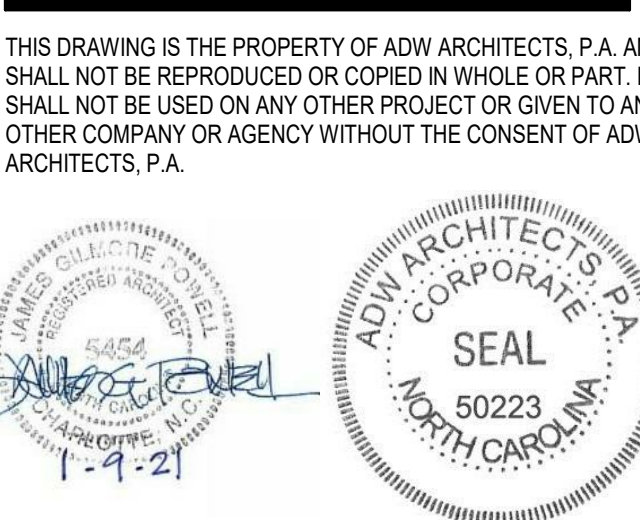
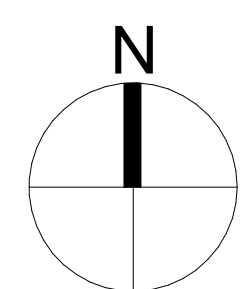
CLINTON, NORTH CAROLINA

911 FINISH FLOOR PLAN

DATE: 12.04.2020
PROJECT NO: 20003

REVISIONS
NO. DATE DESCRIPTION
2 REV 01/09/21 REV2/ADD1

GENERAL NOTE COORDINATION



SHEET NUMBER

A704



SAMPSON COUNTY 911 & ES FACILITIES

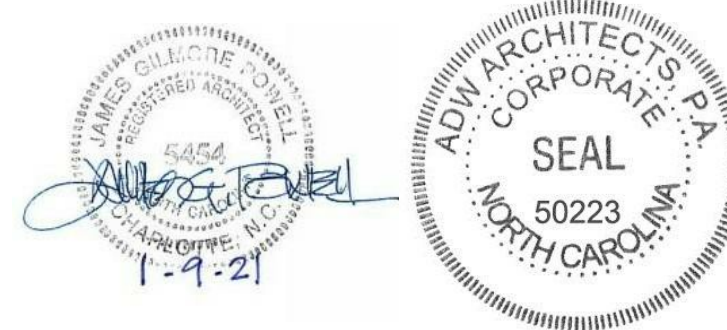
CLINTON, NORTH CAROLINA

INTERIOR DETAILS

DATE: 12.04.2020
PROJECT NO: 20003

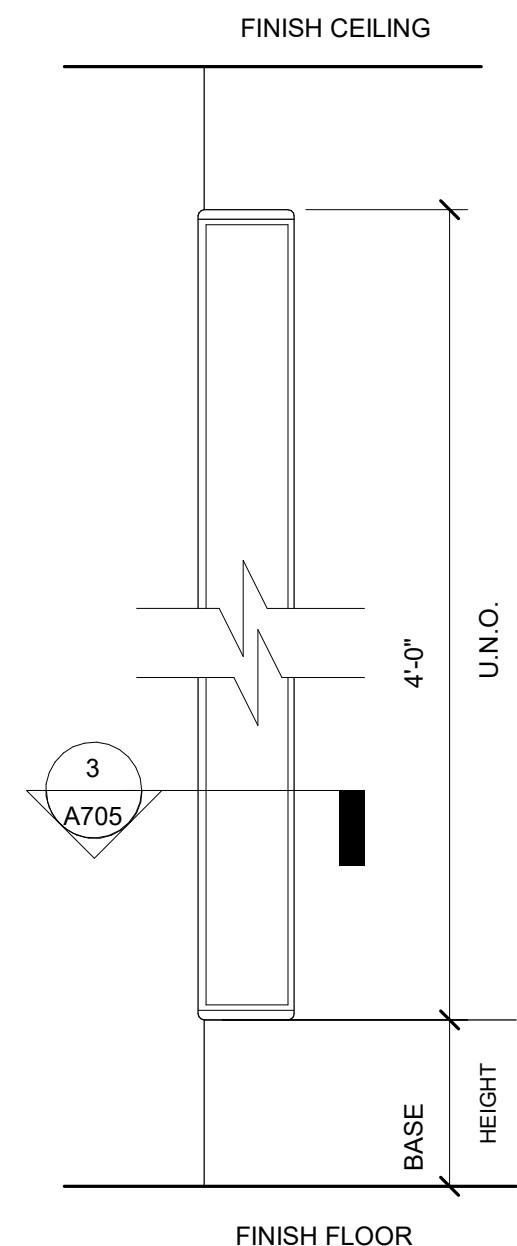
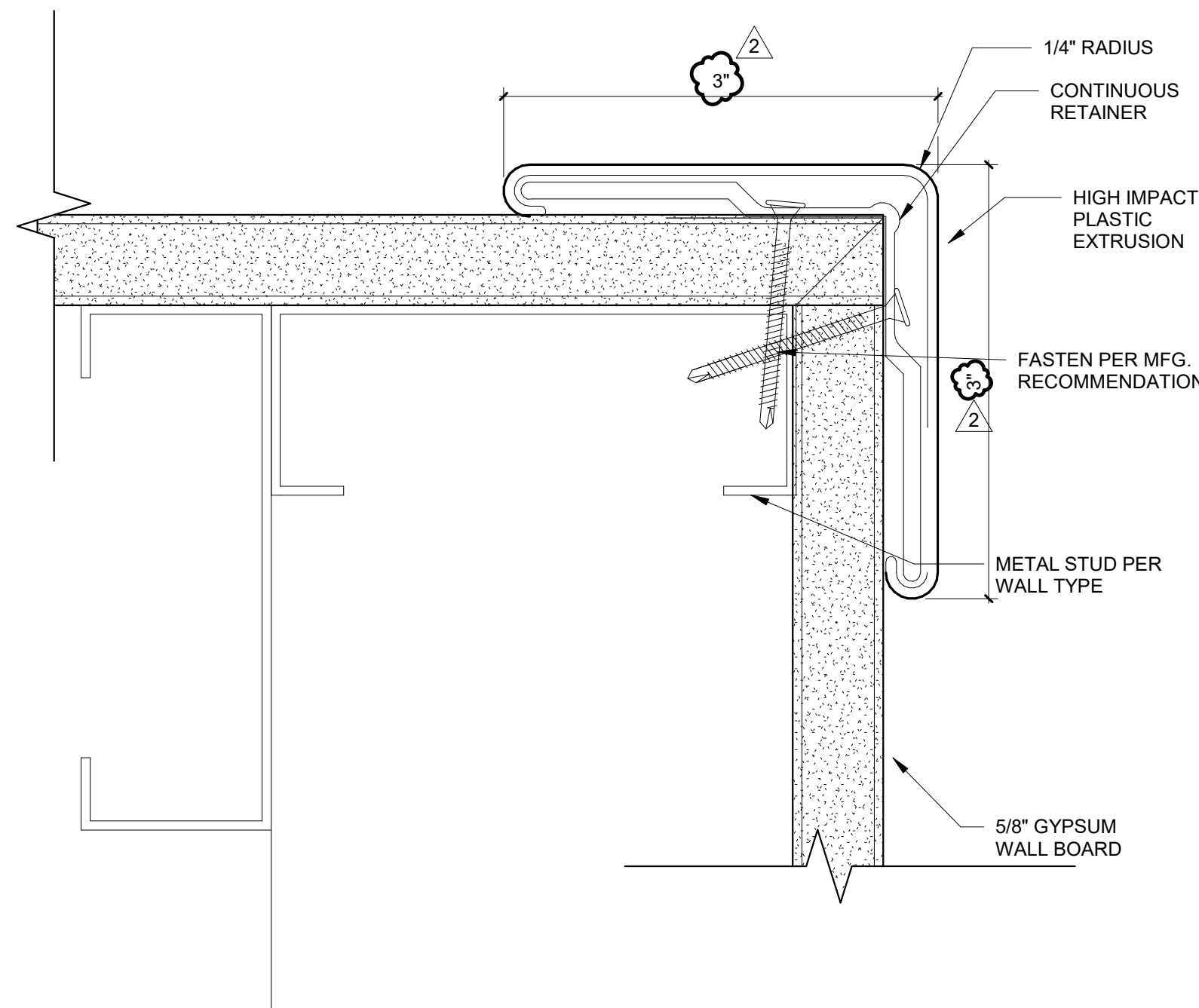
REVISIONS		
NO.	DATE	DESCRIPTION
2 REV	01/09/21	REV2/ADD1

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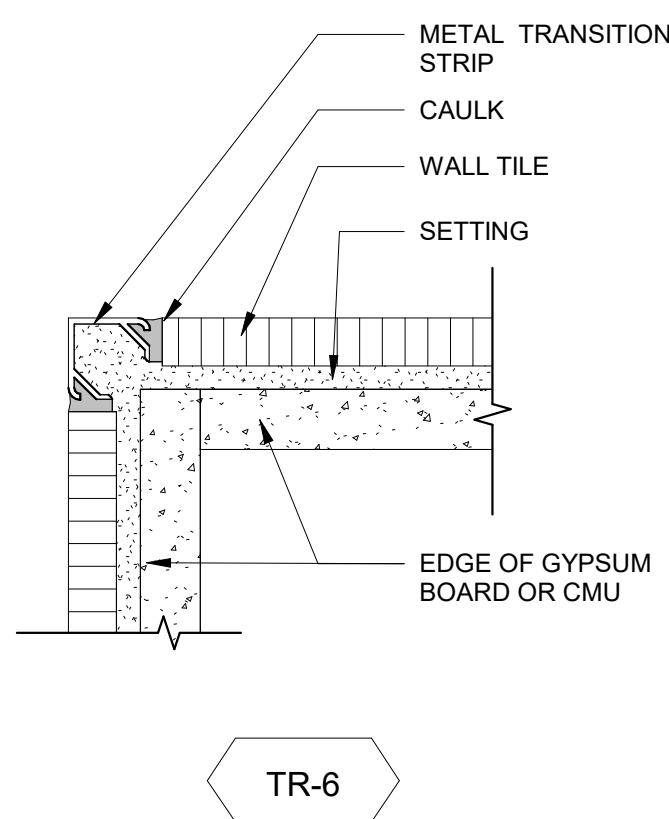
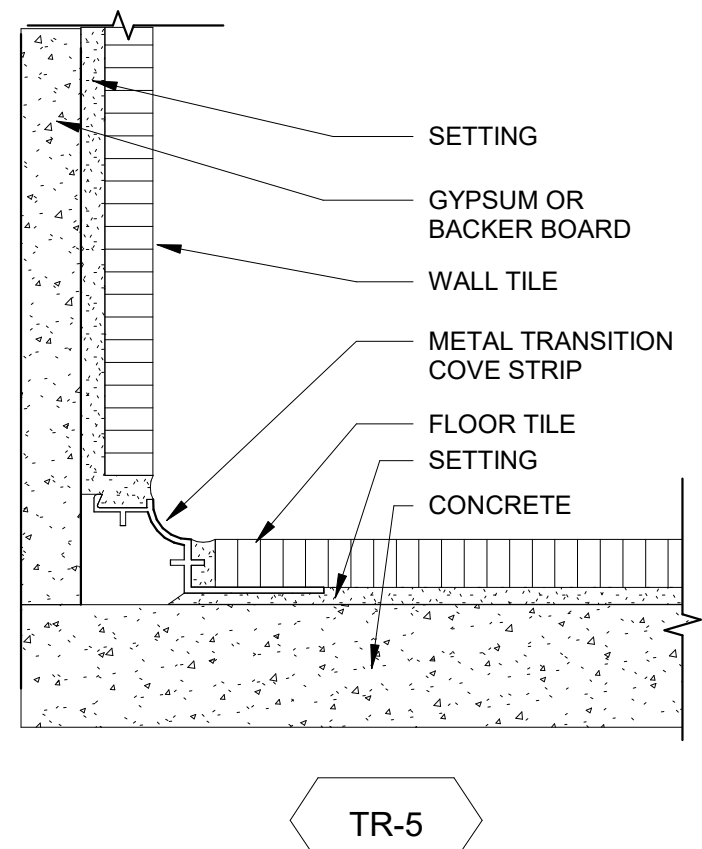
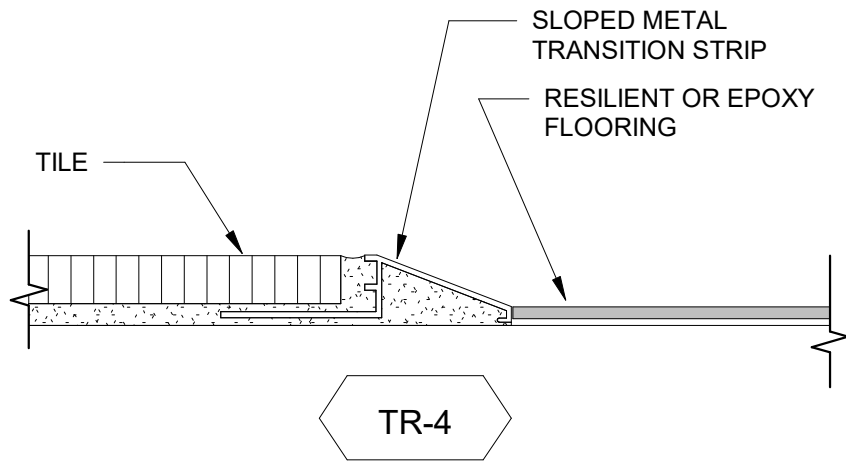
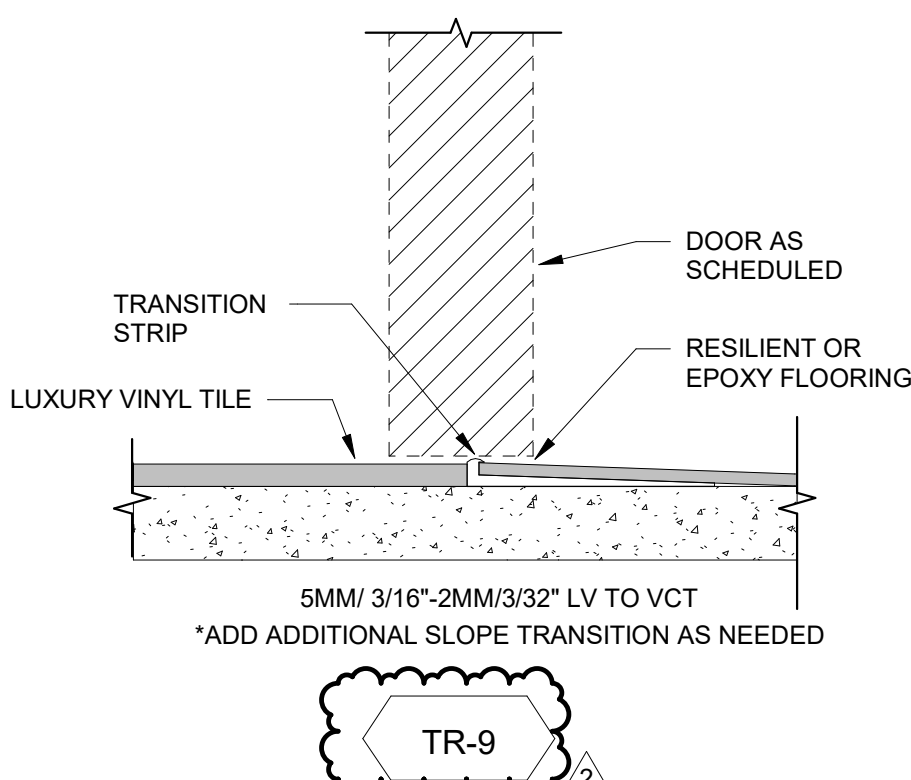
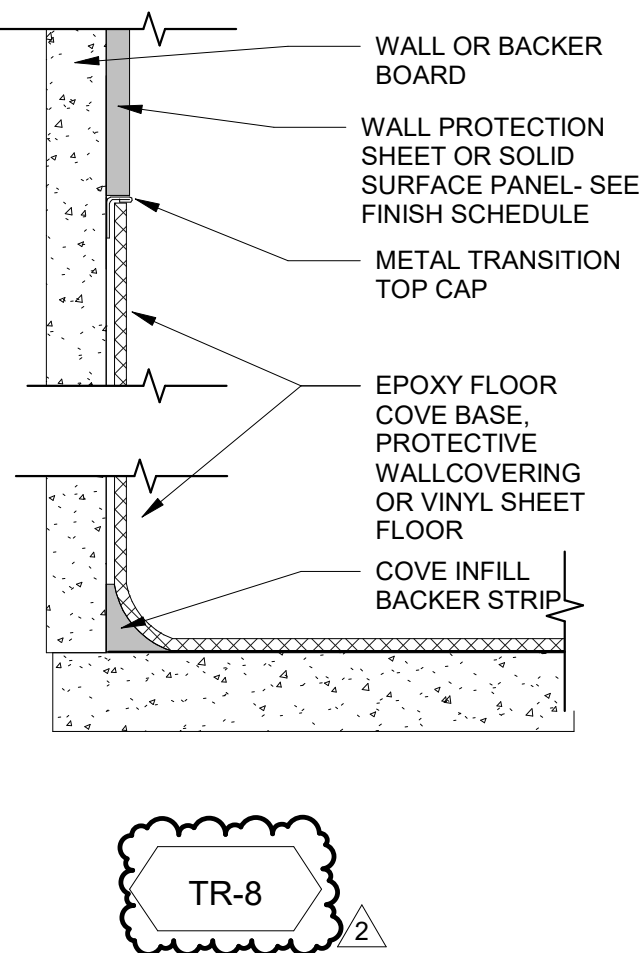
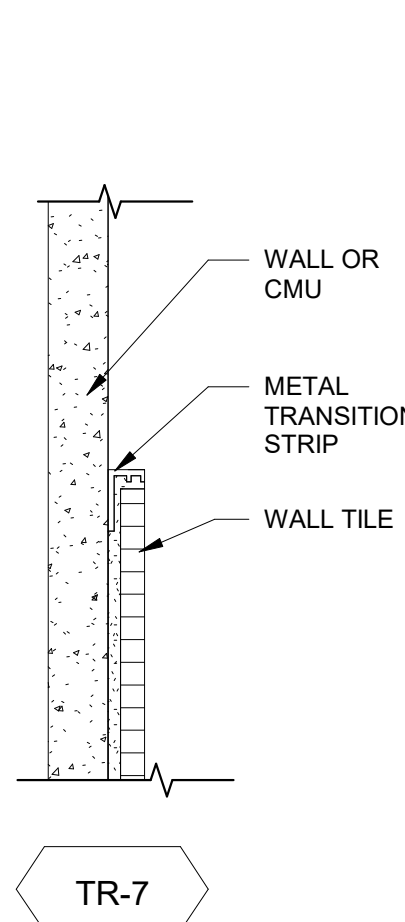
SHEET NUMBER

A705

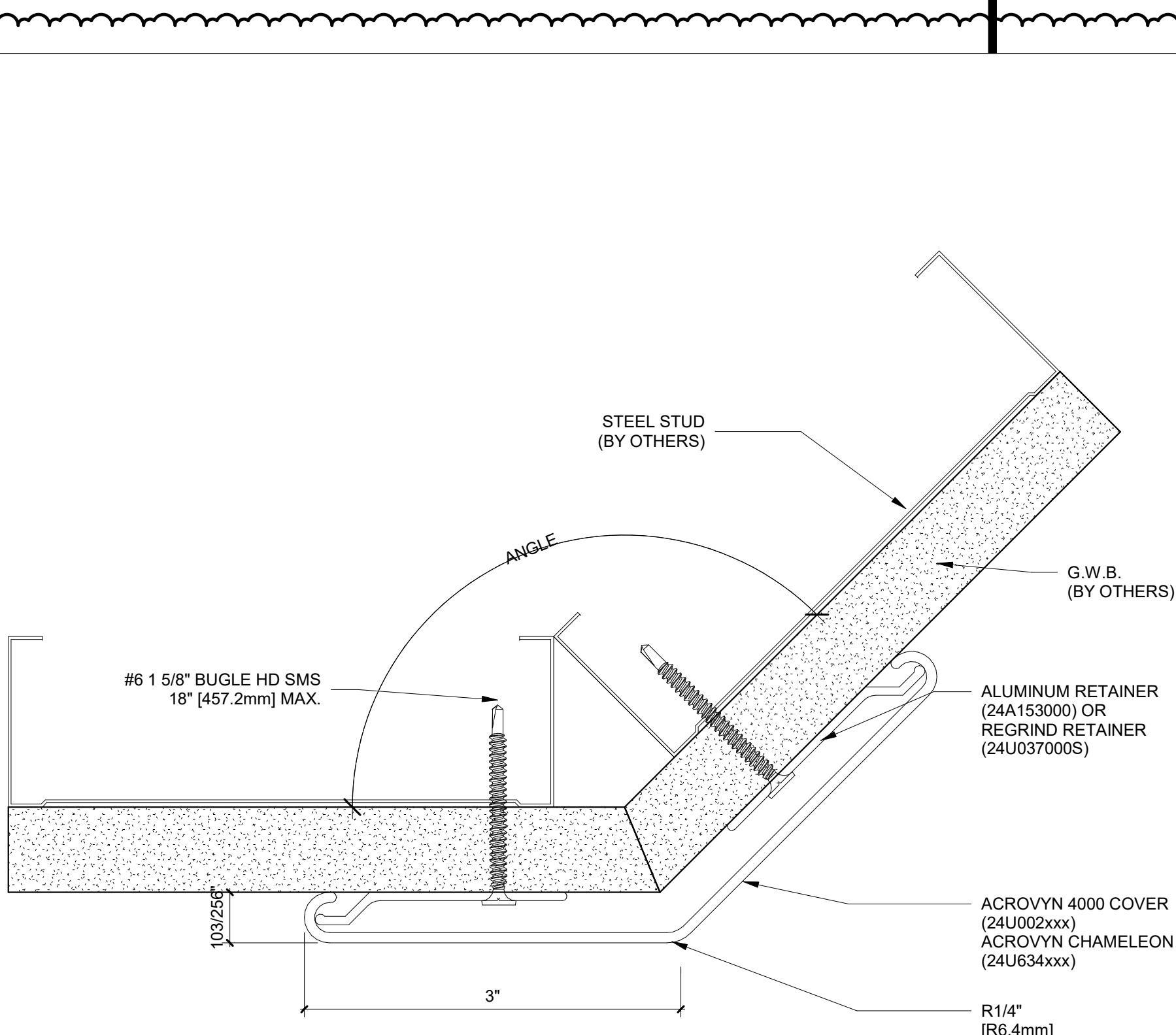
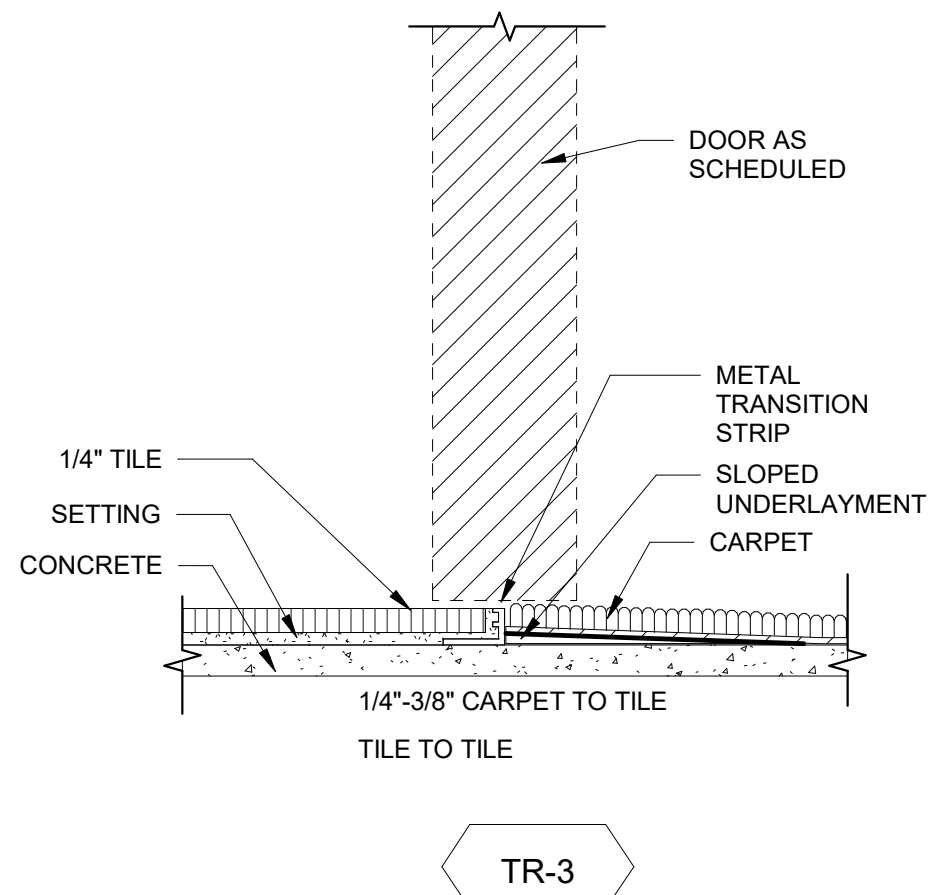
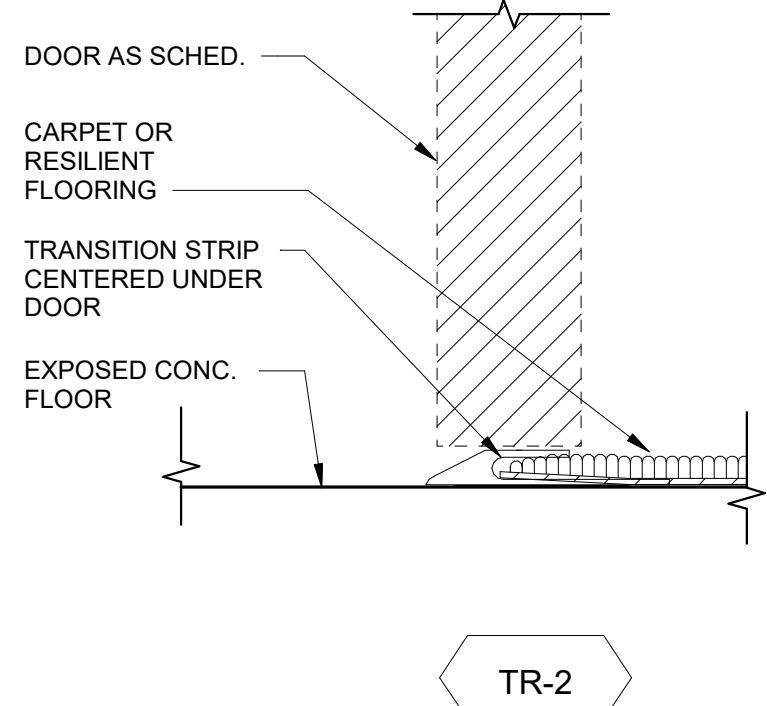
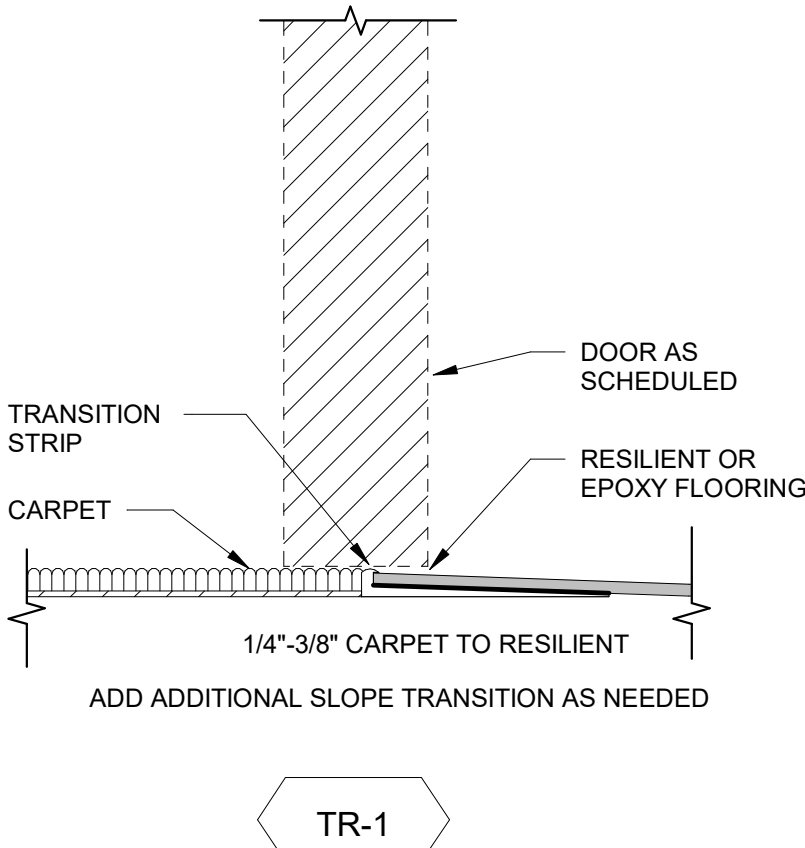


TYP. - CORNER GUARD NTS 3

TYP. ELEV. - CORNER GUARD 6" = 1'-0" 2



2 GENERAL NOTE COORDINATION



TYP. - ODD ANGLE CORNER GUARD 12" = 1'-0" 4

TRANSITION DETAILS 6" = 1'-0" 1



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

SIGNAGE PLAN

DATE 12.04.2020

PROJECT NO 20003

REVISIONS

NUM.	DATE	DESCRIPTION:
REV1	12/17/20	REVISION 01
REV2	01/09/21	REV2/ADD1

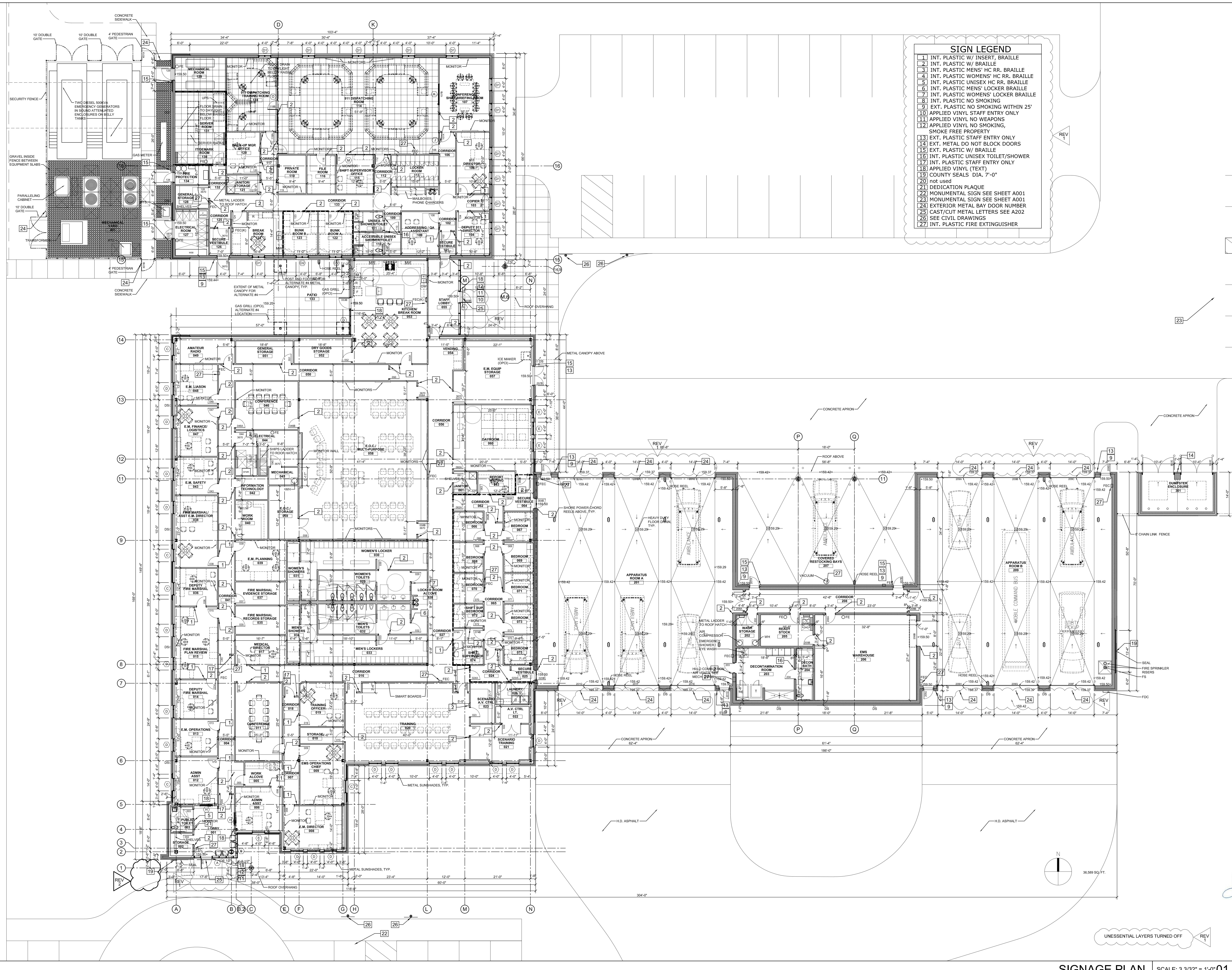
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SEAL

SHEET NUMBER

A711



- ### SIGN LEGEND
- 1 INT. PLASTIC W/ INSERT, BRAILLE
 - 2 INT. PLASTIC W/ BRAILLE
 - 3 INT. PLASTIC MENS' HC RR. BRAILLE
 - 4 INT. PLASTIC WOMENS' HC RR. BRAILLE
 - 5 INT. PLASTIC UNISEX HC RR. BRAILLE
 - 6 INT. PLASTIC MENS' LOCKER BRAILLE
 - 7 INT. PLASTIC WOMENS' LOCKER BRAILLE
 - 8 INT. PLASTIC NO SMOKING
 - 9 EXT. PLASTIC NO SMOKING WITHIN 25'
 - 10 APPLIED VINYL STAFF ENTRY ONLY
 - 11 APPLIED VINYL NO WEAPONS
 - 12 APPLIED VINYL NO SMOKING, SMOKE FREE PROPERTY
 - 13 EXT. PLASTIC STAFF ENTRY ONLY
 - 14 EXT. METAL DO NOT BLOCK DOORS
 - 15 EXT. PLASTIC W/ BRAILLE
 - 16 INT. PLASTIC UNISEX TOILET/SHOWER
 - 17 INT. PLASTIC STAFF ENTRY ONLY
 - 18 APPLIED VINYL (TEXT)
 - 19 COUNTY SEALS DIA. 7'-0"
 - 20 not used
 - 21 DEDICATION PLAQUE
 - 22 MONUMENTAL SIGN SEE SHEET A001
 - 23 MONUMENTAL SIGN SEE SHEET A001
 - 24 EXTERIOR METAL BAY DOOR NUMBER
 - 25 CAST/CUT METAL LETTERS SEE A202
 - 26 SEE CIVIL DRAWINGS
 - 27 INT. PLASTIC FIRE EXTINGUISHER

REV

REV

REV

23

13

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SIGNAGE PLAN

SCALE: 3/32" = 1'-0" 01



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

SIGNAGE DETAILS

DATE

12.04.2020

PROJECT NO

20003

REVISIONS

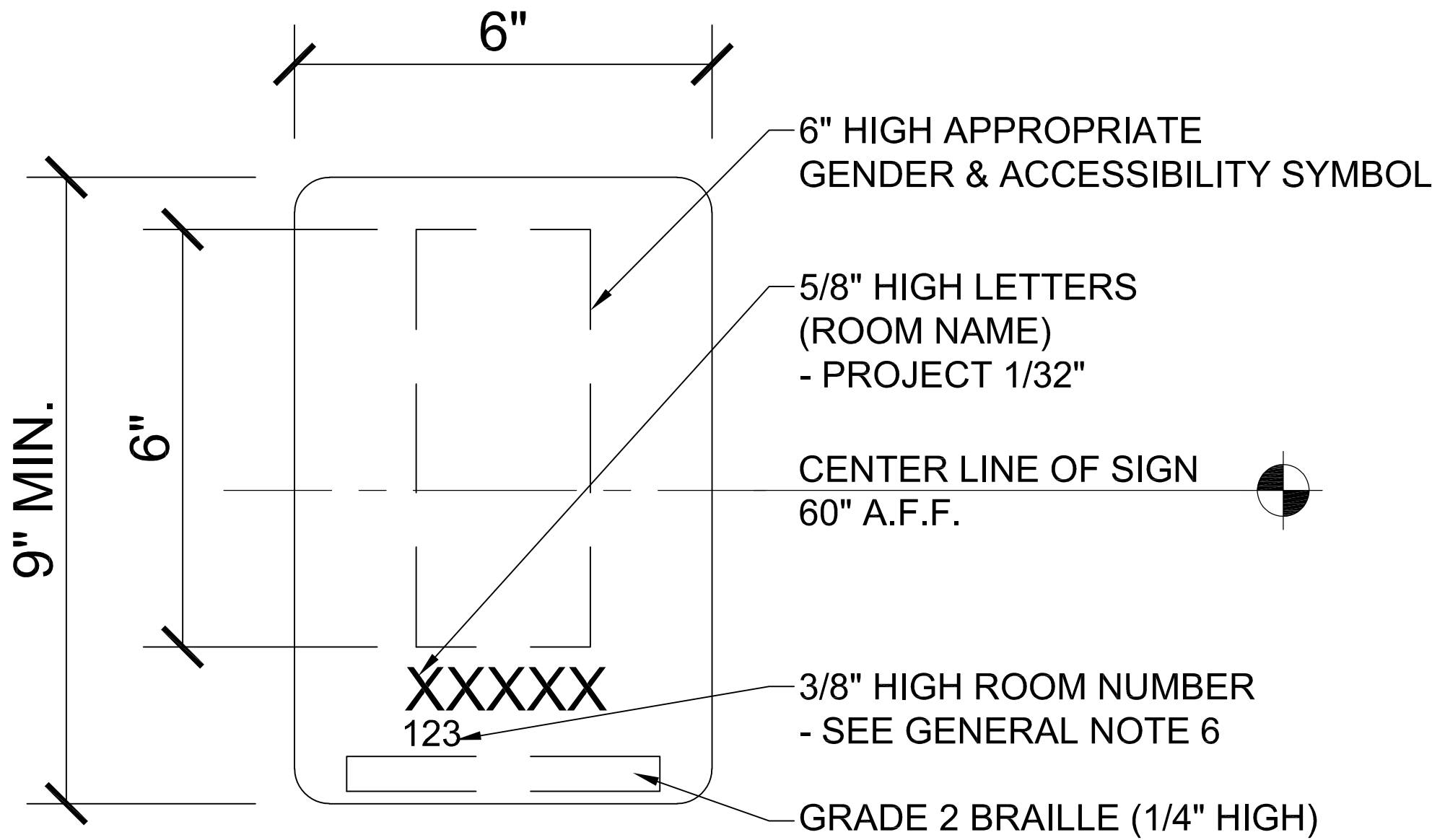
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REV1	12/17/20	REVISION 01
REV2	01/09/21	REV2/ADD1

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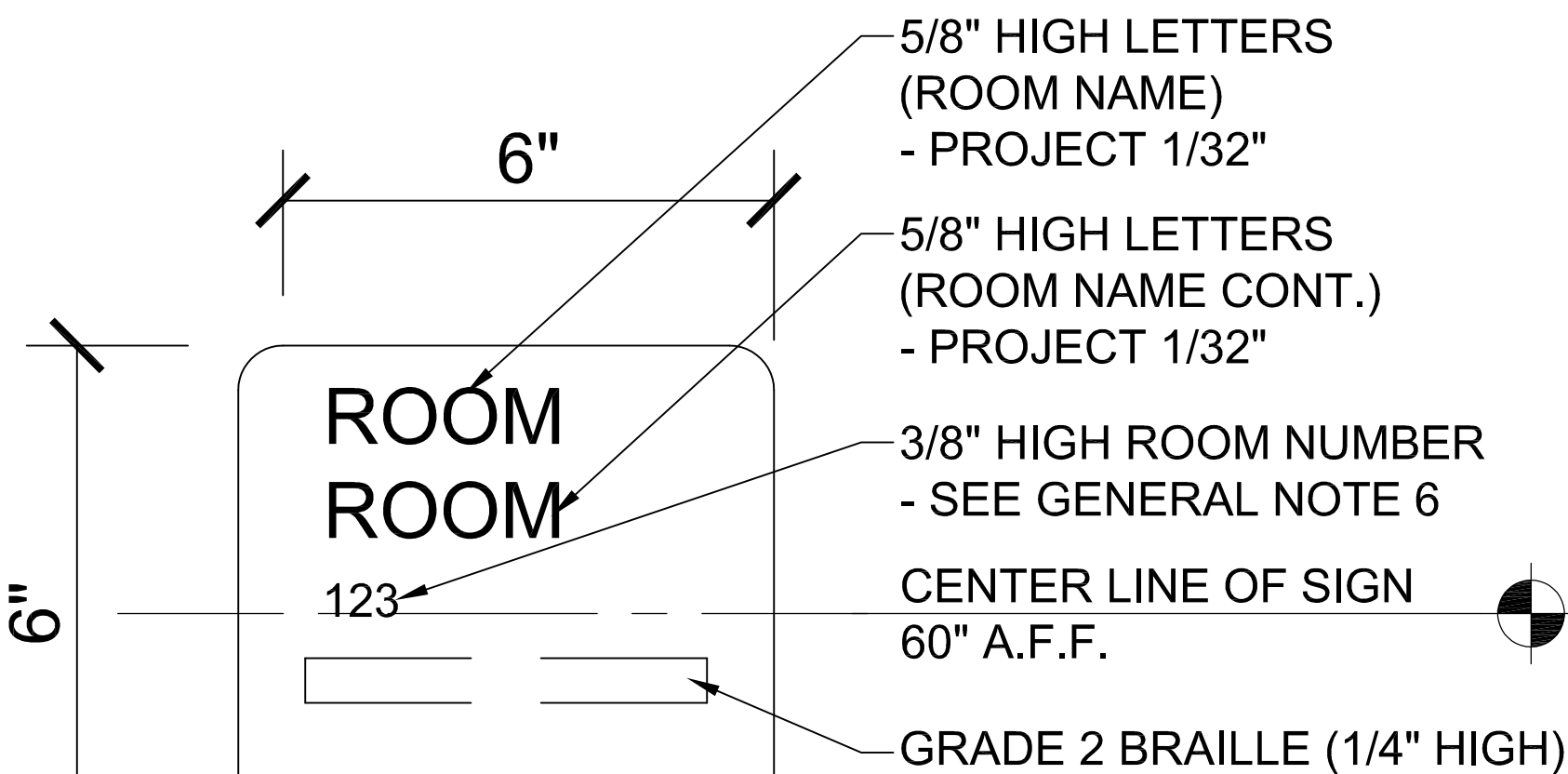
SHEET NUMBER

A712



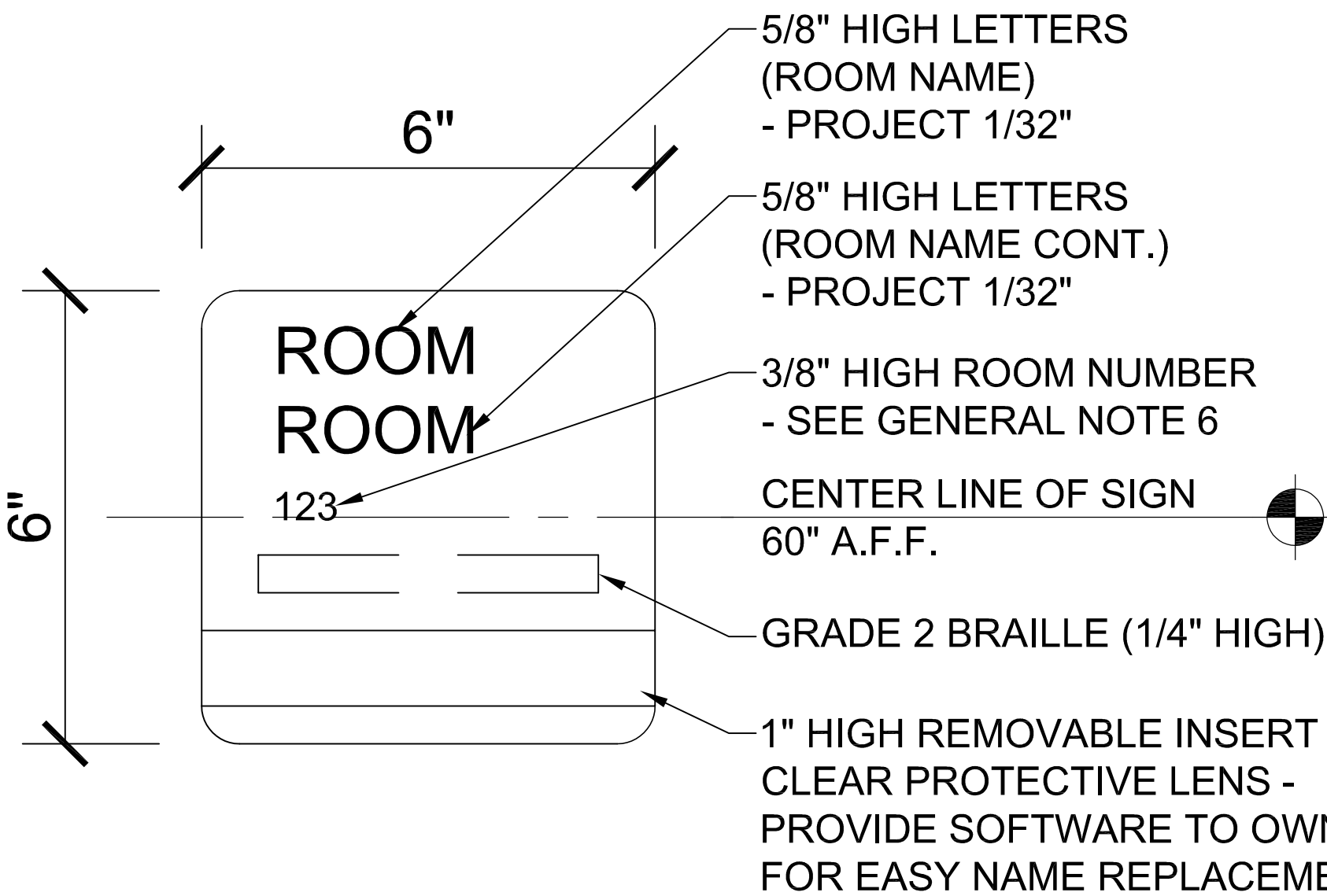
SIGN TYPES 3 THRU 7 AND 16 DETAIL

SCALE: 6" = 1'-0" 03



SIGN TYPES 2 & 15 DETAIL

SCALE: 6" = 1'-0" 02



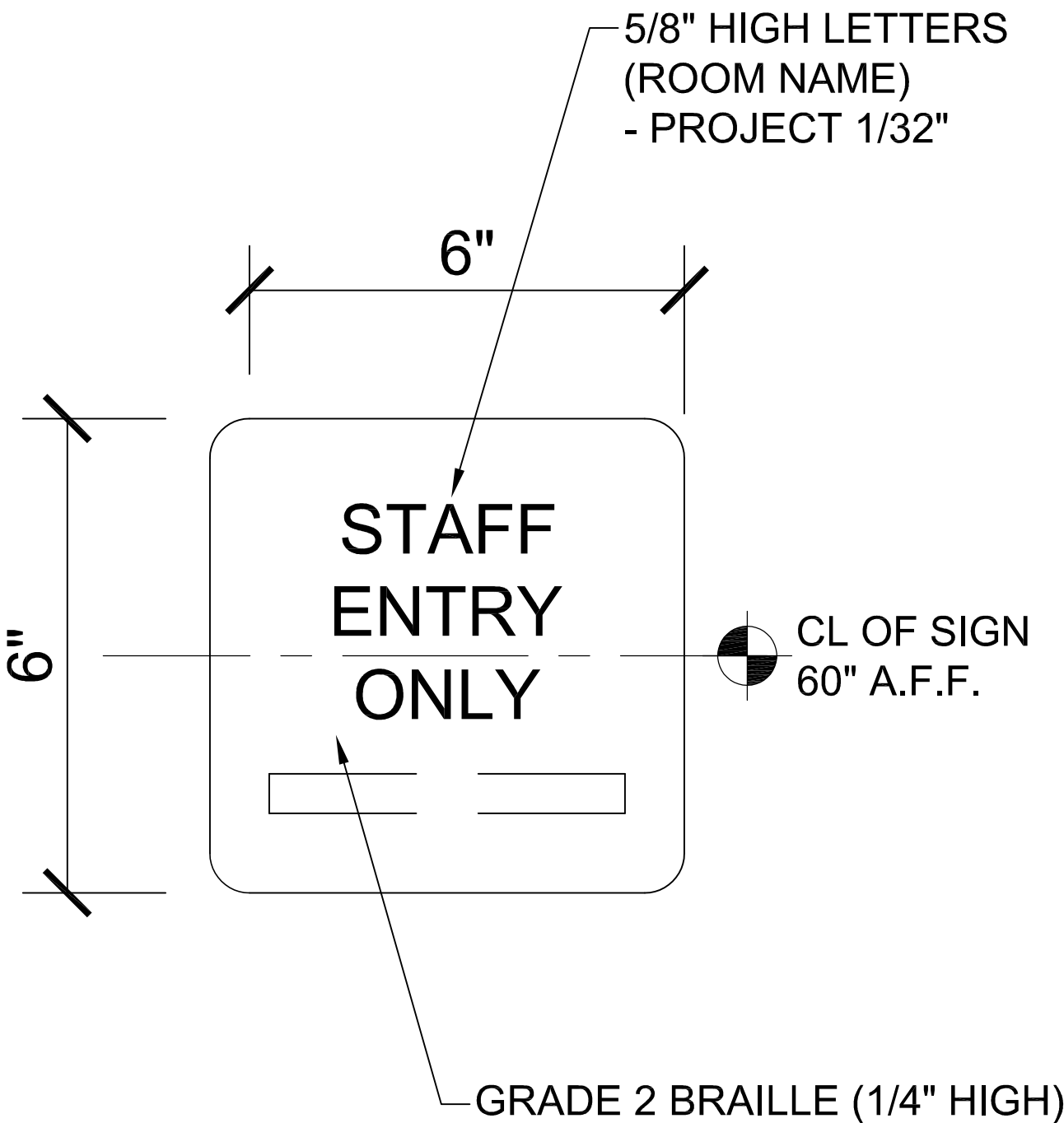
SIGN TYPE 1 DETAIL

SCALE: 6" = 1'-0" 01



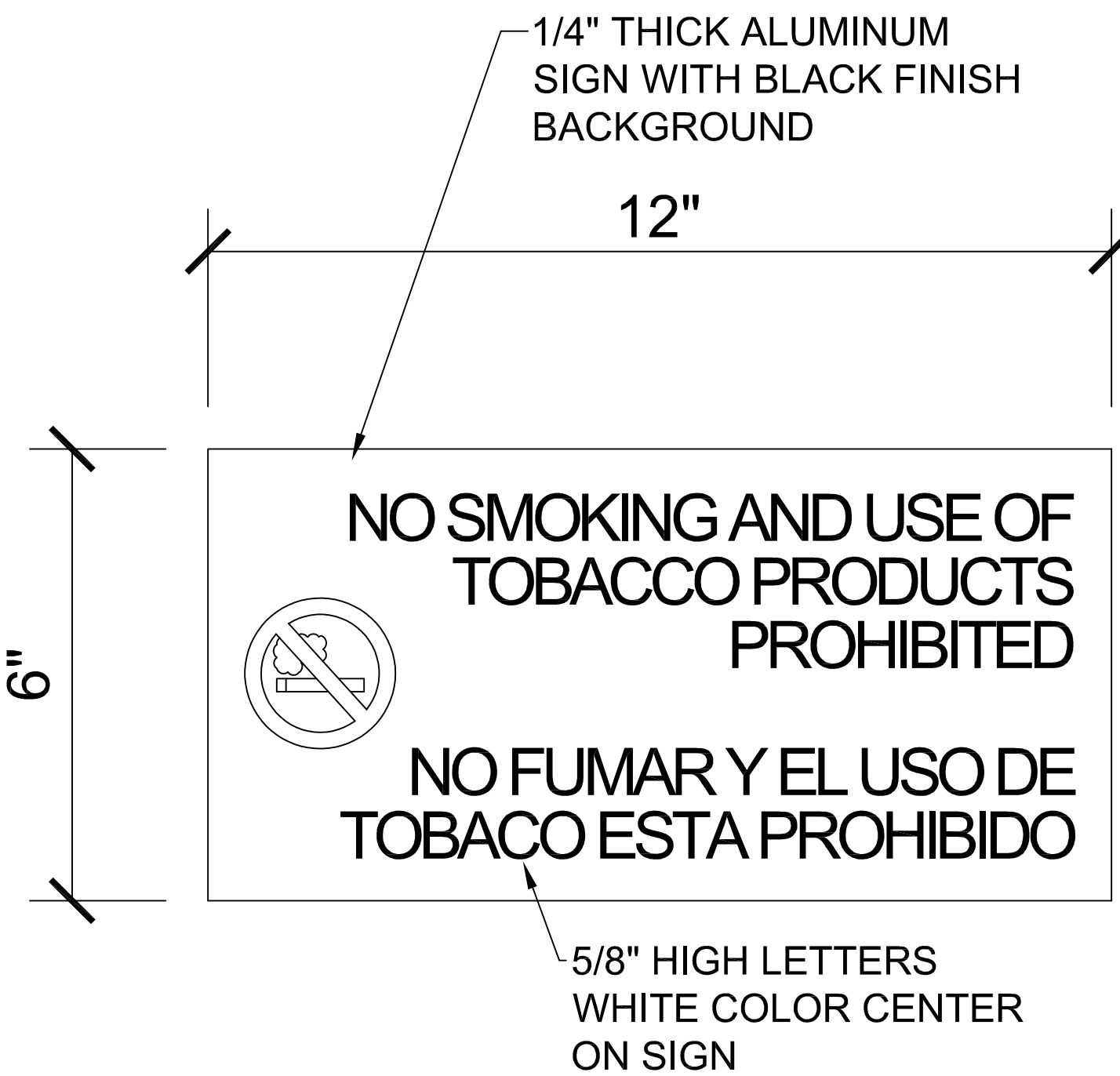
SIGN TYPE 10 & 18 DETAIL

SCALE: 6" = 1'-0" 06



SIGN TYPE 17 DETAIL

SCALE: 6" = 1'-0" 05



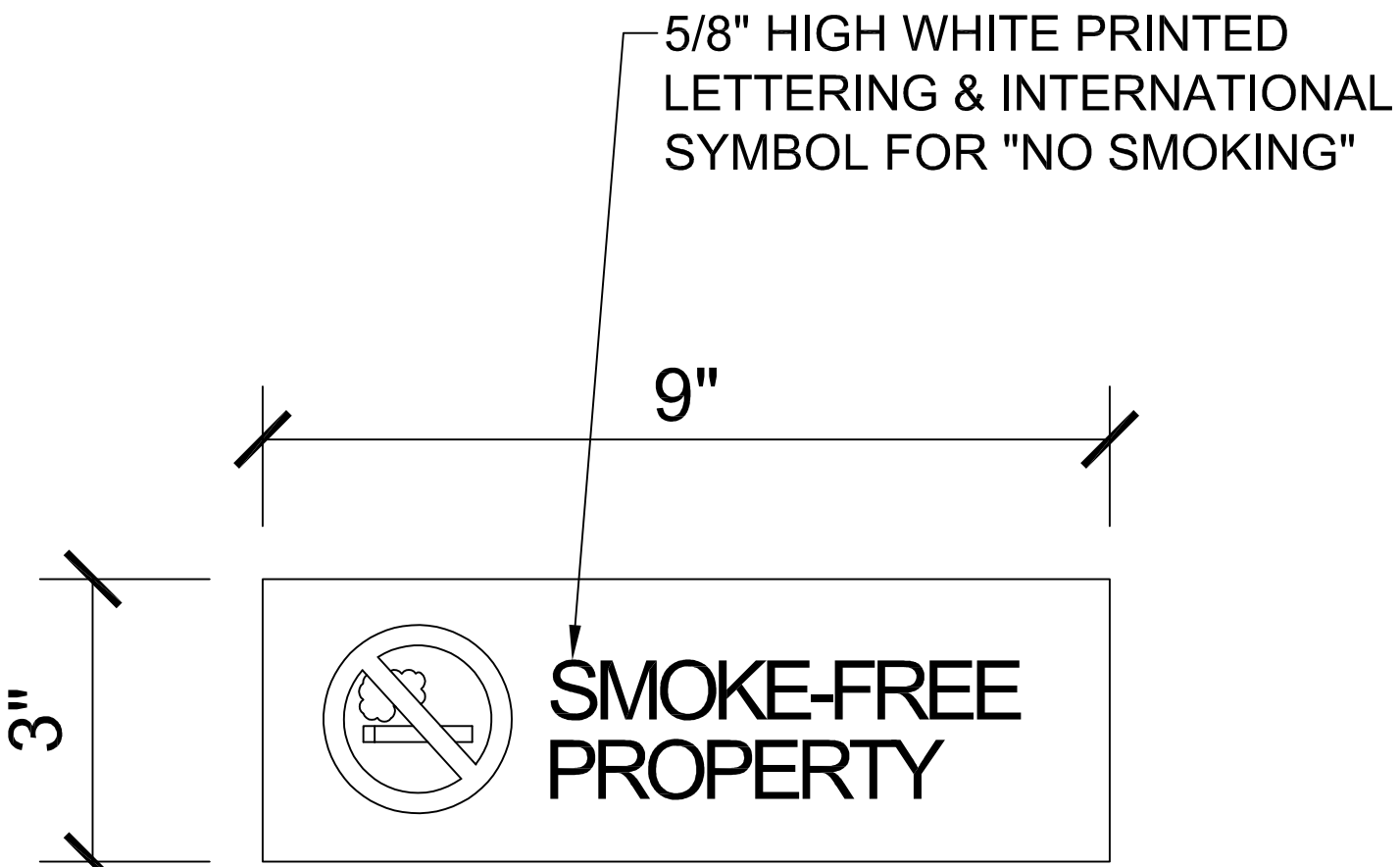
SIGN 8 & 9 DETAIL

SCALE: 6" = 1'-0" 04



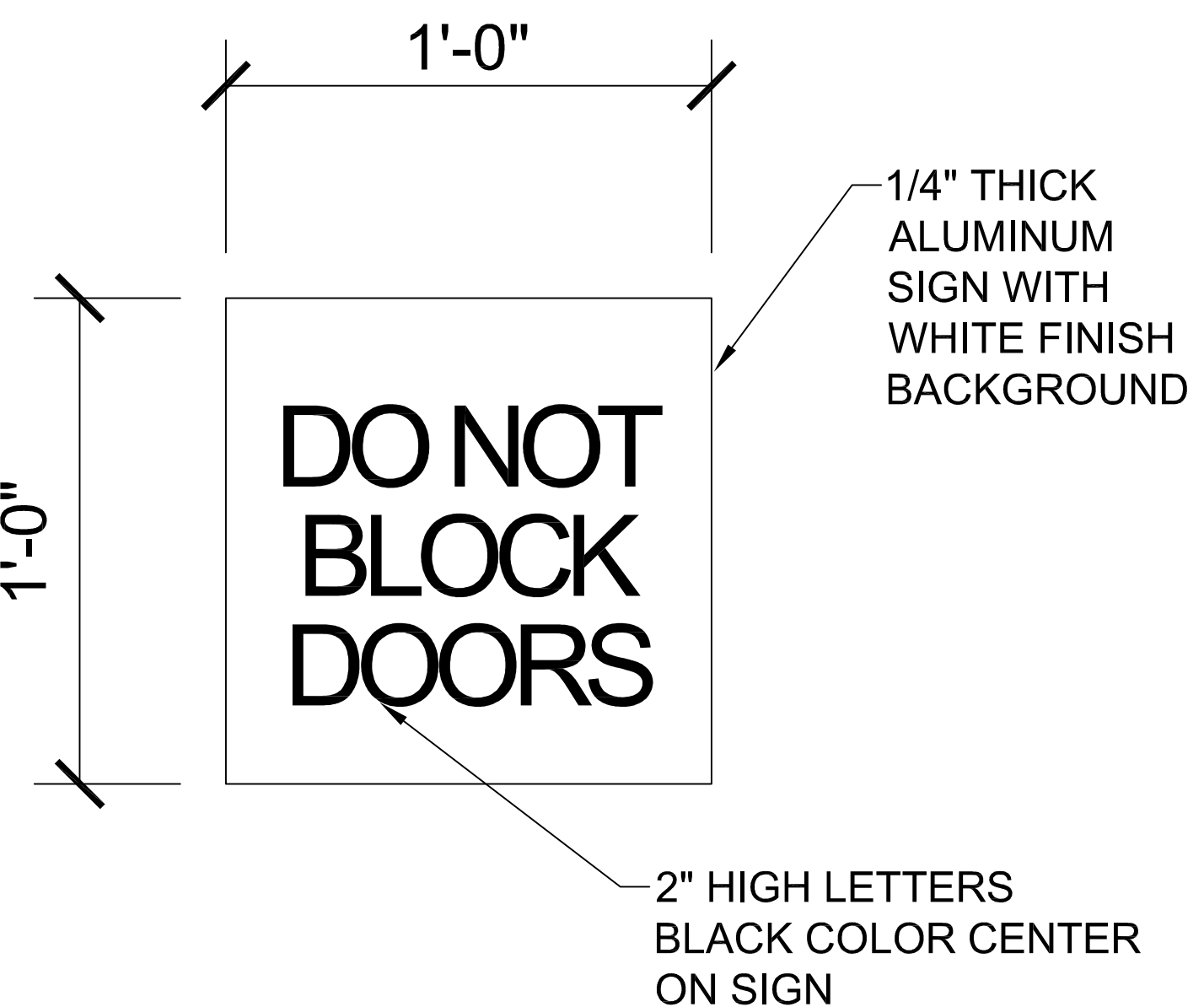
SIGN TYPE 13 DETAIL

SCALE: 3" = 1'-0" 09



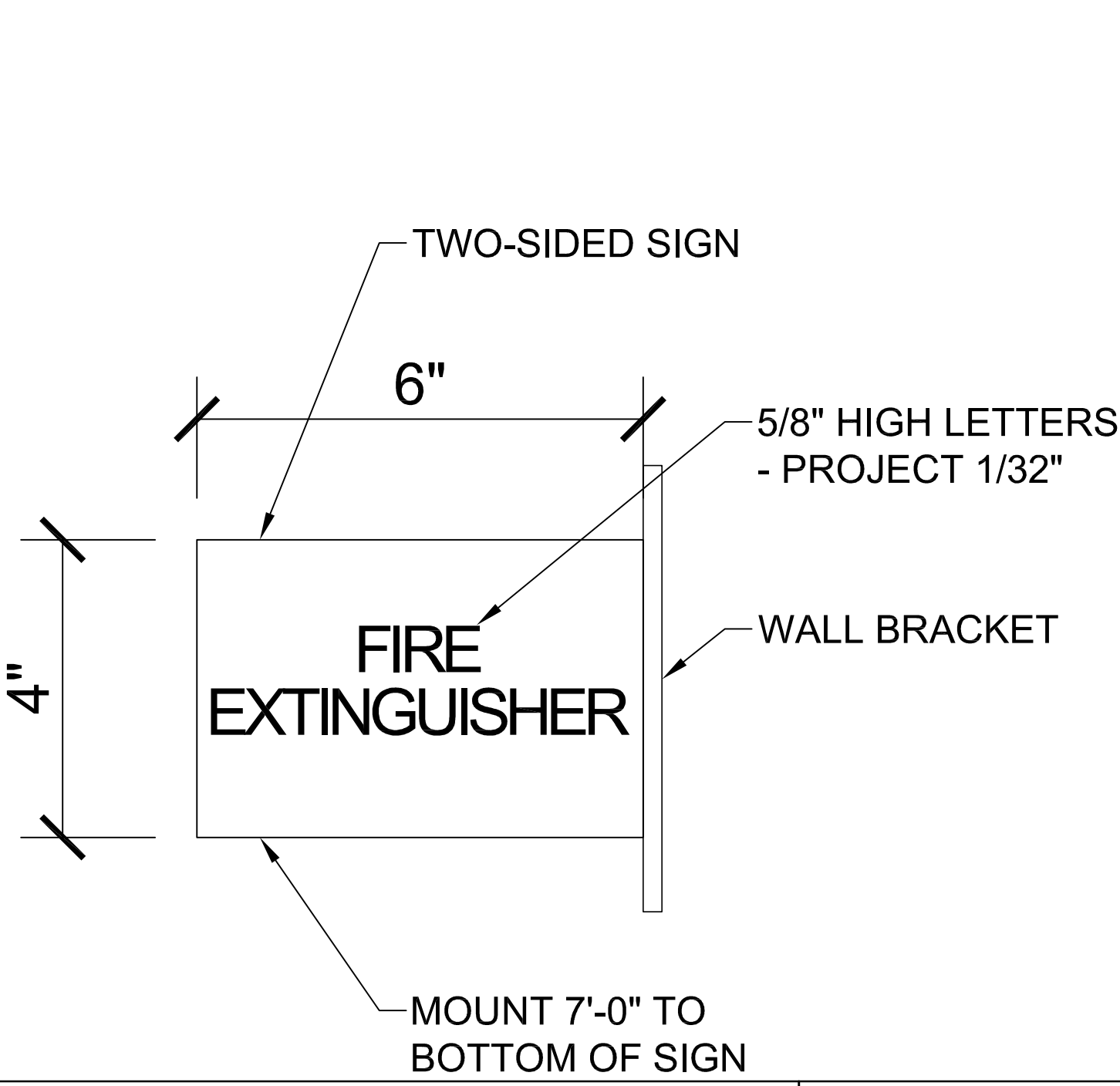
SIGN TYPE 12 DETAIL

SCALE: 3" = 1'-0" 06



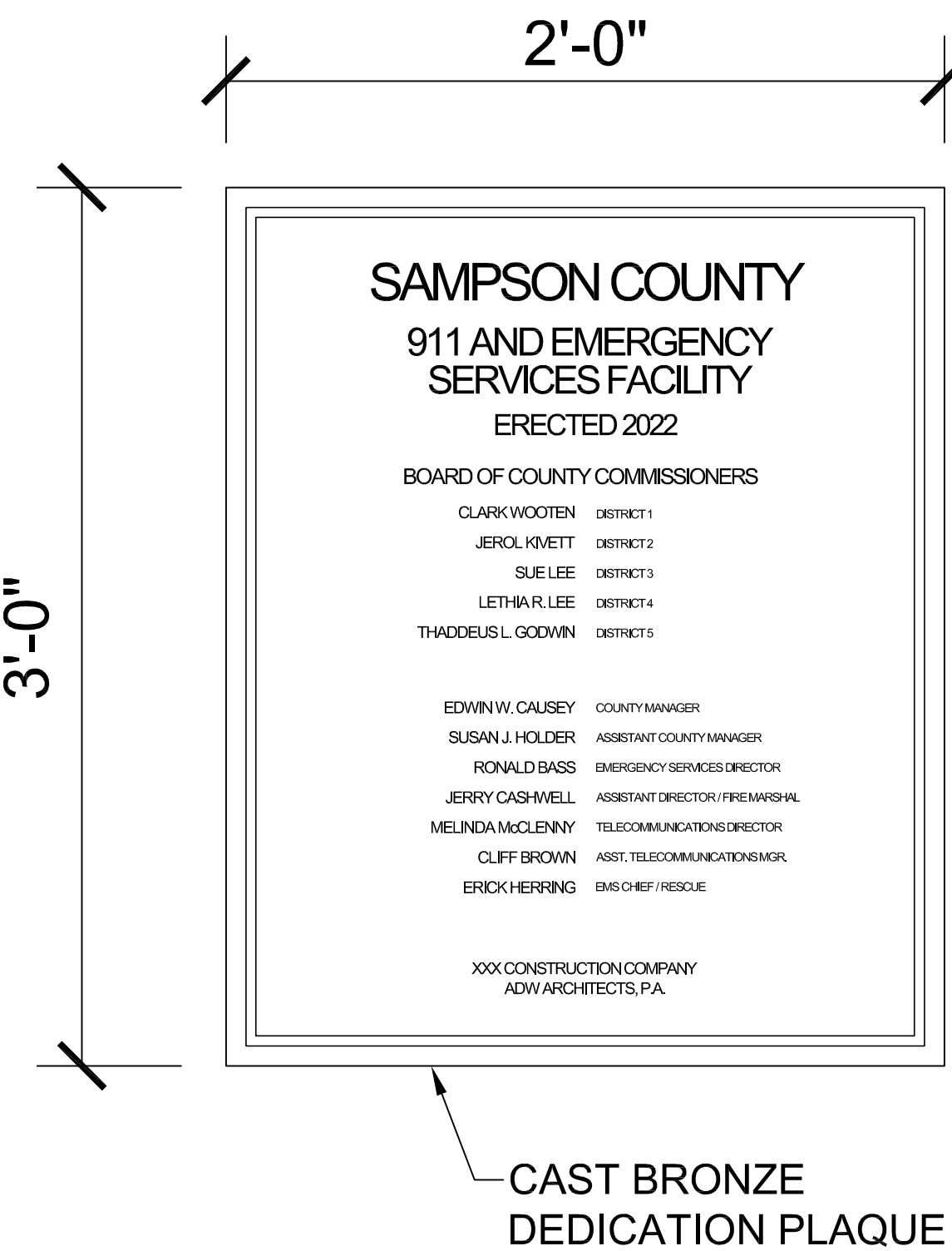
SIGN TYPE 14 DETAIL

SCALE: 3" = 1'-0" 07



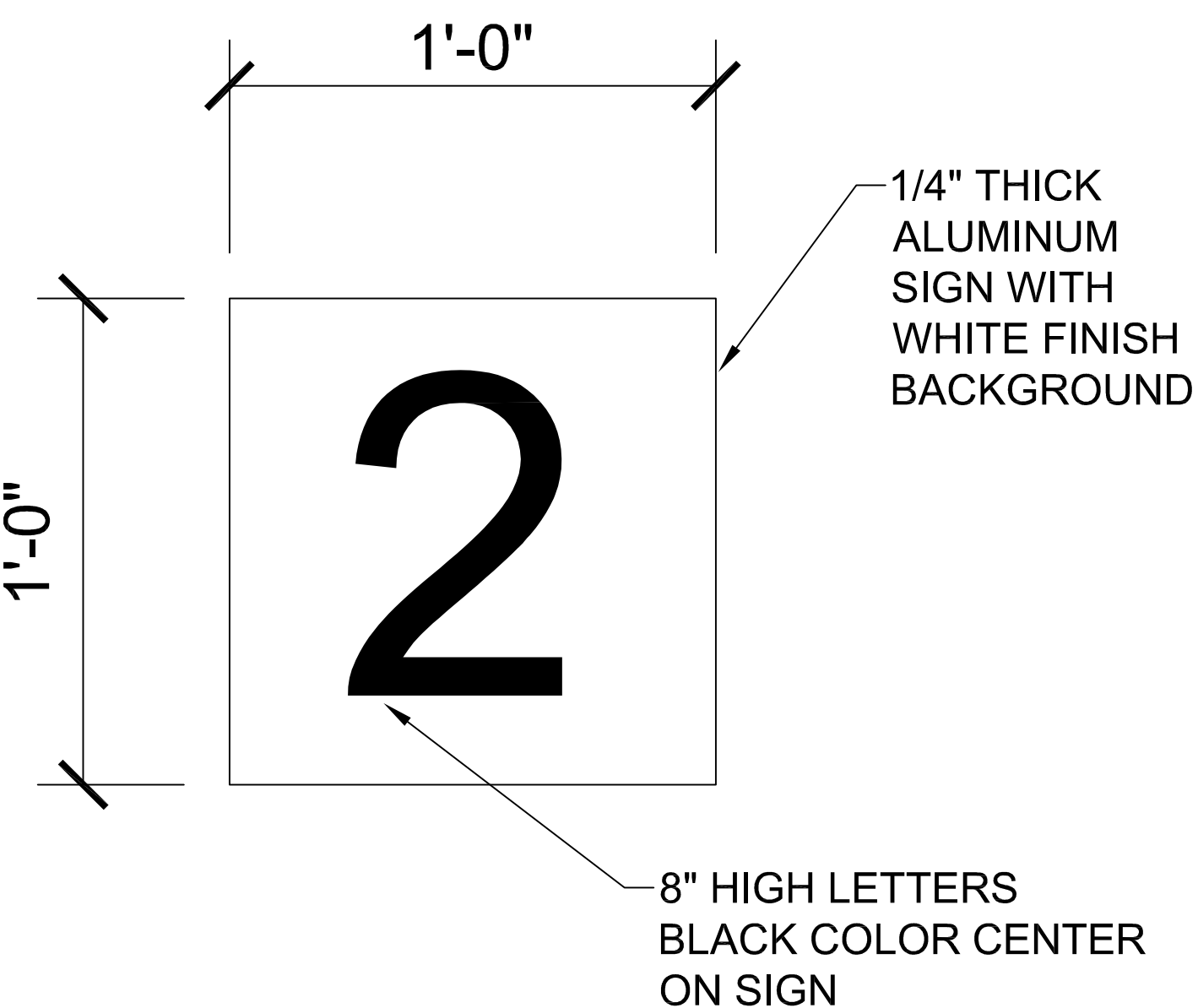
SIGN TYPE 27 DETAIL

SCALE: 1 1/2" = 1'-0" 12



SIGN TYPE 21 DETAIL

SCALE: 1 1/2" = 1'-0" 11



SIGN TYPE 24 DETAIL

SCALE: 3" = 1'-0" 10



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

OVERALL REFLECTED
CEILING PLAN

DATE 12.04.2020
PROJECT NO 20003

REVISIONS		
NUM.	DATE	DESCRIPTION:
REV1	12/17/20	REVISION 01
REV2	01/09/21	REV2/ADD1

REV 2 GENERAL COORDINATION

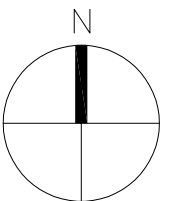
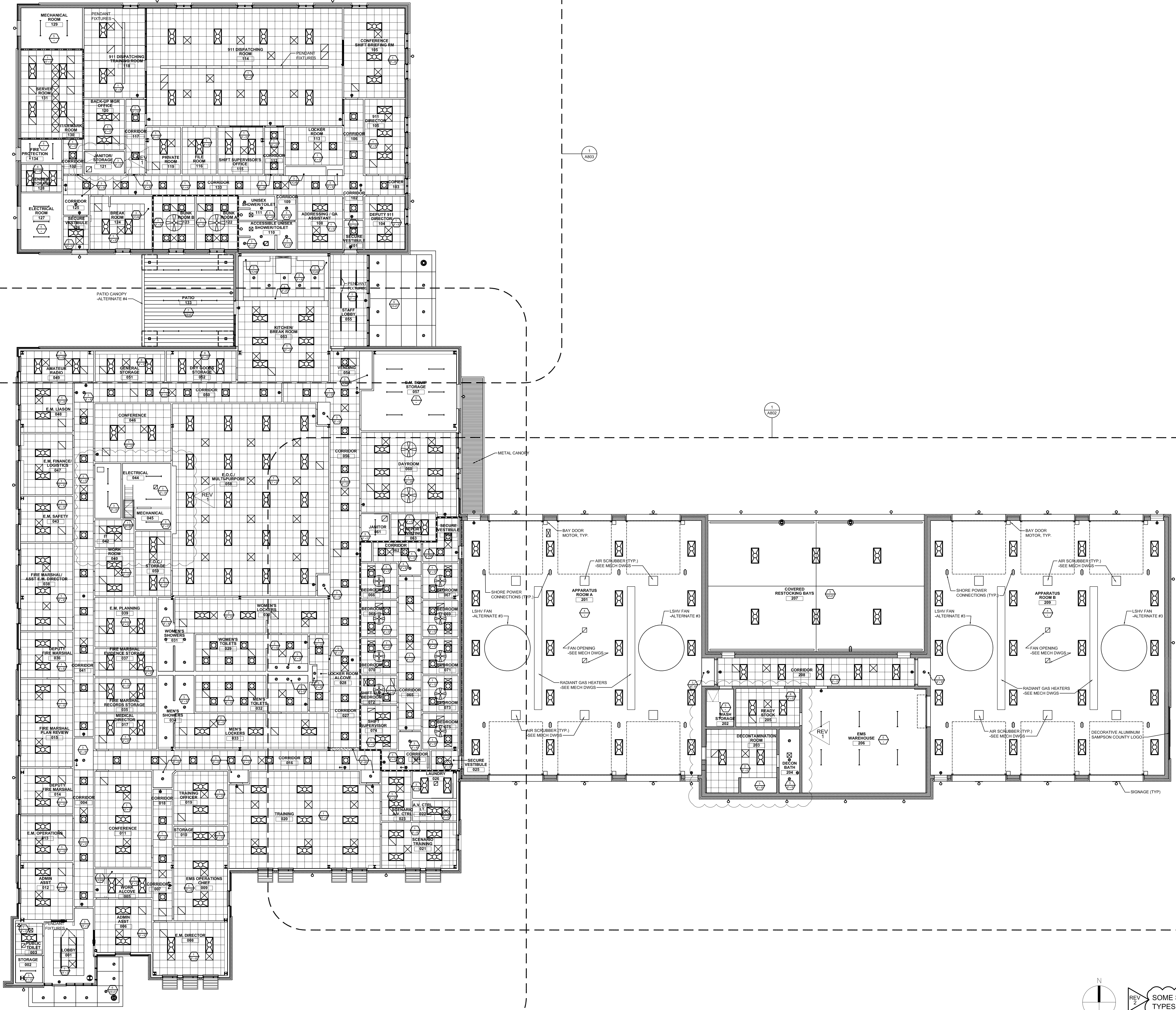
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SEAL

SHEET NUMBER

A800



REV 2 SOME STORAGE ROOM CEILING TYPES CHANGED

REV GENERAL NOTE COORDINATION

environmentsforlife

www.adwarchitects.com



FACILITIES

NORTH CAROLINA

DOCUMENTS

RCP

PROJECT NO	20003
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NUM	DATE	DESCRIPTION:
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REV1	12/17/20	REVISION 01
REV2	01/09/21	REV2/ADD1

REV 2

OTHER COMPANY OR AGENCY WITHOUT THE CONSENT OF ADW
ARCHITECTS, P.A.



— *Journal of the American Medical Association*



REV 1 GENERAL NOTE COORDINATION

SCALE: 3/16" = 1'-0"



SAMPSON COUNTY
911 & ES
FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

EMS WING RCP

DATE 12.04.2020
PROJECT NO 20003

REVISIONS
NUM. DATE DESCRIPTION:
REV1 12/17/20 REVISION 01
REV2 01/09/21 REV2/ADD1

GENERAL COORDINATION

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SHEET NUMBER

A802

SYMBOL LEGEND

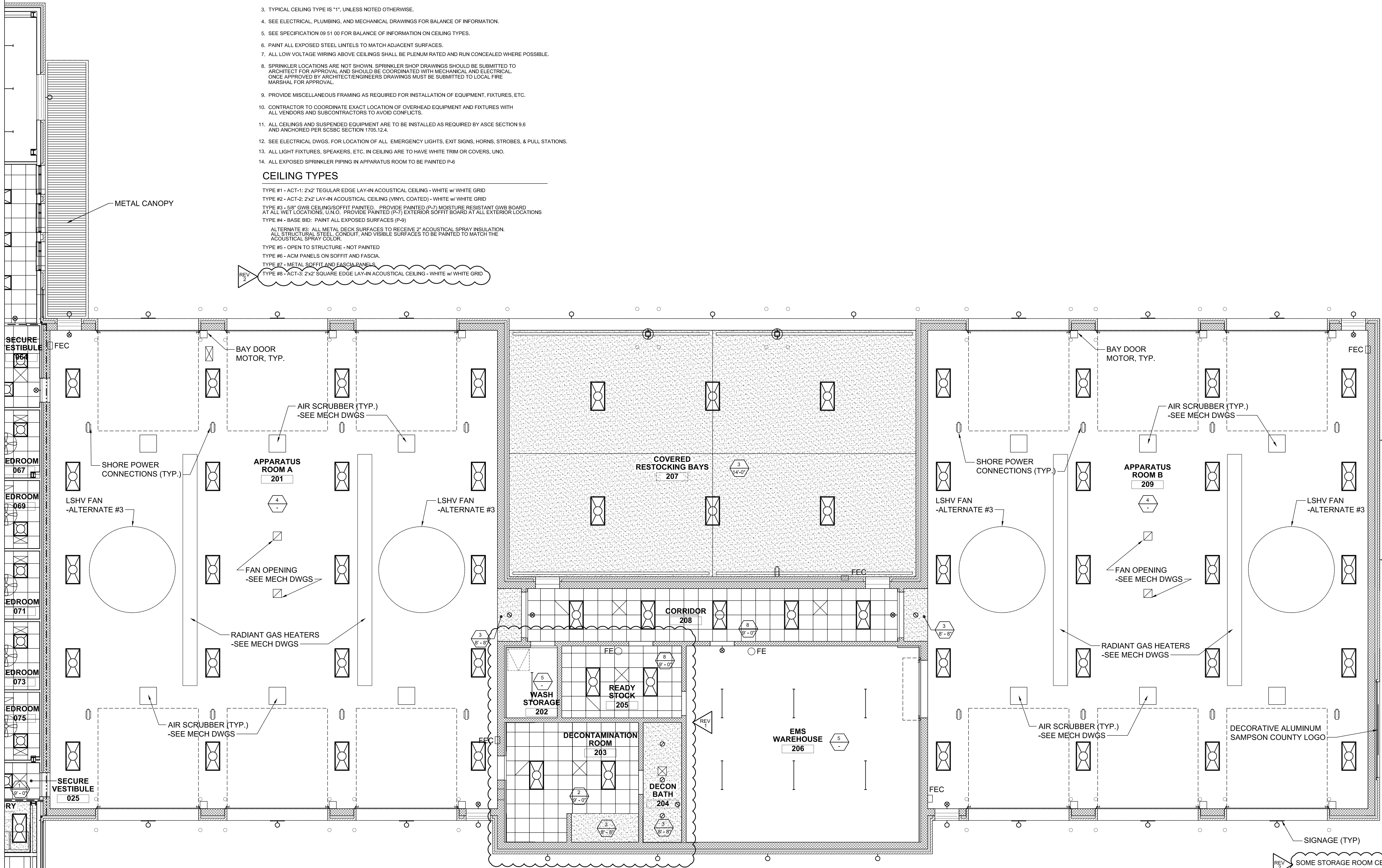
	2' X 4' LED LIGHTING FIXTURE		CEILING FAN
	LED STRIP FIXTURE		SUPPLY AIR CEILING DIFFUSER
	2' X 2' LED LIGHTING FIXTURE		EXHAUST OR RETURN GRILLE
	RECESSED LED LIGHTING FIXTURE		EXHAUST FAN
	WALL MOUNTED LED LIGHTING FIXTURE		A.F.F. ABOVE FINISHED FLOOR
	WALL MOUNTED SPECIAL LIGHTING FIXTURE		CEILING TYPE
	LED STRIP CANOPY FIXTURE		CEILING ELEVATION

GENERAL NOTES

1. ALL CEILING HEIGHTS ARE GIVEN RELATIVE TO FINISH FLOOR IN THAT ROOM UNLESS OTHERWISE NOTED
2. TYPICAL CEILING HEIGHT IS 9'-0" UNLESS NOTED OTHERWISE.
3. TYPICAL CEILING TYPE IS "1", UNLESS NOTED OTHERWISE.
4. SEE ELECTRICAL, PLUMBING, AND MECHANICAL DRAWINGS FOR BALANCE OF INFORMATION.
5. SEE SPECIFICATION 09 51 00 FOR BALANCE OF INFORMATION ON CEILING TYPES.
6. PAINT ALL EXPOSED STEEL LINTELS TO MATCH ADJACENT SURFACES.
7. ALL LOW VOLTAGE WIRING ABOVE CEILINGS SHALL BE PLENUM RATED AND RUN CONCEALED WHERE POSSIBLE.
8. SPRINKLER LOCATIONS ARE NOT SHOWN. SPRINKLER SHOP DRAWINGS SHOULD BE SUBMITTED TO ARCHITECT FOR APPROVAL AND SHOULD BE COORDINATED WITH MECHANICAL AND ELECTRICAL. ONCE APPROVED BY ARCHITECT/ENGINEERS DRAWINGS MUST BE SUBMITTED TO LOCAL FIRE MARSHAL FOR APPROVAL.
9. PROVIDE MISCELLANEOUS FRAMING AS REQUIRED FOR INSTALLATION OF EQUIPMENT, FIXTURES, ETC.
10. CONTRACTOR TO COORDINATE EXACT LOCATION OF OVERHEAD EQUIPMENT AND FIXTURES WITH ALL VENDORS AND SUBCONTRACTORS TO AVOID CONFLICTS.
11. ALL CEILINGS AND SUSPENDED EQUIPMENT ARE TO BE INSTALLED AS REQUIRED BY ASCE SECTION 9.6 AND ANCHORED PER SCSBC SECTION 1705.12.4.
12. SEE ELECTRICAL DWGS. FOR LOCATION OF ALL EMERGENCY LIGHTS, EXIT SIGNS, HORNS, STROBES, & PULL STATIONS.
13. ALL LIGHT FIXTURES, SPEAKERS, ETC. IN CEILING ARE TO HAVE WHITE TRIM OR COVERS, UNO.
14. ALL EXPOSED SPRINKLER PIPING IN APPARATUS ROOM TO BE PAINTED P-6

CEILING TYPES

TYPE #1 - ACT-1: 2'X2' TEGULAR EDGE LAY-IN ACOUSTICAL CEILING - WHITE w/ WHITE GRID
TYPE #2 - ACT-2: 2'X2' LAY-IN ACOUSTICAL CEILING (VINYL COATED) - WHITE w/ WHITE GRID
TYPE #3 - 5/8" GWB CEILING/SOFFIT PAINTED. PROVIDE PAINTED (P-7) MOISTURE RESISTANT GWB BOARD AT ALL WET LOCATIONS, U.N.O. PROVIDE PAINTED (P-7) EXTERIOR SOFFIT BOARD AT ALL EXTERIOR LOCATIONS
TYPE #4 - BASE BID: PAINT ALL EXPOSED SURFACES (P-6)
ALTERNATE #3: ALL METAL DECK SURFACES TO RECEIVE 2" ACOUSTICAL SPRAY INSULATION. ALL STRUCTURAL STEEL, CONDUIT, AND VISIBLE SURFACES TO BE PAINTED TO MATCH THE ACOUSTICAL SPRAY COLOR.
TYPE #5 - OPEN TO STRUCTURE - NOT PAINTED
TYPE #6 - ACM PANELS ON SOFFIT AND FASCIA.
TYPE #7 - METAL SOFFIT AND FASCIA PANELS.
TYPE #8 - ACT-3: 2'X2' SQUARE EDGE LAY-IN ACOUSTICAL CEILING - WHITE w/ WHITE GRID



SIGNAGE (TYP)

SOME STORAGE ROOM CEILING TYPES CHANGED

GENERAL NOTE COORDINATION

EMS WING RCP

SCALE: 3/16" = 1'-0"

1



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

911 BUILDING RCP

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
REV1	12/17/20	REVISION 01
REV2	01/09/21	REV2/ADD1

GENERAL COORDINATION

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SEAL

SHEET NUMBER

A803

911 BUILDING RCP SCALE: 3/16" = 1'-0" 1

SYMBOL LEGEND		
	2' X 4' LED LIGHTING FIXTURE	CEILING FAN
	LED STRIP FIXTURE	SUPPLY AIR CEILING DIFFUSER
	2' X 2' LED LIGHTING FIXTURE	EXHAUST OR RETURN GRILLE
	RECESSED LED LIGHTING FIXTURE	EXHAUST FAN
	WALL MOUNTED LED LIGHTING FIXTURE	ABOVE FINISHED FLOOR
	WALL MOUNTED SPECIAL LIGHTING FIXTURE	CEILING TYPE
	LED STRIP CANOPY FIXTURE	CEILING ELEVATION

GENERAL NOTES

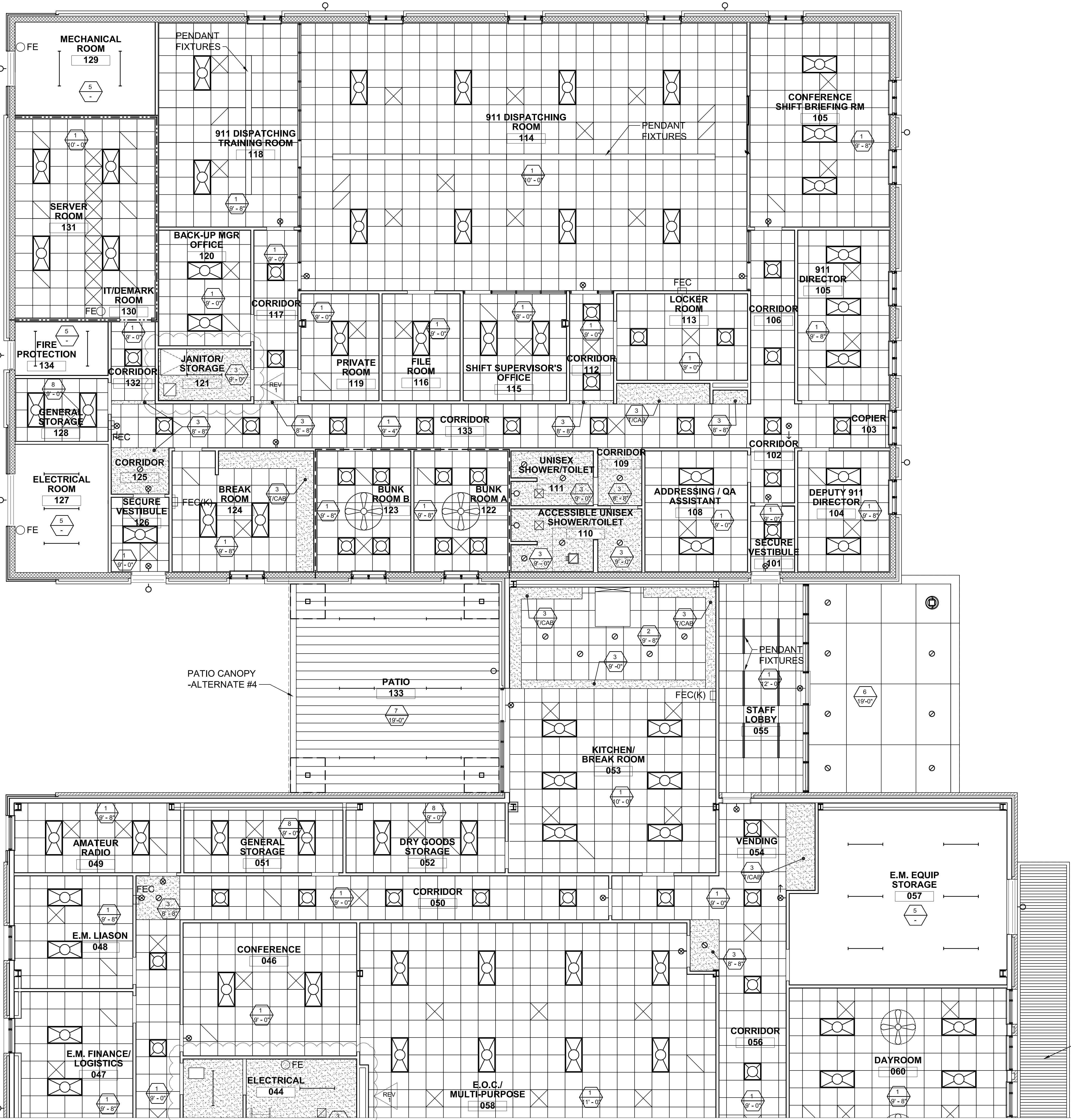
1. ALL CEILING HEIGHTS ARE GIVEN RELATIVE TO FINISH FLOOR IN THAT ROOM UNLESS OTHERWISE NOTED
2. TYPICAL CEILING HEIGHT IS 9'-0" UNLESS NOTED OTHERWISE.
3. TYPICAL CEILING TYPE IS "1", UNLESS NOTED OTHERWISE.
4. SEE ELECTRICAL, PLUMBING, AND MECHANICAL DRAWINGS FOR BALANCE OF INFORMATION.
5. SEE SPECIFICATION 09 51 00 FOR BALANCE OF INFORMATION ON CEILING TYPES.
6. PAINT ALL EXPOSED STEEL LINTELS TO MATCH ADJACENT SURFACES.
7. ALL LOW VOLTAGE WIRING ABOVE CEILINGS SHALL BE PLENUM RATED AND RUN CONCEALED WHERE POSSIBLE.
8. SPRINKLER LOCATIONS ARE NOT SHOWN. SPRINKLER SHOP DRAWINGS SHOULD BE SUBMITTED TO ARCHITECT FOR APPROVAL AND SHOULD BE COORDINATED WITH MECHANICAL AND ELECTRICAL. ONCE APPROVED BY ARCHITECT/ENGINEERS DRAWINGS MUST BE SUBMITTED TO LOCAL FIRE MARSHAL FOR APPROVAL.
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10. CONTRACTOR TO COORDINATE EXACT LOCATION OF OVERHEAD EQUIPMENT AND FIXTURES WITH ALL VENDORS AND SUBCONTRACTORS TO AVOID CONFLICTS.
11. ALL CEILINGS AND SUSPENDED EQUIPMENT ARE TO BE INSTALLED AS REQUIRED BY ASCE SECTION 9.6 AND ANCHORED PER SC900 SECTION 1705.12.4.
12. SEE ELECTRICAL DWGS. FOR LOCATION OF ALL EMERGENCY LIGHTS, EXIT SIGNS, HORNS, STROBES, & PULL STATIONS.
13. ALL LIGHT FIXTURES, SPEAKERS, ETC., IN CEILING ARE TO HAVE WHITE TRIM OR COVERS, UNO.
14. ALL EXPOSED SPRINKLER PIPING IN APPARATUS ROOM TO BE PAINTED P-6

CEILING TYPES

TYPE #1 - ACT-1: 2'x2' REGULAR EDGE LAY-IN ACOUSTICAL CEILING - WHITE w/ WHITE GRID
TYPE #2 - ACT-2: 2'x2' LAY-IN ACOUSTICAL CEILING (VINYL COATED) - WHITE w/ WHITE GRID
TYPE #3 - 5/8" GWS CEILING/SOFFIT PAINTED. PROVIDE PAINTED (P-7) MOISTURE RESISTANT GWS BOARD AT ALL WET LOCATIONS. UNO. PROVIDE PAINTED (P-7) EXTERIOR SOFFIT BOARD AT ALL EXTERIOR LOCATIONS
TYPE #4 - BASE BID: PAINT ALL EXPOSED SURFACES (P-9)
ALTERNATE #3: ALL METAL DECK SURFACES TO RECEIVE 2" ACOUSTICAL SPRAY INSULATION. ALL STRUCTURAL STEEL CONDUIT, AND VISIBLE SURFACES TO BE PAINTED TO MATCH THE ACOUSTICAL SPRAY COLOR.
TYPE #5 - OPEN TO STRUCTURE - NOT PAINTED
TYPE #6 - ACM PANELS ON SOFFIT AND FASCIA.
TYPE #7 - METAL SOFFIT AND FASCIA PANELS.
TYPE #8 - ACT-3: 2'x2' SQUARE EDGE LAY-IN ACOUSTICAL CEILING - WHITE w/ WHITE GRID

REV 1 GENERAL NOTE COORDINATION

REV 2 SOME STORAGE ROOM CEILING TYPES CHANGED



CASEWORK
ELEVATIONS

DATE 12.04.2020
PROJECT NO 20003
REVISIONS
NUM. DATE DESCRIPTION:
REV2 01/09/21 REV2/ADD1

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5454
ADW CORP STATE
SEAL
50223

1-9-21

SEAL

Λ 000

SHEET NUMBER **A900**



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

CASEWORK ELEVATIONS

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
REV2	01/09/21	REV2/ADD1

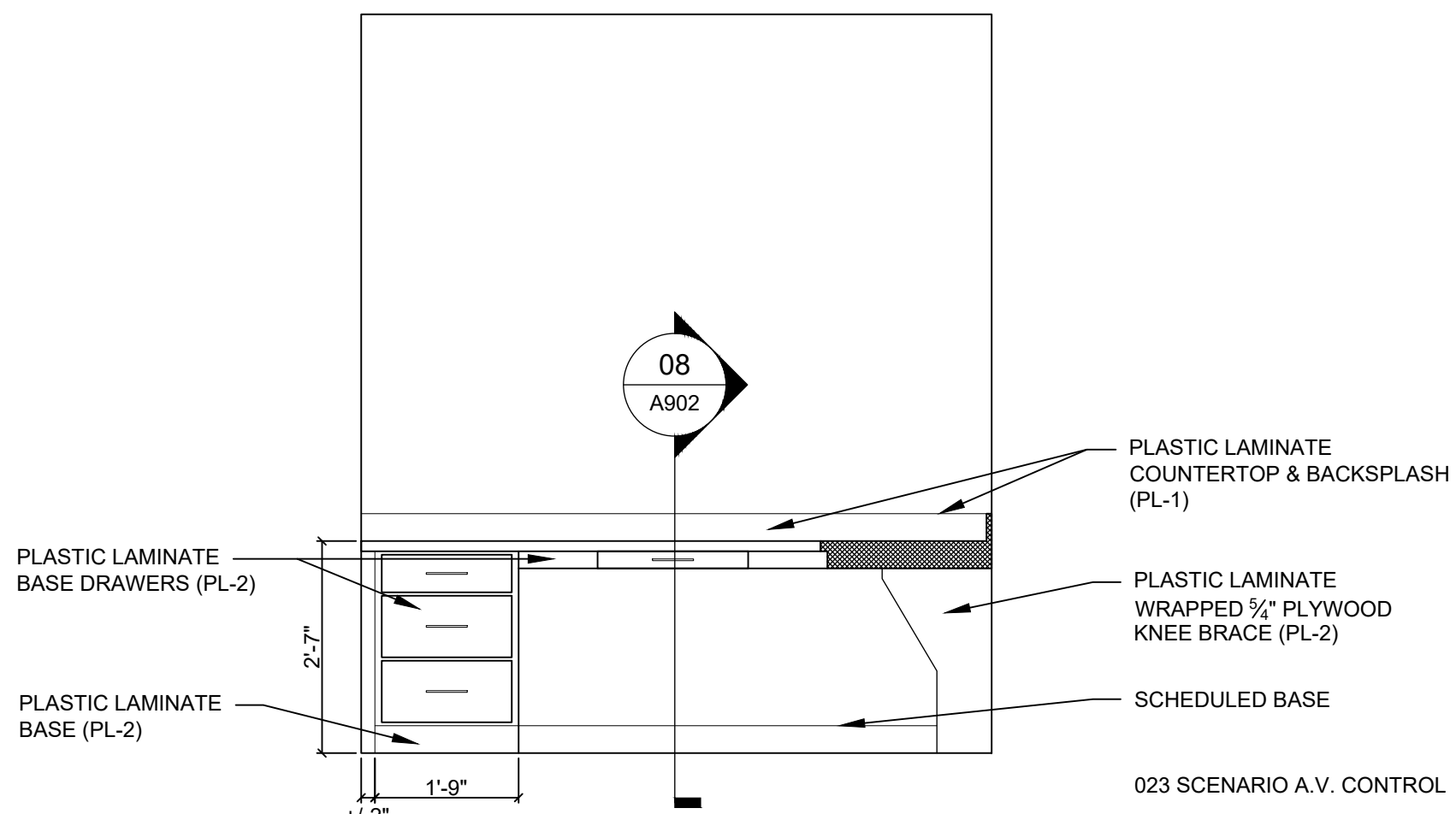


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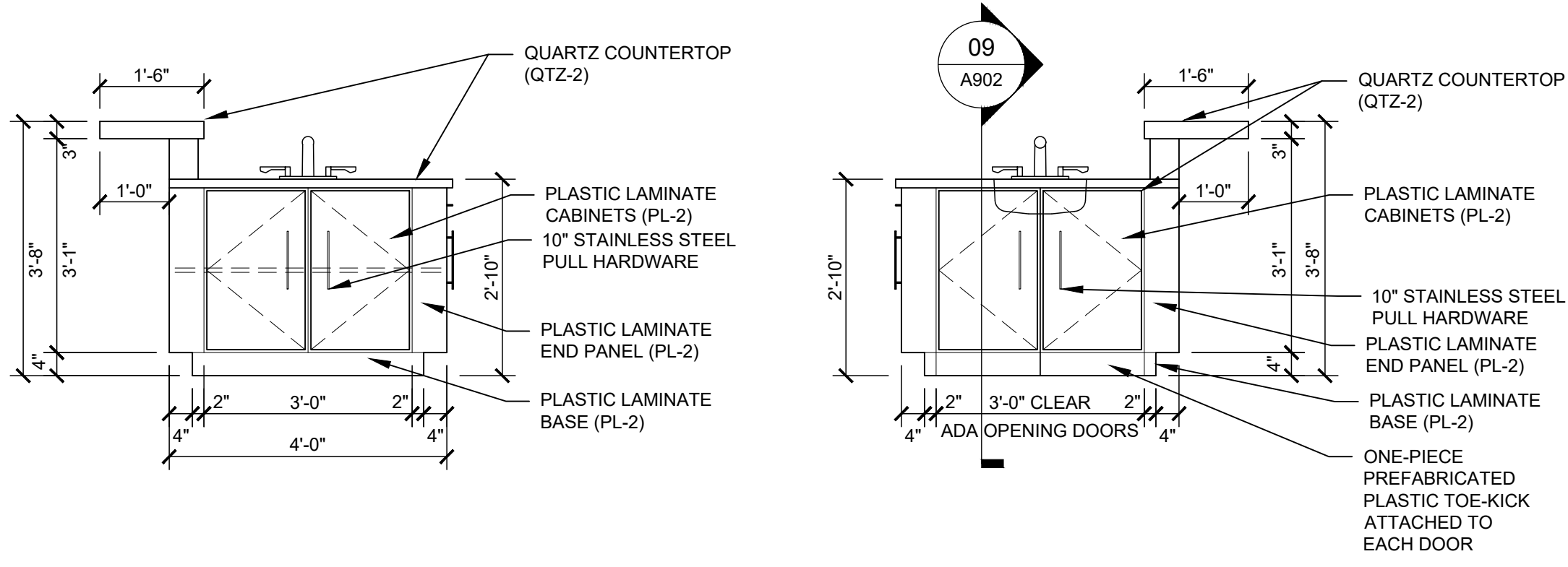
ADW ARCHITECTS, P.A.
CORPORATE SEAL
50223
NORTH CAROLINA
1-9-21
SEAL

SHEET NUMBER

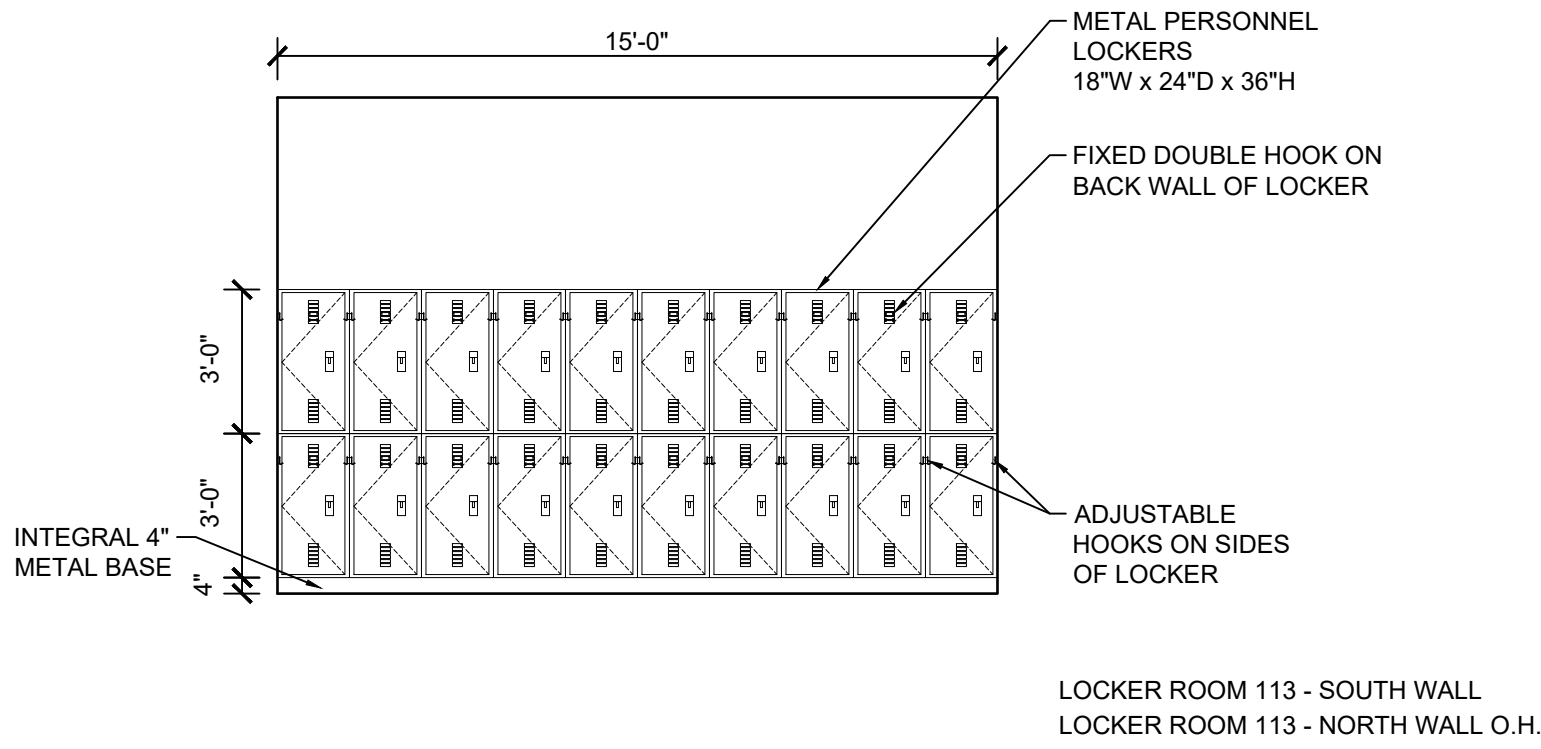
A901



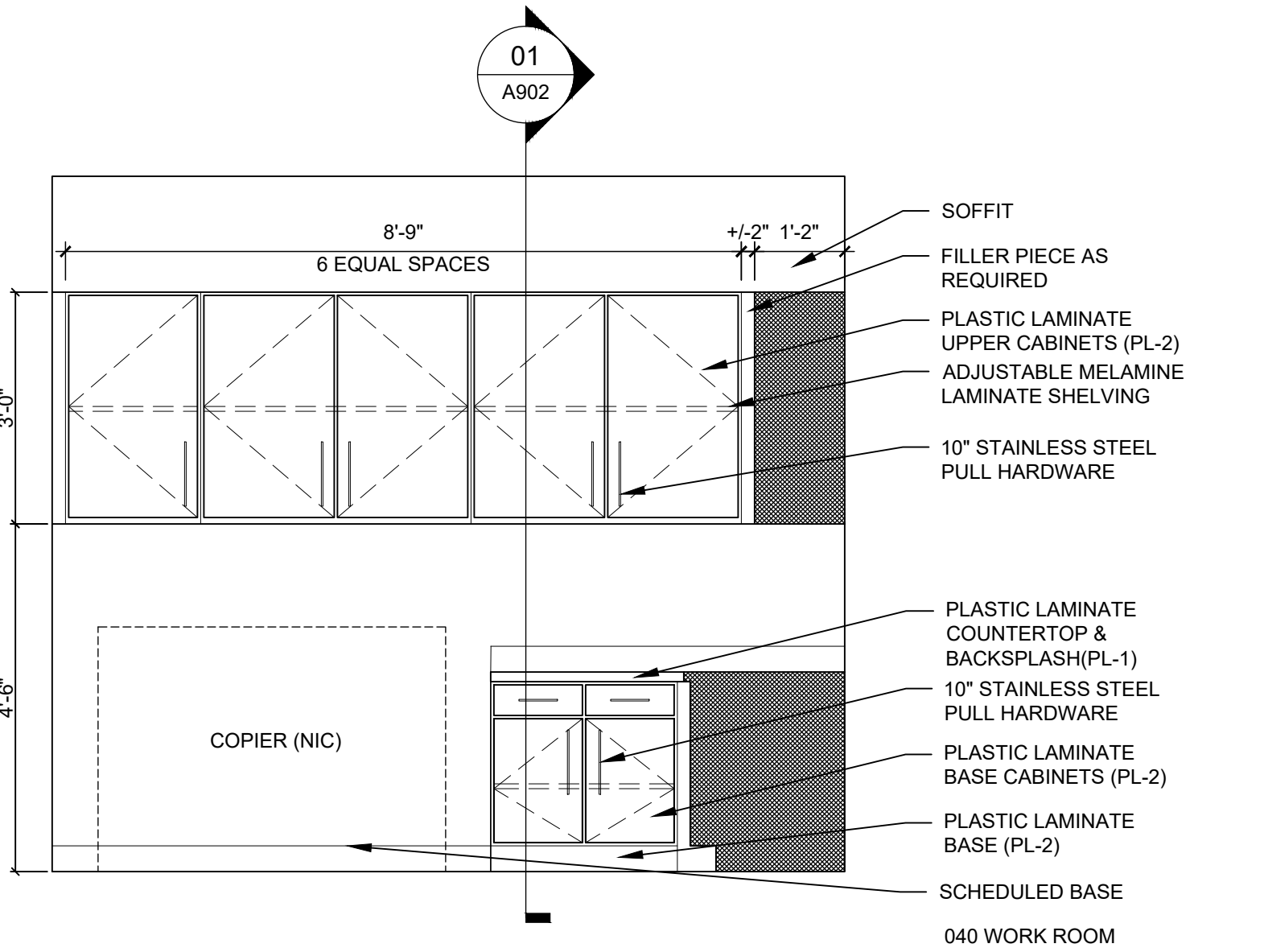
CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 4



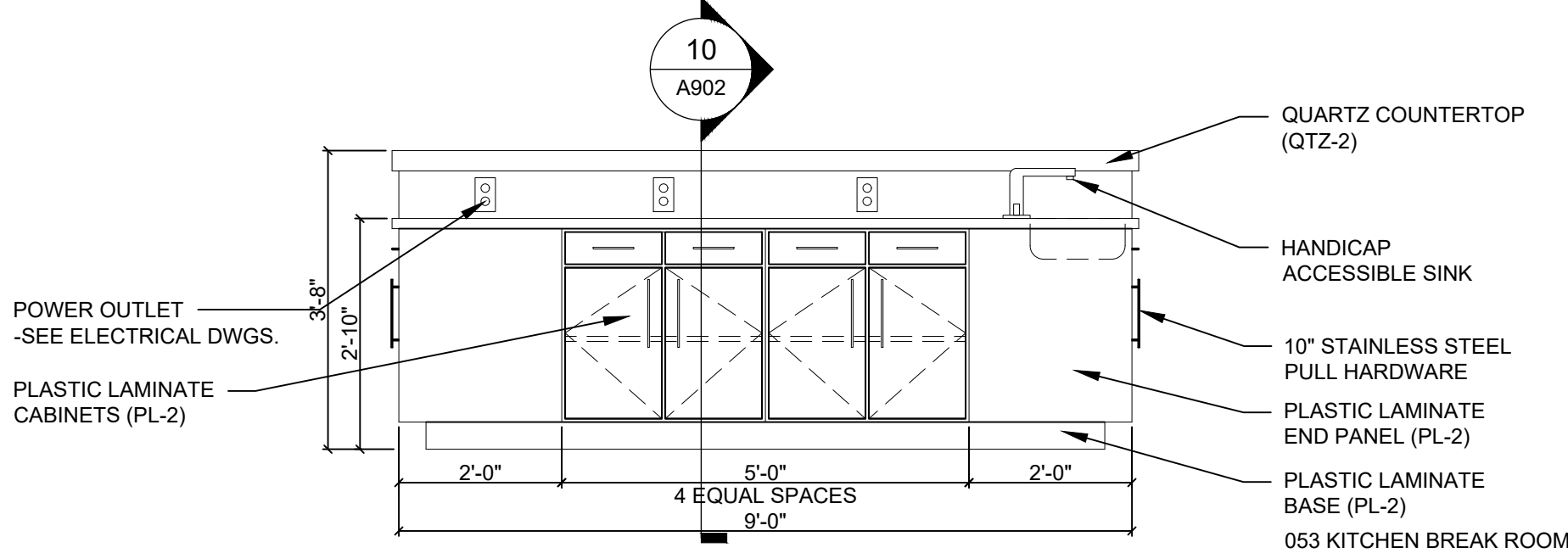
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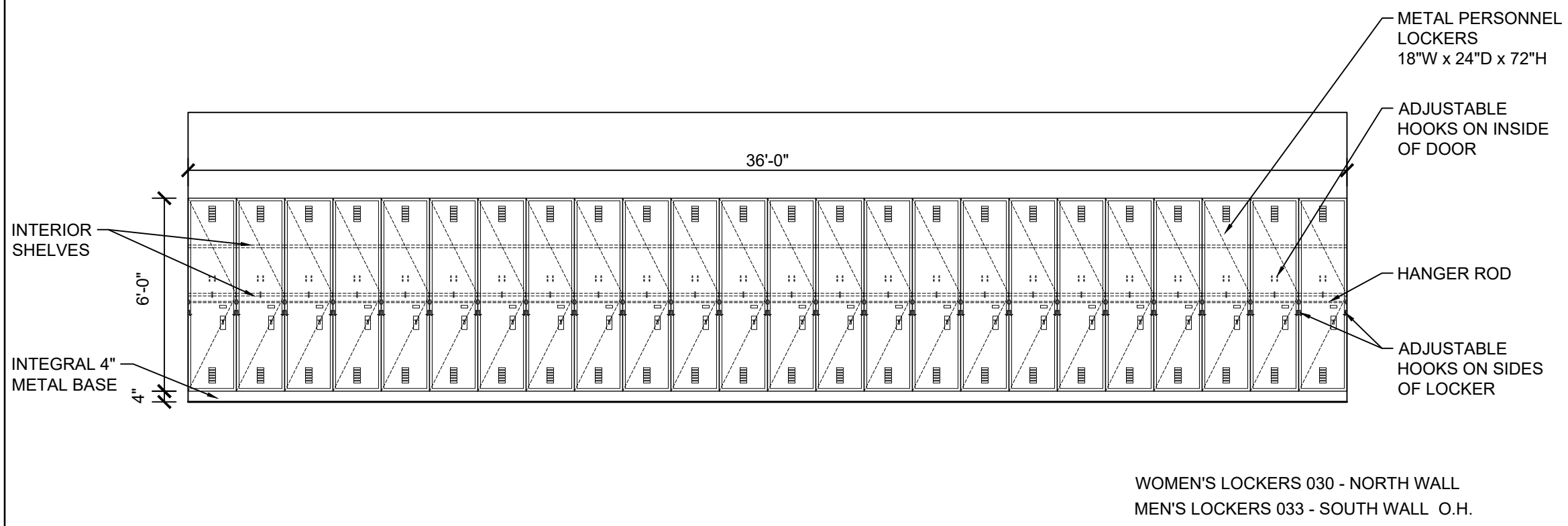
LOCKERS ELEVATION SCALE: 1/4" = 1'-0" 12



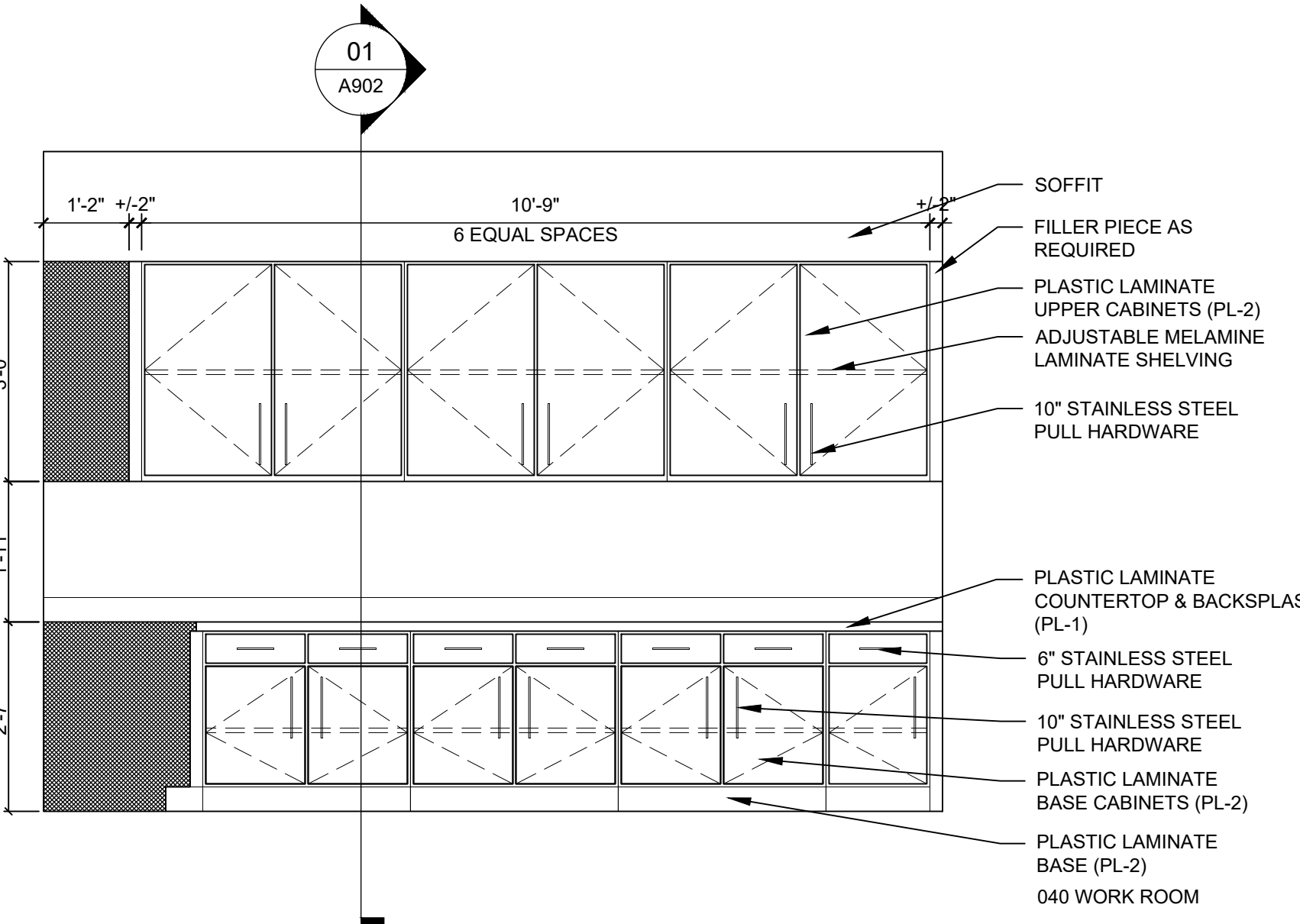
CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 3



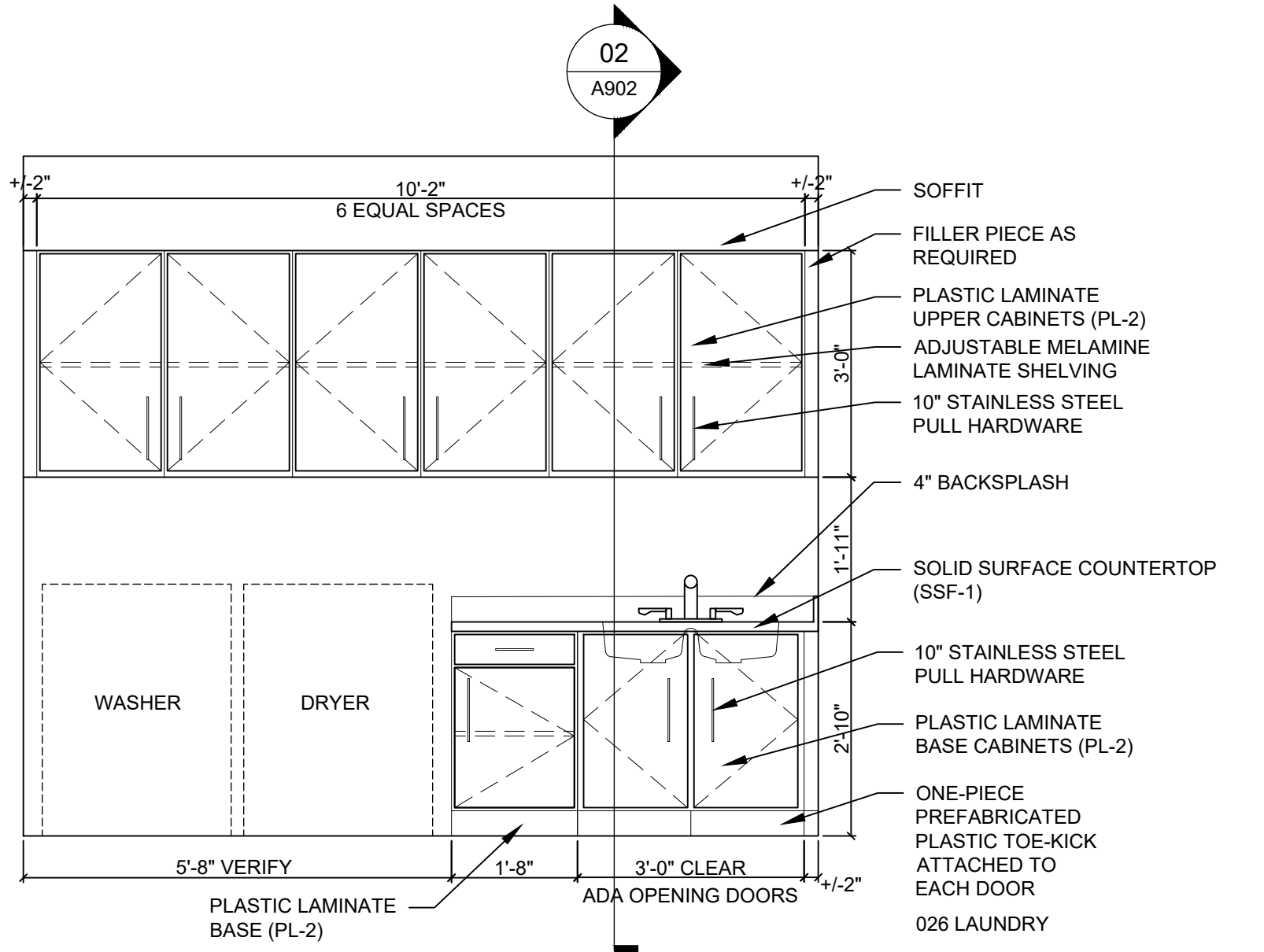
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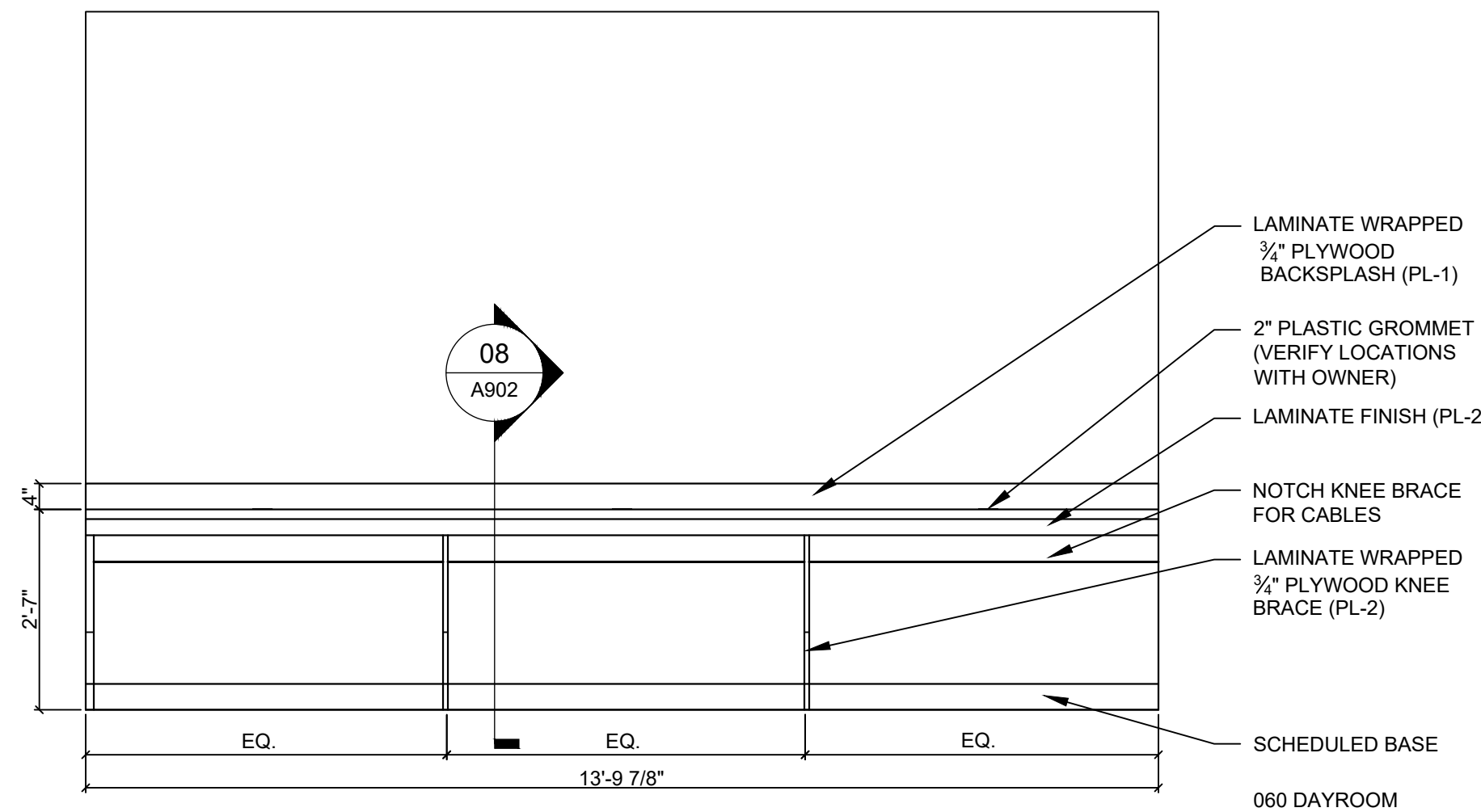
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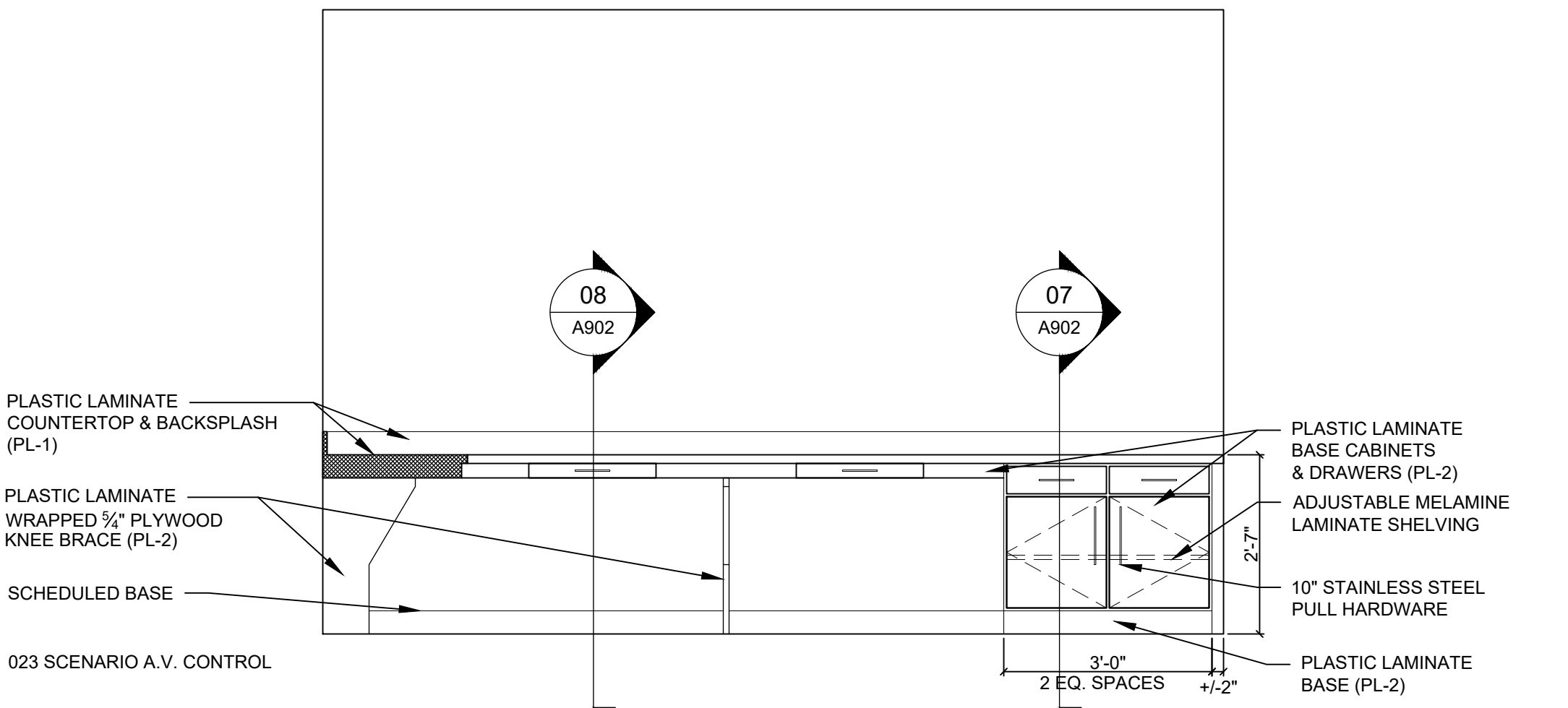
CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 2



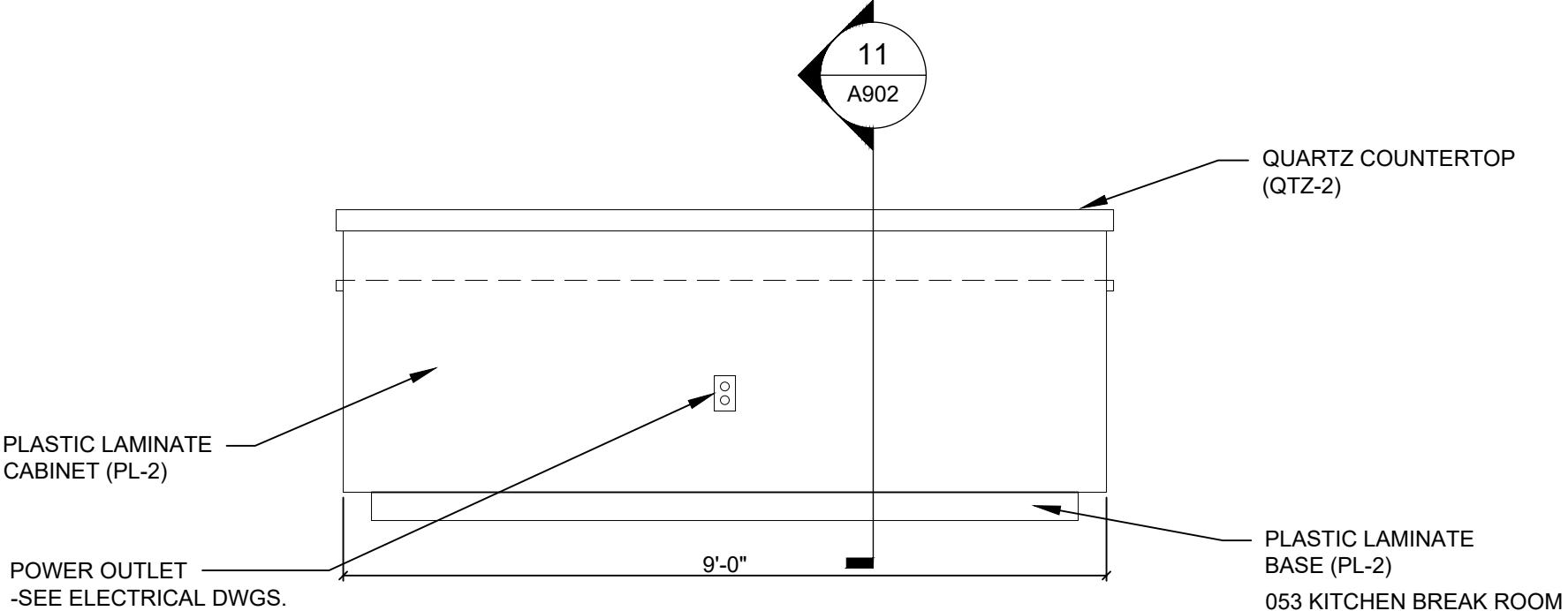
CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 6



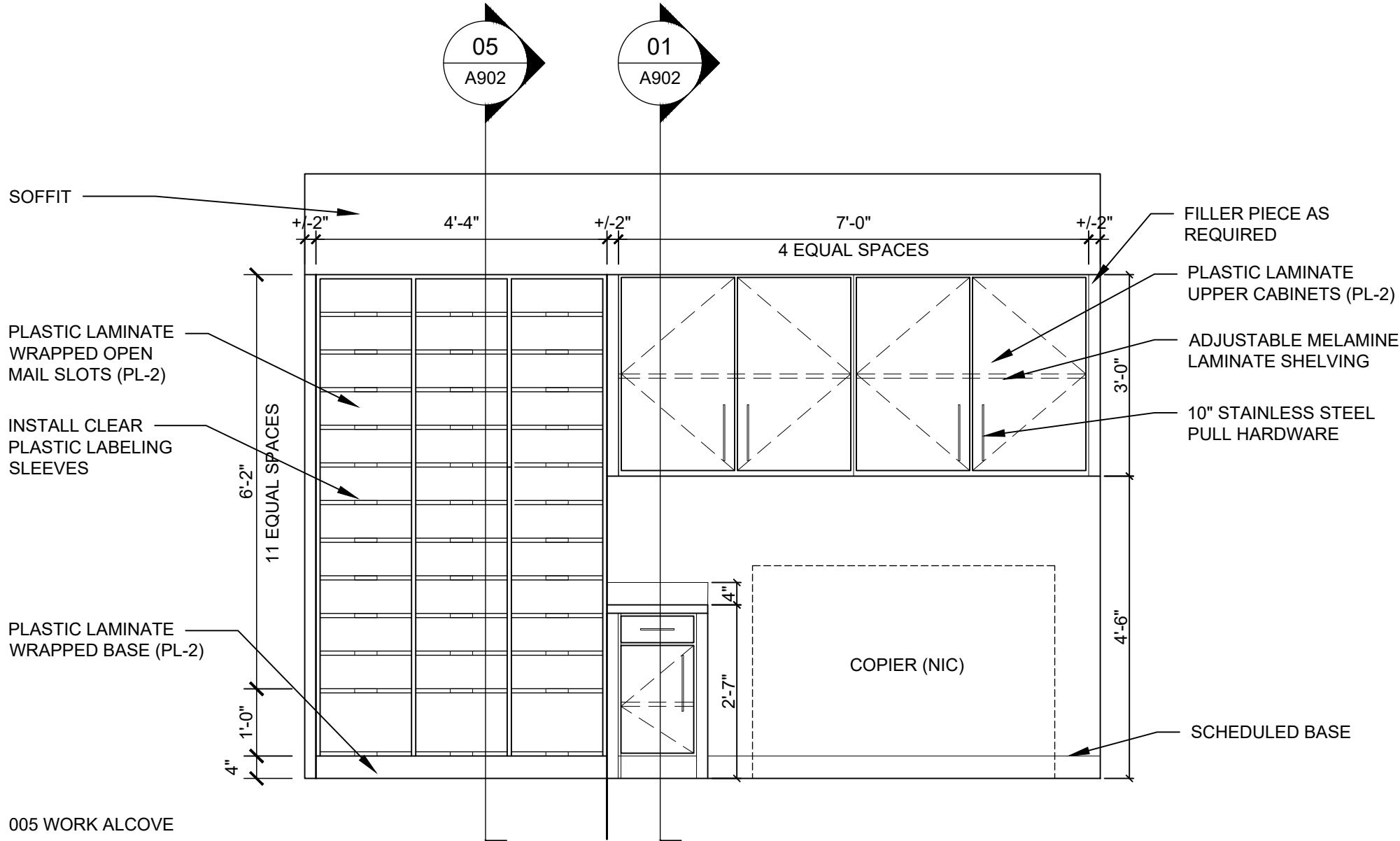
CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 10



CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 5



CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 9



CASEWORK ELEVATION SCALE: 1/2" = 1'-0" 1

SEAL



GENERAL	
1. THESE GENERAL NOTES ARE NOT INTENDED TO REPLACE SPECIFICATIONS. SEE SPECIFICATIONS FOR REQUIREMENTS IN ADDITION TO GENERAL NOTES.	
2. IF THE STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE, AND, EXCEPT WHERE SPECIFICALLY SHOWN, DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, PROCEDURES, TECHNIQUES, AND SEQUENCE. ALL APPLICABLE SAFETY REGULATIONS TO BE FOLLOWED STRICTLY.	
3. THE STRUCTURE HAS BEEN DESIGNED TO RESIST DESIGN LOADS ONLY AS A COMPLETED STRUCTURE. APPLICATIONS OF CONSTRUCTION LOADS TO THE PARTIALLY COMPLETED STRUCTURE SHALL BE CONSIDERED BY THE CONTRACTOR AND SO INCLUDED IN THE DESIGN OF SHORING, BRACING, FORMWORK, AND ANY OTHER SUPPORTING ELEMENTS PROVIDED FOR CONSTRUCTION OF THE STRUCTURE. DURING ERECTION AND UNTIL ALL PERMANENT CONNECTIONS ARE MADE, THE CONTRACTOR MUST PROVIDE TEMPORARY BRACING FOR THE STRUCTURE IN ALL DIRECTIONS.	
4. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND GRADE CONDITIONS (BOTH NEW AND EXISTING), REPORTING ANY DISCREPANCIES TO THE ARCHITECT PRIOR TO ORDERING MATERIALS OR PROCEEDING WITH ANY PHASE OF THE WORK.	
5. THE CONTRACTOR SHALL COMPARE STRUCTURAL SECTIONS WITH ARCHITECTURAL SECTIONS AND REPORT ANY DISCREPANCY TO THE ARCHITECT PRIOR TO FABRICATION OR INSTALLATION OF STRUCTURAL MEMBERS.	
6. DO NOT SCALE DIMENSIONS FROM DRAWINGS. THE CONTRACTOR SHALL REQUEST, FROM THE ARCHITECT, NECESSARY DIMENSIONS NOT SHOWN ON THE DRAWINGS.	
7. IF ANY BIDDER IS IN DOUBT AS TO THE INTENT OF THE PLANS OR SPECIFICATIONS, THEY SHALL REQUEST AN INTERPRETATION FROM THE ARCHITECT IN WRITING AT LEAST TEN (10) DAYS PRIOR TO THE SCHEDULED BID DATE.	
8. PRINCIPAL OPENINGS IN THE STRUCTURE ARE SHOWN ON THESE DRAWINGS. THE GENERAL CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR REQUIRED OPENINGS AS THEY SHALL BE PROVIDED FOR WHETHER SHOWN ON THESE DRAWINGS OR NOT. GENERAL CONTRACTOR SHALL VERIFY SIZE AND LOCATION OF ALL OPENINGS WITH ALL SUB-CONTRACTORS PRIOR TO CONSTRUCTION.	
9. SEE ARCHITECTURAL DRAWINGS FOR FLOOR ELEVATIONS, FLOOR SLOPES, AND THE LOCATION OF DEPRESSED FLOOR AREAS.	
10. WHERE A CONFLICT BETWEEN DRAWINGS AND SPECIFICATIONS OCCURS THE MORE STRINGENT REQUIREMENT SHALL APPLY.	
11. WHERE A DETAIL IS SHOWN FOR ONE CONDITION, IT SHALL APPLY FOR ALL LIKE OR SIMILAR CONDITIONS EVEN THOUGH NOT SPECIFICALLY REFERENCED ON THE DRAWINGS.	
12. SEVERAL ITEMS NOTED HEREIN AND IN THE SPECIFICATIONS REQUIRE THE CONTRACTOR TO ENGAGE A PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED, TO PROVIDE DESIGN AND/OR DETAILING OF STRUCTURAL ELEMENTS. SEE INDIVIDUAL NOTES AND SPECIFICATION SECTIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS. DELEGATED DESIGN ELEMENTS INCLUDE, BUT ARE NOT LIMITED TO:	
□ SPECIALTY FOUNDATION SYSTEM	
□ POST-TENSIONED CONCRETE	
□ STRUCTURAL PRECAST CONCRETE	
□ ARCHITECTURAL PRECAST CONCRETE	
□ STRUCTURAL STEEL (CONNECTIONS)	
✕ PREFABRICATED METAL BUILDING	
□ STEEL STAIRS AND RAILINGS	
✕ STEEL JOISTS AND STEEL JOIST GIRDERS	
□ ROOF ANCHORS	
✕ NON-LOAD BEARING COLD-FORMED STEEL	
□ LOAD BEARING COLD-FORMED STEEL	
□ LIGHT GAUGE COLD-FORMED STEEL TRUSSES	
□ PREFABRICATED WOOD TRUSSES	
✕ MAPES PRE-ENGINEERED CANOPY	

DESIGN CRITERIA

- APPLICABLE CODES:
2018 NORTH CAROLINA STATE BUILDING CODE (2015 INTERNATIONAL BUILDING CODE WITH REVISIONS)
MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES (ASCE/SEI 7-10)
BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-14)
BUILDING CODE REQUIREMENTS/SPECIFICATIONS FOR MASONRY STRUCTURES (ACI 530/530.1-13)
SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS (AISC 360-10)
NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION (NDS/NAWC NDS-2015)
NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS (AISI S100-12)
- LIVE LOADS:

	UNIFORM (PSF)	CONCENTRATED (LB)
CORRIDORS (GROUND)	100	2,000
MECHANICAL	150	NA
ROOF	20	300

RISK CATEGORY: IV

SNOW LOAD:
GROUND SNOW LOAD $p_g = 10$ PSF
IMPORTANCE FACTOR $I_s = 1.20$
SNOW EXPOSURE FACTOR $C_e = 1.00$
THERMAL FACTOR $C_t = 1.00$
FLAT SNOW ROOF LOAD $p = 10$ PSF

WIND LOAD:
ULTIMATE DESIGN WIND SPEED $V_{ult} = 135$ MPH
NOMINAL DESIGN WIND SPEED $V_{ref} = 103$ MPH
EXPOSURE CATEGORY C
INTERNAL PRESSURE COEFFICIENTS
E911 WING $V_x = 33k$ $V_y = 54k$
MAIN BUILDING $V_x = 132k$ $V_y = 83k$
EMS WING $V_x = 31k$ $V_y = 70k$

COMPONENTS AND CLADDING -
ALL BUILDING COMPONENTS AND CLADDING ENGINEERED BY THE COMPONENT MANUFACTURER ARE TO BE DESIGNED BY THE MANUFACTURER'S ENGINEER FOR WIND LOADS DETERMINED PER THE GOVERNING BUILDING CODE FOR THE BASIC DESIGN WIND VELOCITY AND EXPOSURE CATEGORY LISTED ABOVE.

ROOF	10SF	20SF	50SF	100SF
ZONE 1	17.9/44.0	16.8/42.9	15.3/41.4	14.2/40.3
2	40.3/73.8	38.5/66	36.1/55.6	34.4/47.7
3	40.3/73.8	38.5/66	36.1/55.6	34.4/47.7

WALL

ZONE	4	40.3/43.6	38.5/41.9	36.1/39.5	34.4/37.7
5	40.3/53.7	38.5/50.1	36.1/45.4	34.4/41.9	

- SEISMIC LOAD:
DESIGN METHOD - EQUIVALENT LATERAL FORCE PROCEDURE (VALUES BASED ON ASCE 7-16)

	R_s	R_d	R_e	R_t
S_{DS}	13.7 %g			
S_{D1}	6.4 %g			
S_{D5}	14.6 %g			
S_{D1}	10.2 %g			
IMPORTANCE FACTOR	$I_s = 1.50$			
SITE CLASS	D			

SEISMIC DESIGN CATEGORY -
SEISMIC FORCE-RESISTING SYSTEM -
INTERMEDIATE REINFORCED MASONRY SHEAR WALLS AND STEEL SYSTEMS NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE

RESPONSE MODIFICATION COEFFICIENT $R_s = 3.5, 3.0$ $R_d = 3.5, 3.0$
DEFLECTION AMPLIFICATION FACTOR $C_{dr} = 2.25, 3.0$ $C_{dv} = 2.25, 3.0$
SEISMIC RESPONSE COEFFICIENT $C_{sr} = .063/.073$ $C_{sv} = .063/.073$

BASE SHEAR
E911 WING $V_x = 16k$ $V_y = 16k$
MAIN BUILDING $V_x = 41k$ $V_y = 41k$
EMS WING $V_x = 55k$ $V_y = 55k$

NONSTRUCTURAL COMPONENT ANCHORAGE
ALL ARCHITECTURAL, ELECTRICAL, MECHANICAL, AND PLUMBING COMPONENTS ARE TO BE ATTACHED AS REQUIRED BY ASCE/SEI 7 CHAPTER 13, "SEISMIC DESIGN REQUIREMENTS FOR NONSTRUCTURAL COMPONENTS". EACH INDIVIDUAL CONTRACTOR RESPONSIBLE FOR THE COMPONENT MUST PROVIDE PROJECT SPECIFIC DESIGN AND DOCUMENTATION PREPARED BY AN ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED. CHAPTER 13 DEFINES THE FORCE REQUIRED TO SUPPORT THE COMPONENT FOR THE ANCHORAGE AND BRACING. THE COST OF PREPARING THIS INFORMATION AND DESIGN SHALL BE INCLUDED IN EACH CONTRACTOR'S BID THAT IS PROVIDING THE COMPONENT.

- FUTURE LOADS:
UNLESS SPECIFICALLY NOTED, THERE ARE NO PROVISIONS MADE FOR FUTURE FLOORS, ROOFS, OR OTHER LOADS.

FOUNDATIONS

- FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL INVESTIGATION REPORT BY:
S&ME, INC., DATED APRIL 30, 2020 (PROJECT #1305-20-023)
THE DESIGN ALLOWABLE SOIL BEARING PRESSURE IS 2,000 PSF, BASED ON THIS REPORT.
FOOTINGS SHALL BE CARRIED TO LOWER ELEVATIONS THAN THOSE SHOWN ON THE DRAWINGS IF REQUIRED BY THE GEOTECHNICAL ENGINEER OR TESTING LAB TO REACH SOIL CAPABLE OF PROVIDING THE DESIGN ALLOWABLE SOIL BEARING PRESSURE.
- MINIMUM SUBGRADE PREPARATION REQUIREMENTS ARE AS FOLLOWS:
PREPARE SUBGRADE AND UNDERFLOOR FILL TO A POINT THAT EXTENDS 5'-0" (MINIMUM) BEYOND THE LIMITS OF THE FOUNDATIONS.
COMPACT ALL FILL UNDER BUILDING TO 95% MAXIMUM DENSITY AS DETERMINED BY ASTM D698 AND TO 98% MAXIMUM DENSITY WITHIN THE UPPER 18".
PLACE IN LAYERS OF 8" (MAXIMUM) LOOSE THICKNESS.
FIELD COMPACTION SHALL BE VERIFIED WITH AT LEAST ONE TEST PER 2,000 SQUARE FEET PER LAYER, IN ACCORDANCE WITH ASTM D1556 (SAND-CONE METHOD), ASTM D6938 (NUCLEAR METHODS, SHALLOW DEPTH), ASTM D2167 (RUBBER BALLON METHOD), AND/OR ASTM D2937 (DRIVE-CYLINDER METHOD). SEE SPECIFICATIONS FOR OTHER TESTING REQUIREMENTS.
- WALLS RETAINING SOIL SHALL BE TEMPORARILY BRACED DURING BACKFILLING AND UNTIL ALL SUPPORTING SOIL AND SLABS ARE IN PLACE AND ARE AT DESIGN STRENGTH UNLESS NOTED OTHERWISE ON PLANS AND DETAILS.
- UTILITY LINES SHALL NOT BE PLACED THROUGH OR BELOW FOUNDATIONS WITHOUT APPROVAL OF THE STRUCTURAL ENGINEER. CONTRACTOR SHALL SUBMIT DETAILED DRAWINGS OF ALL SUCH CONDITIONS PRIOR TO CONSTRUCTION.
- SUBGRADE MUST BE CHEMICALLY STABILIZED TO PRODUCE A MINIMUM 12" THICK CHEMICALLY STABILIZED LAYER.
- SITE GRADES SHOULD BE RAISED AT LEAST 3' AS NOTED IN THE GEOTECHNICAL REPORT.
- SITE WORK EQUIPMENT AND GROUND WATER MUST BE MANAGED AND DRAINAGE DITCHES INSTALLED AS RECOMMENDED IN THE GEOTECHNICAL REPORT.

CONCRETE / REINFORCING STEEL

- ALL CONCRETE DESIGN AND CONSTRUCTION SHALL CONFORM TO THE REFERENCED EDITION OF THE BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318).
- CONCRETE MIXTURES AS REQUIRED (BASED ON CLASS DESIGNATION):

CLASS	A - FOOTINGS, GRADE/TIE BEAMS	NWC	3,000 PSI
CLASS C -	INTERIOR SLABS ON GRADE	NWC	3,000 PSI
CLASS D -	INTERIOR SLABS ON GRADE AT VEHICLE BAYS	NWC	4,000 PSI
CLASS F -	EXTERIOR SLABS ON GRADE, PADS, TOPPINGS	NWC	4,500 PSI
CLASS F -	EXTERIOR RETAINING WALLS	NWC	4,500 PSI
- REINFORCING:
TYPICAL - ASTM A615, GRADE 60
REINFORCING TO BE WELDED - ASTM A706
DEFORMED BAR ANCHORS - ASTM A496
WELDED WIRE FABRIC - ASTM A1064 (FLAT SHEETS ONLY)
GROUT UNDER BASE PLATES TO BE HIGH STRENGTH (5,000 PSI), NON-SHRINK.
REFER TO THE DRAWINGS FOR REINFORCING LAP REQUIREMENTS. WHERE LAP SPLICES ARE NOT SHOWN, LAP PER ACI 318 OR CRSI STANDARDS.
LAP WELDED WIRE FABRIC SHEETS 8" MINIMUM.
CLEAR COVER FROM FACE OF CONCRETE:
CONCRETE NOT EXPOSED TO EARTH/WEATHER
CONCRETE CAST AGAINST AND EXPOSED TO EARTH
3" 2" FOR #6 BARS AND LARGER, 1 1/2" ELSE
CONCRETE NOT EXPOSED TO EARTH/WEATHER
PROVIDE REINFORCING IN SLABS ON GRADE, 1-1/2" FROM TOP OF SLAB.
4" SLABS 6x6-W2.1xW2.1
6" SLABS #3@12"OC EACH WAY
8" SLABS #4@12"OC EACH WAY
- WHERE SCHEDULED BARS ARE NOT PRESENT, PROVIDE CONTINUOUS #5 TOP AND BOTTOM BARS TO SUPPORT STIRRUPS AS REQUIRED FOR THE LENGTH OF THE STIRRUP SPACING IN ALL BEAMS.
- WALL FOOTING REINFORCING SHALL BE CONTINUOUS THROUGH ADJACENT COLUMN FOOTINGS.
- PROVIDE VERTICAL DOVETAIL SLOTS AT 24"OC WITH TIES AT 18"OC VERTICALLY IN ALL CONCRETE WALLS BACKING-UP MASONRY VENEER.
- BAR SUPPORTS FOR CONCRETE EXPOSED TO VIEW SHALL HAVE PLASTIC COATED LEGS OR BE HOT-DIP GALVANIZED AFTER FABRICATION.
- MECHANICAL AND ELECTRICAL CONDUIT IN SLABS ON GRADE AND ELEVATED SLABS SHALL RUN UNDER TOP LAYER OF SLAB REINFORCING. PROVIDE A MINIMUM OF 1-1/2" CLEAR BETWEEN CONDUITS AND BETWEEN REINFORCING AND ADJACENT CONDUITS PARALLEL TO REINFORCING. IF MAXIMUM SIZE OF CONDUIT EXCEEDS ONE THIRD OF THE SLAB DEPTH, ADDITIONAL FRAMING OR REINFORCING MAY BE NECESSARY AT ENGINEER'S DISCRETION.
- DEVELOP CONCRETE ANCHORS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A108, GRADES 1010, 1015, 1017, OR 1020. STUDS SHALL BE AUTOMATICALLY END WELDED IN THE SHOP OR FIELD IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- EMBED PLATES MUST BE SET IN THE FORM BEFORE POURING CONCRETE, NOT PLACED INTO TOP OF WET CONCRETE. THE CONTRACTOR SHALL CONTACT THE ARCHITECT FOR CORRECTIVE DETAILS FOR ANY EMBED PLATES LEFT OUT OF CONCRETE POURS.
- FOR SLABS ON GRADE, SLAB AND FOOTING REINFORCING SHALL BE HELD IN PLACE BY BAR SUPPORTS WITH SAND PLATES, OR PRECAST CONCRETE BAR SUPPORTS AS DESCRIBED IN CHAPTER 3 OF THE CRSI MANUAL OF STANDARD PRACTICE. BAR SUPPORTS SHALL BE SPACED AT A MAXIMUM OF 4'-0"OC BOTH WAYS. ROCKS, CHU, OR CLAY BRICK WILL NOT BE USED AS SUPPORTS.
- THE CONTRACTOR SHALL ASSUME CONCRETE OVERAGES IN ELEVATED DECK POURS DUE TO MEMBER AND DECK DEFLECTIONS. UNLESS SHOWN ON PLANS, BEAMS ARE NOT CAMBERED. CONCRETE OVERAGES MAY BE CALCULATED BY THE CONTRACTOR FOR BEAM DEFLECTIONS EQUATING L/300 INCLUDING ADDITIONAL DEFLECTIONS DUE TO PONDING AND DECK DEFLECTIONS PER SDI.
- REBAR SHALL NOT BE HEATED WITH A TORCH IN THE FIELD.
- THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER FAR ENOUGH IN ADVANCE (48 HOURS) OF EACH CONCRETE POUR TO ALLOW AMPLE TIME TO CHECK THE LAYOUT OF THE STEEL BEFORE THE BEGINNING OF THE ACTUAL POUR, BUT NOT PRIOR TO 90% OF THE STEEL HAVING BEEN PLACED.

CONCRETE CONSTRUCTION JOINTS

- CONTRACTOR SHALL PROVIDE NECESSARY CONSTRUCTION JOINTS IN MONOLITHIC CONCRETE POURS SO THAT THE QUALITY OF PLACEMENT AND FINISH MEETS THE REQUIREMENTS OF PLANS AND SPECIFICATIONS. THE CONTRACTOR SHALL SUBMIT A PLAN SHOWING THE LOCATION OF ALL CONSTRUCTION JOINTS TO THE STRUCTURAL ENGINEER FOR APPROVAL.
- WHERE SHOWN, CONSTRUCTION JOINTS IN CONCRETE POURS, ALL VERTICAL CONSTRUCTION JOINTS IN SLABS AND BEAMS SHALL BE MADE WITH BULKHEADS. ADDITIONAL REINFORCING AT CONSTRUCTION JOINTS SHALL BE AS SPECIFIED BY THE STRUCTURAL ENGINEER. SEE TYPICAL CONSTRUCTION JOINT DETAILS.

STRUCTURAL MASONRY

- ALL MASONRY DESIGN AND CONSTRUCTION SHALL CONFORM TO THE REFERENCED EDITION OF THE BUILDING CODE REQUIREMENTS/SPECIFICATIONS FOR MASONRY STRUCTURES (ACI 530/530.1).
- LOAD BEARING MASONRY WALLS, PILASTERS, PIERS, RETAINING WALLS, FOUNDATION WALLS AND ANY OTHER MASONRY SO DESIGNATED ON DRAWINGS IS CONSIDERED HERE TO BE STRUCTURAL MASONRY.
- REQUIRED COMPRESSIVE STRENGTH OF MASONRY UNITS:
SOLID CLAY UNITS - 6,200 PSI
CONCRETE UNITS - 2,000 PSI ON NET AREA
- CONCRETE MASONRY UNITS SHALL BE LIGHT WEIGHT (105 PCF) CONFORMING TO ASTM C90. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR UNIT SIZE, FACE, COLOR, JOINTING, ETC.
- MORTAR SHALL BE TYPE S, ASTM C270.
- GROUT FOR REINFORCED MASONRY SHALL BE FINE GROUT, ASTM C476. MINIMUM 28-DAY COMPRESSIVE STRENGTH SHALL BE 2,000 PSI.
- MINIMUM 28-DAY STRENGTH (f_m) OF THE MASONRY WALLS SHALL BE 2,000 PSI. MASONRY STRENGTH SHALL BE DETERMINED BY THE UNIT STRENGTH METHOD OR THE PRISM TEST METHOD AS DESCRIBED BY ACI 530.
- REINFORCING:
TYPICAL - ASTM A615, GRADE 60
ALL REINFORCING TO BE WELDED - ASTM A706
- REFER TO THE DRAWINGS FOR REINFORCING LAP TYPICAL DETAIL AND SCHEDULE REQUIREMENTS. WHERE LAP SPLICES ARE NOT SHOWN, LAP 72 BAR DIAMETERS.
- MAXIMUM HEIGHT TO WHICH MASONRY SHALL BE LAID BEFORE GROUTING IS 5 FEET ABOVE CONSTRUCTION SURFACE OR PREVIOUSLY GROUTED MASONRY. IF GROUT FOUR HEIGHT EXCEEDS 5 FEET, THEN "HIGH LIFT" GROUTING PROCEDURE MUST BE FOLLOWED. PROVIDE CLEANOUT OPENINGS AT THE BOTTOM OF EACH GROUT POUR HEIGHT. CLEANOUT OPENINGS SHALL BE PROVIDED AT EACH CELL TO BE FILLED WITH GROUT.
- ALL GROUT PLACED OVER 12" IN HEIGHT SHALL BE MECHANICALLY CONSOLIDATED DURING GROUTING. GROUT SHALL BE RECONSOLIDATED WITH MECHANICAL VIBRATION AFTER INITIAL WATER LOSS AND SETTLEMENT HAS OCCURRED.
- MAXIMUM GROUT LIFT (GROUT POURED IN ONE CONTINUOUS OPERATION) IS 5 FEET. THIS LIMIT ALSO APPLIES TO "HIGH LIFT" GROUTING.
- REINFORCE MASONRY WHERE SHOWN ON STRUCTURAL DRAWINGS. THE REINFORCING IN POSITION AND PLACE GROUT AROUND REINFORCING. DO NOT PUSH REINFORCING DOWN INTO PREVIOUSLY PLACED GROUT FILL. SET BOLTS SIMILARLY.
- THE MASONRY WYTHES WITH HORIZONTAL REINFORCING AS SPECIFIED.
- PROVIDE VERTICAL BARS, SIZE MATCHING WALL REINFORCING, AT ALL CORNERS, ENDS OF WALLS, EACH SIDE OF CONTROL JOINTS AND EACH SIDE OF WALL OPENINGS. TIE EACH BAR TO THE FOUNDATION WITH A MATCHING DOWEL.
- ALL CORNERS AND INTERSECTIONS OF STRUCTURAL MASONRY WALLS SHALL BE CONSTRUCTED BY INTERLOCKING COURSES.
- ALL LIMITS TO BEAR 8" MINIMUM EACH SIDE OF OPENING, UNLESS NOTED OTHERWISE.
- GROUT ALL MASONRY WALLS AND CAVITY BELOW GRADE SOLID. GROUT ALL WALLS ABOVE GRADE AT THE REINFORCED CELLS (MINIMUM) OR AS INDICATED IN SPECIFIC SECTIONS.
- ONE 3/4"Ø (MAXIMUM) VERTICAL CONDUIT ALLOWED IN ANY REINFORCED CELL PROVIDED 1" CLEAR IS MAINTAINED BETWEEN REINFORCING AND CONDUIT. NO OTHER VERTICAL OR HORIZONTAL CONDUITS, PIPES, OR SLEEVES SHALL BE LOCATED IN REINFORCED CELLS UNLESS OTHERWISE APPROVED BY THE STRUCTURAL ENGINEER. CONTRACTOR SHALL COORDINATE LAYOUT TO AVOID REINFORCED CELLS.

STRUCTURAL STEEL

- DESIGN, FABRICATION, AND ERECTION SHALL BE PER THE SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS (AISC 360).
- STRUCTURAL STEEL:
WIDE FLANGE SHAPES (W SECTIONS) - ASTM A992, GRADE 50 (FY=50 KSI)
CHANNELS, ANGLES, RODS, AND BARS - A36 (FY=36 KSI)
PLATES - ASTM A572, GRADE 50 (FY=50 KSI) OR ASTM A36 (FY=36 KSI)
SQUARE AND RECTANGULAR TUBES - ASTM A500, GRADE B (FY=46 KSI)
PIPES - ASTM A53, GRADE B (FY=35 KSI)
- ANCHOR BOLTS AND THREADED RODS SHALL CONFORM TO ASTM F1554, GRADE 36, UNO.
- BEAM SIMPLE SHEAR AND BRACED FRAME CONNECTIONS NOT DETAILED ON STRUCTURAL DRAWINGS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER RETAINED BY THE STEEL SUPPLIER AND REGISTERED IN THE STATE IN WHICH THE PROJECT IS LOCATED. CONNECTIONS SHALL BE MADE WITH ASTM A325 3/4"Ø BOLTS (MINIMUM), TIGHTENED TO A SNUG-TIGHT CONDITION PER AISC REQUIREMENTS.
- THE CONNECTIONS FOR NON-COMPOSITE BEAMS SHALL BE DESIGNED FOR REACTIONS SHOWN ON DRAWINGS OR FOR REACTIONS DETERMINED BY USING THE MAXIMUM TOTAL UNIFORM LOAD TABULATED IN PART 3 OF THE AISC STEEL CONSTRUCTION MANUAL FOR THE SECTION, SPAN AND STRENGTH OF STEEL SPECIFIED.
- THE CONNECTIONS FOR COMPOSITE BEAMS SHALL BE DESIGNED FOR REACTIONS SHOWN ON DRAWINGS OR AS DICTATED BY THE TYPICAL COMPOSITE SLAB DETAIL.
- THE CONNECTION ENGINEER SHALL SUBMIT A SIGNED AND SEALED LETTER STATING THEY HAVE REVIEWED THE STEEL SHOP DRAWINGS AND THE CONNECTIONS ARE CONSISTENT WITH THEIR CALCULATIONS AND INTENT.
- WHERE STEEL MEMBERS ARE WELDED AND NO SIZE IS SPECIFIED, PROVIDE FULL LENGTH FILLET WELDS BOTH SIDES OF MEMBER. WELD SIZES SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE:

MEMBER THICKNESS	WELD SIZE
3/16" - 5/16"	3/16"
3/8" - 7/16"	1/4"
1/2"	5/16"
9/16"	3/8"
5/8"	7/16"
- SPLICING OF STRUCTURAL STEEL MEMBERS IS PROHIBITED WITHOUT PRIOR APPROVAL OF THE ENGINEER AS TO LOCATION AND TYPE OF SPLICE TO BE MADE. ANY MEMBER HAVING A SPLICE NOT SHOWN AND DETAILED ON SHOP DRAWINGS WILL BE REJECTED.
- ALL WELDING SHALL CONFORM TO THE AMERICAN WELDING SOCIETY CODE. USE E70 SERIES ELECTRODES FOR ALL STRUCTURAL STEEL WELDS.
- SEE THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ALL ITEMS REQUIRED TO BE HOT-DIP GALVANIZED AFTER FABRICATION.
- STRUCTURAL STEEL SHALL BE PUNCHED FOR WOOD BLOCKING, NAILERS, CLIPS AND TIES IN ACCORDANCE WITH ARCHITECTURAL/STRUCTURAL DETAILS.
- ULTRASONIC INSPECTION BY THE TESTING LABORATORY SHALL BE PROVIDED FOR ALL WELDS CALLED FOR ON THE STRUCTURAL DRAWINGS OR SHOP DRAWINGS AS FULL PENETRATION WELDS.
- ALL STEEL EXPOSED TO VIEW SHALL BE CLASSIFIED AS ARCHITECTUALLY EXPOSED STRUCTURAL STEEL (AESS) AS DEFINED BY THE AISC CODE OF STANDARD PRACTICE AND SHALL BE TREATED AS SUCH.

STEEL JOISTS

- ALL STEEL JOISTS SHALL BE OPEN-WEB TYPE CONFORMING TO THE LATEST EDITION OF "STANDARD SPECIFICATIONS, LOAD TABLES AND WEIGHT TABLES FOR STEEL JOISTS AND JOIST GIRDERS" PUBLISHED BY THE STEEL JOIST INSTITUTE.
- PROVIDE BRIDGING PER STEEL JOIST INSTITUTE STANDARD SPECIFICATION. ALL BRIDGING SHALL BE BOLTED OR WELDED AT ALL JOISTS AND AT ALL CROSSINGS AND ANCHORED TO SPANDREL MEMBERS. ALL BRIDGING FOR JOISTS USED AS SPANDREL MEMBERS (AT EDGE OF DECK) SHALL BE "X" BRIDGING. SIZE OF BRIDGING SHALL BE DETERMINED BY THE JOIST SUPPLIER. JOIST SUPPLIER TO PROVIDE ADDITIONAL BRIDGING AS REQUIRED FOR UPLIFT LOADS.
- ALL JOISTS SHALL HAVE ANGLE BOTTOM CHORD MEMBERS UNLESS OTHERWISE APPROVED.
- ALL K-SERIES JOISTS SHALL BE WELDED TO SUPPORT STEEL WITH A MINIMUM OF 2" OF 1/8" FILLET WELD AT BOTH SIDES OF JOIST SEAT.
- WHERE JOISTS FRAME TO COLUMNS, JOISTS SHALL BE FIELD BOLTED TO COLUMNS WITH (2)1/2"Ø A307 BOLTS AT EACH END OF THE JOIST TO PROVIDE LATERAL STABILITY DURING CONSTRUCTION.
- PROVIDE BOLTED DIAGONAL BRIDGING WHERE REQUIRED PER STEEL JOIST INSTITUTE STANDARD SPECIFICATIONS. JOIST SHOP DRAWINGS SHALL INDICATE ALL JOISTS WHICH SHALL HAVE A ROW OF BOLTED BRIDGING IN PLACE BEFORE SLACKENING OF HOISTING LINES.
- JOIST MANUFACTURER SHALL BE PREPARED TO SUBMIT CALCULATIONS FOR ALL JOISTS AT ARCHITECT'S OR ENGINEER'S REQUEST. CALCULATIONS SHALL HAVE LOAD DIAGRAMS FOR EACH MEMBER CLEARLY INDICATING SPAN, UNIFORM AND CONCENTRATED LOADS. ALL CALCULATIONS SHALL BEAR THE SEAL OF A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED.
- JOISTS SHALL BE DESIGNED FOR A NET WIND UPLIFT LOAD OF 20 PSF UNLESS NOTED OTHERWISE.

NON-LOAD BEARING COLD-FORMED STEEL (METAL STUDS)

- ALL STRUCTURAL MEMBERS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE REFERENCED EDITION OF THE NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS BY THE AMERICAN IRON AND STEEL INSTITUTE.
- ALL COLD-FORMED LIGHT GAUGE METAL FRAMING AND CONNECTIONS SHALL BE DESIGNED BY THE SUPPLIER'S ENGINEER. AT ARCHITECT'S OR ENGINEER'S REQUEST CONTRACTOR SHALL SUBMIT CALCULATIONS FOR ALL COLD-FORMED METAL FRAMING USED TO SUPPORT CEILINGS AND EXTERIOR CLADDING.
- ALL MEMBERS SHALL HAVE A MINIMUM YIELD STRENGTH OF 33 KSI AND BE FORMED FROM STEEL HAVING A G-90 GALVANIZED COATING MEETING THE REQUIREMENTS OF ASTM A653 AND C955.
- ALL COLD-FORMED STEEL STRUCTURAL MEMBERS SHALL COME FROM A SINGLE SOURCE MANUFACTURER. ONLY MANUFACTURERS WHO ARE MEMBERS OF THE STEEL STUD MANUFACTURERS ASSOCIATION (SSMA) OR THE STEEL FRAMING INDUSTRY ASSOCIATION (SFIA) WILL BE ACCEPTED. THE INSTALLATION SHALL COMPLY WITH THE MANUFACTURER'S RECOMMENDATIONS.
- SUBMIT SHOP DRAWINGS FOR ALL COLD-FORMED METAL FRAMING USED TO SUPPORT CEILINGS AND EXTERIOR CLADDING. SHOP DRAWINGS SHALL INDICATE PLACING OF ALL FRAMING MEMBERS SHOWING TYPE, SIZE, GAUGE, NUMBER, LOCATION AND SPACING. THEY SHALL ALSO INDICATE SUPPLEMENTAL STRAPPING, BRACING, SPLICES, BRIDGING, ACCESSORIES AND DETAILS REQUIRED FOR PROPER INSTALLATION.
- SHOP DRAWINGS SHALL SHOW SIZE AND LENGTH OF WELDS FOR ALL WELDED CONNECTIONS AND TYPE, SIZE AND NUMBER OF SCREWS FOR ALL SCREWED CONNECTIONS. SUBMIT MANUFACTURER'S DATA GIVING STRENGTH VALUES FOR SCREWS USED.
- SHOP DRAWINGS SUBMITTED MUST BE PREPARED UNDER THE SUPERVISION OF AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED.
- ALL STRUCTURAL FRAMING ACCESSORIES SHALL BE FORMED FROM STRUCTURAL QUALITY STEEL WITH A MINIMUM YIELD STRENGTH OF 50 KSI AND HAVE MINIMUM PROTECTIVE COATING EQUAL TO ASTM A653 G-90 GALVANIZED COATING.
- VERTICAL DEFLECTION CLIPS ARE REQUIRED TO BE CAPABLE OF ACCOMMODATING UPWARD AND DOWNWARD VERTICAL DISPLACEMENT OF THE STRUCTURE THROUGH POSITIVE MECHANICAL ATTACHMENT TO STUD WEB, MECHANICAL ATTACHMENT TO STRUCTURE AND SCREW ATTACHMENT TO STUD WEB USING STEP-BUSHINGS TO PERMIT FRICTIONLESS VERTICAL MOVEMENT. CONNECTIONS MUST BE TESTED IN ACCORDANCE TO ICC AC261 CRITERIA AND HOLD A VALID ICC-ES EVALUATION SERVICE REPORT TO BE ACCEPTABLE.

ADHESIVE AND MECHANICAL POST-INSTALLED ANCHORS

- ANCHOR BOLTS, REINFORCING STEEL, THREADED RODS, STAIR HANDRAILS, AND OTHER EMBEDDED STEEL ITEMS SHALL BE SET INTO HARDENED CONCRETE WITH ADHESIVE OR MECHANICAL POST-INSTALLED ANCHOR ONLY WHERE DETAILED ON THE DRAWINGS OR WHERE APPROVED BY THE ENGINEER.
- PRE-APPROVED MANUFACTURERS ARE HILTI, SIMPSON STRONG-TIE, AND DEWALT. WHERE DETAILS INDICATE SPECIFIC ADHESIVE OR MECHANICAL POST-INSTALLED ANCHORS, IT IS ACCEPTABLE AT THE CONTRACTOR'S OPTION TO SUBMIT AN ALTERNATE SIMILAR PRODUCT PROVIDED BY A DIFFERENT MANUFACTURER AS LONG AS THE MANUFACTURER'S DATA PROVIDES EQUIVALENT LOAD CAPACITY TO THE ANCHOR SPECIFIED.
- MANUFACTURER'S DATA FOR ALL ADHESIVE AND MECHANICAL POST-INSTALLED ANCHORS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION. SUBMITTALS FOR ADHESIVE ANCHOR PRODUCTS SHALL INCLUDE ICC-ES EVALUATION REPORTS. STRICTLY FOLLOW THE MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS. HEED ALL LABEL WARNINGS. INSTALL IN ACCORDANCE WITH APPLICABLE SAFETY LAWS.
- ALL HOLES SHALL BE DRILLED WITH A DIAMETER NO LARGER THAN 1/8" GREATER THAN THE DIAMETER OF THE STEEL MEMBER BEING INSTALLED.
- ALL HOLES SHALL BE CLEANED WITH COMPRESSED AIR AND SHALL BE DRY PRIOR TO INSTALLATION OF ADHESIVE. HOLES SHALL BE FREE OF ALL DELETERIOUS MATERIAL SUCH AS LAITANCE, DUST, DIRT, AND OIL.
- CONTRACTOR PERFORMING ADHESIVE WORK SHALL BE AN APPROVED CONTRACTOR BY THE MANUFACTURER FURNISHING THE ADHESIVE MATERIALS, AND SHALL HAVE NO LESS THAN FIVE YEARS EXPERIENCE IN THE VARIOUS TYPES OF ADHESIVE RELATED WORK REQUIRED IN THIS PROJECT. A CERTIFICATION FROM THE MANUFACTURER ATTESTING TO THE TRAINING SHALL BE SUBMITTED TO THE ENGINEER/ARCHITECT ALONG WITH THE PROPOSAL TO DO THE WORK.
- WHERE ADHESIVE ANCHORS ARE TO BE INSTALLED IN HOLLOW MATERIAL WITH UNKNOWN CAPACITY, THE CONTRACTOR SHALL INSTALL THE ANCHOR IN ULTIMATE CAPACITY UNIT UNLESS OTHERWISE NOTED.
- THE ADHESIVE SHALL BE INSTALLED IN THE HOLLOW BASE MATERIAL USING SCREEN TUBES SUPPLIED BY THE MANUFACTURER. THE ADHESIVE SHALL BE CAPABLE OF SUSTAINING MINIMUM TENSION AND SHEAR LOAD CAPACITIES NOTED ON THE DRAWINGS MULTIPLIED BY A FACTOR OF SAFETY OF 4. ALL HARDWARE AND MATERIAL SHALL BE SUPPLIED BY THE ANCHOR MANUFACTURER.

REPRODUCTION

- THE USE OF REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUBCONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREIN AS CORRECT, AND OBLIGATES HIMSELF TO ANY JOB EXPENSE, REAL OR IMPLIED, ARISING DUE TO ANY ERRORS THAT MAY OCCUR HERE ON.

SYMBOL LEGEND		
SYMBOL	MEANING	REFERENCE
<No>	TOP OF FOOTING, GRADE BEAM, PILE CAP, OR DRILLED PIER. ELEVATION RELATIVE TO REFERENCE ELEVATION.	
<No> <No>	STEP IN TOP OF FOOTING ELEVATION. ELEVATION RELATIVE TO REFERENCE ELEVATION.	
[No]	DEPRESSED OR RAISED SLAB ELEVATION. ELEVATION RELATIVE TO FINISHED FLOOR ELEVATION.	SEE 3/S301
	SLOPED / STEPPED SLAB.	
[No]	TOP OF WALL OR PEDESTAL. ELEVATION RELATIVE TO REFERENCE ELEVATION.	
F#	SPREAD FOOTING TYPE.	
	SPOT ELEVATION. ELEVATION RELATIVE TO REFERENCE ELEVATION.	SEE 1/S302
D1	SPAN DIRECTION OF METAL ROOF DECK. CONSTRUCTION SHALL BE 1 1/2"-20GA METAL ROOF DECK.	SEE 1/SS02
(No) [+No]	TOP OF STEEL/JOIST BEARING ELEVATION TOP OF STEEL ABOVE STEEL/JOIST BEARING ELEVATION.	
V# H# H# A# T#	STEEL BEAM DESIGN END REACTIONS (WHERE APPLICABLE). "V" INDICATES VERTICAL SHEAR, "H" INDICATES BENDING MOMENT, "H" INDICATES HORIZONTAL SHEAR, "A" INDICATES AXIAL TENSION/COMPRESSION, AND "T" INDICATES TORSION. ALL LOADS PROVIDED ARE FACTORED FOR STRENGTH DESIGN IN UNITS OF KIP AND KIP-FEET, AND ALL LOADS SHALL BE CONSIDERED REVERSIBLE, UNO.	
MP#	MASONRY PILASTER TYPE.	SEE 8/S402
ML#	MASONRY LIMIT TYPE.	SEE 19/S401
BP#	STEEL BEARING PLATE TYPE.	SEE 4/S403
MC#	MOMENT CONNECTION TYPE.	SEE 9/SS02
VE#	VERTICAL FRAME TYPE.	S251
[SW#]	MASONRY SHEAR WALL TYPE.	SEE 1/S403

ABBREVIATIONS	
@	AT
CL	AND
Ø	DIAMETER
AB	ANCHOR BOLTS
ACI	AMERICAN CONCRETE INSTITUTE
ADDL	ADDITIONAL
ADH	ADHESIVE
AFF	ABOVE FINISHED FLOOR
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AWS	AMERICAN IRON AND STEEL INSTITUTE
ALT	ALTERNATE
ARCH	ARCHITECTS / ARCHITECTURAL
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWW	AMERICAN WELDING SOCIETY
B/ or BOT	BOTTOM
BTM	BOTTOM CHORD EXTENSION
BFB	BOTTOM FLANGE BRACE
BFF	BELOW FINISHED FLOOR
BLDG	BUILDING
BM	BEAM
BOS	BOTTOM OF STEEL
BRC	ENGINEER
BTWN	BETWEEN
CANT	CANTILEVER
CJ	CONTROL JOINT
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CON	CONCRETE
CONN	CONNECTION
CONST JT	CONSTRUCTION JOINT
CONV	CONVERSION
CONTRACTOR	CONTRACTOR
COORD	COORDINATE
CTRD	CENTERED
CR	CORNER (REINNY)
DBA	DEFORMED BAR ANCHOR
DEFL	DEFLECTION
DEPR	DEPRESSION / DEPRESSED
DIAG	DIAGONAL
DIM	DIMENSION
DIST	DISTANCE
DWG(S)	THE DRAWING(S)
DWL(S)	DOWEL(S)
EA	EACH
EE	EACH END
EE	EACH FACE
EJ	EXPANSION JOINT
ELEV	ELEVATION
EMBED	EMBEDDED / EMBEDMENT
ENGR	ENGINEER
EOD	EDGE OF DECK
EOS	EDGE OF SLAB
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FDN	FOUNDATION
FFE	FINISHED FLOOR ELEVATION
FOM	FACE OF MASONRY
FOW	FACE OF WALL
FS	FAR SIDE
FTG	FOOTING
GA	GALV
GALV	GALVANIZED
HD	HEADED
HORIZ	HIGH
HORIZ	HORIZONTAL
HSS	HOLLOW STRUCTURAL SECTION
INT	INTERIOR
JT	JOINT
K	KIPS
K	KNEE BRACE
KSI	KIPS PER SQUARE INCH
LB	LONG BAR
LB	LONG
LLJ	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LO	LOW</



SAMPSON COUNTY
911 & ES
FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

PARTIAL FLOOR
PLAN -
MECHANICAL

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
1	12/17/20	REVISION 1
2	01/09/21	REV2/ADD1

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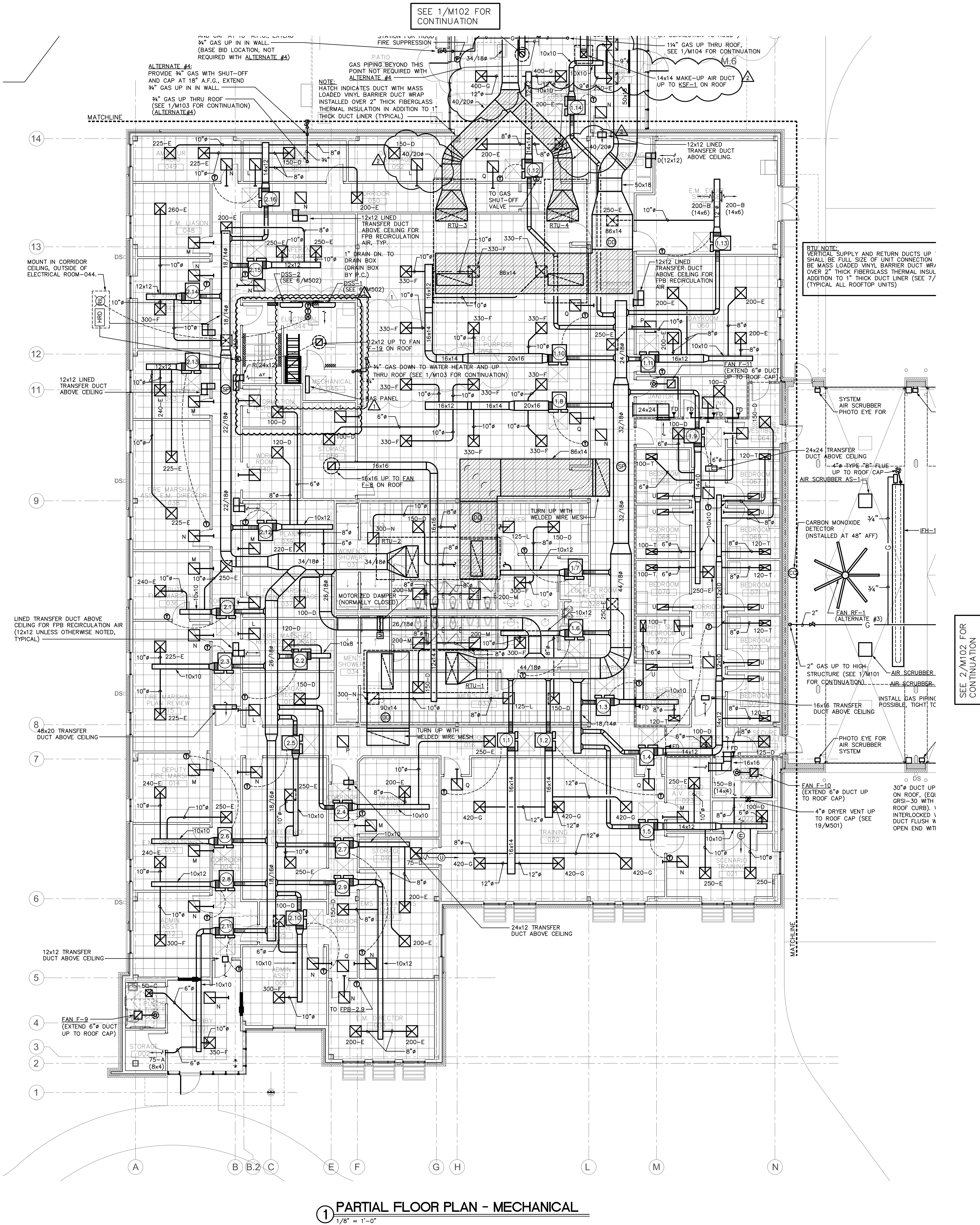


SEAL 12/04/2020

SHEET NUMBER

M101

5 OF 10



1 PARTIAL FLOOR PLAN - MECHANICAL
1/8" = 1'-0"



SAMPSON COUNTY 911 & ES FACILITIES

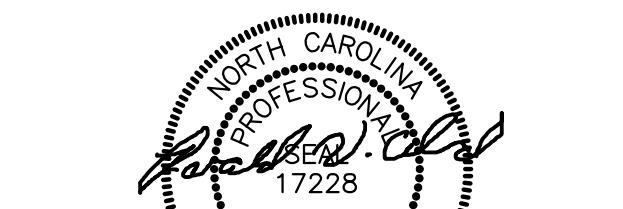
CLINTON,
NORTH CAROLINA

CONSTRUCTION DOCUMENTS

PARTIAL FLOOR PLANS - MECHANICAL

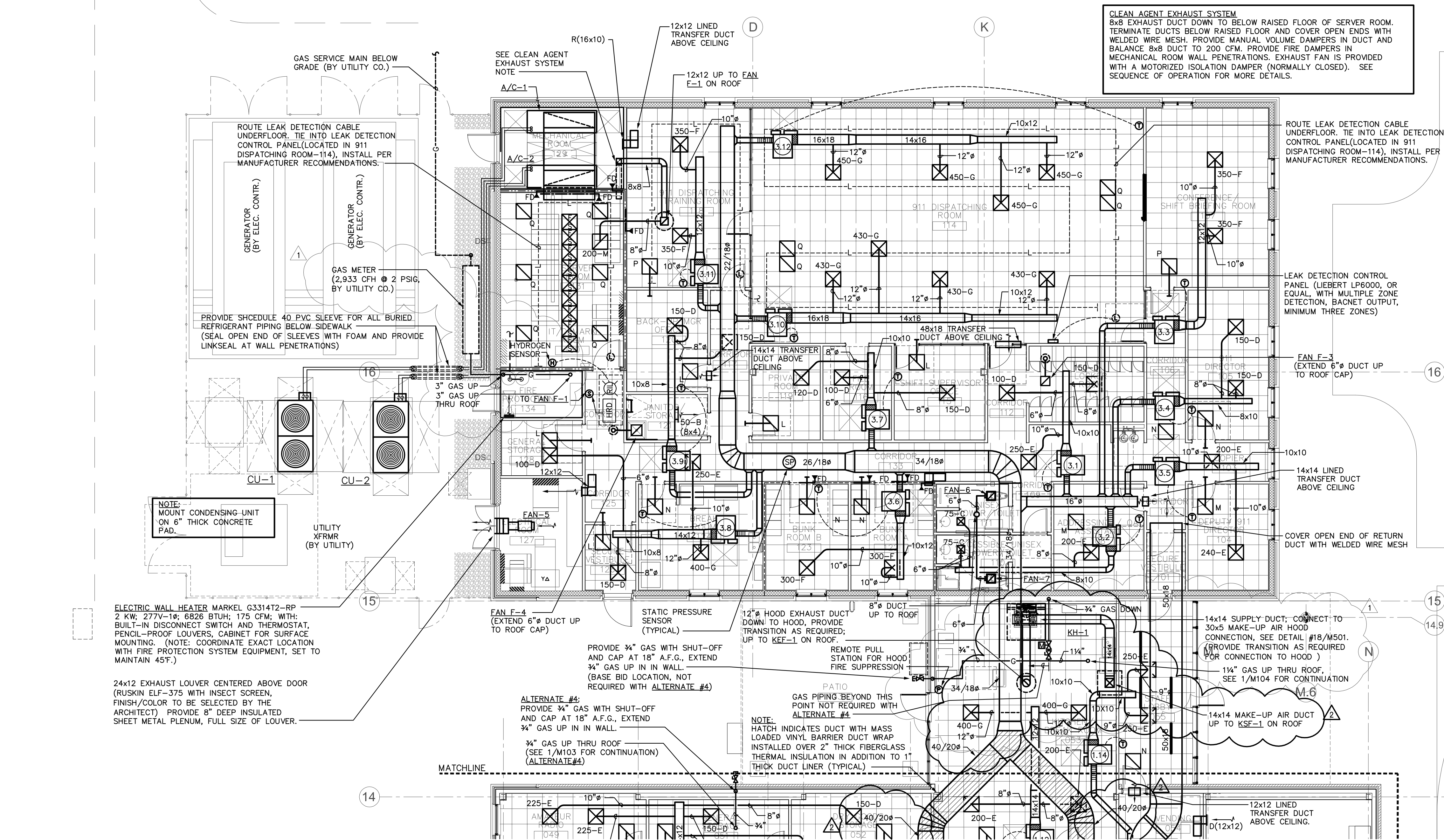
DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
1	12/17/20	REVISION 1
2	01/09/21	REV2/ADD1

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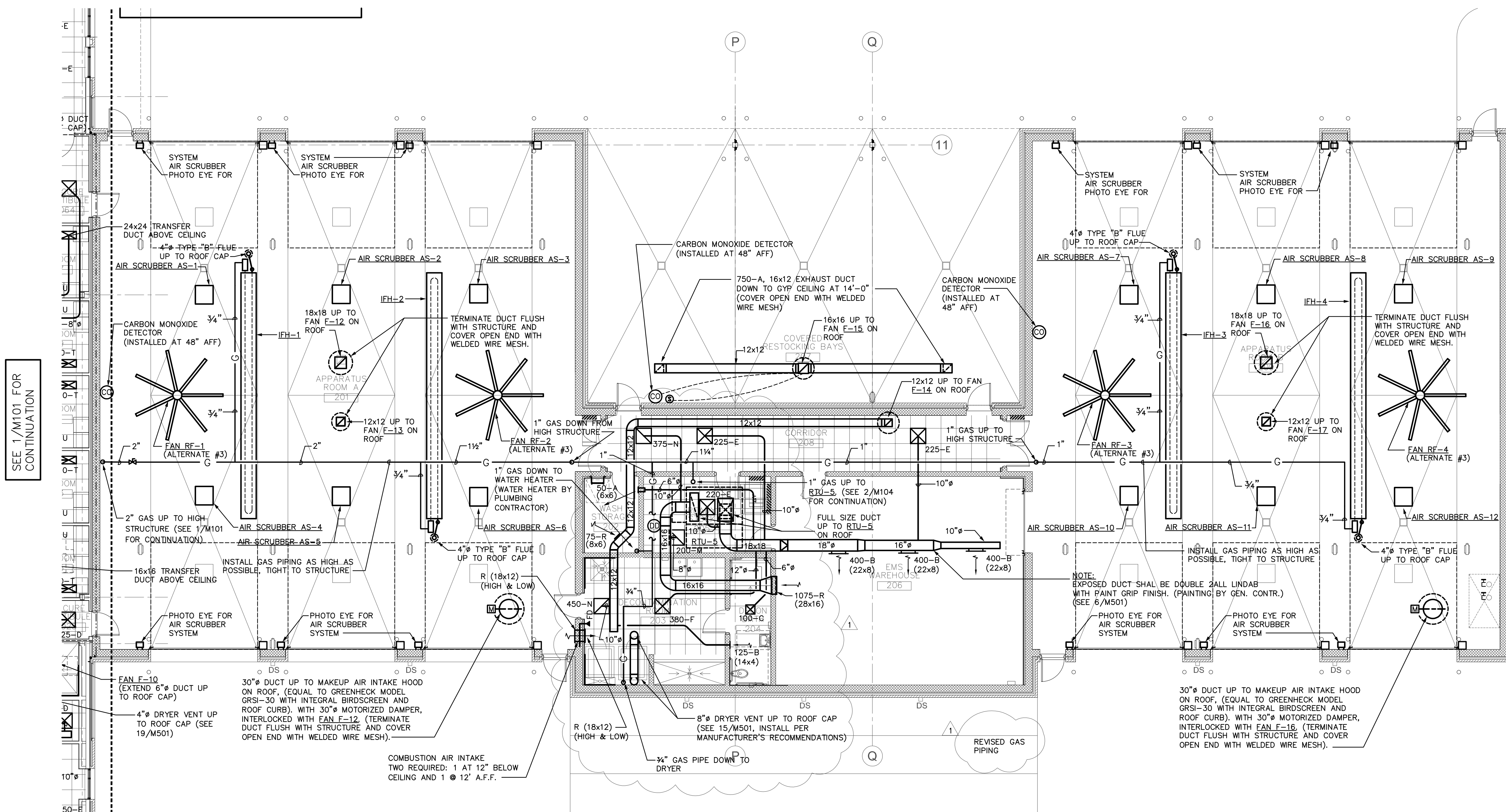
SEAL

SHEET NUMBER
M102

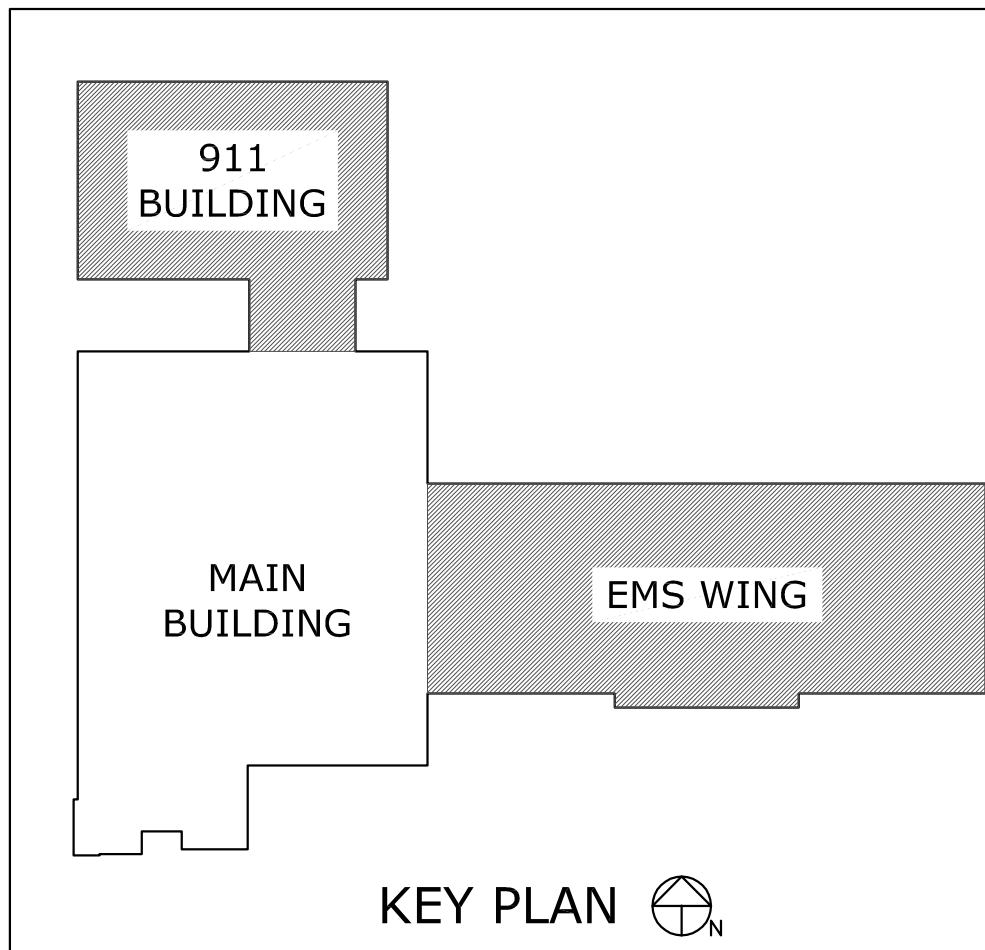


1 PARTIAL FLOOR PLAN - MECHANICAL
1/8" = 1'-0"

SEE 1/M101 FOR
CONTINUATION



2 PARTIAL FLOOR PLAN - MECHANICAL
1/8" = 1'-0"



KEY PLAN



SAMPSON
COUNTY
911 & ES
FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

PARTIAL ROOF
PLANS -
MECHANICAL

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
1	12/17/20	REVISION 1
2	01/09/21	REV2/ADD1

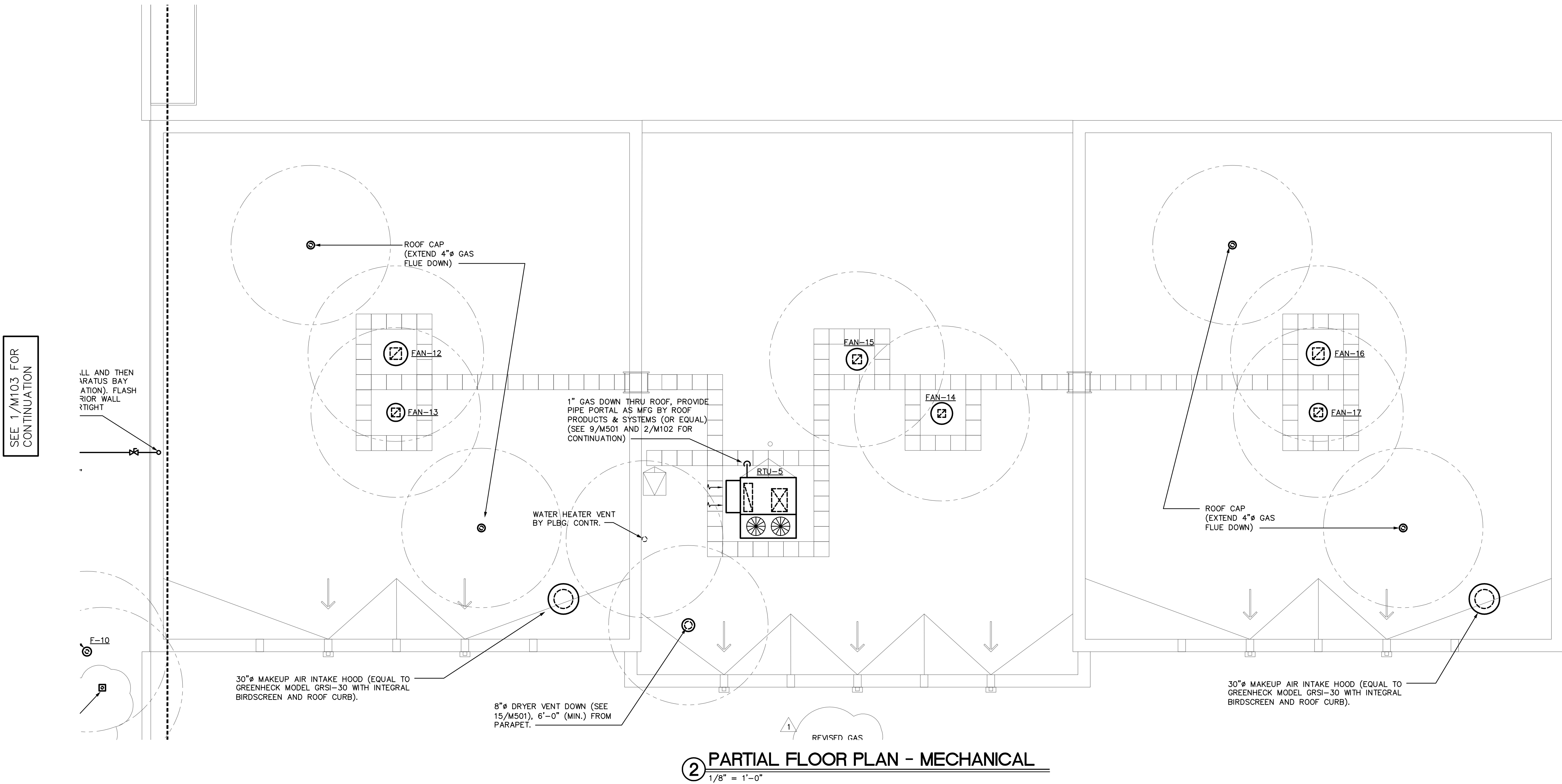
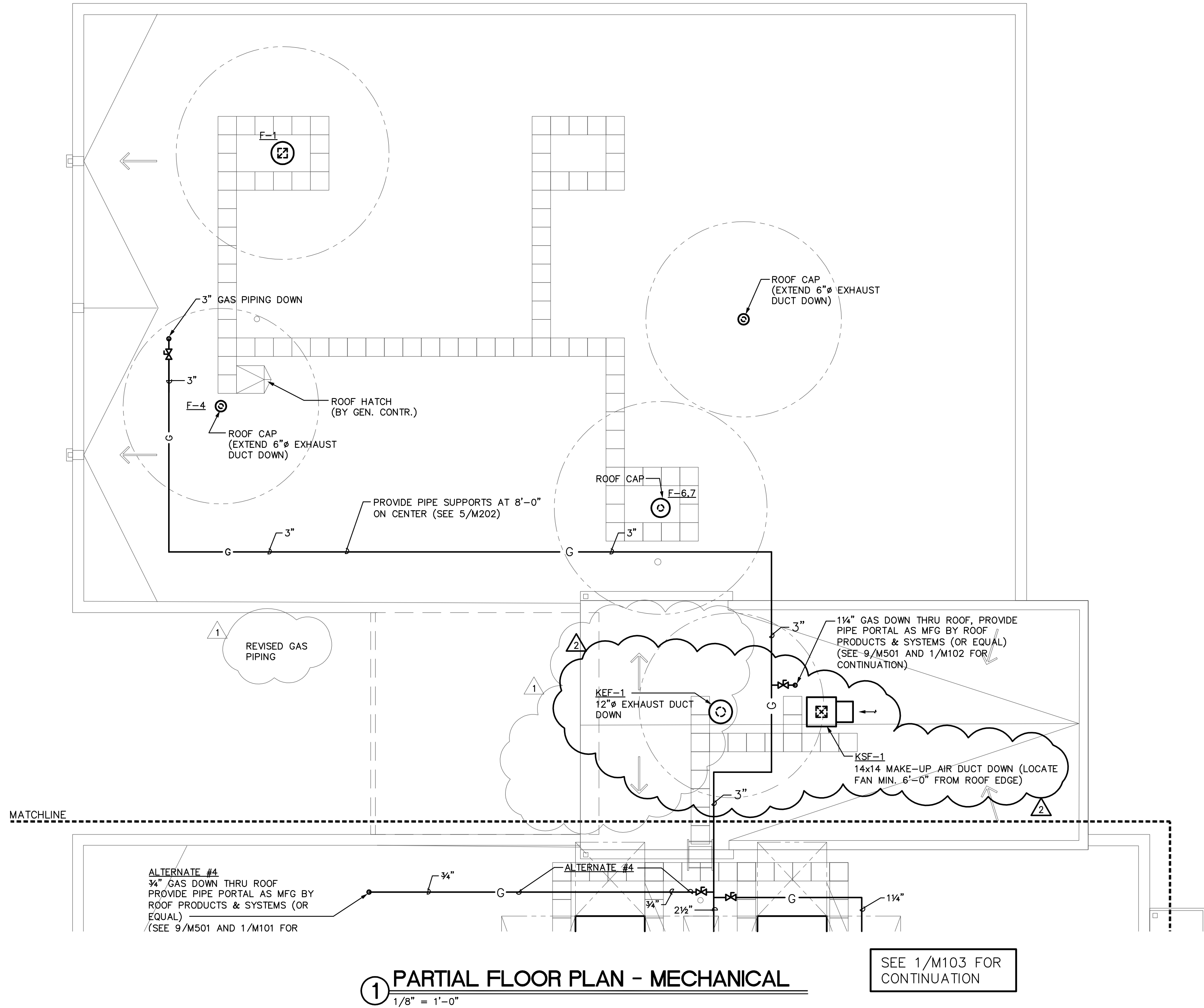
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SEAL

SHEET NUMBER

M104





SAMPSON COUNTY 911 & ES FACILITIES

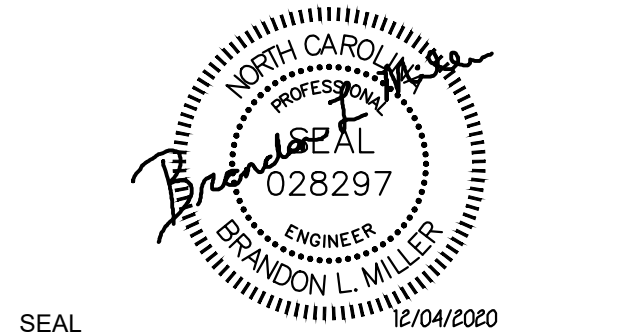
CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

SITE PLAN -
ELECTRICAL

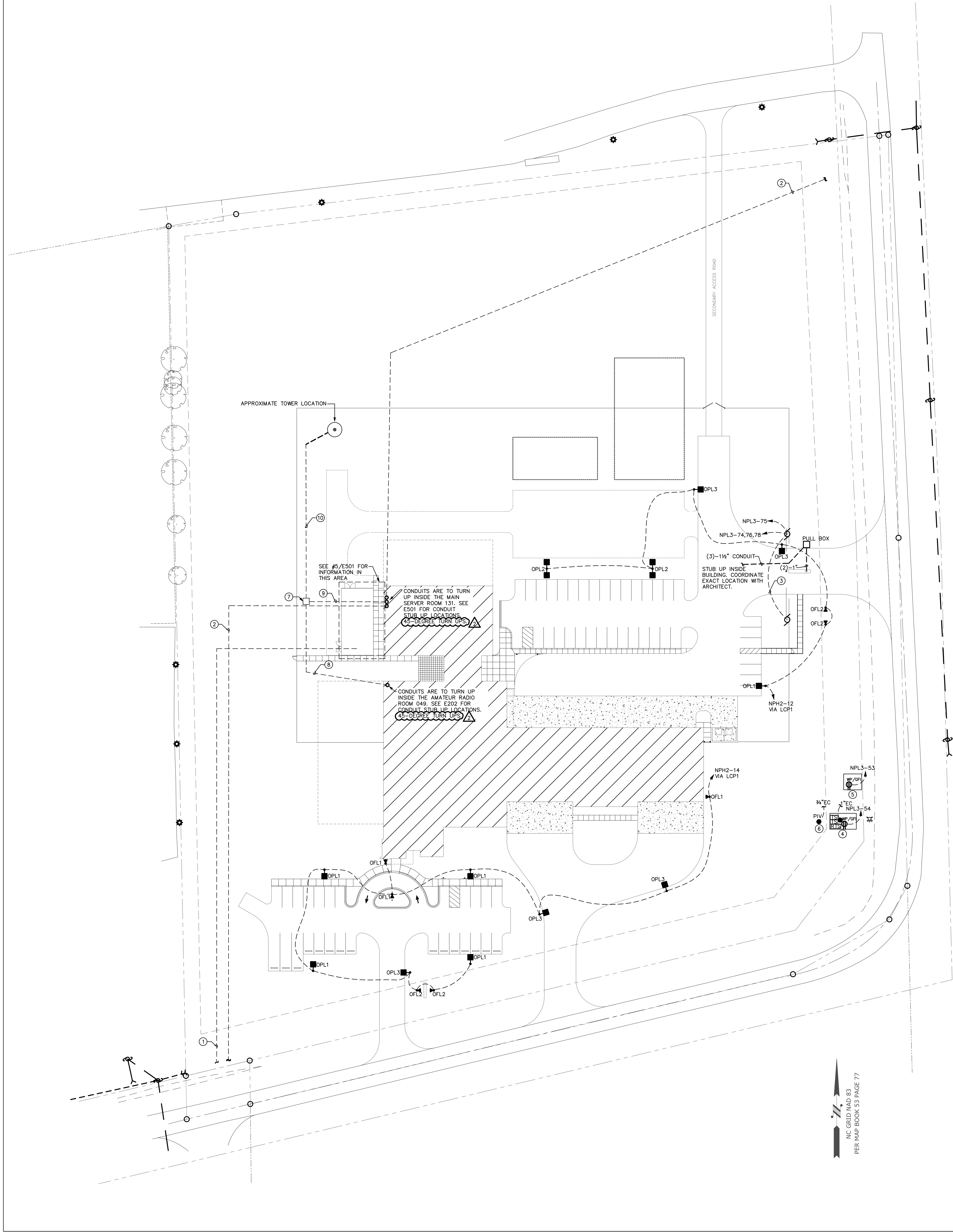
DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
1	12-17-2020	REVISION #1
2	01-09-2021	REV #2 / ADD1

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SEAL

SHEET NUMBER
E010



1 SITE PLAN - ELECTRICAL

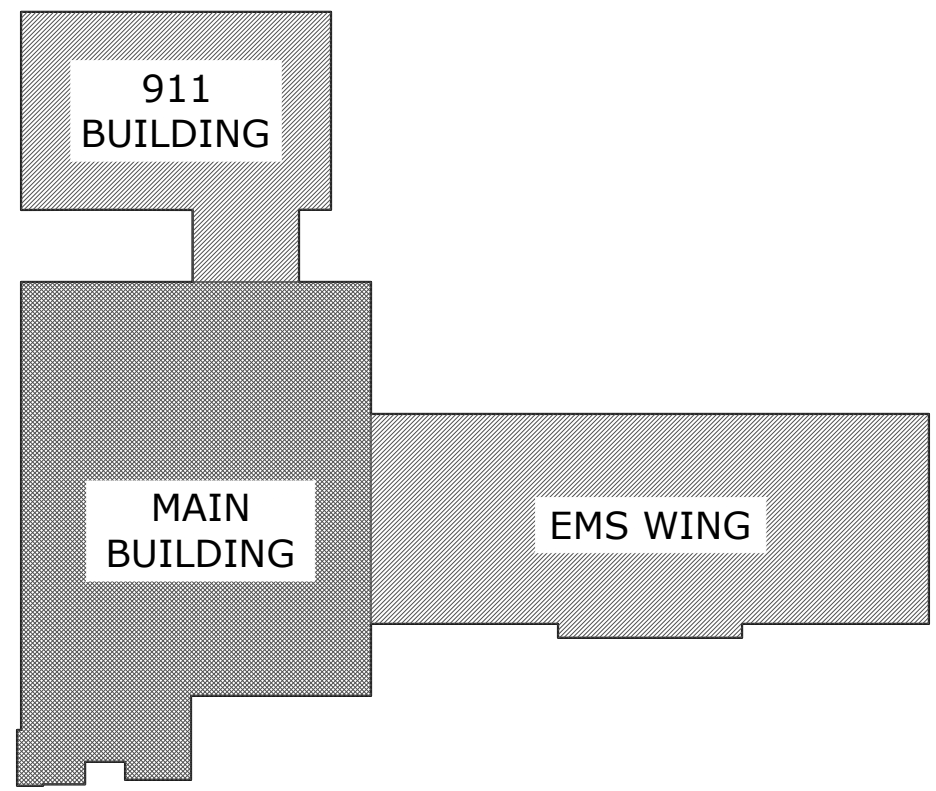
1" = 40'

GENERAL NOTES:

1. ALL LOW VOLTAGE CONDUIT RUNS SHALL HAVE HAND HOLES/PULL BOXES SUPPLIED AT 150' INTERVALS UNLESS OTHERWISE INDICATED BY LOCAL UTILITY. MINIMUM SIZE SHALL BE 36" X 36".
2. ALL SITE LIGHTING POLES SHALL BE MOUNTED ON A 30' POLE WITH A 3' CONCRETE BASE UNLESS OTHERWISE NOTED.

KEY NOTES:

1. PROVIDE (2)-6" CONDUIT FROM PAD MOUNTED TRANSFORMER TO DESIGNATED POINT AT EDGE OF PROPERTY FOR LOCAL POWER UTILITY USE. CONDUIT LOCATION, SIZE, AND BENDING RADIUS SHALL BE COORDINATED WITH UTILITY BEFORE INSTALLATION. PULLBOXES AS REQUIRED BY CODE/LOCAL UTILITY. E.C. TO PROVIDE UP TO 150' OF ADDITIONAL (2)-6" CONDUIT AND COMPLETE INSTALLATION BASED ON UTILITY COORDINATION.
2. PROVIDE (4)-4" CONDUIT FROM MAIN HEAD END ROOM TO PROPERTY LINE FOR TELEPHONE SERVICE. CONDUIT LOCATION, SIZE, AND BENDING RADIUS SHALL BE COORDINATED WITH UTILITY BEFORE INSTALLATION.E.C. TO PROVIDE UP TO 150' OF ADDITIONAL (2)-4" CONDUIT AND COMPLETE INSTALLATION BASED ON UTILITY COORDINATION.
3. PROVIDE CONDUIT FOR GATE MOTOR POWER AND ELECTRIC LOCK POWER BETWEEN EACH GATE MOTOR CONTROLLER.
4. FIRE SERVICE BACKFLOW, PROVIDE 1" CONDUIT TO FACP FOR TAMPER SWITCHES. COORDINATE EXACT QUANTITY AND LOCATION WITH CIVIL PLANS.
5. DOMESTIC SERVICE BACKFLOW, COORDINATE EXACT LOCATION WITH CIVIL PLANS.
6. POST INDICATOR VALVE, 3/4" TO FACP. COORDINATE EXACT LOCATION WITH CIVIL PLANS.
7. 3X3" TELECOMM PULLBOX.
8. (2)-4" EC FROM THE AMATEUR RADIO ROOM TO THE PULLBOX.
9. (2)-4" EC FROM THE SERVER ROOM TO THE PULLBOX.
10. (4)-4" EC FROM THE PULLBOX TO THE ANTENNA.



KEY PLAN



SAMPSON COUNTY 911 & ES FACILITIES

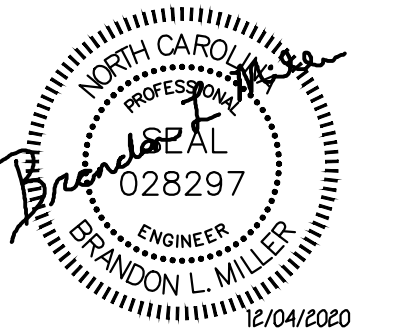
CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

FLOOR PLAN - SITE
GROUNDING

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
2	01-09-2021	REV #2 / ADD1

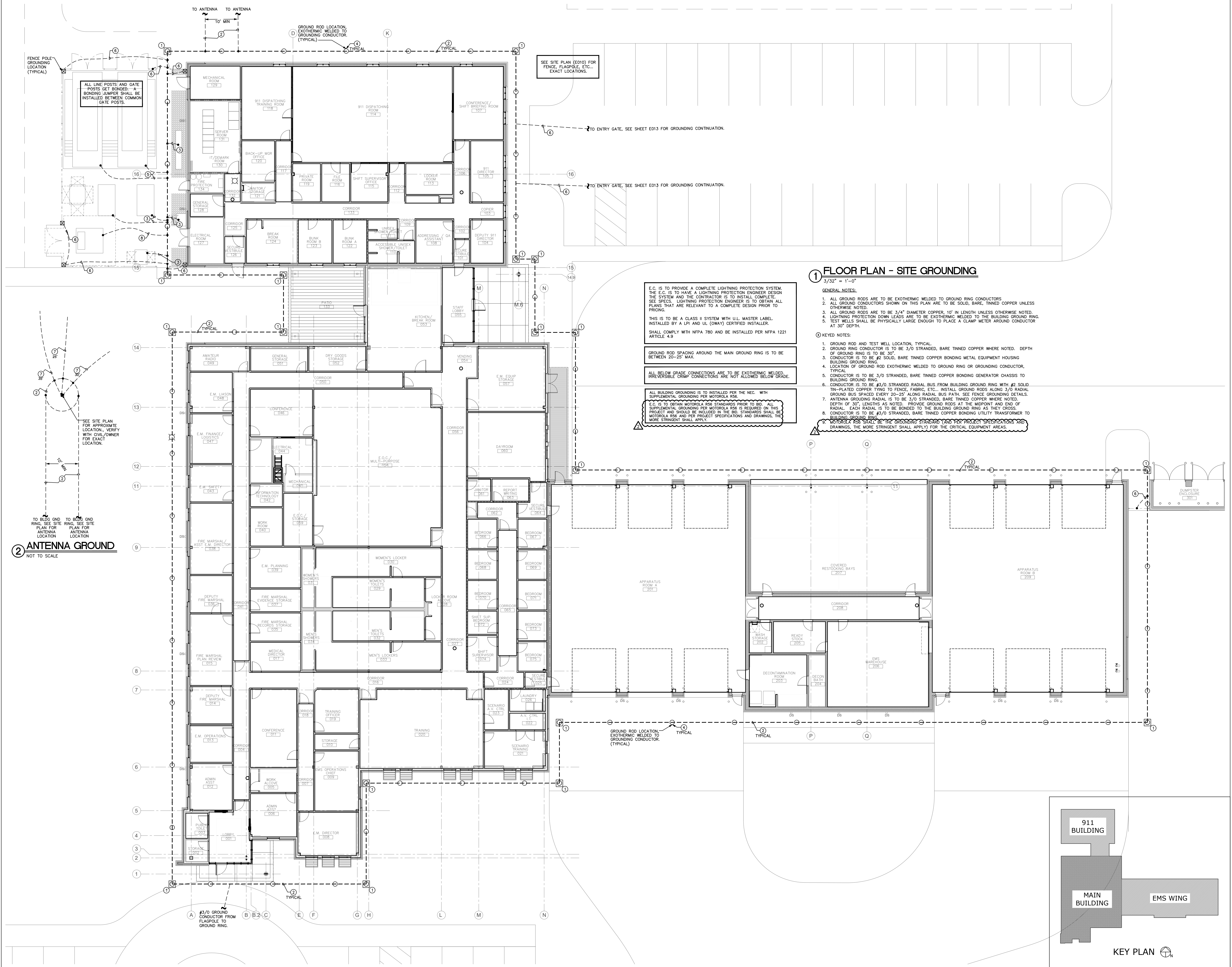
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SEAL

SHEET NUMBER

E011





SAMPSON COUNTY 911 & ES FACILITIES

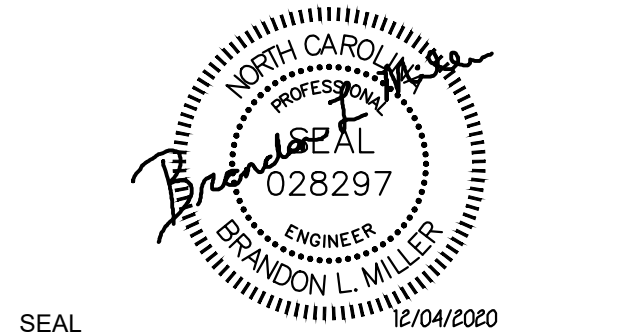
CLINTON,
NORTH CAROLINA

CONSTRUCTION DOCUMENTS

SITE PLAN - GROUNDING

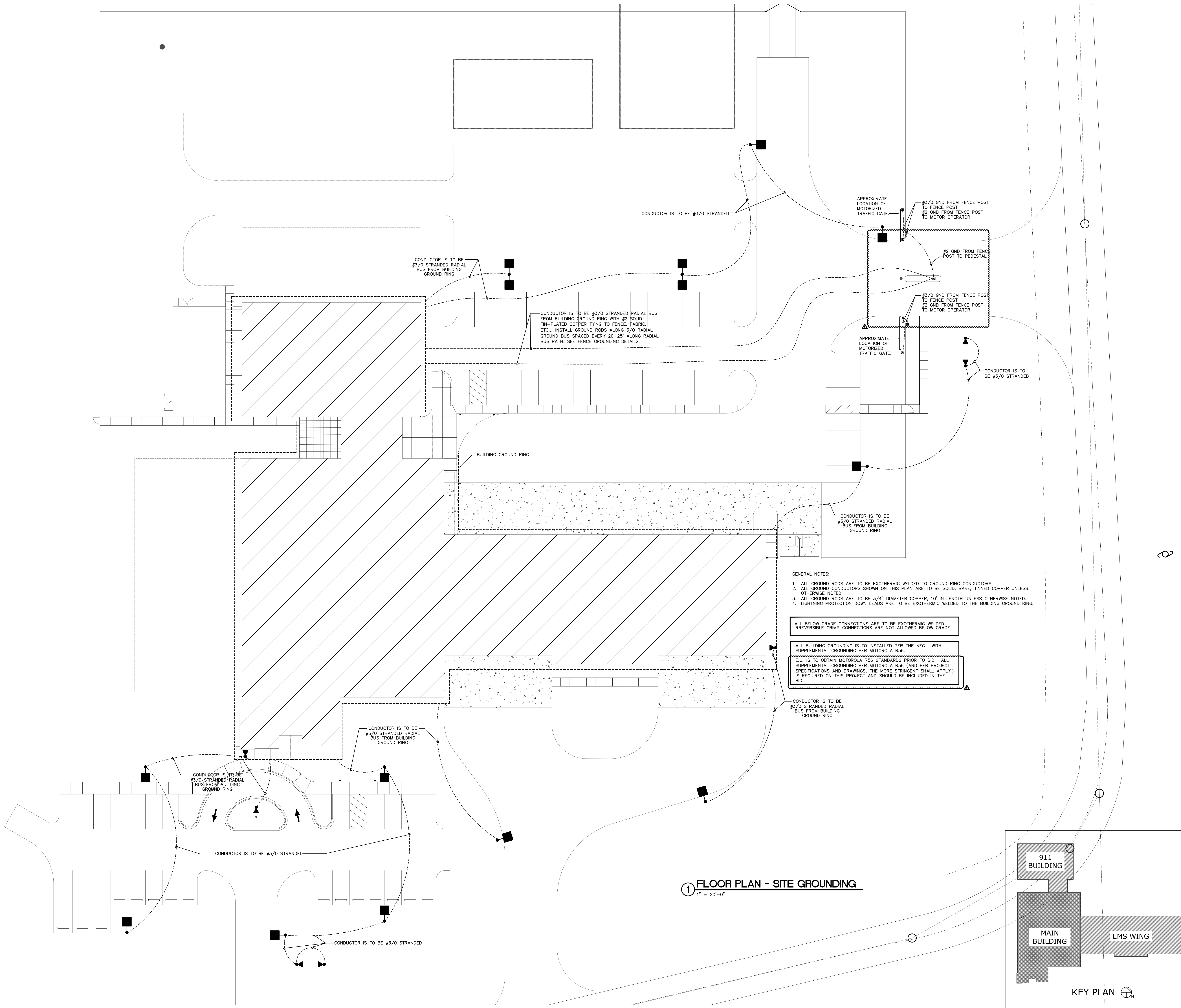
DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
2	01-09-2021	REV #2 / ADD1

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SEAL

SHEET NUMBER
E013



- GENERAL NOTES:
1. ALL GROUND RODS ARE TO BE EXOTHERMIC WELDED TO GROUND RING CONDUCTORS.
 2. ALL GROUND CONDUCTORS SHOWN ON THIS PLAN ARE TO BE SOLID, BARE, TINNED COPPER UNLESS OTHERWISE NOTED.
 3. ALL GROUND RODS ARE TO BE 3/4" DIAMETER COPPER, 10' IN LENGTH UNLESS OTHERWISE NOTED.
 4. LIGHTNING PROTECTION DOWN LEADS ARE TO BE EXOTHERMIC WELDED TO THE BUILDING GROUND RING.

ALL BELOW GRADE CONNECTIONS ARE TO BE EXOTHERMIC WELDED. IRREVERSIBLE CRIMP CONNECTIONS ARE NOT ALLOWED BELOW GRADE.

ALL BUILDING GROUNDING IS TO BE INSTALLED PER THE NEC. WITH SUPPLEMENTAL GROUNDING PER MOTOROLA R56.

E.C. IS TO OBTAIN MOTOROLA R56 STANDARDS PRIOR TO BID. ALL SUPPLEMENTAL GROUNDING PER MOTOROLA R56 (AND PER PROJECT SPECIFICATIONS AND DRAWINGS, THE MORE STRINGENT SHALL APPLY.) IS REQUIRED ON THIS PROJECT AND SHOULD BE INCLUDED IN THE BID.

1 FLOOR PLAN - SITE GROUNDING
1" = 20'-0"

KEY PLAN



SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

GROUNDING
DETAILS

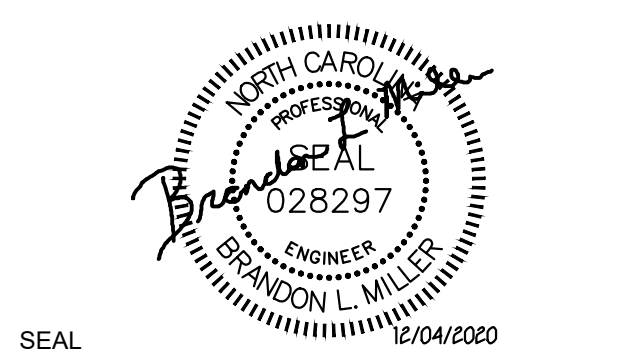
DATE 12.04.2020

PROJECT NO 20003

REVISIONS

NUM.	DATE	DESCRIPTION:
1	12-17-2020	REVISION #1
2	01-09-2021	REV #2 / ADD1

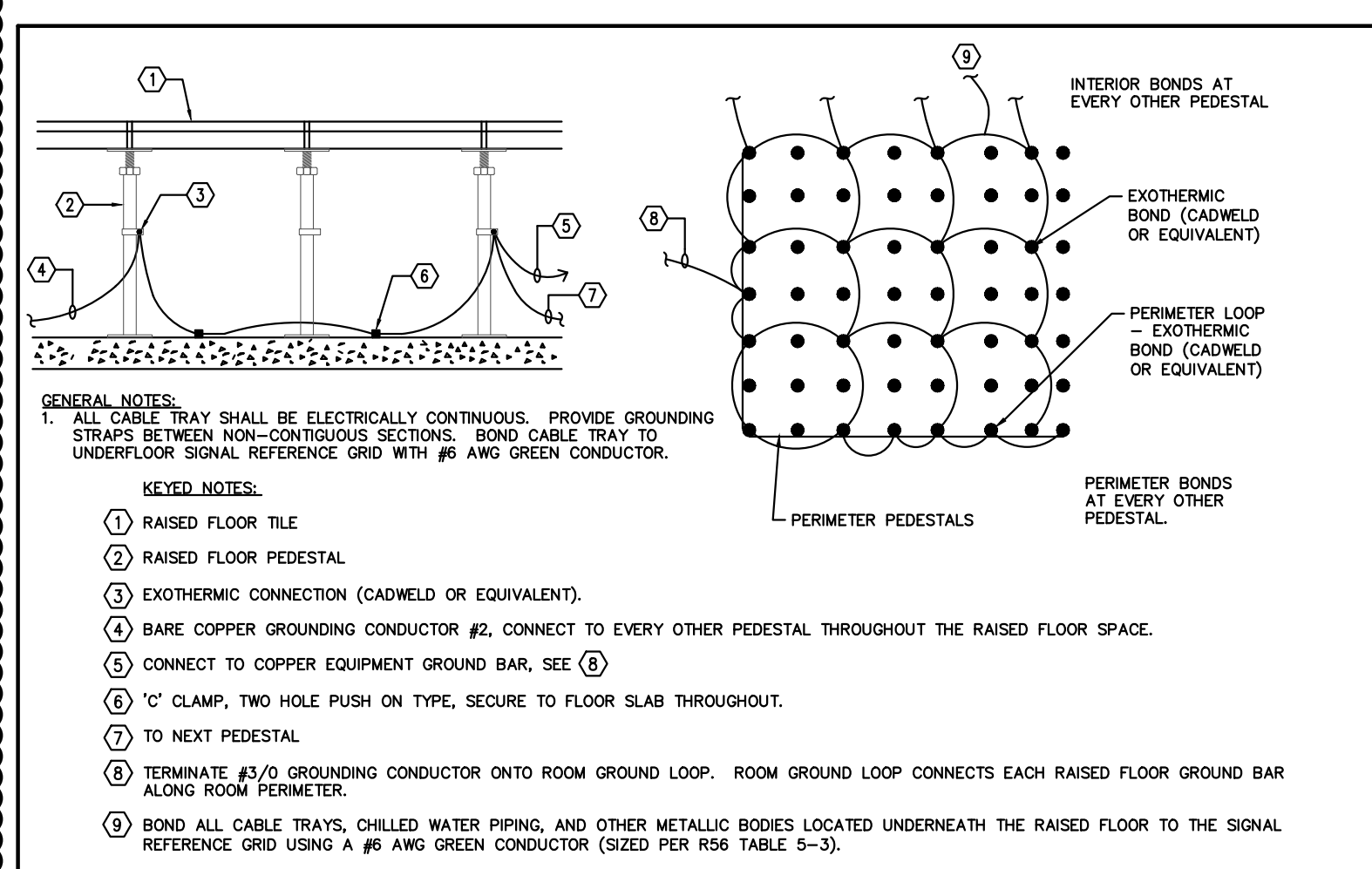
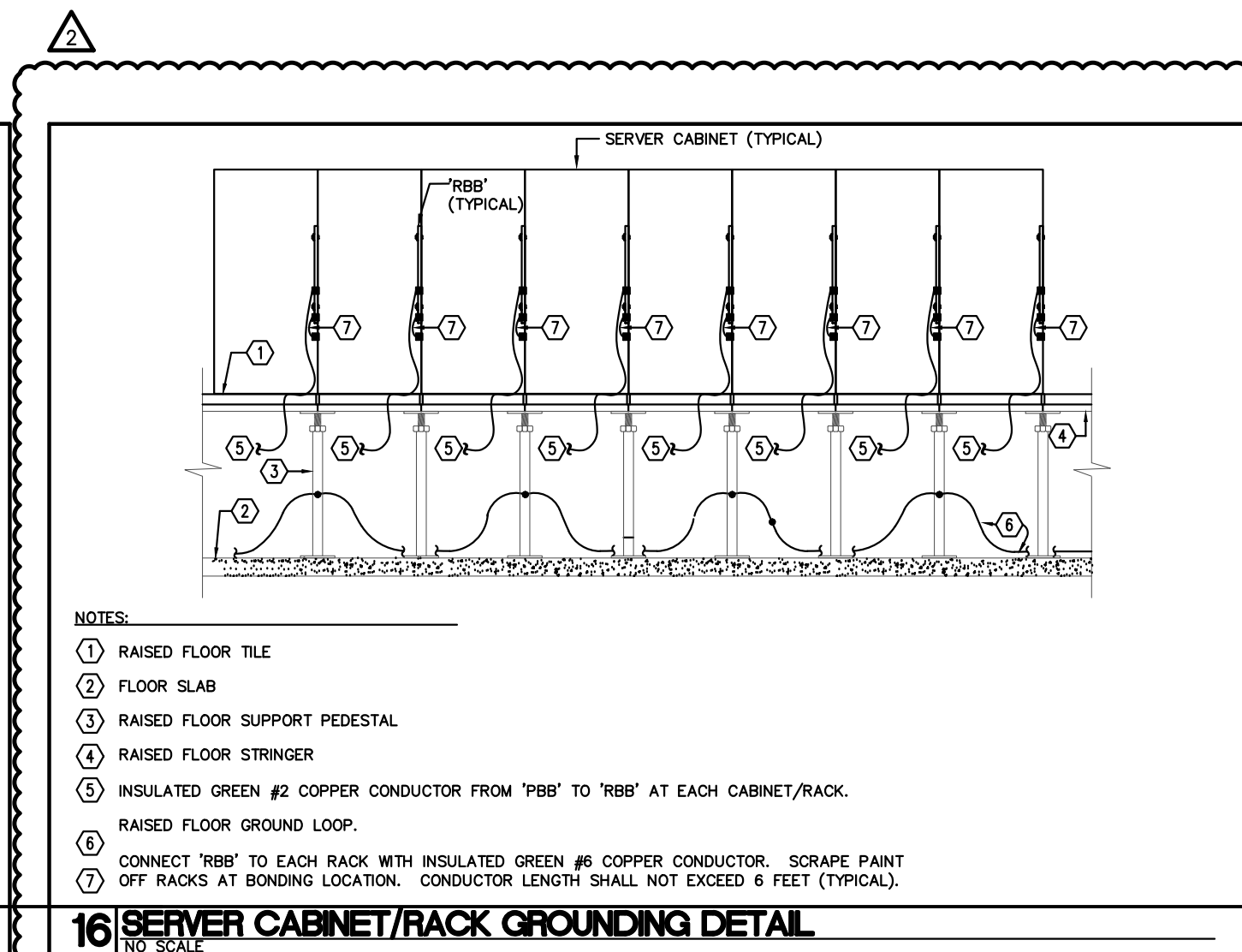
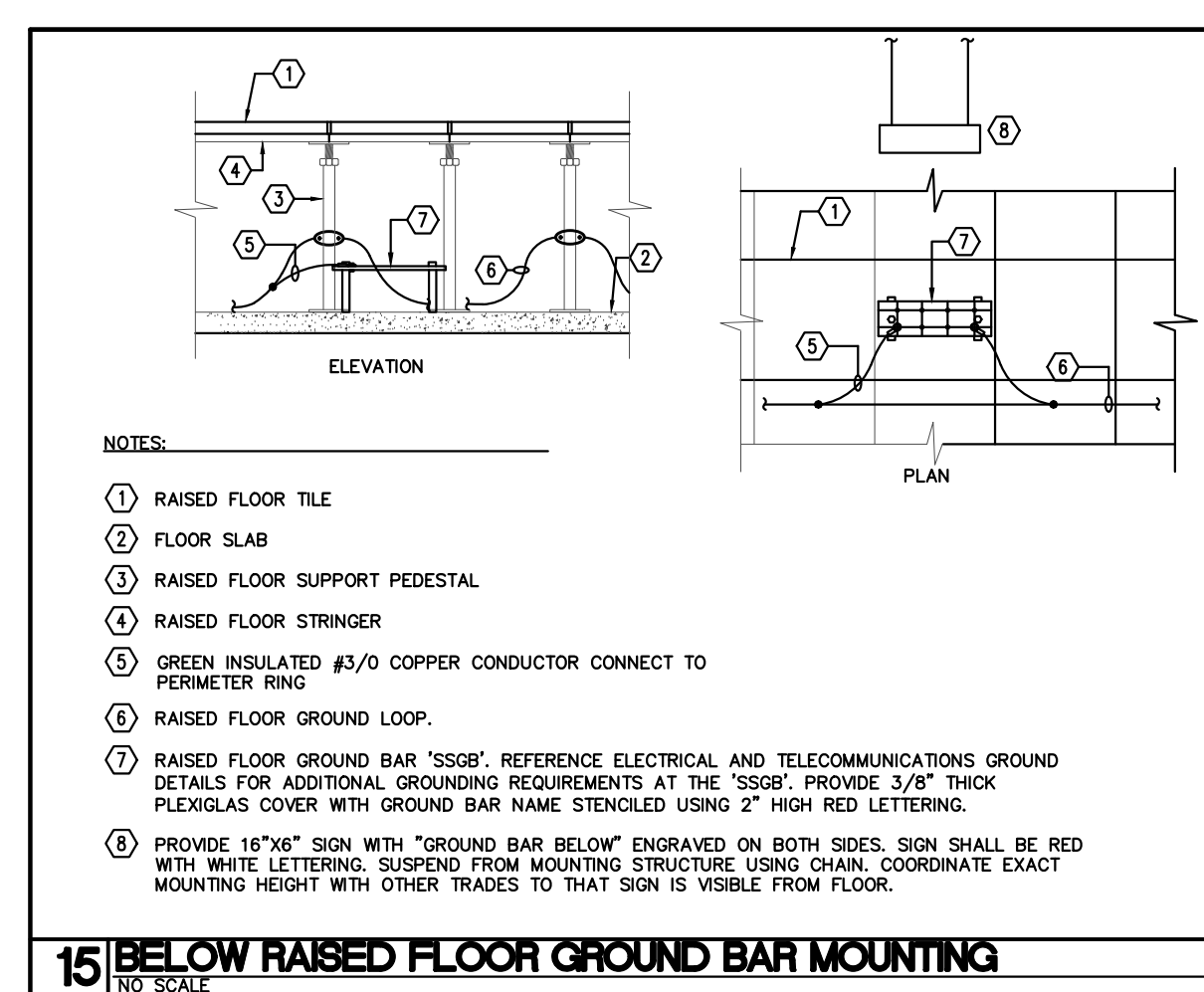
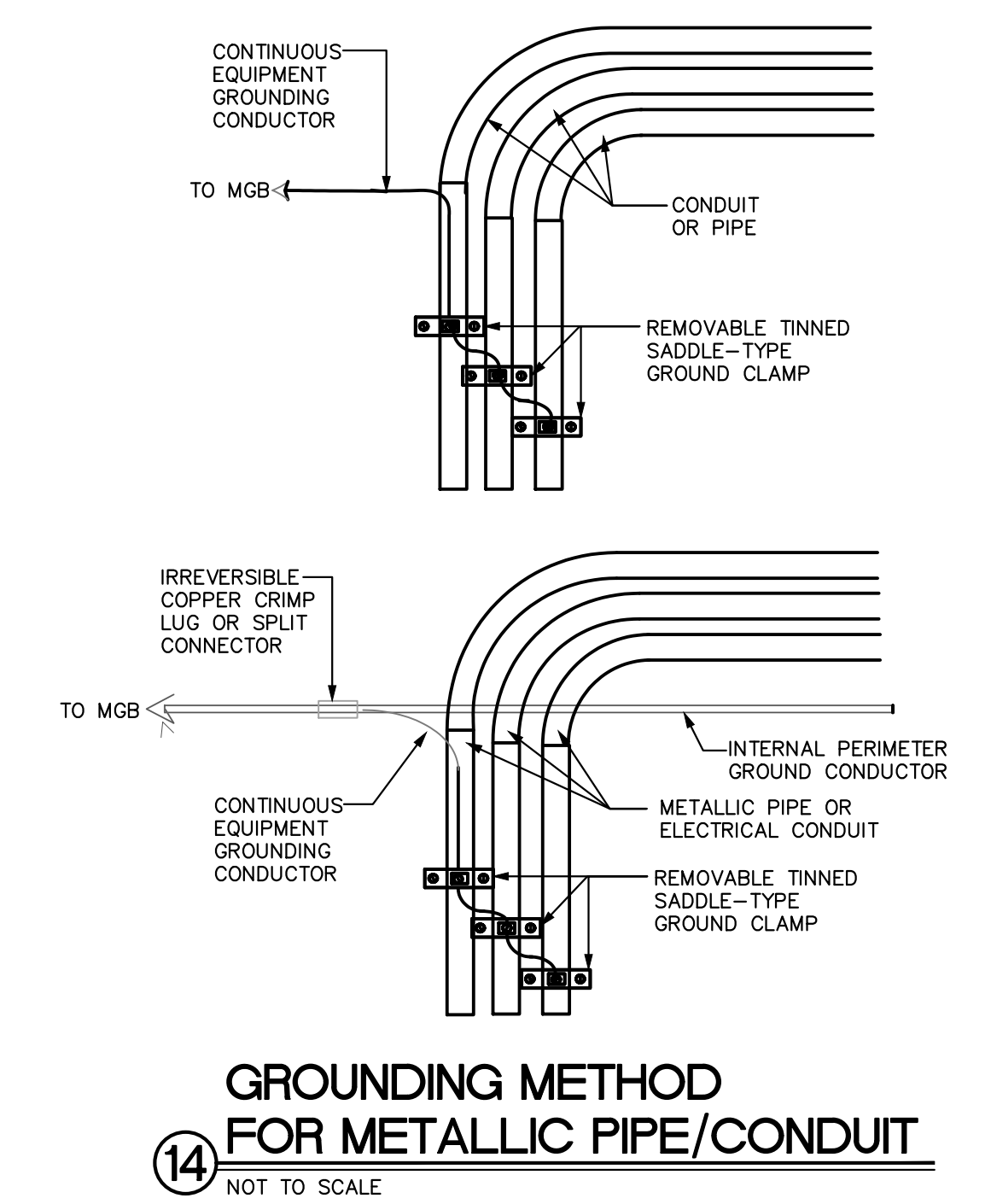
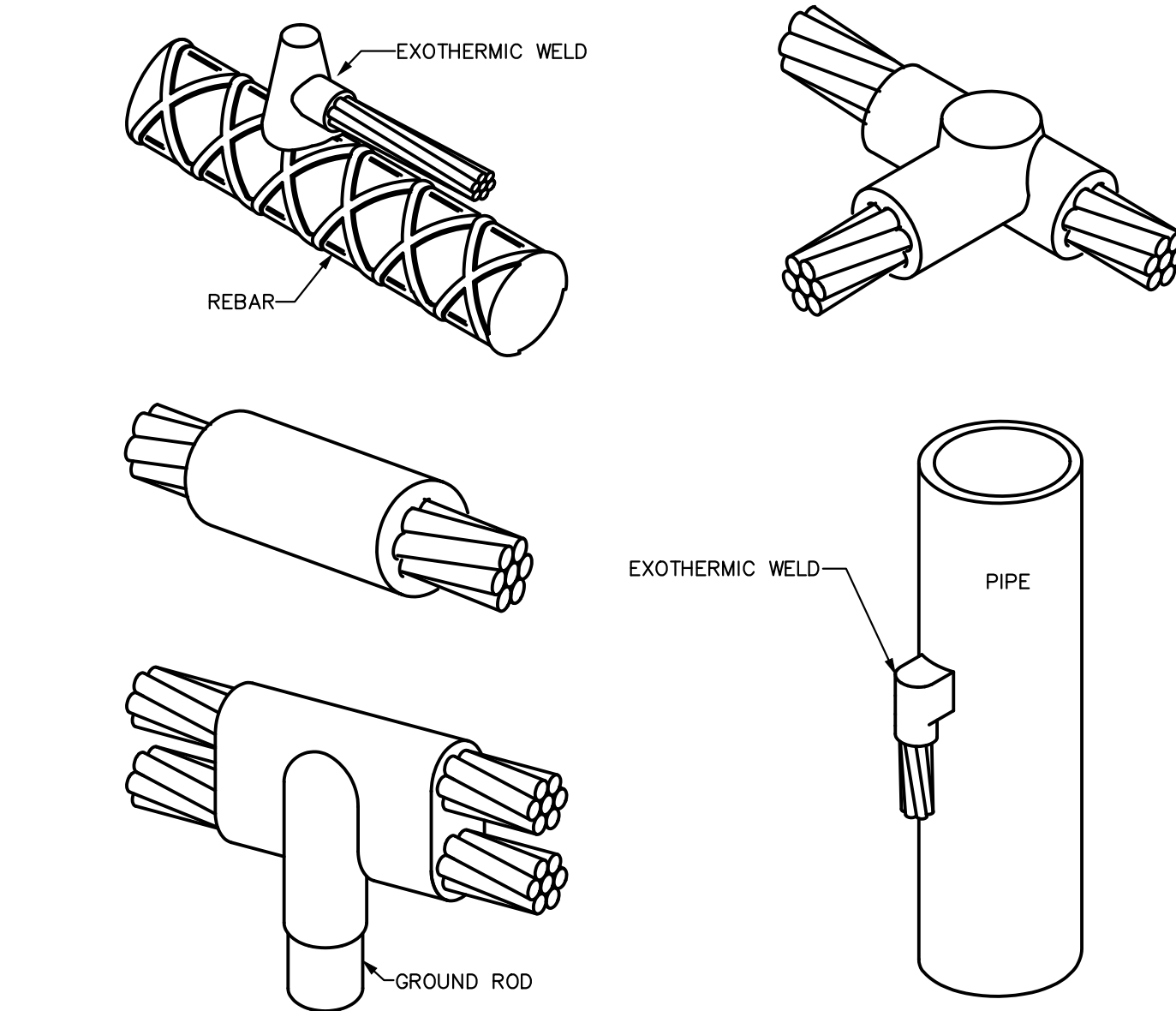
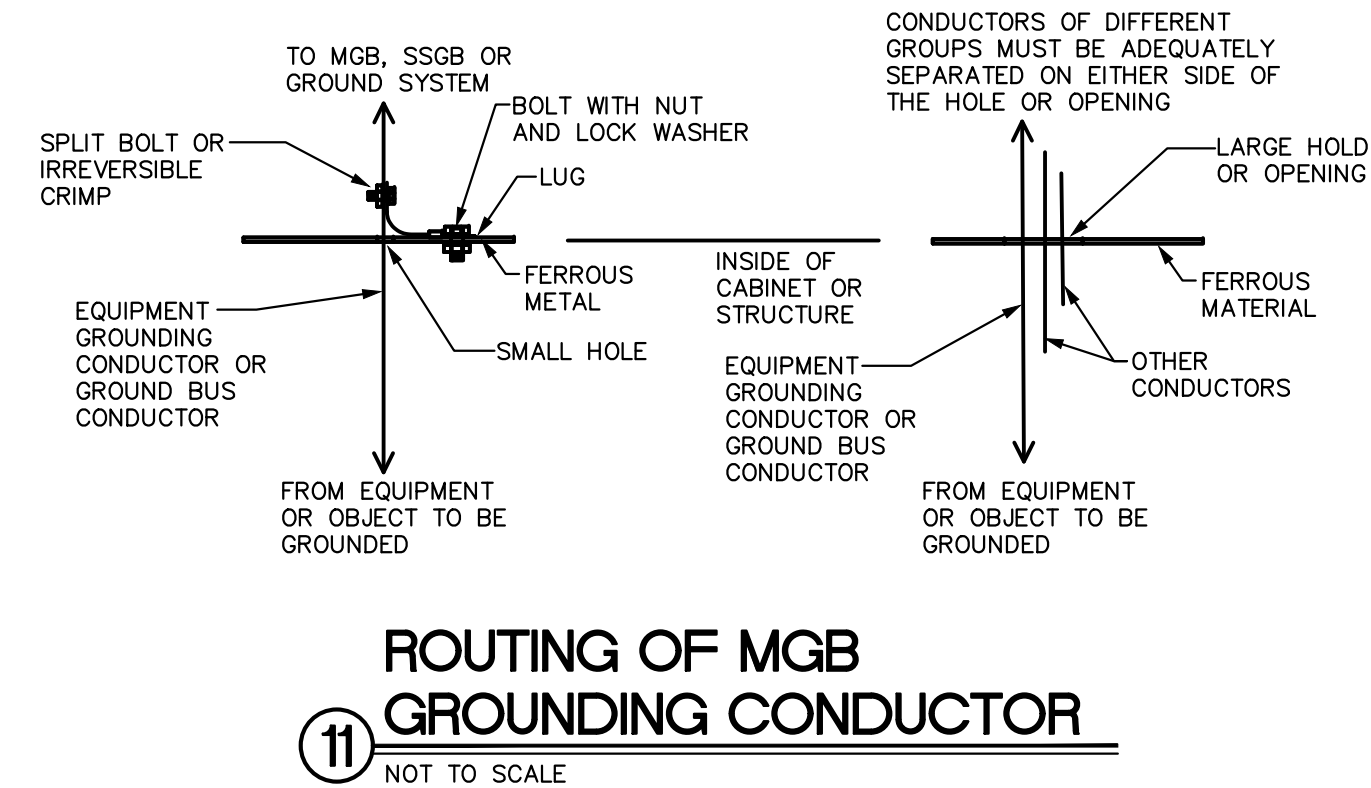
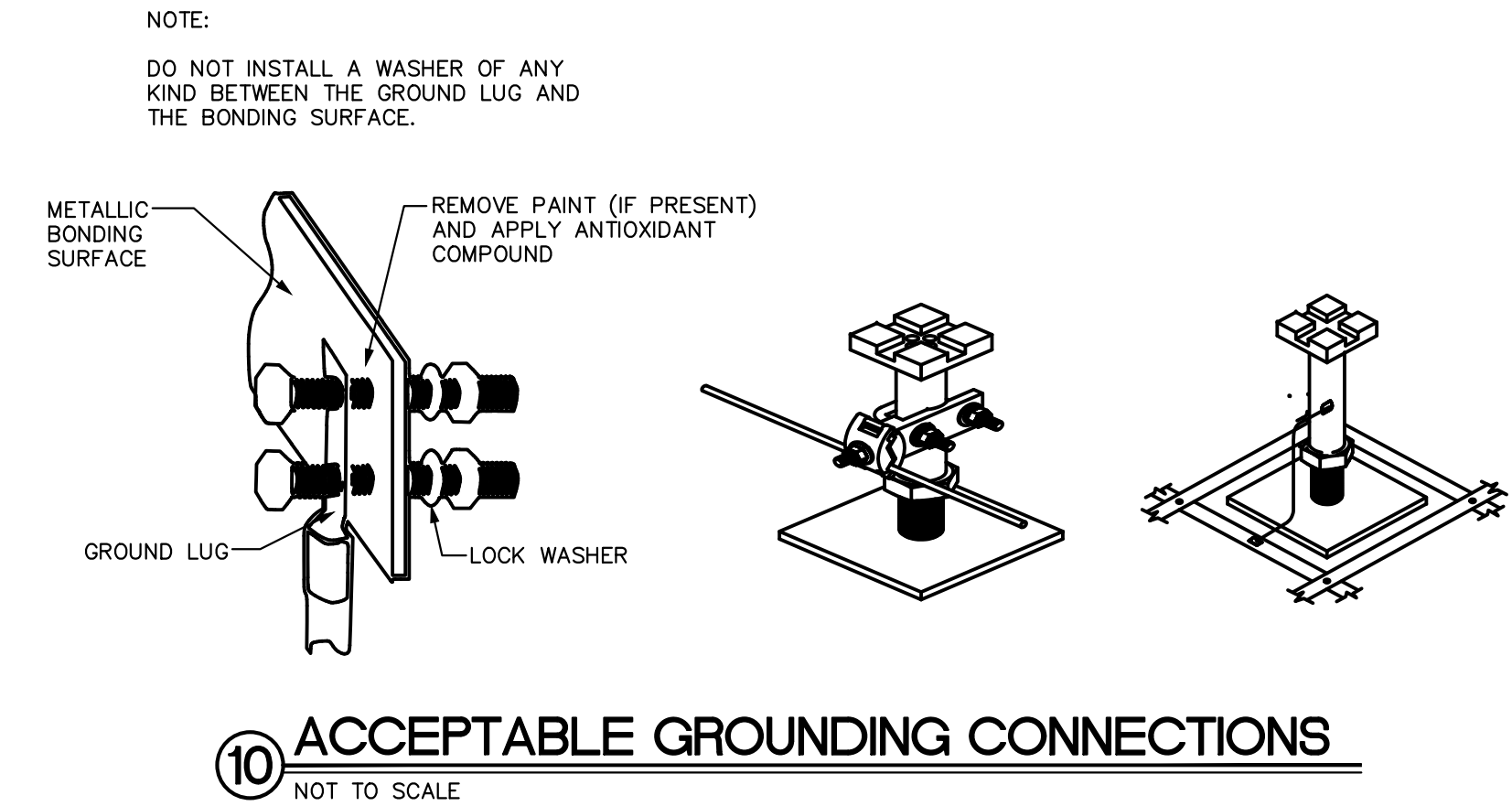
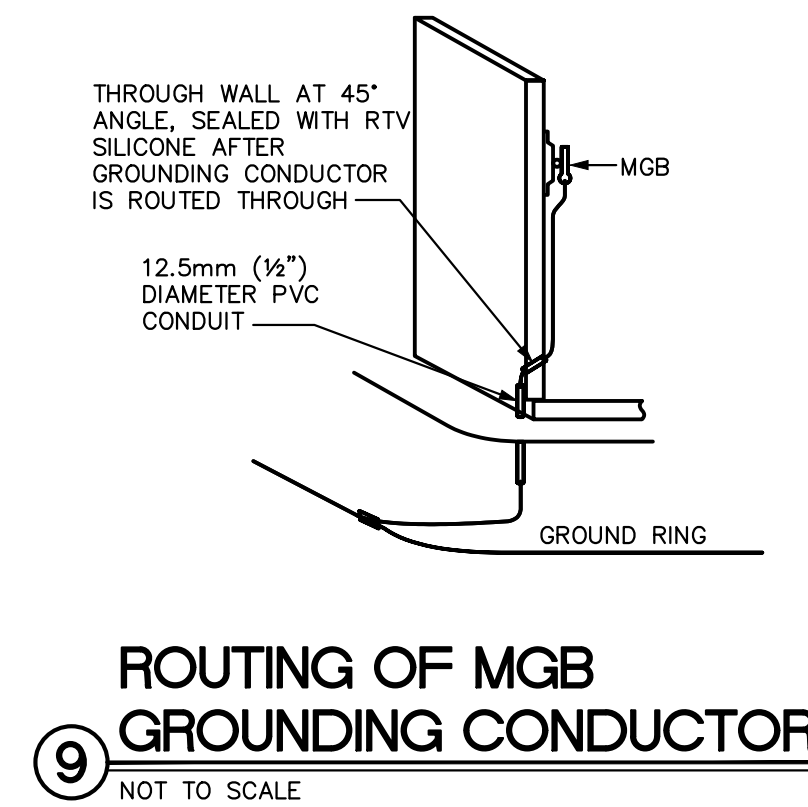
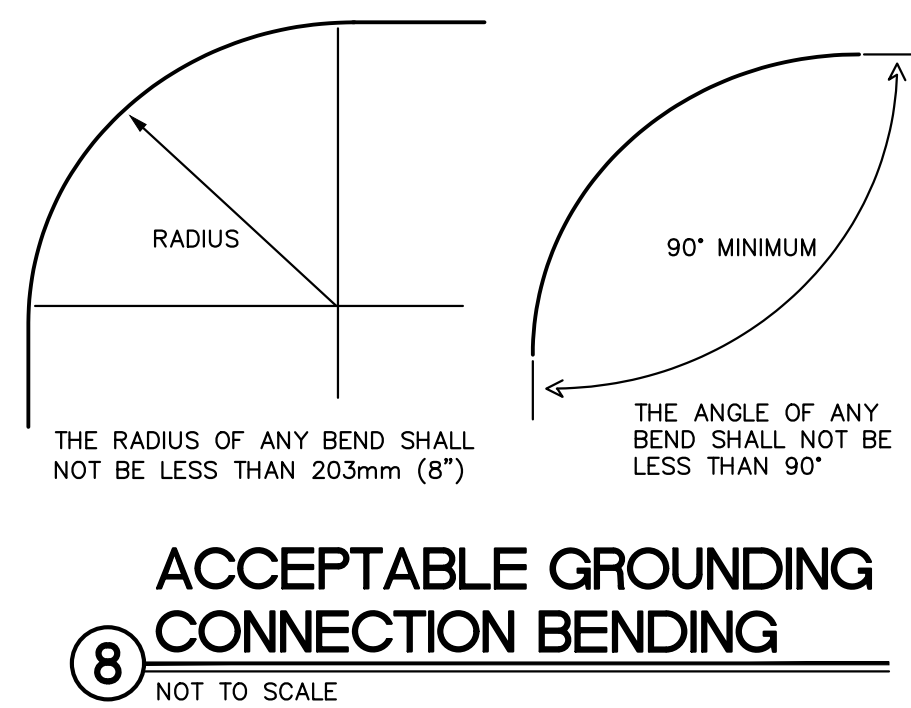
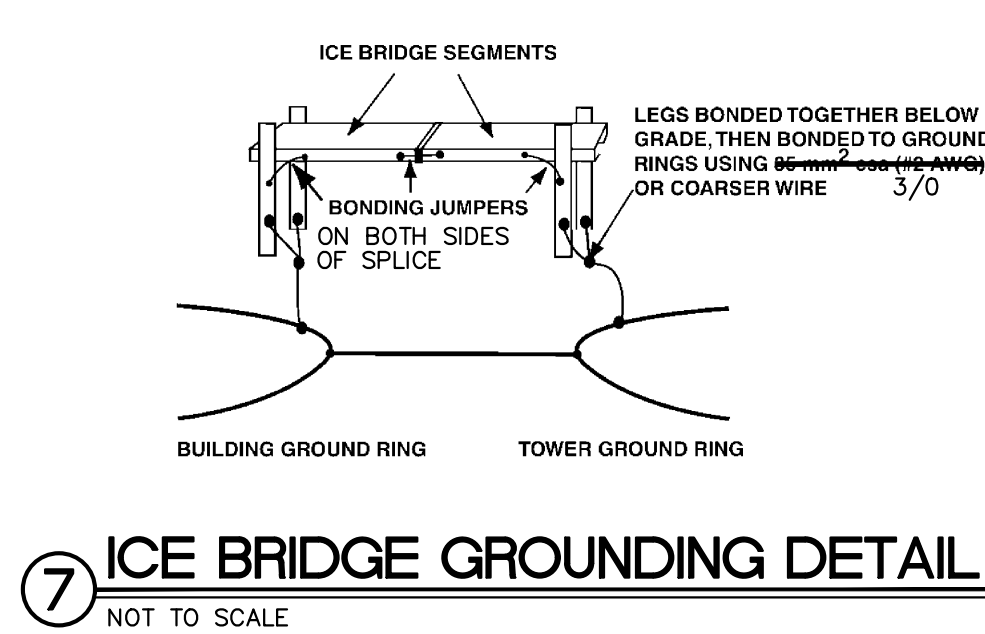
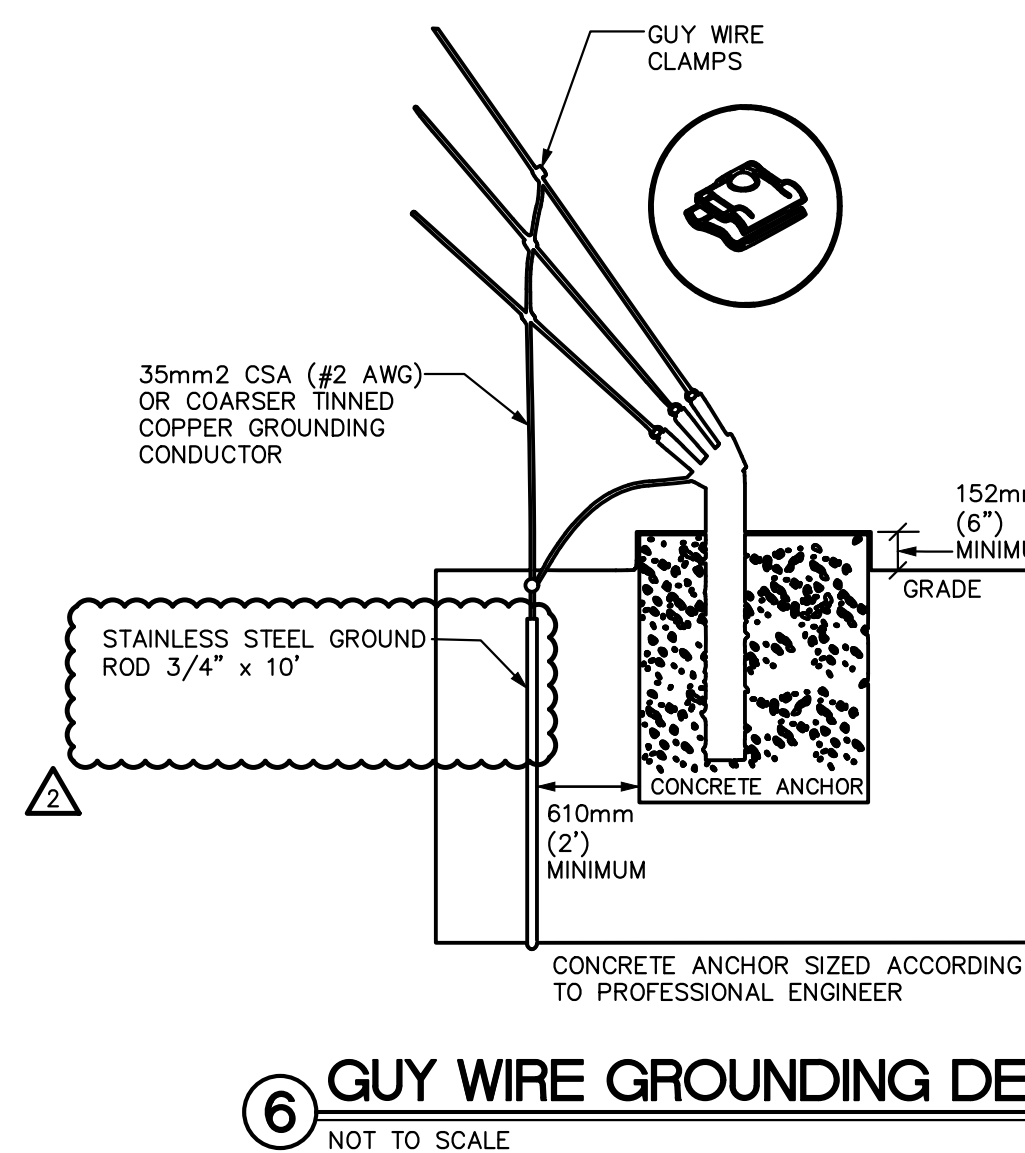
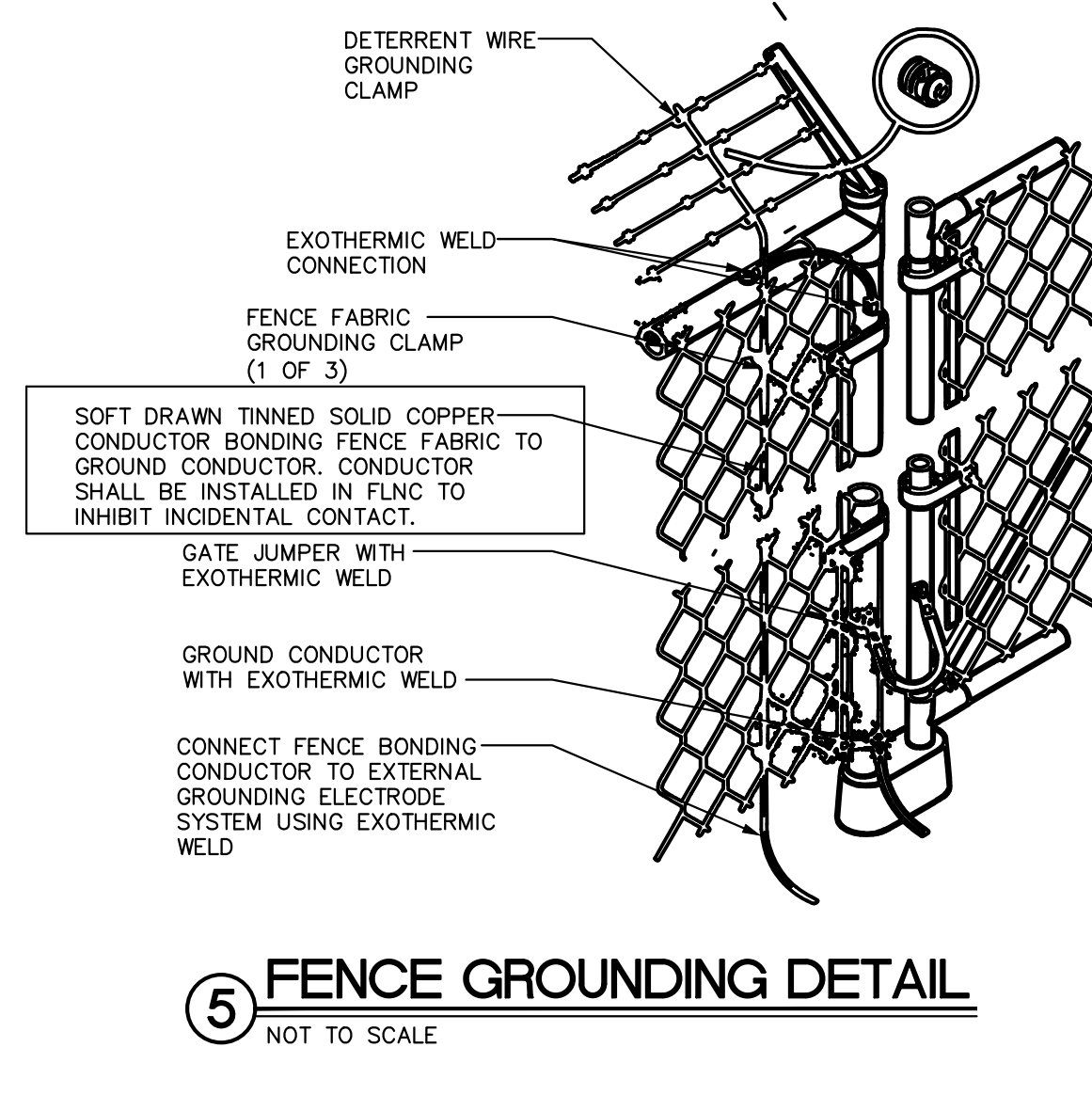
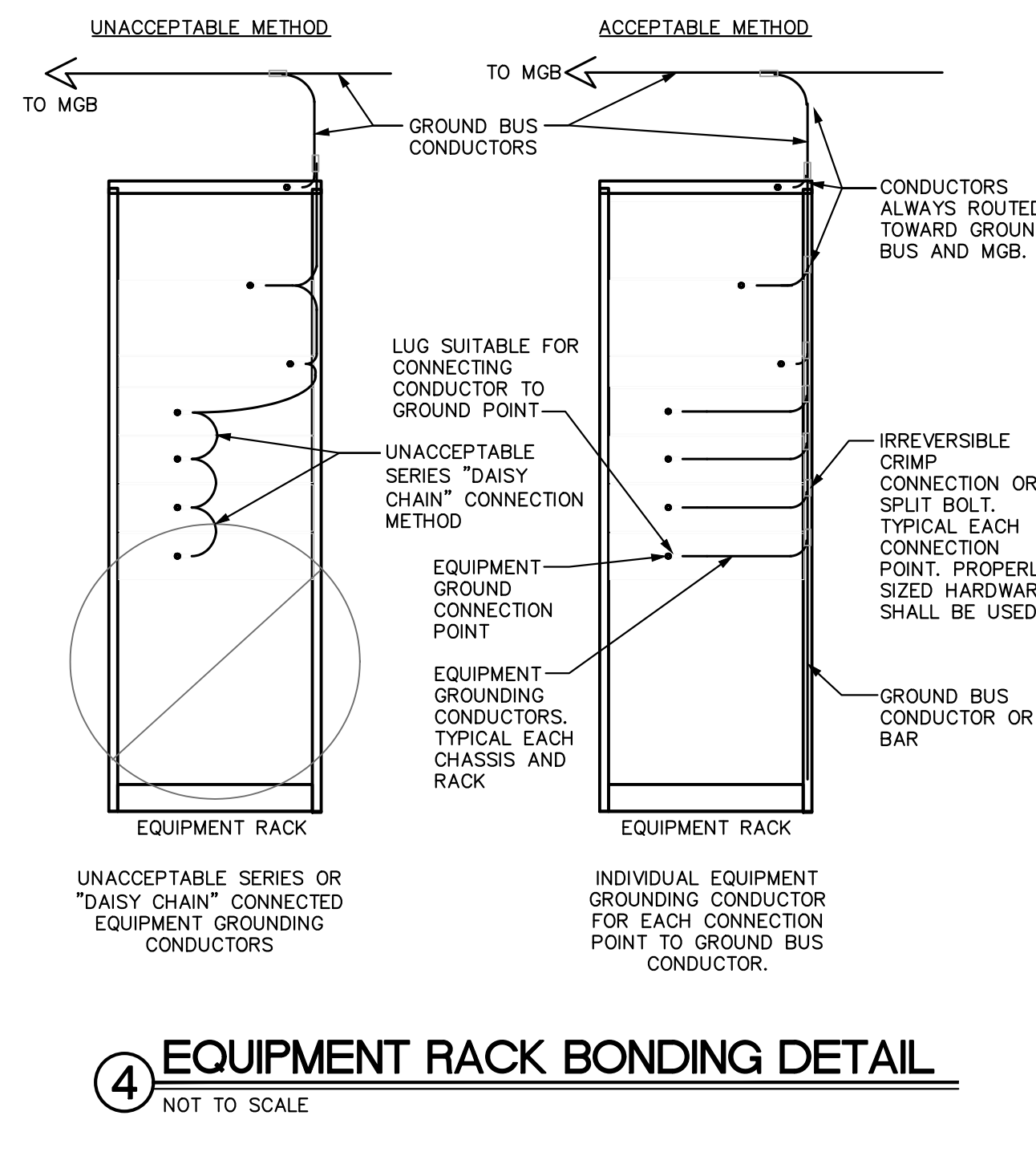
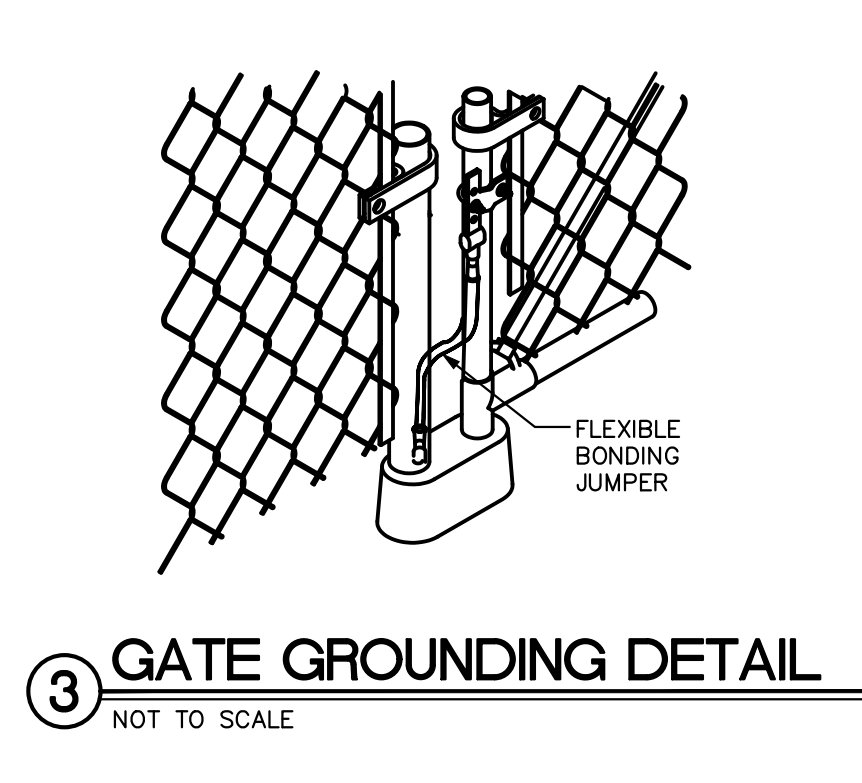
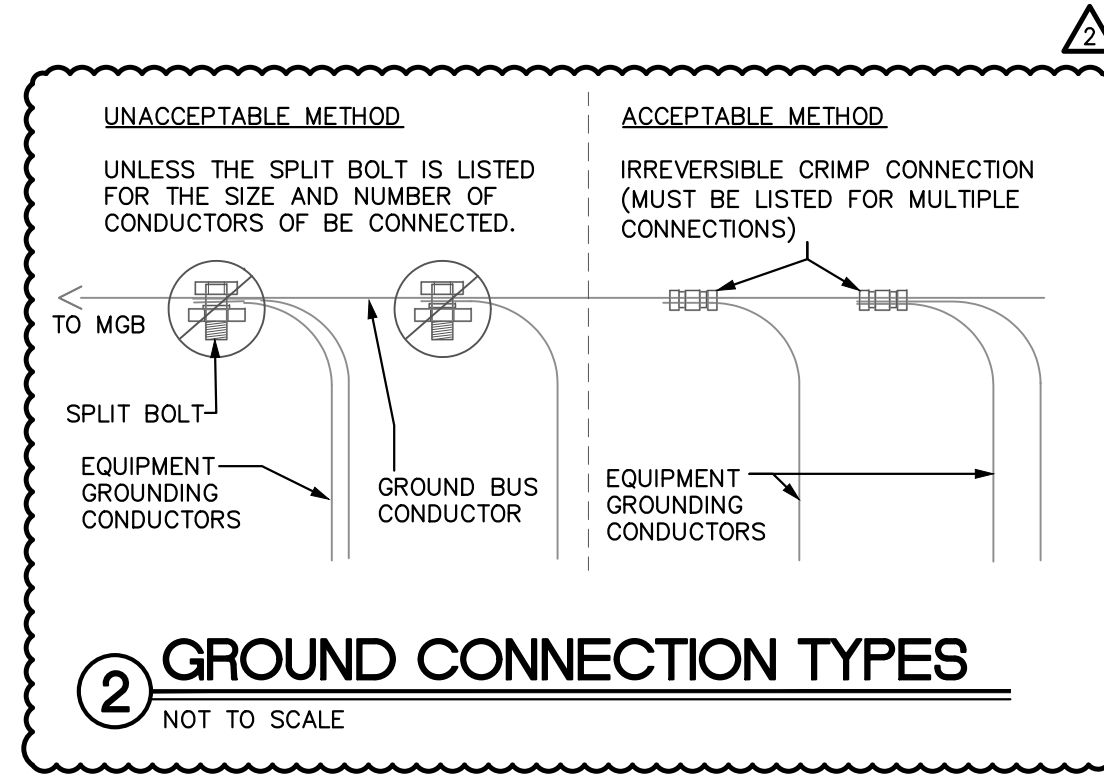
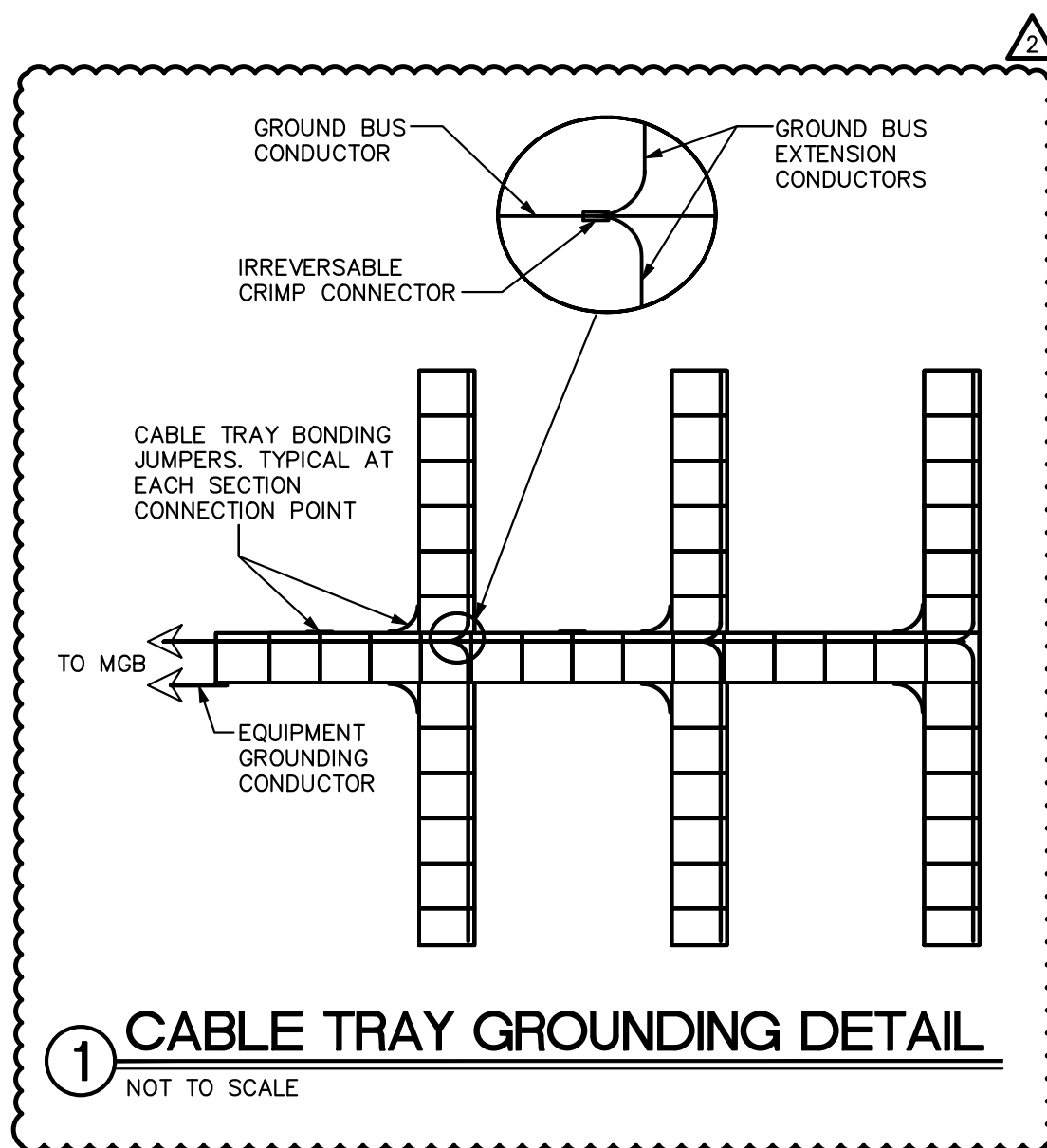
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SEAL

SHEET NUMBER

E014






SAMPSON COUNTY
911 & ES
FACILITIES

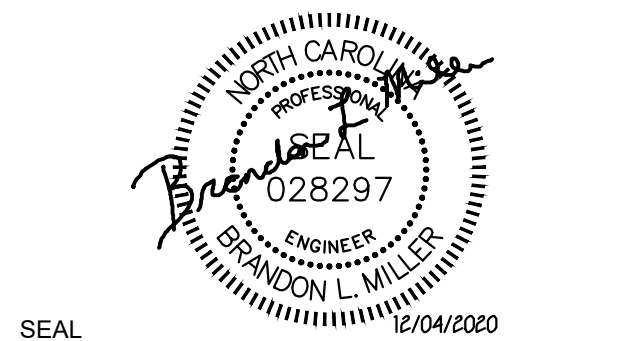
CLINTON,
NORTH CAROLINA

CONSTRUCTION
DOCUMENTS

AREA 1 AND AREA 2
EQUIPMENT
CONNECTIONS ROOF
PLANS

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
	01-09-2021	REV #2 / ADD1

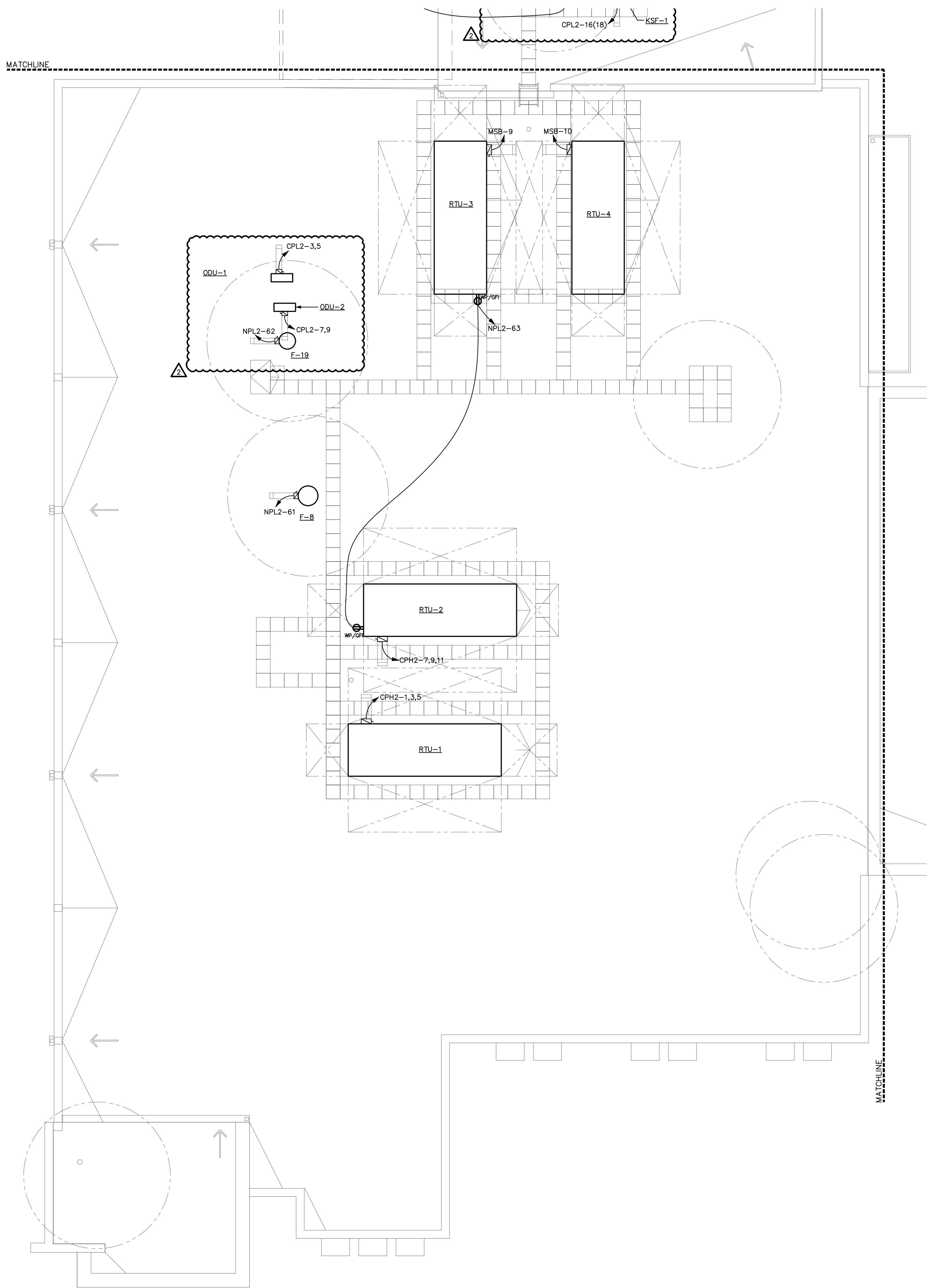
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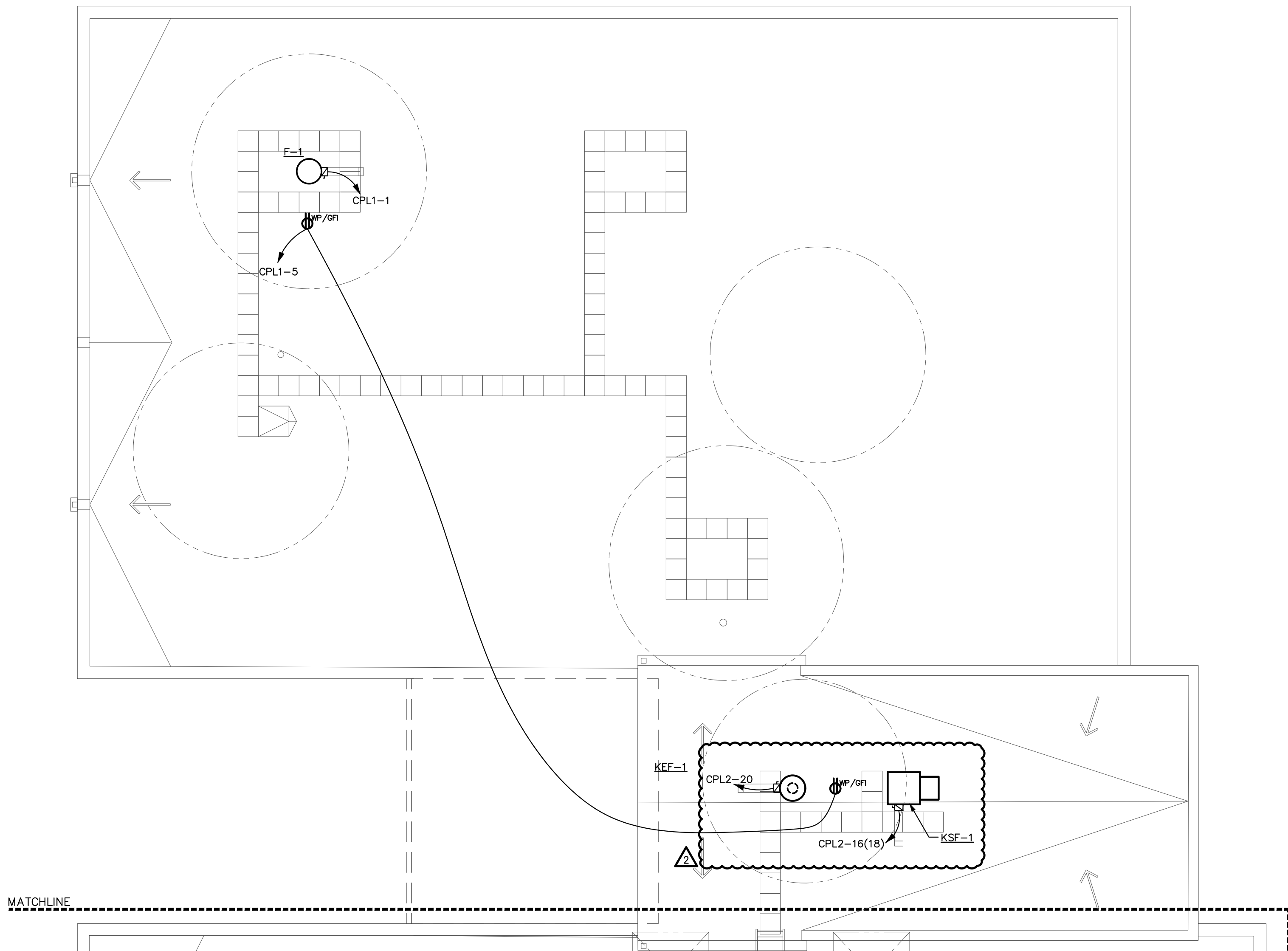
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SHEET NUMBER

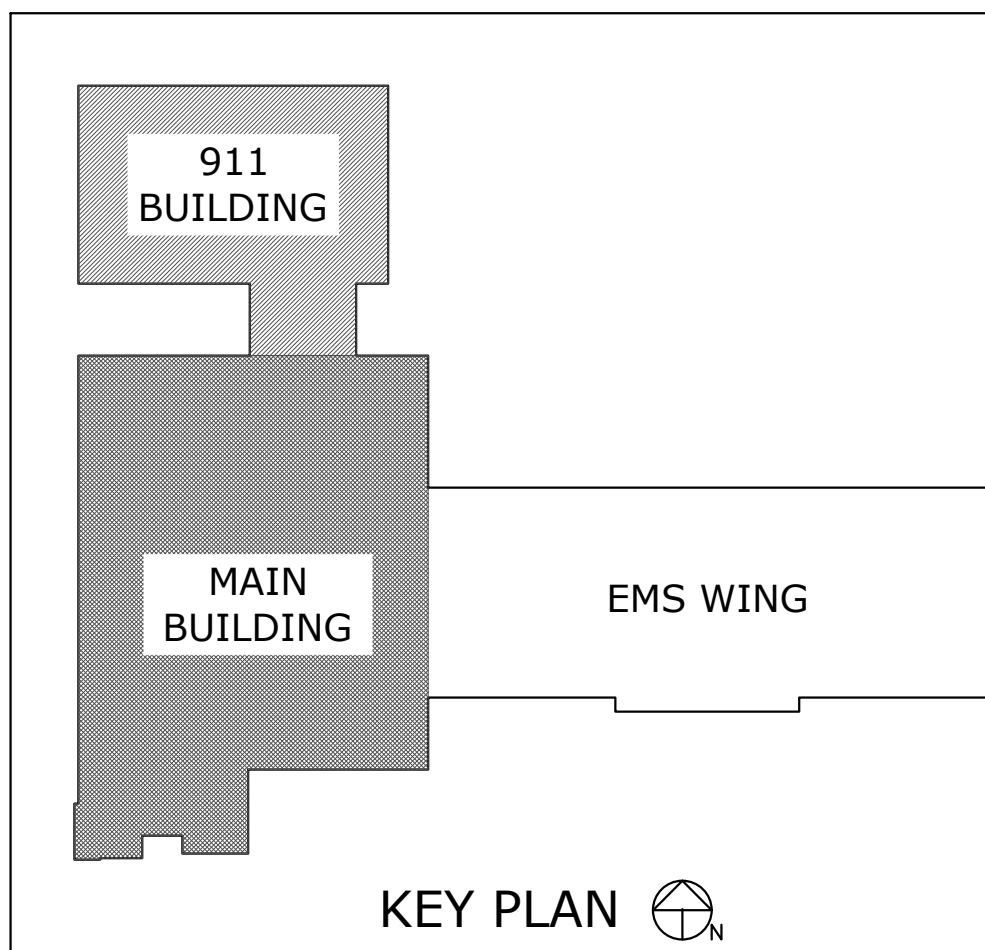
E304



② AREA 2 ROOF PLAN - EQUIPMENT CONNECTIONS
1/8" = 1'-0"



① AREA 1 ROOF PLAN - EQUIPMENT CONNECTIONS
1/8" = 1'-0"



KEY PLAN



SAMPSON COUNTY 911 & ES FACILITIES

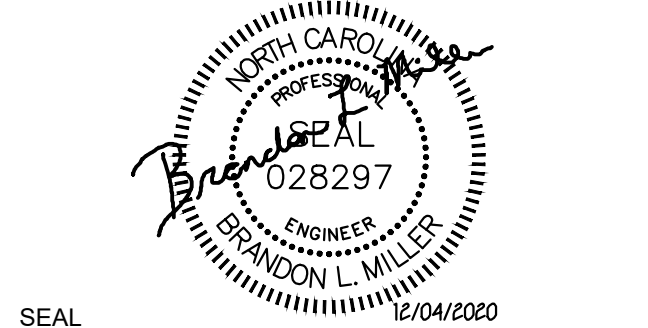
CLINTON,
NORTH CAROLINA

CONSTRUCTION DOCUMENTS

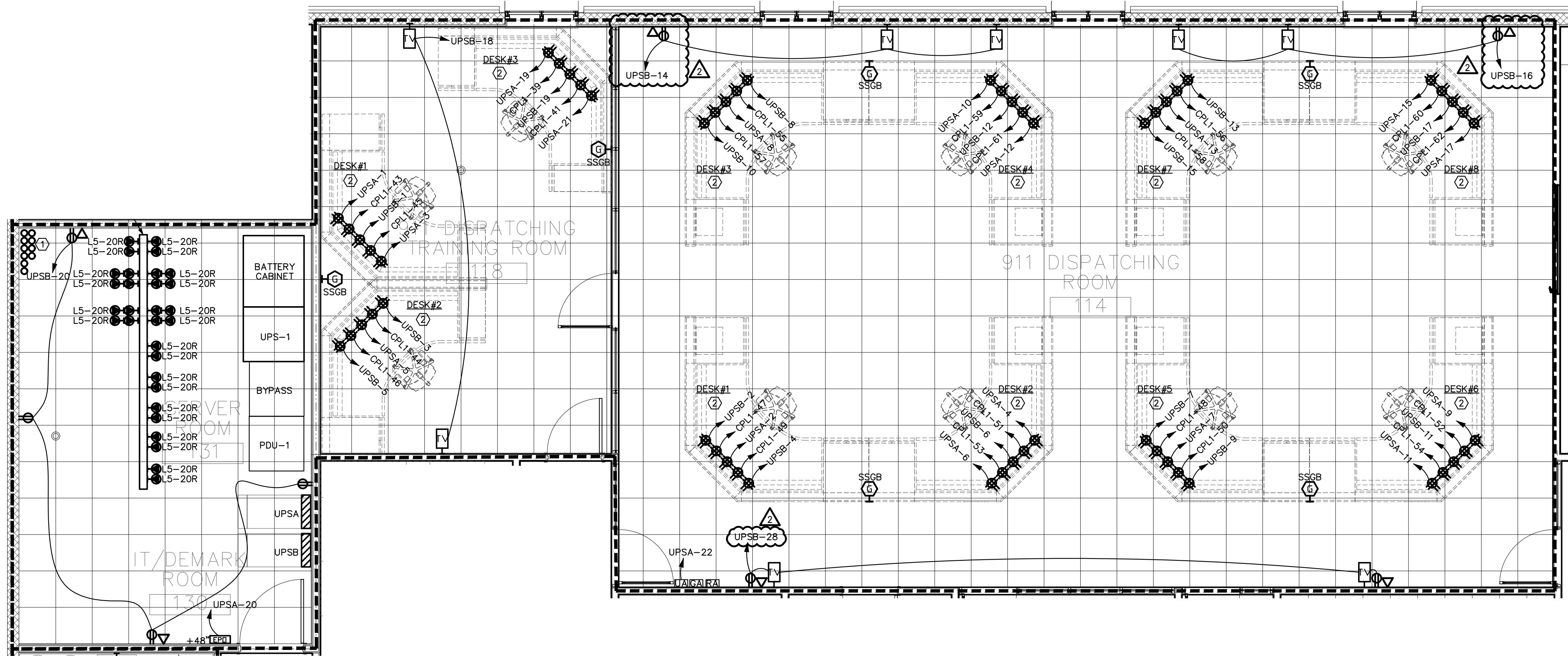
ENLARGED PLANS - ELECTRICAL

DATE	12.04.2020	
PROJECT NO	20003	
REVISIONS		
NUM.	DATE	DESCRIPTION:
1	12-17-2020	REVISION #1
2	01-09-2021	REV #2 / ADD1

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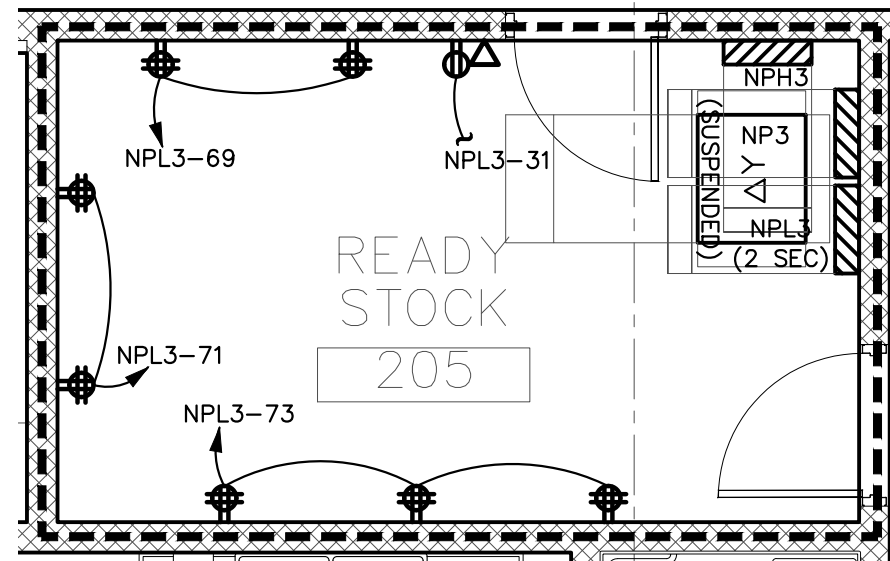


SHEET NUMBER
E501

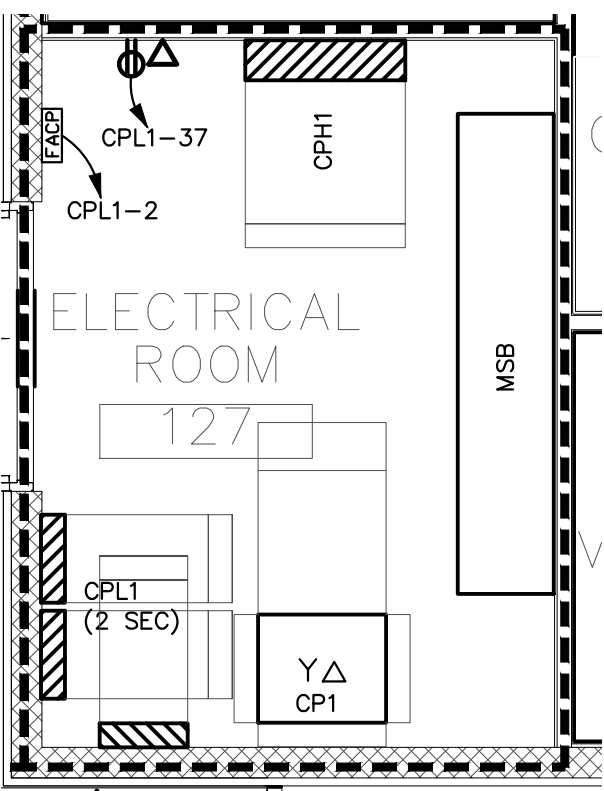


1 ENLARGED PLAN - 911 CENTER
1/4" = 1'-0"

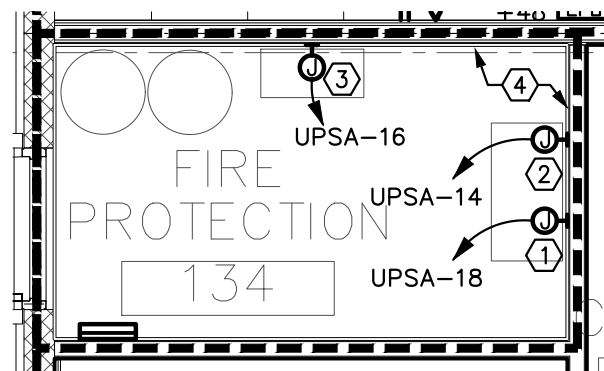
- KEYED NOTES** (X)
(APPLY TO THIS VIEW ONLY)
- CONDUIT STUB UP LOCATION. SEE SHEET E010 FOR ADDITIONAL INFORMATION.
 - AT EACH DESK LOCATION, PROVIDE (2) RAISED FLOOR FURNITURE FEED FLOOR BOXES (SEE DETAIL #5/E603 FOR SPECIFICATION) FOR HARDWIRED FURNITURE POWER AND DATA CONNECTIONS. (1) BOX SHALL BE FOR CRITICAL POWER CIRCUITS, AND (1) FLOOR BOX SHALL BE FOR UPS CIRCUITS. VERIFY EXACT LOCATIONS AND REQUIREMENTS WITH FURNITURE VENDOR PRIOR TO ROUGH-IN.



3 ENLARGED PLAN - READY STOCK 205
1/4" = 1'-0"



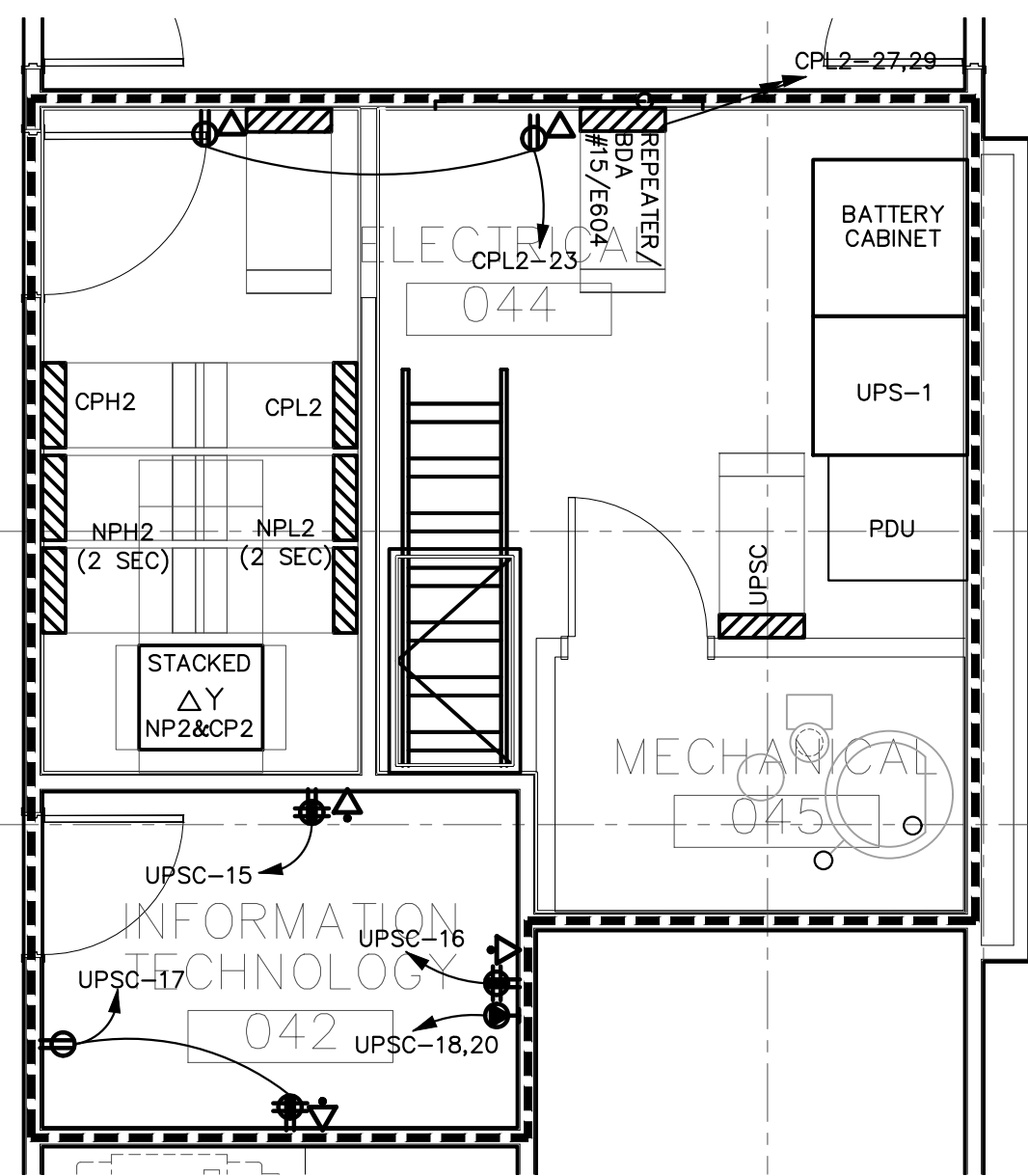
4 ENLARGED PLAN - ELECTRICAL ROOM 127
1/4" = 1'-0"



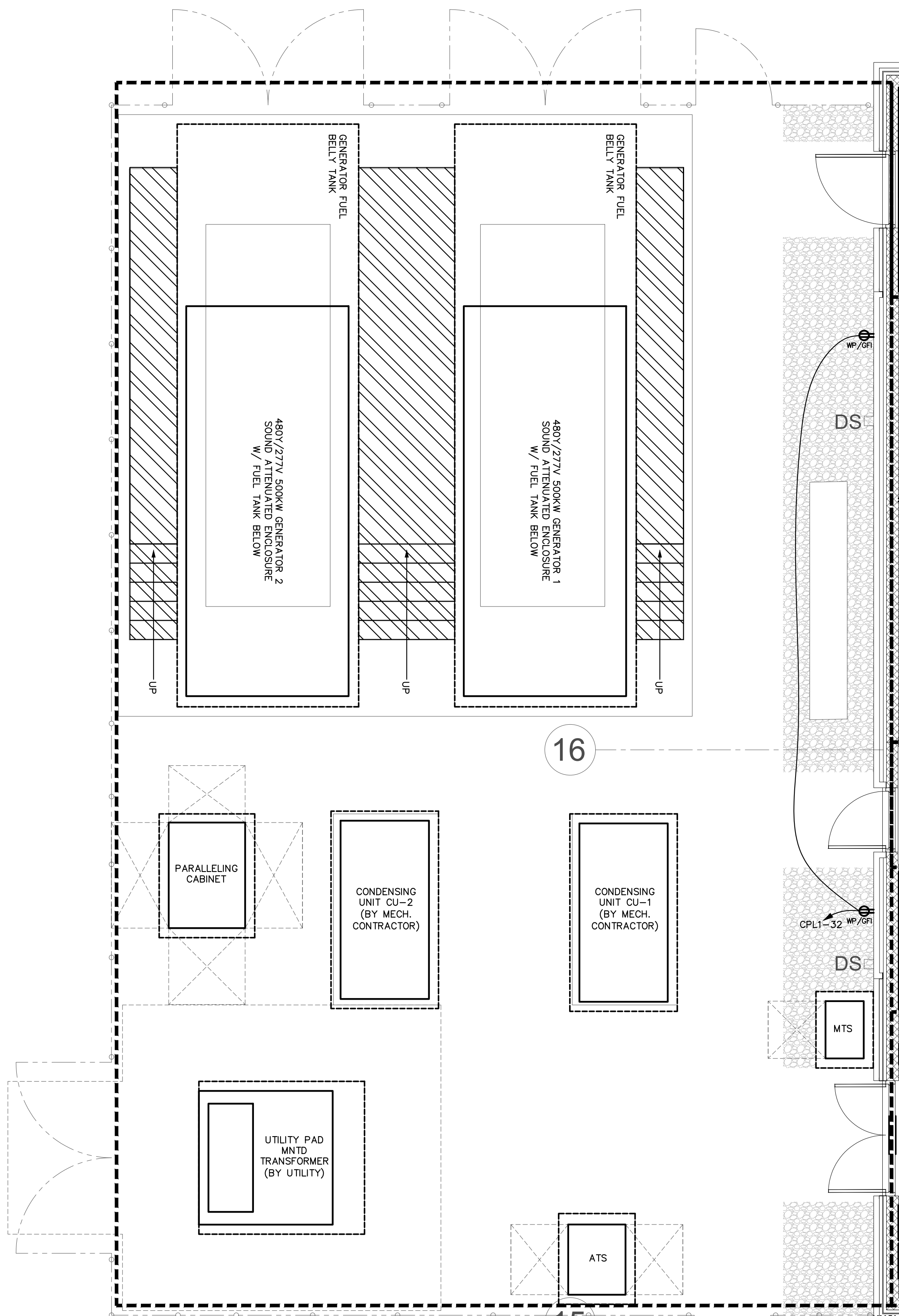
2 ENLARGED PLAN - FIRE PROTECTION 134
1/4" = 1'-0"

KEYED NOTES (X) (APPLY TO THIS VIEW ONLY)

- PROVIDE WALL MOUNTED JUNCTION BOX FOR CONNECTION TO PRE-ACTION CONTROL PANEL. COORDINATE EXACT LOCATION PRIOR TO ROUGH-IN WITH FIRE PROTECTION SUB-CONTRACTOR. CONTRACTOR SHALL PROVIDE NECESSARY CONNECTIONS BACK TO BMS CONTROL PANEL.
- PROVIDE WALL MOUNTED JUNCTION BOX FOR CONNECTION TO PRE-ACTION AIR COMPRESSOR (120V/1/2, 1HP MAX). COORDINATE EXACT LOCATION PRIOR TO ROUGH-IN WITH FIRE PROTECTION SUB-CONTRACTOR.
- PROVIDE WALL MOUNTED JUNCTION BOX FOR CONNECTION TO CLEAN AGENT CONTROL PANEL. COORDINATE EXACT LOCATION PRIOR TO ROUGH-IN WITH FIRE PROTECTION SUB-CONTRACTOR. CONTRACTOR SHALL PROVIDE NECESSARY CONNECTIONS BACK TO BMS CONTROL PANEL.
- ALL CONTROL PANELS AND EQUIPMENT ON THIS WALL SHALL BE MOUNTED ON UNISTRUT.



6 ENLARGED PLAN - IT 042 & ELECTRICAL 044
1/4" = 1'-0"



5 ENLARGED PLAN - EQUIPMENT YARD
1/4" = 1'-0"





SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION DOCUMENTS

ELECTRICAL DETAILS

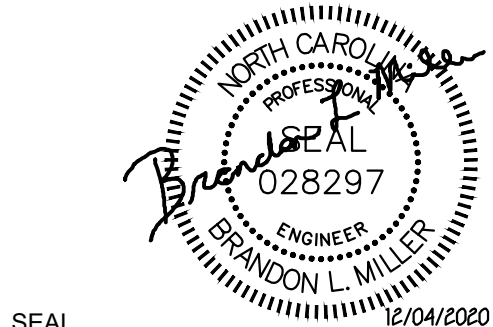
DATE 12.04.2020

PROJECT NO 20003

REVISIONS

NUM.	DATE	DESCRIPTION
1	01-09-2021	REV #2 / ADD1

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SEAL

SHEET NUMBER

E603

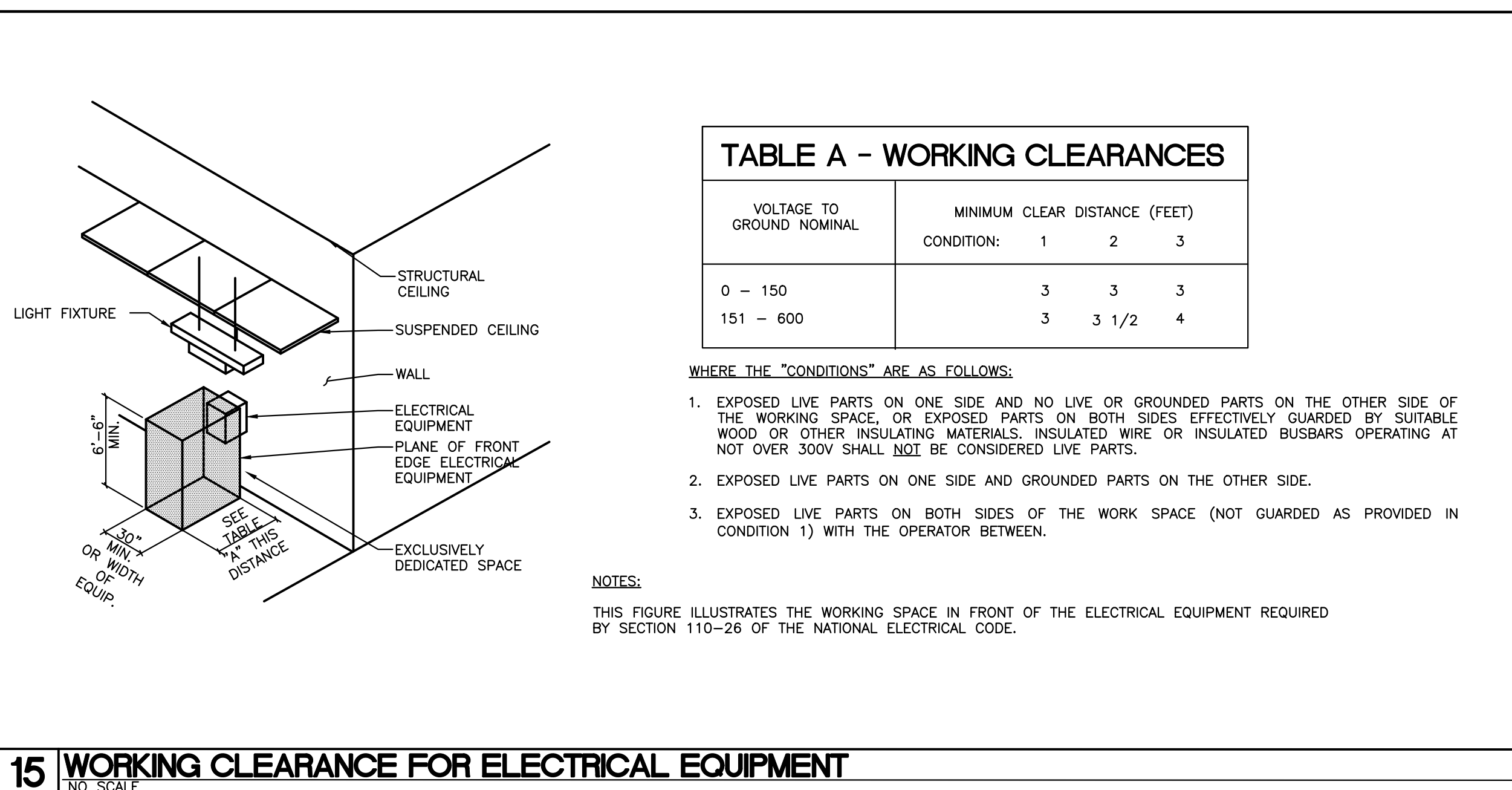
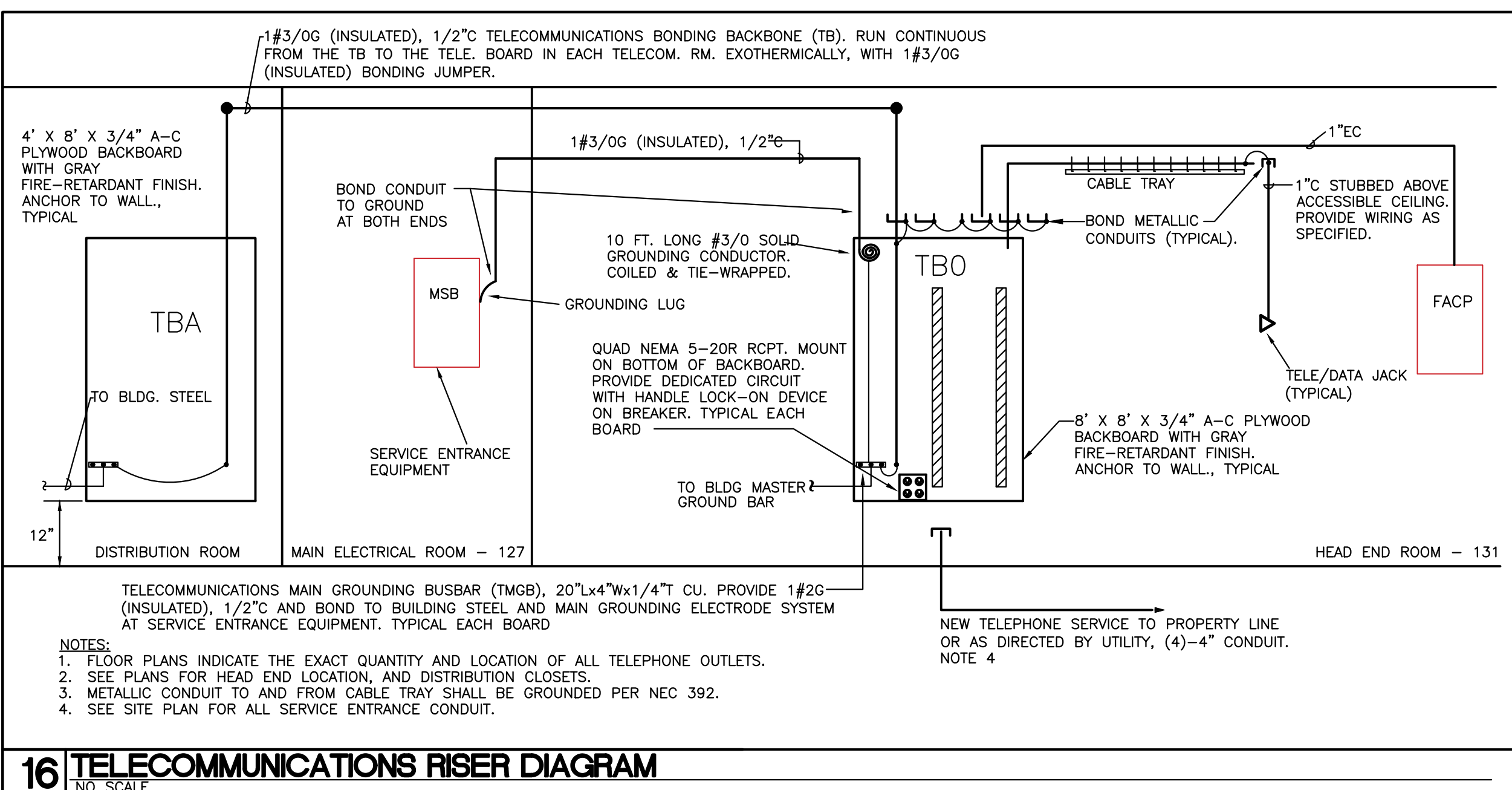
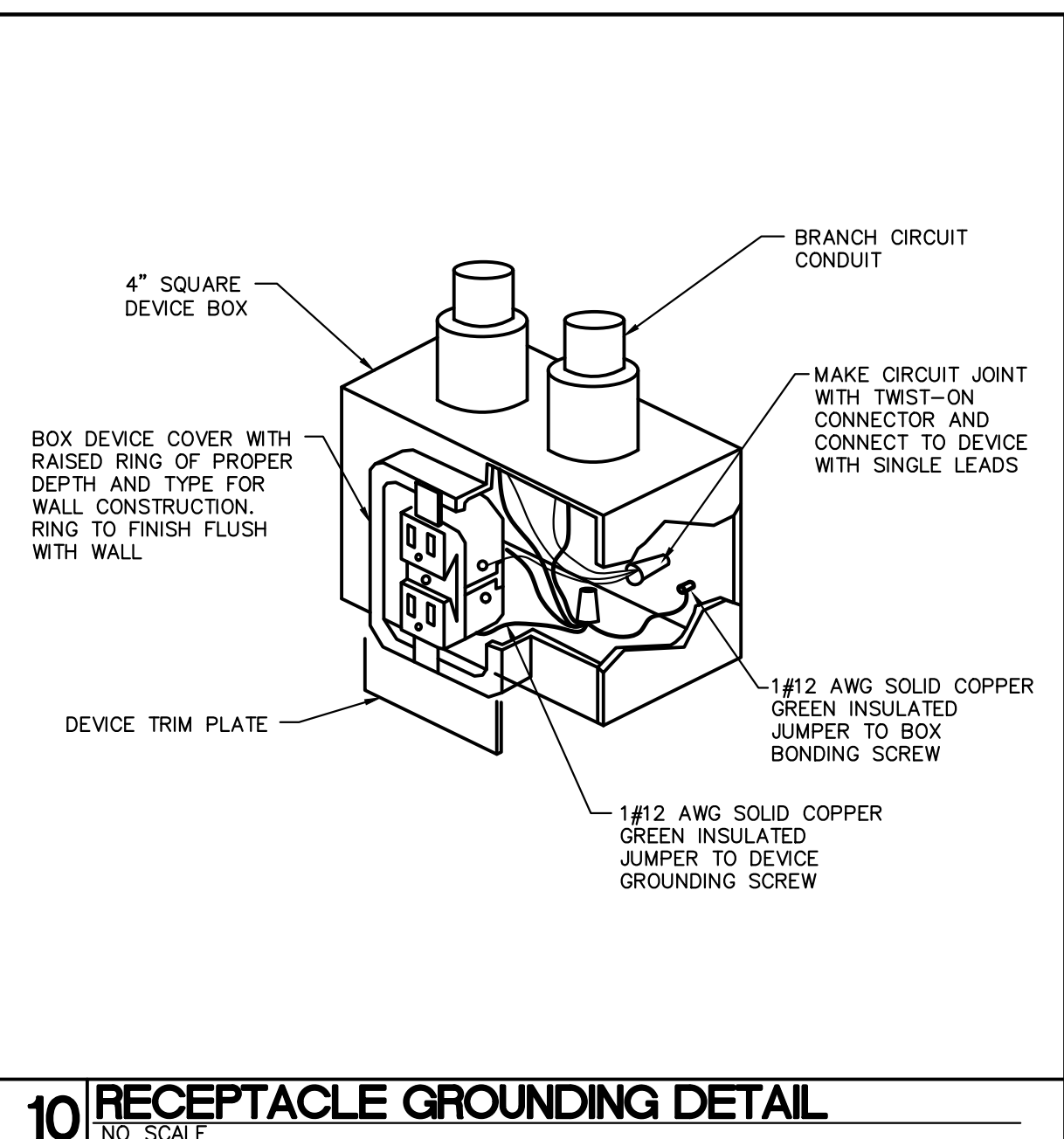
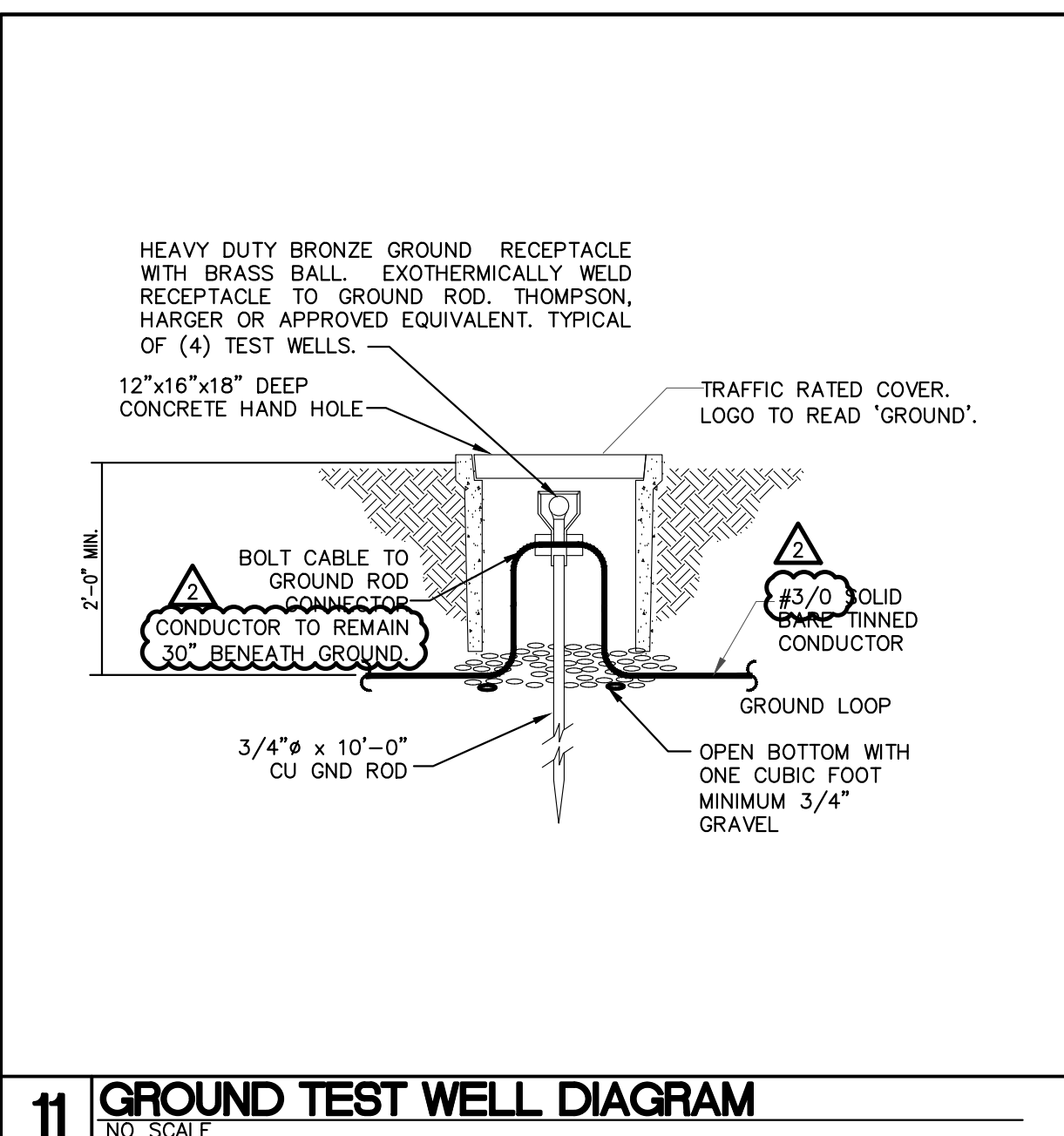
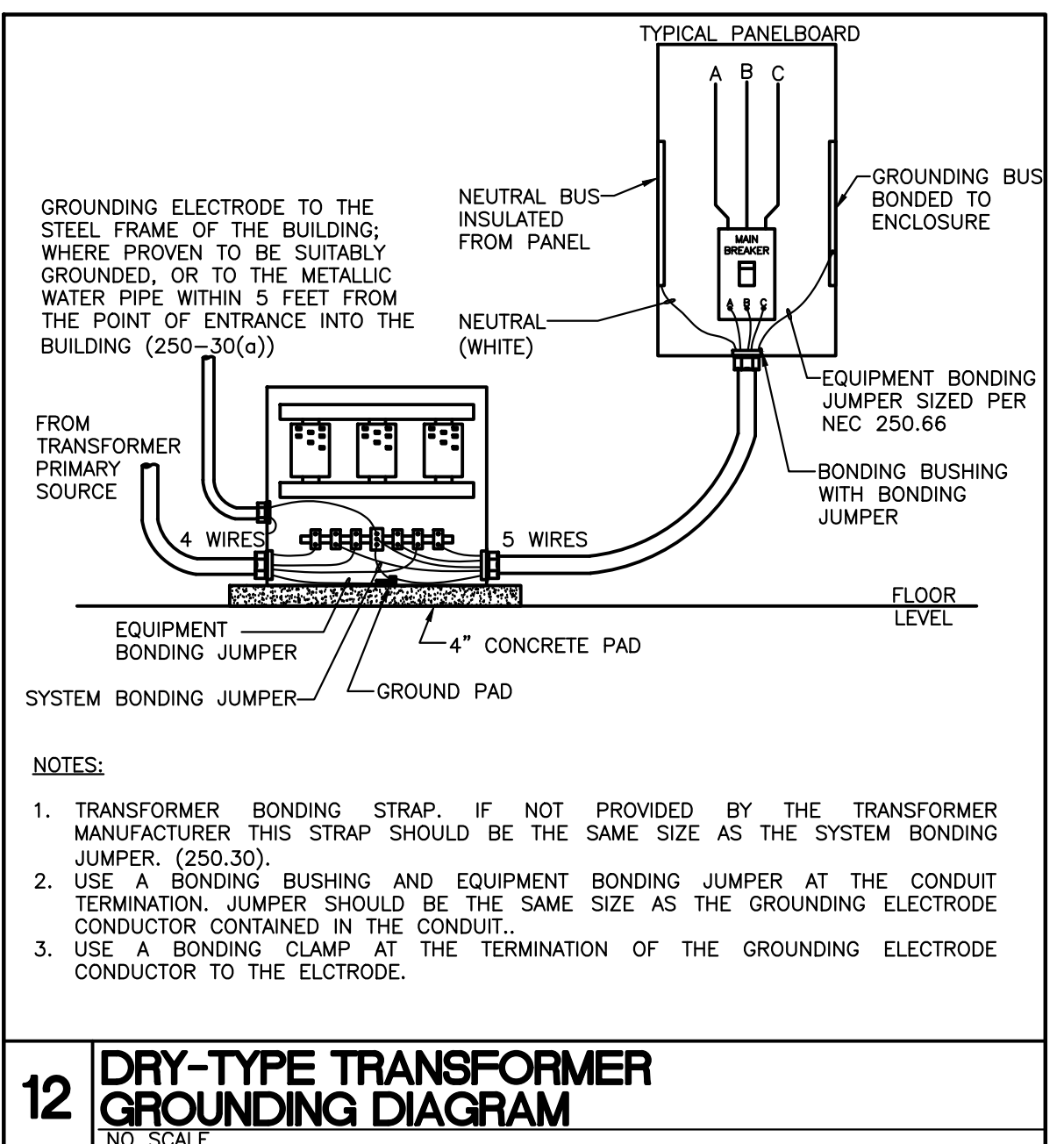
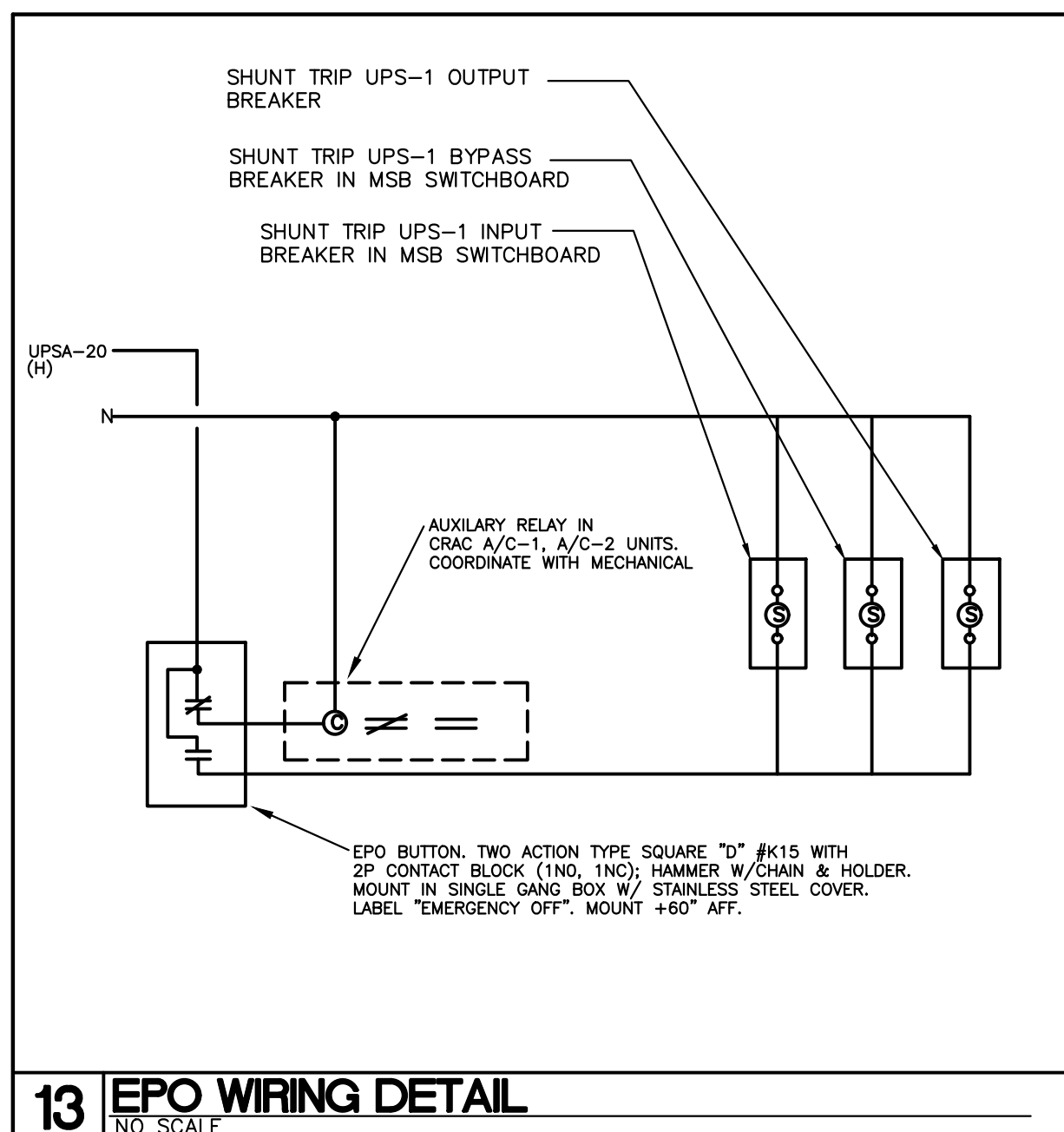
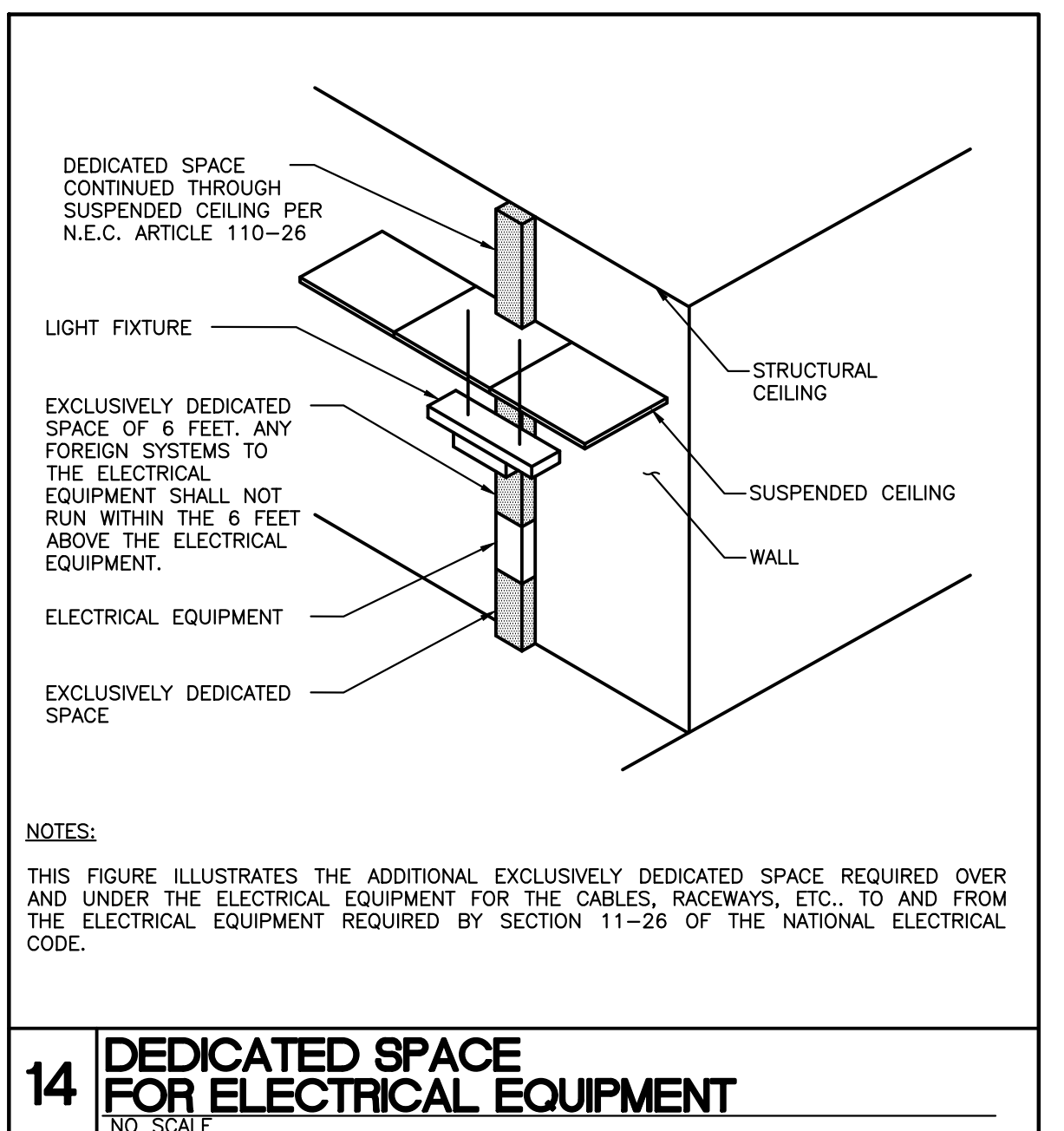
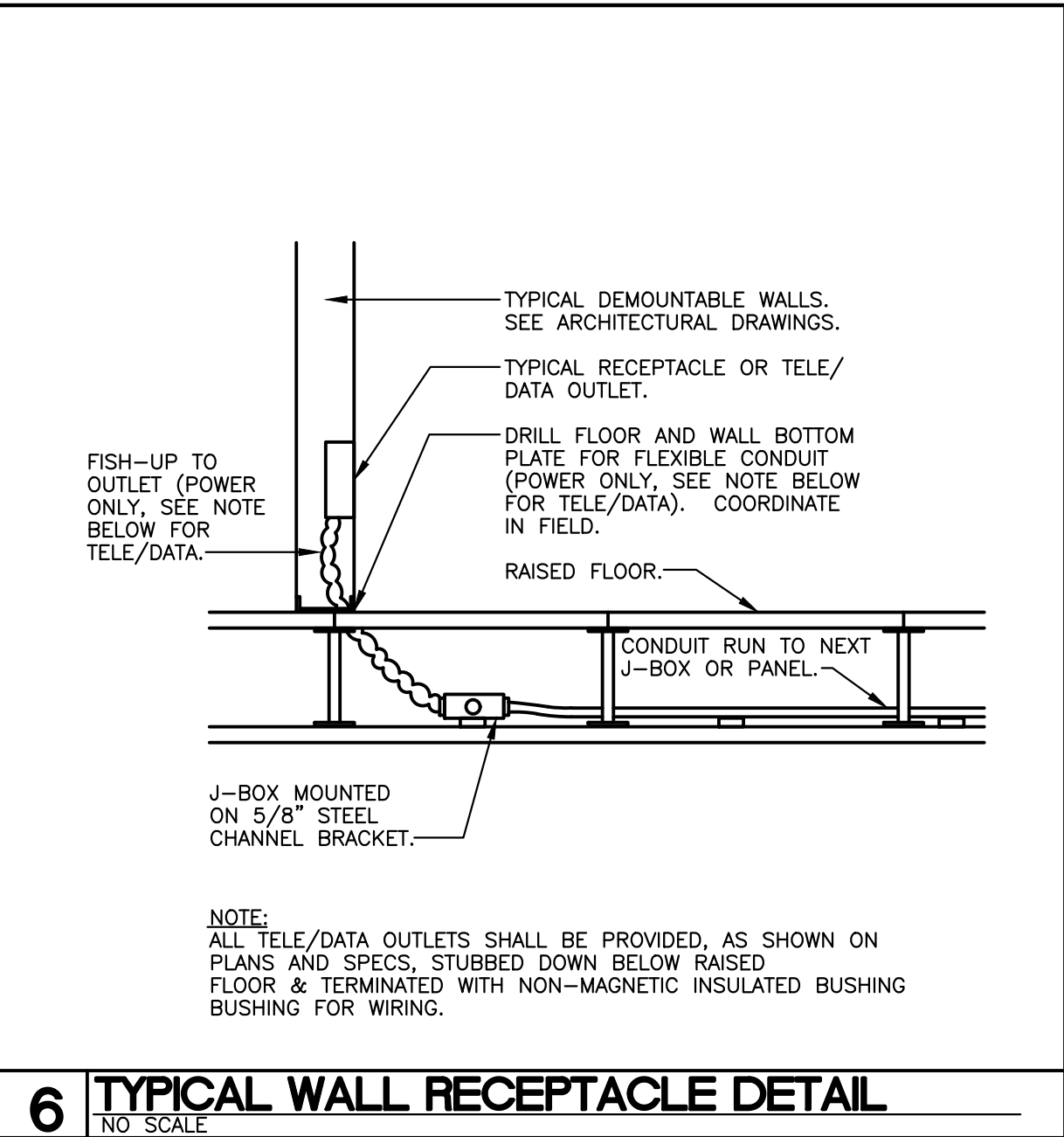
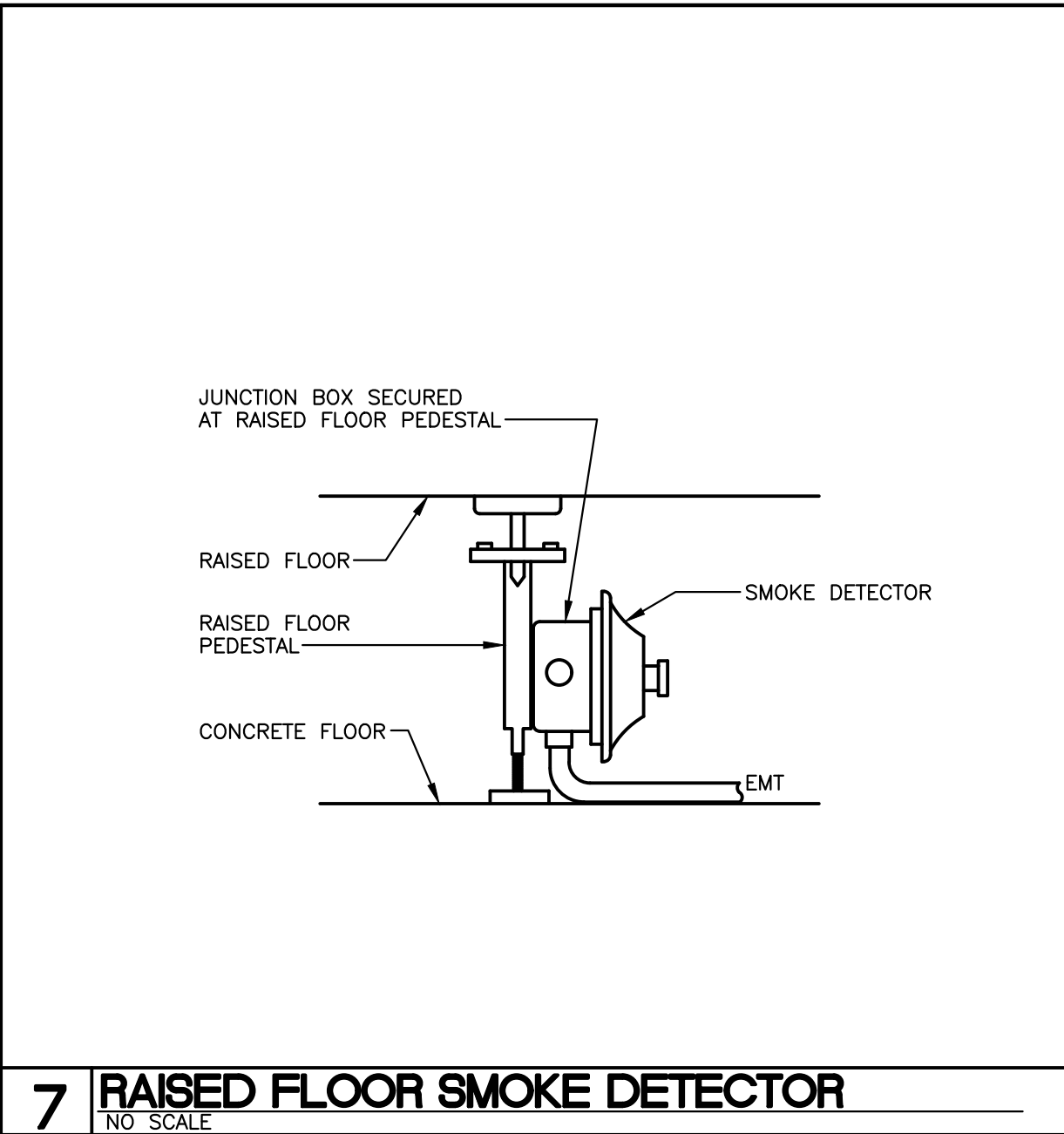
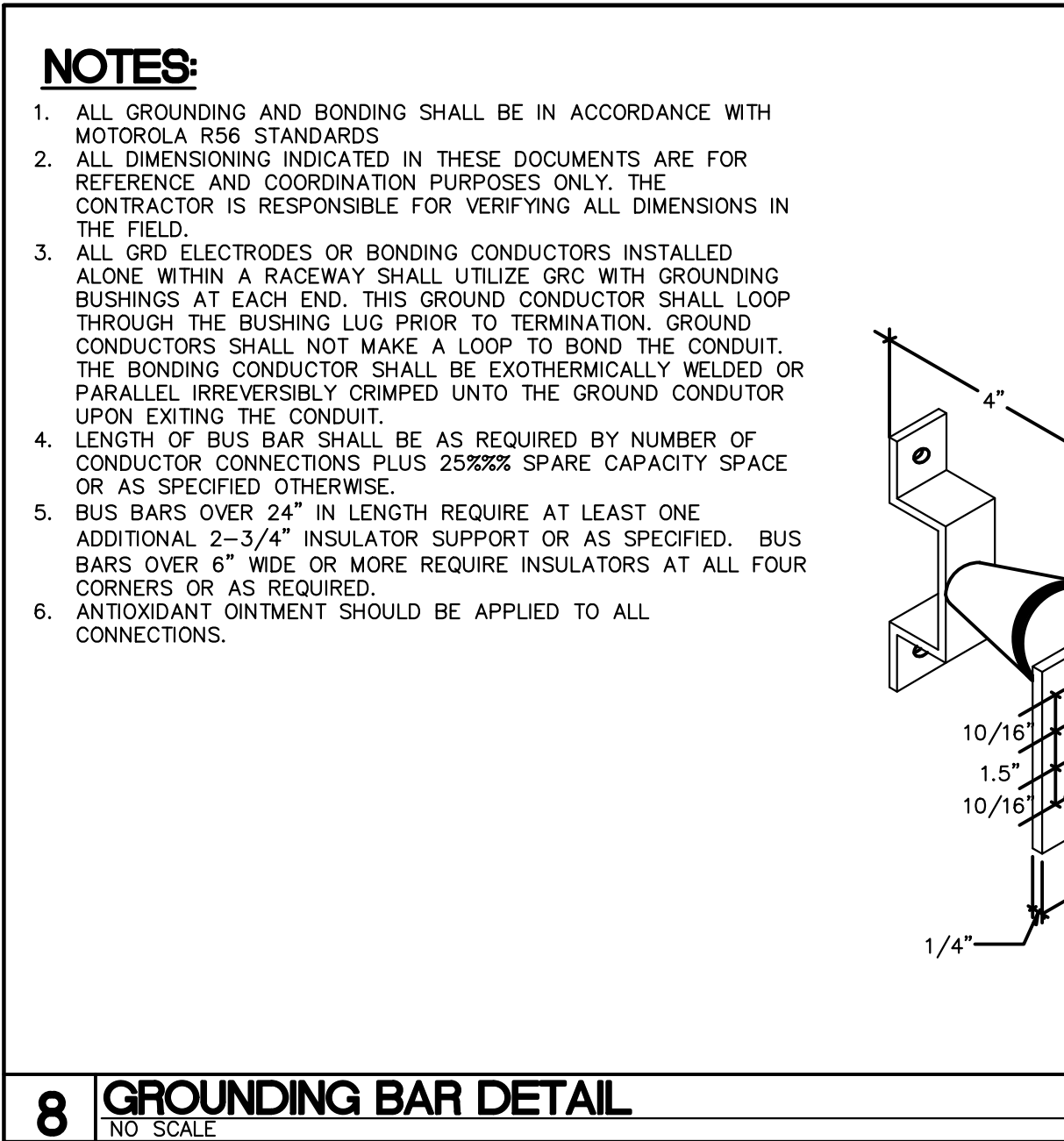
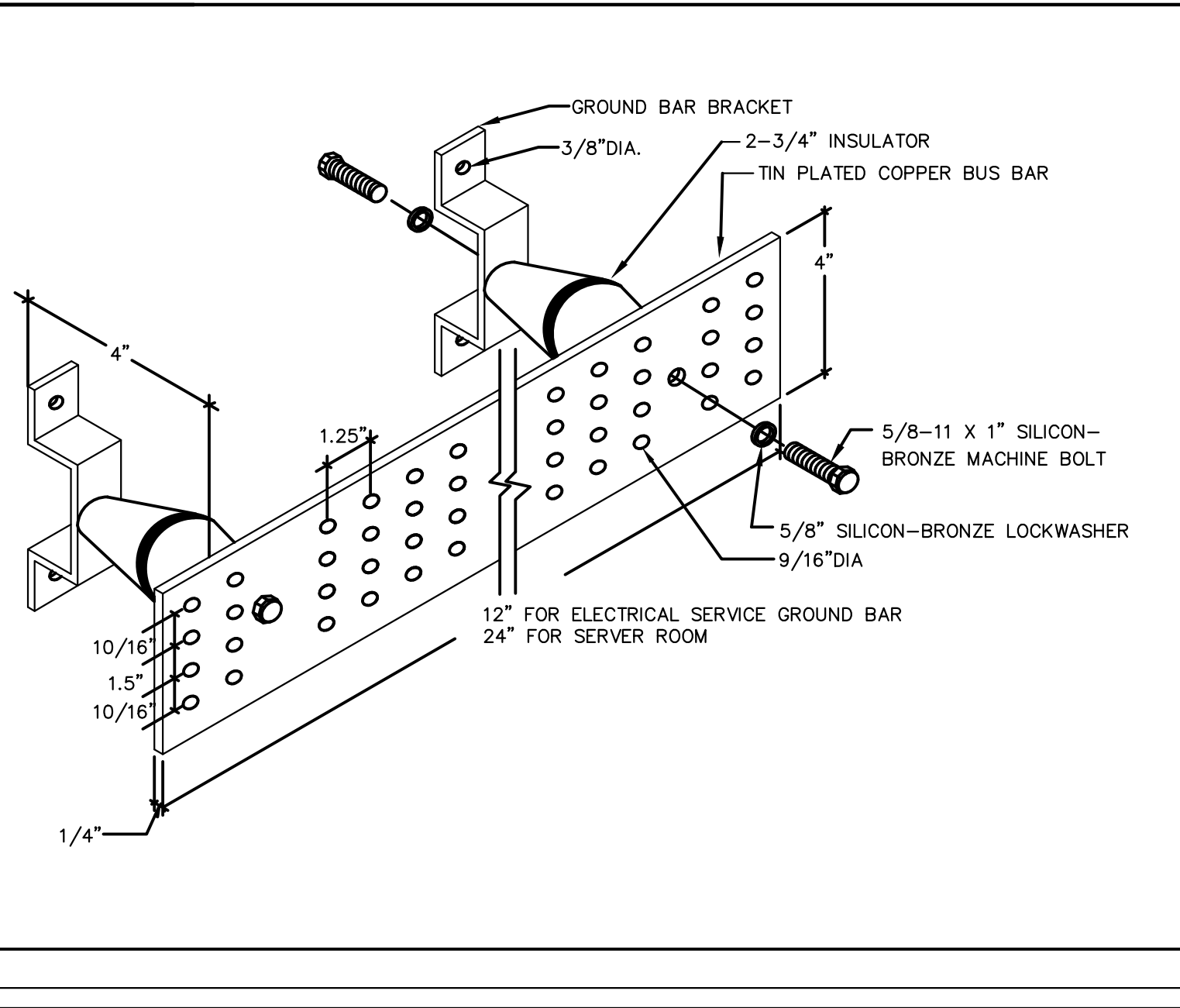
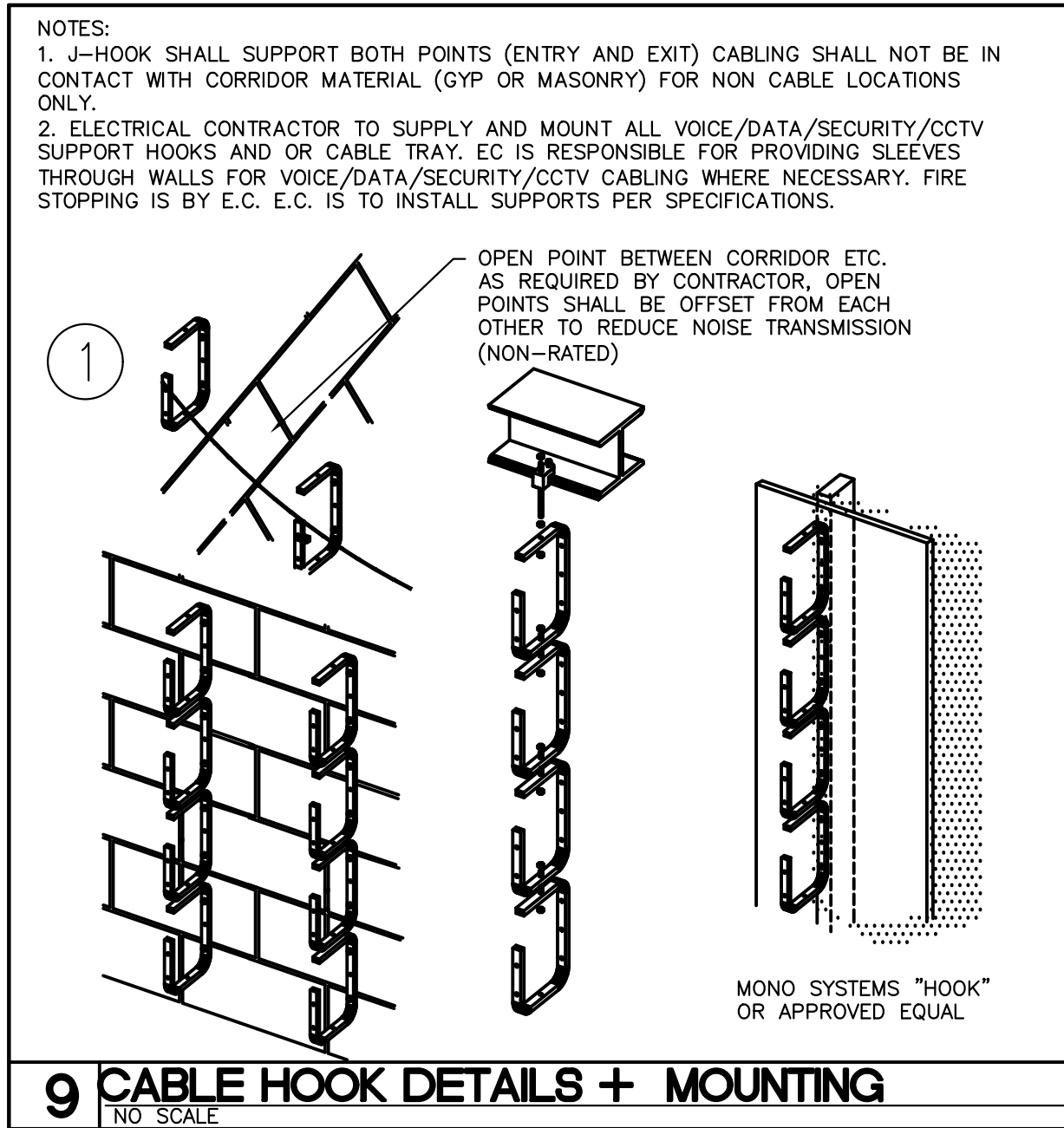
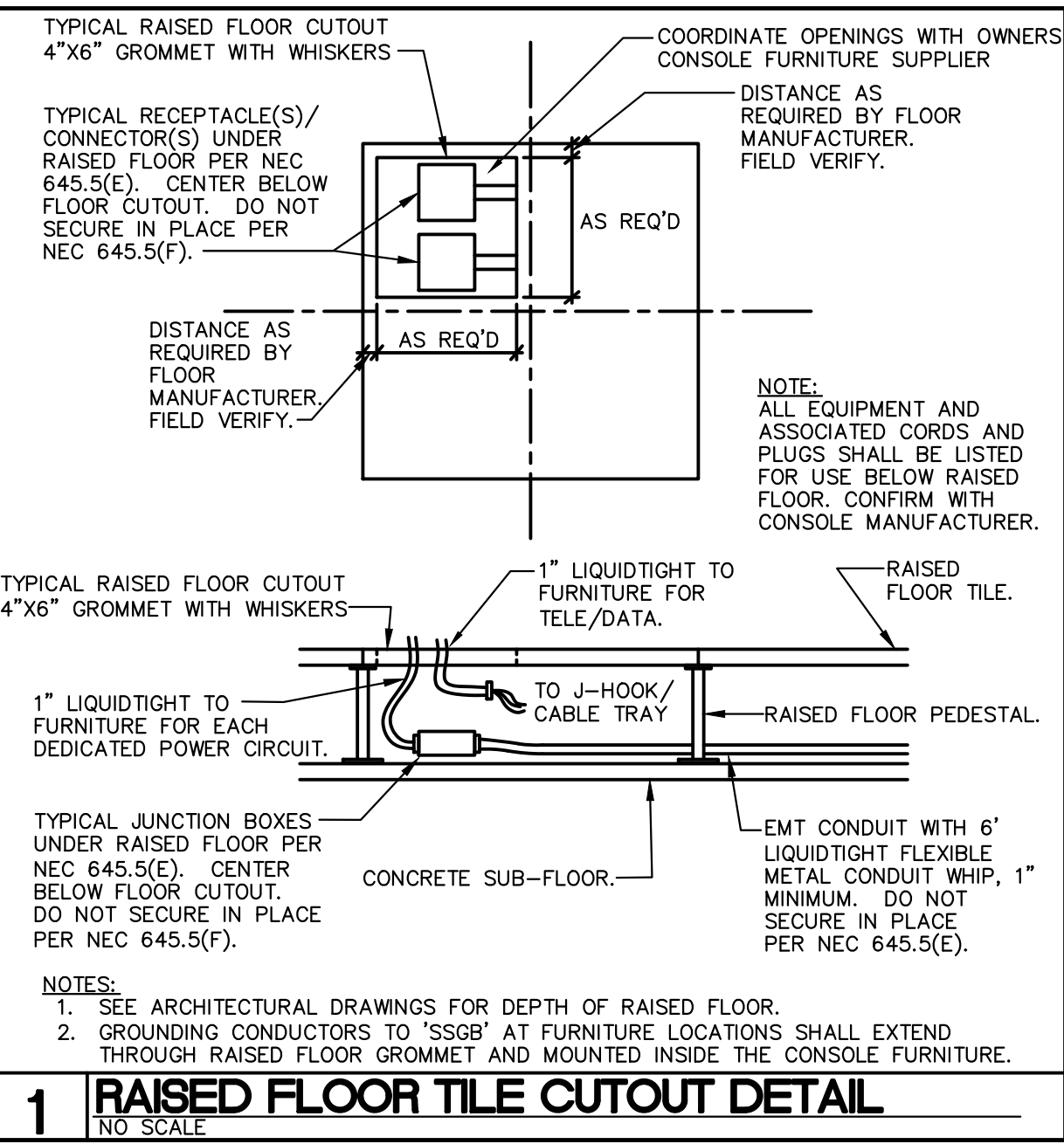
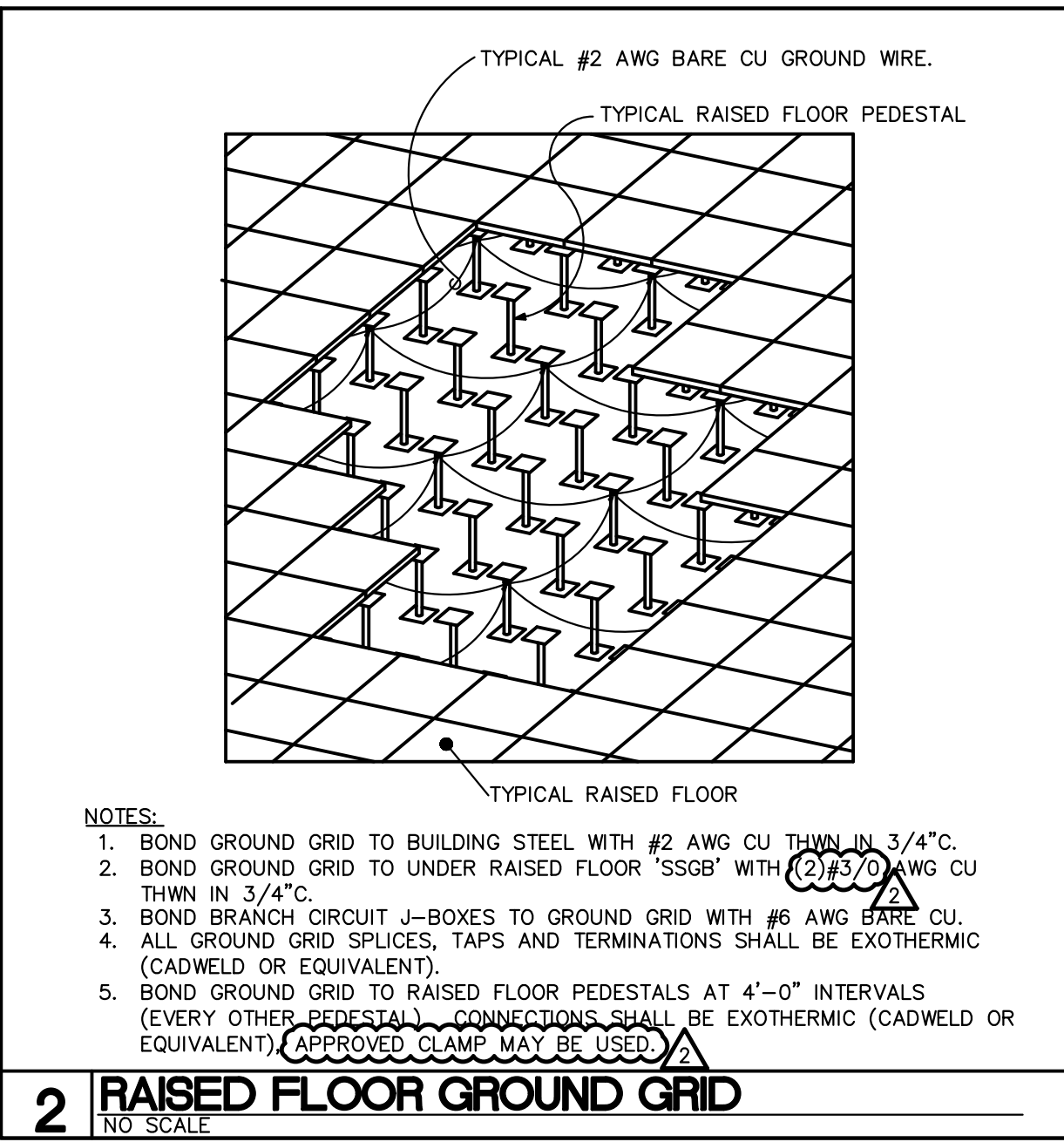
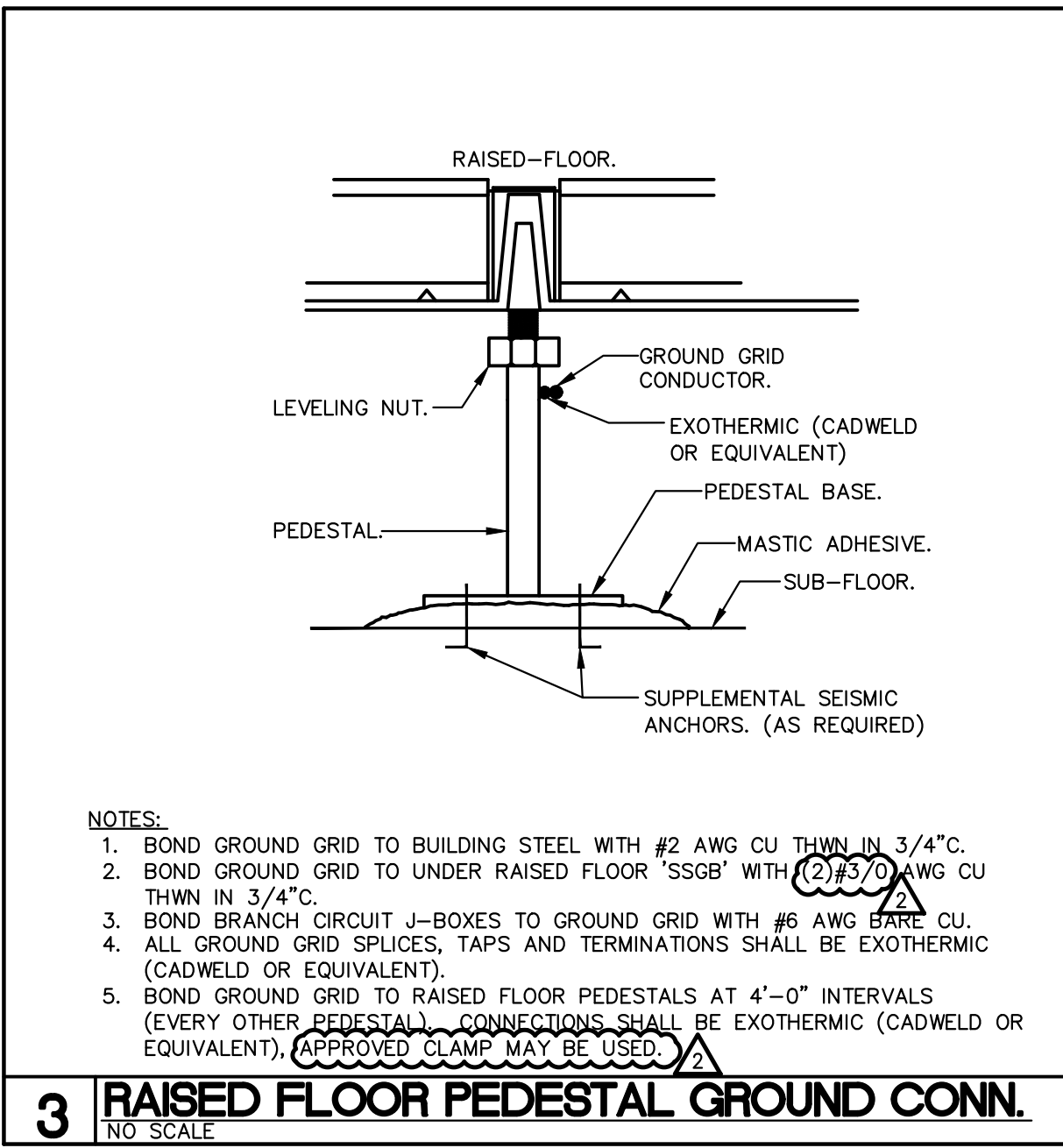
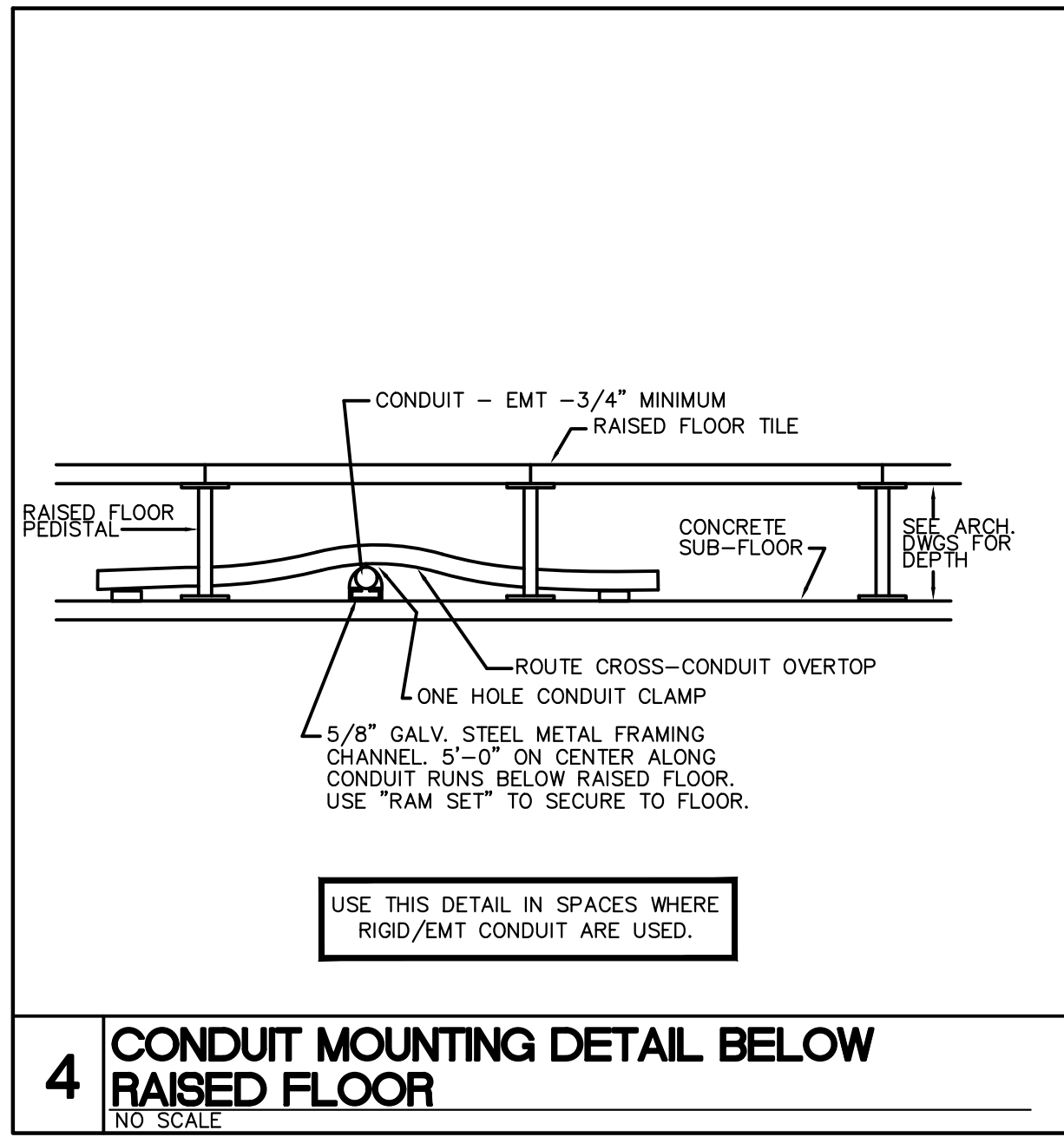
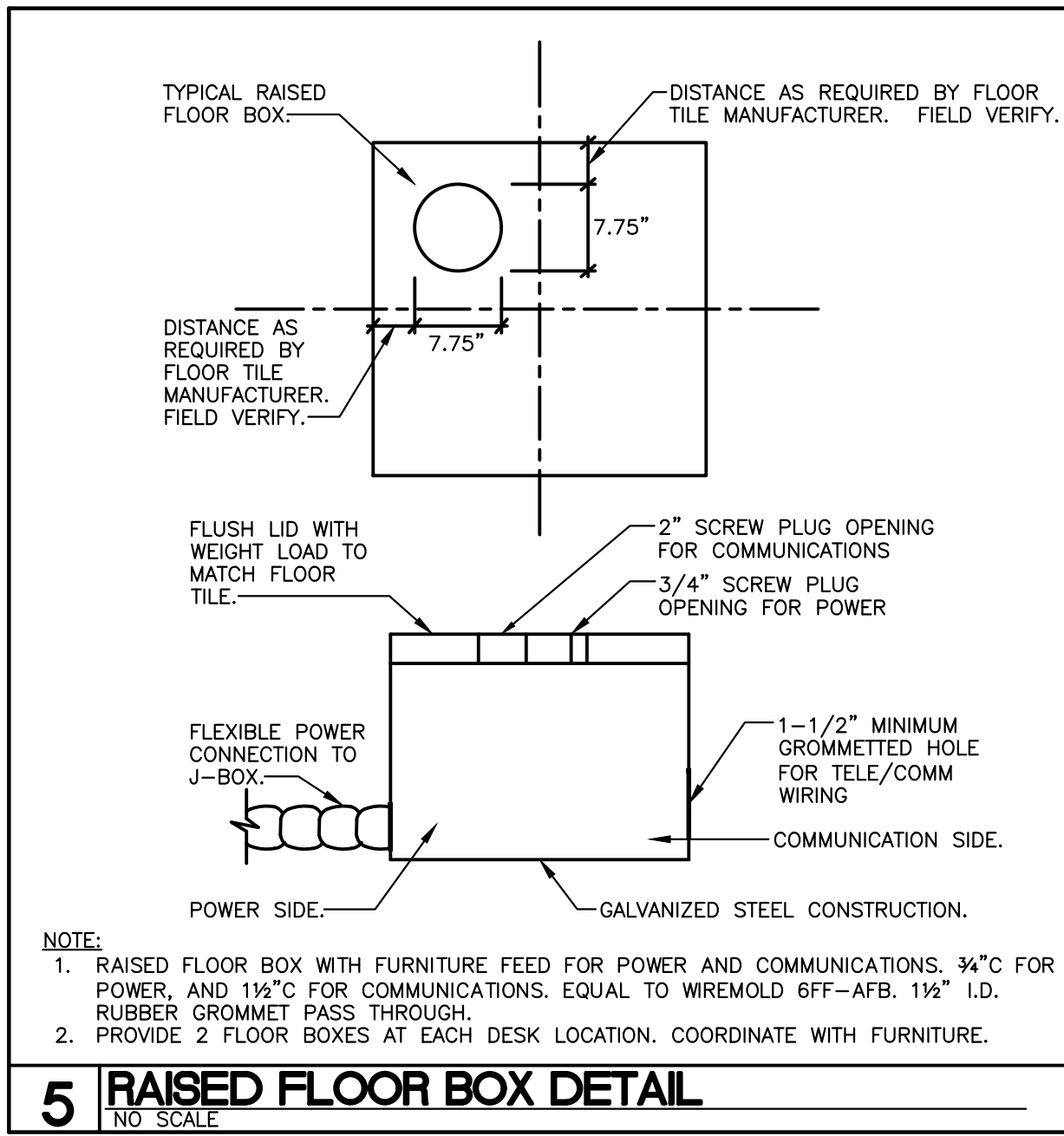


TABLE A - WORKING CLEARANCES

VOLTAGE TO GROUND NOMINAL	MINIMUM CLEAR DISTANCE (FEET)		
	CONDITION: 1	2	3
0 - 150	3	3	3
151 - 600	3	3 1/2	4

WHERE THE "CONDITIONS" ARE AS FOLLOWS:

- EXPOSED LIVE PARTS ON ONE SIDE AND NO LIVE OR GROUNDED PARTS ON THE OTHER SIDE OF THE WORKING SPACE, OR EXPOSED PARTS ON BOTH SIDES EFFECTIVELY GUARDED BY SUITABLE WOOD OR OTHER INSULATING MATERIALS. INSULATED WIRE OR INSULATED BUSBARS OPERATING AT NOT OVER 300V SHALL NOT BE CONSIDERED LIVE PARTS.
- EXPOSED LIVE PARTS ON ONE SIDE AND GROUNDED PARTS ON THE OTHER SIDE.
- EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORK SPACE (NOT GUARDED AS PROVIDED IN CONDITION 1) WITH THE OPERATOR BETWEEN.

NOTES:
THIS FIGURE ILLUSTRATES THE WORKING SPACE IN FRONT OF THE ELECTRICAL EQUIPMENT REQUIRED BY SECTION 110-26 OF THE NATIONAL ELECTRICAL CODE.



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CONSTRUCTION DOCUMENTS

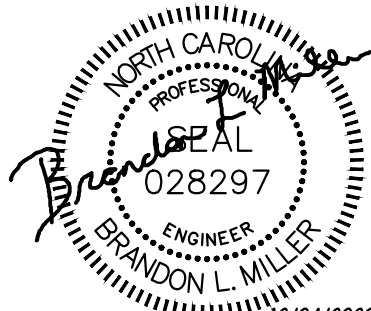
POWER RISER DIAGRAM

DATE 12.04.2020
PROJECT NO 20003

REVISIONS

NUM.	DATE	DESCRIPTION
1	12-17-2020	REVISION #1
2	01-09-2021	REV #2 / ADD1

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SEAL

SHEET NUMBER

E701

BMS SYSTEM POINT LIST (TYP. 2 GENS)

DESIGNATION	DESCRIPTION	UNITS	HARDWIRED POINTS					SOFTWARE POINT	ALARM	TRENDING (Y-N)
			ANALOG INPUT	ANALOG OUTPUT	DIGITAL INPUT	DIGITAL OUTPUT	STATUS			
P-1	VOLTS A-B	VOLTS						X	X	
P-2	VOLTS B-C	VOLTS						X	X	
P-3	VOLTS C-A	VOLTS						X	X	
P-4	CURRENT A	AMPS						X	X	
P-5	CURRENT B	AMPS						X	X	
P-6	CURRENT C	AMPS						X	X	
P-7	WATTS	KW						X	X	
P-8	VOLT AMPERES REACTIVE	KVAR						X	X	
P-9	VOLT AMPERES	KVA						X	X	
P-10	POWER FACTOR	PF						X	X	
P-11	FREQUENCY	HZ						X	X	
P-12	SUMMARY ALARM									X

GENERATORS SHALL BE CAPABLE OF COMMUNICATING VIA MODBUS PROTOCOL. THE GENERATORS SHALL BE WIRED TO THE MAIN SERVICE SWITCHBOARD MSB. AT THIS POINT, THE RS-485 WIRING SHALL BE EXTENDED TO THE BMS. COORDINATE THE SPECIFIC SETUP AND DETAILS OF THESE CONNECTIONS WITH THE BMS SYSTEM CONTROLS CONTRACTOR. COORDINATE DISTANCES OF MODBUS CONNECTIONS IN ORDER TO ACHIEVE OPTIMUM TRANSFER RATES. SEE DETAIL 9 ON DRAWING E007 FOR GENERATORS CONTROL/MONITORING BLOCK DIAGRAM.

UPS SYSTEM POINT LIST

DESIGNATION	DESCRIPTION	UNITS	HARDWIRED POINTS					SOFTWARE POINT	ALARM	TRENDING (Y-N)
			ANALOG INPUT	ANALOG OUTPUT	DIGITAL INPUT	DIGITAL OUTPUT	STATUS			
P-1	VOLTS IN A-B	VOLTS						X	X	
P-2	VOLTS IN B-C	VOLTS						X	X	
P-3	VOLTS IN C-A	VOLTS						X	X	
P-4	VOLTS OUT A-B	VOLTS						X	X	
P-5	VOLTS OUT B-C	VOLTS						X	X	
P-6	VOLTS OUT C-A	VOLTS						X	X	
P-7	CURRENT IN A	AMPS						X	X	
P-8	CURRENT IN B	AMPS						X	X	
P-9	CURRENT IN C	AMPS						X	X	
P-10	CURRENT OUT A	AMPS						X	X	
P-11	CURRENT OUT B	AMPS						X	X	
P-12	CURRENT OUT C	AMPS						X	X	
P-13	WATTS IN	KW						X	X	
P-14	VOLT AMPERES IN	KVA						X	X	
P-15	WATTS OUT	KW						X	X	
P-16	VOLT AMPERES OUT	KVA						X	X	
P-17	PF OUT	PF						X	X	
P-18	FREQUENCY OUT	HZ						X	X	
P-19	SUMMARY ALARM (UPS/BATT)									X

NOTES:

- THE UPS HAS INTEGRAL MONITORING CARDS WHICH WILL COMMUNICATE TO THE BMS FOR REMOTE MONITORING PURPOSES. THE UNIT COLLECTS PERFORMANCE POINTS AND STORES THE VALUES OF THESE POINTS IN REGISTERS WHICH CAN LATER BE RETRIEVED VIA STANDARD MODBUS QUERIES. COORDINATE THE SPECIFIC SETUP AND DETAILS OF THESE CONNECTIONS WITH THE SYSTEM CONTROLS CONTRACTOR. COORDINATE DISTANCES OF CONNECTIONS IN ORDER TO ACHIEVE OPTIMUM TRANSFER RATES.
- ALL NETWORK CABLING SHALL BE CATEGORY 5E CABLE. COORDINATE THE DETAILS OF THESE CONNECTIONS WITH THE SYSTEM CONTROLS CONTRACTOR.
- PROVISIONING OF THE POINTS LISTED HERE SHALL BE COORDINATED WITH OWNER.
- ALL DEVICES SHALL BE PROGRAMMED SO THAT A LOSS OF COMMUNICATION WITH THE DEVICE WILL TRIGGER AN ALARM EVENT.

GENERATOR SYSTEM AND SWITCHBOARD MSB SEQUENCE OF OPERATION

SYSTEM DESCRIPTION:

THIS SEQUENCE OF OPERATION DESCRIBES THE FUNCTIONAL INTENT OF THE GENERATOR SYSTEM AND CONTROL FOR THE MAIN SWITCHBOARD EQUIPMENT. THE SEQUENCE OF OPERATION IS INTENDED FOR BOTH NORMAL AND FAILURE CONDITIONS AND HOW THE SYSTEM WILL REACT TO THESE EVENTS.

THE GENERATOR SYSTEM CONSISTS OF TWO (2) GENERATOR, GEN 1 AND GEN 2. EACH GENERATOR IS RATED FOR 500KW. THE GENERATORS ARE CONNECTED IN PARALLEL VIA THE PARALLELING CABINET. BOTH GENERATORS ARE INTENDED TO OPERATE AS AN 2N (REDUNDANCY) SYSTEM TO SUPPORT THE ECOM-911 AND SUPPORT SPACES AND AS AN N SYSTEM TO SUPPORT THE OVERALL FACILITY. IN ADDITION, THE GENERATOR SYSTEM IS PROVIDED WITH ISOLATED LOAD-BANK BREAKER

GENERATOR, PARALLELING CABINET AND CONTROLS SHALL BE COORDINATED AS A COMPLETE FUNCTIONING PACKAGE.

SEQUENCE OF OPERATION

- UTILITY FAILURE.
 - NORMAL POWER LOSS.
 - START SIGNAL SENT TO THE GENERATORS.
 - BOTH GENERATORS SHALL START. GENERATOR OUTPUT BREAKER SHALL CLOSE TO THE GENERATOR PARALLELING CABINET ONCE VOLTAGE/FREQUENCY IS UP TO RATED.
 - SIGNAL IS SENT FROM GENERATOR SYSTEM TO MSB PLC "BOTH GENS AVAILABLE".
 - MSB PLC SENDS START SIGNAL TO BMS TO START THE MECHANICAL LOAD PER MECHANICAL CONTROL SEQUENCE (SEE MECHANICAL DRAWING). NO LOAD SHED IS REQUIRED.
 - ONCE ALL ACTIVE LOADS ARE ONLINE AFTER 30 MINUTES, MSB PLC WILL MONITOR THE LOAD DEMAND, IF THE RUNNING LOAD IS LESS THAN 95% OF ONE GENERATOR CAPACITY, MSB PLC SHALL SEND SIGNAL TO THE GENERATOR SYSTEM, TO SHUT DOWN 1 GENERATOR.
 - IF DURING THE UTILITY FAILURE SCENARIO, A GENERATOR FAILS TO START AFTER AN ADJUSTABLE TIME DELAY (SET TO 30 SECONDS), A SIGNAL IS SENT TO MSB PLC AND BMS "ONE GEN IS AVAILABLE".
 - BMS MOMENTARILY HOLD MECHANICAL START SIGNALS.
 - MSB PLC VERIFIES LOAD DOES NOT EXCEED CAPACITY OF ONE GENERATOR. IF THE CAPACITY OF ONE GENERATOR IS EXCEEDED, THE NON-CRITICAL LOAD BREAKERS IN MSB ARE SHED (OPEN). THESE PANELS ARE NPH2 AND NPH3. IF THE CAPACITY OF ONE GENERATOR IS NOT EXCEEDED, PROCEED TO NEXT STEP.
 - BMS SENDS START SIGNALS, SEQUENTIALLY, TO THE MECHANICAL LOADS PER THE CONTROL SEQUENCE (SEE MECHANICAL DRAWING). MSB PLC VERIFIES LOAD DOES NOT EXCEED THE CAPACITY OF ONE GENERATOR AFTER EACH LOAD ADD. IF THE CAPACITY OF ONE GENERATOR IS REACHED BEFORE THE ALL MECHANICAL LOADS ARE ADDED, THE NON-CRITICAL LOAD BREAKERS IN THE MSB ARE SHED (OPEN). BMS START SIGNALS CONTINUE.
 - IF BOTH GENERATORS ARE SUPPORTING THE FACILITY AND ONE GENERATOR FAILS, A SIGNAL IS SENT TO MSB PLC & BMS - "ONE GEN AVAILABLE".
 - BMS SHUTS DOWN MECHANICAL LOADS LISTED IN THE CONTROL SEQUENCE (IN REVERSE ORDER OF STARTING, SEE MECHANICAL DRAWING). PROCEED WITH STEP 9 AND 10 ABOVE.

NOTE: GENERATOR SYSTEM SHALL BE OPERATING FOR 30 MINUTES (ADJUSTABLE TIME DELAY) ONCE ONLINE TO AVOID RETRANSFER IN THE EVENT OF SHORT-TIME REESTABLISHMENT OF THE UTILITY POWER SOURCE.

LOAD BANK TEST MODE

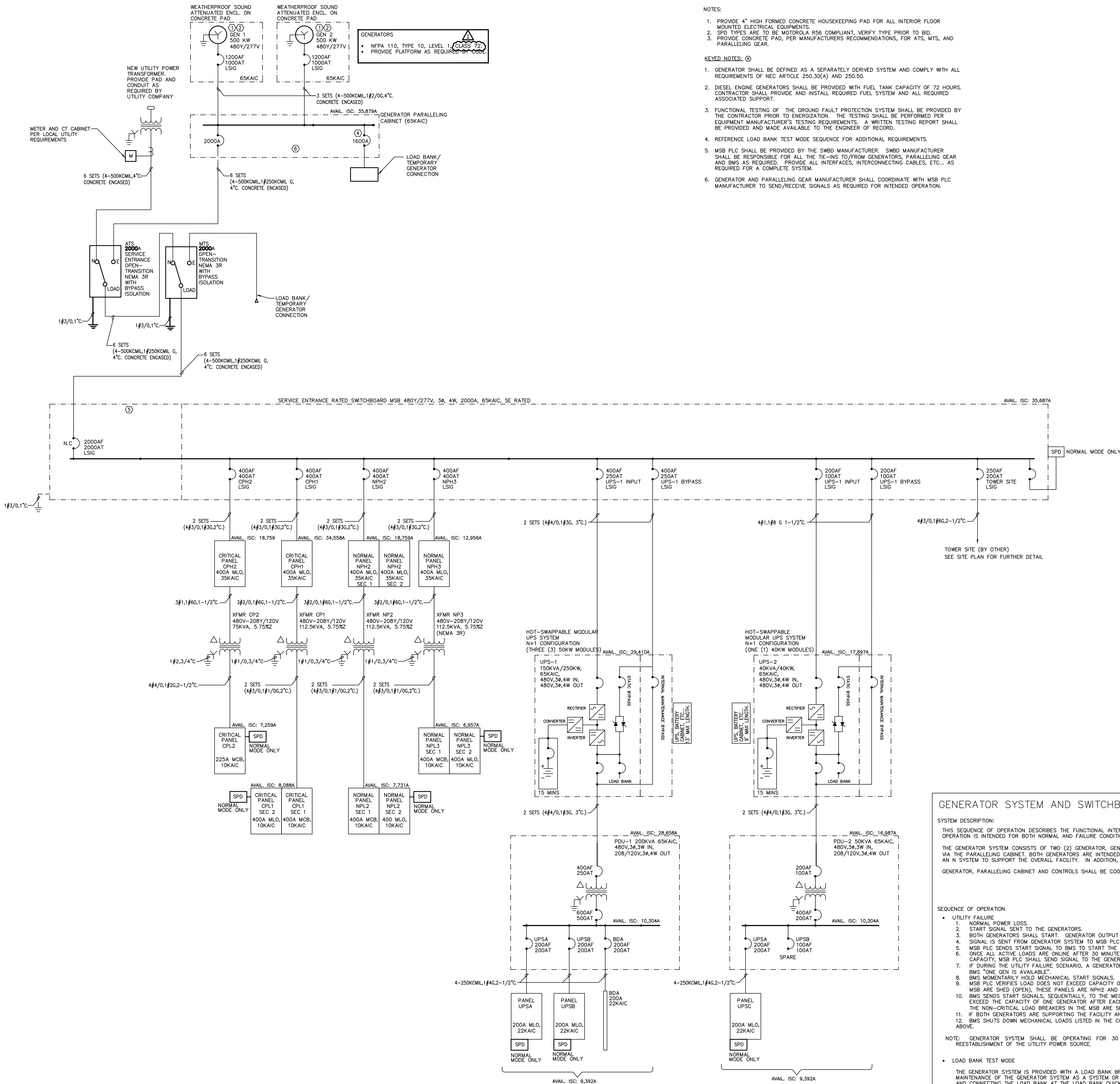
THE GENERATOR SYSTEM IS PROVIDED WITH A LOAD BANK BREAKER AND QUICK CONNECTOR AT THE GENERATOR PARALLELING CABINET WHICH PERMITS LOAD BANK TESTING AND MAINTENANCE OF THE GENERATOR SYSTEM AS A SYSTEM OR SINGLE UNIT. LOAD BANK TESTING IS ACHIEVED BY CLOSING THE LOAD BANK BREAKER ON THE PARALLELING GEAR AND CONNECTING THE LOAD BANK AT THE LOAD BANK QUICK CONNECT. IF THERE IS LOST OF UTILITY DURING A LOAD BANK TESTING, THE GENERATOR LOAD BANK SHALL OPEN AND THE PLC CONTROL SHALL START THE SEQUENCE AND THE GENERATOR SYSTEM SHALL BE OPERATED PER SEQUENCE ABOVE.

NOTES:

- PROVIDE 4" HIGH FORMED CONCRETE HOUSEKEEPING PAD FOR ALL INTERIOR FLOOR MOUNTED ELECTRICAL EQUIPMENTS.
- SPD TYPES ARE TO BE MOTOROLA R56 COMPLIANT, VERIFY TYPE PRIOR TO BID.
- PROVIDE CONCRETE PAD, PER MANUFACTURERS RECOMMENDATIONS, FOR ATS, MTS, AND PARALLELING GEAR.

KEYED NOTES: ⑥

- GENERATOR SHALL BE DEFINED AS A SEPARATELY DERIVED SYSTEM AND COMPLY WITH ALL REQUIREMENTS OF NEC ARTICLE 250.30(A) AND 250.50.
- DIESEL ENGINE GENERATORS SHALL BE PROVIDED WITH FUEL TANK CAPACITY OF 72 HOURS. CONTRACTOR SHALL PROVIDE AND INSTALL REQUIRED FUEL SYSTEM AND ALL REQUIRED ASSOCIATED SUPPORT.
- FUNCTIONAL TESTING OF THE GROUND FAULT PROTECTION SYSTEM SHALL BE PROVIDED BY THE CONTRACTOR PRIOR TO ENERGIZATION. THE TESTING SHALL BE PERFORMED PER EQUIPMENT MANUFACTURER'S TESTING REQUIREMENTS. A WRITTEN TESTING REPORT SHALL BE PROVIDED AND MADE AVAILABLE TO THE ENGINEER OF RECORD.
- REFERENCE LOAD BANK TEST MODE SEQUENCE FOR ADDITIONAL REQUIREMENTS.
- MSB PLC SHALL BE PROVIDED BY THE SWBD MANUFACTURER. SWBD MANUFACTURER SHALL BE RESPONSIBLE FOR ALL THE TIE-INS TO/FROM GENERATORS, PARALLELING GEAR AND BMS AS REQUIRED. PROVIDE ALL INTERFACES, INTERCONNECTING CABLES, ETC... AS REQUIRED FOR A COMPLETE SYSTEM.
- GENERATOR AND PARALLELING GEAR MANUFACTURER SHALL COORDINATE WITH MSB PLC MANUFACTURER TO SEND/RECEIVE SIGNALS AS REQUIRED FOR INTENDED OPERATION.





SAMPSON COUNTY 911 & ES FACILITIES

CLINTON,
NORTH CAROLINA

CONSTRUCTION DOCUMENTS

ELECTRICAL PANEL SCHEDULES

DATE 12.04.2020
PROJECT NO 20003

REVISIONS

NUM.	DATE	DESCRIPTION
1	01-09-2021	REV #2 / ADD1

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SEAL

12/04/2020

SHEET NUMBER **E803**

SWBD: MSB										SQD MFGR								
VOLTAGE: 277 / 480		3 PHASE		4 WIRE		TYPE		MOUNTING: FLOOR		22,000 AIC								
MAIN CIRCUIT BREAKER										65,000 AIC								
MAIN CB NOTES: 6,7,10																		
CKT / ID	LOAD SERVED	BREAKER			FEEDER	NOTES			LOAD KVA									
		FRAME	TRIP	POLE														
1	PANEL "CPH1"	400	400	3	SEE RISER				6	151.6								
2	PANEL "CPH2"	400	400	3	SEE RISER				6	201.4								
3	PANEL "NPH2"	400	400	3	SEE RISER				6, 10	197.5								
4	PANEL "NPH3"	400	400	3	SEE RISER				6, 10	123.9								
5	UPS-1 INPUT (UPSA & UPSB VIA PDU-1)	400	250	3	SEE RISER				6, 10	80.3								
6	UPS-1 BYPASS	400	250	3	SEE RISER				6	0.0								
7	UPS-2 INPUT (UPSC VIA PDU-2)	200	100	3	SEE RISER				6, 10	22.8								
8	UPS-2 BYPASS	200	100	3	SEE RISER					0.0								
9	RTU-3	100	80	3	4W3.1W8 G 1-1/4"					52.4								
10	RTU-4	100	80	3	4W3.1W8 G 1-1/4"					52.4								
11	AC-1	100	80	3	4W3.1W8 G 1-1/4"					49.8								
12	AC-2	100	80	3	4W3.1W8 G 1-1/4"					49.8								
13	SPARE	250	250	3						0.0								
14	SPARE	250	250	3						0.0								
15	SPARE	250	250	3						0.0								
16	SPD	100	60	3						0.0								
17																		
18																		
19																		
20																		
21																		
TOTAL (CONNECTED)										982								
LOAD (KVA)																		
LIGHTS																		
HEATING																		
COOLING																		
VENTILATION																		
MOTORS																		
KITCHEN																		
REC. (1st 10KVA)																		
REC. (>10KVA)																		
WATER HEATER																		
MISC.																		
SPARE																		
TOTAL (KVA)																		

TOTAL LOAD PER PHASE										NOTES: 1. THIS SWBD SHALL BE UTILIZED FOR USES AS SET EQUIP. 2. ALL BREAKS SHALL BE FULLY RATED - NO SERIES RATED. 3. ALL BUSSING, INCL. GND AND NEUTRAL, SHALL BE COPPER. 4. ALL INCOMING BUS & BREAKER LUGS SHALL MATCH FEEDERS. 5. PROVIDE WITH TYPE 2 SPD (120MA MODE, 240KA IPH SEMI). 6. PROVIDE BREAK WITH ACUSTO-BLEBS & GFF TRIP FUNCTIONS. 7. BREAKER SHALL INCL. REDUCED ENERGY LET THRU (REL.T). 8. PROVIDE SWBD WITH POWER METER, SO-D PM280 OR EQUIV. 9. PROVIDE METER WITH NETWORK INTERFACE CARD (N.I.C.). 10. PROVIDE SHUNT-TRIP BREAKER
CONNECTED										
DEMAND										
A = 328.3 KVA 1220.8 A										
B = 309.3 KVA 1096.5 A										
C = 293.3 KVA 1058.3 A										
DEMAND @ 125%										
A = 422.9 KVA 1526.0 A										
B = 379.9 KVA 1370.7 A										
C = 366.6 KVA 1322.9 A										

PANEL: UPSA										SQD MFGR	
VOLTAGE: 120 / 208				3 PHASE		4 WIRE		TYPE			
MOUNTING: SURFACE				200 AMP		MAIN CIRCUIT BREAKER		22,000 AIC			
LOAD KVA	LOAD SERVED	WIRE	TRIP	NOTES	CKT NO	A	B	C	NO		
0.80	911 DISPATCH TRAIN - DESK #1	12	20		1	●	●	●	2		
0.80	911 DISPATCH TRAIN - DESK #1	12	20		2	●	●	●	3		
0.80	911 DISPATCH TRAIN - DESK #2	12	20		3	●	●	●	4		
0.80	911 DISPATCH - DESK #5	12	20		7	●	●	●	8		
0.80	911 DISPATCH - DESK #6	12	20		9	●	●	●	10		
0.80	911 DISPATCH - DESK #6	12	20		11	●	●	●	12		
0.80	911 DISPATCH - DESK #6	12	20		13	●	●	●	14		
0.80	911 DISPATCH - DESK #7	12	20		15	●	●	●	16		
0.80	911 DISPATCH - DESK #8	12	20		17	●	●	●	18		
0.80	911 DISPATCH - DESK #8	12	20		19	●	●	●	20		
0.80	911 DISPATCH TRAIN - DESK #3	12	20		21	●	●	●	22		
0.00	SPARE	20	23		24	●	●	●	25		
0.00	SPARE	20	23		26	●	●	●	27		
0.00	SPARE	20	23		28	●	●	●	29		
0.00	SPARE	20	23		30	●	●	●	31		
0.00	SPARE	20	31		32	●	●	●	33		
0.00	SPARE	20	33		34	●	●	●	35		
0.00	SPARE	20	35		36	●	●	●	37		
0.00	SPARE	20	37		38	●	●	●	39		
0.00	SPD	10	30		39	●	●	●	40		
0.00	TYPE 2A	10	30		41	●	●	●	42		
SUB-TOTALS										8.1	
LOAD (KVA)	COM	D.F.	DMD	TOTAL LOAD PER PHASE				NOTES			
LIGHTS	1.00	1.25	0.0	1. CONNECTED				1. BREAKER FRAME SHALL BE AS REQD PER PANEL AIC RATING			
HEATING	0.00	1.00	0.0	A =	7.6 KVA	59.5 A	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED				
COOLING	0.00	1.00	0.0	B =	5.6 KVA	46.2 A	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER				
VENTILATION	0.00	1.00	0.0	C =	4.3 KVA	35.4 A	4. ALL INCOMING PANEL & BKR LOGS SHALL MATCH FEEDERS				
MOTORS	1.8	1.00	1.8	DEMAND				5. PROVIDE HINGED DOOR IN DOOR WITH OUTER DOOR LOCK			
KITCHEN	0.05	1.00	0.0	A =	7.1 KVA	59.5 A	6. PROVIDE MECH. DIRECTORY FRAME				
REC. (1st 10KW)	0.00	1.00	0.0	B =	5.6 KVA	46.2 A					
REC. (>10KW)	0.00	0.50	0.0	C =	4.3 KVA	35.4 A					
WATER HEATER	0.00	1.00	0.0	DEMAND @ 125%							
MISC	15.1	1.00	15.1	A =	6.9 KVA	74.3 A					
SPARE	0.00	1.00	0.0	B =	6.9 KVA	57.8 A					
TOTAL (KVA)	16.9	16.9	16.9	C =	5.3 KVA	44.2 A					

PANEL: UPSB										SQD MFGR				
VOLTAGE: 120 / 208		3 PHASE		4 WIRE		TYPE				MOUNTING: SURFACE				
200 AMP		MAIN		CIRCUIT BREAKER		22,000 AIC								
LOAD KVA	LOAD SERVED	WIRE	TRIP	NOTES	CKT NO	A	B	C	CKT NO	NOTES	TRIP	WIRE	LOAD SERVED	LOAD KVA
0.80	911 DISPATCH TRAIN - DESK #1	12	20	1	1	4	2		2	20	12	911 DISPATCH - DESK #1		0.80
0.80	911 DISPATCH TRAIN - DESK #2	12	20	2	2	4	2		2	20	12	911 DISPATCH - DESK #1		0.80
0.80	911 DISPATCH TRAIN - DESK #2	12	20	3	3	4	2		2	20	12	911 DISPATCH - DESK #2		0.80
0.80	911 DISPATCH - DESK #5	12	20	4	4	4	2		2	20	12	911 DISPATCH - DESK #3		0.80
0.80	911 DISPATCH - DESK #5	12	20	5	5	4	2		2	20	12	911 DISPATCH - DESK #3		0.80
0.80	911 DISPATCH - DESK #5	12	20	6	6	4	2		2	20	12	911 DISPATCH - DESK #3		0.80
0.80	911 DISPATCH - DESK #5	12	20	7	7	4	2		2	20	12	911 DISPATCH - DESK #3		0.80
0.80	911 DISPATCH - DESK #5	12	20	8	8	4	2		2	20	12	911 DISPATCH - DESK #3		0.80
0.80	911 DISPATCH - DESK #5	12	20	9	9	4	2		2	20	12	911 DISPATCH - DESK #3		0.80
0.80	911 DISPATCH - DESK #7	12	20	10	10	4	2		2	20	12	911 DISPATCH - DESK #4		0.80
0.80	911 DISPATCH - DESK #7	12	20	11	11	4	2		2	20	12	TVS - 911 DISPATCH		0.90
0.80	911 DISPATCH - DESK #7	12	20	12	12	4	2		2	20	12	TVS - 911 DISPATCH		0.90
0.80	911 DISPATCH - DESK #7	12	20	13	13	4	2		2	20	12	TVS - 911 DISPATCH TRAINING		0.72
0.80	911 DISPATCH TRAIN - DESK #3	12	20	14	14	4	2		2	20	12	REC - SERVER/RT ROOM		0.54
0.20	MECHANICAL CONTROLS - 911	12	20	15	15	4	2		2	20	12	LEAK DETECTION PANEL		0.20
0.00	SPARE			16	16	4	2		2	20	12	SECURITY CONTROLS - 911		0.50
0.00	SPARE			17	17	4	2		2	20	12	SECURITY CONTROLS - 911		0.50
0.00	SPARE			18	18	4	2		2	20	12	SECURITY CONTROLS - 911		0.50
0.00	SPARE			19	19	4	2		2	20	12	TVS - 911 DISPATCH		0.90
0.00	SPARE			20	20	4	2		2	20	12	SPARE		0.00
0.00	SPARE			21	21	4	2		2	20	12	SPARE		0.00
0.00	SPARE			22	22	4	2		2	20	12	SPARE		0.00
0.00	SPARE			23	23	4	2		2	20	12	SPARE		0.00
0.00	SPARE			24	24	4	2		2	20	12	SPARE		0.00
0.00	SPARE			25	25	4	2		2	20	12	SPARE		0.00
0.00	SPARE			26	26	4	2		2	20	12	SPARE		0.00
0.00	SPARE			27	27	4	2		2	20	12	SPARE		0.00
0.00	SPARE			28	28	4	2		2	20	12	SPARE		0.00
0.00	SPARE			29	29	4	2		2	20	12	SPARE		0.00
0.00	SPARE			30	30	4	2		2	20	12	SPARE		0.00
0.00	SPARE			31	31	4	2		2	20	12	SPARE		0.00
0.00	SPARE			32	32	4	2		2	20	12	SPARE		0.00
0.00	SPARE			33	33	4	2		2	20	12	SPARE		0.00
0.00	SPARE			34	34	4	2		2	20	12	SPARE		0.00
0.00	SPARE			35	35	4	2		2	20	12	SPARE		0.00
0.00	SPARE			36	36	4	2		2	20	12	SPARE		0.00
0.00	SPARE			37	37	4	2		2	20	12	SPARE		0.00
0.00	SPARE			38	38	4	2		2	20	12	SPARE		0.00
0.00	SPARE			39	39	4	2		2	20	12	SPARE		0.00
0.00	SPARE			40	40	4	2		2	20	12	SPARE		0.00
0.00	SPARE			41	41	4	2		2	20	12	SPARE		0.00
0.00	SPARE			42	42	4	2		2	20	12	SPARE		0.00
0.00	SPARE			43	43	4	2		2	20	12	SPARE		0.00
0.00	SPARE			44	44	4	2		2	20	12	SPARE		0.00
0.00	SPARE			45	45	4	2		2	20	12	SPARE		0.00
0.00	SPARE			46	46	4	2		2	20	12	SPARE		0.00
0.00	SPARE			47	47	4	2		2	20	12	SPARE		0.00
0.00	SPARE			48	48	4	2		2	20	12	SPARE		0.00
0.00	SPARE			49	49	4	2		2	20	12	SPARE		0.00
0.00	SPARE			50	50	4	2		2	20	12	SPARE		0.00
0.00	SPARE			51	51	4	2		2	20	12	SPARE		0.00
0.00	SPARE			52	52	4	2		2	20	12	SPARE		0.00
0.00	SPARE			53	53	4	2		2	20	12	SPARE		0.00
0.00	SPARE			54	54	4	2		2	20	12	SPARE		0.00
0.00	SPARE			55	55	4	2		2	20	12	SPARE		0.00
0.00	SPARE			56	56	4	2		2	20	12	SPARE		0.00
0.00	SPARE			57	57	4	2		2	20	12	SPARE		0.00
0.00	SPARE			58	58	4	2		2	20	12	SPARE		0.00
0.00	SPARE			59	59	4	2		2	20	12	SPARE		0.00
0.00	SPARE			60	60	4	2		2	20	12	SPARE		0.00
0.00	SPARE			61	61	4	2		2	20	12	SPARE		0.00
0.00	SPARE			62	62	4	2		2	20	12	SPARE		0.00
0.00	SPARE			63	63	4	2		2	20	12	SPARE		0.00
0.00	SPARE			64	64	4	2		2	20	12	SPARE		0.00
0.00	SPARE			65	65	4	2		2	20	12	SPARE		0.00
0.00	SPARE			66	66	4	2		2	20	12	SPARE		0.00
0.00	SPARE			67	67	4	2		2	20	12	SPARE		0.00
0.00	SPARE			68	68	4	2		2	20	12	SPARE		0.00
0.00	SPARE			69	69	4	2		2	20	12	SPARE		0.00
0.00	SPARE			70	70	4	2		2	20	12	SPARE		0.00
0.00	SPARE			71	71	4	2		2	20	12	SPARE		0.00
0.00	SPARE			72	72	4	2		2	20	12	SPARE		0.00
0.00	SPARE			73	73	4	2		2	20	12	SPARE		0.00
0.00	SPARE			74	74	4	2		2	20	12	SPARE		0.00
0.00	SPARE			75	75	4	2		2	20	12	SPARE		0.00
0.00	SPARE			76	76	4	2		2	20	12	SPARE		0.00
0.00	SPARE			77	77	4	2		2	20	12	SPARE		0.00
0.00	SPARE			78	78	4	2		2	20	12	SPARE		0.00
0.00	SPARE			79	79	4	2		2	20	12	SPARE		0.00
0.00	SPARE			80	80	4	2		2	20	12	SPARE		0.00
0.00	SPARE			81	81	4	2		2	20	12	SPARE		0.00
0.00	SPARE			82	82	4	2		2	20	12	SPARE		0.00
0.00	SPARE			83	83	4	2		2	20	12	SPARE		0.00
0.00	SPARE			84	84	4	2		2	20	12	SPARE		0.00
0.00	SPARE			85	85	4	2		2	20	12	SPARE		0.00
0.00	SPARE			86	86	4	2		2	20	12	SPARE		0.00
0.00	SPARE			87	87	4	2		2	20	12	SPARE		0.00
0.00	SPARE			88	88	4	2		2	20	12	SPARE		0.00
0.00	SPARE			89	89	4	2		2	20	12	SPARE		0.00
0.00	SPARE			90	90	4	2		2	20	12	SPARE		0.00
0.00	SPARE			91	91	4	2		2	20	12	SPARE		0.00
0.00	SPARE			92	92	4	2		2	20	12	SPARE		0.00
0.00	SPARE			93	93	4	2		2	20	12	SPARE		0.00
0.00	SPARE			94	94	4	2		2	20	12	SPARE		0.00
0.00	SPARE			95	95	4	2		2	20	12	SPARE		0.00
0.00	SPARE			96	96	4	2		2	20	12	SPARE		0.00
0.00	SPARE			97	97	4	2		2	20	12	SPARE		0.00
0.00	SPARE			98	98	4	2		2	20	12	SPARE		0.00
0.00	SPARE			99	99	4	2		2	20	12	SPARE		0.00
0.00	SPARE			100	100	4	2		2	20	12	SPARE		0.00
0.00	SPARE			101	101	4	2		2	20	12	SPARE		0.00
0.00	SPARE			102	102	4	2		2	20	12	SPARE		0.00
0.00	SPARE			103	103	4	2		2	20	12	SPARE		0.00
0.00	SPARE			104	104	4	2		2	20	12	SPARE		0.00
0.00	SPARE			105	105	4	2		2	20	12	SPARE		0.00
0.00	SPARE			106	106	4	2		2	20	12	SPARE		0.00
0.00	SPARE			107	107	4	2		2	20	12	SPARE		0.00
0.00	SPARE			108	108	4	2		2	20	12	SPARE		0.00
0.00	SPARE			109	109	4	2		2	20	12	SPARE		0.00
0.00	SPARE			110	110	4	2		2	20	12	SPARE		0.00
0.00	SPARE			111	111	4	2		2	20	12	SPARE		0.00
0.00	SPARE			112	112	4	2		2	20	12	SPARE		0.00
0.00	SPARE			113	113	4	2		2	20	12	SPARE		0.00
0.00	SPARE			114	114	4	2		2	20	12	SPARE		0.00
0.00	SPARE			115	115	4	2		2	20	12	SPARE		0.00
0.00	SPARE			116	116	4	2		2	20	12	SPARE		0.00
0.00	SPARE			117	117	4	2		2	20	12	SPARE		0.00
0.00	SPARE			118	118	4	2		2	20	12	SPARE		0.00
0.00	SPARE			119	119	4	2		2	20	12	SPARE		0.00
0.00	SPARE			120	120	4	2		2	20	12	SPARE		

PANEL: UPSC														SQD MFGR	TYPE
VOLTAGE: 120 / 208				3 PHASE				4 WIRE							
MOUNTING: SURFACE				200 AMP				MAIN CIRCUIT BREAKER				22,000 AIC			
LOAD KVA	LOAD SERVED	WIRE	TRIP	NOTES	CKT NO	A	B	C	CKT NO	NOTES	WIRE	TRIP	LOAD SERVED	LOAD KVA	
1.00 REC -049		12	20		1	●	●	●	2		20	12	REC -049	1.00	
1.08 REC -058		12	20		3	●	●	●	4		20	12	REC -046	1.23	
1.44 REC -058		12	20		5	●	●	●	6		20	12	REC -058	1.08	
1.08 REC -058		12	20		7	●	●	●	8		20	12	REC -058	1.44	
1.44 REC -058		12	20		9	●	●	●	10		20	12	REC -058 (FLOORBOX)	1.08	
0.72 REC -058 (FLOORBOX)		12	20		11	●	●	●	12		20	12	REC -058 (FLOORBOX)	0.72	
0.72 REC -058 (FLOORBOX)		12	20		13	●	●	●	14		20	12	REC -058 (FLOORBOX)	0.72	
1.00 REC -042		12	20		15	●	●	●	16		20	12	REC -042	1.00	
1.00 REC -042		12	20		17	●	●	●	18		30	10	208V REC -042	1.00	
0.18 REC -058		12	20		19	●	●	●	20					1.50	
0.20 BAS PANEL		12	20		21	●	●	●	22		20	12	SECURITY CONTROLS - MAIN	0.50	
0.00 SPARE		20	23		23	●	●	●	24		20	12	SECURITY CONTROLS - MAIN	0.50	
0.00 SPARE		20	25		25	●	●	●	26		20	12	SECURITY CONTROLS - MAIN	0.50	
0.00 SPARE		20	27		27	●	●	●	28		20	12	SECURITY CONTROLS - EMS	0.50	
0.00 SPARE		20	29		29	●	●	●	30		20	12	SECURITY CONTROLS - EMS	0.50	
0.00 SPARE		20	31		31	●	●	●	32		20		SPARE	0.00	
0.00 SPARE		20	33		33	●	●	●	34		20		SPARE	0.00	
0.00 SPARE		20	35		35	●	●	●	36		20		SPARE	0.00	
0.00 SPARE		20	37		37	●	●	●	38		20		SPARE	0.00	
0.00 SPD		10	30		39	●	●	●	40		20		SPARE	0.00	
0.00 TYPE 2A		10	30		41	●	●	●	42		20		SPARE	0.00	
SUB-TOTALS														12.99	
LOAD (KVA)	COM	D.F.	DMD	TOTAL LOAD PER PHASE				NOTES							
LIGHTS	0.0	1.25	0.0	A =	8.1 KVA	67.8 A		1. BREAKER PANEL SHALL BE READ PER PANEL A CIRCUIT							
HEATING	0.0	1.00	0.0	A =	7.5 KVA	59.6 A		2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED							
COOLING	0.0	1.00	0.0	B =	7.2 KVA	56.1 A		3. ALL BUSSING, IGL, GND AND NEUTRAL, SHALL BE COPPER							
VENTILATION	0.0	1.00	0.0	C =	7.5 KVA	62.1 A		4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS							
MOTORS	0.0	1.00	0.0	DEMAND				5. PROVIDE HINGED DOOR-IN DOOR WITH OUTER DOOR LOCK							
KITCHEN	0.0	0.65	0.0	A =	7.8 KVA	64.8 A		6. PROVIDE MASTER DIRECTORY FRAME							
REC. (1st 10KVA)	10.0	1.00	10.0	A =	6.8 KVA	56.8 A									
REC. (>10KVA)	2.1	0.50	1.0	C =	7.1 KVA	59.3 A									
WATER HEATER	0.0	1.00	0.0	DEMAND @ 125%											
MISC	10.7	1.00	10.7	A =	9.7 KVA	81.0 A									
SPARE	0.0	1.00	0.0	B =	8.5 KVA	71.0 A									
TOTAL (KVA)	22.8		21.7	C =	8.9 KVA	74.1 A									