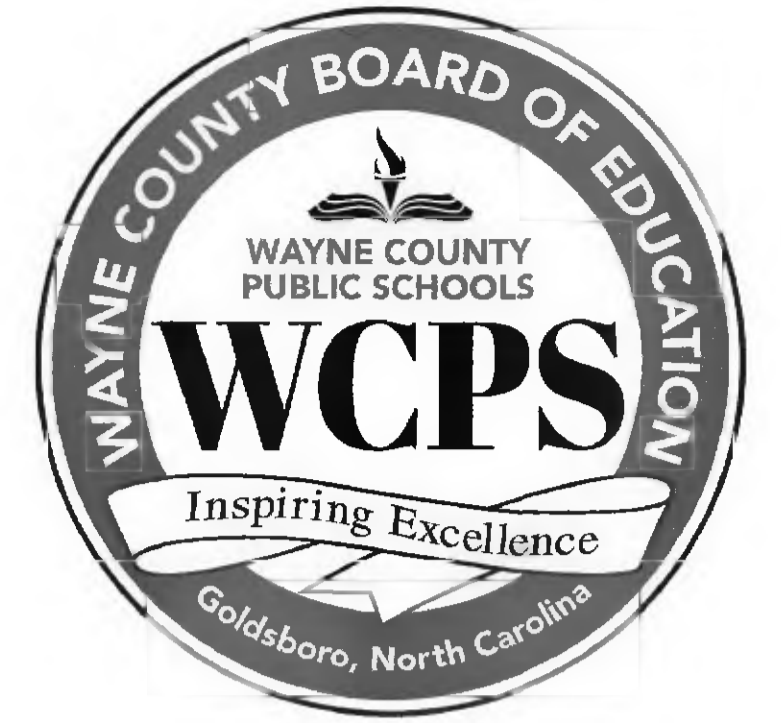


**ROSEWOOD ELEMENTARY SCHOOL
CLASSROOM ADDITON
GOLDSBORO, NC
WAYNE COUNTY**



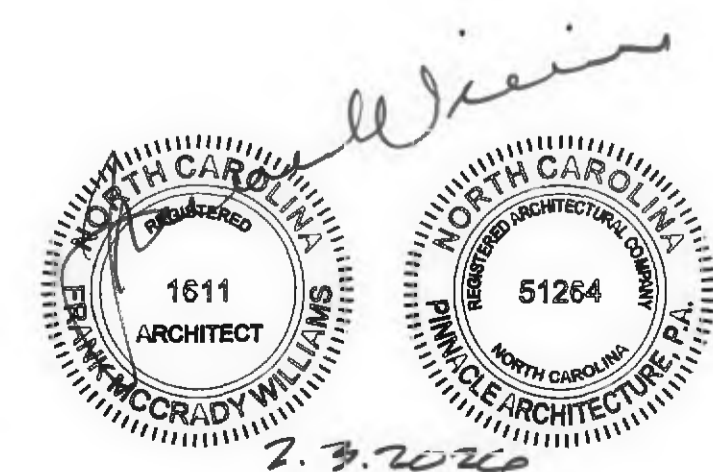
A100	COVER SHEET	S100	FOUNDATION/ SLAB PLAN	M203	MECHANICAL PIPING OVERALL
A101	CODE SUMMARY	S101	ROOF FRAMING PLAN		LARGE SCALE PLAN
A102	LIFE SAFETY PLAN	S200	GENERAL NOTES & SPECIAL	M300	MECHANICAL DETAILS
A103	UL DETAILS		INSPECTION REQUIREMENTS	M301	MECHANICAL DETAILS
A104	ACCESSIBILITY REQUIREMENTS	S201	TYPICAL SECTIONS & DETAILS	E100	ELECTRICAL SYMBOLS &
TBD	SITE PLAN	S202	SECTIONS & DETAILS		SCHEDULES
		S203	SECTIONS & DETAILS	E101	ELECTRICAL OVERALL LARGE
A200	FLOOR PLAN	S204	SECTIONS & DETAILS		SCALE PLAN
A201	REFLECTED CEILING PLAN, NOTES & DETAILS	S205	SECTIONS & DETAILS	E200	ELECTRICAL FLOOR PLAN -
					LIGHTING
A202	WALL TYPES, ROOF PLAN & DETAILS	P100	PLUMBING SCHEDULES	E300	ELECTRICAL FLOOR PLAN -
		P200	PLUMBING WATER FLOOR PLAN		POWER
A300	EXTERIOR ELEVATIONS	P300	PLUMBING WASTE FLOOR PLAN	E400	ELECTRICAL RISER DIAGRAMS
A400	WALL SECTIONS & DETAILS	P400	PLUMBING DETAILS	E500	ELECTRICAL DETAILS
A401	WALL SECTIONS			E600	ELECTRICAL PANEL
A402	WALL DETAILS	M100	MECHANICAL SCHEDULES		SCHEDULES
A500	CASEWORK ELEVATIONS, SECTIONS & DETAILS	M101	MECHANICAL SCHEDULES	E700	ELECTRICAL SPECIFICATIONS
		M102	MECHANICAL SCHEDULES	E701	ELECTRICAL SPECIFICATIONS
A600	ROOM FINISH SCHEDULE, ENLARGED TOILET PLANS	M200	MECHANICAL FLOOR PLAN	E702	ELECTRICAL SPECIFICATIONS
		M201	MECHANICAL PIPING FLOOR PLAN	E703	ELECTRICAL SPECIFICATIONS
A601	DOOR & FRAME SCHEDULES, STYLES, WINDOW STYLES & DETAILS	M202	MECHANICAL PIPING FLOOR PLANS	E704	ELECTRICAL SPECIFICATIONS
				E705	ELECTRICAL SPECIFICATIONS



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REVISION SCHEDULE

DATE	REFERENCE

A100

**2018 BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS**
(Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: ROSEWOOD ELEMENTARY SCHOOL - CLASSROOM ADDITION
 Address: 126 CHARLIE BRASWELL ROAD, GOLDSBORO, NC Zip Code: 27530
 Owner/Authorized Agent: RANDY BAKER Phone: (704) 511-0112 E-Mail: randy@pinnclearchitect.com
 Gained By: Private City/County State
 Code Enforcement Jurisdiction: City County WAYNE State

CONTACT: FRANK M. WILLIAMS, AIA

DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE #	E-MAIL
Architectural	PINNACLE ARCHITECTURE, P.A.	FRANK M. WILLIAMS	1611	(704) 847-9851	jennifer@pinnclearchitect.com
Civil	TIDEWATER ASSOC., INC.	MATTHEW D. KNOTTS	3607B	(704) 521-2112	matthew@mswg.com
Electrical	MSWG ENGINEERS	MATTHEW D. KNOTTS	3607B	(704) 521-2112	matthew@mswg.com
Fire Alarm	MSWG ENGINEERS	J. CRAIG CHAMPION	11250	(704) 521-2112	cchampion@mswg.com
Plumbing	MSWG ENGINEERS	J. CRAIG CHAMPION	11250	(704) 521-2112	cchampion@mswg.com
Mechanical	MSWG ENGINEERS	J. CRAIG CHAMPION	11250	(704) 521-2112	cchampion@mswg.com
Sprinkler-Standpipe	RUGGLES ENGINEERING, PC	RANDY M. RUGGLES	028519	(704) 778-5192	rugglesengineering@embarqmail.com
Structural	RUGGLES ENGINEERING, PC	RANDY M. RUGGLES	028519	(704) 778-5192	rugglesengineering@embarqmail.com
Retaining Walls/High N/A					

2018 NC BUILDING CODE: New Construction 1st Time Interior Completions
 Addition Shell/Core - contact local inspection jurisdiction for possible additional procedures and requirements
 Renovation Phased Construction - Shell Core - contact local inspection jurisdiction for possible additional procedures and requirements

2018 NC EXISTING BUILDING CODE: Prescriptive Alteration Level I Historic Property
 Repair Alteration Level II Change of Use
 Chapter 14 Alteration Level III

CONSTRUCTED: (date) _____ CURRENT OCCUPANCY(S) (Ch. 3): _____
 RENOVATED: (date) _____ PROPOSED OCCUPANCY(S) (Ch. 3): _____
 RISK CATEGORY (Table 1604.5): Current: I II III IV
 Proposed: I II III IV

BUILDING DATA
 Construction Type: I-A I-B II-A II-B III-A III-B IV V-A V-B
 (check all that apply) I-C I-D II-C II-D III-C III-D IV-C IV-D V-C V-D
 Sprinklers: No Partial YES NFPA 13 NFPA 13R NFPA 13D
 Standpipes: No YES Class I II III Wet Dry Yes
 Primary Fire District: No Yes Flood Hazard Area: No Yes
 Special Inspections Required: No YES (contact local inspection jurisdiction for possible additional procedures and requirements)

Gross Building Area Table:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
3rd Floor			
2nd Floor			
Mezzanine			
1st Floor	13,642 S.F.		13,642 S.F.
Basement			
TOTAL	13,642 S.F.		13,642 S.F.

ALLOWABLE AREA
 Primary Occupancy Classification(s):
 Assembly A-1 A-2 A-3 A-4 A-5
 Business
 Educational F-1 Moderate F-2 Low
 Factory H-1 Detonate H-2 Deflagrate H-3 Combust H-4 Health H-5 HPM
 Institutional I-1 I-2 I-3 I-4
 I-1 Condition 1 2
 I-2 Condition 1 2
 I-3 Condition 1 2
 Mercantile R-1 R-2 R-3 R-4
 Residential S-1 Moderate S-2 Low High-Piled
 Storage Parking Garage Open Enclosed Repair Garage
 Utility and Miscellaneous

Accessory Occupancy Classification(s): N/A
 Incidental Uses (Table 504): N/A
 This separation is not exempt as a Non-separated Use (see exceptions).
 Special Uses (Chapter 4 - List Code Sections): N/A
 Special Provisions (Chapter 5 - List Code Sections): N/A
 Mixed Occupancy: No Yes Separation: 2 HR Hr. Exception: N/A

Non-separated Use (503.3) - The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
 See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

Select one

$$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$$

N/A + N/A = N/A ≤ 1.00

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.2 AREA	(C) AREA FOR FRONTAGE INCREASE ⁵	(D) ALLOWABLE AREA PER STORY OR UNLIMITED ³
1st FLOOR	EDUCATION	13,642 S.F.	14,500 S.F.	N/A	14,500 S.F.

1 Perimeter which fronts a public way or open space having 30 feet minimum width = N/A (F)
 2 Total Building Perimeter = N/A (P)
 3 Ratio (F/P) = N/A (F/P)
 4 N = Minimum width of public way = N/A (W)
 5 Percent of frontage increase $i = 100 [F/P - 0.25] \times W/30 = N/A$ (%)
 6 Unlimited area applicable under conditions of Sections 507
 7 Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2)
 8 The maximum area of open parking garages must comply with Table 406.5.4. The maximum area of air traffic control towers must comply with Table 412.3.1
 9 Frontage increase is based on the unsprinkled area value in Table 506.2

ALLOWABLE HEIGHT

	ALLOWABLE	SHOWN ON PLANS	CODE REFERENCE
Building Height in Feet (Table 504.3)	55'	23'-6"	N/A
Building Height in Stories (Table 504.4)	2	1	N/A

1 Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING		DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS
		REQD	PROVIDED (N/A, REDUCTION)				
Structural Frame including columns, girders, trusses			N/A				
Bearing Walls							
Exterior							
North	N/A		N/A				
East	X > 30'		O				
West	10' X X < 30'		O				
South	N/A		N/A				
Interior							
Nonbearing walls and partitions							
Exterior walls							
North	X > 30'		O				
East	N/A		N/A				
West	N/A		N/A				
South	X > 30'		O				
Interior Walls and Partitions							
Floor Construction including supporting beams and joists			N/A				
Floor Ceiling Assembly			N/A				
Columns Supporting Floors			N/A				
Roof Construction including supporting beams and joists			N/A				
Roof Ceiling Assembly			N/A				
Columns Supporting Roof			N/A				
Shaft Enclosures - Exit			N/A				
Shaft Enclosures - Other			N/A				
Corridor Separation	1 HR	1 HR	143/A103/432/403		X-L-1010		
Occupancy/Fire Barrier Separation	2 HR	2 HR			X-L-1010		
Party/Fire Wall Separation	2 HR	2 HR	3/A103	4/05			
Smoke Barrier Separation							
Smoke Partition							
Tenant/Dwelling Unit/Sleeping Unit Separation							
Incidental Use Separation							

FIRE SEPARATION DISTANCE (FEET) FROM PROPERTY LINES	DEGREE OF OPENINGS PROTECTION (TABLE 705.5)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)
N, S, E > 30'	UP, NS	NO LIMIT	N/A
20' < N < 25'	UP, NS	45%	25%

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: Yes No
 Exit Signs: Yes No
 Fire Alarm: Yes No
 Smoke Detection Systems: Yes No Partial
 Carbon Monoxide Detection: Yes No

LIFE SAFETY PLAN REQUIREMENTS

- Life Safety Plan Sheet #: A102
- Fire and/or smoke rated wall locations (Chapter 7)
 - Assumed and real property line locations (if not on the site plan)
 - Exterior wall opening area with respect to distance to occupant load calculation (Table 1004.1.2)
 - Occupant load for each area as it relates to occupant load calculation (Table 1004.1.2)
 - Exit access travel distances (1010)
 - Common path of travel distances (Table 1006.2.1 & 1006.3.2(1))
 - Dead end lengths (1020.4)
 - Clear exit widths for each exit door
 - Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1006.3)
 - Actual occupant load for each exit door
 - A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
 - Location of doors with panic hardware (1010.1.10)
 - Location of doors with delayed egress locks and the amount of delay (1010.1.4.7)
 - Location of doors with electromagnetic egress locks (1010.1.4.4)
 - Location of doors equipped with hold-open devices
 - Location of emergency escape windows (1020)
 - The square footage of each fire area (202)
 - The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
 - Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS (SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ACCESSIBLE PARKING (SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES	# OF ACCESSIBLE SPACES PROVIDED			TOTAL # ACCESSIBLE PROVIDED
		REGULAR WITH 8' ACCESSIBLE	15' ACCESSIBLE	8' ACCESSIBLE	
TOTAL		EXISTING - NO CHANGE			

PLUMBING FIXTURE REQUIREMENTS (TABLE 2902.1)

USE		WATER CLOSETS			URINALS			LAVATORIES			SHOWERS/TUBS	DRINKING FOUNTAINS		
		MALE	FEMALE	UNISEX	MALE	FEMALE	UNISEX	MALE	FEMALE	UNISEX		REGULAR	ACCESSIBLE	
STUDENTS	EXISTING	0	0	0	0	0	0	0	0	0	0	0	0	0
	NEW	3	5	0	2	4	4	0	0	0	1	1		
	REQUIRED	3	5	0	2	4	4	0	0	0	1	1		
TEACHERS	EXISTING	0	0	0	0	0	0	0	0	0	0	0	0	0
	NEW	0	0	1	0	0	0	1	0	0	0	0	0	0
	REQUIRED	0	0	1	0	0	0	1	0	0	0	0	0	0

* URINALS SUBSTITUTED FOR WATER CLOSETS PER SECTION 403.8.3.5 OF NCSPC
 ** URINALS SUBSTITUTED FOR WATER CLOSETS PER SECTION 412.2 OF NCSPC (EDUCATIONAL / ALL OTHER OCCUPANCIES)

SPECIAL APPROVALS

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHS, ICC, etc., describe below)
 LOCAL JURISDICTION

ENERGY SUMMARY

ENERGY REQUIREMENTS:

The following data shall be considered minimum and any special attributes required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan area sheet. If performance method, state the annual energy cost for the standard reference design versus the annual energy cost for the proposed design.

Existing building envelope complies with code: No Yes (The remainder of this section is not applicable.)
 Exempt Building: No Yes (Provide code or statutory reference):

Climate Zone: 3A 4A 5A
 Method of Compliance: Energy Code: Performance Prescriptive
 ASHRAE 90.1: Performance Prescriptive
 Other: Performance (specify source)

THERMAL ENVELOPE (Prescriptive method only)

Roof/Ceiling Assembly (each assembly):
 Description of assembly: STANDING BEAM ROOF, STEEL ATTIC FRAMING & RIGID INSUL.
 U-value of total assembly: 0.04
 R-value of insulation: 25
 Skylights in each assembly: N/A
 U-value of skylight: N/A
 total square footage of skylights in each assembly: N/A

Exterior Walls (each assembly):
 Description of assembly: BRICK, AIR SPACE, RIGID INSUL, EXT. SHEATHING, BATT INSUL, BRICK, AIR SPACE, RIGID INSULATION, CMU, STUD, GYP. BD.
 U-value of total assembly: 0.11
 R-value of insulation: 19.27 Rci (MTL. STUD) / 7.6ci (CMU)
 Opening (windows or doors with glazing): 0.45
 U-value of assembly: 0.45
 Solar heat gain coefficient: N/A
 projection factor: N/A
 Door R-values: 3.23

Walls below grade (each assembly):
 Description of assembly: N/A
 U-value of total assembly: N/A
 R-value of insulation: N/A

Floors over unconditioned space (each assembly):
 Description of assembly: N/A
 U-value of total assembly: N/A
 R-value of insulation: N/A

Floors slab on grade (each assembly):
 Description of assembly: SLAB ON GRADE, WAF. REIN. IV. WASHED STONE
 U-value of total assembly: 1.26
 R-value of insulation: NOT REQUIRED
 Horizontal/vertical requirement: N/A
 slab heated: NO

EXIT REQUIREMENTS

NUMBER AND ARRANGEMENT OF EXITS

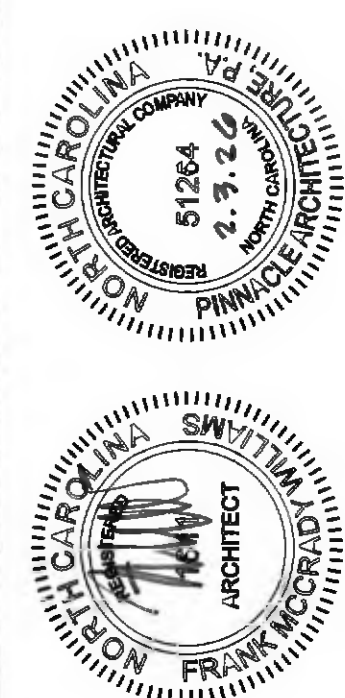
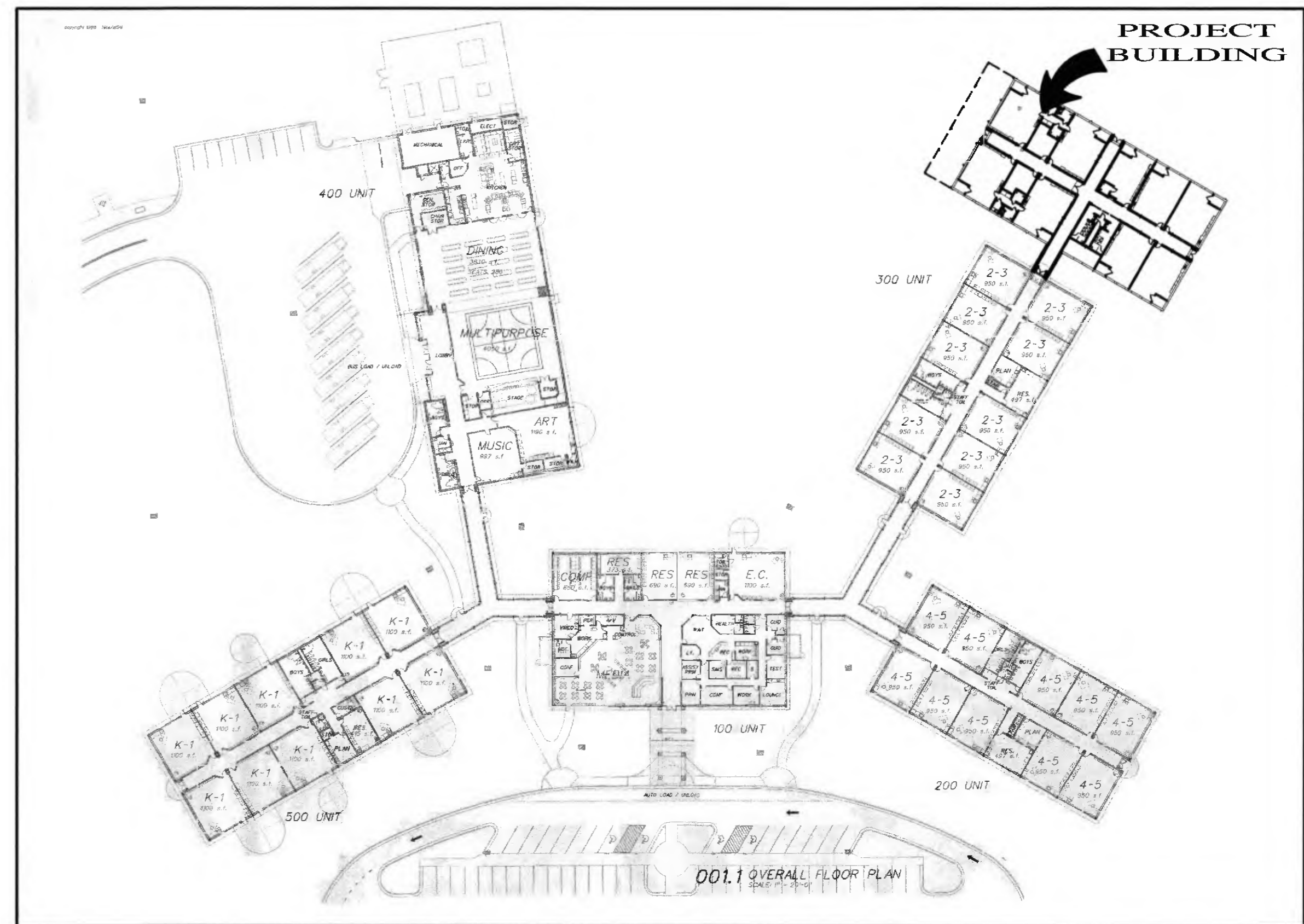
FLOOR, ROOM OR SPACE DESIGNATION	MINIMUM ² NUMBER OF EXITS		TRAVEL DISTANCE	EXIT ACCESS DOORWAY CONFIGURATION ³ (SECTION 1007.1)		
	REQUIRED	SHOWN ON PLANS		ALLOWABLE TRAVEL DISTANCE (TABLE 1017.2)	ACTUAL TRAVEL DISTANCE SHOWN ON PLANS	REQUIRED DISTANCE BETWEEN EXIT DOORS
FIRE AREA I (E)	2	2	200'-0"	134'-11"	60'-0"	66'-11"
FIRE AREA II (E)	2	2	200'-0"	77'-2"	55'-0"	69'-11"

¹ Corridor dead ends (Section 1020.4)
² Minimum stairway width (Section 1011.2); min. corridor width (Section 1020.2); min. door width (Section 1010.1.1)
³ Common Path of Travel (Section 1006.2.1)

EXIT WIDTH

USE GROUP OR SPACE DESCRIPTION	AREA ¹ SQ. FT.	AREA ² PER OCCUPANT (TABLE 1004.1.2)	CALCULATED OCCUPANT LOAD ³ (a-b)	EGRESS WIDTH PER OCCUPANT (1005.3)			EXIT WIDTH (w) ^{2,3,4,5,6}		
				STAIR	LEVEL	STAIR	LEVEL	STAIR	LEVEL
FIRE AREA I (E)	4,152 S.F.	20 S.F./NET	209	0.3	0.2	N/A	42"	N/A	120"
FIRE AREA II (E)	4,283 S.F.	20 S.F./NET	219	0.3	0.2	N/A	44"	N/A	152"

¹ See Table 1004.1.2 to determine whether net or gross area is applicable.
² Minimum stairway width (Section 1011.2); min. corridor width (Section 1020.2); min. door width (Section 1010.1.1)
³ Minimum width of exit passageway (Section 1024.2)
⁴ See Section 1005.6 for converging exits
⁵ The loss of one means of egress shall not reduce the available capacity to less than 50 percent of the total required (Section 1005.5)
⁶ Assembly occupancies (Section 1024)



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ISSUE DATE: 01.30.26
 CHECKED BY: FFW/REB
 PROJECT: 2525

**CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC**

REVISION SCHEDULE
 DATE REFERENCE

GENERAL NOTES

① DEVICE LOCATIONS APPROXIMATE

② DOORS - MEANS OF EGRESS:
 STANDARD 36" LEAF = 32" CLEAR
 = 160 OCCUPANTS CAPACITY
 STANDARD 48" LEAF = 44" CLEAR
 = 220 OCCUPANTS CAPACITY
 DOUBLE 36" LEAF = 64" CLEAR
 = 320 OCCUPANCY CAPACITY
 DOUBLE 48" LEAF = 88" CLEAR
 = 440 OCCUPANCY CAPACITY

EXIT ROUTES ARE SHOWN TO REFLECT SEPARATE AREAS OF EGRESS AND TO ESTABLISH THAT SUFFICIENT EGRESS WIDTH AND TRAVEL DISTANCES ARE PROVIDED ACCORDING TO CURRENT BUILDING CODES. IT IS THE RESPONSIBILITY OF THE OWNER TO CREATE A SPECIFIC EXITING PLAN FOR DAILY USE.

REFER TO ELECTRICAL DRAWINGS FOR INFORMATION REGARDING:

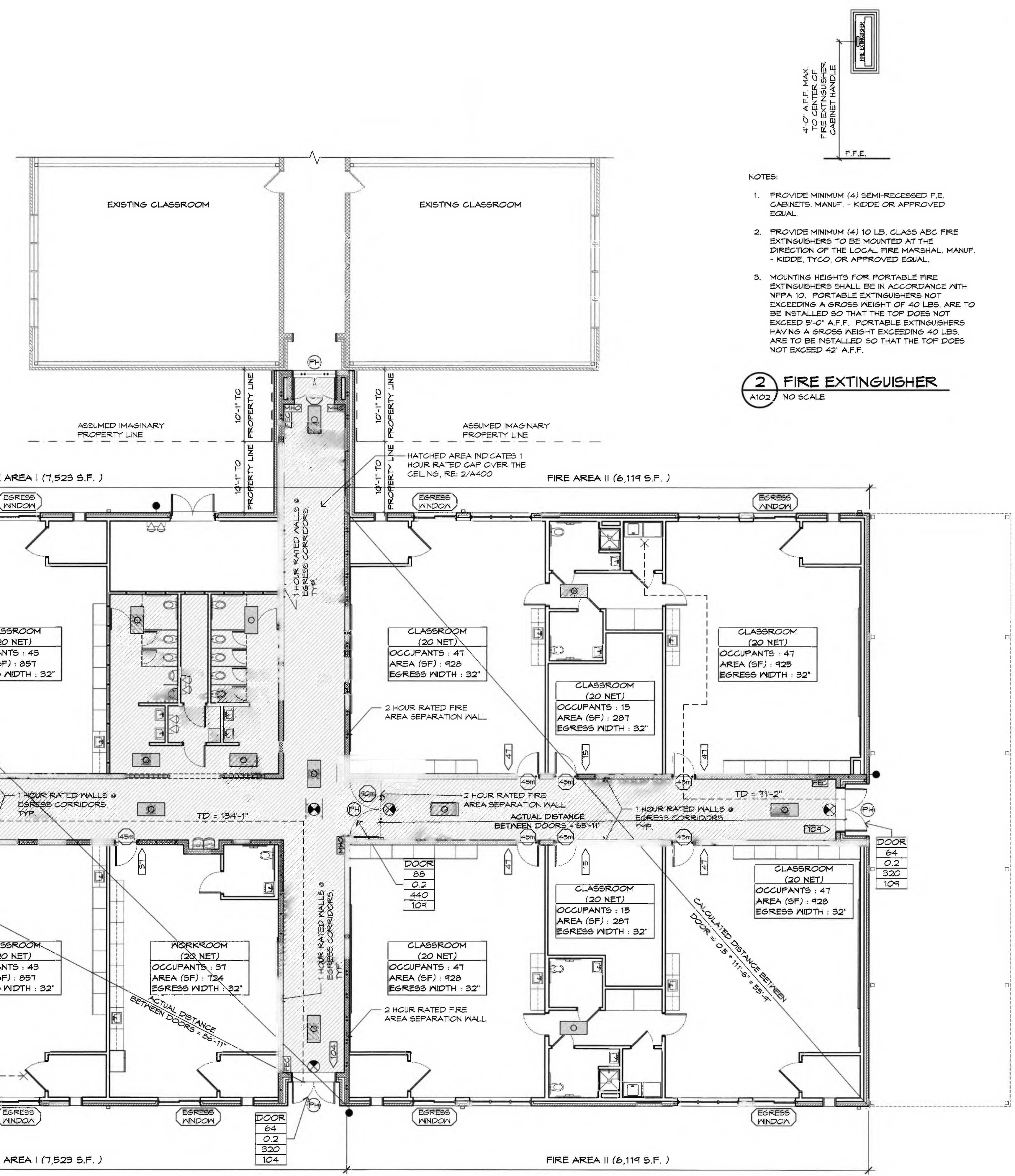
- EMERGENCY LIGHTING
- FIRE ALARM AND SMOKE DETECTION
- EMERGENCY EXIT DISCHARGE LIGHTING

REFER TO CIVIL DRAWINGS FOR INFORMATION REGARDING:

- EMERGENCY VEHICLE ACCESS ROUTES

LEGEND

- EMERGENCY EGRESS LIGHTING
- EMERGENCY / EXIT LIGHT COMBO
- FIRE EXTINGUISHER CABINET
- MAGNETIC HOLD OPEN
- EXTERIOR EMERGENCY LIGHT
- INTERIOR EMERGENCY LIGHT
- 1 HOUR RATED WALL
- 2 HOUR RATED WALL
- TRAVEL DISTANCE TO AN EXIT
- EXIT ELEMENT (DOOR, STAIR, HORIZONTAL EXIT)
- EGRESS WIDTH (CLEAR)
- EXIT WIDTH PER PERSON (IN.)
- CAPACITY (PEOPLE)
- ACTUAL (PEOPLE)
- AREA OCCUPANCY LOAD (PEOPLE) SERVED BY MEANS OF EGRESS DOOR
- PANIC HARDWARE
- DOOR RATING (20m = 20 minutes)

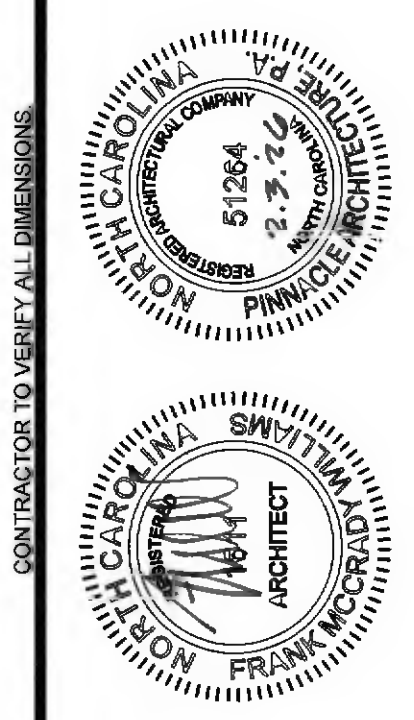


NOTES:

- PROVIDE MINIMUM (4) SEMI-RECESSED F.E. CABINETS, MANUF. - KIDDE OR APPROVED EQUAL.
- PROVIDE MINIMUM (4) 10 LB. CLASS ABC FIRE EXTINGUISHERS TO BE MOUNTED AT THE DIRECTION OF THE LOCAL FIRE MARSHAL, MANUF. - KIDDE, TYCO, OR APPROVED EQUAL.
- MOUNTING HEIGHTS FOR PORTABLE FIRE EXTINGUISHERS SHALL BE IN ACCORDANCE WITH NFPA 10. PORTABLE EXTINGUISHERS NOT EXCEEDING A GROSS WEIGHT OF 40 LBS. ARE TO BE INSTALLED SO THAT THE TOP DOES NOT EXCEED 5'-0" A.F.F. PORTABLE EXTINGUISHERS HAVING A GROSS WEIGHT EXCEEDING 40 LBS. ARE TO BE INSTALLED SO THAT THE TOP DOES NOT EXCEED 42" A.F.F.

2 FIRE EXTINGUISHER
 A102 NO SCALE

1 LIFE SAFETY PLAN
 A102 SCALE: 1/8" = 1'-0"



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ISSUE DATE: 01.30.26
 DRAWN BY: JH
 CHECKED BY: FMV/REB
 PROJECT: 2520

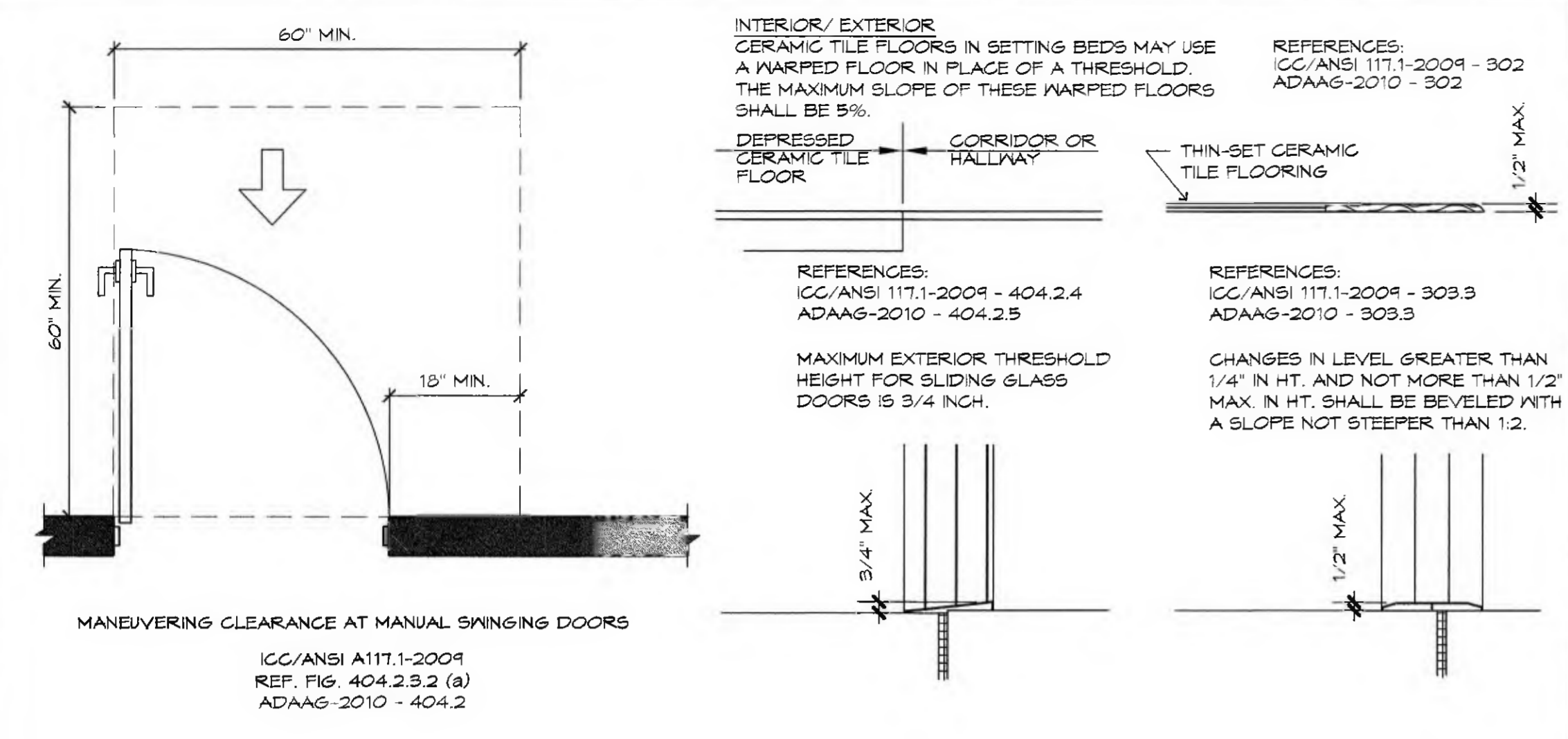
CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC

LIFE SAFETY PLAN

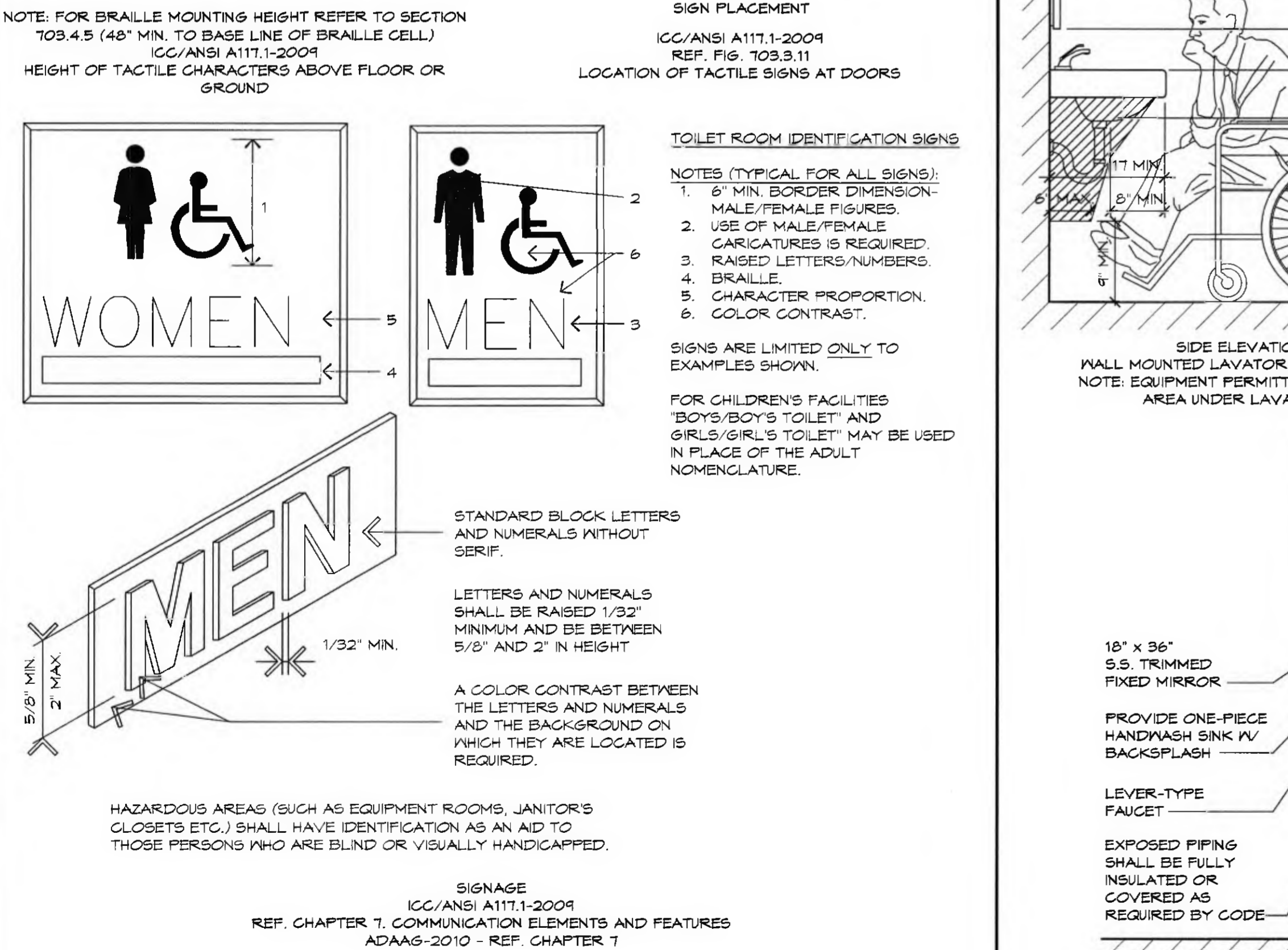
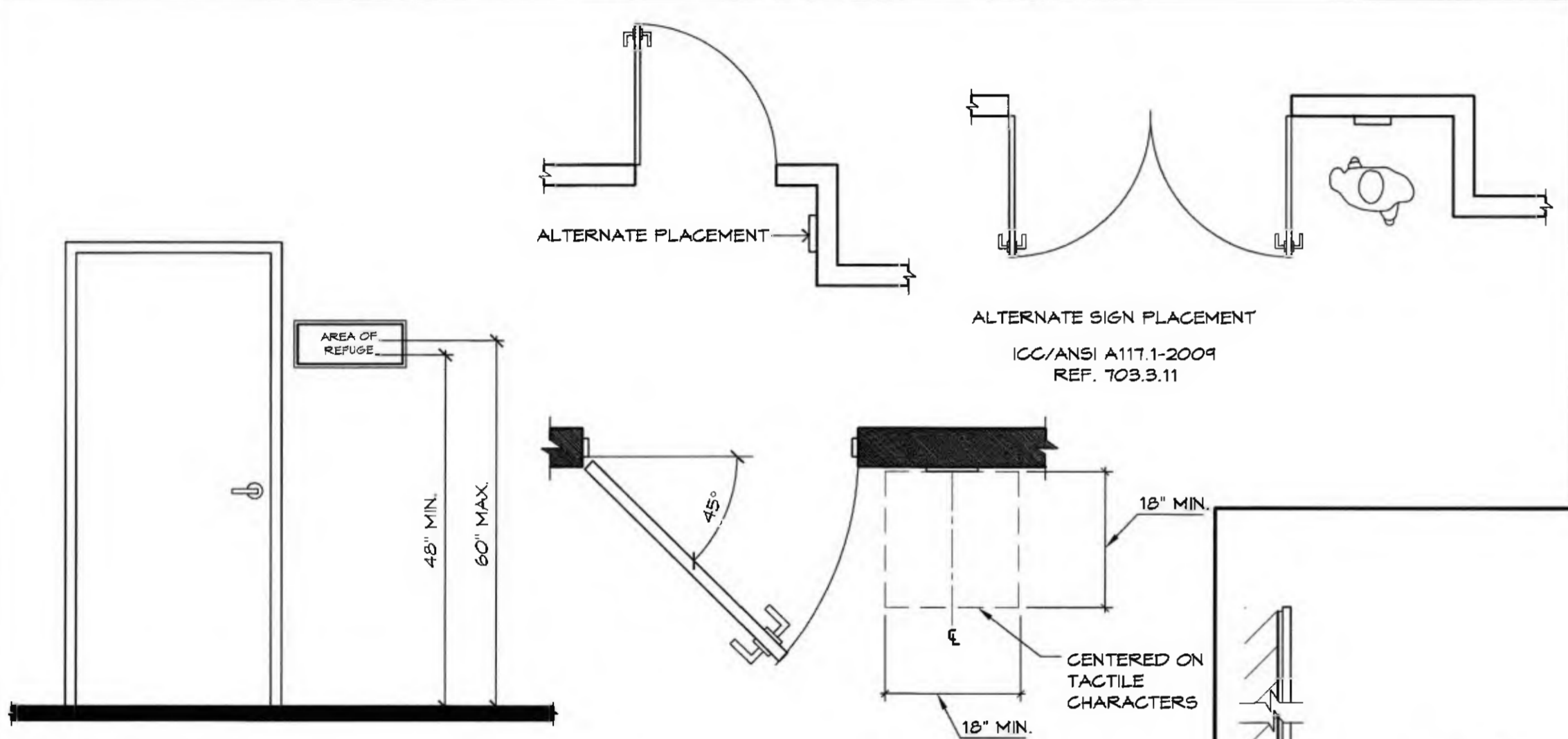
REVISION SCHEDULE

DATE	REFERENCE

A102

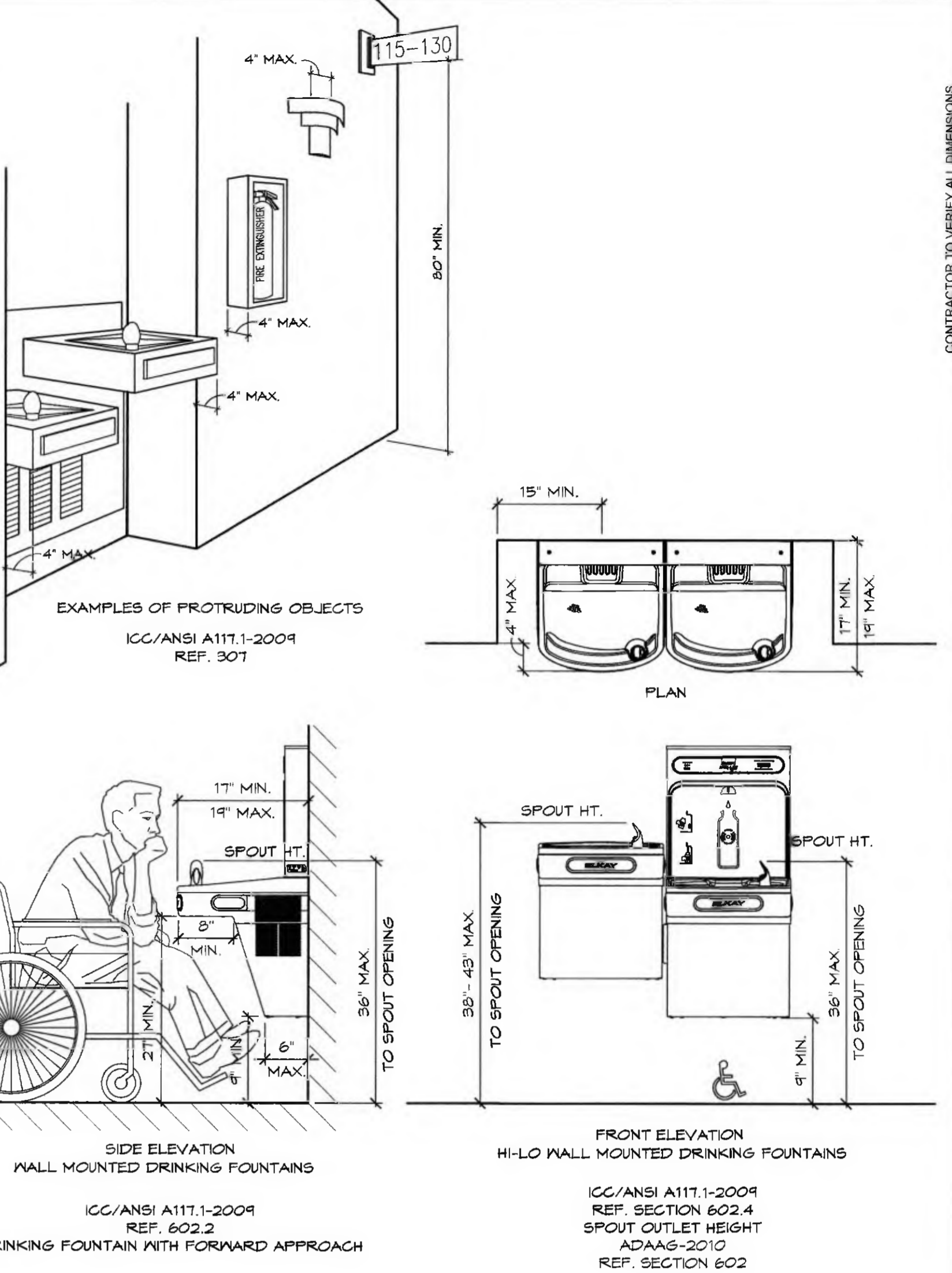
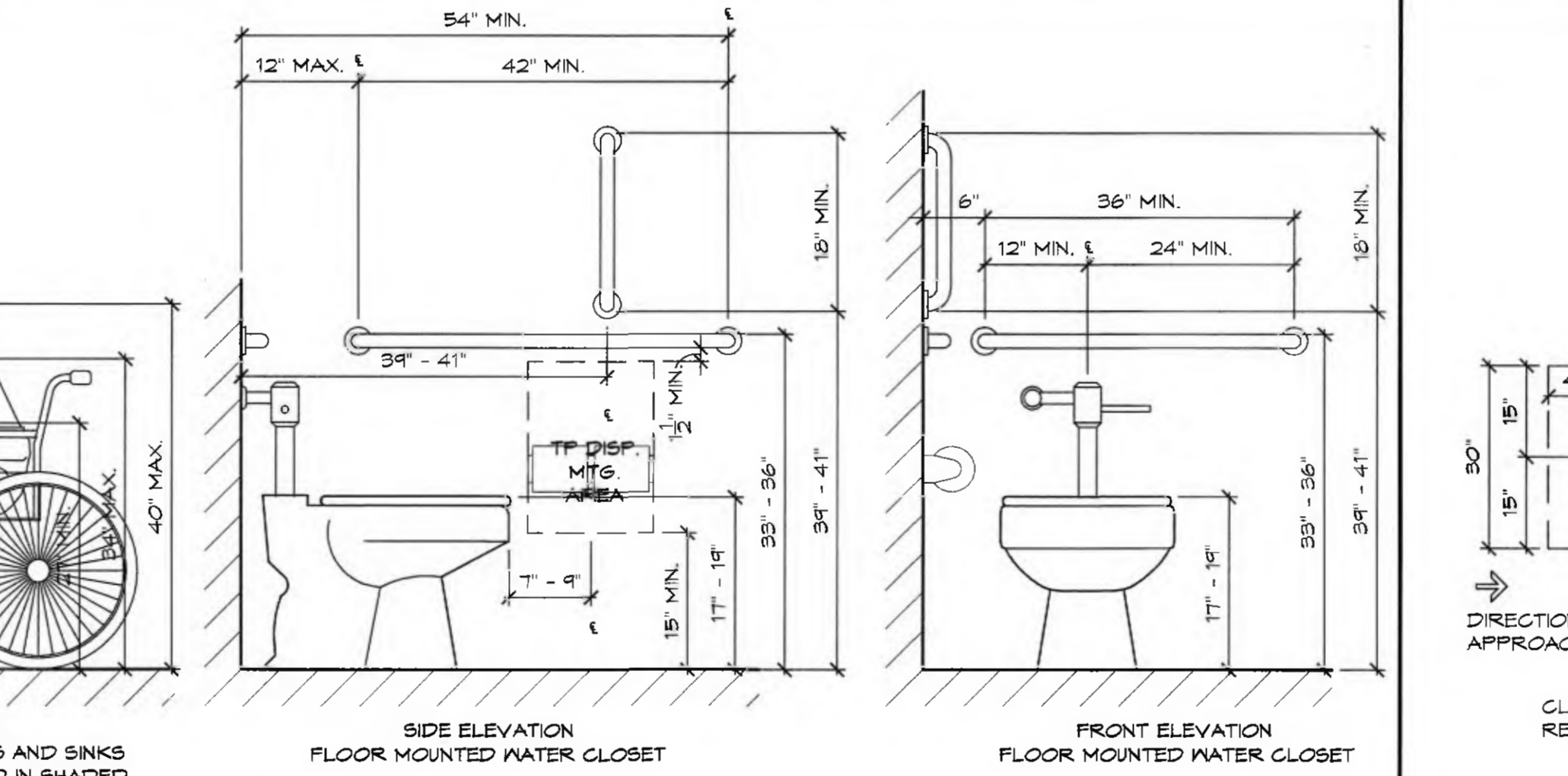
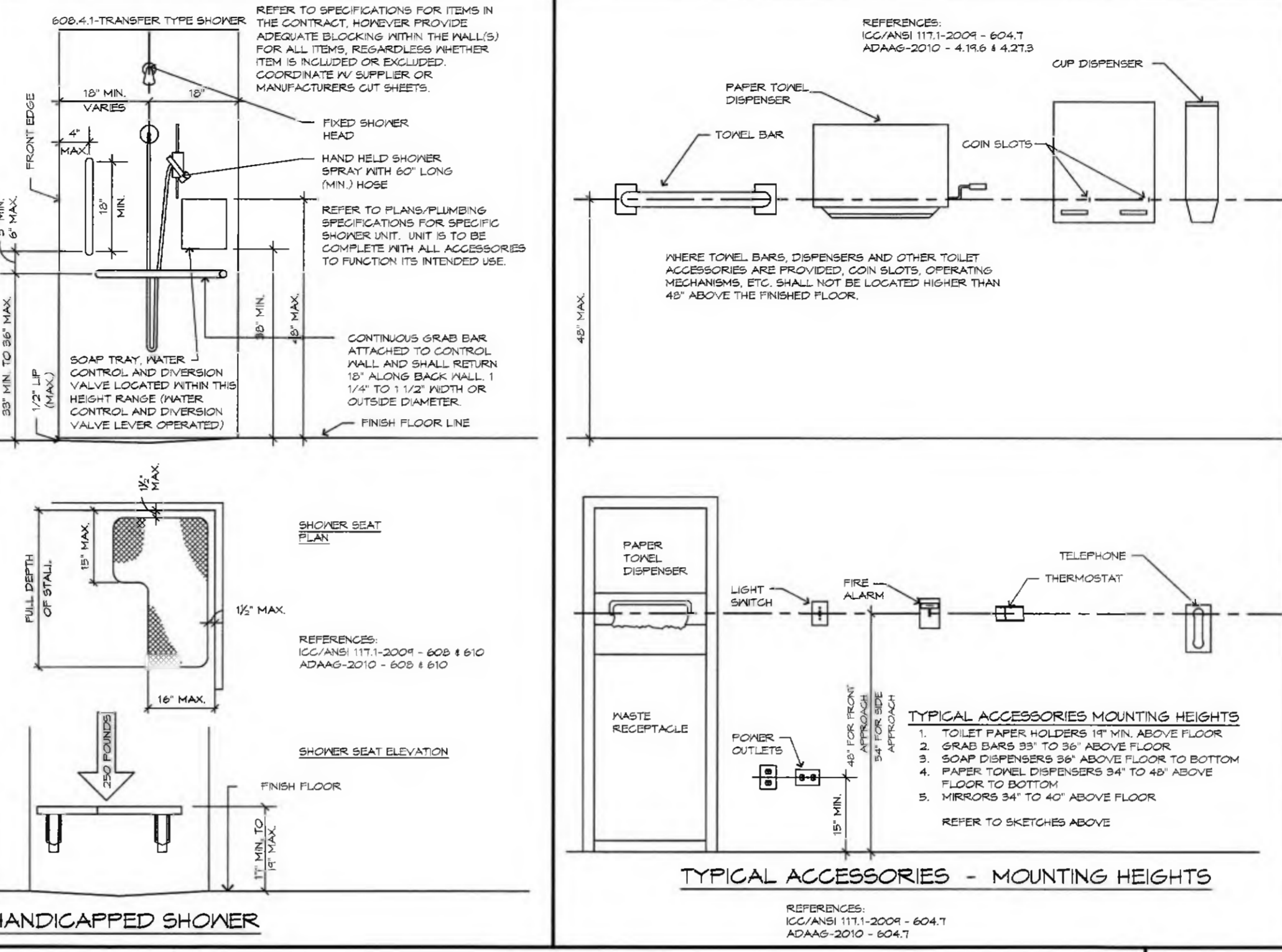


DOORS AND DOORWAYS

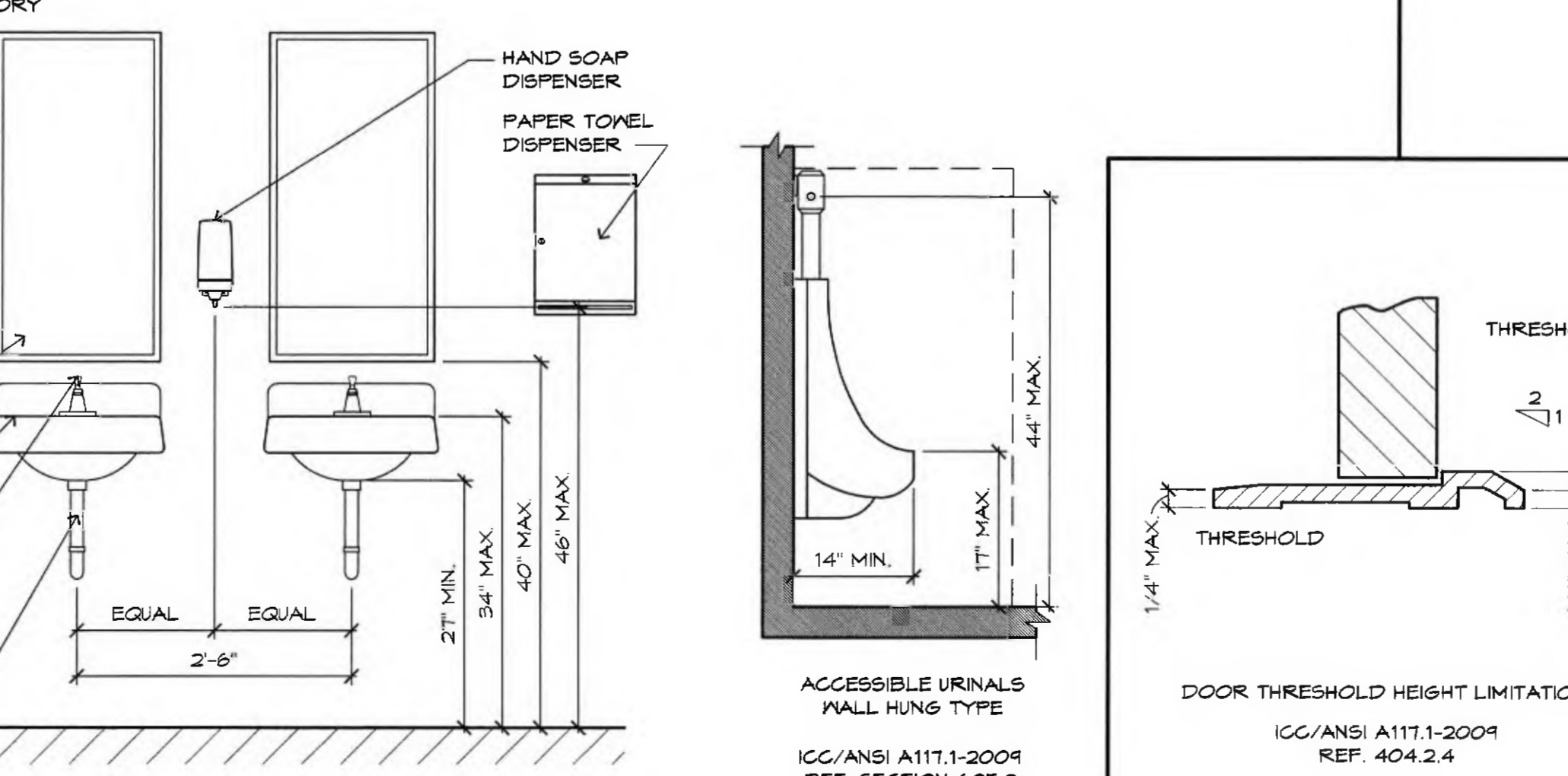


SIGNAGE AND IDENTIFICATION

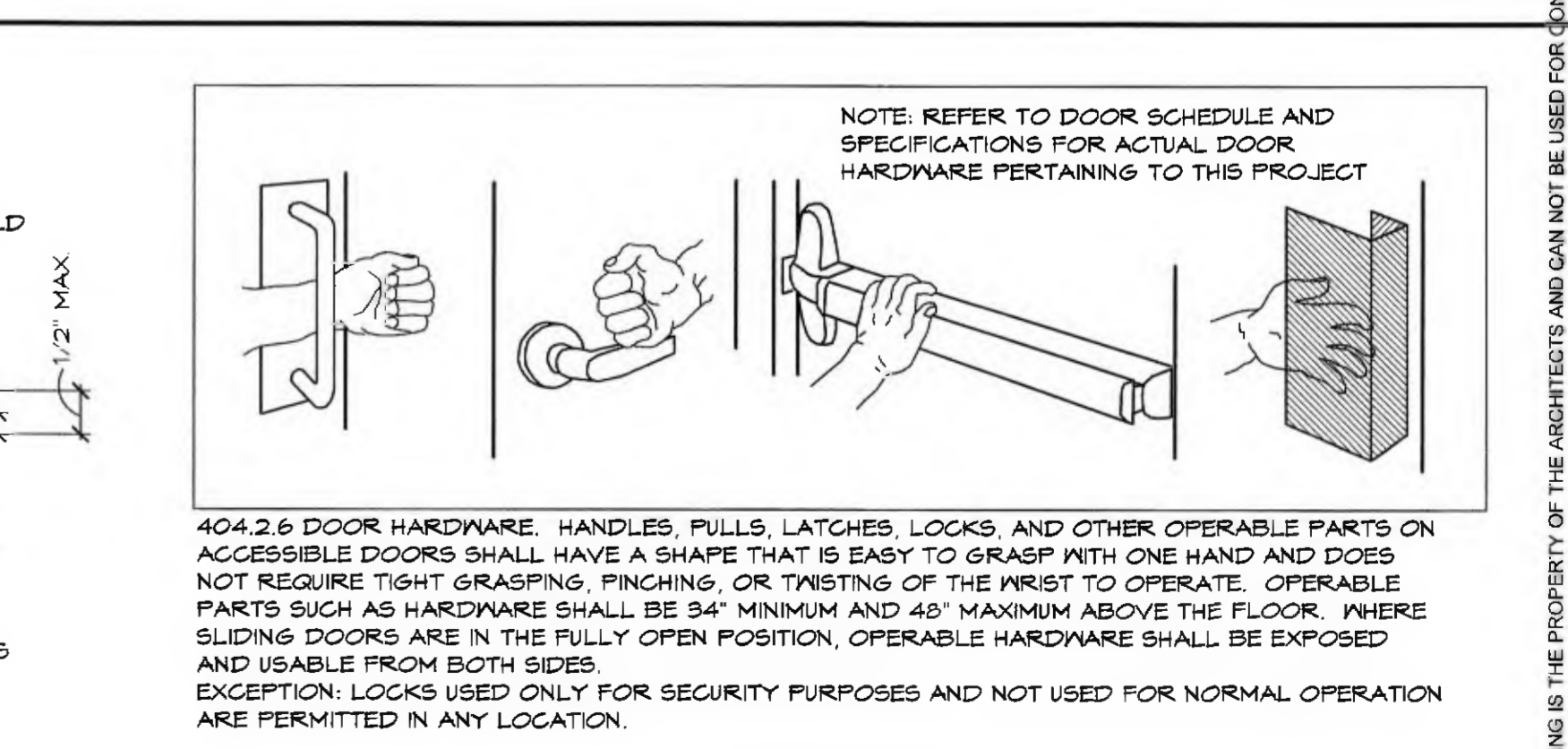
ACCESSIBILITY CODE REQUIREMENTS
WITH REFERENCES TO ANSI A117.1 AND ADAAG
TOILET ACCESSORIES, TOILETS, GRAB BARS,
MOUNTING HEIGHTS AND HANDICAPPED DATA



DRINKING FOUNTAINS



TOILETS



DOOR HARDWARE



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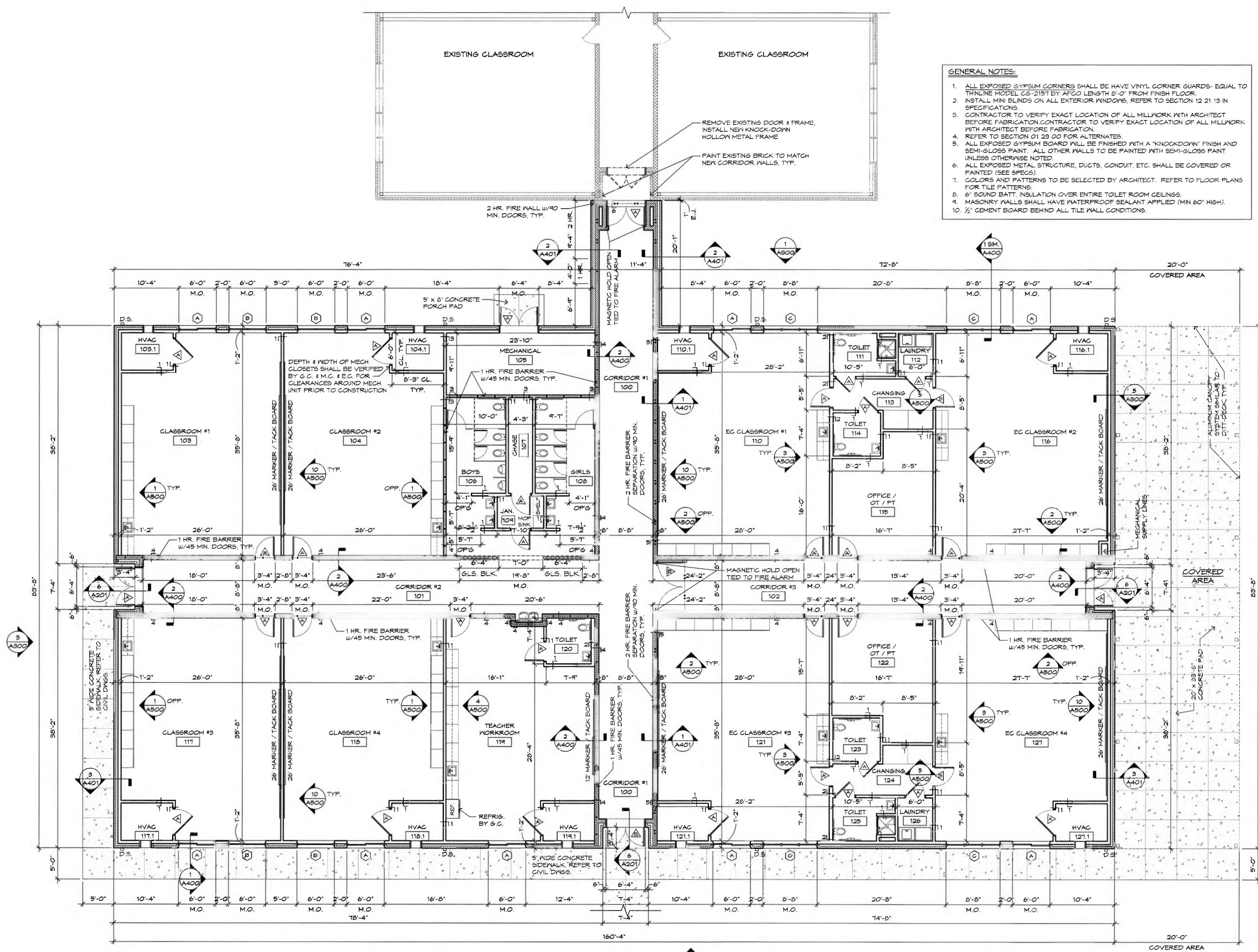
ISSUE DATE: 01/30/26
 DRAWN BY: JH
 CHECKED BY: FMV/REE
 PROJECT: 2526

**CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC**

ACCESSIBILITY REQUIREMENTS

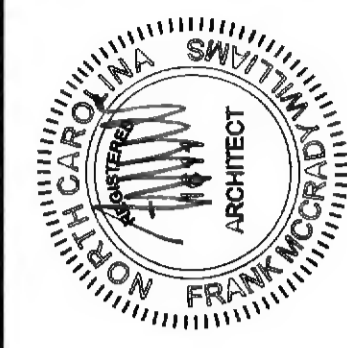
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- GENERAL NOTES:**
1. ALL EXPOSED GYPSUM CORNERS SHALL BE HAVE VINYL CORNER GUARDS- EQUAL TO THINLINE MODEL CG-219T BY AFCO LENGTH 8'-0" FROM FINISH FLOOR.
 2. INSTALL MINI BLINDS ON ALL EXTERIOR WINDOWS. REFER TO SECTION 12 21 13 IN SPECIFICATIONS.
 3. CONTRACTOR TO VERIFY EXACT LOCATION OF ALL MILLWORK WITH ARCHITECT BEFORE FABRICATION CONTRACTOR TO VERIFY EXACT LOCATION OF ALL MILLWORK WITH ARCHITECT BEFORE FABRICATION.
 4. REFER TO SECTION 01 28 00 FOR ALTERNATES.
 5. ALL EXPOSED GYPSUM BOARD WILL BE FINISHED WITH A "KNOCKDOWN" FINISH AND SEMI-GLOSS PAINT. ALL OTHER WALLS TO BE PAINTED WITH SEMI-GLOSS PAINT UNLESS OTHERWISE NOTED.
 6. ALL EXPOSED METAL STRUCTURE, DUCTS, CONDUIT, ETC. SHALL BE COVERED OR PAINTED (SEE SPECS).
 7. COLORS AND PATTERNS TO BE SELECTED BY ARCHITECT. REFER TO FLOOR PLANS FOR TILE PATTERNS.
 8. 6" SOUND BATT. INSULATION OVER ENTIRE TOILET ROOM CEILINGS.
 9. MASONRY WALLS SHALL HAVE WATERPROOF SEALANT APPLIED (MIN 60" HIGH).
 10. 1/2" CEMENT BOARD BEHIND ALL TILE WALL CONDITIONS.

1 FLOOR PLAN
A200 SCALE: 1/8" = 1'-0" 19,560 SF



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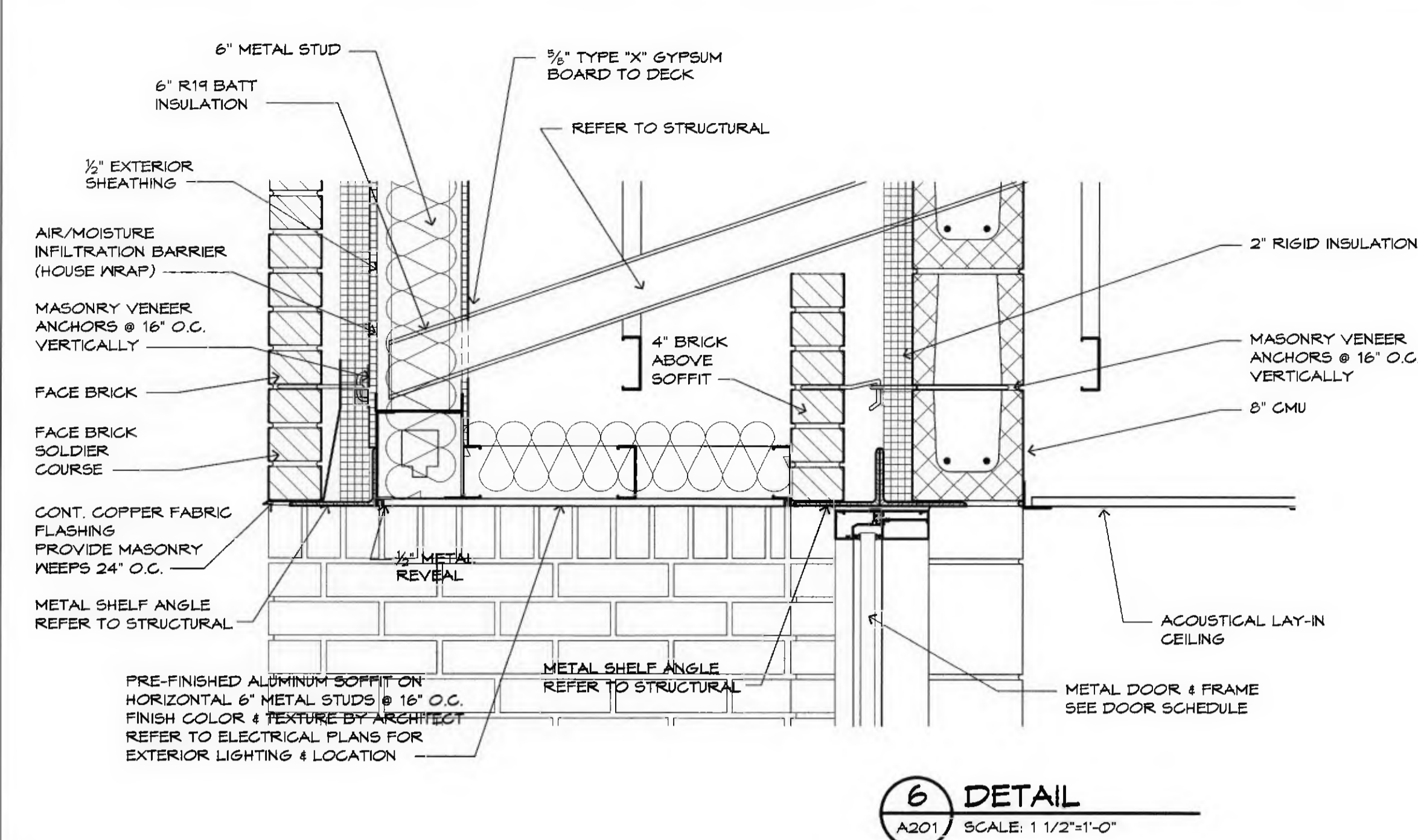
CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
FLOOR PLAN

REVISION	DATE	REFERENCE

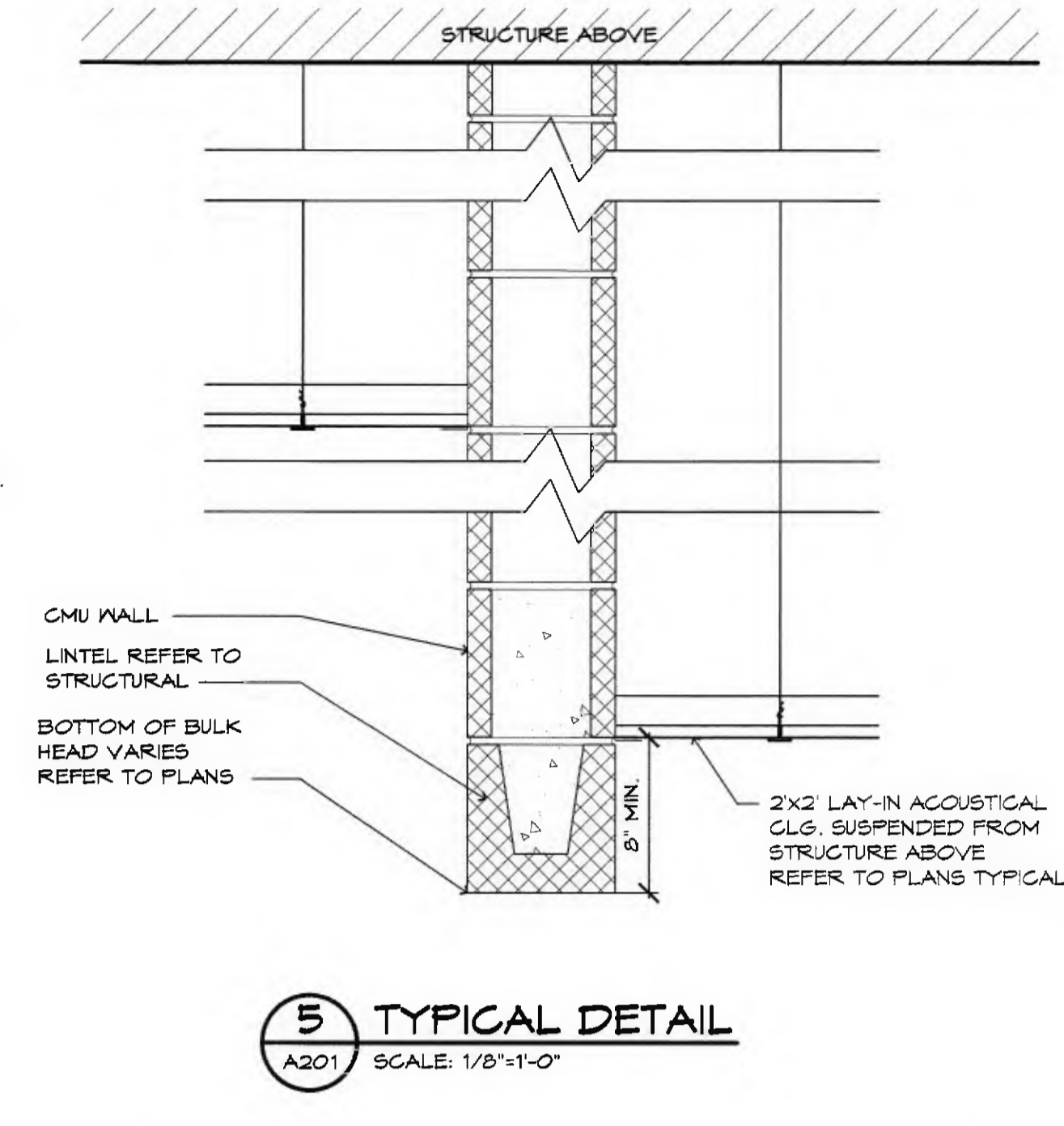
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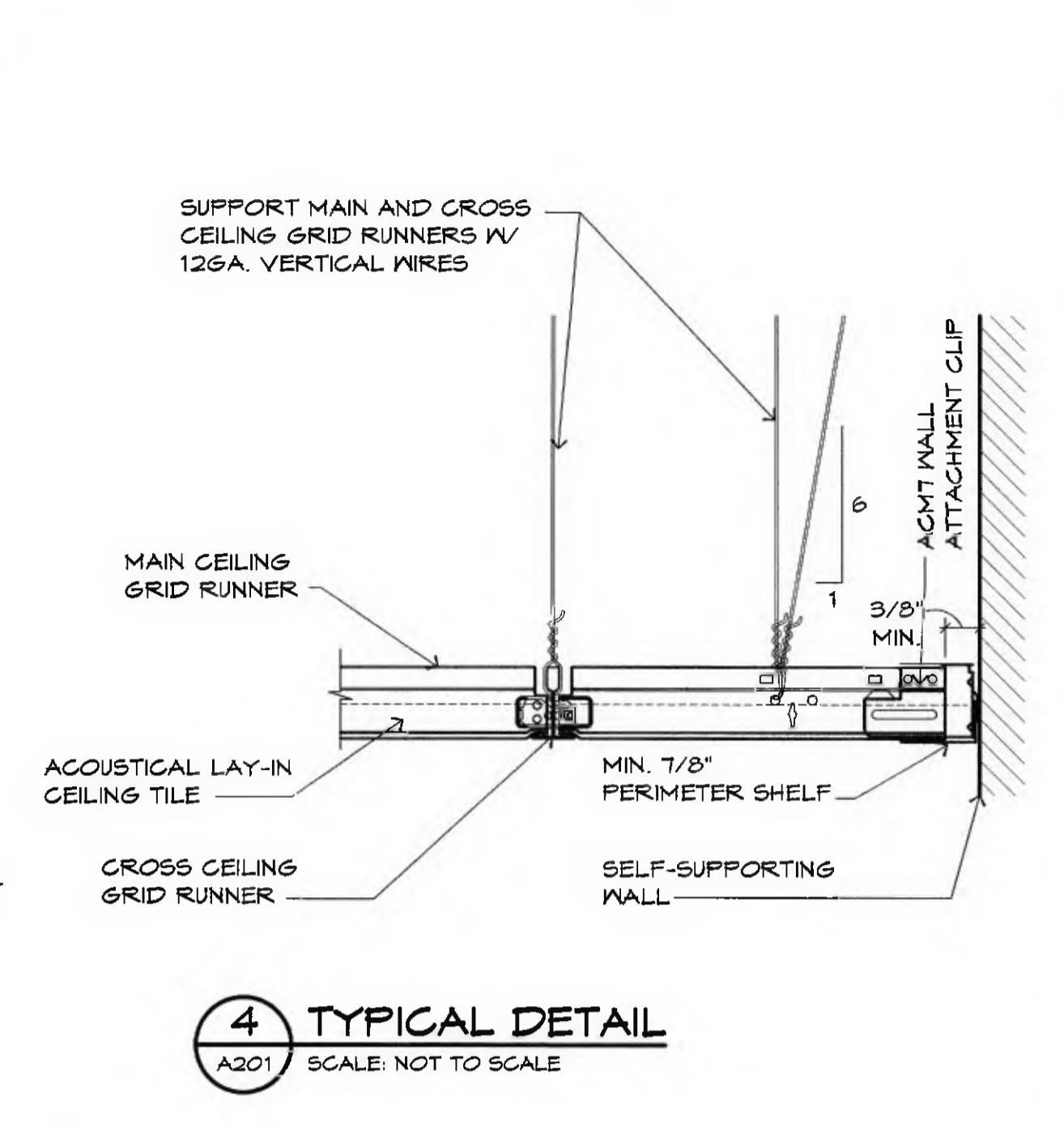
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6 DETAIL
A201 SCALE: 1/2"=1'-0"



5 TYPICAL DETAIL
A201 SCALE: 1/8"=1'-0"

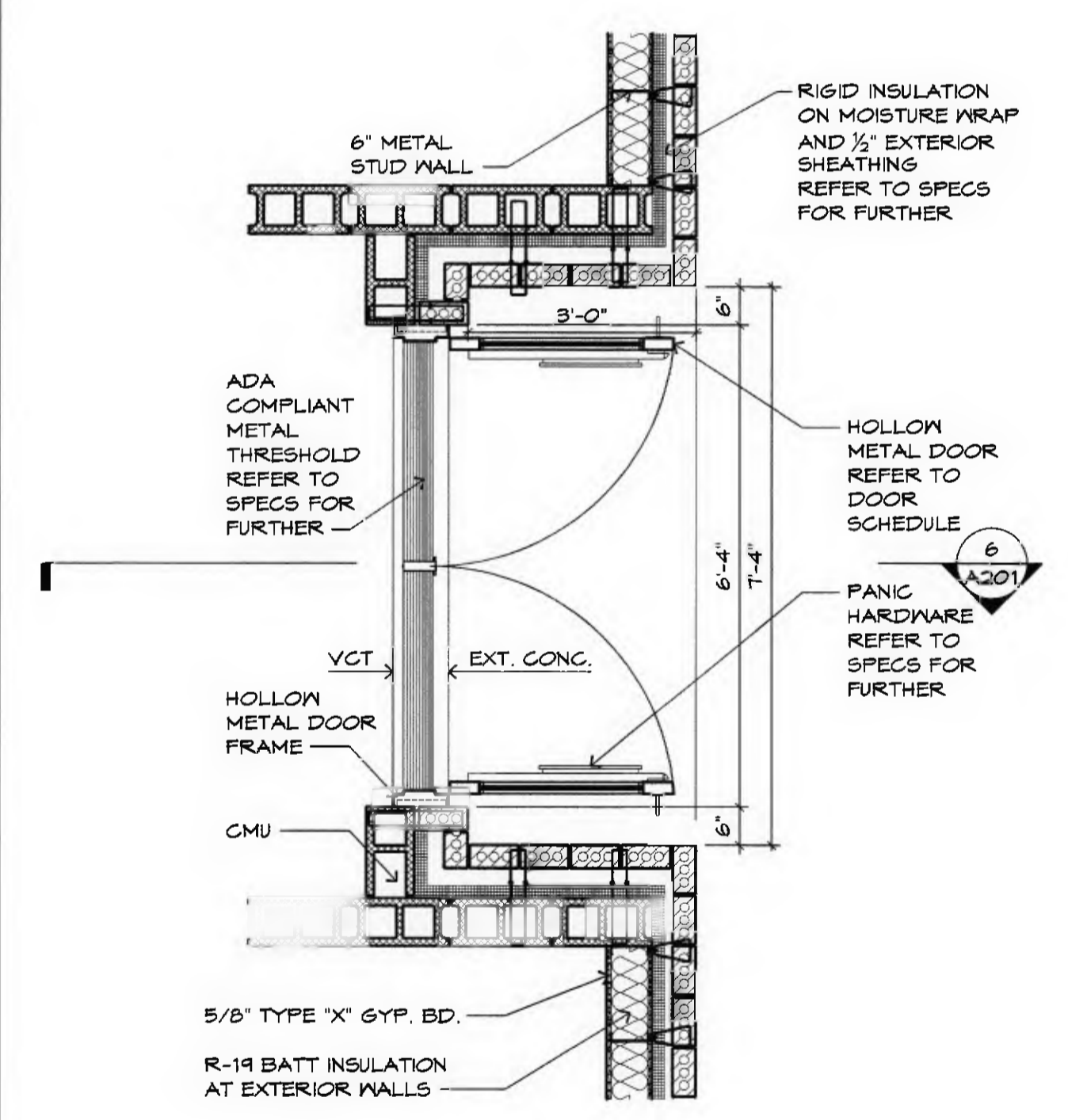


4 TYPICAL DETAIL
A201 SCALE: NOT TO SCALE

- TYPICAL CEILING NOTES:**
SEISMIC DESIGN CATEGORY 'C'
- BASIC CONNECTIONS, PERIMETER AND BRACING**
- 60 LB. MINIMUM INTERSECTION STRENGTH LIMITS @MT/CT
 - VERTICAL HANGER WIRE 12 GA. @ 4'-0" O.C.
 - INTERMEDIATE OR HEAVY DUTY MAIN TEES
 - 1 IN 6 MAXIMUM PLUMB OF VERTICAL HANGER WIRES PER ASTM C635
 - PERIMETER VERTICAL HANGER WIRES NOT MORE THAN 8" FROM MALL UNLESS MOLDING IS LESS THAN 7/8"
 - 3/8" MINIMUM GRID END/WALL CLEARANCE
 - MINIMUM 1/8" PERIMETER CLOSURE WIDTH UNLESS USING PERIMETER WIRES
 - GRID CONNECTION TO PERIMETER ATTACHED ON TWO WALLS NOT PERMITTED
 - PERIMETER TEE ENDS REQUIRED TO BE TIED TOGETHER
 - PARTITION ATTACHMENT ALLOWED ONLY IF CEILING IS CAPABLE OF MOVING LATERALLY
- LIGHTING FIXTURE ATTACHMENT**
- LIGHT FIXTURE (ALL TYPES) MECHANICALLY ATTACHED TO GRID NEG 410-18 (TWO PER FIXTURE UNLESS INDEPENDENTLY SUPPORTED)
 - PENDANT HUNG FIXTURES DIRECTLY SUPPORTED FROM STRUCTURE WITH 4 GA. WIRE (OR APPROVED ALTERNATE)
 - RIGID LAY-IN OR CAN LIGHT FIXTURES:
 - < 10 LBS. - ONE WIRE TO STRUCTURE (MAY BE SLACK)
 - 10-56 LBS. - TWO WIRES FROM HOUSING TO STRUCTURE (MAY BE SLACK)
 - > 56 LBS. - SUPPORTED DIRECTLY TO STRUCTURE APPROVED ALTERNATE
 - BY
 - < 20 LBS. - POSITIVELY ATTACHED TO GRID
 - 20-56 LBS. - POSITIVELY ATTACHED TO GRID AND TWO WIRES TO STRUCTURE (MAY BE SLACK)
 - > 56 LBS. - DIRECTLY SUPPORTED TO STRUCTURE
- SERVICE APPLICATIONS**
- LESS THAN 20 LBS. POSITIVELY ATTACHED TO GRID
 - 20 TO 56 LBS. POSITIVELY ATTACHED TO GRID AND TWO WIRES TO STRUCTURE (CAN BE SLACK)
 - MORE THAN 56 LBS. MUST BE DIRECTLY SUPPORTED TO STRUCTURE
 - MINIMUM 3/8" ON ALL SIDES PERTAINING TO SPRINKLER HEADS AND OTHER PENETRATION CLEARANCES

CEILING LEGEND

C-1	24 X 24 X 5/8 LAY-IN PANELS (ARMSTRONG FINE FISSURE/HUMIGUARD)
C-2	WATER RESISTANT GYPSUM BOARD CEILING, PAINTED
C-3	NO CEILING, OPEN TO STRUCTURE ABOVE, PAINTED
C-4	EXPOSED METAL CANOPY BY PEACHTREE OR APPROVED EQUAL
C-5	PRE-FINISHED ALUMINUM SOFFIT REFER TO SPECS (COLOR/TEXTURE BY ARCHITECT)

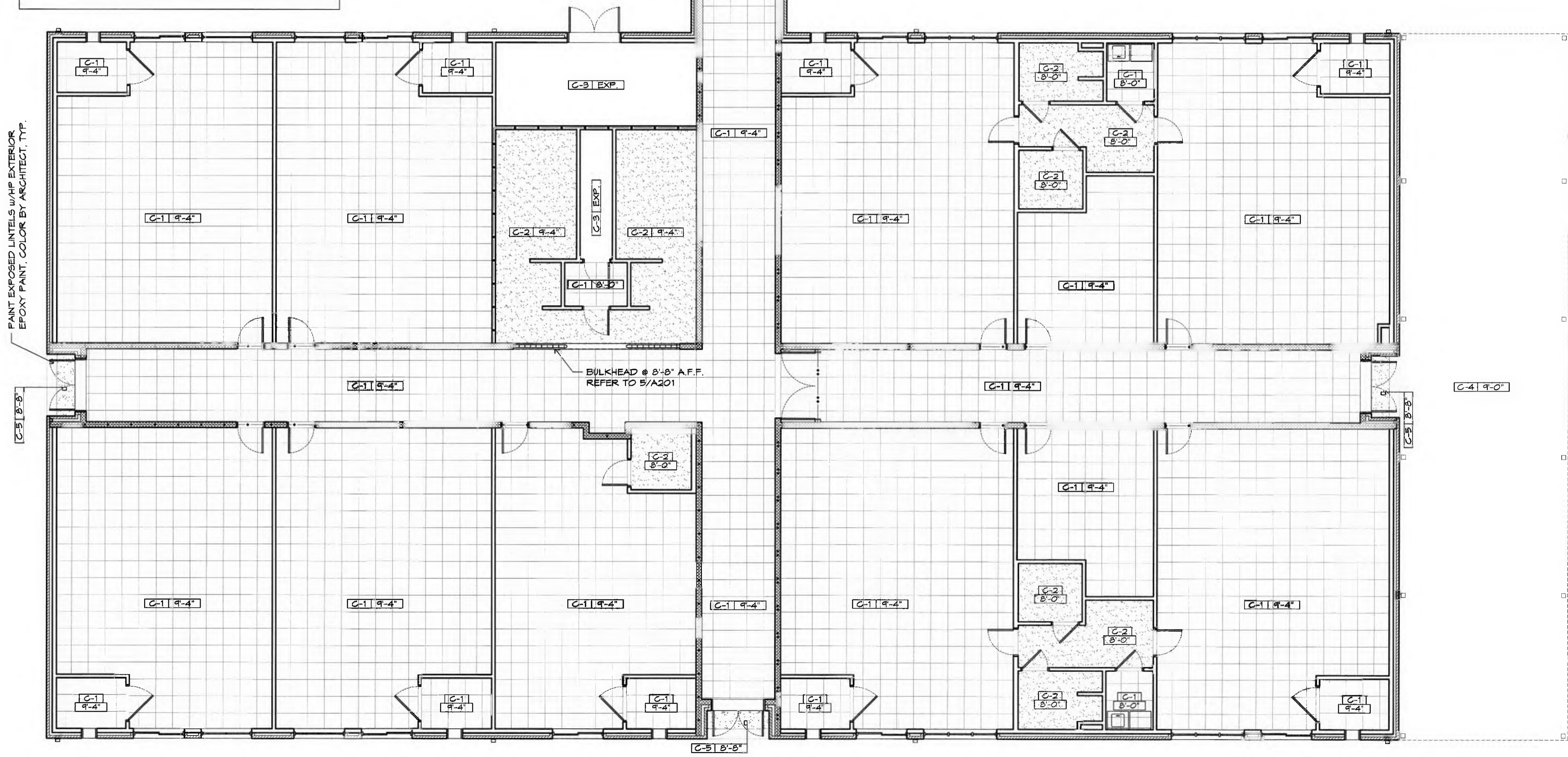


3 ENLARGED DETAIL
A201 SCALE: 1/2"=1'-0"

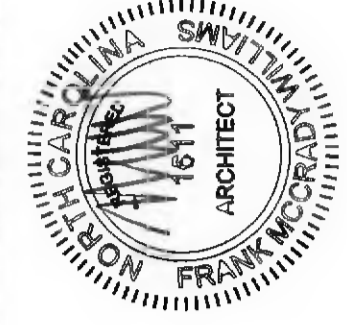
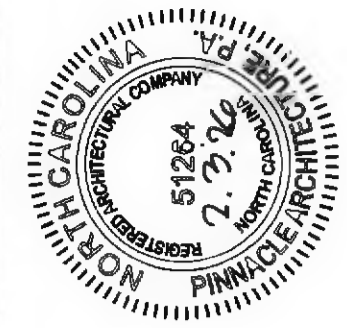
REFLECTED CEILING PLAN SYMBOLS

[Grid Symbol]	2'x2' ACOUSTICAL LAY-IN CEILING GRID AND TILES
[Circle with X]	LAY-IN GRID MOUNTED 2'x4' LED FIXTURE
[Dotted Area]	DRYWALL CEILING PAINTED
[Horizontal Line]	SUSPENDED 4' LED FIXTURE
[Circle]	SURFACE MOUNTED LED FIXTURE
[Square with X]	HVAC SUPPLY GRILLE
[Square with /]	HVAC RETURN GRILLE / EXHAUST FAN GRILLE
[Circle with dot]	WALL MOUNTED LIGHT FIXTURE

2 TYP. SYMBOLS
A201 SCALE: NTS



1 REFLECTED CEILING PLAN
A201 SCALE: 1/8"=1'-0"



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**CLASSROOM ADDITION
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WAYNE COUNTY, NC**

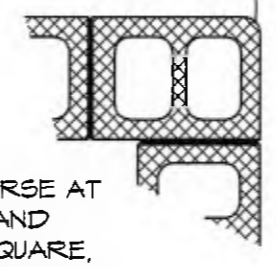
REFLECTED CEILING PLAN,
NOTES & DETAILS

REVISION SCHEDULE

DATE	REFERENCE
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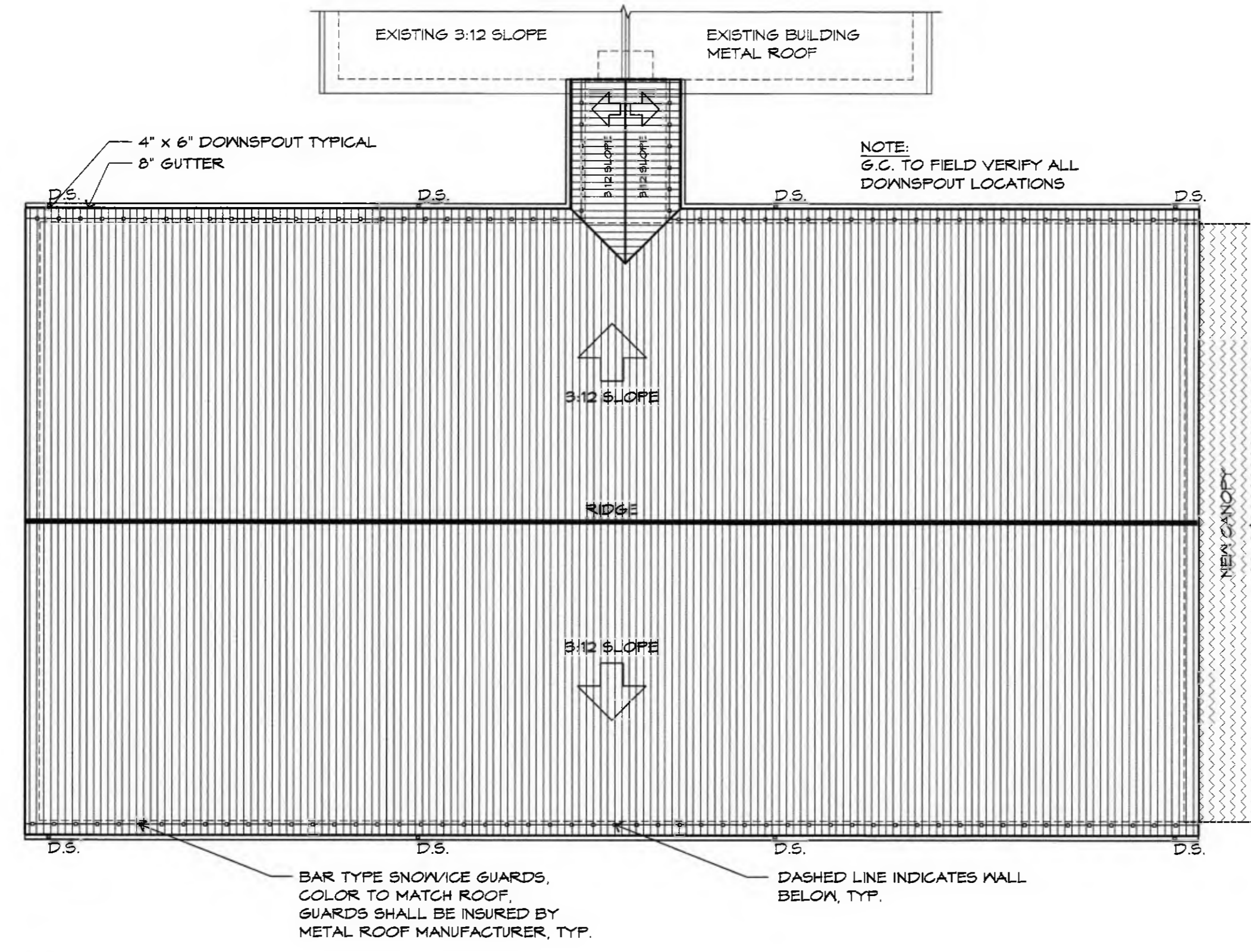
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ALL CORNERS TO BE FACTORY RADIUS TO INCLUDE BUT NOT LIMITED TO WINDOW OPENING(S), DOOR OPENING(S), WALL OPENING(S), WALL(S), ETC...

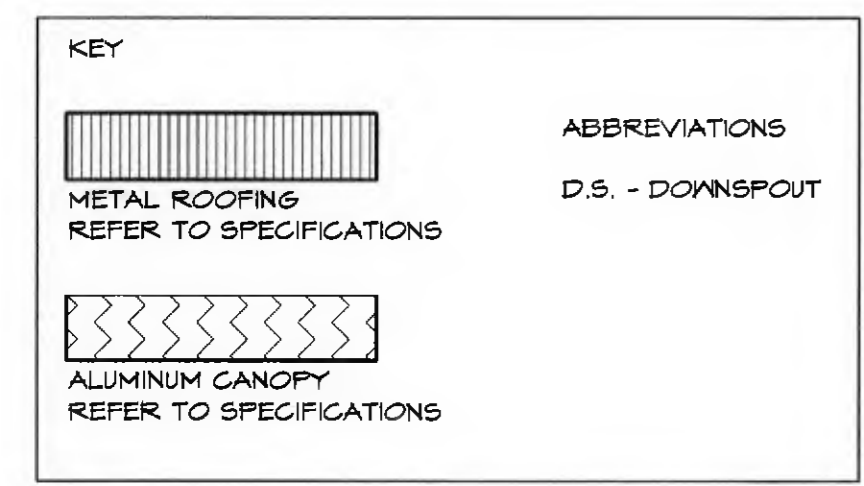


NOTE: MASONRY COURSE AT CEILING GRID AND BASE TO BE SQUARE, NOT FACTORY RADIUS.

5 INTERIOR CMU CORNERS
A202 SCALE: 1"=1'-0"

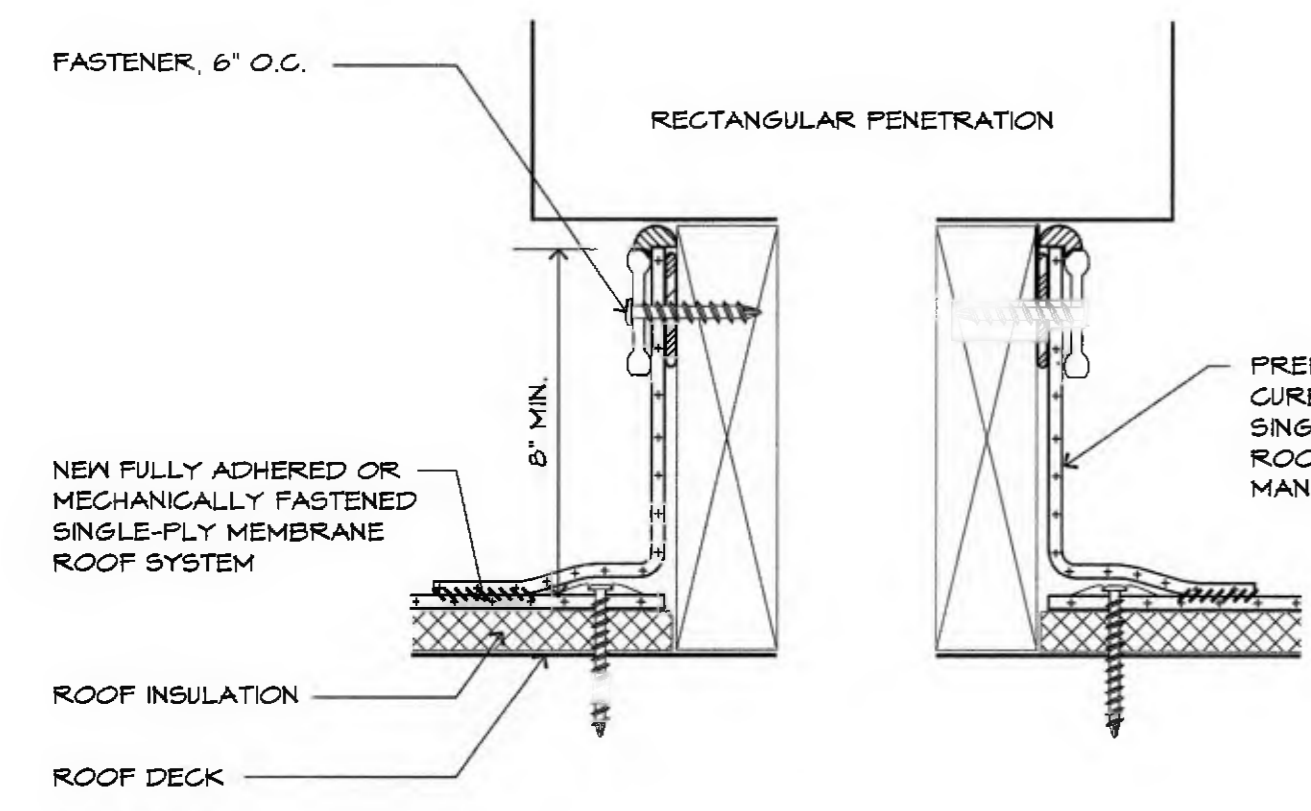


- NOTE:**
1. ROOFING CONTRACTOR TO PROVIDE CRICKETS/SADDLES TO UPSLOPE SIDES OF ALL ROOF TOP EQUIPMENT TO ENSURE POSITIVE DRAINAGE.
 2. OPENINGS REQUIRED FOR MECHANICAL, ELECTRICAL AND PLUMBING ARE SHOWN ONLY FOR INFORMATION PURPOSES. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS TO CONFIRM EXACT LOCATIONS.
 3. ALL ROOF PENETRATIONS WILL HAVE FACTORY PREPARED FLASHING BOOTS AND WILL BE FLASHED BY THE ROOFER.
 4. TO COORDINATE DOWNSPOUT LOCATIONS W/ CANOPY MANUFACTURER & CIVIL, DRAINS TO BE CONNECTED TO LEADER SYSTEM TO ENABLE WATER TO BE CARRIED AWAY FROM BUILDING EXCEPT WHERE DRAINED THROUGH CURB, REFER TO CIVIL DRAWINGS, TYPICAL ALL CANOPIES.

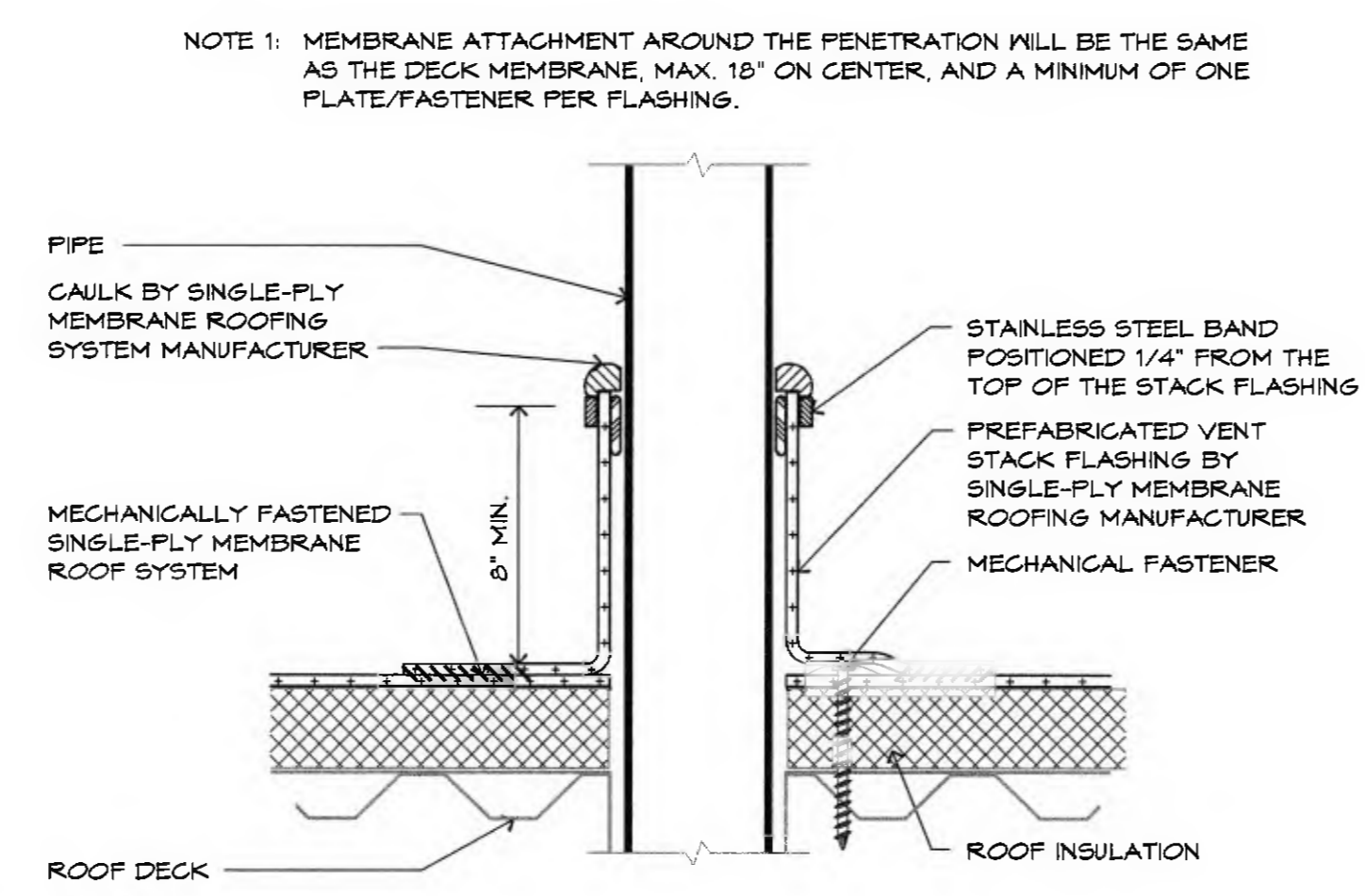


4 ROOF PLAN
A202 SCALE: 1/16" = 1'-0"

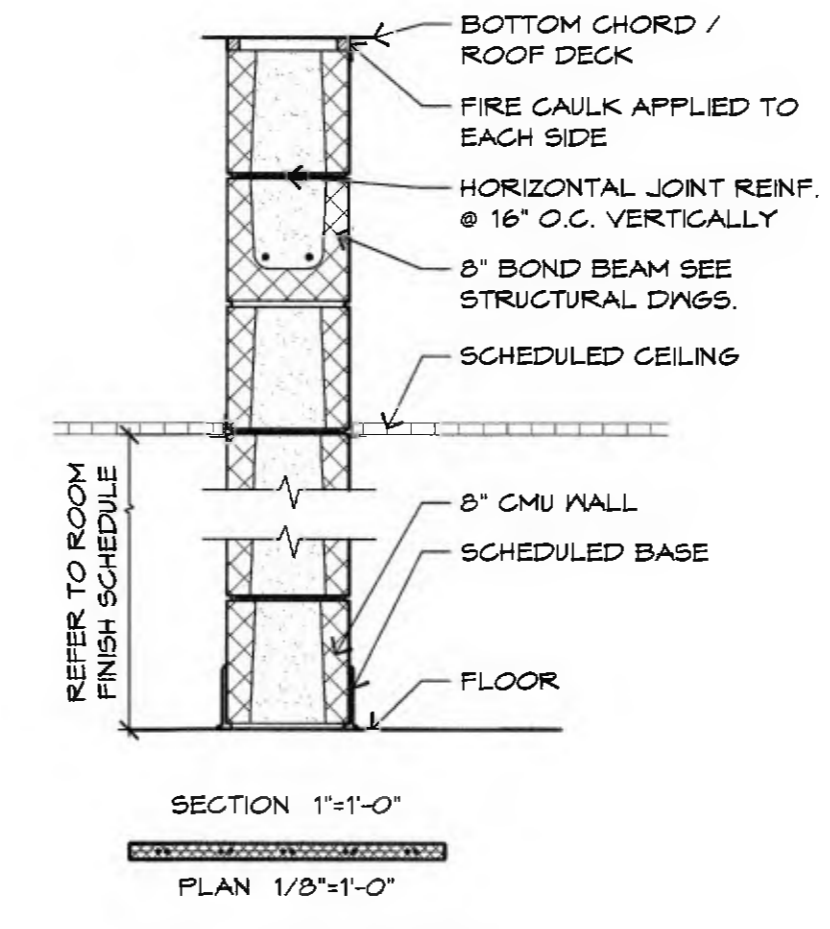
- NOTE 1:** PERIMETER FASTENING OF THE DECK MEMBRANE WILL BE THE SAME FASTENING PATTERN AS THE FIELD MEMBRANE, MAX. 18-INCHES ON CENTER, AND NO LESS THAN ONE FASTENER PER SIDE.
- NOTE 2:** ALL TERMINATION BAR TO HAVE A FASTENER 1-INCH MAX. FROM EACH CORNER.



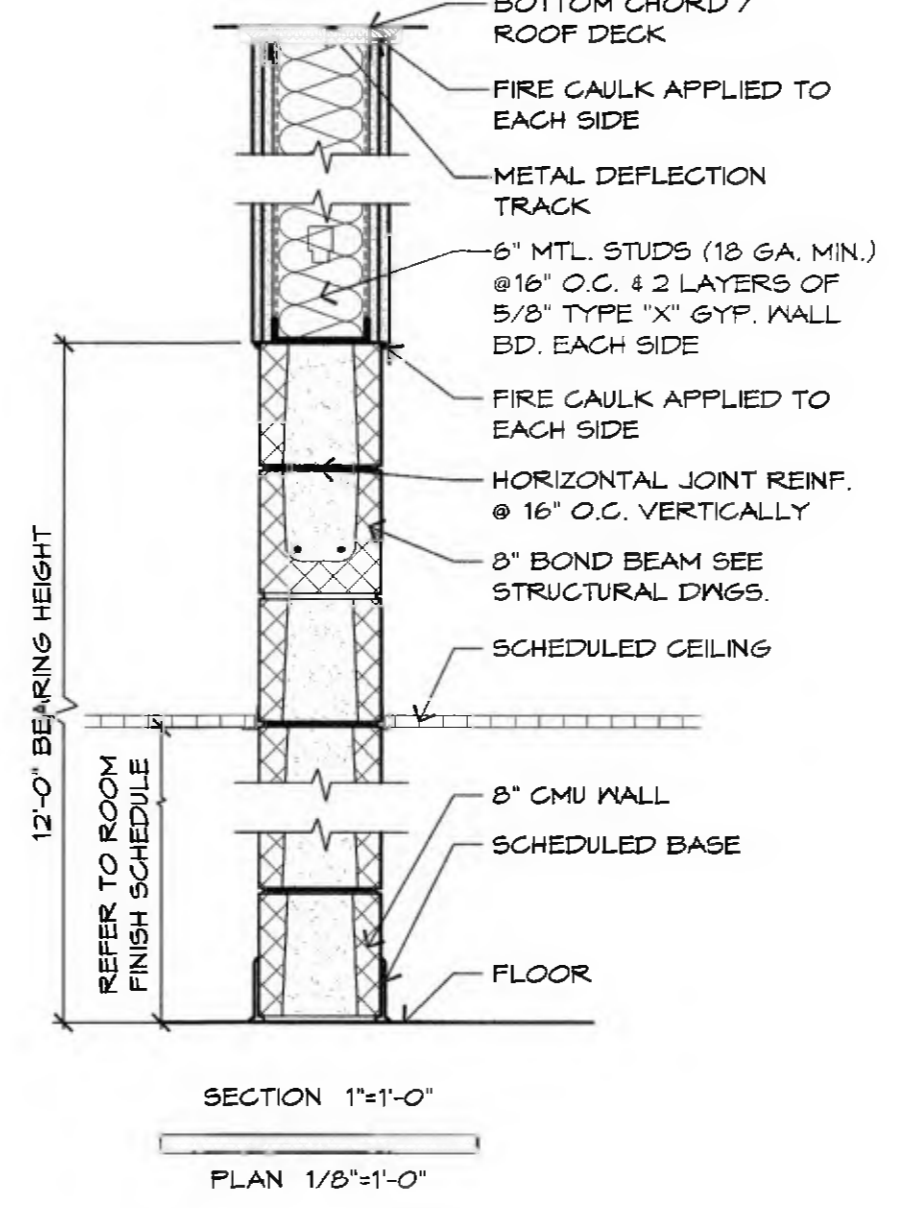
3 ROOF PENETRATION DETAIL
A202 NO SCALE



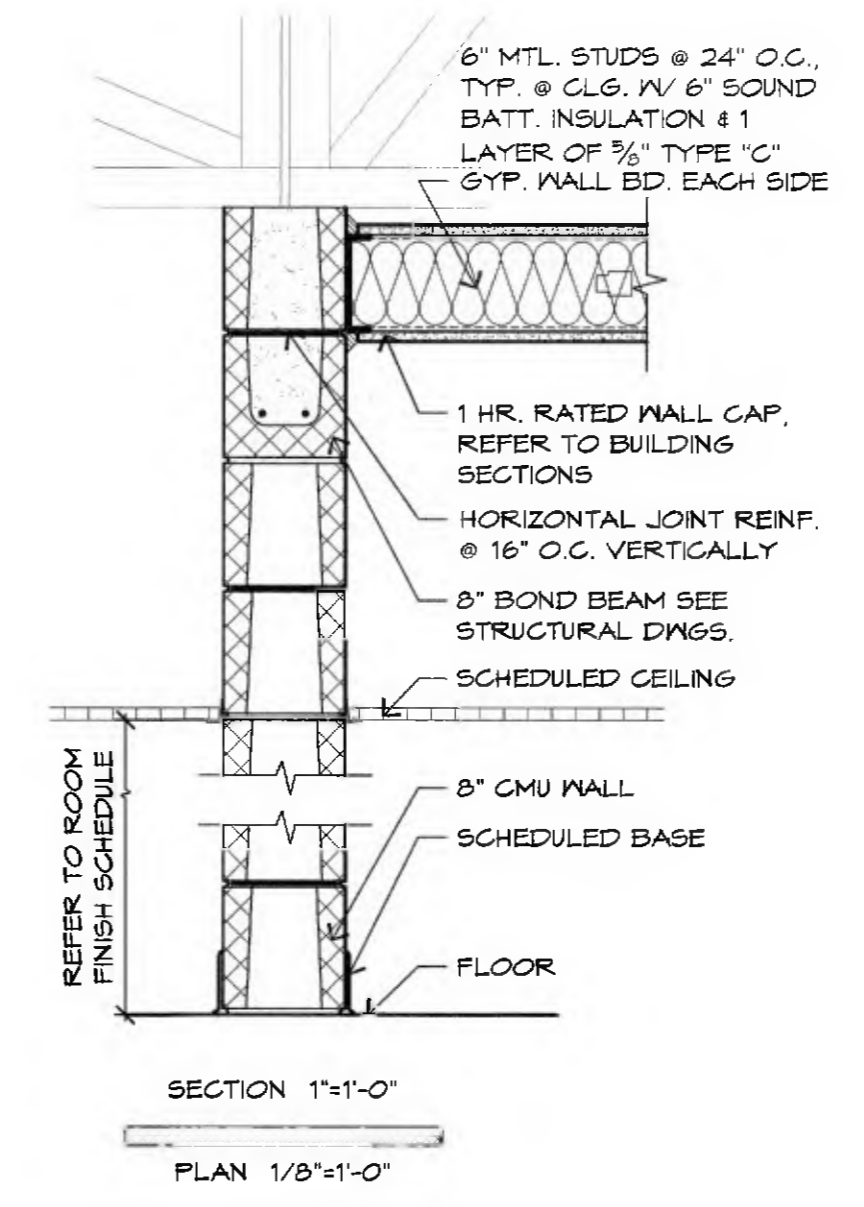
2 ROOF PENETRATION DETAIL
A202 NO SCALE



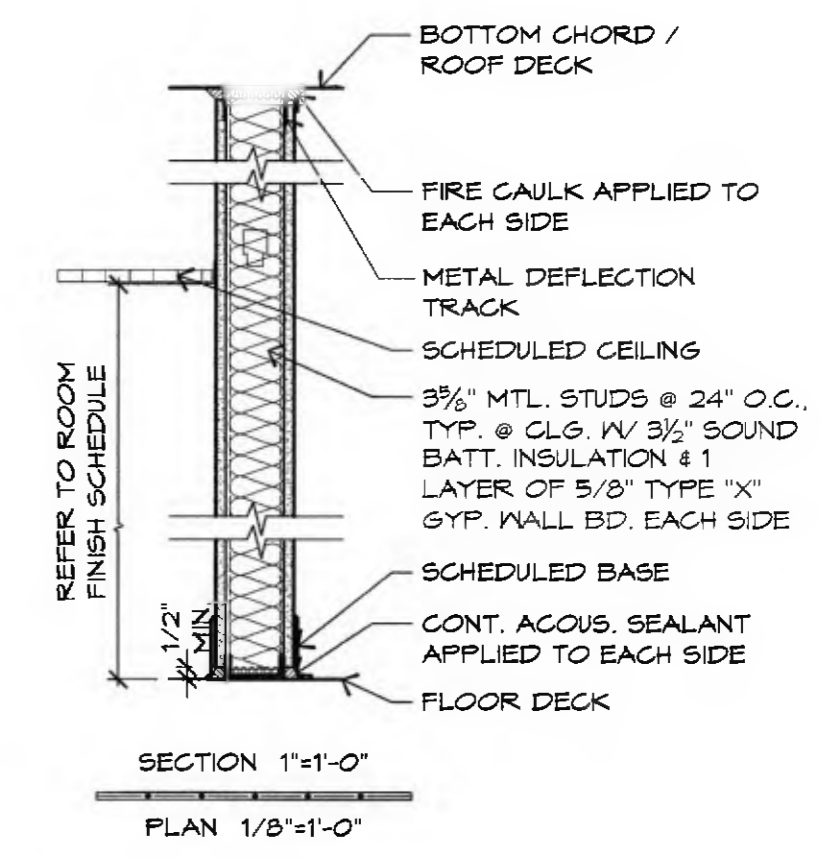
WALL TYPE #6
2 HR - #U905



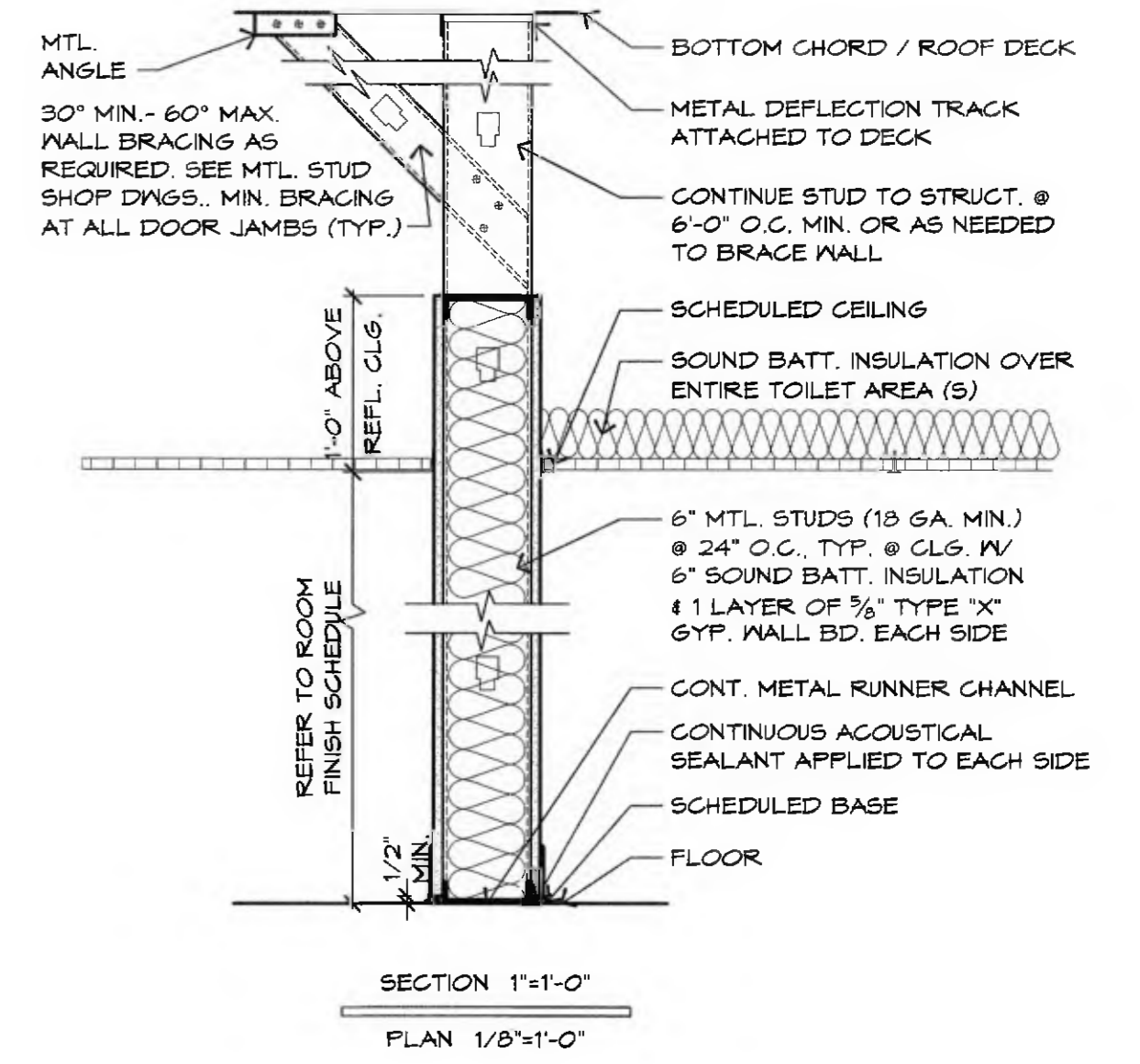
WALL TYPE #5
2 HR - #U905



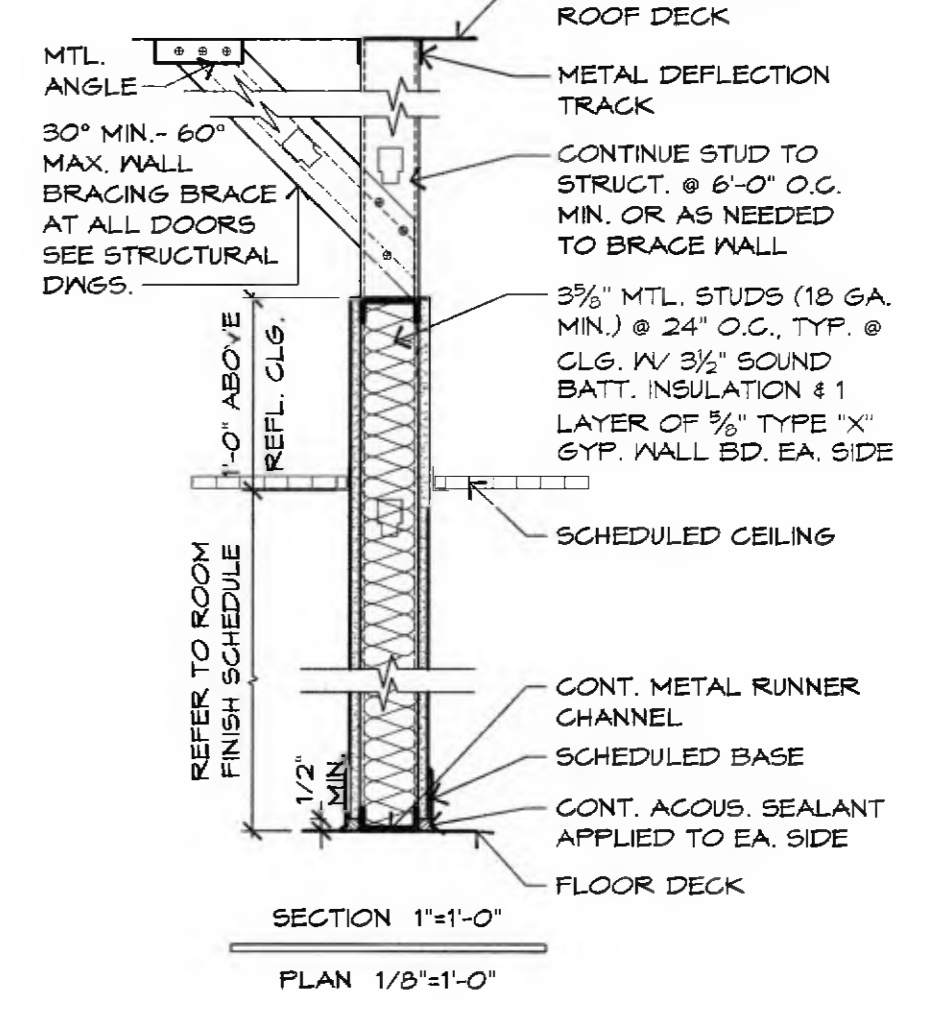
WALL TYPE #4
1 HR - #U905



WALL TYPE #3
1HR - #U432

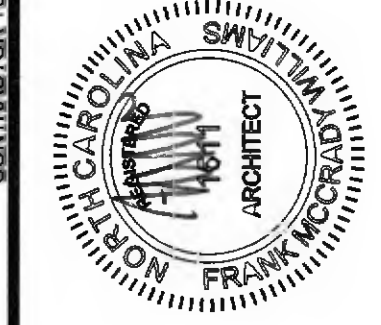
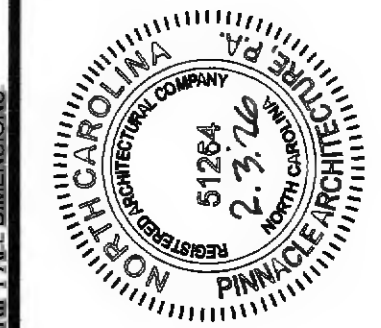


WALL TYPE #2



WALL TYPE #1

1 INTERIOR WALL TYPES
A202 SCALE: 1"=1'-0"



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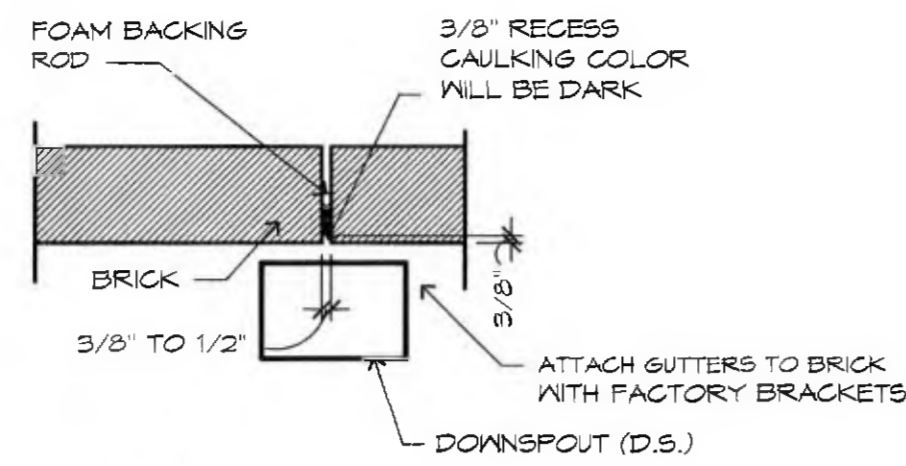


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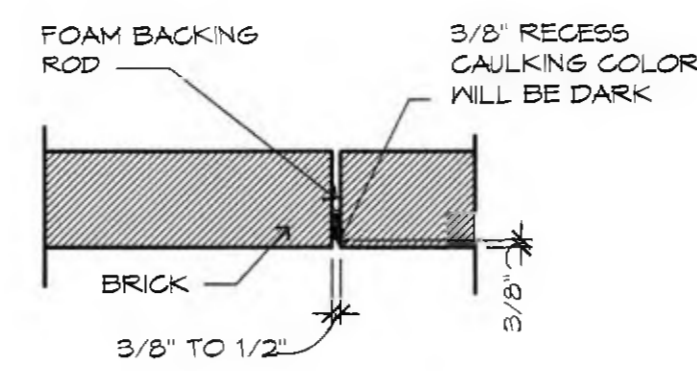
**CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC**

WALL TYPES, ROOF PLAN & DETAILS

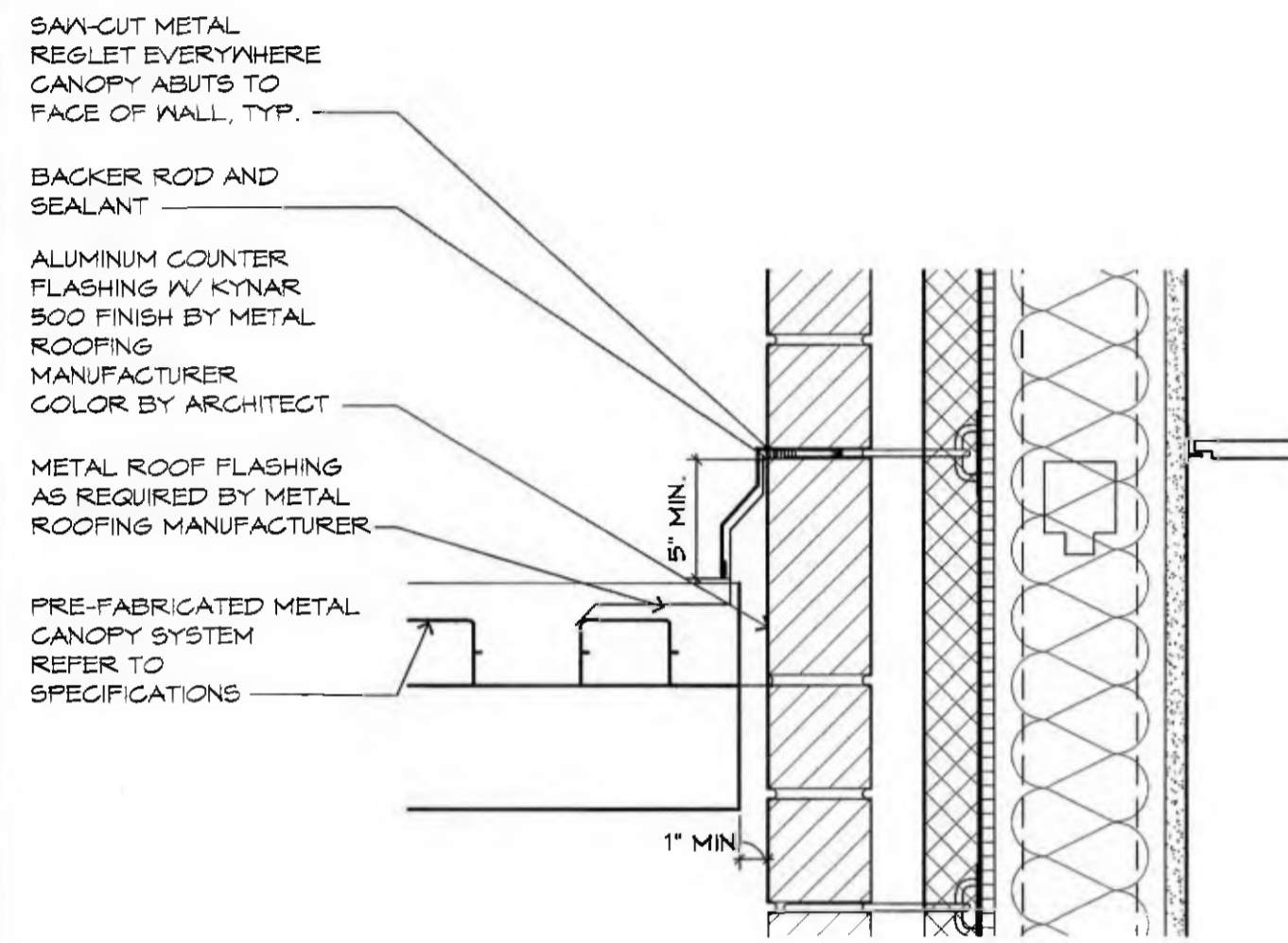
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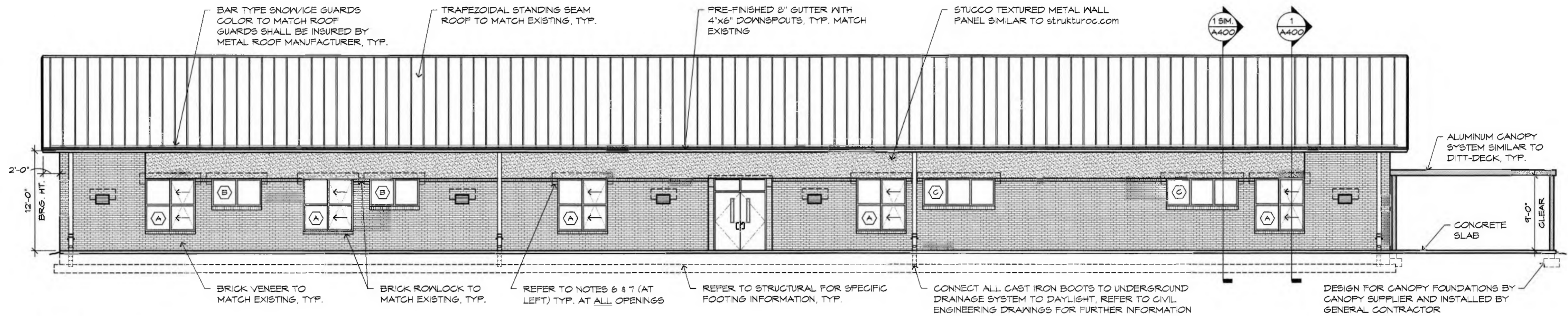
7 TYP. EXPANSION JOINT
A300 SCALE: N.T.S.



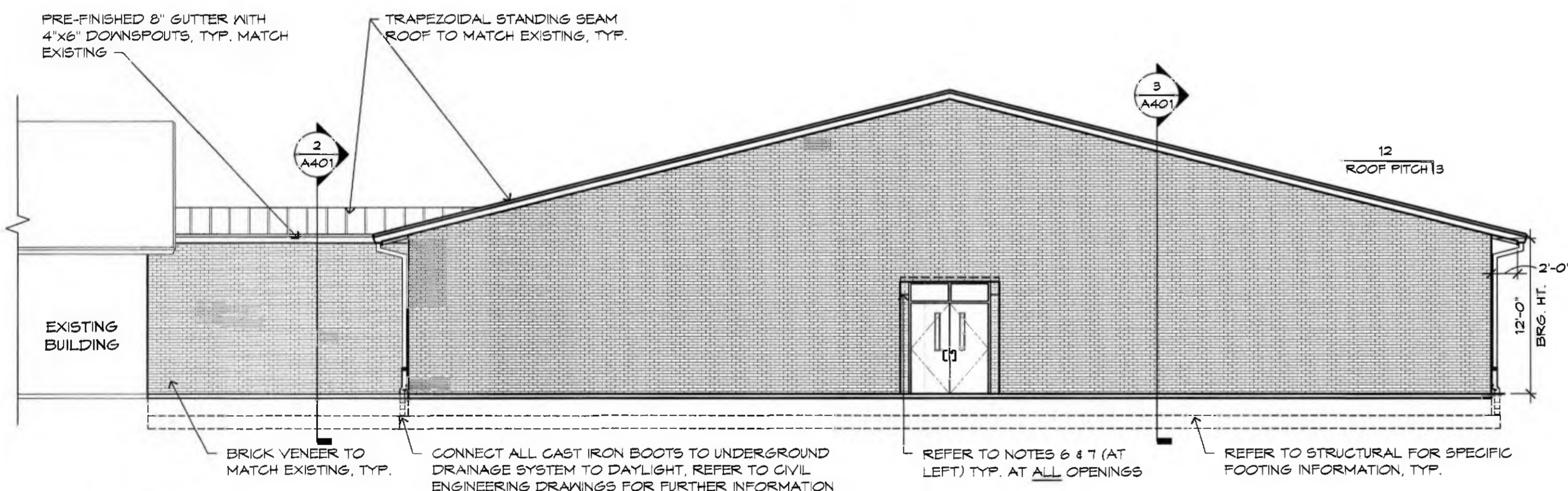
6 TYP. EXPANSION JOINT
A300 SCALE: N.T.S.



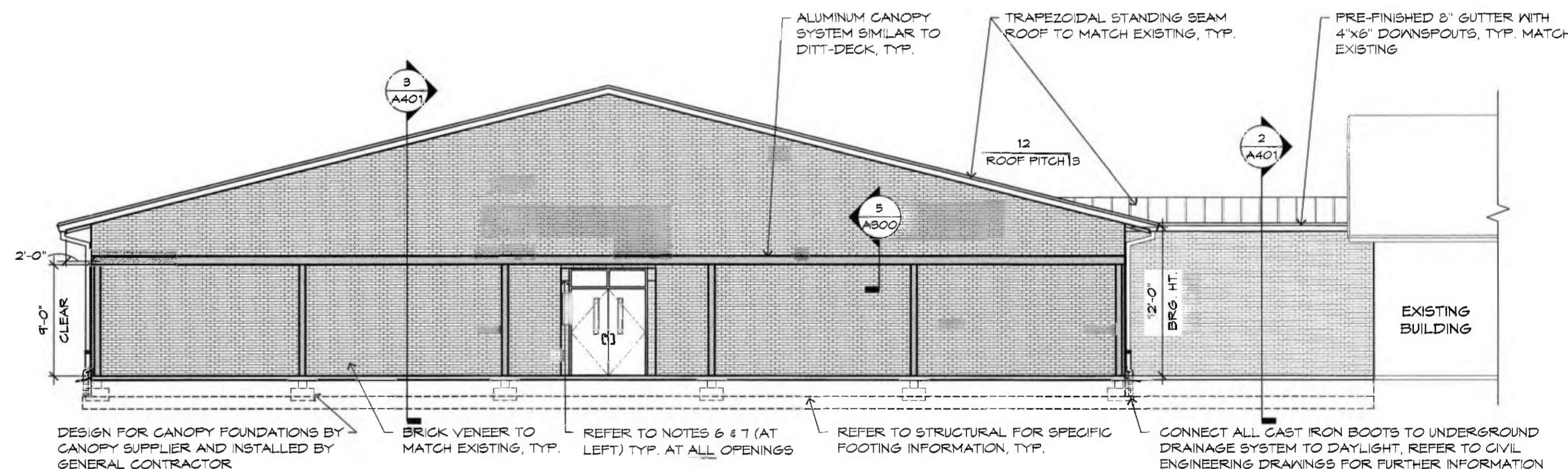
5 CANOPY FLASHING DETAIL
A300 SCALE: N.T.S.



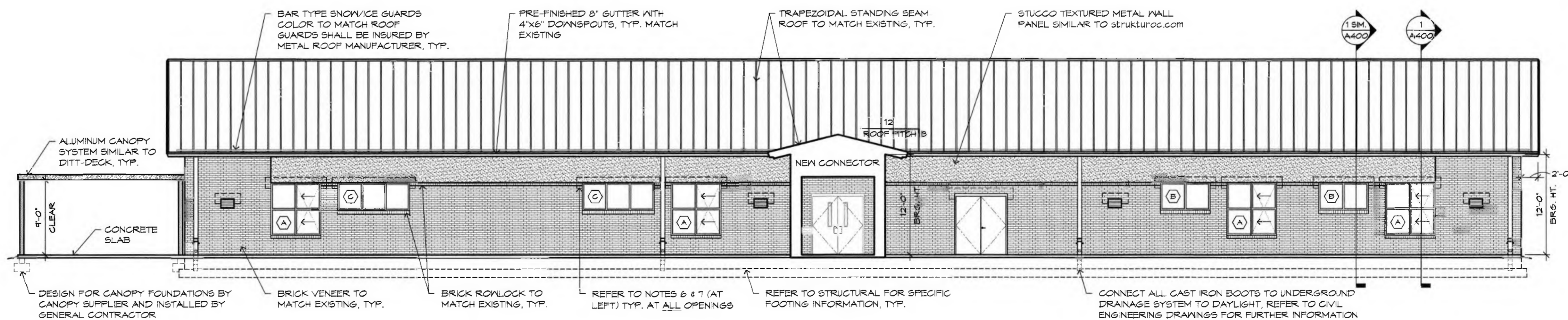
4 EXTERIOR ELEVATION
A300 SCALE: 1/8" = 1'-0"



3 EXTERIOR ELEVATION
A300 SCALE: 1/8" = 1'-0"

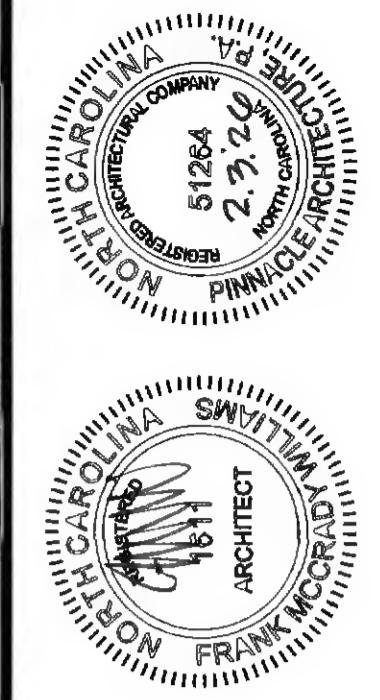


2 EXTERIOR ELEVATION
A300 SCALE: 1/8" = 1'-0"



1 EXTERIOR ELEVATION
A300 SCALE: 1/8" = 1'-0"

- NOTES: TYPICAL ALL BUILDINGS**
- GUTTER AND RIDGE GAP TO MATCH ROOF COLOR AS CLOSE AS POSSIBLE.
 - DOWNSPOUT TO MATCH WALL COLOR AS CLOSE AS POSSIBLE.
 - GUTTER AND DOWNSPOUT SYSTEM BY METAL ROOF MANUFACTURER.
 - TRAPEZOIDAL LOCK SEAM ROOF - COLOR TO BE SELECTED BY ARCHITECT.
 - EXPANSION JOINTS BEHIND DOWN SPOUTS.
 - G.C. TO CONTACT COMMERCIAL GRADE AIR BARRIER (TYVEK) MANUFACTURER TO COORDINATE PROPER INSTALLATION AT ALL OPENINGS. ALL MANUFACTURER'S WARRANTIES WILL APPLY. FLASHING AROUND ALL OPENINGS, TYP.
 - PROVIDE LAMINATED COPPER FABRIC FLASHING AT ALL INTEL CONDITIONS. G.C. TO CONTACT MANUFACTURER TO COORDINATE PROPER INSTALLATION. REFER TO SHEET A6.0 FOR MORE INFORMATION.



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PROJECT
CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC

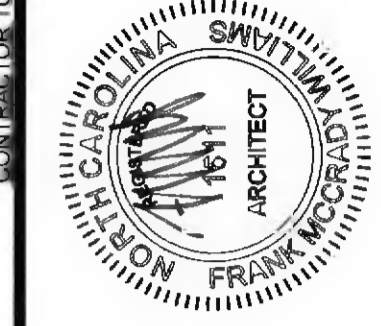
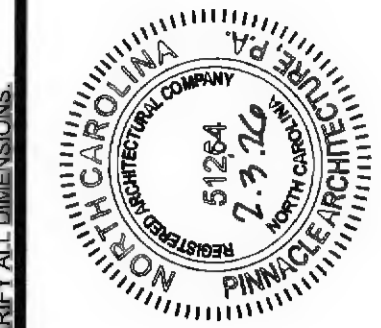
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EXTERIOR ELEVATIONS

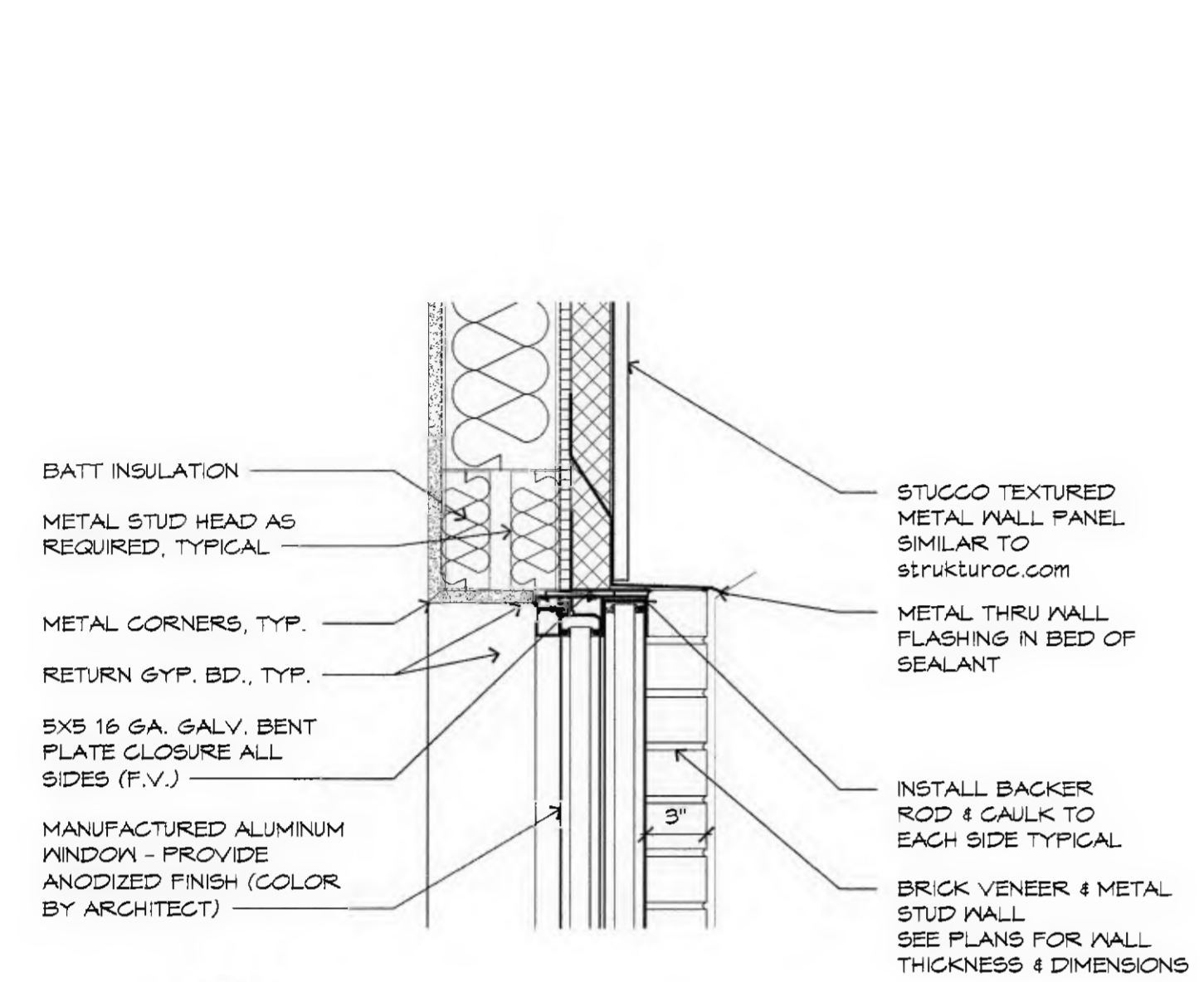
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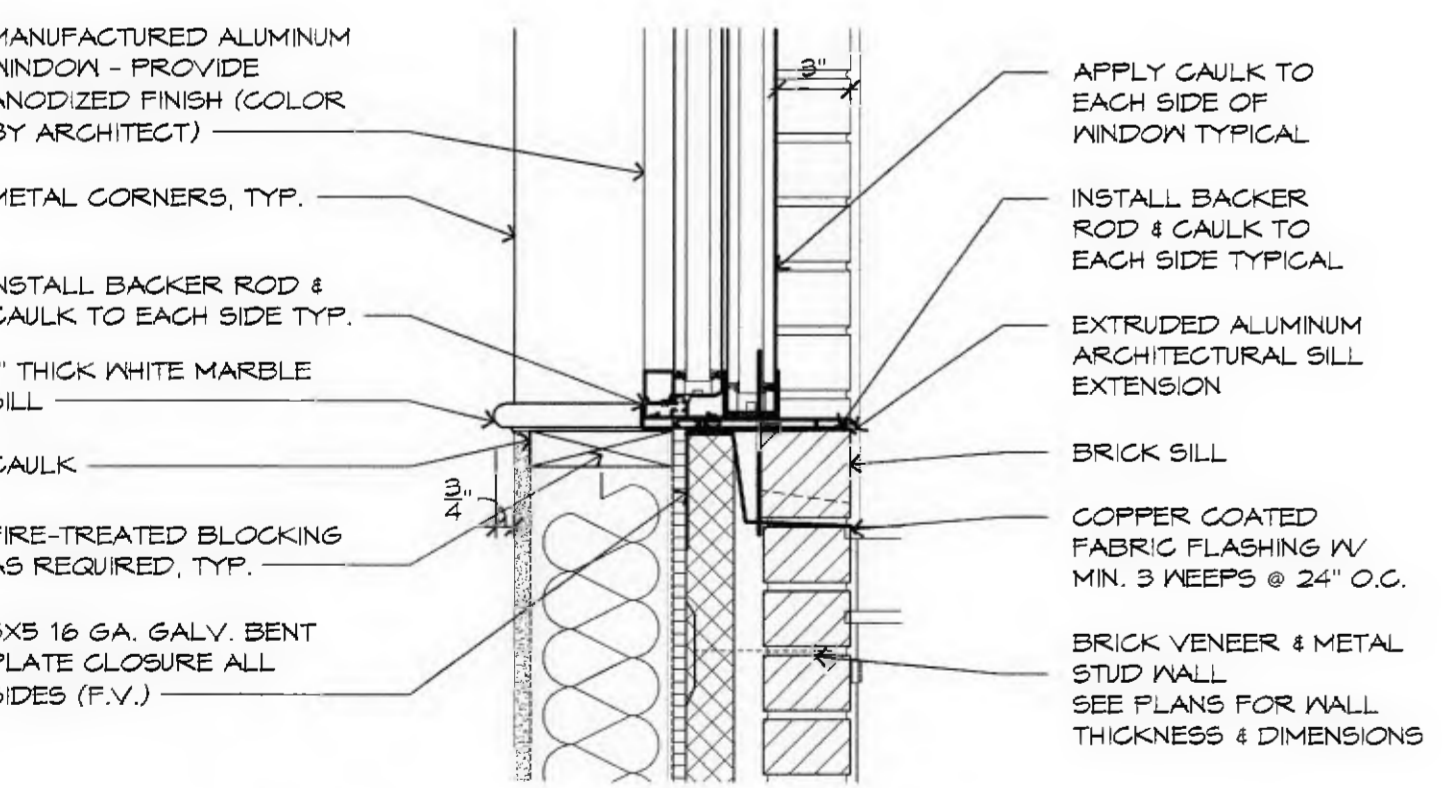
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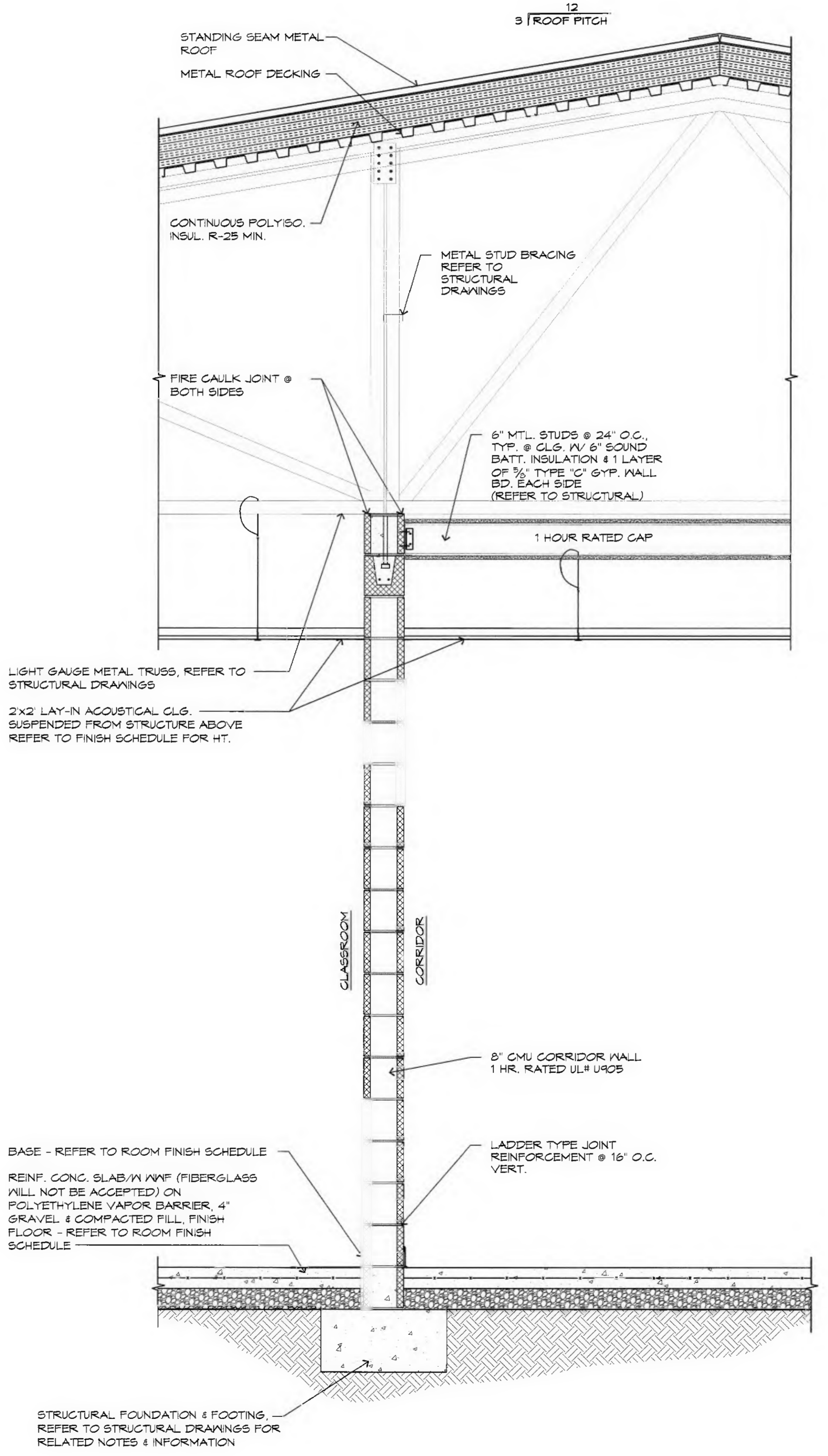
- GENERAL NOTES:**
- SOIL AT EXTERIOR WALL SHALL BE A MINIMUM FULL BRICK COURSE BELOW FINISHED FLOOR AND SHALL SLOPE AWAY AT 1/4" PER FOOT MINIMUM.
 - EXTERIOR PAVEMENT AT EXTERIOR WALLS SHALL BE 1/2" BELOW FINISHED FLOOR AND SHALL SLOPE AWAY AT 1/8" PER FOOT MINIMUM.



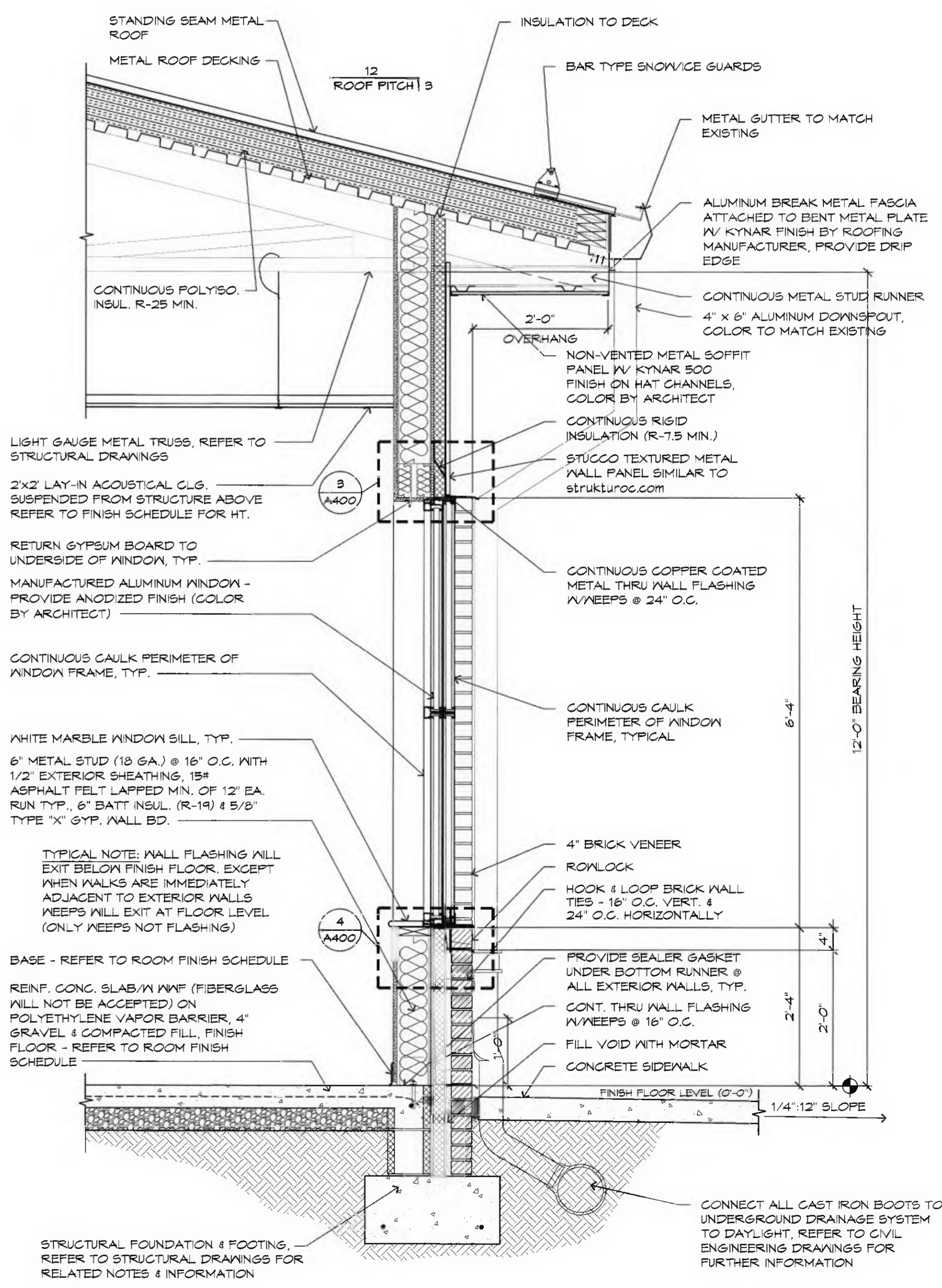
4 TYP. WINDOW HEAD DETAIL
A400 SCALE: 1 1/2" = 1'-0"



3 TYP. WINDOW SILL DETAIL
A400 SCALE: 1 1/2" = 1'-0"



2 WALL SECTION
A400 SCALE: 3/4" = 1'-0"



1 WALL SECTION
A400 SCALE: 3/4" = 1'-0"

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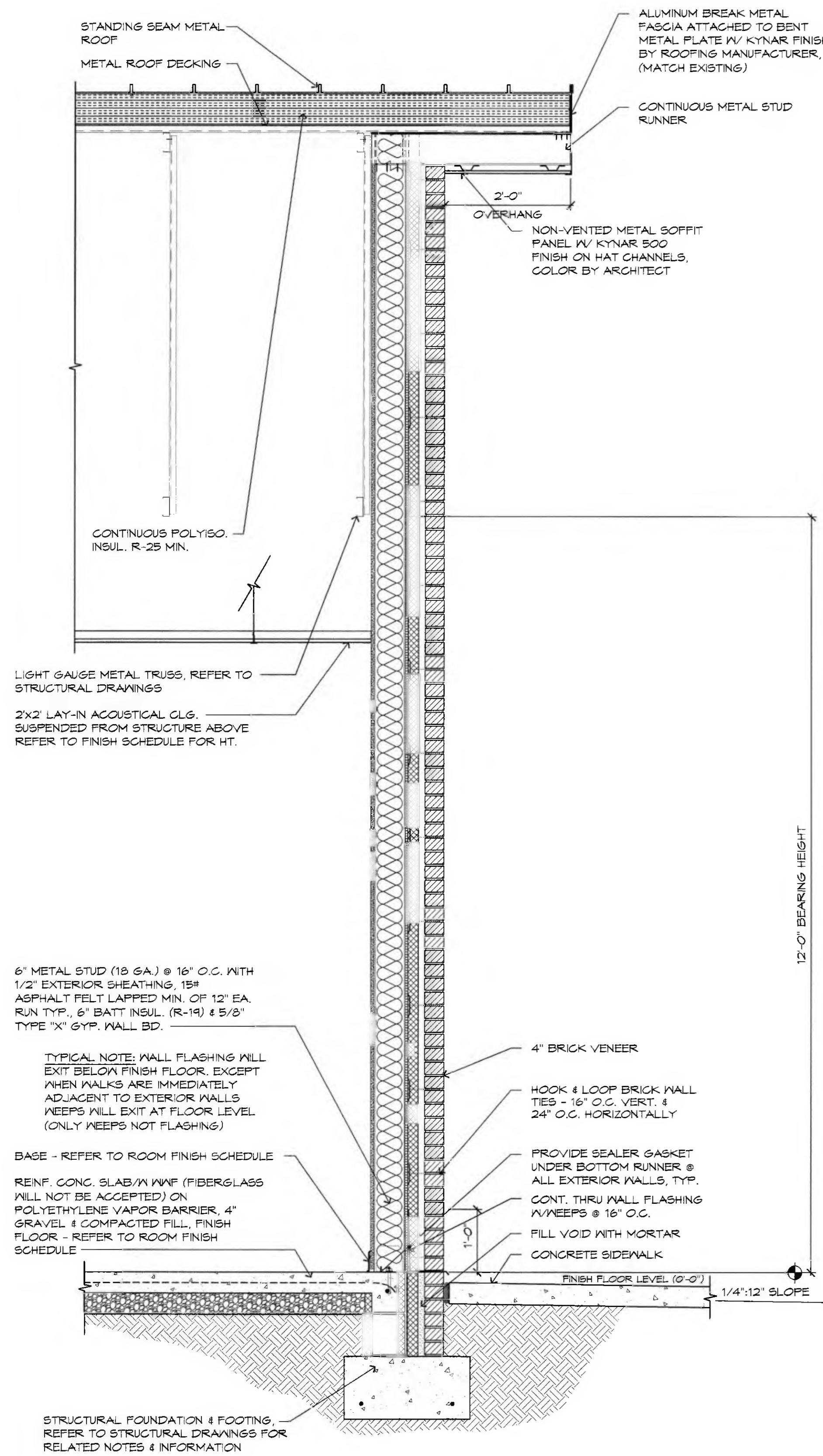


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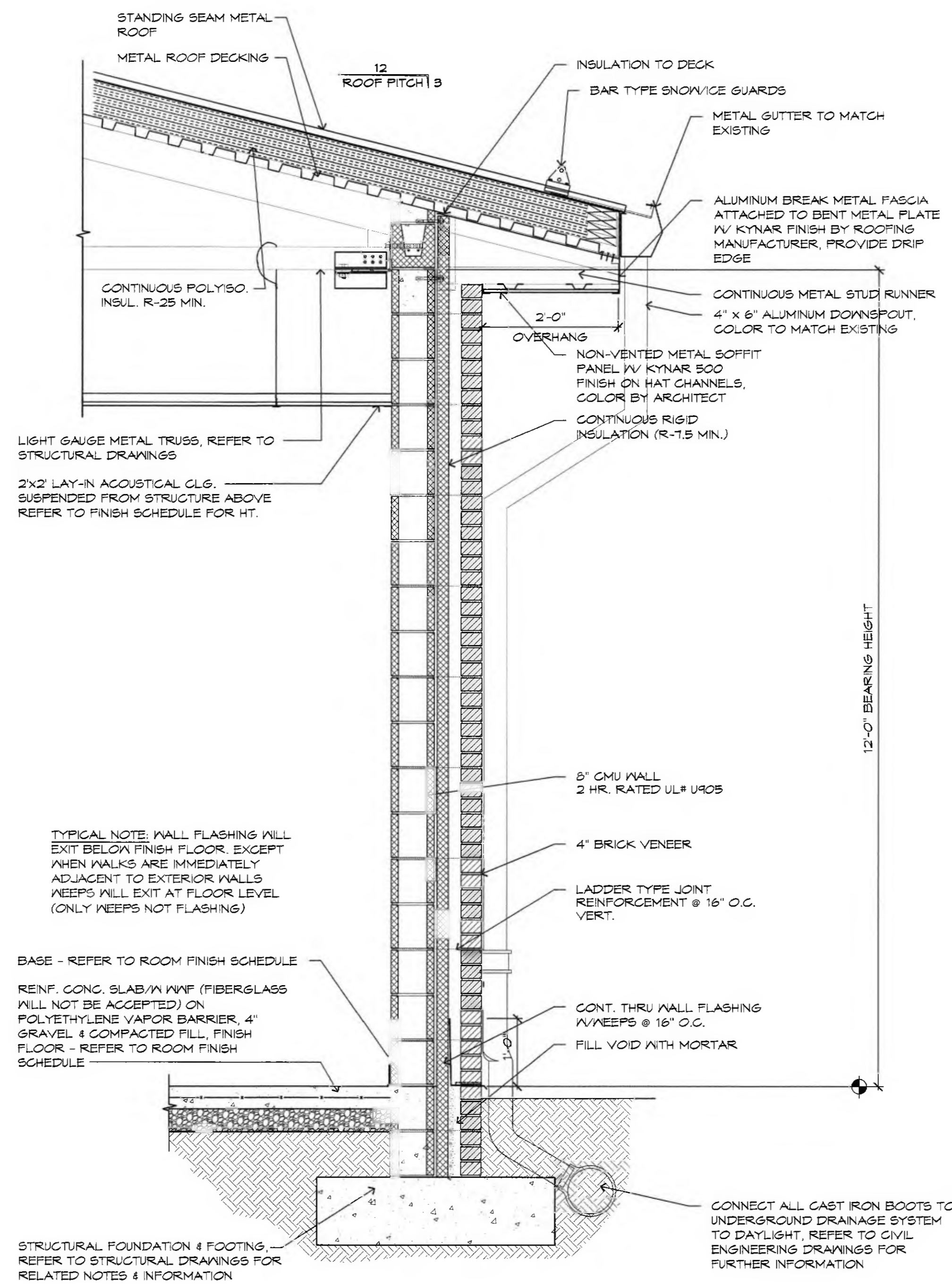
CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
WALL SECTIONS & DETAILS

REVISION SCHEDULE	
DATE	REFERENCE

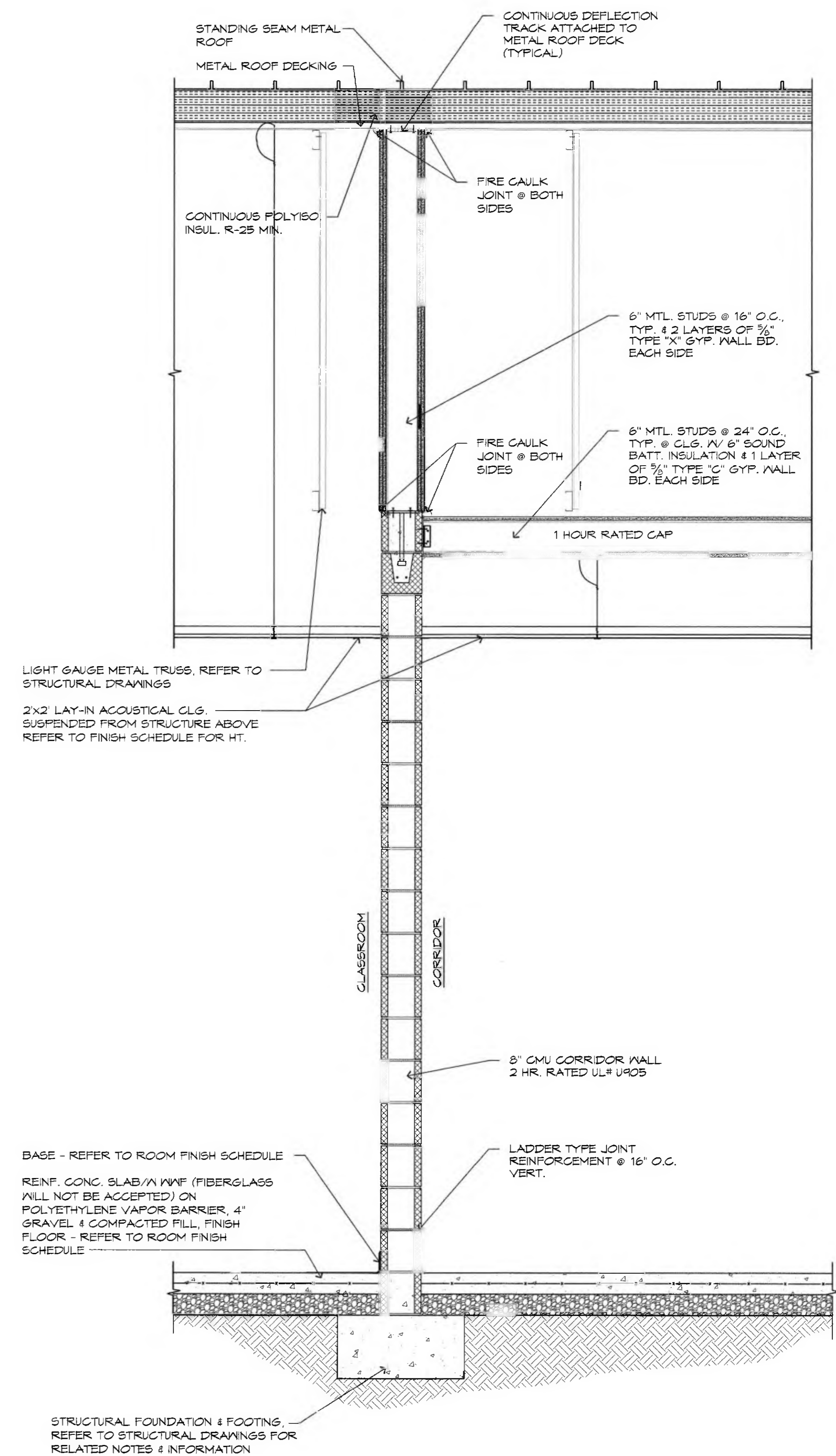
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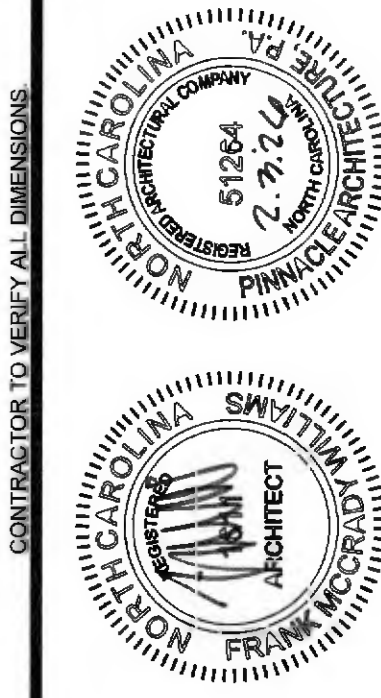
3 WALL SECTION
A401 SCALE: 3/4" = 1'-0"



2 WALL SECTION
A401 SCALE: 3/4" = 1'-0"



1 WALL SECTION
A401 SCALE: 3/4" = 1'-0"



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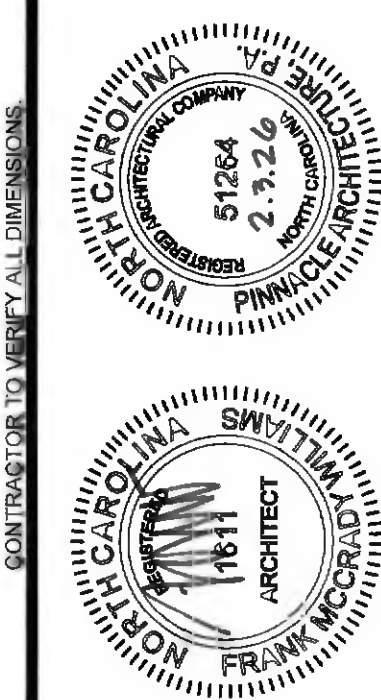
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**CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC**

A401

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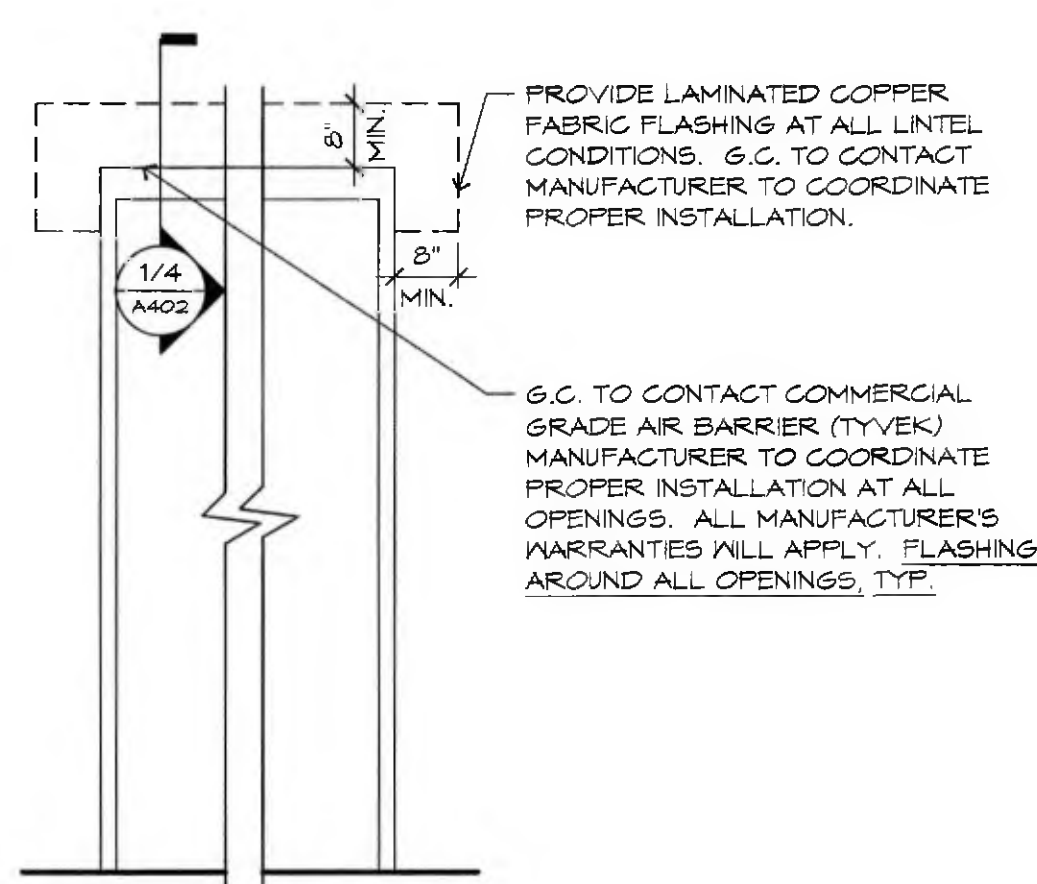
ISSUE DATE: 01.30.26
 DRAWN BY: JHM/VTF/EEB
 CHECKED BY: JHM/VTF/EEB
 PROJECT: 252D

**CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC**

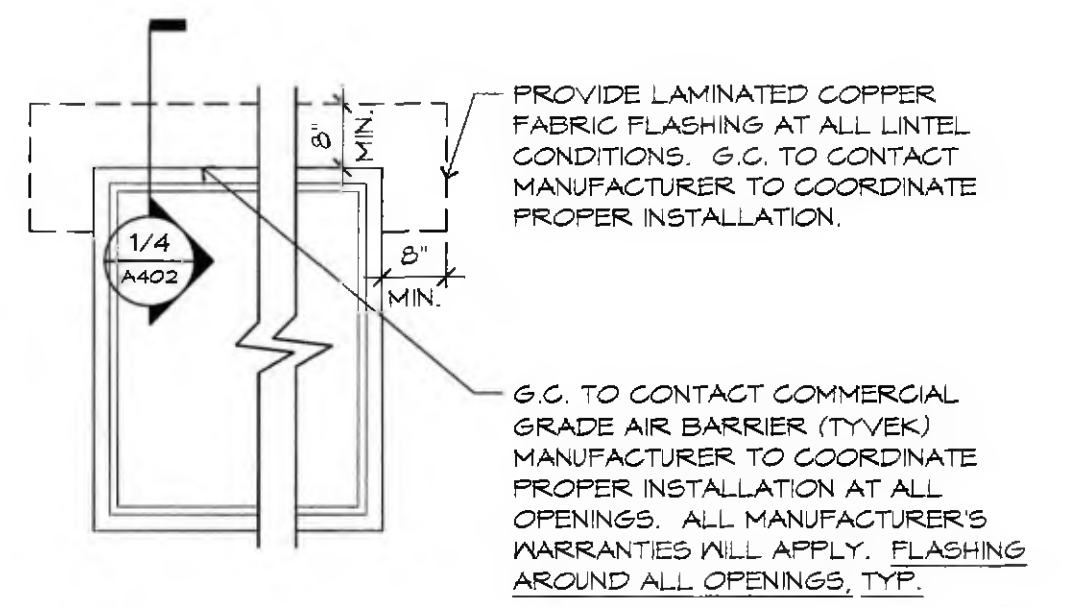
REVISION SCHEDULE		
NO.	DATE	REFERENCE

A402

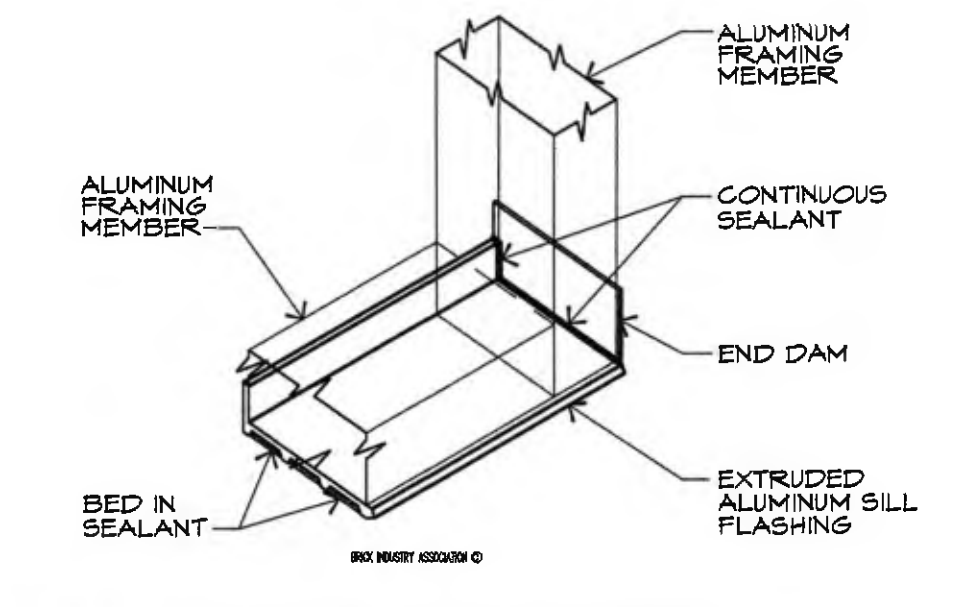
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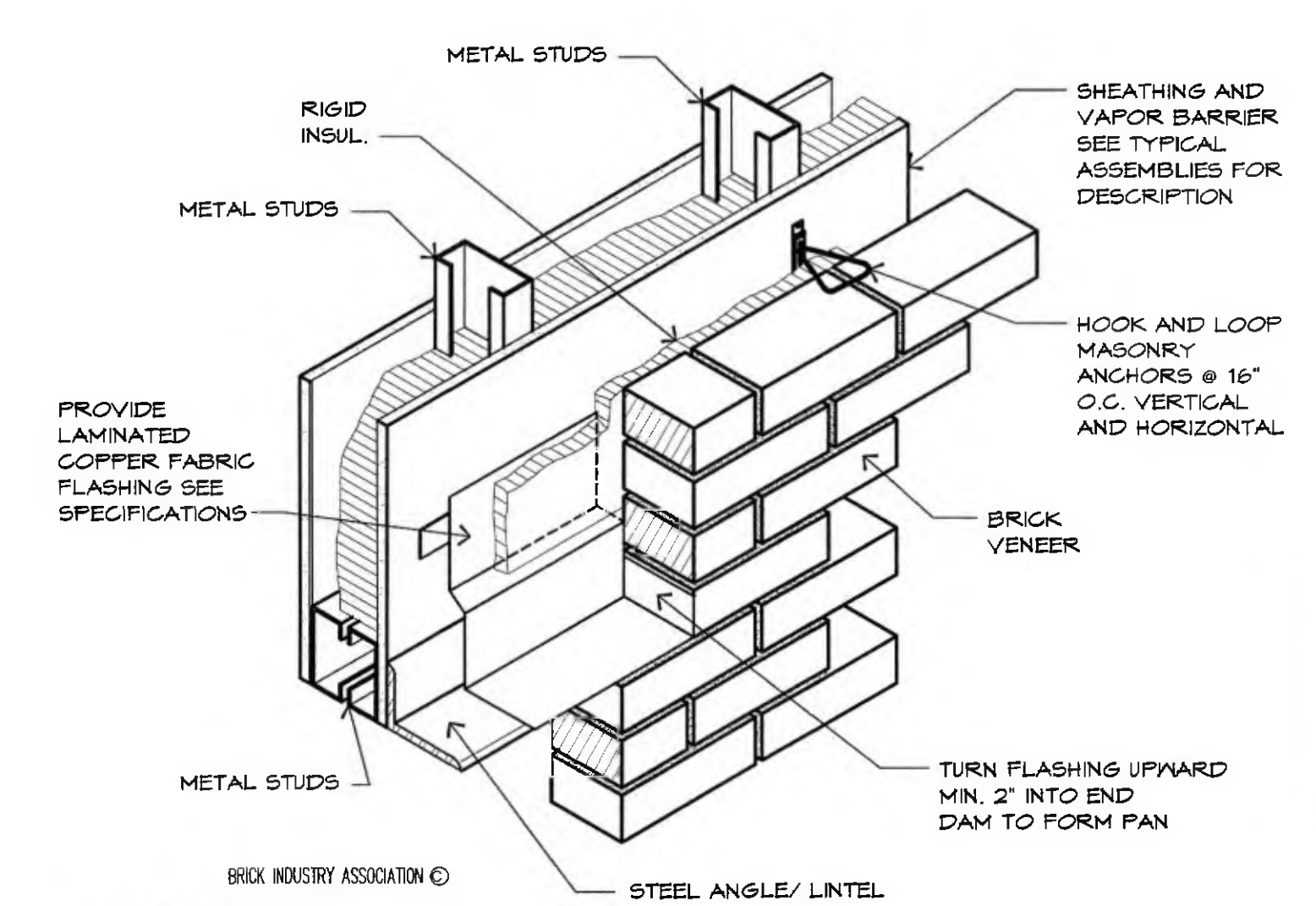
7 TYP. DOOR FLASHING DETAIL
A402 NTS



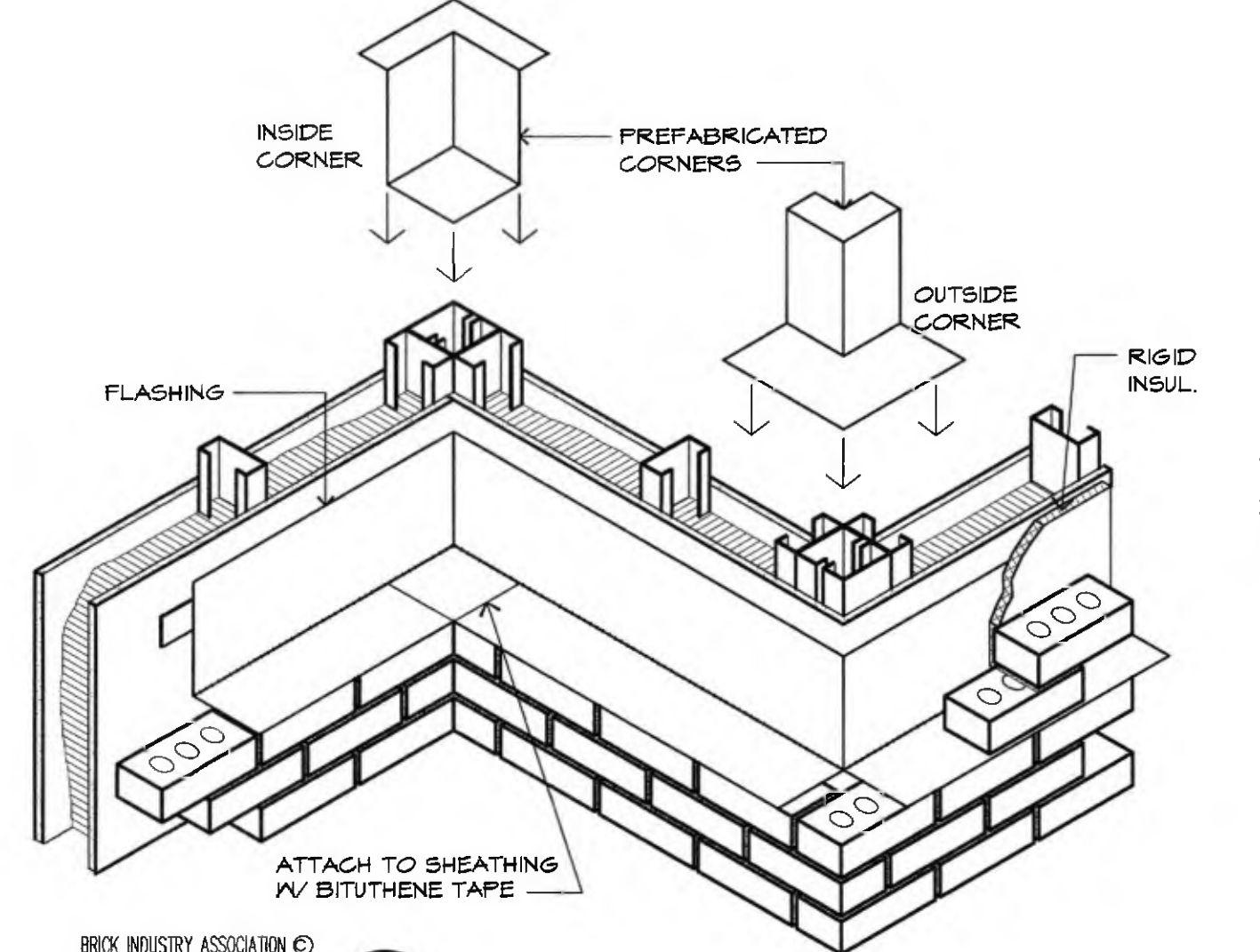
6 TYP. WINDOW FLASHING DETAIL
A402 NTS



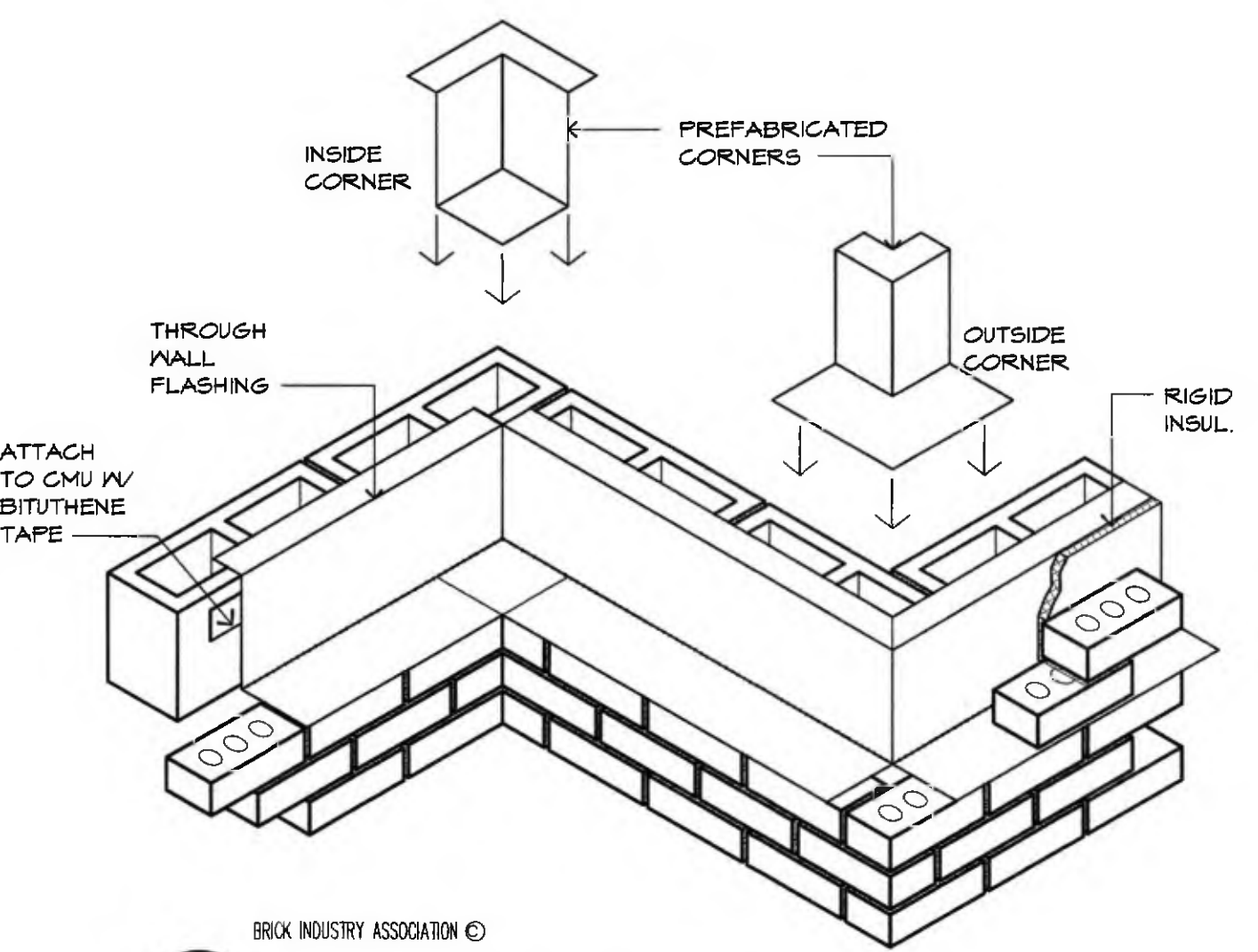
5 TYP. SILL FLASHING & END DAM DETAIL
A402 SCALE: NTS @ ALUM. WINDOW/STOREFRONT SYSTEM



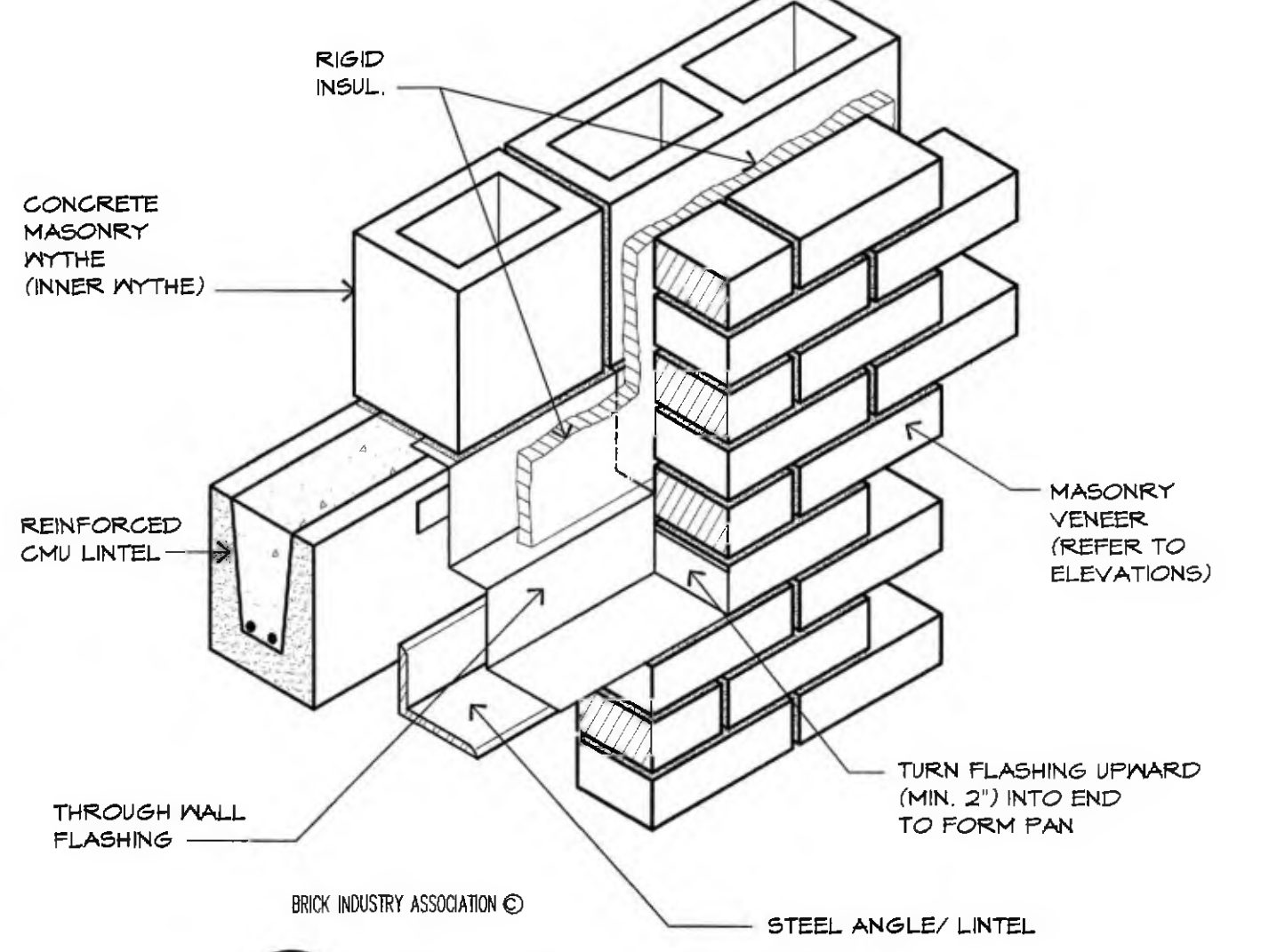
4 TYP. FLASHING DETAIL
A402 SCALE: NTS @ LINTEL W/ END DAM



3 TYP. FLASHING DETAIL
A402 SCALE: NTS @ CORNERS

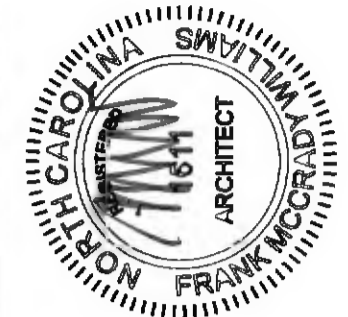


2 TYP. FLASHING DETAIL
A402 SCALE: NTS @ CORNERS



1 TYP. FLASHING DETAIL
A402 SCALE: NTS @ LINTEL W/ END DAM

1/16" VERTICAL SCALE ONLY FOR WALLS AND PARTS THEREOF. 1/8" HORIZONTAL SCALE ONLY FOR WALLS AND PARTS THEREOF. 1/4" HORIZONTAL SCALE ONLY FOR FLOOR SLABS AND PARTS THEREOF. 1/2" HORIZONTAL SCALE ONLY FOR FOUNDATIONS AND PARTS THEREOF. 3/4" HORIZONTAL SCALE ONLY FOR ROOFS AND PARTS THEREOF. 1" HORIZONTAL SCALE ONLY FOR EXTERIOR WALLS AND PARTS THEREOF. 1 1/2" HORIZONTAL SCALE ONLY FOR INTERIOR WALLS AND PARTS THEREOF. 2" HORIZONTAL SCALE ONLY FOR EXTERIOR WALLS AND PARTS THEREOF. 3" HORIZONTAL SCALE ONLY FOR INTERIOR WALLS AND PARTS THEREOF. 4" HORIZONTAL SCALE ONLY FOR EXTERIOR WALLS AND PARTS THEREOF. 6" HORIZONTAL SCALE ONLY FOR INTERIOR WALLS AND PARTS THEREOF. 8" HORIZONTAL SCALE ONLY FOR EXTERIOR WALLS AND PARTS THEREOF. 12" HORIZONTAL SCALE ONLY FOR INTERIOR WALLS AND PARTS THEREOF. 18" HORIZONTAL SCALE ONLY FOR EXTERIOR WALLS AND PARTS THEREOF. 24" HORIZONTAL SCALE ONLY FOR INTERIOR WALLS AND PARTS THEREOF. 36" HORIZONTAL SCALE ONLY FOR EXTERIOR WALLS AND PARTS THEREOF. 48" 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PINACLE ARCHITECTURE PROFESSIONAL ASSOCIATION
 P.O. BOX 187, 630 TRAM ROAD, SUITE 200 MATTHEWS, NORTH CAROLINA 28106
 701 EAST BAY STREET, SUITE 302 CHARLESTON, SOUTH CAROLINA 29403
 PH: (704) 847-9851 FAX: (704) 847-9853



ISSUE DATE: 01/30/26
 DRAWN BY: JH
 CHECKED BY: PMV/REE
 PROJECT: 2526

**CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC**

REVISION SCHEDULE

NO.	DATE	REFERENCE

A600

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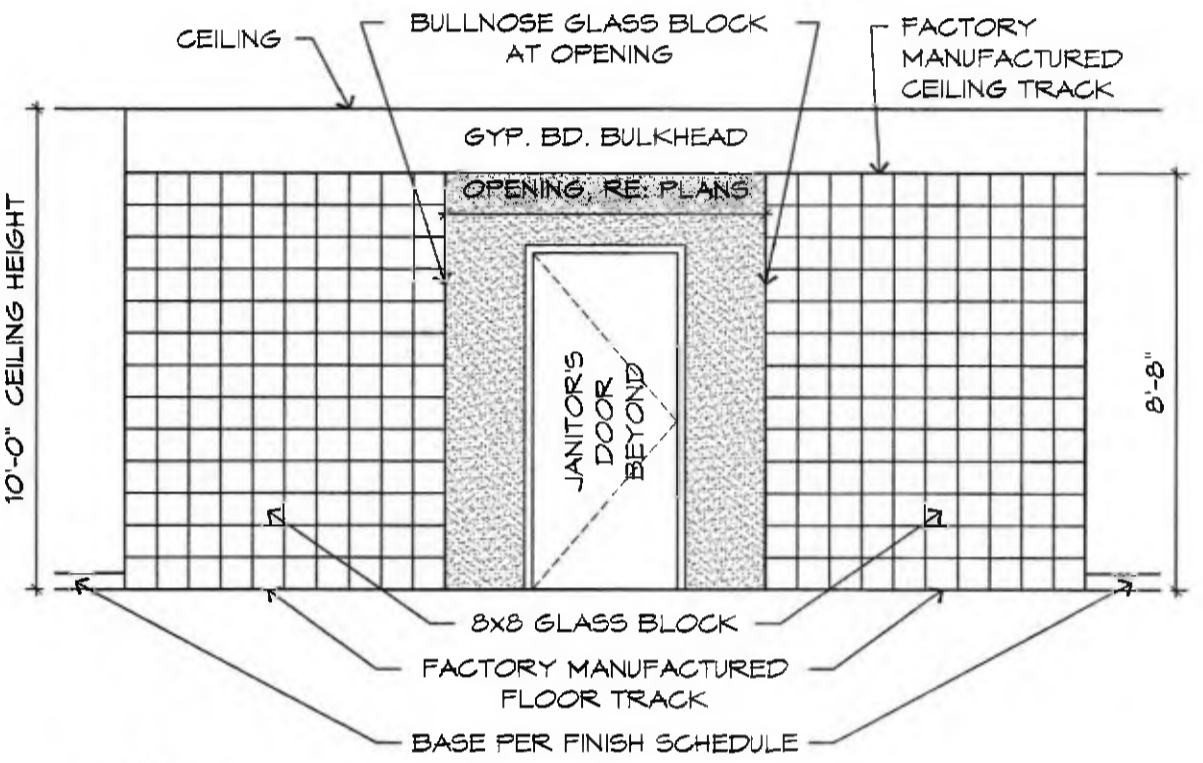
NOTE:
 OWNER WILL RENUMBER/
 RELABEL ALL ROOMS PRIOR
 TO ORDERING NEW SIGNAGE.

GENERAL NOTES:

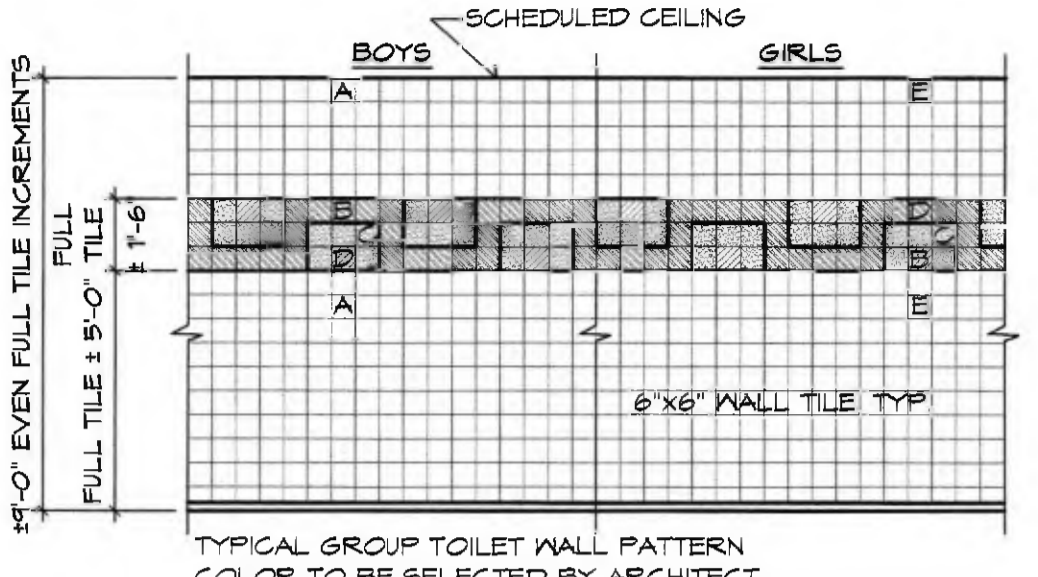
- ALL EXPOSED GYPSUM CORNERS SHALL BE HAVE VINYL CORNER GUARDS- EQUAL TO THINLINE MODEL CG-215T BY AFGO LENGTH 8'-0" FROM FINISH FLOOR.
- INSTALL MINI BLINDS ON ALL EXTERIOR WINDOWS. REFER TO SECTION 12 21 19 IN SPECIFICATIONS.
- CONTRACTOR TO VERIFY EXACT LOCATION OF ALL MILLWORK WITH ARCHITECT BEFORE FABRICATION. CONTRACTOR TO VERIFY EXACT LOCATION OF ALL MILLWORK WITH ARCHITECT BEFORE FABRICATION.
- REFER TO SECTION 01 23 00 FOR ALTERNATES.
- ALL EXPOSED GYPSUM BOARD WILL BE FINISHED WITH A "KICKDOWN" FINISH AND SEMI-GLOSS PAINT. ALL OTHER WALLS TO BE PAINTED WITH SEMI-GLOSS PAINT UNLESS OTHERWISE NOTED.
- ALL EXPOSED METAL STRUCTURE, DUCTS, CONDUIT, ETC. SHALL BE COVERED OR PAINTED (SEE SPECS).
- COLORS AND PATTERNS TO BE SELECTED BY ARCHITECT. REFER TO FLOOR PLANS FOR TILE PATTERNS.
- 6" SOUND BATT. INSULATION OVER ENTIRE TOILET ROOM CEILING.
- MASONRY WALLS SHALL HAVE WATERPROOF SEALANT APPLIED (MIN 60" HIGH).
- 1/2" CEMENT BOARD BEHIND ALL TILE WALL CONDITIONS.

ROOM FINISH SCHEDULE ABBREVIATIONS:

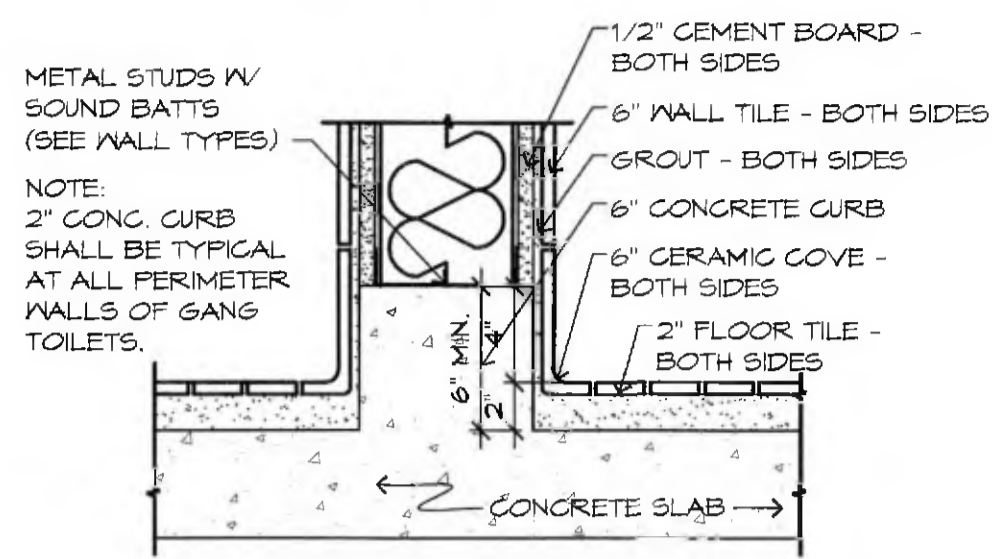
- ACOUS - SUSPENDED ACOUSTICAL CEILING
- VCT - VINYL COMPOSITION TILE
- DW - DRYWALL
- CMU - CONCRETE MASONRY UNIT
- CMT BD - CEMENT BOARD
- CT - CERAMIC TILE
- CONC - CONCRETE
- AR DW - ABUSE RESISTANT DRYWALL
- WP DW - WATERPROOF DRYWALL
- MMMR PAINT - MOISTURE / MOLD/ MILDEW / RESISTANT EPOXY PAINT



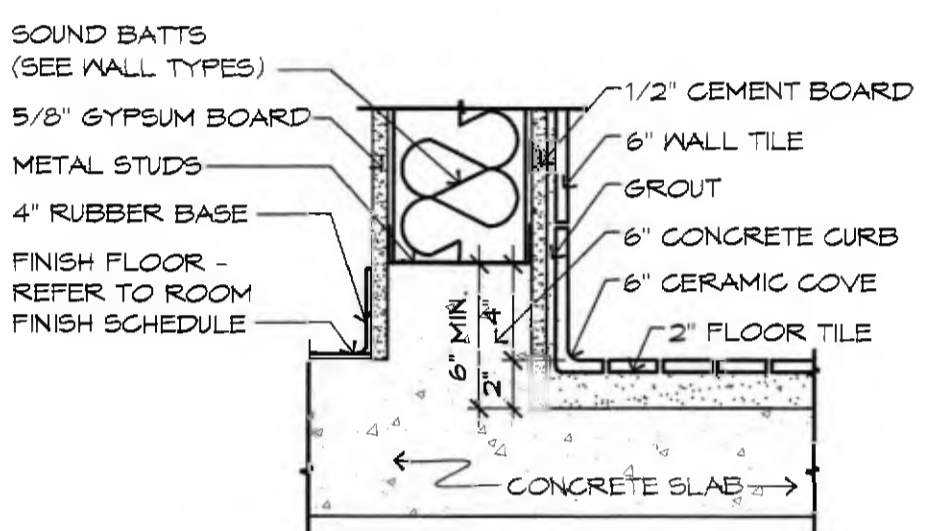
6 TYP. ELEV. - GROUP TOILET ENTRY
 A600 SCALE: 1/4" = 1'-0"



8 TYP. ELEV. - GROUP TOILET
 A600 SCALE: 1/4" = 1'-0"



9 TYP. CERAMIC BASE SECTION @ TOILET WALL
 A600 SCALE: N.T.S.

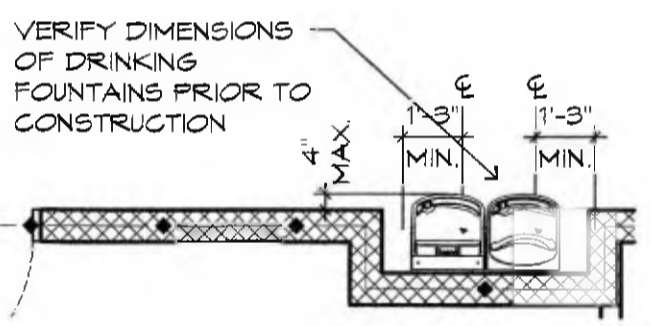


7 TYP. CERAMIC BASE SECTION @ TOILET WING WALL
 A600 SCALE: N.T.S.

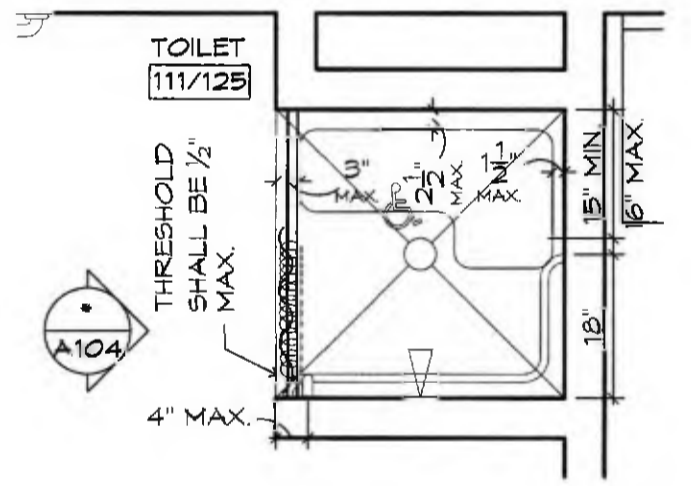
NOTES:

- REFER TO ACCESSIBILITY SHEET FOR TOILET FIXTURE AND ACCESSORY MOUNTING HEIGHTS
- ALL EXPOSED CMU CORNERS WILL BE FACTORY RADIUS
- ALL HANDICAPPED ACCESSIBLE STALLS SHALL RECEIVE HINGES WITH INTEGRAL CLOSERS

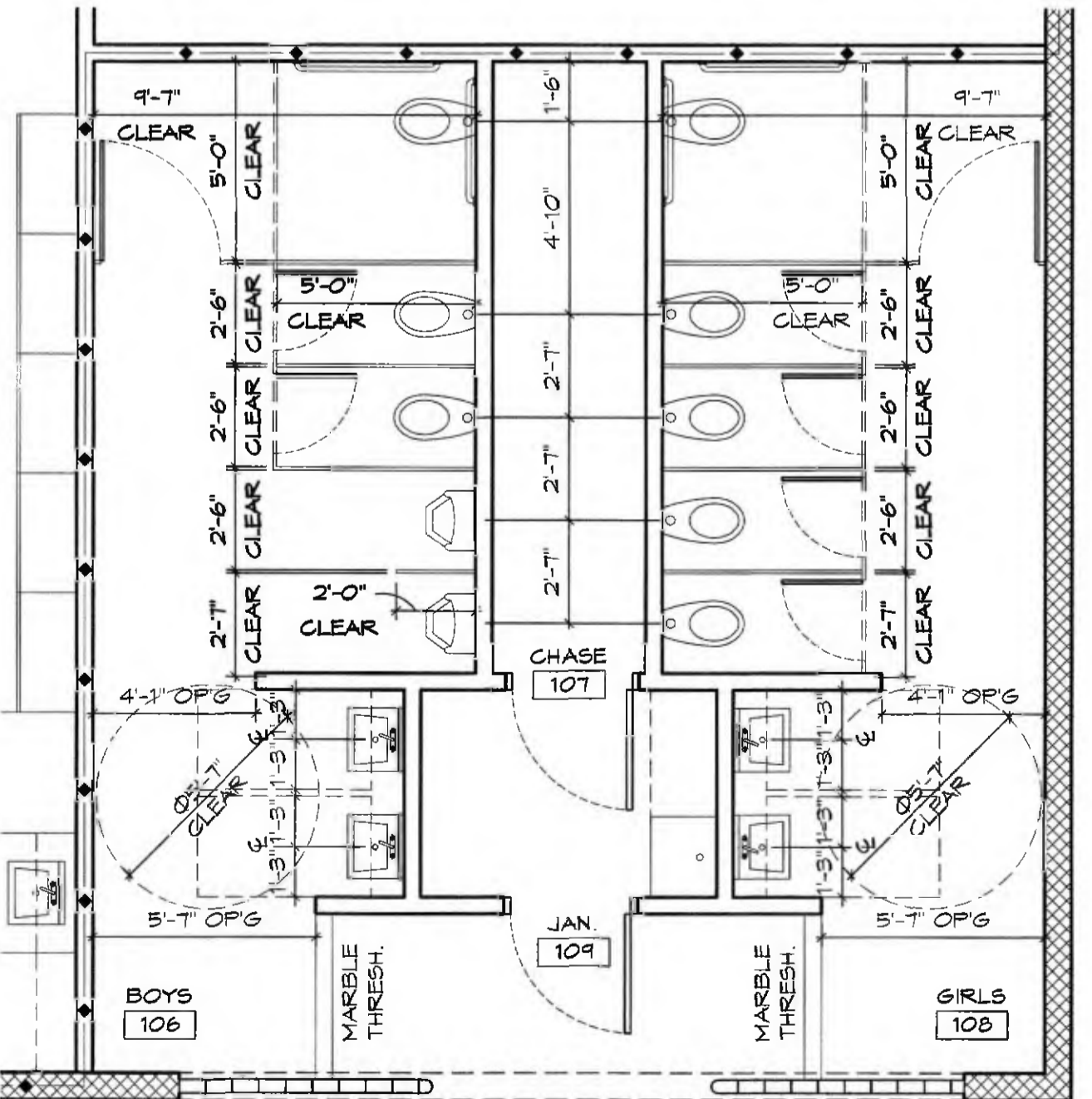
NOTE:
 ALL ENLARGED TOILET DIMENSIONS SHOWN ARE FROM INTERIOR FINISHED FACE OF WALL TO INTERIOR FINISHED FACE OF WALL.



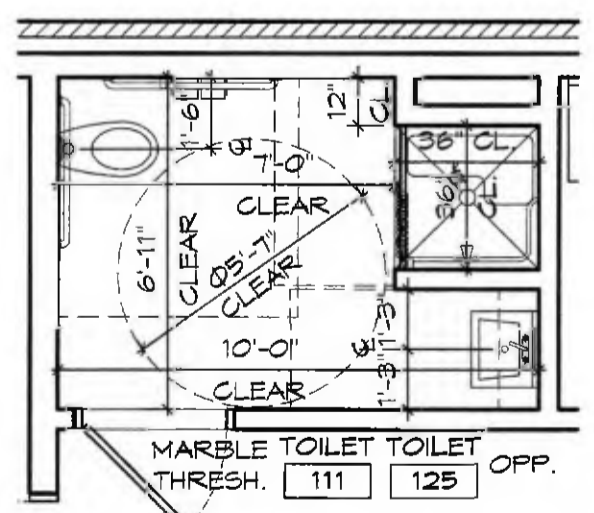
5 DRINKING FOUNTAIN ENLARGED PLAN
 A600 SCALE: 1/4" = 1'-0"



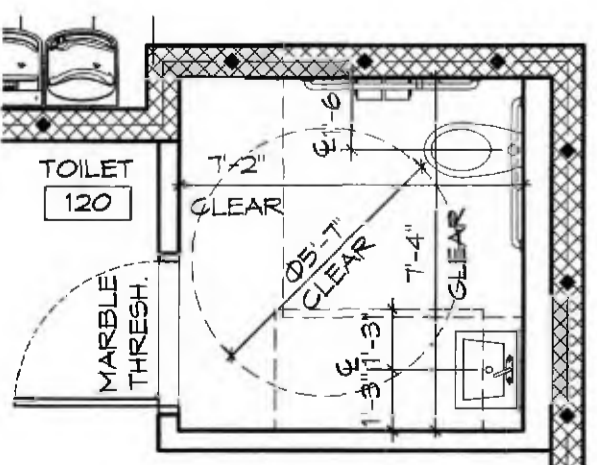
4 GRAB RAIL & SEAT DETAIL
 A600 SCALE: 1/2" = 1'-0"



2 ENLARGED TOILET PLAN
 A600 SCALE: 1/4" = 1'-0"

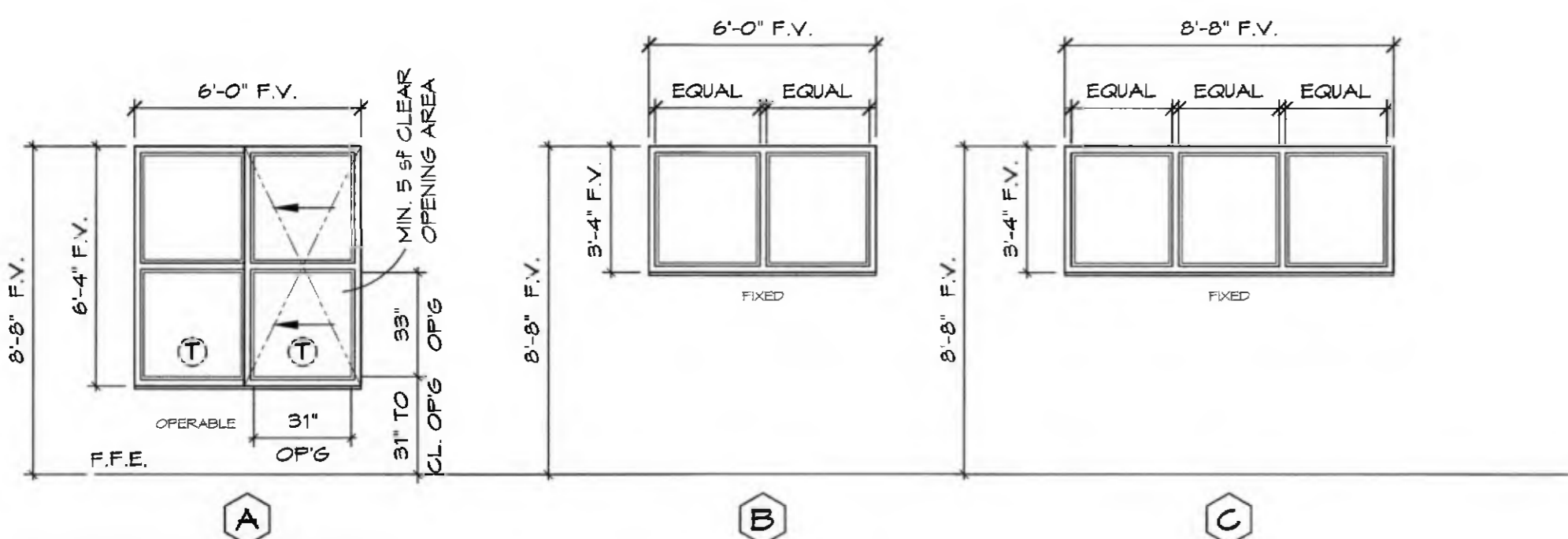


1 ENLARGED TOILET PLAN
 A600 SCALE: 1/4" = 1'-0"



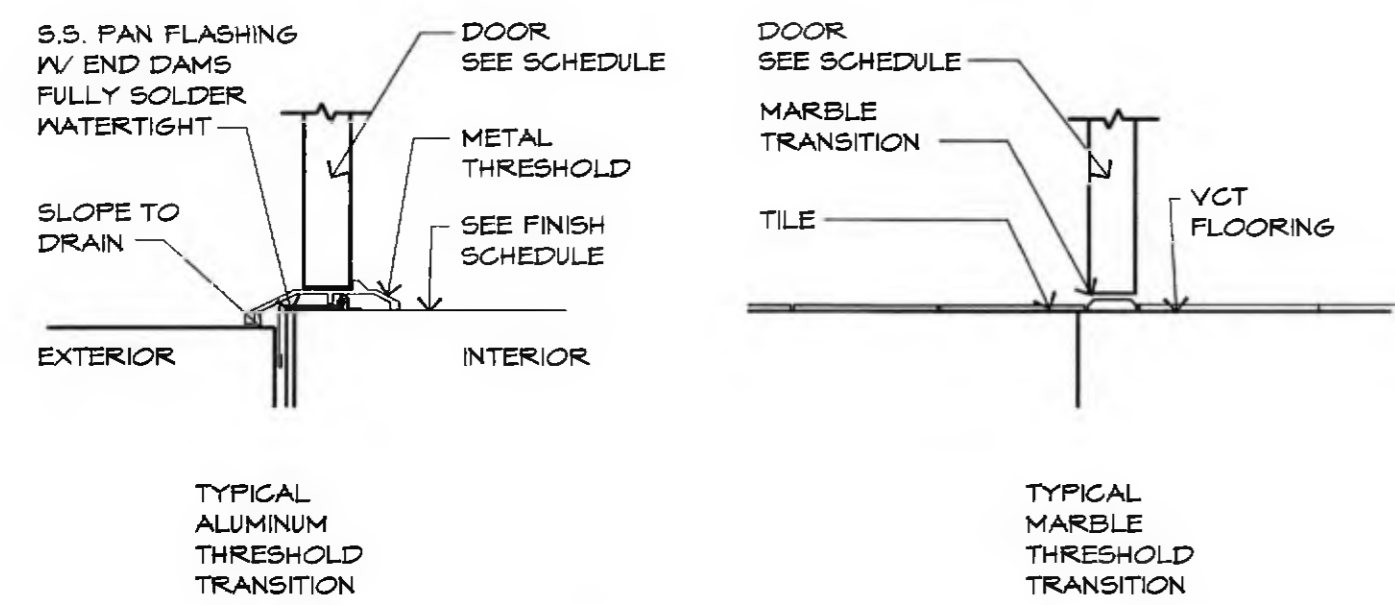
3 ENLARGED TOILET PLAN
 A600 SCALE: 1/4" = 1'-0"

ROOM FINISH SCHEDULE						
ALL FINISHES TO BE CHOSEN BY OWNER. ALL MATERIALS MUST MEET OR EXCEED CHAPTER 8 OF 2018 NCSCB.						
No.	NAME	FLOOR	BASE	WALL / FINISH	CEILING / HEIGHT	COMMENTS
100	CORRIDOR #1	VCT	4" RUBBER	CMU / PAINT	ACOUS / 9'-4"	
101	CORRIDOR #2	VCT	4" RUBBER	CMU / PAINT	ACOUS / 9'-4"	
102	CORRIDOR #3	VCT	4" RUBBER	CMU / PAINT	ACOUS / 9'-4"	
103	CLASSROOM #1	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
103.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
104	CLASSROOM #2	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
104.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
105	MECHANICAL	SEALED CONG.	4" RUBBER	DW / PAINT	---	
106	BOYS	2" CT	6" CT W/GOVE	1/2" CMT BD / 6" CT	WP DW / 9'-4"	BATT INSULATION ABOVE ENTIRE CEILING
107	CHASE	SEALED CONG.	4" RUBBER	DW / PAINT	---	
108	GIRLS	2" CT	6" CT W/GOVE	1/2" CMT BD / 6" CT	WP DW / 9'-4"	BATT INSULATION ABOVE ENTIRE CEILING
109	JANITOR	VCT	4" RUBBER	DW / PAINT	ACOUS / 8'-0"	
110	EC CLASSROOM #1	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
110.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
111	TOILET	2" CT	6" CT W/GOVE	DW / MMR PAINT	WP DW / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
112	LAUNDRY	VCT	4" RUBBER	DW / MMR PAINT	ACOUS / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
113	CHANGING	VCT	4" RUBBER	DW / MMR PAINT	WP DW / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
114	TOILET	2" CT	6" CT W/GOVE	DW / MMR PAINT	WP DW / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
115	OFFICE/ OT/ PT	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
116	EC CLASSROOM #2	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
116.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
117	CLASSROOM #3	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
117.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
118	CLASSROOM #4	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
118.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
119	TEACHER WORKROOM	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
119.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
120	TOILET	2" CT	6" CT W/GOVE	DW / MMR PAINT	WP DW / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
121	EC CLASSROOM #3	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
121.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
122	OFFICE/ OT/ PT	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	
123	TOILET	2" CT	6" CT W/GOVE	DW / MMR PAINT	WP DW / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
124	CHANGING	VCT	4" RUBBER	DW / MMR PAINT	WP DW / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
125	TOILET	2" CT	6" CT W/GOVE	DW / MMR PAINT	WP DW / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
126	LAUNDRY	VCT	4" RUBBER	DW / MMR PAINT	ACOUS / 8'-0"	BATT INSULATION ABOVE ENTIRE CEILING
127	EC CLASSROOM #4	VCT	4" RUBBER	CMU / DW / PAINT	ACOUS / 9'-4"	
127.1	HVAC	VCT	4" RUBBER	DW / PAINT	ACOUS / 9'-4"	

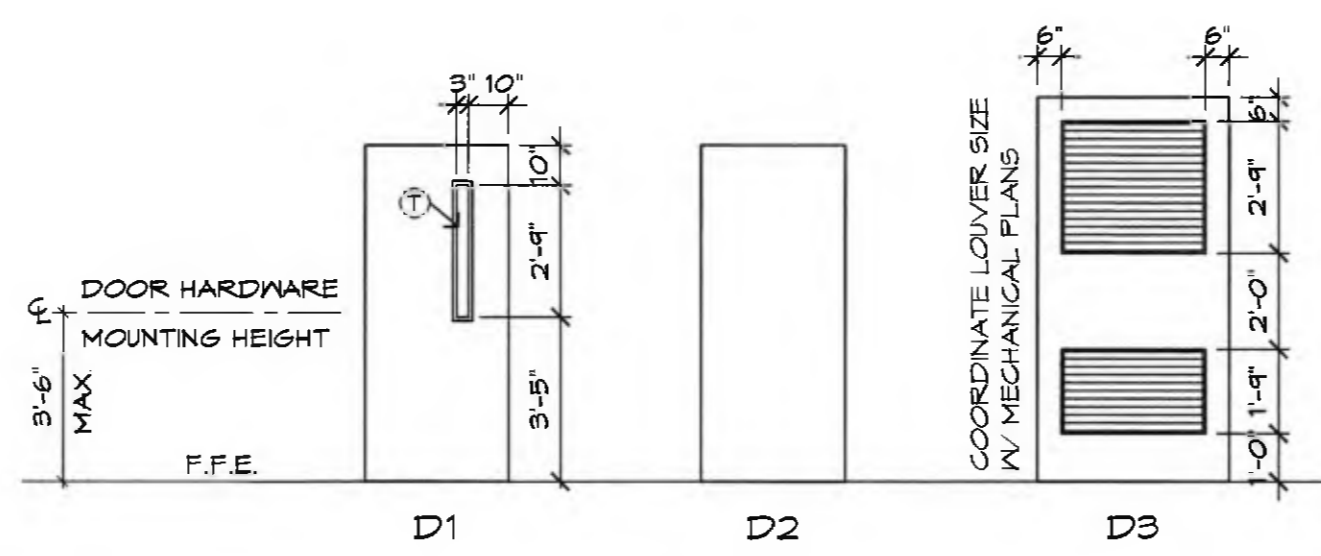


EXTERIOR WINDOW STYLE NOTES:
 1. ALL EXTERIOR WINDOWS WILL HAVE AN ALUMINUM SILL EXTENSIONS, 1" TINTED INSULATED GLASS, AND THERMAL BREAK UNLESS OTHERWISE NOTED.
 2. GLAZING CONTRACTOR WILL PROVIDE TEMPERED GLASS IN ALL OPENINGS REQUIRED BY CODE. TEMPERED LITES WILL BE SHOWN ON SHOP DRAWINGS.
 3. ALL WINDOWS SHALL BE IN COMPLIANCE WITH NCSCBC 2018.

7 EXT. WINDOW STYLES
 A601 SCALE: 1/4" = 1'-0"

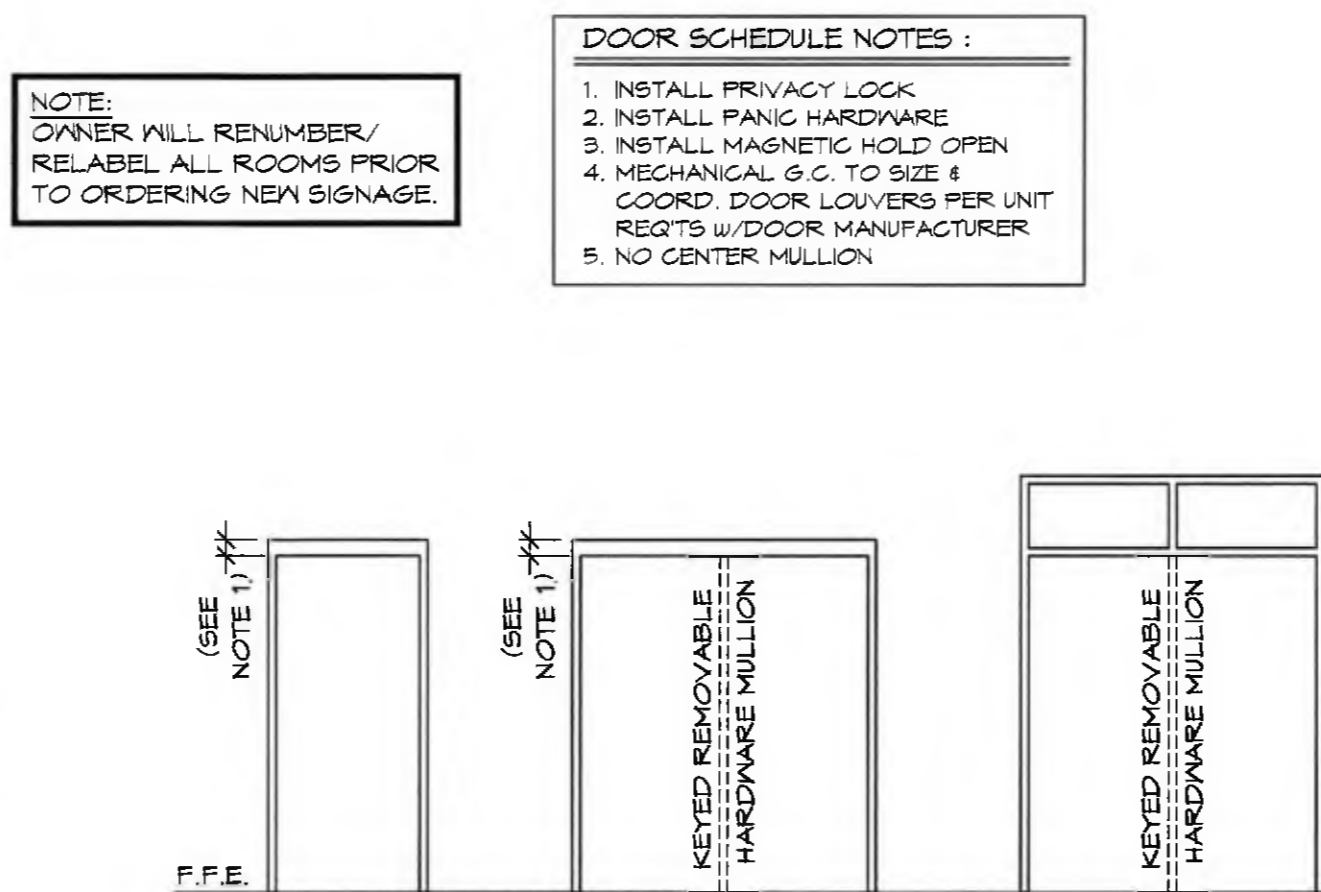


5 TYP. THRESHOLD DETAILS
 A601 SCALE: NOT TO SCALE



DOOR STYLE NOTES:
 1. HOLLOW METAL DOORS SHALL BE THE FLUSH SEAMLESS TYPE.
 2. ALL WOOD DOORS SHALL MATCH IN GRAIN COLOR, WITH CENTER BALANCE MATCH, BOOK MATCH FLITCH, ALL DOORS IN SAME AREA TO BE SIMILAR IN GRAIN SHADE.
 3. ALL WOOD DOORS SHALL NOT HAVE DARK GRAIN PATTERNS.
 4. ALL PAIRED DOORS WILL BE FROM SAME FLITCH AND BALANCED.

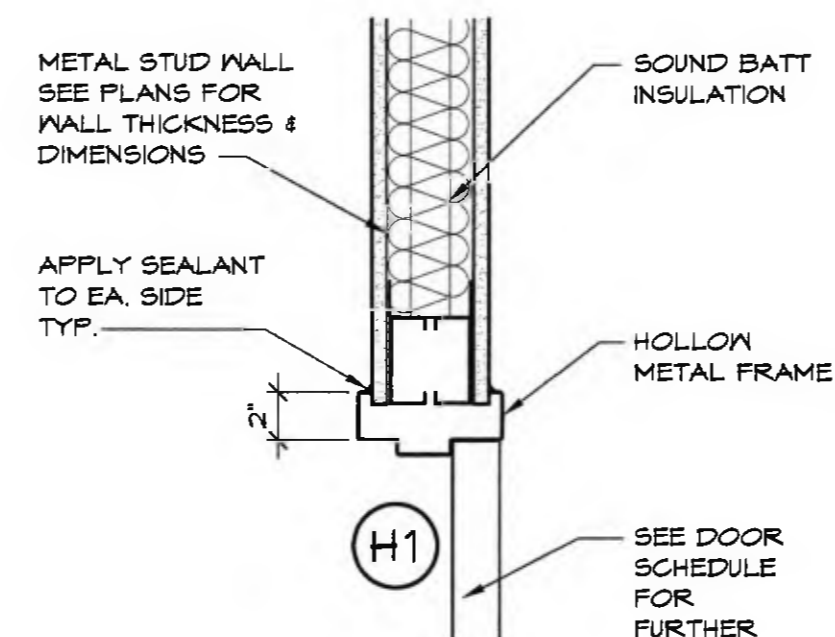
4 DOOR STYLES
 A601 SCALE: 1/4" = 1'-0"



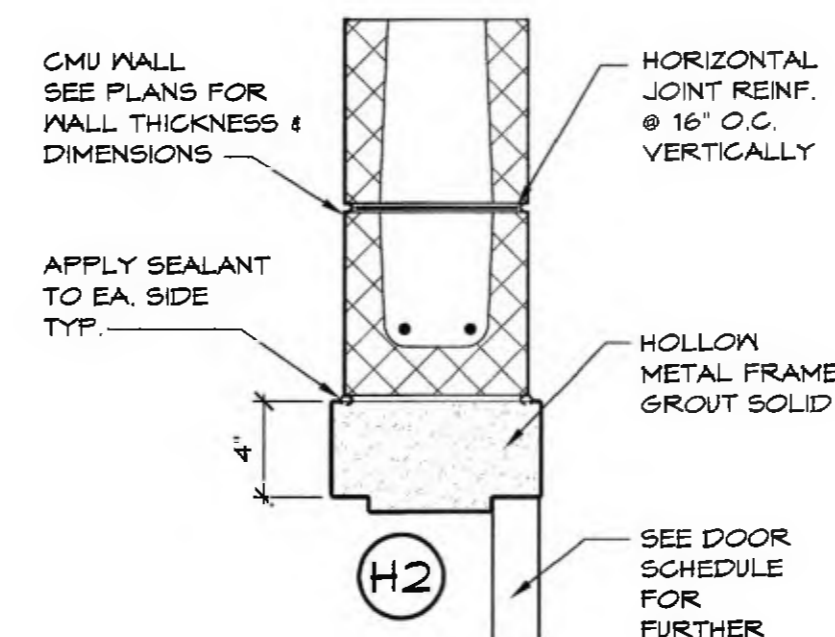
DOOR SCHEDULE NOTES:
 1. INSTALL PRIVACY LOCK
 2. INSTALL PANIC HARDWARE
 3. INSTALL MAGNETIC HOLD OPEN
 4. MECHANICAL S.C. TO SIZE & COORD. DOOR LOUVERS PER UNIT REG'TS W/ DOOR MANUFACTURER
 5. NO CENTER MULLION

DOOR FRAME STYLE NOTES:
 1. 4" METAL HEADS AT ALL MASONRY OPENING (2" METAL HEADS @ ALL NON-MASONRY)
 2. ADJUSTABLE FOOT ANCHORS
 3. THREE JAMB ANCHORS PER JAMB

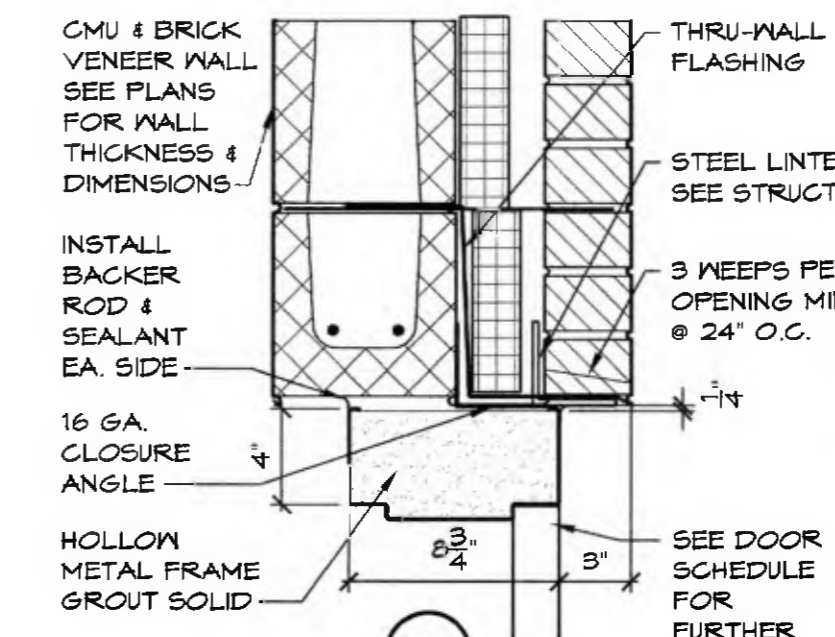
1 FRAME STYLES
 A601 SCALE: 1/4" = 1'-0"



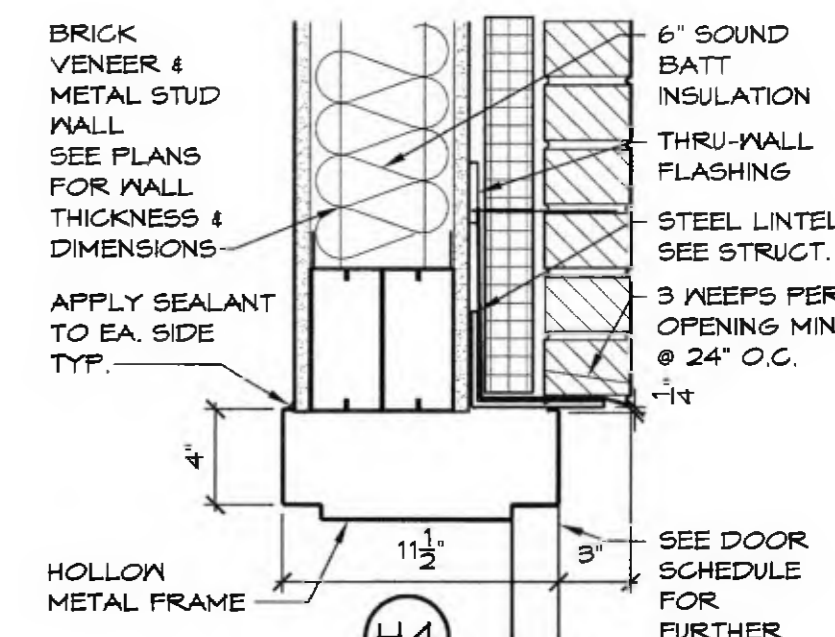
NOTE: REFER TO STRUCTURAL DRAWINGS FOR LINTEL INFORMATION. FRAME WIDTH IS ONE INCH PLUS WALL THICKNESS.



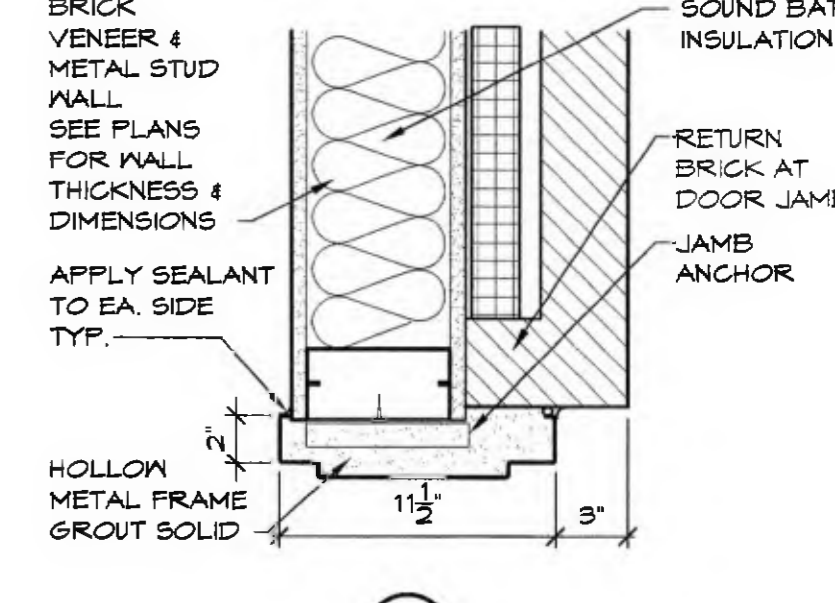
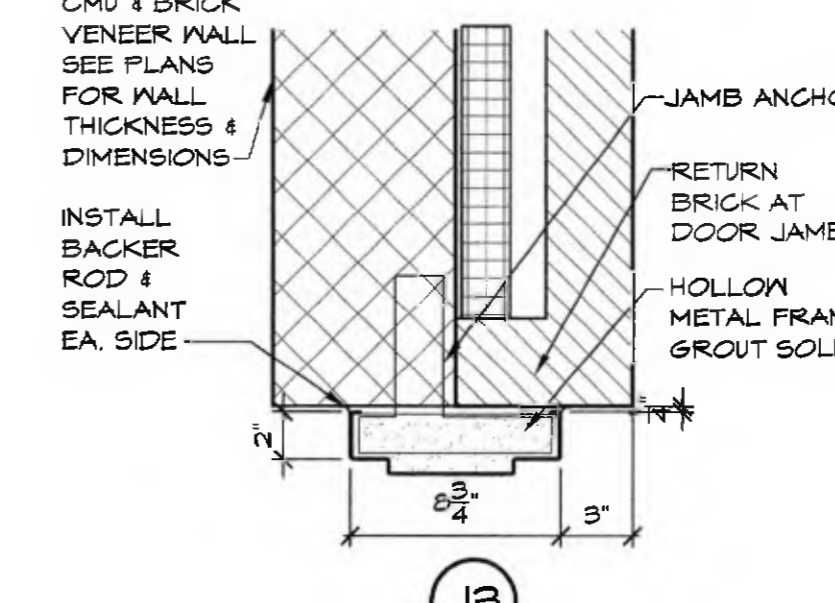
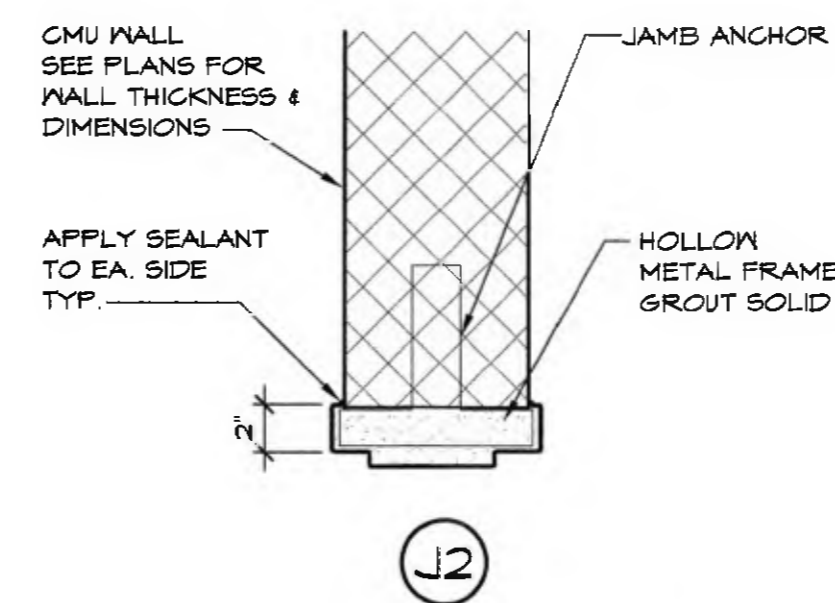
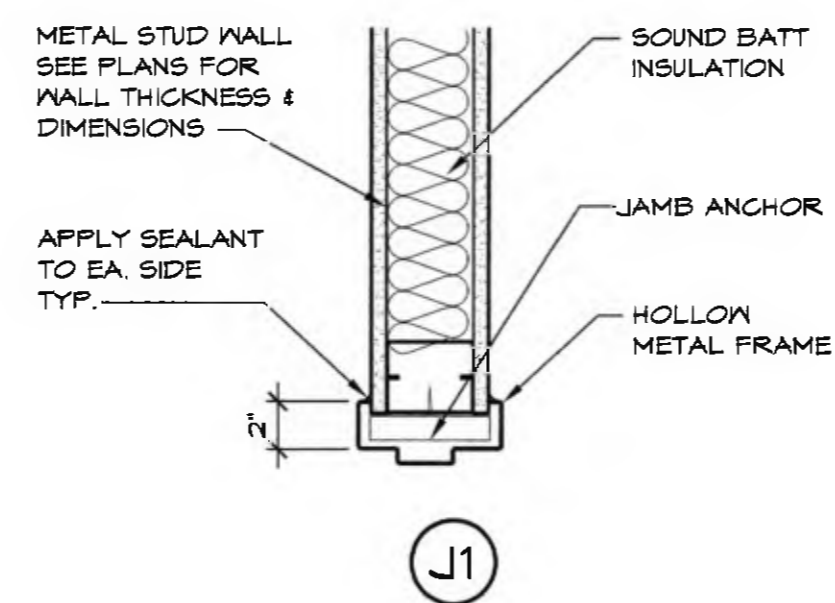
NOTE: REFER TO STRUCTURAL DRAWINGS FOR LINTEL INFORMATION. FRAME WIDTH IS ONE INCH PLUS WALL THICKNESS.



NOTE: REFER TO STRUCTURAL DRAWINGS FOR LINTEL INFORMATION.



NOTE: REFER TO STRUCTURAL DRAWINGS FOR LINTEL INFORMATION.

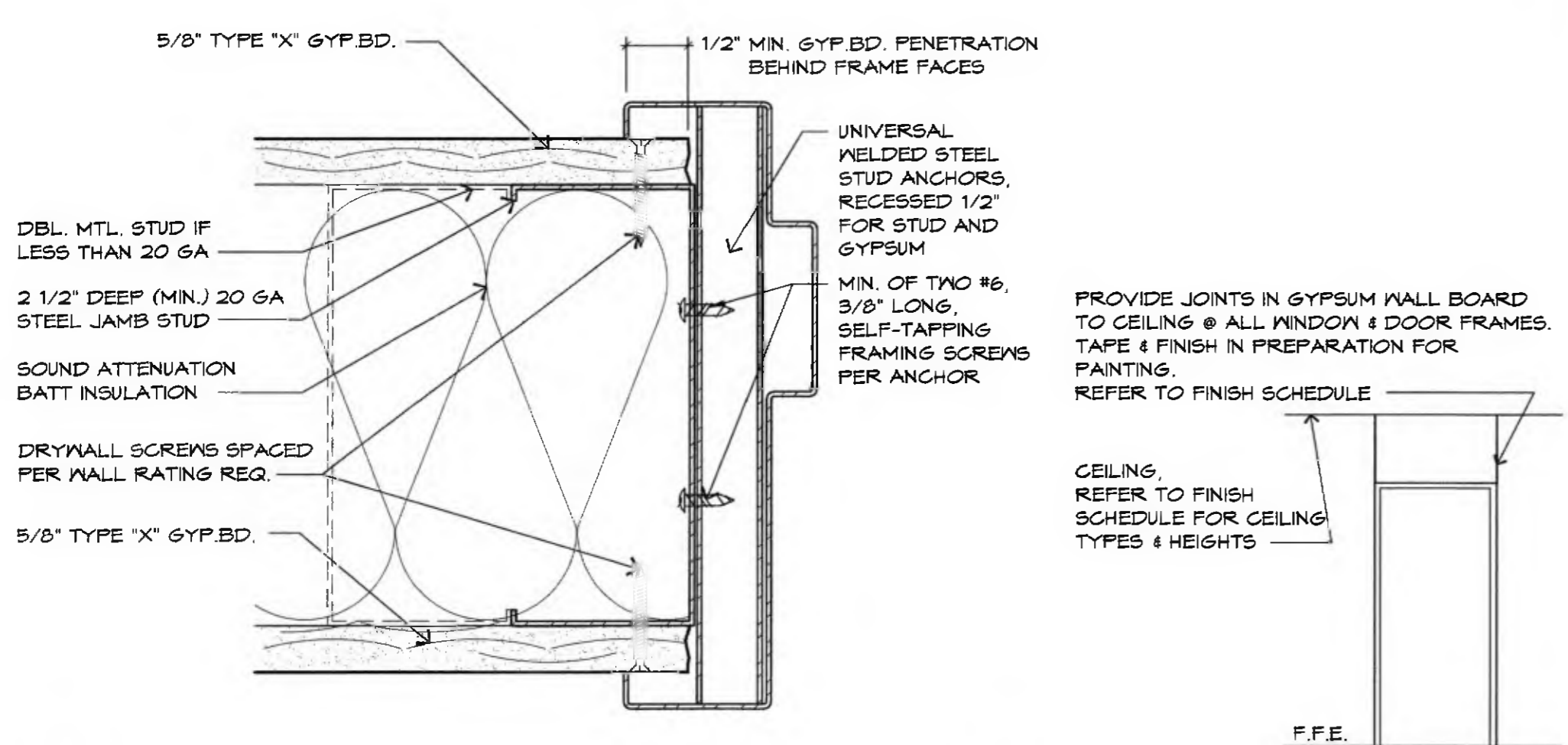


6 FRAME DETAILS
 A601 SCALE: 1 1/2" = 1'-0"

DOOR SCHEDULE
 NOTE: ALL DOORS SHALL HAVE LEVER TYPE ADA COMPLIANT HANDLES.

DOOR NUMBER	ROOM NAME	SIZE	DOOR		FRAME		HEAD/JAMB	THRESHOLD	FIRE RATING	CLOSER	REMARKS
			STYLE	MATL	STYLE	MATL					
	EXIST. ENTRY	6'-0" x 7'-0" F.O.	--	--	F1	HM	H3/J3	ALUMINUM	--	--	FRAMED OPENING
100A	CORRIDOR #1	PR. 3'-0" x 7'-0"	D1	WD	F2	HM	H2/J2	ALUMINUM	90 MIN	YES	SEE NOTES #2 & 3
100B	CORRIDOR #1	PR. 3'-0" x 7'-0"	D1	HM	F3	HM	H3/J3	ALUMINUM	--	YES	SEE NOTE #2
101A	CORRIDOR #2	PR. 3'-0" x 7'-0"	D1	HM	F3	HM	H3/J3	ALUMINUM	--	YES	SEE NOTE #2
102A	CORRIDOR #3	PR. 3'-0" x 7'-0"	D1	HM	F3	HM	H3/J3	ALUMINUM	--	YES	SEE NOTE #2
102B	CORRIDOR #3	PR. 4'-0" x 7'-0"	D1	WD	F2	HM	H2/J2	--	90 MIN	YES	SEE NOTES #2 & 3
103A	CLASSROOM #1	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
103.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
104A	CLASSROOM #2	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
104.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
105A	MECHANICAL	PR. 3'-0" x 7'-0"	D2	HM	F2	HM	H4/J4	ALUMINUM	--	YES	
107A	CHASE	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	ALUMINUM	--	--	
109A	JANITOR	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	--	--	YES	
110A	EC CLASSROOM #1	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
110.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
111A	TOILET	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	MARBLE	--	--	SEE NOTE #1
112A	LAUNDRY	3'-0" x 7'-0"	D1	WD	F1	HM	H1/J1	--	--	--	
113A	CHANGING	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	--	--	--	
113B	CHANGING	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	--	--	--	
114A	TOILET	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	MARBLE	--	--	SEE NOTE #1
115A	OFFICE / OT / PT	3'-0" x 7'-0"	D1	WD	F1	HM	H1/J1	--	45 MIN	YES	
116A	EC CLASSROOM #2	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
116.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
117A	CLASSROOM #3	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
117.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
118A	CLASSROOM #4	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
118.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
119A	TEACHER WORKROOM	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
119.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
120A	TOILET	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	MARBLE	--	--	SEE NOTE #1
121A	EC CLASSROOM #3	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
121.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5
122A	OFFICE / OT / PT	3'-0" x 7'-0"	D1	WD	F1	HM	H1/J1	--	45 MIN	YES	
123A	TOILET	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	MARBLE	--	--	SEE NOTE #1
124A	CHANGING	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	--	--	--	
124B	CHANGING	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	--	--	--	
125A	TOILET	3'-0" x 7'-0"	D2	WD	F1	HM	H1/J1	MARBLE	--	--	SEE NOTE #1
126A	LAUNDRY	3'-0" x 7'-0"	D1	WD	F1	HM	H1/J1	--	--	--	
127A	EC CLASSROOM #4	3'-0" x 7'-0"	D1	WD	F1	HM	H2/J2	--	45 MIN	YES	
127.1A	HVAC	4'-0" x 8'-0"	D3	WD	F2	HM	H1/J1	--	--	--	SEE NOTES #4 & 5

ABBREVIATIONS: HM - HOLLOW METAL WD - WOOD

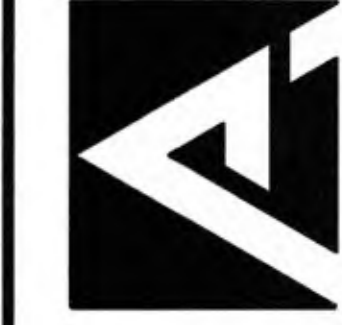


3 FRAME INSTALLATION DETAIL
 A601 SCALE: NTS @ 20, 30, 45 OR 60 MIN. DOOR FRAME WHERE REQ'D.

2 TYPICAL FRAME DETAIL
 A601 SCALE: 1/4" = 1'-0"



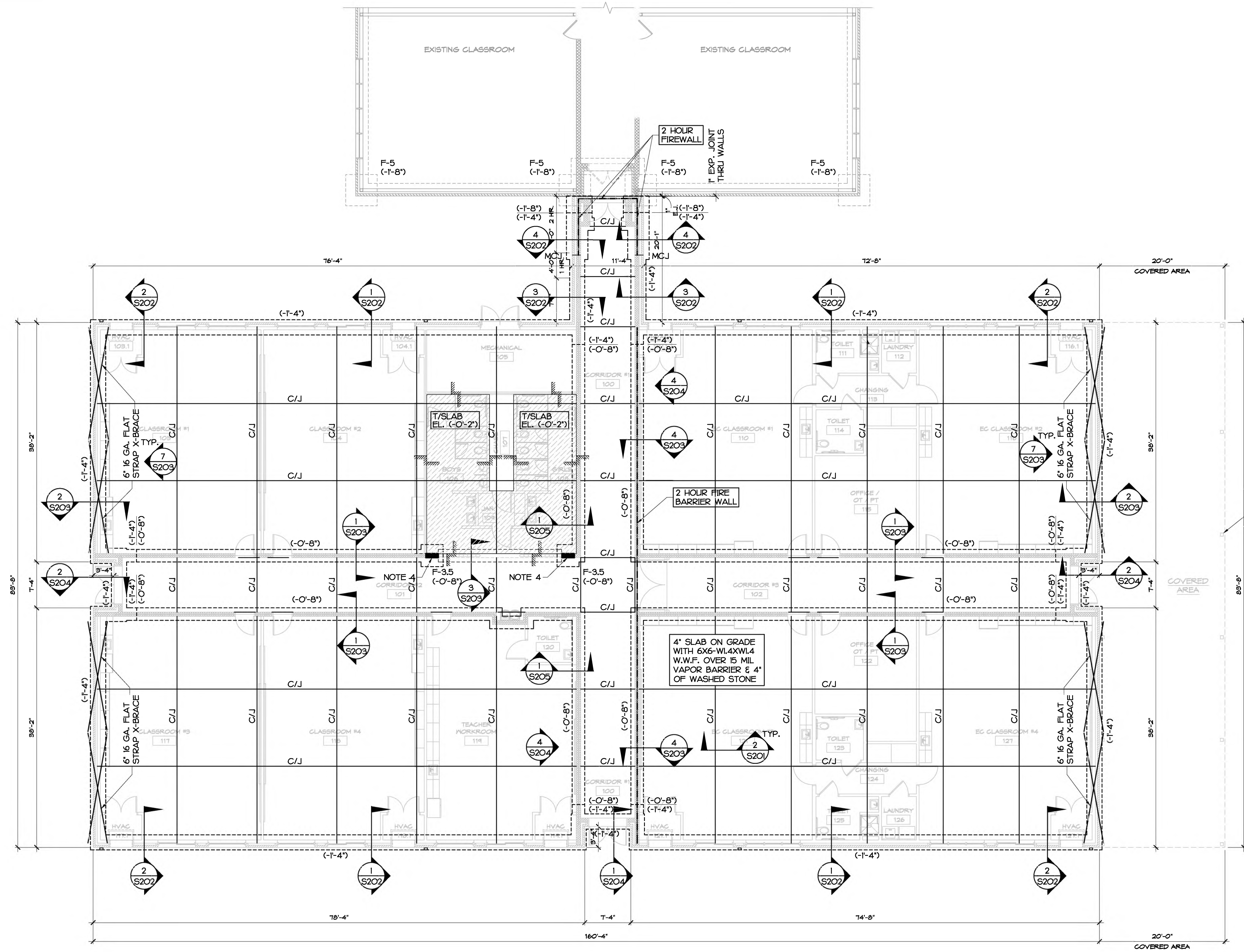
PINACLE ARCHITECTURE PROFESSIONAL ASSOCIATION
 P.O. BOX 187, 630 TEAM ROAD, SUITE 200
 MATTHEWS, NORTH CAROLINA 28106
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ISSUE DATE: 01/30/26
 DRAWN BY: JH
 CHECKED BY: FMV/REB
 PROJECT: 2526

**CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC**
 DOOR & FRAME SCHEDULES, STYLES,
 WINDOW STYLES & DETAILS

REVISION SCHEDULE
 DATE REFERENCE



DESIGN FOR CANOPY FOUNDATIONS BE CANOPY SUPPLIER AND INSTALLED BY GENERAL CONTRACTOR

FOUNDATION / SLAB PLAN

- 1/8"=1'-0"
 PLAN NOTES
 1. SEE S200 FOR GENERAL NOTES AND SPECIAL INSPECTION REQUIREMENTS.
 2. ALL ELEVATION REFERENCED FROM FINISH FLOOR ELEVATION + (-0'-0") UNLESS NOTED OTHERWISE.
 3. TOP OF FOOTING ELEVATION NOTED THUS (-1'-4") REFERENCED FROM ELEVATION (+0'-0").
 4. NOTE 4 INDICATES GROUT 3 CELLS SOLID WITH #5 PER CELL.

CONTRACTOR TO VERIFY ALL DIMENSIONS
 THIS DRAWING IS THE PROPERTY OF THE ARCHITECTS AND CAN NOT BE USED FOR CONSTRUCTION PURPOSES OR REPRODUCED WITHOUT WRITTEN CONSENT OF THE ARCHITECT.
 ISSUE DATE: 11/16/25
 DRAWN BY: RMR
 CHECKED BY: 2526
 PROJECT:

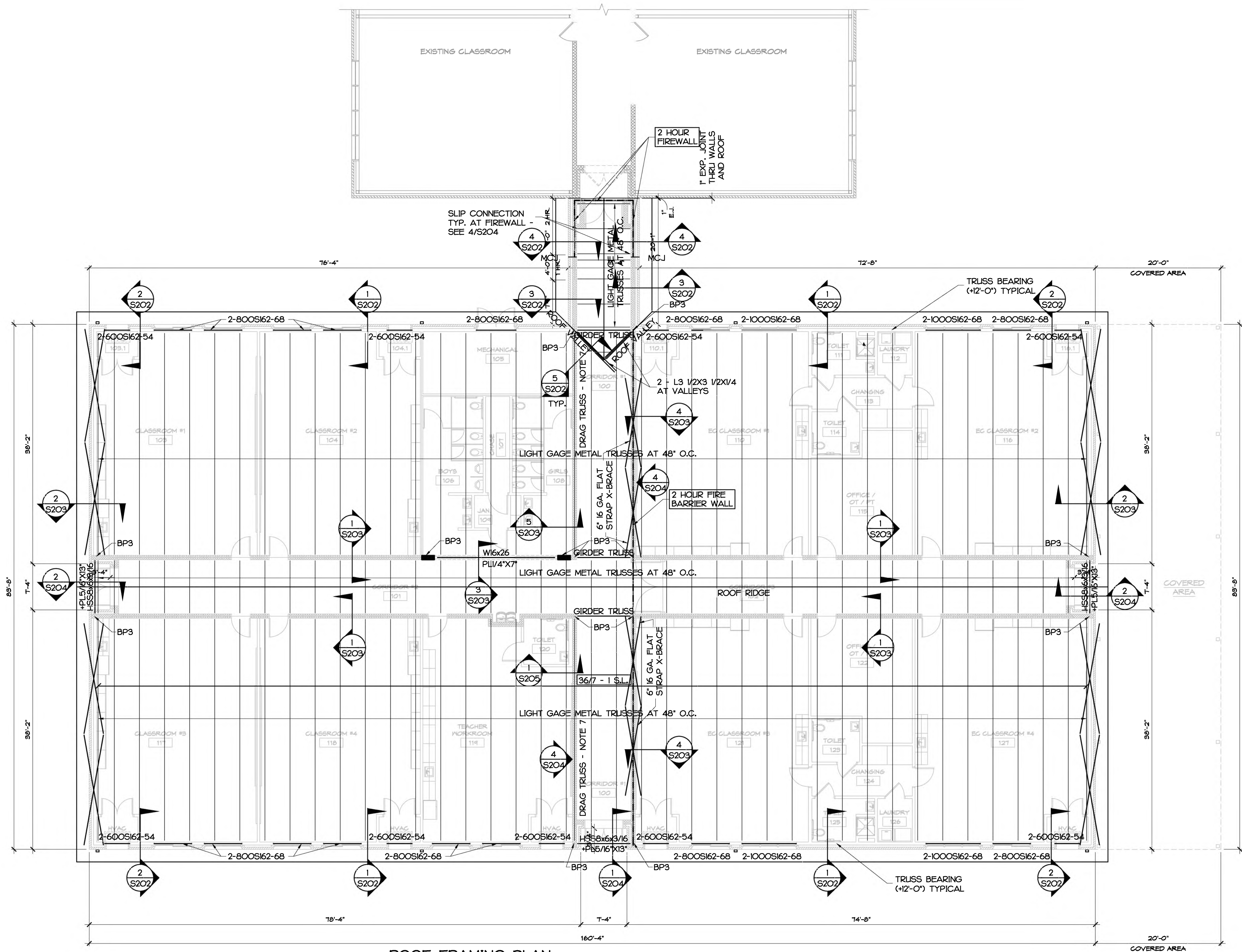
PINNACLE ARCHITECTURE
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RUGGLES ENGINEERING PC
 Structural Engineers
 1116 Whittington Woods Drive
 Raleigh, NC 27605
 PH: 760-782-5182
 Firm No. C-2817
 Email: rugglesengineering@earthlink.net
 11/16/25

CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
 FOUNDATION/SLAB PLAN

REVISION SCHEDULE		
NO.	DATE	REFERENCE

S100



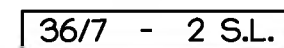
ROOF FRAMING PLAN

1/8"=1'-0"

PLAN NOTES:

1. SEE SHEET S200 FOR GENERAL NOTES AND SPECIAL INSPECTION REQUIREMENTS.
2. SEE PLAN FOR TOP OF STEEL ELEVATION.
3. ROOF DECK SHALL BE 1 1/2" GAGE 22 WIDE RIB ROOF DECK (PAINTED UNLESS NOTED OTHERWISE).

DECK CONNECTION KEY



NUMBER OF #10 TEK SCREWS PER DECK SPAN
DECK FASTENER PATTERN WITH #12 TEK SCREWS - SEE 8/S202.

4. COORDINATE ALL OPENING SIZES AND LOCATIONS WITH MECHANICAL SUBCONTRACTOR.
5. ALL ROOF SLOPES SHALL BE 3/12 UNLESS NOTED OTHERWISE.
6. ROOF FRAMING SHALL BE LIGHT GAGE METAL TRUSSES SPACED AT 4'-0" O.C. UNLESS NOTED OTHERWISE.
7. CENTER DRAG TRUSS OVER BRACED WALL. DESIGN TRUSSES FOR A LATERAL SERVICE LOAD OF 240 PLF.

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CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
ROOF FRAMING PLAN

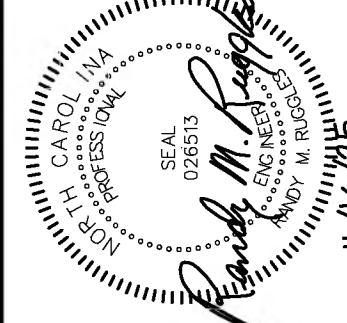
REVISION SCHEDULE		
NO.	DATE	REFERENCE

S101



PINNCLE ARCHITECTURE
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 Raleigh, NC 27615
 PH: 704-783-5122
 Firm No. C-2817
 Email: rugglesengineering@earthlink.com

Qualification Requirements for Inspectors and Testing Technicians

PE/SE Structural Engineer – licensed PE or SE specializing in the design of buildings and structures
 PE/GE Geotechnical Engineer – licensed PE specializing in soil mechanics and foundations
 EIT Engineer-in-Training – graduate engineer who has passed the Fundamentals of engineering examination

American Concrete Institute (ACI) Certification
 ACI-CCSI Concrete Construction Special Inspector
 ACI-LTTC Concrete Laboratory Testing Technician Level 1 or 2
 ACI-STT Concrete Strength Testing Technician
 ACI-FTT Concrete Field Testing Technician – Grade I

American Society of Non-Destructive Testing (ASNT) Certification
 Non-Destructive Testing Technician – Level II or III

American Welding Society (AWS) Certification
 AWS-CWI Certified Welding Inspector

Exterior Design Institute (EDI) Certification
 EDI-EIFS Certified EIFS Inspector

International Code Council (ICC) Certification
 ICC-PCSI Prestressed Concrete Special Inspector
 ICC-RCSI Reinforced Concrete Special Inspector
 ICC-SSI Soils Special Inspector
 ICC-SFSI Spray-applied Fireproofing Special Inspector
 ICC-SMSI Structural Masonry Special Inspector
 ICC-SSBSI Structural Steel and Bolting Special Inspector
 ICC-SSWSI Structural Welding Special Inspector

National Institute for Certification in Engineering Technologies (NICET) Certification
 NICET-CT Concrete Technician – Levels I, II, III and IV
 NICET-GET Geotechnical Engineering Technician – Levels I, II, III and IV
 NICET-ST Soils Technician – Levels I, II, III and IV

Listing of Required Structural Tests and Special Inspections

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Steel Construction (ref: IBC-15 Section 1705.2, AISC 360-10 Chapter N, AISC 341-10 Chapter J)				
	Prior to Welding (AISC 360-10 Table N5.4-1)	X		
	1. Welding procedure specifications (WPS) available	X		
X	2. Manufacturer certifications for welding consumables available		X	
X	3. Material identification (type/grade)		X	
X	4. Welder identification system		X	
	5. Fit-up of groove welds (including joint geometry)		X	
	a. Joint preparation		X	
	b. Dimensions (alignment, root opening, root face, bevel)		X	
	c. Cleanliness (condition of steel surfaces)		X	
	d. Tacking (tack weld quality and location)		X	
	e. Backing type and fit (if applicable)		X	
	6. Configuration and finish of access holes		X	
X	7. Fit-up of fillet welds		X	
X	a. Dimensions (alignment, gaps at root)		X	
X	b. Cleanliness (condition of steel surfaces)		X	
X	c. Tacking (tack weld quality and location)		X	
X	8. Check welding equipment		X	
	During Welding (AISC 360-10 Table N5.4-2)		X	
X	1. Use of qualified welders		X	
X	2. Control and handling of welding consumables		X	
X	a. Packaging		X	
X	b. Exposure control		X	
X	3. No welding over cracked tack welds		X	
X	4. Environmental conditions		X	
X	a. Wind speed within limits		X	
X	b. Precipitation and temperature		X	
X	5. WPS followed		X	
X	a. Settings on welding equipment		X	
X	b. Travel speed		X	
X	c. Selected welding materials		X	
X	d. Shielding gas type/flow rate		X	
X	e. Preheat applied		X	
X	f. Interpass temperature maintained (min./max.)		X	
X	g. Proper position (F, V, H, OH)		X	
X	h. Intermix of filler metals avoided unless approved (ref: AISC 341-10)		X	
X	6. Welding techniques		X	
X	a. Interpass and final cleaning		X	
X	b. Each pass within profile limitations		X	
X	c. Each pass meets quality requirements		X	
	After Welding (AISC 360-10 Table N5.4-3)		X	
X	1. Welds cleaned		X	
X	2. Size, length and location of welds		X	
X	3. Welds meet visual acceptance criteria		X	
X	a. Crack prohibition		X	
X	b. Weld/basis-metal fusion		X	
X	c. Crater cross section		X	
X	d. Weld profiles		X	
X	e. Weld size		X	
X	f. Undercut		X	
X	g. Porosity		X	
X	4. Arc strikes		X	
X	5. k-area		X	
X	6. Backing removed and weld tabs removed (if required)		X	
X	7. Repair activities		X	
X	8. Document acceptance or rejection of welded joint or member		X	
X	9. Placement of reinforcing or contouring fillet welds (if required) (ref: AISC 341-10)		X	
X	10. Backing removed, weld tabs removed and finished, and fillet welds added (if required) (ref: AISC 341-10)		X	
	Nondestructive Testing (AISC 360-10 Section N5.5)		X	
X	1. Risk Category II Structures - Perform Ultrasonic Testing on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading, in materials 5/16 in. thick or greater.		X	
X	2. Risk Category III or IV Structures - Perform Ultrasonic Testing on all CJP groove welds subject to transversely applied tension loading in butt, T- and corner joints, in materials 5/16 in. thick or greater.		X	
X	3. Access Holes – Perform Magnetic Particle Testing or Liquid Penetrant Testing when the flange thickness exceeds 2 in. for rolled shapes, or when the web thickness exceeds 2 in. for built-up shapes.		X	
X	4. Welded Joints Subject to Fatigue		X	

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Steel Construction (ref: IBC-15 Section 1705.2, AISC 360-10 Chapter N, AISC 341-10 Chapter J) (CONTINUED)				
	Nondestructive Testing (AISC 341-10 Section J6.2)		X	
	1. k-area		X	
	2. CJP Groove weld		X	
	3. Lamellar tearing		X	
	4. Beam cope and access hole		X	
	5. Reduced beam section repair		X	
	6. Weld tab removal		X	
	Prior to Bolting (AISC 360-10 Table N5.6-1)		X	
	These inspections are not required for snug-tight joints			
	1. Manufacturer's certifications available for fastener materials		X	
	2. Fasteners marked in accordance with ASTM requirements		X	
	3. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)		X	
	4. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)		X	
	5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements		X	
	6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used		X	
	7. Proper storage provided for bolts, nuts, washers and other fastener components		X	
	During Bolting (AISC 360-10 Table N5.6-2)		X	
	These inspections are not required for snug-tight joints. These inspections are not required for pre-tensioned joints and slip-critical joints, when the installer is using the turn-of-nut method with match marking techniques, the direct-tension-indicator method, or the twist-of-type tension control bolt method.			
	1. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required		X	
	2. Joint brought to the snug-tight condition prior to the pretensioning operation		X	
	3. Fastener component not turned by the wrench prevented from rotating		X	
	4. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges		X	
	After Bolting (AISC 360-10 Table N5.6-3)		X	
X	Document acceptance or rejection of bolted connections		X	
	Other Inspection Tasks (AISC 360-10 Section N5.7)		X	
X	1. Verify compliance of fabricated steel with the details shown on the approved shop drawings.		X	
X	2. Verify compliance of the erected steel frame with the details shown on the approved erection drawings, including bracing, stiffeners, member locations and joint details.		X	
X	3. Anchor rods and other embeddings support structural steel		X	
X	a. Verify the diameter, grade, type and length of the anchor rod or embedded item.		X	
X	b. Verify the extent or depth of embedment into the concrete.		X	
X	4. RBS requirements, if applicable (ref: AISC 341-10)		X	
	a. Contour and finish		X	
	b. Dimensional tolerances		X	
	5. Protected zone – no holes and unapproved attachments made by fabricator or erector, as applicable (ref: AISC 341-10)		X	
	6. H-piles - Protected zone – no holes and unapproved attachments made by the responsible contractor, as applicable (ref: AISC 341-10)		X	
	Cold-formed Steel Deck (IBC-15 1705.2.2)		X	
X	1. Special inspections in accordance with QA/QC-2011 Standard for Quality control and Quality assurance for Installation of Steel Deck		X	
	Open-Web Steel Joists and Joist Girders (IBC-15 Table 1705.2.3)		X	
X	1. Installation of open-web steel joists and joist girders		X	
	a. End connections – welding or bolted		X	
	b. Bridging – horizontal or diagonal		X	
	1. Standard bridging		X	
	2. Bridging that differs from the SJI specifications listed in Section 2207.1		X	
	Inspection of Composite Structures Prior to Concrete Placement (AISC 341-10 Table J9-1)		X	
	1. Material identification of reinforcing steel (Type/Grade)		X	
	2. Determination of carbon equivalent for reinforcing steel other than ASTM A706		X	
	3. Proper reinforcing steel size, spacing and orientation		X	
	4. Reinforcing steel has not been rebent in the field		X	
	5. Reinforcing steel has been tied and supported as required		X	
	6. Required reinforcing steel clearances have been provided		X	
	7. Composite member has required size		X	
	Inspection of Composite Structures During Concrete Placement (AISC 341-10 Table J9-2)		X	
	1. Concrete: Material identification (mix design, compressive strength, maximum large aggregate size, maximum slump)		X	
	2. Limits on water added at the truck or pump		X	
	3. Proper placement techniques to limit segregation		X	
	Inspection of Composite Structures After Concrete Placement (AISC 341-10 Table J9-3)		X	
	1. Achievement of minimum specified concrete compressive strength at specified age		X	
	Cold-formed Steel Trusses Spanning 60-feet or Greater (ref: IBC-15 Section 1705.2.4)		X	
X	1. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.		X	
X	2. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.		X	

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Concrete Construction (ref: IBC-15 Table 1705.3)				
X	1. Inspect reinforcing steel, including prestressing tendons, and placement.		X	
X	2. Inspection of reinforcing steel welding in accordance with Steel Construction section above.		X	
X	3. Inspection of anchors cast in concrete.		X	
X	4. Inspection of anchors post-installed in hardened concrete members.		X	
X	5. Verify use of approved design mix.		X	
X	6. Prior to placement fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.		X	
X	7. Inspect concrete and shotcrete placement for proper application techniques.		X	
X	8. Inspect for maintenance of specified curing temperature and techniques.		X	
	9. Inspection of prestressed concrete:		X	
	a. Application of prestressing forces		X	
	b. Grouting of bonded prestressing tendons in the seismic-force-resisting system.		X	
	10. Erection of precast structural members		X	
	11. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.		X	
X	12. Inspection formwork for shape, location and dimensions of the concrete member being formed.		X	

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Masonry Construction (ref: IBC-15 Section 1705.4)				
	1. Inspect masonry construction in accordance with IBC-15 Section 1705.4 and TMS 602-13/ACI 530.1-13/ASCE 6-13 Article 1.6.			
	Level C Quality Assurance			
	Tests:			
	1. Verify f'm and f'ac in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.4B prior to construction, and for every 5000 square feet during construction.			
	2. Verify proportions of materials in premixed or pre-blended mortar, prestressing grout, and grout other than self-consolidating grout as delivered to the project site.			
	3. Verify slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.5B, 1.5.3 for self-consolidating grout			
X	1. Verify compliance with the approved submittals and project specifications.		X	
X	2. Verify		X	
	a. Proportions of site-prepared mortar, grout and prestressing grout for bonded tendons.		X	
	b. Grade, type and size of reinforcement and anchor bolts, and prestressing tendons and anchorages		X	
	c. Placement of masonry units and construction of mortar joints.		X	
X	d. Placement of reinforcement, connectors and prestressing tendons and anchorages		X	
X	e. Grout space prior to grouting.		X	
X	f. Placement of grout and prestressing grout for bonded tendons.		X	
X	g. Size and location of structural elements.		X	
X	h. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X	
	i. Welding of reinforcement		X	
X	j. Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).		X	
	k. Application and measurement of prestressing force.		X	
	l. Placement of AAC masonry units and construction of thin-bed mortar joints.		X	
	m. Properties of thin-bed mortar for AAC masonry.		X	
X	3. Observe preparation of grout specimens, mortar specimens and/or prisms		X	

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Soils (ref: IBC-15 Table 1705.6)				
X	1. Verify materials below shallow foundations are adequate to achieve the required bearing capacity.		X	
X	2. Verify excavations are extended to proper depth and have reached proper material.		X	
X	3. Perform classification and testing of compacted fill materials.		X	
X	4. Verify use of proper materials, densities and lift thickness during placement and compaction of compacted fill.		X	
X	5. Prior to placement of controlled fill, observe sub-grade and verify that site has been prepared properly.		X	

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Wind Resistance (ref: IBC-15 Section 1705.11)				
X	1. Provide inspections when required by Section 1705.11.			

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Seismic Resistance (ref: IBC-15 Section 1705.12)				
	1. Provide inspections when required by Section 1705.12.			

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Cold-formed Steel Light-frame (ref: IBC-15 Section 1705.12.3)				
X	1. Welding operations of elements of the seismic force resisting system		X	
X	2. Screw attachments, bolting, anchoring and other fastening of elements of the seismic force resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold downs		X	

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Testing and Qualification for Seismic Resistance (ref: IBC-15 Section 1705.13)				
X	1. Test and qualify seismic resistance in accordance with IBC-15 Section 1705.13 and the project specifications.			

Required?	Structural Test or Special Inspection	Continuous	Periodic	Frequency of Periodic Test or Inspection
Fire-resistant Penetrations and Joints (ref: IBC-15 Section 1705.17)				
X	1. Perform inspections in accordance with project specifications and IBC-15 Section 1705.17.		X	

GENERAL NOTES

1. GENERAL

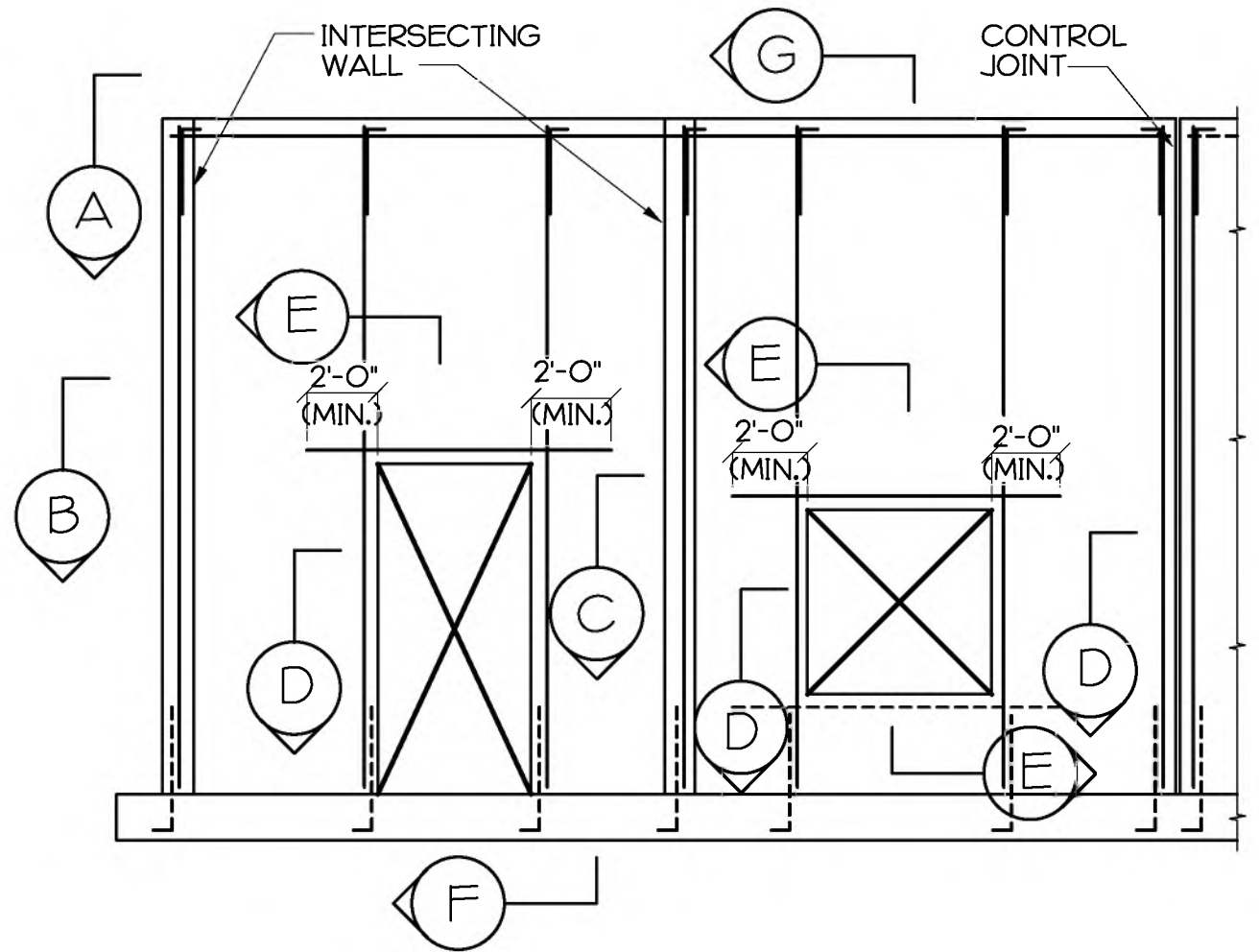
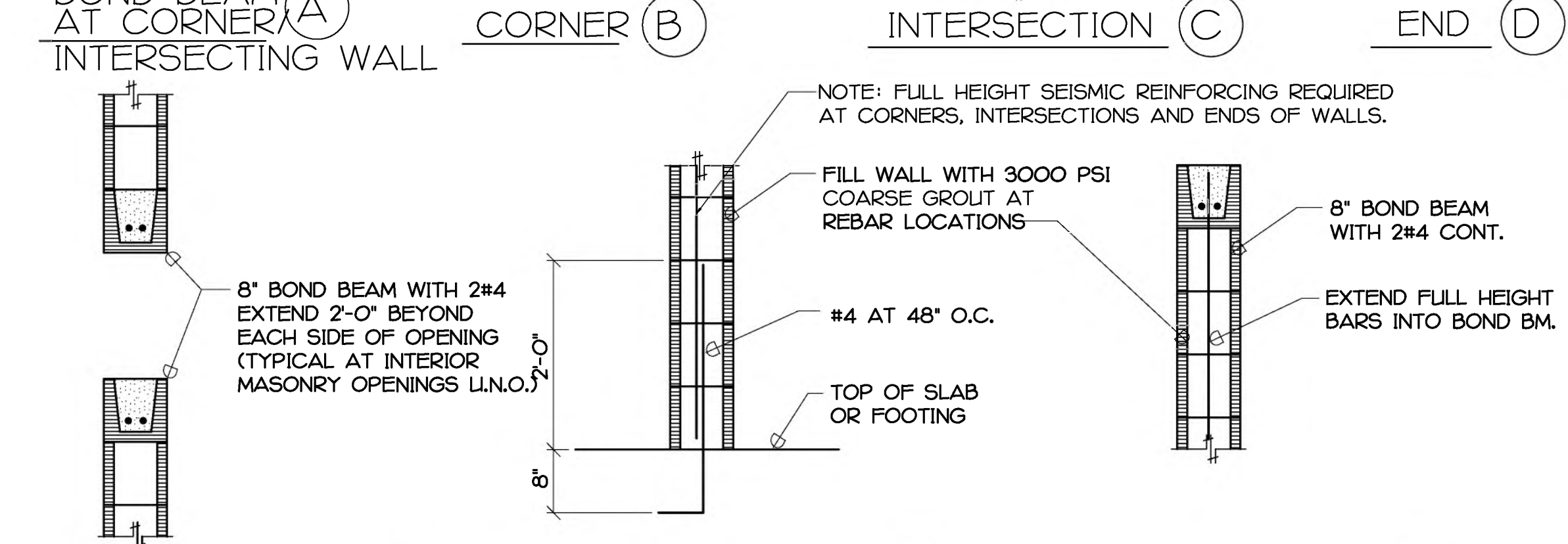
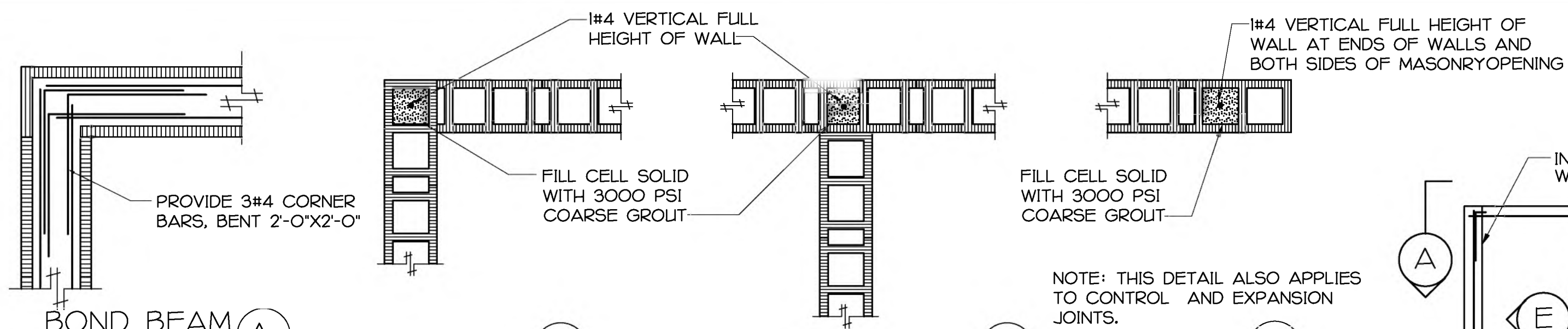
A. THE STRUCTURAL DRAWINGS SHALL BE IN CONJUNCTION WITH AND COORDINATED WITH THE ARCHITECTURAL DRAWINGS.
 B. THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND SHALL AT ALL TIMES TAKE ALL REASONABLE PRECAUTIONS FOR THE SAFETY OF ITS EMPLOYEES ON THE PROJECT. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF FEDERAL, STATE AND MUNICIPAL SAFETY LAWS AND BUILDING CODES.
 C. FOUNDATIONS ARE DESIGNED BASED ON A PRESUMED BEARING CAPACITY OF 2000 PSF BEARING. BEARING PRESSURE SHALL BE VERIFIED BY GEO-TECHNICAL ENGINEER PRIOR TO POURING FOUNDATIONS.
 D. IF EXISTING CONDITIONS MAKE IT NECESSARY TO REVERSE STRUCTURAL DETAILS, ADVISE STRUCTURAL ENGINEER BEFORE PROCEEDING WITH ANY CHANGE.

2. DESIGN CRITERIA

A. BUILDING DESIGNED IN ACCORDANCE WITH THE 2018 NORTH CAROLINA STATE BUILDING CODE
 B. FLOOR LIVE LOADS:
 1. ASSEMBLY / STAIRS / 1ST FLOOR -100 PSF
 C. ROOF LIVE LOAD
 20 PSF
 D. ROOF SNOW LOAD
 1. GROUND SNOW LOAD
 2. FLAT-ROOF SNOW LOAD
 3. SNOW EXPOSURE FACTOR
 4. THERMAL FACTOR
 5. SNOW LOAD IMPORTANCE FACTOR
 E. WIND LOADS DESIGNED IN ACCORDANCE WITH 2018 NORTH CAROLINA STATE BUILDING CODE AND ANSI/ASCE 7-10
 1. BASIC WIND SPEED (3-SECOND GUST) LLT, 129 MPH
 BASIC WIND SPEED (3-SECOND GUST) ASD, 100 MPH
 2. WIND EXPOSURE
 3. INTERNAL PRESSURE COEFFICIENT
 4. COMPONENTS AND CLADDING SHALL BE DESIGNED FOR THE ULTIMATE WIND PRESSURE TABULATED BELOW:
 5. WIND BASE SHEAR: $V_w = 43k V_w = 49k$

ZONE PER FIG. 203-1	EFFECTIVE WIND AREA	POSITIVE PRESSURE PSF	NEGATIVE PRESSURE PSF
1	50	+8.9	-26.0
2	50	+8.9	-29.4
3	50	+8.9	-60.8
4	10	+0.4	-33.0
4	20	+0.0	-8.6
4	50	+21.2	-29.8
4	100	+25.9	-28.4
5	10	+30.4	-40.7
5	20	+29.0	-36.0
5	50	+27.2	-34.3
5	100	+25.9	-38.6

F. EARTHQUAKE DESIGN DATA
 RISK CATEGORY II
 2. SEISMIC IMPORTANCE FACTOR $I_e = 1.25$
 3. SPECTRAL RESPONSE ACCELERATIONS $S_a = .153 S_1 = .074$
 4. SPECTRAL RESPONSE COEFFICIENTS: $S_{a1} = .163 S_{a2} = .19$
 5. SEISMIC SITE CLASS: D
 6. BASIC SEISMIC-FORCE-RESISTING-SYSTEM : INTERMEDIATE REINFORCED MASONRY SHEAR WALLS
 7. SEISMIC BASE SHEAR : $V_{max} = 23k V_{min} = 23k$
 8. SEISMIC RESPONSE COEFFICIENT : $C_e = .0583$
 9. RESPONSE MODIFICATION COEFFICIENT : $R = 3.5$
 10. ANALYSIS PROCEDURE - EQUIVALENT LATERAL FORCE
 11. SEISMIC DESIGN CATEGORY B



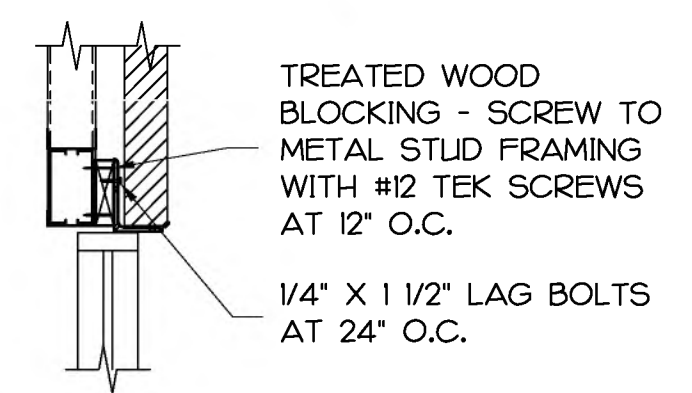
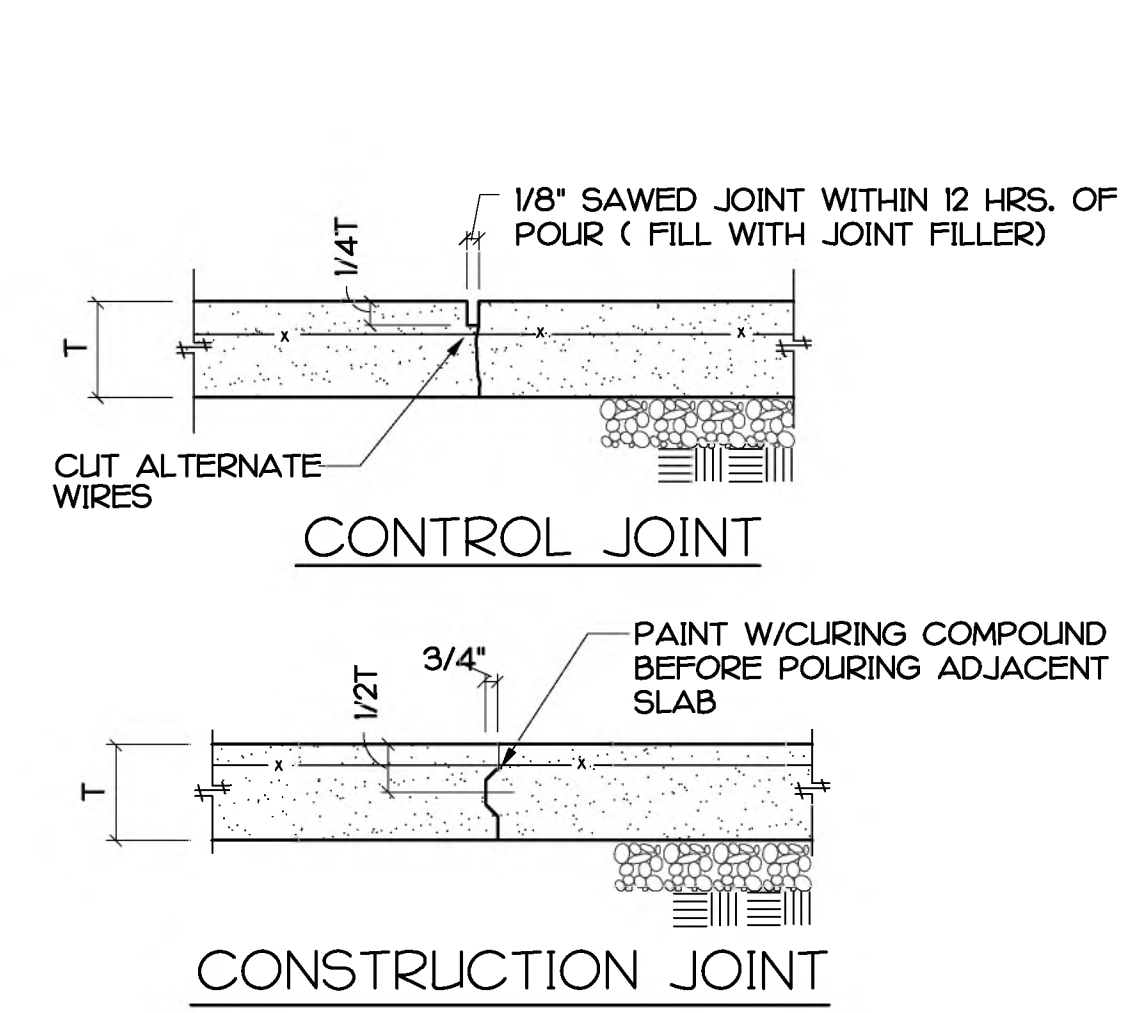
COLUMN FOOTING SCHEDULE						2000 PSF BEARING
MARK	SIZE	DEPTH	REINFORCING (EACH WAY BOTTOM)	SERVICE LOAD CAP.	REMARKS	
F-3	3'-0"x3'-0"	12"	4#4	18K		
F-3.5	3'-6"x3'-6"	12"	4#4	24.5K		
F-4	4'-0"x4'-0"	12"	4#4	32K		
F-4.5	4'-6"x4'-6"	12"	4#4	40.5K		
F-5	5'-0"x5'-0"	12"	6#4	50K		
F-5.5	5'-6"x5'-6"	12"	5#5	60.5K		
F-6	6'-0"x6'-0"	12"	5#6	72K		
F-6.5	6'-6"x6'-6"	13"	8#5	84.5K		
F-7	7'-0"x7'-0"	14"	6#6	98K		
F-7.5	7'-6"x7'-6"	15"	7#6	112.5K		
F-8	8'-0"x8'-0"	16"	6#7	128K		
F-8.5	8'-6"x8'-6"	17"	9#6	144.5K		
F-9	9'-0"x9'-0"	18"	7#7	162K		
F-9.5	9'-6"x9'-6"	18"	12#6	180.5K		
F-10	10'-0"x10'-0"	19"	9#7	200K		

SECTION AT MASONRY OPENINGS (E) DETAIL AT BASE OF WALL (F) DETAIL AT TOP OF WALL (G)

NOTE: UNLESS SHOWN OTHERWISE, ALL CMU WALLS

1 TYPICAL SEISMIC REINFORCING DETAILS - TYPICAL AT 6", 8" AND 12" CMU WALLS

S201 3/4"-1'-0"



LOOSE LINTEL SCHEDULE	
ROUGH OPENING	ANGLE SIZE
≤ 6'-4"	L4X3 1/2X1/4 (LLH)
≤ 10'-0"	L6X4X5/16 (LLV)
≤ 12'-0"	L7X4X3/8 (LLV)

NOTE: BEAR 8" EACH END OF OPENING ALL EXTERIOR LINTELS TO BE GALVANIZED

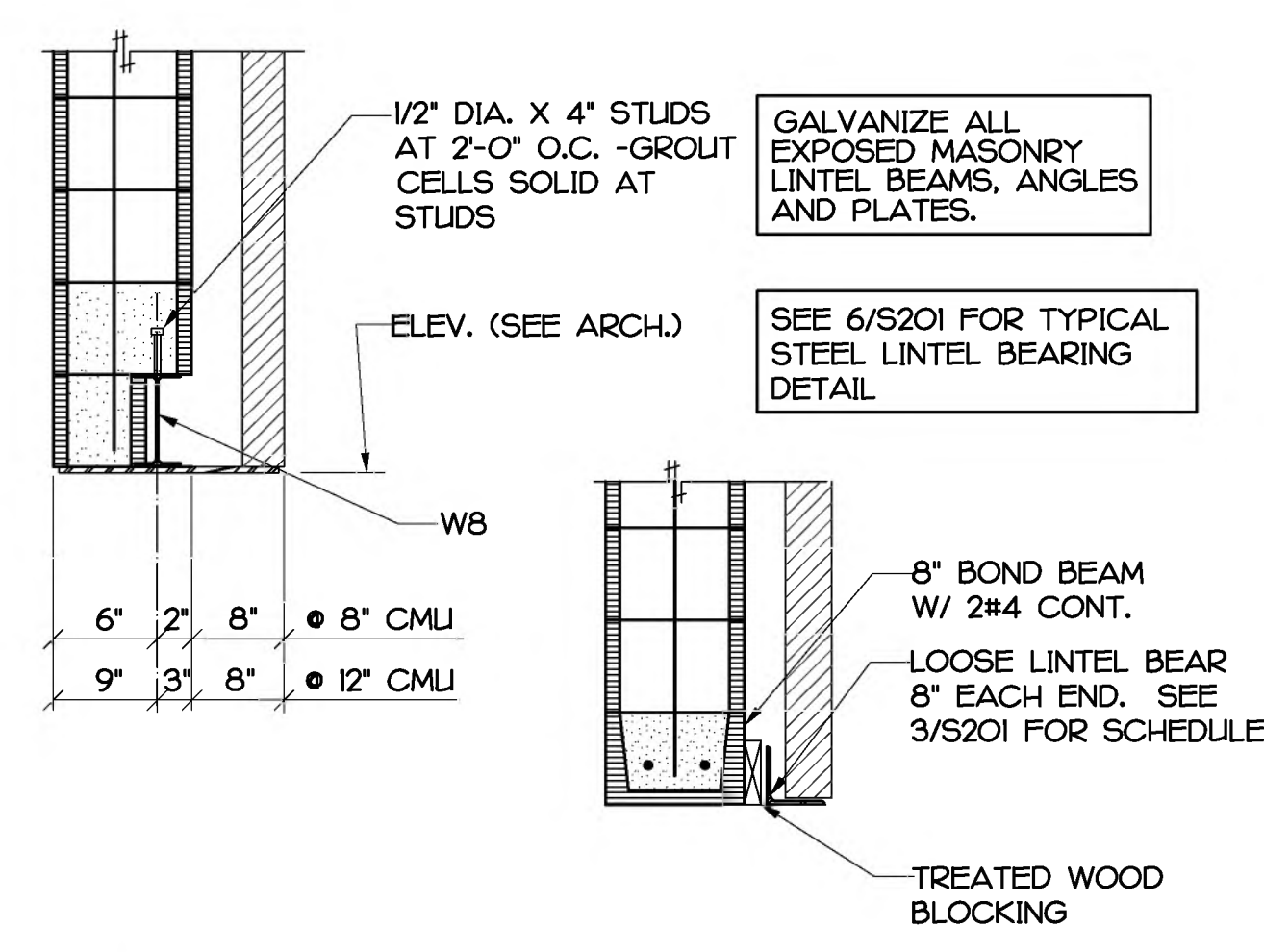
2 TYP. SLAB JOINTS

S201 3/4"-1'-0"

3 TYP. LINTEL DETAIL

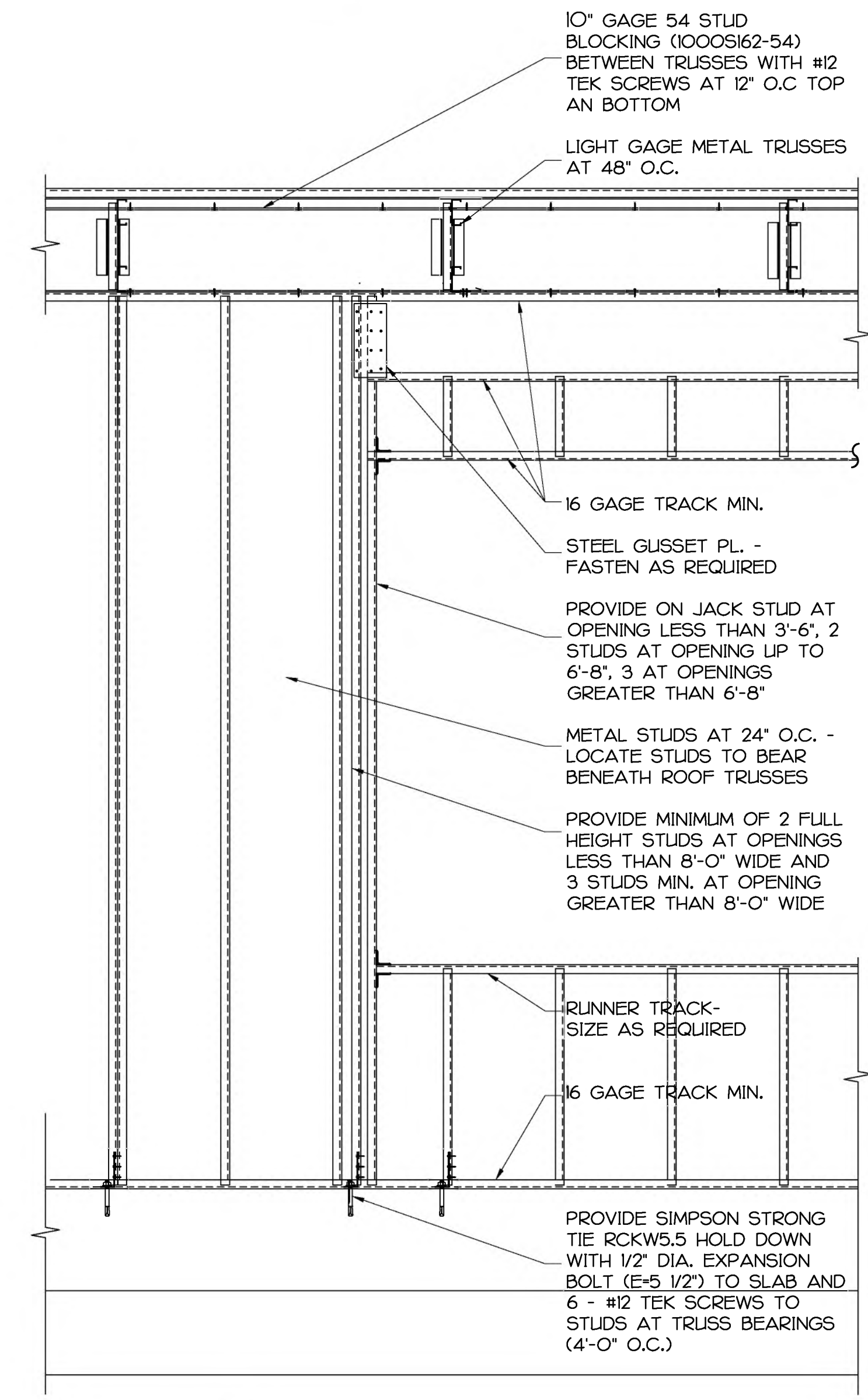
S201 3/4"-1'-0"

BEARING PLATE SCHEDULE			
MARK	PLATE SIZE	SHEAR STUDS	ALLOWABLE LOAD
BP1	PL. 3/8"x7"x7"	1-1/2" DIA. X 6"	18k
BP2	PL. 1/2"x6"x9"	2-3/4" DIA. X 10"	20k
BP3	PL. 1/2"x7 1/2"x9"	2-3/4" DIA. X 10"	25k
BP4	PL. 7/8"x7 1/2"x12"	2-3/4" DIA. X 8"	34k
BP5	PL. 1 1/4"x7 1/2"x16"	3-3/4" DIA. X 8"	45k
BP6	PL. 1 5/8"x7 1/2"x24"	3-3/4" DIA. X 8"	68k
BP7	PL. 2"x7 1/2"x28"	3-3/4" DIA. X 8"	79k
BP8	PL. 3/4"x10"x16"	2-3/4" DIA. X 8"	60k
BP9	PL. 3/8"x5"x10'-0"	3/4" DIA. X 10" STUDS AT 16" O.C.	-
BP10	PL. 1"x6"x16"	2-3/4" DIA. X 10"	36k
BP11	PL. 2"x6"x28"	3-3/4" DIA. X 10"	63k
BP12	PL. 3/4"x6"x12"	2-3/4" DIA. X 10"	27k
BP13	PL. 1 1/8"x11"x16"	4-3/4" DIA. X 10"	66k
BP14	PL. 3/8"x7"x10'-0"	3/4" DIA. X 10" STUDS AT 16" O.C.	-



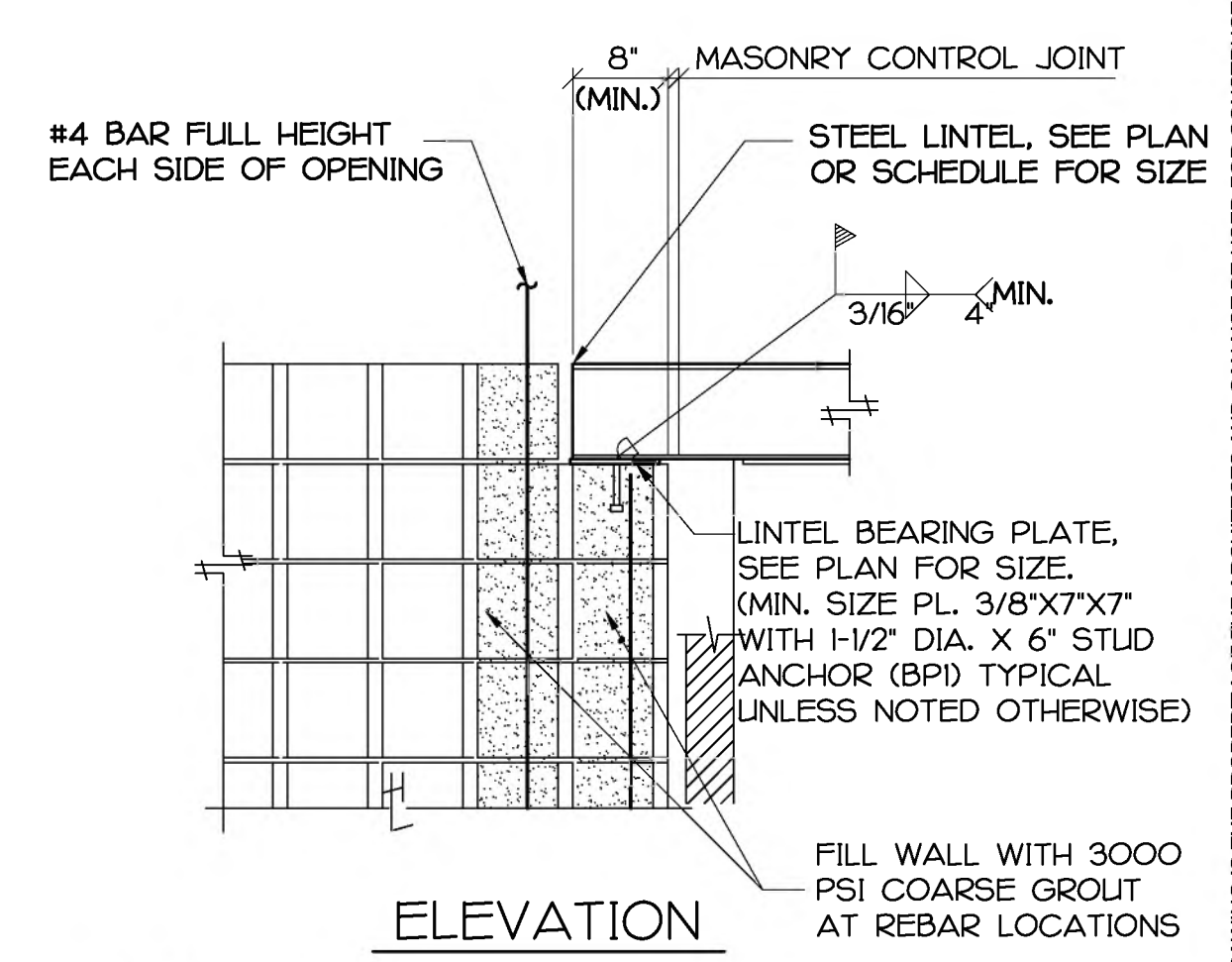
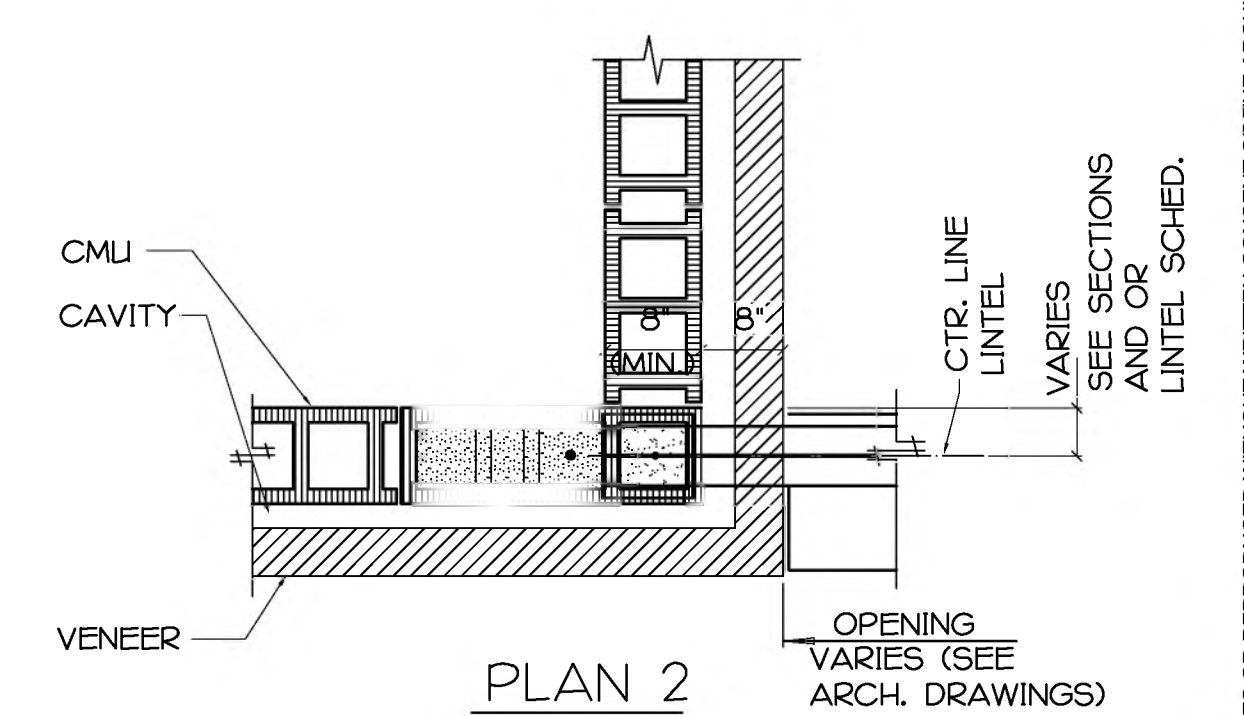
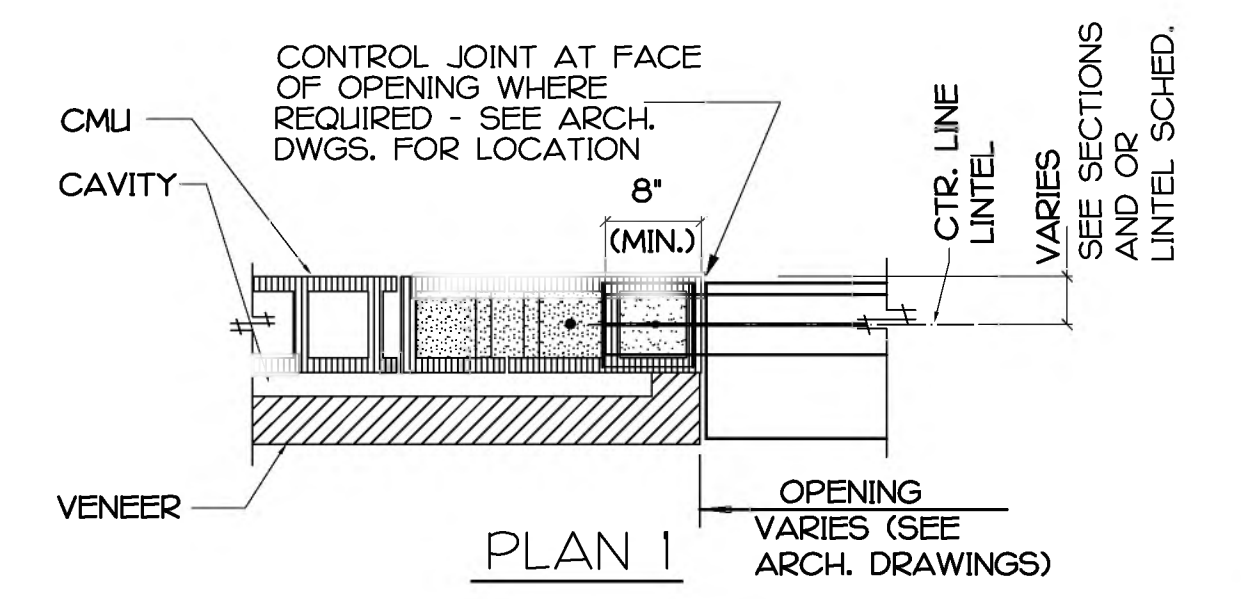
4 TYP. LINTEL DETAILS

S201 3/4"-1'-0"



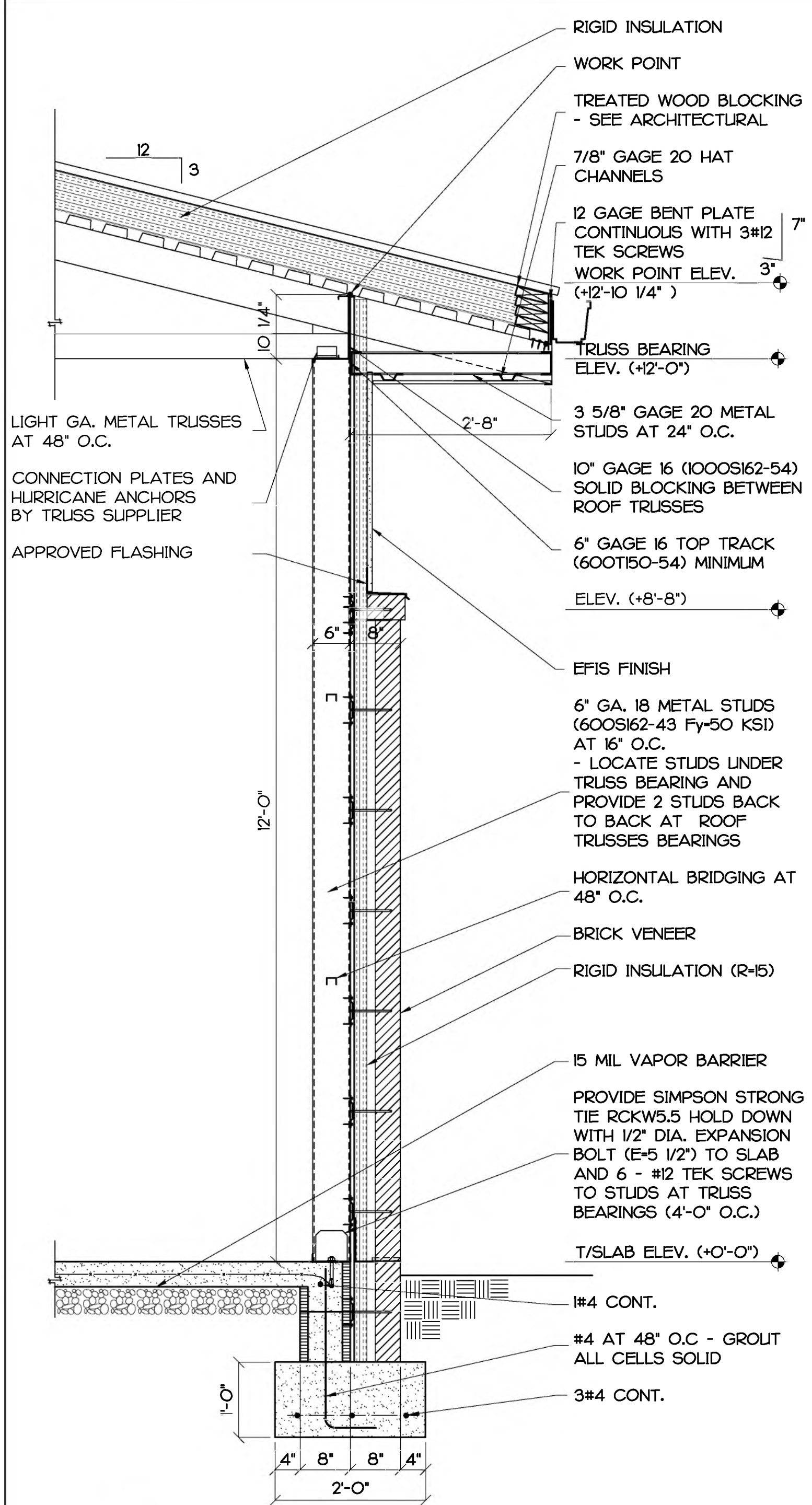
5 TYP. FRAMING DETAIL

S201 3/4"-1'-0"

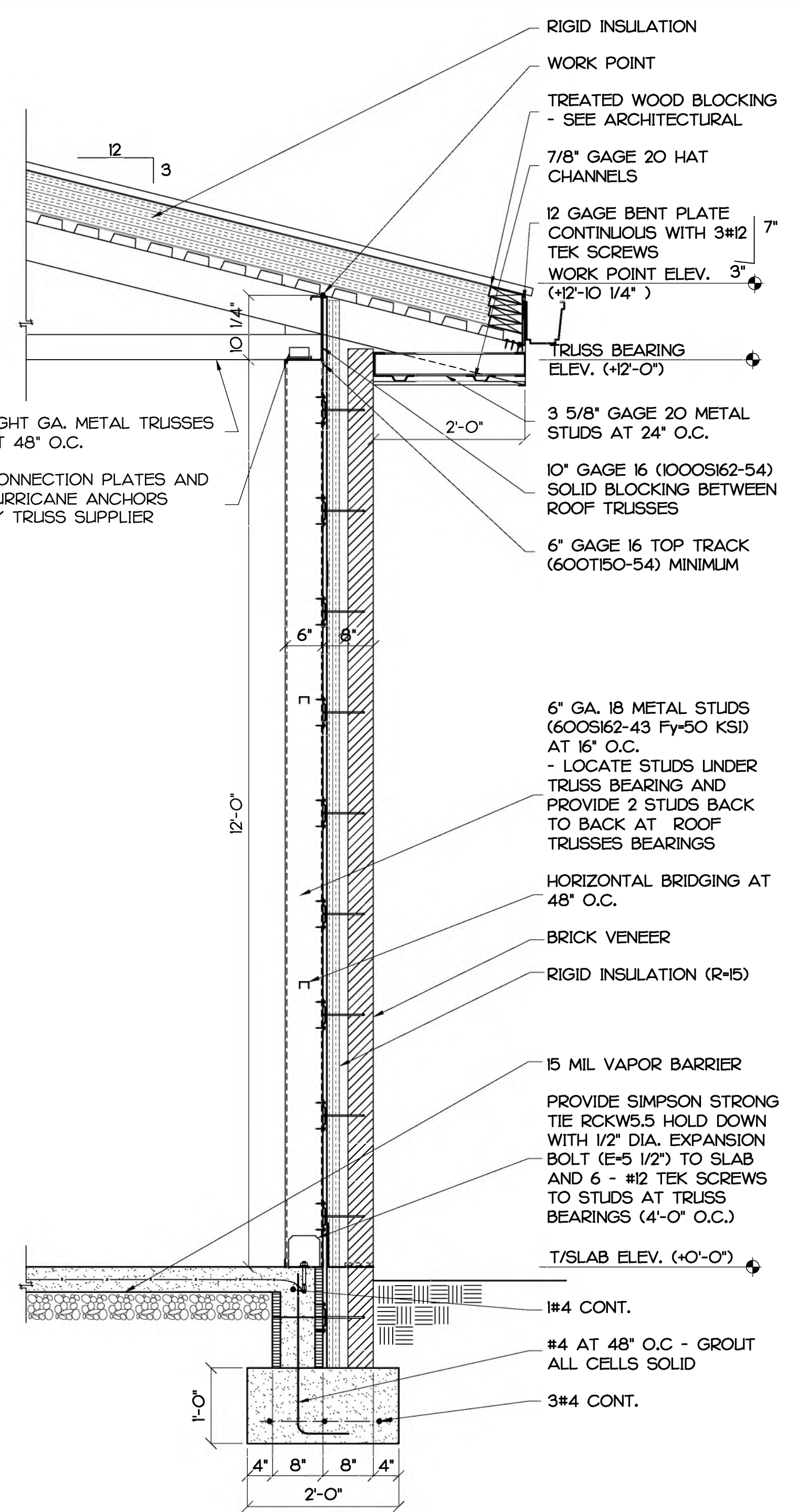


6 TYP. LINTEL BEARING DETAIL

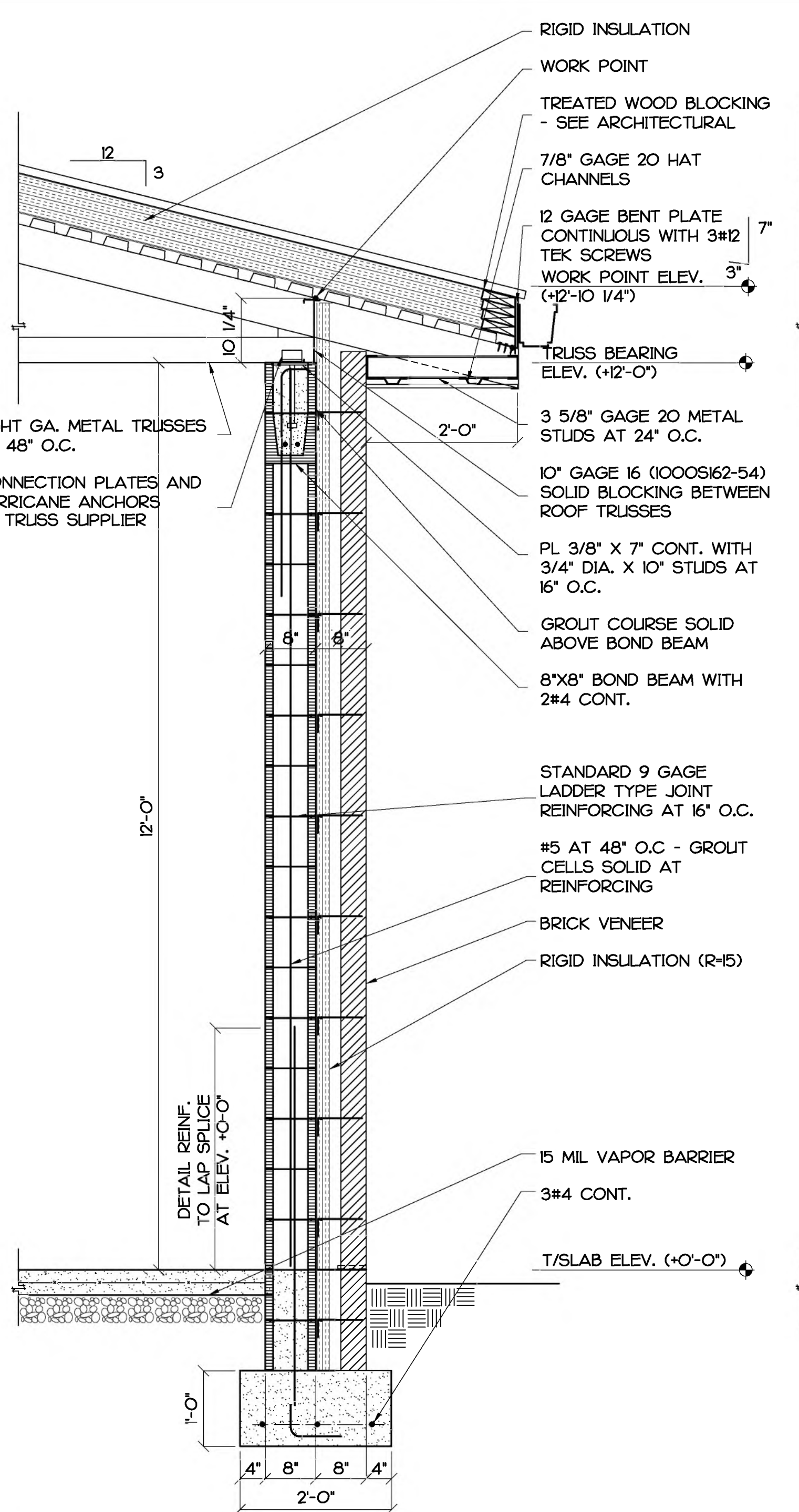
S201 3/4"-1'-0"



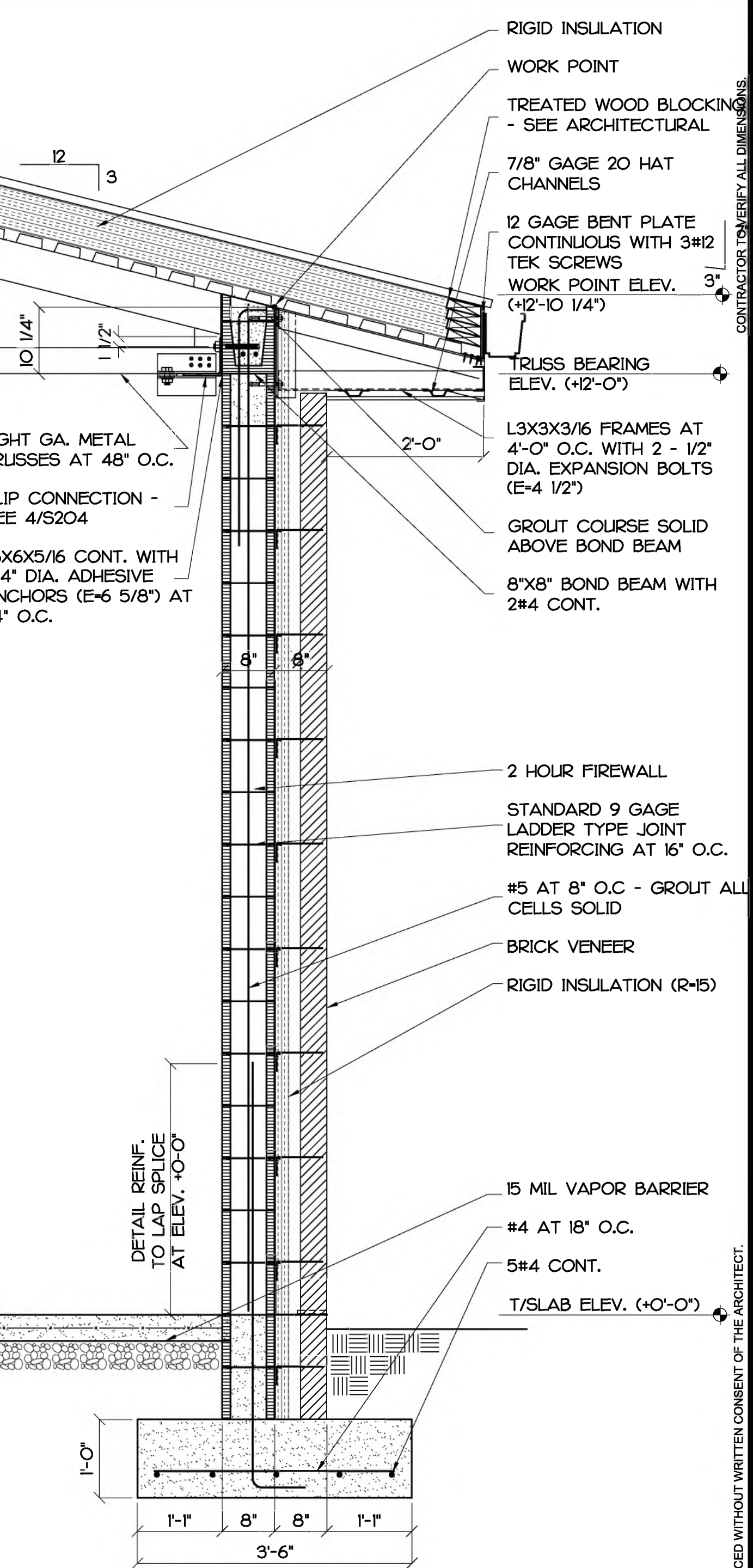
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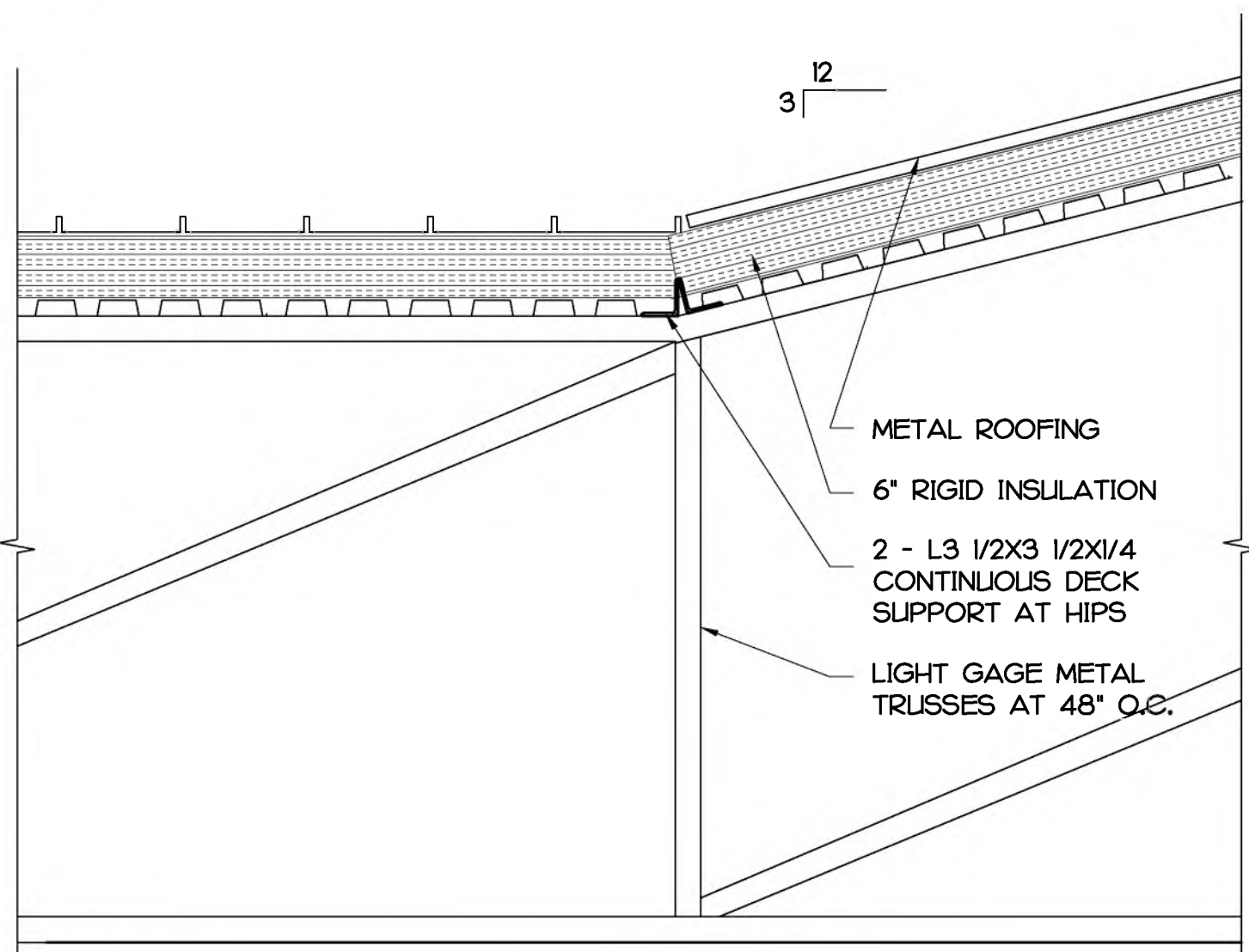
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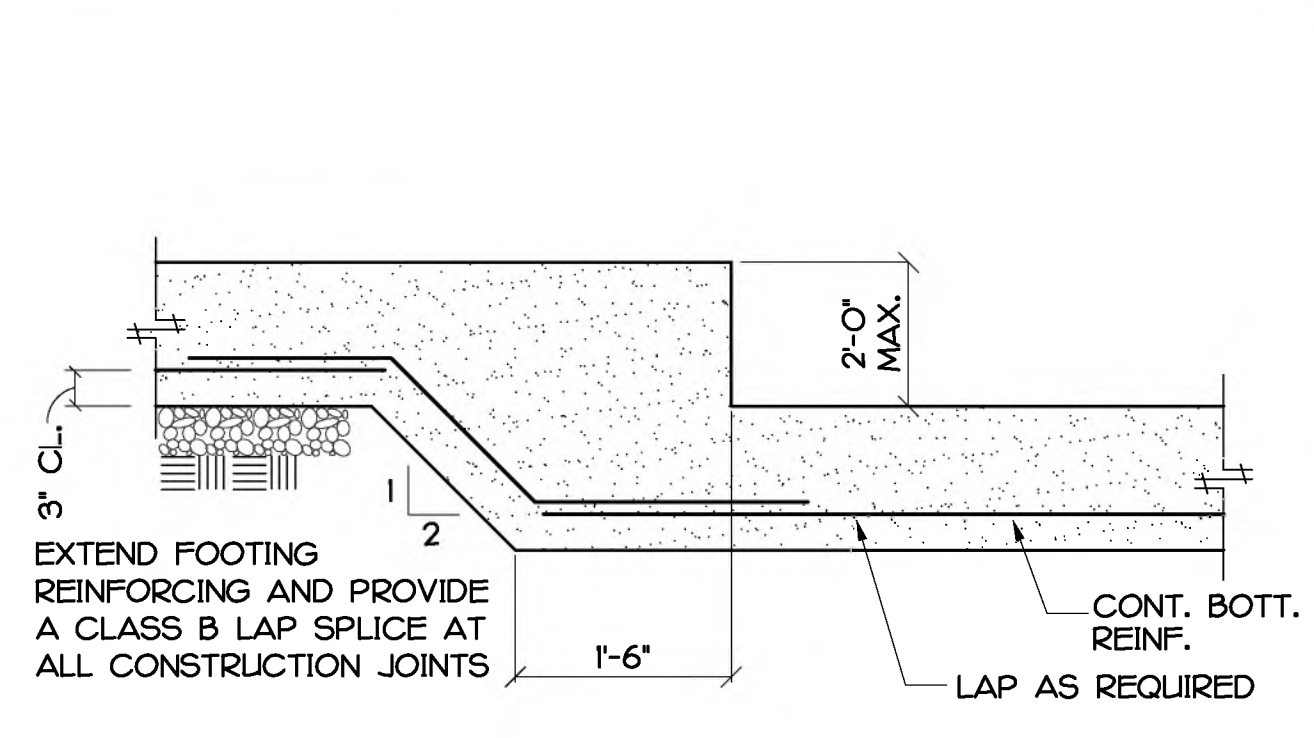
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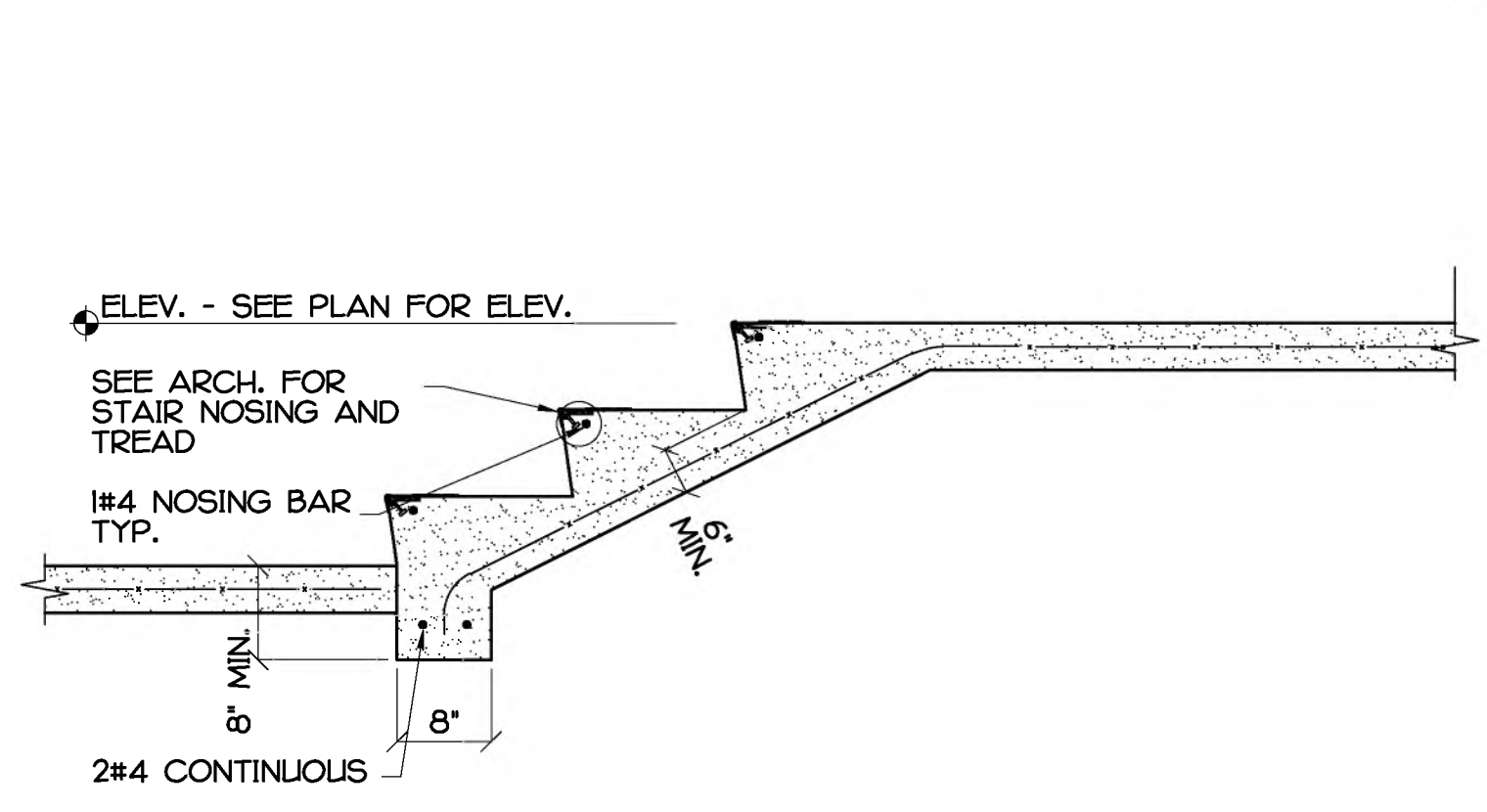
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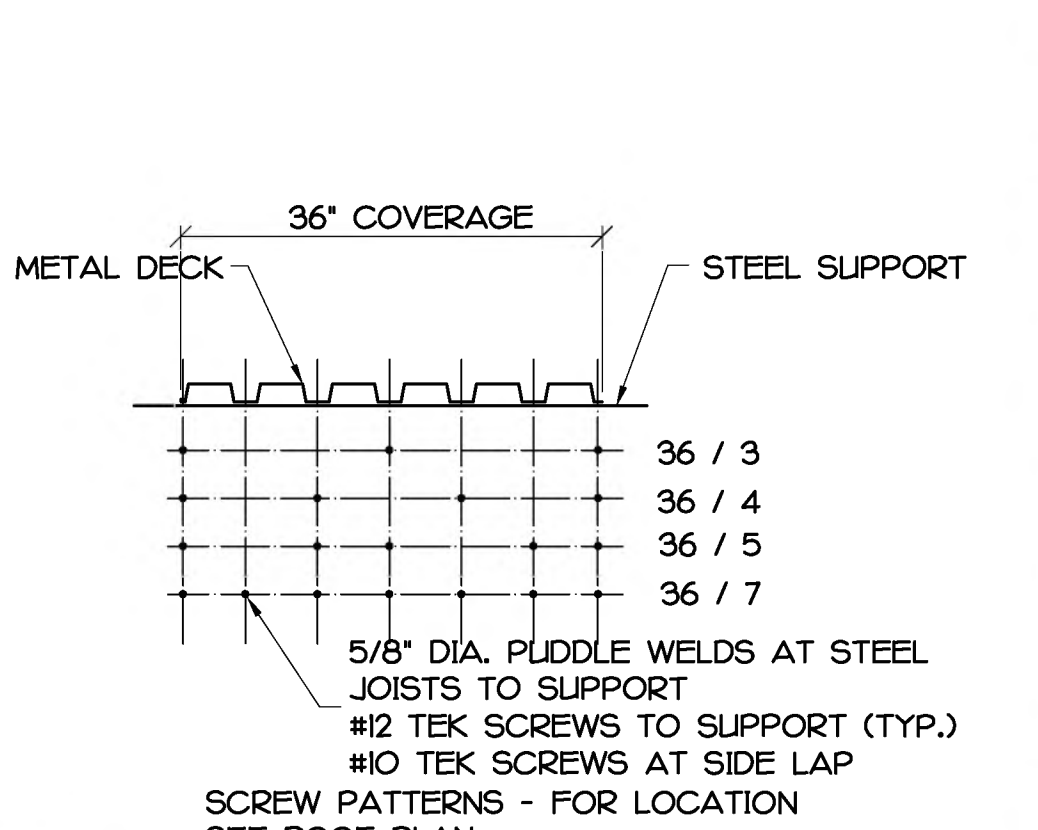
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6 TYP. STEP FOOTING DETAIL
S202 3/4" x 1'-0"



7 SECTION
S202 3/4" x 1'-0"



8 DECK WELD PATTERNS
S202 3/4" x 1'-0"

CONTRACTOR TO VERIFY ALL DIMENSIONS
 RUGGLES ENGINEERING PC
 Structural Engineers
 1118 Whittington Woods Drive
 P.O. Box 187, 630 Team Road, Suite 200
 Matthews, North Carolina 28106
 Phone: (704) 847-9851 Fax: (704) 847-9853
 Email: rugglesengineering@gmail.com
 11/16/25

PINNACLE ARCHITECTURE
 PROFESSIONAL ASSOCIATION
 P.O. Box 187, 630 Team Road, Suite 200
 Matthews, North Carolina 28106
 Phone: (704) 847-9851 Fax: (704) 847-9853

CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC

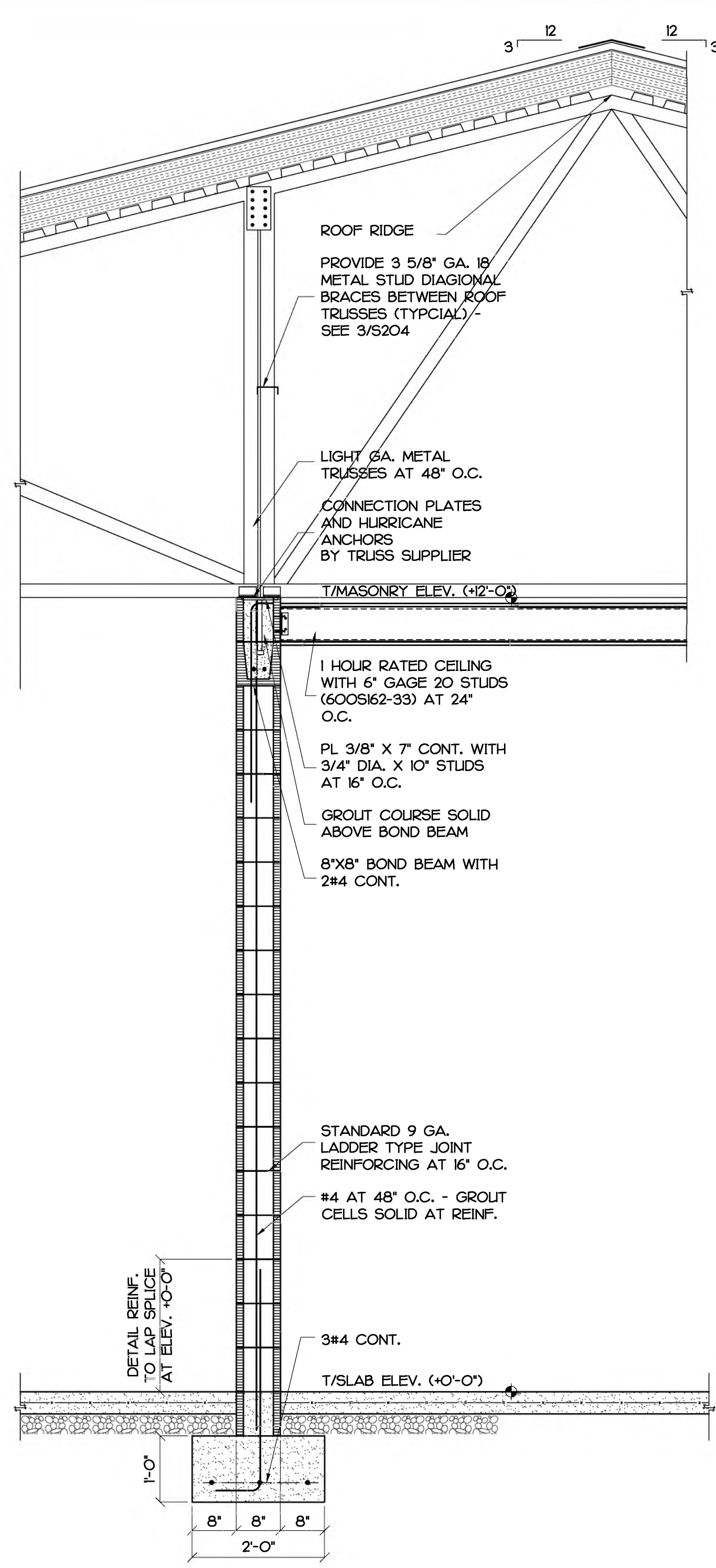
SECTIONS AND DETAILS

REVISION	SCHEDULE
DATE	REFERENCE

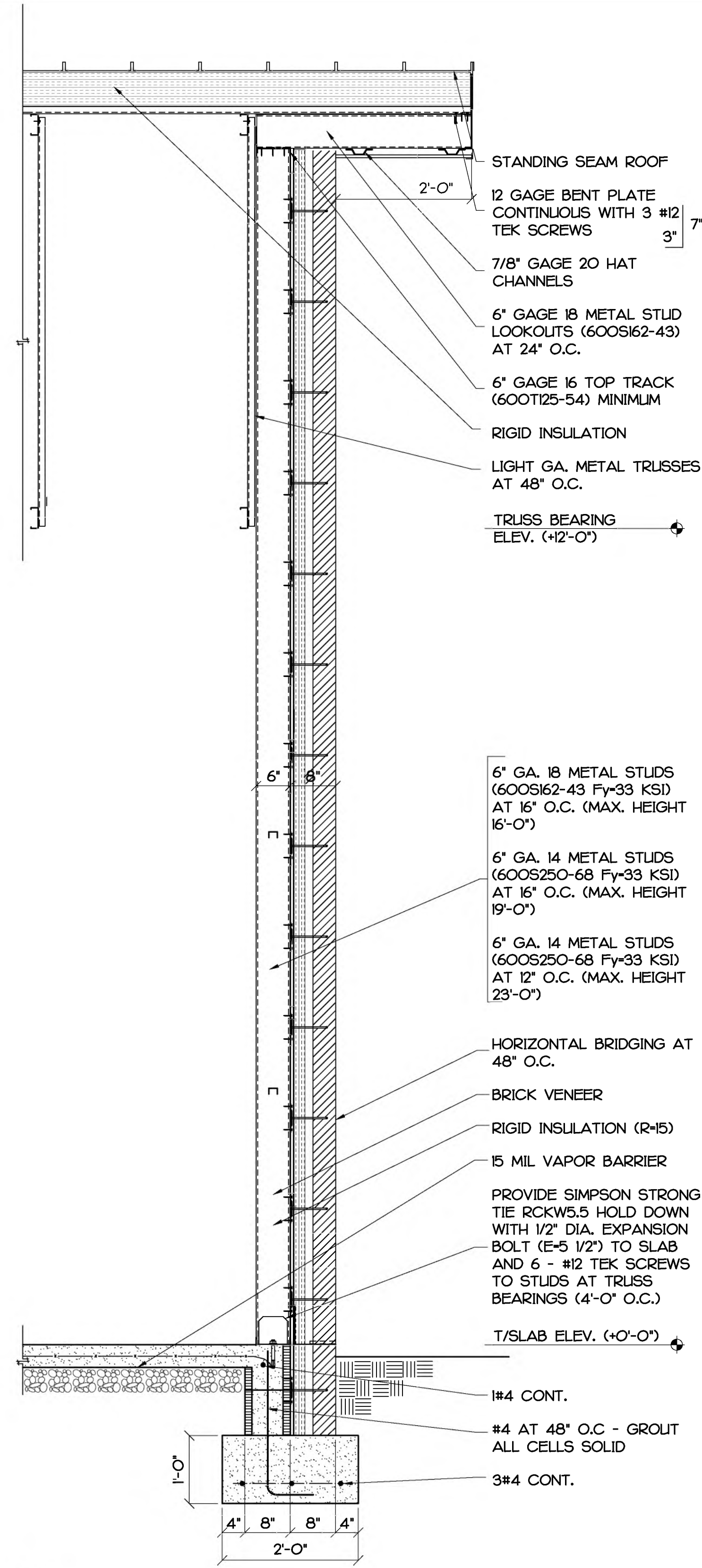
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 DRAWN BY: RMR
 CHECKED BY: RMR
 PROJECT: 2526

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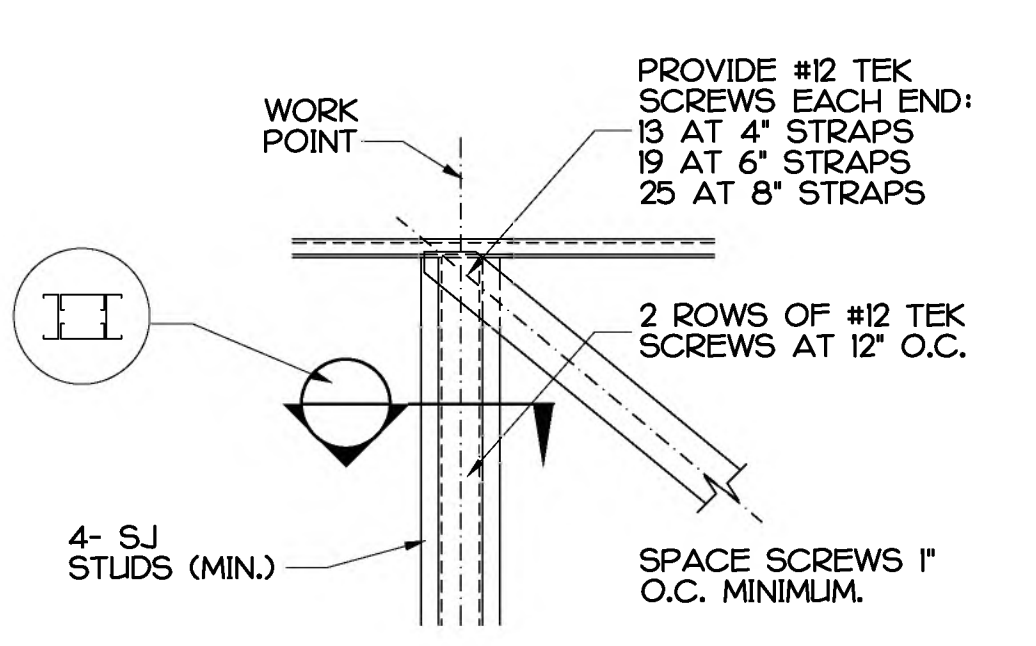
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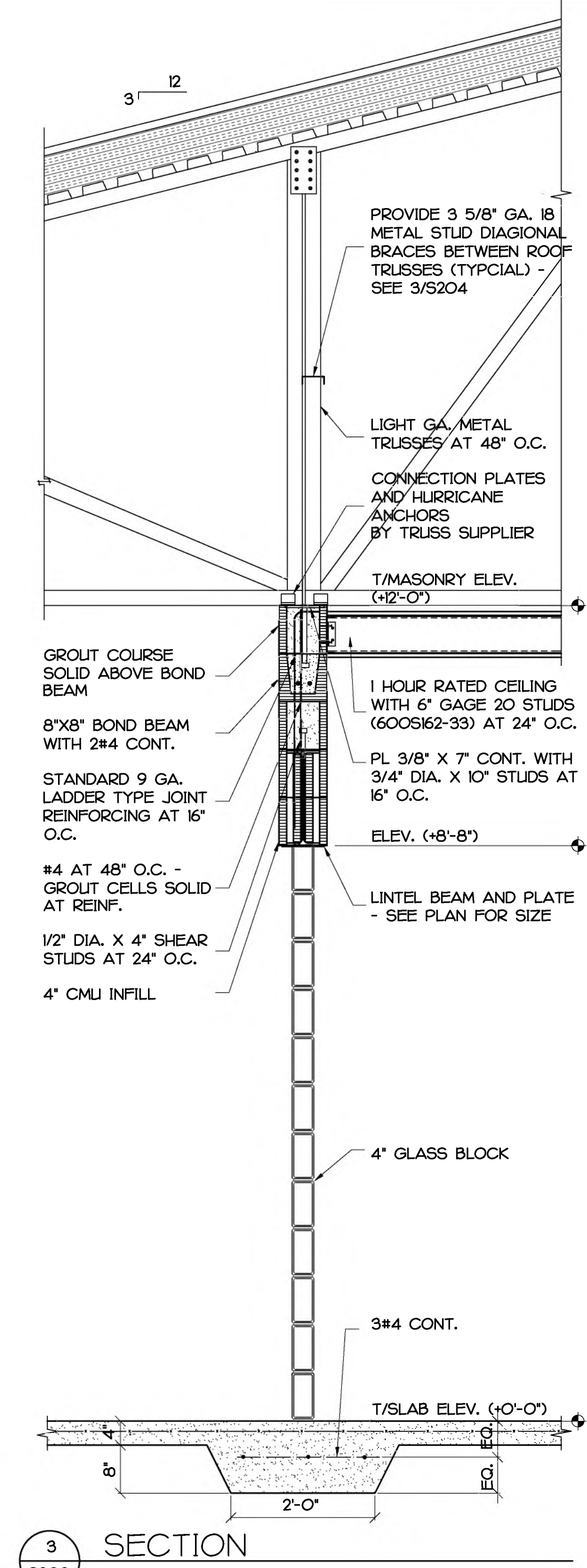
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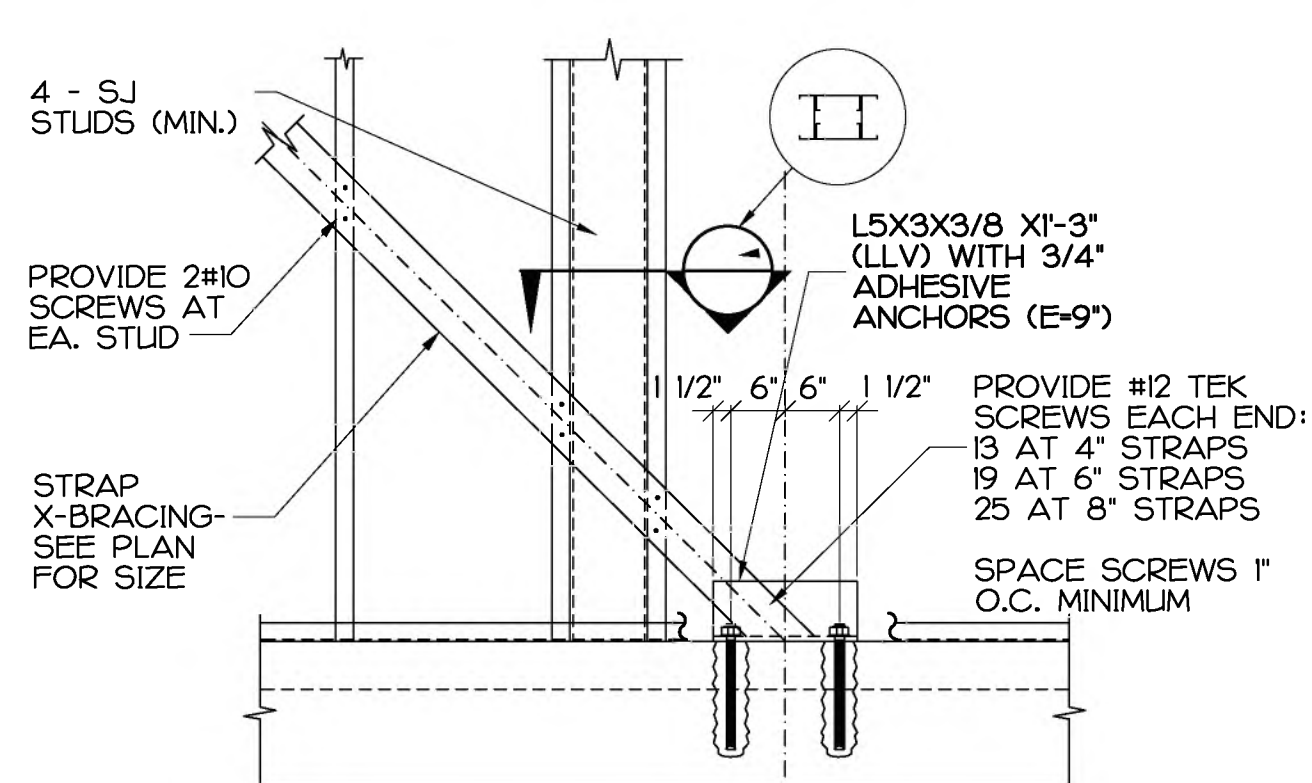
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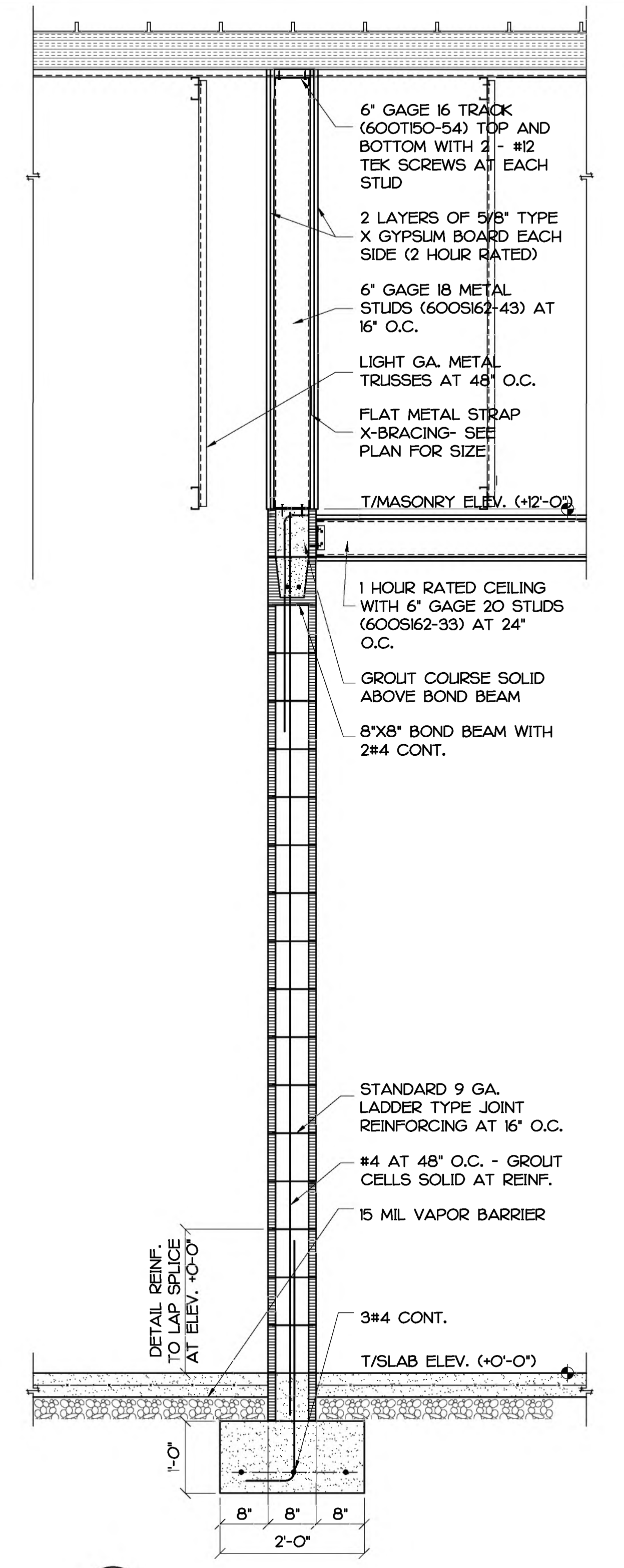
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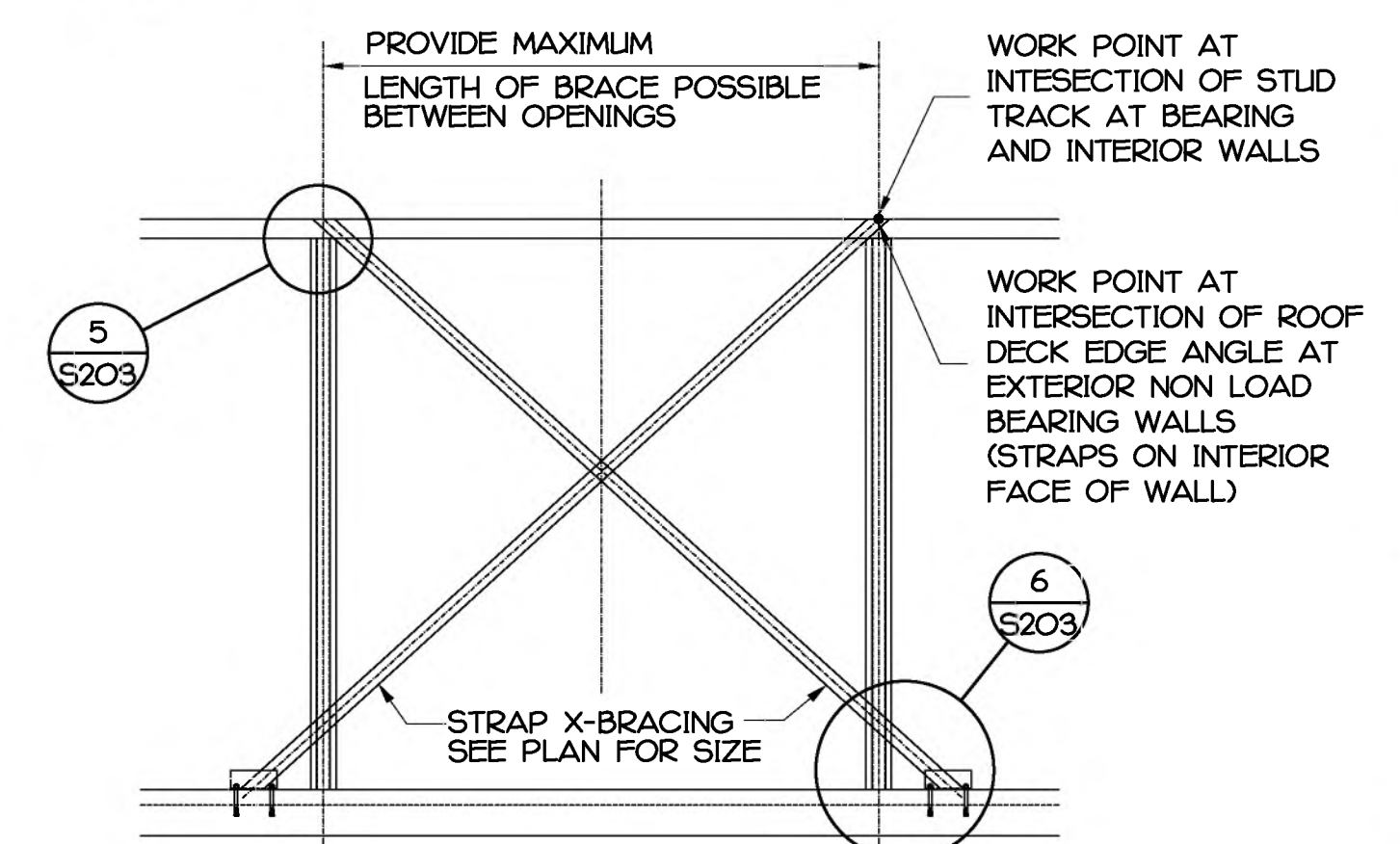
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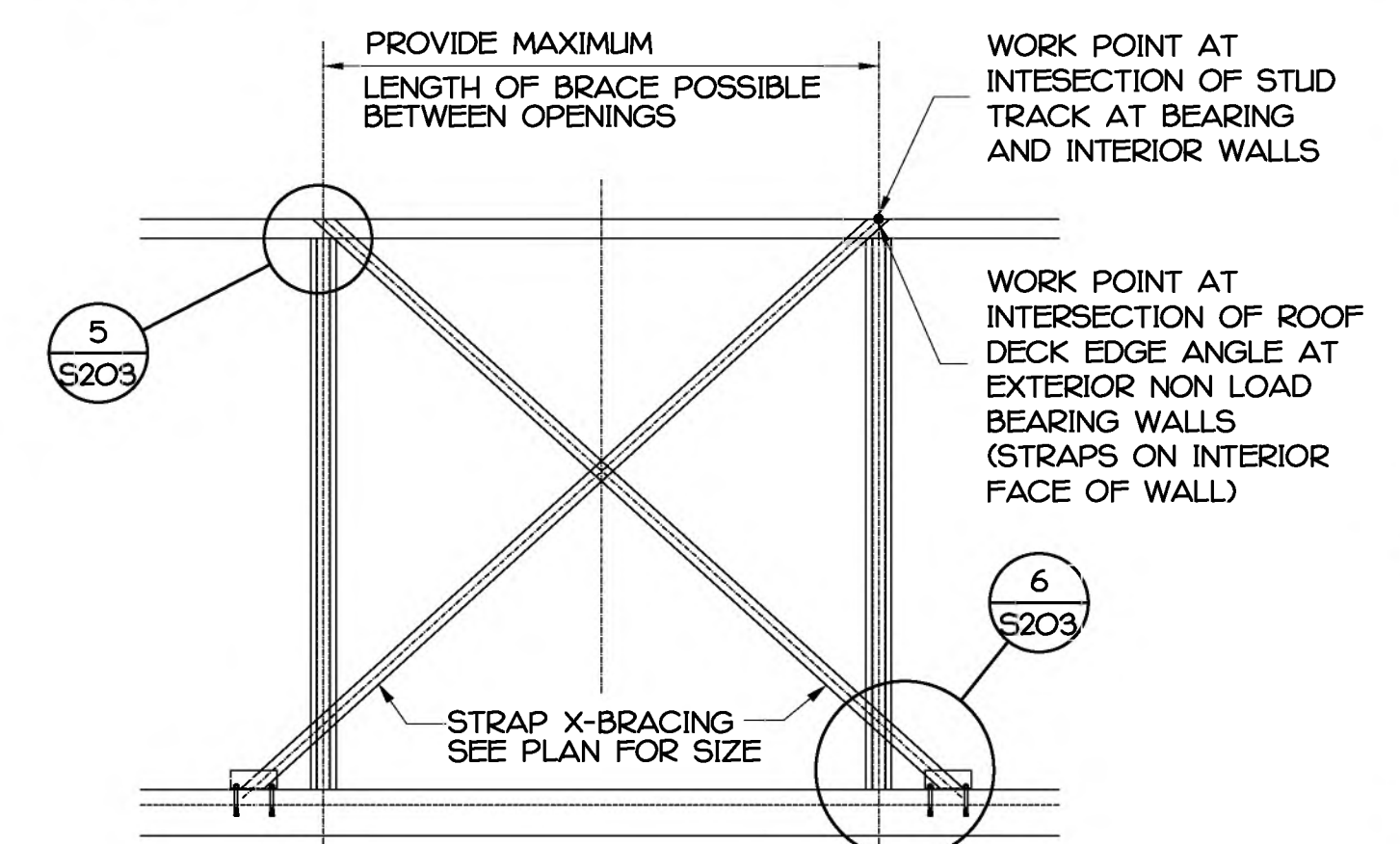
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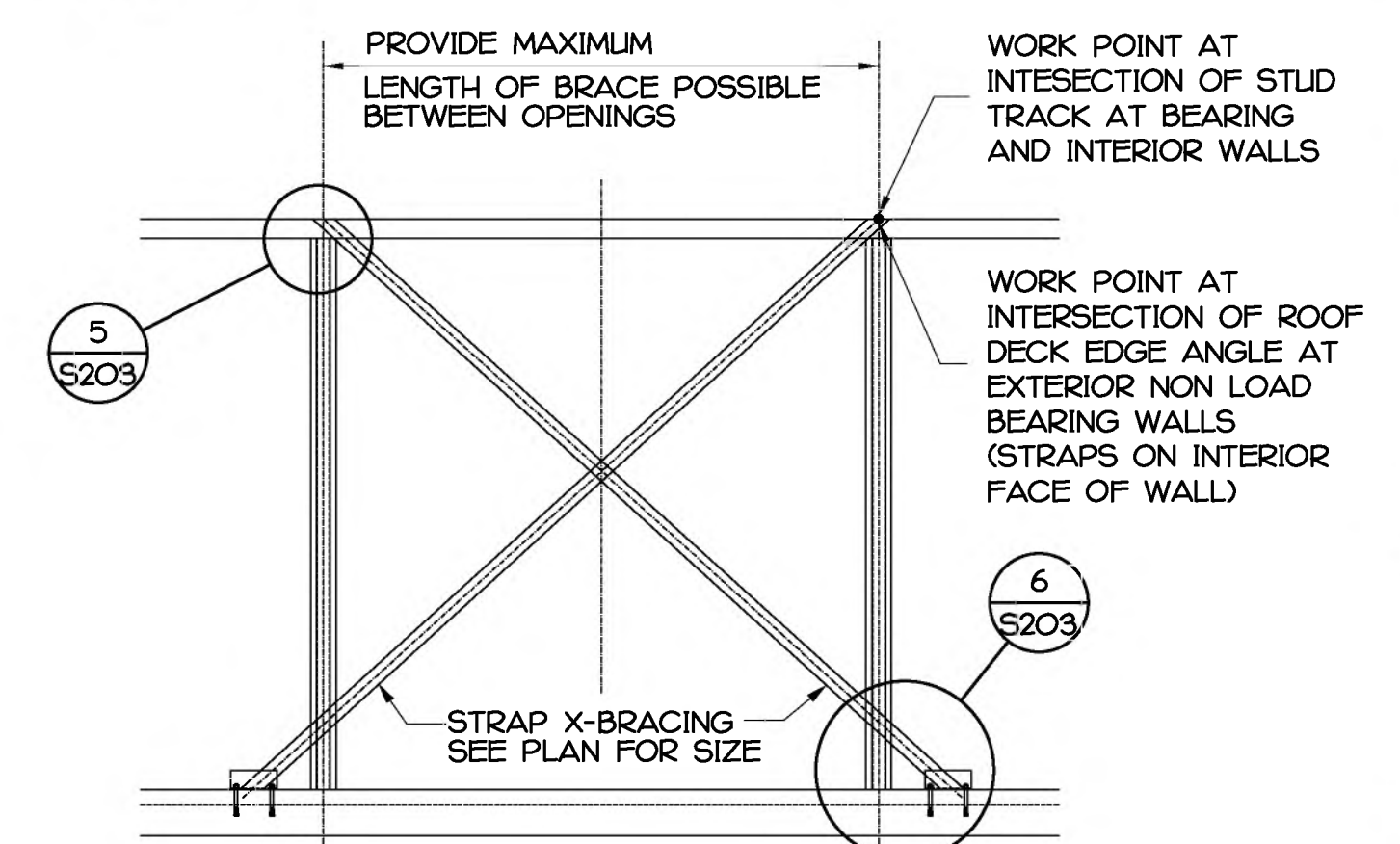
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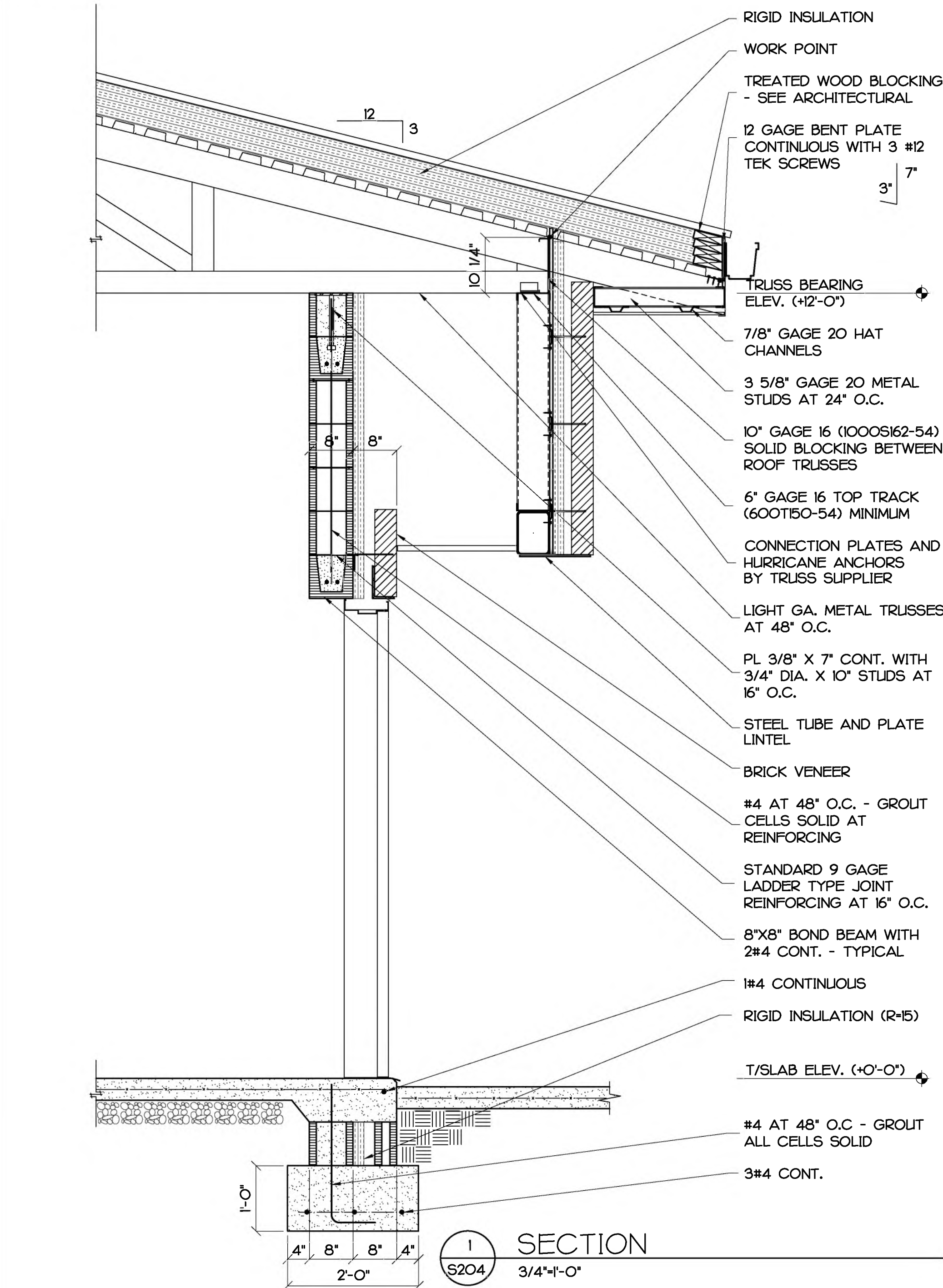
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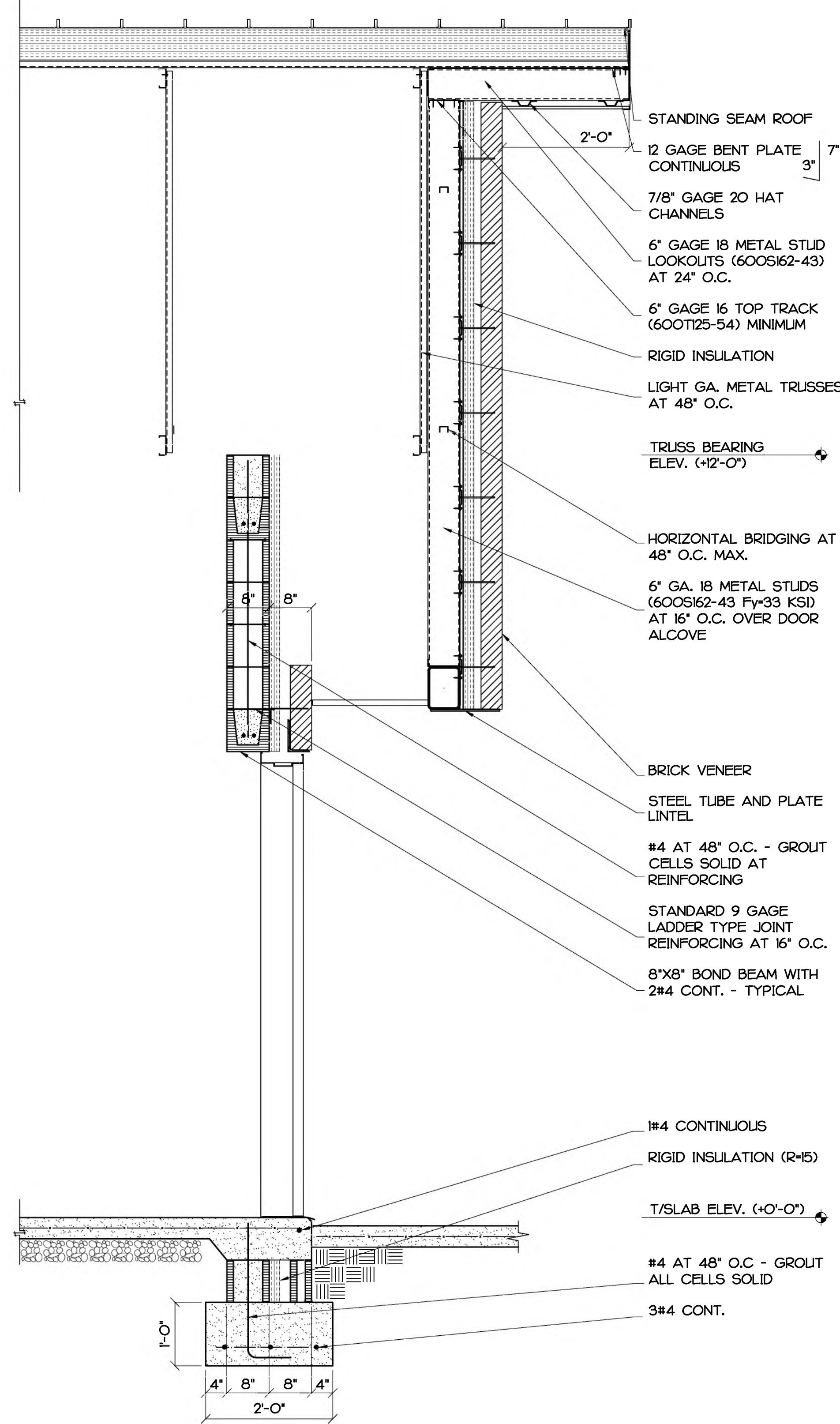
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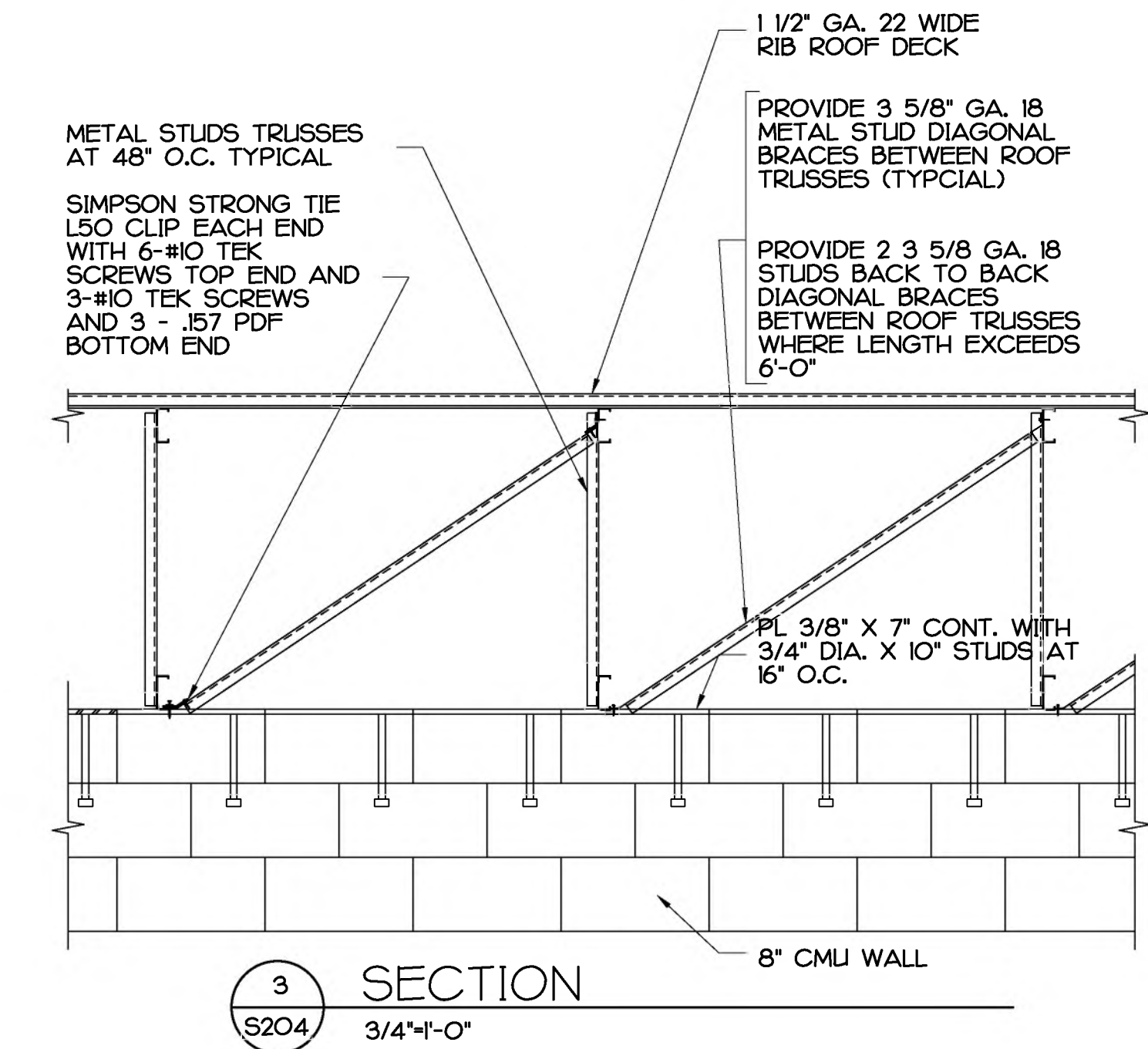
7 TYP. BRACING ELEVATION
S203 1/4" x 1'-0"



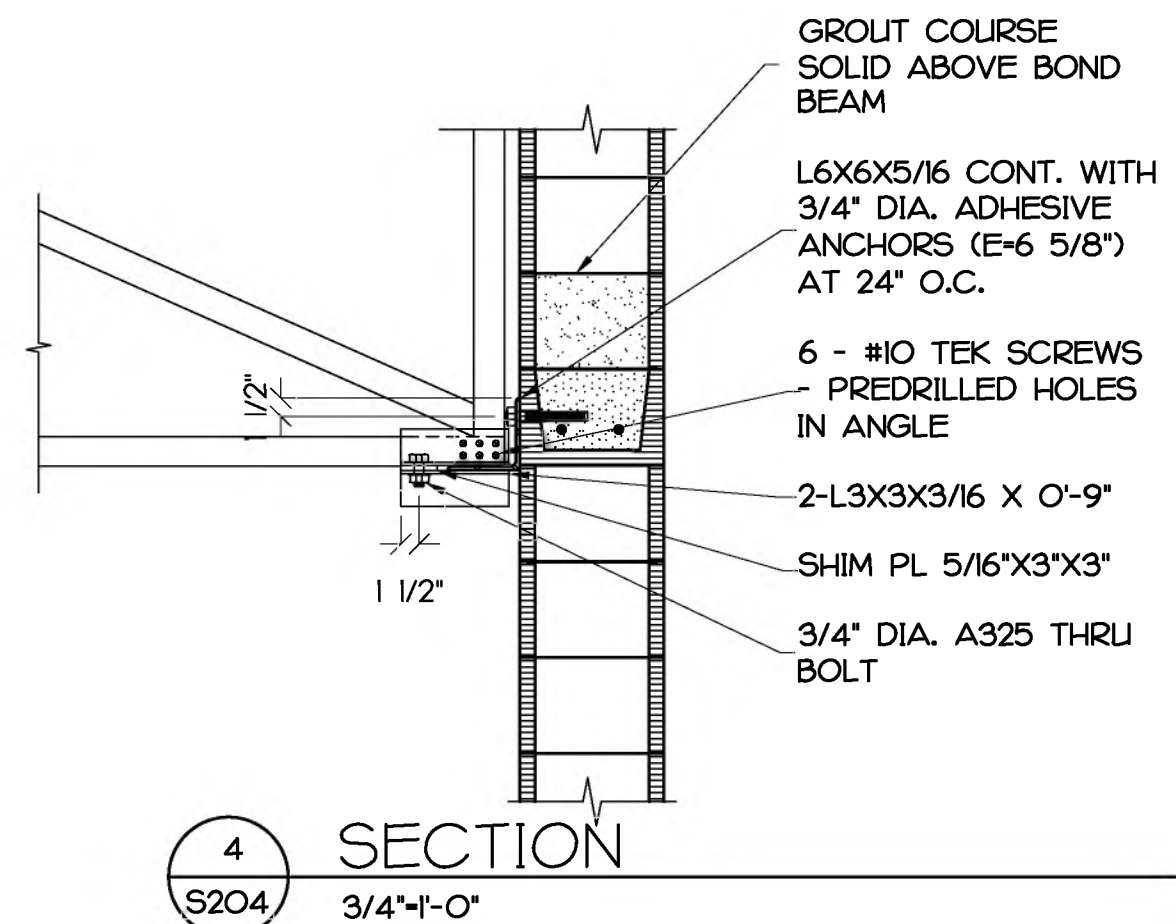
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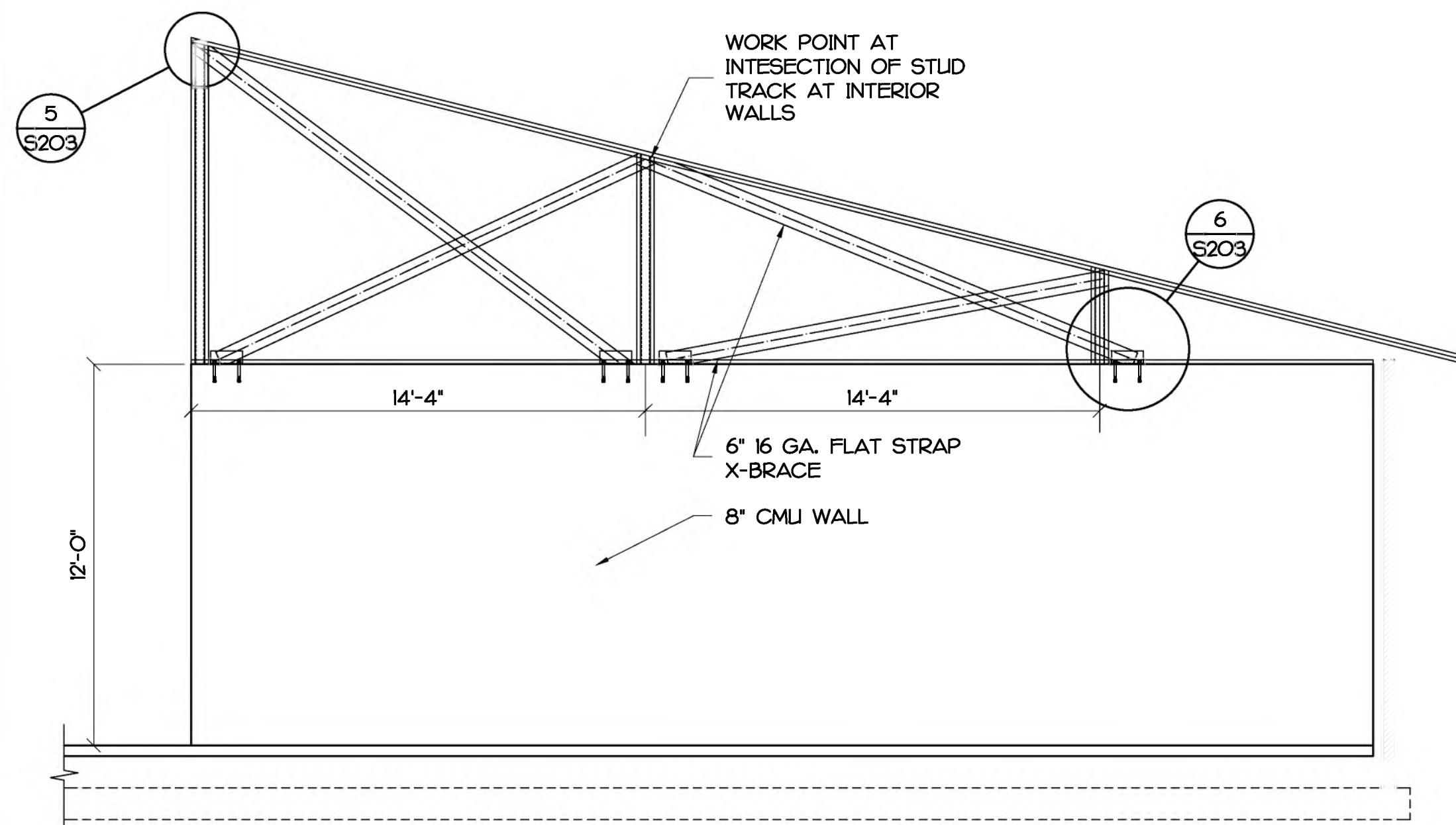
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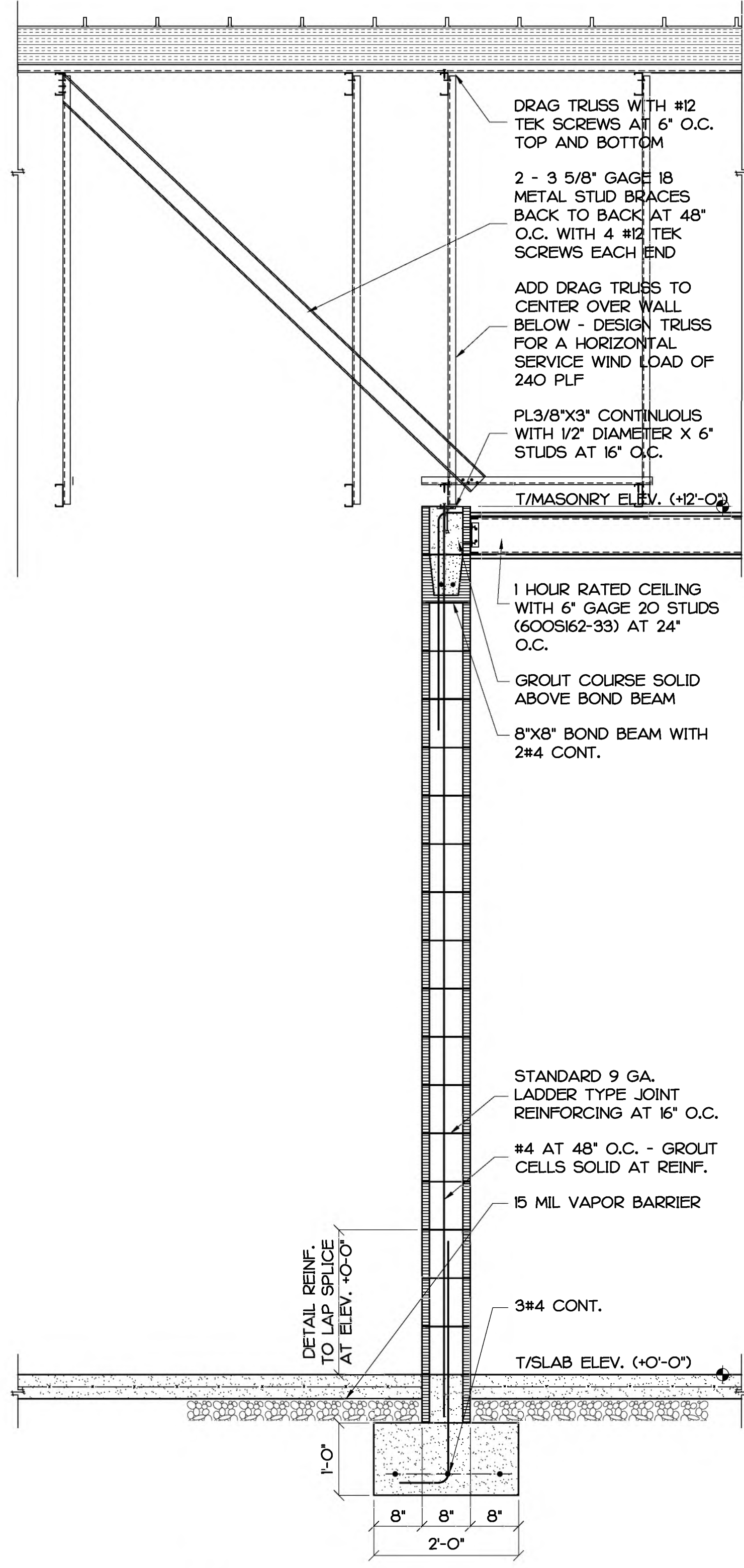
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S204 3/4"-1'-0"



4 SECTION
S204 3/4"-1'-0"



5 BRACE ELEVATION
S204 3/4"-1'-0"



SECTION
S205 3/4"-1'-0"

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REVISION SCHEDULE	
DATE	REFERENCE

**CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC**



ISSUE DATE: 11/16/25
DRAWN BY: RWR
CHECKED BY: RWR
PROJECT: 2520

**PINNACL ARCHITECTURE
PROFESSIONAL ASSOCIATION**
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**RUGGLES ENGINEERING PC
Structural Engineers**
1116 Whispering Winds Drive
Waynesville, NC 27586
PH: 704-782-5182
Firm No. C-2817
Email: rugglesengineering@baronmail.com
11/16/25

CONTRACTOR TO VERIFY ALL DIMENSIONS.

S205

PLUMBING SPECIALTIES SCHEDULE			
SYM	DESCRIPTION	MODEL NUMBER	REMARKS
FD	FLOOR DRAIN	ZURN ZN-415-S	1,7
SFD	SHOWER FLOOR DRAIN	ZURN Z-415-B WITH POLISHED CHROME TOP	1
FCO	FLOOR CLEANOUT	ZURN ZN-1400-T WITH NIKALOY TOP. CARPET MARKERS AS REQUIRED. SEE ARCHITECTURAL FINISH SCHEDULE FOR CARPETED AREAS.	1
YCO	YARD CLEANOUT	ZURN Z-1406-HD WITH CAST IRON TOP ZURN Z-1474-HD WITH CAST IRON TOP (TRAFFIC AREAS)	1
FPH	FROST-PROOF HYDRANT	WOODFORD #67 W/ DBL CHECK VALVE (ASSE 1052)	2,3
HB	HOSE BIBB	WOODFORD #26 WITH LOOSE KEY, CHROME PLATED, (ASSE 1052).	2,3
WCO	WALL CLEANOUT	ZURN Z-1446 W/STAINLESS STEEL COVER	1, 8

- EQUALS BY JOSAM, JAY R. SMITH, ZURN, MIFAB, WATTS.
- EQUALS BY JOSAM, JAY R. SMITH.
- PROVIDE INTEGRAL CHECK STOPS AT ALL WALL FAUCETS.
- EQUALS BY OATEY, SIOUX CHIEF.
- PROVIDE WITH NB FRAMING GRATE
- EQUALS BY JOSAM, JAY R. SMITH, WATTS - ASSE 1010 APPROVED. PROVIDE AT QUICK-CLOSING FIXTURES PER IPC 604.9.
- AT EACH FLOOR DRAIN & FLOOR SINK, PROVIDE WITH TRAP PRIMER CONNECTION (SUFFIX -P) AND INCLUDE PRIMER OPTION "TP" NOTED ABOVE.
- PROVIDE WCO AT BASE OF EACH WASTE STACK PER IPC 708.3.4.

BLDG. LOAD SUMMARY	
WATER FIXTURE UNITS —	196
WATER GPM —	90
WASTE FIXTURE UNITS —	86.5
HW GPH (110°F) —	175

PLUMBING FIXTURE SCHEDULE							
ALL PLUMBING FIXTURES MUST BE REVIEWED AND APPROVED BY OWNER PRIOR TO ORDERING.							
SYM	DESCRIPTION	CW	HW	W	V	MODEL NUMBER	REMARKS
P-1	WATER CLOSET	1 1/4"	-	3"	2"	KOHLER "WELLCOMME" K-96053-0; BENEKE 527SS SEAT; SLOAN ROYAL 115-1.6-YK FLUSH VALVE	1,4,5,6
P-2	WATER CLOSET (ADA)	1 1/4"	-	3"	2"	KOHLER "HIGHCLIFF" K-96057-0; BENEKE 527SS SEAT; SLOAN ROYAL 111 FLUSH VALVE	1,4,5,6,7, 8
P-3	URINAL	1"	-	3"	2"	KOHLER "DEXTER" K-5016-ET W/SLOAN REGAL 186-1 FLUSH VALVE	1,3,4,6
P-4	LAVATORY (WALL,GRID)	1/2"	1/2"	2"	2"	KOHLER "HUDSON" K-2861; DELTA 501LF-HGMHDF FAUCET; K-7608 SUPPLY; K-8998 TRAP, K-7129-A DRAIN.	1,2,3,9, 15,17
P-4A	LAVATORY (WALL,GRID)	1/2"	1/2"	2"	2"	KOHLER "HUDSON" K-2861; CHICAGO 802-V765ABCP FAUCET; K-7608 SUPPLY; K-8998 TRAP, K-7129-A DRAIN.	1,2,3,9, 15,17
P-5	MOP BASIN	1/2"	1/2"	3"	2"	FIAT MSB-2424 W/ 830-AA FAUCET, 832-AA HOSE BRACKET, 889-CC MOP HANGER & SEALANT AS REQUIRED. INCLUDE SS WALL GUARDS.	1,14,19
P-6	WASHER CONNECTION BOX	1/2"	1/2"	2"	2"	GUY GRAY WB200HA	20
P-7	SHOWER TRIM AND PAN	1/2"	1/2"	2"	2"	AQUABATH C4136BF-OT-FUS 3/4" W/ ROUND CENTER DRAIN. DELTA R10700-UNWS W/ T13H332-20 SHOWER TRIM KIT; PROVIDE SHOWER PAN AS NEEDED	1, 12
P-8	SINGLE CMPT. SINK	1/2"	1/2"	2"	2"	ELKAY LR-1918 W/LK-335 STRAINER; CHICAGO 201-GBAE3-317AB FAUCET; KOHLER K-7608-CP SUPPLY, K-9000 TRAP	1,2,10,16
P-9	UTILITY BOX	1/2"	-	-	-	GUY GRAY AB9700HA	20
P-10	WATER COOLER W/ BOTTLE FILLER	1/2"	-	2"	2"	OASIS MODEL PG8BEF, PROVIDE ACCESSORY APRON ON UPPER UNIT. PROVIDE STOP & TRAP. COLOR SELECTED BY ARCHITECT.	1,3,13,18

- SEE ARCHITECTURAL PLANS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL FIXTURES.
- INCLUDE ADA COMPLIANT OFFSET SINK STRAINER; PROVIDE TRUEBRO MODEL 102 INSULATION KIT, PLUMBEREX MODEL PRO-2000 OR MCGUIRE PWV8902
- PREWRAPPED CAST P-TRAP ASSEMBLY KIT ON ALL HANDICAP ACCESSIBLE LAVATORIES AND/OR SINKS.
- PROVIDE CARRIERS FOR ALL WALL MOUNTED FIXTURES.
- FOR LAVATORIES: SINGLE HANGER FOR BLOCK WALLS; FOR GYPBOARD WALL, PROVIDE FLOOR-MOUNT ARM CARRIERS (CONCEALED OR EXPOSED PER MFR'S REQUIREMENTS).
- EQUAL CHINA FIXTURE BY AMERICAN STANDARD, ZURN & SLOAN.
- EQUAL TOILET SEAT BY BEMIS, OLSONITE & BENEKE.
- EQUAL FLUSH VALVES BY ZURN & TOTO.
- TOP OF FLUSH VALVE SHALL BE LOCATED MINIMUM 3" BELOW BOTTOM OF GRAB BAR. P.C. TO CUT OUTLET TUBE AS REQUIRED.
- FLUSH VALVE MECHANISM SHALL BE LOCATED OPPOSITE OF HAND RAIL AS PER ADA REQUIREMENT.
- EQUAL FAUCETS BY SYMMONS, CHICAGO FAUCETS, DELTA, MOEN, ZURN & AMERICAN STANDARD.
- EQUAL SHOWER TRIM BY LEONARD, ZURN & SPEAKMAN. (PROVIDE SHOWER PAN AS REQ'D PER CODE SECTION 417.4 & 417.5; SEE ARCH DWGS/SPECS FOR DETAILS).
- EQUAL SHOWER TRIM BY ZURN, LEONARD & SPEAKMAN (PROVIDE SHOWER PAN AS REQ'D PER CODE SECTION 417.4 & 417.5; SEE ARCH DWGS/SPECS FOR DETAILS).
- EQUAL WATER COOLER/DRINKING FOUNTAIN BY HALSEY TAYLOR, SUNROC, HAWS & ELKAY.
- EQUAL MOP BASIN BY SWANSTONE, E.L.MUSTEE.
- WHEN ASTERISK ("*") PREFIX IS USED, PROVIDE TRAP PRIMER AND PIPE 1/2" LINE BELOW SLAB TO FLOOR DRAIN.
- EQUAL FAUCETS BY CHICAGO FAUCETS, T&S, ELKAY, ZURN & AMERICAN STANDARD. SINGLE SINK = RIGID SPOUT; DOUBLE SINK = RESTRICTED SPOUT.
- EQUAL CAST IRON LAVATORIES BY CECO & ZURN.
- ACCESSORY APRON MAY BE OMITTED IF WATER COOLER IS RECESSED.
- PROVIDE INTEGRAL CHECK STOPS AT ALL WALL FAUCETS.
- EQUAL SPECIALTY FIXTURE BY OATEY, SIOUX CHIEF.

ELECTRIC WATER HEATER SCHEDULE											
UNIT TAG	CAPACITY						RECIRC PUMP	EXPANSION TANK	LOCATION	MODEL	REMARKS
	INPUT (KW)	VOLT/PHASE	NUMBER OF ELEMENTS	RECOVERY (GPH)	TANK VOLUME (GAL)	TEMP RISE (F)					
WH-1	27	208/3	6	148	50	80	YES	YES	MECH 105	AO SMITH DRE-52-27	1,2,3,4

- EQUALS BY STATE, RHEEM
- RECIRCULATION PUMPS ARE BELL & GOSSETT NBF-25 (3-SPEED CIRCULATOR, SET TO SPEED #2), 125 WATTS, 115V/1-PH, ALL BRONZE; EQUALS BY AURUORA, GRUNDFOS. PROVIDE WITH TIME CLOCK, AQUASTAT, AND ON/OFF TOGGLE SWITCH.
- EXPANSION TANKS ARE AMTROL ST-12 OR EQUALS BY STATE, TACO
- EACH ELEMENT CONTROLLED BY INDIVIDUALLY MOUNTED T-STAT.

PLUMBING LEGEND		
SYMBOL	ABBREVIATION	DESCRIPTION
	CW	COLD WATER
	HW	HOT WATER
	HW-140	HOT WATER 140
	HWR	HOT WATER RETURN
	G	GAS
	W	WASTE
	GW	GREASE WASTE
	V	VENT
	RL	ROOF LEADER
	EQUIPMENT	PLUMBING EQUIPMENT
	EXREMA	EXISTING TO REMAIN
	EXREMO	EXISTING TO BE REMOVED
	EXRELO	EXISTING TO BE RELOCATED
	VTR	VENT THRU ROOF
		GLOBE VALVE
		BALL VALVE
		BACKFLOW PREVENTER (RPZ/DCVA)
		CHECK VALVE
		UNION
		PRESSURE REDUCING VALVE
	FPH	FROST PROOF HYDRANT
	HB	HOSE BIBB
		SHOCK ABSORBER
	RD	ROOF DRAIN
	FCO	FLOOR CLEANOUT
	FCO/YCO	FLOOR OR YARD CLEANOUT
	FD	FLOOR DRAIN
		VACUUM BREAKER
	S.A.-(?)	SHOCK ABSORBER
		AQUASTAT
	HD	HUB DRAIN
		CONNECT TO EXISTING

CONTRACTOR TO VERIFY ALL DIMENSIONS

PINNACLE ARCHITECTURE PROFESSIONAL ASSOCIATION

CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
PLUMBING SCHEDULES

REVISION SCHEDULE

NO.	DATE	REFERENCE

P100

ISSUE DATE: 01.30.26
DRAWN BY: HJD
CHECKED BY: 2528
PROJECT:

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MSWG Project 25-088



1 PLUMBING WASTE FLOOR PLAN
 SCALE: 1/8" = 1'-0"

THIS DRAWING IS THE PROPERTY OF THE ARCHITECTS AND CAN NOT BE USED FOR CONSTRUCTION PURPOSES OR REPRODUCED WITHOUT WRITTEN CONSENT OF THE ARCHITECT.

CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
PLUMBING WASTE FLOOR PLAN

REVISION SCHEDULE		
NO.	DATE	REFERENCE

P300

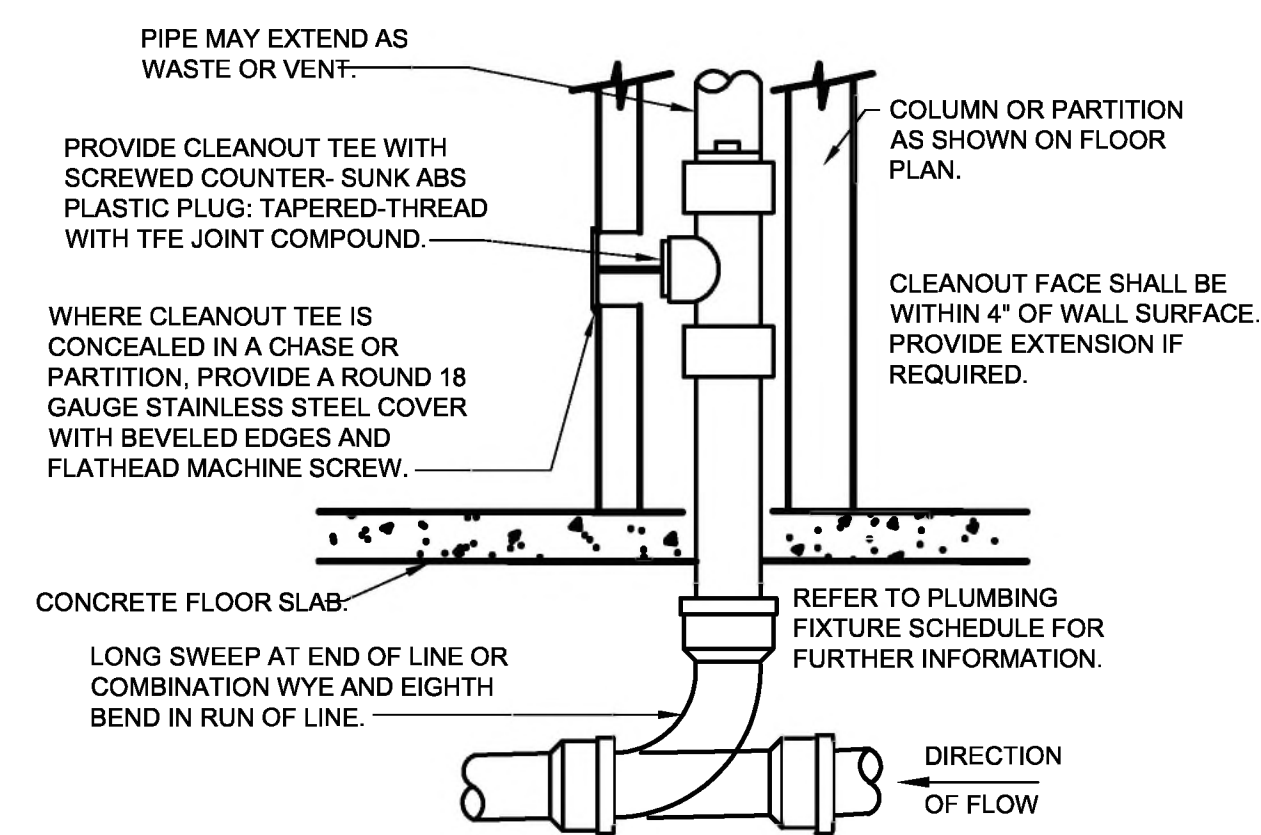


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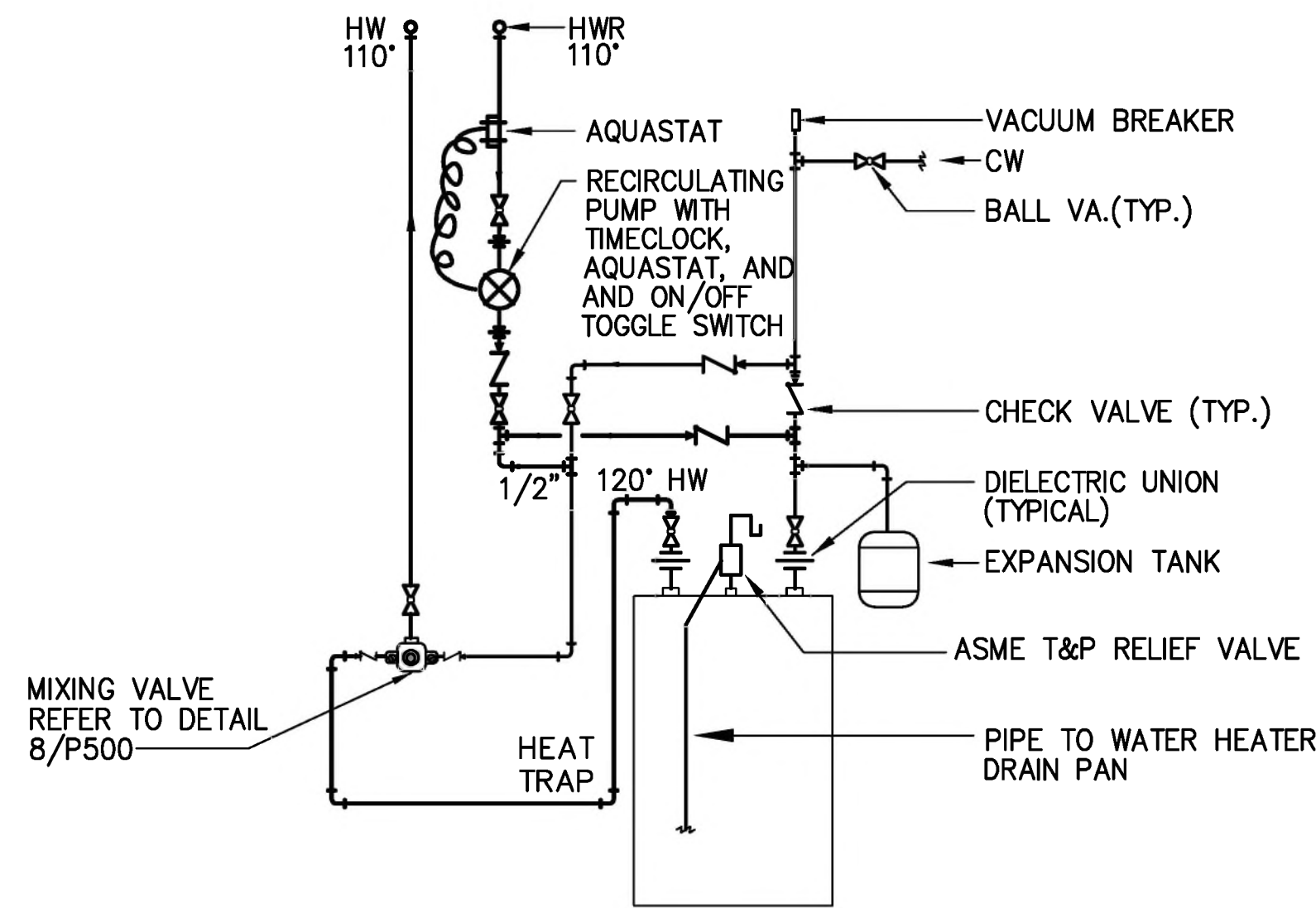
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 engineers
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 mswg.com
 MSWG Project
 25-088

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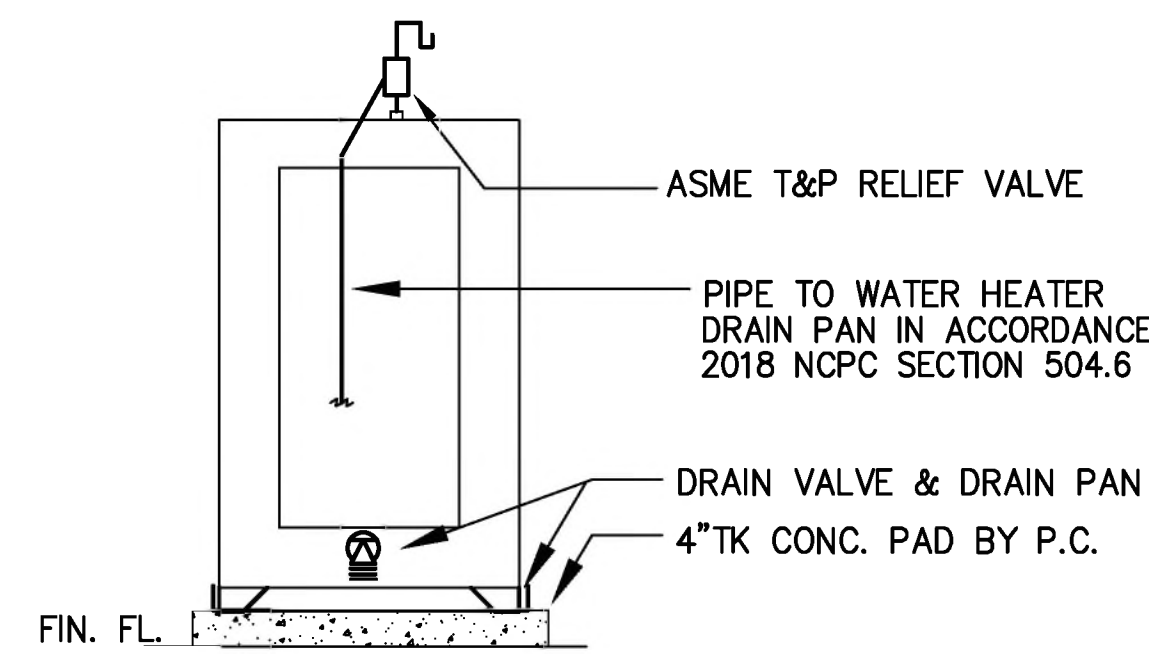
PROVIDE WCO WHERE SHOWN ON PLAN, AND ON SANITARY WASTE BRANCHES NOT SERVED WITH A FLOOR CLEANOUT. LOCATE ABOVE FIXTURE FLOOR RIM WITHIN 4' OF FLOOR. CONSULT LOCAL CODES FOR OTHER WCO REQUIREMENTS.

5 WALL CLEANOUT DETAIL
NTS

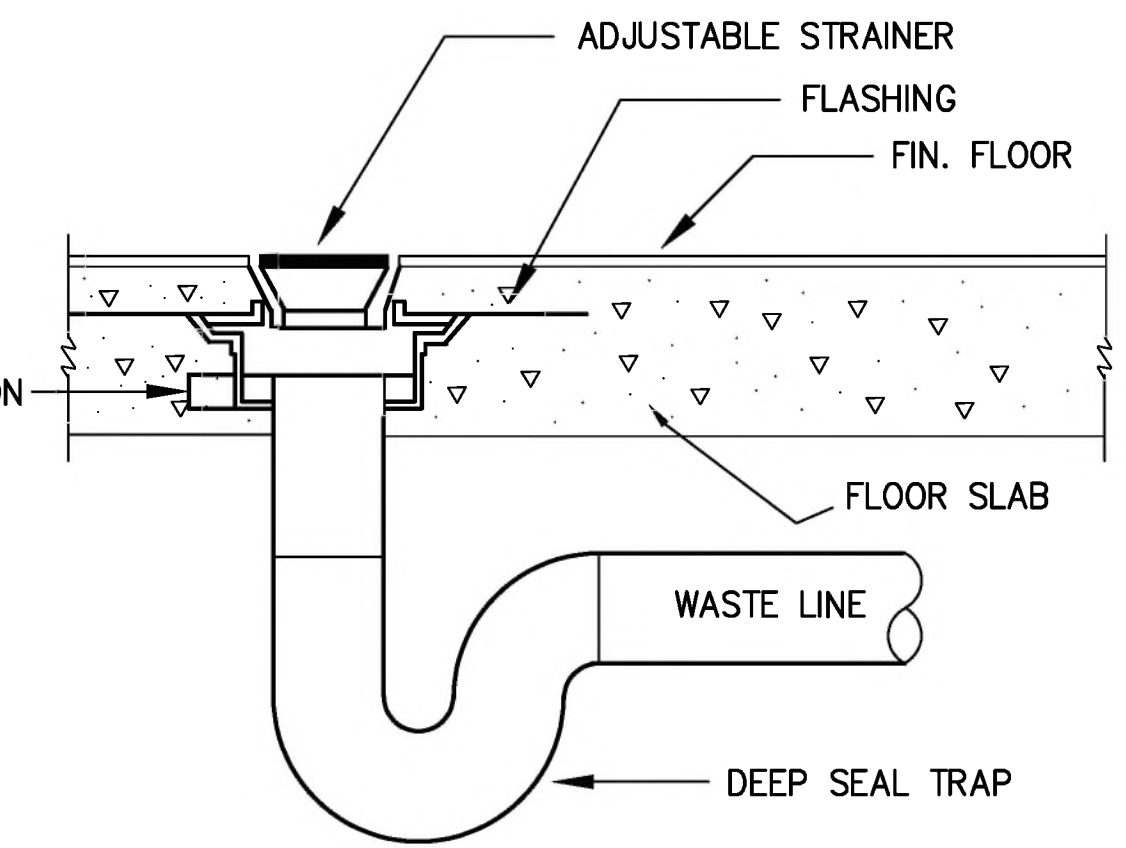


NOTE: FINAL PIPING ARRANGEMENT FOR WATER HEATER, MIXING VALVE, AND RECIRCULATION PUMP SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PLUMBING CODE

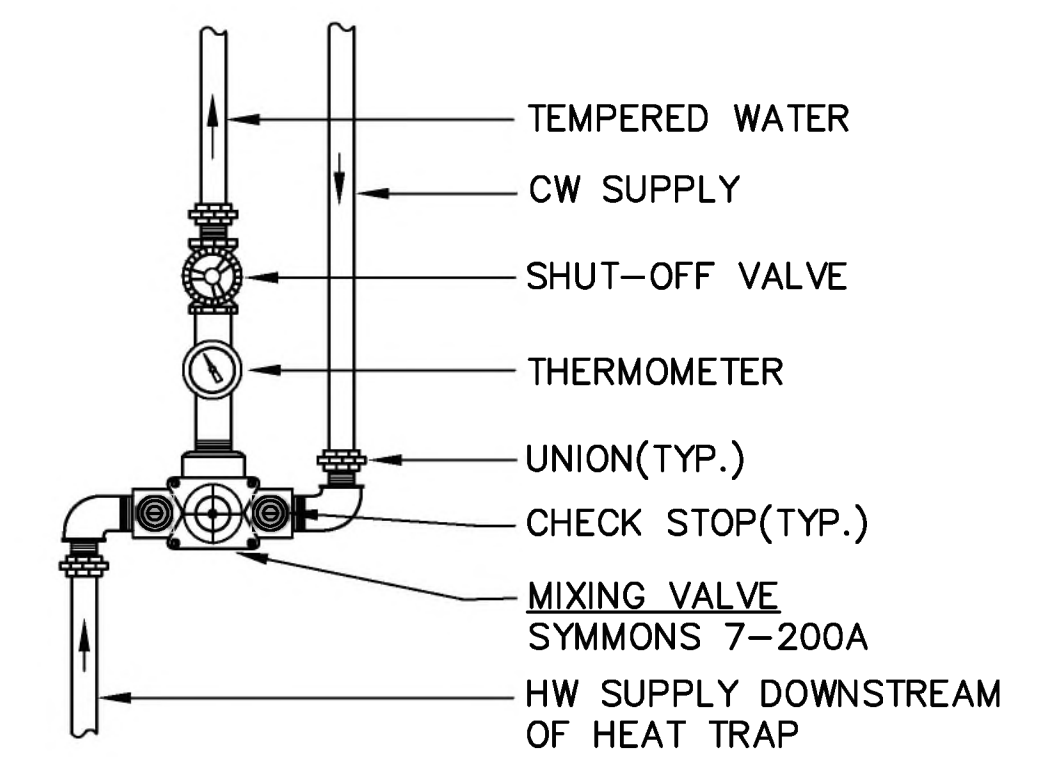
6 WATER HEATER PIPING DIAGRAM
NTS



7 WATER HEATER MOUNTING DETAIL
NTS

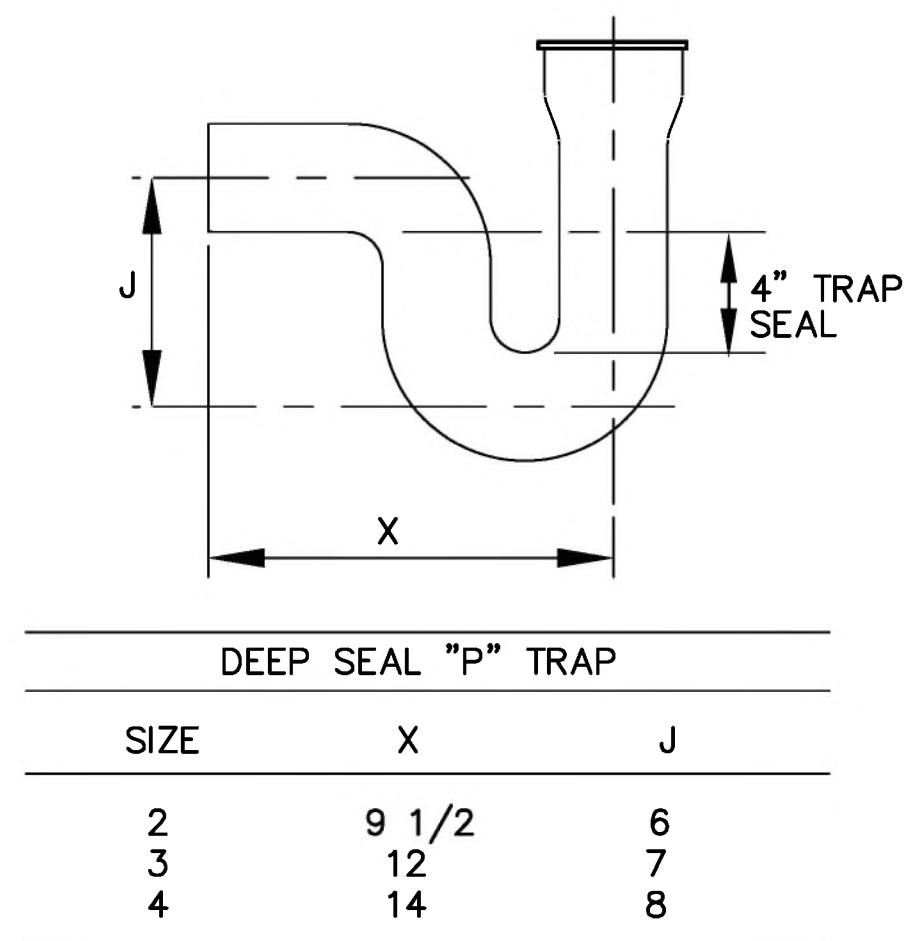


9 FLOOR DRAIN DETAIL
NTS

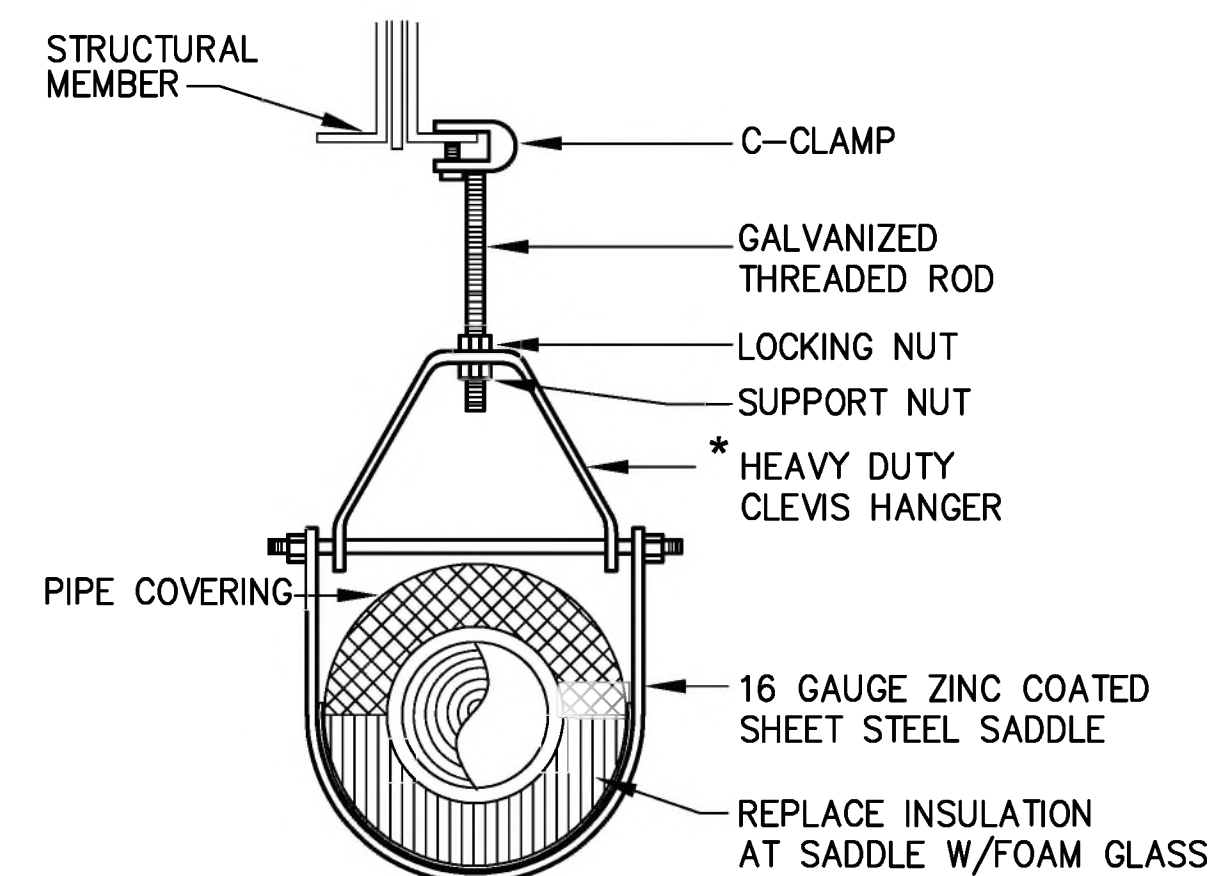


NOTE: FINAL PIPING ARRANGEMENT FOR WATER HEATER, MIXING VALVE, AND RECIRCULATION PUMP SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PLUMBING CODE

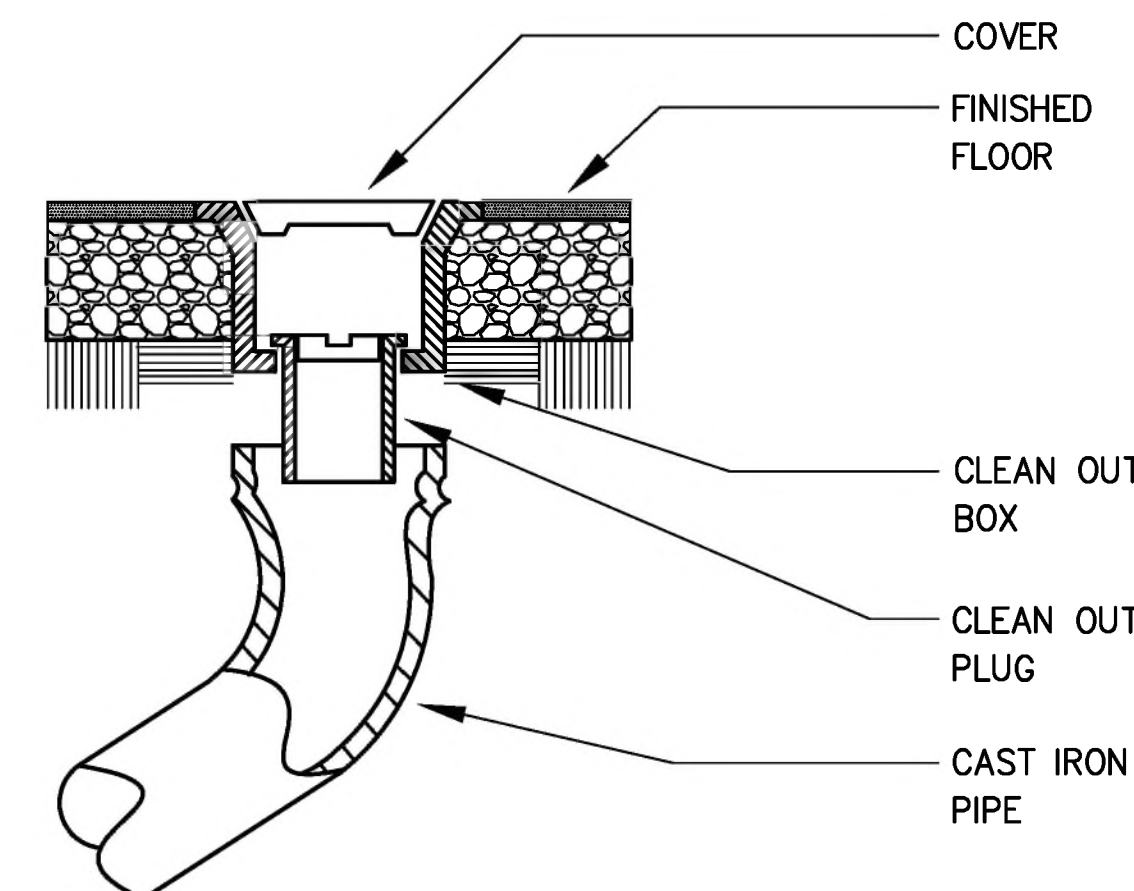
8 MIXING VALVE PIPING DIAGRAM
NTS



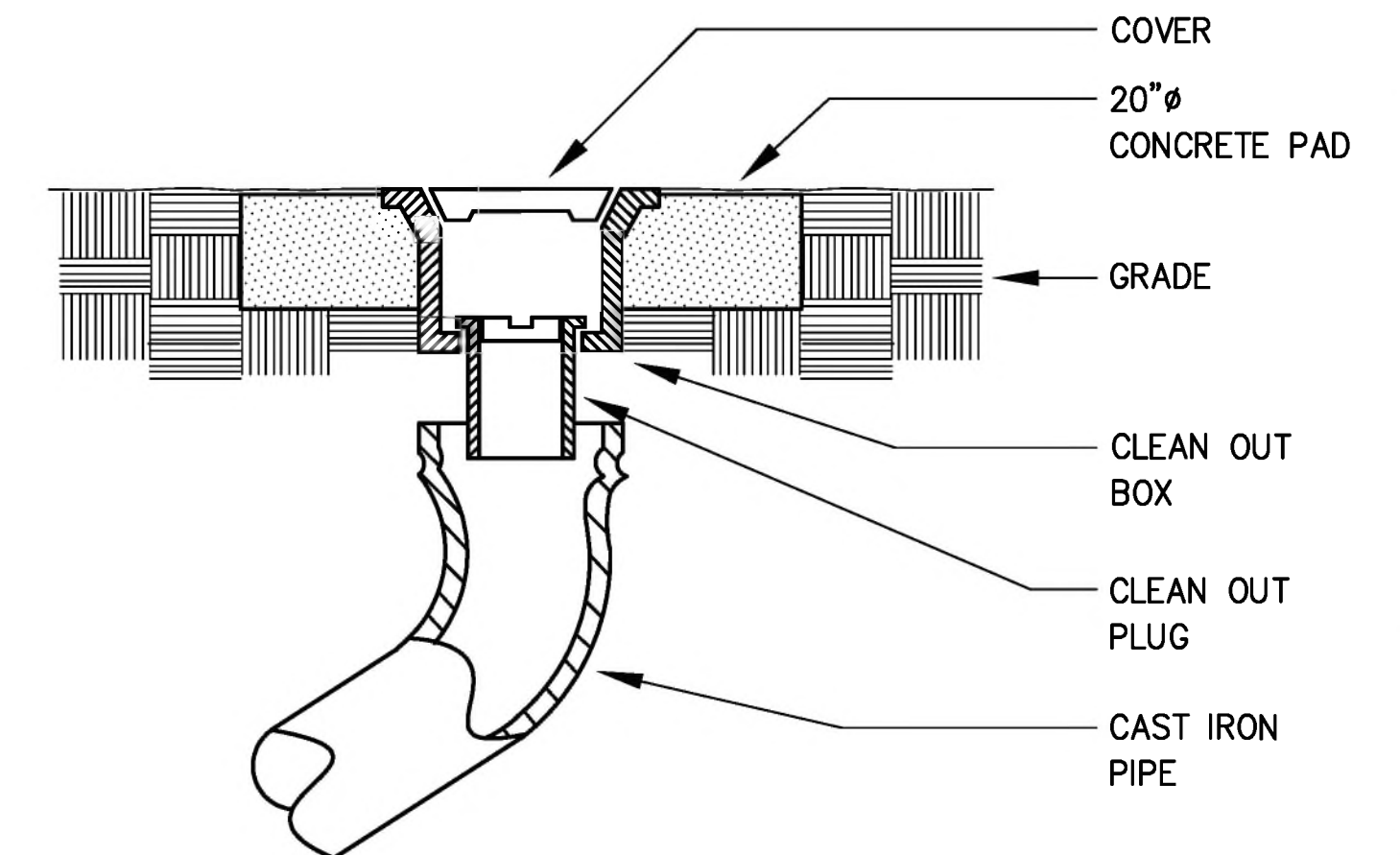
1 MINIMUM TRAP DIMENSIONS
NTS



2 PIPE HANGER DETAIL
NTS
* CONTRACTOR OPTION:
MICHIGAN HANGER #403



3 FLOOR CLEANOUT DETAIL
NTS



4 YARD CLEANOUT DETAIL
NTS

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CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC

REVISION SCHEDULE		
NO.	DATE	REFERENCE

P400

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ISSUE DATE: 01.30.26
 DRAWN BY: HJB
 CHECKED BY: JSD
 PROJECT:

CONTRACTOR TO VERIFY ALL DIMENSIONS

GRILLE & DIFFUSER SCHEDULE									
SYM	TYPE	USE	MAXIMUM AIRFLOW CFM	NECK SIZE	FRAME SIZE	FINISH	FRAME	PRICE MODEL NO	REMARKS
A6	LOUVER FACE 4-WAY	SUPPLY	100	6X6	24X24	OFF WHITE	RMK 3	SMDA	1-5, 7, 12
A8	LOUVER FACE 4-WAY	SUPPLY	200	9X9	24X24	OFF WHITE	RMK 3	SMDA	1-5, 7, 12
A10	LOUVER FACE 4-WAY	SUPPLY	350	12X12	24X24	OFF WHITE	RMK 3	SMDA	1-5, 7, 12
A12	LOUVER FACE 4-WAY	SUPPLY	500	12X12	24X24	OFF WHITE	RMK 3	SMDA	1-5, 7, 12
A14	LOUVER FACE 4-WAY	SUPPLY	750	15X15	24X24	OFF WHITE	RMK 3	SMDA	1-5, 7, 12
A18	LOUVER FACE 4-WAY	SUPPLY	1,100	18X18	24X24	OFF WHITE	RMK 3	SMDA	1-5, 7, 12
B6	PERFORATED	RETURN/EXHAUST	100	6X6	24X24	OFF WHITE	RMK 3	PDDR	1-3, 5, 7, 12
B8	PERFORATED	RETURN/EXHAUST	200	8X8	24X24	OFF WHITE	RMK 3	PDDR	1-3, 5, 7, 12
B10	PERFORATED	RETURN/EXHAUST	350	10X10	24X24	OFF WHITE	RMK 3	PDDR	1-3, 5, 7, 12
B12	PERFORATED	RETURN/EXHAUST	500	12X12	24X24	OFF WHITE	RMK 3	PDDR	1-3, 5, 7, 12
B14	PERFORATED	RETURN/EXHAUST	750	15X15	24X24	OFF WHITE	RMK 3	PDDR	1-3, 5, 7, 12
B18	PERFORATED	RETURN/EXHAUST	1,100	18x18	24X24	OFF WHITE	RMK 3	PDDR	1-3, 5, 7, 12
CS	DOUBLE DEFLECTION REGISTER	SUPPLY	SEE PLANS	SEE PLANS	RMK 4	RMK 5		520D	1, 2, 4, 5, 8, 9
DS	SIDEWALL GRILLE	RETURN/EXHAUST	SEE PLANS	SEE PLANS	RMK 4	RMK 5		530	1, 2, 4, 5, 8, 9

- REMARKS**
- REFER TO APPROVED MANUFACTURER LIST FOR ACCEPTABLE EQUAL MANUFACTURERS.
 - SYMBOL EXPLANATION: *##/CFM = SYM/CFM
 - FRAME TYPES: PROVIDE FRAME SUITABLE FOR CEILING INSTALLATION, REFER TO ARCHITECTURAL REFLECTED CEILING PLANS.
 - ADJUSTABLE: HORIZONTAL/VERTICAL - "PIANO HINGE" DEVICE.
 - FINISH SHALL MATCH ADJACENT SURFACES, PAINT ALL INSIDE VISIBLE SURFACES FLAT BLACK.
 - OSD IF USED AS SUPPLY OR EXHAUST.
 - ALL ALUMINUM CONSTRUCTION (INCLUDING BACKPAN).
 - VOLUME EXTRACTOR WHERE SHOWN ON PLANS.
 - VERTICAL FRONT BLADES.
 - PROVIDE FULLY INSULATED PLENUM BOOT WITH DUCT COLLARS.
 - CONCEALED PLASTER FRAME WITH MITERED END CONDITION.
 - PROVIDE SQUARE TO ROUND TRANSITION AS REQUIRED.
 - SPIRAL DUCT MOUNTED GRILLE/DIFFUSER, FINISH SHALL MATCH DUCT.

FAN SCHEDULE														
Unit Tag	Area Served	CFM	ESP (IN.)	Fan RPM	Sones	Drive	BHP	HP (Watts)	Volts	Phase	Type	Model	Weight (lbs)	Remarks
EF-1	106 BOYS, 108 GIRLS, 109 JAN.	550	0.25	769	2.2	DIRECT	0.04	1/2	115	1	DIRECT DRIVE INLINE EXHAUST FAN	SQ-120-VG	61	1,3,6,10
EF-2	111 TOILET	100	0.25	1100	0.7	DIRECT	0.01	(21)	115	1	DIRECT DRIVE BATHROOM EXHAUST	SP-A125	17	1,3,6,7
EF-3	114 TOILET	50	0.25	778	0.3	DIRECT	-	(9)	115	1	DIRECT DRIVE BATHROOM EXHAUST	SP-A90	12	1,3,6,7
EF-4	120 TOILET	50	0.25	778	0.3	DIRECT	-	(9)	115	1	DIRECT DRIVE BATHROOM EXHAUST	SP-A90	12	1,3,6,7
EF-5	123 TOILET	50	0.25	778	0.3	DIRECT	-	(9)	115	1	DIRECT DRIVE BATHROOM EXHAUST	SP-A90	12	1,3,6,7
EF-6	125 TOILET	100	0.25	1100	0.7	DIRECT	0.01	(21)	115	1	DIRECT DRIVE BATHROOM EXHAUST	SP-A125	17	1,3,6,7

- BASIS OF DESIGN IS GREENHECK. REFER TO APPROVED MANUFACTURER LIST FOR ACCEPTABLE EQUAL MANUFACTURERS. COORDINATE POWER REQUIREMENTS FOR ALL SUBSTITUTIONS.
- STARTER BY E.C. / DISCONNECT BY MFG.
- PROVIDE BIRDSCREEN AND BACKDRAFT DAMPER.
- PROVIDE MANUFACTURER'S ROOF CURB.
- PROVIDE 277V STEP-DOWN TRANSFORMER AS REQUIRED.
- UNIT MOUNTED SOLID STATE SPEED CONTROL.
- INTERLOCK WITH SPACE OCCUPANCY SENSOR, COORDINATE WITH ELECTRICAL CONTRACTOR.
- WALL MOUNTED THERMOSTAT, COORDINATE WITH ELECTRICAL CONTRACTOR.
- PROVIDE WALL SWITCH, COORDINATE WITH ELECTRICAL CONTRACTOR.
- PROVIDE RELAY FOR CONTROL THROUGH BUILDING AUTOMATION SYSTEM.

WALL LOUVER SCHEDULE										
Unit Tag	Equipment Served	CFM	Gross Dimensions		Free Area (sq. ft.)	Free Area Velocity (fpm)	PD (in.)	Function	Model	Remarks
			Width (in.)	Height (in.)						
L-1	EF-1, EF-2, EF-3	550	18	18	1	550.0	0.05	EXHAUST	ELF6375DXD	1-9
L-2	EF-4, EF-5	150	12	12	0.36	416.7	0.03	EXHAUST	ELF6375DXD	1-9
L-3	EF-7, EF-8	150	12	12	0.36	416.7	0.03	EXHAUST	ELF6375DXD	1-9
L-4	EF-6	50	12	12	0.36	138.9	1.03	EXHAUST	ELF6375DXD	1-9
L-5	AH-100	240	18	12	0.57	421.1	0.03	INTAKE	ELF6375DXD	1-9
L-6	AH-103	210	18	12	0.57	368.4	0.03	INTAKE	ELF6375DXD	1-9
L-7	AH-104	210	18	12	0.57	368.4	0.03	INTAKE	ELF6375DXD	1-9
L-8	AH-110	230	18	12	0.57	403.5	0.03	INTAKE	ELF6375DXD	1-9
L-9	AH-116	240	18	12	0.57	421.1	0.03	INTAKE	ELF6375DXD	1-9
L-10	AH-117	210	18	12	0.57	368.4	0.03	INTAKE	ELF6375DXD	1-9
L-11	AH-118	210	18	12	0.57	368.4	0.03	INTAKE	ELF6375DXD	1-9
L-12	AH-119	110	18	12	0.57	193.0	0.03	INTAKE	ELF6375DXD	1-9
L-13	AH-121	230	18	12	0.57	403.5	0.03	INTAKE	ELF6375DXD	1-9
L-14	AH-127	240	18	12	0.57	421.1	0.03	INTAKE	ELF6375DXD	1-9

- BASIS OF DESIGN IS RUSKIN. REFER TO APPROVED MANUFACTURER LISTING FOR EQUALS.
- SUBMIT MATERIAL LIST OF ITEMS, MANUFACTURER'S SPECIFICATIONS, PHYSICAL PRODUCT SAMPLES, FINISH SWATCHES, AND MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR REVIEW.
- PRESSURE DROP LISTED IS MAXIMUM ALLOWED.
- PROVIDE ALL 6063 ALUMINUM CONSTRUCTION, MINIMUM 0.081" THICKNESS AND FABRICATE FROM EXTRUDED OR ROLL-FORMED ONLY.
- 6" LOUVER DEPTH WITH 5-3/32" BLADE CENTERS AND MANUFACTURER'S STANDARD BLADE ANGLE.
- ALUMINUM BIRDSCREEN.
- KYNAR FINISH, COLOR SELECTED BY ARCHITECT.
- LOUVER SHALL BE LISTED FOR AMCA 540 IMPACT TEST.
- LOUVER SHALL BE LISTED FOR AMCA 550 HIGH VELOCITY WIND DRIVEN RAIN TEST.

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT METHOD OF COMPLIANCE

Prescriptive Energy Cost Budget

Thermal Zone: Wayne County, North Carolina (3A)

Exterior Design Conditions

Winter Dry Bulb: 28
Summer Dry Bulb: 83

Interior Design Conditions

Winter Dry Bulb: 70
Summer Dry Bulb: 75
Relative Humidity: 50%

Building Heating Load: 155,900 BTUH
Building Cooling Load: 289,200 BTUH

Mechanical Space Conditioning System

Unitary:
Description of Unit: Refer to HVAC Equipment Schedules

Heating Efficiency: Refer to HVAC Equipment Schedules
Cooling Efficiency: Refer to HVAC Equipment Schedules
Heat Output of Unit: Refer to HVAC Equipment Schedules
Cooling Output of Unit: Refer to HVAC Equipment Schedules

List Equipment Efficiencies:

Equipment Schedules with Motors (Mechanical Systems)
Motor Horsepower: Comply w/ 2024 NC Energy Conservation Code
Number of Phases: Comply w/ 2024 NC Energy Conservation Code
Minimum Efficiency: Comply w/ 2024 NC Energy Conservation Code
Motor Type: Comply w/ 2024 NC Energy Conservation Code
Number of Poles: Comply w/ 2024 NC Energy Conservation Code

Designer Statement:
To the best of my knowledge and belief, the design of this building complies with the 2024 North Carolina Energy Conservation Code. The requirements of Section C406 are met through the Subsection C406.3 (Reduced Lighting Power Density).

APPROVED MANUFACTURER LISTING - MECHANICAL

THE FOLLOWING MANUFACTURER'S LISTING (ALPHABETICALLY ORDERED) IS PROVIDED FOR BIDDING PURPOSES AND DOES NOT IMPLY OR PROVIDE A GUARANTEE OF SUBMITTAL APPROVAL. ALL ITEMS SUBMITTED SHALL MEET OR EXCEED THE MINIMUM SPECIFIED DESIGN AND QUALITY CRITERIA IN THIS SET OF CONSTRUCTION DOCUMENTS. ANY BIDDER THAT INTENDS TO SUBMIT USING A MANUFACTURER NOT LISTED BELOW MAY REQUEST A PRIOR APPROVAL IN ACCORDANCE WITH THE ENTIRETY OF THE PROJECT BID DOCUMENTS, REFER TO THE ARCHITECT'S GENERAL CONDITIONS AND BIDDING REQUIREMENTS.

THE BIDDER IS RESPONSIBLE FOR INCLUDING ALL COSTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT, INCLUDING BUT NOT LIMITED TO, CODE AND MANUFACTURER'S REQUIRED MAINTENANCE AND ACCESS CLEARANCE, COORDINATION WITH ALL OTHER BUILDING TRADES, AND INSTALLATION OF DUCTWORK, PIPING, ETC. BIDDER SHALL BEAR RESPONSIBILITY FOR ALL ASSOCIATED COSTS AND ADDITIONAL COSTS RESULTING FROM SUBSTITUTED ITEMS SHALL NOT BE CONSIDERED FOR APPROVAL AFTER BIDS ARE AWARDED.

ITEM	MANUFACTURER'S
AIR DISTRIBUTION	CARNES, METAL*AIRE, NAILOR, PRICE, TITUS, TUTTLE & BAILEY
AIR HANDLING UNIT	CARRIER, DAIKIN-MCQUAY, JCI/YORK, TRANE
DUCTLESS SPLIT SYSTEMS	DAIKIN, LG, SAMSUNG, TOSHIBA-CARRIER, TRANE-MITSUBISHI
FANS	COOK, GREENHECK, PENN, TWIN CITY
FIRE DAMPERS	GREENHECK, NAILOR, RUSKIN, POTTORFF
WALL LOUVERS	CARNES, GREENHECK, NAILOR, POTTORFF, RUSKIN

CONTRACTOR TO VERIFY ALL DIMENSIONS

PINNACLE ARCHITECTURE PROFESSIONAL ASSOCIATION

CLASSROOM ADDITION ROSEWOOD ELEM. SCHOOL WAYNE COUNTY, NC

MECHANICAL SCHEDULES

REVISION SCHEDULE

NO.	DATE	REFERENCE

ISSUE DATE: 01.30.26
DRAWN BY: HJB
CHECKED BY: JSD
PROJECT: 2526

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MSW9 Project 25-088

M100

AIR HANDLING UNIT SCHEDULE

Unit Tag	CFM			ESP/ TSP (in.)	Fan																	Vib. Isol. Type	H/ Defl. V	Trane Model No.	Detail	Remarks			
	SA	Outside Air			HP	Motor			EAT (F)	LAT (F)	MBH Total	MBH Sens.	GPM	EWT (F)	WTR (F)	Max. Water PD (ft.)	Max. Air PD (in.)	EAT (F)	LAT (F)	MBH	GPM						EWT (F)	Max. Water PD (ft.)	Max. Air PD (in.)
		Min.	Max.			Phs																							
AH-100	1600	240	240	1/1.27	0.911	208	1	80/67	51.93/51.62	74.06	49.50	10.54	42	56	2.92	0.191	60	101.88	72.67	3.63	180	0.3	0.04	A-3	3/4"	V	BCVE090	5/M300	1-7,9,15
AH-103	1200	210	210	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-8,15
AH-104	1200	210	210	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-7,9,14
AH-110	1200	230	230	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-7,9,15
AH-116	1200	240	240	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-7,9,14
AH-117	1200	210	210	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-8,14
AH-118	1200	210	210	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-7,9,15
AH-119	1200	110	110	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-7,9,15
AH-121	1200	230	230	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-7,9,14
AH-127	1200	240	240	1/1.326	1.016	208	1	80/67	50.62/50.52	58.89	38.86	8.38	42	56	2.42	0.251	60	103.9	61.04	3.05	180	0.49	0.036	A-3	3/4"	V	BCVE072	5/M300	1-7,9,15

- SEE APPROVED EQUALS SCHEDULE FOR EQUALS. SEE DETAILS FOR UNIT ARRANGEMENTS. COILS SELECTED ON A 0.0 FOULING FACTOR. VIB. ISOL. TO BE SEISMIC RATED IF CALLED FOR ELSEWHERE IN PLANS. CONTROL VA. MAX. PD = 12". CNTRL. VA. SHALL SEAT AGAINST MAX. SYSTEM PRESS. MC SHALL VERIFY SERVICE CLEARANCES FOR SUBSTITUTIONS.
- WALL MOUNTED TSTAT.
- MANUFACTURER'S FAN DATA INCLUDES FAN CASING. ESP IN SCHEDULE INCLUDES ALL PRESSURE DROPS EXTERNAL TO UNIT. UNIT PD INCLUDES ALL ITEMS INTERNAL TO UNIT: CLEAN FILTERS (VAV = DIRTY), COILS, ETC. TSP = ESP + UNIT PD.
- 2" TK PLID FILTERS: FARR 30-30, UL CLASS II, 20-25% & 90-92% ASHRAE 52-92.1.
- IAQ DRAIN PAN.
- PIPING CONNECTIONS: (4-PIPE SYSTEM) 1 1/4" CD W/ TRAP. HWS/R, CHWS/R. UNIT HAS BOTH COOLING AND HEATING COILS.
- FACTORY MOUNTED CONTROL BOX INCLUDES DISCONNECT SWITCH, 24 VOLT TRNSFM (W/FUSED SECONDARY) & STARTER.
- 3-WAY CONTROL VALVES, SEE DETAIL 1/301
- 2-WAY CONTROL VALVES, SEE DETAIL 2/M301
- 2-WAY HW CONTROL VALVE, SEE DETAIL.
- ECONOMIZER CYCLE.
- EMERGENCY POWER.
- 2-SPEED/2-WINDING MOTOR
- LEFT HAND PIPING CONNECTIONS
- RIGHT HAND PIPING CONNECTIONS

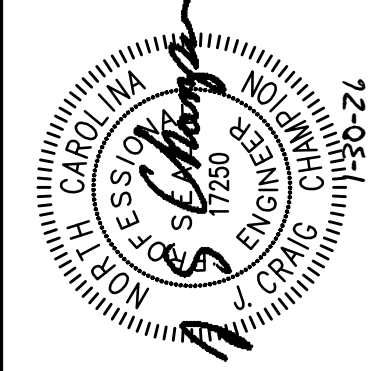
OUTSIDE AIR CALCULATION - AH-100												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
100 CORRIDOR #1	CORRIDORS	840	0.06	0	0	0	0	NO	0	0	50	0
101 CORRIDOR #2	CORRIDORS	635	0.06	0	0	0	0	NO	0	0	40	0
102 CORRIDOR #3	CORRIDORS	600	0.06	0	0	0	0	NO	0	0	40	0
106 MEN	TOILET ROOMS - PUBLIC	250	0	0	50	5	0	NO	0	0	0	250
107 CHASE	CORRIDORS	60	0.06	0	0	0	0	NO	0	0	0	0
108 WOMEN	TOILET ROOMS - PUBLIC	250	0	0	50	5	0	NO	0	0	0	250
109 JAN	STORAGE ROOMS	37	0.12	0	0	0	0	NO	0	0	0	0
115 OFFICE/OT/PT	OFFICE SPACES	286	0.06	0	0	0	10	NO	3	5	30	0
122 OFFICE/OT/PT	OFFICE SPACES	286	0.06	0	0	0	10	NO	3	5	30	0
TOTAL OUTSIDE AIR CALCULATION (V _{out}) =											190	500
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =											0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =											240	

OUTSIDE AIR CALCULATION - AH-103												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
103 CLASSROOM #1	CLASSROOMS (AGES 5-8)	880	0	0	0	0	25	YES	22	7.5	170	0
TOTAL OUTSIDE AIR CALCULATION (V _{out}) =											170	0
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =											0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =											210	

OUTSIDE AIR CALCULATION - AH-104												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
104 CLASSROOM #2	CLASSROOMS (AGES 5-8)	880	0	0	0	0	25	YES	22	7.5	170	0
TOTAL OUTSIDE AIR CALCULATION (V _{out}) =											170	0
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =											0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =											210	

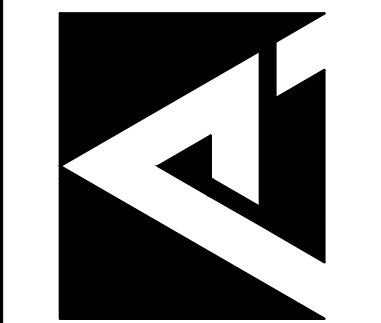
OUTSIDE AIR CALCULATION - AH-110												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
110 EC CLASSROOM #1	CLASSROOMS (AGES 5-8)	953	0	0	0	0	25	YES	24	7.5	180	0
111 TOILET	TOILET ROOMS - PUBLIC	66	0	0	50	1	0	NO	0	0	0	50
114 TOILET	TOILET ROOMS - PUBLIC	52	0	0	50	1	0	NO	0	0	0	50
TOTAL OUTSIDE AIR CALCULATION (V _{out}) =											180	100
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =											0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =											230	

OUTSIDE AIR CALCULATION - AH-116												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
112 LAUNDRY	COMMERCIAL LAUNDRY	39	0	0	0	0	10	NO	0	25	0	0
113 CHANGING	CORRIDORS	104	0.06	0	0	0	0	NO	0	0	10	0
116 EC CLASSROOM #2	CLASSROOMS (AGES 5-8)	952	0	0	0	0	25	YES	24	7.5	180	0
TOTAL OUTSIDE AIR CALCULATION (V _{out}) =											190	0
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =											0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =											240	



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ISSUE DATE: 01.30.26
 DRAWN BY: HJB
 CHECKED BY: JSD
 PROJECT: 2526

**CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC**

MECHANICAL SCHEDULES

REVISION SCHEDULE		
NO.	DATE	REFERENCE

M101

THIS DRAWING IS THE PROPERTY OF THE ARCHITECTS AND CAN NOT BE USED FOR CONSTRUCTION PURPOSES OR REPRODUCED WITHOUT WRITTEN CONSENT OF THE ARCHITECT. CONTRACTOR TO VERIFY ALL DIMENSIONS.

NON-DUCTED MINI-SPLIT HEAT PUMP SCHEDULE

Unit Tag	Area Served	CFM	Fan Motor			Cooling Performance				Heating Performance			Outdoor Unit					Refrigerant Piping					MITSUBISHI TRANE INDOOR UNIT	MITSUBISHI TRANE OUTDOOR UNIT	Remarks					
			FLA	Volts	Phase	EAT	BTU Total	BTU Sensible	Efficiency SEER	EAT	BTU Total	Efficiency COP	Fan		MCA	MOCP	Fuse Size	Volts	Phase	Design Pipe Length (ft)	Design Elevation Between Units (ft)	Design # of Bends				Mfg. Max Pipe Length (ft)	Mfg. Max Elevation Between Units (ft)	Mfg. Max # of Bends		
													No.	FLA(ea)																
MSAH-1	105 MECHANICAL	381	0.75	208	1	80/67	13,600	12,000	25.6	47	18,100	3.84	MSHP-1	79	1	0.5	10	15	15	208	1	20	10	3	65	40	10	MSZ-GS12NA	MUZ-GS12NA	1-10

- REFER TO APPROVED MANUFACTURER LIST FOR ACCEPTABLE EQUAL MANUFACTURERS. COORDINATE POWER REQUIREMENTS FOR ALL SUBSTITUTIONS.
- MECHANICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND LOCAL CODES.
- WIRED REMOTE CONTROLLER AND BAS INTERFACE ADAPTOR.
- REFRIGERANT LINES AND ACCESSORIES PER SPECS AND AS RECOMMENDED BY UNIT MFG.
- PROVIDE FACTORY CONDENSATE PUMP POWERED FROM AIR HANDLER. ROUTE 3/4" PUMPED CONDENSATE TO DRAIN WITH MINIMUM 1" AIR GAP.
- VARIABLE SPEED, INVERTER DRIVEN.
- INDOOR UNIT IS POWERED BY OUTDOOR UNIT. COORDINATE SUBSTITUTE MANUFACTURER ELECTRICAL REQUIREMENTS WITH ELECTRICAL CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
- PROVIDE ACCESSORIES AS REQUIRED TO ALLOW FOR LOW AMBIENT COOLING DOWN TO 18°F.
- PROVIDE WITH MANUFACTURER'S 5-YEAR WARRANTY.
- MAXIMUM PIPING LENGTH, MAXIMUM HEIGHT DIFFERENCE BETWEEN INDOOR AND OUTDOOR UNIT, AND THE MAXIMUM # OF BENDS ARE BASED ON BASIS OF DESIGN MANUFACTURER'S EQUIPMENT CUTSHEET. MECHANICAL CONTRACTOR SHALL CONFIRM WITH ALL SUBSTITUTE EQUIPMENT THAT THE MANUFACTURER'S INSTALLATION GUIDELINES FOR MAXIMUM PIPE LENGTH, MAXIMUM ELEVATION BETWEEN INDOOR AND OUTDOOR UNITS, AND MAXIMUM NUMBER OF BENDS MEET OR EXCEED THE REQUIREMENTS FOR INSTALLATION OF REFRIGERANT PIPING.

OUTSIDE AIR CALCULATION - AH-117												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
117 CLASSROOM#3	CLASSROOMS (AGES 5-8)	881	0	0	0		25	YES	22	7.5	170	0

TOTAL OUTSIDE AIR CALCULATION (V _{oa}) =	170	0
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =	0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =	210	

OUTSIDE AIR CALCULATION - AH-118												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
118 CLASSROOM#4	CLASSROOMS (AGES 5-8)	881	0	0	0		25	YES	22	7.5	170	0

TOTAL OUTSIDE AIR CALCULATION (V _{oa}) =	170	0
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =	0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =	210	

OUTSIDE AIR CALCULATION - AH-119												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
119 TEACHER WORKROOM	OFFICE SPACES	750	0.06	0	0		10	NO	8	5	90	0
120 TOILET	TOILET ROOMS - PUBLIC	53	0	0	50	1	0	NO	0	0	0	50

TOTAL OUTSIDE AIR CALCULATION (V _{oa}) =	90	50
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =	0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =	110	

OUTSIDE AIR CALCULATION - AH-121												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
121 EC CLASSROOM #3	CLASSROOMS (AGES 5-8)	952	0	0	0		25	YES	24	7.5	180	0
123 TOILET	TOILET ROOMS - PUBLIC	52	0	0	50	1	0	NO	0	0	0	50
125 TOILET	TOILET ROOMS - PUBLIC	52	0	0	50	1	0	NO	0	0	0	50

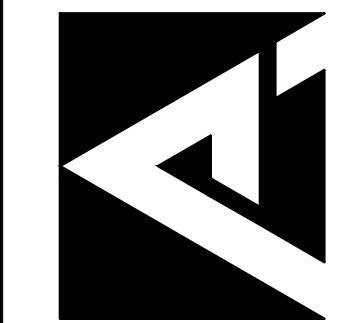
TOTAL OUTSIDE AIR CALCULATION (V _{oa}) =	180	100
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =	0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =	230	

OUTSIDE AIR CALCULATION - AH-127												
ROOM NAME	AREA TYPE	FLOOR AREA (SQ. FT)	OA CFM/SQFT	EA CFM/SQFT	EA CFM PER FIXTURE	EA NUMBER OF FIXTURE	DEFAULT OCCUPANT DENSITY #/1000 SQ. FT	DEMAND CONTROL VENTILATION REQUIRED?	# OF PEOPLE PER SPACE	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE (CFM/PERSON)	OUTSIDE AIR PER SPACE (CFM)	EXHAUST AIR PER SPACE (CFM)
124 CHANGING	CORRIDORS	104	0.06	0	0		0	NO	0	0	10	0
126 LAUNDRY	COMMERCIAL LAUNDRY	38	0	0	0		10	NO	0	25	0	0
127 EC CLASSROOM #4	CLASSROOMS (AGES 5-8)	953	0	0	0		25	YES	24	7.5	180	0

TOTAL OUTSIDE AIR CALCULATION (V _{oa}) =	190	0
ZONE DISTRIBUTION EFFECTIVENESS (E _z) =	0.8	
ZONE OUTDOOR AIRFLOW RATE (V _{oz}) =	240	

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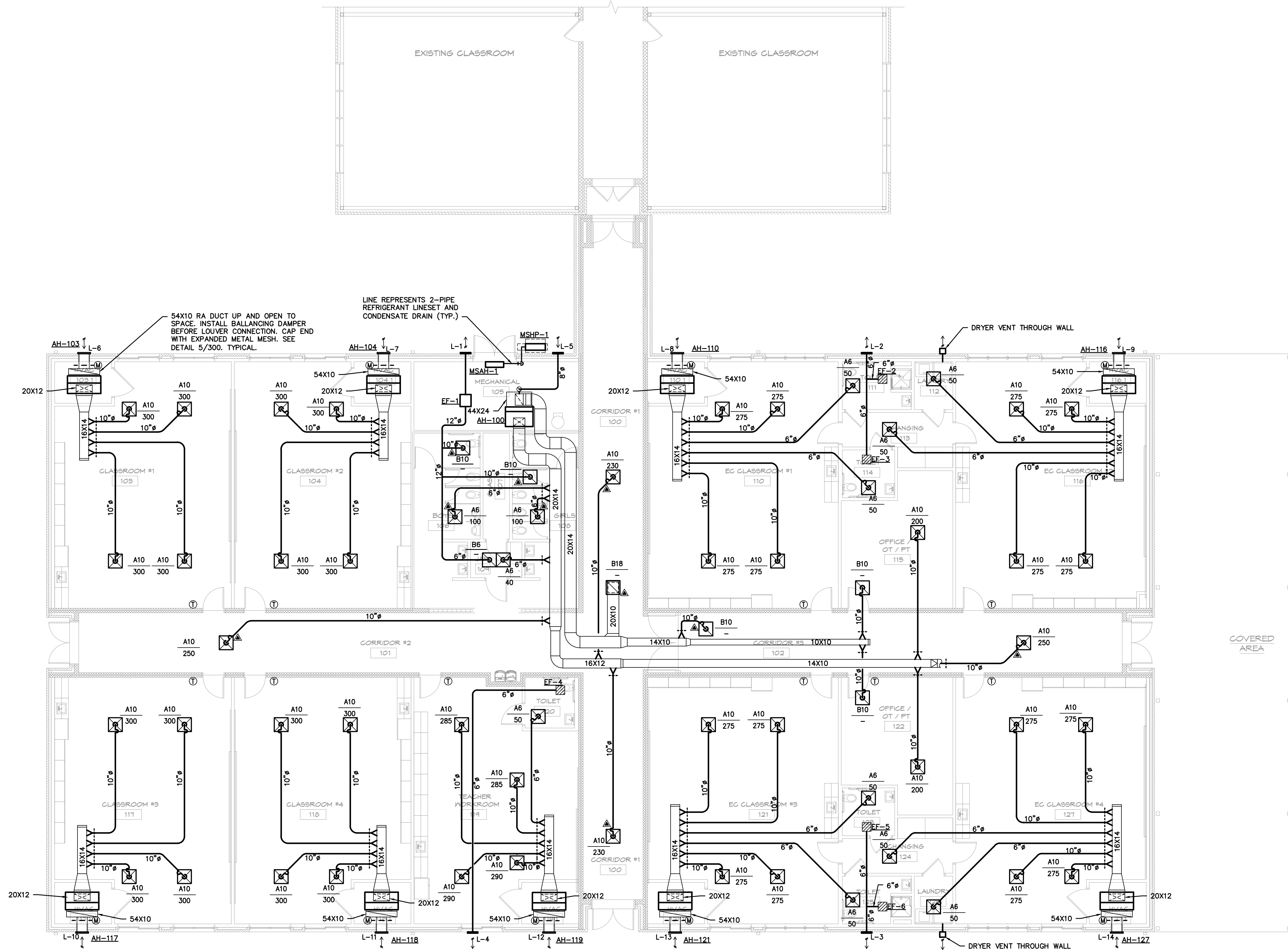
**CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC**
 MECHANICAL SCHEDULES

REVISION SCHEDULE	
DATE	REFERENCE

M102

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 25-088
 mswg.com

CONTRACTOR TO VERIFY ALL DIMENSIONS



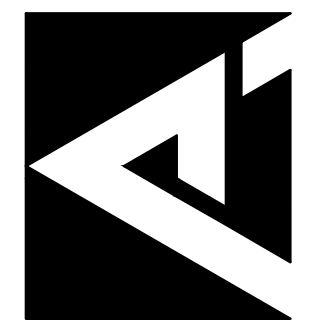
1 MECHANICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"

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CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
MECHANICAL FLOOR PLAN

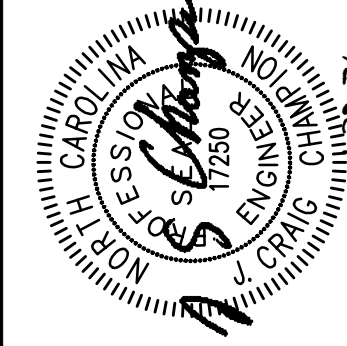
REVISION SCHEDULE		
NO.	DATE	REFERENCE

M200



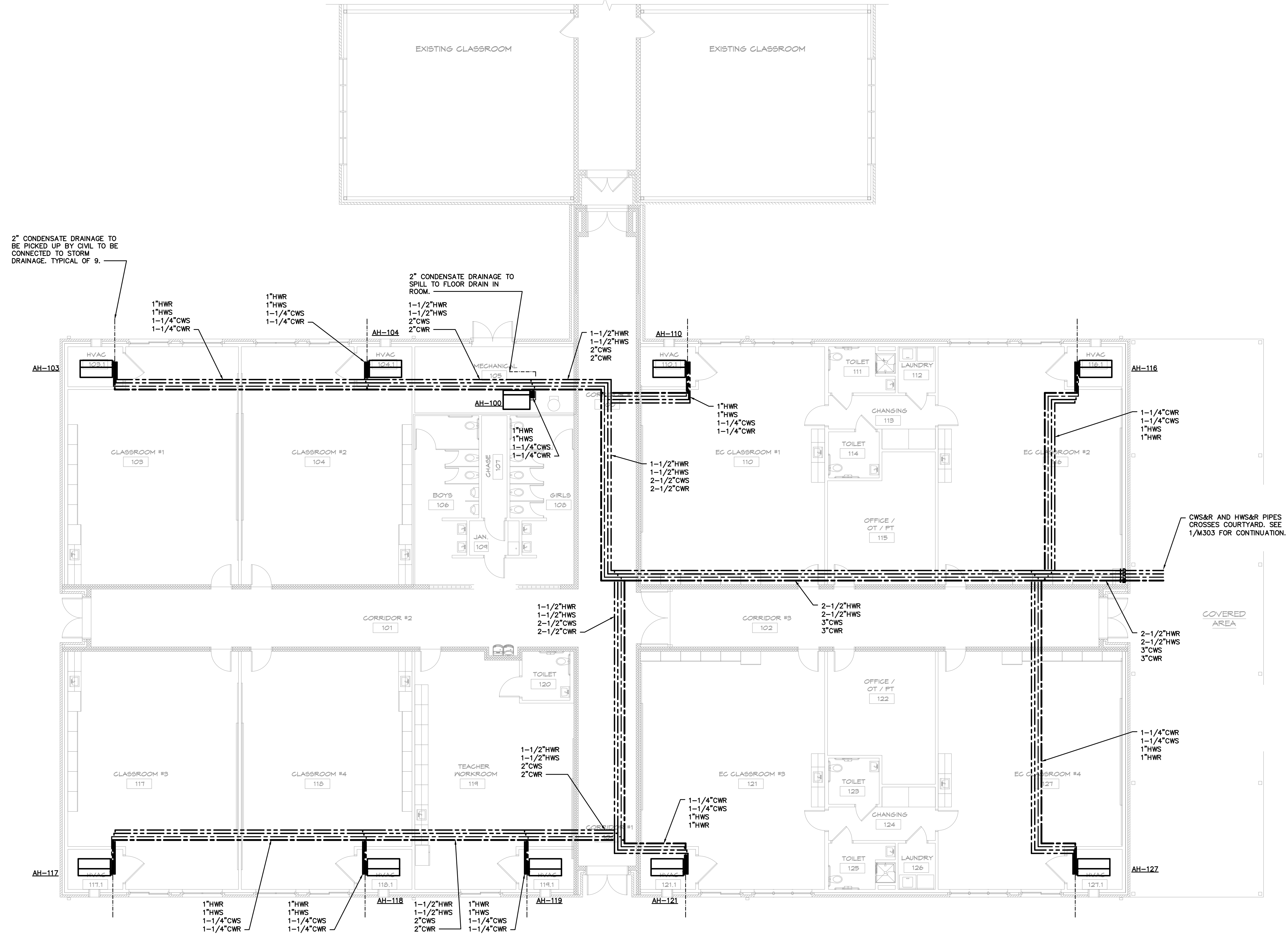
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CONTRACTOR TO VERIFY ALL DIMENSIONS

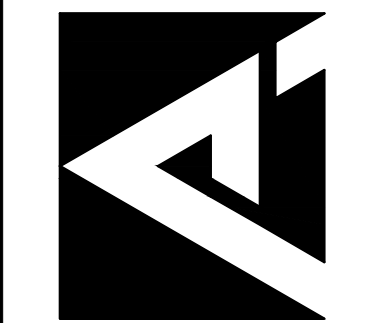


2" CONDENSATE DRAINAGE TO BE PICKED UP BY CIVIL TO BE CONNECTED TO STORM DRAINAGE, TYPICAL OF 9.

2" CONDENSATE DRAINAGE TO SPILL TO FLOOR DRAIN IN ROOM.

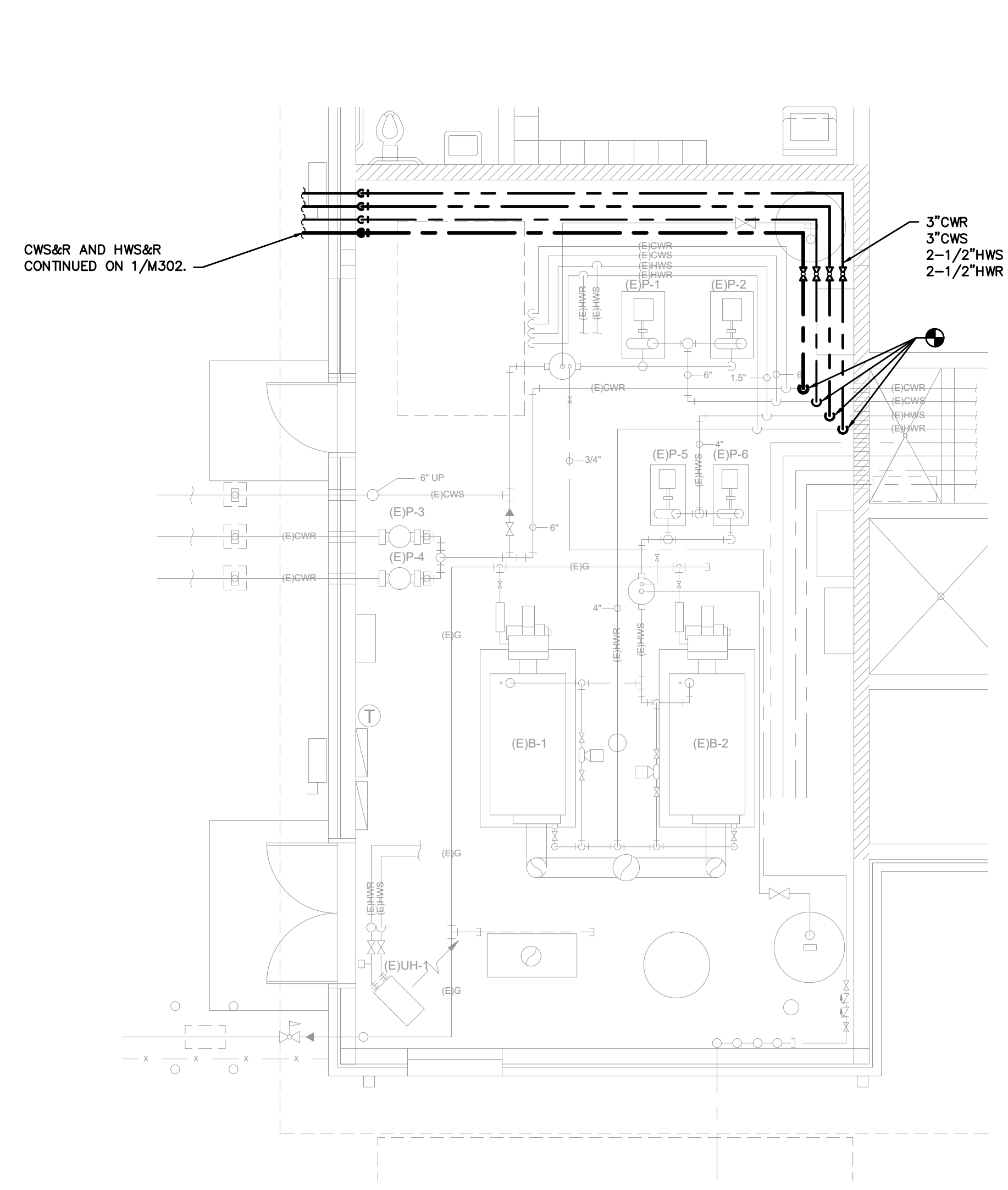
CWS&R AND HWS&R PIPES CROSSES COURTYARD. SEE 1/M303 FOR CONTINUATION.

1 MECHANICAL PIPING FLOOR PLAN
SCALE: 1/8" = 1'-0"

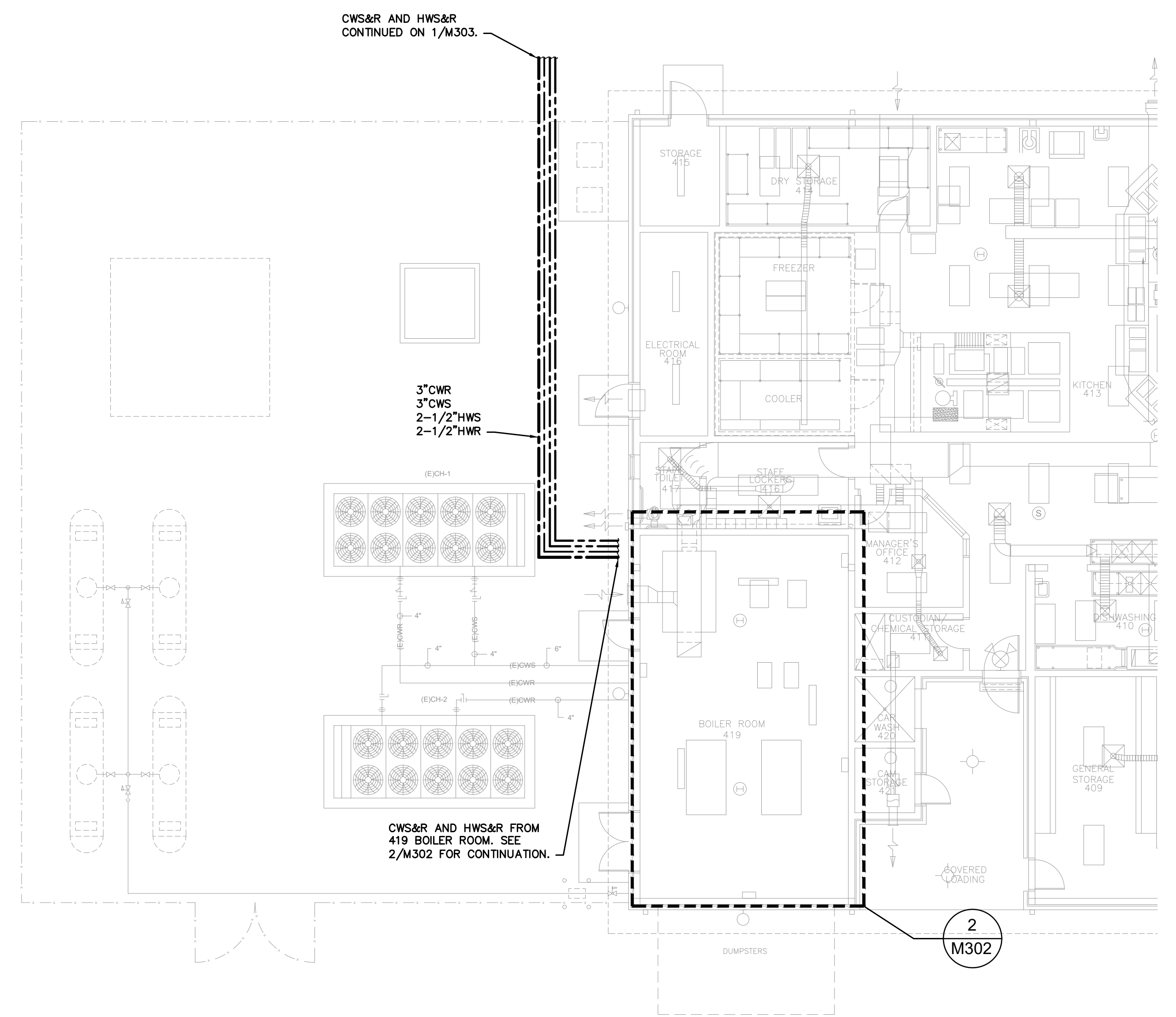


REVISION SCHEDULE	
DATE	REFERENCE

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2 MECHANICAL PIPING FLOOR PLAN
 - 400 WING ENLARGED PLAN
 SCALE: 1/4" = 1'-0"



1 MECHANICAL PIPING FLOOR PLAN - 400 WING
 SCALE: 1/8" = 1'-0"

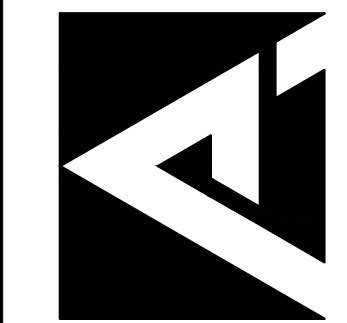
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REVISION SCHEDULE		
NO.	DATE	REFERENCE

**CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC**

MECHANICAL PIPING FLOOR PLANS

ISSUE DATE: 01.30.26
 DRAWN BY: HJB
 CHECKED BY: 2526
 PROJECT:



**PINACLE ARCHITECTURE
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M202



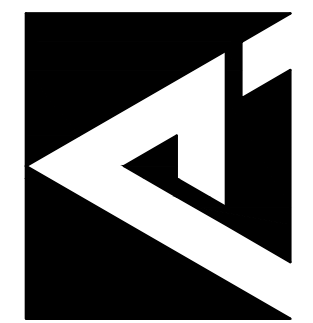
1 MECHANICAL PIPING OVERALL LARGE SCALE PLAN
SCALE: 1" = 30'-0"

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CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
MECHANICAL PIPING OVERALL LARGE
SCALE PLAN

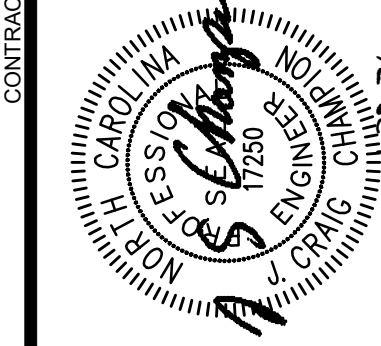
REVISION SCHEDULE	
DATE	REFERENCE

M203



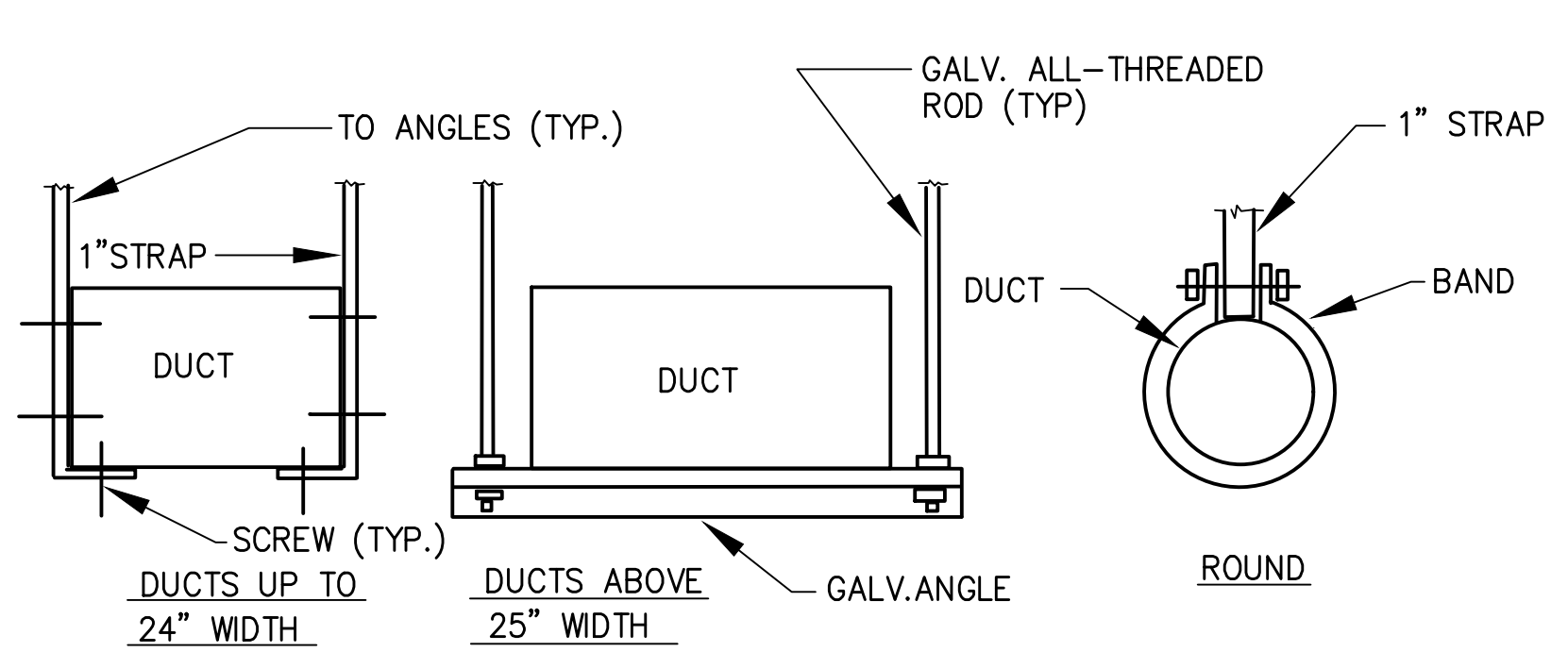
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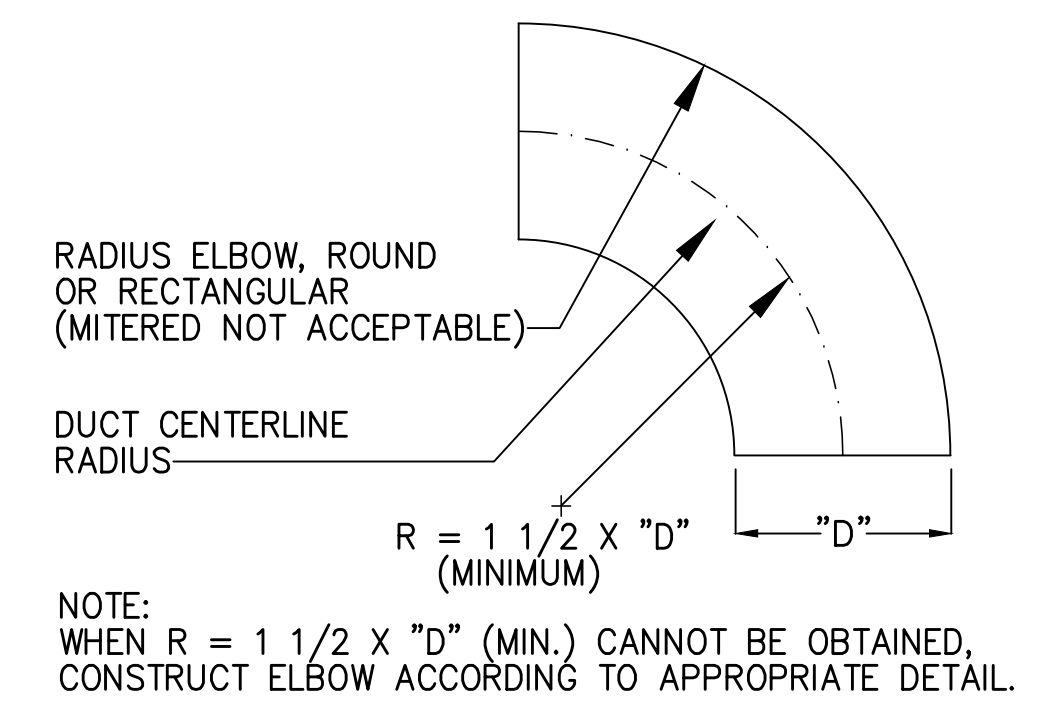


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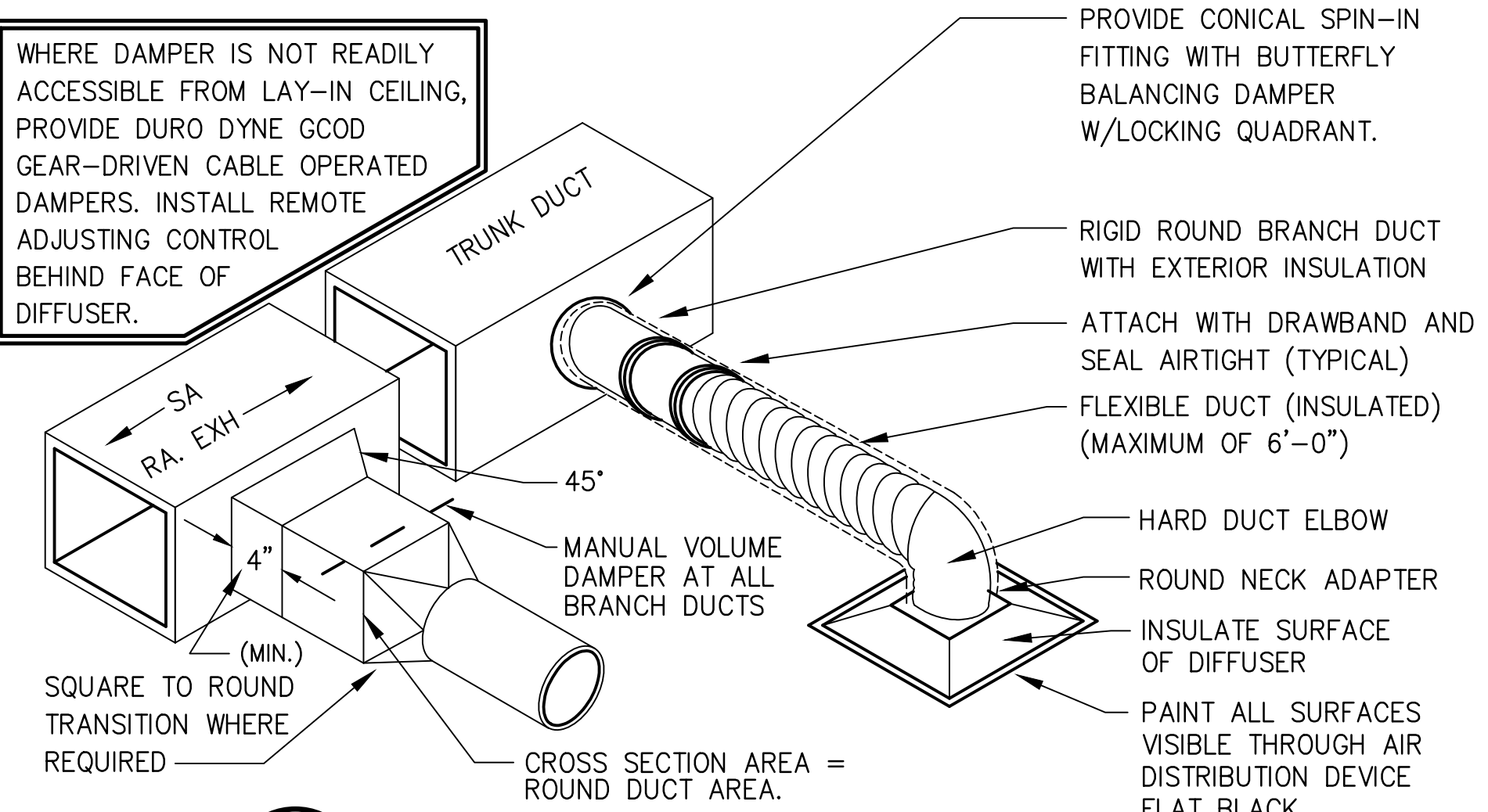
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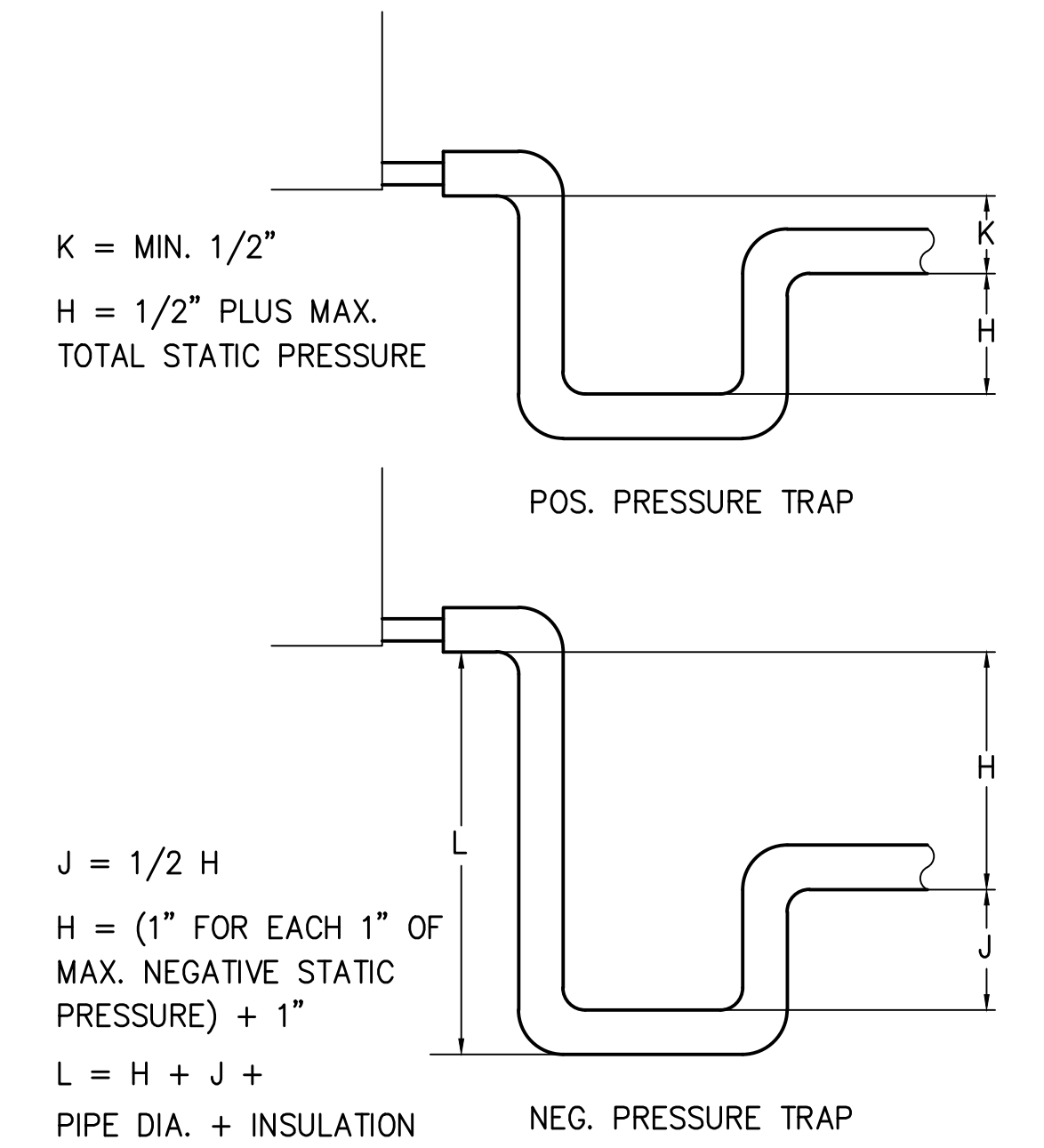
1 DUCTWORK HANGER DETAILS
NTS



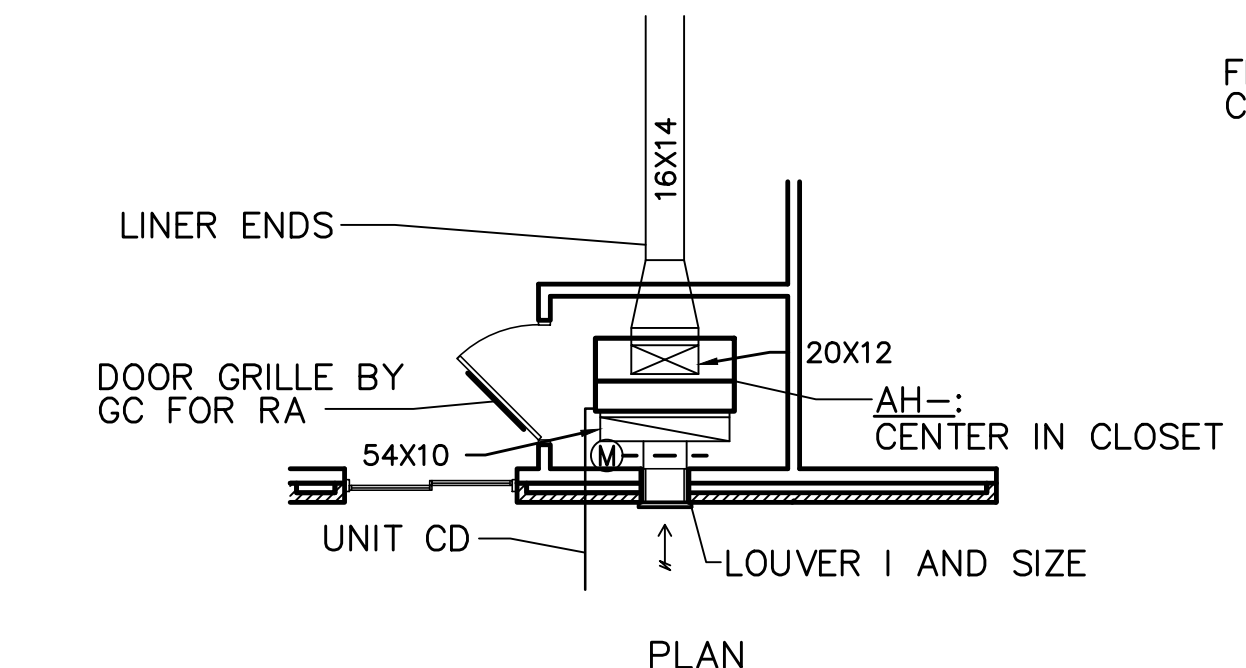
2 RADIUS ELBOW DETAIL
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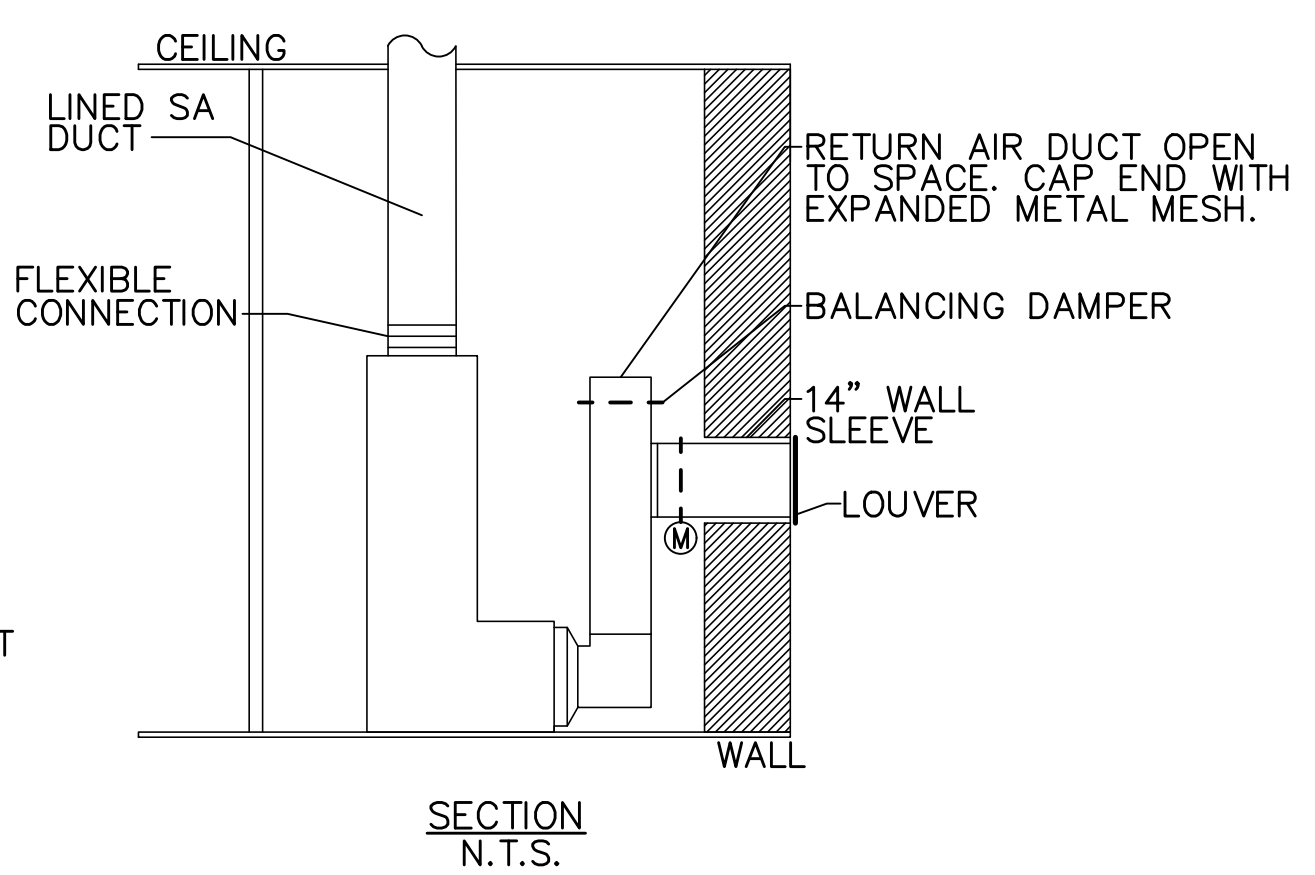
3 DUCT TAKE-OFF DETAIL
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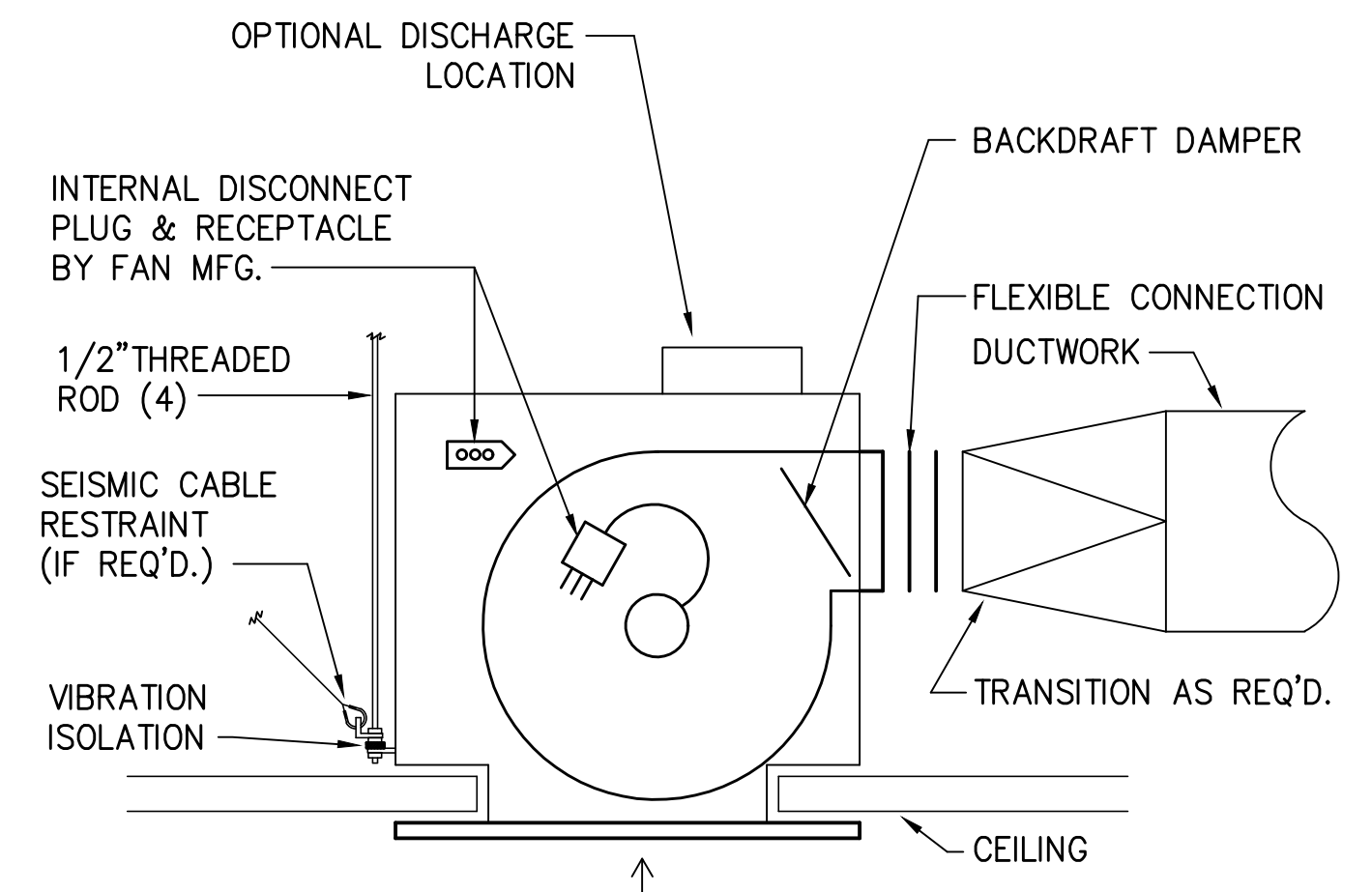
4 CONDENSATE TRAP DETAIL
NTS



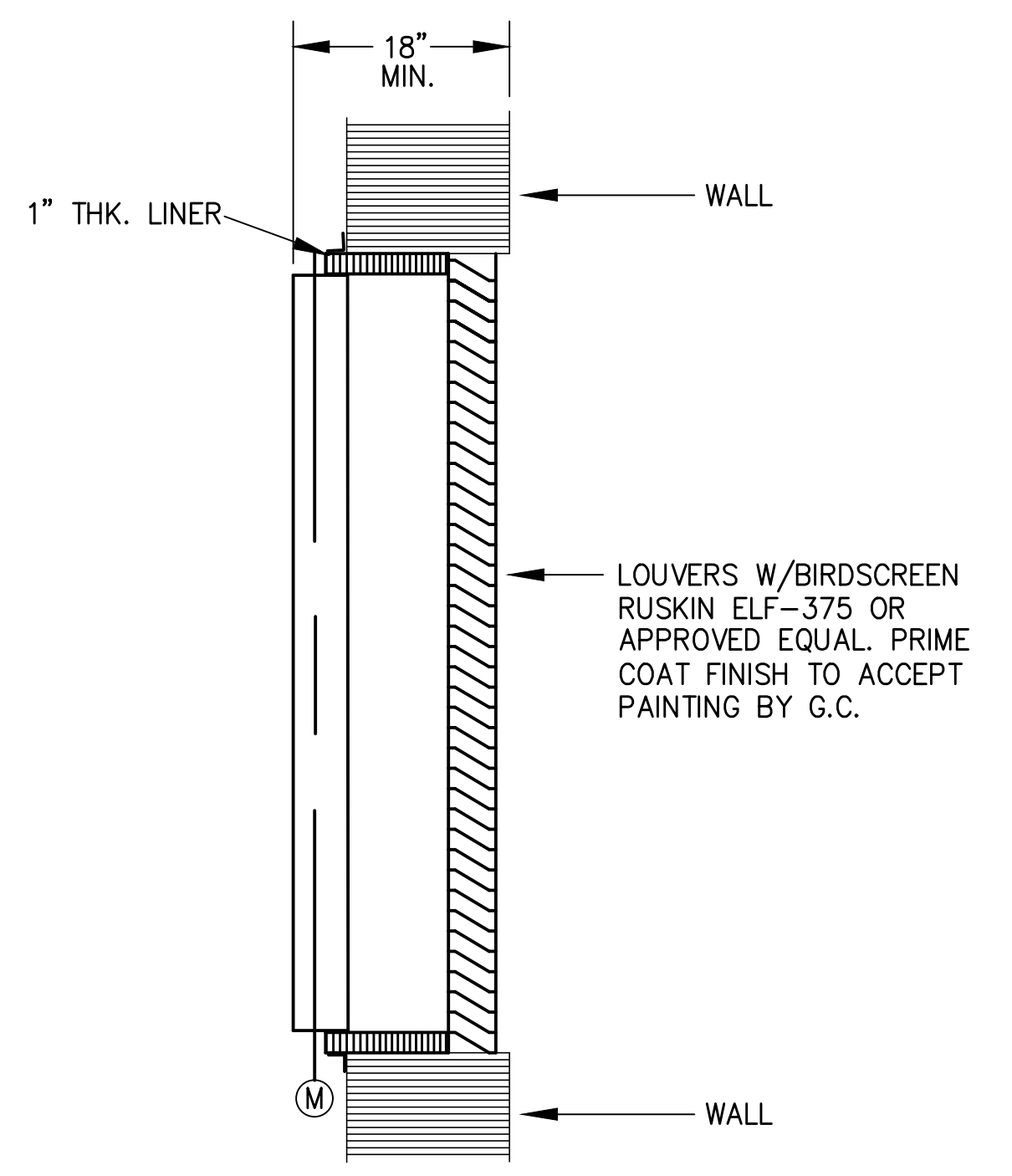
5 TYP. CLASSROOM MECHANICAL CLOSET
NTS



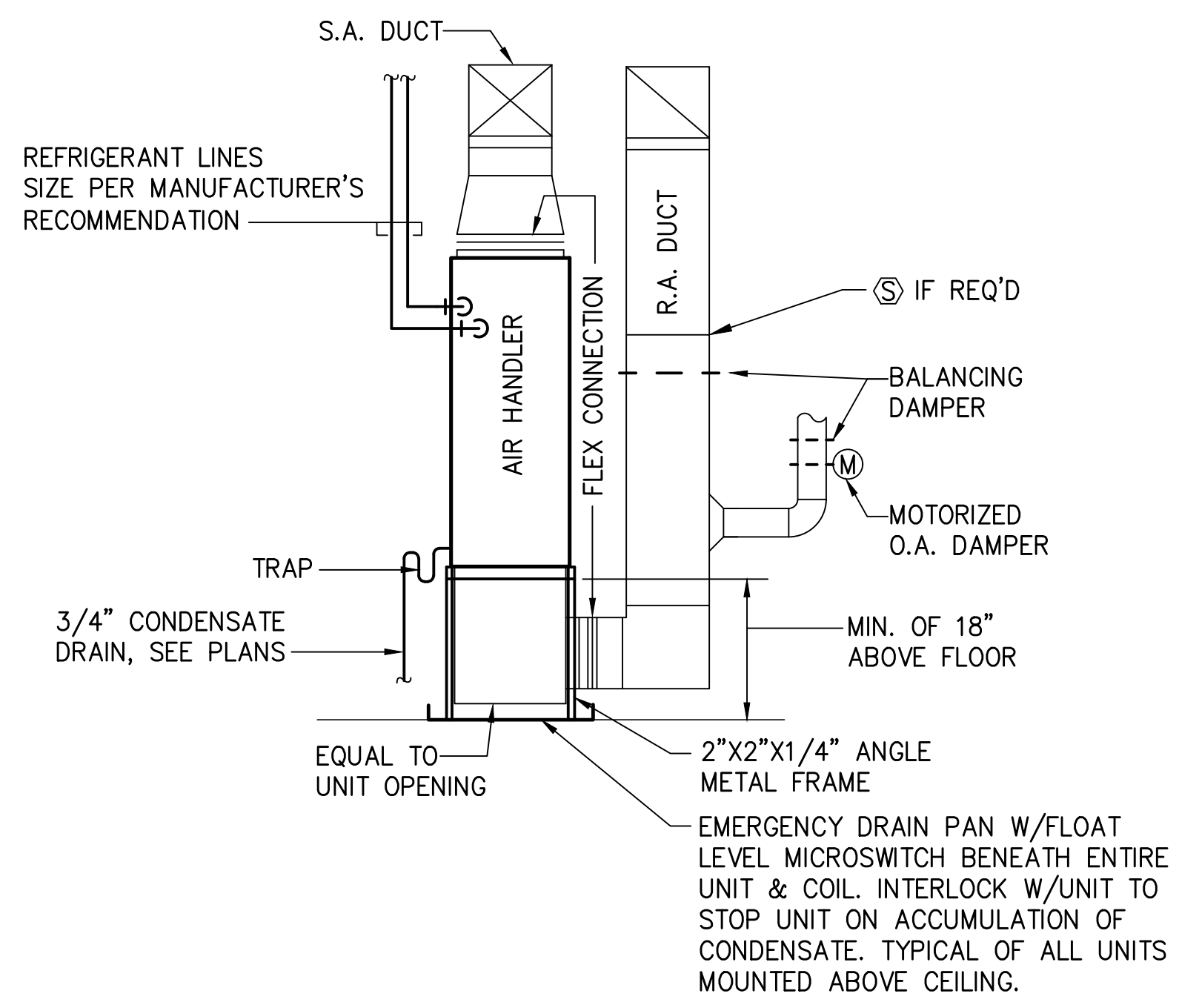
6 CEILING EXHAUST FAN DETAIL
NTS



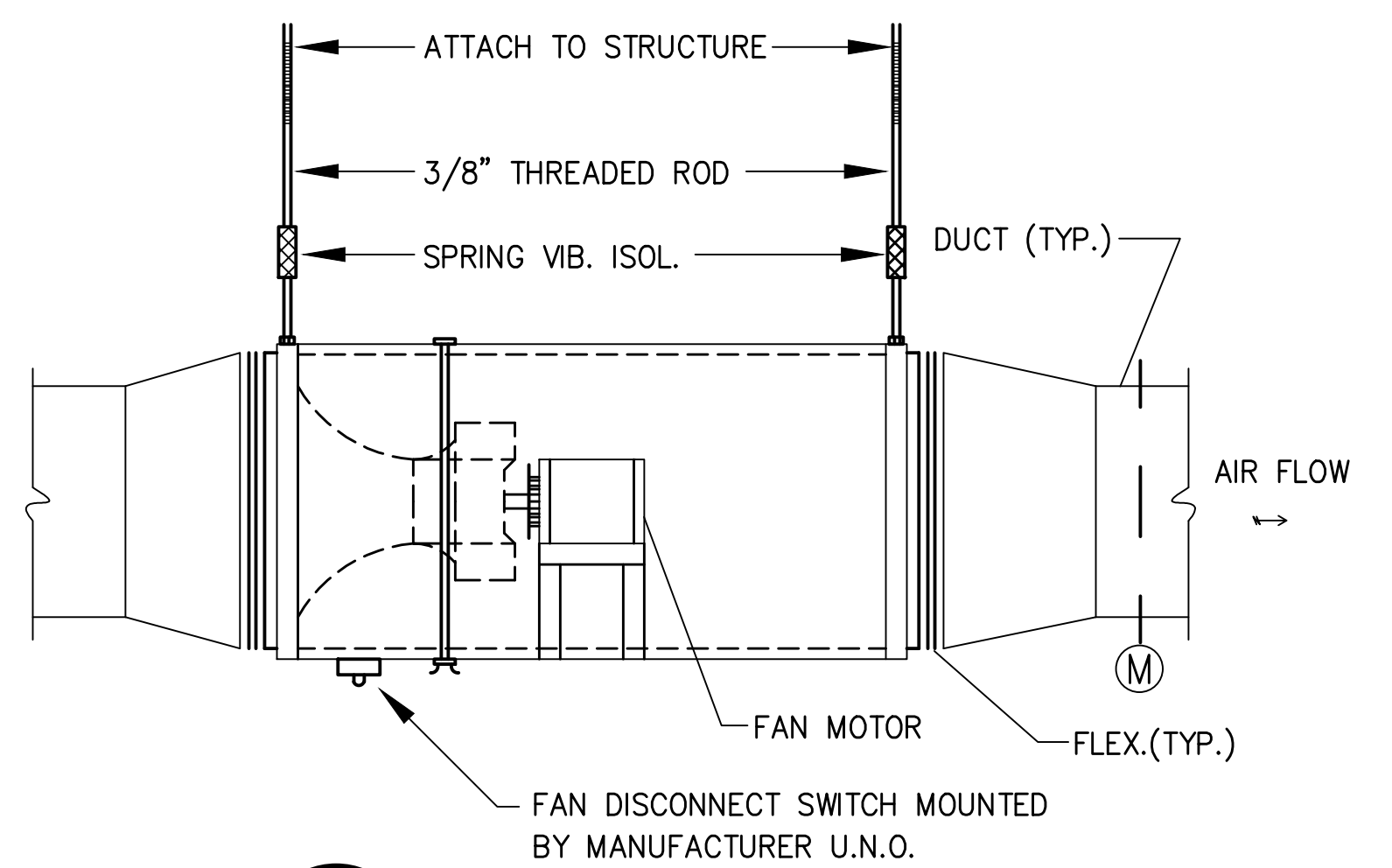
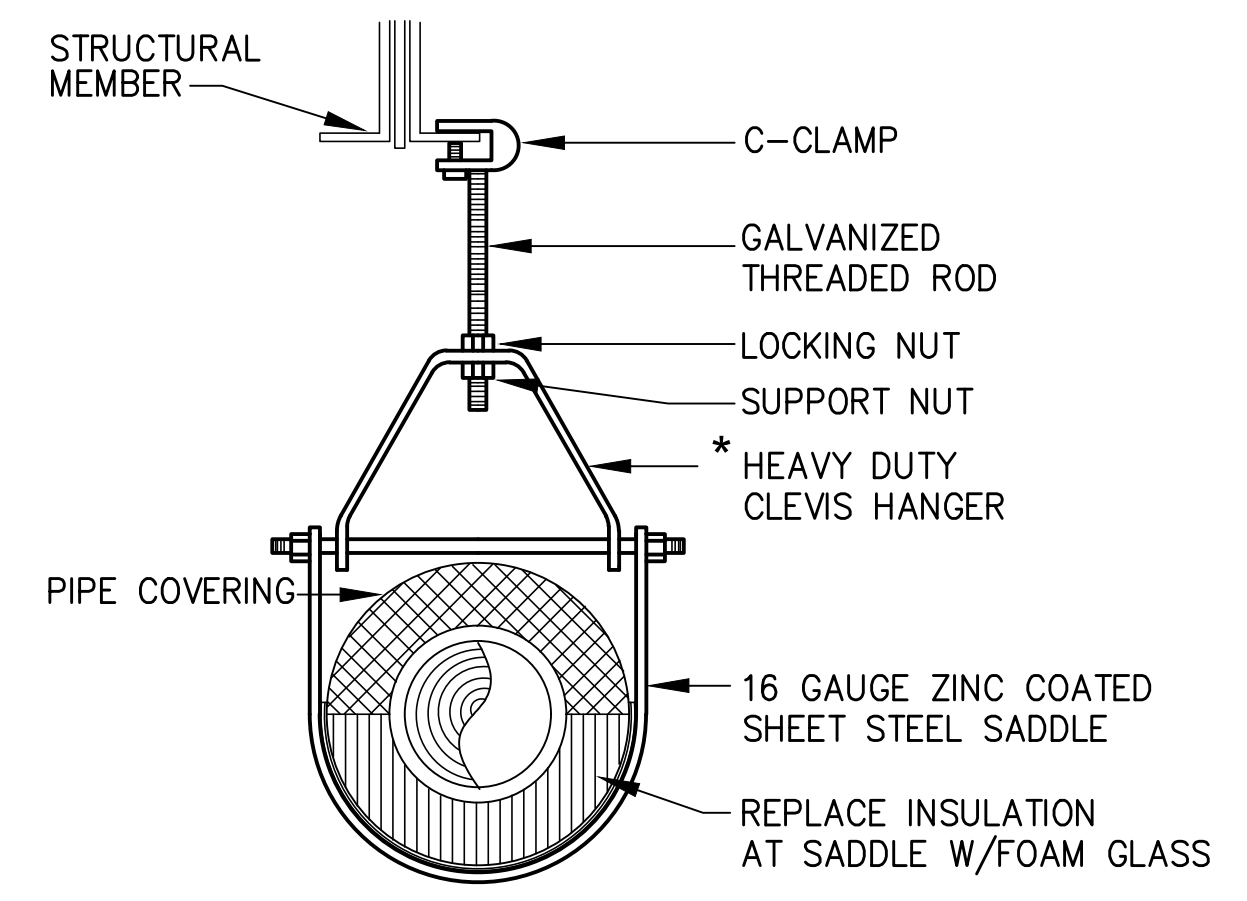
7 LOUVER/DAMPER DETAIL
NTS



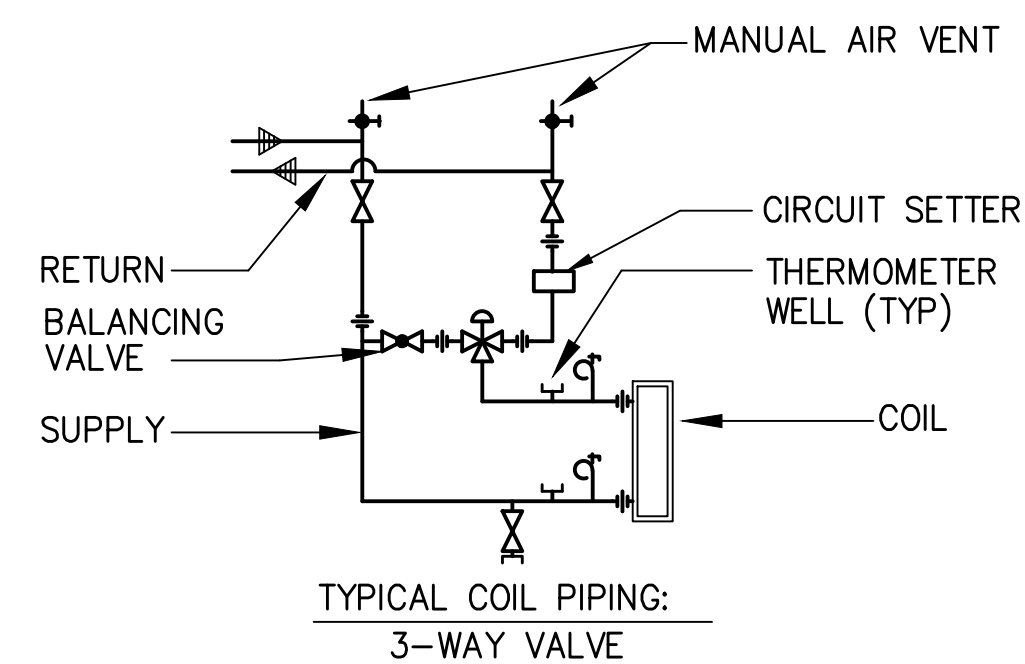
8 VERTICAL AIR HANDLER DETAIL
NTS



9 PIPE HANGER DETAIL
NTS

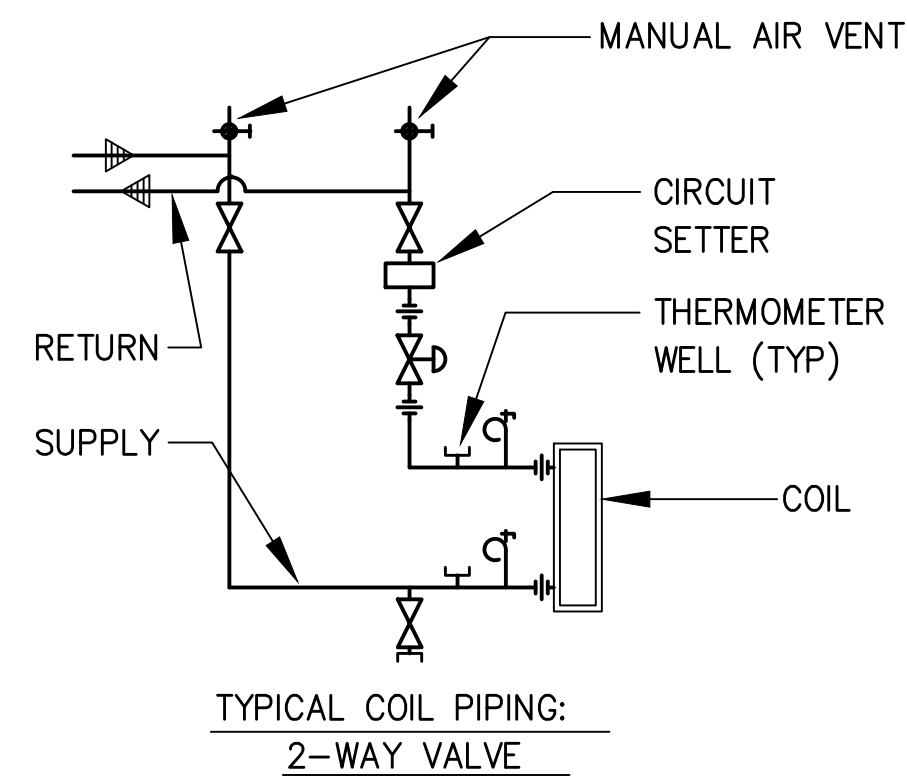


10 IN-LINE FAN DETAIL
NTS



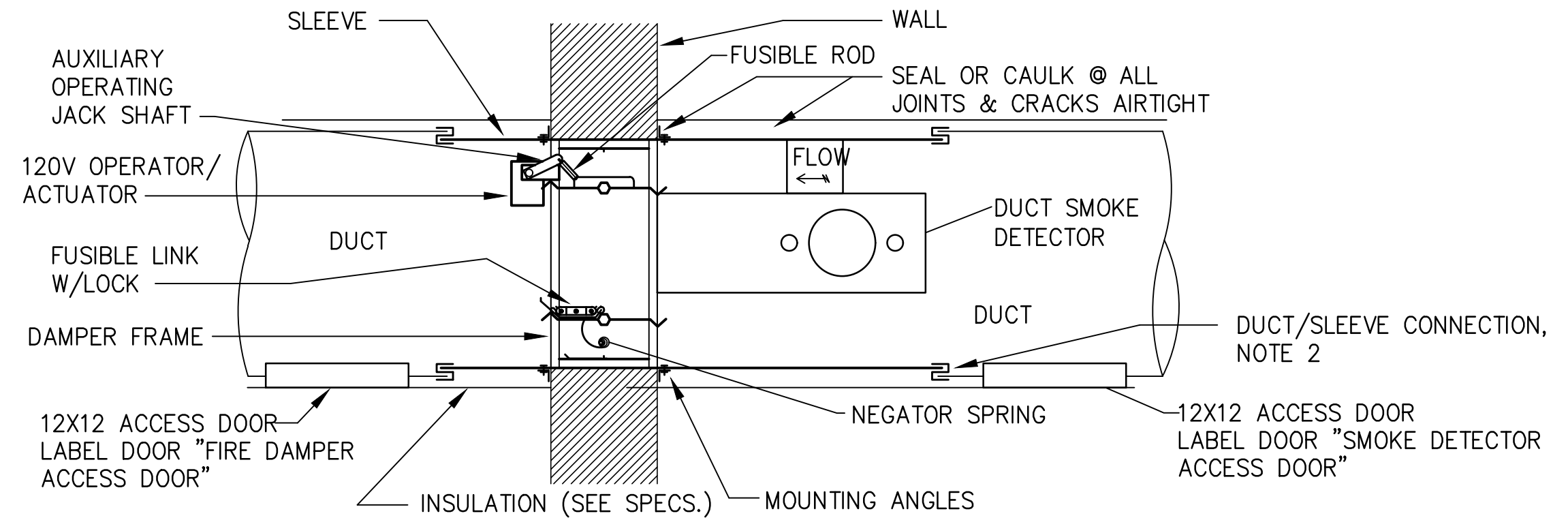
NOTE: FOR UNITS WITH PIPING LESS THAN ONE INCH DIAMETER: IN LIEU OF GAUGE COCK AND SNUBBER THERMOMETER WELL, PROVIDE SISCO PLUG AND ONE SET OF GAUGES.

1 3-WAY COIL PIPING DETAIL
NTS



NOTE: FOR UNITS WITH PIPING LESS THAN ONE INCH DIAMETER: IN LIEU OF GAUGE COCK AND SNUBBER THERMOMETER WELL, PROVIDE SISCO PLUG AND ONE SET OF GAUGES.

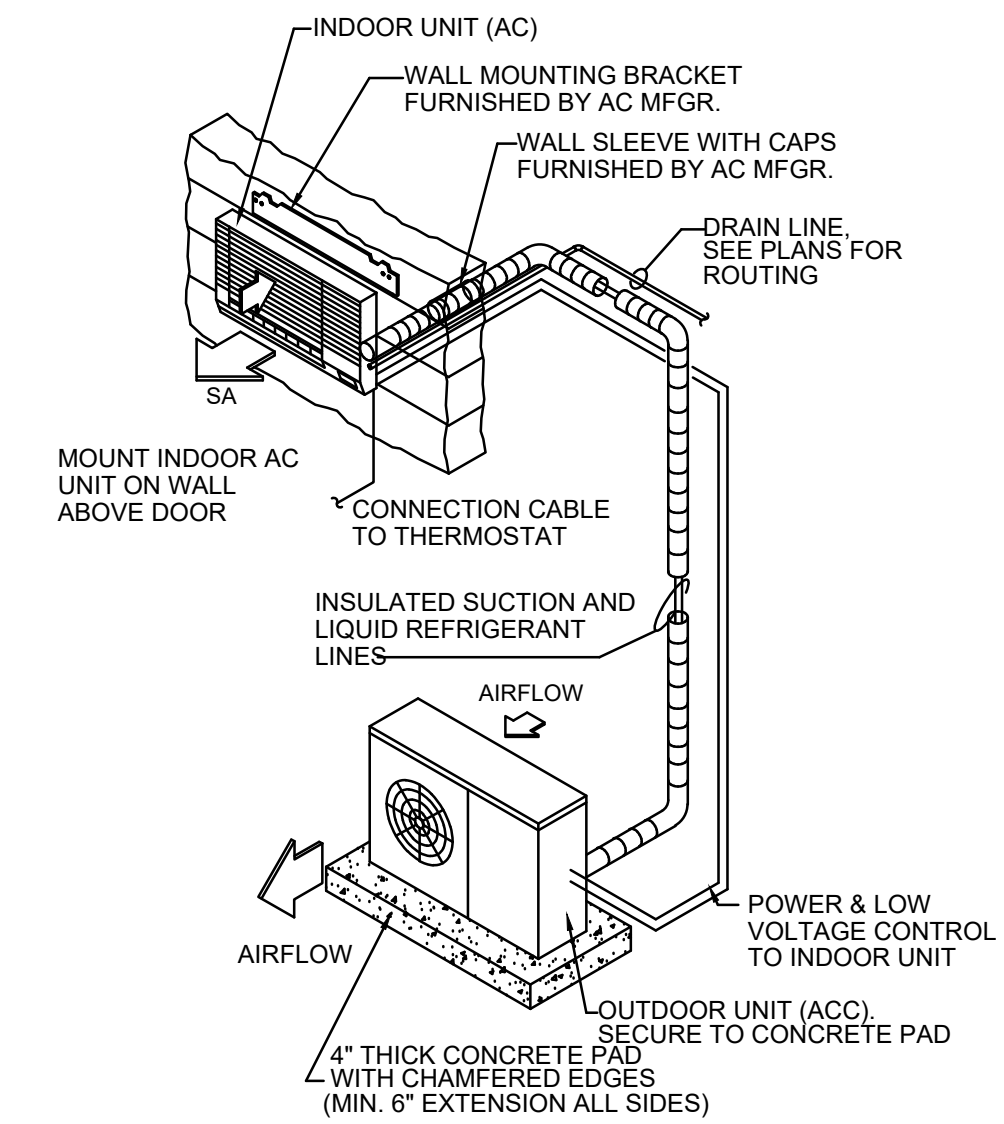
2 2-WAY COIL PIPING DETAIL
NTS



NOTES:

1. OPENINGS IN FLOOR OR WALL SHALL BE 1/8" / FT LARGER THAN OVERALL SIZE OF FIRE DAMPER AND SLEEVE ASSEMBLY. MINIMUM = DIAMETER + 1/4"; MAXIMUM = 1/8" / FT + 1"
2. SLEEVE GAUGE SHALL BE AT LEAST EQUAL TO THE GAGE OF THE DUCT AS DEFINED BY THE APPROPRIATE SMACNA DUCT CONSTRUCTION STANDARD, AS DESCRIBED IN NFPA90A, WHEN ONE OR MORE OF THE FOLLOWING DUCT SLEEVE CONNECTIONS ARE USED (PLAIN S SLIP, HEMMED S SLIP, STANDING S SLIP, REINFORCED S SLIP, INSIDE SLIP JOINT, DOUBLE S SLIP, (BREAKAWAY CONNECTIONS)).
3. IF ANY OTHER DUCT SLEEVE CONNECTIONS ARE USED, THE SLEEVE SHALL BE MINIMUM 16 GAGE FOR DAMPERS UP TO 36"W X 24"H AND 14 GAGE IF WIDTH EXCEEDS 36" OR HEIGHT EXCEEDS 24".
4. MOUNTING ANGLES SHALL BE MINIMUM OF 1 1/2" X 1 1/2" X 14 GAUGE AND BOLTED, TACK WELDED, RIVETED OR SCREWED TO SLEEVE AT MAXIMUM SPACING OF 12" AND WITH MINIMUM OF TWO CONNECTIONS IN EACH SIDE, TOP AND BOTTOM. MOUNTING ANGLES SHALL OVERLAP WALL A MINIMUM OF ONE INCH ON ALL FOUR SIDES.
5. DAMPER SHALL BE BOLTED, TACK WELDED, RIVETED OR SCREWED TO SLEEVE ON SAME SPACING AS ANGLES.
6. INSTALLATION AND MANUFACTURER RECOMMENDATIONS COMPLY WITH UNDERWRITER LABORATORIES SAFETY STANDARDS 555.
7. PROVIDE ACCESS DOOR IN DUCT FOR INSPECTION.
8. FUSIBLE LINK SHALL MELT @ 212°F, CAUSING DAMPER TO CLOSE AND LOCK.
9. LOCATE DAMPER & DAMPER OPERATOR ABOVE ACCESSIBLE CEILING IF POSSIBLE; IF NOT, M.C. TO PROVIDE ACCESS PANELS AT INACCESSIBLE CEILING, M.C. TO COORDINATE LOCATIONS.
10. DAMPER TO BE RUSKIN FSD35 OR APPROVED EQUAL (LOW PRESSURE) OR RUSKIN FSD60 OR APPROVED EQUAL (MEDIUM PRESSURE).
11. DETAIL IS APPLICABLE FOR VERTICAL OR HORIZONTAL INSTALLATION.
12. DAMPER SHALL BE CLASS II.
13. DUCT SMOKE DETECTOR TO BE RUSKIN DSD IONIZATION SMOKE DETECTOR W/REMOTE TEST AND RESET STATION OR APPROVED EQUAL.
14. DUCT SMOKE DETECTOR SHALL BE FURNISHED, INSTALLED, AND WIRED IN THE FIRE/SMOKE DAMPER SLEEVE.
15. LOCATE A FLOW ARROW ON DUCTWORK INDICATING DIRECTION OF FLOW.

3 COMBINATION FIRE/SMOKE DAMPER WITH DUCT SMOKE DETECTOR
NTS



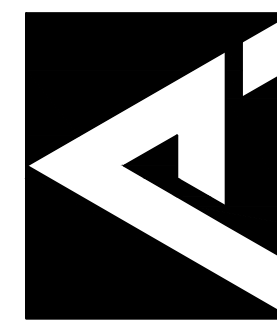
4 DUCTLESS SPLIT SYSTEM DIAGRAM
NTS

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CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
MECHANICAL DETAILS

REVISION SCHEDULE	
DATE	REFERENCE

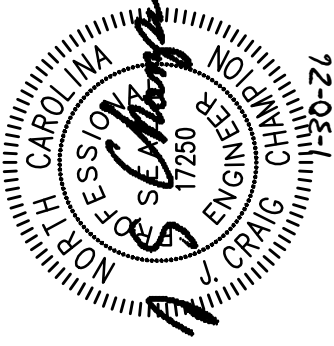
M301



ISSUE DATE: 01.30.26
DRAWN BY: HJB
CHECKED BY: JSD
PROJECT: 2526

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SYMBOL SCHEDULE

GENERAL SYMBOLS	
SYMBOL	DESCRIPTION
—	CONDUIT RUN CONCEALED ABOVE CEILINGS OR IN WALLS.
---	CONDUIT RUN CONCEALED IN OR BELOW FLOORS OR UNDERGROUND.
- - -	CONDUIT RUN EXPOSED.
—○—	CONDUIT TURNING UP
—○↓	CONDUIT TURNING DOWN
—○—○—	SQUARE ON CONDUIT SYMBOL INDICATES THAT CIRCUIT CONTINUES BUT NOT SWITCHLEG.
→	HOMERUN TO PANEL AND CIRCUIT(S) DESIGNATED. ARROW(S) INDICATE QUANTITY OF CIRCUITS
⊙	JUNCTION BOX PER N.E.C.
◇	SPECIAL NOTE, NUMERALS IDENTIFY, SEE SCHEDULE.
①	SPECIAL CONNECTION TO A SPECIFIC ITEM OF EQUIPMENT. SEE CONNECTION SCHEDULE.
⊕	MOTOR CONNECTION. RATING AS NOTED.

LIGHTING	
SYMBOL	DESCRIPTION
○	LED LIGHTING FIXTURE, DRAWN TO SCALE.
▨	LED LIGHTING FIXTURE, UTILIZED AS A NIGHT-LIGHT. CONNECT TO THE UNSWITCHED LEG OF THE CIRCUIT.
—	BARE LED STRIP FIXTURE.
○	LED LIGHTING FIXTURE, WALL MOUNTED.
●	LED LIGHTING FIXTURE, WALL MOUNTED. CONNECTED TO AN EMERGENCY CIRCUIT OR EMERGENCY BALLAST.
⊙	EXIT SIGN, CEILING MOUNTED. SHADING INDICATES FACE ORIENTATION. CONNECT TO THE UNSWITCHED LEG OF THE CIRCUIT.
⊙	EXIT SIGN, WALL MOUNTED. SHADING INDICATES FACE ORIENTATION. CONNECT TO THE UNSWITCHED LEG OF THE CIRCUIT.
⊕	EMERGENCY BATTERY PACK FIXTURE, WALL MOUNTED. CONNECT TO UNSWITCHED LEG OF THE CIRCUIT.

DISTRIBUTION	
SYMBOL	DESCRIPTION
—	ELECTRICAL PANELBOARD, FLUSH MOUNTED.
—	ELECTRICAL PANELBOARD, SURFACE MOUNTED.
—	CONTROL CABINET, FLUSH OR SURFACE MOUNTED.
⊕	MOTOR STARTER
⊕	ENCLOSED CIRCUIT BREAKER
⊕	DISCONNECT SWITCH, NON-FUSIBLE.
⊕	DISCONNECT SWITCH, FUSIBLE.
⊕	DISCONNECT SWITCH PROVIDED WITH EQUIPMENT.
→	GROUND CONNECTION.
⊕	DRY-TYPE TRANSFORMER, 480-120/208V 3-PHASE OR 208-120/208V 3-PHASE.

FIRE ALARM SYSTEM	
SYMBOL	DESCRIPTION
⊕	FIRE ALARM SYSTEM CONTROL PANEL.
⊕	FIRE ALARM SYSTEM REMOTE ANNUNCIATOR.
⊕	FIRE ALARM SYSTEM MANUAL 'PULL' STATION.
⊕	FIRE ALARM SYSTEM CEILING MOUNTED PHOTOELECTRIC TYPE SMOKE DETECTOR.
⊕	FIRE ALARM SYSTEM DUCT MOUNTED PHOTOELECTRIC TYPE SMOKE DETECTOR.
⊕	FIRE ALARM SYSTEM FIXED-TEMPERATURE THERMAL DETECTOR.
⊕	FIRE ALARM SYSTEM COMBINATION AUDIBLE/VISUAL NOTIFICATION APPLIANCE DEVICE. PROVIDE SYNCHRONIZED STROBES WHERE 2 OR MORE STROBES ARE LOCATED IN ONE ROOM OR VISIBLE FROM ONE LOCATION.
⊕	FIRE ALARM SYSTEM VISUAL ONLY NOTIFICATION APPLIANCE DEVICE. PROVIDE SYNCHRONIZED STROBES WHERE 2 OR MORE STROBES ARE LOCATED IN ONE ROOM OR VISIBLE FROM ONE LOCATION.
⊕	FIRE ALARM SYSTEM MAGNETIC DOOR HOLD DEVICE AND ASSOCIATED OUTPUT MODULE. UNLESS OTHERWISE NOTED, CONTROL FOR THIS DEVICE SHALL BE BY ASSOCIATED DOOR RELEASE SMOKE DETECTORS ONLY. DOOR RELEASE SMOKE DETECTORS SHALL BE INSTALLED PER NFPA 72 PARAGRAPH 17.7.5.6.
⊕	EXTERIOR FIRE ALARM SYSTEM COMBINATION WEATHERPROOF AUDIBLE/HIGH-POWER VISUAL NOTIFICATION APPLIANCE DEVICE. PROVIDE SYNCHRONIZED STROBES WHERE 2 OR MORE STROBES ARE VISIBLE FROM ONE LOCATION.

WIRING DEVICES	
SYMBOL	DESCRIPTION
⊕	DUPLEX RECEPTACLE, 125V, 3-WIRE GROUNDING TYPE.
⊕ _{EWC}	DUPLEX RECEPTACLE, 125V, GROUND FAULT CIRCUIT INTERRUPTING, 3-WIRE GROUNDING TYPE. LOCATE WITHIN OR BEHIND AN ELECTRIC WATER COOLER. COORDINATE WITH PLUMBER FOR EXACT LOCATION.
⊕ _{GFI}	DUPLEX RECEPTACLE, GROUND FAULT CIRCUIT INTERRUPTING.
⊕ _{OP}	DUPLEX GFCI RECEPTACLE. PROVIDE WITH OPERABLE, IN-US WEATHERPROOF COVER.
⊕ _C	DUPLEX RECEPTACLE, 125V, 3-WIRE GROUNDING TYPE. CEILING MOUNTED.
⊕ _{2C}	TWO DUPLEX RECEPTACLES, 125V, 3-WIRE GROUNDING TYPE, IN A TWO-GANG BOX WITH TWO-GANG FACEPLATE.
⊕ _{SP}	SPECIAL PURPOSE RECEPTACLE, WITH SPECIAL NEMA CONFIGURATION AS NOTED.
⊕ _H	HEAVY-WALL METAL CONDUIT STUB-UP FROM FLOOR, AT HEIGHT INDICATED, WITH CAST FS-TYPE BOX AND WIRING DEVICE AS INDICATED.
▽	WALL OUTLET FOR DATA. PROVIDE BACKBOX AND 1" WITH FULL CORD TO NEAREST ACCESSIBLE CEILING SPACE. CABLING BY OTHERS. PROVIDE J-HOOKS AS REQUIRED TO SUPPORT CABLES. MTD 18" AFF UON.
▽	WIRELESS ACCESS POINT (WIFI). FOR WALL MOUNTED DEVICES, PROVIDE BACKBOX AND 3/4" WITH FULL CORD TO NEAREST ACCESSIBLE CEILING SPACE FOR CEILING MOUNTED DEVICES. NO PROVISIONS ARE NECESSARY. CABLING BY OTHERS. PROVIDE J-HOOKS AS REQUIRED TO SUPPORT CABLES.
⊕	DOT ABOVE OUTLETS INDICATES THAT THE DEVICE IS TO BE INSTALLED ABOVE CASEWORK OR HIGHER THAN STANDARD HEIGHT. COORDINATE WITH ARCHITECTURAL DRAWINGS.
S	LIGHT SWITCH, SINGLE-POLE,
S ₃	LIGHT SWITCH, 3-WAY,
S ₄	LIGHT SWITCH, 4-WAY,
S _T	PROGRAMMABLE LIGHT SWITCH, WALL MOUNTED.
S _D	DIMMER LIGHT SWITCH.
S _{OS}	COMBINATION LIGHT SWITCH, DUAL TECHNOLOGY OCCUPANCY SENSOR. SENSOR SWITCH #WSZ-PDT-WH OR APPROVED EQUAL.
S _S	TWO SINGLE POLE LIGHT SWITCHES UNDER A COMMON FACEPLATE. SUBSCRIPT DENOTES FIXTURE TO BE CONTROLLED.
⊕	DUAL TECHNOLOGY OCCUPANCY SENSOR, CEILING MOUNTED. PROVIDE WITH 10 FEET WHIP TO ALLOW FIELD ADJUSTMENT OF LOCATION. COORDINATE EXACT LOCATION WITH MANUFACTURERS RECOMMENDATION.
⊕	COMMUNICATIONS SYSTEM INTERCOM STATION MOUNTED AT 46" AFF. PROVIDE 1" TO ABOVE ACCESSIBLE CEILING.

MOUNTING HEIGHTS	
(DISTANCE FROM FINISHED FLOOR TO CENTER OF DEVICE UNLESS OTHERWISE NOTED)	
RECEPTACLE	
GENERAL	18" AFF. (UNLESS OTHERWISE NOTED)
ABOVE COUNTER TOP	MIN. 6" ABOVE COUNTER (UON)
LIGHT SWITCH	46" AFF. (UNLESS OTHERWISE NOTED)
TELECOMMUNICATIONS	
GENERAL	18" AFF. (UNLESS OTHERWISE NOTED)
ABOVE COUNTER TOP	46" AFF. (UNLESS OTHERWISE NOTED)
WALL	46" AFF. (UNLESS OTHERWISE NOTED)
FIRE ALARM	
PULL STATION	46" AFF. (UNLESS OTHERWISE NOTED)
AUDIBLE/STROBE COMBINATION OR STROBE DEVICE ONLY	BETWEEN 80" AFF. AND 96" AFF.

ABBREVIATIONS			
A	AMPERES	LFNC	LIQUIDTIGHT FLEXIBLE NON-METALLIC CONDUIT
ACC	ARMORED CLAD CABLE	LFMC	LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT
AFC	AVAILABLE FAULT CURRENT	LVC	LOW VOLTAGE CONTROL CABINET
AFI	ABOVE FINISHED FLOOR	MCB	MAIN CIRCUIT BREAKER
AFG	ABOVE FINISHED GRADE	MCC	METAL CLAD CABLE
AHJ	AUTHORITY HAVING JURISDICTION	MLO	MAIN LUGS ONLY
ANN	FIRE ALARM ANNUNCIATOR CABINET	MTD	MOUNTED
AWG	AMERICAN WIRE GAUGE	N	NEW
BLDG	BUILDING	NEC	NATIONAL ELECTRICAL CODE
C	CONDUIT	NIC	NOT IN CONTRACT
CB	CIRCUIT BREAKER	NIGHT	NIGHT LIGHT
CD	CANDELA	NMC	NON-METALLIC CLAD CABLE
CKG	CIRCUIT	NTS	NOT TO SCALE
CL	CEILING	P	POLE
CT	CURRENT TRANSFORMER	PB	PULLBOX
CU	COPPER	PH	PHASE
DN	DOWN	PB	PANELBOARD
E	DISHWASHER	PRS	PROGRAM RAPID START
EC	EXISTING	PS	PROGRAM START
EG	ELECTRICAL CONTRACTOR	PVC	POLYVINYL CHLORIDE
EGC	EQUIPMENT GROUNDING CONDUCTOR	PWR	POWER
EMT	EMERGENCY	RCP	RECEPTACLE
ENT	ELECTRICAL METALLIC TUBING	RL	EXISTING TO BE RELOCATED
ENT	ELECTRICAL NON-METALLIC TUBING	RM	EXISTING TO REMAIN
EOLR	END OF LINE RESISTOR	RMC	RIGID METAL CONDUIT
EWC	ELECTRIC WATER COOLER	RP	EXISTING TO BE REPLACED
FA	FIRE ALARM	RV	EXISTING TO BE REMOVED
FACP	FIRE ALARM CONTROL PANEL	RS	RAPID START
FMC	FLEXIBLE METAL CONDUIT	RS	FIRE ALARM PULL STATION
FPN	FUSE PER NAMEPLATE	SC	SWITCH
GEC	GROUNDING ELECTRODE CONDUCTOR	SWB	SWITCHBOARD
G.GND	GROUND	TIB	TELEPHONE TERMINAL BOARD
GFI	GROUND FAULT INTERRUPTER	TEL	TELEPHONE
HDA	HAND OFF AUTOMATIC	TR	TAMPER RESISTANT
HP	HORSEPOWER	TV	TELEVISION
HPF	HIGH POWER FACTOR	TYP	TYPICAL
HX	HIGH REACTANCE	UO	UNLESS OTHERWISE NOTED
IG	ISOLATED GROUND	V	VOLTS
IMC	INTERMEDIATE METAL CONDUIT	VP	VAPOR PROOF
IS	INSTANT START	W	WALL MOUNTED
JB	JUNCTION BOX	WG	WIRE GUARD
KVA	KILOVOLT-AMPERES	WP	WEATHER PROOF
	KILOWATTS	XFMR	TRANSFORMER

AFTER SUBSTANTIAL COMPLETION OF THE PROJECT, CONTRACTOR SHALL PROVIDE A SITE ANALYSIS TO DETERMINE PROPER EMERGENCY RESPONDER RADIO COVERAGE PER 2018 NORTH CAROLINA FIRE PREVENTION CODE SECTION 510 AND PROVIDE EMERGENCY RESPONDER COMMUNICATION COVERAGE SYSTEM AS NECESSARY. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	VOLT.	LIGHT ENGINE			QTY	DRIVER		WATTS	MOUNTING	MANUF. CATALOG NO.
			TEMP	CRI	LUMENS		TYPE	TYPE			
A1	2'X4' VOLUMETRIC LED TROFFER. GRID TYPE FOR LAY-IN CEILING. HOUSING AND REFLECTORS ARE DIE FORMED COLD ROLLED STEEL, ACRYLIC LINEAR PRISMATIC DIFFUSER, CONTOUR SHIELDING, WHITE POWDER COAT FINISH. 3000 LUMENS NOMINAL.	277	3500 K	80	3470	1	0-10V DIMMING	TYPE	26.4	CEILING, RECESSED	LITHONIA #2VTL4-30L WILLIAMS #LT SERIES METALUX #24CZ SERIES DAY-BRITE #EVOGRID SERIES COLUMBIA #LCAT SERIES
A1E	PROVIDE WITH EMERGENCY BATTERY PACK. BATTERY PACK SHALL ILLUMINATE FIXTURE FOR A MINIMUM OF 90 MINUTES.										
A1F	2'X4' VOLUMETRIC LED TROFFER. FLANGE TYPE FOR CYP. BOARD CEILING. HOUSING AND REFLECTORS ARE DIE FORMED COLD ROLLED STEEL, ACRYLIC LINEAR PRISMATIC DIFFUSER, CONTOUR SHIELDING, WHITE POWDER COAT FINISH. 3000 LUMENS NOMINAL.	277	3500 K	80	3470	1	0-10V DIMMING	TYPE	26.4	CEILING, RECESSED	LITHONIA #2VTL4-30L WILLIAMS #LT SERIES METALUX #24CZ SERIES DAY-BRITE #EVOGRID SERIES COLUMBIA #LCAT SERIES
A1FE	PROVIDE WITH EMERGENCY BATTERY PACK. BATTERY PACK SHALL ILLUMINATE FIXTURE FOR A MINIMUM OF 90 MINUTES.										
A2	2'X4' VOLUMETRIC LED TROFFER. GRID TYPE FOR LAY-IN CEILING. HOUSING AND REFLECTORS ARE DIE FORMED COLD ROLLED STEEL, ACRYLIC LINEAR PRISMATIC DIFFUSER, CONTOUR SHIELDING, WHITE POWDER COAT FINISH. 6000 LUMENS NOMINAL.	277	3500 K	80	6301	1	0-10V DIMMING	TYPE	47.7	CEILING, RECESSED	LITHONIA #2VTL4-48L WILLIAMS #LT SERIES METALUX #24CZ SERIES DAY-BRITE #EVOGRID SERIES COLUMBIA #LCAT SERIES
A3	2'X2' VOLUMETRIC LED TROFFER. GRID TYPE FOR LAY-IN CEILING. HOUSING AND REFLECTORS ARE DIE FORMED COLD ROLLED STEEL, ACRYLIC LINEAR PRISMATIC DIFFUSER, CONTOUR SHIELDING, WHITE POWDER COAT FINISH. 3000 LUMENS NOMINAL.	277	3500 K	80	3000	1	0-10V DIMMING	TYPE	25	CEILING, RECESSED	LITHONIA #2VTL4-30L WILLIAMS #LT SERIES METALUX #24CZ SERIES DAY-BRITE #EVOGRID SERIES COLUMBIA #LCAT SERIES
WF	LED WALL BRACKET, 4 FOOT NOMINAL LENGTH, ROLL FORMED CODE GAUGE STEEL HOUSING, HIGH IMPACT ACRYLIC DIFFUSER, WHITE POLYESTER POWDER COAT FINISH.	277	3500 K	82	3095	1	FIXED OUTPUT DRIVER	TYPE	28.2	WALL, SURFACE	LITHONIA #WL4-20L, 30L OR 40L SERIES METALUX
BS	4 FOOT LED STRIPLIGHT, HEAVY GAUGE COLD STEEL HOUSING, WHITE FINISH, FROST ACRYLIC LENS, END CAPS, ELECTRONIC LED DRIVER.	0VOLT	3500 K	80	3000	-	0-10V DIMMING DRIVER STANDARD	TYPE	26	CEILING, SURFACE SUSPENDED	DAY-BRITE #FSS FLUXSTREAM SERIES COLUMBIA #CL4 OR APPROVED EQUAL
BSW	4 FOOT LED STRIPLIGHT, HEAVY GAUGE COLD STEEL HOUSING, WHITE FINISH, FROST ACRYLIC LENS, END CAPS, ELECTRONIC LED DRIVER.	0VOLT	3500 K	80	3000	-	0-10V DIMMING DRIVER STANDARD	TYPE	24	WALL, SURFACE 7" AFF	DAY-BRITE #FSS FLUXSTREAM SERIES LITHONIA #ZLN SERIES COLUMBIA #CL4 OR APPROVED EQUAL
WL	DECORATIVE EXTERIOR WALL MOUNTED LED FIXTURE. TRAPEZOID SHAPE DIE-CAST ALUMINUM HOUSING, ACRYLIC LENS, ONE LIGHT ENGINE, ELECTRONIC DRIVER, WIDE DISTRIBUTION (SR2), UL LISTED FOR WET LOCATION. FINISH AS SELECTED BY ARCHITECT.	0VOLT	4000 K	70	6609	-	FIXED OUTPUT DRIVER	TYPE	50	WALL, SURFACE MTG HT AS DIRECTED BY ARCHITECT	LITHONIA #WST LED SERIES MCGRAW-EDISON #ST SERIES LIGMAN LIGHTING #WVK WILLIAMS #WVM SERIES OR APPROVED EQUAL
WLE	DECORATIVE EXTERIOR WALL MOUNTED LED FIXTURE. TRAPEZOID SHAPE DIE-CAST ALUMINUM HOUSING, ACRYLIC LENS, TWO LIGHT ENGINES, ELECTRONIC DRIVER, WIDE DISTRIBUTION (SR2), UL LISTED FOR WET LOCATION. FINISH AS SELECTED BY ARCHITECT. PROVIDE WITH INTEGRAL BATTERY PACK FOR 90 MINUTE MINIMUM ILLUMINATION.	0VOLT	4000 K	70	6609	-	FIXED OUTPUT DRIVER	TYPE	50	WALL, SURFACE MTG HT AS DIRECTED BY ARCHITECT	LITHONIA #WST LED SERIES MCGRAW-EDISON #ST SERIES LIGMAN LIGHTING #WVK WILLIAMS #WVM SERIES OR APPROVED EQUAL
LE	LED EMERGENCY LIGHTING UNIT, WITH SELF-CONTAINED NI-CAD BATTERY RESERVE, WHITE THERMOPLASTIC HOUSING, FOR WALL OR CEILING MOUNTING. CONNECT FIXTURE AHEAD OF ALL LOCAL AREA SWITCHING. FIXTURE SHALL NOT BE SWITCHED.	0VOLT	-	-	-	-	-	TYPE	3	WALL, 1 FT. BELOW CEILING EXCEPT 8 FT. AFF. MAX.	LITHONIA #ELM2 LED SERIES EXITRONIX #LED-90 SERIES LSI #LEM LED SERIES WILLIAMS #EMER/LED SERIES SURE-LITES SEL SERIES
ES	EXIT SIGN, WHITE METAL HOUSING, UNIVERSAL MOUNTING, RED STENCIL FACE, QUANTITY OF FACES INDICATED BY SHADING ON SYMBOL, DIRECTIONAL ARROWS AS INDICATED, WITH SELF-CONTAINED BATTERY RESERVE, CONNECT FIXTURE AHEAD OF ALL LOCAL AREA SWITCHING, FIXTURE SHALL NOT BE SWITCHED.	0VOLT	-	-	-	-	-	TYPE	5	WALL OR CEILING AS INDICATED BY SYMBOL	LITHONIA #LE SURE-LITES #OX7 HIGH-LITES #ZLED EXITRONIX #400U LIGHTALARMS #XLD/XLED SERIES EMERG-LITE #P

EQUIPMENT CONNECTION SCHEDULE

SYM.	EQUIPMENT	LOAD	VOLT/PHASE	DISCONNECT				CONDUCTORS	RACEWAY		NOTES
				TYPE	RATING	POLES	TRIP/FUSE		ENCL.	TYPE	
①	AH-1	9.6KW+3/4HP	480/3	NFDS	30	3	---	1	3#12,1#12G	FMC	1/2"
②	HP-1	6.5RLA+1.1FLA	480/3	FDS	30	3	15	3R	3#12,1#12G	FMC	1/2"
③	AH-103, AH-104, AH-110, AH-116, AH-117, AH-118, AH-119, AH-121, AH-127	8FLA	208/1	NFDS	30	2	---	1	2#12,1#12G	FMC	1/2"
④	WH-1	27KW	480/3	NFDS	60	3	---	1	3#8,1#10G	FMC	3/4"
⑤	MSAH-1	1FLA	208/1	NFDS	30	2	---	1	2#12,1#12G	FMC	1/2"
⑥	MSHP-1	10MCA, 15MOCP	208/1	FDS	30	2	15	3R	2#12,1#12G	LFMC	1/2"

LEGEND

DISCONNECT TYPES
 ETCB = ELECTRONIC-TRIP CIRCUIT BREAKER
 FDS = FUSIBLE DISCONNECT SWITCH
 MCP = MOTOR CIRCUIT PROTECTOR
 NFDS = NON-FUSIBLE DISCONNECT SWITCH
 ST/DS = COMBINATION STARTER/DISCONNECT SWITCH
 TMCB = THERMAL-MAGNETIC CIRCUIT BREAKER
 TOG = HP RATED TOGGLE SWITCH

DISCONNECT ENCLOSURE TYPES
 1 = NEMA 1 ENCLOSURE
 3R = NEMA 3R ENCLOSURE
 4 = NEMA 4 ENCLOSURE
 4X = NEMA 4X ENCLOSURE

RACEWAY TYPES
 EMT = ELECTRIC METALLIC TUBING
 FMC = FLEXIBLE METAL CONDUIT
 IMC = INTERMEDIATE METAL CONDUIT
 LFMC = LIQUID-TIGHT FLEXIBLE METAL CONDUIT
 PVC = NON-METALLIC PVC CONDUIT
 RMC = RIGID METAL CONDUIT

STARTER TYPES
 CFVNR = COMBINATION FULL VOLTAGE, NONREVERSING

CONTROL DEVICES
 HOA = HAND-OFF-AUTO
 RPL = RED PILOT LIGHT
 AUX = AUXILIARY CONTACTS (2 N.O., 1 N.C.)
 CT50 = 50 VA CONTROL TRANSFORMER

NOTES

ALL ELECTRICAL CHARACTERISTICS SCHEDULED ABOVE ARE BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN. ELECTRICAL CONTRACTOR SHALL VERIFY ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT WITH EQUIPMENT SUPPLIER(S) PRIOR TO ROUGHING, AND SHALL VERIFY EXACT LOCATION AND EXACT TYPE OF CONNECTION. ALL EQUIPMENT SHALL BE PROPERLY AND SECURELY GROUNDED. ANY SIGNIFICANT CHANGES IN LOCATION, ELECTRICAL REQUIREMENTS, OR TYPE OF CONNECTION REQUIRED FOR ANY EQUIPMENT SCHEDULED ABOVE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN WRITING PRIOR TO PROCEEDING.

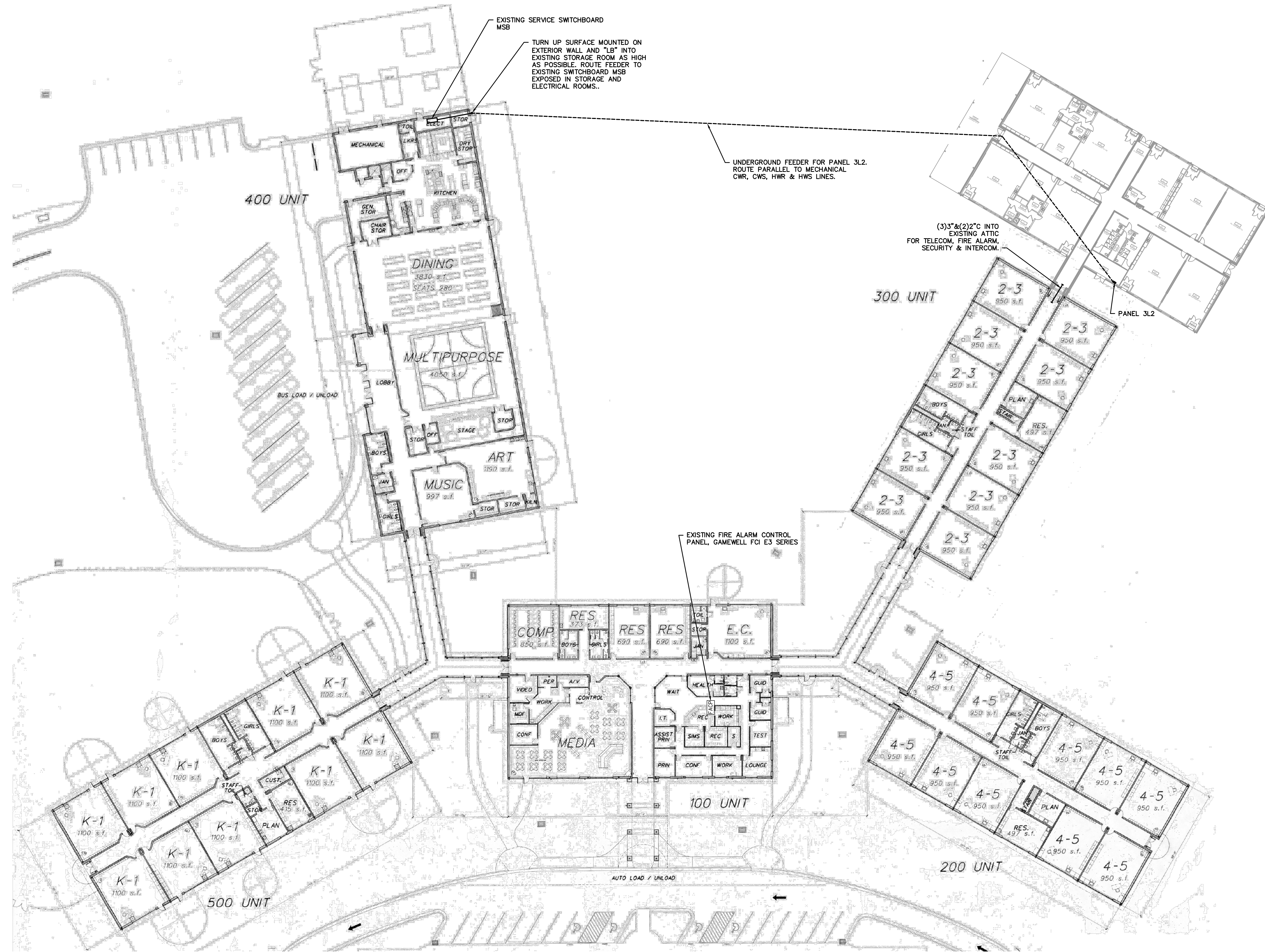
CONDUCTORS AND RACEWAY SPECIFIED IN THE ABOVE SCHEDULE ARE FOR FINAL CONNECTION TO UNIT AND SHALL BE EXTENDED FROM THE DISCONNECT SHOWN ON THE FLOOR PLANS TO THE EQUIPMENT TERMINATION BOX.

CONDUIT AND BOXES REQUIRED FOR EQUIPMENT CONNECTIONS SHALL BE INSTALLED IN SUCH A WAY AS TO NOT COVER UP EQUIPMENT NAMEPLATES, SERVICE AREAS, AIR FLOW AREAS, ETC.

◇ INDOOR MSAH UNIT FED FROM ASSOCIATED OUTDOOR MSHP UNIT. PROVIDE 2#12,1#12G,1/2" FROM INDOOR UNIT TO ASSOCIATED OUTDOOR UNIT.

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CONTRACTOR TO VERIFY ALL DIMENSIONS



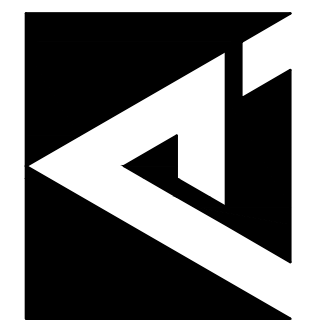
1 ELECTRICAL OVERALL LARGE SCALE PLAN
SCALE: 1" = 30'-0"

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**CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC**
ELECTRICAL OVERALL LARGE
SCALE PLAN

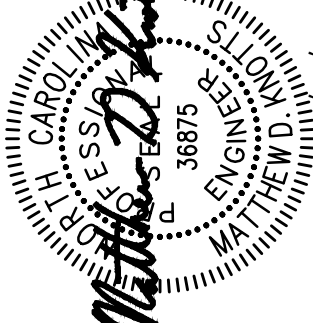
REVISION SCHEDULE	
DATE	REFERENCE

E101



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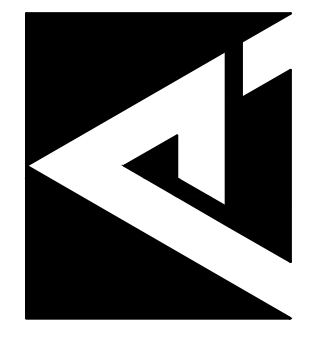
1 FLOOR PLAN - LIGHTING
 SCALE: 1/8" = 1'-0"

NOTES:
 ◆ ROUTE VIA EXTERIOR LIGHTING CONTROL CABINET "ELC". REFER TO DETAIL FOR ADDITIONAL INFORMATION.

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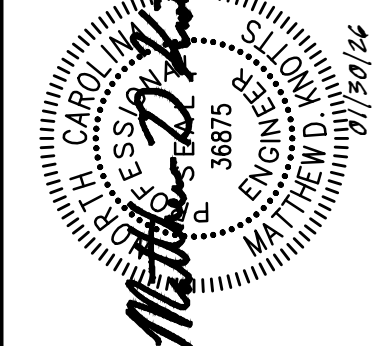
REVISION SCHEDULE		
NO.	DATE	REFERENCE

CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
 ELECTRICAL FLOOR PLAN - LIGHTING



ISSUE DATE: 01.30.26
 DRAWN BY: MDK
 CHECKED BY: 2525
 PROJECT:

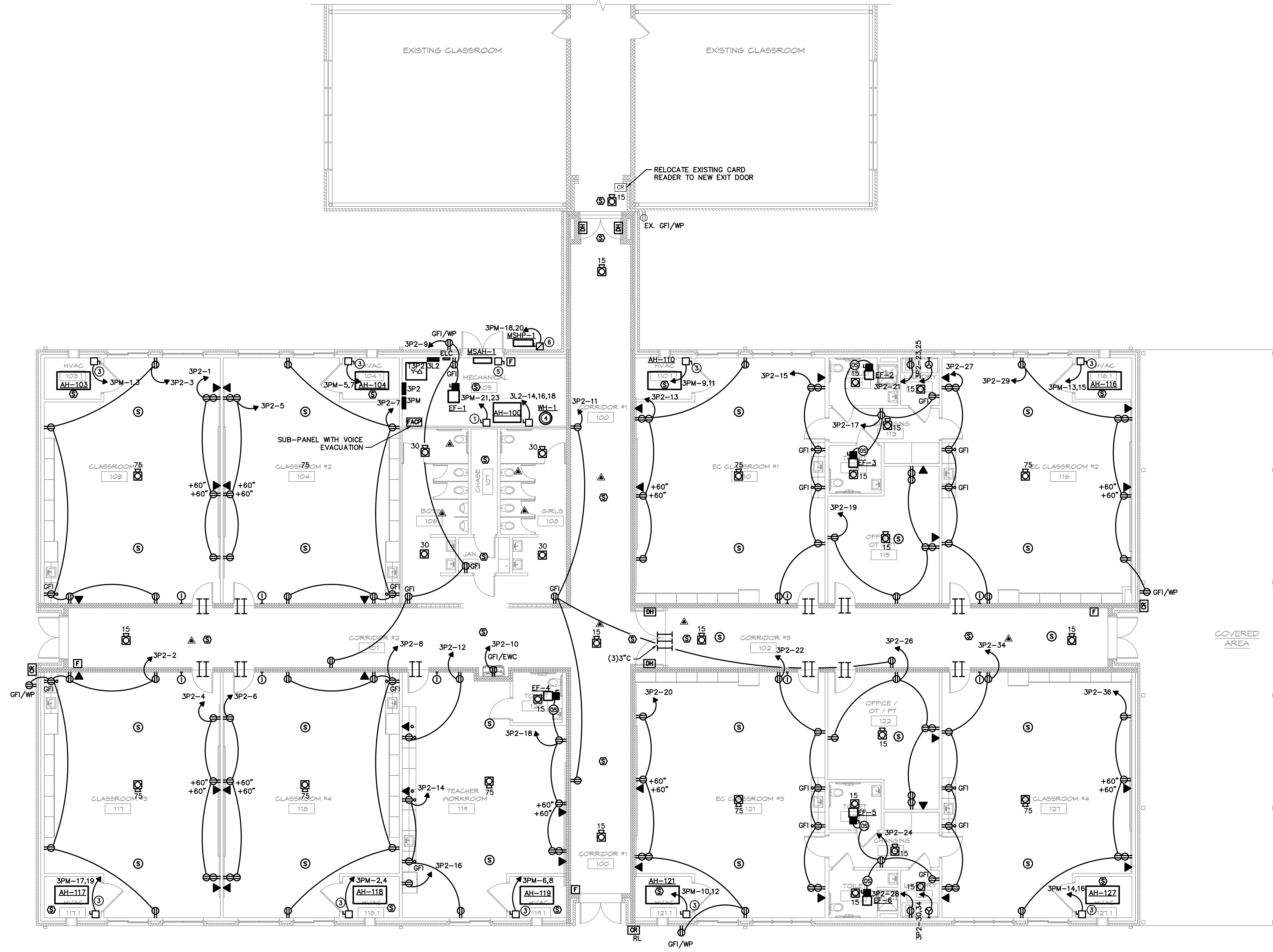
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E200



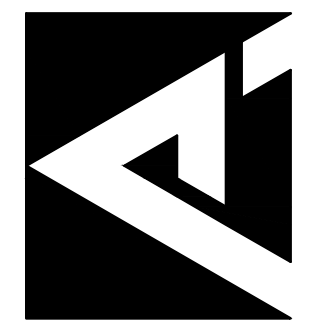
1 FLOOR PLAN - POWER
 SCALE: 1/8" = 1'-0"

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CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC
ELECTRICAL FLOOR PLAN - POWER

REVISION SCHEDULE		
NO.	DATE	REFERENCE

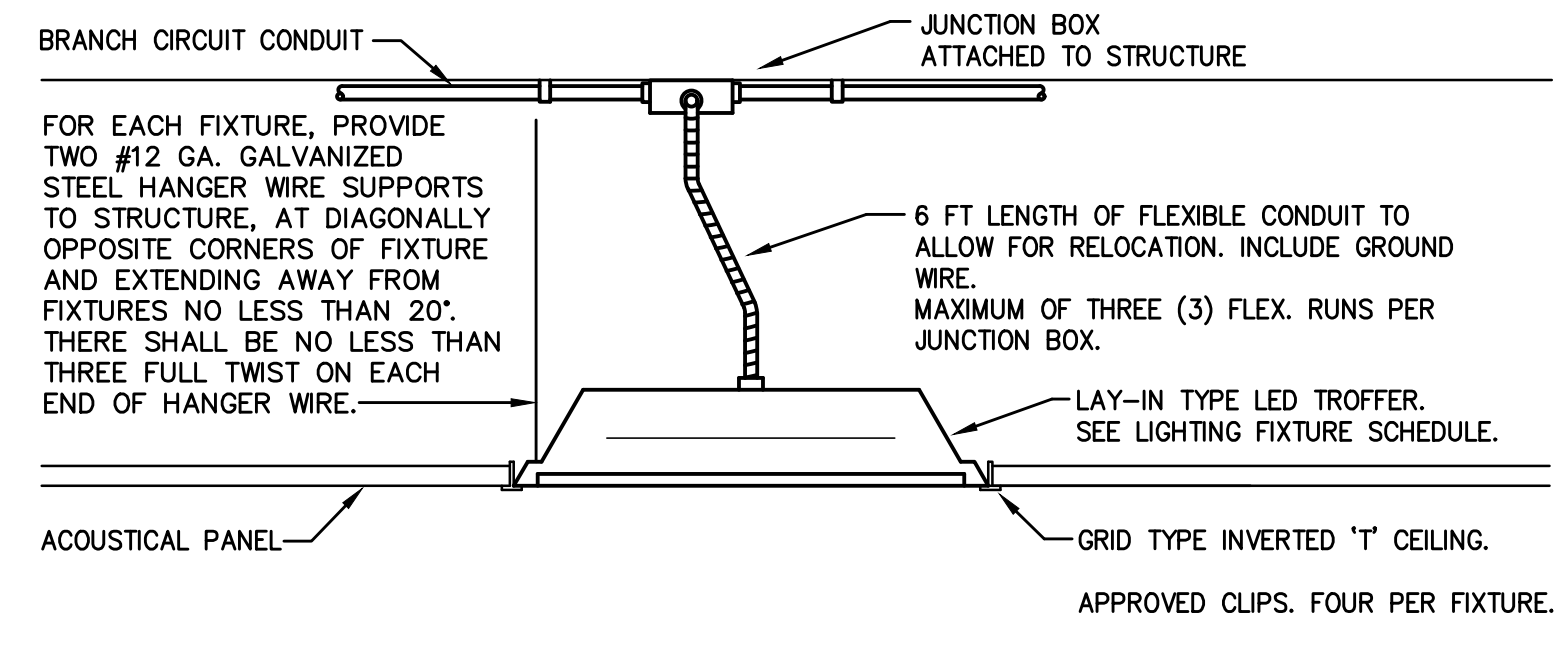
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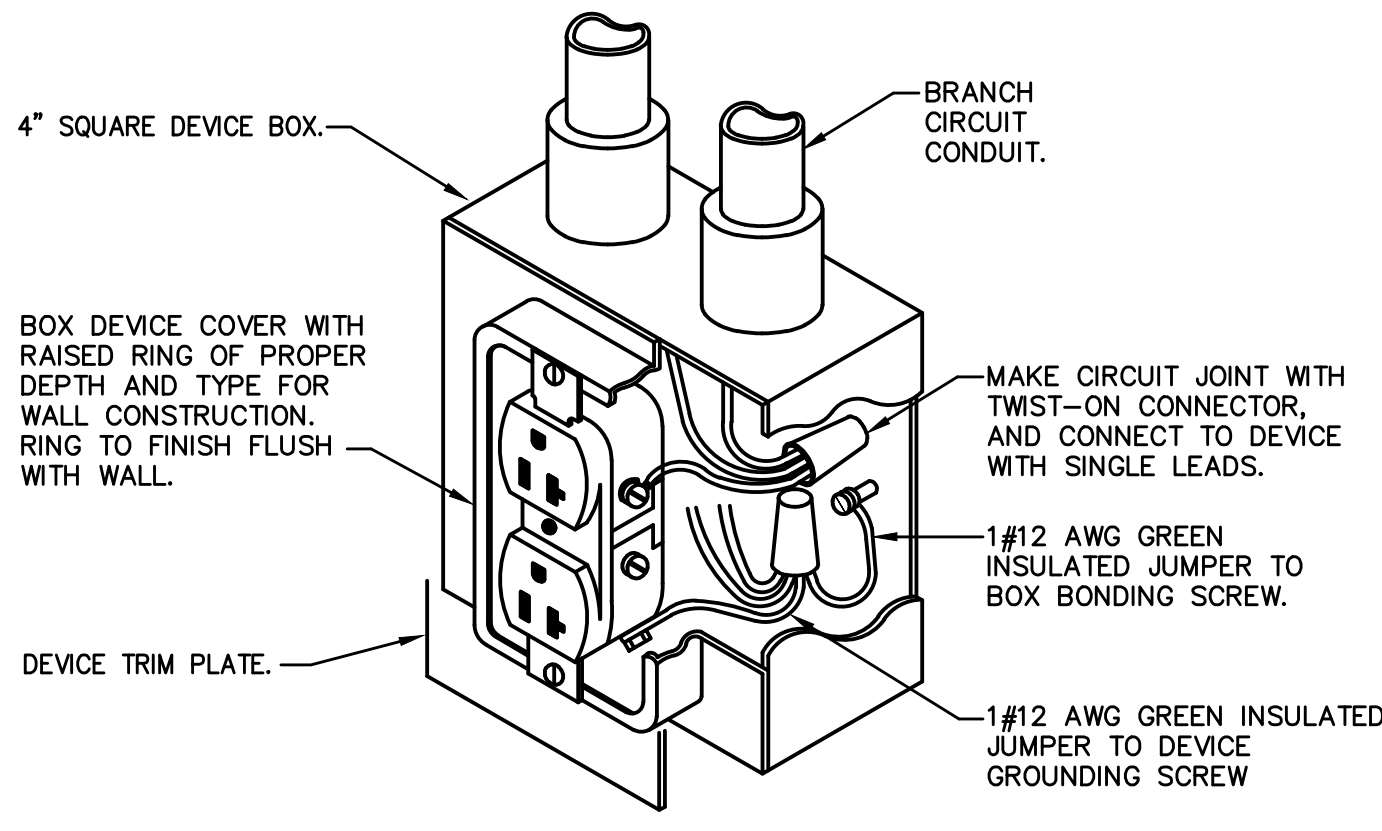
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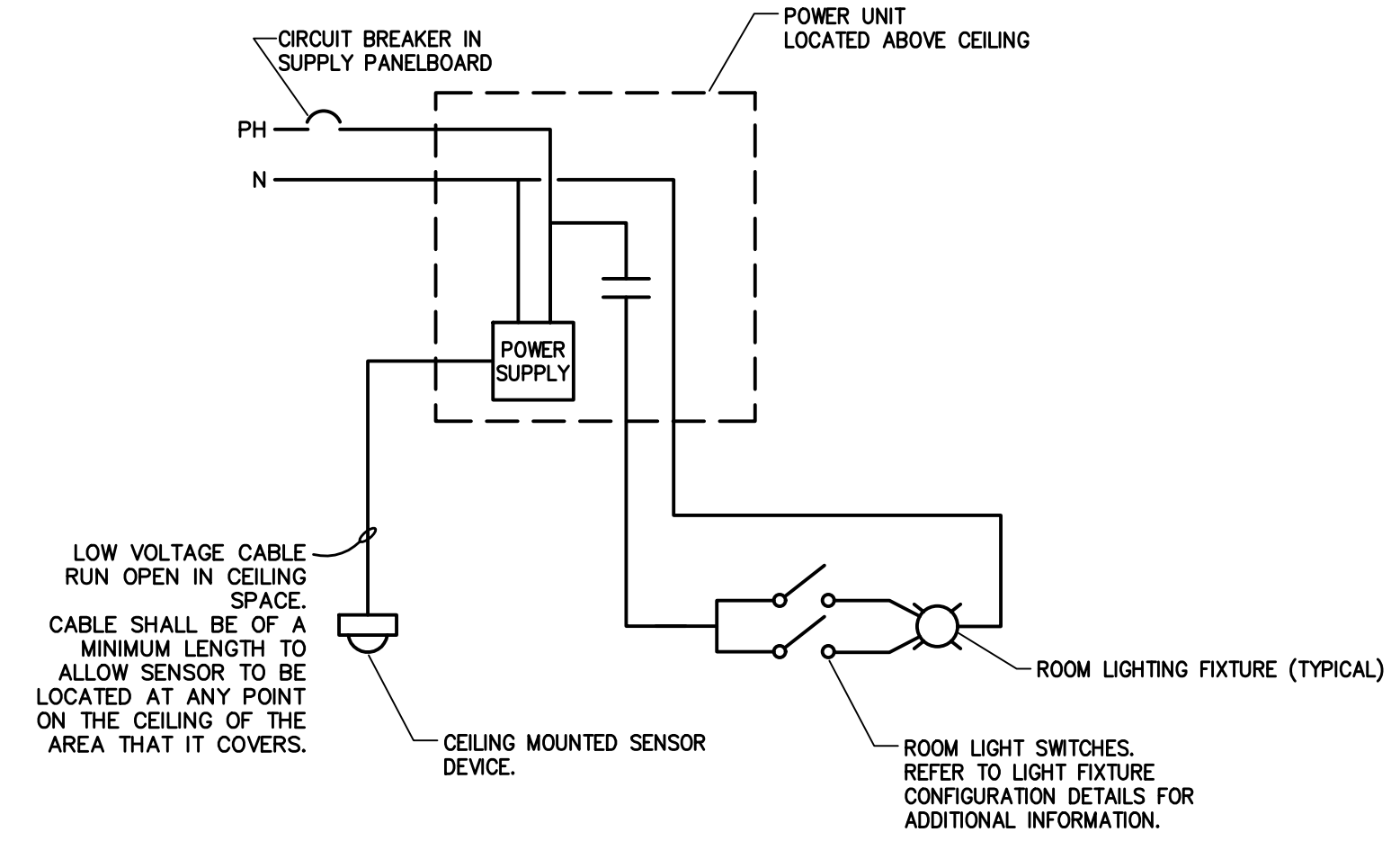
CONTRACTOR TO VERIFY ALL DIMENSIONS



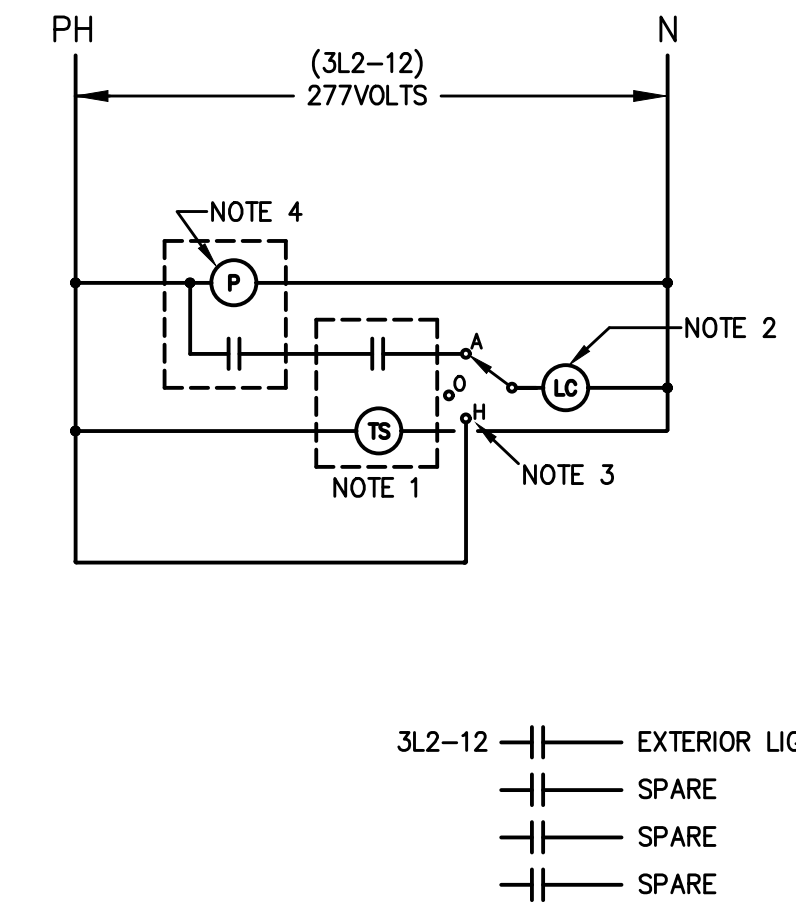
1 **DETAIL – TYPICAL LAY-IN FIXTURE INSTALLATION**
NOT TO SCALE



2 **DETAIL – TYPICAL DUPLEX RECEPTACLE INSTALLATION**
NOT TO SCALE



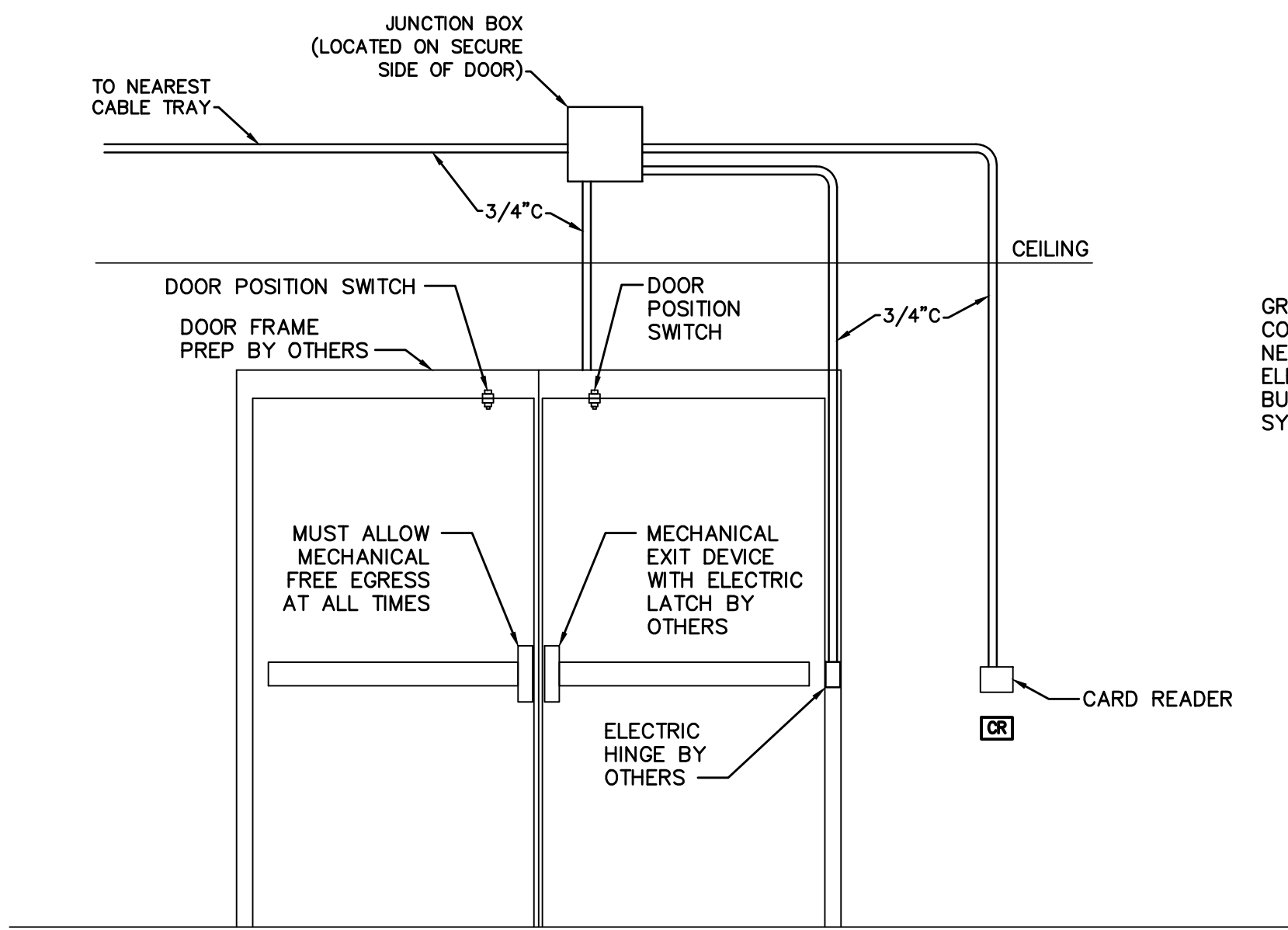
3 **DETAIL – OCCUPANCY SENSOR CONTROL**
NOT TO SCALE



- NOTES:
- DIGITAL TIME SWITCH. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
 - ELECTRICALLY HELD LIGHTING CONTACTOR WITH 20A BALLAST RATED CONTACTS. CONTACTOR SHALL BE OPEN TYPE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
 - HAND-OFF-AUTOMATIC SELECTOR SWITCH. SWITCH SHALL BE HEAVY-DUTY, OIL TIGHT, MAINTAINED CONTACT TYPE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
 - PHOTOCELL CONTROL DEVICE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
 - MOUNT TIME SWITCH AND CONTACTOR IN 18"x 18"x 6" DEEP NEMA 1 ENCLOSURE WITH HINGED DOOR. MOUNT SELECTOR SWITCH ON DOOR. PROVIDE PERMANENT NAMEPLATE ON DOOR TO READ: "EXTERIOR LIGHTING CONTROL".

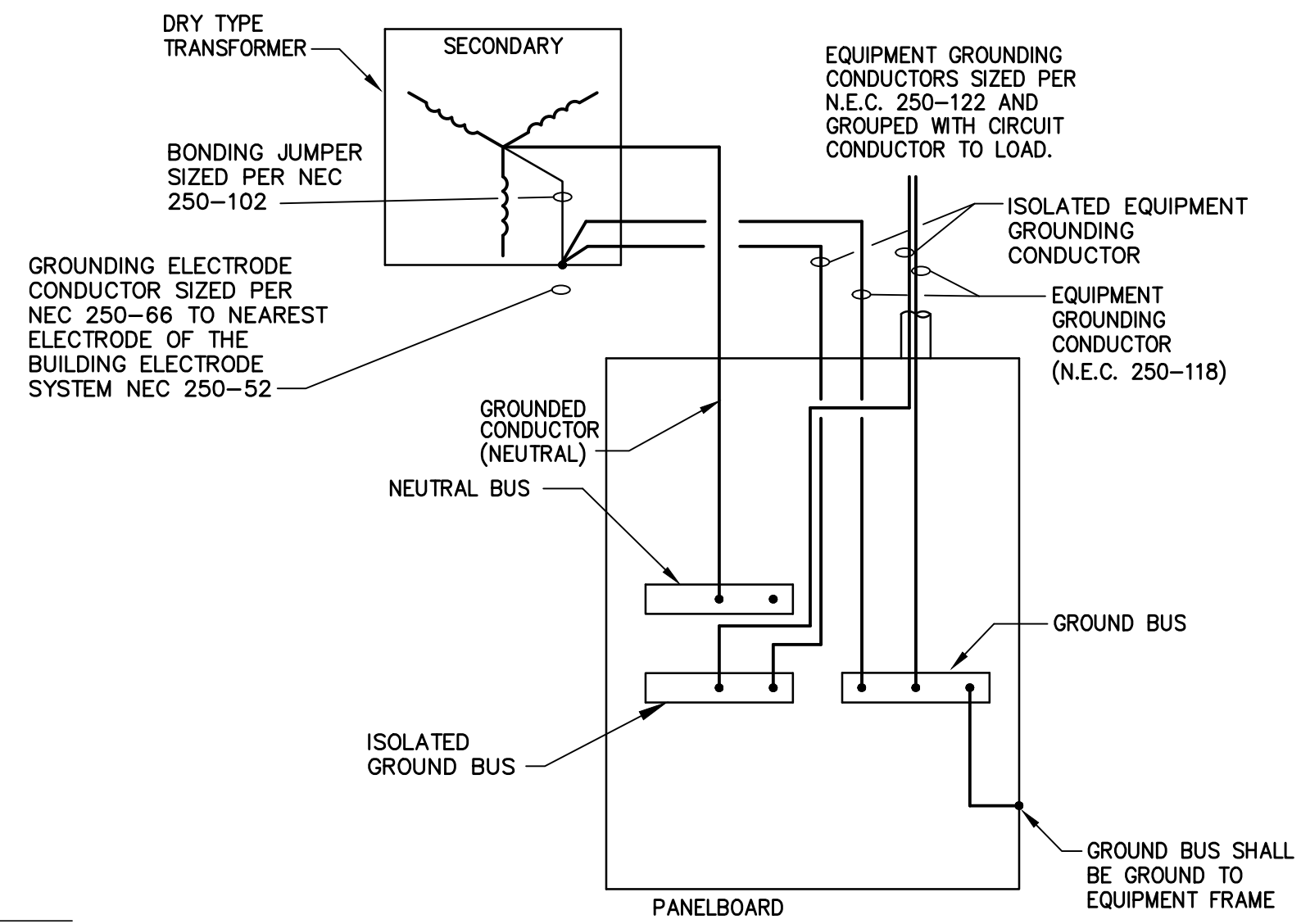
3L2-12 — EXTERIOR LIGHTING
 — SPARE
 — SPARE
 — SPARE

4 **EXTERIOR LIGHTING CONTROL DIAGRAM "ELC"**
SCALE: NOT TO SCALE



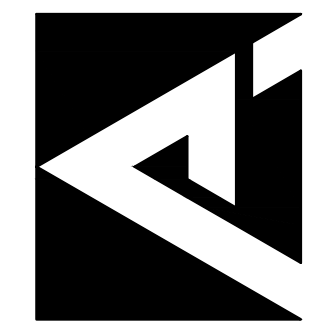
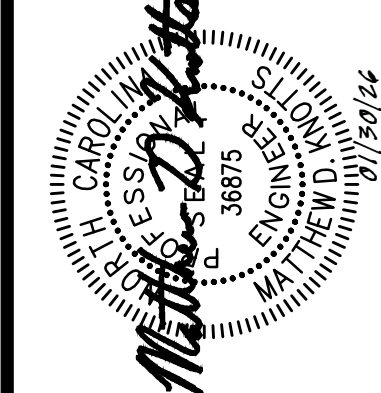
5 **TYPICAL EXTERIOR DOOR ACCESS CONTROL DIAGRAM**
SCALE: NOT TO SCALE

- NOTES:
- COORDINATE THE EXACT LOCATION OF SECURITY DEVICES, CONDUIT AND JUNCTION BOXES WITH G.C.
 - STUB CONDUIT INTO FRAME OF DOOR FOR DOOR POSITION SWITCHES AND ELECTRIC HINGE.
 - E.C. TO PROVIDE ALL CONDUIT AND BOX ROUGH-IN FOR FUTURE DEVICES BY OTHERS. PROVIDE PULL STRINGS FOR EACH CONDUIT.
 - ALL SECURITY SYSTEM JUNCTION BOXES SHALL BE MOUNTED ON THE SECURE SIDE OF DOOR.



6 **DRY TYPE TRANSFORMER GROUNDING CONNECTION DIAGRAM**
SCALE: NOT TO SCALE

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ISSUE DATE: 01/30/26
 DRAWN BY: MDK
 CHECKED BY: MDK
 PROJECT: 2523

REVISION	DATE	REFERENCE

PANELBOARD:		3L2		GROUND BUS		SC RATING:		25 KAMPS RMS SYMM.	
SERVICE:		480Y/277V 3PH 4W		MOUNTING:		SURFACE			
MAINS:		225 AMP MLO		TYPE: BRANCH		ENCLOSURE:		NEMA 1	
LOAD DESCRIPTION	WIRE	BKR	CONNECTED LOAD (KVA)			BKR	WIRE	LOAD DESCRIPTION	
			CKT	NEUT	A	B	C	CKT	
PNL 3P2	1	125/3	1A	2.1	19.5			2A	20/1 12
VIA XFMR T3P2	1	/	3B	1.7	16.8			4B	20/1 12
	1	/	5C	1.8	17.1	1.8		6C	20/1 12
SPACE ONLY	/	/	7A	1.7	0.0			8A	20/1 12
	/	/	9B	0.9	0.0			10B	20/1 12
	/	/	11C	0.5	0.0	0.5		12C	20/1 12
SPACE ONLY	/	/	13A	0.0	9.0			14A	50/3 8
	/	/	15B		0.0			16B	/ 8
	/	/	17C		0.0			18C	/ 8
SPACE ONLY	/	/	19A	0.0	0.0			20A	/3
	/	/	21B	0.0	0.0			22B	/
	/	/	23C		0.0			24C	/
SPACE ONLY	/	/	25A	0.0	0.0			26A	/3
	/	/	27B		0.0			28B	/
	/	/	29C		0.0			30C	/
				8.7	32.3	28.4	28.4		

LOAD TYPE	CONNECTED (KVA)	DEMAND FACTOR	DEMAND (KVA)
LIGHTS	8.7	1.25	10.9
RECEPTS	21.24	NEC 220.44	20.62
MOTORS	22.2	NEC 430.24	22.6
HEAT	37.0	1.0	37.0
KITCHEN	0.0	0.65	0.0
CMPTPR	0.0	1.0	0.0
OTHER	0.0	1.0	0.0
TOTAL	89.1	TOTAL	91.1

NOTES:

PANELBOARD:		3P2		GROUND BUS		SC RATING:		10 KAMPS RMS SYMM.	
SERVICE:		208Y/120V 3PH 4W		MOUNTING:		SURFACE			
MAINS:		300 AMP MCB		TYPE: BRANCH		ENCLOSURE:		NEMA 1	
LOAD DESCRIPTION	WIRE	BKR	CONNECTED LOAD (KVA)			BKR	WIRE	LOAD DESCRIPTION	
			CKT	NEUT	A	B	C	CKT	
REC: CLASSROOM	12	20/1	1A	1.1	1.1			2A	20/1 10
REC: CLASSROOM	12	20/1	3B	0.9	0.9			4B	20/1 10
REC: CLASSROOM	12	20/1	5C	0.7	0.7			6C	20/1 10
REC: CLASSROOM	12	20/1	7A	0.9	0.9			8A	20/1 12
REC: GENERAL	12	20/1	9B	0.9	0.9	1.2		10B	20/1 12
REC: GENERAL	12	20/1	11C	0.7	0.4		0.7	12C	20/1 12
REC: CLASSROOM	12	20/1	13A	0.9	0.9	0.5		14A	20/1 12
REC: CLASSROOM	12	20/1	15B	1.1	0.2		1.1	16B	20/1 12
REC: CHANGING	12	20/1	17C	0.4	0.7		0.4	18C	20/1 12
REC: OFFICE	12	20/1	19A	1.1	1.1			20A	20/1 12
WASHER (GF)	12	*20/1	21B	1.5	1.1		1.5	22B	20/1 12
DRYER (GF)	10	*30/2	23C	0.4	0.4		2.5	24C	20/1 12
			25A	2.5	1.1			26A	20/1 12
REC: CLASSROOM	12	20/1	27B	1.1	1.5			28B	*20/1 12
REC: CLASSROOM	10	20/1	29C	1.1	2.5		1.1	30C	*30/2 10
SPARE			31A	0.0	0.0		2.5	32A	/
SPARE			33B	0.0	1.1			34B	20/1 12
SPARE			35C	0.0	1.1		0.0	36C	20/1 10
SPARE			37A	0.0	0.0			38A	**20/1 12
SPARE			39B	0.0	0.0			40B	20/1
SPARE			41C	0.0	0.0		0.0	42C	20/1
SPACE ONLY	/	/	43A	0.0	0.0			44A	20/1
	/	/	45B	0.0	0.0			46B	20/1
	/	/	47C	0.0	0.0			48C	20/1
SPACE ONLY	/	/	49A	0.0	0.0			50A	/3
	/	/	51B	0.0	0.0			52B	/
	/	/	53C	0.0	0.0			54C	/
				25.4	12.9	11.2	11.3		

LOAD TYPE	CONNECTED (KVA)	DEMAND FACTOR	DEMAND (KVA)
LIGHTS	0.0	1.25	0.0
RECEPTS	21.24	NEC 220.44	20.62
MOTORS	4.2	NEC 430.24	4.7
HEAT	10.0	1.0	10.0
KITCHEN	0.0	0.65	0.0
CMPTPR	0.0	1.0	0.0
OTHER	0.0	1.0	0.0
TOTAL	35.4	TOTAL	35.3


NOTES:
 **=PROVIDE GFCI CIRCUIT BREAKER.
 ***=PROVIDE CB WITH RED "LOCK-ON" CLIP.

PANELBOARD:		3PM		GROUND BUS		SC RATING:		10 KAMPS RMS SYMM.	
SERVICE:		208Y/120V 3PH 4W		MOUNTING:		SURFACE			
MAINS:		400 AMP MLO		TYPE: BRANCH		ENCLOSURE:		NEMA 1	
LOAD DESCRIPTION	WIRE	BKR	CONNECTED LOAD (KVA)			BKR	WIRE	LOAD DESCRIPTION	
			CKT	NEUT	A	B	C	CKT	
AH-103	12	15/2	1A		0.8			2A	15/2 12
	12	/	3B		0.8			4B	/ 12
AH-104	12	15/2	5C		0.8		0.8	6C	15/2 12
	12	/	7A		0.8		0.8	8A	/ 12
AH-110	12	15/2	9B		0.8		0.8	10B	15/2 12
	12	/	11C		0.8		0.8	12C	/ 12
AH-116	12	15/2	13A		0.8		0.8	14A	15/2 12
	12	/	15B		0.8		0.8	16B	/ 12
AH-117	12	15/2	17C		0.8		0.9	18C	15/2 12
	12	/	19A		0.8		0.9	20A	/ 12
AH-100	12	15/2	21B		0.8		0.0	22B	/2
	12	/	23C		0.0		0.0	24C	/
SPACE ONLY	/	/	25A		0.0		0.0	26A	/3
	/	/	27B		0.0		0.0	28B	/
	/	/	29C		0.0		0.0	30C	/
				0.0	6.6	5.6	5.8		

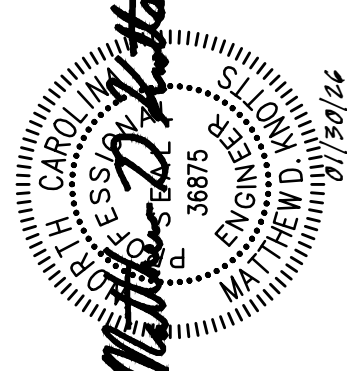
LOAD TYPE	CONNECTED (KVA)	DEMAND FACTOR	DEMAND (KVA)
LIGHTS	0.0	1.25	0.0
RECEPTS	0.0	NEC 220.44	0.00
MOTORS	18.0	NEC 430.24	18.4
HEAT	0.0	1.0	0.0
KITCHEN	0.0	0.65	0.0
CMPTPR	0.0	1.0	0.0
OTHER	0.0	1.0	0.0
TOTAL	18.0	TOTAL	18.4

NOTES:

CONTRACTOR TO VERIFY ALL DIMENSIONS.

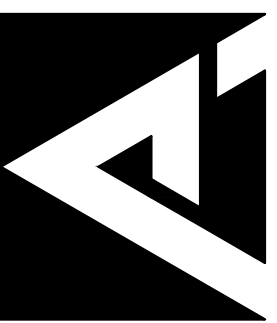


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PINNACLE ARCHITECTURE PROFESSIONAL ASSOCIATION
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 CHARLESTON, SOUTH CAROLINA 29403
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 ISSUE DATE: 01/30/26
 DRAWN BY: MDK
 CHECKED BY: MDK
 PROJECT: 2523

**CLASSROOM ADDITION
 ROSEWOOD ELEM. SCHOOL
 WAYNE COUNTY, NC**
ELECTRICAL PANEL SCHEDULES

REVISION SCHEDULE	DATE	REFERENCE

E600

ELECTRICAL GENERAL REQUIREMENTS

- 1.1 SCOPE:
 - A. APPLICABLE REQUIREMENTS OF THE GENERAL CONDITIONS OF THE CONTRACT, AMENDMENTS, SUPPLEMENTARY GENERAL CONDITIONS, AND SPECIAL CONDITIONS GOVERN WORK UNDER THIS DIVISION.
 - B. WORK COVERED BY THIS DIVISION CONSISTS OF PROVIDING ALL LABOR, EQUIPMENT, SUPPLIES, AND MATERIALS; AND PERFORMING ALL OPERATIONS, INCLUDING TRENCHING, BACKFILLING, CUTTING, PATCHING, AND CHASING NECESSARY FOR THE INSTALLATION OF COMPLETE ELECTRICAL SYSTEMS IN STRICT ACCORDANCE WITH THESE SPECIFICATIONS AND THE APPLICABLE DRAWINGS.
 - C. MINOR DETAILS NOT USUALLY SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER INSTALLATION AND OPERATION, SHALL BE INCLUDED IN THE WORK, THE SAME AS IF HEREIN SPECIFIED OR SHOWN.
 - D. THIS CONTRACT IS REFERRED TO THE GENERAL AND SPECIAL CONDITIONS OF THE CONTRACT WHICH SHALL FORM A PART AND BE INCLUDED IN THIS SECTION OF THE SPECIFICATION AND SHALL BE BINDING ON THIS CONTRACTOR.
 - E. SOME ITEMS OF EQUIPMENT ARE SPECIFIED IN THE SINGULAR; HOWEVER, THE CONTRACTOR SHALL PROVIDE AND INSTALL THE NUMBER OF ITEMS OR EQUIPMENT AS INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR COMPLETE SYSTEMS.

- 1.2 DEFINITION:
 - A. THE WORD "CONTRACTOR" AS USED IN THIS SECTION OF THE SPECIFICATION REFERS TO THE ELECTRICAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE. THE WORD "PROVIDE" MEANS FURNISH, FABRICATED, COMPLETE, INSTALL, ERECT, INCLUDING LABOR AND INCIDENTAL MATERIALS NECESSARY TO COMPLETE IN PLACE AND READY FOR OPERATION OR USE THE ITEM REFERRED TO OR DESCRIBED HEREIN AND/OR REFERRED TO ON THE CONTRACT DRAWINGS.

- 1.3 CONTRACTOR'S QUALIFICATIONS:
 - A. IT IS ASSUMED THAT THE CONTRACTOR HAS HAD SUFFICIENT GENERAL KNOWLEDGE AND EXPERIENCE TO ANTICIPATE THE NEEDS OF A CONSTRUCTION OF THIS NATURE. THE CONTRACTOR SHALL FURNISH ALL ITEMS REQUIRED TO COMPLETE THE CONSTRUCTION IN ACCORDANCE WITH REASONABLE INTERPRETATION OF THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. ANY MINOR ITEMS REQUIRED BY CODE, LAW OR REGULATIONS SHALL BE PROVIDED EVEN IF NOT SPECIFIED OR SPECIFICALLY SHOWN, WHERE IT IS PART OF A MAJOR SYSTEM.

- 1.4 CONTRACT DOCUMENTS:
 - A. THE CONTRACT DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO INDICATE EVERY DETAIL OF CONSTRUCTION OR EVERY ITEM OF MATERIAL OR EQUIPMENT REQUIRED, OR EXACT LOCATIONS. INDICATED LOCATIONS OF OUTLETS, EQUIPMENT, AND CONNECTIONS ARE APPROXIMATE AND SHALL BE VERIFIED BY REFERENCE TO RELATED DOCUMENTS.
 - B. THE CONTRACTOR SHALL PROCURE COMPLETE DRAWINGS AND SPECIFICATIONS ON ALL COINCIDENT CONSTRUCTION AND FIT THE ELECTRICAL WORK IN WITH IT. HE SHALL COOPERATE WITH OTHER TRADES TO ACHIEVE WELL-COORDINATED PROGRESS AND RESULTS; AND AVOID CONFLICTS WITH OTHER TRADES. HE SHALL MAKE MINOR MOVES AND CHANGES NECESSARY TO ACCOMMODATE OTHER EQUIPMENT AND/OR PRESERVE SYMMETRY WITHOUT CLAIM FOR EXTRA PAYMENT. SHOULD THERE BE ANY DOUBT AS TO THE SPACING INTENT, OR LOCATION OF EQUIPMENT, THE CONTRACTOR SHALL HAVE THE POINT CLARIFIED BY THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE INSTALLATION.

- 1.5 RECORD DRAWINGS:
 - A. DURING CONSTRUCTION OF THIS PROJECT, THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF ELECTRICAL CONTRACT DRAWINGS, ON WHICH SHALL BE RECORDED ALL SIGNIFICANT CHANGES. THIS SET OF DRAWINGS SHALL BE USED FOR NO OTHER PURPOSE. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL SUBMIT THESE DRAWINGS TO THE ARCHITECT/ENGINEER FOR APPROVAL AND PRESENTATION TO THE OWNER.
 - B. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PREPARE AN OPERATION AND MAINTENANCE MANUAL, WHICH SHALL INCLUDE CATALOG DATA, EQUIPMENT INFORMATION, WIRING DIAGRAMS, AND WARRANTY INFORMATION FOR THE ELECTRICAL INSTALLATION. SUBMIT THREE COPIES TO THE ARCHITECT/ENGINEER FOR APPROVAL AND PRESENTATION TO THE OWNER.

- 1.6 REGULATIONS AND COMPLIANCE:
 - A. THE REQUIREMENTS OF THE NORTH CAROLINA STATE BUILDING CODE, THE NATIONAL ELECTRICAL CODE, AND OF ALL OTHER STATE AND LOCAL CODES, ORDINANCES, REGULATIONS, AND INTERPRETATIONS BY AUTHORITIES HAVING JURISDICTION ARE BINDING UPON THIS CONTRACTOR, AND NOTHING CONTAINED IN, OR INFERRED BY, THESE SPECIFICATIONS OR THE APPLICABLE DRAWINGS MAY BE CONSTRUED AS WAIVING THOSE REQUIREMENTS. THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, REFERRED TO HEREIN AND ON THE DRAWINGS AS "N.E.C.", FORMS A PART OF THESE SPECIFICATIONS; AND UNDER NO CIRCUMSTANCES MAY THE INSTALLATION FAIL TO MEET THE MINIMUM REQUIREMENTS THEREIN.
 - B. THIS CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS, FEES, INSPECTIONS, AND LICENSES REQUIRED. UPON COMPLETION OF THE PROJECT AND PRIOR TO HIS REQUEST FOR FINAL PAYMENT HE SHALL PRESENT TO THE ARCHITECT/ENGINEER A CERTIFICATE OF INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES.
 - C. REQUIREMENTS OF THE POWER AND TELEPHONE UTILITIES SHALL BE MET. THE CONTRACTOR SHALL INSTALL AND CONNECT ALL UTILITY SUPPLIED EQUIPMENT SUCH AS CURRENT TRANSFORMERS, CABINETS, METERS, AND BOXES. REGULATIONS OF THE UTILITY SHALL GOVERN SERVICE CONNECTIONS AND INSTALLATION OF METERING EQUIPMENT.
 - D. THE CONTRACTOR SHALL INCLUDE IN HIS WORK, WITHOUT EXTRA COST TO THE OWNER, ANY LABOR, MATERIALS, SERVICE, APPARATUS, DRAWINGS, TO COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, AND REGULATIONS, WHETHER SHOWN ON DRAWINGS AND/OR SPECIFIED.
 - E. ALL MATERIALS FURNISHED, AND ALL WORK INSTALLED SHALL COMPLY WITH THE NATIONAL FIRE CODES OF THE NATIONAL FIRE PROTECTION ASSOCIATION, AND WITH THE REQUIREMENTS OF ALL GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION.
 - F. ALL MATERIALS AND EQUIPMENT SHALL BEAR THE APPROVAL LABEL, AND SHALL BE LISTED BY THE UNDERWRITERS' LABORATORIES, INC., OR ANY OTHER THIRD-PARTY LISTING ORGANIZATION ACCEPTABLE TO THE NORTH CAROLINA BUILDING CODE COUNCIL. REFER TO THE LIST OF ACCEPTABLE TESTING AGENCIES ON THE NC OSFM WEBSITE UNDER "CODE ENFORCEMENT RESOURCES".
 - G. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE LOCAL ELECTRICAL INSPECTOR TO SCHEDULE THE REQUIRED INSPECTIONS.
 - H. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OFFICE OF THE STATE ELECTRICAL INSPECTOR, DEPARTMENT OF INSURANCE, TO SCHEDULE THE REQUIRED INSPECTIONS.

- 1.7 ELECTRICAL TESTING:
 - A. CONDUIT FULL-SCALE TESTS WITH ALL LIGHTS, EQUIPMENT AND APPLIANCES IN OPERATION AND PROVE THE ELECTRICAL SYSTEM SATISFACTORY FOR OPERATION AND FREE FROM DEFECTS. PAY ATTENTION TO THE BALANCING OF THE SINGLE-PHASE LOADS ON THE THREE-PHASE SYSTEM. PROMPTLY REMEDY ALL DEFECTS.
 - B. ALL FEEDER PHASE CONDUCTORS AND NEUTRALS SHALL BE TESTED AS INSTALLED, AND BEFORE CONNECTIONS ARE MADE, FOR INSULATION RESISTANCE, CONTINUITY, AND ACCIDENTAL GROUND. THIS SHALL BE DONE WITH A 500-VOLT MEGGER. THE PROCEDURES LISTED BELOW SHALL BE FOLLOWED:
 1. MINIMUM READINGS SHALL BE ONE MILLION OR MORE OHMS FOR #6 AWG WIRE AND SMALLER, 250,000 OHMS OR MORE FOR #4 AWG WIRE OR LARGER, BETWEEN CONDUCTORS AND BETWEEN CONDUCTOR AND THE GROUNDING CONDUCTOR.
 2. AFTER ALL FIXTURES AND DEVICES ARE INSTALLED AND ALL CONNECTIONS COMPLETED TO EACH PANEL, THE CONTRACTOR SHALL DISCONNECT THE NEUTRAL FEEDER CONDUCTOR FROM THE NEUTRAL BAR AND TAKE A MEGGER READING BETWEEN THE NEUTRAL BAR AND THE GROUNDED ENCLOSURE. IF THIS READING IS LESS THAN 250,000 OHMS, THE CONTRACTOR SHALL DISCONNECT THE BRANCH CIRCUIT NEUTRAL WIRES FROM THIS NEUTRAL BAR. HE SHALL THEN TEST EACH ONE SEPARATELY ON THE PANEL UNTIL THE LOW READING IS FOUND. THE CONTRACTOR SHALL CORRECT TROUBLES, RECONNECT, AND RETEST UNTIL AT LEAST 250,000 OHMS FROM THE NEUTRAL BAR TO THE GROUNDED PANEL CAN BE ACHIEVED WITH ONLY THE NEUTRAL FEEDER DISCONNECTED.
 3. AT FINAL INSPECTION, THE CONTRACTOR SHALL FURNISH A MEGGER AND SHOW THAT THE PANELS COMPLY WITH THE ABOVE REQUIREMENTS. HE SHALL ALSO FURNISH AN AMMETER (HOOK-ON TYPE) AND VOLTMETER TO TAKE CURRENT AND VOLTAGE READINGS AS DIRECTED.
 - C. UPON COMPLETION OF INSTALLATION OF THE ELECTRICAL GROUNDING AND BONDING SYSTEMS, THE GROUND RESISTANCE SHALL BE TESTED WITH A GROUND RESISTANCE TESTER UTILIZING THE IEEE FALL-OFF-POTENTIAL METHOD OF TESTING. WHERE TESTS SHOW RESISTANCE-TO-GROUND IS OVER 25 OHMS, APPROPRIATE ACTION SHOULD BE TAKEN TO REDUCE THE RESISTANCE TO 25 OHMS, OR LESS, BY DRIVING ADDITIONAL GROUND RODS. (THE COMPLIANCE SHOULD BE DEMONSTRATED

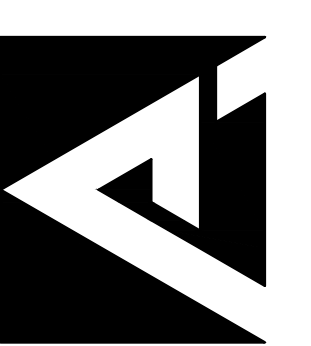
- D. BY RETESTING).
 - D. IF PROVIDED, GROUND FAULT PROTECTION ON NEW CIRCUIT BREAKERS SHALL BE PERFORMANCE TESTED IN THE FIELD AND PROPERLY CALIBRATED AND SET IN ACCORDANCE WITH THE COORDINATION STUDY.
 - E. ALL TESTS SPECIFIED SHALL BE COMPLETELY DOCUMENTED INDICATING TIME OF DAY, DATE, TEMPERATURE, AND ALL PERTINENT TEST INFORMATION.
 - F. ALL REQUIRED DOCUMENTATION OF READINGS INDICATED ABOVE SHALL BE SUBMITTED TO ENGINEER PRIOR TO, AND AS ONE OF THE PREREQUISITES FOR, FINAL ACCEPTANCE OF THE PROJECT.
 - G. ALL ELEMENTS OF THE ELECTRICAL SYSTEM PROVIDED, FURNISHED, INSTALLED, OR OTHERWISE ALTERED UNDER THIS CONTRACT SHALL BE SUBJECT TO TESTING REQUIRED UNDER THIS CONTRACT. WHERE TEST RESULTS INDICATE FAILURE, THE CONTRACTOR SHALL REPAIR, ADJUST, OR REPLACE AS REQUIRED AND REPEAT THE TESTING AT NO EXTRA COST.
 - H. TESTING SHALL BE PERFORMED BY QUALIFIED TESTING AGENCIES AND FIELD SERVICES COMPANIES AS NECESSARY TO AUGMENT THE CONTRACTOR'S OWN CAPABILITIES. TESTING AND REPORTING METHODS SHALL COMPLY WITH PUBLISHED STANDARDS. ALL TEST RESULTS SHALL BE PUBLISHED ON THE CONTRACTOR'S OR TESTING COMPANY'S LETTERHEAD OR TEST FORMS BEARING THE LEGAL NAME AND ADDRESS OF THE COMPANY.
- 1.8 GUARANTEE:
- A. THE CONTRACTOR SHALL GUARANTEE THAT THE WORK DONE HAS BEEN DONE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, FREE OF IMPERFECT MATERIALS AND DEFECTIVE WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE BY THE OWNER. THE CONTRACTOR SHALL REPAIR OR REPLACE, AT NO ADDITIONAL EXPENSE TO THE OWNER, ANY IMPERFECT MATERIALS OR DEFECTIVE WORKMANSHIP.
- 2.1 GENERAL:
- A. EXCEPT WHERE REUSE OF EXISTING ITEMS IS SPECIFICALLY INDICATED OR PERMITTED, ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL CONFORM TO THE STANDARDS OF THE NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION AND UNDERWRITERS' LABORATORIES, INC. IN EVERY INSTANCE WHERE SUCH A STANDARD HAS BEEN ESTABLISHED FOR THE ITEM INVOLVED.
 - B. CATALOG NUMBERS AND TRADE NAMES IN THESE SPECIFICATIONS AND DRAWINGS ARE INTENDED ONLY TO SET FORTH AND CONVEY TO BIDDERS THE GENERAL STYLE, TYPE, CHARACTER, AND QUALITY OF PRODUCT DESIRED. SIMILAR PRODUCTS OF OTHER MANUFACTURERS, OF EQUAL QUALITY, SIZE, CAPACITY, CHARACTER, AND APPEARANCE MAY BE SUBSTITUTED ON THE WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER. REQUESTS FOR APPROVAL OF SUBSTITUTIONS SHALL BE MADE AFTER THE AWARD OF THE CONTRACT IN ACCORDANCE WITH THE BIDDING REQUIREMENTS OF THESE SPECIFICATIONS.
 - C. IF THE INTENT OF THE DRAWINGS AND SPECIFICATIONS THAT THE INSTALLATION BE COMPLETE, OF FINISHED APPEARANCE, AND READY FOR OPERATION, MANUFACTURER'S CATALOG NUMBERS AS USED HEREIN AND ON THE DRAWINGS ARE INDICATIVE OF THE TYPE OF PRODUCT TO BE INSTALLED, AND DO NOT NECESSARILY IDENTIFY ALL PARTS AND ACCESSORIES REQUIRED FOR THE PROPER ASSEMBLY, INSTALLATION, AND UTILIZATION OF THE PRODUCT, ALL REQUIRED PARTS AND ACCESSORIES SHALL BE PROVIDED.
 - D. MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR UPON THEIR ARRIVAL AT THE SITE TO BE SURE THEY ARE CORRECT, MATERIAL AND EQUIPMENT STORED ON THE SITE SHALL BE PROTECTED AGAINST PHYSICAL DAMAGE, DIRT AND DAMAGE CAUSED BY PRECIPITATION, WIND, CONDENSATION, EXCESSIVE HUMIDITY, AND EXTREMES OF TEMPERATURE. MATERIALS SHALL BE STORED IN THEIR ORIGINAL CARTONS WITH SUBSTANTIAL CLEAN AND DRY STORAGE FACILITIES PROVIDED UNDER THIS CONTRACT. CONDUIT, LARGE GALVANIZED BOXES, AND LIGHTING POLES MAY BE STORED OUTDOORS ON SUITABLE BLOCKS OR RACKS CLEAR OF THE EARTH AND UNDERGROWTH AND PITCHED TO DRAIN. LARGE ELECTRICAL EQUIPMENT INTENDED FOR ULTIMATE INSTALLATION OUTDOORS MAY BE STORED IN THE WEATHER ON SUITABLE BLOCKS OR PLATFORMS CLEAR OF THE EARTH AND UNDERGROWTH, AND WITH INTERIOR LAMPS OR SPACE HEATERS CONTINUOUSLY ENERGIZED TO PREVENT CONDENSATION. ALTERNATE STORAGE PROVISIONS MAY BE SUBMITTED TO THE ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO THE ARRIVAL OF THE MATERIAL. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE STORED IN THE WEATHER UNDER A COVER OF POLYETHYLENE OR TARP/APOD. THE ARCHITECT/ENGINEER WILL BE THE SOLE JUDGE AS TO THE ACCEPTABILITY OF STORAGE FACILITIES, AND WHEN DIRECTED BY THE ARCHITECT/ENGINEER, IMPROPERLY STORED OR DAMAGED MATERIAL SHALL BE REMOVED FROM THE SITE AND REPLACED WITH NEW MATERIAL.
- 2.2 SUBMITTALS:
- A. SUBMITTAL DATA SHALL BE THOROUGHLY REVIEWED AND APPROVED BY THE CONTRACTOR PRIOR TO BEING FORWARDED TO THE ARCHITECT/ENGINEER. SUBMITTAL DATA RECEIVED FROM THE CONTRACTOR WILL BE CONSIDERED TO HAVE BEEN REVIEWED AND APPROVED BY THE CONTRACTOR AS SUITABLE FOR THE APPLICATION AND FOR INSTALLATION IN THE SPACE ALLOTTED.
 - B. THE SUBMITTAL OF SHOP DRAWINGS SHALL BE WITH THE CONTRACTOR STAMP AFFIXED. THIS STAMP INDICATES THAT THE CONTRACTOR, BY APPROVING AND SUBMITTING SHOP DRAWINGS, REPRESENTS THAT HE HAS DETERMINED AND VERIFIED ALL FIELD MEASUREMENTS AND QUANTITIES, FIELD CONSTRUCTION CRITERIA, MATERIAL, CATALOG MATERIAL, AND SIMILAR DATA THAT HE HAS REVIEWED AND COORDINATED INFORMATION IN THE SHOP DRAWINGS WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS. IT, ALSO, INDICATES THAT ANY DEVIATION FROM THE CONTRACT DOCUMENTS HAS BEEN SHOWN ON THE SUBMITTAL AND CLEARLY DETAILED. THE DEVIATIONS SHALL BE APPROVED BY THE ARCHITECT/ENGINEER.
 - C. APPROVAL RENDERED ON SHOP DRAWINGS SHALL NOT BE CONSIDERED AS A GUARANTEE OF QUANTITIES, MEASUREMENTS, OR BUILDING CONDITIONS. WHERE DRAWINGS ARE APPROVED, SAID APPROVAL DOES NOT MEAN THAT DRAWINGS HAVE BEEN CHECKED IN DETAIL. SAID APPROVAL DOES NOT IN ANY WAY RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITIES OR NECESSITY OF FURNISHING MATERIAL OR PERFORMING WORK AS REQUIRED BY THE CONTRACT DRAWINGS AND SPECIFICATIONS.
 - D. FAILURE OF THE CONTRACTOR TO SUBMIT SHOP DRAWINGS IN AMPLE TIME FOR CHECKING SHALL NOT ENTITLE HIM TO AN EXTENSION OF CONTRACT TIME, AND NO CLAIM FOR EXTENSION BY REASON OF DEFAULT WILL BE ALLOWED.
 - E. CONTRACTOR SHALL KEEP ON THE JOB AT ALL TIMES COPIES OF ALL APPROVED SHOP DRAWINGS.
- 2.3 EQUIPMENT DEVIATIONS:
- A. WHERE THE CONTRACTOR PROPOSES TO USE AN ITEM OF EQUIPMENT OTHER THAN THAT SPECIFIED OR DETAILED ON THE DRAWINGS, WHICH REQUIRES ANY REDESIGN OF THE STRUCTURE, PARTITIONS, FOUNDATIONS, PIPING, WIRING OR ANY OTHER PART OF THE MECHANICAL, ELECTRICAL, OR ARCHITECTURAL LAYOUT, ALL SUCH REDESIGN, AND ALL NEW DRAWINGS AND DETAILING REQUIRED THEREFORE, SHALL BE PREPARED BY THE CONTRACTOR AT HIS OWN EXPENSE AND SUBMITTED FOR APPROVAL BY THE ARCHITECT/ENGINEER.
 - B. WHERE SUCH APPROVED DEVIATION REQUIRES A DIFFERENT QUANTITY AND ARRANGEMENT OF WIRING, CONDUIT, AND EQUIPMENT FROM THAT SPECIFIED OR INDICATED ON THE DRAWINGS, THE CONTRACTOR SHALL FURNISH AND INSTALL ANY SUCH STRUCTURAL SUPPORTS, ELECTRICAL WIRING AND CONDUIT, AND ANY OTHER ADDITIONAL EQUIPMENT REQUIRED BY THE SYSTEM, AT NO ADDITIONAL COST TO THE OWNER.
- 3.1 GENERAL:
- A. THE CONTRACTOR SHALL COORDINATE THE WORK AND EQUIPMENT OF THIS DIVISION WITH THE WORK AND EQUIPMENT SPECIFIED ELSEWHERE TO ASSURE A COMPLETE AND SATISFACTORY INSTALLATION. WORK SUCH AS EXCAVATION, BACKFILL, CONCRETE, FLASHING, WIRING, ETC., WHICH IS REQUIRED BY THE WORK OF THIS SECTION SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE SECTION OF THE SPECIFICATIONS.
 - B. IF IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION, WHENEVER THE WORK "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE AND READY FOR USE".
- 3.2 DUTIES OF CONTRACTOR:
- A. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIALS CALLED FOR IN THESE SPECIFICATIONS AND ACCOMPANYING DRAWINGS AND MUST FURNISH THE APPARATUS COMPLETE IN EVERY RESPECT. ANYTHING CALLED FOR IN THE SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS OR SHOWN ON THE DRAWINGS AND NOT CALLED FOR IN THE SPECIFICATIONS MUST BE FURNISHED BY THE CONTRACTOR.
 - B. THE CONTRACTOR IS RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH THE DETAILS OF THE CONSTRUCTION OF THE BUILDING WORK UNDER THESE SPECIFICATIONS INSTALLED IMPROPERLY OR WHICH REQUIRES CHANGING DUE TO IMPROPER READING OR INTERPRETATION OF BUILDING PLANS SHALL BE CORRECTED AND CHANGED AS DIRECTED BY THE ARCHITECT/ENGINEER WITHOUT ADDITIONAL COST TO THE OWNER.
 - C. THE CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS OR OTHER TRADES TO VERIFY SPACES IN WHICH WORK WILL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITIONS AT ALL POINTS. WHERE HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE, THE ARCHITECT/ENGINEER SHALL BE NOTIFIED BEFORE PROCEEDING WITH
- 3.3 COORDINATION:
- A. THIS CONTRACTOR SHALL COORDINATE THE WORK OF ALL SUBS AND SHALL FURNISH ANY INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTOIRLY AND WITH THE LEAST POSSIBLE INTERFERENCE OR DELAY.
 - B. WHERE THE WORK WILL BE INSTALLED NEAR, OR MAY INTERFERE WITH THE WORK OF OTHER TRADES, THE CONTRACTOR SHALL ASSIST IN WORKING OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT. IF DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PREPARE COMPOSITE WORKING DRAWINGS AND SECTIONS AT A SUITABLE SCALE NOT LESS THAN 3/8" = 1'-0", CLEARLY SHOWING HOW HIS WORK IS TO BE INSTALLED IN RELATION TO THE WORK OF OTHER TRADES. IF THE CONTRACTOR INSTALLS HIS WORK BEFORE COORDINATION, OR TO CAUSE ANY INTERFERENCE WITH WORK OF ANY SUBS, HE SHALL MAKE THE NECESSARY CHANGES IN HIS WORK TO CORRECT THE CONDITION WITHOUT EXTRA CHARGE.
 - C. THE CONTRACTOR SHALL FURNISH TO OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS, AND SHOP DETAILS FOR THE PROPER INSTALLATION OF WORK AND FOR COORDINATING ADJACENT WORK.
- 3.4 EXCAVATION:
- A. REQUIRED EXCAVATION FOR INSTALLATION OF ALL ELECTRICAL WORK SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. CARE SHALL BE TAKEN NOT TO DISTURB OR DAMAGE THE WORK OF OTHER TRADES.
 - B. TRENCHING AND SHORING SHALL COMPLY WITH REQUIREMENTS OF NORTH CAROLINA STATE DEPARTMENT OF LABOR'S REGULATIONS ENTITLED "SAFEGUARDS DURING CONSTRUCTION", AND "TRENCHING AND SHORING".
 - C. IN BACKFILLING PIPE TRENCHES, APPROVED FILL SHALL FIRST BE COMPACTED FIRMLY AND EVENLY ON BOTH SIDES OF PIPE IN 6" LAYERS TO A DEPTH OF 12" OVER THE TOP OF THE PIPE. THE REMAINING OF TRENCHES SHALL BE BACKFILLED TO ESTABLISHED GRADE IN 6" LAYERS. THE CONTRACTOR SHALL COMPACT BETWEEN EACH LAYER WITH A HIGH-FREQUENCY VIBRATOR TAMPER SUCH AS WACKER NEULSON SOIL COMPACTOR OR EQUIVALS BY MULTIQUIP OR WEBER. FILL SHALL BE COMPACTED TO DENSITY SPECIFIED IN EARTHWORK SECTION FOR THE AREA THROUGH WHICH TRENCH IS CUT. WHERE COMPACT REQUIREMENTS ARE NOT ESTABLISHED FOR AN AREA, THE CONTRACTOR SHALL COMPACT FILL TO 95% MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT.
 - D. EXCESS EARTH SHALL BE DEPOSITED ON THE SITE AS DIRECTED BY THE ARCHITECT/ENGINEER.
 - E. WHERE DITCHES OCCUR OUTSIDE OF THE BUILDING, THE SURFACE SHALL BE FINISHED TO MATCH EXISTING SURFACES. ANY EXISTING WORK, OR WORK OF OTHER TRADES, WHICH IS DAMAGED OR DISTURBED SHALL BE REPAIRED OR REPLACED AND LEFT IN GOOD ORDER.
- 3.5 SLEEVES, CUTTING, AND PATCHING:
- A. CONTRACTOR SHALL PLACE HIS OWN SLEEVES AND ADVISE OTHER TRADES OF REQUIRED CHASES AND OPENINGS, SO THEY CAN BE PROPERLY BUILT IN. SLEEVES PROVIDED UNDER THIS DIVISION SHALL BE FORMED OUT OF NO LESS THAN SCHEDULE 40 GALVANIZED RIGID STEEL CONDUITS. WHERE ANY RACEWAY SUPPORTS INSTALLED UNDER THIS CONTRACT PIERCE THE ROOF, SUITABLE PITCH POCKETS SHALL BE PROVIDED AND COORDINATED WITH THE ROOFING CONTRACTOR AS NECESSARY TO BE ACCEPTABLE TO THE ARCHITECT/ENGINEER. PROVIDE SUITABLE FITTINGS WHERE ANY RACEWAYS OR EQUIPMENT CROSS EXPANSION JOINTS.
 - B. PERMITTED CUTTING OR PATCHING NECESSARY SHALL BE DONE BY CONTRACTOR. STRUCTURAL MEMBERS SHALL NOT BE CUT EXCEPT BY WRITTEN PERMISSION OF ARCHITECT/ENGINEER.
- 3.6 PROTECTION AND CLEAN-UP:
- A. PROTECT ALL MATERIAL AND WORK FROM DAMAGE DURING CONSTRUCTION. EQUIPMENT INSTALLED IN THE BUILDING PRIOR TO ITS BEING CLOSED IN AND DRIED OUT SHALL BE PROTECTED FROM THE ELEMENTS OF THE WEATHER IN THE SAME MANNER AS PREVIOUSLY SPECIFIED FOR STORED MATERIALS. PROTECT FINISHED SURFACES FROM SPATTERING MORTAR, PAINT, DIRT, PLASTER, ETC. DO NOT INSTALL DEVICE PLATES, FACE PLATES, CANOPIES, FLUSH CABINET TRIMS, OR FIXTURES ON WALLS OR CEILING UNTIL AFTER PAINTING OR CLEANING OF THE SURFACE HAS BEEN COMPLETED AND ARRANGE FOR SUCH ITEMS THAT ARE REQUIRED TO BE FIELD PAINTED TO BE PAINTED BEFORE BEING MOUNTED. REPAIR, CLEAN AND TOUCH-UP OR REPLACE ALL DAMAGED MATERIAL AT THE COMPLETION OF THE PROJECT, REMOVE ALL DUST FROM FINISHED SURFACES, INCLUDING LIGHTING FIXTURES, LENSES AND LAMPS.
 - B. THE CONTRACTOR SHALL KEEP PREMISES FREE OF DEBRIS RESULTING FROM HIS WORK.
- 3.7 PAINING AND FINISHING:
- A. SUITABLE FINISHES SHALL BE PROVIDED ON ALL ITEMS OF ELECTRICAL EQUIPMENT AND MATERIALS WHICH ARE EXPOSED. THIS SHALL CONSIST OF EITHER AN ACCEPTABLE FINISH AS MANUFACTURED AND SUPPLIED TO THE JOB OR APPLICATION OF SUITABLE FINISHES AFTER INSTALLATION.
 - B. WHEN INSTALLED IN FINISHED AREAS, EXPOSED EQUIPMENT AND MATERIALS SHALL BE SUPPLIED WITH PRIME COAT AND SHALL BE PROFESSIONALLY PAINTED OR ENAMELED AS DIRECTED TO MATCH OR BLEND WITH ADJACENT SURFACES.
 - C. IN UNFINISHED AREAS SUCH AS EQUIPMENT ROOMS, EXPOSED EQUIPMENT SHALL BE FURNISHED WITH SUITABLE FACTORY APPLIED FINISHES (E.G., STANDARD GRAY ENAMEL FINISH FOR PANELBOARDS, ETC.).
 - D. EQUIPMENT FURNISHED IN FINISHES SUCH AS STAINLESS STEEL AND BRUSHED ALUMINUM SHALL NOT BE PAINTED.
 - E. ALL FINISHING SHALL BE AS DIRECTED BY, AND SHALL BE SATISFACTORY TO, THE ARCHITECT/ENGINEER.
 - F. PAINT MATERIAL SHALL BE SELECTED FROM THE PRODUCTS LISTED BELOW AND, INSOFAR AS PRACTICAL, PRODUCTS OF ONLY ONE MANUFACTURER SHALL BE USED. CONTRACTOR SHALL SUBMIT TO THE ARCHITECT/ENGINEER THE LISTED MANUFACTURER HE PROPOSES TO USE IN THE WORK. SHOULD THE CONTRACTOR DESIRE TO USE PRODUCTS OF A MANUFACTURER NOT LISTED BELOW, OR PRODUCTS MADE BY A LISTED MANUFACTURER BUT NOT SCHEDULED HEREIN, CONTRACTOR SHALL SUBMIT COMPLETE TECHNICAL INFORMATION ON THE PROPOSED PRODUCTS TO THE ARCHITECT/ENGINEER FOR APPROVAL. ONLY PRODUCTS APPROVED BY THE ARCHITECT/ENGINEER SHALL BE USED.
- 3.8 OBSERVATION:
- A. THE PROJECT WILL BE OBSERVED PERIODICALLY AS CONSTRUCTION PROGRESSES. THE CONTRACTOR WILL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT/ENGINEER AT LEAST 72

- INSTALLATION.
- D. WHILE EVERY EFFORT HAS BEEN MADE TO ACCOMMODATE THE EQUIPMENT NECESSARY FOR THE WORK OF THIS CONTRACT, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT EQUIPMENT SUPPLIED AS A PART OF THIS CONTRACT WILL FIT IN THE SPACES PROVIDED FOR BY THE DRAWINGS. ANY CONCERN BY THE CONTRACTOR REGARDING THE ADEQUACY OF A SPACE FOR THE EQUIPMENT SUPPLIED, SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER IN A WRITTEN FORM PRIOR TO THE APPROVAL OF THE RELATED EQUIPMENT SUBMITTALS AND PRIOR TO ANY ROUGH-IN ASSOCIATED WITH THIS EQUIPMENT.
 - E. THE PLANS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW EACH FITTING OR A COMPLETE DETAIL OF ALL THE WORK TO BE DONE; BUT ARE FOR ILLUSTRATING THE TYPE OF SYSTEM, ETC., AND SPECIAL CONDITIONS CONSIDERED NECESSARY FOR THE EXPERIENCED MECHANIC TO TAKE OFF HIS MATERIALS AND LAY OUT HIS WORK. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASUREMENTS AS MAY BE NECESSARY AT THE JOB AND ADAPTING HIS WORK TO LOCAL CONDITIONS.
 - F. CONDITIONS SOMETIMES OCCUR WHICH REQUIRE CERTAIN CHANGES IN DRAWINGS AND SPECIFICATIONS, IF SUCH CHANGES IN DRAWING AND SPECIFICATIONS ARE NECESSARY, THE SAME ARE TO BE MADE BY THE CONTRACTOR WITHOUT EXPENSE TO THE OWNER, PROVIDING SUCH CHANGES DO NOT REQUIRE FURNISHING MORE MATERIALS, OR PERFORMING MORE LABOR THAN THE TRUE INTENT OF THE DRAWINGS AND SPECIFICATIONS DEMANDS. IT IS UNDERSTOOD THAT WHILE THE DRAWINGS ARE TO BE FOLLOWED AS CLOSELY AS CIRCUMSTANCES WILL PERMIT, THE CONTRACTOR IS HELD RESPONSIBLE FOR THE INSTALLATION OF THE SYSTEM ACCORDING TO THE TRUE INTENT AND MEANING OF THE DRAWINGS. ANYTHING NOT ENTIRELY CLEAR IN THE DRAWINGS AND SPECIFICATION WILL BE FULLY EXPLAINED IF APPLICATION IS MADE TO THE ARCHITECT/ENGINEER. SHOULD, HOWEVER, CONDITIONS ARISE WHERE IN THE JUDGMENT OF THE CONTRACTOR CERTAIN CHANGES WILL BE ADVISABLE, THE CONTRACTOR WILL COMMUNICATE WITH THE ARCHITECT/ENGINEER AND SECURE HIS APPROVAL OF THESE CHANGES BEFORE GOING AHEAD WITH THE WORK.
 - G. THE RIGHT TO MAKE ANY RESPONSIBLE CHANGE IN LOCATION OF APPARATUS, EQUIPMENT, ROUTING OF CONDUIT UP TO THE TIME OF ROUGHING IN, IS RESERVED BY THE ARCHITECT WITHOUT INVOLVING ANY ADDITIONAL EXPENSE OR BACKLETTED TO ESTABLISHED GRADE IN 6" LAYERS.
 - H. IT SHALL BE THE DUTY OF PROSPECTIVE CONTRACTORS TO VISIT THE JOB SITE AND FAMILIARIZE THEMSELVES WITH JOB CONDITIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF ADDITIONAL WORK NECESSITATED BY, OR CHANGES IN PLANS REQUIRED BECAUSE OF EVIDENT JOB CONDITIONS, THAT ARE NOT INDICATED ON THE DRAWINGS.
 - I. CONTRACTOR SHALL LEAVE THE PREMISES IN A CLEAN AND ORDERLY MANNER UPON COMPLETION OF THE WORK AND SHALL REMOVE FROM THE PREMISES ALL DEBRIS THAT HAS ACCUMULATED DURING THE PROGRESS OF THE WORK.
- 3.3 COORDINATION:
- A. THIS CONTRACTOR SHALL COORDINATE THE WORK OF ALL SUBS AND SHALL FURNISH ANY INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTOIRLY AND WITH THE LEAST POSSIBLE INTERFERENCE OR DELAY.
 - B. WHERE THE WORK WILL BE INSTALLED NEAR, OR MAY INTERFERE WITH THE WORK OF OTHER TRADES, THE CONTRACTOR SHALL ASSIST IN WORKING OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT. IF DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PREPARE COMPOSITE WORKING DRAWINGS AND SECTIONS AT A SUITABLE SCALE NOT LESS THAN 3/8" = 1'-0", CLEARLY SHOWING HOW HIS WORK IS TO BE INSTALLED IN RELATION TO THE WORK OF OTHER TRADES. IF THE CONTRACTOR INSTALLS HIS WORK BEFORE COORDINATION, OR TO CAUSE ANY INTERFERENCE WITH WORK OF ANY SUBS, HE SHALL MAKE THE NECESSARY CHANGES IN HIS WORK TO CORRECT THE CONDITION WITHOUT EXTRA CHARGE.
 - C. THE CONTRACTOR SHALL FURNISH TO OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS, AND SHOP DETAILS FOR THE PROPER INSTALLATION OF WORK AND FOR COORDINATING ADJACENT WORK.
- 3.4 EXCAVATION:
- A. REQUIRED EXCAVATION FOR INSTALLATION OF ALL ELECTRICAL WORK SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. CARE SHALL BE TAKEN NOT TO DISTURB OR DAMAGE THE WORK OF OTHER TRADES.
 - B. TRENCHING AND SHORING SHALL COMPLY WITH REQUIREMENTS OF NORTH CAROLINA STATE DEPARTMENT OF LABOR'S REGULATIONS ENTITLED "SAFEGUARDS DURING CONSTRUCTION", AND "TRENCHING AND SHORING".
 - C. IN BACKFILLING PIPE TRENCHES, APPROVED FILL SHALL FIRST BE COMPACTED FIRMLY AND EVENLY ON BOTH SIDES OF PIPE IN 6" LAYERS TO A DEPTH OF 12" OVER THE TOP OF THE PIPE. THE REMAINING OF TRENCHES SHALL BE BACKFILLED TO ESTABLISHED GRADE IN 6" LAYERS. THE CONTRACTOR SHALL COMPACT BETWEEN EACH LAYER WITH A HIGH-FREQUENCY VIBRATOR TAMPER SUCH AS WACKER NEULSON SOIL COMPACTOR OR EQUIVALS BY MULTIQUIP OR WEBER. FILL SHALL BE COMPACTED TO DENSITY SPECIFIED IN EARTHWORK SECTION FOR THE AREA THROUGH WHICH TRENCH IS CUT. WHERE COMPACT REQUIREMENTS ARE NOT ESTABLISHED FOR AN AREA, THE CONTRACTOR SHALL COMPACT FILL TO 95% MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT.
 - D. EXCESS EARTH SHALL BE DEPOSITED ON THE SITE AS DIRECTED BY THE ARCHITECT/ENGINEER.
 - E. WHERE DITCHES OCCUR OUTSIDE OF THE BUILDING, THE SURFACE SHALL BE FINISHED TO MATCH EXISTING SURFACES. ANY EXISTING WORK, OR WORK OF OTHER TRADES, WHICH IS DAMAGED OR DISTURBED SHALL BE REPAIRED OR REPLACED AND LEFT IN GOOD ORDER.
- 3.5 SLEEVES, CUTTING, AND PATCHING:
- A. CONTRACTOR SHALL PLACE HIS OWN SLEEVES AND ADVISE OTHER TRADES OF REQUIRED CHASES AND OPENINGS, SO THEY CAN BE PROPERLY BUILT IN. SLEEVES PROVIDED UNDER THIS DIVISION SHALL BE FORMED OUT OF NO LESS THAN SCHEDULE 40 GALVANIZED RIGID STEEL CONDUITS. WHERE ANY RACEWAY SUPPORTS INSTALLED UNDER THIS CONTRACT PIERCE THE ROOF, SUITABLE PITCH POCKETS SHALL BE PROVIDED AND COORDINATED WITH THE ROOFING CONTRACTOR AS NECESSARY TO BE ACCEPTABLE TO THE ARCHITECT/ENGINEER. PROVIDE SUITABLE FITTINGS WHERE ANY RACEWAYS OR EQUIPMENT CROSS EXPANSION JOINTS.
 - B. PERMITTED CUTTING OR PATCHING NECESSARY SHALL BE DONE BY CONTRACTOR. STRUCTURAL MEMBERS SHALL NOT BE CUT EXCEPT BY WRITTEN PERMISSION OF ARCHITECT/ENGINEER.
- 3.6 PROTECTION AND CLEAN-UP:
- A. PROTECT ALL MATERIAL AND WORK FROM DAMAGE DURING CONSTRUCTION. EQUIPMENT INSTALLED IN THE BUILDING PRIOR TO ITS BEING CLOSED IN AND DRIED OUT SHALL BE PROTECTED FROM THE ELEMENTS OF THE WEATHER IN THE SAME MANNER AS PREVIOUSLY SPECIFIED FOR STORED MATERIALS. PROTECT FINISHED SURFACES FROM SPATTERING MORTAR, PAINT, DIRT, PLASTER, ETC. DO NOT INSTALL DEVICE PLATES, FACE PLATES, CANOPIES, FLUSH CABINET TRIMS, OR FIXTURES ON WALLS OR CEILING UNTIL AFTER PAINTING OR CLEANING OF THE SURFACE HAS BEEN COMPLETED AND ARRANGE FOR SUCH ITEMS THAT ARE REQUIRED TO BE FIELD PAINTED TO BE PAINTED BEFORE BEING MOUNTED. REPAIR, CLEAN AND TOUCH-UP OR REPLACE ALL DAMAGED MATERIAL AT THE COMPLETION OF THE PROJECT, REMOVE ALL DUST FROM FINISHED SURFACES, INCLUDING LIGHTING FIXTURES, LENSES AND LAMPS.
 - B. THE CONTRACTOR SHALL KEEP PREMISES FREE OF DEBRIS RESULTING FROM HIS WORK.
- 3.7 PAINING AND FINISHING:
- A. SUITABLE FINISHES SHALL BE PROVIDED ON ALL ITEMS OF ELECTRICAL EQUIPMENT AND MATERIALS WHICH ARE EXPOSED. THIS SHALL CONSIST OF EITHER AN ACCEPTABLE FINISH AS MANUFACTURED AND SUPPLIED TO THE JOB OR APPLICATION OF SUITABLE FINISHES AFTER INSTALLATION.
 - B. WHEN INSTALLED IN FINISHED AREAS, EXPOSED EQUIPMENT AND MATERIALS SHALL BE SUPPLIED WITH PRIME COAT AND SHALL BE PROFESSIONALLY PAINTED OR ENAMELED AS DIRECTED TO MATCH OR BLEND WITH ADJACENT SURFACES.
 - C. IN UNFINISHED AREAS SUCH AS EQUIPMENT ROOMS, EXPOSED EQUIPMENT SHALL BE FURNISHED WITH SUITABLE FACTORY APPLIED FINISHES (E.G., STANDARD GRAY ENAMEL FINISH FOR PANELBOARDS, ETC.).
 - D. EQUIPMENT FURNISHED IN FINISHES SUCH AS STAINLESS STEEL AND BRUSHED ALUMINUM SHALL NOT BE PAINTED.
 - E. ALL FINISHING SHALL BE AS DIRECTED BY, AND SHALL BE SATISFACTORY TO, THE ARCHITECT/ENGINEER.
 - F. PAINT MATERIAL SHALL BE SELECTED FROM THE PRODUCTS LISTED BELOW AND, INSOFAR AS PRACTICAL, PRODUCTS OF ONLY ONE MANUFACTURER SHALL BE USED. CONTRACTOR SHALL SUBMIT TO THE ARCHITECT/ENGINEER THE LISTED MANUFACTURER HE PROPOSES TO USE IN THE WORK. SHOULD THE CONTRACTOR DESIRE TO USE PRODUCTS OF A MANUFACTURER NOT LISTED BELOW, OR PRODUCTS MADE BY A LISTED MANUFACTURER BUT NOT SCHEDULED HEREIN, CONTRACTOR SHALL SUBMIT COMPLETE TECHNICAL INFORMATION ON THE PROPOSED PRODUCTS TO THE ARCHITECT/ENGINEER FOR APPROVAL. ONLY PRODUCTS APPROVED BY THE ARCHITECT/ENGINEER SHALL BE USED.
- 3.8 OBSERVATION:
- A. THE PROJECT WILL BE OBSERVED PERIODICALLY AS CONSTRUCTION PROGRESSES. THE CONTRACTOR WILL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT/ENGINEER AT LEAST 72

- HOURS IN ADVANCE WHEN ANY WORK TO BE COVERED UP IS READY FOR INSPECTION. NO WORK SHALL BE COVERED UP UNTIL AFTER OBSERVATION HAS BEEN COMPLETED.
- EQUIPMENT CONNECTIONS AND COORDINATION
- 1.1 SCOPE:
- A. THE CONNECTION OF ALL EQUIPMENT PROVIDED UNDER ANY DIVISION OF THESE SPECIFICATIONS OR BY THE OWNER REQUIRING ELECTRICAL CONNECTION SHALL BE PROVIDED AS PART OF THIS DIVISION, UNLESS OTHERWISE INDICATED OR SPECIFIED. A SPECIAL OUTLET, WHERE INDICATED, IS THE ELECTRICAL CONNECTION TO THE EQUIPMENT.
 - B. DRAWINGS INDICATE APPROXIMATE EQUIPMENT CAPACITY (INCLUDING MOTOR HORSEPOWER) AND APPROXIMATE LOCATION OF CONNECTION. IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO DETERMINE THE EXACT CHARACTERISTICS OF EQUIPMENT BEING SUPPLIED; AND TO PROVIDE PROPER BRANCH CIRCUIT CONNECTIONS, CONDUCTOR PROTECTION, AND GROUNDING.
- 2.1 GENERAL:
- A. HEATING, VENTILATING, AIR CONDITIONING, REFRIGERATION AND PLUMBING EQUIPMENT: UNLESS OTHERWISE INDICATED, PROVIDE ALL POWER WIRING, INCLUDING FEEDERS AND BRANCH CIRCUITS, TO THE TERMINALS OF THE EQUIPMENT, INCLUDING MOUNTING OF MOTOR STARTERS, FEEDER AND BRANCH CIRCUIT OVER-CURRENT PROTECTION; DISCONNECTING MEANS WITHIN SIGHT OF EACH MOTOR AND EACH STARTER, WHETHER SPECIFICALLY INDICATED ON DRAWINGS, MOTOR CONTROL CENTERS INDICATED, COMPLETE AS SCHEDULED AND SPECIFIED.
- BASIC MATERIALS AND METHODS
- 1.1 WIRING METHODS:
- A. UNLESS OTHERWISE INDICATED OR SPECIFIED, THE WIRING METHOD FOR THIS PROJECT SHALL CONSIST OF COPPER CONDUCTORS WITH 600-VOLT INSULATION INSTALLED IN METAL RACEWAYS.
 - B. THE WORD "RACEWAY" AND THE WORD "CONDUIT" (OR ABBREVIATION "C") USED HEREIN OR ON THE DRAWINGS INDICATE RIGID METAL CONDUIT, AND WHERE PERMITTED, INTERMEDIATE METAL CONDUIT, ELECTRICAL METALLIC TUBING, RIGID NONMETALLIC CONDUIT, FLEXIBLE METAL CONDUIT, OR LIQUIDTIGHT FLEXIBLE METAL CONDUIT.
 - C. REFERENCE TO "RIGID CONDUIT" OR "RMC" INDICATES HEAVY-WALL RIGID METAL CONDUIT ONLY.
 - D. REFERENCE TO "IMC" INDICATES INTERMEDIATE METAL CONDUIT.
 - E. REFERENCE TO "PVC" INDICATES RIGID NONMETALLIC CONDUIT.
 - F. REFERENCE TO "EMT" OR "TUBING" INDICATES ELECTRICAL METALLIC TUBING.
 - G. REFERENCE TO "FLEX" OR "FLEXIBLE CONDUIT" INDICATES FLEXIBLE METAL CONDUIT, OR, WHERE REQUIRED, LIQUIDTIGHT FLEXIBLE METAL CONDUIT.
- 1.2 FASTENING METHODS:
- A. ACCEPTABLE FASTENING METHODS INCLUDE WOOD SCREWS AND NAILS ON WOOD CONSTRUCTION, TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION BOLTS AND LEAD ANCHORS ON BRICK AND CONCRETE, AND MACHINE SCREWS ON METAL SURFACES.
 - B. EXPLOSIVE FASTENERS MAY BE USED IN STEEL AND CONCRETE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 - C. WIRE, PERFORATED METAL STRAP, AND WOODEN PLUGS ARE NOT ACCEPTABLE AS FASTENING MATERIAL.
 - D. MATERIALS USED SHALL BE GOOD QUALITY, MADE OF ZINC OR CADMIUM COATED STEEL OR OTHER NON-CORRODING MATERIAL.
 - E. MATERIALS, WHETHER EXPOSED OR CONCEALED, SHALL BE FIRMLY AND ADEQUATELY HELD IN PLACE. FASTENING AND SUPPORT SHALL AFFORD SAFETY FACTOR OF THREE OR HIGHER AND SHALL BE IN FULL COMPLIANCE WITH THE SEISMIC PROTECTION REQUIREMENTS OF THE NORTH CAROLINA STATE BUILDING CODE.
 - F. FIXTURES, RACEWAYS, AND EQUIPMENT SHALL BE SUPPORTED FROM THE STRUCTURE. NOTHING MAY BE SUPPORTED ON SUSPENDED CEILING UNLESS NOTED SO ON THE DRAWINGS OR SPECIFICALLY PERMITTED BY THE ARCHITECT/ENGINEER.
 - G. EQUIPMENT AND RACEWAYS ATTACHED TO OUTSIDE WALLS, OR INTERIOR WALLS SUBJECT TO PERMANENT MOISTURE, SHALL BE SHIMMED OUT WITH NON-CORRODIBLE MATERIAL TO PROVIDE 1/4" AIR SPACE BETWEEN WALL AND EQUIPMENT OR RACEWAY.
- 1.3 EQUIPMENT IDENTIFICATION:
- A. SUITABLE NAMEPLATES SHALL BE PROVIDED FOR THE IDENTIFICATION OF ELECTRICAL EQUIPMENT INCLUDING SWITCHBOARDS, PANELBOARDS, DRY-TYPE TRANSFORMERS, MOTOR STARTERS, SAFETY SWITCHES AND CIRCUIT BREAKERS.
 - B. NAMEPLATES SHALL BE OF ENGRAVED WHITE CORE PLASTIC LAMINATE, NOT LESS THAN 1/16" THICK. NAMEPLATE IDENTIFICATION SHALL INCLUDE EQUIPMENT NAME, SOURCE OF POWER SUPPLY AND VOLTAGE.
 - C. NAMEPLATE ENGRAVING SHALL BE OF PROFESSIONAL QUALITY, WITH BLOCK STYLE LETTERS, MINIMUM 1/4" HIGH.
 - D. NAMEPLATES SHALL BE ATTACHED WITH SHEET METAL SCREWS. THEY SHALL BE SIZED TO ALLOW FOR INSTALLATION OF SCREWS WITHOUT OBSCURING TEXT.
 - E. ALL EMPTY CONDUIT RUNS AND CONDUIT WITH CONDUCTORS FOR FUTURE USE SHALL BE IDENTIFIED FOR USE AND SHALL INDICATE WHERE THEY TERMINATE. IDENTIFICATION SHALL BE BY TAGS WITH STRING OR WIRE ATTACHED TO CONDUIT OR OUTLET.
- 1.4 SLEEVES AND PENETRATIONS:
- A. THE ELECTRICAL CONTRACTOR SHALL PROVIDE SLEEVES AND OPENINGS FOR HIS PENETRATIONS THROUGH EXTERIOR WALLS, INTERIOR WALLS AND PARTITIONS, FLOORS, AND ROOFS. PROVISIONS FOR ALL SUCH PENETRATIONS SHALL BE AS APPROVED BY THE ARCHITECT/ENGINEER.
 - B. FOR ANY RACEWAY PASSING THROUGH AN EXTERIOR WALL, ABOVE OR BELOW GRADE, PROVIDE APPROPRIATE SLEEVE AND WATER PROOFING. CENTER THE CONDUIT IN THE SLEEVE AND FILL THE SPACE BETWEEN CONDUIT AND SLEEVE WITH APPROPRIATE COMPOUND SUCH AS LEAD AND OAKUM, AND THEN APPLY CAULKING COMPOUND - THIOCAULK OR APPROVED EQUAL - FLUSH WITH THE WALL SURFACES.
 - C. FOR RACEWAYS, PENETRATING FLOOR SLABS, SMOKE PARTITIONS, AND FIRE-RATED WALLS, PROVIDE STEEL PIPE SLEEVES AND SEAL WITH HIGH-TEMPERATURE NON-SHRINK GROUT OR OTHER MATERIAL AS APPROVED BY THE ARCHITECT/ENGINEER. MATERIALS AND INSTALLATION METHODS SHALL BE UL LISTED AS A THROUGH-PENETRATION FIRESTOP SYSTEM SUITABLE FOR USE WITH THE UL FIRE RESISTANCE DESIGN ENCOUNTERED. REFER TO THE UL FIRE PROTECTION DETAILS SHOWN ON THE DRAWINGS. REFER TO THE UL FIRE PENETRATION DETAILS SHOWN IN THE DRAWINGS.
 - D. CONDUITS PENETRATING ROOF SURFACES FOR THE PURPOSE OF CONNECTING TO ROOF-TOP MECHANICAL EQUIPMENT SHALL UTILIZE OPENINGS AND CURBS PROVIDED FOR THE EQUIPMENT WHERE POSSIBLE.
 - E. FOR OTHER RACEWAY PENETRATIONS THROUGH THE ROOF THE CONTRACTOR SHALL PROVIDE APPROPRIATE PREFABRICATED CURB ASSEMBLIES - "PIPE PORTAL SYSTEM" AS MANUFACTURED BY ROOF PRODUCTS AND SYSTEM CORP., ADDISON, ILLINOIS, OR EQUAL METHOD AS APPROVED BY ARCHITECT/ENGINEER AND ROOFING SUBCONTRACTOR.
- 1.5 SUBMITTALS:
- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR ALL BASIC MATERIALS.
- RACEWAYS AND FITTINGS
- 1.1 SCOPE:
- A. PROVIDE COMPLETE RACEWAY SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED HEREIN, AND AS REQUIRED BY APPLICABLE CODES.
 - B. ALL WIRING SHALL BE INSTALLED IN RACEWAYS UNLESS SPECIFICALLY NOTED OTHERWISE.
- 1.2 SUBMITTALS:
- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR ALL RACEWAY SYSTEM COMPONENTS.
- 2.1 MANUFACTURERS:
- A. METAL RACEWAY AND COMPONENTS SHALL BE MANUFACTURED BY ALLIED, TRIANGLE, WHEATLAND, THOMAS & BETTS, OR OTHER APPROVED MANUFACTURERS.
 - B. NON-METALLIC RACEWAY SYSTEM COMPONENTS SHALL BE MANUFACTURED BY CARLON, QUEEN CITY PLASTICS, IPEX OR OTHER APPROVED MANUFACTURERS.
- 2.2 MATERIALS AND APPLICATIONS:



PINNACLE ARCHITECTURE
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ISSUE DATE: 01/30/25
DRAWN BY: MDK
CHECKED BY: MDK
PROJECT: 2523

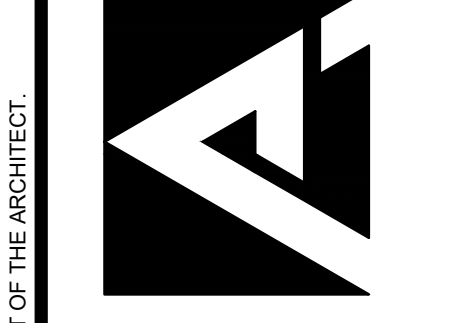
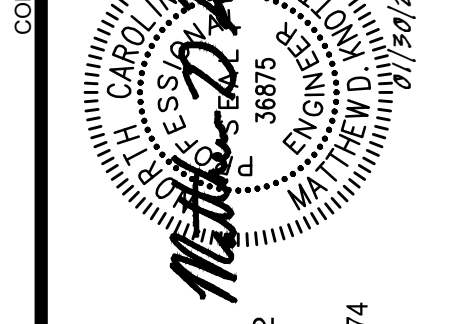
CLASSROOM ADDITION
ROSEWOOD ELEM. SCHOOL
WAYNE COUNTY, NC

DATE	REFERENCE
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ELECTRICAL SPECIFICATIONS
E700

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CONTRACTOR TO VERIFY ALL DIMENSIONS



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THIS DRAWING IS THE PROPERTY OF THE ARCHITECTS AND CANNOT BE USED FOR CONSTRUCTION PURPOSES OR REPRODUCED WITHOUT WRITTEN CONSENT OF THE ARCHITECT.

- A. RIGID METAL CONDUIT SHALL BE ZINC-COATED SCHEDULE 40 STEEL OR ALLOY 6063-T42 ALUMINUM WITH THREADED COUPLINGS AND FITTINGS. TERMINATION AT SHEET METAL ENCLOSURES SHALL CONSIST OF DOUBLE LOCKNUTS AND INSULATING BUSHINGS. RIGID STEEL CONDUIT SHALL BE USED FOR ALL EXPOSED AND CONCEALED WORK EXCEPT WHERE OTHER RACEWAYS ARE INDICATED OR PERMITTED. ALUMINUM CONDUIT COMPLETE WITH ALUMINUM FITTINGS MAY BE USED IN LIEU OF STEEL CONDUIT EXCEPT IN WET LOCATIONS, UNDERGROUND, OR IN POURED CONCRETE. STEEL AND ALUMINUM SHALL NOT BE MIXED IN THE SAME RUN OF CONDUIT. WHEN USING ALUMINUM CONDUIT, CONTRACTOR SHALL USE COUPLINGS, FITTINGS, BOXES AND SUPPORTS WITH APPROPRIATE DIELECTRIC MEANS TO PREVENT CORROSION WITH DISSIMILAR METALS.
- B. INTERMEDIATE METAL CONDUIT (IMC) WITH THREADED COUPLINGS AND FITTINGS MAY BE USED FOR EXPOSED AND CONCEALED WORK IN LIEU OF RIGID METAL CONDUIT EXCEPT UNDERGROUND OUTSIDE THE BUILDING FOUNDATION, OR WHERE SUPPORTING LIGHTING FIXTURES, OR IN HAZARDOUS LOCATIONS, OR WHEN EXPOSED TO SEVERE IMPACT OR INJURY. TERMINATION AT SHEET METAL ENCLOSURES SHALL CONSIST OF DOUBLE LOCKNUTS AND INSULATING BUSHINGS.
- C. ELECTRICAL METALLIC TUBING (EMT) MAY BE USED FOR CONCEALED WORK IN LIEU OF RIGID METAL CONDUIT EXCEPT UNDERGROUND OR IN POURED CONCRETE. EMT MAY BE USED FOR EXPOSED WORK IN LIEU OF RIGID METAL CONDUIT EXCEPT OUTDOORS, OR ABOVE A ROOF, OR WHERE SUPPORTING LIGHTING FIXTURES, OR WHEN EXPOSED TO SEVERE IMPACT OR INJURY, OR IN HAZARDOUS LOCATIONS, OR LESS THAN 10 FEET ABOVE A FLOOR OR PLATFORM IN OTHER THAN ELECTRICAL, MECHANICAL, OR COMMUNICATIONS CLOSETS OR EQUIPMENT ROOMS.
- D. RIGID PVC CONDUIT SHALL BE SCHEDULE 40, UL LISTED FOR USE WITH 90°C. CONDUIT RUN UNDERGROUND OR RUN IN OR UNDER A POURED CONCRETE SLAB SHALL BE RIGID PVC. VERTICAL ELBOWS AND VERTICAL EXTENSIONS FROM UNDERGROUND OR CONCRETE EMBEDDED PVC CONDUITS SMALLER THAN 3" TRADE SIZE MAY ALSO BE OF PVC IF THEY REMAIN CONCEALED OR OTHERWISE PROTECTED BUT SHALL BE OF RIGID STEEL CONDUIT (OR IMC WHERE PERMITTED) WHERE THEY STUB UP INTO EXPOSED LOCATIONS OR TRADE SIZE IS 3" OR LARGER. AN INSULATING BUSHING OR END-BELL SHALL BE PROVIDED AT EACH TERMINATION. CONDUIT RUN UNDERGROUND AND NOT UNDER A POURED CONCRETE SLAB SHALL HAVE INSTALLED CONTINUOUSLY ABOVE IT A WARNING TAPE. THE TAPE SHALL BE 12 INCHES WIDE, CENTERED ON CONDUIT AND LOCATED 12 INCHES BELOW FINISHED GRADE.
- E. FLEXIBLE METAL CONDUIT SHALL BE OF ZINC COATED STEEL OF MINIMUM LENGTH AND SHALL BE USED IN LIEU OF RIGID METAL CONDUIT FOR CONNECTIONS TO MOVING OR VIBRATING APPARATUS, RECESSED LIGHTING FIXTURES, DRY-TYPE TRANSFORMERS, AND MOTORS. FLEXIBLE METAL CONDUIT MAY BE USED WHERE RIGID CONNECTIONS ARE IMPRACTICAL DUE TO OBSTRUCTIONS OR SPACE LIMITATIONS. FLEXIBLE METAL CONDUIT USED IN WET, DAMP, OR CORROSIVE LOCATION SHALL BE OF THE FOLLOWING TYPES: EMT, FLEXIBLE METAL CONDUIT WITH CONTINUOUSLY APPLIED GALVANIZED COATING, OR TYPE EMT WITH GALVANIZED COATING.
- F. FITTINGS FOR STEEL CONDUIT AND TUBING SHALL BE OF ZINC COATED STEEL OR MALLEABLE IRON. INSULATING BUSHINGS OF PLASTIC PROVIDED FOR RIGID AND INTERMEDIATE METAL CONDUITS SHALL BE RATED FOR 150°C. BONDING BUSHINGS SHALL BE STEEL OR MALLEABLE IRON WITH NON-REMOVABLE PLASTIC THROATS RATED 150°C. EMT FITTINGS SHALL BE OF THE COMPRESSION TYPE AND CONCRETE TIGHT OR RAIN TIGHT AS APPLICABLE. SETSCREW, INDENTER, PRESSURE CAST AND DIE CAST FITTINGS ARE NOT ACCEPTABLE. CONNECTORS FOR EMT, FLEXIBLE METAL CONDUIT AND LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE THE INSULATED THROAT TYPE. CONNECTORS FOR FLEXIBLE METAL CONDUITS SHALL BE OF THE "TITE-BITE" DESIGN.
- G. CONDUIT EXPANSION FITTINGS SHALL BE OF ZINC COATED CAST OR MALLEABLE IRON AND STEEL CONDUIT. COMPLETE WITH FLEXIBLE BONDING STRAPS. EXPANSION FITTINGS SHALL ALLOW LONGITUDINAL CONDUIT MOVEMENT OF 4 INCHES.
- H. MINIMUM RACEWAY SIZE SHALL BE 1/2", EXCEPT FLEXIBLE METAL CONDUIT CONNECTIONS TO INDIVIDUAL LIGHTING FIXTURES MAY BE 3/8". OTHER RACEWAY SIZES, UNLESS INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR IN ACCORDANCE WITH NEC REQUIREMENTS FOR TYPE THW INSULATED CONDUCTORS, OR THE ACTUAL INSULATION USED IF IT IS THICKER THAN TYPE THW.

3.1 INSTALLATION:

- A. RIGID AND INTERMEDIATE METAL CONDUITS SHALL BE MADE UP WITH FULL THREADS, TO WHICH A CONDUCTIVE PIPE COMPOUND (T & B KOPR-SHIELD OR EQUAL) HAS BEEN APPLIED AND BUTTED IN COUPLING. TERMINATIONS AT SHEET METAL ENCLOSURES IN INDOOR DRY LOCATIONS SHALL BE MADE WITH DOUBLE LOCKNUTS AND AN INSULATING BUSHING. TERMINATIONS AT SHEET METAL ENCLOSURES IN OUTDOOR, DAMP, AND WET LOCATIONS SHALL BE MADE WITH THREADED CONDUIT HUBS OF ZINC COATED MALLEABLE IRON.
- B. EXCEPT WHEN RUN UNDER A CONCRETE SLAB ON GRADE, UNDERGROUND CONDUITS SHALL BE INSTALLED A MINIMUM OF 30" BELOW GRADE. TRENCHING AND BACKFILLING SHALL COMPLY WITH ELECTRICAL GENERAL REQUIREMENTS.
- C. ALL UNDERGROUND CONDUITS SHALL HAVE METALIZED WARNING TAPE INSTALLED ABOVE THE CONDUIT THAT IDENTIFIES THE SPECIFIC SYSTEM BURIED BELOW. THE WARNING TAPE SHALL CONSIST OF A MINIMUM 3.5 MIL SOLID FOIL CORE ENCASED IN A PROTECTIVE PLASTIC JACKET (TOTAL THICKNESS 5.5 MILS). THE TAPE SHALL BE 6 INCHES WIDE WITH BLACK LETTERING IMPRINTED ON A COLOR-CODED BACKGROUND THAT CONFORMS TO APWA COLOR CODE SPECIFICATIONS. TAPE SHALL BE INSTALLED 18 INCHES ABOVE THE CONDUIT AND IN NO CASE LESS THAN 6 INCHES BELOW GRADE.
- D. INSTALLATION OF PVC CONDUIT SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS USING SOLVENT WELDED COUPLINGS AND FITTINGS. FIELD BENDS SHALL BE MADE WITH APPROVED HEATING EQUIPMENT. OPEN FLAMES ARE NOT PERMITTED. AN INSULATING BUSHING OR END-BELL SHALL BE PROVIDED AT EACH TERMINATION.
- E. CONDUITS SHALL BE RIGIDLY SUPPORTED NOT MORE THAN 8 FEET ON CENTER AND SHALL BE CONCEALED WITHIN WALLS, CEILINGS, AND FLOORS, EXCEPT AS INDICATED OR SPECIFICALLY APPROVED BY THE ARCHITECT/ENGINEER, KEPT AT LEAST 6" FROM FLUES AND STEAM OR HOT WATER PIPES; AND PROTECTED AGAINST THE ENTRY OF DIRT, PLASTER, OR TRASH. RACEWAYS SHALL BE SUPPORTED INDEPENDENTLY OF SUSPENDED CEILING MEMBERS AND SUSPENSION WIRES.
- F. PVC CONDUITS THAT TURN UP INSIDE WALLS SHALL TRANSITION TO EMT NO GREATER THAN 60 INCHES ABOVE SLAB OR AT THE FIRST BOX ENCOUNTERED, WHICHEVER COMES FIRST.
- G. SUSPENDED EMT SHALL BE PROVIDED WITH ADDITIONAL HANGERS AT ELBOWS AND BENDS, AND WHERE NECESSARY TO AVOID STRAIN AT COUPLINGS AND CONNECTORS.
- H. EXPOSED CONDUITS, WHERE PERMITTED, SHALL BE RUN PARALLEL OR PERPENDICULAR TO WALLS, STRUCTURAL MEMBERS, AND CEILINGS; WITH RIGHT-ANGLE TURNS CONSISTING OF SYMMETRICAL BENDS OR CAST METAL FITTINGS WITH THREADED HUBS. OFFSETS MAY BE USED WHERE NECESSARY IF THEY ARE OF MINIMUM LENGTH.
- I. CONDUITS CROSSING EXPANSION AND CONTRACTION JOINTS SHALL CROSS PERPENDICULAR TO THE JOINT AND SHALL BE PROVIDED WITH EXPANSION FITTINGS. CONDUITS SHALL NOT BE EMBEDDED IN THE CONCRETE SLABS AT THE EXPANSION AND CONTRACTION JOINTS.
- J. CONDUIT MAY NOT BE INSTALLED Laterally IN ANY CONCRETE SLAB WHERE THE OUTSIDE DIAMETER OF THE CONDUIT, MEASURED AT A COUPLING, EXCEEDS ONE-THIRD THE THICKNESS OF THE CONCRETE. CONDUITS SHALL OCCUPY THE MIDDLE THIRD OF THE SLAB WHEN PRACTICAL AND LEAVE AT LEAST A 3/4-INCH CONCRETE COVER. WHERE REINFORCING BARS OCCUR AT THE 3/4-INCH LEVEL THE CONDUIT SHALL BE RUN INSIDE THEM TOWARD THE CENTER OF THE SLAB. CONDUITS MAY CROSS EACH OTHER WITHIN THE SLAB PROVIDED THE 3/4-INCH CONCRETE COVER IS MAINTAINED. CONDUITS SHALL BE TIED TO THE REINFORCING RODS OR OTHERWISE SUPPORTED WHEN NECESSARY TO PREVENT SAGGING WHEN CONCRETE IS POURED. THEY SHALL BE Laterally SPACED NOT CLOSER THAN THREE DIAMETERS ON CENTERS TO ALLOW COMPLETE COVERAGE.
- K. IMMEDIATELY AFTER INSTALLATION, CONDUIT OPENINGS SHALL BE COVERED TO PREVENT ENTRANCE OF FOREIGN MATTERS. COVERS SHALL REMAIN IN PLACE THROUGHOUT THE ROUGH-IN STAGE.
- L. WHEN INSTALLING CONDUIT ON INTERIOR SURFACE OF EXTERIOR WALLS, MOUNT 1/4 INCH FROM WALL WITH CLAMP BACKS OR STRUT.

CONDUCTORS

- 1.1 SCOPE:
- A. FURNISH AND INSTALL A COMPLETE SYSTEM OF WIRE AND CABLE.
- 1.2 SUBMITTALS:
- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR ALL CONDUCTOR TYPES. ALL WIRE SHALL BE LISTED BY AN "APPROVED" THIRD PARTY TESTING AGENCY.
- 2.1 MATERIALS:
- A. INSULATED CONDUCTORS SHALL BE MANUFACTURED BY ENCORE, SOUTHWIRE, GENERAL CABLE OR APPROVED EQUAL.
- B. UNLESS OTHERWISE INDICATED, ALL WIRE AND CABLE CONDUCTORS SHALL BE COPPER.
- C. CONDUCTORS SHALL BE NOT SMALLER THAN #12 AWG EXCEPT THAT #10 AWG MINIMUM IS REQUIRED FOR THE ENTIRE LENGTH OF 120-VOLT BRANCH CIRCUITS WHOSE DISTANCE TO THE CENTER OF THE LOAD EXCEEDS 75 FEET. #14 AWG MAY BE USED FOR SIGNAL AND REMOTE-CONTROL CIRCUITS. #16 AWG MAY BE USED FOR TAPS TO INDIVIDUAL RECESSED LIGHTING FIXTURES ON CIRCUITS PROTECTED BY OVER-CURRENT DEVICES RATED AT 20 AMPERES OR LESS AND CONTAINED WITHIN FLEXIBLE METAL CONDUITS THAT DO NOT EXCEED 6 FEET IN LENGTH. CONDUCTORS THAT ARE SMALLER THAN #14 AWG MAY BE USED ONLY WHERE SPECIFICALLY INDICATED ON THE DRAWINGS

- OR SPECIFIED HEREIN.
- D. CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID, DUAL RATED TYPE THWN/THHN.
- E. CONDUCTORS #8 AWG AND LARGER SHALL BE CLASS B STRANDED, DUAL RATED TYPE THWN/THHN.
- F. EACH CONDUCTOR SHALL BEAR EASILY READABLE MARKINGS ALONG THE ENTIRE LENGTH, INDICATING SIZE AND INSULATION TYPE.
- G. INSULATION ON CONDUCTORS #10 AWG AND SMALLER SHALL BE SUITABLY COLORED IN MANUFACTURE.
- H. CONDUCTORS IN ANY LOCATION SUBJECT TO ABNORMAL TEMPERATURE SHALL BE FURNISHED WITH AN INSULATION TYPE SUITABLE FOR TEMPERATURE ENCOUNTERED.
- I. WHERE NO INDICATION IS MADE OF WIRE SIZE, THE CONDUCTOR SHALL BE OF N.E.C. SIZE TO MATCH ITS OVERCURRENT PROTECTIVE DEVICE, BUT IN NO CASE SMALLER THAN #12 AWG.
- J. JOINTS IN SOLID CONDUCTORS SHALL BE SPLICED USING IDEAL "WIRE-NUTS", 3M COMPANY "SCOTCHLOCK" OR T&B CONNECTORS IN JUNCTION BOXES, OUTLET BOXES AND LIGHTING FIXTURES.
- K. "STA-KON" OR OTHER PERMANENT TYPE CRIMP CONNECTORS SHALL NOT BE USED FOR BRANCH CIRCUIT CONNECTIONS.

3.1 SPLICES, TAPS, AND CONNECTIONS:

- A. SPLICES IN CONDUCTORS #10 AWG AND SMALLER SHALL BE MADE WITH TWIST-ON SPRING STEEL DEVICES UL LISTED AS PRESSURE CABLE CONNECTORS, WITH INTEGRAL INSULATING COVERS RATED 75°C AT 600 VOLTS, EXCEPT THAT THOSE USED FOR CONNECTIONS TO LIGHT FIXTURES AND OTHER HEAT-PRODUCING EQUIPMENT SHALL COMPLY WITH TEMPERATURE RATINGS MARKED ON THE EQUIPMENT BUT NOT LESS THAN 90°C.
- B. SPLICES IN COPPER CONDUCTORS #8 AWG AND LARGER SHALL BE MADE WITH MECHANICAL DEVICES. WIRE-NUTS, SCOTCHLOCK, WIRE-NUTS, AND SIMILAR DEVICES SHALL NOT BE USED FOR SPLICES IN COPPER CONDUCTORS AND INSULATED WITH THERMOPLASTIC TAPE UL LISTED FOR USE AS SOLE INSULATION. TAPE MAY BE OMITTED FROM CONNECTORS SUPPLIED WITH SECURELY FASTENED INSULATING COVERS WHICH COMPLETELY ENCLOSE THE CONNECTOR AND THE CONDUCTORS. INSULATING COVERS SHALL BE RATED 75°C AT 600 VOLTS.
- C. CONNECT SOLID WIRES TO EQUIPMENT, SWITCHES, AND DEVICES EQUIPPED WITH BONDING SCREW TERMINALS BY LOOPING THE WIRE UNDER THE SCREW HEAD IN SUCH A MANNER THAT THE LOOP IS TIGHTENED AS THE SCREW IS TIGHTENED. STRAIGHT-IN WIRING UNDER SCREW TERMINALS IS NOT ACCEPTABLE.
- D. STRANDED WIRES SHALL NOT BE INSERTED INTO BACK-WIRING HOLES ON DEVICES, NOR SHALL THEY BE DIRECTLY CONNECTED TO SCREW HEAD TERMINALS. THEY SHALL BE FITTED WITH INSULATED CRIMP-ON TYPE SPADE TERMINALS FOR CONNECTION UNDER THE SCREW HEAD.
- E. JOINTS IN STRANDED CONDUCTORS SHALL BE SPLICED BY APPROVED MECHANICAL CONNECTORS AND GUM RUBBER TAPE OR FRICTION TAPE. SOLDERLESS MECHANICAL CONNECTORS FOR SPLICES AND TAPS, PROVIDED WITH UL-APPROVED INSULATING COVERS, MAY BE USED INSTEAD OF MECHANICAL CONNECTORS PLUS TAPE.
- F. CONDUCTORS, IN ALL CASES, SHALL BE CONTINUOUS FROM OUTLET TO OUTLET AND NO SPLICING SHALL BE MADE EXCEPT WITHIN OUTLET OR JUNCTION BOXES, TROUGHS AND GUTTERS.
- G. ALL SINGLE-PHASE CIRCUITS SHALL BE PROVIDED WITH INDIVIDUAL NEUTRAL. UTILIZING MULTI-POLE BREAKERS FOR SINGLE-PHASE CIRCUITS SHARING A NEUTRAL IS NOT ALLOWED. NO MORE THAN THREE CURRENT CARRYING CONDUCTORS ALLOWED PER CONDUIT, EXCEPT THREE SINGLE-PHASE BRANCH CIRCUIT CONDUCTORS, EACH WITH INDIVIDUAL NEUTRALS, SHALL BE ALLOWED IN A CONDUIT.

3.2 COLOR CODING:

- A. ALL WIRING SHALL BE COLOR-CODED.
- B. ON 120/208V, 3-PHASE, 4-WIRE POWER SYSTEMS, CONDUCTOR INSULATION SHALL BE COLOR CODED BLACK (PHASE A), RED (PHASE B), BLUE (PHASE C), AND WHITE (NEUTRAL).
- C. ON 277/480V, 3-PHASE, 4-WIRE POWER SYSTEMS, CONDUCTOR INSTALLATION SHALL BE COLOR CODED BROWN (PHASE A), ORANGE (PHASE B), YELLOW (PHASE C) AND GRAY (NEUTRAL).
- D. INSULATION FOR GROUNDING CONDUCTORS ON ALL SYSTEMS SHALL BE GREEN.
- E. CONDUCTORS #4 AWG AND LARGER MAY BE IDENTIFIED WITH TWO OR MORE BANDS OF APPROPRIATE COLOR PLASTIC TAPE APPLIED NEAR EACH SPLICE AND TERMINATION. PAINTING WIRE WILL NOT BE ACCEPTABLE.
- F. PHASE SEQUENCE SHALL BE "A", "B" AND "C" FROM LEFT TO RIGHT, TOP TO BOTTOM OR FRONT TO BACK WHEN FACING EQUIPMENT.
- G. WHERE SERVICE OR FEEDER CONDUCTORS SHALL NOT USE THE ABOVE-NAMED COLORS EXCEPT GREEN FOR GROUNDING. ANY OTHER COLORS OR STRIPING MAY BE USED BUT THE CODING SHALL PROVIDE SAME COLOR OR STRIPING BETWEEN ANY TWO TERMINALS BEING JOINED.
- H. SWITCH LEGS, INCLUDING "TRAVELERS", SHALL BE THE SAME COLOR AS PHASE CIRCUIT CONDUCTORS.

3.3 BRANCH CIRCUIT RACEWAY WIRING:

- A. THREE-PHASE CIRCUITS SHALL BE LIMITED TO ONE SUCH CIRCUIT PER RACEWAY. THEY SHALL CONSIST OF THREE DIFFERENT PHASE WIRES, AND A NEUTRAL WHERE REQUIRED.
- B. A NEUTRAL SHALL NOT SERVE MORE THAN ONE CIRCUIT. RUN A SEPARATE NEUTRAL FOR EACH 120 VOLT CIRCUIT.
- C. THE NEUTRAL CARRYING ALL OR ANY PART OF THE CURRENT OF ANY SPECIFIC LOAD SHALL BE CONTAINED IN THE SAME RACEWAY OR ENCLOSURE WITH THE PHASE WIRE OR WIRES ALSO CARRYING THAT CURRENT.
- D. CIRCUITS SHALL BE CONNECTED TO PANELS AS SHOWN IN THE PANEL SCHEDULES.
- E. CONDUCTORS SUPPLYING LIGHTING OUTLETS MAY BE COMBINED IN THE SAME RACEWAYS WITH CONDUCTORS SUPPLYING RECEPTACLES, BUT LIGHTING OUTLETS AND RECEPTACLE OUTLETS SHALL NOT BE CONNECTED TO THE SAME CIRCUITS UNLESS SPECIFICALLY INDICATED IN THE DRAWINGS.

3.4 SERVICE & FEEDER CONDUCTORS:

- A. UNLESS SPECIFICALLY SHOWN OTHERWISE, EACH FEEDER AND EACH SET OF SERVICE CONDUCTORS SHALL BE INSTALLED IN A SEPARATE RACEWAY.
- B. WHERE THE PARALLELING OF CONDUCTORS IS SHOWN FOR FEEDERS OR SERVICE ENTRANCE, IT IS ABSOLUTELY REQUIRED THEY BE THE SAME LENGTH BETWEEN TERMINATIONS.
- C. WHERE SERVICE OR FEEDER CONDUCTORS ARE INSTALLED SO THAT THE CONDUCTOR MARKINGS CANNOT BE READ WITHOUT MOVING OR TWISTING CONDUCTORS, THEY SHALL BE PROVIDED WITH SUITABLE TAGS INDICATING THE CONDUCTOR SIZE AND INSULATION.

METAL-CLAD CABLE SYSTEMS

- 1.1 SCOPE:
- A. FURNISH AND INSTALL A COMPLETE SYSTEM OF METAL-CLAD CABLE FOR BRANCH CIRCUIT, SIGNAL, AND REMOTE-CONTROL WIRING AS SPECIFIED HEREIN.
- B. BRANCH CIRCUIT CABLE SYSTEMS OTHER THAN AN MC CABLE SYSTEMS, SUCH AS TYPES AC, NM, AND NMC ARE NOT PERMITTED.
- 1.2 APPLICATIONS:
- A. METAL-CLAD CABLES MAY BE USED IN LIEU OF WIRE IN METAL RACEWAY ONLY FOR CONCEALED WORK IN DRY LOCATIONS ABOVE SUSPENDED CEILINGS AND WITHIN STUD PARTITIONS.
- B. CABLES MAY NOT BE RUN IN, OR THROUGH, CONCRETE OR MASONRY, FIRE-RATED PARTITIONS, SMOKE PARTITIONS, OR FLOORS.
- 1.3 SUBMITTALS:
- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR METAL-CLAD CABLE SYSTEMS.
- 2.1 MATERIALS:
- A. METAL-CLAD CABLES SHALL BE UL LISTED AS TYPE MC WITH COPPER CONDUCTORS, THHN INSULATED, WITH FULL SIZE GREEN INSULATED GROUNDING CONDUCTORS. MINIMUM SIZES SHALL BE #12 AWG FOR BRANCH CIRCUITS, #14 AWG FOR SIGNAL AND REMOTE CONTROL. MAXIMUM SIZE SHALL BE #10 AWG.
- B. CABLE CONNECTORS SHALL BE UL LISTED FOR GROUNDING THE METAL SHEATH. CONNECTORS SHALL BE OF STEEL OR MALLEABLE IRON WITH INSULATED THROATS.
- C. CABLES SHALL BE COLOR-CODED IN MANUFACTURE.

3.1 INSTALLATION:

- A. CABLES SHALL NOT BE RUN EXPOSED. CONDUIT SKIRTS MAY BE PROVIDED ON SURFACE MOUNTED PANELBOARDS TO CONCEAL CABLES BETWEEN PANEL TOPS AND CEILINGS.
- B. EXCEPT WHEN INSTALLED IN CONTINUOUS ROWS, LIGHTING FIXTURES SHALL BE INDIVIDUALLY CONNECTED TO A CONCEALED OUTLET BOX. CABLES MAY NOT BE LOOPED FROM FIXTURE TO FIXTURE.

GROUNDING AND BONDING

1.1 SCOPE:

- A. THE ELECTRICAL SYSTEM NEUTRAL, THE NEUTRAL OF EACH SEPARATELY DERIVED SYSTEM, AND ALL NON-CURRENT-CARRYING METAL PARTS, RACEWAYS, AND ENCLOSURES SHALL BE PERMANENTLY AND EFFECTIVELY GROUNDED.
- B. GROUNDING AND BONDING SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND AS SPECIFIED HEREIN AND ON THE DRAWINGS.
- C. THE CONTRACTOR SHALL NOTE THAT THE REQUIRED GROUNDING CONDUCTORS AND CONNECTIONS ARE NOT ALL SHOWN ON THE DRAWINGS. NEC REQUIREMENTS APPLY.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR GROUNDING AND BONDING MATERIALS.

2.1 MATERIALS AND APPLICATIONS:

- A. GROUNDING CONDUCTORS SHALL BE OF THWN INSULATED COPPER, UNLESS OTHERWISE INDICATED.
- B. GROUNDING BUS BARS IN DISTRIBUTION EQUIPMENT SHALL BE BARE COPPER.
- C. ALUMINUM ALLOYS ARE NOT ACCEPTABLE AS GROUNDING MATERIALS.
- D. CLAMPS FOR ATTACHING CONDUCTORS TO WATER PIPES AND GROUND RODS SHALL BE OF BRONZE. GROUND ROD CLAMPS SHALL BE UL LISTED FOR DIRECT BURIAL.
- E. CLAMPS FOR ATTACHING CONDUCTORS TO BUILDING STEEL SHALL BE OF STEEL, BRONZE, OR MALLEABLE IRON.
- F. THREADED HUBS FOR BONDING METAL RACEWAYS TO THE CONTAINED GROUNDING ELECTRODE CONDUCTORS AND TO THE WATER PIPE CLAMPS SHALL BE OF BRONZE OR MALLEABLE IRON. SIMILAR HUBS SHALL BE USED TO BOND THE SAME RACEWAYS TO THE CONDUCTORS AND TO SHEET METAL EQUIPMENT ENCLOSURES.
- G. DRIVEN GROUNDING ELECTRODES SHALL CONSIST OF COPPER CLAD STEEL RODS. RODS SHALL BE 10 FEET LONG AND 3/4" DIAMETER UNLESS OTHERWISE INDICATED.
- H. BONDING BUSHINGS SHALL BE OF STEEL OR MALLEABLE IRON WITH NON-REMOVABLE PLASTIC THROATS RATED 150°C.
- I. BONDING LOCKNUTS AND WEDGES FOR SERVICE CONDUITS SHALL BE OF ZINC COATED STEEL.
- J. GROUNDING TYPE INSULATED BONDING BUSHINGS AND JUMPSERS SHALL BE PROVIDED WHERE CONDUITS TERMINATE IN SERVICE ENTRANCE EQUIPMENT, GENERATOR FEEDERS, TRANSFER SWITCHES, TRANSFORMERS, AND WHERE CONCENTRIC, ECCENTRIC, OR OVER-SIZED KNOCKOUTS ARE ENCOUNTERED. THE JUMPSERS SHALL BE SIZED PER NEC TABLE 250-86 FOR SERVICES, GENERATOR FEEDERS, AND TRANSFORMERS, AND PER TABLE 250-122 FOR BRANCH CIRCUITS.

3.1 ELECTRICAL EQUIPMENT GROUNDING:

- A. ALL NON-CURRENT-CARRYING METAL PARTS, RACEWAYS, AND ENCLOSURES OF THE ELECTRICAL SYSTEM AND OF EQUIPMENT SUPPLIED THROUGH THE ELECTRICAL SYSTEM SHALL BE PERMANENTLY AND EFFECTIVELY GROUNDED.
- B. EQUIPMENT GROUNDING CONDUCTORS SHALL BE PROVIDED FOR EACH FEEDER AND FOR EACH BRANCH CIRCUIT AND SHALL BE CONTAINED WITHIN THE SAME RACEWAYS AS THE FEEDER AND BRANCH CIRCUIT CONDUCTORS. THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THWN INSULATED COPPER, NOT SMALLER THAN #12 AWG.
- C. COPPER BONDING STRIPS NORMALLY INCLUDED IN SMALL SIZES OF LIQUID-TIGHT FLEXIBLE METAL CONDUIT AND DEPENDENT UPON THE TERMINAL CONNECTORS FOR BONDING CONTINUITY WILL NOT BE ACCEPTED IN LIEU OF THE EQUIPMENT GROUNDING CONDUCTORS SPECIFIED HEREIN.
- D. GROUNDING TERMINALS ON WIRING DEVICES, OTHER THAN ISOLATED GROUND RECEPTACLES, BUT INCLUDING SWITCHES, SHALL BE CONNECTED TO THE EQUIPMENT GROUNDING CONDUCTOR INCLUDED IN THE BRANCH CIRCUIT RACEWAY, AND TO THE DEVICE BOX WITH SUITABLE JUMPERS AND LUGS BOLTED TO THE BOX. NOT THE PLASTER RING. "G" CLIPS ARE NOT ACCEPTABLE. AND "SELF-GROUNDING" TYPE DEVICE MOUNTING SCREWS WILL NOT BE ACCEPTED AS THE DEVICE GROUNDING METHOD.
- E. WHERE METAL RACEWAYS ENTER SHEET METAL ENCLOSURES THROUGH KNOCKOUTS PROVIDE BONDING BUSHINGS AND JUMPSERS TO THE ENCLOSURE UNDER ANY OF THE FOLLOWING CONDITIONS:
 - VOLTAGE EXCEEDS 250 VOLTS TO GROUND.
 - BRANCH CIRCUIT CONDUIT EXCEEDS 1" IN SIZE.
 - FEEDER CONDUIT REGARDLESS OF VOLTAGE AND SIZE.

3.2 GROUNDING OF OTHER SYSTEMS:

- A. ALL METAL PIPING SYSTEMS INCLUDING WATER PIPING, GAS PIPING AND SPRINKLER PIPING SHALL BE PERMANENTLY AND EFFECTIVELY BONDED TO THE ELECTRICAL EQUIPMENT GROUND SYSTEM AS REQUIRED BY N.E.C. 250.
- B. PROVIDE INTERSYSTEM BONDING TERMINATION DEVICE FOR OTHER SYSTEMS AS REQUIRED BY N.E.C. 250.94.
 - STRUCTURAL METAL SYSTEMS SHALL BE PERMANENTLY AND EFFECTIVELY BONDED TO THE ELECTRICAL EQUIPMENT GROUND SYSTEM AS REQUIRED BY N.E.C. 250.
 - THE LIGHTNING PROTECTION SYSTEM SHALL BE PERMANENTLY AND EFFECTIVELY BONDED TO THE ELECTRICAL GROUNDING ELECTRODE SYSTEM AS REQUIRED BY N.E.C. 250.

3.3 GROUNDING ELECTRODE SYSTEM:

- A. THE GROUNDING ELECTRODE SYSTEM FOR THE SERVICE NEUTRAL AND SERVICE EQUIPMENT SHALL INCLUDE CONNECTIONS TO THE FOLLOWING:
 - THE WATER MAIN AT THE NEAREST ACCESSIBLE POINT TO WHERE IT ENTERS THE BUILDING AND ON THE STRIKE SIDE OF THE MAIN VALVE. THIS CONNECTION SHALL REMAIN ACCESSIBLE AFTER CONSTRUCTION IS COMPLETE.
 - A GROUND ROD USING #4 AWG COPPER CONDUCTOR. THE GROUND RODS SHALL BE DRIVEN TO A DEPTH EQUAL TO THEIR LENGTH PLUS SIX INCHES. PROVIDE ADDITIONAL GROUND RODS NOT LESS THAN 10 FEET APART WHERE NEEDED TO COMPLY WITH NEC GROUND RESISTANCE LIMITATIONS, AND RESISTANCE LIMITATIONS SPECIFIED HEREIN.
 - STRUCTURAL METAL BUILDING FRAME, WHERE APPLICABLE.

- B. GROUNDING ELECTRODE CONDUCTORS SHALL BE WITHOUT SPLICES AND SHALL BE CONTAINED WITHIN STEEL RACEWAYS AND BONDED TO THE RACEWAY AT BOTH ENDS. RACEWAY MAY BE OMITTED ONLY WHERE SPECIFICALLY INDICATED ON THE DRAWINGS.
- C. A MECHANICAL CLAMP TYPE GROUND CONDUCTOR CONNECTION IS ACCEPTABLE ONLY IF THE CONNECTION IS READILY ACCESSIBLE FOR INSPECTION AND TIGHTENING. ANY CONNECTION POINT NOT READILY ACCESSIBLE SHALL BE MADE BY THE THERMAL WELDING PROCESS.
- D. THE CONTRACTOR SHALL TEST THE GROUND RESISTANCE OF THE COMPLETED GROUNDING ELECTRODE SYSTEM AS REQUIRED BY SECTION 16010 ELECTRICAL GENERAL REQUIREMENTS. IF THE TEST INDICATES A RESISTANCE TO GROUND MORE THAN 25-OHMS, IT SHALL BE REDUCED TO 25-OHMS OR LESS BY PROVIDING ADDITIONAL GROUND RODS.
- E. PRIOR TO MAKING THE FINAL MAIN BOND JUMPER CONNECTION FROM THE GROUNDING ELECTRODE CONDUCTOR TO THE SYSTEM NEUTRAL, THE CONTRACTOR SHALL DEMONSTRATE BY MEGGER TEST ADEQUATE ISOLATION FROM GROUND OF THE SYSTEM NEUTRAL. THIS TEST WILL REQUIRE THAT THE SYSTEM NEUTRAL BE SUITABLY ISOLATED FROM SERVICE NEUTRAL IF IT HAS BEEN GROUNDED IN ANY WAY.

3.4 SEPARATELY DERIVED SYSTEMS:

- A. THE SECONDARY OF A DRY-TYPE TRANSFORMER, AND THE OUTPUT OF A GENERATOR OR UPS WITH A NEUTRAL THAT IS NOT CONNECTED TO THE SERVICE NEUTRAL IS A SEPARATELY DERIVED SYSTEM AND MUST BE GROUNDED PER NEC 250.
- B. THE GROUNDING ELECTRODE CONDUCTOR FOR THE NEUTRAL AND EQUIPMENT OF EACH SEPARATELY DERIVED SYSTEM SHALL BE CONNECTED TO THE NEAREST ACCESSIBLE MEMBER OF THE GROUNDED STRUCTURAL METAL BUILDING FRAME WHERE APPLICABLE. OR, IN THE ABSENCE OF SUITABLE STRUCTURAL METAL, TO THE NEAREST ACCESSIBLE COLD-WATER PIPE. THIS CONNECTION SHALL REMAIN ACCESSIBLE AFTER CONSTRUCTION IS COMPLETE.
- C. GROUNDING ELECTRODE CONDUCTORS FOR SEPARATELY DERIVED SYSTEMS SHALL BE WITHOUT SPLICE AND SHALL BE CONTAINED WITHIN STEEL RACEWAYS AND BONDED TO THE RACEWAY AT BOTH ENDS. RACEWAY MAY BE OMITTED ONLY WHERE SPECIFICALLY INDICATED ON THE DRAWINGS.
- D. BOND THE FOLLOWING TOGETHER WITHIN THE ENCLOSURE OF EACH DRY-TYPE TRANSFORMER, UNLESS OTHERWISE INDICATED:
 - GROUNDING ELECTRODE CONDUCTOR DESCRIBED ABOVE.
 - TRANSFORMER SECONDARY NEUTRAL.
 - TRANSFORMER ENCLOSURE.

1.1 SCOPE:

- A. FURNISH AND INSTALL OUTLET BOXES, SWITCH BOXES, PULL BOXES, TERMINAL BOXES, JUNCTION BOXES AND FLOOR BOXES COMPLETE AS SHOWN AND SPECIFIED.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR ALL BOX TYPES.

2.1 MATERIALS AND APPLICATIONS:

- A. UNLESS SPECIFICALLY NOTED OR APPROVED OTHERWISE, BOXES SHALL BE OF ZINC COATED STEEL OR CAST FERROUS ALLOY AS MANUFACTURED BY STEEL CITY, RAGO, CROUSE-HINDS, APPLETON, OR APPROVED EQUAL.
- B. FOR EXPOSED WORK ON THE EXTERIOR OF THE BUILDING, AND IN DAMP OR WET INTERIOR LOCATIONS, BOXES SHALL BE OF CAST METAL WITH THREADED CONDUIT HUBS AND GASKET SEALED COVERS; OR OF ZINC COATED SHEET STEEL OF NEC GAUGE AND SIZE WITH SCREW FASTENED GASKET SEALED COVERS AND THREADED CONDUITS HUBS OF ZINC COATED MALLEABLE IRON AND NO KNOCKOUTS OR EXTRANEIOUS OPENINGS. COVER SCREWS SHALL BE STAINLESS STEEL.
- C. FOR EXPOSED WORK IN INTERIOR DRY LOCATIONS LESS THAN 8 FEET ABOVE A FLOOR OR PLATFORM IN OTHER THAN ELECTRICAL, MECHANICAL OR COMMUNICATIONS CLOSETS OR EQUIPMENT ROOMS, BOXES SHALL BE OF CAST METAL WITH THREADED CONDUIT HUBS AND MATCHING COVERS, OR OF ZINC COATED SHEET STEEL OF NEC GAUGE AND SIZE WITH SCREW FASTENED COVERS AND NO KNOCKOUTS OR EXTRANEIOUS OPENINGS. COVER SCREWS SHALL BE STEEL.
- D. FOR EXPOSED WORK IN INTERIOR DRY LOCATIONS IN ELECTRICAL, MECHANICAL, OR COMMUNICATIONS CLOSETS OR EQUIPMENT ROOMS; OR, IN OTHER DRY AREAS, 8 FEET OR MORE ABOVE A FLOOR OR PLATFORM, BOXES 5" SQUARE AND LARGER SHALL BE NEC GAUGE AND SIZE OF ZINC COATED SHEET STEEL. 4" OCTAGONAL, 4" SQUARE AND 4-1/16" SQUARE "KNOCKOUT" BOXES SHALL BE OF ZINC COATED STEEL, NEC GAUGE AND SIZE. BOX EXTENSIONS ARE NOT PERMITTED ON EXPOSED "KNOCKOUT" BOXES AND COVERS SHALL BE OF THE RAISED SURFACE TYPE. "HANDY" BOXES ARE NOT PERMITTED.
- E. FOR CONCEALED WORK, FIXTURE OUTLET BOXES SHALL BE 4" OCTAGONAL MINIMUM, PROVIDED WITH PLASTER RINGS IN PLASTERED SURFACES. CONCRETE RING BOXES SHALL BE USED IN POURED CONCRETE. SWITCH AND OUTLET BOXES IN PLASTERED AND DRY WALLS SHALL BE 4" SQUARE MINIMUM OR ONE-PIECE MULTI-GANG WITH APPROPRIATE PLASTER RINGS. SWITCH AND OUTLET BOXES IN EXPOSED BRICK, BLOCK OR TILE WALLS SHALL BE SINGLE OR MULTI-GANG ONE-PIECE BOXES NOT LESS THAN 3-1/2" DEEP WITH SQUARE CORNERS AND WITH INTERNAL DEVICE MOUNTING HOLES, EQUAL TO STEEL CITY TYPE GW. BOXES IN WALLS FINISHED WITH CERAMIC TILE OR WOOD PANELING SHALL BE 4" SQUARE MINIMUM OR ONE-PIECE MULTI-GANG BOXES, FITTED WITH APPROPRIATE TILE RINGS HAVING SQUARE CORNERS AND INTERNAL DEVICE MOUNTING HOLES. GANGABLE BOXES ARE NOT PERMITTED.

3.1 INSTALLATION:

- A. SET RECESSED BOXES WITH EDGES FLUSH WITH FINISHED SURFACES.
- B. IMMEDIATELY AFTER INSTALLATION COVER BOXES TO PREVENT ENTRANCE OF FOREIGN MATTER.
- C. SCALING OF PLANS FOR OUTLET LOCATIONS IS NOT NECESSARILY ACCURATE ENOUGH FOR THE INTENT OF THESE SPECIFICATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH THE EVIDENT INTENT FOR CENTERING OR SYMMETRIC ARRANGEMENT IN CEILING AND WALL SPACES. SPECIAL ATTENTION IS ALSO DIRECTED TO THE LOCATION OF ANY OUTLETS WHICH ARE BUILT INTO, OR LOCATED IN RELATION TO, OTHER FEATURES SUCH AS SHELVING, WORK COUNTERS, AND EQUIPMENT. THE CONTRACTOR SHALL CONSULT PLANS AND SHOP DRAWINGS ON SUCH FEATURES AND LOCATE OUTLETS AS THEREBY INDICATED.
- D. MOUNTING HEIGHTS INDICATED HEREIN AND ON THE DRAWINGS ARE APPROXIMATE DIMENSIONS OF THE CENTER OF THE BOX TO THE FLOOR AND MAY VARY SLIGHTLY TO CLEAR OBSTRUCTIONS AND MATCH JOINTS IN MASONRY. REFERENCES TO "HORIZONTAL" AND "VERTICAL" APPLY TO THE ORIENTATION OF THE LONG DIMENSION OF A SINGLE-GANG PLATE AND OF THE DEVICE MOUNTING STRAP ALIGNMENT TOLERANCE SHALL BE 1/16 INCH. UNLESS OTHERWISE INDICATED WALL OUTLET BOXES SHALL BE MOUNTED AS FOLLOWS:
 - RECEPTACLE AND COMMUNICATIONS OUTLETS SHALL BE INSTALLED VERTICAL, 18" UP.
 - OUTLETS INDICATED AS "COUNTER HEIGHT", AS WELL AS BOXES FOR WALL SWITCHES, FIRE ALARM MANUAL STATIONS, AND WALL TELEPHONES SHALL BE INSTALLED VERTICAL, 46" UP. CLEAR OF WALL CABINETS, BACK-SPLASHES, AND WAINSCOT INTERFERENCES.
 - FIRE ALARM SIGNAL DEVICES SHALL BE INSTALLED WITH THE TOP OF THE DEVICE APPROXIMATELY 6" BELOW THE CEILING OR WITH THE BOTTOM OF THE DEVICE 80" ABOVE THE FLOOR, WHICHEVER IS LOWER.
 - SWITCH BOXES SHALL BE INSTALLED VERTICAL, 46" UP. SWITCH BOXES BESIDE DOORS SHALL BE ON THE STRIKE SIDE, WITH EDGE APPROXIMATELY 2" FROM DOOR JAMB OR TRIM.
- E. JUNCTION AND PULL BOXES MAY BE USED AS NECESSARY TO FACILITATE WIRING PROVIDED. THEY ARE HIDDEN FROM SIGHT (BUT ACCESSIBLE), OR INSTALLED IN LOCATIONS WHERE EXPOSED WIRING IS PERMITTED, OR FLUSH MOUNTED AT LOCATIONS APPROVED BY THE ARCHITECT/ENGINEER.

WIRING DEVICES

1.1 SCOPE:

- A. THE CONTRACTOR SHALL FURNISH AND COMPLETELY INSTALL LIGHTING SWITCHES, CONVENIENCE OUTLETS, AND SPECIAL PURPOSE RECEPTACLES ALONG WITH APPROPRIATE OUTLET BOXES AND DEVICE PLATES AS INDICATED ON THE DRAWINGS AND AS HEREIN SPECIFIED.
- B. WHEN CONNECTION TO AN ITEM OF EQUIPMENT IS REQUIRED UNDER THIS CONTRACT, AND WHERE SUCH EQUIPMENT REQUIRES A RECEPTACLE FOR CONNECTION, THE CONTRACTOR SHALL FURNISH AND INSTALL THE APPROPRIATE DEVICE, WHETHER THE DEVICE IS SPECIFICALLY SHOWN OR SPECIFIED.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL CATALOG DATA SHEETS FOR ALL WIRING DEVICES.

2.1 MANUFACTURERS:

- A. WIRING DEVICES AND DEVICE PLATES SHALL BE MANUFACTURED BY HUBBELL, BRYANT, ARROW HART, PASS AND SEYMOUR, LEVITON, OR EAGLE.
- B. CATALOG NUMBERS OF ONE OR MORE OF THE MANUFACTURERS ARE USED HEREIN AND, ON THE DRAWINGS, TO SET A STANDARD OF QUALITY AND CAPACITY. EQUIVALENT PRODUCTS OF OTHER NAMED MANUFACTURERS ARE ALSO ACCEPTABLE, PROVIDED THEY ARE SUBMITTED AND APPROVED IN ACCORDANCE WITH SECTION 16010, ELECTRICAL GENERAL REQUIREMENTS.
- C. ALL WIRING DEVICES OF ANY ONE GENERAL TYPE (E.G., ALL DUPLEX RECEPTACLES OR ALL LIGHT SWITCHES) SHALL BE OF THE SAME MANUFACTURER AND SHALL MATCH THROUGHOUT.

2.2 WIRING DEVICES AND PLATES - GENERAL:

- A. WIRING DEVICES SHALL BE INDUSTRIAL SPECIFICATION GRADE UNLESS OTHERWISE INDICATED.
- B. RECEPTACLES SHALL BE LISTED TO MEET THE REQUIREMENTS OF FED SPEC W-5966.
- C. SWITCHES SHALL BE LISTED TO MEET THE REQUIREMENTS OF FED SPEC W-5-896E.
- D. UNLESS OTHERWISE INDICATED OR DIRECTED, WIRING DEVICES SHALL BE GRAY IN COLOR.
- E. UNLESS OTHERWISE INDICATED, PLATES FOR FLUSH OUTLETS SHALL BE STAINLESS STEEL (TYPE 302) AND SHALL BE STANDARD SIZE. THOSE FOR SURFACE CAST BOXES SHALL BE OF STEEL, OF SHAPE AND FINISH TO MATCH THE BOX. SCREWS SHALL BE STEEL SLOTTED HEAD OVAL TYPE TO MATCH THE PLATE. QUANTITY OF 2% SPARE COVER PLATES OF EACH TYPE SHALL BE PROVIDED TO THE OWNER.
- F. EACH WIRING DEVICE (INCLUDING EACH SWITCH) SHALL BE EQUIPPED WITH A HEX-HEAD GREEN GROUNDING SCREW FOR GROUNDING THE DEVICE AND PLATE TO THE OUTLET BOX

D. SWITCHES WITH COLLARS AROUND THE OPERATING TOGGLE WILL NOT BE ACCEPTED.

2.4 RECEPTACLES:

- A. RECEPTACLES SHALL BE LISTED TO UL498 AND FED SPEC W-C-596. UNLESS OTHERWISE INDICATED OR REQUIRED, RECEPTACLES SHALL BE THE DUPLEX TYPE, SIDE AND BACK WIRED, WITH NYLON FACE ON CIRCUITS SUPPLYING TWO OR MORE SUCH RECEPTACLES, THEY SHALL BE RATED 15 AMPS, 125 VOLTS, NEMA 5-15R, DUPLEX RECEPTACLES ON INDIVIDUAL CIRCUITS SHALL BE RATED 20 AMPS, 125 VOLTS, NEMA 5-20R. RECEPTACLES SHALL CONFORM TO NEMA WD-1, WD-6 AND UL498. B. WHEN NO OTHER FEATURES ARE INDICATED ON THE DRAWINGS PROVIDE HUBBELL 5262 AND 5362 SERIES FOR 5-15R AND 5-20R RESPECTIVELY. C. WHEN INDICATED ON THE DRAWINGS PROVIDE GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES, HUBBELL GF5262 AND GF5362 SERIES FOR 5-15R AND 5-20R RESPECTIVELY. GFCI RECEPTACLES SHALL BE CLASS A, LISTED TO UL STANDARD 943. D. WHEN INDICATED ON THE DRAWINGS, WEATHER-RESISTANT RECEPTACLES SHALL CONSIST OF GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES AS SPECIFIED ABOVE WITH A WEATHER-RESISTANT "WR" RATING, PROVIDE WITH ALUMINUM COVERS UL LISTED FOR WET LOCATIONS WHILE-IN-USE, PASS AND SEYMOUR WUCAST1. E. WHEN INDICATED ON THE DRAWINGS PROVIDE TIGHT PROOF (TAMPER RESISTANT "TR" RATING) RECEPTACLES. A TAMPER RESISTANT COVER IS NOT ACCEPTABLE. F. WHEN INDICATED ON THE DRAWINGS PROVIDE RECEPTACLES WITH TWO USB CHARGER DEVICES (TYPE 2.0 PORTS) RATED AT 3A AND 5VDC, HUBBELL USB15X2 AND USB20X2 FOR 5-15R AND 5-20R RESPECTIVELY. G. WHEN INDICATED ON THE DRAWINGS OR REQUIRED BY NEC ARTICLE 517, PROVIDE HOSPITAL GRADE RECEPTACLES. RECEPTACLES SHALL BE LISTED TO UL498 AND FED. SPEC. W-C-596G AND SHALL MEET THE REQUIREMENTS OF NEMA WD-1 AND WD-6. H. WHEN INDICATED ON THE DRAWINGS PROVIDE ISOLATED GROUND RECEPTACLES, HUBBELL IG5262 AND IG5362 SERIES FOR 5-15R AND 5-20R RESPECTIVELY.

3.1 INSTALLATION:

- A. DEVICES SHALL BE MOUNTED TIGHTLY TO BOXES AND BE ADJUSTED PLUMB AND LEVEL. DEVICES SHALL BE MOUNTED FLUSH WITH ITS ASSOCIATED COVERPLATE. EARS ON FLUSH DEVICES SHALL BE IN UNIFORM CONTACT WITH WALL SURFACES. OR THE DEVICES SHALL BE FITTED WITH CADDY RLC DEVICE LEVELERS. DEVICE PLATES SHALL NOT BE USED FOR SUPPORT OF FLUSH DEVICES. B. WHEN TWO OR MORE DEVICES ARE INDICATED FOR GANG INSTALLATION, THEY SHALL BE TRIMMED WITH GANG TYPE PLATES. C. GROUNDING TYPE RECEPTACLES SHALL BE GROUNDING WITH INSULATED COPPER GROUNDING CONDUCTORS ROUTED WITH THE CIRCUIT CONDUCTORS. D. THE CONTRACTOR SHALL PROVIDE SUITABLE TESTERS, AND DEMONSTRATE, WHEN DIRECTED, THAT RECEPTACLES ARE OPERATIONAL AND CORRECTLY WIRED; AND THAT GROUND FAULT CIRCUIT INTERRUPTER TYPE RECEPTACLES WILL TRIP WHEN CURRENT TO GROUND HAS A VALUE IN THE RANGE OF 4 THROUGH 6 MILLIAMPERES.

RACEWAY AND OUTLET SYSTEMS

1.1 SCOPE:

- A. CONTRACTOR SHALL FURNISH AND INSTALL SYSTEMS OF RACEWAYS, OUTLET BOXES, EQUIPMENT BOARDS, AND CABINETS, AS INDICATED ON THE DRAWINGS AND AS HEREIN SPECIFIED TO ACCOMMODATE THE INSTALLATION BY OTHERS OF WIRING AND EQUIPMENT.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR CABLE TRAY SYSTEM COMPONENTS.

2.1 MATERIALS:

- A. RACEWAYS, AND BOXES, SHALL BE IN COMPLIANCE WITH THE RELEVANT SECTIONS OF THESE SPECIFICATIONS. B. WALL OUTLETS SHALL CONSIST OF STANDARD 4" X 4" X 2-1/2" OUTLET BOXES WITH SINGLE DEVICE RINGS. TRIM PLATES SHALL BE BLANK TO MATCH WIRING DEVICE TRIM PLATES, UNLESS OTHERWISE INDICATED. C. SPECIAL OUTLETS INCLUDING FLOOR OUTLETS SHALL BE AS NOTED ON THE DRAWINGS. D. EQUIPMENT BOARDS SHALL BE OF SIZE NOTED OR SHOWN ON THE DRAWINGS, AND SHALL BE CONSTRUCTED OF 3/4" PLYWOOD, WITH FINISH GRADE ON FRONT. PAINT BOARD WITH GRAY FIRE-RETARDANT PAINT.

3.1 COORDINATION:

- A. CONTRACTOR SHALL FULLY COORDINATE WITH THE TELEPHONE AND SYSTEM INSTALLER, AND SHALL INSTALL SERVICE ENTRANCE RACEWAYS, BACKBOARDS, AND GROUNDING CONDUCTORS IN ACCORDANCE WITH THEIR REQUIREMENTS. B. CONTRACTOR SHALL FULLY COORDINATE WITH OTHER INSTALLERS OF WIRING AND EQUIPMENT AND SHALL INSTALL RACEWAYS, OUTLETS, CABINETS, AND BACKBOARDS IN ACCORDANCE WITH THEIR REQUIREMENTS.

3.2 INSTALLATION:

- A. INSTALL PULL BOXES AS NECESSARY TO LIMIT RUNS BETWEEN PULL POINTS TO TWO 90-DEGREE BENDS (OR EQUIVALENT) AND TO 100 FEET IN LENGTH, UNLESS OTHER ARRANGEMENTS ARE APPROVED BY THE WIRING INSTALLERS. B. LEAVE ALL RACEWAYS WITH 100 LB. TEST NYLON PULL CORD. C. INSTALL RACEWAYS AND BOXES IN ACCORDANCE WITH RELEVANT SECTIONS OF THESE SPECIFICATIONS. D. UNLESS SPECIFICALLY NOTED OTHERWISE, PROVIDE AN INDIVIDUAL 1" CONDUIT FROM EACH INDICATED OUTLET TO THE NEAREST CABLE TRAY, EQUIPMENT CABLE TRAY, CABINET OR TERMINAL BOARD FOR THE SYSTEM INVOLVED. E. PROVIDE ALL CONDUITS NOT TERMINATING ON BOXES WITH PLASTIC BUSHINGS. F. AT THE EQUIPMENT TERMINAL BOARD, TERMINATE ALL CONDUITS WITH PLASTIC BUSHINGS.

MISCELLANEOUS MATERIALS

1.1 SCOPE:

- A. CONTRACTOR SHALL FURNISH AND INSTALL MISCELLANEOUS MATERIALS AS INDICATED ON THE DRAWINGS AND AS HEREIN SPECIFIED.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS ON EACH DEVICE SPECIFIED BY THIS SECTION.

2.1 CONTROL RELAYS:

- A. THE RELAY COIL SHALL OPERATE SATISFACTORILY WITH COIL VOLTAGES WITHIN 85% TO 110% OF ITS VOLTAGE RATING. UNLESS OTHERWISE NOTED, CONTACT RATING SHALL BE 10 AMPS, CONTINUOUS FOR THE APPLIED VOLTAGE LEVEL. B. TIME DELAY RELAYS SHALL BE PROVIDED WITH ON-DELAY OR OFF-DELAY AS REQUIRED, AND REPETITIVE ACCURACY OF PLUS OR MINUS 0.2%. C. RELAYS SHALL BE INSTALLED IN A SUITABLE ENCLOSURE TO FIT THE ENVIRONMENT OF THEIR LOCATION. D. RELAYS SHALL BE MANUFACTURED BY GE, SQUARE D, EATON OR APPROVED EQUAL.

2.2 CONTACTORS:

- A. CONTACTORS SHALL BE "ELECTRICALLY HELD" OR "MECHANICALLY HELD" TYPE, AS INDICATED ON DRAWINGS. B. ELECTRICALLY HELD CONTACTORS SHALL INCLUDE AUXILIARY CONTACTS AS INDICATED AND LINE AND LOAD TERMINAL CONNECTORS. C. MECHANICALLY HELD CONTACTORS SHALL BE INDUSTRIAL TYPE, SINGLE OR DUAL SOLENOID OPERATOR, WITH MECHANISM CAPABLE OF WITHSTANDING REDUCTION OR LOSS OF CONTROL VOLTAGE WITHOUT CHANGE OF POSITION. CONTACTOR SHALL INCORPORATE CONTROL POWER CUT-OUT CONTACTS SO THAT THE MAGNETIC SOLENOID OPERATOR IS ONLY MOMENTARILY ENERGIZED DURING THE INSTANT THE SWITCH CHANGES POSITION. D. CONTACTOR CORE AND COIL ASSEMBLY, OR OPERATORS, SHALL OPERATE SATISFACTORILY WITH COIL VOLTAGE WITHIN 85% OR 110% OF ITS VOLTAGE RATING. E. ALL CONTACTS SHALL BE OF NON-WELDING, NON-CORRODING SILVER ALLOY. F. RATING OF CONTACTORS SHALL BE AS INDICATED ON DRAWINGS. AUXILIARY RELAYS SHALL BE PROVIDED AS APPLICABLE. CONTACTORS SHALL BE CONTAINED IN A SUITABLE ENCLOSURE FOR THE

ENVIRONMENT OF THEIR LOCATION. CONTACTORS SHALL BE SUITABLE FOR A CONTINUOUS LOAD NOT LESS THAN 100% OF THEIR ELECTRICAL RATING.

CONTACTORS SHALL BE MANUFACTURED BY GE, SQUARE D, EATON OR APPROVED EQUAL.

2.3 INDIVIDUAL PUSHBUTTONS, SELECTOR SWITCHES AND INDICATING LIGHTS:

- A. PUSHBUTTONS SHALL BE HEAVY-DUTY, OIL-TIGHT, MOMENTARY, OR MAINTAINED CONTACT, AS APPLICABLE. DEVICES RATED 600 VOLTS WITH THE NUMBER OF BUTTONS AND THE MARKING OF NAMEPLATES IN ACCORDANCE WITH NEMA PUBLICATION NO. IC5. B. PUSHBUTTONS SHALL BE DESIGNED WITH THE INDICATED NUMBER OF NORMALLY OPEN CIRCUIT-CLOSING CONTACTS, NORMALLY CLOSED CIRCUIT-OPENING CONTACTS, OR COMBINATION THEREOF. PUSHBUTTONS SHALL HAVE POSITIVE MAKE AND BREAK NON-WELDING, NON-CORRODING SILVER ALLOY CONTACTS. C. SELECTOR SWITCHES FOR CONTROL CIRCUITS SHALL BE HEAVY-DUTY, OIL-TIGHT MAINTAINED CONTACT DEVICES WITH THE NUMBER OF POSITIONS AND THE MARKING OF NAMEPLATES AS INDICATED ON DRAWINGS OR OTHERWISE SPECIFIED. D. INDICATING LIGHTS FOR CONTROL CIRCUITS SHALL BE OIL-TIGHT, INSTRUMENT TYPE DEVICES WITH THREADED BASE AND COLLAR FOR FLUSH MOUNTING AND TRANSLUCENT CONVEX LENS. INDICATING LIGHTS SHALL BE LONG LIFE TYPE, RATED 7500 HOURS, MINIMUM, PROVIDE OWNER WITH TWO SPARE INDICATING LIGHTS OF EACH SIZE AND TYPE USED. E. PUSHBUTTONS, SELECTOR SWITCHES AND INDICATING LIGHTS SHALL BE CONTAINED IN AN ENCLOSURE SUITABLE FOR THE ENVIRONMENT OF THEIR LOCATION, AND SHALL BE SQUARE D CLASS 9001, TYPE T SERIES, OR EQUIVALENT AS ACCEPTED BY THE A-E, AND SHALL BE SQUARE D CLASS 9001, TYPE T SERIES, OR APPROVED EQUAL.

2.4 CONTROL CIRCUIT TRANSFORMERS:

- A. CONTROL CIRCUIT TRANSFORMERS SHALL BE PROVIDED WITHIN THE ENCLOSURE OF MAGNETIC CONTACTORS WHEN INDICATED ON DRAWINGS OR SPECIFIED OTHERWISE AND THE LINE VOLTAGE IS MORE THAN 120 VOLTS. THE TRANSFORMER SHALL BE DRY TYPE SINGLE PHASE, 60 HERTZ ALTERNATING CURRENT WITH A 120-VOLT ISOLATED SECONDARY WINDING IN ACCORDANCE WITH NEMA PUBLICATION STL "SPECIALTY TRANSFORMERS". B. THE RATED PRIMARY VOLTAGE OF THE TRANSFORMER SHALL BE NOT LESS THAN THE RATED VOLTAGE OF THE CONTROLLER. THE RATED SECONDARY CURRENT OF THE TRANSFORMER SHALL BE NOT LESS THAN CONTINUOUS DUTY CURRENT OF THE CONTROL CIRCUIT. C. THE VOLTAGE REGULATION OF THE TRANSFORMER SHALL BE SUCH THAT WITH RATED PRIMARY VOLTAGE AND FREQUENCY THE SECONDARY VOLTAGE WILL NOT BE LESS THAN 95% OR MORE THAN 105% OF RATED SECONDARY VOLTAGE. D. THE SOURCE OF SUPPLY FOR CONTROL CIRCUIT TRANSFORMERS SHALL BE TAKEN FROM THE LOAD SIDE OF THE MAIN DISCONNECTING DEVICE. THE PRIMARY AND SECONDARY WINDINGS OF THE TRANSFORMER AND CONTROL CIRCUIT WIRING SHALL BE PROTECTED AGAINST OVERLOADS AND SHORT CIRCUITS WITH PROPERLY SELECTED FUSES. THE SECONDARY WINDING OF THE CONTROL CIRCUIT TRANSFORMER SHALL BE GROUNDED.

2.5 TIME SWITCHES:

- A. TIME SWITCHES FOR THE CONTROL OF LED LIGHTING LOADS, RESISTIVE HEATING LOADS, MOTORS AND MAGNETICALLY OPERATED DEVICES SHALL CONSIST OF A DIGITAL PROGRAMMABLE TIMER AND SWITCH ASSEMBLY IN A SUITABLE ENCLOSURE, AS INDICATED AND HEREIN SPECIFIED. B. TIMER SHALL OPERATE FROM 120, 208, 240 OR 277V. C. BATTERY RESERVE POWER SHALL BE PROVIDED WHICH WILL AUTOMATICALLY OPERATE THE TIMER IN CASE OF ELECTRIC POWER FAILURE FOR A PERIOD OF NOT LESS THAN 30 DAYS. D. THE SWITCH MECHANISM SHALL INCLUDE A HEAVY-DUTY, GENERAL PURPOSE, PRECISION SNAP-ACTION SWITCH. PROVISION SHALL BE MADE FOR MANUAL "OFF" AND "ON" OPERATION OF THE SWITCH. E. TIME SWITCHES SHALL BE MANUFACTURED BY TORK, SANGAMO, GENERAL ELECTRIC, INTERMATIC OR APPROVED EQUAL.

2.6 PHOTOCCELL CONTROL DEVICES:

- A. PHOTOCCELL CONTROL DEVICES FOR CONTROL OF OUTDOOR FIXTURES AND NATURAL DAYLIGHT UTILIZATION FOR INDOOR SPACES SHALL BE FIXTURE MOUNTED OR INDIVIDUALLY MOUNTED AS INDICATED ON DRAWINGS, OR OTHERWISE SPECIFIED. B. FIXTURE MOUNTED PHOTOCCELL CONTROL DEVICES SHALL INCLUDE A SNAP-ACTION SWITCH WITH A RATING OF NOT LESS THAN 1000 WATTS INCANDESCENT LOAD AND 1200 VOLT-AMP REACTIVE OR HID LOAD AT RATED VOLTAGE AND FREQUENCY. DEVICE ALSO SHALL HAVE AN INHERENT TIME DELAY OF MORE THAN 5 SECONDS, BUILT-IN SURGE PROTECTION, AND THE APPROPRIATE LOCK TYPE RECEPTACLE BASE. THE DEVICE SHALL BE ENCLOSED IN A WEATHERPROOF ENCLOSURE. DEVICE RATING SHALL BE 120 OR 277 VOLTS, AS APPLICABLE, 60 HERTZ. THE DEVICE SHALL BE FACTORY PRESET TO TURN "ON" LIGHTS AT APPROXIMATELY 3 FOOT-CANDLES WITH A RATIO OF "ON" TO "OFF" OF ABOUT 1 TO 2. C. INDIVIDUALLY MOUNTED PHOTO CONTROL DEVICES SHALL HAVE THE SAME CHARACTERISTICS AS FIXTURE MOUNTED DEVICES, EXCEPT THAT THEY SHALL BE FIELD ADJUSTABLE FOR "ON" "OFF" OPERATION FROM 2 TO 50 FOOT-CANDLES, HAVE A CAPACITY OF UP TO 2000 WATTS OF INCANDESCENT LOAD, BE OUTLET BOX MOUNTED, AND NOT REQUIRE SURGE PROTECTION. D. PHOTO CONTROL DEVICES SHALL BE AS MANUFACTURED BY TORK, SANGAMO, GENERAL ELECTRIC, OR APPROVED EQUAL.

2.7 WALL BOX DIMMERS:

- A. WALL BOX DIMMERS SHALL BE FLUSH MOUNTED, WITH BUILT-IN PUSH-PUSH SWITCH AND ROTARY DIMMING CONTROL, OR SLIDING KNOB, AS APPLICABLE. DIMMERS SHALL BE CONTINUOUSLY RATED FOR AC (60 HZ) LOADS OF WATTAGE AS SHOWN ON DRAWING. B. LED DIMMER CONTROLS SHALL BE COMPATIBLE WITH THE LED DRIVER DEVICES BEING CONTROLLED. C. DIMMERS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. D. DIMMERS SHALL BE UL LISTED.

2.8 SPECIAL ENCLOSURES:

- A. SPECIAL ENCLOSURES DESIGNED IN ACCORDANCE WITH UL AND NEMA STANDARDS SHALL BE PROVIDED AS REQUIRED TO PROTECT DEVICES AND EQUIPMENT FROM WET, DUSTY, CORROSIVE, HAZARDOUS OR FLAMMABLE ATMOSPHERES. ENCLOSURES SHALL BE NEMA TYPE 3R, 3S, 4X, 7, 9, 12, OR 13 IN ACCORDANCE WITH THE ENVIRONMENT PRESENT IN THE SPECIFIC LOCATION. B. ENCLOSURES SHALL BE MADE OF METAL UNLESS OTHERWISE SPECIFICALLY NOTED. C. NEMA TYPE 4X ENCLOSURE SHALL BE MADE OF CORROSION-RESISTANT, CHROMIUM NICKEL STAINLESS STEEL CONFORMING TO UL STANDARD NO. 50 "CABINET AND BOXES". D. NEMA TYPE 7, AND 9 ENCLOSURES SHALL BE MADE OF CAST IRON, BOLTED-TYPE UL LISTED FOR THE USE INTENDED. CAST METAL ENCLOSURES SHALL BE NOT LESS THAN 1/8" THICK AT EVERY POINT, EXCEPT THAT IT SHALL BE NOT LESS THAN 1/4" THICK AT TAPPED HOLES FOR CONDUITS.

2.9 OCCUPANCY SENSORS:

- A. OCCUPANCY SENSORS SHALL BE PROVIDED WHERE INDICATED ON THE DRAWINGS. SENSORS SHALL BE THE DUAL TECHNOLOGY TYPE SUITABLE FOR SENSING BOTH PASSIVE INFRARED AND ULTRASONIC WAVE TYPE, COMPLETE WITH A SELF-CONTAINED POWER/SWITCH UNIT TO AVOID THE NEED FOR LOW VOLTAGE WIRING TO A REMOTE SENSOR. EACH SENSOR SHALL HAVE A TIME DELAY CIRCUIT ADJUSTABLE FROM 6 - 15 MINUTES WITH A SHORTENED 30 SECOND TIME DELAY FEATURE FOR SET-UP PURPOSES AND A MANUAL TIME DELAY BYPASS FEATURE. IN ADDITION, EACH SENSOR SHALL HAVE A LED WALK TEST INDICATOR FOR SET-UP PURPOSES. B. THE POWER/SWITCH PACK SHALL CONSIST OF A CONTROL TRANSFORMER AND RECTIFIER CIRCUIT AND A RELAY WITH CONTACTS RATED 277 VAC, 20 AMP, 4800 WATTS. C. THE SENSOR SHALL BE SENSITIVE TO 9 - 10 MICROMETER WAVELENGTH INFRARED HEAT WAVES. D. UPON DETECTION OF THE HEAT WAVES OR MOTION, THE RELAY CONTACTS SHALL INSTANTLY CLOSE TO ACTIVATE THE ROOM LIGHTING. THE CONTACTS SHALL REMAIN CLOSED UNTIL NO MOTION OR PRESENCE OF WAVES IS SENSED FOR THE FULL LENGTH OF TIME SET BY THE ADJUSTABLE TIME DELAY CIRCUIT. E. THE SENSOR SHALL BE CEILING MOUNTED AND LOCATED AS RECOMMENDED BY THE MANUFACTURER. THE SENSOR SHALL BE PROVIDED COMPLETE WITH ALL NECESSARY HARDWARE, BRACKETS, SPECIAL BOXES AND COVERS. F. UNLESS OTHERWISE INDICATED, ALL LIGHTING WITHIN THE ROOM WHERE THE OCCUPANCY SENSOR IS LOCATED SHALL BE CONTROLLED BY THE OCCUPANCY SENSOR. G. OCCUPANCY SENSORS SHALL PROVIDE 95% COVERAGE OF SPACE WHERE SHOWN. PROVIDE ADDITIONAL SENSORS AS REQUIRED TO ACHIEVE THIS COVERAGE. H. SUBMIT LAYOUT OF ALL OCCUPANCY SENSORS SPECIFIC FOR THIS PROJECT AS DEVELOPED BY THE SENSOR MANUFACTURER PRIOR TO INSTALLATION OF SENSORS.

3.1 INSTALLATION:

- A. DEVICES SPECIFIED BY THIS SECTION SHALL BE INSTALLED SUCH THAT ONLY ONE WIRE IS

TERMINATED ON ANY GIVEN SCREW.

SECONDARY DISTRIBUTION EQUIPMENT

1.1 SCOPE:

- A. PROVIDE EQUIPMENT FOR OVER-CURRENT PROTECTION, SWITCHING, DISCONNECTING, TRANSFORMATION, AND CONTROL OF SERVICES, SEPARATELY DERIVED SYSTEMS, FEEDERS, AND BRANCH CIRCUITS AS INDICATED ON THE DRAWINGS AND AS HEREIN SPECIFIED. B. EQUIPMENT SPECIFIED BY THIS SECTION SHALL BE THIRD PARTY LISTED.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR FUSES, ENCLOSED SWITCHES, AND CIRCUIT BREAKERS.

2.1 MANUFACTURERS:

- A. DISTRIBUTION EQUIPMENT, OTHER THAN FUSES, SHALL BE MANUFACTURED BY SQUARE D, GENERAL ELECTRIC, SIEMENS, OR EATON. EQUIPMENT DESIGN FEATURES AND COMPONENTS INDICATED ON THE DRAWINGS ARE THOSE OF EATON, AND THE STANDARD CONSTRUCTION FEATURES OF THAT MANUFACTURER SHALL BE CONSIDERED AS MINIMUM REQUIREMENTS, WITH ADDITIONAL REQUIREMENTS AS SPECIFIED HEREIN AND ON THE DRAWINGS. B. FUSES SHALL BE MANUFACTURED BY BUSSMANN, GOULD SHAWMUT, OR LITTELFUSE.

2.2 OVERCURRENT PROTECTION DEVICES:

- A. UNLESS OTHERWISE INDICATED, CIRCUIT BREAKERS SHALL BE PROVIDED AS THE OVER-CURRENT PROTECTION DEVICES FOR SERVICES, SEPARATELY DERIVED SYSTEMS, FEEDERS, AND BRANCH CIRCUITS. FUSES MAY BE USED ONLY WHEN INDICATED ON THE DRAWINGS, OR REQUIRED BY THE NAMEPLATE FOR EQUIPMENT CONNECTED, OR SPECIFIED HEREIN. B. MOLDED-CASE AND INSULATED-CASE CIRCUIT BREAKERS SHALL BE THE STATIC OR THERMAL-MAGNETIC TYPE, QUICK-MAKE AND QUICK-BREAK FOR MANUAL AND AUTOMATIC OPERATION. MULTI-POLE BREAKERS SHALL BE COMMON TRIP. CIRCUIT BREAKERS SHALL BE BOLTED IN PLACE WHERE POSSIBLE. THERMAL-MAGNETIC BREAKERS SHALL BE CALIBRATED AT 40°C OR AMBIENT COMPENSATED, AMPERE RATINGS, FRAME SIZES, AND SHORT CIRCUIT RATINGS SHALL BE INDICATED ON THE DRAWINGS. SERIES RATINGS MAY BE APPLIED ONLY WHERE SPECIFICALLY INDICATED ON THE DRAWINGS. INDIVIDUAL ENCLOSURES SHALL BE NEMA 1 INDOORS 3R OUTDOORS, UNLESS OTHERWISE INDICATED. OTHER CIRCUIT BREAKERS SHALL BE SUITABLE FOR INSTALLATION IN SWITCHBOARDS, PANELBOARDS, AND MOTOR CONTROL CENTERS AS HEREINAFTER SPECIFIED. C. SINGLE-POLE 15- AND 20-AMP CIRCUIT BREAKERS SHALL BE SWD RATED. D. FUSES SHALL BE NON-RENEWABLE, TIME DELAY, CARTRIDGE TYPE, UL CLASS RK5 UNLESS OTHERWISE INDICATED; FOR INSTALLATION IN SAFETY SWITCHES, AS HEREINAFTER SPECIFIED.

2.3 SWITCHING EQUIPMENT:

- A. FUSIBLE SWITCHES SHALL BE INCORPORATED INTO SAFETY SWITCHES, AS HEREINAFTER SPECIFIED. MANUAL OPERATION SHALL BE QUICK-MAKE AND QUICK-BREAK. FUSE HOLDERS SHALL BE THE CLASS R REJECTION TYPE UNLESS OTHERWISE INDICATED. B. SAFETY SWITCHES SHALL BE THE NEMA HEAVY DUTY TYPE, HORSEPOWER RATED, WITH INTERLOCKED COVERS THAT CAN BE DEFEATED, NON-FUSIBLE EXCEPT WHERE FUSED SWITCHES ARE INDICATED, OR FUSES ARE REQUIRED. SWITCH MECHANISMS SHALL BE QUICK-MAKE AND QUICK-BREAK. ENCLOSURES SHALL BE NEMA 1 INDOORS, NEMA 3R OUTDOORS UNLESS OTHERWISE INDICATED. FUSE HOLDERS, WHERE REQUIRED, SHALL BE AS SPECIFIED ABOVE FOR FUSIBLE SWITCHES. SWITCH SHALL HAVE PROVISIONS FOR PADLOCKING SWITCH HANDLE OPEN OR CLOSED.

2.4 ENCLOSED CIRCUIT BREAKER:

- A. CIRCUIT BREAKERS SHALL BE ENCLOSED IN U.L. LISTED ENCLOSURES, NEMA 1 INDOORS AND NEMA 3R OUTDOORS UNLESS OTHERWISE INDICATED. B. CIRCUIT BREAKER HANDLE SHALL BE ACCESSIBLE FROM OUTSIDE ENCLOSURE WITH COVER CLOSED. C. ENCLOSURE SHALL HAVE PROVISIONS FOR PADLOCKING CIRCUIT BREAKER HANDLE OPEN OR CLOSED.

2.5 APPLICATION:

- A. DISTRIBUTION EQUIPMENT SHALL BE SIZED FOR INSTALLATION WITH REQUIRED CLEARANCES AT THE LOCATIONS SHOWN ON THE DRAWINGS. ALTERNATIVE ARRANGEMENTS MAY BE SUBMITTED TO THE ARCHITECT/ENGINEER BY THE CONTRACTOR FOR APPROVAL, IN THE FORM OF SHOP DRAWINGS, DRAWN TO SCALE AND SHOWING ACTUAL DIMENSIONS OF PROPOSED EQUIPMENT AND REQUIRED CLEARANCES. B. UNLESS OTHERWISE INDICATED, DISTRIBUTION EQUIPMENT SHALL BE INTERCONNECTED WITH WIRE OR CABLE IN GENERAL. THESE SPECIFIED CONDUCTORS ARE RATED FOR A MAXIMUM OPERATING TEMPERATURE OF 75°C AND ARE SIZED FOR THAT TEMPERATURE RATING IN AN AMBIENT OF 30°C. DISTRIBUTION EQUIPMENT, INCLUDING TERMINAL LUGS, TEMPERATURE SENSITIVE DEVICES, AND ENCLOSURES SHALL BE DESIGNED, SIZED, AND LABELED FOR FIELD CONNECTION WITH CONDUCTORS AS SPECIFIED. C. POWER CONDUCTORS SHALL BE PROPERLY TIGHTENED AND/OR TORQUED AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER SUPPLYING THE LUGS/TERMINALS USED FOR TERMINATING THE CONDUCTORS. D. LUGS/TERMINALS SHALL COMPLY WITH UL STANDARDS UL486A AND UL486B.

2.6 IDENTIFICATION:

- A. GROUP MOUNTED CIRCUIT BREAKERS IN PANELBOARDS AND SWITCHBOARDS SHALL BE PROVIDED WITH NAMEPLATES AS DESCRIBED ABOVE; OR THEY SHALL BE IDENTIFIED WITH NUMERALS AND CARDBOARD DIRECTORIES IN METAL OR HEAVY POLYCARBONATE DIRECTORY FRAMES. DIRECTORIES IN METAL FRAMES SHALL BE PROTECTED WITH RIGID PLASTIC COVERS. DIRECTORIES SHALL BE SIZED TO PERMIT ALL CIRCUIT DESIGNATIONS TO BE READ WITHOUT REMOVING THE CARD FROM THE FRAME. B. MANUFACTURER'S NAMEPLATES OR LABELS ON CUSTOM FABRICATED OR FACTORY ASSEMBLED CUSTOM EQUIPMENT SHALL CONTAIN SUFFICIENT IDENTIFICATION TO EXPEDITE THE FUTURE PROCUREMENT OF PARTS, ADDITIONS, AND SHOP DRAWINGS. C. SERVICE EQUIPMENT SHALL BE UL LABELED AS "SUITABLE FOR USE AS SERVICE EQUIPMENT." SERVICE DISCONNECTS SHALL BE CLEARLY IDENTIFIED. D. LABEL ALL RECEPTACLES, LIGHT SWITCHES, AND DISCONNECT SWITCHES WITH FEEDER PANEL NAME AND BRANCH CIRCUIT NUMBER. USE DYNO-TYPE LABELING. BLACK BACKGROUND WITH WHITE LETTERS FOR NORMAL POWER. RED BACKGROUND WITH WHITE LETTERS FOR EMERGENCY POWER. LABELS TO BE INSTALLED ON THE EXTERIOR FRONT COVER OF DISCONNECT SWITCHES AND UNDER COVER PLATES OF RECEPTACLES AND SWITCHES. E. LABEL ALL TRANSFORMERS, POWER, LIGHTING AND DISTRIBUTION PANELS WITH NAME, VOLTAGE, # PHASE, # WIRES AND FEEDER INFORMATION. LABELS TO BE ENGRAVED LAMINATED PHENOLIC NAMEPLATES. BLACK BACKGROUND WITH WHITE LETTERS FOR NORMAL POWER. RED BACKGROUND WITH WHITE LETTERS FOR EMERGENCY POWER. IN ADDITION, EACH MAJOR PIECE OF MECHANICAL EQUIPMENT WILL BE LABELED WITH THE DEVICE NAME AND SOURCE OF POWER. F. SERVICE EQUIPMENT SHALL BE MARKED TO INDICATE THE MAXIMUM AVAILABLE FAULT CURRENT AT THE EQUIPMENT BUS AS REQUIRED BY NEC 110. G. ALL SWITCHBOARDS AND PANELBOARDS SHALL BE MARKED TO WARN OF POTENTIAL ELECTRIC FLASH HAZARDS AS REQUIRED BY NEC 110.

3.1 INSTALLATION:

- A. DISTRIBUTION EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS FOR HANDLING, SUPPORT, CONNECTIONS, ASSEMBLY, PROTECTION, ENERGIZING, ADJUSTMENT, AND SIMILAR PROCEDURES. B. FASTENING METHODS SHALL COMPLY WITH BASIC MATERIALS AND METHODS. C. FLOOR MOUNTED EQUIPMENT SHALL BE PROVIDED WITH 4" HIGH CONCRETE PADS AND SHALL BE SECURED TO THE CONCRETE PAD. PADS SHALL HAVE A 3/4-INCH CHAMBER ON EACH ACCESSIBLE SIDE. D. EQUIPMENT INTERIORS SHALL BE THOROUGHLY CLEANED OF DUST, DIRT, TRASH, AND OTHER FOREIGN MATERIAL PRIOR TO ENERGIZING THE EQUIPMENT. E. EXTERIOR SAFETY SWITCHES THAT ARE READILY ACCESSIBLE TO UNAUTHORIZED PERSONS SHALL HAVE THEIR COVERS PADLOCKED AND CLOSED BY THE CONTRACTOR. KEYS SHALL BE IDENTIFIED AND DELIVERED TO THE OWNER. F. UPON COMPLETION OF THE PROJECT, FURNISH TO THE OWNER ONE COMPLETE SET OF REPLACEMENT FUSES OF THE SAME TYPE, RATING AND RATED CURRENT. G. DIRECTORY CARDS FOR PANELBOARDS AND FOR GROUP MOUNTED SWITCHBOARD SECTIONS SHALL BE NEATLY FILLED IN WITH A TYPEWRITER TO INDICATE THE TYPE AND LOCATION OF THE

LOAD ON EACH CIRCUIT OR FEEDER.

PANELBOARDS

1.1 SCOPE:

- A. FURNISH AND INSTALL LIGHTING, POWER, AND DISTRIBUTION PANELBOARDS AS INDICATED ON THE DRAWINGS AND AS HEREIN SPECIFIED.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL PANELBOARD SHOP DRAWINGS WHICH INCLUDE AS A MINIMUM THE FOLLOWING INFORMATION: 1. CABINET DIMENSIONS. 2. MOUNTING REQUIREMENTS. 3. BUSSING ARRANGEMENT. 4. CIRCUIT BREAKER ARRANGEMENT. 5. ACCESSORIES.

2.1 BRANCH CIRCUIT PANELBOARDS:

- A. PANELBOARD TYPES, RATINGS, AND CONTENTS SHALL BE AS SHOWN ON THE DRAWINGS. B. EQUIPMENT SHALL BE BUILT TO NEMA STANDARD PB-1, UL STANDARDS UL50 AND UL67, AND NEC REQUIREMENTS. C. PANELBOARD BACKBOXES SHALL BE CONSTRUCTED OF GALVANIZED SHEET STEEL AND SHALL BE SECURELY FABRICATED WITH SCREWS, BOLTS, RIVETS, OR BY WELDING. BACK-BOXES SHALL BE A MINIMUM 20" WIDE AND 5-3/4" DEEP, UNLESS NOTED OTHERWISE, AND HEIGHTS SHALL NOT EXCEED 72" OVERALL. THE TOP OR BOTTOM GUTTER SPACE SHALL BE INCREASED 6" WHERE FEEDER LOOPS THROUGH PANEL. END PLATES SHALL BE SUPPLIED WITHOUT KNOCKOUTS. D. COVERS SHALL BE CONSTRUCTED OF HIGH-GRADE FLAT SHEET STEEL WITH: 1. DOOR-IN-DOOR CONSTRUCTION SHALL BE PROVIDED. THE INSIDE HINGE DOOR SHALL ALLOW ACCESS TO DEVICE HANDLES ONLY. DOOR SHALL CLOSE FLUSH WITH COVER AND AGAINST A FULL INSIDE TRIM STOP. HINGES SHALL BE INSIDE TYPE. THE OUTER HINGED DOOR SHALL ALLOW ACCESS TO WIRING GUTTER. 2. A FLUSH LATCH AND TUMBLER TYPE LOCK, SO PANEL DOOR MAY BE HELD CLOSED WITHOUT BEING LOCKED. ALL SUCH LOCKS SHALL BE KEYEDED ALIKE. FURNISH TO THE OWNER TWO KEYS WITH EACH LOCK OR A TOTAL OF 10 KEYS FOR THE PROJECT. 3. FOUR OR MORE COVER FASTENERS OF A TYPE WHICH WILL PERMIT MOUNTING PLUMB ON BOX. COVER SHALL ALSO HAVE INSIDE SUPPORT STUDS TO REST ON LOWER EDGE OF BACK-BOX WHILE BEING FASTENED. FOR FLUSH MOUNTED PANELBOARDS, COVER FASTENING HARDWARE SHALL BE CONCEALED BEHIND THE HINGED DOOR. E. A MEANS SHALL BE PROVIDED FOR READILY ADJUSTING PROJECTION OF PANEL INTERIOR ASSEMBLY WITH ALL CONNECTIONS IN PLACE. A METHOD REQUIRING STACKING OF WASHERS IS NOT ACCEPTABLE. INTERIOR TRIM SHALL FIT NEATLY BETWEEN INTERIOR ASSEMBLY AND COVER LEAVING NO GAPS BETWEEN THE TWO. F. PANELBOARD PHASE AND NEUTRAL BUS WORK SHALL BE COPPER. A COPPER GROUND BUS SHALL BE PROVIDED IN EACH PANEL. G. MINIMUM SHORT CIRCUIT RATING OF ANY PANELBOARD ASSEMBLY SHALL BE 10,000A. FURNISH PANELBOARDS WITH HIGHER RATING WHERE SO NOTED OR WHERE EVIDENTLY INTENDED BY SPECIFICATION OF CIRCUIT BREAKERS WITH HIGHER INTERRUPTING CAPACITY. H. AMPACITY OF MAINS SHALL BE EQUAL TO, OR GREATER THAN, THE AMPACITY OF THE FEEDER UNLESS OTHERWISE INDICATED. I. WHERE DRAWING SCHEDULES INDICATE SPACES FOR ADDITION OF FUTURE CIRCUIT BREAKERS, FURNISH ALL NECESSARY BUS-WORK, STRAP, BRACKETS, HARDWARE, AND REMOVABLE BLANK COVERS. J. BREAKERS IN PANELBOARDS SHALL BE PHYSICALLY ARRANGED IN LOCATIONS SHOWN IN PANEL SCHEDULES ON THE DRAWINGS WHERE POSSIBLE. THEY SHALL BE CONNECTED TO THE PHASES AS SHOWN. K. UNLESS OTHERWISE INDICATED AND WHERE AVAILABLE FOR THE PANELBOARD TYPE SPECIFIED, CIRCUIT BREAKERS SHALL BE OF THE BOLT-ON TYPE. L. PROVIDE SURGE SUPPRESSOR EXTERNAL TO THE PANELBOARD AS INDICATED ON THE DRAWINGS AND BY SECTION 16401 OF THE SPECIFICATIONS FOR LIMITING SURGE VOLTAGES AND TO PREVENT CONTINUED FLOW OF FOLLOW CURRENT WHILE REMAINING CAPABLE OF REPEATING THESE FUNCTIONS.

3.1 INSTALLATION:

- A. EQUIPMENT SHALL BE PERFECTLY PLUMB AND LEVEL. B. OPENINGS IN BACK-BOXES SHALL BE CUT OR SAWED WITH TOOLS MADE FOR THAT PURPOSE. BURNING OF OPENINGS IS UNACCEPTABLE. C. UNUSED OPENINGS SHALL BE CLOSED. D. ONLY ONE SOLID WIRE IS ALLOWABLE UNDER A SCREW. PROVIDE APPROVED LUGS FOR CONNECTING STRANDED WIRE OR MORE THAN ONE SOLID CONDUCTOR. E. CENTERED ABOVE THE BREAKERS IN EACH PANELBOARD ATTACH A NAMEPLATE INDICATING PANEL DESIGNATION - FOR EXAMPLE "PANEL A", OR "PANEL MDP". NAMEPLATES SHALL COMPLY WITH BASIC MATERIALS AND METHODS. F. PANELBOARD BACKBOXES SHALL BE MOUNTED WITH THEIR TOPS 6"-8" ABOVE THE FLOOR.

DRY-TYPE BUILDING TRANSFORMERS

1.1 SCOPE:

- A. CONTRACTOR SHALL FURNISH AND INSTALL DRY-TYPE TRANSFORMERS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN. B. TRANSFORMERS AND THEIR INSTALLATION SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF SECTION 16400 - SECONDARY DISTRIBUTION EQUIPMENT. C. TRANSFORMERS SHALL BE ENERGY EFFICIENT. TRANSFORMERS SHALL MEET OR EXCEED NEMA TP-1 REQUIREMENTS. A CLASS 220°C INSULATION SYSTEM AND A 115°C TEMPERATURE RISE RATING SHALL BE PROVIDED. THE TRANSFORMER OVERLOAD CAPABILITY SHALL BE IN ACCORDANCE WITH IEEE C57.96. FOR STANDARD TRANSFORMERS, AND IEEE C57.110. FOR K-RATED TRANSFORMERS. THE K-RATED TRANSFORMER, WHEN USED SHALL ALSO BE ENERGY EFFICIENT AND SHALL BEAR THE ENERGY STAR LABEL AND SHALL ALSO MEET NEMA TP-1 REQUIREMENTS. D. THE ENERGY POLICY ACT OF 2005 (EPACT 2005), PUBLIC LAW 109-58, CAME INTO EFFECT JANUARY 1, 2007. WILL BE ENFORCED.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL MANUFACTURER'S DATA SHEETS FOR EACH DRY-TYPE TRANSFORMER PROVIDED. SUBMITTALS SHALL SHOW AS A MINIMUM THE FOLLOWING INFORMATION: 1. ELECTRICAL CHARACTERISTICS. 2. IMPEDANCE. 3. PRIMARY TAPS AVAILABLE. 4. INSULATION CLASS. 5. DECIBEL RATINGS. 6. ENCLOSURE DIMENSIONS. 7. INSTALLATION AND MAINTENANCE INSTRUCTIONS.

2.1 RATINGS:

- A. VOLTAGE AND KVA RATINGS SHALL BE AS INDICATED ON THE DRAWINGS. B. UNLESS OTHERWISE INDICATED, 3-PHASE TRANSFORMER PRIMARY VOLTAGES SHALL BE 480V "DELTA", AND SECONDARY VOLTAGES SHALL BE 120/208V, 4 WIRE "WYE". C. THE TRANSFORMER OVERLOAD CAPABILITY SHALL BE IN ACCORDANCE WITH IEEE C57.96 FOR STANDARD TRANSFORMERS AND IEEE C57.110 FOR NON-LINEAR TRANSFORMERS. D. TRANSFORMERS SHALL BE ENERGY EFFICIENT AND SHALL MEET OR EXCEED NEMA TP-1 REQUIREMENTS.

2.2 CONSTRUCTION FEATURES:

- A. ENCLOSURES SHALL BE VENTILATED FOR INDOOR USE UNLESS OTHERWISE INDICATED. B. TRANSFORMERS SHALL BE DESIGNED FOR FLOOR OR PLATFORM MOUNTING; HOWEVER THEY SHALL BE PROVIDED WITH WALL MOUNTING BRACKETS WHERE WALL MOUNTING IS INDICATED ON THE DRAWINGS. C. WINDINGS SHALL BE OF COPPER OR ALUMINUM. WINDINGS SHALL BE DESIGNED FOR FULL LOAD OPERATION AT A MAXIMUM TEMPERATURE RISE OF 115°C ABOVE A 40°C AMBIENT; HOWEVER WINDING COEFFICIENT SHALL BE RATED 220°C. D. EACH TRANSFORMER SHALL BE PROVIDED WITH FCBN TAPS ON THE PRIMARY WINDING OF THE MANUFACTURER'S STANDARD PERCENTAGES, BUT NOT LESS THAN FOUR 2.5% FCBN TAPS.

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- E. CORE AND COIL ASSEMBLIES SHALL BE MOUNTED ON RUBBER ISOLATION PADS TO MINIMIZE TRANSMISSION OF SOUND AND VIBRATION. SOUND LEVELS FOR INDIVIDUAL TRANSFORMERS, MEASURED IN ACCORDANCE WITH NEMA STANDARDS, SHALL NOT EXCEED 45 DECIBELS FOR SIZES 225 KVA AND 50 DECIBELS FOR SIZES LARGER THAN 225 KVA.
- F. TRANSFORMERS INDICATED TO BE NON-LINEAR TYPE SHALL, IN ADDITION, BE SUITABLE FOR USE ON DISTRIBUTION SYSTEMS SUPPLYING LOADS WHICH GENERATE 3RD, 5TH, 7TH 11TH AND 13TH HARMONIC CURRENTS. THESE ARE TYPICAL NON-LINEAR LOADS SUCH AS COMPUTERS, NON-LINEAR TYPE TRANSFORMERS SHALL HAVE A FULL-LENGTH COPPER ELECTROSTATIC SHIELD WHICH PRODUCES AN AVERAGE EFFECTIVE COUPLING CAPACITANCE OF 30 PICO FARADS BETWEEN PRIMARY AND SECONDARY. ELECTRICAL NOISE ATTENUATION SHALL AVERAGE 120 DB COMMON MODE AND 30 DB NORMAL MODE. NON-LINEAR TYPE TRANSFORMERS SHALL HAVE THE NEUTRAL BAR SIZED FOR AT LEAST 200% AMPACITY OF THE SECONDARY PHASE CONDUCTORS, SHALL HAVE A 1% RATING OF ICH3, DESIGNED FOR USE WITH 100% NON-LINEAR SWITCHING LOADS AND SHALL BE UL 1561 LISTED.
- G. TRANSFORMERS INDICATED TO BE SHIELDED ISOLATION TYPE SHALL, IN ADDITION, INCLUDE AN ELECTROSTATIC SHIELD WITH GROUND WIRE TO SUPPRESS HIGH FREQUENCY SIGNALS BETWEEN SUPPLY LINE AND GROUND FROM PASSING TO LOAD. SUPPRESSION OF COMMON MODE NOISE SHALL HAVE AN ATTENUATION RATIO OF 100:1.

3.1 MOUNTING:

- A. FOR FLOOR MOUNTED UNITS, PROVIDE 4" HIGH POURED CONCRETE PADS. PROVIDE VIBRATION ISOLATING PADS UNDER FRAME SUPPORTS.
- B. WHERE TRANSFORMERS DESIGNED FOR FLOOR MOUNTING ARE INDICATED TO BE WALL MOUNTED, PROVIDE MANUFACTURER'S STANDARD MOUNTING BRACKETS, OR PROVIDE STEEL CHANNEL FRAMES, ATTACHED TO THE WALL AND SUSPENDED FROM THE BUILDING STRUCTURE USING 1/2" DIAMETER THREADED STEEL RODS.

3.2 CONDUIT CONNECTIONS:

- A. WHERE FEASIBLE, CONDUITS SHALL ENTER THE ENCLOSURES OF FLOOR MOUNTED TRANSFORMERS FROM UNDERNEATH.
- B. WHERE CONDUITS MUST ATTACH TO TRANSFORMER HOUSING, UTILIZE 12" LENGTHS OF FLEXIBLE CONDUIT TERMINATED WITH CONNECTORS AND BONDING BUSHINGS.

3.3 SECONDARY CONNECTIONS:

- A. TRANSFORMER ENCLOSURES AND SECONDARY NEUTRALS SHALL BE GROUNDED AS SEPARATELY DERIVED SYSTEMS. SEE SECTION 16100.
- B. TRANSFORMER SECONDARY LIGHTING FIXTURES SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE NEC AND LOCAL REQUIREMENTS.

3.4 LABELING:

- A. EACH UNIT SHALL BEAR MANUFACTURER'S NAMEPLATE INDICATING TRANSFORMER RATING AND CONNECTION DIAGRAM.
- B. PROVIDE NAMEPLATE INDICATING TRANSFORMER DESIGNATION, VOLTAGE, AND DEVICE FROM WHICH TRANSFORMER IS SUPPLIED. NAMEPLATES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 16100, BASIC MATERIALS AND METHODS.

3.5 ADJUSTMENTS:

- A. THE CONTRACTOR SHALL ADJUST THE TRANSFORMER TAPS TO PRODUCE, APPROXIMATELY, THE SECONDARY VOLTAGES INDICATED AT NO LOAD.

3.6 NOISE AND VIBRATION:

- A. TRANSFORMERS PRODUCING OBJECTIONABLE SOUND OR VIBRATION SHALL BE CORRECTED AS DIRECTED BY THE MANUFACTURER OR REPLACED.

LIGHTING FIXTURES AND ACCESSORIES

1.1 SCOPE:

- A. THE CONTRACTOR SHALL FURNISH AND COMPLETELY INSTALL LIGHTING FIXTURES AND ACCESSORIES AS INDICATED ON THE DRAWINGS AND AS HEREIN SPECIFIED.
- B. A LIGHTING FIXTURE SHALL BE PROVIDED FOR EACH LIGHTING OUTLET INDICATED. OUTLETS LACKING FIXTURE DESIGNATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE SUBMITTING PROPOSAL. OTHERWISE, UNITS SELECTED BY THE ARCHITECT/ENGINEER SHALL BE FURNISHED AND INSTALLED AT NO ADDITIONAL CHARGE.

1.2 SUBMITTALS:

- A. SUBMIT FOR APPROVAL COMPLETE MANUFACTURER'S DATA SHEETS FOR ALL FIXTURES. INDICATE ALL COMPONENTS, CHARACTERISTICS, AND OPTIONS.
- B. SUBMIT FOR APPROVAL LIGHTING FIXTURE SAMPLES AS REQUESTED BY THE ARCHITECT/ENGINEER. SAMPLES SHALL BE EQUIPPED WITH LAMPS, CORDS, PLUGS, AND BALLASTS FOR 120-VOLT OPERATION.

2.1 LIGHTING FIXTURES:

- A. ALL FIXTURES SHALL BE LABELED BY UNDERWRITERS LABORATORIES, INC.
- B. FIXTURE DESIGNATIONS ON THE DRAWINGS GENERALLY CONSIST OF A LETTER INDICATING THE FIXTURE TYPE. FIXTURE TYPES ARE IDENTIFIED IN THE LIGHTING FIXTURE SCHEDULE OR SYMBOL SCHEDULE. HOWEVER, THE SCHEDULE DOES NOT NECESSARILY LIST ALL ACCESSORIES AND HARDWARE NECESSARY FOR THE COMPLETE INSTALLATION, NOR DOES IT DETAIL THE CONSTRUCTION TO BE ENCOUNTERED AT THE FIXTURE LOCATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROPERLY DETERMINE AND PROVIDE CORRECT COMPONENTS, ACCESSORIES, AND HARDWARE REQUIRED FOR THE INSTALLATION.
- C. PENDANT FIXTURES SHALL BE EQUIPPED WITH SWIVEL HANGERS; TWIN STEMS FOR INDIVIDUAL FIXTURES AND SINGLE STEM FOR CONTINUOUS ROW FIXTURES, SPACED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS BUT NOT LESS THAN ONE PER FIXTURE UNIT PLUS ONE PER ROW.
- D. RECESSED FIXTURES IN PLASTER AND GYPSUM BOARD CEILINGS SHALL BE EQUIPPED WITH PLASTER FRAMES. IN OTHER CEILINGS THEY SHALL BE EQUIPPED WITH PLASTER FRAMES AND/OR OTHER DEVICES AS APPROVED BY THE ARCHITECT/ENGINEER, TO FACILITATE REMOVAL OF FIXTURE AND ACCESS TO THE CONCEALED JUNCTION BOX FROM BELOW.
- E. PLASTIC MATERIALS INDICATED TO BE "ACRYLIC" SHALL BE OF 100% VIRGIN METHYL METHACRYLATE PRODUCED BY ROHM AND HAAS, DUPONT, OR CYANAMID.
- F. RECESSED FIXTURES (TROFFERS) SHALL CONFORM TO THE FOLLOWING MINIMUM REQUIREMENTS UNLESS MODIFIED BY NOTES AND SCHEDULES ON THE DRAWINGS:
- HOUSINGS SHALL BE 5" MAXIMUM DEPTH AND OF 22-GAUGE MINIMUM STEEL, WITH DEEPLY FORMED TRANSVERSE RIBS FOR RIGIDITY, PRIMED, AND FINISHED IN BAKED WHITE ENAMEL. THE USE OF PRE-PAINTED STEEL IS ACCEPTABLE.
 - LENSES SHALL BE OF FLAT CLEAR K-12 TYPE ACRYLIC OF 125" NOMINAL (115" MINIMUM) THICKNESS IN RIGID HINGED STEEL OR EXTRUDED ALUMINUM DOOR FRAMES FINISHED IN BAKED WHITE ENAMEL AND SECURED WITH INCONSPICUOUS SPRING-LOADED OR ROTARY CAM TYPE STEEL LATCHES. LENSES SHALL BE MAINTAINED IN A FLAT POSITION WITH INVISIBLE CLIPS AND SHALL BE REMOVABLE FROM THE DOOR FRAMES USING A SCREWDRIVER WITHOUT DAMAGING THE LENS OR THE FRAME.
 - JOINTS BETWEEN HOUSINGS AND DOOR FRAMES SHALL BE TOTALLY FREE OF LIGHT LEAKS. GASKETS, IF USED, SHALL BE INVISIBLE AND IN COMPRESSION WHEN THE DOOR IS CLOSED. GASKET MATERIAL SUBJECT TO RUBBING WHEN THE DOOR IS OPENED OR CLOSED WILL NOT BE ACCEPTED. FLEXIBLE AND/OR REMOVABLE BLACK BAFFLES WILL NOT BE ACCEPTED.
 - TOP ACCESS PLATES TO FACILITATE WIRING ARE OPTIONAL WITH THE CONTRACTOR. EACH FIXTURE SHALL BE INDIVIDUALLY CONNECTED TO A CONCEALED JUNCTION BOX WITH #16 TFM CONDUCTORS IN 6 FEET OF 3/8" FLEXIBLE METAL CONDUIT.
 - TROFFERS FOR INVERTED TEE EXPOSED GRID CEILINGS SHALL BE DESIGNED TO BE RAISED THROUGH THE CEILING OPENING AND SHALL BE SUPPORTED INDEPENDENTLY OF THE GRID SYSTEM WITH TWO HANGERS ON DIAGONAL CORNERS. HANGERS SHALL BE NO. 12 AWG AND SHALL BE ATTACHED TO THE BUILDING STRUCTURAL SYSTEM. THEY SHALL BE SECURED TO THE CEILING GRID AT ALL FOUR CORNERS USING SHEET METAL SCREWS.
 - TROFFERS FOR PLASTER AND GYPSUM BOARD CEILINGS SHALL BE FURNISHED WITH PLASTER FRAMES.
 - TROFFERS FOR CEILINGS WITH CONCEALED SUSPENSION SYSTEMS INCLUDING PLASTER, GYPSUM BOARD, AND ACOUSTICAL TILE SHALL BE EQUIPPED WITH SUITABLE ADJUSTABLE YOKES OR BRACKETS DESIGNED TO HOOK ONTO THE PLASTER FRAME OR CEILING CHANNELS, PREVENT THE CHANNELS FROM SPREADING, AND SUPPORT THE

2.2 LED DRIVERS:

- A. GENERAL
- PROVIDE WITH TEN-YEAR OPERATIONAL LIFE WHILE OPERATING AT MAXIMUM CASE TEMPERATURE AND 90 PERCENT NON-CONDENSING RELATIVE HUMIDITY.
 - DRIVERS SHALL BE DESIGNED AND TESTED TO WITHSTAND ELECTROSTATIC DISCHARGES UP TO 15,000 V WITHOUT IMPAIRMENT PER IEC801-2.
 - ELECTROLYTIC CAPACITORS SHALL OPERATE AT LEAST 20 DEGREES C BELOW THE CAPACITOR'S MAXIMUM TEMPERATURE RATING WHEN THE DRIVER IS UNDER FULLY LOADED CONDITIONS AND UNDER MAXIMUM CASE TEMPERATURE.
 - PROVIDE A MAXIMUM INRUSH CURRENT OF 2 AMPERES FOR 120V AND 277V DRIVERS.
 - DRIVERS SHALL WITHSTAND UP TO A 4,000-VOLT SURGE WITHOUT IMPAIRMENT OF PERFORMANCE AS DEFINED BY ANSI C62.41 CATEGORY A.
 - DRIVERS SHALL BE MANUFACTURED IN A FACILITY THAT EMPLOY ESD REDUCTION PRACTICES IN COMPLIANCE WITH ANSI/ESD S20.20.
 - DRIVERS SHALL HAVE A CLASS A SOUND RATING - INAUDIBLE IN A 27-DBA AMBIENT.
 - DRIVERS SHALL HAVE NO VISIBLE CHANGE IN LIGHT OUTPUT WITH A VARIATION OF PLUS/MINUS 10 PERCENT LINE VOLTAGE INPUT.
 - DRIVERS SHALL HAVE TOTAL HARMONIC DISTORTION LESS THAN 20 PERCENT AND MEET ANSI C83.11 MAXIMUM ALLOWABLE THD REQUIREMENTS.
 - DRIVERS SHALL TRACK EVENLY ACROSS:

A. GENERAL

- MULTIPLE FIXTURES.
 - ALL LIGHT LEVELS.
 - CONSTANT CURRENT DRIVERS SHALL:
- SUPPORT FROM 200MA TO 2.1 AMPS (IN 10MA STEPS) TO ENSURE A COMPATIBLE DRIVER EXISTS.
 - SUPPORT LED ARRAYS UP TO 40W OR 50W (710MA TO 1.05A IN 10MA STEPS).
- CONSTANT VOLTAGE DRIVERS SHALL:
- SUPPORT FROM 10V TO 40V (IN 0.5V STEPS) TO ENSURE A COMPATIBLE DRIVER EXISTS.
 - SUPPORT LED ARRAYS UP TO 40W.
- CONFIGURATION TOOL SHALL BE AVAILABLE TO OPTIMIZE THE FOLLOWING FOR LED FIXTURES:
- LIGHT LEVEL.
 - EFFICACY.
 - THERMAL PERFORMANCE.
- DRIVERS SHALL OPERATE PROPERLY FROM A SUPPLY VOLTAGE OF 120 THROUGH 277VAC AT 60HZ.

B. LED 0-10V DIMMING DRIVERS

- LED DRIVER SHALL BE INSTALLED INSIDE AN ELECTRICAL ENCLOSURE.
- WIRING INSIDE ELECTRICAL ENCLOSURE SHALL COMPLY WITH 600V/105°C RATING OR HIGHER.
- LED DRIVER SHALL BE CERTIFIED BY UL CLASS 2 FOR USE IN A DRY OR DAMP LOCATION.
- LED DRIVER SHALL HAVE A CLASS A SOUND RATING.
- LED DRIVER SHALL HAVE A MINIMUM OPERATING AMBIENT TEMPERATURE OF -40°C.
- LED DRIVER SHALL HAVE A LIFE EXPECTANCY OF 50,000 HOURS AT CASE TEMP OF 57°C.
- LED DRIVER SHALL HAVE A LIFE EXPECTANCY OF 100,000 HOURS AT CASE TEMP OF 56°C.
- LED DRIVER SHALL HAVE A MAXIMUM SELF-RISE TEMPERATURE OF 25°C IN OPEN AIR WITHOUT HEAT SINK.
- LED DRIVER SHALL HAVE A MAXIMUM ALLOWABLE CASE TEMPERATURE RATING OF 75°C.
- LED DRIVER SHALL REDUCE OUTPUT POWER TO LEDS IF MAXIMUM ALLOWABLE CASE TEMPERATURE IS EXCEEDED.
- LED DRIVER SHALL HAVE A FAILURE RATE ≤ 0.01% PER 1,000 HOURS AT CASE TEMP ≤ 70°C.
- LED DRIVER HAS A FAILURE RATE OF 0.01% - 0.02% PER 1,000 HOURS AT CASE TEMP OF 70°C - 80°C.
- LED DRIVER SHALL TOLERATE SUSTAINED OPEN CIRCUIT AND SHORT CIRCUIT OUTPUT CONDITIONS WITHOUT DAMAGE.
- LED DRIVER SHALL COMPLY WITH FCC RULES AND REGULATIONS, AS PER TITLE 47 CFR PART 15 NON-CONSUMER (CLASS A).
- THE MAXIMUM AVAILABLE OUTPUT PARAMETERS OF THE DRIVER SHALL MEET THE CLASS 2 INHERENTLY LIMITED PARAMETERS.
- WHEN THE DRIVER IS INSTALLED IN THE END-USE APPLICATION, THE MEASURED CASE TEMPERATURE AT THE (TC) LOCATION SPECIFIED ON THE MARKING LABEL SHALL NOT EXCEED 77.6°C.
- THE DRIVER SHALL BE INSTALLED IN COMPLIANCE WITH THE REQUIREMENTS OF THE END-PRODUCT STANDARD.
- THE CASE OF THE DRIVER MUST BE CONNECTED TO EARTH GROUND WHEN INSTALLED IN THE END-USE APPLICATION.

2.3 EMERGENCY EXIT LUMINAIRE:

- A. IT SHALL BE COMPLETELY SELF-CONTAINED, PROVIDED WITH MAINTENANCE-FREE BATTERY, AUTOMATIC CHARGER, AND OTHER FEATURES. LUMINAIRE MUST BE THIRD-PARTY LISTED AS EMERGENCY LIGHTING EQUIPMENT, AND MEET OR EXCEED THE FOLLOWING STANDARDS: NEC, NORTH CAROLINA BUILDING CODE, ENERGY CODE, NFPA-101, AND NEMA STANDARDS.
- B. BATTERY SHALL BE SEALED, MAINTENANCE-FREE TYPE, WITH MINIMUM OF 90 MINUTES OPERATING ENDURANCE. BATTERY SHALL HAVE A NORMAL LIFE EXPECTANCY OF 10 YEARS. BATTERIES SHALL BE HIGH TEMPERATURE TYPE WITH AN OPERATING RANGE OF 0-DEGREE C TO 60 DEGREES C AND CONTAIN A RESEALABLE PRESSURE VENT, A SINTERED + POSITIVE TERMINAL AND - NEGATIVE TERMINAL.
- C. CHARGER SHALL BE FULLY AUTOMATIC SOLID-STATE TYPE, FULL WAVE RECTIFYING, WITH CURRENT LIMITING. THE CHARGER SHALL RESTORE THE BATTERY TO ITS FULL CHARGE WITHIN 24 HOURS AFTER A DISCHARGE OF 90 MINUTES UNDER FULL RATED LOAD. THE UNIT SHALL BE ACTIVATED WITH THE VOLTAGE DROPS BELOW 80 PERCENT; A LOW VOLTAGE DISCONNECT SWITCH SHALL BE INCLUDED IF A LEAD BATTERY IS USED. TO DISCONNECT THE BATTERY FROM THE LOAD AND PREVENT DAMAGE FROM A DEEP DISCHARGE DURING EXTENDED POWER OUTAGE.
- D. PILOT LIGHT SHALL INDICATE THE UNIT IS CONNECTED TO AC POWER. THE BATTERY SHALL HAVE HIGH-RATE CHARGE PILOT LIGHT UNLESS SELF-DIAGNOSTIC TYPE. TESTS SWITCH SHALL SIMULATE THE OPERATION OF THE UNIT UPON LOSS OF A.C. POWER BY ENERGIZING THE LAMPS FROM THE BATTERY. THIS SIMULATION MUST ALSO EXERCISE THE TRANSFER RELAY.
- E. THE ENTIRE UNIT SHALL BE WARRANTED FOR THREE YEARS. THE BATTERY MUST HAVE AN ADDITIONAL TWO MORE YEARS' PRO-RATED WARRANTY. THE WARRANTY SHALL START FROM THE DATE OF THE FINAL ACCEPTANCE. THE WARRANTY SHALL BE INCLUDED IN THE CONTRACT DOCUMENT.
- F. THE USE OF LED IS REQUIRED DUE TO THEIR RELIABLE PERFORMANCE, LOW POWER CONSUMPTION, AND LIMITED MAINTENANCE REQUIREMENTS. MAXIMUM LED FAILURE RATE SHALL BE 25% WITHIN A SEVEN (7) YEAR PERIOD; OTHERWISE, IF EXCEEDED, MANUFACTURER SHALL REPLACE THE COMPLETE UNIT AT NO CHARGE TO THE OWNER.
- G. THE CONTRACTOR SHALL PERFORM A TEST ON EACH UNIT AFTER IT IS PERMANENTLY INSTALLED AND CHARGED FOR A MINIMUM OF 24 HOURS. BATTERY SHALL BE TESTED FOR 90 MINUTES. THE BATTERY TEST SHALL BE DONE 10 DAYS PRIOR TO FINAL INSPECTION. ANY UNIT WHICH FAILS THE TEST MUST BE REPAIRED OR REPLACED AND TESTED AGAIN. THE TEST SHALL DEMONSTRATE THAT THE BATTERIES CONFORM TO THE REQUIREMENTS OF NEC 700.12 (F).

2.4 EMERGENCY EGRESS LUMINAIRE:

- A. SHALL BE COMPLETELY SELF-CONTAINED, PROVIDED WITH MAINTENANCE-FREE 12-VOLT BATTERY, AUTOMATIC CHARGER, TWO LAMPS, AND OTHER FEATURES. LUMINAIRE SHALL BE THIRD-PARTY LISTED AS EMERGENCY LIGHTING EQUIPMENT, AND MEET OR EXCEED THE FOLLOWING STANDARDS: NEC, NORTH CAROLINA BUILDING CODE, ENERGY CODE, NFPA-101, AND NEMA STANDARDS.
- B. PILOT LIGHT SHALL INDICATE THE UNIT IS CONNECTED TO A.C. POWER. THE BATTERY SHALL HAVE HIGH-RATE CHARGE PILOT LIGHT, UNLESS SELF-DIAGNOSTIC TYPE. A TEST SWITCH SHALL SIMULATE THE OPERATION OF THE UNIT UPON LOSS OF A.C. POWER BY ENERGIZING THE LAMPS FROM THE BATTERY. THIS SIMULATION MUST ALSO EXERCISE THE TRANSFER RELAY. AN LED CHARGING INDICATOR LIGHT MUST BE EASILY VISIBLE AFTER INSTALLATION AND A REMOTE TEST SWITCH SHALL BE INSTALLED ADJACENT TO THE FIXTURE.
- C. BATTERY SHALL BE SEALED, MAINTENANCE FREE TYPE, WITH MINIMUM OF 90 MINUTES OPERATING ENDURANCE. BATTERY SHALL HAVE A NORMAL LIFE EXPECTANCY OF 10 YEARS.

- BATTERIES SHALL BE A HIGH TEMPERATURE TYPE WITH AN OPERATING RANGE OF 0-DEGREE C TO 60 DEGREES C AND CONTAIN A RESEALABLE PRESSURE VENT, A SINTERED + POSITIVE TERMINAL AND - NEGATIVE TERMINAL.
- D. CHARGER SHALL BE FULLY AUTOMATIC SOLID-STATE TYPE, FULL WAVE RECTIFYING, WITH CURRENT LIMITING. THE CHARGER SHALL RESTORE THE BATTERY TO ITS FULL CHARGE WITHIN 24 HOURS AFTER A DISCHARGE OF 90 MINUTES UNDER FULL RATED LOAD. THE UNIT SHALL BE ACTIVATED WHEN THE VOLTAGE DROPS BELOW 80%. A LOW VOLTAGE DISCONNECT SWITCH SHALL BE INCLUDED IF LEAD BATTERY IS USED, TO DISCONNECT THE BATTERY FROM THE LOAD AND PREVENT DAMAGE FROM A DEEP DISCHARGE DURING EXTENDED POWER OUTAGE.
- E. THE ENTIRE UNIT SHALL BE WARRANTED FOR THREE YEARS. THE BATTERY MUST HAVE AN ADDITIONAL TWO MORE YEARS' PRO-RATED WARRANTY. THE WARRANTY SHALL START FROM THE DATE OF PROJECT FINAL ACCEPTANCE. THE WARRANTY SHALL BE INCLUDED IN THE CONTRACT DOCUMENT.
- F. THE CONTRACTOR SHALL PERFORM A TEST ON EACH UNIT AFTER IT IS PERMANENTLY INSTALLED AND CHARGED FOR A MINIMUM OF 24 HOURS. BATTERY SHALL BE TESTED FOR 90 MINUTES. THE BATTERY TEST SHALL BE DONE 10 DAYS PRIOR TO FINAL INSPECTION. ANY UNIT WHICH FAILS THE TEST MUST BE REPAIRED OR REPLACED AND TESTED AGAIN. THE TEST SHALL DEMONSTRATE THAT THE BATTERIES CONFORM TO THE REQUIREMENTS OF NEC 700.12 (F).

3.1 COORDINATION:

- A. CONTRACTOR SHALL VERIFY CEILING OR WALL TYPE IN OR ON WHICH EACH FIXTURE IS TO BE MOUNTED, AND SHALL FURNISH UNIT WITH APPROPRIATE TRIM TYPE, MOUNTING HARDWARE, AND ACCESSORIES TO FIT THE CONSTRUCTION; AND FEED THROUGH JUNCTION BOXES AS REQUIRED TO MAINTAIN PROPER ACCESS TO SYSTEM WIRING.

3.2 INSTALLATION:

- A. LIGHTING FIXTURES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- B. LIGHTING FIXTURES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE USING CORROSION RESISTANT STEEL HARDWARE IN COMPLIANCE WITH SECTION 16100, BASIC MATERIALS AND METHODS.
- C. A MINIMUM OF TWO NO. 12 GAUGE WIRE SUPPORTS ATTACHED TO THE STRUCTURE SHALL BE PROVIDED FOR EACH LIGHTING FIXTURE UNLESS OTHERWISE INDICATED OR APPROVED BY THE ARCHITECT/ENGINEER. THE SUPPORTS SHALL BE LOCATED AT DIAGONAL CORNERS OF RECTANGULAR FIXTURES AND ANGLED AWAY FROM FIXTURE. A MINIMUM OF THREE FULL TWISTS SHALL BE MADE AT EACH END TO SECURE THE WIRE.
- D. IN ADDITION TO THE SUPPORTS FROM THE STRUCTURE, FIXTURES SHALL ALSO BE SECURED TO SUSPENDED CEILINGS ON WHICH THEY ARE MOUNTED, OR IN WHICH THEY ARE RECESSED, WHERE FIXTURES ARE SECURED TO SUSPENDED CEILINGS, THE PRIMARY SUPPORTS FROM THE BUILDING STRUCTURE SHALL BE SLACK.
- E. WHERE INSTALLED RECESSED GRID TYPE CEILINGS ARE INSTALLED, THE FIXTURES SHALL BE ATTACHED TO THE MAIN RUNNERS OF THE SUSPENDED CEILING AT ALL FOUR CORNERS USING SHEET METAL SCREWS.
- F. CONDUCTORS IN FIXTURE TAPS SHALL BE #16 AWG MINIMUM, TYPE TFM, IN 3/8" FLEXIBLE METAL CONDUIT OF 72" MAXIMUM LENGTH. A GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INCLUDED.
- G. MOUNT FIXTURES PLUMB AND SQUARE. KEEP ROWS IN PERFECT LINE.
- H. AT THE TIME OF PROJECT COMPLETION, FIXTURES SHALL BE CLEAN AND FULLY OPERATIONAL.

FIRE ALARM SYSTEM, ADDRESSABLE

1.1 SCOPE:

- A. CONTRACTOR SHALL FURNISH AND INSTALL A COMPLETE FIRE DETECTION AND ALARM SYSTEM AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN.
- B. SYSTEM SHALL INCLUDE ALL DEVICES, WIRING, EQUIPMENT, RACEWAYS, AND CONNECTIONS REQUIRED FOR A COMPLETE AND SATISFACTORILY OPERATING SYSTEM, WHETHER EVERY SUCH ITEM IS SPECIFICALLY SHOWN OR MENTIONED.
- C. SYSTEM SHALL BE THE FULLY SUPERVISED MICROPROCESSOR BASED MULTIPLEX TYPE UTILIZING ADDRESSABLE DEVICES.
- D. ALL INITIATION DEVICES SHALL BE ANALOG ADDRESSABLE DEVICES. THE NOTIFICATION DEVICES SHALL BE INSTALLED WHERE REQUIRED TO MEET ADA, NFPA 72 AND THE NORTH CAROLINA STATE BUILDING CODE.

1.2 STANDARDS AND CODES:

- A. THE EQUIPMENT AND INSTALLATION SHALL COMPLY WITH THE CURRENT PROVISIONS OF THE FOLLOWING STANDARDS AND CODES:
- THE LATEST EDITION OF THE NORTH CAROLINA STATE BUILDING CODE.
 - NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS:
 - NFPA 70 NATIONAL ELECTRIC CODE
 - NFPA 72 NATIONAL FIRE ALARM CODE
 - NFPA 90A AIR CONDITIONING SYSTEMS
 - NFPA 101 LIFE SAFETY CODE
 - UNDERWRITERS LABORATORIES INC. STANDARDS:
 - a) UNDERWRITERS LABORATORIES INC. LABEL IN FIRE PROTECTIVE SIGNALING SYSTEMS SHALL LIST THE SYSTEM AND ALL COMPONENTS. THE UL LABEL SHALL BE CONSIDERED AS EVIDENCE OF COMPLIANCE WITH THIS REQUIREMENT. THE EQUIPMENT SHALL BE LISTED BY UL UNDER THE FOLLOWING STANDARDS AS APPLICABLE:
 - UL 864/UOJZ, APOU CONTROL UNITS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
 - UL 1076/APOU PROPRIETARY BURGLAR ALARM UNITS AND SYSTEMS.
 - UL 268 SMOKE DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
 - UL 268A SMOKE DETECTORS FOR DUCT APPLICATIONS.
 - UL 217 SMOKE DETECTORS SINGLE STATION.
 - UL 521 HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
 - UL 228 DOOR HOLDERS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
 - UL 464 AUDIBLE SIGNALING APPLIANCES.
 - UL 1638 VISUAL SIGNALING APPLIANCES.
 - UL 38 MANUALLY ACTIVATED SIGNALING BOXES.
 - UL 346 WATER FLOW INDICATORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
 - UL 1971 VISUAL SIGNALING APPLIANCES.
 - UL 1481 POWER SUPPLIES FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
 - AMERICANS WITH DISABILITIES ACT (ADA).

1.3 CONTRACTOR QUALIFICATIONS:

- A. EQUIPMENT AND MATERIALS SHALL BE PROVIDED BY A FACTORY-AUTHORIZED DISTRIBUTOR TO ENSURE PROPER SPECIFICATION ADHERENCE, FINAL CONNECTION TEST, TURNOVER, WARRANTY COMPLIANCE, AND SERVICE. THE FACTORY-AUTHORIZED DISTRIBUTOR IS REQUIRED TO HAVE BEEN IN THE FIRE ALARM INDUSTRY (SERVICE AND INSTALLATION) FOR A MINIMUM OF 5 YEARS.

1.4 SUBMITTALS:

- A. SHOP DRAWINGS SHALL BE SUBMITTED FOR EACH ITEM OF EQUIPMENT TO BE FURNISHED.
- B. SUBMITTAL SHALL INCLUDE:
- A COMPLETE WIRING AND CONDUIT LAYOUT ON THE BUILDING FLOOR PLAN.
 - SYSTEM BATTERY CALCULATIONS.
 - NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP CALCULATIONS. THIS DATA MUST BE PREPARED BY AN AUTHORIZED REPRESENTATIVE OF THE SYSTEM MANUFACTURER. LAYOUT SHALL INDICATE CONDUCTOR SIZES, QUANTITIES, AND COLOR CODING FOR EACH CONDUIT RUN, AS WELL AS REQUIRED CONDUIT SIZES.
- C. EVIDENCE OF LISTING BY UNDERWRITERS LABORATORIES FOR ALL PROPOSED EQUIPMENT FOR USE AS FIRE ALARM EQUIPMENT. (REF. UNDERWRITERS LABORATORIES SECTION UOJZ).
- D. A COPY OF THE CONTRACTOR'S TRAINING CERTIFICATION, ISSUED BY THE MANUFACTURER OF THE FIRE ALARM CONTROL EQUIPMENT, SHALL BE PROVIDED. THESE QUALIFICATION CREDENTIALS SHALL NOT BE MORE THAN TWO YEARS OLD, TO ENSURE UP-TO-DATE PRODUCT

- AND APPLICATION KNOWLEDGE ON THE PART OF THE INSTALLING CONTRACTOR.
- E. PROOF SHALL BE FURNISHED THAT THE MANUFACTURER OF THE FIRE ALARM SYSTEM COMPONENTS IS CERTIFIED AS AN ISO 9001 COMPANY IN EACH OF THE FOLLOWING DISCIPLINES: DESIGN ENGINEERING, MANUFACTURING, TECHNICAL SUPPORT, DOCUMENTATION, TRAINING, AND MARKETING. IN LIEU OF SUCH PROOF, THE MANUFACTURER MUST BE ABLE TO SHOW THAT THE METHOD THAT THEY EMPLOY IN THOSE DISCIPLINES IS EQUIVALENT TO ISO 9001 REQUIREMENTS.

1.5 CLOSEOUT DOCUMENTS:

- A. A COMPLETE SET OF RECORD WIRING SCHEMATICS, DRAWN TO SCALE, SHOWING ALL DEVICE LOCATIONS, WIRE ROUTING AND CONNECTIONS, ETC. SHALL BE PROVIDED PRIOR TO FINAL INSPECTION.
- B. WARRANTY STATEMENT FROM THE MANUFACTURER: WARRANTY STATEMENT WILL STATE THE PERIOD OF WARRANTY FOR ALL THE PRODUCTS PROPOSED FOR THE PROJECT AND SHALL INCLUDE THE NAME AND ADDRESS OF THE AUTHORIZED MANUFACTURERS' AGENT WHO WILL HONOR ALL WARRANTY CLAIMS.
- C. WRITTEN CERTIFICATION BY THE FIRE ALARM CONTRACTOR THAT NO POWER SUPPLY OR CIRCUIT IN THE SYSTEM HAS AN ELECTRICAL LOAD GREATER THAN 80% OF ITS RATED CAPACITY.
- D. A SCALED PLAN OF THE BUILDING SHOWING THE PLACEMENT OF EACH ITEM OF FIRE ALARM EQUIPMENT AS WELL AS RACEWAY SIZE AND ROUTING, JUNCTION BOXES, AND CONDUCTOR SIZE, QUANTITY, AND COLOR IN EACH RACEWAY. THIS SHALL BE SUBMITTED IN AUTOCAD FORMAT ON CD-ROM.
- E. A SINGLE LINE SYSTEM BLOCK DIAGRAM AND WRITTEN SYSTEM OPERATIONAL OVERVIEW.
- F. COMPLETE BATTERY AND VOLTAGE DROP CALCULATIONS WHICH INCLUDE LOADS FOR ALL SYSTEM COMPONENTS.
- G. FIELD CONNECTION DRAWINGS: A COMPLETE SET OF DRAWINGS, ONE FOR EACH FIRE ALARM CONTROL PANEL MODULE WHICH HAS AN EXTERNAL (FIELD) WIRING CONNECTED TO IT, AND ONE FOR EACH SYSTEM DETECTOR, MODULE OR SIGNALING APPLIANCE, SHALL BE SUPPLIED. PRINT-OUT REPORT DETAILING THE SENSITIVITY OF EACH SMOKE DETECTOR INSTALLED IN THE SYSTEM. INCLUDE DATE ON REPORT.
- I. A RESET PROCEDURE FOR RESETTING THE ELEVATORS AFTER A SYSTEM ALARM.
- J. TWO COPIES OF THE OPERATING SYSTEM PROGRAM ON CD-ROM AND TWO APPROPRIATE CABLES TO LOAD THE PROGRAM FROM A LAPTOP COMPUTER.
- K. AN ADDRESS MAP OF THE BUILDING SHOWING THE PHYSICAL LOCATION OF THE DEVICES AND THE ASSOCIATED ADDRESSES SHALL BE PROVIDED.

1.6 SYSTEM FUNCTION:

- A. IN GENERAL, SYSTEM FUNCTION SHALL BE AS EVIDENTLY INTENDED BY SELECTION OF EQUIPMENT INDICATED HEREIN.
- B. ACTIVATION OF ANY MANUAL STATION, SMOKE DETECTOR, SPRINKLER SYSTEM FLOW SWITCH, OR OTHER ALARM INITIATING DEVICE SHALL CAUSE:
- THE SOUNDING OF ALARMS WHICH AFFECT THROUGHOUT THE FACILITY.
 - THE FLASHING OF ALARM INDICATING SIGNAL LIGHTS.
 - INDICATION OF THE ALARM CONDITION AT THE CONTROL PANEL INDICATING TYPE OF ALARM (E.G. WHETHER MANUAL STATION, SMOKE DETECTOR, ETC.) AS WELL AS LOCATION OF INITIATING DEVICE.
 - RELEASE OF MAGNETIC DOOR HOLDERS (POWER AND CONTROLS), SHUT DOWN OF AIR HANDLING SYSTEMS, CLOSING OF SMOKE DAMPERS (POWER AND CONTROLS) AND OTHER CONTROL FUNCTIONS AS INDICATED OR REQUIRED.
 - A LOCAL SOUNDING DEVICE IN THE PANEL SHALL BE ACTIVATED.
 - ALL AUTOMATIC PROGRAMS ASSIGNED TO THE ALARM POINT SHALL BE EXECUTED AND THE ASSOCIATED NOTIFICATION APPLIANCE CIRCUITS AND CONTROL RELAYS ADDRESSED AND ACTIVATED.
 - OTHER FUNCTIONS AS NOTED ON THE DRAWINGS OR AS EVIDENTLY INTENDED OR REQUIRED.
- C. THE MAGNETIC DOOR HOLDERS SHALL BE RELEASED ONLY BY THE ACTIVATION OF THEIR ASSOCIATED SMOKE DETECTORS.
- D. ALL STROBES SHALL BE SYNCHRONIZED IN COMMON SPACES.
- E. PROVIDE A HORN SILENCE FUNCTION WITH AN ADJUSTABLE DELAY OF 2 MINUTES TO 15 MINUTES. DELAY SHALL PREVENT SILENCE FUNCTION FROM ENGAGING. SILENCE FUNCTION SHALL BE MANUALLY ACTIVATED ONLY AND SHALL NOT PREVENT VISUAL ALARM FROM FLASHING.
- F. PROVIDE A SUPERVISED "AHJ SHUTDOWN DEFEAT" SWITCH IN OR ADJACENT TO THE FACP. THIS SWITCH SHALL CAUSE A SYSTEM "TROUBLE" INDICATION WHEN PLACED IN THE OFF-NORMAL (SHUTDOWN DEFEATED) POSITION. THIS SWITCH SHALL ALLOW TEMPORARY RESUMPTION OF HVAC OPERATION IF AN UNWANTED ALARM WILL NOT CLEAR.
- G. THE FIRE ALARM SYSTEM SHALL ASSUME PRIMARY CONTROL OF ELEVATOR OPERATION WHEN A SMOKE DETECTOR LOCATED IN ANY ASSOCIATED ELEVATOR LOBBY, ELEVATOR MACHINE ROOM OR ELEVATOR HOISTWAY INITIATES.
- H. THE FIRE ALARM SYSTEM SHALL SIGNAL SHUT-TRIP OPERATION OF ELEVATOR MAIN POWER CIRCUIT BREAKER WHEN A HEAT DETECTOR LOCATED IN THE ASSOCIATED ELEVATOR HOIST WAY INITIATES.

1.7 SUPERVISION:

- A. THERE SHALL BE SPRINKLER SUPERVISORY INITIATION DEVICE CIRCUITS FOR CONNECTION OF ALL SPRINKLER VALVE TAMPER SWITCHES TO PERFORM THE SUPERVISORY SERVICE OPERATION. WIRING METHODS WHICH AFFECT ANY FIRE ALARM INITIATION CIRCUITS TO PERFORM THIS FUNCTION SHALL BE DEEMED UNACCEPTABLE, I.E. SPRINKLER AND STANDPIPE TAMPER SWITCHES (N/C CONTACTS) SHALL NOT BE CONNECTED TO CIRCUITS WITH FIRE ALARM INITIATION DEVICES (NO CONTACTS). THIS INDEPENDENT INITIATION CIRCUIT SHALL BE LABELED SUPERVISORY SERVICE AND SHALL DIFFERENTIATE BETWEEN TAMPER SWITCH ACTIVATION AND WIRING FAULTS.
- B. THERE SHALL BE INDEPENDENTLY SUPERVISED AND INDEPENDENTLY FUSED INDICATING APPLIANCE CIRCUITS FOR ALARM SPEAKERS AND STROBES. DISARRANGEMENT CONDITIONS OF ANY CIRCUIT SHALL NOT AFFECT THE OPERATION OF OTHER CIRCUITS.
- C. ALL AUXILIARY MANUAL CONTACTS SHALL BE SUPERVISED SO THAT ALL SWITCHES MUST BE RETURNED TO THE NORMAL AUTOMATIC POSITION TO CLEAR SYSTEM TROUBLE.
- D. EACH INDEPENDENTLY SUPERVISED CIRCUIT SHALL INCLUDE DISCRETE PANEL READOUT TO INDICATE DISARRANGEMENT CONDITIONS PER CIRCUIT.
- E. THE INCOMING POWER TO THE SYSTEM SHALL BE SUPERVISED SO THAT ANY POWER FAILURE MUST BE AUDIBLY AND VISUALLY INDICATED AT THE CONTROL PANEL AND THE REMOTE ANNUNCIATOR. A GREEN "POWER ON" LED SHALL BE DISPLAYED CONTINUOUSLY WHILE INCOMING POWER IS PRESENT. THE SYSTEM BATTERIES SHALL BE SUPERVISED SO THAT A LOW BATTERY CONDITION OR DISCONNECTION OF THE BATTERY SHALL BE AUDIBLY AND VISUALLY INDICATED AT THE CONTROL PANEL AND THE REMOTE ANNUNCIATOR.
- F. THE SYSTEM EXPANSION MODULES SHALL BE ELECTRICALLY SUPERVISED FOR MODULE PLACEMENT. SHOULD A MODULE BECOME DISCONNECTED FROM THE CONTROLS, THE SYSTEM TROUBLE INDICATOR MUST ILLUMINATE, AND AUDIBLE TROUBLE SIGNAL MUST SOUND.
- G. THE SYSTEM SHALL HAVE PROVISIONS FOR DISABLING AND ENABLING ALL CIRCUITS INDIVIDUALLY FOR MAINTENANCE OR TESTING PURPOSES.

1.8 ONE-WAY VOICE COMMUNICATION:

- A. THE FIRE ALARM SYSTEM SHALL INCORPORATE ONE-WAY VOICE COMMUNICATIONS AND TONE GENERATING CAPABILITIES. THE ONE-WAY COMMUNICATIONS SYSTEM SHALL BE DUAL CHANNEL ALLOWING THE TRANSMISSION OF AN EVACUATION AUDIO SIGNAL TO ONE OR MORE ZONES AND SIMULTANEOUS MANUAL VOICE PAGING TO OTHER ZONES SELECTIVELY AND IN ANY COMBINATION.
- B. A CENTRAL AUDIO CONTROL MODULE SHALL BE PROVIDED FOR THE NECESSARY ALARM MESSAGE/TONE GENERATION, MAIN AND REMOTE MICROPHONE CONNECTIONS, MUSIC INPUTS, AND MIXER/PRE-AMPLIFIER CIRCUITS. CONTINUOUS SUPERVISION SHALL BE PROVIDED ALONG WITH SPECIFIC INFORMATION AS TO THE TYPE OF FAILURE SHOULD A PROBLEM OCCUR (E.G. MAIN MICROPHONE TROUBLE, TONE TROUBLE, ETC.). AUDIO OUTPUTS SHALL HAVE INDIVIDUAL GAIN CONTROL.
- C. A HAND-HELD, PUSH-TO-TALK MICROPHONE SHALL BE PROVIDED, RECESSED WITHIN A PROTECTIVE PANEL-MOUNTED ENCLOSURE. THE MICROPHONE SHALL BE A NOISE-CANCELING COMMUNICATION TYPE WITH A FREQUENCY RANGE OF 200 HZ TO 4000 HZ AND SHALL BE EQUIPPED WITH A SELF-WINDING FIVE-FOOT COILED CABLE. AN LED INDICATOR SHALL BE PROVIDED TO INDICATE THE MICROPHONE PUSH-TO-TALK BUTTON HAS BEEN PRESSED AND SPEAKER CIRCUITS ARE READY FOR TRANSMISSION. THE MICROPHONE SHALL BE SUPERVISED FOR DISCONNECTION.
- D. AN AUDIO CONTROL SWITCH MODULE SHALL BE FURNISHED TO PROVIDE MANUAL ACCESS TO AUDIO OPERATIONS FOR AUTHORIZED PERSONNEL. THE MODULE SHALL INCLUDE AN "ALL CIRCUITS" SWITCH, "AUX TONE 1" SWITCH, "AUX TONE 2" SWITCH, "TONE GENERATOR STOP SWITCH, AND "AUDIO TROUBLE" RESET" SWITCH. THESE SWITCHES AND ASSOCIATED LED INDICATORS SHALL BE SUPERVISED FOR DISARRANGEMENT OR FAILURE.
- E. AUDIO POWER AMPLIFIERS SHALL BE FURNISHED WITH A SELF-CONTAINED FILTERED 24VDC POWER

CONTRACTOR TO VERIFY ALL DIMENSIONS

PINACLE ARCHITECTURE PROFESSIONAL ASSOCIATION

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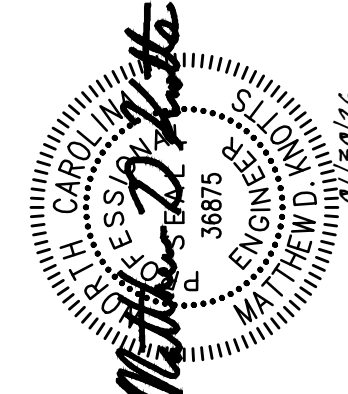
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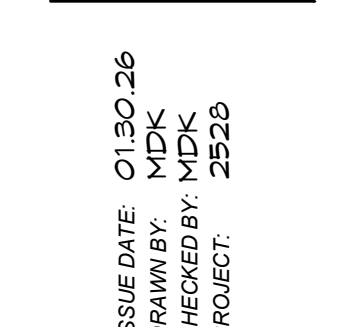
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SUPPLY, TRANSFORMER, AND AMPLIFIER MONITOR CIRCUITS. THE AMPLIFIERS SHALL PROVIDE A 70 VOLT RMS OUTPUT WITH A FREQUENCY RESPONSE OF 120 HZ TO 12,000 HZ. PROVIDE SUFFICIENT AMPLIFICATION TO OPERATE ALL SYSTEM SPEAKERS SIMULTANEOUSLY PLUS TWENTY (20) PERCENT SPARE CAPACITY. FOR THIS CALCULATION, USE THE AMPLIFIERS CONTINUOUS TWO-TONE OUTPUT RATING AND THE DESIGN POWER RATING OF EACH SPEAKER. SUBMIT CALCULATION WITH SHOP DRAWINGS.

F. IN ADDITION, PROVIDE AT LEAST ONE BACK-UP AMPLIFIER CAPABLE OF AUTOMATICALLY REPLACING ANY FAILED AMPLIFIER.

G. THE SPEAKER CIRCUITS SHALL BE CAPABLE OF SUPPLYING 70 VOLT RMS AUDIO POWER FROM THE SYSTEM AMPLIFIERS. SUPERVISION FOR OPEN, SHORT OR GROUND FAULT CONDITIONS SHALL BE PROVIDED. INDIVIDUAL AND DISTINCT TROUBLE INDICATIONS SHALL BE PROVIDED FOR EACH FAULT. PROVIDE ONE CIRCUIT FOR EACH FLOOR, STAIRWELL AND AREA OF DISTINCT COMMUNICATIONS.

H. DIGITIZED TONES FOR ALARM AND AUXILIARY REQUIREMENTS SHALL BE PROVIDED.

I. A PRE-RECORDED DIGITIZED VOICE MESSAGE CAPABILITY IS TO BE PROVIDED FOR AUTOMATIC TRANSMISSION TO BUILDING OCCUPANTS DURING ALARM CONDITIONS. THE AUTOMATIC MESSAGE PLAYER SHALL NOT RELY ON A TAPE OR OTHER MECHANICAL MEANS OF TRANSMITTING THE EVACUATION MESSAGE. A STANDARD EVACUATION MESSAGE SHALL BE PROVIDED UNDER THIS CONTRACT. HOWEVER, THE MESSAGE PLAYER MUST BE CAPABLE OF TRANSMITTING A CUSTOM MESSAGE UP TO FIVE (5) MINUTES LONG. A SELF-CONTAINED SPEAKER WILL PROVIDE TESTING OF THE MESSAGE(S) WITHOUT DISTURBING THE OCCUPANTS OF THE FACILITY.

J. AUTOMATIC VOICE EVACUATION SEQUENCE

- THE AUDIO ALARM SIGNAL SHALL CONSIST OF AN ALARM TONE FOR A MAXIMUM OF 15 SECONDS FOLLOWED BY AUTOMATIC PRE-SELECTED VOICE EVACUATION MESSAGES. AT THE END OF EACH VOICE EVACUATION MESSAGE, THE ALARM TONE SHALL RESUME. THE ALARM TONES SHALL SOUND ALTERNATELY UNTIL THE ALARM SILENCE SWITCH AT THE FIRE ALARM CONTROL PANEL HAS BEEN OPERATED.
- ALL AUDIO ALARM OPERATIONS (SPEAKER CIRCUIT SELECTION AND ALARM TONE/VOICE MESSAGE TIMING VARIATIONS) SHALL BE ACTIVATED BY THE SYSTEM SOFTWARE SO THAT ANY REQUIRED FUTURE CHANGES TO THE EVACUATION SEQUENCE CAN BE FACILITATED BY AUTHORIZED PERSONNEL WITHOUT ANY COMPONENT REWIRING.

K. MANUAL VOICE PAGING SEQUENCE

- THE SYSTEM SHALL BE CONFIGURED TO ALLOW SELECTIVE VOICE PAGING. UPON ACTIVATION OF ANY SPEAKER MANUAL CONTROL SWITCH, TWO (2) ATTENTION GETTING BEEPS SHALL SOUND OVER THE SPEAKERS INDICATING AN IMPENDING VOICE MESSAGE WILL OCCUR.
- IF ANY SPEAKER MANUAL CONTROL SWITCHES ARE ACTIVATED, THE CONTROL PANEL OPERATOR SHALL BE ABLE TO MAKE ANNOUNCEMENTS VIA THE PUSH-TO-TALK PAGING MICROPHONE OVER THE PRESELECTED SPEAKERS.
- FACILITY FOR TOTAL BUILDING EVACUATION AND PAGING SHALL BE PROVIDED TO ALLOW FOR ACTIVATION OF ALL SPEAKERS. THIS SHALL BE ACCOMPLISHED BY THE MEANS OF AN "ALL CIRCUIT" SWITCH.

L. PUBLIC ACCESS OVERRIDE

- MAKE PROVISIONS FOR SUPPLYING AN AUDIO FEED OF THE ONE-WAY COMMUNICATIONS SYSTEM TO THE STADIUM PUBLIC ADDRESS SYSTEM FOR OVERRIDE OF THAT SYSTEM DURING AN EMERGENCY.

2.1 MANUFACTURERS:

- FIRE CONTROL INSTRUMENTS: IFC10
- NOTIFIER: NFS-640
- SIMPLEX GRINNELL 4100ES

2.2 SYSTEM COMPONENTS:

A. CONTROL PANEL: THE PANEL SHALL INCLUDE A MASTER CONTROLLER BOARD AND ALL MODULES AND COMPONENTS REQUIRED FOR SPECIFIED FUNCTION INCLUDING, BUT NOT LIMITED TO:

- 24 VDC SYSTEM POWER AND SUPERVISORY CONTROL.
- SIGNALING LINE CIRCUIT MODULES (STYLE 4, CLASS B).
- NOTIFICATION APPLIANCE CIRCUIT MODULES (STYLE Y, CLASS B).
- AUXILIARY CONTROL CIRCUIT MODULES.
- BATTERY, CHARGER, CONTROL, AND METERING. BATTERIES SHALL BE LEAD-CALCIUM SEALED-CELL TYPE. CAPACITY SHALL BE ADEQUATE TO OPERATE SYSTEM FOR 60 HOURS MINIMUM IN STANDBY, PLUS 5 MINUTES IN ALARM.
- MODULES AND/OR RELAYS AS REQUIRED FOR SPECIAL SYSTEM FUNCTIONS. CONTROL PANEL ENCLOSURE SHALL INCLUDE SPARE SPACE FOR A MINIMUM OF FIVE ADDITIONAL MODULES.

B. MULTIPLE ADDRESSABLE PERIPHERAL NETWORK:

- THE SYSTEM MUST PROVIDE COMMUNICATIONS WITH INITIATING AND CONTROL DEVICES INDIVIDUALLY. ALL THESE DEVICES WILL BE INDIVIDUALLY ANNUNCIATED AT THE CONTROL PANEL. ANNUNCIATION SHALL INCLUDE THE FOLLOWING CONDITIONS FOR EACH POINT:
 - ALARM
 - TROUBLE
 - OPEN
 - SHORT
 - DEVICE MISSING/FAILED
- THE FIRE ALARM SYSTEM SHALL BE MICROPROCESSOR DRIVEN WITH STORED PROGRAM CONTROLLERS. EACH PANEL (NODE) ON THE NETWORK SHALL USE A MULTIPLE MICROPROCESSOR DESIGN SO THAT THE FAILURE OF A SINGLE MICROPROCESSOR WILL NOT RESULT IN A LOCAL FAILURE. FIRE ALARM SYSTEMS THAT UTILIZE ONLY ONE MICROPROCESSOR FOR SYSTEM (NODE) AND SLC CONTROL WILL NOT BE ACCEPTED.
- AN ELECTRONIC 100% DIGITAL CONTROLLER SHALL BE PROVIDED BY THE FIRE ALARM CONTROL PANEL TO INTERFACE BETWEEN THE PANEL AND THE ANALYTICAL MICROPROCESSOR-BASED DETECTORS AND MODULES.
- ALL SYSTEM PROGRAMMING AND HISTORY SHALL BE PERMANENTLY STORED IN NON-VOLATILE MEMORY TO ENSURE THAT NO PROGRAMMING OR HISTORY IS LOST. SYSTEMS WHICH STORE INITIAL PROGRAMMING OR FIELD PROGRAMMING CHANGES IN BATTERY BACKED MEMORY WILL NOT BE ACCEPTED.
- ELECTRONIC LOOP CONTROLLER SHALL DETECT THE ELECTRICAL LOCATION OF EACH CONNECTED DETECTOR AND MODULE. THE LOCATION AND TYPE OF EACH CONNECTED DEVICE SHALL BE MAPPED AND STORED IN MEMORY IN THE LOOP CONTROLLER. IT SHALL BE POSSIBLE TO ACCESS AND DISPLAY THIS MAP AT ANY TIME.
- ADDRESSABLE DEVICES SHALL HAVE THE CAPABILITY OF BEING DISABLED OR ENABLED INDIVIDUALLY. UP TO 250 ADDRESSABLE DEVICES MAY BE MULTI-DROPPED FROM A SINGLE PAIR OF WIRES. SYSTEMS THAT REQUIRE FACTORY REPROGRAMMING TO ADD OR DELETE DEVICES ARE UNACCEPTABLE.
- THE COMMUNICATION FORMAT MUST BE A COMPLETELY DIGITAL POLL/RESPONSE PROTOCOL. A HIGH DEGREE OF COMMUNICATION RELIABILITY MUST BE OBTAINED BY USING PARITY DATA BIT ERROR CHECKING ROUTINES FOR ADDRESS CODES AND CHECK SUM ROUTINES FOR THE DATA TRANSMISSION PORTION OF THE PROTOCOL. SYSTEMS THAT DO NOT UTILIZE FULL DIGITAL TRANSMISSION PROTOCOL ARE NOT ACCEPTABLE.
- EACH ADDRESSABLE DEVICE MUST BE UNIQUELY IDENTIFIED BY AN ADDRESS CODE ENTERED ON EACH DEVICE AT TIME OF INSTALLATION. DEVICE IDENTIFICATION SCHEMES THAT DO NOT USE UNIQUELY SET ADDRESSES BUT RELY ON ELECTRICAL POSITION ALONG THE COMMUNICATION CHANNEL ARE UNACCEPTABLE.
- WIRING TYPES SHALL BE APPROVED BY THE EQUIPMENT MANUFACTURER. THE SYSTEM SHALL ALLOW A LINE DISTANCE OF UP TO 2,500 FEET TO THE FURTHEST ADDRESSABLE DEVICE.
- THE SYSTEM CONTROL PANEL MUST BE CAPABLE OF COMMUNICATING WITH THE TYPES OF ADDRESSABLE DEVICES SPECIFIED BELOW. ADDRESSABLE DEVICES SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. THERE SHALL BE NO LIMIT TO THE NUMBER OF DETECTORS, STATIONS, OR ADDRESSABLE MODULES, WHICH MAY BE ACTIVATED OR "IN ALARM" SIMULTANEOUSLY.

C. ADDRESSABLE DEVICES

- SYSTEM SHALL USE ANALYTICAL DETECTORS THAT ARE CAPABLE OF FULL DIGITAL COMMUNICATIONS WITH THE FIRE ALARM SYSTEM USING BOTH BROADCAST AND POLLING COMMUNICATIONS PROTOCOLS. EACH DETECTOR SHALL BE CAPABLE OF PERFORMING INDEPENDENT ADVANCED FIRE DETECTION ALGORITHMS. THE FIRE DETECTION ALGORITHM SHALL MEASURE SENSOR SIGNAL DIMENSIONS, TIME PATTERNS AND COMBINE DIFFERENT FIRE PARAMETERS TO INCREASE RELIABILITY AND DISTINGUISH REAL FIRE CONDITIONS FROM UNWANTED NOISANCE ALARMS CAUSED BY ENVIRONMENTAL EVENTS. SIGNAL PATTERNS THAT ARE NOT TYPICAL OF FIRES SHALL BE ELIMINATED BY DIGITAL FILTERS AND WILL NOT CAUSE A SYSTEM ALARM CONDITION. DEVICES NOT CAPABLE OF COMBINING DIFFERENT FIRE PARAMETERS OR EMPLOYING DIGITAL FILTERS WILL NOT BE ACCEPTABLE.
- EACH DETECTOR SHALL BE CAPABLE OF IDENTIFYING DIAGNOSTIC CODES TO BE USED FOR SYSTEM MAINTENANCE. ALL DIAGNOSTIC CODES SHALL BE STORED IN THE DETECTOR. EACH SMOKE DETECTOR SHALL BE CAPABLE OF TRANSMITTING PRE-ALARM, ALARM, AND MAINTENANCE SIGNALS TO THE FIRE ALARM CONTROL PANEL VIA THE

ELECTRONIC LOOP CONTROLLER.

3. ALL DETECTORS AND THEIR BASES WILL ALSO BE REQUIRED TO BE LABELED WITH ENGRAVED LEXAN LABELS TO IDENTIFY DEVICE ADDRESS AND INTENDED LOCATION. LABELS SHALL BE RED BACKGROUND WITH WHITE LETTERS; LETTERS SHALL BE A MINIMUM OF 1/4" IN HEIGHT.

4. HEAT DETECTOR SHALL HAVE A SOLID-STATE HEAT SENSOR AND SHALL TRANSMIT AN ALARM AT A FIXED TEMPERATURE OF 135° F OR DUE TO A TEMPERATURE RATE OF RISE OF 15° F/MINUTE. THE DETECTOR SHALL CONTINUALLY MONITOR THE TEMPERATURE OF THE AIR IN ITS SURROUNDINGS TO MINIMIZE THERMAL LAG TO THE TIME REQUIRED TO PROCESS AN ALARM. THE HEAT DETECTOR SHALL BE RATED FOR CEILING INSTALLATION AT 70 FT CENTERS AND BE SUITABLE FOR WALL MOUNT APPLICATIONS.

5. PHOTOELECTRIC DETECTOR SHALL UTILIZE A LIGHT SCATTERING TYPE PHOTOELECTRIC SMOKE SENSOR TO DETECT VISIBLE PARTICULATES PRODUCED BY COMBUSTION. THE DETECTOR SHALL DYNAMICALLY EXAMINE VALUES FROM THE SENSOR AND INITIATE A SYSTEM ALARM BASED ON THE ANALYSIS OF DATA. DETECTOR SHALL CONTINUALLY MONITOR ANY CHANGES IN SENSITIVITY DUE TO THE ENVIRONMENTAL AFFECTS OF DIRT, SMOKE, TEMPERATURE, AGING AND HUMIDITY. THE ALARM SET POINT SHALL BE FIELD SELECTABLE TO ANY OF FIVE SENSITIVITY SETTINGS RANGING FROM 1.0% TO 3.5% SMOKE OBSCURATION PER FOOT. THE PHOTO DETECTOR SHALL BE SUITABLE FOR OPERATION IN THE FOLLOWING ENVIRONMENT:

- TEMPERATURE: 32OF TO 120OF (0OC TO 49OC)
- HUMIDITY: 0-93% RH, NON-CONDENSING
- ELEVATION: NO LIMIT

6. RESIDENCE ROOM SMOKE SENSOR SHALL BE SYSTEM TYPE WITH SOUNDER BASE. RESIDENCE ROOM DETECTOR SHALL PROVIDE A SEPARATELY ADDRESSABLE SMOKE SENSOR AND HEAT SENSOR. THE SMOKE SENSOR SHALL ALARM ONLY ITS ASSOCIATED SOUNDER BASE AND A LOCAL ALARM IN THE FIRE ALARM CONTROL PANEL. THE HEAT SENSOR SHALL ACTIVATE A GENERAL ALARM. THE HEAT SENSOR SHALL BE SELECTABLE, AT THE FIRE ALARM CONTROL PANEL TO ACTIVATE FROM 32 DEGREES F, TO 150 DEGREES F, AND SHALL BE SET TO 120 DEGREES F. RATE OF RISE SHALL BE SELECTABLE TO EITHER 15 OR 20 DEGREE RISE PER MINUTE AND SHALL BE SET AT A 20-DEGREE RATE OF RISE. SOUNDER BASE SHALL ACTIVATE WITH ITS ASSOCIATED DETECTOR AND UPON A GENERAL ALARM. SOUNDER BASE SHALL EMIT A 520 HZ TONE THAT MEETS NFPA 72 LOW-FREQUENCY REQUIREMENTS FOR SLEEPING AREAS. IN HANDICAPPED ROOMS THE SENSOR SHALL ALSO ACTIVATE A VISUAL ALARM AS REQUIRED BY ADA. A TROUBLE CONDITION SHALL BE TRANSMITTED TO THE CENTRAL STATION UPON ACTIVATION OF A RESIDENCE ROOM SMOKE SENSOR PORTION AND AN ALARM UPON ACTIVATION OF THE HEAT SENSOR PORTION.

7. MOUNTING BASE SHALL SUPPORT ALL SMOKE DETECTOR TYPES DETAILED IN THIS SPECIFICATION, AND HAVE THE FOLLOWING MINIMUM REQUIREMENTS:

- REMOVAL OF THE RESPECTIVE DETECTOR WILL NOT AFFECT ELECTRONIC LOOP COMMUNICATIONS WITH OTHER DETECTORS ON THAT LOOP.
- FIELD WIRING CONNECTIONS SHALL BE MADE TO THE ROOM SIDE OF THE BASE, SO THAT WIRING CONNECTIONS CAN BE MADE OR DISCONNECTED BY THE CONTRACTOR WITHOUT THE NEED TO REMOVE THE MOUNTING BASE FROM THE ELECTRICAL PANEL.
- THE BASE SHALL BE CAPABLE OF SUPPORTING REMOTE ALARM ANNUNCIATION.
- THE BASE SHALL HAVE THE OPTION OF EXTERNAL L.E.D. OPERATION, RELAY BASE OR DATA LINE ISOLATOR BASE.
 - (AA) RELAY BASE SHALL MOUNT IN A STANDARD ELECTRICAL BOX DESCRIBED ABOVE AND PROVIDE FORM "C" CONTACTS RATED AT 1 AMP @ 30VDC AND LISTED FOR "PILOT DUTY".
 - (BB) ISOLATOR BASES SHALL OPERATE WITHIN A MINIMUM OF 23 MSEC. OF A SHORT CIRCUIT ON THE DATA LINE, SHALL RUN SELF-TEST PERIODICALLY. FIELD WIRING SHALL BE ESTABLISHED NORMAL OPERATION, AND SHALL OPERATE IN A CLASS "A" OPERATION AS WELL AS CLASS "B".

8. DUCT SMOKE DETECTOR SHALL UTILIZE A PHOTOELECTRIC SMOKE DETECTOR THAT IS READILY ADAPTABLE FOR USE IN AIR DUCT SMOKE DETECTION APPLICATIONS, USING A HOUSING THAT MOUNTS TO THE OUTSIDE OF THE DUCT. WHEN USED FOR DUCT SMOKE DETECTION, THE SMOKE DETECTORS SHALL NOT FORFEIT ANY OF THE SYSTEM FUNCTIONALITY WHICH THEY HAVE WHEN USED AS AREA SMOKE DETECTORS. THE DUCT SMOKE DETECTION HOUSING SHALL ALLOW THE DETECTOR TO SAMPLE AND COMPENSATE FOR VARIATIONS IN DUCT AIR VELOCITY BETWEEN 300 AND 4000 FEET PER MINUTE. THE DETECTOR SAMPLING TUBE SHALL EXTEND THE FULL WIDTH OF THE DUCT. SAMPLING TUBES LONGER THAN 36 INCHES SHALL BE SUPPORTED FROM BOTH ENDS. REMOTE ALARM LEDS AND REMOTE TEST STATIONS SHALL BE SUPPORTED BY THE DUCT SMOKE DETECTOR AND PROVIDED FOR EACH DETECTOR. ALL DETECTORS USED IN DUCT APPLICATIONS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 72 RECOMMENDATIONS.

9. BEAM SMOKE DETECTOR SHALL CONSIST OF A SEPARATE TRANSMITTER AND RECEIVER CAPABLE OF BEING POWERED SEPARATELY OR TOGETHER. THE DETECTOR SHALL OPERATE IN EITHER A SHORT-RANGE MODE (30 TO 100 FEET) OR A LONG-RANGE MODE (100 TO 300 FEET). THE DETECTOR SHALL EMIT A BANK OF ALIGNMENT LEDS ON BOTH THE RECEIVER AND TRANSMITTER TO ENSURE PROPER ALIGNMENT WITHOUT THE USE OF SPECIAL TOOLS. THE DETECTOR SHALL UTILIZE AN AUTOMATIC GAIN CONTROL TO COMPENSATE FOR GRADUAL SIGNAL DETERIORATION FROM DIRT ACCUMULATION ON LENSES. THE BEAM SMOKE DETECTORS SHALL BE POWERED FROM THE SYSTEM CONTROL PANEL. TESTING SHALL BE CARRIED OUT USING CALIBRATED TEST FILTERS.

10. THE FIRE ALARM SYSTEM SHALL INCORPORATE ADDRESSABLE MODULES FOR THE MONITORING AND CONTROL OF SYSTEM INPUT AND OUTPUT FUNCTIONS OVER A 2-WIRE ELECTRONIC COMMUNICATIONS LOOP. USING BOTH BROADCAST AND SERIAL POLLING PROTOCOLS. ALL MODULES SHALL DISPLAY COMMUNICATIONS AND ALARM STATUS VIA LED INDICATORS. THE FUNCTION OF EACH CONNECTED MODULE SHALL BE DETERMINED BY THE MODULE TYPE AND SHALL BE DEFINED IN THE SYSTEM SOFTWARE THROUGH THE APPLICATION OF A PERSONALITY CODE. SIMPLY CHANGING THE ASSOCIATED PERSONALITY CODE MAY CHANGE MODULE OPERATION AT ANY TIME. ALL ADDRESSING OF THE ADDRESSABLE MODULES SHALL BE DONE ELECTRONICALLY, AND THE ELECTRICAL LOCATION OF EACH MODULE SHALL BE AUTOMATICALLY REPORTED TO THE FIRE ALARM CONTROL PANEL. WHERE IT MAY BE DOWNLOADED INTO A PC, OR PRINTED OUT. THE ADDRESSING OF THE MODULES WILL NOT BE DEPENDENT ON THEIR ELECTRICAL LOCATION ON THE CIRCUIT. ALL FIELD WIRING TO THE ADDRESSABLE MODULES SHALL BE SUPERVISED FOR OPENS AND GROUND FAULTS AND SHALL BE LOCATION ANNUNCIATED TO THE MODULE OF INCIDENCE. DIAGNOSTIC CIRCUITRY, AND THEIR ASSOCIATED INDICATORS, WITH REVIEWABLE TROUBLE CODES, SHALL BE INTEGRAL TO THE ADDRESSABLE MODULES TO ASSIST IN TROUBLESHOOTING SYSTEM FAULTS.

- ADDRESSABLE INPUT MODULES SHALL BE USED TO PROVIDE SUPERVISED INPUT CIRCUITS CAPABLE OF LATCHING OPERATION FOR USE WITH CONTACT DEVICES, NON-DAMPED WATER-FLOW SWITCHES, NON-LATCHING SUPERVISORY SPRINKLER SWITCHES.
- ADDRESSABLE OUTPUT MODULES SHALL PROVIDE ONE FORM "C" DRY RELAY CONTACT RATED AT 2 AMPS @ 24 VDC OR 0.5 AMPS AT 120 VAC TO CONTROL EXTERNAL APPLIANCES OR EQUIPMENT PROCESSES. THE CONTROL RELAY MODULE SHALL BE RATED FOR PILOT DUTY APPLICATIONS AND RELASING SYSTEMS SERVICE. THE POSITION OF THE RELAY CONTACT SHALL BE CONFIRMED BY THE SYSTEM FIRMWARE.

11. THE ADDRESSABLE FIRE ALARM STATIONS SHALL BE A LEXAN SINGLE ACTION FIRE ALARM STATIONS AND FIT IN TO A STANDARD ELECTRICAL BOX. STATIONS SHALL BE KEYS RESET. STATIONS SHALL BE RED WITH WHITE LETTERING. WHERE SHOWN ON DRAWINGS PROVIDE TAMPER-RESISTANT MANUAL FULL STATION COVER. THE COVER SHALL BE CLEAR LEXAN, SUITABLE FOR SURFACE MOUNT OR SEMI-FLUSH MOUNT DEPENDING ON THE APPLICATION. THE COVER SHALL HAVE A LOCAL SOUND OPTION, WHICH WHEN OPERATED, SHALL SOUND A LOCAL SIGNAL ONLY.

D. APPLIANCE DEVICES:

- ALL APPLIANCES WHICH ARE SUPPLIED FOR THE REQUIREMENTS OF THIS SPECIFICATION SHALL BE U.L. LISTED FOR FIRE PROTECTIVE SERVICE AND SHALL BE CAPABLE OF PROVIDING THE "EQUIVALENT FACILITATION" WHICH IS ALLOWED UNDER THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADA/AG) AND SHALL BE UL 1971, AND ULCS 528 LISTED. ALL APPLIANCES SHALL BE OF THE SAME MANUFACTURER AS THE FIRE ALARM CONTROL PANEL SPECIFIED TO ENSURE ABSOLUTE COMPATIBILITY BETWEEN THE APPLIANCES AND THE CONTROL PANELS, AND TO ENSURE THAT THE APPLICATION OF THE APPLIANCES IS DONE IN ACCORDANCE WITH THE SINGLE MANUFACTURERS' INSTRUCTIONS.
- SPEAKERS SHALL BE ELECTRONIC AND SHALL PROVIDE AN ADJUSTABLE HIGH OUTPUT OR LOW OUTPUT AT 98DB OR 94DB. IN - OUT SCREW TERMINALS SHALL BE PROVIDED FOR WIRING. THE USE OF "PIG-TAIL" TYPE CONNECTORS IS NOT ACCEPTABLE. THE ALDIE EVALUATION SIGNAL SHALL BE THE THREE-PULSE TEMPORAL PATTERN IN SLEEPING AREAS. PROVIDE SPEAKER WITH 520 HZ TONE OPTION THAT MEETS NFPA 72 LOW-FREQUENCY REQUIREMENTS FOR SLEEPING AREAS. SPEAKER SHALL HAVE 70 VRMS INPUTS AND HAVE FIELD SELECTABLE POWER TAPS FROM 1/4

WATT TO 2 WATTS. PROVIDE WITH CAPACITOR INPUT FOR CONNECTION TO SUPERVISED NOTIFICATION APPLIANCE CIRCUITS. SPEAKER SHALL HAVE FREQUENCY RESPONSE OF 400 TO 4,000 HZ AND BE U.L. LISTED FOR FIRE ALARM VOICE EVACUATION USE. SPEAKER SHALL HAVE 4-INCH CONE. SPEAKERS SHALL BE DESIGNED TO BE MOUNTED ON A WALL, CEILING, OR OTHER SUITABLE RIGID SURFACE AND BE CAPABLE OF BEING FLUSH MOUNTED.

3. HORNS SHALL BE ELECTRONIC, WITH FIELD SELECTABLE JUMPERS TO SET OPERATION FOR EITHER CONTINUOUS RING OR TEMPORAL PATTERN AND SHALL PROVIDE AN ADJUSTABLE HIGH OUTPUT OR LOW OUTPUT AT 98DB OR 94DB. IN - OUT SCREW TERMINALS SHALL BE PROVIDED FOR WIRING. THE USE OF "PIG-TAIL" TYPE CONNECTORS ARE NOT ACCEPTABLE.

4. STROBES SHALL BE SUPPLIED BY THE SAME MANUFACTURER AS THE FIRE ALARM CONTROL EQUIPMENT. THE STROBES SHALL HAVE A RED OR WHITE PLASTIC FACELATE. THEY SHALL PROVIDE THE PROPER CANDELA OUTPUT FOR THE PROJECT PER NFPA 72 SPACING GUIDELINES AND SYNCHRONIZED FLASH OUTPUTS MINIMUM REQUIREMENTS. THE STROBE SHALL HAVE LENS DISTRIBUTION SUITABLE FOR WALL OR CEILING MOUNTED AS REQUIRED. IN - OUT SCREW TERMINALS SHALL BE PROVIDED FOR WIRING. THEY SHALL PROVIDE SYNCHRONIZED FLASH OUTPUTS AS REQUIRED TO COMPLY WITH CODE REQUIREMENTS.

E. REMOTE LCD ANNUNCIATOR: REMOTE LCD ANNUNCIATOR SHALL HAVE THE FULL ABILITY AND DUPLICATE IN ALL FASHION THE MAIN USER INTERFACE LOCATED ON THE CONTROL PANEL. THIS INCLUDES THE ABILITY TO CONTROL ALL SYSTEM FUNCTIONS, TESTS, PROGRAMMING, AND ANNUNCIATIONS. ANNUNCIATOR SHALL ALSO INCLUDE THE ABILITY TO ADD PROGRAMMABLE SWITCHES AND/OR LED'S AS REQUIRED FOR SPECIAL FUNCTIONS WITH OUT THE NEED TO ADD ADDITIONAL WIRES OR CABINETS.

F. NOTIFICATION APPLIANCE CIRCUITS: PROVIDE WHERE INDICATED ON THE PLANS SUPERVISED HARD-WIRED NOTIFICATION APPLIANCE CIRCUITS (NAC) FOR THE CONTROL OF 24VDC SIGNALING APPLIANCES. EACH NAC SHALL OPERATE AS A CLASS B (STYLE Y) CIRCUIT AND SHALL BE CAPABLE OF CONTROLLING UP TO 3.5 AMPS OF SIGNALING POWER.

G. MAGNETIC DOOR HOLDERS: MAGNETIC DOOR HOLDERS SHALL BE SEMI-FLUSH WALL MOUNTED WHERE POSSIBLE. FLOOR MOUNTED WHERE NECESSARY. 24 VDC OPERATION. COORDINATE WITH GENERAL CONTRACTOR FOR EXACT LOCATIONS AND PROVIDE ALL REQUIRED HARDWARE, RELAYS. RELAYS FOR REMOTE CONTROL WIRING, WHERE THE WIRING IS PROVIDED UNDER ANOTHER CONTRACT, SHALL HAVE DPDT CONTACTS RATED 10 AMPERES AT 115 VAC, MINIMUM.

I. DEVICE GUARDS: DEVICE GUARDS SHALL BE PROVIDED WHERE INDICATED ON THE DRAWINGS. GUARDS SHALL BE TAMPERPROOF ASSEMBLIES CONSISTING OF 1/4-GAUGE STEEL FRAMES AND 16-GAUGE STEEL COVERS WITH 3/16" DIAMETER PERFORATIONS ON 1/4" STAGGERED CENTERS. ARMOR MANUFACTURING S-575 SERIES OF REQUIRED DEPTH AND WITHOUT CONDUIT KNOCKOUTS OR APPROVED EQUIVALENTS.

J. CENTRAL STATION SERVICE INTERFACE: THE CONTRACTOR SHALL PROVIDE ALL NECESSARY CONDUCTORS, CONDUIT AND RELAYS TO TERMINATE THE FOLLOWING SIGNALS INTO A CENTRAL STATION SERVICE INTERFACE:

- FIRE ALARM
- SPRINKLER WATER FLOW ALARM
- FIRE ALARM SYSTEM AC POWER TROUBLE (ONLY IF 120VAC INTERRUPTED FOR 8 HOURS)

B. INTERFACE SHALL BE CAPABLE OF BEING DISCONNECTED AND REMOVED WITHOUT AFFECTING THE BUILDING SYSTEM. THE INTERCONNECTION SHALL BE SUPERVISED. UPON ANY FIRE ALARM INITIATED BY A WATER FLOW SWITCH, MANUAL STATION, THERMAL DETECTOR, OR A VERIFIED SMOKE DETECTOR ALARM, ONE GENERAL ALARM SIGNAL SHALL BE SENT TO THE CENTRAL STATION. UPON THE ACTIVATION OF ANY SUPERVISORY SWITCH IN THE BUILDING CONNECTED TO CIRCUITS REPORTING TO THE CPU, ONE SEPARATE SIGNAL SHALL BE FORWARDED OFF-SITE. UPON THE ACTIVATION OF THE MAIN FAC TROUBLE, ONE TROUBLE SIGNAL SHALL BE SENT TO THE CENTRAL STATION.

C. THE PRECEDENCE OF SIGNALS TRANSMITTED SHALL BE AS FOLLOWS:

- FIRE ALARM
- SECURITY ALARM
- SUPERVISORY SIGNAL
- TROUBLE SIGNAL

D. THE CENTRAL STATION SERVICE INTERFACE SHALL BE AN EIGHT CIRCUIT DIGITAL ALARM COMMUNICATING TRANSMITTER (DACT) INSTALLED AND CONNECTED TO TWO SEPARATE COMMUNICATIONS METHODS IN ACCORDANCE WITH NFPA 72. WHERE A DACT IS USED WITH PUBLIC SWITCHED TELEPHONE AS THE MEANS OF COMMUNICATION, THEN, ONE OF THE FOLLOWING ALTERNATIVE TRANSMISSION METHODS SHALL BE EMPLOYED AS A REDUNDANT, SECONDARY PATH:

- ONE-WAY PRIVATE RADIO ALARM SYSTEM (NFPA 72-26.6.3.3.2)
- TWO-WAY RF MULTIPLEX SYSTEM (NFPA 72-26.6.3.3.1)
- PERFORMANCE BASED METHOD (NFPA 72-26.6.3.1) THESE PERMISSIBLE PERFORMANCE-BASED METHODS INCLUDE PHONE COMMUNICATION FROM ALTERNATE TELEPHONE PROVIDER THAN THE PRIMARY INCLUDING CELLULAR; OR, USE OF IP DACT, I.E. EQUIPMENT THAT TRANSMITS DATA ACROSS A PUBLIC SWITCHED NETWORK USING IP.
- UPON APPROVAL OF THE LOCAL JURISDICTION WITH FIRE RESPONSE AUTHORITY A SECOND TELEPHONE LINE WILL BE PERMITTED TO BE USED.

E. ALL U.L. STANDARDS AND NFPA STANDARDS FOR RELIABILITY SHALL BE MET. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS RELATING TO TELEPHONE NUMBERS ON BOTH SENDING AND RECEIVING ENDS. BEING RELIABLE ACCORDING TO NFPA STANDARDS. ALL EQUIPMENT SHALL BE U.L. LISTED AND SHALL PROVIDE A DETAILED NARRATIVE DESCRIPTION IN THE OPERATION AND MAINTENANCE MANUALS OF THE FINAL INSTALLED CONDITIONS AND ARRANGEMENTS, INCLUDING TELEPHONE CIRCUITS USED ON-SITE AND NUMBERS CALL OFF-SITE. ONCE THE NEW SYSTEM IS COMPLETE, TESTED, AND ACCEPTED, IT SHALL BE PLACED IN SERVICE AND CONNECTED TO THE OFF-SITE, CENTRAL STATION, FIRE ALARM REPORTING SERVICE.

F. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY CONDUCTORS, CONDUIT AND RELAYS TO TERMINATE THE FOLLOWING SIGNALS INTO A CENTRAL STATION SERVICE INTERFACE AND TRANSMITTER PANEL:

- FIRE ALARM
- SPRINKLER WATER FLOW ALARM
- FIRE ALARM SYSTEM AC POWER TROUBLE (ONLY IF 120VAC INTERRUPTED FOR 8 HOURS)

G. THE PRECEDENCE OF SIGNALS TRANSMITTED SHALL BE AS FOLLOWS:

- FIRE ALARM
- SECURITY ALARM
- SUPERVISORY SIGNAL
- TROUBLE SIGNAL

I. PANEL SHALL BE IN ITS OWN CABINET (NOT WITHIN THE MAIN PANEL) AND SHALL BE CAPABLE OF BEING DISCONNECTED AND REMOVED WITHOUT AFFECTING THE BUILDING SYSTEM. THE INTERCONNECTION SHALL BE SUPERVISED. UPON ANY FIRE ALARM INITIATED BY A WATER FLOW SWITCH, MANUAL STATION, THERMAL DETECTOR, OR A VERIFIED SMOKE DETECTOR ALARM, ONE GENERAL ALARM SIGNAL SHALL BE SENT TO THE CENTRAL STATION. UPON THE ACTIVATION OF ANY SUPERVISORY SWITCH IN THE BUILDING CONNECTED TO CIRCUITS REPORTING TO THE CPU, ONE SEPARATE SIGNAL SHALL BE FORWARDED OFF-SITE. UPON THE ACTIVATION OF THE MAIN FAC TROUBLE, ONE TROUBLE SIGNAL SHALL BE SENT TO THE CENTRAL STATION.

J. ELEVATOR CONTROL: PROVIDE CONTACTS FOR EACH ELEVATOR IN THE ELEVATOR MACHINE ROOM THAT SHALL BE ACTIVATED WHENEVER SMOKE OR BY-PRODUCTS OF COMBUSTION ARE DETECTED IN ANY OF THE ELEVATOR LOBBIES SERVED BY THE ELEVATOR, OR IN MACHINE ROOM, OR IN THE HOIST WAY. RUN NO. 10 AWG CONDUCTORS IN RACEWAY FROM EACH SET OF CONTACTS TO THE APPLICABLE ELEVATOR CONTROLLER. TERMINATE CONDUCTORS WITH 12" TAPED SLACK IN A JUNCTION BOX ADJACENT TO ELEVATOR CONTROLLER. CONNECT N.O. OR N.C. AS DIRECTED BY ELEVATOR INSTALLER FOR RETURN OF ELEVATOR TO MAIN FLOOR OR DESIGNATED ALTERNATE FLOOR UPON SMOKE DETECTION BY ELEVATOR LOBBY OR MACHINE ROOM DETECTORS. DETECTION OF SMOKE IN MAIN FLOOR LOBBY SHALL SIGNAL ELEVATOR TO GO TO ALTERNATE FLOOR. DETECTION OF SMOKE IN LOBBY OTHER THAN MAIN FLOOR LOBBY OR IN MACHINE ROOM SHALL SIGNAL ELEVATOR TO GO TO MAIN FLOOR.

K. ELEVATOR SHUT-TRIP: PROVIDE CONTACTS FOR EACH ELEVATOR IN THE ELEVATOR MACHINE ROOM THAT SHALL BE ACTIVATED WHEN THE HEAT DETECTORS LOCATED IN ITS ASSOCIATED HOIST WAY AND ADJACENT TO EACH SPRINKLER SYSTEM HEAD INITIATE. CONNECT CONTACTS INTO ELEVATOR MAIN POWER CIRCUIT BREAKER SHUNT-TRIP CONTROL CIRCUIT TO SIGNAL BREAKER SHUNT-TRIP OPERATION.

L. SPARE COMPONENTS: ANY SPECIAL TOOLS, EQUIPMENT, PROGRAMMING DEVICES AND CABLES NEEDED TO MAINTAIN OR REPAIR THE SYSTEM SHALL BE PROVIDED TO THE OWNER. FURNISH SPARE COMPONENTS TO THE OWNER IN THE FOLLOWING QUANTITIES, BUT NOT LESS THAN ONE OF EACH TYPE OF DEVICE USED ON THE PROJECT:

- FUSES - 2 OF EACH TYPE AND SIZE
- MANUAL STATIONS - 2% OF INSTALLED QUANTITY.
- SIGNAL DEVICES - 4% OF INSTALLED QUANTITY OF EACH TYPE.
- AUTOMATIC DETECTORS WITH BASES - 6% OF INSTALLED QUANTITY OF EACH TYPE.
- MISCELLANEOUS DEVICES - 2% OF INSTALLED QUANTITY.

3.1 INSTALLATION:

A. WIRING SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR PROPER SYSTEM OPERATION.

B. SIGNAL LINE CIRCUIT CABLE FOR MONITORING AND CONTROL OF ADDRESSABLE DEVICES SHALL BE NOT LESS THAN #18 AWG TWISTED SHIELDED PAIR TYPE EPLW/PLF/PLP FIRE ALARM CABLE. UNLESS SPECIFICALLY NOTED OR APPROVED OTHERWISE, OTHER CONDUCTORS SHALL BE OF STANDED COPPER NOT SMALLER THAN #14 AWG, WITH THINWTHHN INSULATION. COLOR CODING SHALL BE AS FOLLOWS:

- SIGNALING LINE CIRCUIT RED (+) BLACK (-)
- NOTIFICATION APPLIANCE CIRCUITS BLUE (+) BLACK (-)
- 24 VDC OPERATING POWER YELLOW (+) BROWN (-)
- DOOR CONTROL CIRCUITS ORANGE

C. ALL WIRING SHALL BE IN METAL RACEWAY, UNLESS SPECIFICALLY SHOWN OTHERWISE. RACEWAYS SHALL BE SIZED FOR THE WIRING REQUIREMENTS OF THE SYSTEM PROPOSED, WITH MAXIMUM CONDUIT FILL OF 40%.

D. IN MULTISTORY BUILDINGS, ALL WIRING LEAVING THE RISER ON EACH FLOOR SHALL RUN THROUGH A LABELED TERMINAL BLOCK LOCATED IN A HINGED CABINET ACCESSIBLE FROM THE FLOOR. TERMINATIONS SHALL HAVE PRESSURE WIRE CONNECTORS OF THE SELF-LIFTING OR BOX LUG TYPE.

E. WALL-MOUNTED SYSTEM DEVICES SHALL BE FLUSH MOUNTED WHERE CONSTRUCTION PERMITS, WHERE NECESSARY AND APPROVED BY THE ARCHITECT/ENGINEER. SURFACE MOUNTING ENCLOSURES MAY BE UTILIZED. CONTRACTOR SHALL COORDINATE TRIM TYPES.

F. AUTOMATIC DETECTORS SHALL BE LOCATED AT LEAST THREE FEET FROM ANY HVAC DIFFUSER. AN IDENTIFICATION MAP SHOWING ALL INITIATING DEVICES AND THEIR ADDRESS NUMBERS SHALL BE PROVIDED AND MOUNTED BESIDE THE MAIN PANEL FOR QUICK AND EASY LOCATION OF ALARMED OR TROUBLED DEVICES. SYSTEM MAP SHALL BE MOUNTED UNDER PLEXIGLAS.

H. ALL JUNCTION AND CONNECTION BOXES SHALL BE PAINTED RED FOR EASY IDENTIFICATION.

I. FIELD-CONNECTED DEVICES MUST BE INSTALLED AND WIRED BY A FACTORY TRAINED AND AUTHORIZED FIRE ALARM SYSTEM SUB-CONTRACTOR OR A LICENSED ELECTRICAL CONTRACTOR UNDER DIRECT SUPERVISION OF A FACTORY TRAINED AND AUTHORIZED FIRE ALARM SYSTEM SUB-CONTRACTOR.

J. ALL AUXILIARY POWER SUPPLIES OR OTHER FIRE PANELS SHALL BE IN ELECTRICAL OR MECHANICAL ROOMS. THEY SHALL BE MOUNTED AT A HEIGHT BETWEEN 48 TO 60 INCHES FROM FLOOR LEVEL. ALL SUCH PANELS SHALL BE "SUPERVISED" BY THE MAIN FIRE ALARM PANEL. A SMOKE DETECTOR SHALL BE LOCATED ON THE CEILING WITHIN FIVE FEET OF ALL AUXILIARY POWER SUPPLIES.

K. ISOLATION MODULES SHALL BE PROVIDED AS FOLLOWS:

- AFTER EACH 25 DEVICES AND CONTROL POINTS ON ANY ADDRESSABLE LOOP.
- FOR EACH ADDRESSABLE CIRCUIT THAT EXTENDS OUTSIDE THE BUILDING WALLS.
- ON EACH END OF EACH ADDRESSABLE LOOP AT THE FIRE ALARM CONTROL PANEL (WITHIN 15 FEET AND IN THE SAME ROOM AS THE FACP).
- FOR ADDRESSABLE LOOPS EXTENDING BEYOND ONE FLOOR, INSTALL ISOLATOR MODULE AT TERMINAL CABINET ON EACH FLOOR.
- EACH ISOLATION MODULE SHALL BE CLEARLY LABELED AND READILY ACCESSIBLE.

L. NO WIRING ASSOCIATED WITH THE FIRE ALARM SYSTEM SHALL BE SPICED OTHER THAN AT DEVICE OR CABINET TERMINAL BLOCKS. PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL CONNECTIONS AT THE FIRE ALARM CONTROL PANEL, POWER SUPPLIES AND TERMINAL CABINETS.

M. PROVIDE ALL NECESSARY POWER AND CONTROL WIRING FOR SMOKE DAMPERS FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR. COORDINATE VOLTAGE REQUIREMENTS FOR SMOKE DAMPER ACTUATORS WITH MECHANICAL CONTRACTOR.

N. DUCT SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR. COORDINATE INSTALLATION, INCLUDING SAMPLING TUBE, WITH MECHANICAL CONTRACTOR.

O. PROVIDE ALL NECESSARY POWER AND CONTROL WIRING FOR MAGNETIC DOOR HOLDER DEVICES. COORDINATE INSTALLATION WITH DOOR HARDWARE INSTALLER.

3.2 FIRE ALARM SYSTEM MONITORING:

A. ALL NEW FIRE ALARM SYSTEMS AND SUBSTANTIALLY RENOVATED ALARM SYSTEMS SHALL HAVE EITHER A CENTRAL STATION FIRE ALARM SYSTEM OR A PROPRIETARY SUPERVISING STATION SYSTEM. THESE SYSTEMS MUST BE IN COMPLIANCE WITH NFPA 72. CENTRAL STATION FIRE ALARM SYSTEMS MUST BE THIRD PARTY VERIFIED WHEN ANY OF THE FOLLOWING CONDITIONS EXIST:

- NEW CONSTRUCTION
- NEW FIRE ALARM SYSTEM IN EXISTING FACILITIES
- REPLACEMENT OF THE FIRE ALARM CONTROL PANEL (FACP) MUST BE COMPLETED WITHIN SIX MONTHS.
- THE ADDITION OF UP TO 25 DEVICES, EITHER INITIATING OR ANNUNCIATING, WITHIN A 12-MONTH PERIOD WILL NOT REQUIRE THE ENTIRE SYSTEM TO BE UPGRADED, PROVIDED A NEW PACP OR EXTENDER PANEL IS NOT REQUIRED TO FEED THE NEW DEVICES. (REPLACEMENT OF A GIVEN DEVICE AT THE SAME LOCATION DOES NOT COUNT AS AN ADDITION.)
- ADDITIONS QUALIFYING AS SEPARATE BUILDINGS UNDER THE INTERNATIONAL BUILDING CODE AND HAVING AN INDEPENDENT FIRE ALARM SYSTEM WILL ONLY BE REQUIRED TO BE THIRD PARTY VERIFIED WHEN THE BUILDING IS BEING REPAIRED OR WHEN ALL FIRE ALARM SYSTEMS ARE EQUIPPED WITH ENUCINATION AT ONE LOCATION. NOTE THAT THE FACP OF EACH ALARM SYSTEM MUST BE IN THE BUILDING THAT ITS ALARM SYSTEM PROTECTS. 110 VOLT SYSTEMS SHALL NOT BE EXPANDED OR ADDED ON THE (SUPERSEDES "4" ABOVE).
- BUILDINGS THAT ARE NOT GROUP E OR GROUP E WITH LESS THAN A 100-OCCUPANT LOAD ARE EXEMPT FROM 1208.1.1.

3.3 MANUFACTURER'S RESPONSIBILITIES:

A. FINAL SYSTEM CONNECTIONS SHALL BE MADE BY OR UNDER THE DIRECT SUPERVISION OF AN AUTHORIZED REPRESENTATIVE OF THE MANUFACTURER, WHO SHALL VERIFY TO THE ARCHITECT/ENGINEER THAT THE SYSTEM HAS BEEN LEFT IN FULL AND PROPER OPERATING CONDITION. PROGRAMMING OF THE FIRE ALARM SYSTEM SHALL BE AS SPECIFIED BY THE OWNER.

B. MANUFACTURER'S REPRESENTATIVE AND A RECORD OF COMPLETION PRESENTED UPON COMPLETION SHALL VERIFY SYSTEM INSTALLATION AND OPERATIONS. THE MANUFACTURER'S REPRESENTATIVE SHALL BE RESPONSIBLE FOR AN ON-SITE DEMONSTRATION OF THE OPERATION OF THE SYSTEM AND INITIAL STAFF TRAINING.

C. MANUFACTURER SHALL SUPPLY A 2-YEAR WARRANTY FROM DATE OF MANUFACTURED CONTROL SYSTEM AND FIELD DEVICES AND APPLIANCES.

D. SYSTEM SHALL BE MAINTAINED IN PERFECT OPERATING CONDITION FOR A PERIOD OF TWO YEARS FOLLOWING COMPLETION OF THE PROJECT, AT NO ADDITIONAL COST TO THE OWNER.

E. MANUFACTURER SHALL MAINTAIN A SERVICE ORGANIZATION WITH ADEQUATE SPARE PARTS STOCK WITHIN 50 MILES OF THE INSTALLATION. ANY DEFECTS THAT RENDER THE SYSTEM INOPERATIVE SHALL BE REPAIRED WITHIN 24 HOURS OF THE OWNER NOTIFYING THE CONTRACTOR. OTHER DEFECTS SHALL BE REPAIRED WITHIN 48 HOURS OF THE OWNER NOTIFYING THE CONTRACTOR.

3.4 SURGE PROTECTION AND GROUNDING:

A. ALL EQUIPMENT SHALL BE PROPERLY GROUNDDED. MAIN PANEL SHALL BE GROUNDDED DIRECTLY TO "EARTH GROUND". SURGE PROTECTION AND LIGHTNING ARRESTORS SHALL BE INSTALLED ON THE AC SUPPLY AND ALL INITIATING, NOTIFICATION AND MONITORING CIRCUITS.

B. DITEK DTK-LVLP SERIES FOR LOW VOLTAGE DATA AND SIGNAL LINE PROTECTION

C. EFF HMM-120 OR EQUIV. FOR AC LINE PROTECTION FOR 120 VAC. FOR ADDED PROTECTION, WIND SHIELD COIL TO FURNISH 1/4 INCH DIAMETER IN THE BRANCH CIRCUIT PHASE EQUAL TO THAT DOWNSTREAM OF THE SUPPRESSOR CONNECTION. INSTALL THE SUPPRESSOR IN A LISTED ENCLOSURE NEAR THE ELECTRICAL PANELBOARD AND TRIM EXCESS LEAD LENGTHS.

3.5 SYSTEM TEST AND CERTIFICATION/DEMONSTRATION:

A. THE COMPLETELY INSTALLED FIRE ALARM SYSTEM SHALL BE FULLY TESTED IN COMPLIANCE WITH TESTING PROCEDURES FOR SIGNALING SYSTEMS (NFPA 72) UNDER THE SUPERVISION OF A TRAINED MANUFACTURERS REPRESENTATIVE. THE SYSTEM SHALL BE DEMONSTRATED TO PERFORM ALL THE FUNCTIONS AS SPECIFIED.

B. THE FIRE ALARM SYSTEM SUB-CONTRACTOR SHALL TEST:

- EVERY ALARM INITIATING DEVICE FOR PROPER RESPONSE AND PROGRAM EXECUTION.
- EVERY NOTIFICATION APPLIANCE FOR PROPER OPERATION AND AUDIBLE/VISUAL OUTPUT.
- ALL AUXILIARY CONTROL FUNCTIONS SUCH AS ELEVATOR CAPTURE, SMOKE DOOR AND DAMPER RELEASE, AND FUNCTIONAL OVERRIDE OF HVAC, VENTILATION, AND PRESSURIZATION CONTROLS.

C. THE CONTRACTOR SHALL SUPPLY ALL NECESSARY TWO-WAY RADIOS, LADDERS AND ANY OTHER MATERIALS NEEDED TO TEST THE SYSTEM.

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ELECTRICAL SPECIFICATIONS

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- D. THE ENGINEER AND OWNER MUST BE NOTIFIED AT LEAST 10 WORKING DAYS PRIOR TO THE SCHEDULED TESTING SO THAT HE MAY BE PRESENT FOR SUCH TESTING.
- E. AFTER THE SYSTEM HAS BEEN COMPLETELY TESTED TO THE SATISFACTION OF THE ENGINEER AND OWNER, THE FIRE ALARM SYSTEM SUB-CONTRACTOR SHALL COMPLETE THE FIRE ALARM SYSTEM CERTIFICATION OF COMPLETION FORM PUBLISHED BY THE NFPA.
- F. THE COMPLETED FORM SIGNED BY A PRINCIPAL OF THE FIRE ALARM SYSTEM SUB-CONTRACTOR AND SHALL BE DELIVERED TO THE ARCHITECT/ENGINEER WITH THE OTHER SYSTEM DOCUMENTATION REQUIRED BY THESE SPECIFICATIONS.

3.6 INSTRUCTION OF OWNER:

- A. THE FIRE ALARM SYSTEM SUB-CONTRACTOR SHALL SCHEDULE AND EXECUTE AN INSTRUCTION CLASS FOR THE BUILDING OWNER WHICH DETAILS THE PROPER OPERATION OF THE INSTALLED FIRE ALARM SYSTEM. THE INSTRUCTION SHALL ALSO COVER THE SCHEDULE OF MAINTENANCE REQUIRED BY NFPA 72 AND ANY ADDITIONAL MAINTENANCE RECOMMENDED BY THE SYSTEM MANUFACTURER. THIS TRAINING SHALL ALSO INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING SUBJECTS:
 - 1. HOW TO REPLACE HEADS AND SET ADDRESSES IF NOT SET AUTOMATICALLY.
 - 2. HOW TO LOCATE SHORT IN THE CIRCUIT.
 - 3. HOW TO REPLACE ELECTRONIC CARDS AND WHERE TO MOUNT THEM IN THE PANEL.
 - 4. EACH ELECTRONIC CARD SHALL BE THIRD PARTY LISTED.
 - 5. GET FAMILIAR WITH FUNCTIONALITY OF EACH ELECTRONIC CARD.
 - 6. HOW TO DO DIRTY HEAD TEST REPORT AND SENSITIVITY TEST REPORT.
 - 7. HOW TO SYNCHRONIZE THE STROBE LIGHTING FOR THE ENTIRE BUILDING.
 - 8. HOW TO CHECK THE CIRCUIT GROUND FAULT AND HOW TO CLEAR IT.
 - 9. HOW TO INTERPRET THE DISPLAY FIELD CODES (A=ALARM, S=SUPERVISORY, T=TROUBLE, M=MODULES).
 - 10. HOW TO LOCATE FAULTY MODULE FROM THE TROUBLE DISPLAY CODES.
- B. THE INSTRUCTION SHALL BE A MINIMUM OF 8 HOURS IN DURATION AND PRESENTED IN AN ORGANIZED AND PROFESSIONAL MANNER BY A PERSON FACTORY-TRAINED IN THE OPERATION AND MAINTENANCE OF THE EQUIPMENT AND WHO IS ALSO THOROUGHLY FAMILIAR WITH THE INSTALLATION.
- C. THE FIRE ALARM SYSTEM SUB-CONTRACTOR SHALL PROVIDE SERVICE AND OPERATION MANUALS OR ANY OTHER CURRICULA THAT MAY ENHANCE THE INSTRUCTION OF THE BUILDING OWNERS OR LOCAL MUNICIPAL FIRE DEPARTMENT IN THE OPERATION AND MAINTENANCE OF THE SYSTEM. ALSO PROVIDE SOFTWARE AND HARDWARE NECESSARY TO TROUBLESHOOT AND COMPLETELY PROGRAM THE SYSTEM.

EMERGENCY RESPONDER COMMUNICATION COVERAGE SYSTEM

1.1. SCOPE

- 1. FURNISH AND INSTALL AN EMERGENCY RESPONDER COMMUNICATION COVERAGE SYSTEM AS SPECIFIED HEREIN.
- 2. THE WORK INCLUDED UNDER THIS SPECIFICATION CONSISTS OF THE CONTRACTOR'S EMERGENCY RESPONDER RADIO COVERAGE SYSTEM (ERCCS) SUBCONTRACTOR FURNISHING ALL LABOR, EQUIPMENT, MATERIALS, AND SUPPLIES AND PERFORMING ALL OPERATIONS NECESSARY TO COMPLETE THE INSTALLATION OF THE ERCCS IN COMPLIANCE WITH THE SPECIFICATIONS AND DRAWINGS. THE ERCCS SUBCONTRACTOR SHALL PROVIDE AND INSTALL ALL THE REQUIRED MATERIAL TO FORM A COMPLETE AND OPERATIONAL SYSTEM.
- 3. AN APPROVED MANUFACTURER OR A QUALIFIED AND APPROVED VENDOR SHALL SUPPLY, TEST, AND DETERMINE LOCATIONS OF COMPONENTS REQUIRED FOR PROPER OPERATION AND SHALL SUPPLY, INSTALL, TEST, AND CERTIFY THE PERFORMANCE OF THE COMPLETE SYSTEM. VENDOR QUALIFICATIONS SHALL BE ACCEPTABLE TO THE OWNER AND THE AHJ.

1.2. SUBMITTALS

- 1. CONTRACTOR SHALL SUBMIT RESULTS OF INITIAL RF SURVEY TO THE OWNER.
- 2. IF RF SURVEY RESULTS SHOW AN ERCCS IS REQUIRED, CONTRACTOR SHALL SUBMIT THE FOLLOWING:
 - A. ERCCS SYSTEM DESIGNER'S LICENSE AND ERCCS LEAD INSTALLATION PERSONNEL TRAINING CERTIFICATION.
 - B. PRODUCT DATA FOR ERCCS CABLING, AMPLIFIERS, ANTENNAS, PANELS, BATTERY BACKUP UNIT, AND ALL NECESSARY COMPONENTS FOR A COMPLETE SYSTEM.
 - C. SHOP DRAWINGS INDICATING DEVICE PLACEMENT AND CABLE ROUTING.
 - D. RF LINK CALCULATIONS, BATTERY BACKUP CALCULATIONS AND OTHER DESIGN DATA.
 - E. AS-BUILT SPECIFICATIONS AND DRAWINGS.
- 3. ALL TEST RECORDS ALONG WITH USER MANUALS, RF LINK CALCULATIONS, BATTERY BACKUP CALCULATION AND OTHER DESIGN DATA SHALL BE SUBMITTED PRIOR TO FINAL INSPECTION BY THE FIRE MARSHAL AND AS REQUIRED BY THE AHJ.

1.3. CONDUIT PATHWAYS

- 1. UNLESS NOTED OTHERWISE, THE CONTRACTOR SHALL PROVIDE CONDUIT PATHWAYS FOR USE BY ERCCS SUBCONTRACTOR.
- 2. CONTRACTOR SHALL BE RESPONSIBLE FOR FIRESTOPPING ALL CONDUIT SLEEVES WHERE REQUIRED TO MAINTAIN INTEGRITY OF FIRE WALLS.

1.4. ERCCS SUBCONTRACTOR REQUIREMENTS

- 1. THE CONTRACTOR'S ERCCS SYSTEM DESIGNER(S) SHALL HAVE A VALID FCC-ISSUED GENERAL RADIO OPERATOR'S LICENSE.
- 2. THE CONTRACTOR'S LEAD ERCCS INSTALLATION PERSONNEL SHALL HAVE CERTIFICATION OF IN-BUILDING SYSTEM TRAINING ISSUED BY A NATIONALLY RECOGNIZED ORGANIZATION, SCHOOL OR A CERTIFICATE ISSUED BY THE MANUFACTURER OF THE EQUIPMENT BEING INSTALLED.

2.1. PRODUCTS EMERGENCY RESPONDER COMMUNICATION COVERAGE SYSTEM (ERCCS)

- 1. ERCCS ITEMS SHALL BE PROVIDED WITH ALL APPLICABLE ACCESSORIES AS A COMPLETE AND OPERATIONAL SYSTEM.
- 2. ACCEPTABLE MANUFACTURERS:
 - A. BI-DIRECTIONAL AMPLIFIER
 - 1. BIRD RESCUELINE SIGNAL BOOSTERS
 - 2. HONEYWELL NON-ADDRESSABLE CLASS B BI-DIRECTIONAL AMPLIFIER
 - 3. COMBA R78V3 CLASS B BI-DIRECTIONAL AMPLIFIER
 - B. ANTENNAS
 - 1. INDOOR OMNI LOW PROFILE CEILING MOUNT ANTENNA 698-2700 MHZ: COMBA IXD-360H04MJN OR APPROVED EQUAL
 - 2. OUTDOOR DIRECTIONAL YAGI ANTENNA 746-896 MHZ: COMBA OY-MN-V11T OR APPROVED EQUAL
 - C. CABLING
 - 1. HARDLINE AIR DIELECTRIC COAX: RFS ICA12-50JPLW OR APPROVED EQUAL
 - 2. COAX JUMPER: TIMES MICROWAVE SYSTEMS LMR-400-LLPL OR APPROVED EQUAL
 - 3. HARDLINE FOAM DIELECTRIC COAX: LCS-1250J OR APPROVED EQUAL
 - D. BATTERY BACKUP UNIT
 - 1. COMBA BBUV3-LFPXXXXX OR APPROVED EQUAL
 - E. REMOTE ANNUNCIATOR PANEL
 - 1. COMBA CPAPV1-DC-B-UL OR APPROVED EQUAL
- 3. ADDITIONAL EMERGENCY RESPONDER ANTENNA SYSTEM REQUIREMENTS:
 - 1. DEDICATED CONDUIT PATHWAYS AND ROUGH-IN BOXES SHALL BE PROVIDED BY THE CONTRACTOR.

3.1. INSTALLATION

- 1. ERCCS SUBCONTRACTOR SHALL PERFORM A BUILDING WIDE RF SURVEY AT A TIME IDENTIFIED DURING CONSTRUCTION BY THE OWNER'S REPRESENTATIVE. RF SURVEY SHALL INDICATE ALL AREAS THAT DO NOT MEET ACCEPTABLE LEVELS OF EMERGENCY RESPONDER RADIO COVERAGE. THE OWNER'S REPRESENTATIVE AND A FIRE SAFETY COORDINATOR SHALL BE IN ATTENDANCE DURING THE RF SURVEY.

- 2. INSTALL ERCCS CABLES, EQUIPMENT, AND AUXILIARY MATERIALS AS INDICATED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, AND RECOGNIZED INDUSTRY PRACTICES.

A. CONTRACTOR SHALL PROVIDE CONDUIT PATHWAYS AS REQUIRED.

- 1. INSTALL J-HOOKS FOR CABLING ABOVE ACCESSIBLE CEILINGS OR NON-PUBLIC SPACES.
- 2. INSTALL CONDUIT PATHWAYS FOR NON-ACCESSIBLE CEILINGS AND IN PUBLIC AREAS THAT ARE OPEN TO STRUCTURE.
- 3. NO FASTENING CABLE TO CONDUITS, PIPING, EQUIPMENT, OR ANYTHING OTHER THAN CONTRACTOR INSTALLED CONDUIT PATHWAYS.

B. PROVIDE BACK BOXES PER MANUFACTURER'S REQUIREMENTS (SIZE AND TYPE).

- C. IDENTIFY ALL ERCCS CABLING UPON ENTERING AND EXISTING PRIMARY PATHWAYS VIA LABELING AND/OR CABLE STAMP. LABEL SHALL READ "ERCCS CABLE".

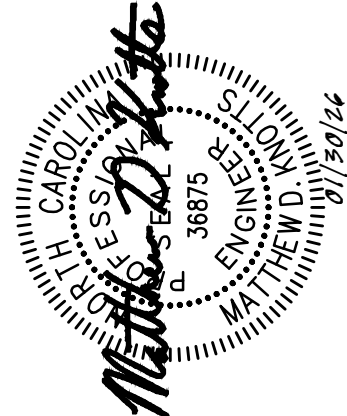
3. ERCCS REQUIREMENTS:

- A. INTENT SHALL BE THAT ALL INTERNAL AREAS OF THE BUILDING SHALL HAVE RADIO FREQUENCY COVERAGE SUCH THAT AN EMERGENCY RESPONDER'S (LOCAL POLICE, FIRE, OR EMS PERSONNEL) HAND-HELD RADIO WILL BE OPERATIONAL IN ALL AREAS OF THE BUILDING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THIS FULL COVERAGE ON ALL LEVELS AT ALL LOCATIONS INCLUDING MECHANICAL ROOMS, ETC. SYSTEM COMPONENTS MAY BE RELOCATED OR CHANGED, AND CABLE TYPES CHANGED AS NEEDED (FIBER OR COAXIAL CABLE) IF PRIOR COORDINATION HAS BEEN MADE WITH THE ENGINEER AND ARCHITECT. FINAL RESPONSIBILITY FOR COVERAGE WITHIN THE BUILDING WHICH SATISFIES THE LOCAL AUTHORITY HAVE JURISDICTION (AHJ), AND THE FIRE MARSHAL REMAINS WITH THE CONTRACTOR.
 - B. THE SYSTEM SHALL COMPLY WITH THE MINIMUM REQUIREMENTS OF UL60950 IN-BUILDING 2-WAY EMERGENCY RESPONSE COMMUNICATION COVERAGE SYSTEM, SECTION 510 OF THE 2021 INTERNATIONAL FIRE CODE.
 - C. ALL SIGNAL BOOSTERS AND OTHER ACTIVE SYSTEM COMPONENTS MUST HAVE FCC CERTIFICATION PRIOR TO INSTALLATION. THE EQUIPMENT'S FCC ID SHALL BE SHOWN ON THE PRODUCT DATASHEETS AND TECHNICAL SUBMITTALS. THE ID SHALL ALSO BE DISPLAYED ON THE PRODUCT AS REQUIRED BY THE FCC.
4. THE EMERGENCY RESPONDER COMMUNICATION COVERAGE ENHANCEMENT SYSTEM SHALL PROVIDE THE FOLLOWING SIGNAL STRENGTHS:
- 1. DOWNLINK - MINIMUM SIGNAL STRENGTH OF -95 DBM THROUGHOUT THE COVERAGE AREA.
 - 2. UPLINK - MINIMUM SIGNAL STRENGTH OF -95 DBM RECEIVED AT THE AHJ RADIO SYSTEM.
5. THE SIGNAL BOOSTER SHALL BE A CLASS B PUBLIC SAFETY TYPE AS DESIGNATED BY THE FCC OR AS REQUIRED BY THE AHJ.
6. ACCEPTANCE AND TEST PROCEDURES
- A. ACCEPTANCE TESTING FOR AN IN-BUILDING RADIO SYSTEM IS REQUIRED UPON COMPLETION OF INSTALLATION.
 - B. THE COVERAGE TESTING SHALL BE DONE IN ACCORDANCE WITH NFPA 72, IFC AND AS REQUIRED BY THE LOCAL AHJ.
 - C. ALL TEST RECORDS SHALL BE SUBMITTED PRIOR TO FINAL INSPECTION BY THE FIRE MARSHAL, AND AS REQUIRED BY THE AHJ.

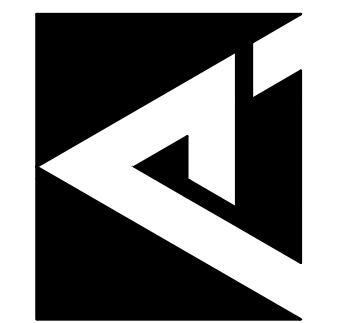
3.2. COMMISSIONING

- 1. THE CONTRACTOR SHALL COORDINATE A DATE AND TIME AFTER THE SYSTEM IS FULLY OPERATIONAL AND PRIOR TO SUBSTANTIAL COMPLETION TO PROVIDE A FULL SYSTEM DEMONSTRATION WITH THE OWNER, FIRE MARSHAL AND AHJ. THE DEMONSTRATION SHALL INCLUDE ALL SYSTEM OPERATION ASPECTS THAT THE OWNER MIGHT ENCOUNTER.

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