

# SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA

## ARCHITECTURAL

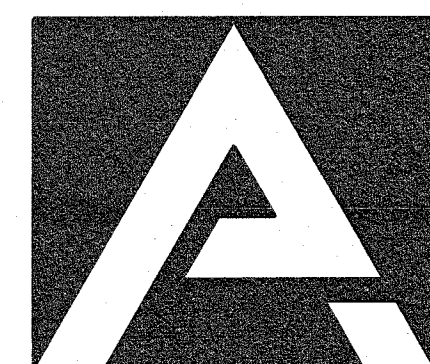
A100 COVER SHEET  
A101 APPENDIX "B" & CODE DATA  
A200 OVERALL DEMOLITION PLANS  
A201 EXISTING CONDITIONS - EXTERIOR PHOTOS  
A300 OVERALL FLOOR PLANS  
A301 EXTERIOR ELEVATIONS  
A302 WALL SECTIONS  
A303 WINDOW STYLES, NOTES & DETAILS

## MECHANICAL

M200 MECHANICAL PLAN - AREA A (DEMOLITION)  
M201 MECHANICAL PLAN - AREA B (DEMOLITION)  
M202 MECHANICAL PLAN - AREA C (DEMOLITION)  
M203 MECHANICAL PLAN - AREA D (DEMOLITION)  
M204 MECHANICAL PLAN - AREA E (DEMOLITION)  
M205 MECHANICAL PLAN - AREA F (DEMOLITION)  
M206 FLOOR PLAN - AREA A  
M207 FLOOR PLAN - AREA B  
M208 FLOOR PLANS - AREA C & D  
M209 FLOOR PLANS - AREA E & F  
M210 2nd FLOOR PLAN - AREA C  
M211 ENLARGED MECHANICAL AND BOILER ROOM  
M300 MECHANICAL DETAILS  
M301 MECHANICAL DETAILS  
M400 MECHANICAL SCHEDULES  
M401 MECHANICAL SCHEDULES  
M500 CONTROLS

## ELECTRICAL

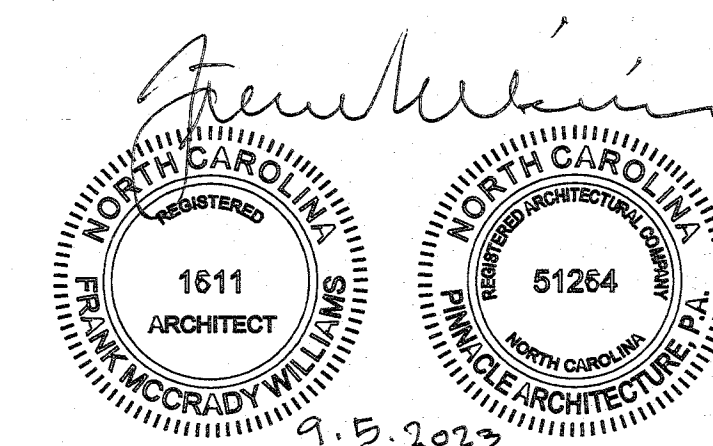
E100 SYMBOLS AND SCHEDULES  
E201 FLOOR PLAN - AREA A - LIGHTING  
E202 FLOOR PLAN - AREA B - LIGHTING  
E203 FLOOR PLANS - AREA C & D - LIGHTING  
E204 FLOOR PLANS - AREA E & F - LIGHTING  
E205 2nd FLOOR PLAN - AREA C - LIGHTING  
E301 FLOOR PLAN - AREA A - POWER  
E302 FLOOR PLAN - AREA B - POWER  
E303 FLOOR PLANS - AREA C & D - POWER  
E304 FLOOR PLANS - AREA E & F - POWER  
E305 2nd FLOOR PLAN - AREA C - POWER  
E400 SPECIFICATIONS  
E401 SPECIFICATIONS  
E402 SPECIFICATIONS  
E403 SPECIFICATIONS



**PINNACLE ARCHITECTURE**  
PROFESSIONAL ASSOCIATION

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REVISION SCHEDULE	
DATE	REFERENCE

ISSUE DATE: 04.05.2023

A100



**APPENDIX B  
2018 BUILDING CODE SUMMARY  
FOR ALL COMMERCIAL PROJECTS**  
(Except 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)  
(Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: SOUTHERN WAYNE HIGH SCHOOL - RENOVATIONS  
Address: 124 WALTER FULCHER ROAD, DUDLEY, NC Zip Code: 28333  
Owner/Authorized Agent: RANDY BANKS Phone: (704) 511-0122 E-Mail: randy@pinnaclearchitect.com  
Owned By:  City/County  Private  State  
Code Enforcement Jurisdiction:  City  County  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	joshe@pinnaclearchitect.com
Civil	N/A				
Electrical	MSNG ENGINEERS, INC.	MATTHEW D. KNOTTS	88875	(704) 521-2112	mattheu@msng.com
Fire Alarm	N/A				
Plumbing	N/A				
Mechanical	MSNG ENGINEERS	J. CRAIG CHAMPION	11250	(704) 521-2112	cchampion@msng.com
Sprinkler-standpipe	N/A				
Structural	N/A				
Retaining Walls/High	N/A				
Other	N/A				

(\*Other should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)

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

CURRENT OCCUPANCY(S) (Ch. 3): EDUCATIONAL  
PROPOSED OCCUPANCY(S) (Ch. 3): EDUCATIONAL

CONSTRUCTED: (date) 1984  
RENOVATED: (date) N/A

RISK CATEGORY (Table 1604.5): Current:  I  II  III  IV  
Proposed:  I  II  III  IV

**BUILDING DATA**  
(check all that apply)

Construction Type:  I-A  I-B  II-A  II-B  III-A  III-B  IV  V-A  V-B

Sprinklers:  No  Partial  YES  NFPA 13  NFPA 19R  NFPA 13D

Standpipes:  No  YES  Class  II  III  IV  V

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			
Basement			
TOTAL			

**ALLOWABLE AREA**

Primary Occupancy Classification(s):  
 Assembly  A-1  A-2  A-3  A-4  A-5  
 Business  
 Educational  
 Factory  F-1 Moderate  F-2 Low  H-3 Combust  H-4 Health  H-5 HPM  
 Hazardous  H-1 Detonate  H-2 Deflagrate  
 Institutional  I-1  I-2  I-3  I-4  
 I-1 Condition  1  2  
 I-2 Condition  1  2  
 I-3 Condition  1  2  3  4  5  
 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):  
 Incidental Uses (Table 504):  
 This separation is not exempt as a Non-separated use (see exceptions).  
 Special Uses (Chapter 4 - List Code Sections):  
 Special Provisions (Chapter 5 - List Code Sections):  
 Mixed Occupancy:  No  Yes Separation: \_\_\_\_\_ Hr. Exception: \_\_\_\_\_  
 Non-separated Use (508.3) - 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.  
 Separated Use (508.4) - 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

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

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.2 AREA	(C) AREA FOR FRONTAGE INCREASE 1, 2	(D) ALLOWABLE AREA PER STORY OR UNLIMITED 3

1 Frontage area increases from Section 506.2 are computed thus:  
 a. Perimeter which fronts a public way or open space having 20 feet minimum width = \_\_\_\_\_ (F)  
 b. Total Building Perimeter = \_\_\_\_\_ (P)  
 c. Ratio (F/P) = \_\_\_\_\_ (F/P)  
 d. W = Minimum width of public way = \_\_\_\_\_ (W)  
 e. Percent of frontage increase 1 = 100 (F/P - 0.25) x W/30 = \_\_\_\_\_ (%)  
 2 Unlimited area applicable under conditions of Sections 507  
 3 Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2)  
 4 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  
 5 Frontage increase is based on the unspinkered area value in Table 506.2

**ALLOWABLE HEIGHT EXISTING - NO CHANGE**

Building Height in Feet (Table 504.5)	ALLOWABLE	SHOWN ON PLANS	CODE REFERENCE
Building Height in Stories (Table 504.4)			

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

**FIRE PROTECTION REQUIREMENTS EXISTING - NO CHANGE**

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATINGS		DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR PENETRATION	SHEET # FOR RATED JOINTS
		REG'D	PROV'D (IV - REDUCTION)				
Structural Frame including columns, girders, trusses							
Bearing Walls							
Exterior							
North							
East							
West							
South							
Interior							
Nonbearing walls and partitions							
Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction including supporting beams and joists							
Floor Ceiling Assembly							
Columns Supporting Floors							
Roof Construction including supporting beams and joists							
Roof Ceiling Assembly							
Columns Supporting Roof							
Shaft Enclosures - Exit							
Shaft Enclosures - Other							
Corridor Separation							
Occupancy/Fire Barrier Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Smoke Partition							
Tenant/Dwelling Unit/Sleeping Unit Separation							
Incidental Use Separation							

\* Indicate section number permitting reduction

**EXISTING - NO CHANGE**

FIRE SEPARATION DISTANCE (FEET) FROM PROPERTY LINES	DEGREE OF OPENINGS PROTECTION (TABLE 705.6)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)

**LIFE SAFETY SYSTEM REQUIREMENTS EXISTING - NO CHANGE**

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

**LIFE SAFETY PLAN REQUIREMENTS EXISTING - NO CHANGE**

Life Safety Plan Sheet # \_\_\_\_\_

- Fire and/or smoke rated wall locations (Chapter 7)
- Assumed and real property line locations (if not on the site plan)
- Exterior wall opening areas with respect to distance to assumed property lines (705.6)
- Occupancy use for each area as it relates to occupant load calculation (Table 1004.1.2)
- Occupant load for each area
- Exit access travel distances (1017)
- 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 (1009.3)
- 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 (1010.1.9.7)
- Location of doors with electromagnetic egress locks (1010.1.9.4)
- Location of doors equipped with hold-open devices
- Location of emergency escape windows (1030)
- 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	TYPE A UNITS	TYPE B UNITS	TOTAL ACCESSIBLE UNITS
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
		REGULAR WITH # ACCESSIBLE	VAN SPACES WITH # ACCESSIBLE	REGULAR WITH # ACCESSIBLE	REGULAR WITH # ACCESSIBLE	
TOTAL						

**PLUMBING FIXTURE REQUIREMENTS (TABLE 2402.1)**

USE	WATER CLOSETS			URINALS			LAVATORIES			SHOWERS/TUBS			DRINKING FOUNTAINS		
	MALE	FEMALE	UNSEX	MALE	FEMALE	UNSEX	MALE	FEMALE	UNSEX	MALE	FEMALE	UNSEX	REGULAR	ACCESSIBLE	
EXISTING															
REQUIRED															
EXISTING															
REQUIRED															

\* URINALS SUBSTITUTED FOR WATER CLOSETS PER SECTION 403.9.3.5 OF NCBCFC  
 \*\* URINALS SUBSTITUTED FOR WATER CLOSETS PER SECTION 414.2 OF NCBCFC (EDUCATIONAL / ALL OTHER OCCUPANCIES)

**SPECIAL APPROVALS**

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

**ENERGY REQUIREMENTS EXISTING - NO CHANGE**

**ENERGY REQUIREMENTS:**  
 The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data 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): 2018 NCEBC 100.1

Climate zone:  3A  4A  5A

Method of Compliance:  Performance  Prescriptive  
 ASHRAE 90.1:  Performance  Prescriptive  
 Other:  Performance (specify source)

**THERMAL ENVELOPE (Prescriptive method only)**

Roof/Ceiling Assembly (each assembly)  
 Description of assembly: \_\_\_\_\_  
 U-value of total assembly: \_\_\_\_\_  
 R-value of insulation: \_\_\_\_\_  
 Skylights in each assembly: \_\_\_\_\_  
 U-value of skylight: \_\_\_\_\_  
 Total square footage of skylights in each assembly: \_\_\_\_\_

Exterior Walls (each assembly)  
 Description of assembly: \_\_\_\_\_  
 U-value of total assembly: \_\_\_\_\_  
 R-value of insulation: \_\_\_\_\_  
 U-value of assembly: \_\_\_\_\_  
 Solar heat gain coefficient: \_\_\_\_\_  
 projection factor: \_\_\_\_\_  
 Door R-value: \_\_\_\_\_

Walls below grade (each assembly)  
 Description of assembly: \_\_\_\_\_  
 U-value of total assembly: \_\_\_\_\_  
 R-value of insulation: \_\_\_\_\_

Floors over unconditioned space (each assembly)  
 Description of assembly: \_\_\_\_\_  
 U-value of total assembly: \_\_\_\_\_  
 R-value of insulation: \_\_\_\_\_

Floors slab on grade  
 Description of assembly: \_\_\_\_\_  
 U-value of total assembly: \_\_\_\_\_  
 R-value of insulation: \_\_\_\_\_  
 Horizontal/vertical requirement: \_\_\_\_\_  
 See notes:

**EXIT REQUIREMENTS NUMBER AND ARRANGEMENTS OF EXITS**

FLOOR ROOM OR SPACE DESIGNATION	MINIMUM NUMBER OF EXITS	TRAVEL DISTANCE	EXIT ACCESS DOORWAY CONFIGURATION 2 (SECTION 1001.1)	
			REQUIRED DISTANCE BETWEEN EXITS	ACTUAL DISTANCE SHOWN ON PLANS

**EXIT WIDTH**

USE GROUP OR SPACE DESCRIPTION	AREA 1 SQ. FT.	AREA PER OCCUPANT (TABLE 1004.1.2)	CALCULATED OCCUPANT LOAD (4-1)	EGRESS WIDTH PER OCCUPANT (1009.3)		REQUIRED WIDTH (4-1) x 6		ACTUAL WIDTH SHOWN ON PLANS	
				STAIR LEVEL	STAIR LEVEL	STAIR LEVEL	STAIR LEVEL		

1 Corridor dead ends (Section 1020.4)  
 2 Stairways with single exits (Table 1006.3.2(2)); Spaces with one means of egress (Table 1006.2.1)  
 3 Common Path of Travel (Section 1006.2.1)

**DESIGN LOADS:**  
 Importance Factors: Snow (I<sub>s</sub>) 1.1  
 Seismic (I<sub>s</sub>) 1.25

Live Loads: Roof 20 psf  
 Mezzanine N/A psf  
 Floor 100 psf

Ground Snow Load: 10 psf

Wind Load: Ultimate Wind Speed 132 mph (ASCE-7)  
 Exposure Category C

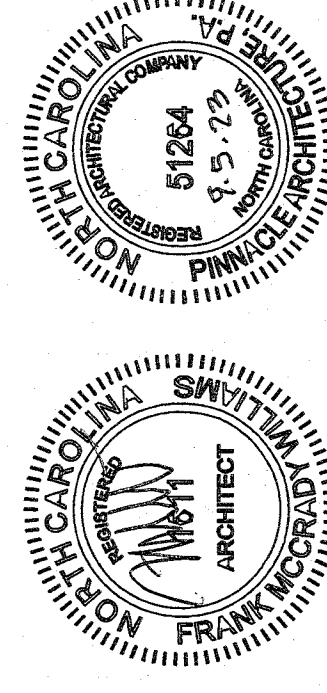
**SEISMIC DESIGN CATEGORY**  A  B  C  D  
 Provide the following Seismic Design Parameters:  
 Risk Category (Table 1604.5)  I  II  III  IV  
 Spectral Response Acceleration S<sub>s</sub> 0.16 g<sub>s</sub> S<sub>1</sub> 0.16 g<sub>s</sub>  
 Site Classification (ASCE 7)  A  B  C  D  E  F  
 Data Source:  Field Test  Presumptive  Historical Data

**Basic structural system**  
 Bearing Wall  Dual w/Special Moment Frame  
 Building Frame  Dual w/Intermediate R/C or Special Steel  
 Moment Frame  Inverted Pendulum

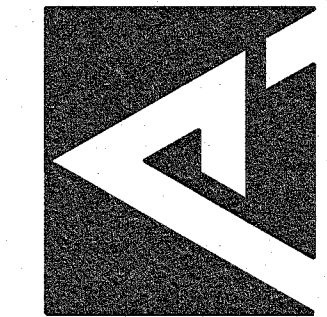
Analysis Procedure  Simplified  Equivalent Lateral Force  Dynamic  
 Architectural, Mechanical, Components anchored?  Yes  No

**LATERAL DESIGN CONTROL:**  Earthquake  Wind

**SOIL BEARING CAPACITIES:**  
 Field Test (provide copy of test report) \_\_\_\_\_ psf  
 Presumptive Bearing capacity 2,000 psf  
 Pile size, type, and capacity \_\_\_\_\_



**PINNACLE ARCHITECTURE PROFESSIONAL ASSOCIATION**  
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 PH: (704) 847-9851 FAX: (704) 847-9853



ISSUE DATE: 04.08.2023  
 DRAWN BY: JLR/JR  
 CHECKED BY: PWW/PBB  
 PROJECT: 2216

**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA**  
**APPENDIX "B" - CODE DATA**

**REVISION SCHEDULE**

NO.	DATE	REFERENCE



**TYPICAL SELECTIVE DEMOLITION NOTES:**  
(RESPONSIBILITY OF THE GENERAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE)

1. REMOVE AND LEGALLY DISPOSE OF ITEMS EXCEPT THOSE AS INDICATED FOR REUSE.
2. ITEMS NOTED AS SALVAGE ARE TO REMAIN THE PROPERTY OF THE OWNER.
3. ITEMS NOTED FOR REMOVAL AND REINSTALLATION ARE TO BE CLEANED AND REPAIRED TO AS LIKE NEW CONDITION.
4. PROTECT ALL ITEMS AND REMAINING CONSTRUCTION AGAINST DAMAGE.
5. THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS WILL COMPLY WITH ALL GOVERNING EPA REGULATIONS (IE LEAD ASBESTOS, ETC.) AT ALL TIMES.
6. IF OWNER IS OCCUPYING PORTIONS OF THE EXISTING BUILDING ADJACENT TO SELECTIVE DEMOLITION AND NEW CONSTRUCTION ALL WORK WILL BE CARRIED OUT AS TO NOT DISRUPT THE OWNERS OPERATIONS. THE G.C. WILL PROVIDE 12 HOURS NOTICE TO BOTH THE OWNER AND ARCHITECT WITH ANY ACTIVITIES AFFECTING OWNER OPERATION.
7. RESTORE EXPOSED FINISHES OF PATCHED AREAS EXTENDING FINISH RESTORATION TO ADJOINING CONSTRUCTION IN A MANNER TO ELIMINATE EVIDENCE OF CUTTING AND PATCHING.
8. PATCH AND REPAIR FLOOR AND WALL SURFACES TO PROVIDE A FLUSH AND EVEN SURFACE.
9. USE ONLY MATERIALS WHEN INSTALLED THAT EQUAL OR SURPASS THE PERFORMANCE OF THOSE EXISTING.
10. PRIOR TO SELECTIVE DEMOLITION THE G.C. WILL VERIFY THAT ALL EXISTING UTILITIES HAVE BEEN CAFFED OR DISCONTINUED AS INDICATED.
11. G.C. TO PROVIDE AND MAINTAIN BRACING AND SHORING FOR STRUCTURAL SUPPORT TO MAINTAIN STABILITY AND PREVENT MOVEMENT, SETTLEMENT OR COLLAPSE OF ADJACENT REMAINING STRUCTURES.
12. REMOVE EXISTING CONSTRUCTION ONLY TO THE EXTENTS AS REQUIRED FOR NEW CONSTRUCTION.
13. SYSTEMATICALLY PROCEED WITH SELECTIVE DEMOLITION FROM HIGH TO LOW.
14. CUT ALL NEW OPENINGS NEAT, PLUMB, SQUARE, AND TRUE TO REQUIRED DIMENSIONS.
15. ALL DEMOLITION EQUIPMENT TO BE LOCATED SO AS NOT TO IMPOSE EXCESSIVE LOADS ON SUPPORTING FRAMING, WALL, OR FLOORS.
16. REMOVE, DRAIN, COLLECT, PURGE, AND DISPOSE OF ALL DANGEROUS MATERIALS PRIOR TO SELECTIVE DEMOLITION.
17. CONTRACTOR PRIOR TO DEMO SHALL NOTIFY ARCHITECT OF ANY LOAD BEARING PARTITION(S), COLUMN(S), ETC. INDICATED TO BE DEMOLISHED.

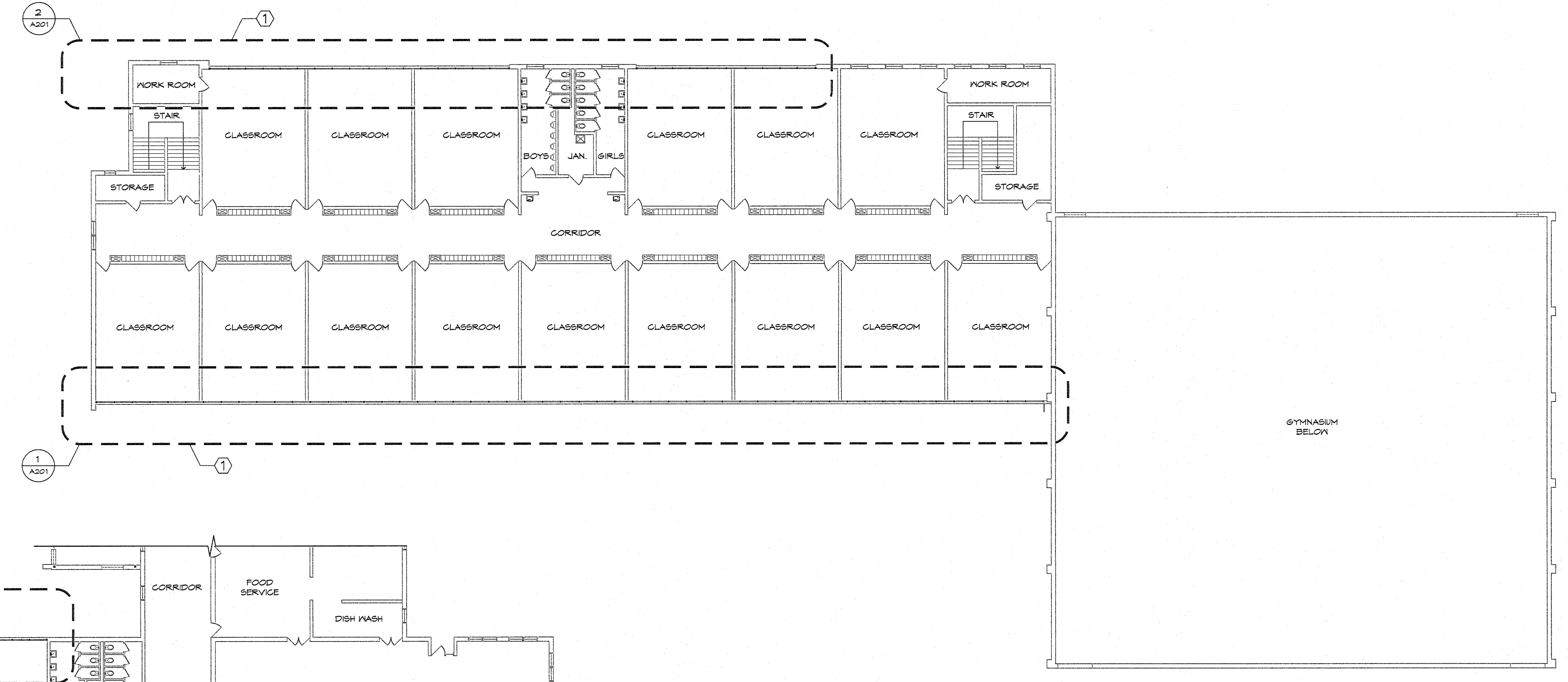
**DEMOLITION PLAN NOTES:**  
(RESPONSIBILITY OF THE GENERAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE)

1. REMOVE EXISTING WINDOW OPAQUE PANEL CURTAIN WALL(S) AS INDICATED BY LETTERING: (A) - CLEAN AND REPAIR OPENING AND ADJACENT WALLS TO ORIGINAL (AS NEW) CONDITION IN PREPARATION FOR NEW WINDOW OPAQUE PANEL CURTAIN WALL.

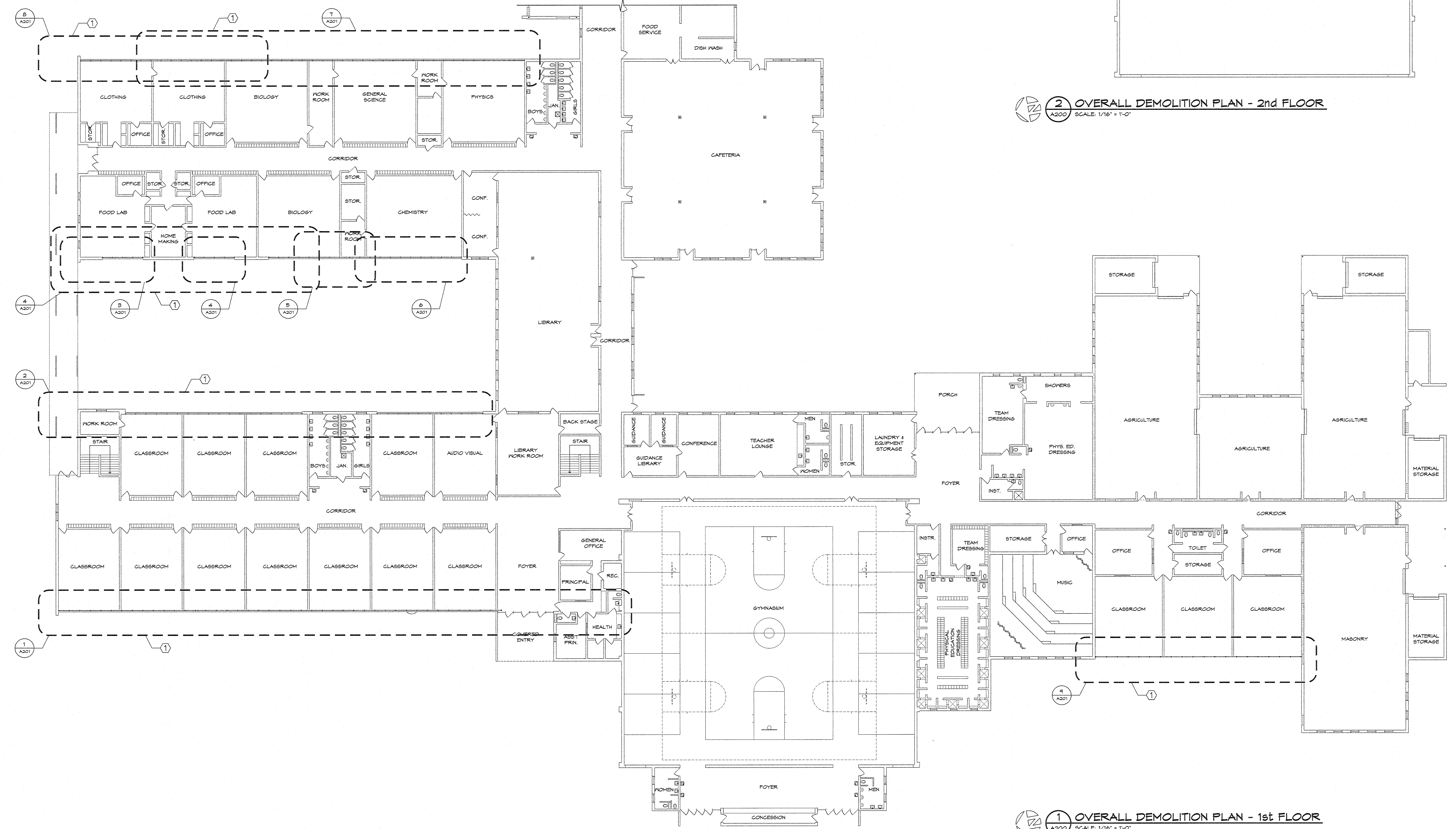
**NOTES FOR GENERAL CONTRACTOR:**

GENERAL CONTRACTOR IS RESPONSIBLE FOR TOTAL COMPLIANCE WITH THE RENOVATION, REPAIR AND PAINTING RULE (RRP RULE) FINALIZED IN APRIL 2008 UNDER THE RESIDENTIAL LEAD-BASED PAINT HAZARD REDUCTION ACT OF 1992. REFER TO [WWW.EPA.GOV/LEAD](http://www.epa.gov/lead) FOR ADDITIONAL INFORMATION.

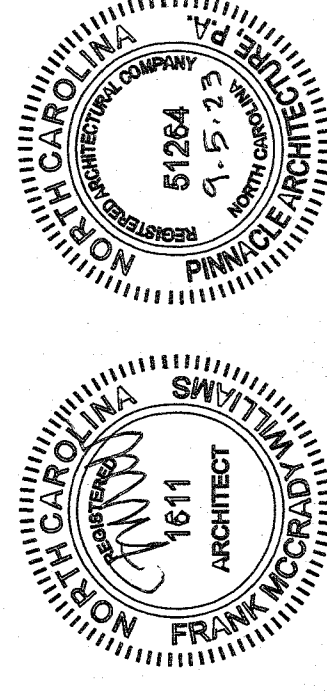
THE ARCHITECT HAS ENDEAVORED TO LOCATE AND NOTE ALL ITEMS NEEDING TO BE DEMOLISHED AND REMOVED FOR THE PURPOSE OF THE PLACEMENT OF RENOVATED OR NEW CONSTRUCTION. THIS DOES NOT RELIEVE THE GENERAL CONTRACTOR FROM HIS RESPONSIBILITY TO THOROUGHLY FAMILIARIZE HIMSELF WITH THE DEMOLITION PHASE OF THIS PROJECT. ANY ITEM NOT SHOWN AND/OR NOTED HEREIN WILL BE REMOVED AT NO ADDITIONAL PROJECT COST.



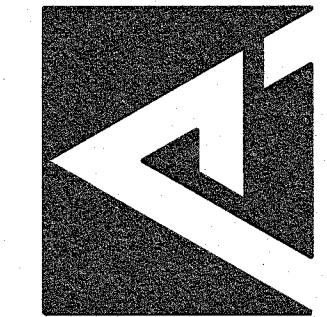
**2 OVERALL DEMOLITION PLAN - 2nd FLOOR**  
A200 SCALE: 1/16" = 1'-0"



**1 OVERALL DEMOLITION PLAN - 1st FLOOR**  
A200 SCALE: 1/16" = 1'-0"



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ISSUE DATE: 04.05.2023  
DRAWN BY: JAV/JR  
CHECKED BY: FAW/REB  
PROJECT: 2216

**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA**  
OVERALL DEMOLITION PLANS

REVISION SCHEDULE

NO.	DATE	REFERENCE

**A200**

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



1/16/2025 10:58:00 AM C:\Users\jw\OneDrive\Documents\Projects\Southern Wayne High School Renovations\DWG\A201 - EXTERIOR PHOTOS.dwg



1 EXISTING CONDITION  
A201 SCALE: NO SCALE



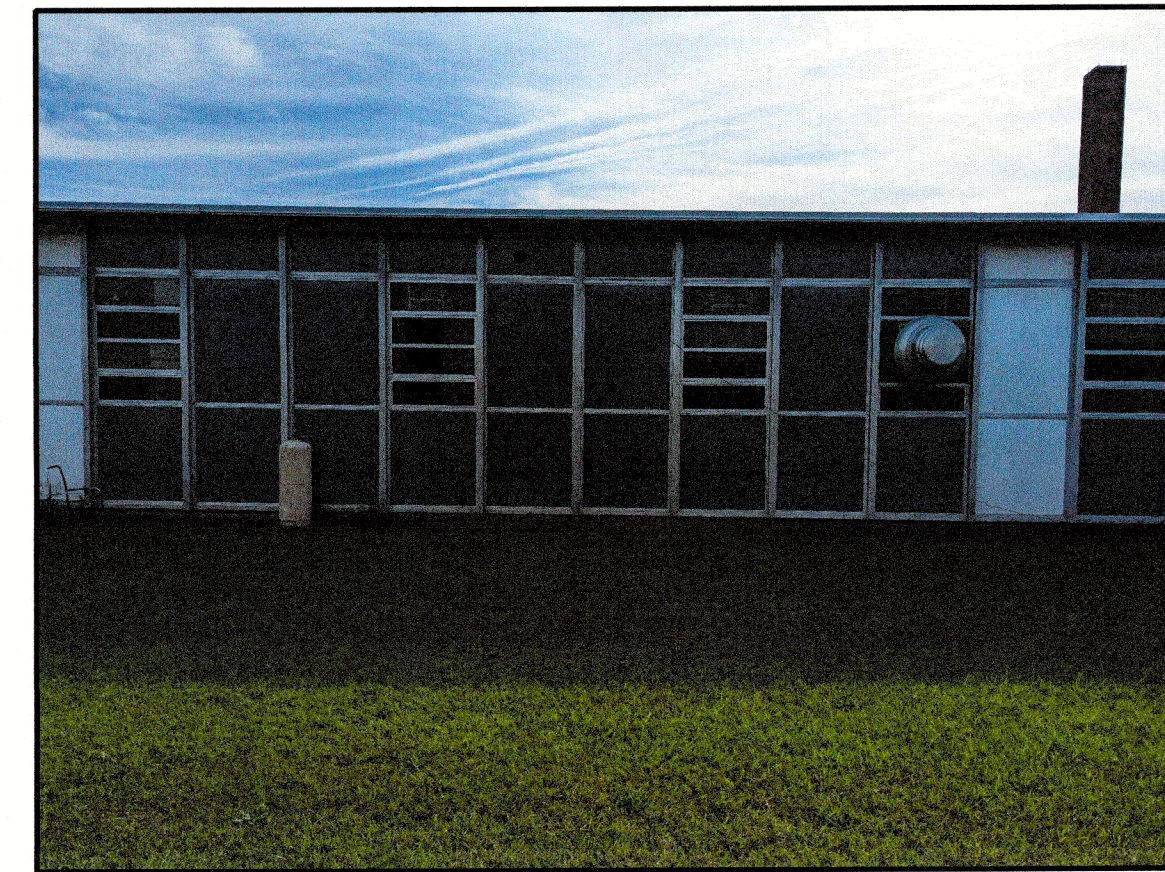
2 EXISTING CONDITION  
A201 SCALE: NO SCALE



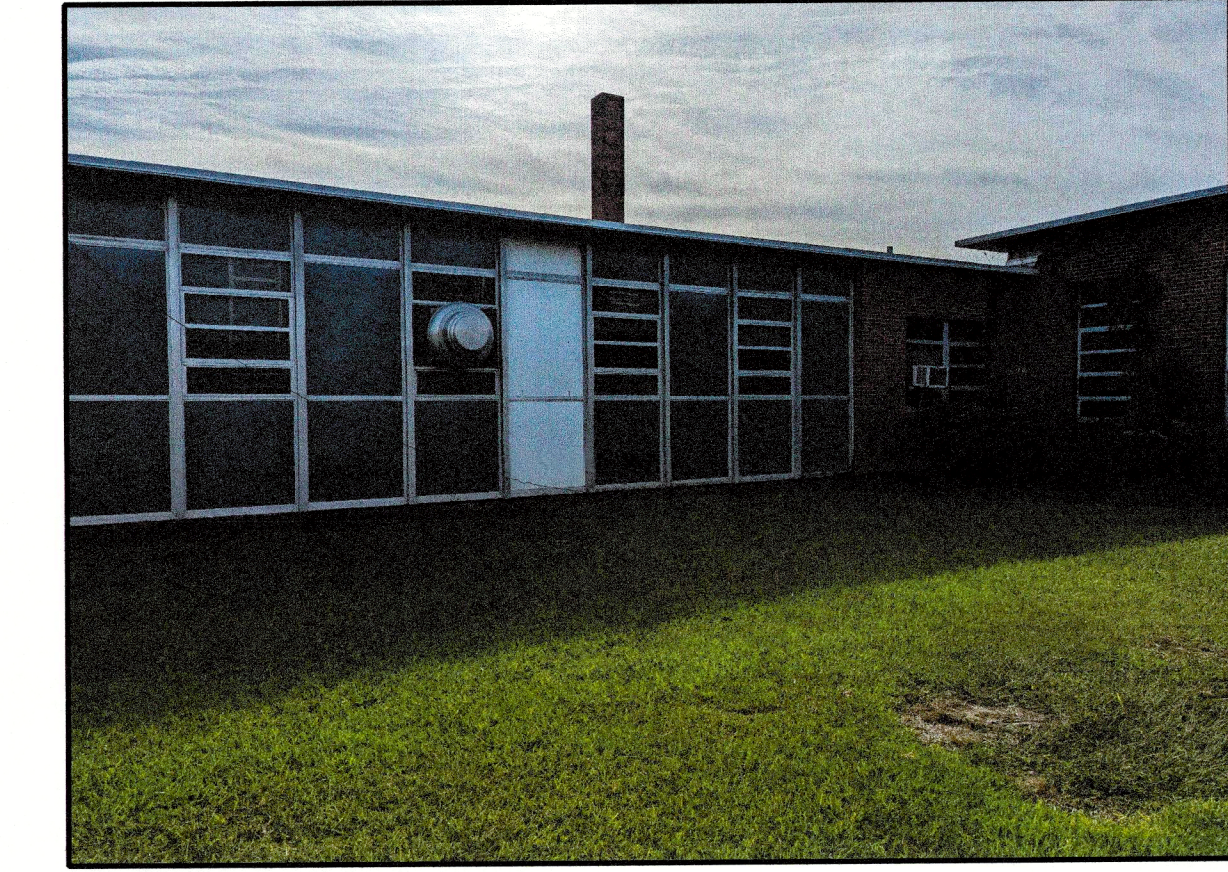
3 EXISTING CONDITION  
A201 SCALE: NO SCALE



4 EXISTING CONDITION  
A201 SCALE: NO SCALE



5 EXISTING CONDITION  
A201 SCALE: NO SCALE



6 EXISTING CONDITION  
A201 SCALE: NO SCALE



7 EXISTING CONDITION  
A201 SCALE: NO SCALE



8 EXISTING CONDITION  
A201 SCALE: NO SCALE



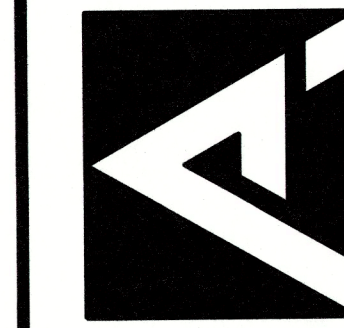
9 EXISTING CONDITION  
A201 SCALE: NO SCALE

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SOUTHERN WAYNE HIGH SCHOOL  
RENOVATIONS  
DUDLEY, NORTH CAROLINA  
EXISTING CONDITIONS - EXTERIOR PHOTOS

REVISION SCHEDULE	
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CHECKED BY: FFW/REB  
PROJECT: 2216

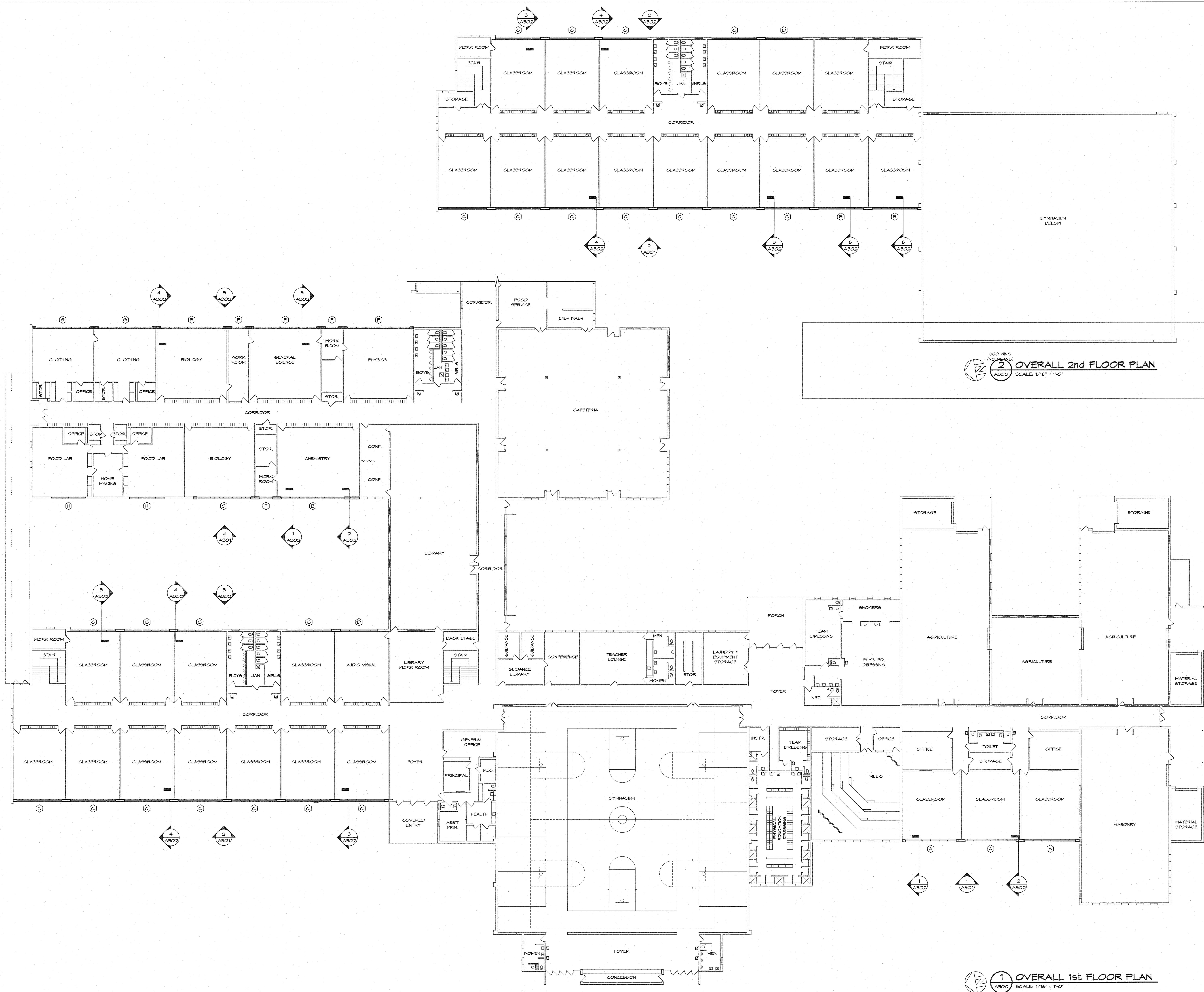



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701 EAST BAY STREET, SUITE 302  
CHARLESTON, SOUTH CAROLINA 29403  
PH: (843) 872-5345 FAX: (843) 872-5374

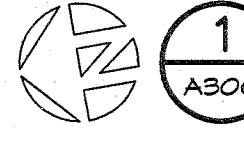
CONTRACTOR TO VERIFY ALL DIMENSIONS



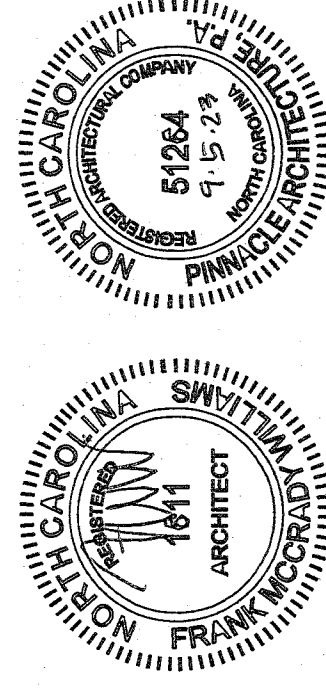




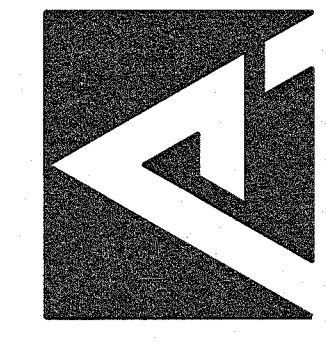

**2 OVERALL 2nd FLOOR PLAN**  
 SCALE: 1/16" = 1'-0"


**1 OVERALL 1st FLOOR PLAN**  
 SCALE: 1/16" = 1'-0"

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**SOUTHERN WAYNE HIGH SCHOOL**  
**RENOVATIONS**  
**DUDLEY, NORTH CAROLINA**  
**OVERALL FLOOR PLANS**  
**NEW WORK**

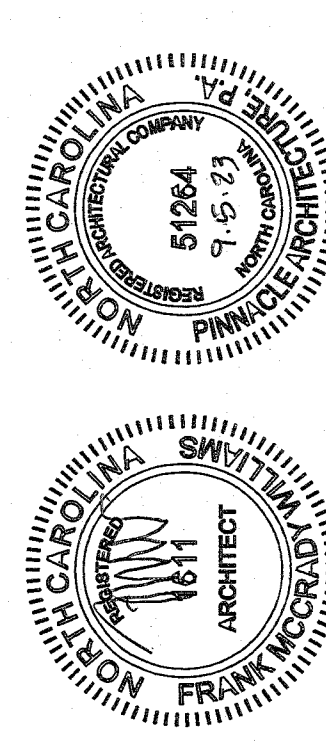
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NO.	DATE	REFERENCE

**A300**

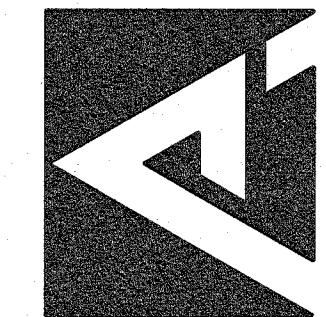








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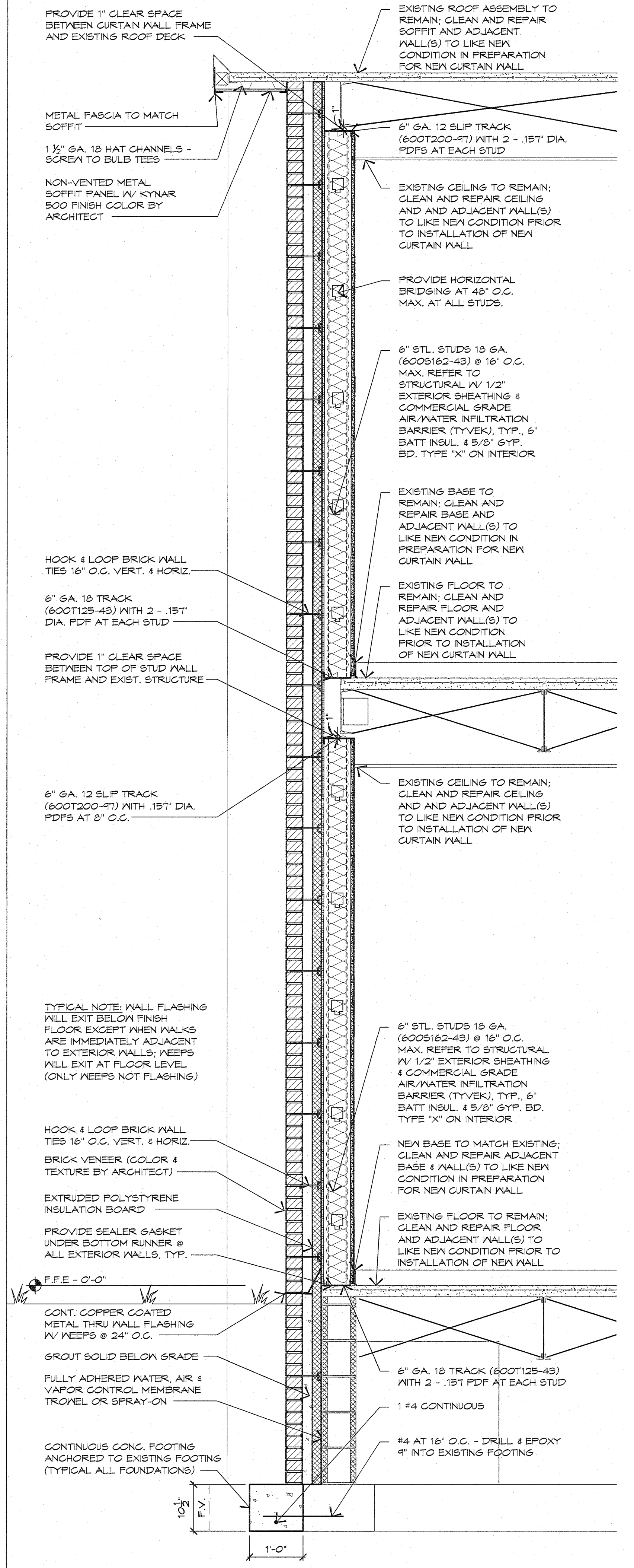
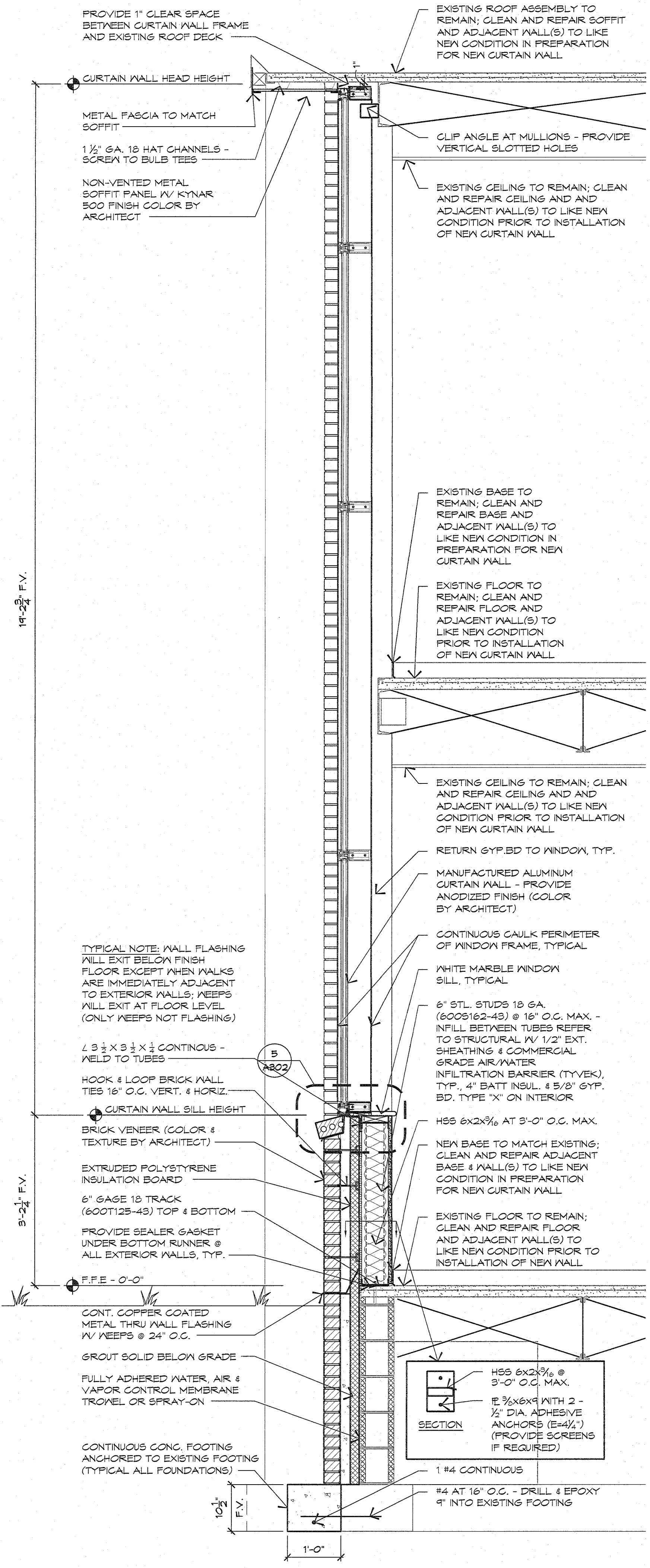
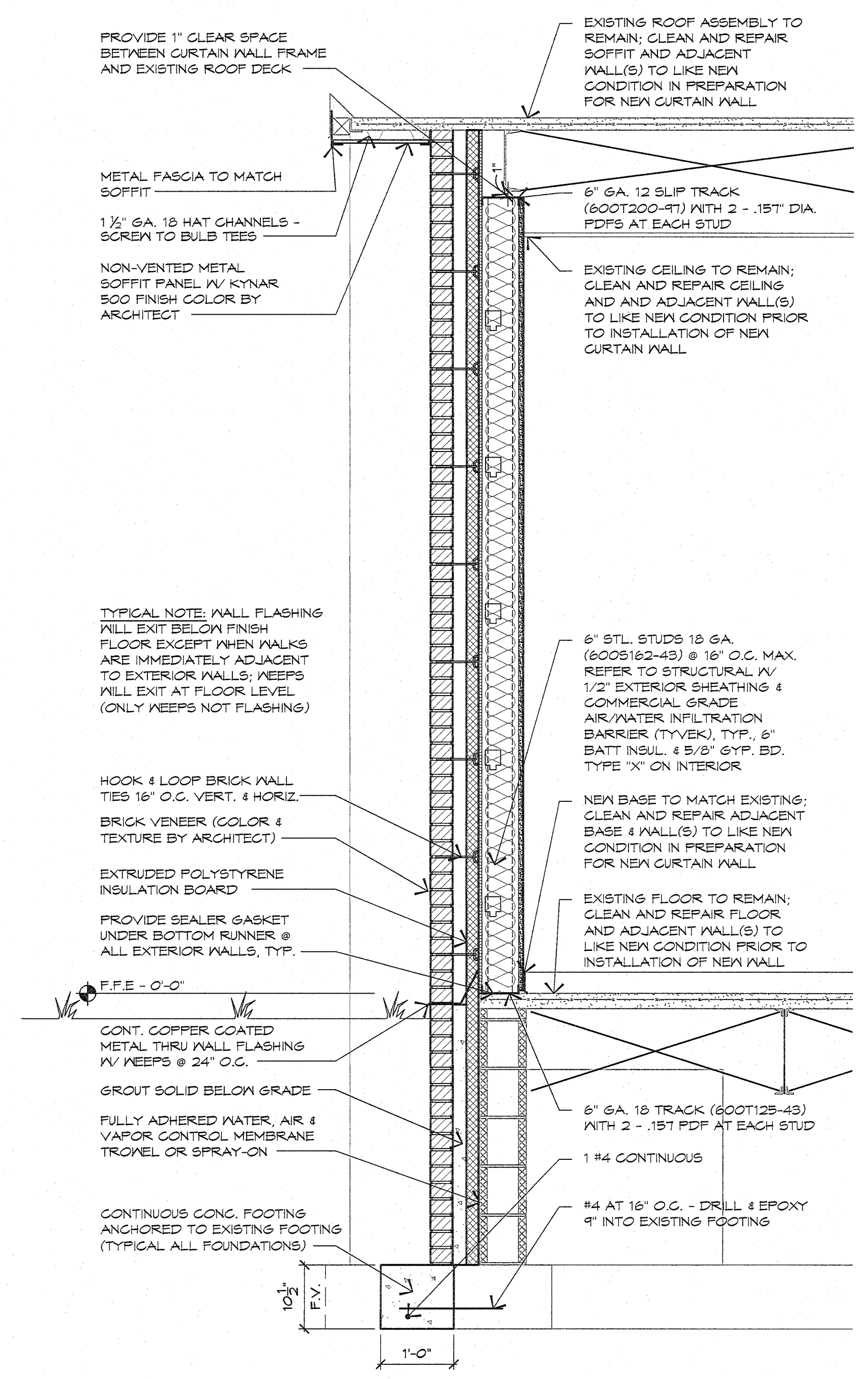
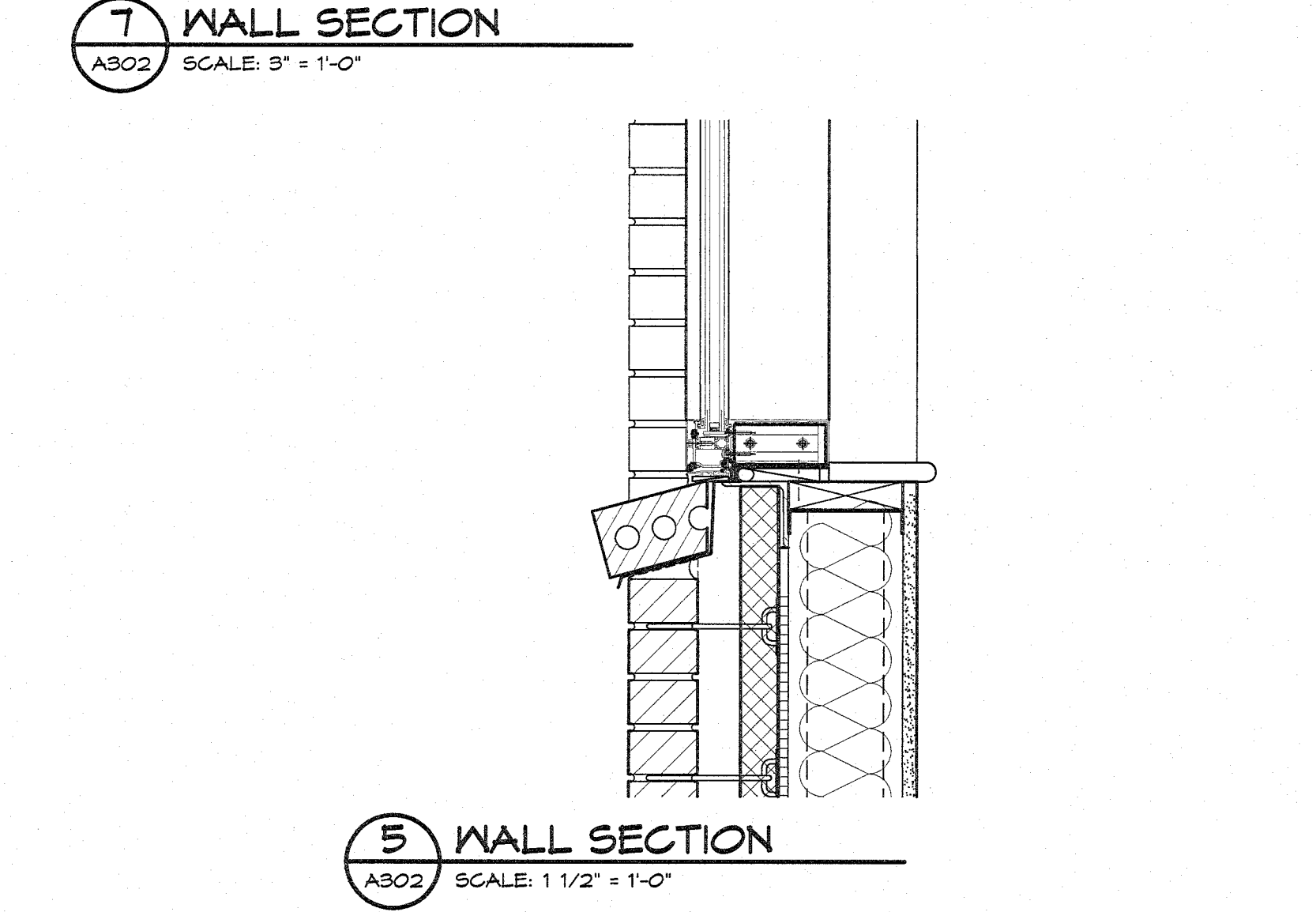
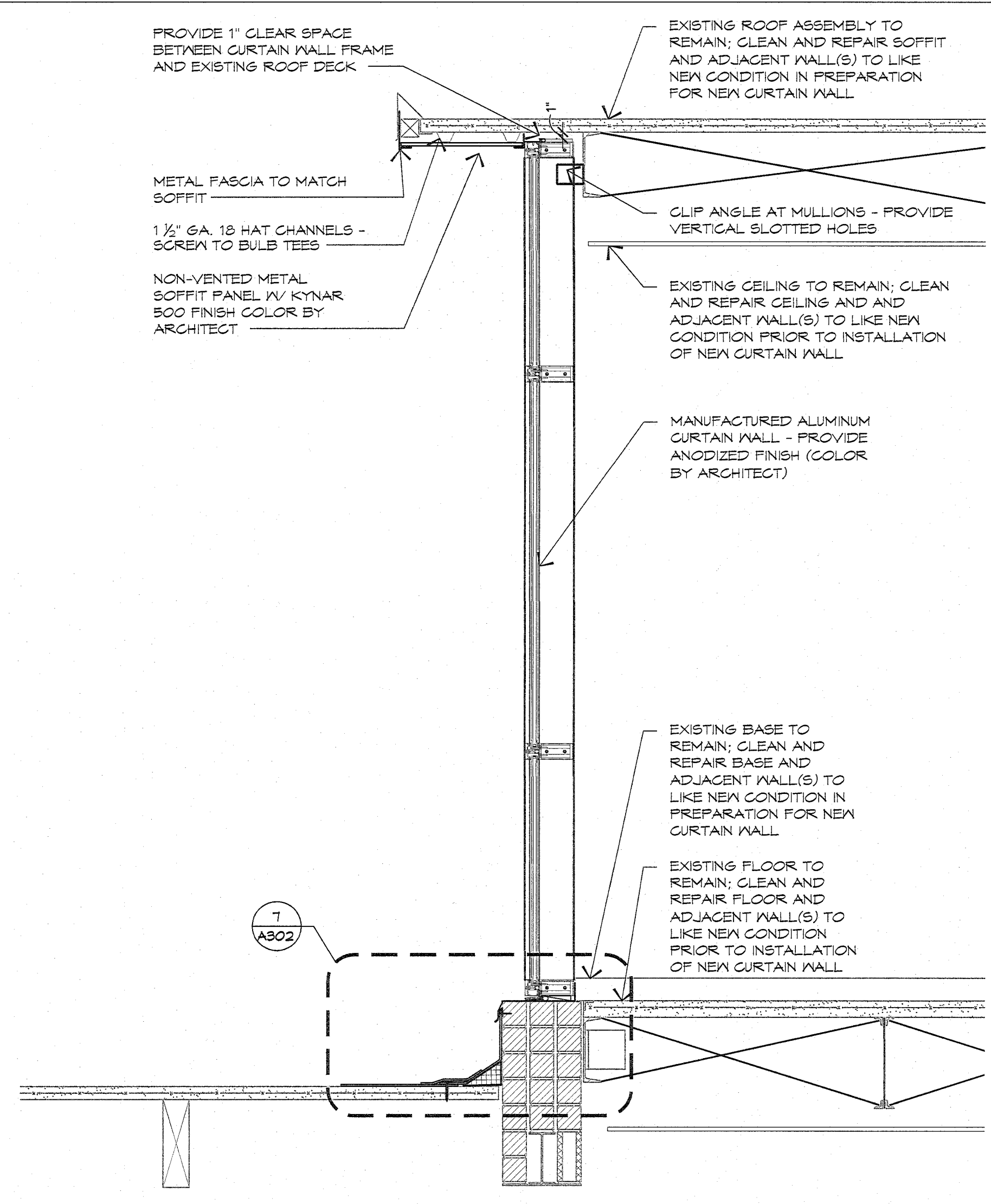
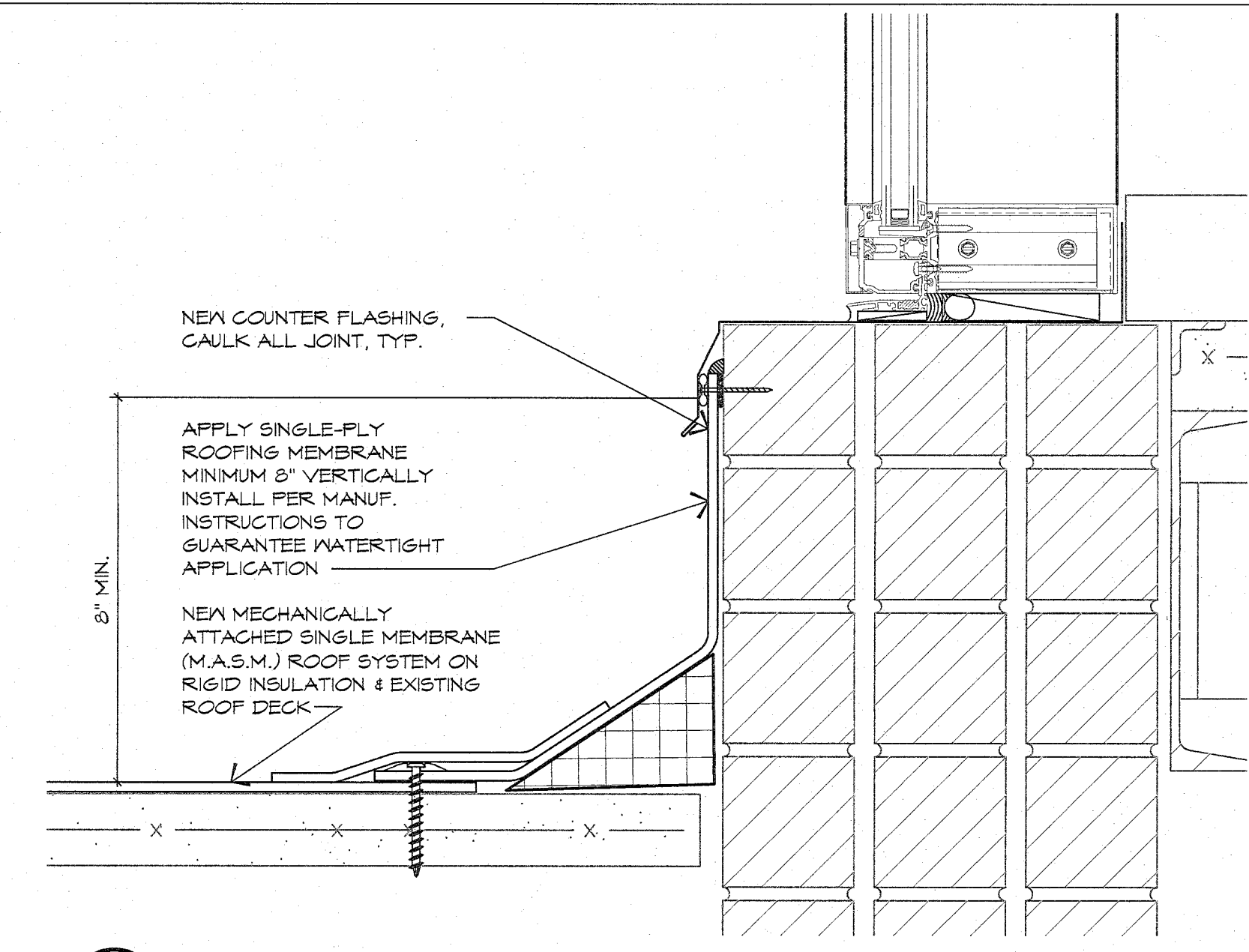


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**SOUTHERN WAYNE HIGH SCHOOL**  
**RENOVATIONS**  
**DUDLEY, NORTH CAROLINA**  
 WALL SECTIONS  
 NEW WORK

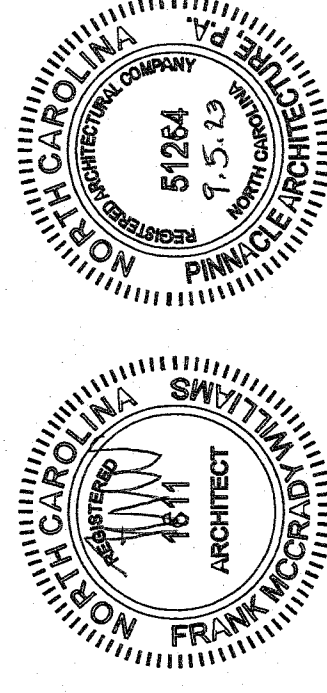
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**A302**



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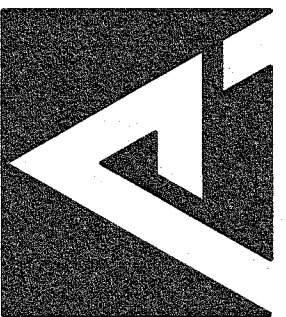


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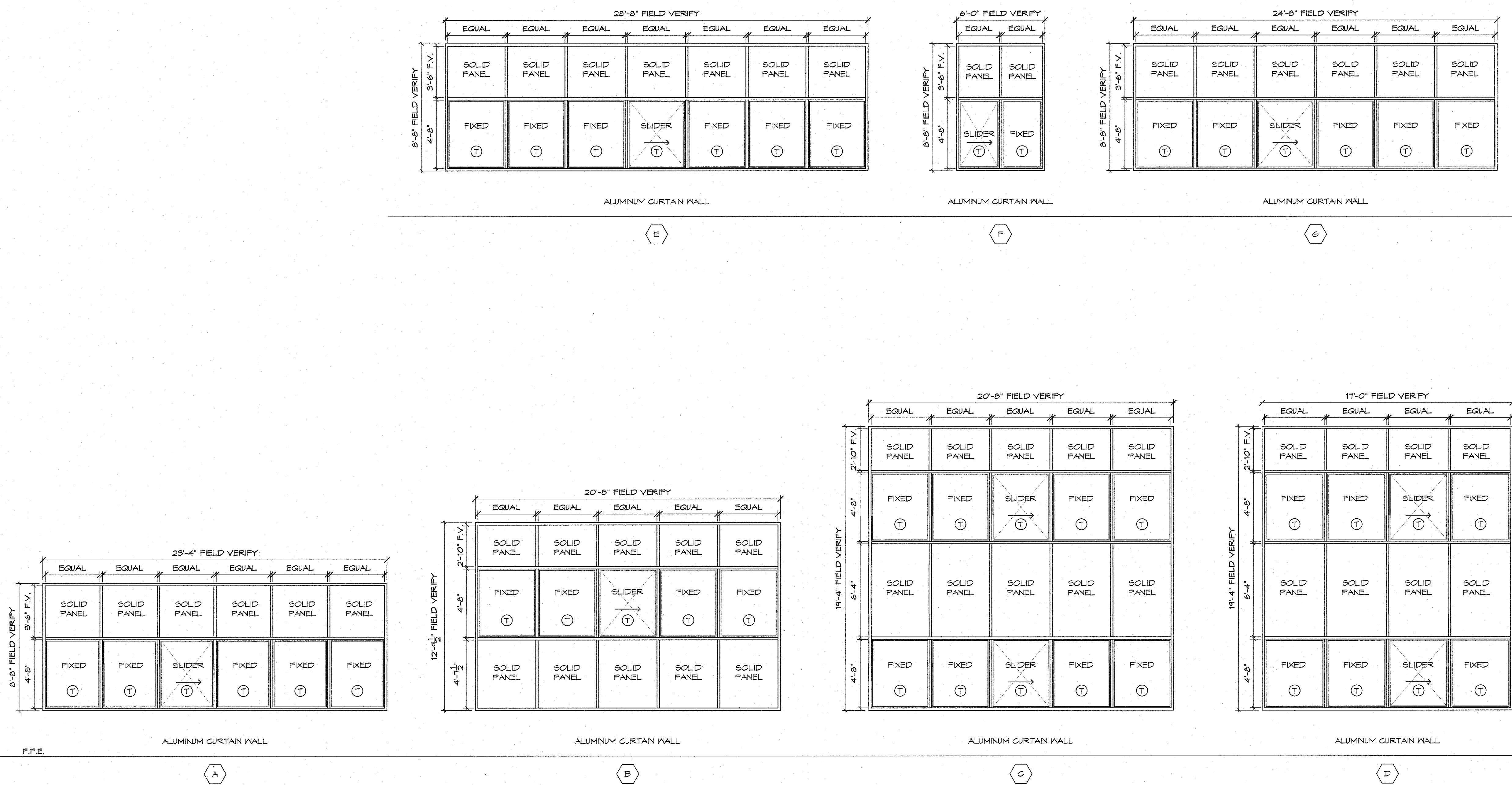
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**SOUTHERN WAYNE HIGH SCHOOL**  
 RENOVATIONS  
 DUDLEY, NORTH CAROLINA

WINDOW STYLES, NOTES & DETAILS  
 NEW WORK

REVISION SCHEDULE		
NO.	DATE	REFERENCE

A303



- EXTERIOR WINDOW STYLE NOTES:**
- ALL EXTERIOR WINDOWS WILL HAVE AN ALUMINUM BILL EXTENSIONS, T INSULATED GLASS, AND THERMAL BREAK UNLESS OTHERWISE NOTED.
  - ALL SLIDING WINDOW OPENINGS(S) ARE EGRESS WINDOWS AND SHALL MEET ALL CURRENT LOCAL AND STATE BUILDING CODE(S).

**1 WINDOW STYLES**  
 A303 SCALE: 1/4" = 1'-0"

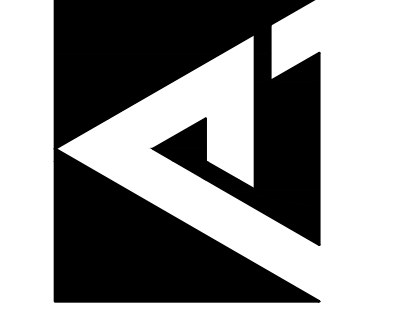
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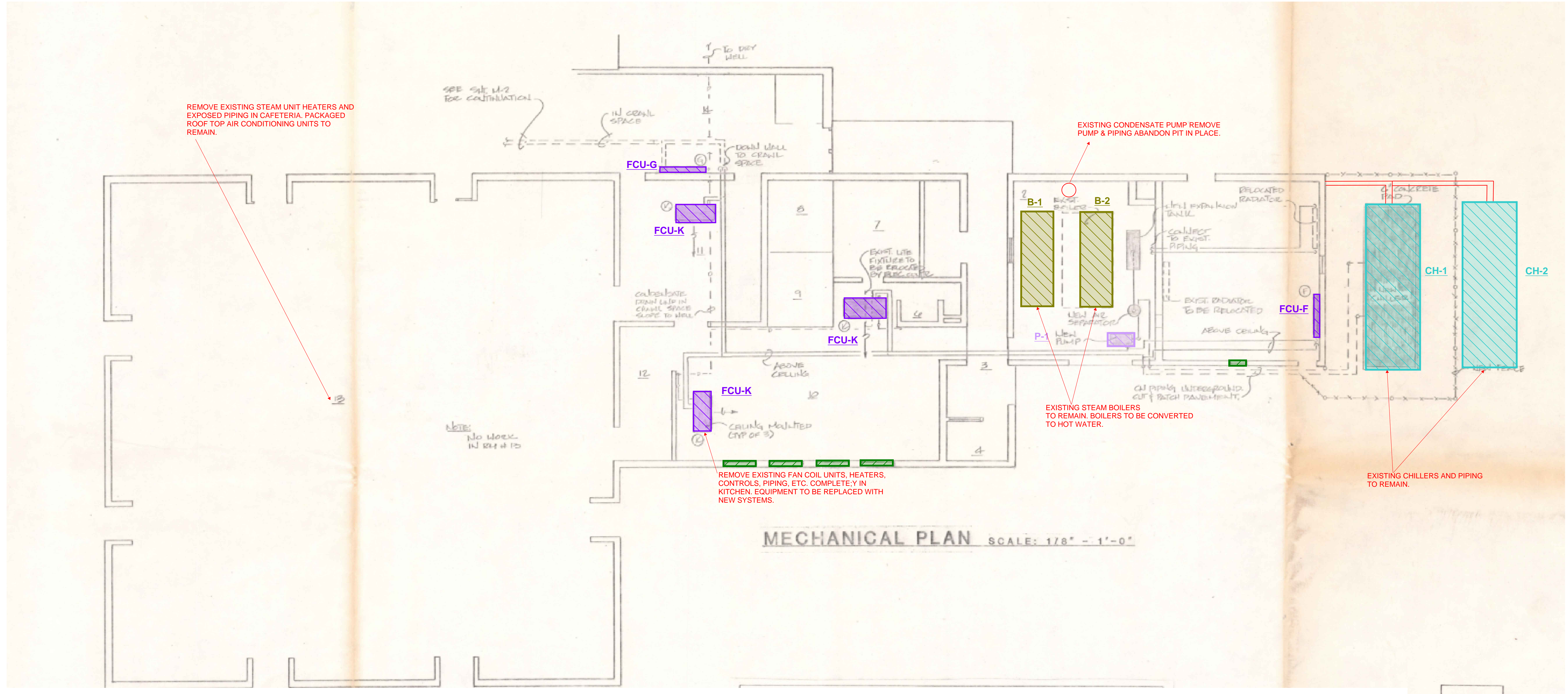
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ISSUE DATE: 11-23-2022  
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**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA**  
 MECHANICAL PLAN - AREA A (DEMOLITION)

REVISION SCHEDULE	
NO.	DATE



REMOVE EXISTING STEAM UNIT HEATERS AND EXPOSED PIPING IN CAFETERIA. PACKAGED ROOF TOP AIR CONDITIONING UNITS TO REMAIN.

SEE SHT. 14-2 FOR CONTINUATION

EXISTING CONDENSATE PUMP REMOVE PUMP & PIPING ABANDON FIT IN PLACE.

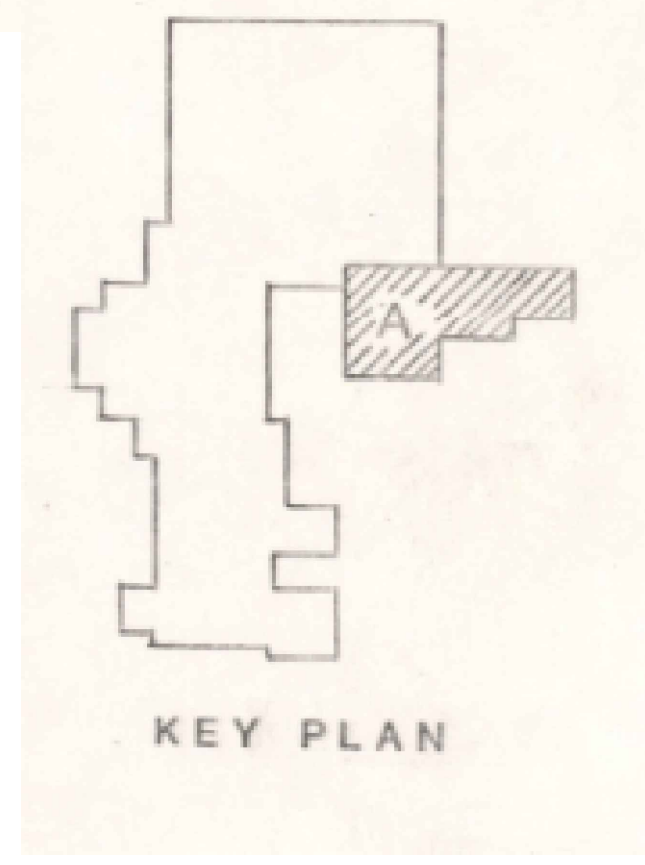
EXISTING STEAM BOILERS TO REMAIN. BOILERS TO BE CONVERTED TO HOT WATER.

EXISTING CHILLERS AND PIPING TO REMAIN.

REMOVE EXISTING FAN COIL UNITS, HEATERS, CONTROLS, PIPING, ETC. COMPLETELY IN KITCHEN. EQUIPMENT TO BE REPLACED WITH NEW SYSTEMS.

NOTE: No work in Rm # 13

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



Air Handling Units		AH-X
Unit Ventilators		UV-X
Fan Coil Units		FCU-X
Rooftop Units		RTU-X
Chiller		CH-X
Pumps		P-X
Condensing Units		CU-X
Boilers		B-X
Radiators		R-X

**DEMOLITION NOTES**

**A THIS CONTRACTOR SHALL VISIT THE SITE TO BECOME FAMILIAR WITH EXISTING CONDITIONS. SUBMISSION OF A BID WILL BE CONSIDERED VERIFICATION THAT THE CONTRACTOR HAS VISITED THE SITE. NO EXTRAS WILL BE ALLOWED DUE TO LACK OF KNOWLEDGE OF THE EXISTING CONDITIONS.**

**B THIS CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING NECESSARY TO INSTALL HIS EQUIPMENT. THIS CONTRACTOR SHALL RESTORE AREAS UNCOVERED BY REMOVAL OF EXISTING EQUIPMENT WHICH WILL REMAIN EXPOSED. PATCHING SHALL MATCH ADJACENT SURFACES. FINAL PAINTING SHALL BE BY THIS CONTRACTOR UNLESS NOTED OTHERWISE.**

**C NO STRUCTURAL MEMBERS SHALL BE CUT WITHOUT THE APPROVAL OF THE ARCHITECT AND/OR STRUCTURAL ENGINEER. ALL SUCH CUTTING SHALL BE DONE IN A MANNER AS DIRECTED BY THEM.**

**D THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER OPENINGS INTO BUILDING TO ADMIT HIS EQUIPMENT. IF IT BECOMES NECESSARY TO CUT ANY PORTION OF THE BUILDING TO ADMIT HIS EQUIPMENT, PORTIONS CUT MUST BE RESTORED TO THEIR FORMER CONDITION BY THIS CONTRACTOR.**

**E EXISTING EQUIPMENT REMOVED SHALL BE STORED ON SITE BY THIS CONTRACTOR (COORDINATE LOCATION WITH GC). EXISTING EQUIPMENT TO BE RETURNED TO OWNER (IDENTIFIED BY OWNER) SHALL BE KEPT IN ORIGINAL CONDITION, PROTECTED FROM WEATHER BY THIS CONTRACTOR AND REMOVED FROM SITE STORAGE BY OWNER. EXISTING EQUIPMENT NOT RETURNED TO OWNER SHALL BE REMOVED FROM SITE STORAGE & DISPOSED OF BY GC.**

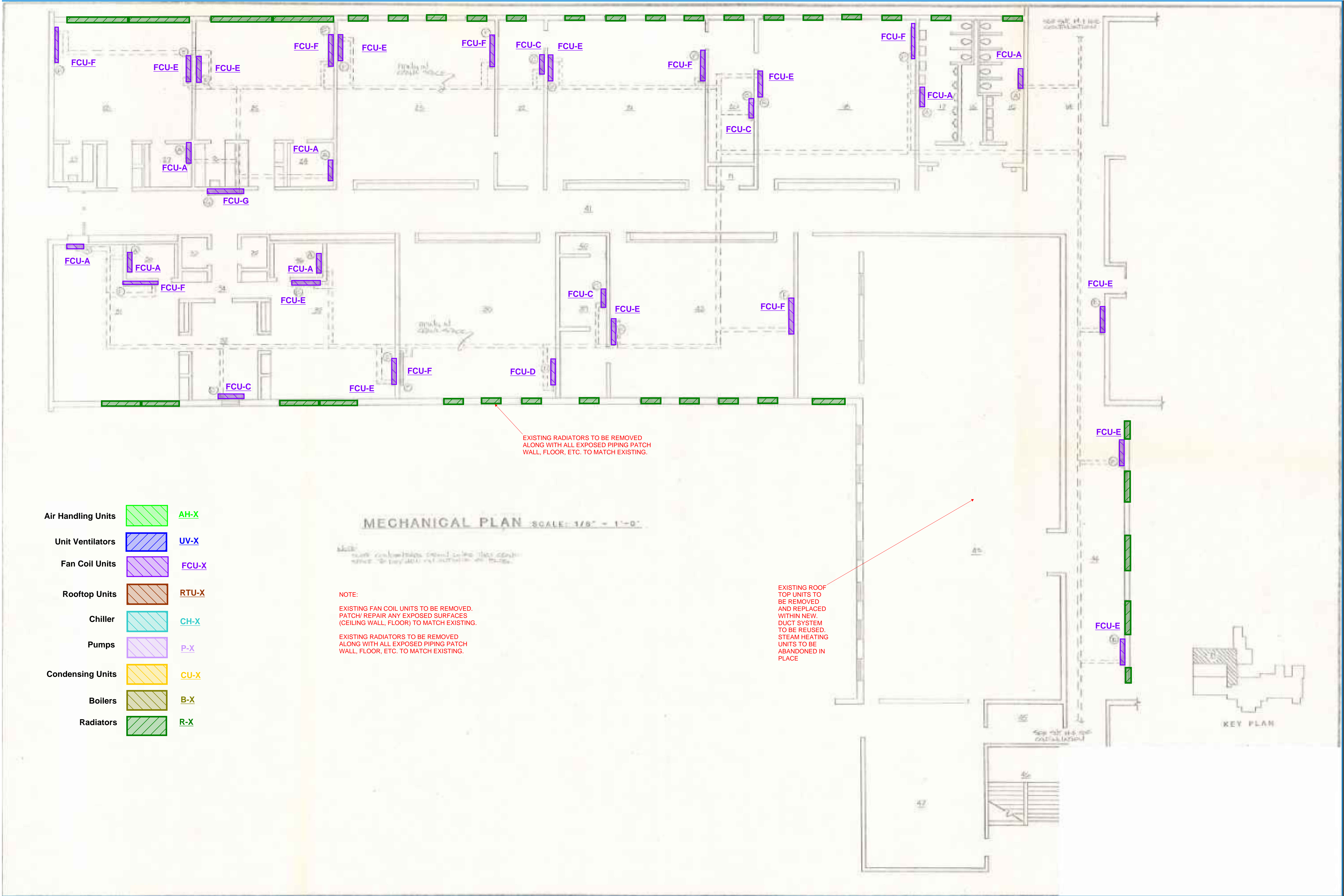
**F EQUIPMENT REMOVED CONTAINING REFRIGERANTS (COILS, REFRIGERANT LINES, CONDENSING UNITS, CHILLERS, ETC.): EVACUATE AND DISPOSE OF REFRIGERANT PER ALL APPLICABLE CODES. RETURN REFRIGERANT TO OWNER.**

**G EQUIPMENT REMOVED WITH PIPING CONNECTIONS: REMOVE EQUIPMENT, EXPOSED PIPING, AND PIPING SPECIALTIES. CAP PIPES BELOW FLOOR, IN WALL, OR ABOVE CEILING AS REQUIRED. REPAIR WALLS, FLOORS, AND CEILINGS TO ORIGINAL CONDITION. FINAL PAINTING BY THIS CONTRACTOR UNLESS NOTED OTHERWISE.**

**H REMOVE LAY-IN CEILING AS REQUIRED FOR WORK ABOVE CEILING, REINSTALL CEILING WHEN WORK IS COMPLETE. REPLACE DAMAGED CEILING TILES. CEILING REMOVAL AND REPLACEMENT SHALL BE PERFORMED BY A SUBCONTRACTOR REGULARLY EMPLOYED FOR INSTALLATION OF CEILING SYSTEMS, SUBJECT TO APPROVAL BY ARCHITECT.**

**I REMOVE PLASTER CEILING AS REQUIRED FOR PIPE, OR UNIT HANGER ATTACHMENT TO JOIST. REINSTALL CEILING WHEN WORK IS COMPLETE. REPLACE DAMAGED PORTIONS OF CEILING. CEILING REMOVAL & REPLACEMENT SHALL BE PERFORMED BY A SUBCONTRACTOR REGULARLY EMPLOYED FOR INSTALLATION OF CEILING SYSTEMS, SUBJECT TO APPROVAL BY ARCHITECT.**



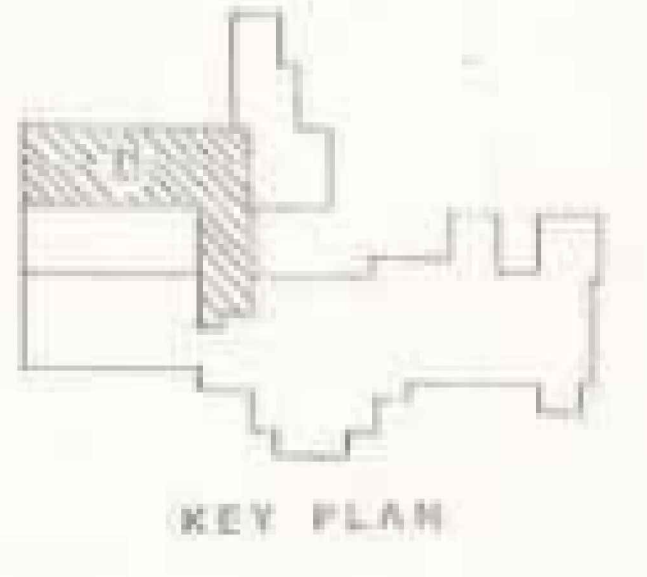


- Air Handling Units  AH-X
- Unit Ventilators  UV-X
- Fan Coil Units  FCU-X
- Rooftop Units  RTU-X
- Chiller  CH-X
- Pumps  P-X
- Condensing Units  CU-X
- Boilers  B-X
- Radiators  R-X

NOTE:  
 EXISTING FAN COIL UNITS TO BE REMOVED.  
 PATCH/ REPAIR ANY EXPOSED SURFACES  
 (CEILING, WALL, FLOOR) TO MATCH EXISTING.  
 EXISTING RADIATORS TO BE REMOVED  
 ALONG WITH ALL EXPOSED PIPING PATCH  
 WALL, FLOOR, ETC. TO MATCH EXISTING.

EXISTING RADIATORS TO BE REMOVED  
 ALONG WITH ALL EXPOSED PIPING PATCH  
 WALL, FLOOR, ETC. TO MATCH EXISTING.

EXISTING ROOF  
 TOP UNITS TO  
 BE REMOVED  
 AND REPLACED  
 WITHIN NEW  
 DUCT SYSTEM  
 TO BE REUSED.  
 STEAM HEATING  
 UNITS TO BE  
 ABANDONED IN  
 PLACE

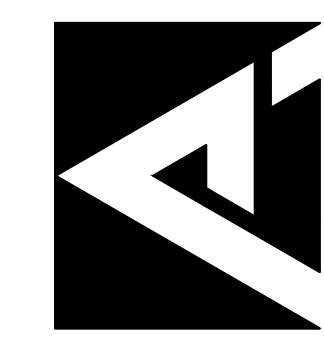


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SOUTHERN WAYNE HIGH SCHOOL  
 RENOVATIONS  
 DUDLEY, NORTH CAROLINA  
 MECHANICAL PLAN - AREA B (DEMOLITION)

REVISION SCHEDULE		
NO.	DATE	REFERENCE

M201

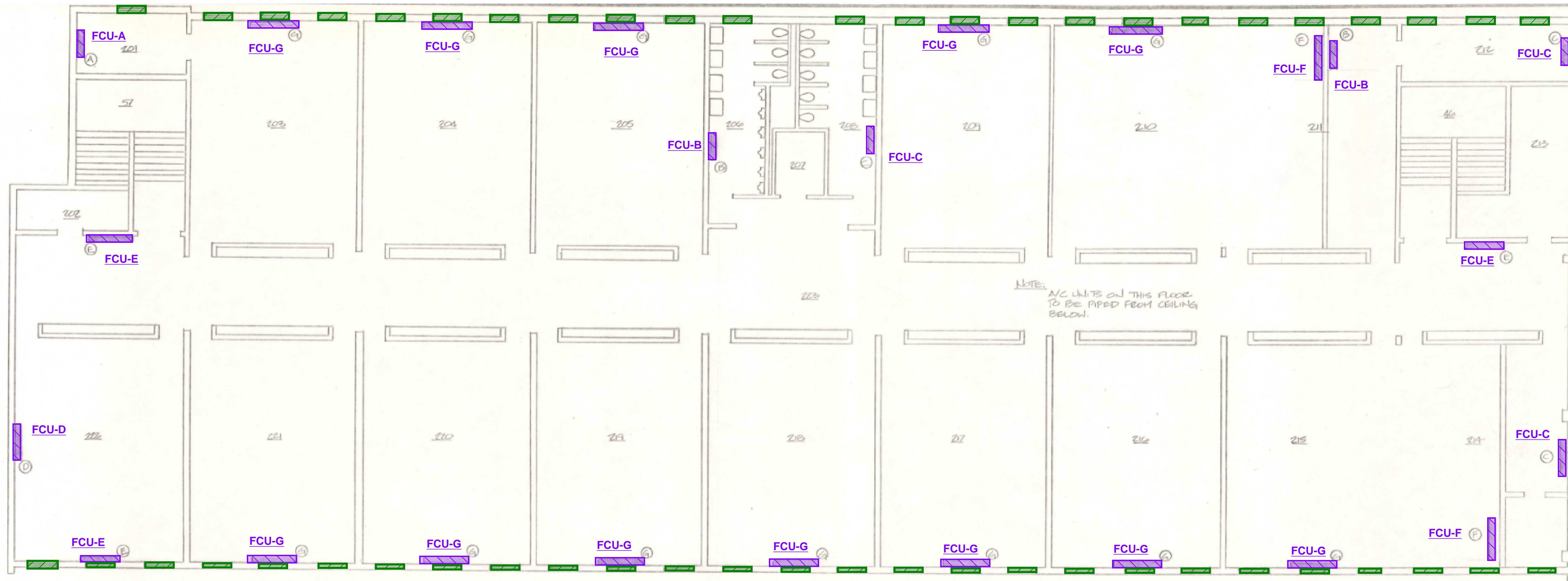


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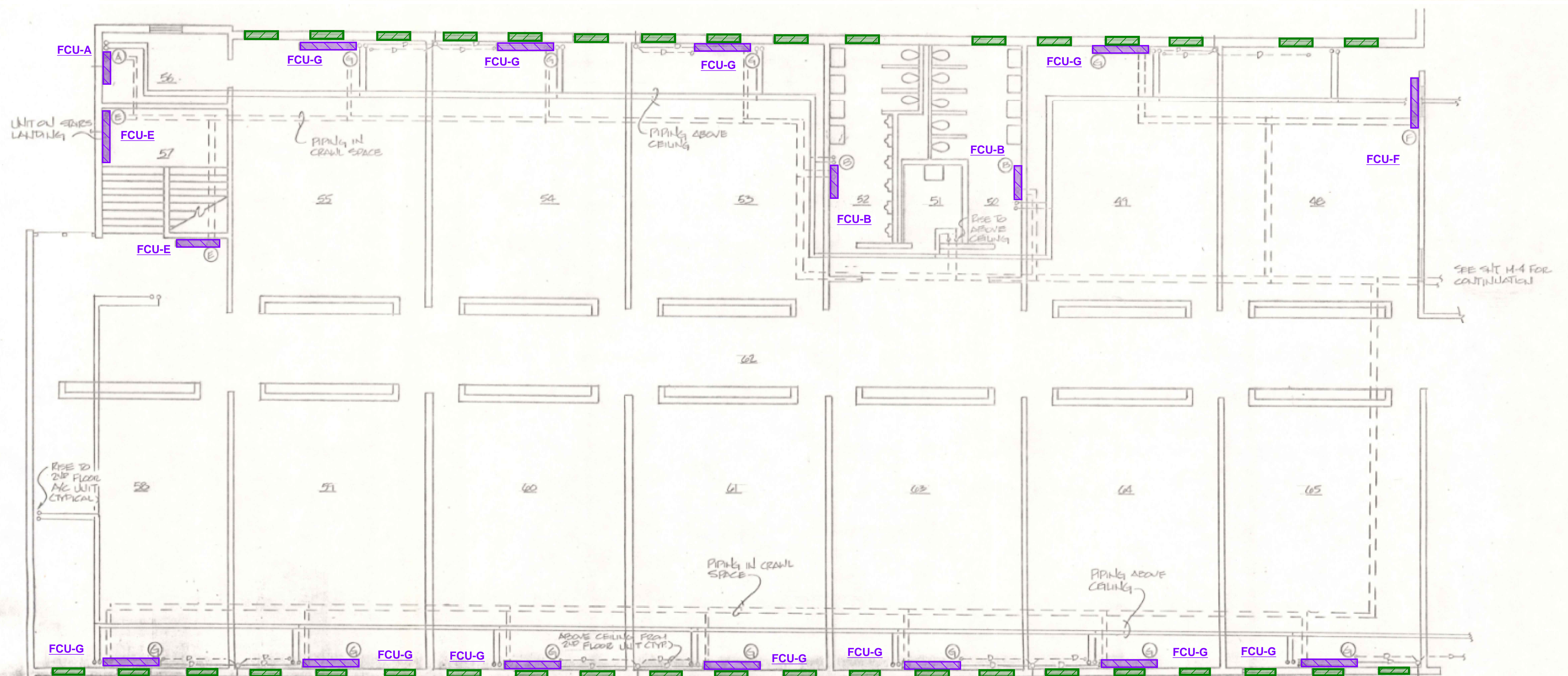




MECHANICAL PLAN - SECOND FLOOR SCALE: 1/8" = 1'-0"

NOTE: A/C UNITS ON THIS FLOOR TO BE PIPED FROM CEILING BELOW.

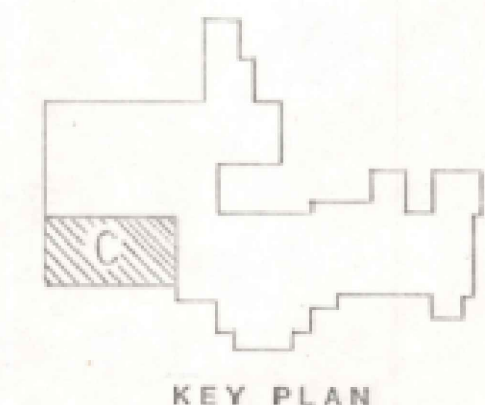
NOTE: SLOPE CONDENSATE DRAIN LINES THRU CRAWL SPACE TO DRY WELL ON OUTSIDE OF BLDG.



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

NOTE:  
EXISTING FAN COIL UNITS TO BE REMOVED. PATCH/REPAIR ANY EXPOSED SURFACES (CEILING, WALL, FLOOR) TO MATCH EXISTING.  
EXISTING RADIATORS TO BE REMOVED ALONG WITH ALL EXPOSED PIPING PATCH WALL, FLOOR, ETC. TO MATCH EXISTING.

- Air Handling Units  AH-X
- Unit Ventilators  UV-X
- Fan Coil Units  FCU-X
- Rooftop Units  RTU-X
- Chiller  CH-X
- Pumps  P-X
- Condensing Units  CU-X
- Boilers  B-X
- Radiators  R-X



CONTRACTOR TO VERIFY ALL DIMENSIONS



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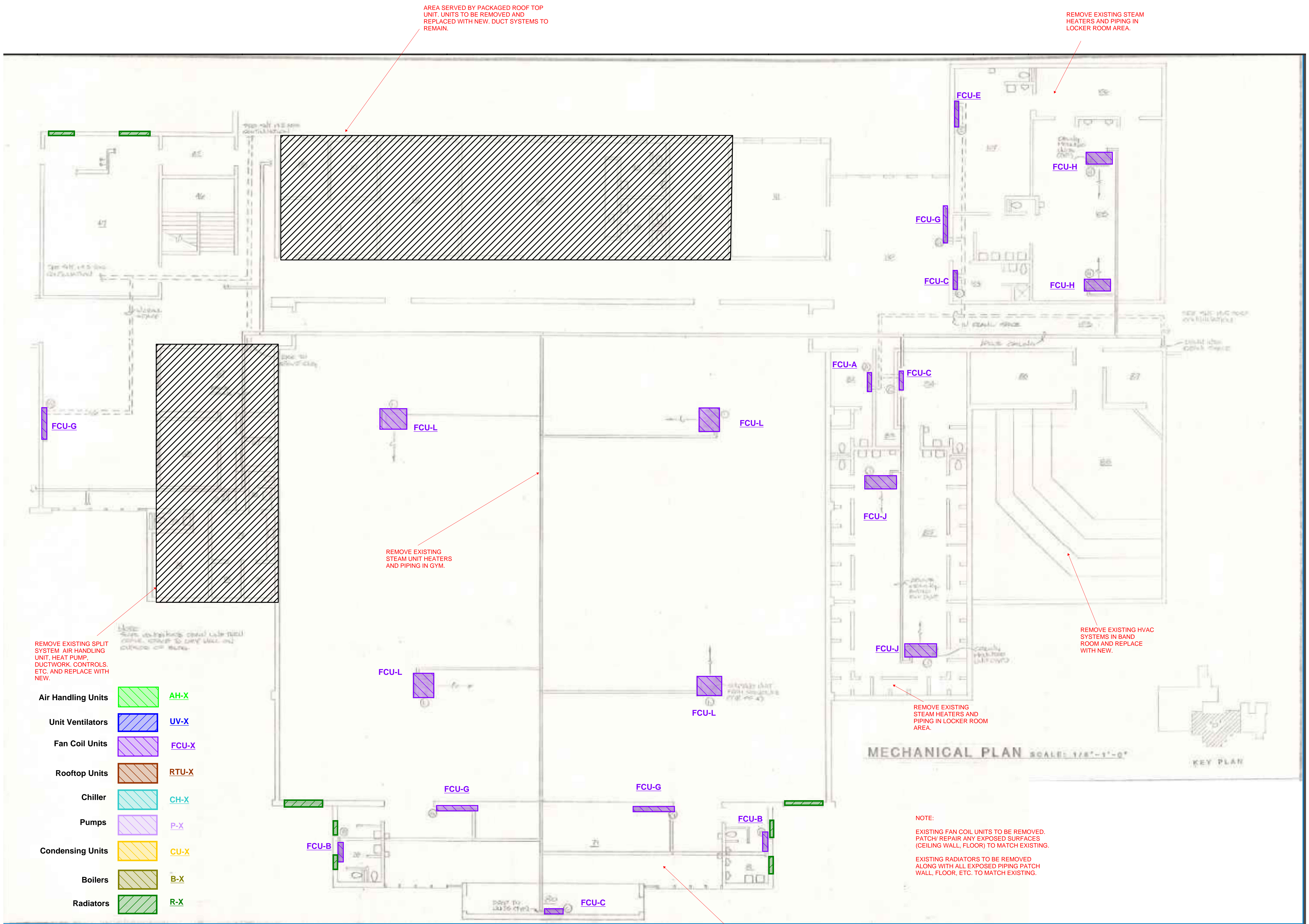
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**SOUTHERN WAYNE HIGH SCHOOL**  
**RENOVATIONS**  
**DUDLEY, NORTH CAROLINA**  
**MECHANICAL PLAN - AREA C (DEMOLITION)**

REVISION SCHEDULE	
DATE	REFERENCE

M202





REMOVE EXISTING SPLIT SYSTEM AIR HANDLING UNIT, HEAT PUMP, DUCTWORK, CONTROLS, ETC. AND REPLACE WITH NEW.

- Air Handling Units ■ AH-X
- Unit Ventilators ■ UV-X
- Fan Coil Units ■ FCU-X
- Rooftop Units ■ RTU-X
- Chiller ■ CH-X
- Pumps ■ P-X
- Condensing Units ■ CU-X
- Boilers ■ B-X
- Radiators ■ R-X

NOTE:  
 EXISTING FAN COIL UNITS TO BE REMOVED. PATCH/ REPAIR ANY EXPOSED SURFACES (CEILING, WALL, FLOOR) TO MATCH EXISTING.  
 EXISTING RADIATORS TO BE REMOVED ALONG WITH ALL EXPOSED PIPING PATCH WALL, FLOOR, ETC. TO MATCH EXISTING.

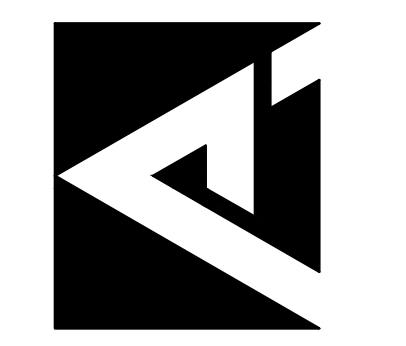
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CONTRACTOR: EDWARDS & KELCEY



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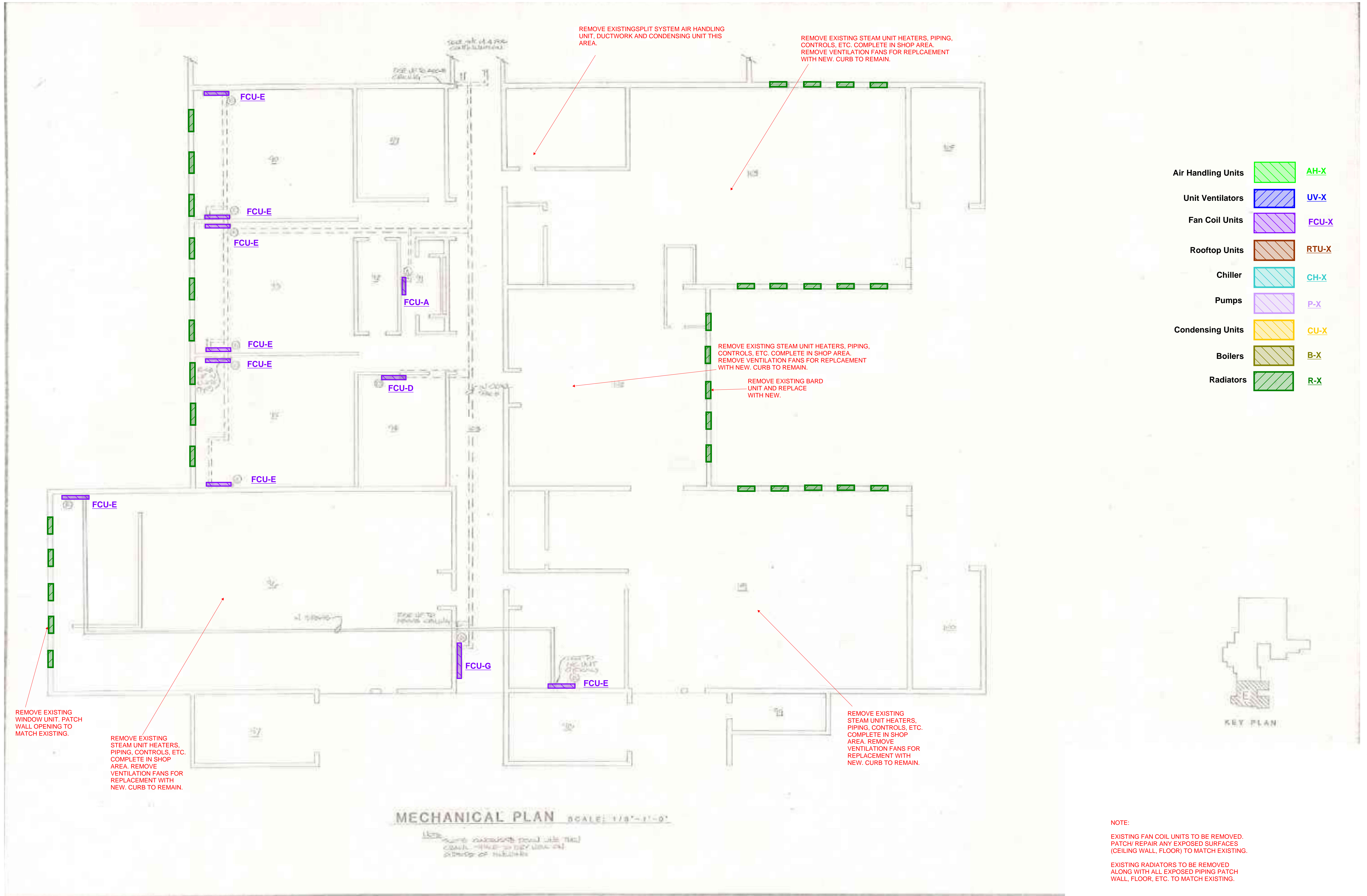


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**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA**  
**MECHANICAL PLAN - AREA D (DEMOLITION)**

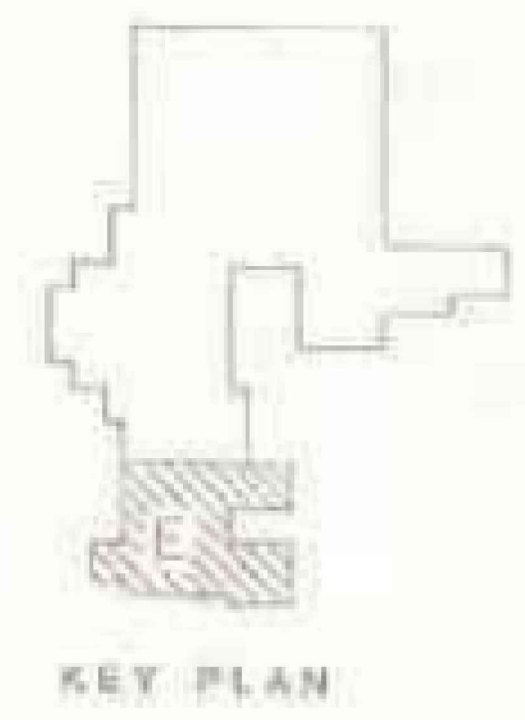
REVISION SCHEDULE		
NO.	DATE	REFERENCE





Air Handling Units		AH-X
Unit Ventilators		UV-X
Fan Coil Units		FCU-X
Rooftop Units		RTU-X
Chiller		CH-X
Pumps		P-X
Condensing Units		CU-X
Boilers		B-X
Radiators		R-X

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



REMOVE EXISTING WINDOW UNIT. PATCH WALL OPENING TO MATCH EXISTING.

REMOVE EXISTING STEAM UNIT HEATERS, PIPING, CONTROLS, ETC. COMPLETE IN SHOP AREA. REMOVE VENTILATION FANS FOR REPLACEMENT WITH NEW. CURB TO REMAIN.

REMOVE EXISTING SPLIT SYSTEM AIR HANDLING UNIT, DUCTWORK AND CONDENSING UNIT THIS AREA.

REMOVE EXISTING STEAM UNIT HEATERS, PIPING, CONTROLS, ETC. COMPLETE IN SHOP AREA. REMOVE VENTILATION FANS FOR REPLACEMENT WITH NEW. CURB TO REMAIN.

REMOVE EXISTING STEAM UNIT HEATERS, PIPING, CONTROLS, ETC. COMPLETE IN SHOP AREA. REMOVE VENTILATION FANS FOR REPLACEMENT WITH NEW. CURB TO REMAIN.

REMOVE EXISTING BARD UNIT AND REPLACE WITH NEW.

REMOVE EXISTING STEAM UNIT HEATERS, PIPING, CONTROLS, ETC. COMPLETE IN SHOP AREA. REMOVE VENTILATION FANS FOR REPLACEMENT WITH NEW. CURB TO REMAIN.

**NOTE:**  
 EXISTING FAN COIL UNITS TO BE REMOVED. PATCH/ REPAIR ANY EXPOSED SURFACES (CEILING WALL, FLOOR) TO MATCH EXISTING.  
 EXISTING RADIATORS TO BE REMOVED ALONG WITH ALL EXPOSED PIPING PATCH WALL, FLOOR, ETC. TO MATCH EXISTING.

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**SOUTHERN WAYNE HIGH SCHOOL  
 RENOVATIONS  
 DUDLEY, NORTH CAROLINA**  
 MECHANICAL PLAN - AREA E

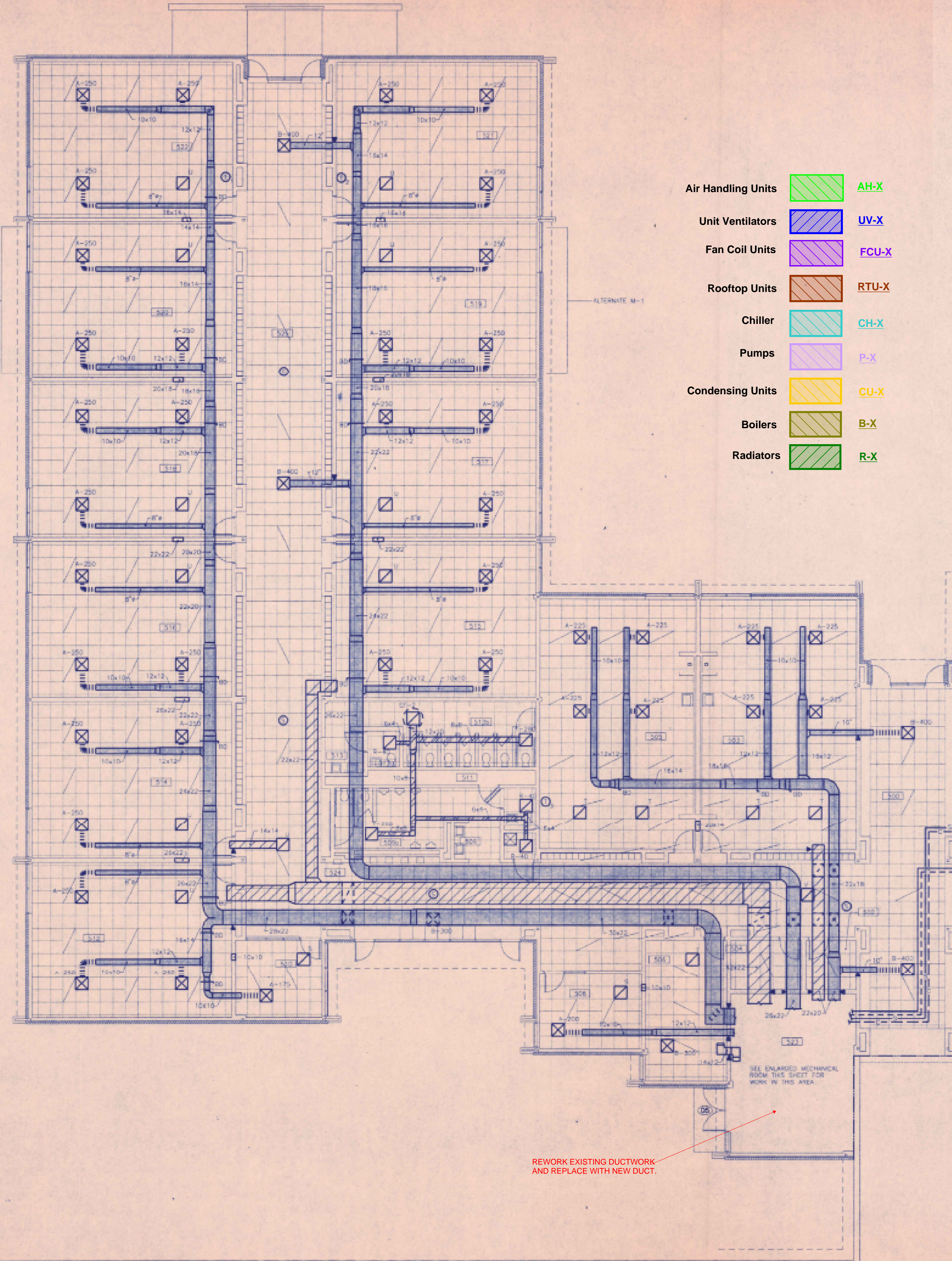
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NO.	DATE	REFERENCE

**M204**

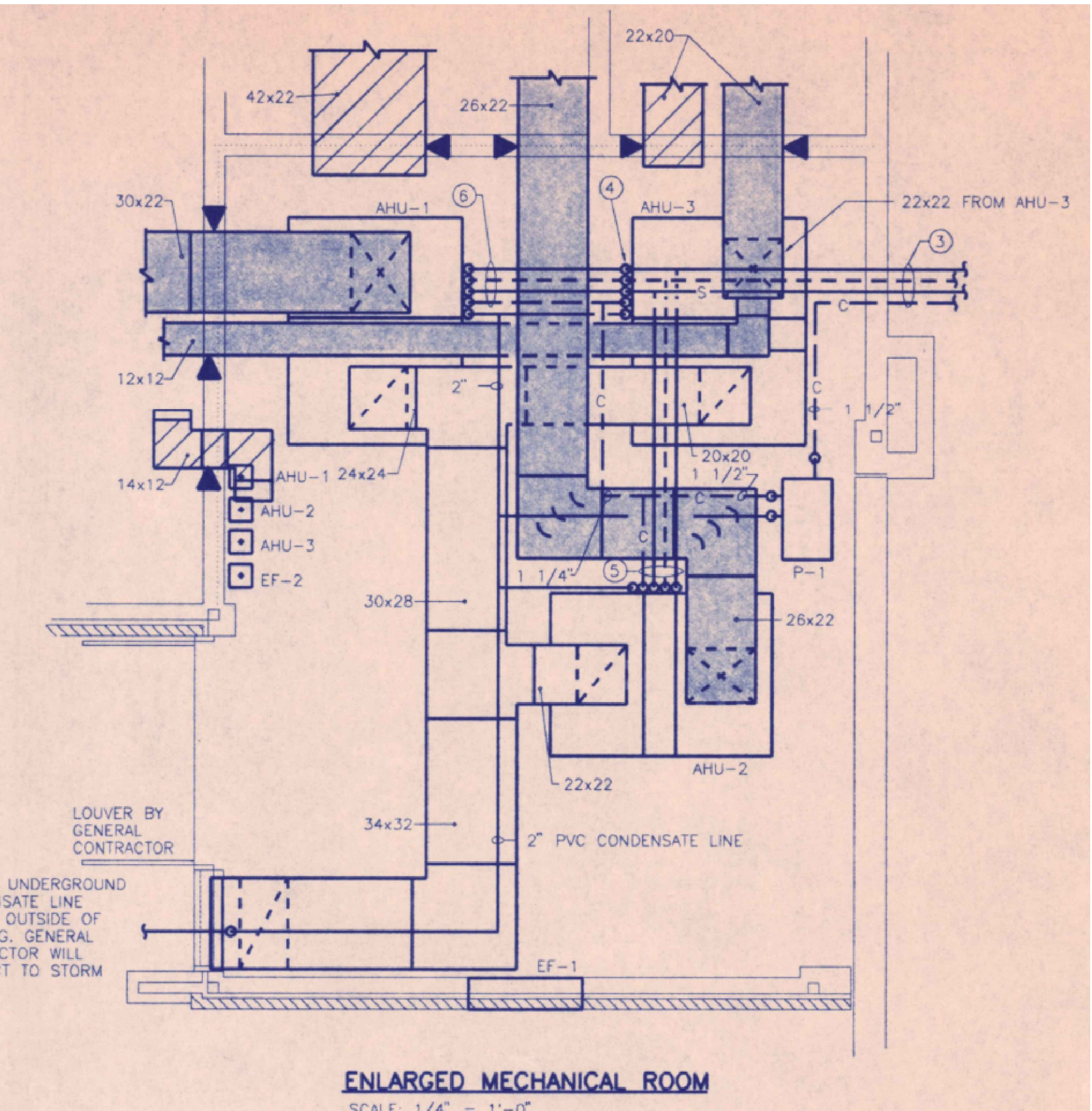


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- Air Handling Units  AH-X
- Unit Ventilators  UV-X
- Fan Coil Units  FCU-X
- Rooftop Units  RTU-X
- Chiller  CH-X
- Pumps  P-X
- Condensing Units  CU-X
- Boilers  B-X
- Radiators  R-X

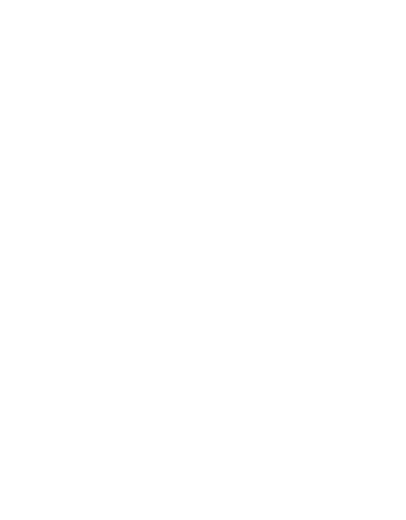


NOTE:  
 RUN ALL DUCTWORK AND PIPING TIGHT AGAINST STRUCTURE  
 COORDINATE WITH GENERAL CONTRACTOR RUN BRANCH DUCTS  
 FROM MAIN IN BETWEEN JOIST TO GRILLES.

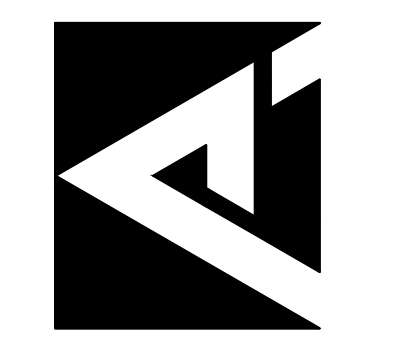
- NOTES: (AS INDICATED ON THIS PLAN BY A NUMBER IN A ○ )
- ① THE MECHANICAL CONTRACTOR SHALL TIE THE NEW C.W. SUPPLY AND RETURN LINES INTO THE EXISTING C.W. SUPPLY AND RETURN LINES AT A POINT IN THE BOILER ROOM BEFORE THE PIPES DESCEND INTO THE CHILL SPACE.
  - ② THE MECHANICAL CONTRACTOR SHALL TIE THE NEW STEAM AND CONDENSATE LINES INTO THE EXISTING STEAM AND CONDENSATE LINES AT THE EXISTING IMP. VERIFY IN FIELD. NEW CONDENSATE LINE SHALL BE TIED INTO THE EXISTING ON THE SUCTION SIDE OF THE RECEIVER.
  - ③ 1/2" CHILLED WATER SUPPLY  
 1/2" CHILLED WATER RETURN  
 1/2" STEAM SUPPLY  
 1 1/2" CONDENSATE RETURN
  - ④ 1/2" CHILLED WATER SUPPLY  
 1/2" CHILLED WATER RETURN  
 1 1/2" STEAM SUPPLY  
 1 1/2" CONDENSATE RETURN
  - ⑤ 1/2" CHILLED WATER SUPPLY  
 1/2" CHILLED WATER RETURN  
 1 1/2" STEAM SUPPLY  
 1 1/2" CONDENSATE RETURN
  - ⑥ 1/2" CHILLED WATER SUPPLY  
 1/2" CHILLED WATER RETURN  
 1 1/2" STEAM SUPPLY  
 1 1/2" CONDENSATE RETURN

REWORK EXISTING DUCTWORK  
 AND REPLACE WITH NEW DUCT.

CONTRACTOR TO VERIFY ALL DIMENSIONS  
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 CHECKED BY: EJM/REB  
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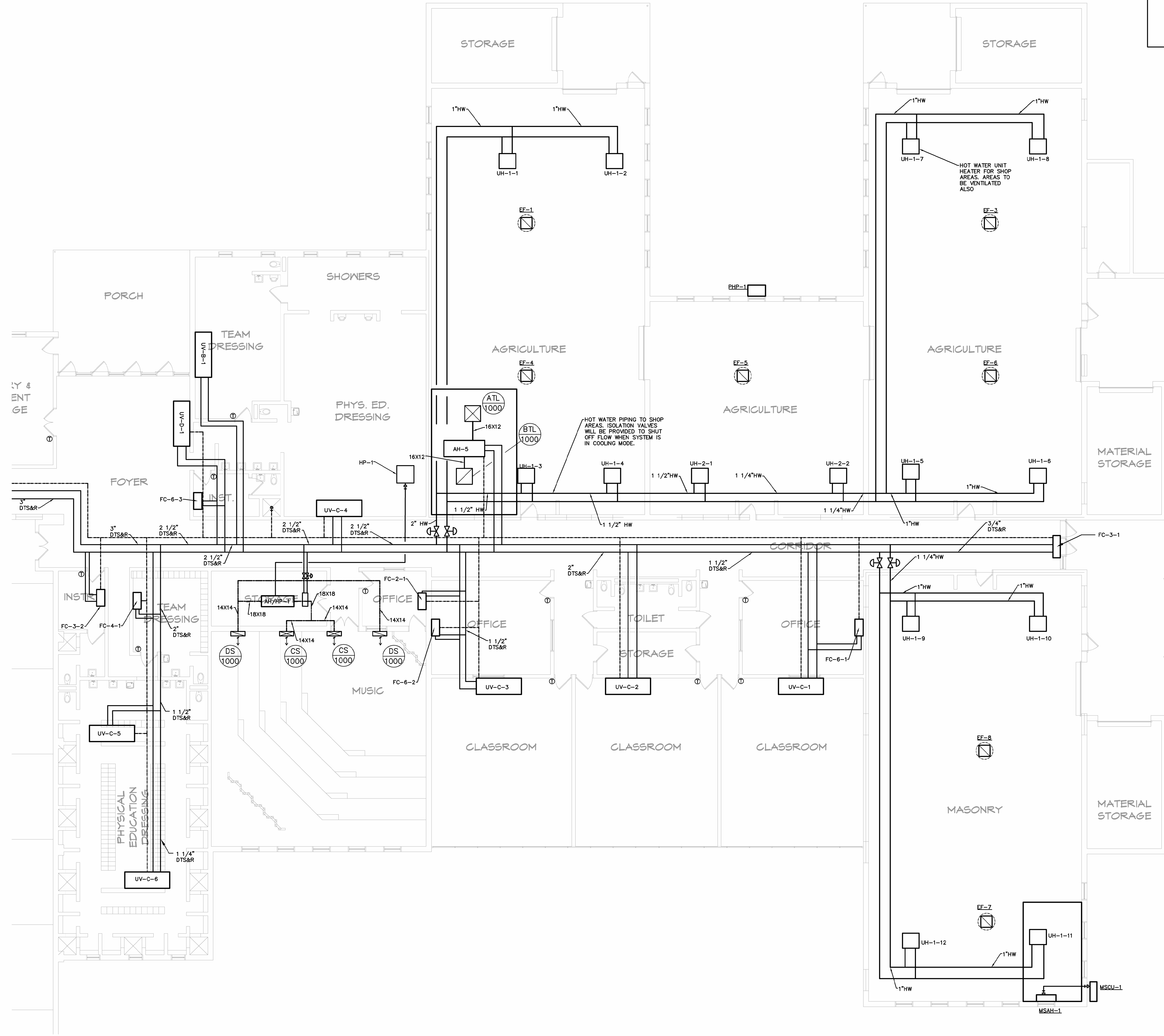
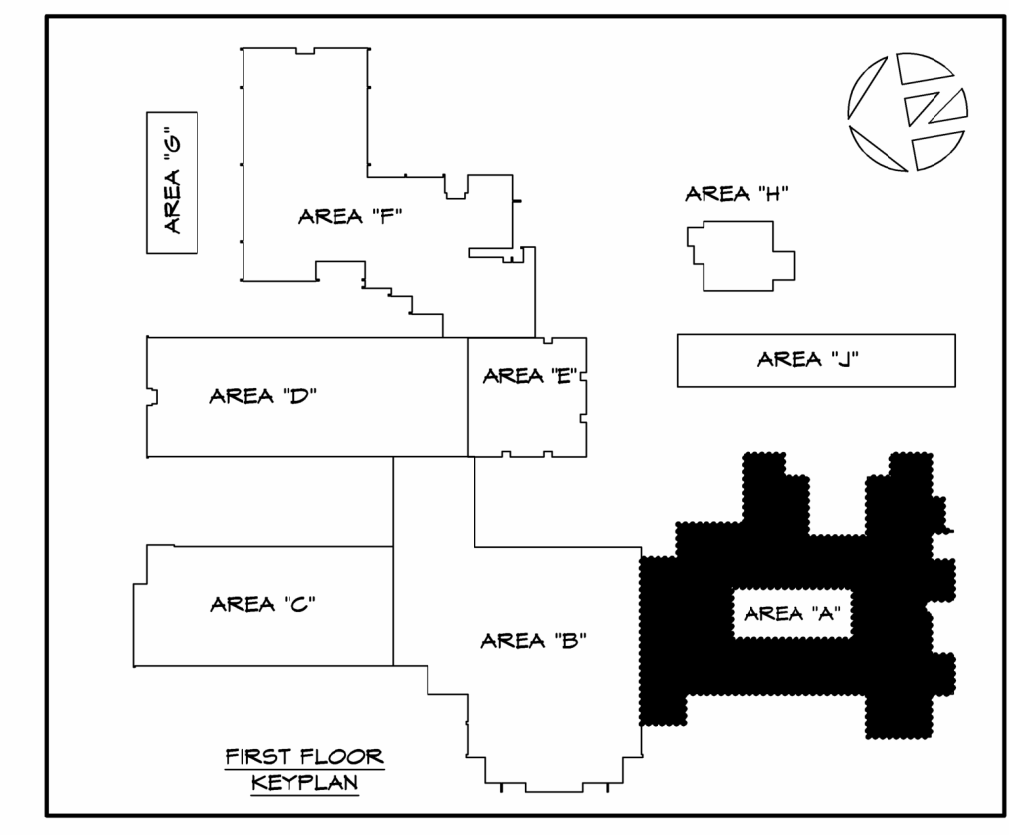
SOUTHERN WAYNE HIGH SCHOOL  
 RENOVATIONS  
 DUDLEY, NORTH CAROLINA  
 MECHANICAL PLAN - AREA F (DEMOLITION)

REVISION SCHEDULE	
DATE	REFERENCE



# LEGEND

- CONDENSATE DRAIN
- OUTSIDE AIR DUCT
- MECHANICAL PIPING
- EXISTING TO REMAIN



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

CONTRACTOR TO VERIFY ALL DIMENSIONS

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PROJECT: 2218


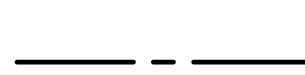
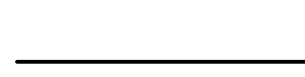
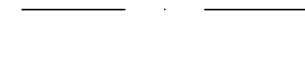
**SOUTHERN WAYNE HIGH SCHOOL**  
**RENOVATIONS**  
**DUDLEY, NORTH CAROLINA**  
**FLOOR PLAN - AREA A**

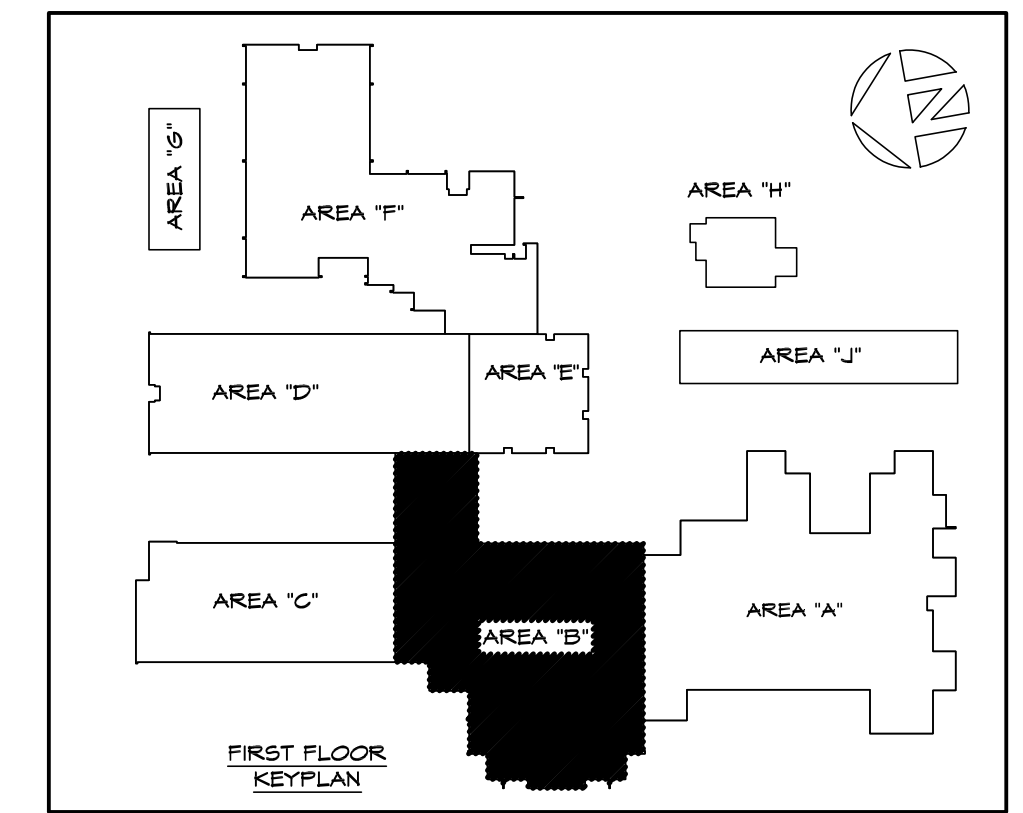
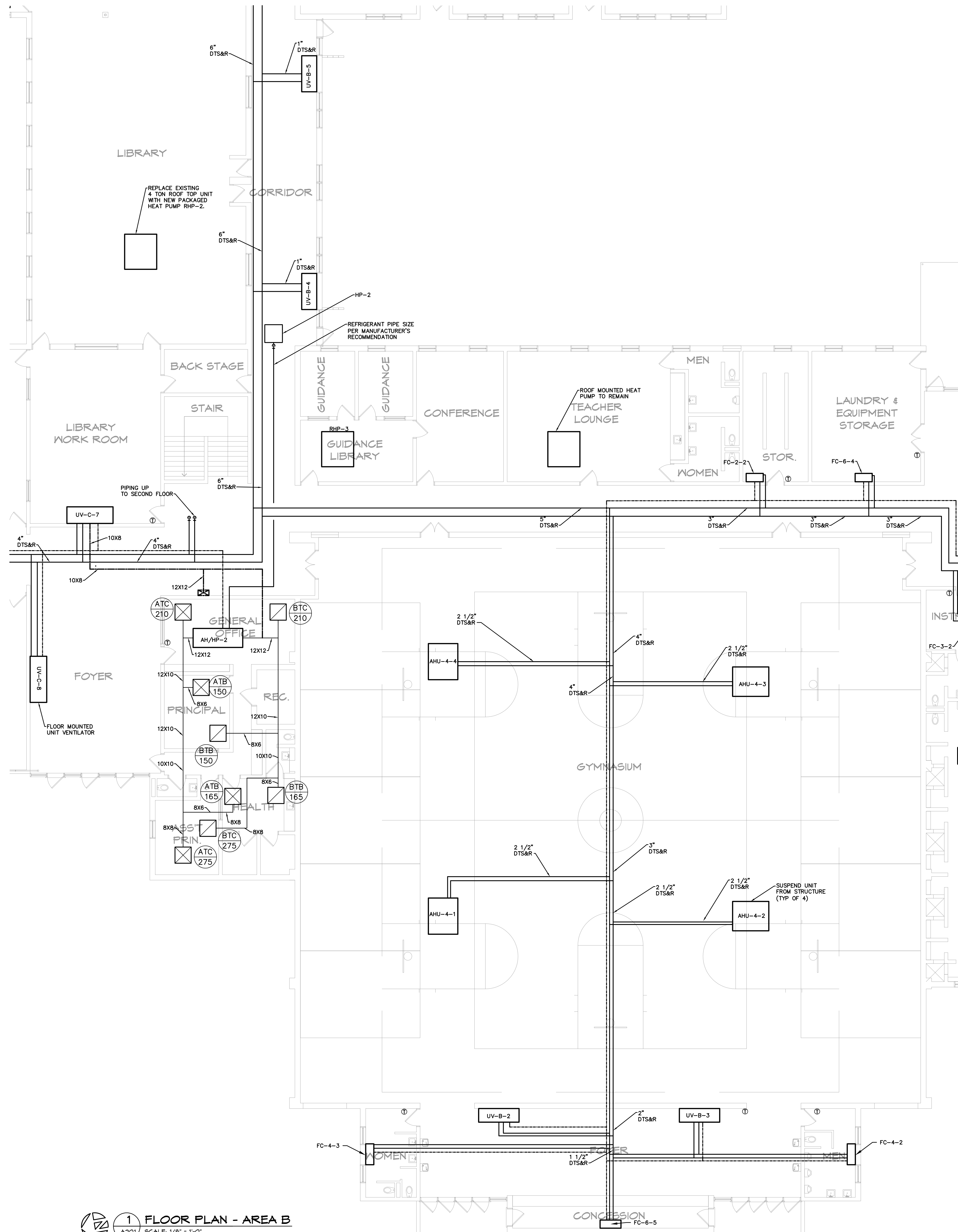
REVISION SCHEDULE		
NO.	DATE	REFERENCE

**M206**



# LEGEND

-  CONDENSATE DRAIN
-  OUTSIDE AIR DUCT
-  MECHANICAL PIPING
-  EXISTING TO REMAIN



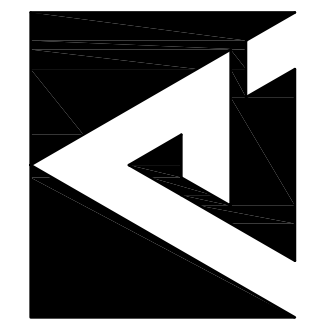
**1 FLOOR PLAN - AREA B**  
 A201 SCALE: 1/8" = 1'-0"

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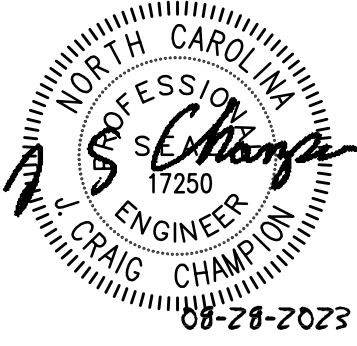
**SOUTHERN WAYNE HIGH SCHOOL  
 RENOVATIONS  
 DUDLEY, NORTH CAROLINA**  
 FLOOR PLAN - AREA B

REVISION SCHEDULE	
DATE	REFERENCE

ISSUE DATE: 11/23/2022  
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 CHECKED BY: JMW/REB  
 PROJECT: 2218



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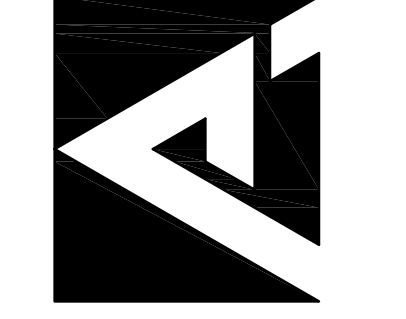
**M207**



CONTRACTOR TO VERIFY ALL DIMENSIONS



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PH: (853) 872-5345 FAX: (853) 872-5374



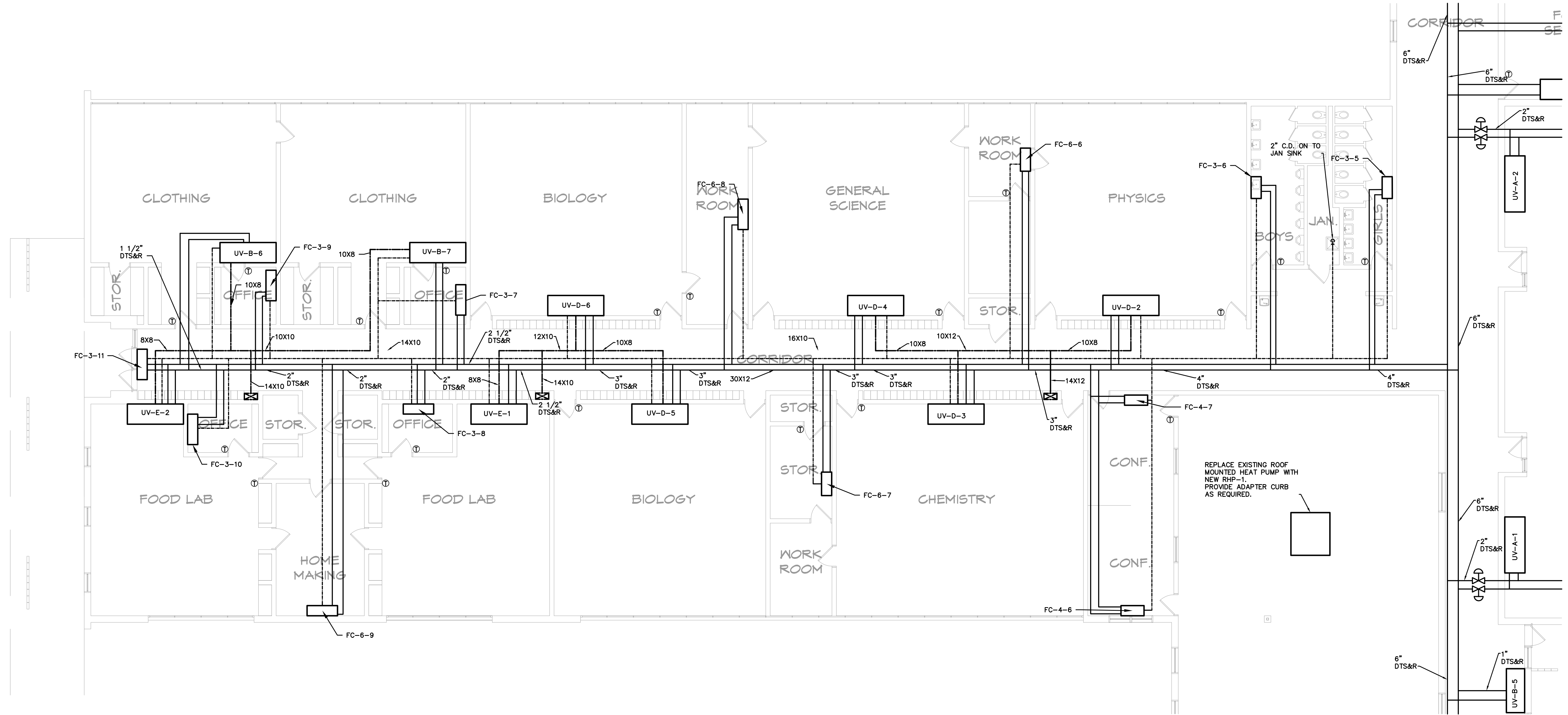
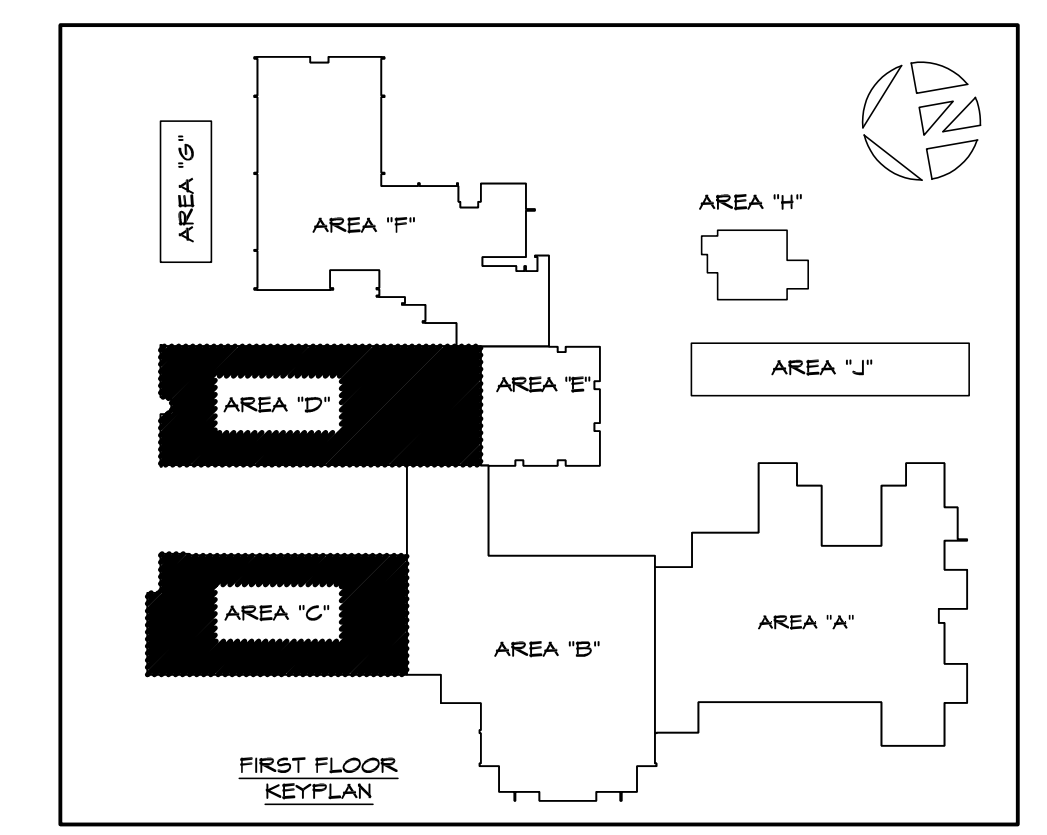
ISSUE DATE: 11.23.2022  
DRAWN BY: EJM/REB  
CHECKED BY: EJM/REB  
PROJECT: 2218

**SOUTHERN WAYNE HIGH SCHOOL**  
RENOVATIONS  
DUDLEY, NORTH CAROLINA  
FLOOR PLANS - AREA C & D

REVISION SCHEDULE

NO.	DATE	REFERENCE

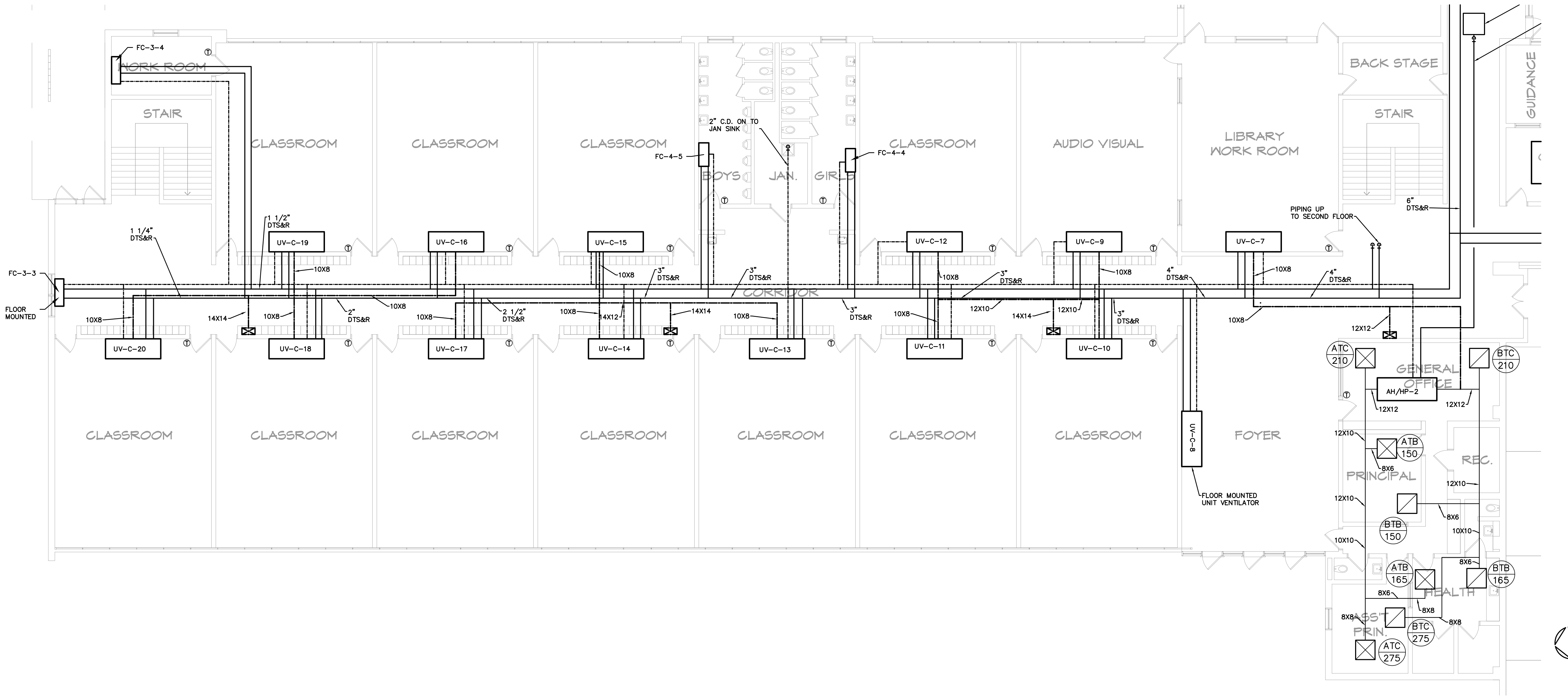
M208



**2 FLOOR PLAN - AREA D**  
A202 SCALE: 1/8" = 1'-0"

**LEGEND**

- CONDENSATE DRAIN
- OUTSIDE AIR DUCT
- MECHANICAL PIPING
- EXISTING TO REMAIN

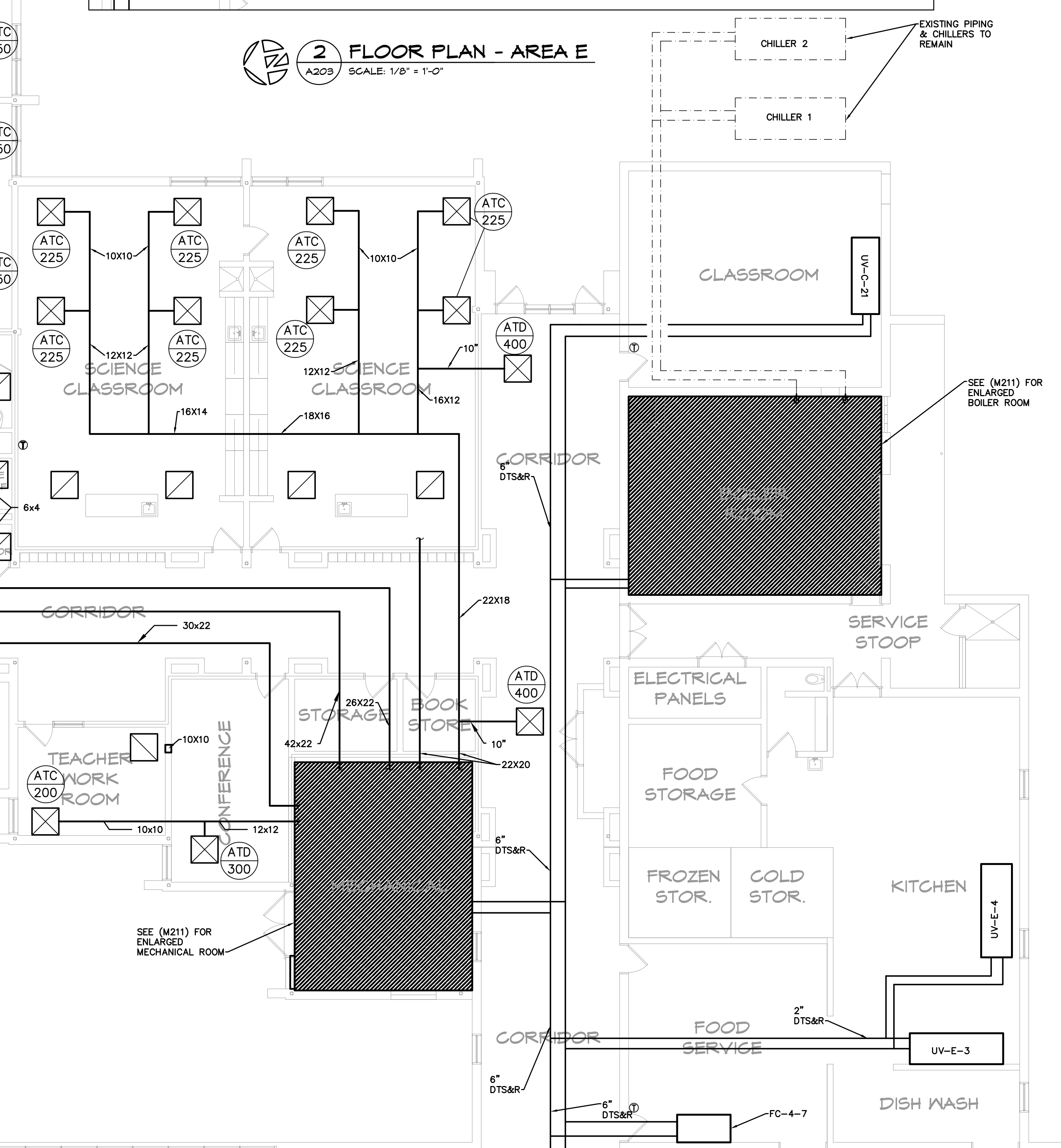
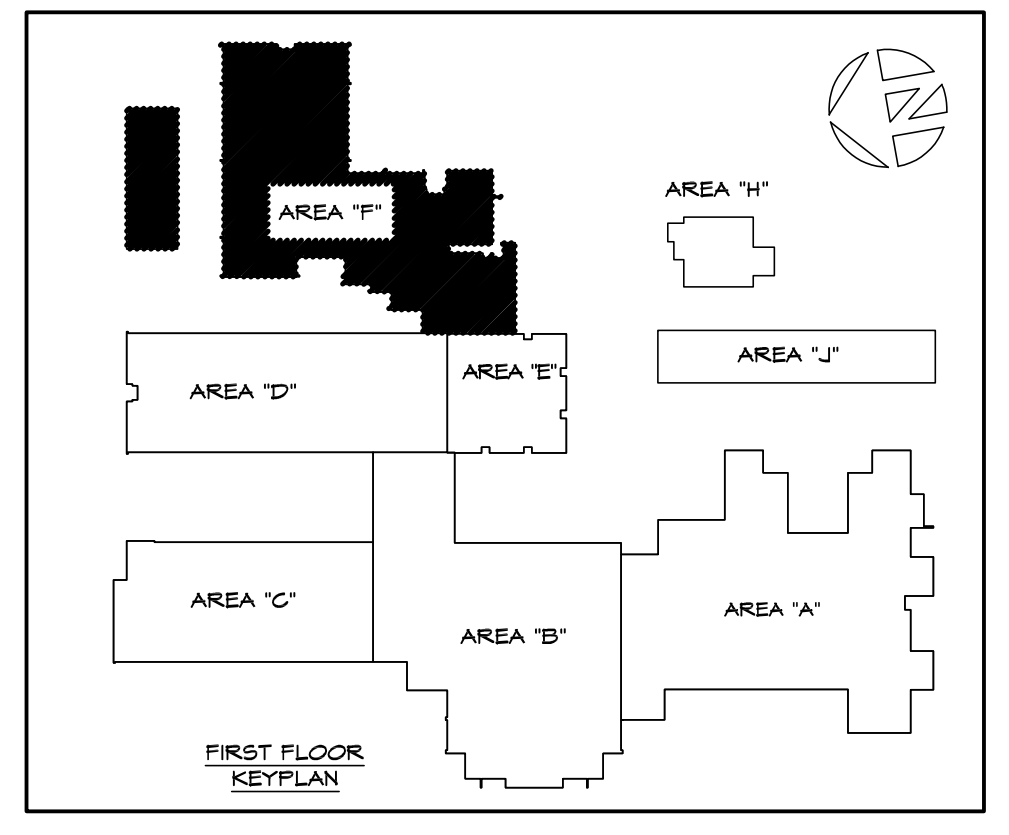
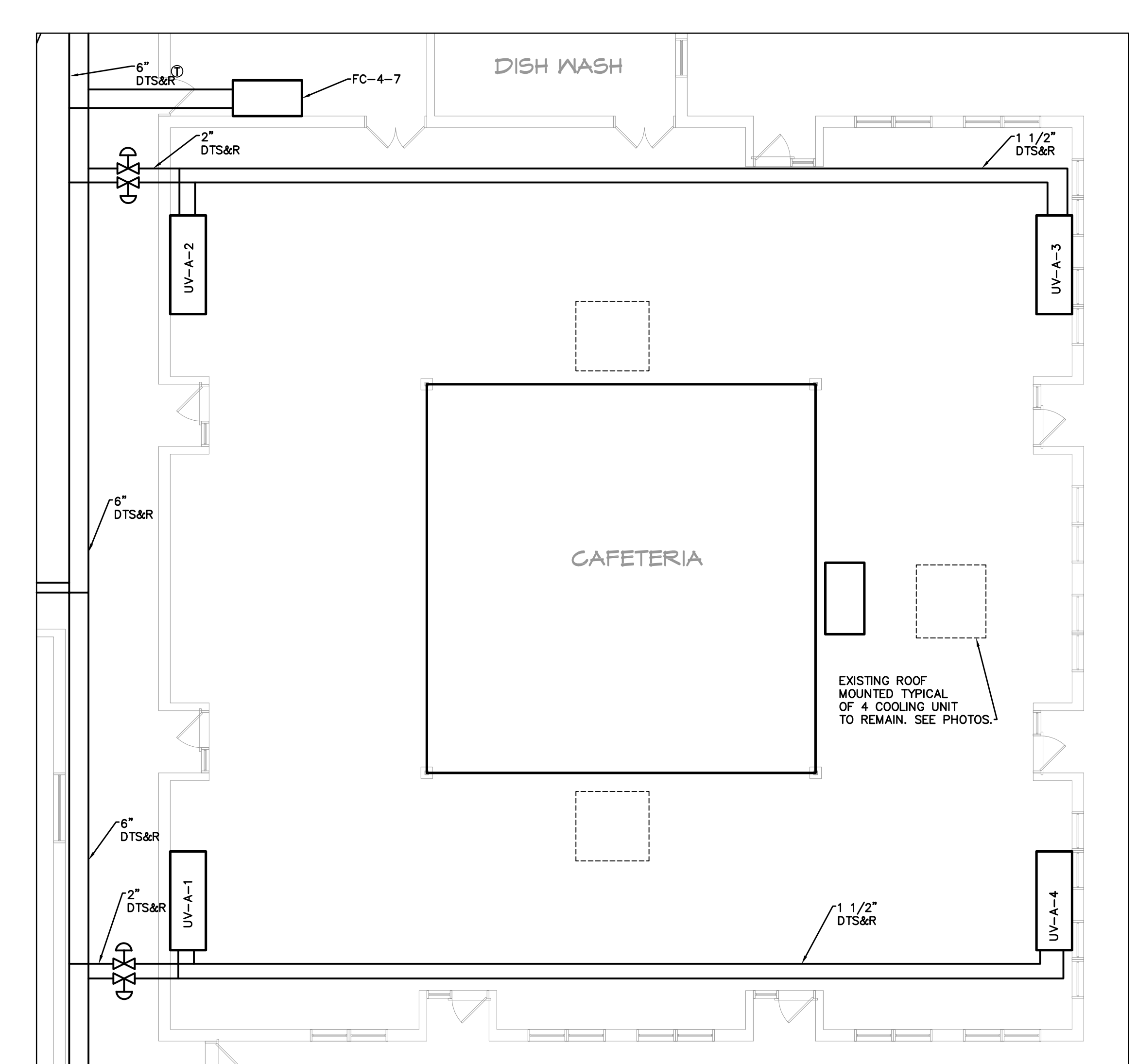
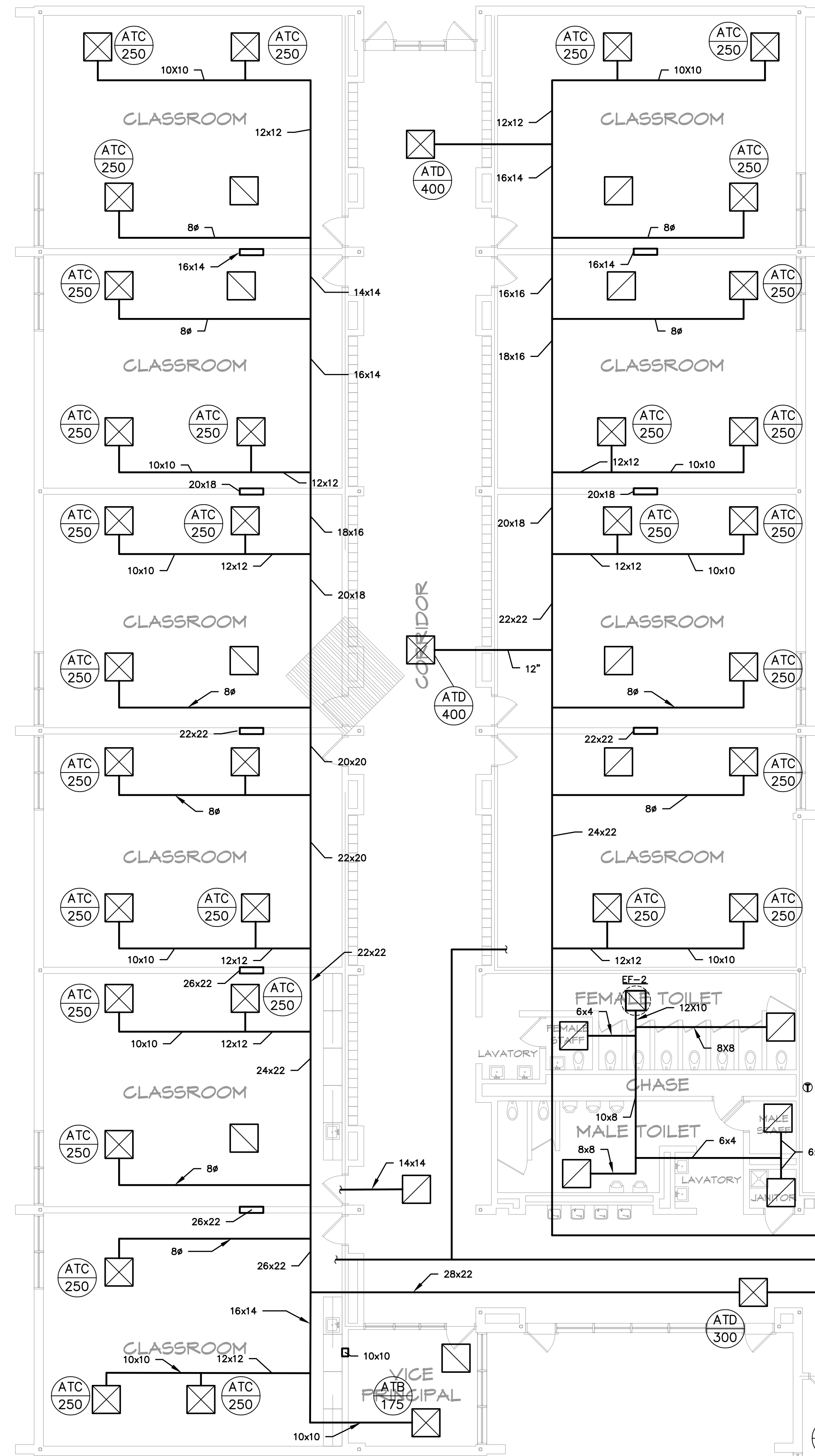


**1 FLOOR PLAN - AREA C**  
A202 SCALE: 1/8" = 1'-0"



# LEGEND

- - - - CONDENSATE DRAIN
- - - - OUTSIDE AIR DUCT
- MECHANICAL PIPING
- - - - EXISTING TO REMAIN

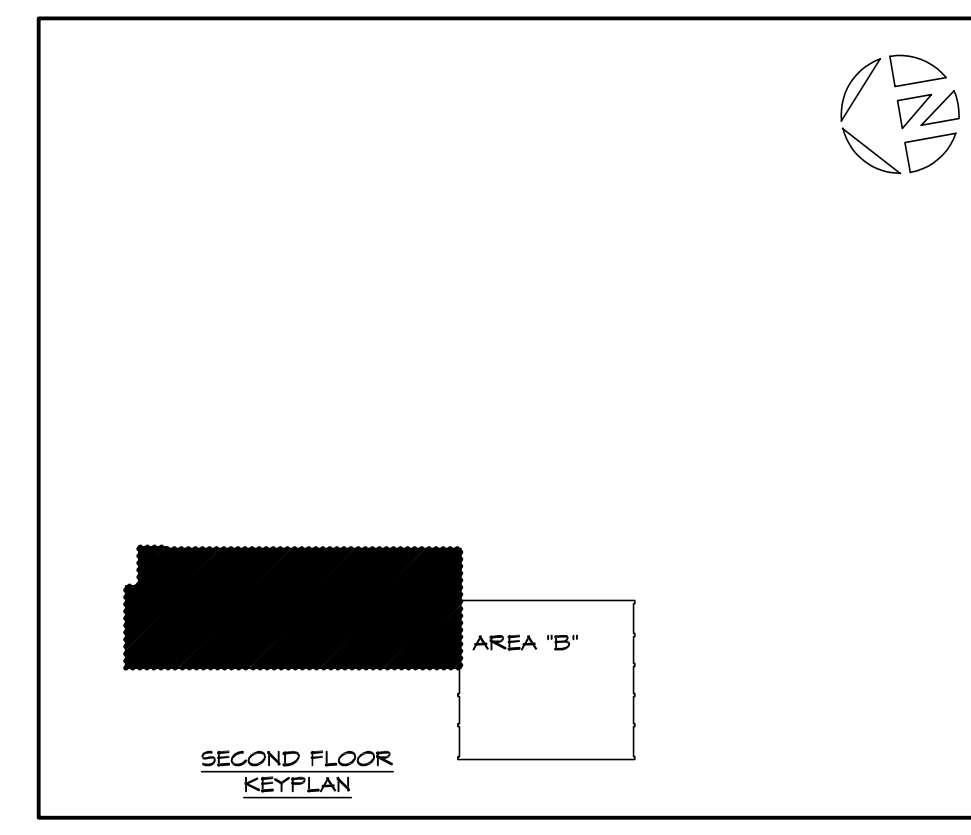
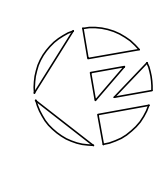


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 DRAWN BY: J.M./RFB  
 CHECKED BY: E.M.W./RFB  
 PROJECT: 2218  
 SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA  
 FLOOR PLANS - AREA E & F  
 PINNACLE ARCHITECTURE PROFESSIONAL ASSOCIATION  
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REVISION SCHEDULE  
 A DATE REFERENCE





CONTRACTOR TO VERIFY ALL DIMENSIONS

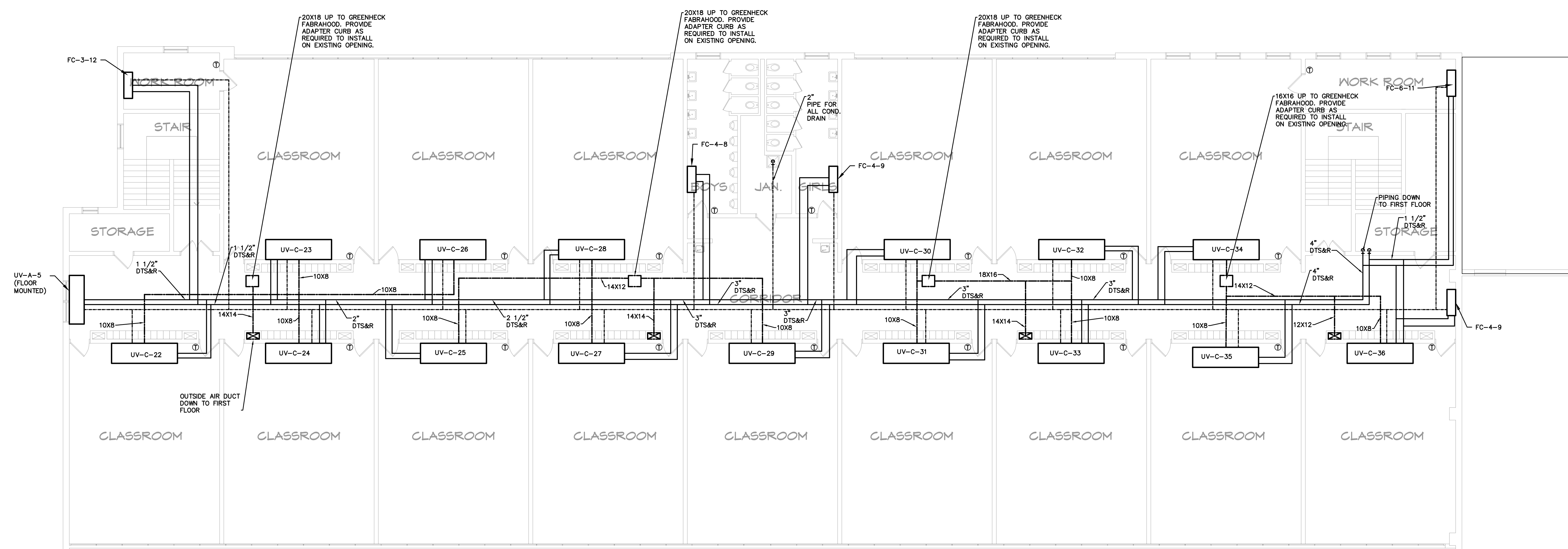


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# LEGEND

- CONDENSATE DRAIN
- OUTSIDE AIR DUCT
- MECHANICAL PIPING
- EXISTING TO REMAIN



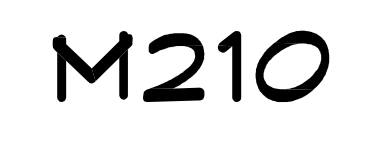
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CHECKED BY: EJM/REB  
PROJECT: 2218

**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS**  
DUDLEY, NORTH CAROLINA  
2nd FLOOR PLANS - AREA C

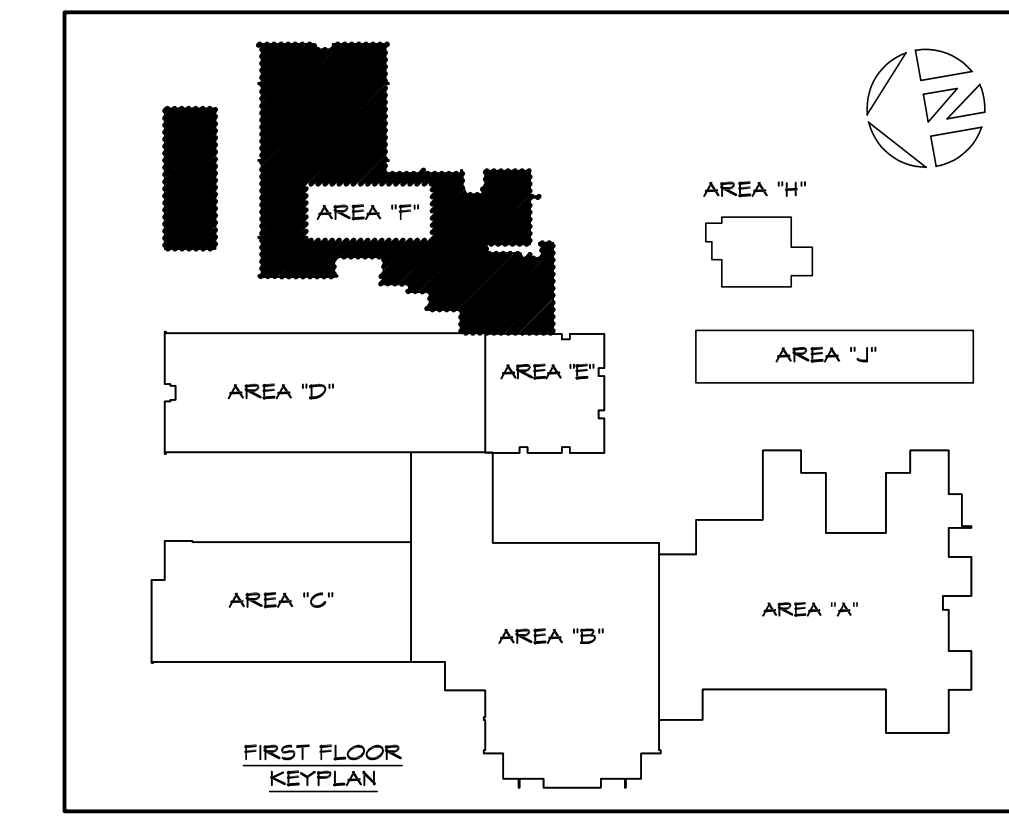
REVISION SCHEDULE	
DATE	REFERENCE

**1 2nd FLOOR PLAN - AREA C**  
A305 SCALE: 1/8" = 1'-0"

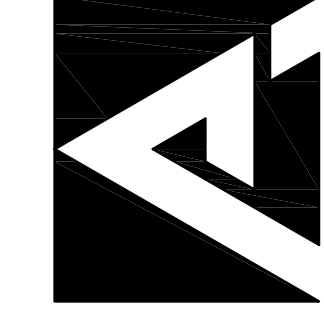




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 701 EAST BAY STREET, SUITE 302  
 CHARLESTON, SOUTH CAROLINA 29403  
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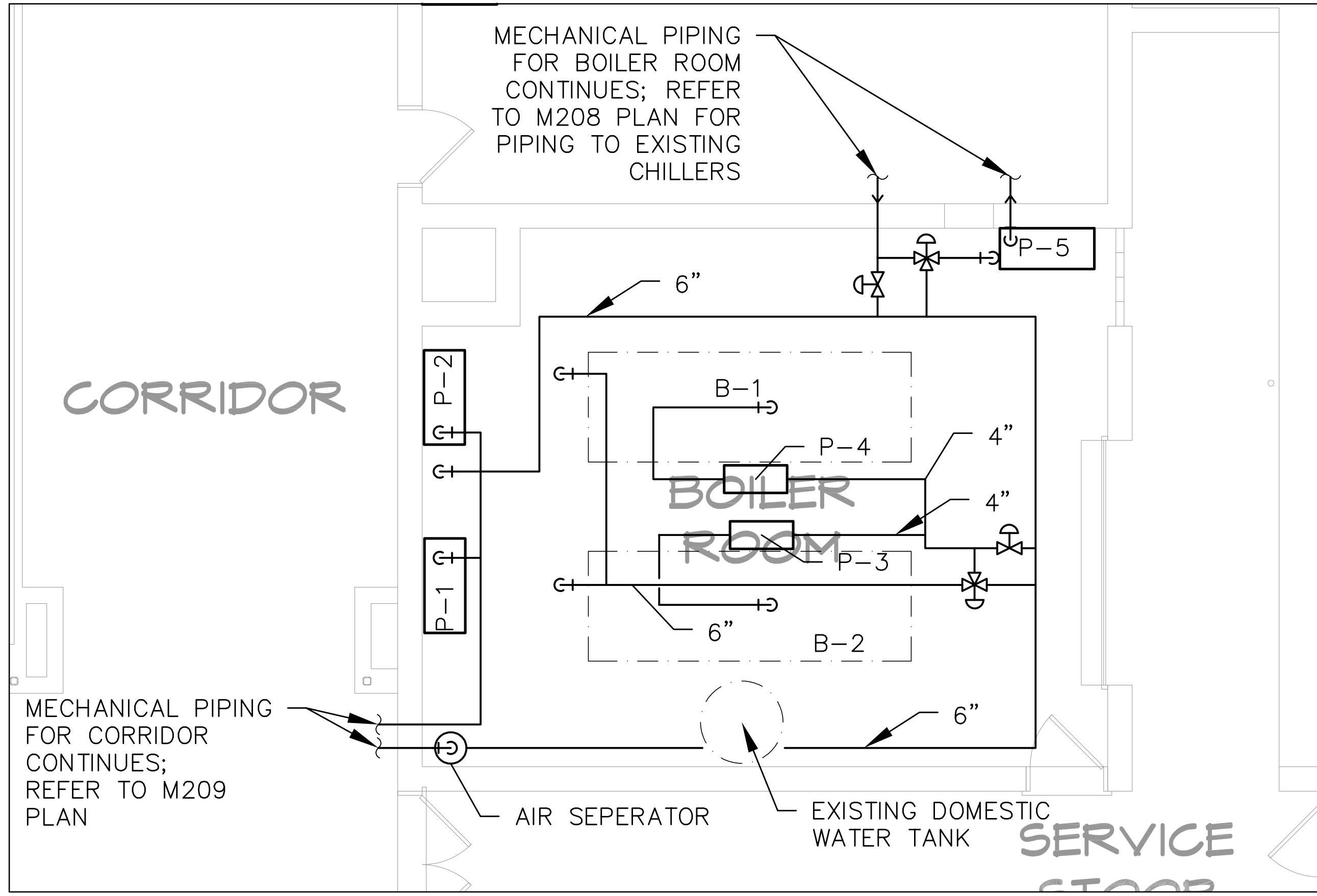


ISSUE DATE: 11/23/2022  
 DRAWN BY: E.M.W./F.R.B.  
 CHECKED BY: E.M.W./F.R.B.  
 PROJECT: 2218

**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS**  
**DUDLEY, NORTH CAROLINA**  
**ENLARGED MECHANICAL AND BOILER ROOM**

REVISION SCHEDULE		
NO.	DATE	REFERENCE

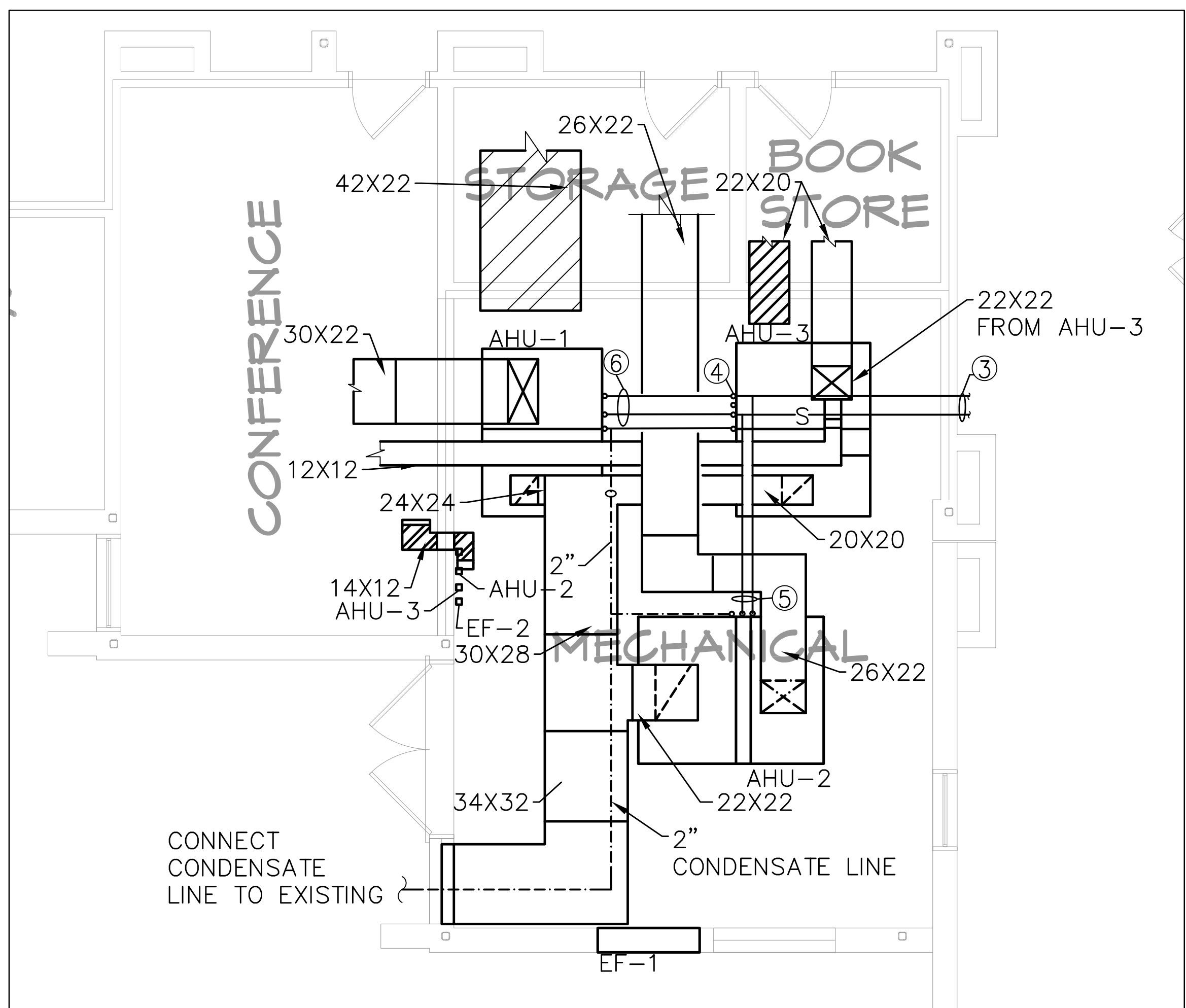
**M211**



**2 ENLARGED BOILER ROOM**  
 A209 SCALE: 1/4" = 1'-0"

**LEGEND**

- CONDENSATE DRAIN
- OUTSIDE AIR DUCT
- MECHANICAL PIPING
- EXISTING TO REMAIN



**1 ENLARGED MECHANICAL ROOM**  
 A209 SCALE: 1/4" = 1'-0"

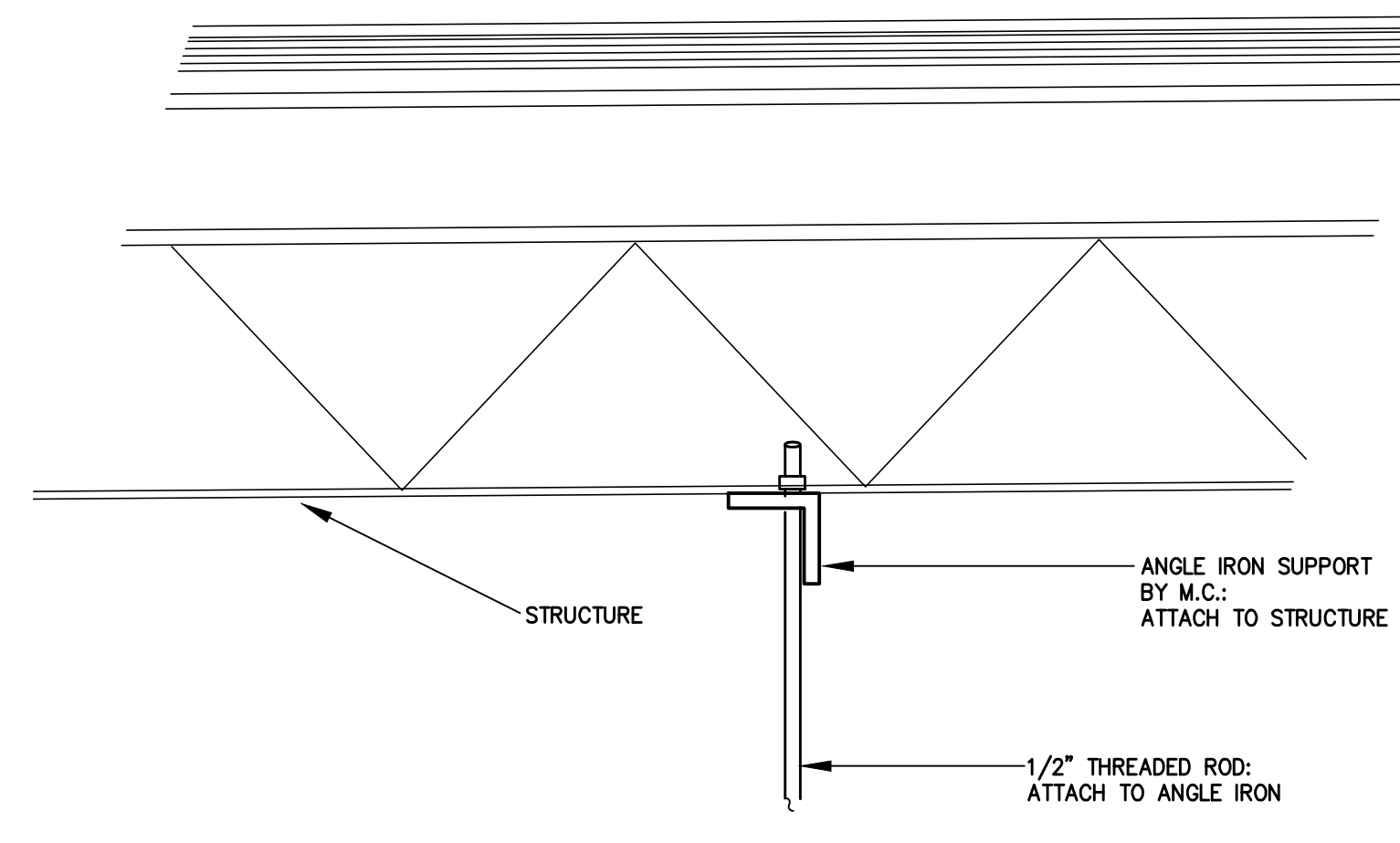
**NOTES:**

1. 3" DUAL TEMPERATURE WATER SUPPLY  
3" DUAL TEMPERATURE WATER RETURN
2. 2" DUAL TEMPERATURE WATER SUPPLY  
2" DUAL TEMPERATURE WATER RETURN
3. 2" DUAL TEMPERATURE WATER SUPPLY  
2" DUAL TEMPERATURE WATER RETURN
4. 2 1/2" DUAL TEMPERATURE WATER SUPPLY  
2 1/2" DUAL TEMPERATURE WATER RETURN

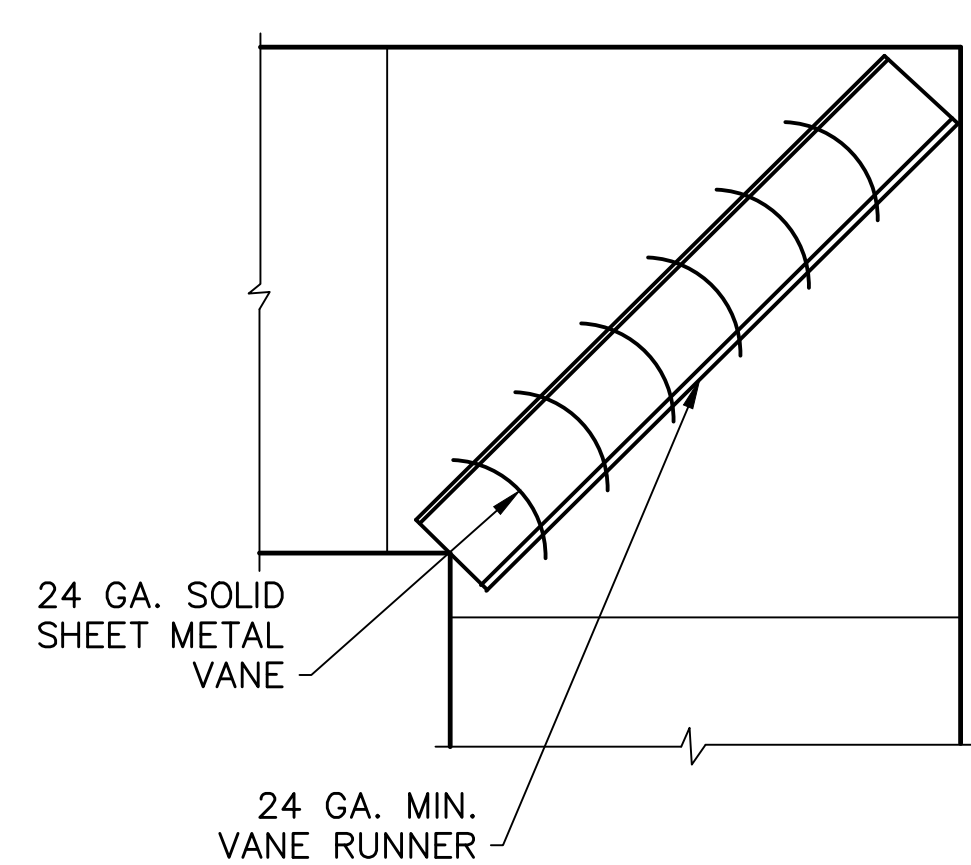




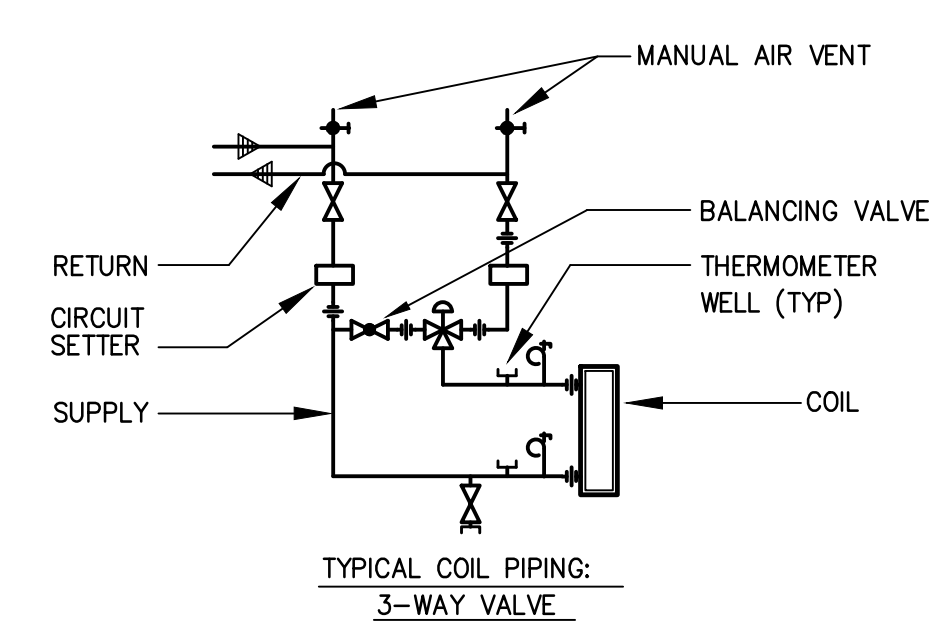




**13 SUPPORT DETAIL**  
SCALE: NTS

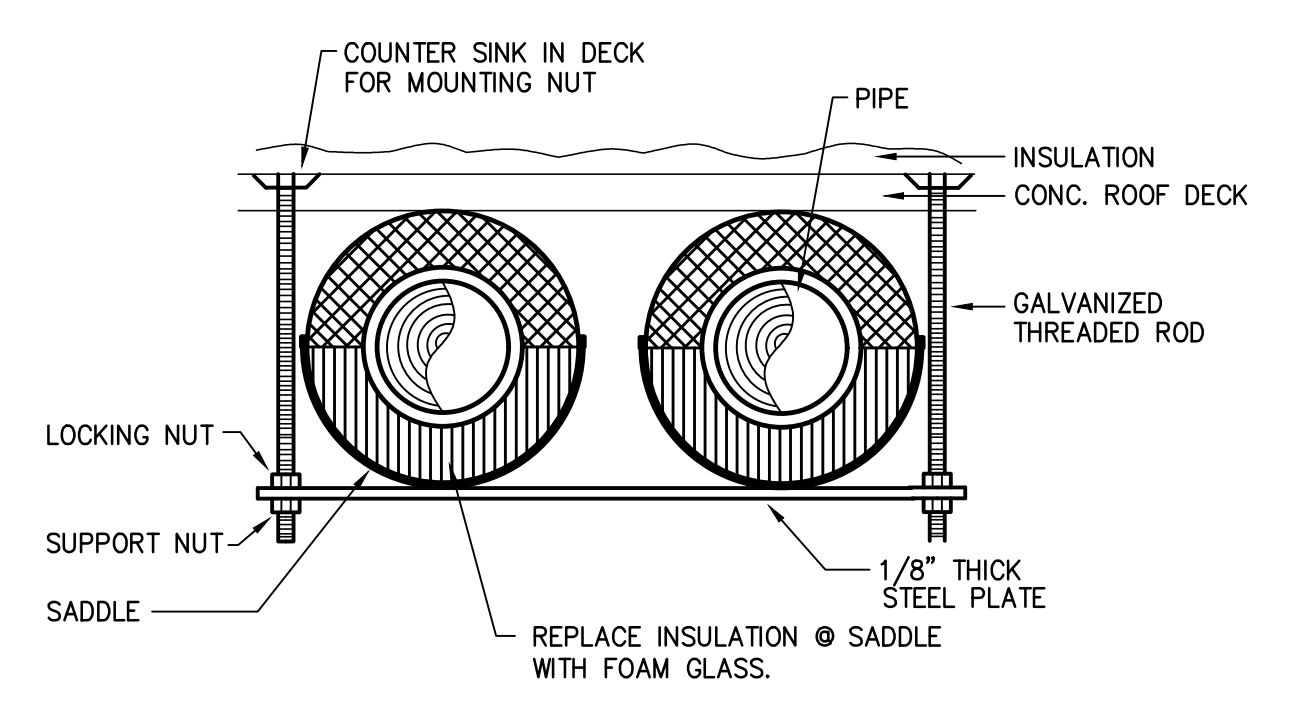


**14 TURNING VANE DETAIL**  
SCALE: NTS

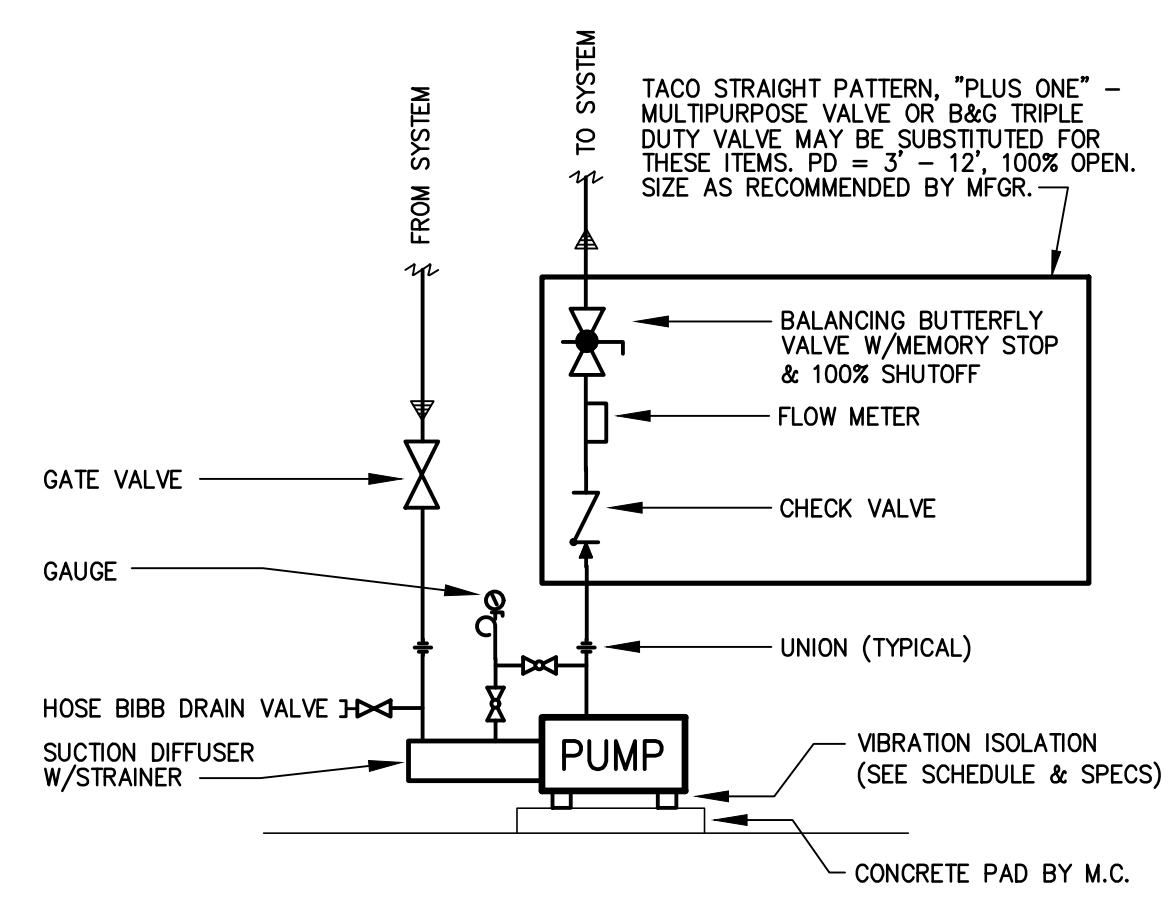


NOTE: FOR UNITS WITH PIPING LESS THAN ONE INCH DIAMETER: IN LIEU OF GAUGE COCK AND SNUBBER THERMOMETER WELL, PROVIDE SISCO PLUG AND ONE SET OF GAUGES.

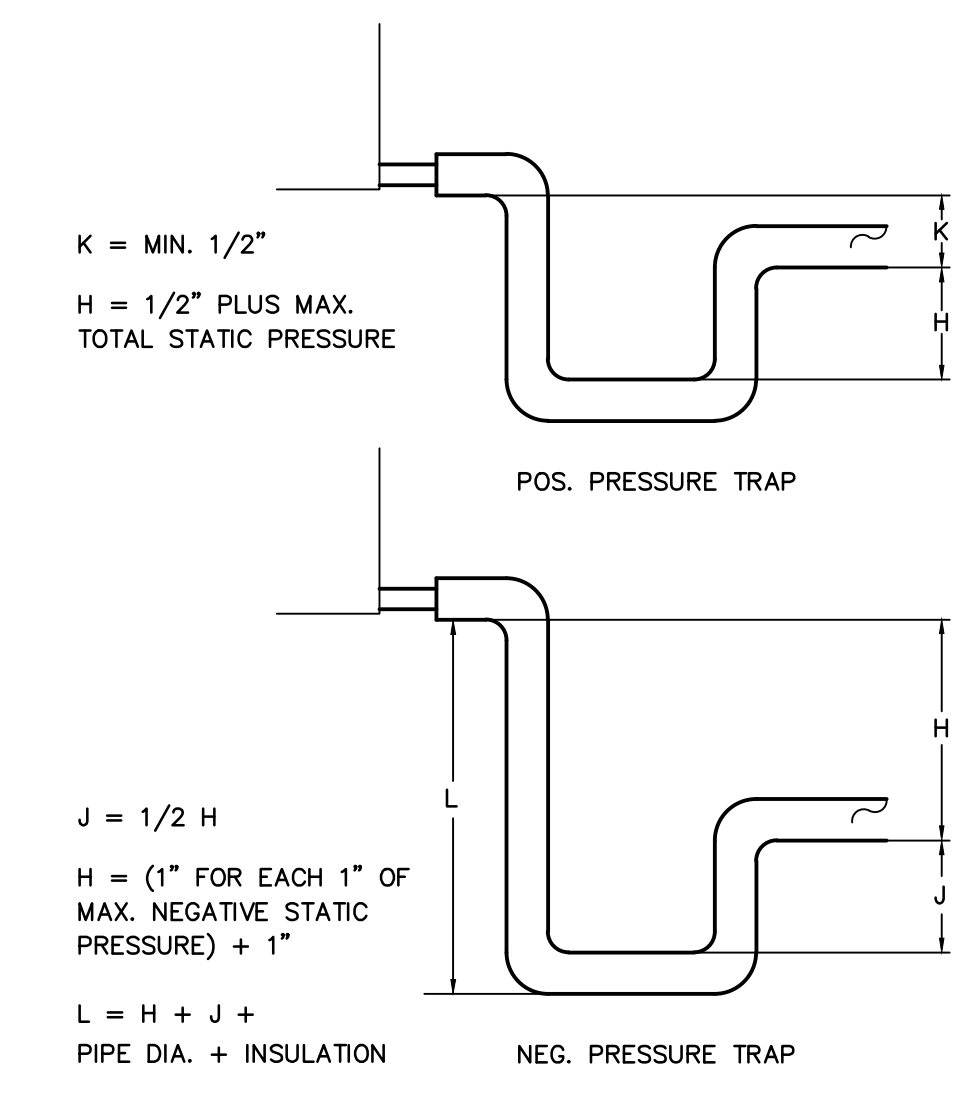
**15 COIL PIPING DETAIL**  
SCALE: NTS



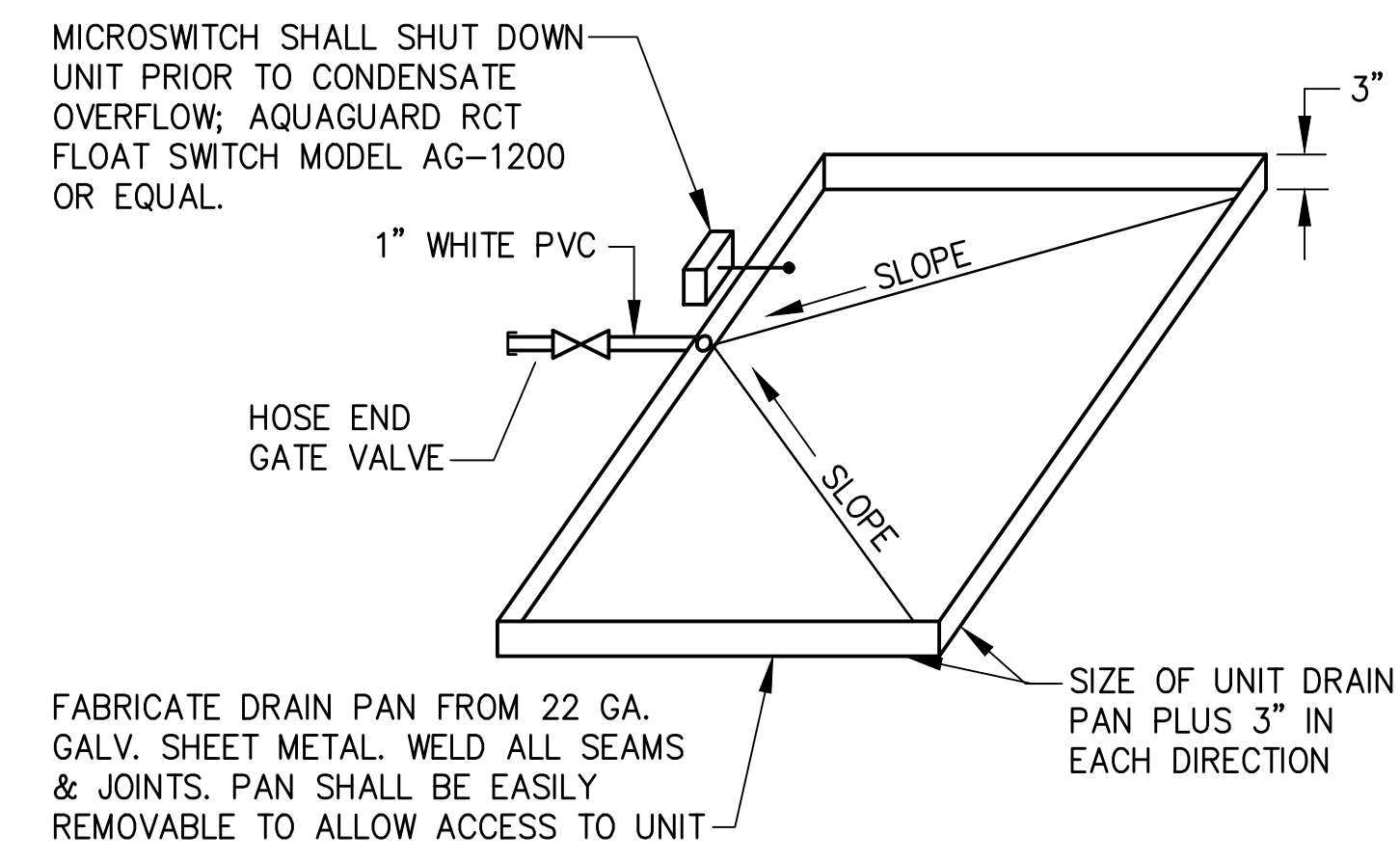
**16 PIPING DETAIL - 2 LINE**  
SCALE: NTS



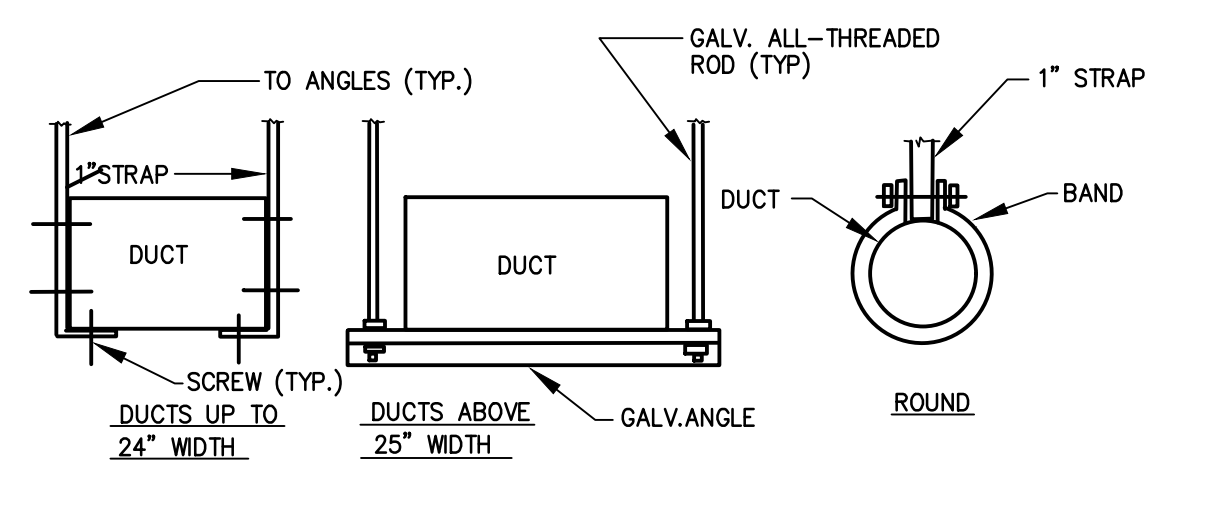
**9 PUMP PIPING DETAIL**  
SCALE: NTS



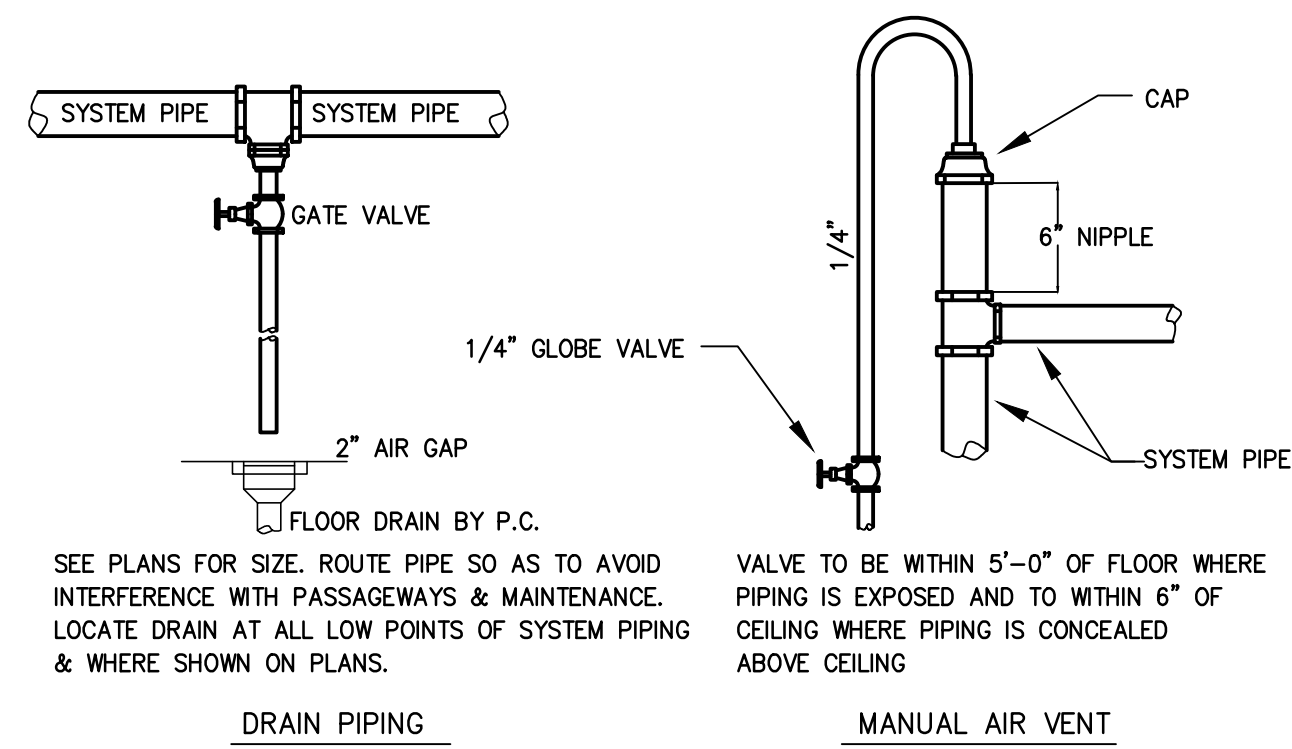
**10 CONDENSATE TRAP DETAIL**  
SCALE: NTS



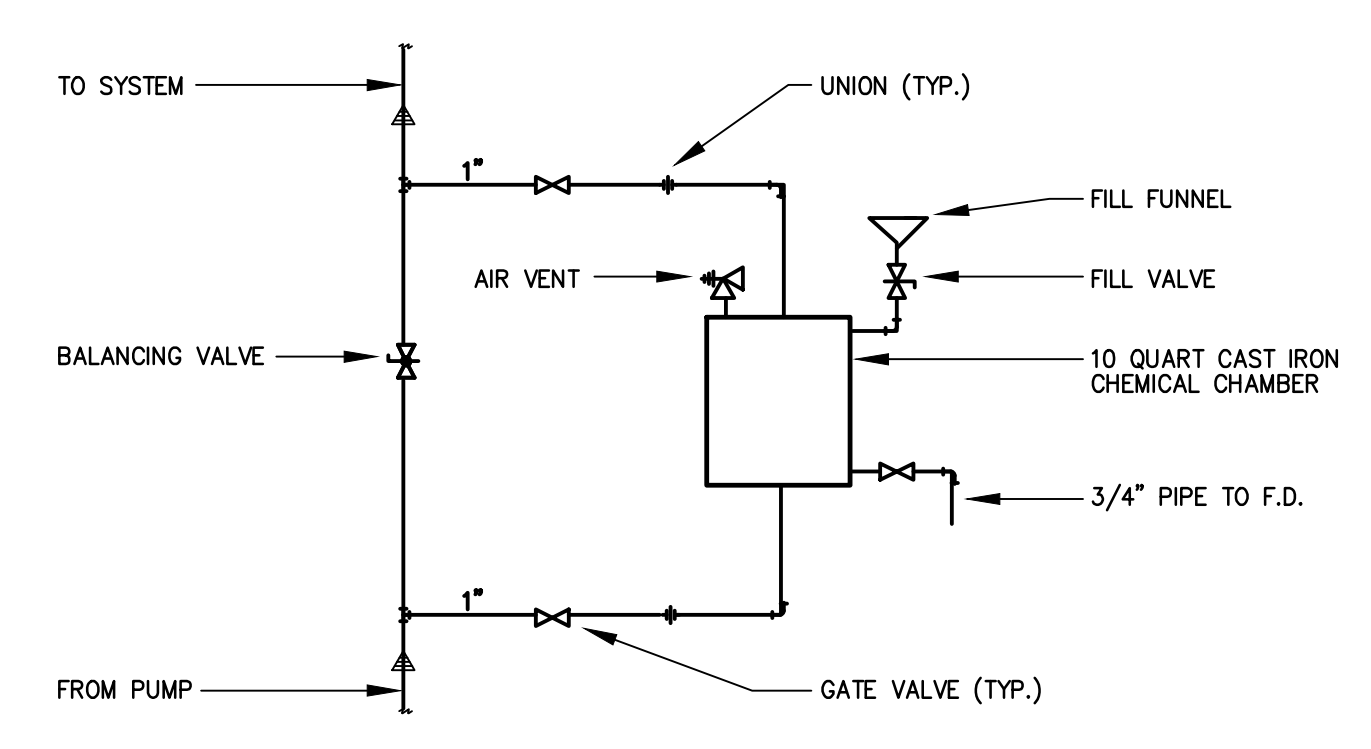
**11 AUXILIARY DRAIN PAN DETAIL**  
SCALE: NTS



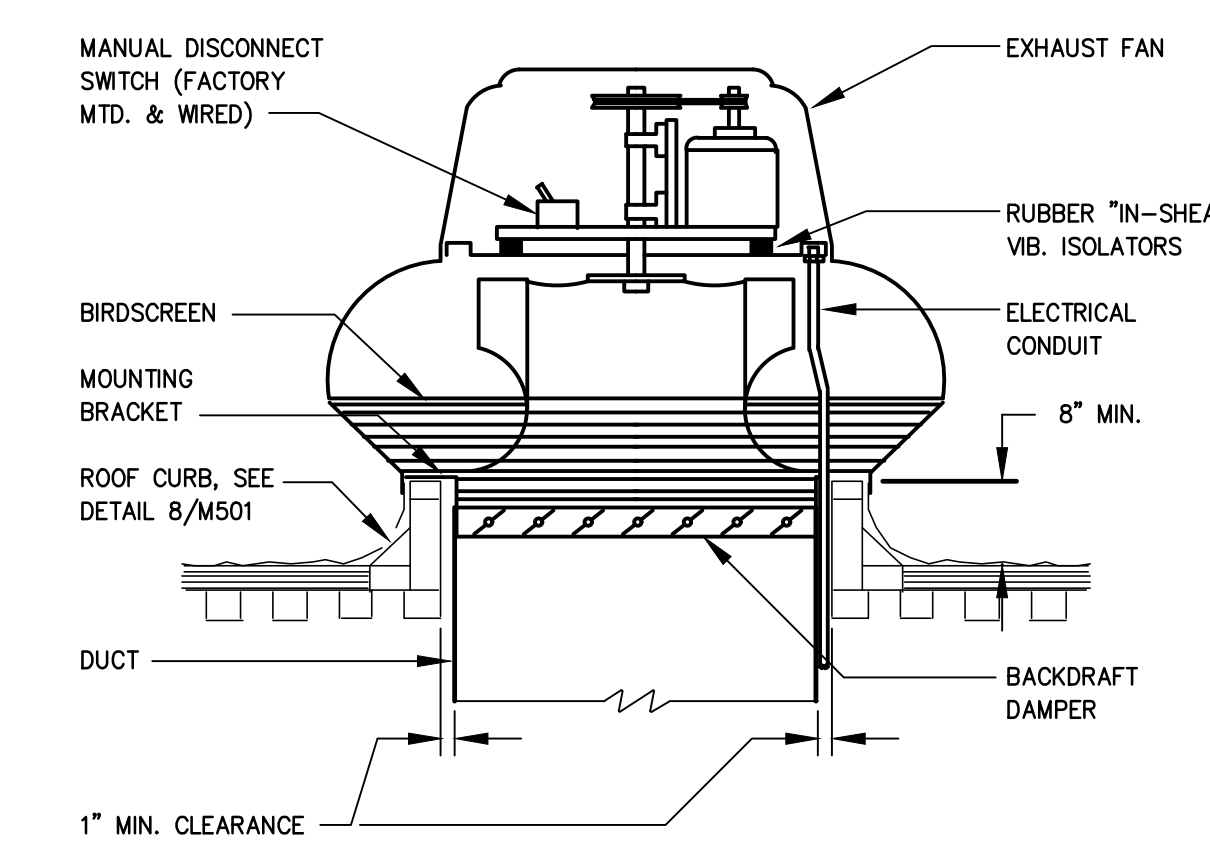
**12 DUCTWORK HANGER DETAILS**  
SCALE: NTS



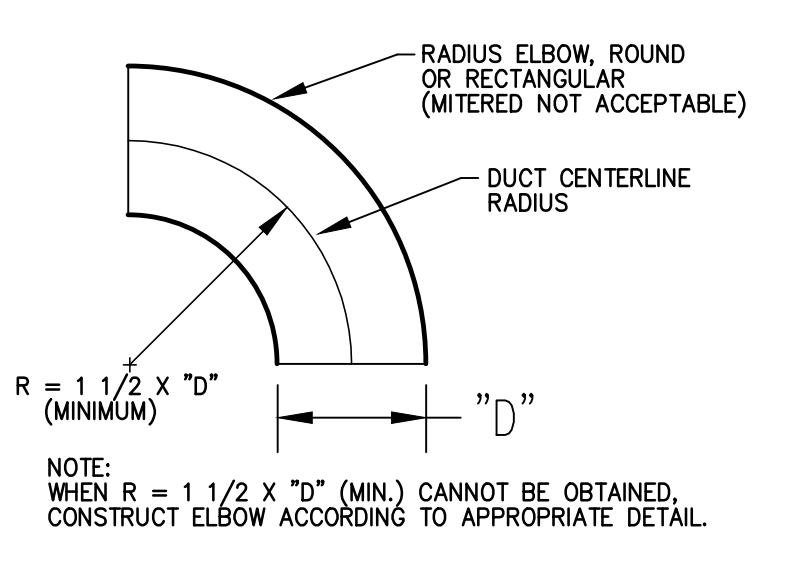
**5 DRAIN PIPING & MANUAL AIR VENT DETAIL**  
SCALE: NTS



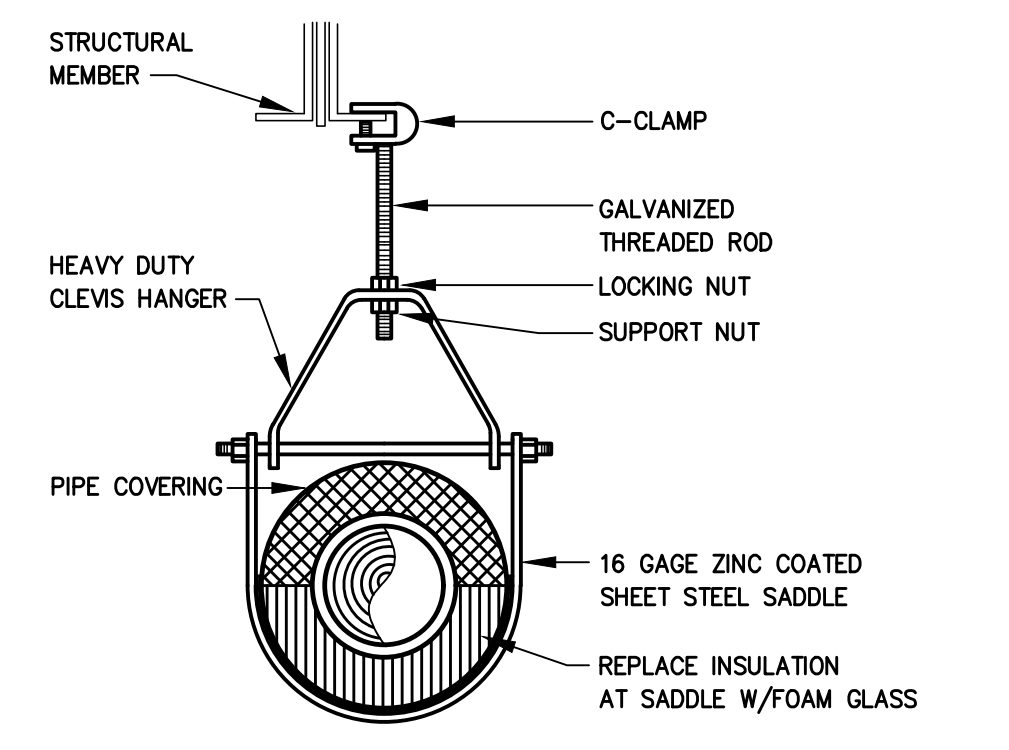
**6 ONE SHOT CHEMICAL FEED DETAIL**  
SCALE: NTS



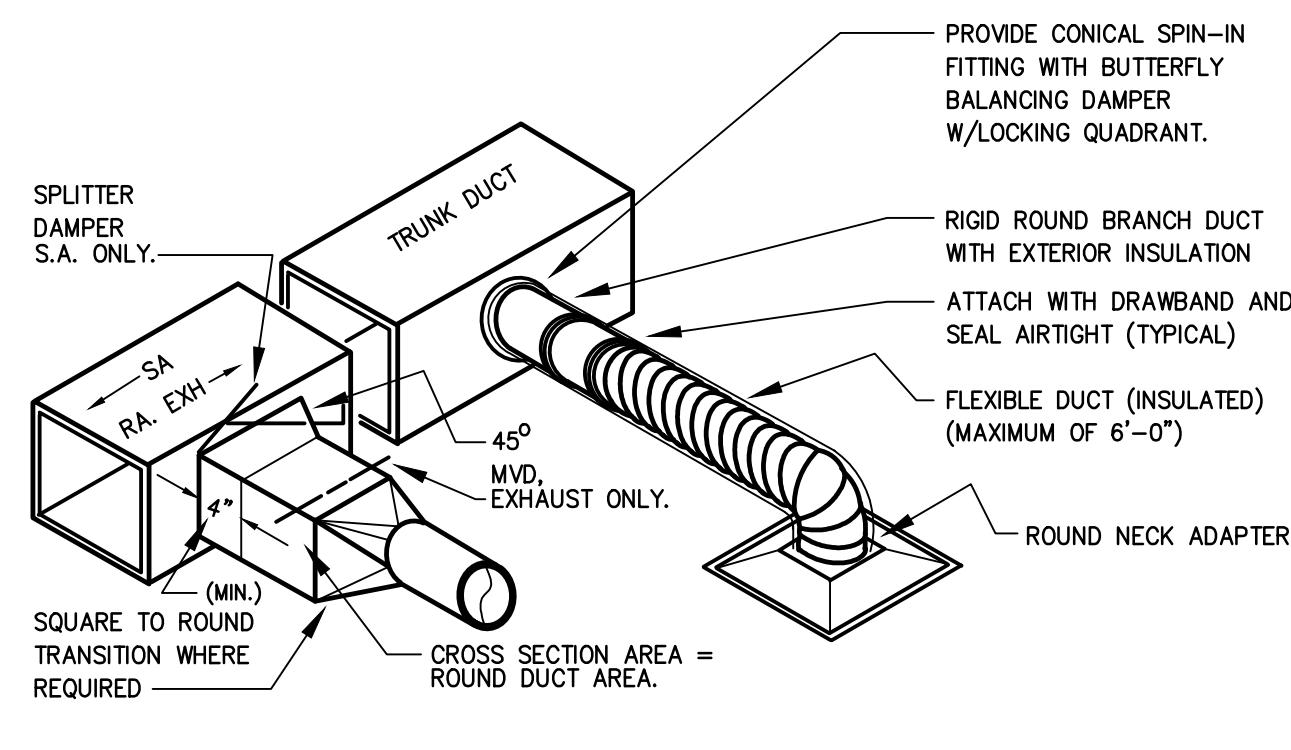
**7 ROOF MTD. EXHAUST FAN DETAIL**  
SCALE: NTS



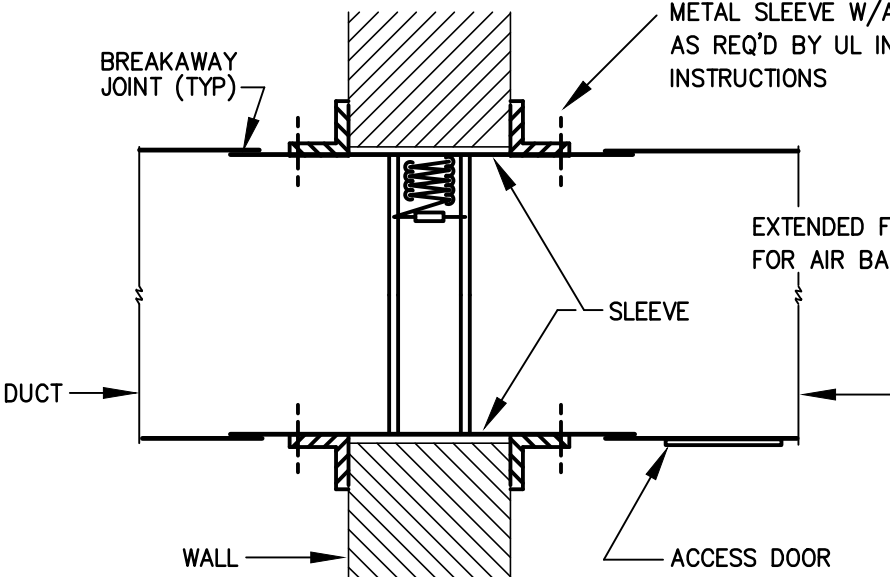
**8 RADIUS ELBOW DETAIL**  
SCALE: NTS



**1 PIPE HANGER DETAIL**  
SCALE: NTS

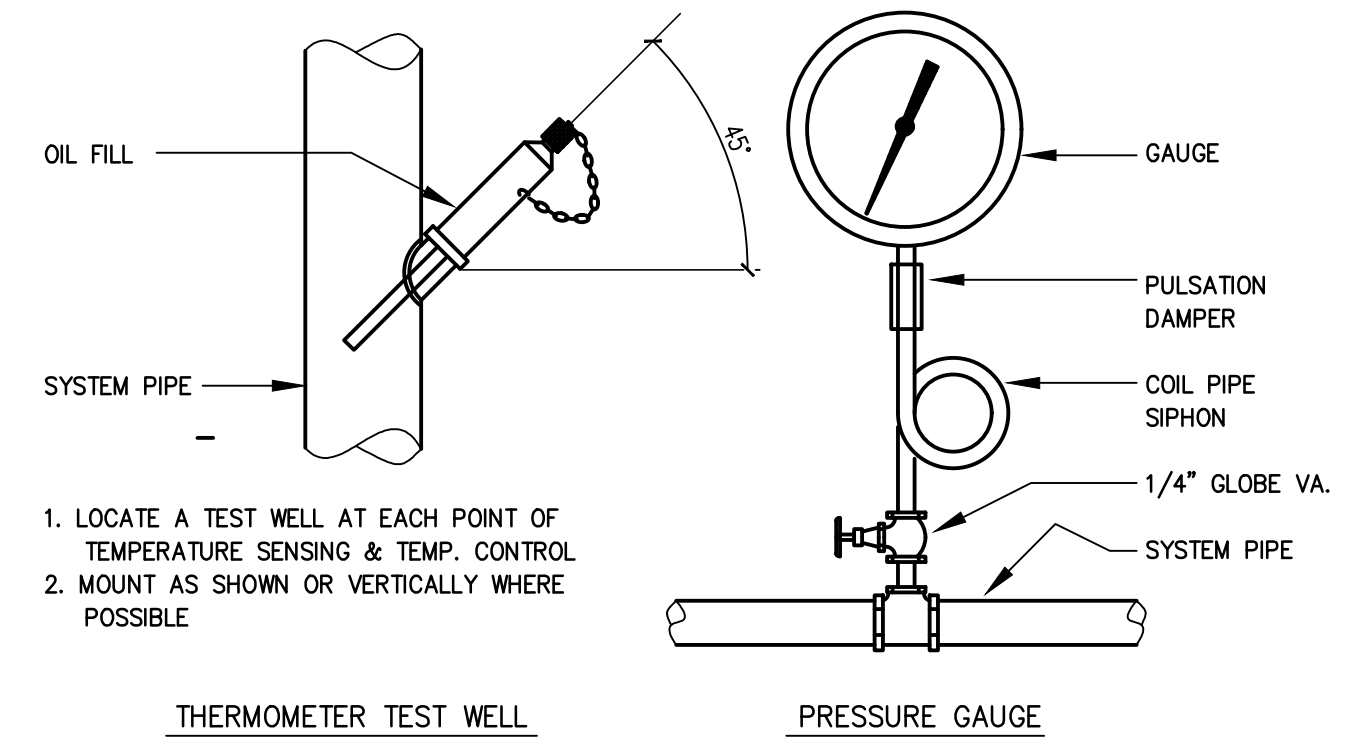


**2 DUCT TAKE-OFF DETAIL**  
SCALE: NTS



**3 FIRE DAMPER DETAIL (IN AIR STREAM) TYPE "A"**  
SCALE: NTS

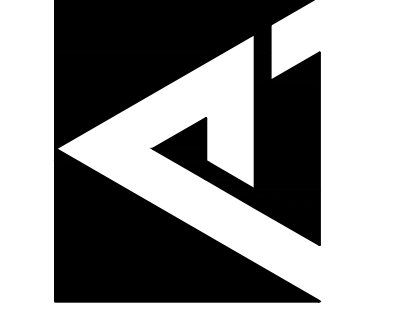
NOTES: 1. FD "A" IS USED FOR LOW PRESSURE DUCT PENETRATIONS THRU FIRE-RATED WALLS (SEE SPECS FOR "LOW PRESSURE DUCT" DEFINITION). 2. FIRE-RATED WALLS ARE SHOWN ON PLANS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE NUMBER AND SIZE OF ALL DUCT PENETRATIONS THRU FIRE-RATED WALLS. 3. PLAN SYMBOL =



**4 THERMOMETER TEST WELL & PRESSURE GAUGE DETAIL**  
SCALE: NTS



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PROJECT: 2218

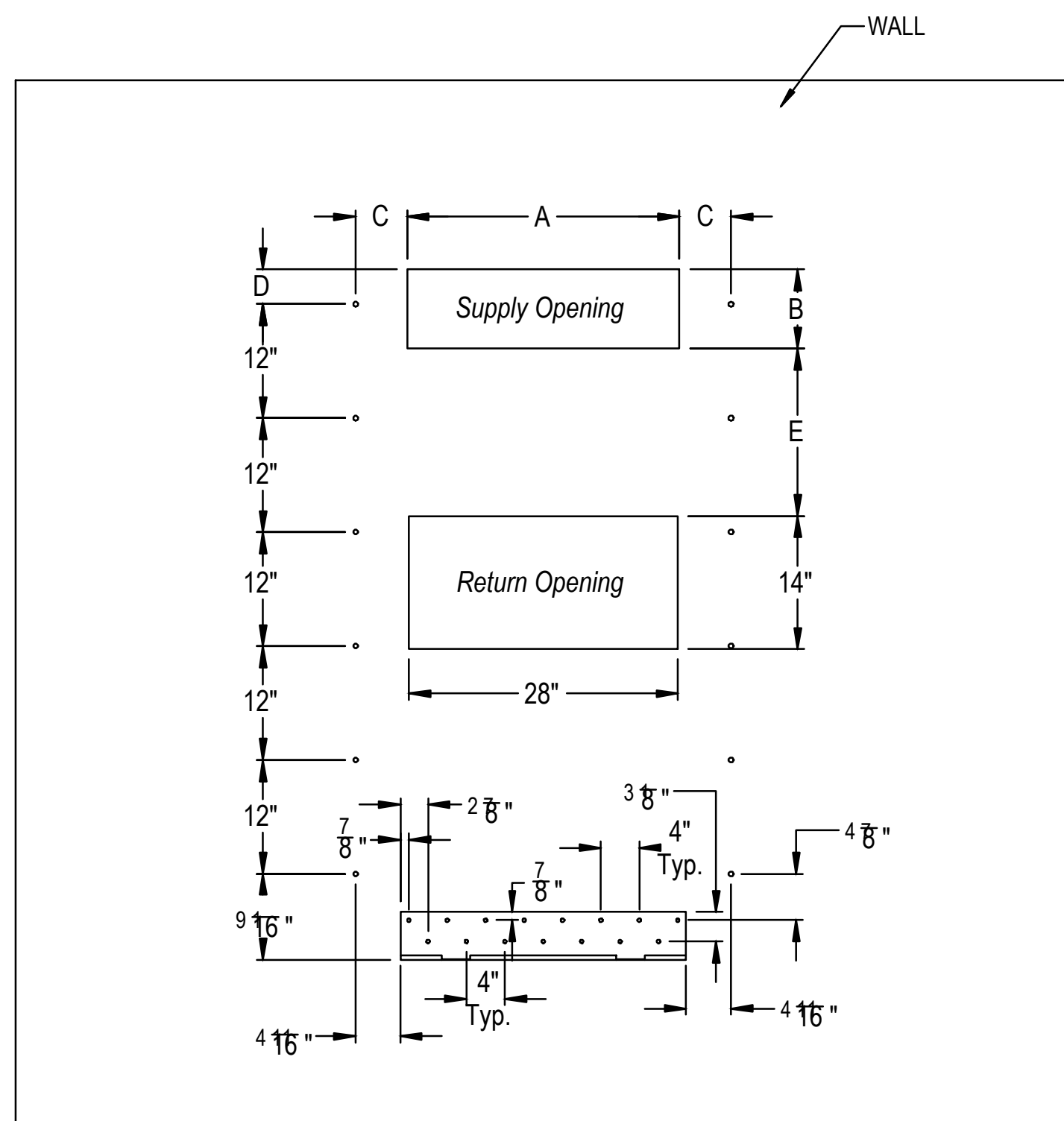
**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA**  
MECHANICAL DETAILS

REVISION SCHEDULE	
DATE	REFERENCE

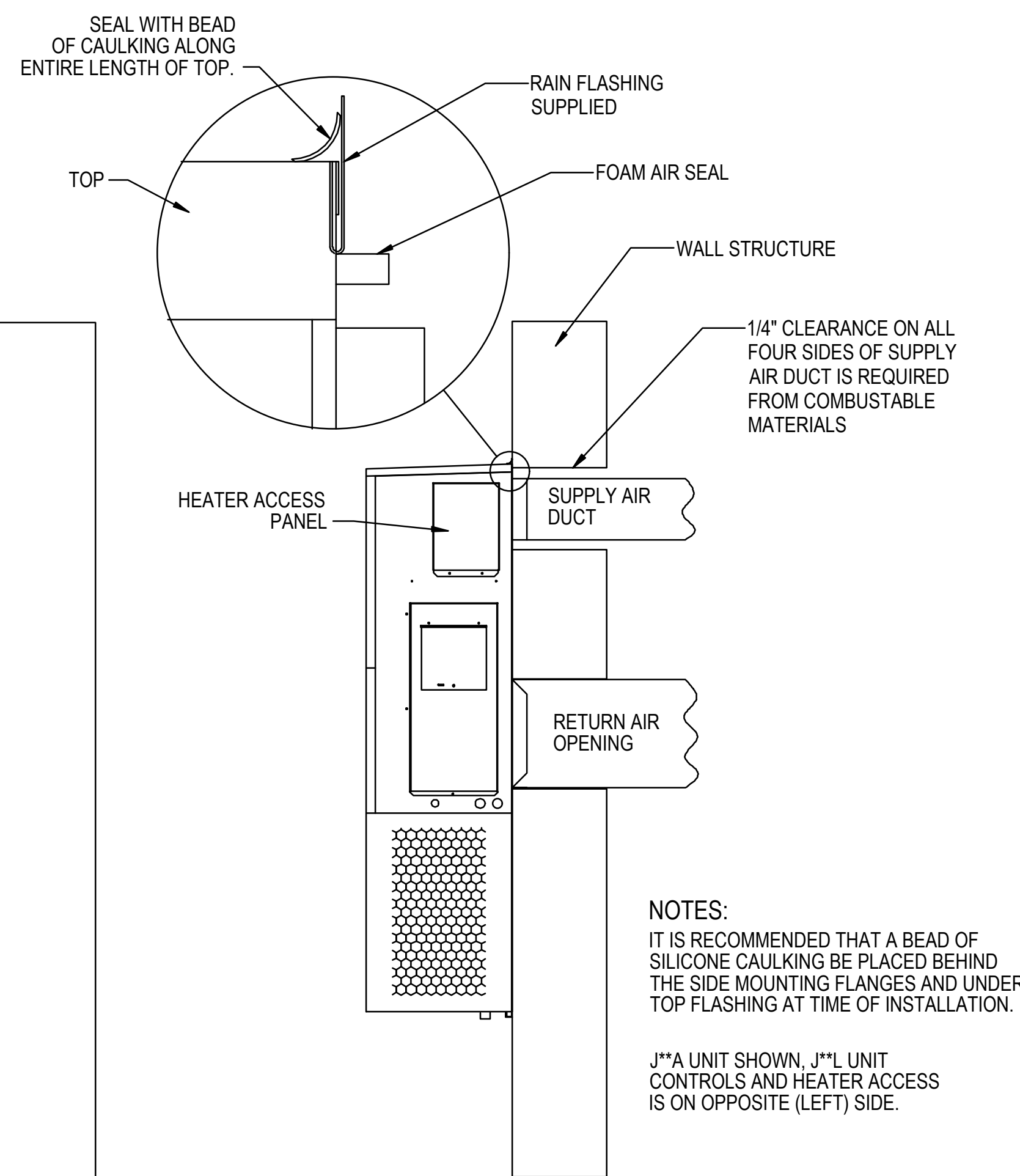
M300



REQUIRED DIMENSIONS TO MAINTAIN 1/4" MIN. CLEARANCE FROM COMBUSTIBLE MATERIALS	A	B	C	D	E
	28 3/8"	8 3/8"	5 3/8"	3 11/16"	17 5/8"
REQUIRED DIMENSIONS TO MAINTAIN RECOMMENDED 1" CLEARANCE FROM COMBUSTIBLE MATERIALS					
	29 7/8"	9 7/8"	4 5/8"	4 1/2"	16 7/8"



Wall Opening and Hole Location View

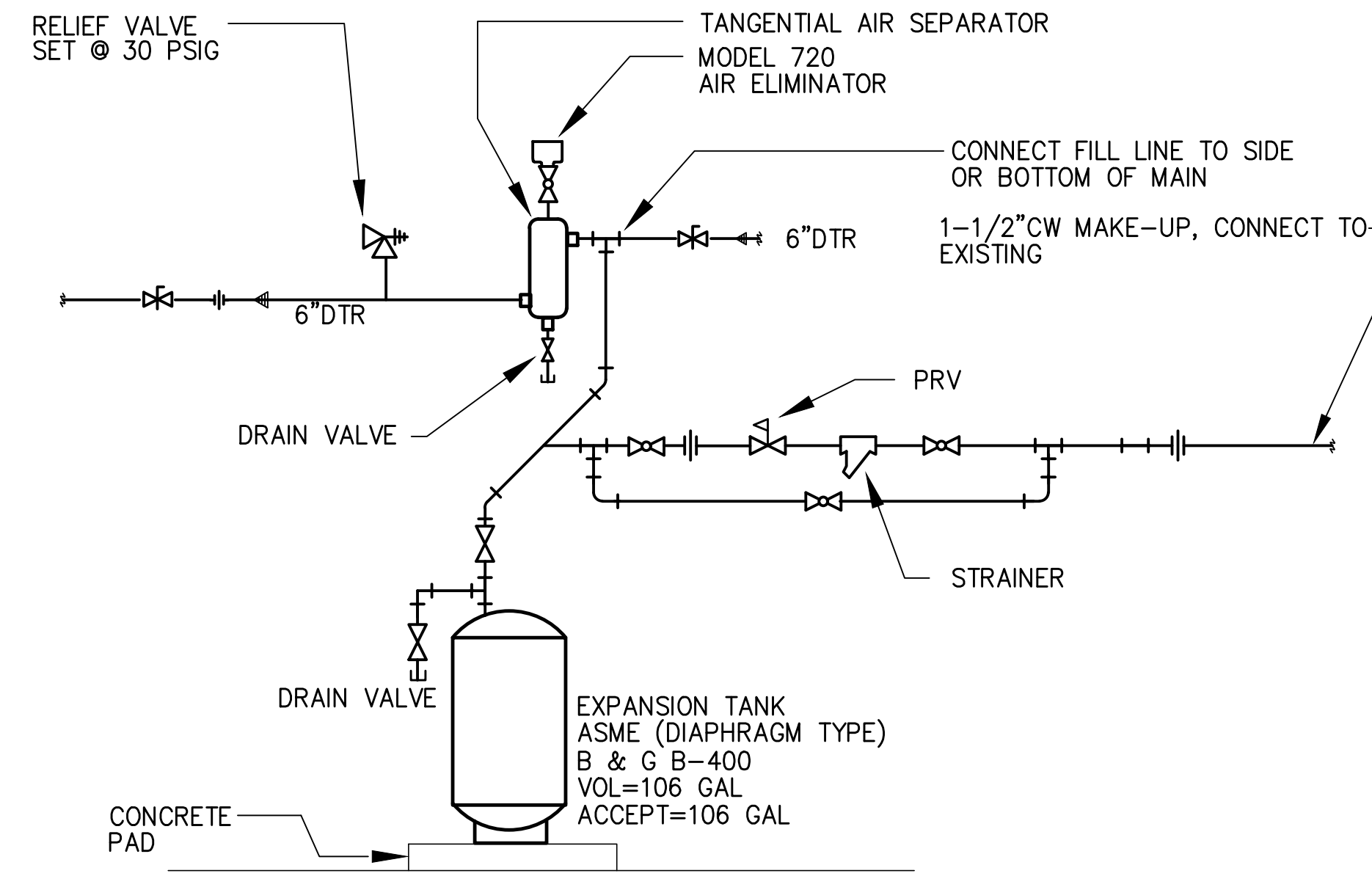


Right Side View

MIS-3158 A

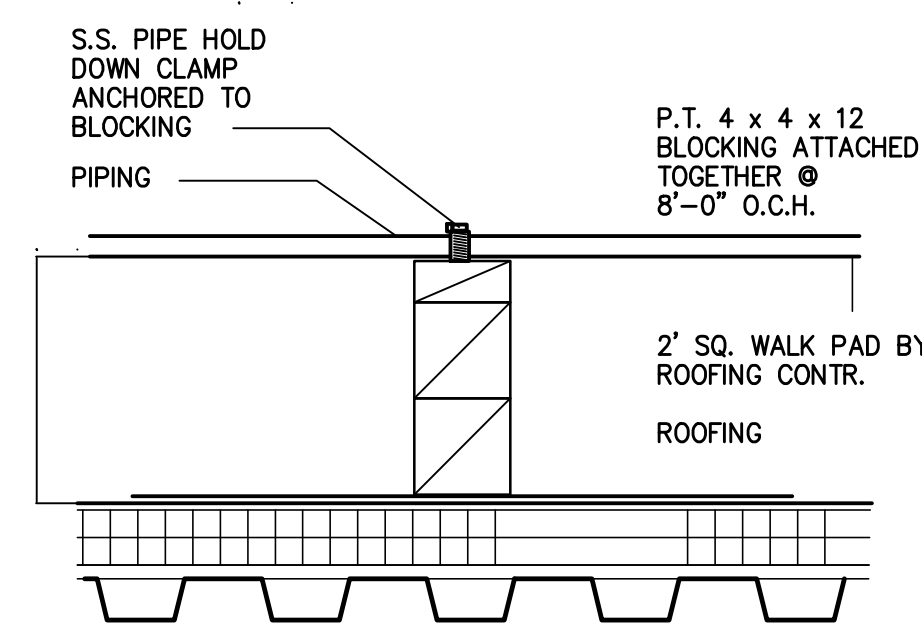
9 WALL HUNG BARD UNIT DETAIL

SCALE: NTS



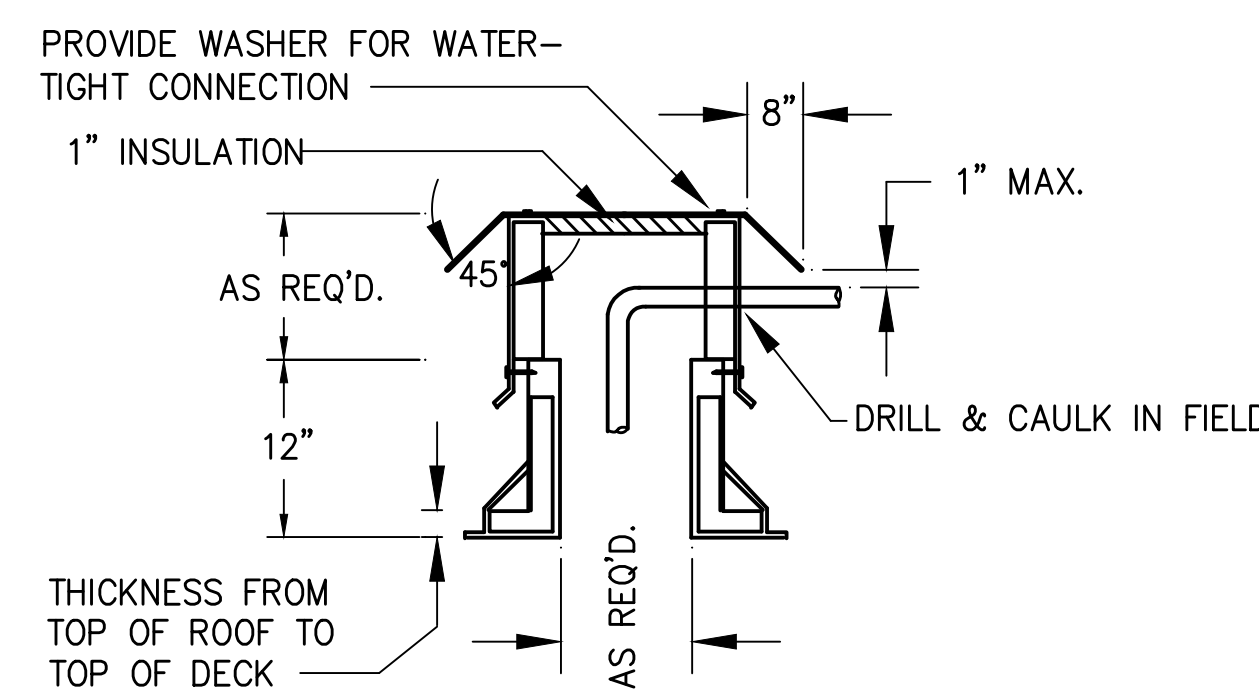
10 PRESSURIZATION & AIR ELIMINATION DETAIL

SCALE: NTS



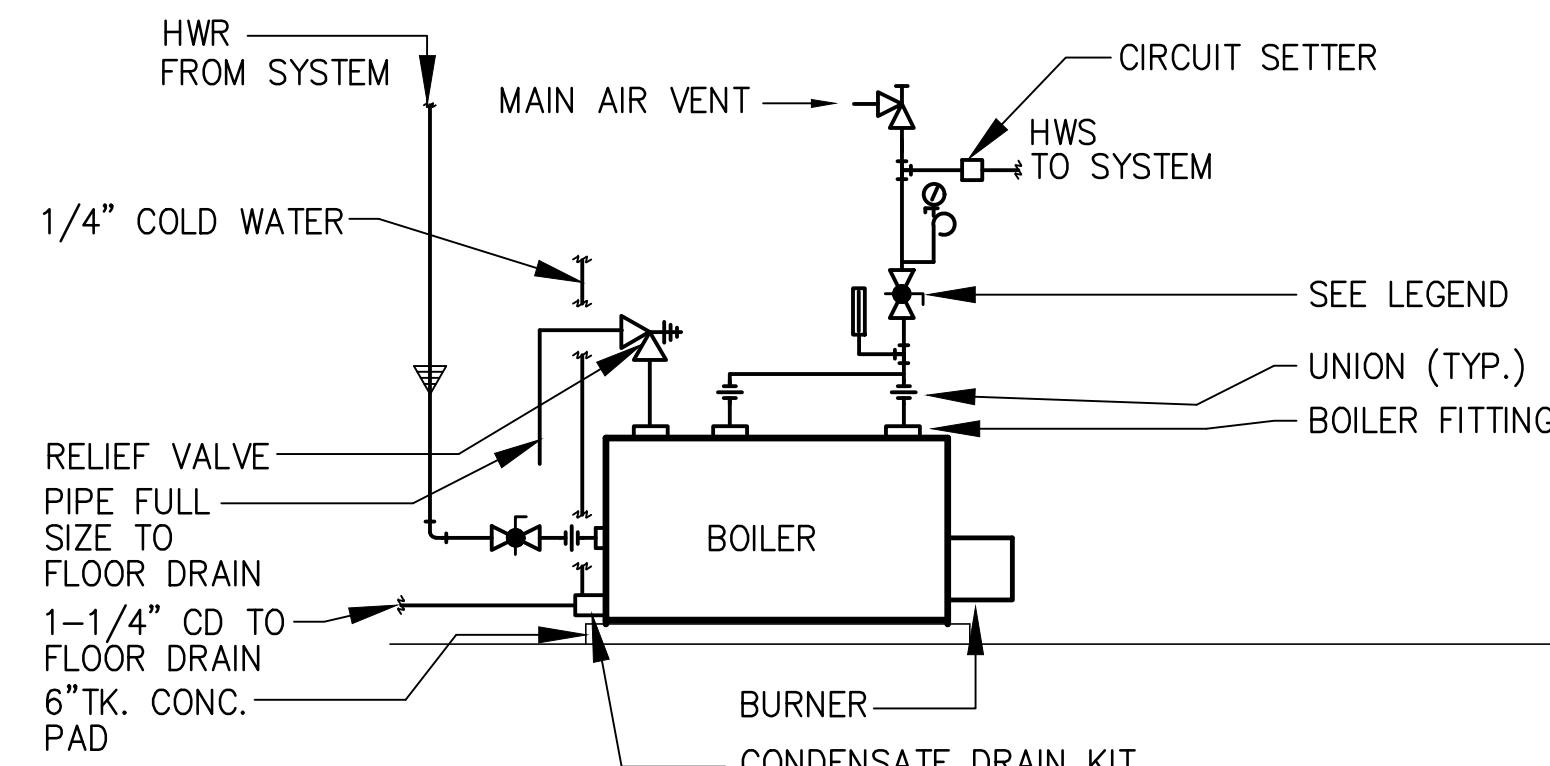
5 PIPE SUPPORT DETAIL

SCALE: NTS



6 PIPING THRU ROOF DETAIL

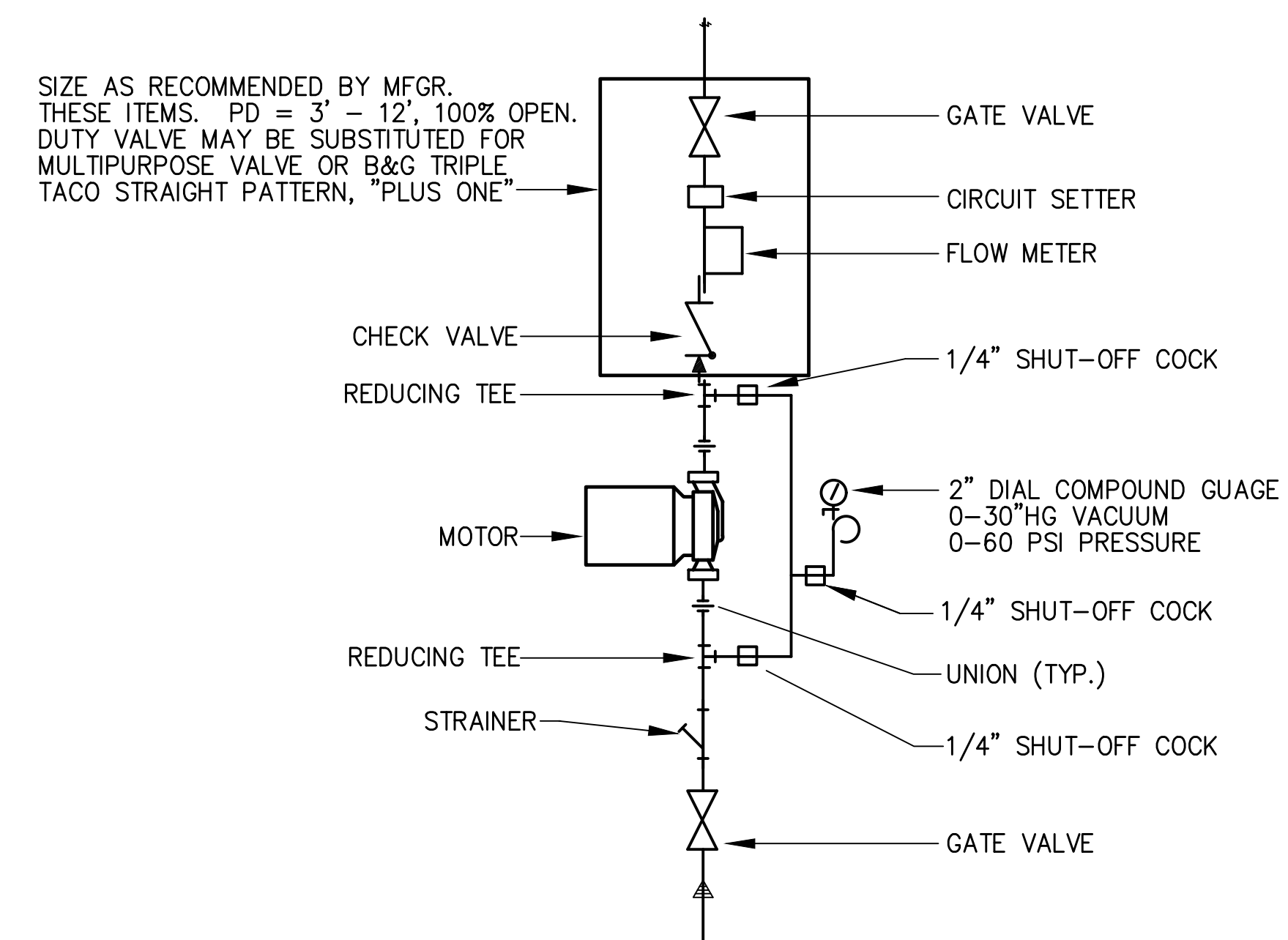
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7 BOILER PIPING DETAIL

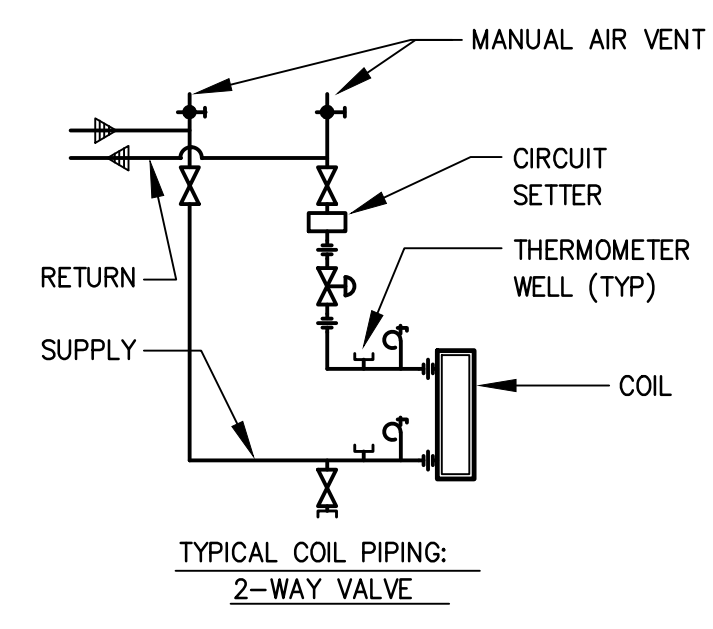
SCALE: NTS

EXISTING WELL-MCLAIN 1388 STEAM BOILER TO BE REUSED. CONVERT FROM STEAM TO HOT WATER PER MANUFACTURERS GUIDELINES.  
PROVIDE WELL-MCLAIN WATER TRIM ASSEMBLY WITH 50 PSI RELIEF VALVE AND MCDONNELL & MILLER 751P-MT-120 LWCO WITH MANUAL RESET FOR EACH BOILER.



8 INLINE PUMP DETAIL

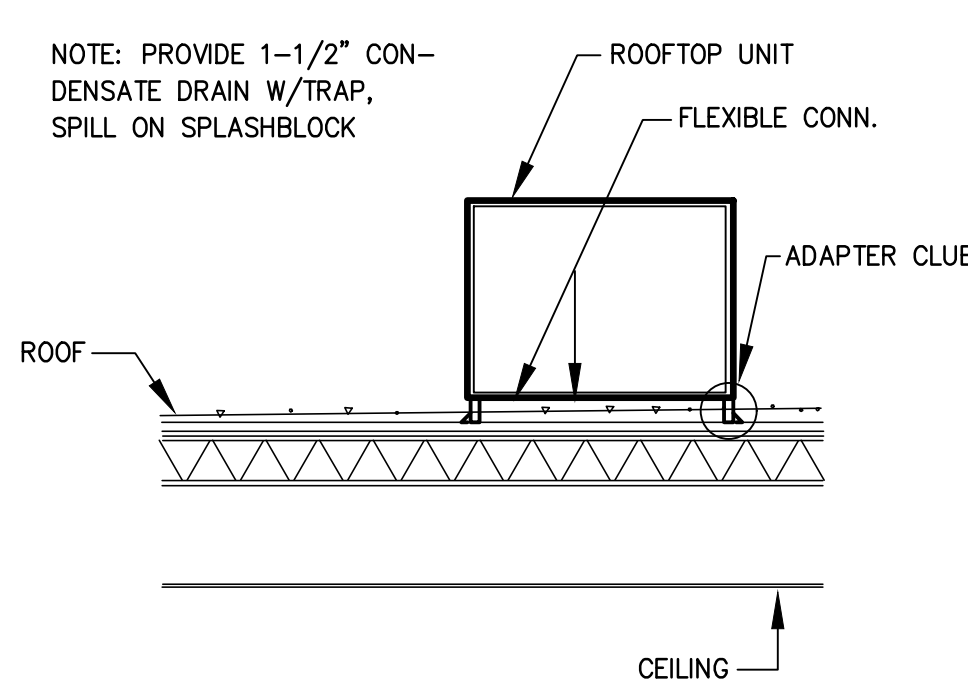
SCALE: NTS



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.

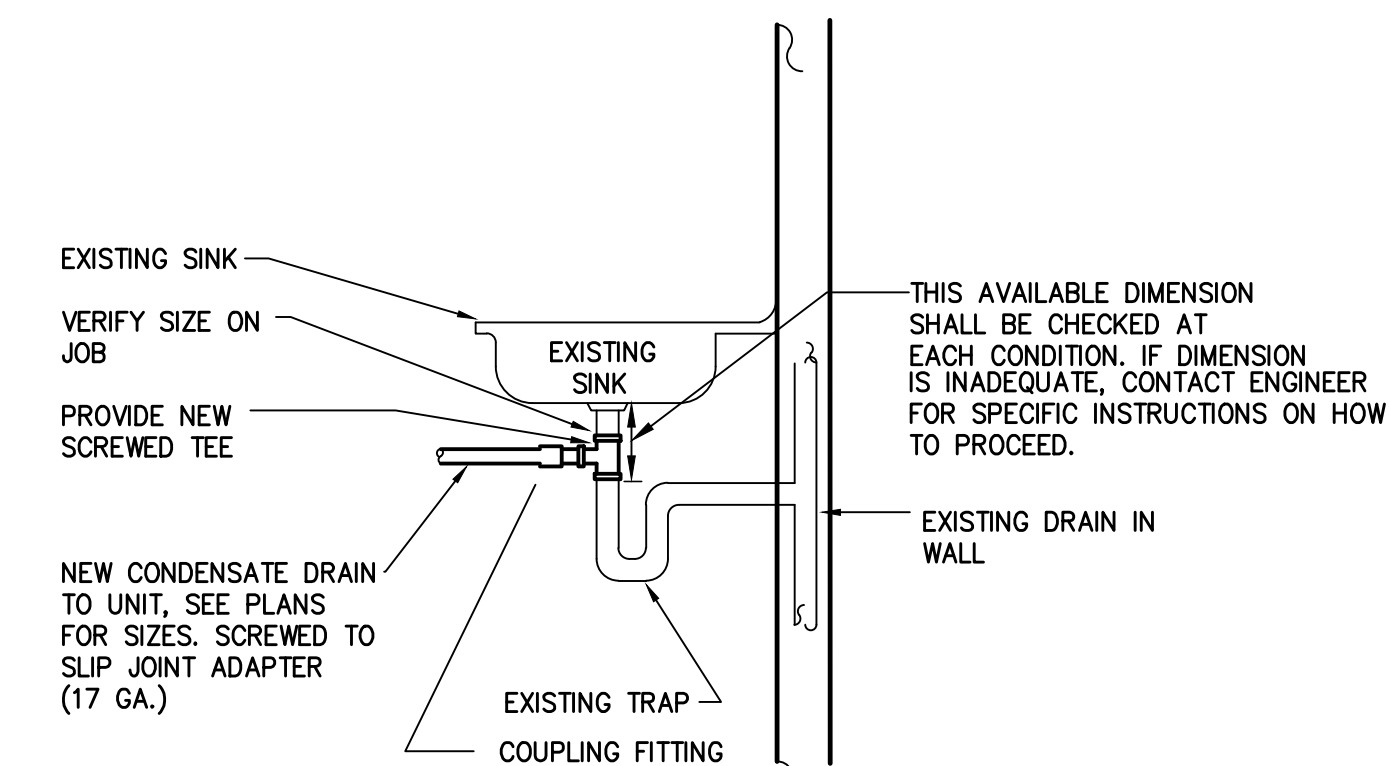
1 COIL PIPING DETAIL

SCALE: NTS



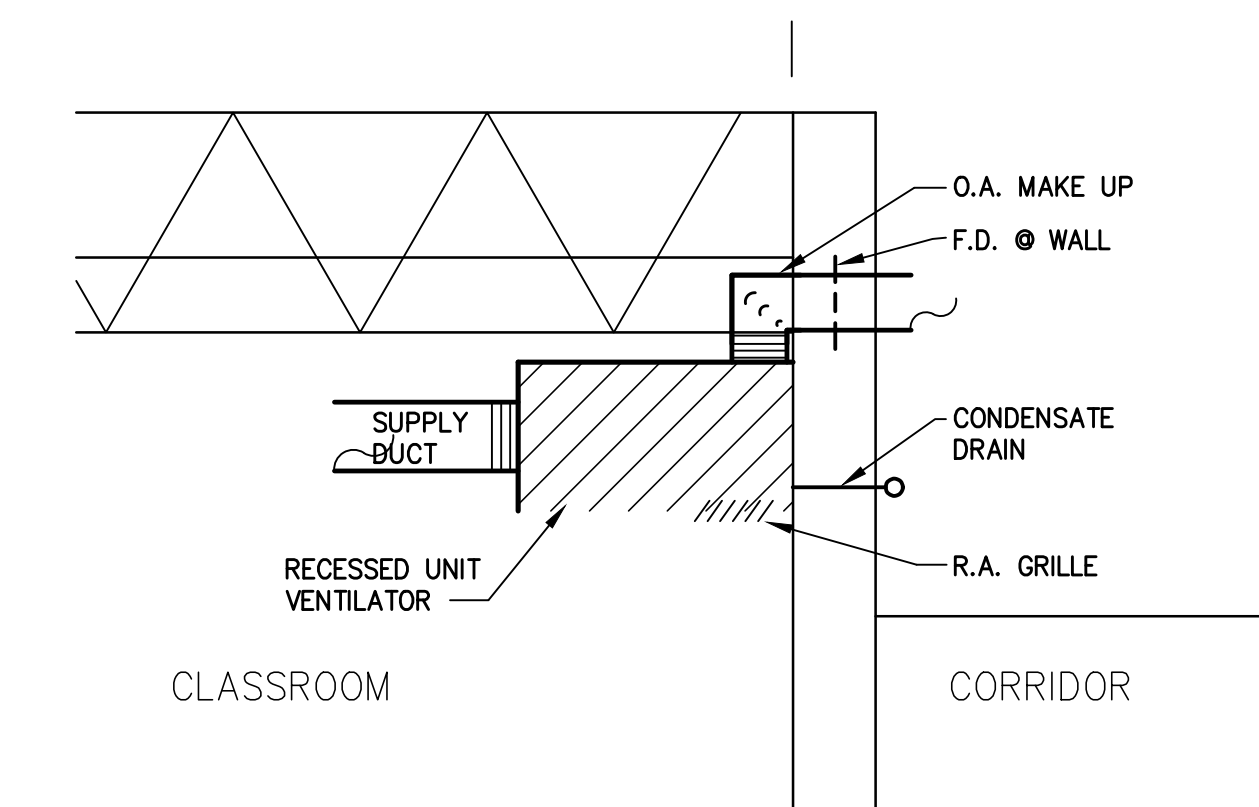
2 SECTION @ ROOFTOP UNIT

SCALE: NTS  
NOTE: SEE PLANS FOR SIZES



3 COND. DRAIN TIE-IN @ EXISTING SINK

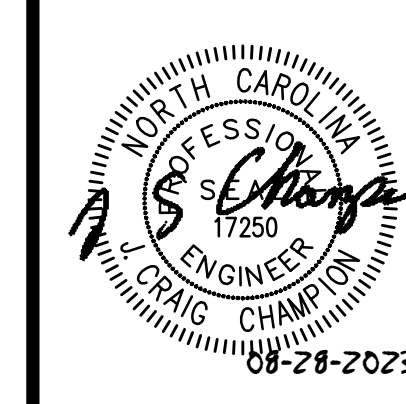
SCALE: NTS  
PROVIDE ESCUTCHEON PLATES AT LOCATIONS WHERE DRAIN PENETRATES CABINET TOP.



4 SECTION @ UNIT VENTILATOR

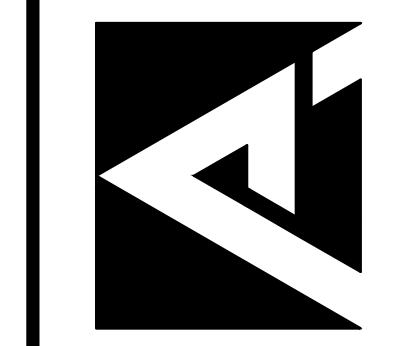
SCALE: NTS

CONTRACTOR TO VERIFY ALL DIMENSIONS



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ISSUE DATE: 11.03.2022  
DRAWN BY: EJM/REB  
CHECKED BY: EJM/REB  
PROJECT: 2218

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SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA MECHANICAL DETAILS

REVISION SCHEDULE	
NO.	DATE

M301



PACKAGED VERTICAL UNIT SCHEDULE																										
Unit Tag	TYPE	EER	Evaporator Fan (remark 1)				Cooling Performance				Compressor				Condenser Fan				Unit Electrical			Bard Model #	Weight Lbs.	Remarks		
			SA	OA	ESP	HP	EAT	MBH	Amb.	No.	Volt	Phs	LRA	RLA	No.	Volt	Phs	FLA	Volt	Phs	# of Conn.				MCA	MOP
PHP-01	WALL MOUNTED	11.0	420	230	0.15	1/2	80/67	34.0	95	1	208	3	73.0	15.7	1	208	3	4.5	208	3	1	47	50	WR35	415	1-10,12

- REFER TO APPROVED MANUFACTURER LIST FOR ACCEPTABLE EQUAL MANUFACTURERS. COORDINATE POWER REQUIREMENTS FOR ALL SUBSTITUTIONS.
- MANUFACTURER'S FAN DATA INCLUDES WET COIL, CLEAN MERV-8 FILTERS, AND UNIT CASING. ESP IS PRESSURE DROP EXTERNAL TO UNIT.
- SINGLE POINT ELECTRICAL CONNECTION AND MANUFACTURER'S FACTORY INSTALLED UNIT MOUNTED NON-FUSED DISCONNECT.
- ACCESS DOOR ATTACHED W/ HINGES.
- COORDINATE CASE FINISH TYPE WITH OWNER.
- PROVIDE WALL MOUNTED SUPPLY GRILLE (MODEL SG-2W) AND RETURN GRILLE (MODEL RG-2W).
- ECONOMIZER EXCEPTION IN ACCORDANCE WITH NCECC SECTION C403.3 EXCEPTION #2) NOT REQUIRED FOR COOLING <65,000 BTUH.
- PROVIDE UNIT WITH HOT GAS REHEAT DEHUMIDIFICATION OPTION.
- PROVIDE UNIT WITH 2-STAGE SUPPLY AIR FANS FOR COOLING AND HEATING.
- PROVIDE WITH COMMERCIAL VENTILATOR MOTORIZED ON/OFF OUTSIDE AIR DAMPER PACKAGE. DAMPER SHALL OPEN DURING OCCUPIED HOURS AND CLOSE DURING UNOCCUPIED HOURS.

HOT WATER UNIT HEATER SCHEDULE															
Unit Tag	Area Served	CFM	Fan Motor			Heating Performance					Horiz./Vert.	Height To Top (FT)	Model	Detail	Remarks
			HP	Volts	Phs	EAT (F)	LAT (F)	MBH (F)	GPM (F)	EWT (F)					
UH-1	MASONRY, AGRICULTURE	1100	1/8	115	1	60	86.9	32.1	3.3	180	5	H	RMK 3	TRANE 70-S	1 - 4
UH-2	AGRICULTURE (SMALL)	543	1/20	115	1	60	84.3	14.3	1.5	180	5	H	RMK 3	TRANE 38-S	1 - 4

- EQUALS BY TRANE, MODINE, REZTOR.
- DISCONNECT BY EC.
- TOP OF UNIT 6" +/- BELOW STRUCTURE.
- SEE HW UNIT HEATER DETAIL.

FAN COIL SCHEDULE (2-PIPE SYSTEM)																												
Unit Tag	CFM	ESP	Motor			Cooling Performance					Filters					Yib. Isol.	H/ V	OA Inlet	Conc. Cab. DTS/ Rec.	Pipe Sizes (in) DTS/ CD w/ DTR/ Trap	Mfg. & Model No.	Remarks						
			Unit	Min. OA	FLA (ea)	Volts	Phs	Min. Face Area (sf)	EAT DBWB	LAT DBWB	MBH Total	MBH Sens.	GPM	EWT (F)	WTR (F)								Max. Water PD (ft.)	Rows	Type	Face Area (sf)		
FC-1	160	-	35"	1	4.5	115	1	7	80/67	25	17.7	3	45	12	10	4	C	RMK 7	7.2	NONE	-	H/	-	ANY	1	1.25"	TRANE UNITRANE 08	1 - 8, 10, 11
FC-2	160	-	35"	1	1.1	115	1	7	80/67	5.2	4.0	4.5	45	12	10	4	C	RMK 7	3.85	NONE	-	H/	-	ANY	1/2"	1.25"	TRANE UNITRANE 02	1 - 10
FC-3	217	-	35"	1	1.3	115	1	8	80/67	7.6	5.6	1.3	45	12	10	4	C	RMK 7	4.97	NONE	-	H/	-	ANY	1/2"	1.25"	TRANE UNITRANE 03	1 - 10
FC-4	313	-	35"	1	2.1	115	1	1.1	80/67	10.0	7.6	2.0	45	8.1	10	4	C	RMK 7	4.97	NONE	-	H/	-	ANY	3/4"	1.25"	TRANE UNITRANE 04	1 - 10
FC-6	519	-	35"	1	3.4	115	1	1.6	80/67	16.9	12.8	2.8	45	8.9	10	4	C	RMK 7	7.2	NONE	-	H/	-	ANY	1"	1.25"	TRANE UNITRANE 06	1 - 10

- SEE APPROVED MFG LIST FOR EQUAL UNIT MTD. DISC. SWITCH BY MFR. ALL UNITS SELECTED AT MEDIUM SPEED.
- CONTROL VALVE MAX. PD = 12". CONTROL VALVE TO SEAT AGAINST 100' OF PRESSURE UNLESS NOTED OTHERWISE.
- WALL MOUNTED TSTAT.
- NOT USED.
- MFR'S FAN DATA INCLUDES UNIT CASING, WET COIL & NO FILTER. ESP IN SCHEDULE INCLUDES ALL OTHER PRESSURE DROPS.
- PIPING CONNECTIONS TO UNIT: (2-PIPE SYSTEM) 1 1/4" CD W/ TRAP, DTS/R. ONE COIL DOES BOTH COOLING AND HEATING.
- NOT USED.
- 2-WAY CONTROL VALVE!
- HORIZ UNIT DUCTED DISCHARGE, UNIT FLUSH W/CEILING, UNIT MOUNTED RETURN AIR GRILLE.
- SCHEDULE IS GENERAL. NOT EVERY SELECTION IS NECESSARILY USED. SEE PLANS FOR QUANTITIES.
- HORIZONTAL RECESSED. REPLACE EXISTING UNIT IN AUDITORIUM

UNIT VENTILATOR SCHEDULE (2-PIPE SYSTEM)																												
Unit Tag	Area Served	CFM	ESP	Motor			Cooling Performance					Heating Performance					Filters					Yib. Isol.	H/ V	OA Inlet	Pipe Sizes (in) DTS/ CD w/ DTR/ Trap	Model	Remarks	
				Unit	Min. OA	FLA	Volts	Phs	Min. Face Area (sf)	EAT DBWB	LAT DBWB	MBH Total	MBH Sens.	GPM	EWT (F)	WTR (F)	Max. Water PD (ft.)	Rows	Type	Face Area (sf)								
UV-A	SEE PLANS	750	225	.25	5.31	115	1	3.5	80/67	57.13/56.03	19.85	14.25	3.5	45	11.31	10	3	AC	RMK 7	3.85	NONE	-	E	-	1"	1.25"	TRANE HUV075	1 - 10
UV-B	SEE PLANS	1000	375	.25	5.31	115	1	4.5	80/67	58.88/58.27	23.33	18.85	4.0	45	11.65	10	4	AE	RMK 7	4.97	NONE	-	E	-	1.25"	1.25"	TRANE HUV100	1 - 10
UV-C	SEE PLANS	1250	375	.25	5.31	115	1	5.5	80/67	56.3/55.67	38.67	27.67	6.5	45	11.86	10	4	AE	RMK 7	6.08	NONE	-	E	-	1.25"	1.25"	TRANE HUV125	1 - 10
UV-D	SEE PLANS	1500	375	.25	5.31	115	1	6.5	80/67	54.21/53.62	44.51	29.60	8.0	45	11.1	10	4	AE	RMK 7	7.2	NONE	-	E	-	1.5"	1.25"	TRANE HUV150	1 - 10
UV-E	SEE PLANS	2000	375	.25	12	115	1	6.5	80/67	54.84/54.19	51.47	34.69	9.0	45	11.4	10	4	AE	RMK 7	7.2	NONE	-	H	-	1.5"	1.25"	TRANE HUV200	1 - 10

- EQUALS BY AAF. UNIT MTD. DISC. SWITCH BY MFR.
- CONTROL VALVE MAX. PD = 12". CONTROL VALVE TO SEAT AGAINST 100' OF PRESSURE UNLESS NOTED OTHERWISE.
- WALL MOUNTED TSTAT.
- NOT USED.
- MFR'S FAN DATA INCLUDES UNIT CASING, WET COIL & CLEAN FILTER. ESP IN SCHEDULE INCLUDES ALL OTHER PRESSURE DROPS.
- PIPING CONNECTIONS TO UNIT: (2-PIPE SYSTEM) 1 1/4" CD W/ TRAP, DTS/R. ONE COIL DOES BOTH COOLING AND HEATING.
- NOT USED.
- COOLING MODE: FACE & BYPASS CONTROL (CONTROL VALVE WIDE OPEN), HEATING MODE: CONTROL THROUGH VALVE MODULATION. TWO-WAY CONTROL VALVE UNLESS 3-WAY SHOWN ON PLANS.
- HORIZ UNIT DUCTED DISCHARGE, UNIT FLUSH W/CEILING, UNIT MOUNTED RETURN AIR GRILLE.
- SCHEDULE IS GENERAL. NOT EVERY SELECTION IS NECESSARILY USED. SEE PLANS FOR QUANTITIES.

SPLIT SYSTEM HEAT PUMP SCHEDULE																																		
Unit Tag	SEER (EER)	COP @47 DEG. F	CFM	OA	ESP	Air Handling Unit										DX Coil Performance					Heating Performance					Electrical Data (Outdoor Unit)					Remarks			
						Fan Motor			Electric Heating Coil				MCA			MOCP		Trane Model		DX Coil Performance			EAT		LAT		Capacity MBH@47 F		Fan			Compressor		
						HP	Volts	Phase	kW	Steps	Volts	Phase	EAT	LAT	EAT	LAT	MBH Total	MBH Sens.	EAT	LAT	Capacity	No.	FLA	No.	LRA	RLA	Volts	Phase	MCA	MOCP		Trane Model		
AH/HP-1	15	4	1640	2000	-	0.75	208	1	10.8	1	208	1	70	86.98	45	45	TEM6B0C60H51	80/67	58.5	44.12	70	86.44	53.5	1	1.1	1	110	15.9	208	1	35	35	4TWA060A3	1-9
AH/HP-2	15.2	3.9	715	800	-	0.33	208	1	5.77	1	208	1	70	92.68	38	40	TEM6A0B24H21	80/67	23.7	17.8	70	87.13	22.6	1	0.77	1	59.5	11.5	208	1	15	25	4TWS024N1	1-9

- REFER TO APPROVED MANUFACTURER LIST FOR ACCEPTABLE EQUAL MANUFACTURERS. COORDINATE POWER REQUIREMENTS FOR ALL SUBSTITUTIONS.
- CONTRACTOR SHALL VERIFY SERVICE CLEARANCES FOR ALL SUBSTITUTIONS.
- SINGLE POINT ELECTRICAL CONNECTION AT AIR HANDLING UNIT UNLESS TWO CIRCUITS SHOWN ON SCHEDULE.
- FOR LINE SETS BETWEEN 50 AND 175 FEET, INCLUDE THE FOLLOWING:  
CRANKCASE HEATER  
COMPRESSOR START ASSIST CAPACITOR AND RELAY  
LIQUID - LINE SOLENOID VALVE OR HARD SHUTOFF TXV
- WALL MOUNTED PROGRAMMABLE T'STAT BY UNIT MFG.
- REFRIGERANT LINES AND ACCESSORIES PER UNIT MFG. RECOMMENDATIONS.
- AIR HANDLER CONVERTIBLE FOR VERTICAL / HORIZONTAL INSTALLATION.
- UNIT SHALL BE SUSPENDED FROM STRUCTURE.
- PROVIDE OVERFLOW DRAIN PAN BELOW UNIT WITH MICROSWITCH TO SHUT OFF UNIT PRIOR TO PAN OVERFLOW.

MECHANICAL EQUIPMENT LEGEND		DESCRIPTION
SYMBOL	SINGLE LINE	DOUBLE LINE
<b>LOW PRESSURE DUCTWORK</b>		
		DUCT SECTION-1ST FIGURE WIDTH, 2ND DEPTH
		SQUARE TO ROUND TRANS.
		FLEX DUCTWORK
		ELBOW WITH TURNING VANES
		LONG RADIUS ELBOW
		EXHAUST DUCT SECTION
		SUPPLY DUCT SECTION
		OUTSIDE AIR DUCT SECTION
		RETURN/RELIEF AIR DUCT SECTION
		TRANSFER AIR DUCT SECTION
		EXPOSED DUCT
		SHORT RADIUS VANED ELBOW
		CONICAL DUCT TAKE-OFF
		RECTANGULAR-TO-ROUND TAKE-OFF WITH DAMPER
		RECTANGULAR-TO-ROUND TAKE-OFF WITHOUT DAMPER
		RECTANGULAR TAKE-OFF
		LONG RADIUS TEE
		TEE WITH TURNING VANES
		"Y" TAKE-OFF WITH SPLITTER DAMPER
		FIRE DAMPER "A" OR "B"
		COMBINATION FIRE/ SMOKE DAMPER
		VOLUME EXTRACTOR
<b>MISCELLANEOUS</b>		
		THERMOSTAT
		THERMOSTAT WAIRUSE PROOF COVER, CAST ALUMINUM
		HUMIDISTAT
		CARBON DIOXIDE SENSOR
		SMOKE DAMPER
		SMOKE DETECTOR
		CONDENSATE DRAIN
		BACKDRAFT DAMPER
		MOTOR OPERATED DAMPER
		DAMPER
		MANUAL SWITCH
		SUMMER/WINTER SWITCH
		ABOVE FINISHED FLOOR
		TIE INTO EXISTING AT THIS POINT
		CAST IRON
		UNLESS NOTED OTHERWISE

GRILLE & DIFFUSER SCHEDULE									
SYM	TYPE	USE	CFM RANGE	NECK SIZE	OVER-ALL SIZE	FINISH	FRAME	PRICE MODEL NO	REMARKS
A--	LOUVER FACE	SUPPLY 4-WAY	SEE PLANS & RMK 5	RMK 5	RMK 4	OFF WHITE	RMK 3	SMDA	1-6
B--	PERF.	RETURN/ EXHAUST	SEE PLANS & RMK 6	RMK 7	RMK 4	OFF WHITE	RMK 3	PDDR	1-4, 7-10
C-	SIDEWALL	SUPPLY	SEE PLANS	SEE PLANS	RMK 4	RMK 12	SEE PLANS	520D	1-4, 9, 11-13
D-	SIDEWALL	RETURN/ EXHAUST	SEE PLANS	SEE PLANS	RMK 4	RMK 12	SEE PLANS	530	1-4, 9, 12, 13

- REMARKS**
- EQUALS: METALAIR, TITUS, KRUEGER, TUTTLE & BAILEY, NAIL-OR, CARNES. SCHEDULE IS GENERAL, SOME MAY NOT BE USED. PAINT ALL INSIDE VISIBLE SURFACES FLAT BLACK.
  - SYMBOL EXPLANATION:  
XXX/CFM = SYMBOL, FRAME (RMK 3), NECK (RMK 5,7)/CFM
  - FRAME TYPES:  
S = FLUSH SURF. MTD.,  
E = DUCT MOUNTED: V-BEVELED PLASTER FRAME FOR CEILING MOUNTING.  
D = DROPPED FRAME
  - OVERALL SIZE: LAY-IN = 2"x2", OTHER GRILLES = NECK + 2"x+/-.
  - LOUVER FACE SUPPLY NECK SIZES

NO.	ROUND NK SIZE	CFM	NO.	SQUARE NK SIZE	CFM
A	6"	100	H	6x6	125
B	8"	175	I	9x9	280
C	10"	275	J	12x12	500
D	12"	400	K	15x15	780
E	14"	535	L	18x18	1125
F	16"	700	M	21x21	1530
G	18"	885	N	24x24	2000

NOTE: VERIFY CFM / NECK SIZE.

NO.	ROUND NK SIZE	CFM	NO.	SQUARE NK SIZE	CFM
A	6"	100	G	8x8	220
B	8"	175	H	10x10	345
C	10"	275	I	12x12	500
D	12"	400	J	14x14	680
E	14"	535	K	16x16	885
F	16"	700	L	18x18	1125
			M	22x22	1680
			N	22x46	2600

NOTE: VERIFY CFM / NECK SIZE.

**APPROVED MANUFACTURER LISTING - MECHANICAL**

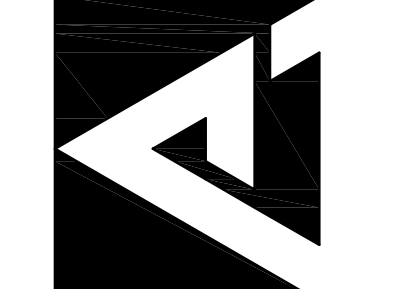
THE FOLLOWING MANUFACTURER'S LISTING (ALPHABETICALLY ORDERED) IS PROVIDED FOR BIDDING PURPOSES AND DOES NOT IMPLY OR PROVIDE A GUARANTEE OF SUBMITTAL APPROVAL. ALL ITEMS SUBMITTED SHALL MEET OR EXCEED THE MINIMUM SPECIFIED DESIGN AND QUALITY CRITERIA IN THIS SET OF CONSTRUCTION DOCUMENTS. ANY BIDDER 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
DUCTLESS SPLIT SYSTEMS	DAIKIN, I.G. SAMSUNG, TOSHIBA-CARRIER, TRANE-MITSUBISHI
FANS	COOK, GREENHECK, PENN
FIRE DAMPERS	GREENHECK, NAILOR, RUSKIN, POTTORFF
FAN COIL UNITS	CARRIER, DAIKIN-MCQUAY, JCI/YORK, TRANE
MODULAR AIR HANDLING UNITS	CARRIER, DAIKIN-MCQUAY, JCI/YORK, TRANE
PACKAGED ROOFTOP UNITS	CARRIER, DAIKIN-MCQUAY, JCI/YORK, TRANE
PUMPS & HYDRONIC EQUIPMENT	ARMSTRONG, BELL & GOSSETT, GRUNDFOSS, TACO
ROOF HOODS	CARNES, COOK, GREENHECK
SPIRAL DUCTWORK	EASTERN SHEET METAL, LINX-LINDAB, UNITED MCGILL
SPLIT SYSTEM HEAT PUMPS	CARRIER, DAIKIN-MCQUAY, JCI/YORK, TRANE



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ISSUE DATE: 11-23-2022



PACKAGED CAV HEAT PUMP (3T-20T) RTU WITH ELEC HEAT SCHEDULE																														
Unit Tag	Area Served	Nom. Tons	EER	IEER	S.A. Design	O.A. Min.	ESP	Indoor Fan Motor		Cooling Performance		Heating Performance		Electric Heater		Electrical Data								Model	Weight (lbs.)	Remarks				
								HP	Volts/Ph.	EAT DB/AB	MBH Net Total	MBH Net Sens.	EAT MBH	OUTPUT MBH	KW	OUTPUT MBH	Cond. Fan		Compressors				MCA				MOCP	Volts	Phase	
																	No.	FLA	No.	LRA	RLA	No.								RLA
RHP-1	LIBRARY	4	12.3	14.3	1600	240	0.7	1	460/3	80/67	48.1	38.5	70	40.98	12	40.98	1	0.7	1	-	6.3	2	0	30	30	460	3	WSCO48H4REA	818	1-13
RHP-2	LIBRARY	4	12.3	14.3	1600	240	0.7	1	460/3	80/67	48.1	38.5	70	40.98	12	40.98	1	0.7	1	-	6.3	2	0	30	30	460	3	WSCO48H4REA	818	1-13
RHP-3	GUIDANCE LIBRARY	4	12.3	14.3	1600	240	0.7	1	460/3	80/67	48.1	38.5	70	40.98	12	40.98	1	0.7	1	-	6.3	2	0	30	30	460	3	WSCO48H4REA	818	1-13

- REFER TO APPROVED MANUFACTURER LIST FOR ACCEPTABLE EQUAL MANUFACTURERS. FOR ALL SUBSTITUTIONS MECHANICAL CONTRACTOR SHALL COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR AND PHYSICAL DIMENSIONS WITH GENERAL CONTRACTOR PRIOR TO ORDERING.
- SINGLE POINT ELECTRICAL CONNECTION. DISCONNECT BY ELECTRICAL CONTRACTOR.
- R-410A REFRIGERANT
- MANUFACTURER FAN DATA BASED ON WET COIL AND CLEAN FILTERS. TSP = ESP + ECON HOOD PD.
- CONSTANT AIR VOLUME
- PROVIDE UNIT WITH WATER LEVEL MONITORING DEVICE IN CONDENSATE DRAIN PAN TO SHUT UNIT DOWN IN ACCORDANCE WITH 2018 NCMC SECTION 307.2.3.1 WATER LEVEL MONITORING DEVICE.
- OUTSIDE AIR INTAKE HOOD WITH MANUAL VOLUME DAMPER. PER 2018 NCECC, ECONOMIZER IS NOT REQUIRED FOR SYSTEMS LESS THAN 65,000 BTUH.
- UNIT SHALL BE ROOF MOUNTED WITH VERTICAL DISCHARGE (3-50 TONS). PROVIDE MANUFACTURER'S MINIMUM 14" HIGH CURB.
- UNIT SHALL BE TRUE HORIZONTAL DISCHARGE (3-10 TONS AND 27.5-50 TONS). HORIZONTAL DISCHARGE CURB IS NOT ALLOWED. PROVIDE MANUFACTURER'S MINIMUM 14" HIGH CURB.
- 4" THICK MERV 13 DISPOSABLE FILTERS.
- PROVIDE MANUFACTURER'S UNIT CONTROLLER AND INTEGRATE IN TO BUILDING AUTOMATION SYSTEM, INCLUDING MAPPING AND GRAPHICS. PROVIDE BACNET CARD.
- PROVIDE MANUFACTURER'S TEMPERATURE AND HUMIDITY SENSOR. UNIT CONTROLLER SHALL BE CAPABLE OF CONTROLLING HEATING, COOLING, DEHUMIDIFICATION, AND ECONOMIZER.
- PROVIDE HOT GAS REHEAT FOR DEHUMIDIFICATION CONTROL.
- COORDINATE WITH ELECTRICAL CONTRACTOR TO PROVIDE DUCT MOUNTED CARBON MONOXIDE DETECTOR IN EACH ROOFTOP UNIT SUPPLY DUCT AS REQUIRED TO MEET THE EXCEPTION TO 2018 NCMC, SECTION 313.4.1.3. CARBON MONOXIDE DETECTOR SHALL BE WIRED TO FIRE ALARM FOR NOTIFICATION AND TO BAS FOR RTU SHUT DOWN.

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	AGRICULTURE	1420	0.25	669	6.5	DIRECT	0.15	1/4	115	1	ROOF MOUNTED UPBLAST	GB-160	63	1-6
EF-2	TOILET	680	0.05	1550	8.5	DIRECT	0.06	1/16	120	1	ROOF MOUNTED UPBLAST	GB-90	-	1-5,7
EF-3	AGRICULTURE	1420	0.25	669	6.5	DIRECT	0.15	1/4	115	1	ROOF MOUNTED UPBLAST	GB-160	63	1-6
EF-4	AGRICULTURE	1420	0.25	669	6.5	DIRECT	0.15	1/4	115	1	ROOF MOUNTED UPBLAST	GB-160	63	1-6
EF-5	AGRICULTURE	1315	0.25	866	6.8	DIRECT	0.17	1/4	115	1	ROOF MOUNTED UPBLAST	GB-140	61	1-6
EF-6	AGRICULTURE	1420	0.25	669	6.5	DIRECT	0.15	1/4	115	1	ROOF MOUNTED UPBLAST	GB-160	63	1-6
EF-7	MASONRY	875	0.25	1211	6.5	DIRECT	0.13	1/4	115	1	ROOF MOUNTED UPBLAST	GB-130	57	1-6
EF-8	MASONRY	875	0.25	1211	6.5	DIRECT	0.13	1/4	115	1	ROOF MOUNTED UPBLAST	GB-100	51	1-6

- 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 ADAPTER CURB.
- UNIT MOUNTED SOLID STATE SPEED CONTROL.
- PROVIDE WALL SWITCH, COORDINATE WITH ELECTRICAL CONTRACTOR.
- PROVIDE RELAY FOR CONTROL THROUGH BUILDING AUTOMATION SYSTEM.

PUMP SCHEDULE												
Unit Tag	SERVICE	GPM	HEAD (FT.)	RPM	EFF. (%)	HP	VOLTS	PHS.	Type	MFR. & MODEL NO.	RMKS.	
P-1/P-2	BUILDING	260	100	1750	72.9	7.5	460	3	ES	B&G SERIES E-1510 3GB	1,2,3,4	
P-3/P-4	BOILER	170	30	1750	67.2	3	460	3	IL	B&G SERIES 80 3x3x7C	1,2,3,4	
P-5	CHILLER	520	50	1750	77.1	10	460	3	ES	B&G SERIES E-1510 3BD	1,2,3,4	

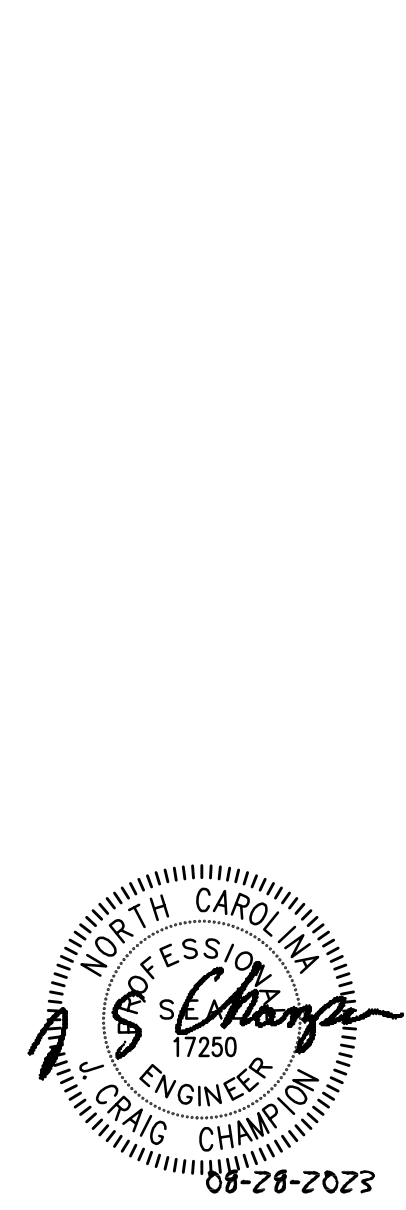
- SEE APPROVED MANUFACTURER'S LIST FOR EQUALS  
TYPES: IL= INLINE, ES = END SUCTION.
- PROVIDE SHAFT BRUSH RINGS ON MOTOR.
- PROVIDE PREMIUM EFFICIENCY INVERTER- DUTY MOTOR AND VARIABLE FREQUENCY DRIVE.
- VFD AND PUMP MOTOR SHALL BE CONTROLLED BY CHILLER OUTPUT SIGNAL; REFER TO CHILLER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

AIR HANDLING UNIT SCHEDULE (CHILLED WATER/HOT WATER)																																					
UNIT TAG	AREA SERVED	UNIT TYPE	SYSTEM AIRFLOW RATES					ESP (IN)	TSP (IN)	FAN MOTOR						COOLING PERFORMANCE						H/V	UNIT COIL CONNECTIONS	UNIT WIDTH	UNIT HEIGHT	UNIT MODULES & DIMENSIONS					UNIT LENGTH	UNIT WEIGHT (pounds)	TRANE MODEL NO.	REMARKS			
			SA CFM	SA ACH	OA CFM MN.	OA CFM MAX.	OA ACH			EAT (F) DBWB	LAT (F) DBWB	MBH (GROSS) TOTAL	GPM	EWT (F)	LWT (F)	MAX. PD WATER (FT.)	MAX. PD AIR (IN.)	FILTER L (IN)	PHW COL L (IN)	CHW COL L (IN)	ACCESS L (IN)					FAN L (IN)											
																											BHP	HP	VOLTS	PHS					MCA	MFS	
AHU-1	MECHANICAL ROOM	VAV	4975	2.5	4975	4975	-	2.00	4.24	-	6.030	460	3	8.33	15	81.0/67.0	54.0/53.9	200.14	148.01	40.0	45	55.0	5.11	0.76	H	RIGHT HAND	61.5	79.0	20	-	50	-	36.38	106.38	1603	CSAA010	1-13
AHU-2	MECHANICAL ROOM	VAV	3880	3.2	3880	3880	-	2.00	4.25	-	6.030	460	3	8.33	15	81.0/67.1	54.0/53.9	156.09	115.43	31.2	45	55.0	2.87	0.81	H	RIGHT HAND	50.5	79.0	20	-	40	-	36.38	96.38	1438	CSAA008	1-13
AHU-3	MECHANICAL ROOM	VAV	3100	3.5	3100	3100	-	2.00	3.64	-	6.030	460	3	8.33	15	81.0/67.0	54.0/53.9	124.72	92.23	24.9	45	55.0	1.91	0.52	H	RIGHT HAND	50.5	79.0	20	-	40	-	36.38	96.38	1432	CSAA008	1-13
AHU-4	GYMNASIUM	VAV	4680	4.7	4680	4680	-	0.50	1.26	2.00	3	208	3	14.25	25	80.0/67.0	55.54/54.96	175.00	126.18	35.0	45	55.0	9.24	0.52	H	RIGHT HAND	63.0	38.0	16	-	38	34	-	88.00	717.7	UCCAA10A0G0RJ07200000DAE00AA0000000000	1-13
AHU-5	AGRICULTURE	VAV	1000	1.0	1000	1000	-	-	-	-	0.33	208	1	4	15	80.0/67.0	59.40/57.40	29.50	21.90	5.9	45	55.0	-	-	H	RIGHT HAND	21.13	18.56	-	-	-	-	46.75	145	TEM4A0B31M31	1-13	

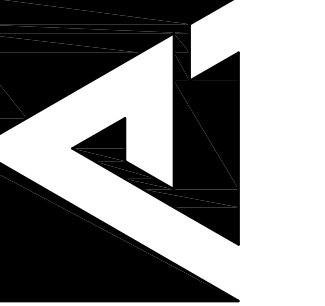
- REFER TO APPROVED MANUFACTURER'S LIST FOR SUBSTITUTION REQUIREMENTS.
- SEE DETAILS FOR UNIT ARRANGEMENTS. COILS SELECTED WITH 0.0001 FOULING FACTOR.
- FANS SHALL BE PROVIDED WITH VIBRATION ISOLATION. FAN DATA INCLUDES FAN CASING. ESP IN SCHEDULE INCLUDES ALL PRESSURE DROPS EXTERNAL TO UNIT. UNIT PD INCLUDES ALL ITEMS INTERNAL TO UNIT; CLEAN FILTERS (VAV = DIRTY), COILS, ETC. TSP = ESP+UNIT PD. FILTER CASING PRESSURE DROP INCLUDED IN FILTER PRESSURE DROP.
- PROVIDE DUCT MOUNTED SMOKE DETECTORS TO BE INSTALLED IN DUCTWORK. REFER TO UNIT DIAGRAMS FOR INSTALL LOCATIONS.
- FILTERS: 2" PLEATED MERV 13 FILTERS
- STAINLESS STEEL IQD DRAIN PAN.
- UNITS SHALL BE SHIPPED SPLIT IN A SUCH A MANNER TO ALLOW THEM TO BE TRANSPORTED INTO UPPER LEVEL MECHANICAL ROOM VIA ELEVATOR. TOP OF UNIT SHALL FACE UP WHILE BEING TRANSPORTED. EQUIPMENT NOT ABLE TO BE TRANSPORTED AS DESCRIBED SHALL NOT BE ACCEPTED.
- PROVIDE VARIABLE FREQUENCY DRIVE FOR EACH FAN MOTOR.
- PROVIDE ON-OFF SWITCH FOR UV LIGHTS. MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL AFTERMARKET UV LIGHTS.
- AIR FLOW MONITORING STATION ON OUTSIDE AIR INTAKE OF UNIT.
- UNIT CASING MAXIMUM SOUND LEVELS SHALL NOT EXCEED, 63 HZ - 8KHZ, 84DB, 73DB, 83DB, 88DB, 72DB, 64 DB, 64DB, 60DB.
- 2-WAY CHW VALVE, 2-WAY HW VALVE. CONTROL VALVE MAXIMUM PD = 12'. CONTROL VALVE SHALL SEAT AGAINST MAXIMUM SYSTEM PRESSURE.
- UNIT HANDEDNESS ORIENTATION IS BASED UPON PERSON STANDING OUTSIDE OF UNIT AT DISCHARGE END FACING TOWARDS UNIT. DIRECTION OF AIRFLOW WOULD BE INTO THE PERSONS FACE.

NON-DUCTED MINI-SPLIT A/C SCHEDULE																										
Unit Tag	Area Served	CFM	Fan Motor			Cooling Performance			Outdoor Unit				Refrigerant Piping						Trane - Mitsubishi Model Outdoor Unit	Trane - Mitsubishi Model Indoor Unit	Remarks					
			FLA	Volts	Phase	EAT	BTU Total	BTU Minimum	Efficiency SEER	Unit Tag	Weight	Fan			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)	MCA										Fuse Size	Volts	Phase
MSAH-1	MASONRY	320-370-425	0.5	208	1	80/67	12,000	5,800	20.8	MSCU-1	103	1	0.5	11	-	208	1	XXX	XXX	XX	70	XXX	XXX	PUY-A12NKA7	PKA-A12HA7	1-8

- REFER TO APPROVED MANUFACTURER LIST FOR ACCEPTABLE EQUAL MANUFACTURERS. COORDINATE POWER REQUIREMENTS FOR ALL SUBSTITUTIONS.
- WIRED REMOTE CONTROLLER (TAC-YT53CRAU-J).
- REFRIGERANT LINES AND ACCESSORIES PER SPECS AND AS RECOMMENDED BY UNIT MFG.
- PROVIDE FACTORY CONDENSATE PUMP POWERED FROM AIR HANDLER. ROUTE 3/4" CD TO HUB DRAIN AND SPILL WITH AIR GAP.
- VARIABLE SPEED, INVERTER DRIVEN.
- INDOOR UNIT IS POWERED BY OUTDOOR UNIT. COORDINATE SUBSTITUTE MFG. ELECTRICAL REQUIREMENTS W/ E.C. AT NO ADDITIONAL COST TO OWNER.
- PROVIDE ACCESSORIES AS REQUIRED TO ALLOW FOR LOW AMBIENT COOLING DOWN TO 18°F.
- 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.



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**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA MECHANICAL SCHEDULES**

REVISION SCHEDULE	
NO.	DATE / REFERENCE

**M401**



SEQUENCE OF OPERATION

DUAL TEMPERATURE PUMPS

DUAL TEMPERATURE WATER IS PROVIDED TO THE PRIMARY LOOPS THROUGH TWO PUMPS IN PARALLEL. THE PUMPS SHALL BE ENERGIZED WHEN THE BUILDING IS IN OCCUPIED MODE OR ON ANY CALL FOR HEATING OR COOLING. PUMPS SHALL OPERATE ANYTIME OUTSIDE AIR TEMPERATURE IS BELOW 32F.

UPON INITIATION, THE LEAD PUMP (ALTERNATED WEEKLY), SHALL PROVIDE WATER TO THE BUILDING. IF THE LEAD PUMP IS AT 60 HZ AND THE DIFFERENTIAL PRESSURE SENSOR SETPOINT FALLS 1 PSI (ADJ) BELOW SETPOINT FOR 1 HOUR, THE LAG PUMP WILL BE BROUGHT ON LINE. WHEN THE SPEED ON BOTH PUMPS FALLS BELOW 40% FOR 1 HOUR, THE LAG PUMP WILL CYCLE OFF LINE.

SET POINT IN HEATING MODE SHALL BE PER THE FOLLOWING RESET SCHEDULE.

OUTSIDE AIR	HOT WATER SUPPLY
20 DEG. F.	160 DEG. F.
60 DEG. F.	100 DEG. F.

THE SYSTEM SHALL ENTER HEATING MODE WHEN THE OUTDOOR TEMPERATURE IS LESS THAN 50F FOR TWO HOURS. SYSTEM SHALL REMAIN IN HEATING MODE UNTIL OUTDOOR TEMPERATURE EXCEEDS 55F FOR TWO HOURS.

THE SYSTEM SHALL ENTER COOLING MODE WHEN THE OUTDOOR TEMPERATURE EXCEEDS 60F FOR TWO HOURS. SYSTEM SHALL REMAIN IN COOLING MODE UNTIL OUTDOOR TEMPERATURE IS LESS THAN 55F FOR TWO HOURS.

CHANGEOVER VALVES SHALL MODULATE DURING TRANSITION FROM ONE SETTING TO THE OTHER IN ORDER TO PREVENT SHOCKING BOILER/CHILLER.

- DUAL TEMP SYSTEM POINTS LIST.
- WATER SUPPLY TEMPERATURE
  - WATER RETURN TEMPERATURE
  - OUTSIDE AIR TEMPERATURE.
  - PRIMARY PUMP START/STOP/STATUS.
  - SECONDARY PUMP START/STOP/STATUS.
  - DIFFERENTIAL PRESSURE
  - VARIABLE SPEED DRIVE OUTPUT

HOT WATER SYSTEM

HOT WATER IS PROVIDED TO THE BUILDING BY TWO GAS-FIRED BOILERS AND SECONDARY PUMPS.

BOILERS SHALL BE ENERGIZED THROUGH THE BAS WHENEVER THE DUAL TEMPERATURE LOOP ENTERS HEATING MODE. EACH BOILER WILL CONTROL ITS ASSOCIATED PUMP. UPON PROOF OF FLOW THE BOILERS WILL BE ENERGIZED.

THE BOILERS SHALL OPERATE UNDER ITS INTERNAL CONTROL TO PROVIDE 180F WATER. THE THREE WAY CHANGEOVER VALVE SHALL MODULATE TO MAINTAIN THE LOOP TEMPERATURE NOTED ABOVE.

THE HOT WATER SUPPLY AND RETURN TEMPERATURES SHALL BE MONITORED AND ALARMED AT THE DDC. EACH BOILER SHALL BE ENERGIZED FROM THE DDC WITH A STATUS CONTACT MONITORED AND ALARMED.

- BOILER SYSTEM POINTS LIST.
- HOT WATER SUPPLY TEMPERATURE (EACH BOILER).
  - HOT WATER RETURN TEMPERATURE (EACH BOILER).
  - PUMP START/STOP/STATUS.

CHILLED WATER SYSTEM

CHILLED WATER IS PROVIDED TO THE BUILDING BY TWO CHILLERS AS SHOWN ON THE PLANS. THE CHILLERS SHALL HAVE A DEDICATED SECONDARY PUMP.

UPON A CALL FOR COOLING FROM THE BAS, THE CHILLED WATER PUMP SHALL BE ENERGIZED. UPON PROOF OF FLOW, THE CHILLERS WILL BE INDEXED FOR OPERATION. THE CHILLER SHALL OPERATE UNDER ITS OWN CONTROLS TO PROVIDE 44F CHILLED WATER TO THE LOOP.

CHILLER SYSTEM POINTS LIST WITH LOCAL DISPLAY AT CHILLER AND AT THE BMS.

- CHILLED WATER SUPPLY TEMPERATURE (SECONDARY LOOP)
- CHILLED WATER RETURN TEMPERATURE (SECONDARY LOOP).
- PUMP START/STOP/STATUS.

FAN COIL UNITS AND AIR HANDLING UNITS

A PROGRAMMABLE CONTROLLER CAPABLE OF STAND-ALONE OPERATION WILL CONTROL THE UNIT. THE UNIT WILL BE STARTED VIA PRE-DETERMINED OPTIMUM START THROUGH THE BUILDING AUTOMATION SYSTEM (BAS). THE UNIT WILL BE DE-ENERGIZED IN ACCORDANCE WITH TIME SCHEDULES THROUGH THE BAS.

OCCUPIED MODE: IN OCCUPIED MODE, THE SUPPLY FAN WILL BE INDEXED ON AND WILL RUN CONTINUOUSLY. IN UNOCCUPIED MODE, THE FAN SHALL CYCLE ON AS REQUIRED TO MAINTAIN SPACE SET POINTS.

TEMPERATURE CONTROL: THE UNIT SHALL INDEX MODE BASED ON DUAL TEMPERATURE SYSTEM SETTING, IN COOLING MODE, ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT, THE CONTROLLER WILL MODULATE THE DUAL TEMPERATURE WATER VALVE OPEN TO THE COIL. ON A DROP IN SPACE TEMPERATURE, THE VALVE WILL MODULATE CLOSED. IN HEATING MODE, ON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SET POINT, THE CONTROLLER WILL MODULATE THE VALVE OPEN TO THE COIL. ON A RISE IN SPACE TEMPERATURE, THE REVERSE WILL OCCUR. UNIQUE TEMPERATURE SET POINTS SHALL BE PROVIDED FOR OCCUPIED AND UNOCCUPIED MODE.

- FAN COIL POINT LIST.
- FAN START/STOP/STATUS.
  - DISCHARGE AIR TEMPERATURE.
  - CONTROL VALVE OUTPUTS.
  - SPACE TEMPERATURE

HOT WATER UNIT HEATERS

WHEN THE SYSTEM IS IN COOLING MODE, THE ISOLATION VALVES SHOWN ON THE DRAWINGS SHALL REMAIN CLOSED. WHEN THE SYSTEM IS IN HEATING MODE THE VALVES SHALL BE FULLY OPEN.

THE UNIT FANS SHALL CYCLE IN RESPONSE TO A SPACE MOUNTED THERMOSTAT TO MAINTAIN SETPOINT.

UNIT VENTILATORS

A PROGRAMMABLE CONTROLLER CAPABLE OF STAND-ALONE OPERATION WILL CONTROL THE UNIT. THE UNIT WILL BE STARTED VIA PRE-DETERMINED OPTIMUM START THROUGH THE BUILDING AUTOMATION SYSTEM (BAS). THE UNIT WILL BE DE-ENERGIZED IN ACCORDANCE WITH TIME SCHEDULES THROUGH THE BAS.

OCCUPIED MODE: IN OCCUPIED MODE, THE SUPPLY FAN WILL BE INDEXED ON AND WILL RUN CONTINUOUSLY. IN UNOCCUPIED MODE, THE FAN SHALL CYCLE ON AS REQUIRED TO MAINTAIN SPACE SET POINTS.

TEMPERATURE CONTROL: THE UNIT SHALL INDEX MODE BASED ON DUAL TEMPERATURE SYSTEM SETTING, IN COOLING MODE, ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT, THE CONTROLLER WILL MODULATE THE CHILLED WATER VALVE OPEN TO THE COIL AND THE FACE AND BYPASS DAMPER SHALL MODULATE TO MAINTAIN TEMPERATURE SET POINT. ON A DROP IN SPACE TEMPERATURE, THE CHILLED WATER VALVE WILL MODULATE CLOSED. IN HEATING MODE, ON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SET POINT, THE CONTROLLER WILL MODULATE THE VALVE OPEN TO THE COIL. ON A RISE IN SPACE TEMPERATURE, THE REVERSE WILL OCCUR. IN HEATING MODE THE FACE AND BYPASS DAMPERS SHALL BE FULLY OPEN TO THE COIL. UNIQUE TEMPERATURE SET POINTS SHALL BE PROVIDED FOR OCCUPIED AND UNOCCUPIED MODE.

OUTSIDE AIR IS DUCTED TO THE UNIT VENTILATOR. PROVIDE AN ACUTATOR TO CYCLE THE INTEGRAL UV DAMPER. THE DAMPER SHALL OPEN TO SETPOINT IN RESPONSE TO SPACE CO2 EXCEEDING 1000 PPM. WHEN SPACE CO2 IS LESS THAN 800 PPM, THE DAMPER SHALL CLOSE. ALL DAMPERS SHALL CLOSE IN UNOCCUPIED TIME.

- UNIT VENTILATOR POINTS LIST
- FAN START/STOP/STATUS.
  - DISCHARGE AIR TEMPERATURE.
  - FACE AND BYPASS DAMPER OUTPUT
  - CONTROL VALVE OUTPUTS.
  - SPACE TEMPERATURE
  - SPACE CO2

PACKAGED UNITARY EQUIPMENT

A PROGRAMMABLE CONTROLLER CAPABLE OF STAND-ALONE OPERATION WILL CONTROL THE UNIT. THE UNIT WILL BE STARTED VIA PRE-DETERMINED OPTIMUM START THROUGH THE BUILDING AUTOMATION SYSTEM (BAS). THE UNIT WILL BE DE-ENERGIZED IN ACCORDANCE WITH TIME SCHEDULES THROUGH THE BAS.

OCCUPIED MODE: IN OCCUPIED MODE, THE SUPPLY FAN WILL BE INDEXED ON AND WILL RUN CONTINUOUSLY. IN UNOCCUPIED MODE, THE FAN SHALL CYCLE ON AS REQUIRED TO MAINTAIN SPACE SET POINTS. IN OCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL MODULATE TO MINIMUM POSITION. IN UNOCCUPIED MODE THE DAMPER SHALL REMAIN CLOSED.

TEMPERATURE CONTROL: THE UNIT COMPONENTS SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE HEATING OR COOLING SETPOINT.

- POINTS LIST.
- START/STOP/STATUS.
  - DISCHARGE AIR TEMPERATURE.
  - SPACE TEMPERATURE.

MISCELLANEOUS

FANS SERVING GROUP TOILETS SHALL BE ENABLED THROUGH THE BUILDING AUTOMATION SYSTEM. FAN SHALL CYCLE AS REQUIRED BY A SPACE MOUNTED OCCUPANCY SENSOR. FANS SERVING TOILETS IN ADMIN AREA SHALL BE INTERLOCKED WITH LIGHT SWITCH.

PROVIDE EMERGENCY SWITCH AT ENTRANCE OF BOILER ROOM THAT SHALL UPON ACTIVATION SHUTDOWN ALL BURNERS WITHIN THE BOILER ROOM.

ALL POINTS (UNIT START/STOP, TEMPERATURE SETTINGS, ETC.) SHALL BE VIEWABLE AND ADJUSTABLE THROUGH THE BUILDING GRAPHICS.

MAIN PAGE SHALL HAVE A HOLIDAY SETTING THAT WILL ENABLE THE OWNER TO PUT THE ENTIRE BUILDING IN "UNOCCUPIED" MODE.

PROVIDE MORNING WARMUP/COOLDOWN MODE. IN WARMUP MODE ALL FANS SHALL BE OFF. ALL OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED. ALL UNITS SHALL OPERATE IN HEATING MODE UNTIL SPACE TEMPERATURE SETPOINTS ARE ACHIEVED.

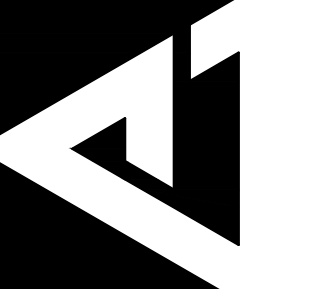
IN UNOCCUPIED MODE, UNITS SHALL OPERATE TO MAINTAIN SETBACK SPACE SETPOINTS.

PROVIDE SPACE MOUNTED SENSOR TO MONITOR TEMPERATURE IN ALL SPACE SERVED BY A DUCTLESS SPLIT SYSTEM. PROVIDE ALL INTERLOCK WIRING REQUIRED FOR UNIT OPERATION. UNIT SHALL BE PROVIDED WITH A BACNET INTERFACE THAT ALLOWS FOR MONITORING OF UNIT OPERATION AND CHANGING SETPOINTS.

CONTRACTOR TO VERIFY ALL DIMENSIONS



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SOUTHERN WAYNE HIGH SCHOOL  
 RENOVATIONS  
 DUDLEY, NORTH CAROLINA  
 MECHANICAL CONTROLS

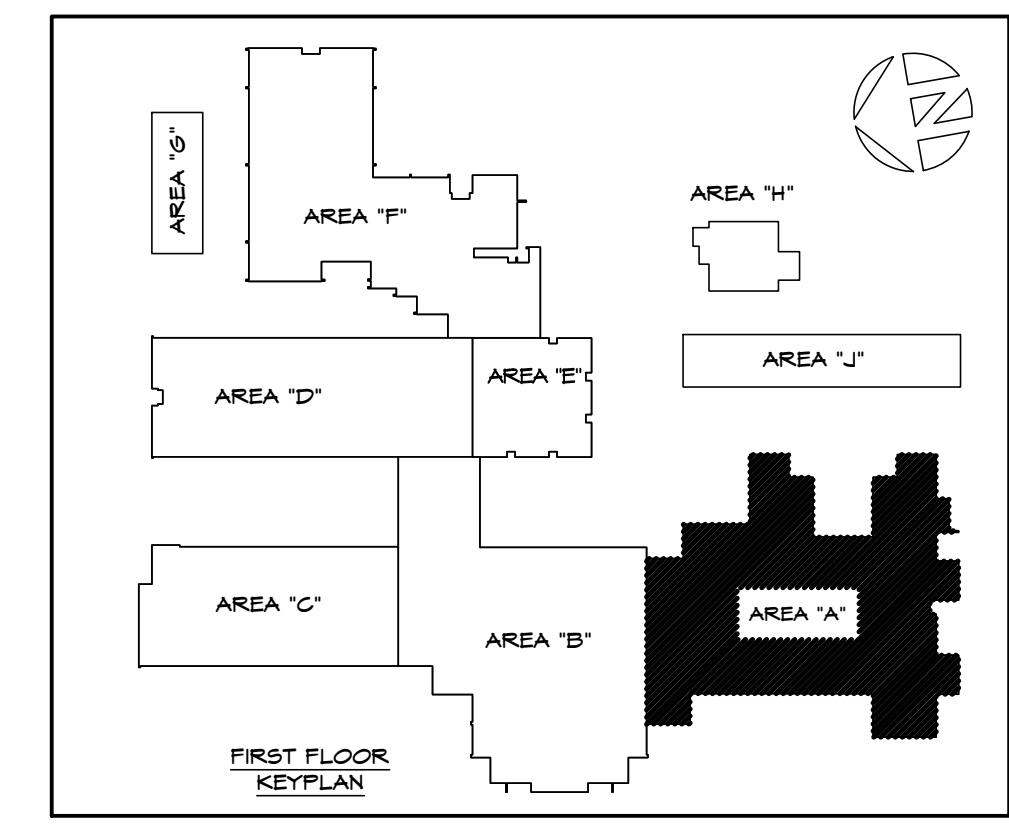
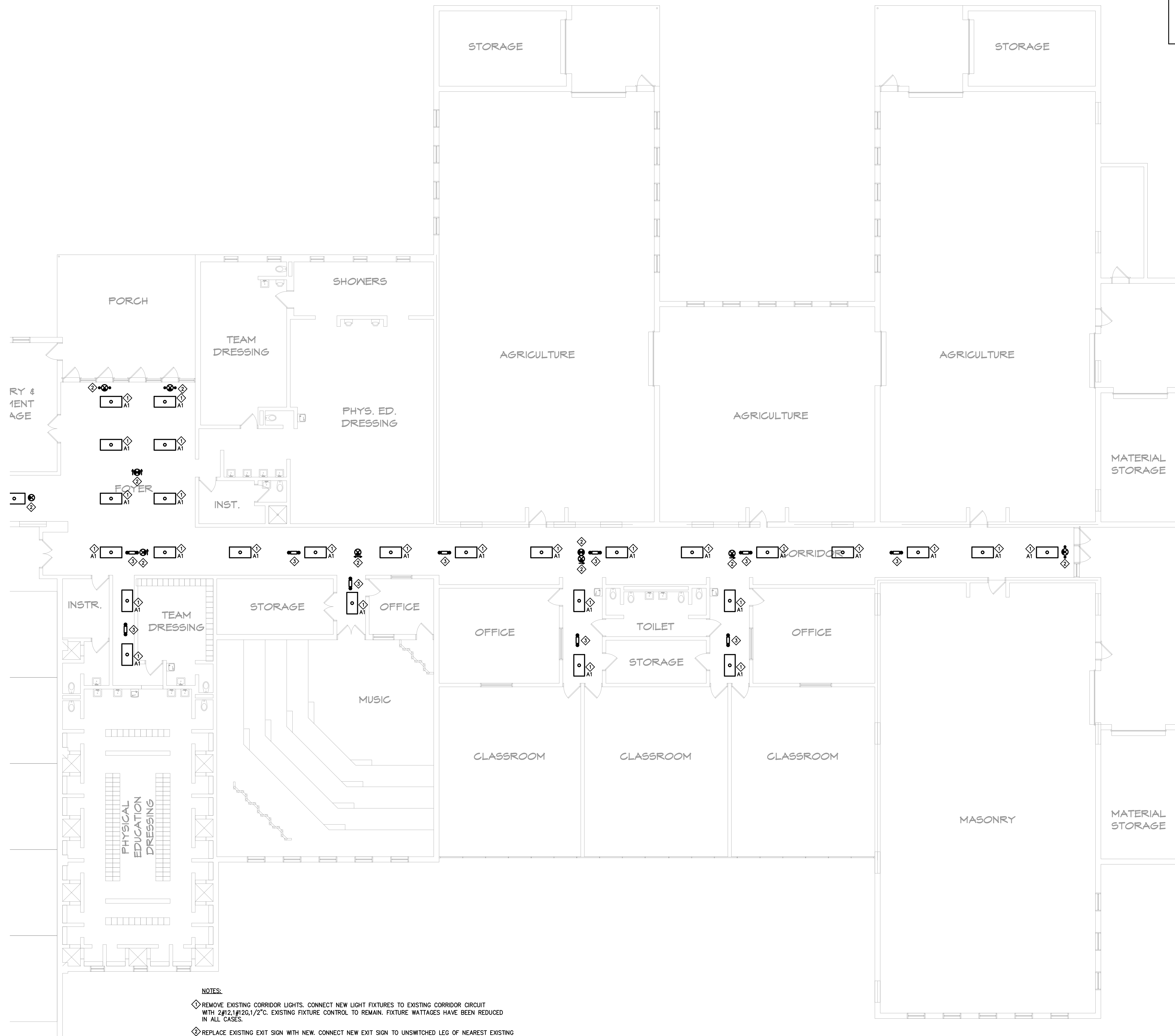
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**M500**









- NOTES:**
- ◇ REMOVE EXISTING CORRIDOR LIGHTS. CONNECT NEW LIGHT FIXTURES TO EXISTING CORRIDOR CIRCUIT WITH 2#12,1#12G,1/2"C. EXISTING FIXTURE CONTROL TO REMAIN. FIXTURE WATTAGES HAVE BEEN REDUCED IN ALL CASES.
  - ◇ REPLACE EXISTING EXIT SIGN WITH NEW. CONNECT NEW EXIT SIGN TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT. WHERE CIRCUIT EXTENSION IS REQUIRED, EXTEND EXISTING CIRCUIT WITH 2#12,1#12G,1/2"C.
  - ◇ PROVIDE NEW CEILING MOUNTED EMERGENCY LIGHT. CONNECT TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT WITH 2#12,1#12G,1/2"C. IN LIEU OF INSTALLATION OF NEW CEILING MOUNTED EMERGENCY LIGHTS, IT IS ACCEPTABLE TO REPLACE EXISTING WALL MOUNTED EMERGENCY LIGHTS "ONE FOR ONE" IN AREA OF WORK.

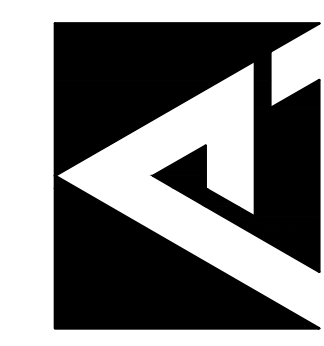
1 FLOOR PLAN - AREA A - LIGHTING  
SCALE: 1/8" = 1'-0"

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**SOUTHERN WAYNE HIGH SCHOOL  
RENOVATIONS  
DUDLEY, NORTH CAROLINA**  
FLOOR PLAN - AREA A - LIGHTING

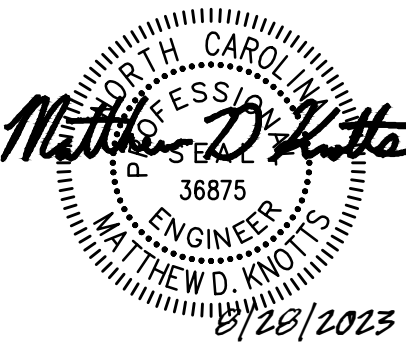
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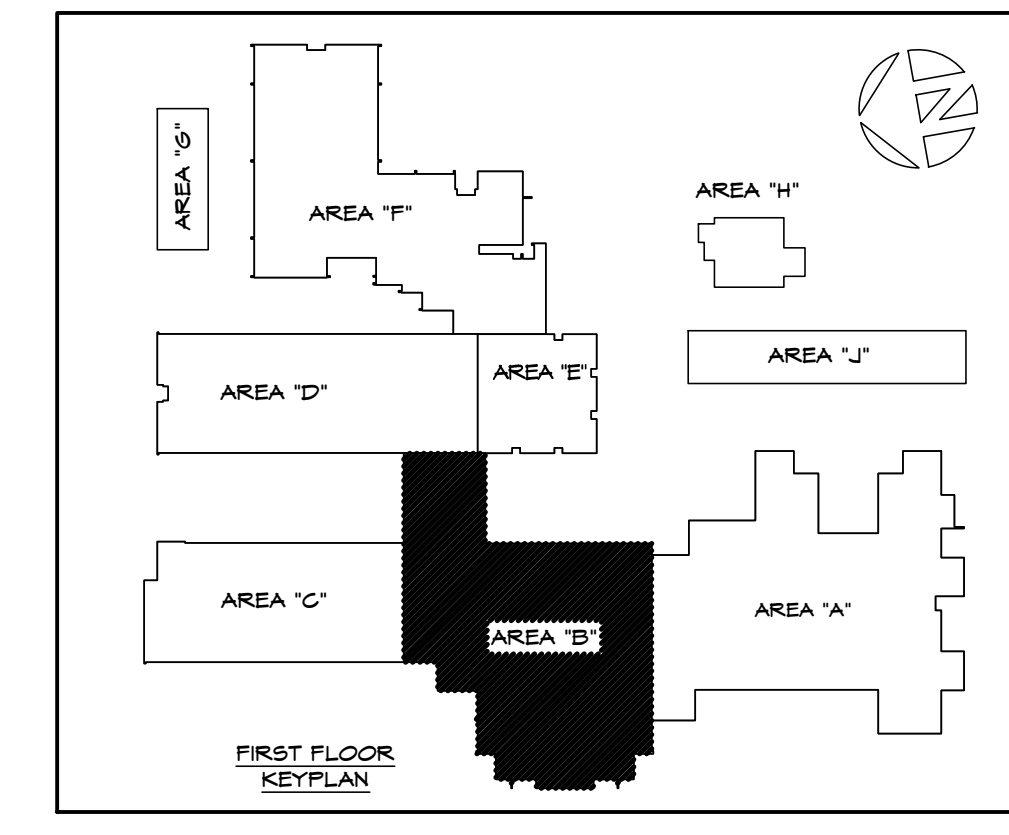
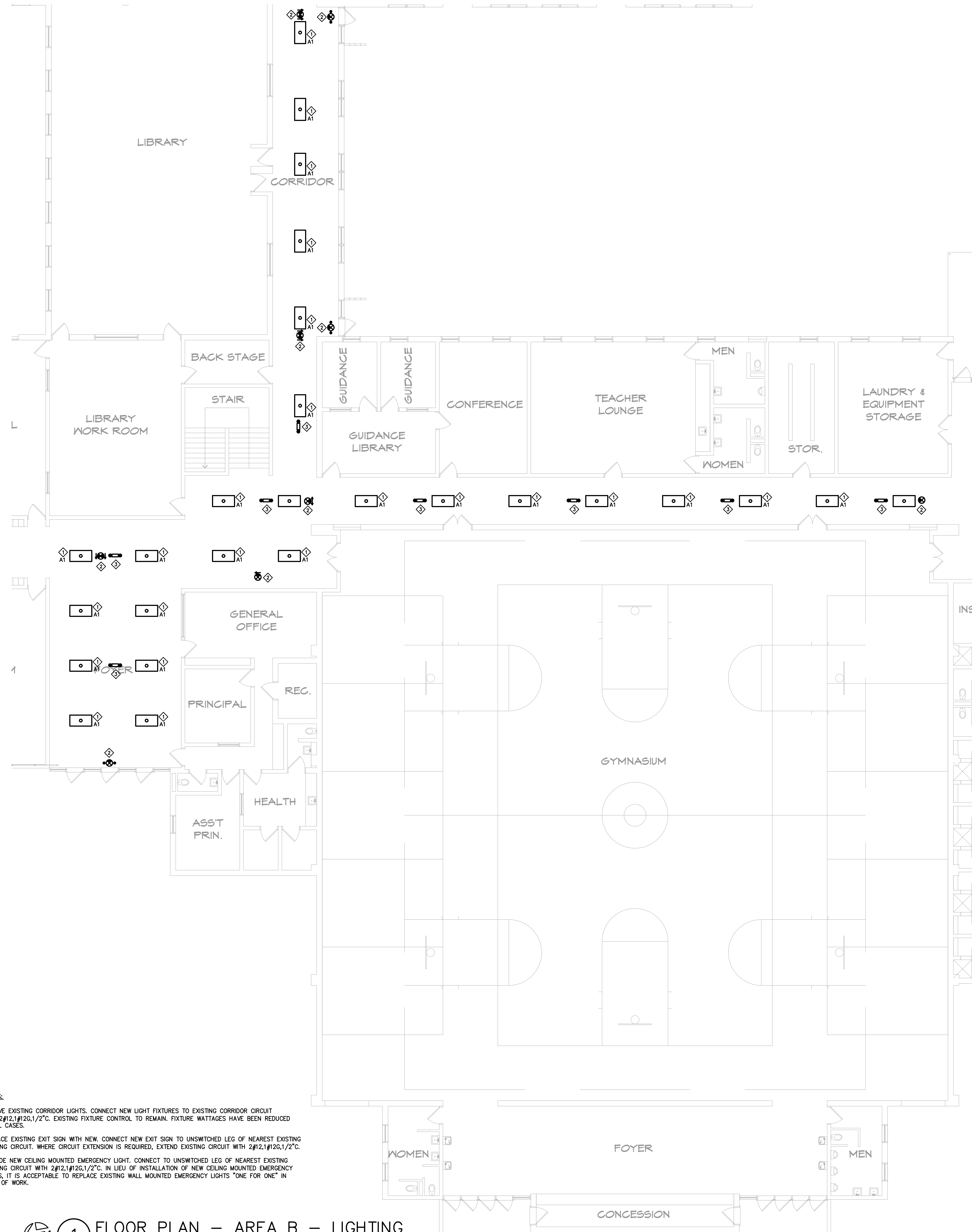
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22005

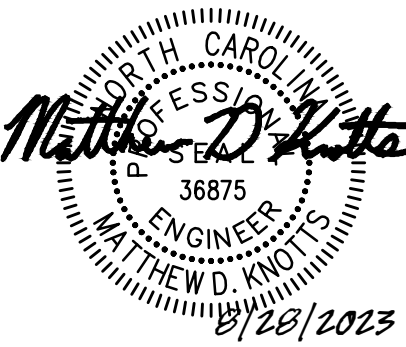
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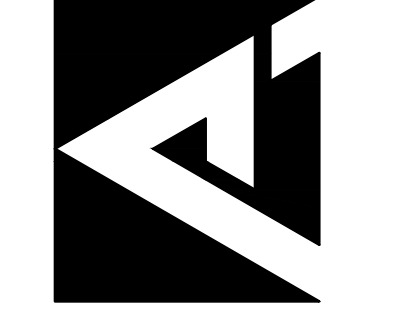


- NOTES:**
- ◇ REMOVE EXISTING CORRIDOR LIGHTS. CONNECT NEW LIGHT FIXTURES TO EXISTING CORRIDOR CIRCUIT WITH 2#12,1#20,1/2" C. EXISTING FIXTURE CONTROL TO REMAIN. FIXTURE WATTAGES HAVE BEEN REDUCED IN ALL CASES.
  - ◇ REPLACE EXISTING EXIT SIGN WITH NEW. CONNECT NEW EXIT SIGN TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT. WHERE CIRCUIT EXTENSION IS REQUIRED, EXTEND EXISTING CIRCUIT WITH 2#12,1#20,1/2" C.
  - ◇ PROVIDE NEW CEILING MOUNTED EMERGENCY LIGHT. CONNECT TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT WITH 2#12,1#20,1/2" C. IN LIEU OF INSTALLATION OF NEW CEILING MOUNTED EMERGENCY LIGHTS, IT IS ACCEPTABLE TO REPLACE EXISTING WALL MOUNTED EMERGENCY LIGHTS "ONE FOR ONE" IN AREA OF WORK.

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



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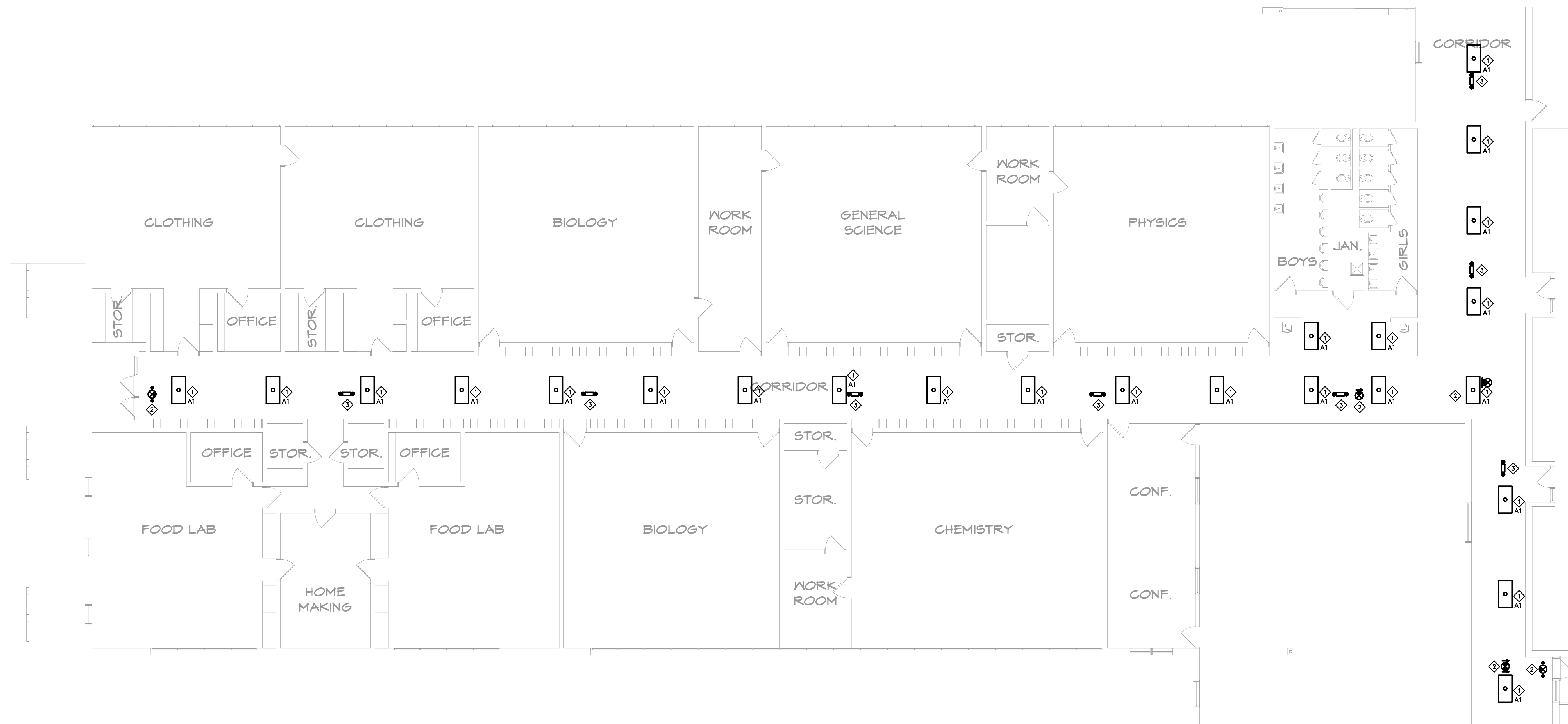


DATE: 11.23.2022  
DRAWN BY: MDK  
CHECKED BY: MDK  
PROJECT:

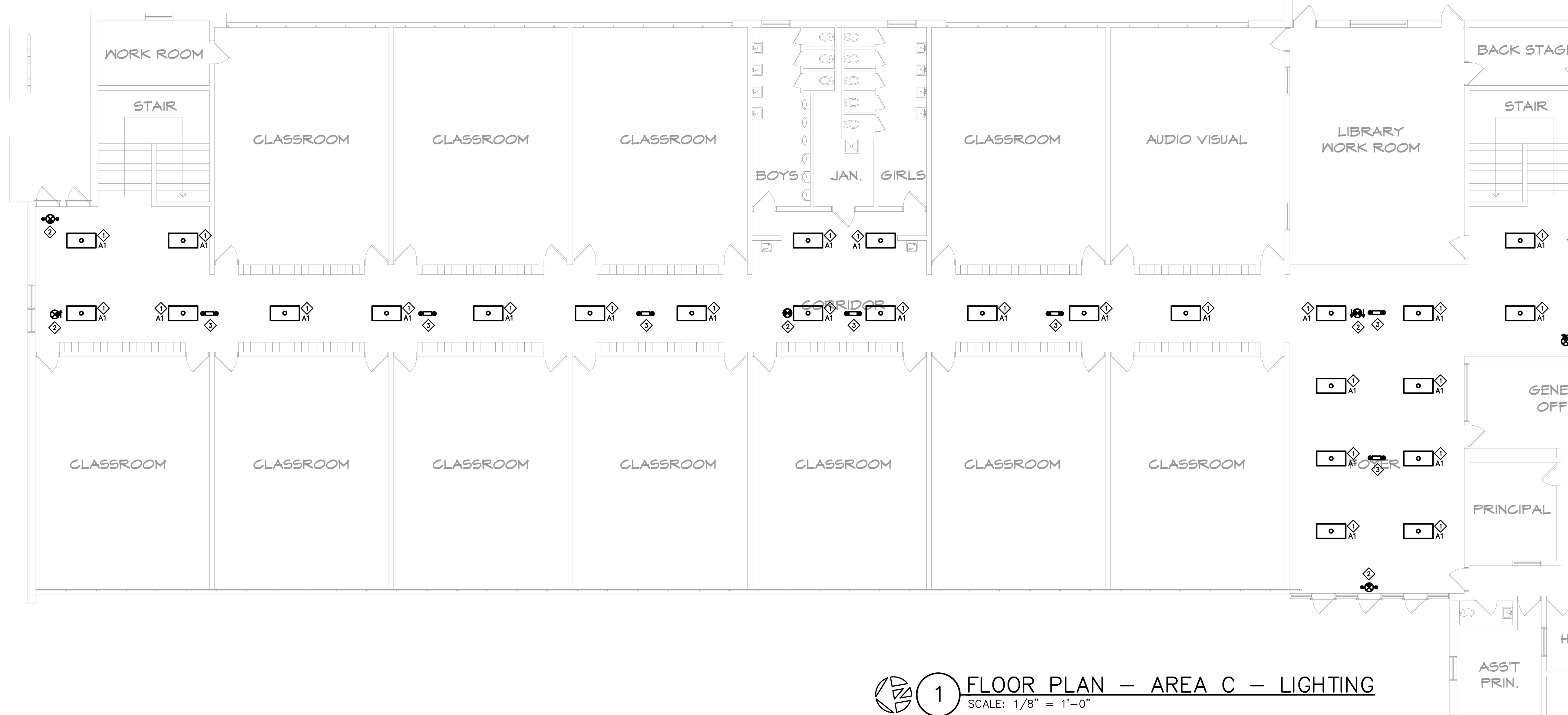
**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA**  
FLOOR PLAN - AREA B - LIGHTING

REVISION SCHEDULE	
DATE	REFERENCE



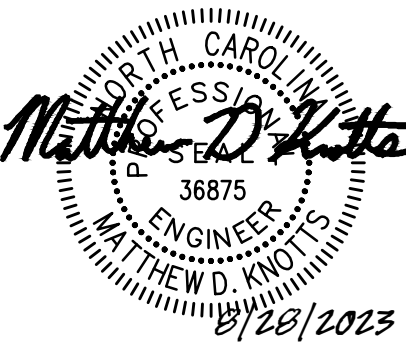
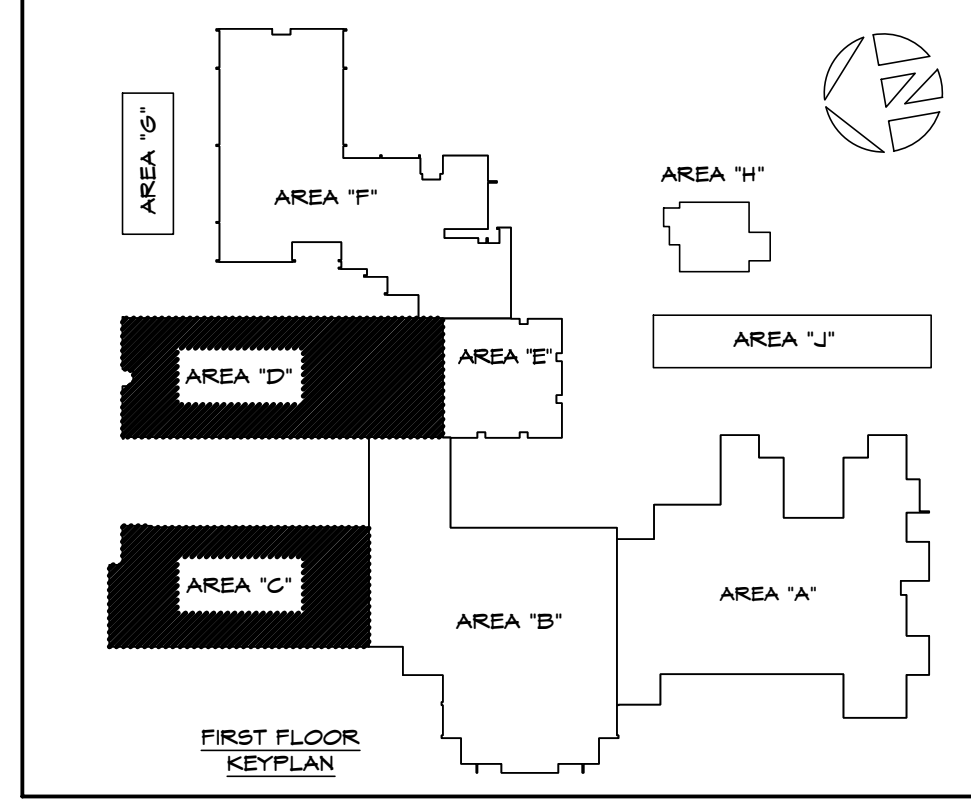


**2 FLOOR PLAN - AREA D - LIGHTING**  
SCALE: 1/8" = 1'-0"



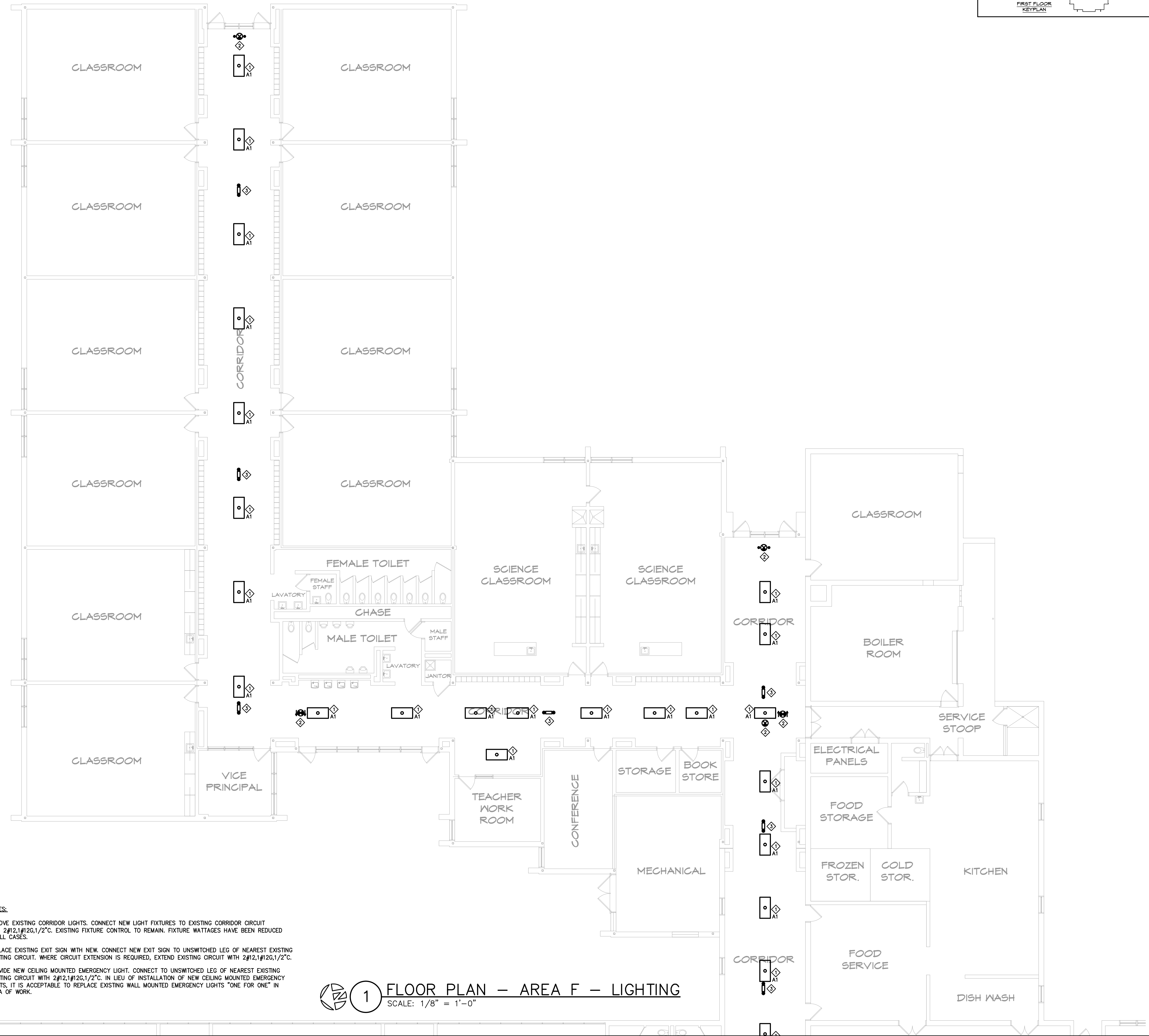
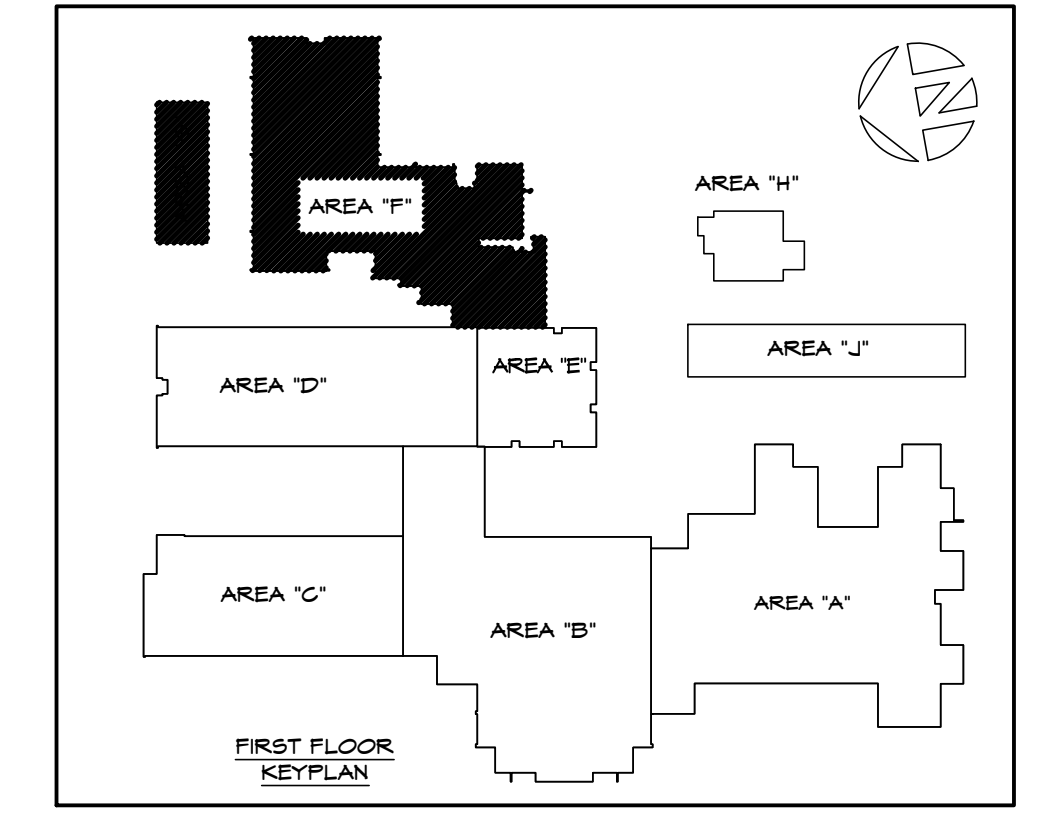
**1 FLOOR PLAN - AREA C - LIGHTING**  
SCALE: 1/8" = 1'-0"

- NOTES:
- ◇ REMOVE EXISTING CORRIDOR LIGHTS. CONNECT NEW LIGHT FIXTURES TO EXISTING CORRIDOR CIRCUIT WITH 2#12;1#26;1/2"C. EXISTING FIXTURE CONTROL TO REMAIN. FIXTURE WATTAGES HAVE BEEN REDUCED IN ALL CASES.
  - ◇ REPLACE EXISTING EXIT SIGN WITH NEW. CONNECT NEW EXIT SIGN TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT. WHERE CIRCUIT EXTENSION IS REQUIRED, EXTEND EXISTING CIRCUIT WITH 2#12;1#26;1/2"C.
  - ◇ PROVIDE NEW CEILING MOUNTED EMERGENCY LIGHT. CONNECT TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT WITH 2#12;1#26;1/2"C. IN LIEU OF INSTALLATION OF NEW CEILING MOUNTED EMERGENCY LIGHTS, IT IS ACCEPTABLE TO REPLACE EXISTING WALL MOUNTED EMERGENCY LIGHTS "ONE FOR ONE" IN AREA OF WORK.



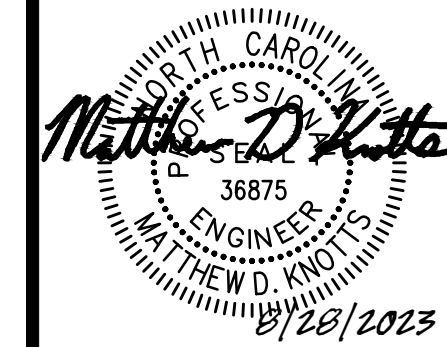
REVISION SCHEDULE	
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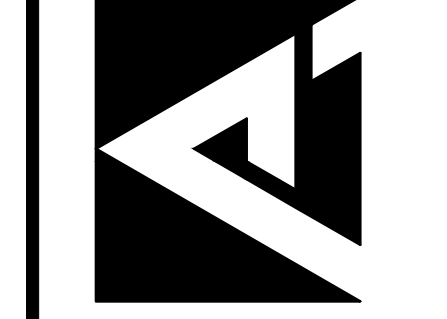
- NOTES:
- ◇ REMOVE EXISTING CORRIDOR LIGHTS. CONNECT NEW LIGHT FIXTURES TO EXISTING CORRIDOR CIRCUIT WITH 2#12,1#20,1/2" C. EXISTING FIXTURE CONTROL TO REMAIN. FIXTURE WATTAGES HAVE BEEN REDUCED IN ALL CASES.
  - ◇ REPLACE EXISTING EXIT SIGN WITH NEW. CONNECT NEW EXIT SIGN TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT. WHERE CIRCUIT EXTENSION IS REQUIRED, EXTEND EXISTING CIRCUIT WITH 2#12,1#20,1/2" C.
  - ◇ PROVIDE NEW CEILING MOUNTED EMERGENCY LIGHT. CONNECT TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT WITH 2#12,1#20,1/2" C. IN LIEU OF INSTALLATION OF NEW CEILING MOUNTED EMERGENCY LIGHTS, IT IS ACCEPTABLE TO REPLACE EXISTING WALL MOUNTED EMERGENCY LIGHTS "ONE FOR ONE" IN AREA OF WORK.

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



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701 EAST BAY STREET, SUITE 302  
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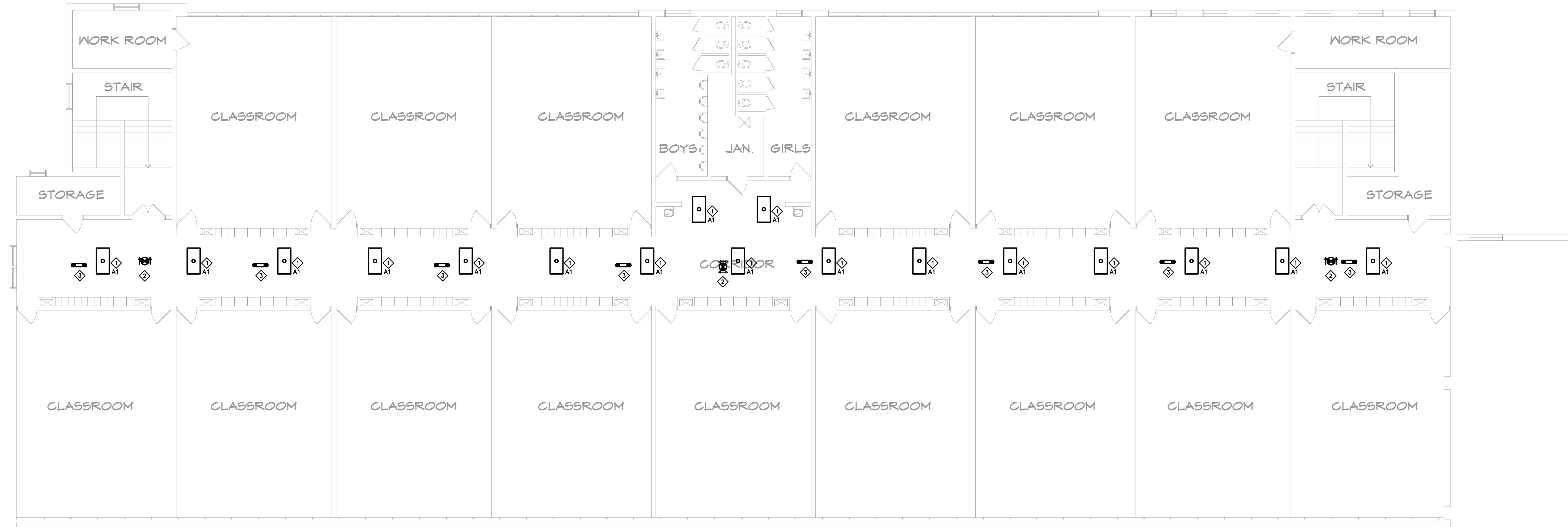


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DRAWN BY: MDK  
CHECKED BY: MDK  
PROJECT:

**SOUTHERN WAYNE HIGH SCHOOL**  
**RENOVATIONS**  
**DUDLEY, NORTH CAROLINA**  
**FLOOR PLANS - AREA E & F - LIGHTING**

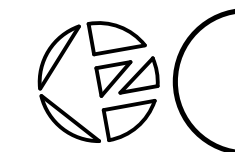
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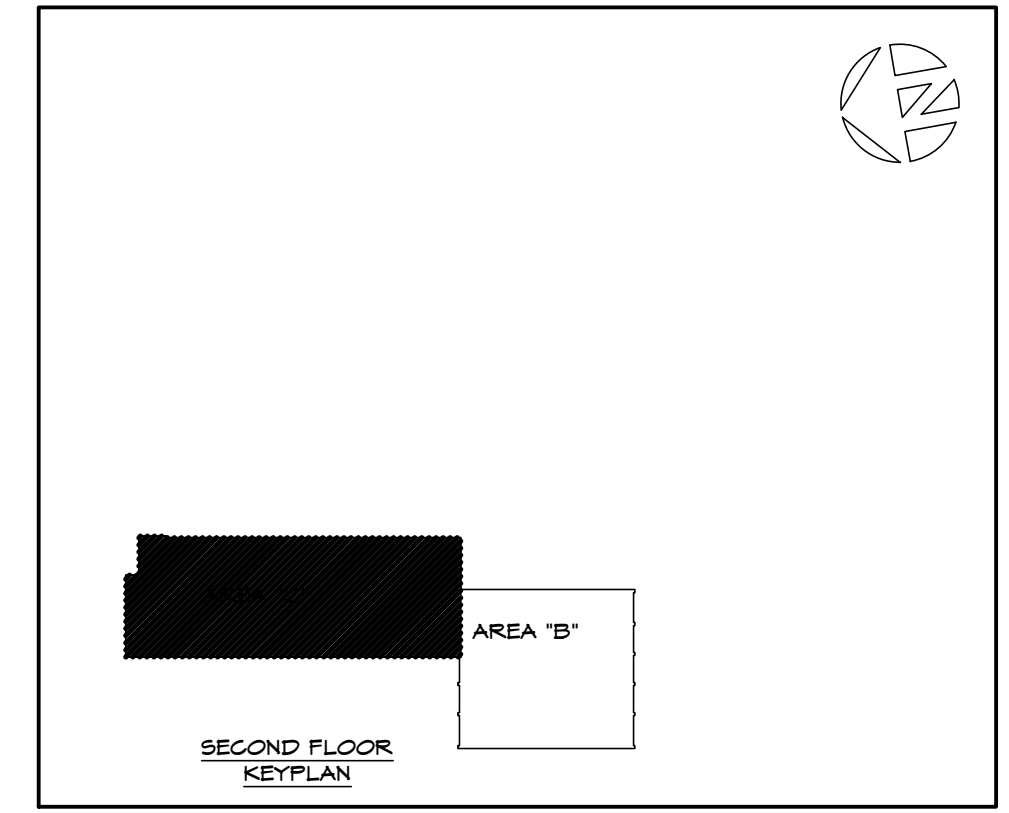
**NOTES:**

- ◇ REMOVE EXISTING CORRIDOR LIGHTS. CONNECT NEW LIGHT FIXTURES TO EXISTING CORRIDOR CIRCUIT WITH 2#12,1#12G,1/2" C. EXISTING FIXTURE CONTROL TO REMAIN. FIXTURE WATTAGES HAVE BEEN REDUCED IN ALL CASES.
- ◇ REPLACE EXISTING EXIT SIGN WITH NEW. CONNECT NEW EXIT SIGN TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT. WHERE CIRCUIT EXTENSION IS REQUIRED, EXTEND EXISTING CIRCUIT WITH 2#12,1#12G,1/2" C.
- ◇ PROVIDE NEW CEILING MOUNTED EMERGENCY LIGHT. CONNECT TO UNSWITCHED LEG OF NEAREST EXISTING LIGHTING CIRCUIT WITH 2#12,1#12G,1/2" C. IN LIEU OF INSTALLATION OF NEW CEILING MOUNTED EMERGENCY LIGHTS, IT IS ACCEPTABLE TO REPLACE EXISTING WALL MOUNTED EMERGENCY LIGHTS "ONE FOR ONE" IN AREA OF WORK.



**1 2ND FLOOR PLAN - AREA C - LIGHTING**

SCALE: 1/8" = 1'-0"



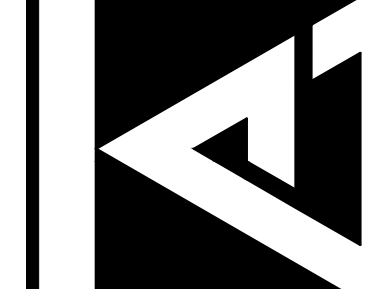
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**SOUTHERN WAYNE HIGH SCHOOL  
RENOVATIONS  
DUDLEY, NORTH CAROLINA**  
2nd FLOOR PLANS - AREA C - LIGHTING

**REVISION SCHEDULE**

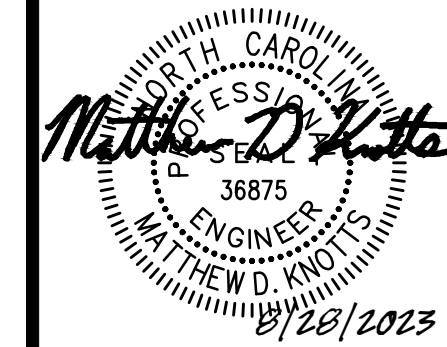
NO.	DATE	REFERENCE

DATE: 11-23-2022  
DRAWN BY: MDK  
CHECKED BY: MDK  
PROJECT:



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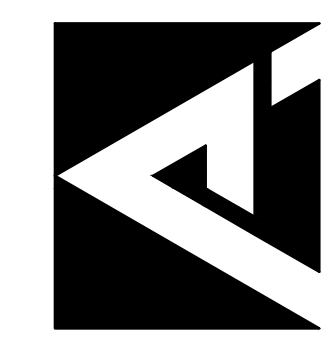
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22009

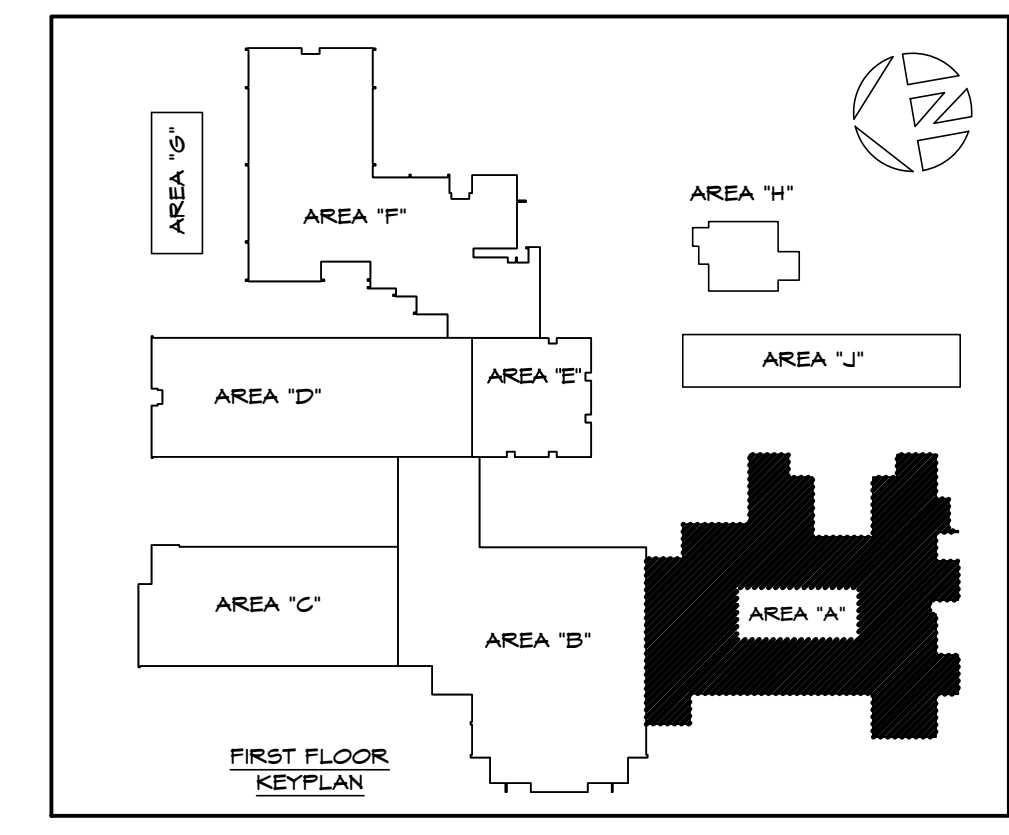
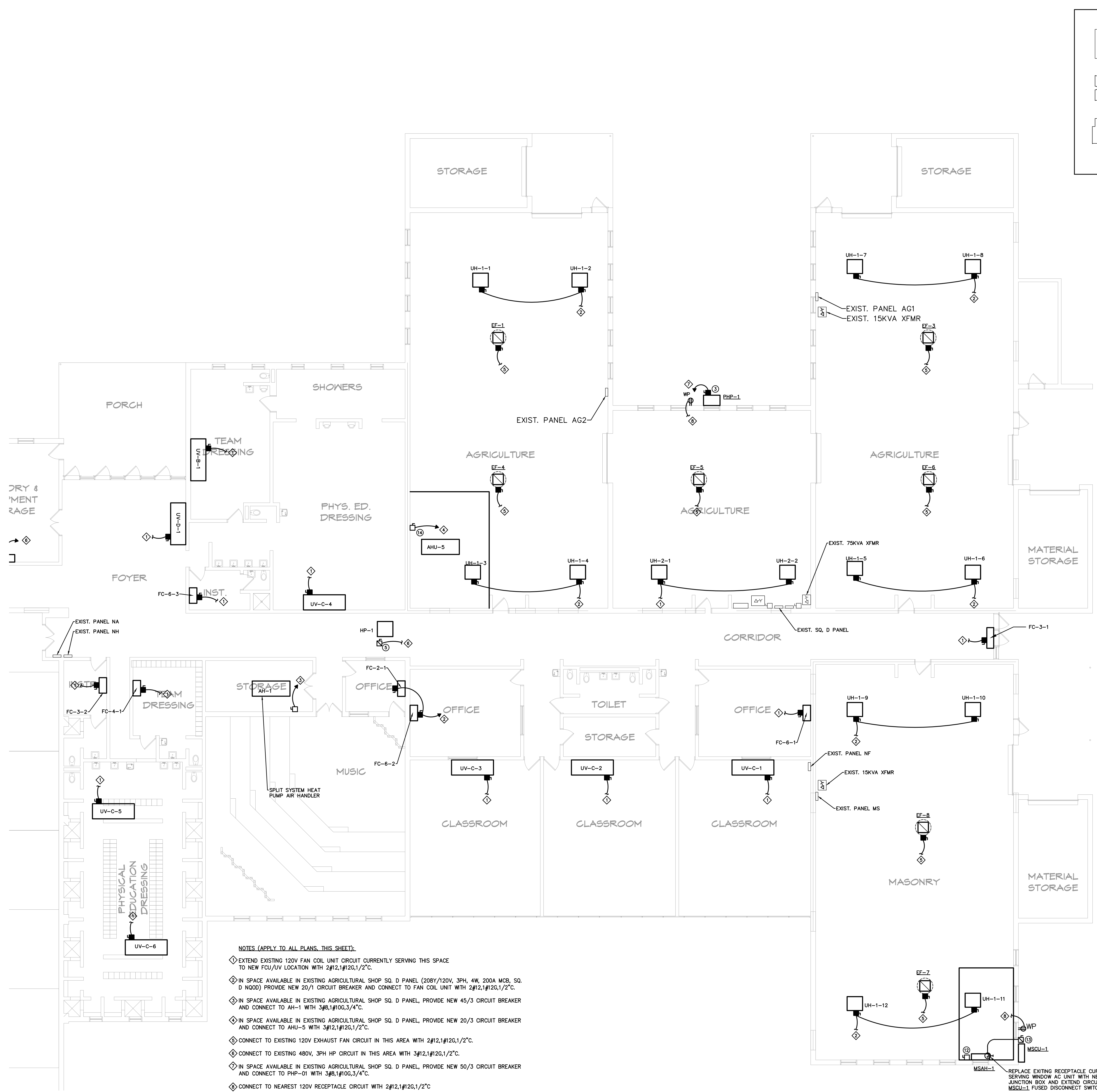
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REVISION SCHEDULE

NO.	DATE	REFERENCE
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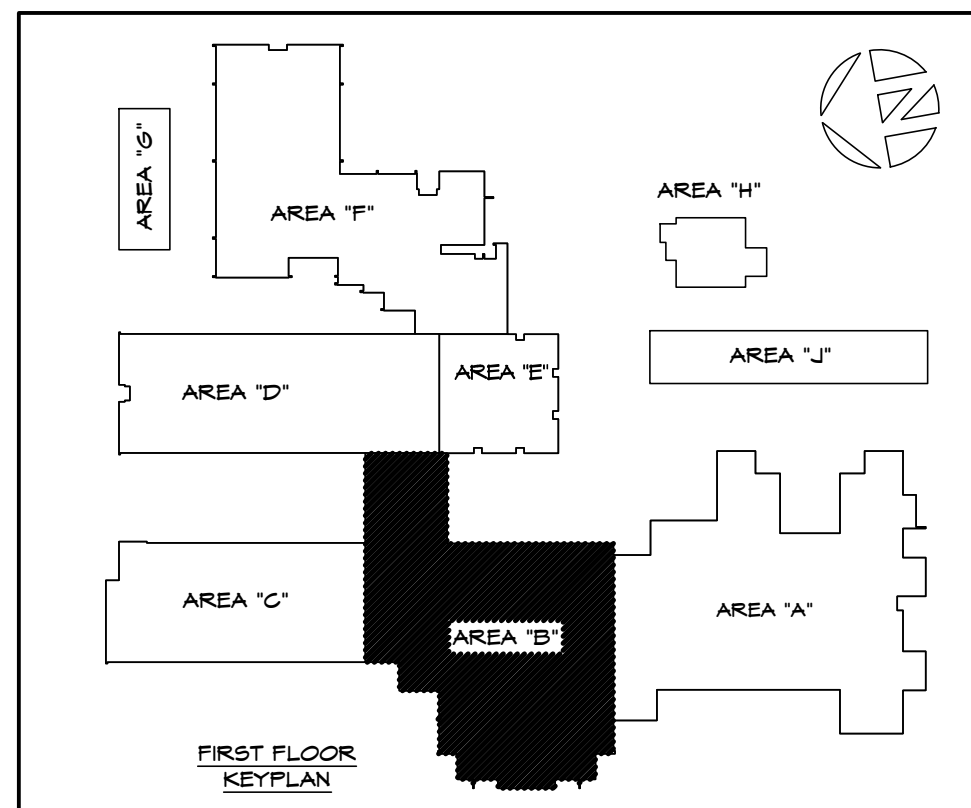


- NOTES (APPLY TO ALL PLANS, THIS SHEET):**
- ◇ EXTEND EXISTING 120V FAN COIL UNIT CIRCUIT CURRENTLY SERVING THIS SPACE TO NEW FCU/UV LOCATION WITH 2#12,1#12G,1/2"C.
  - ◇ IN SPACE AVAILABLE IN EXISTING AGRICULTURAL SHOP SQ. D PANEL (208Y/120V, 3PH, 4W, 200A MCB, SQ. D HOOD) PROVIDE NEW 20/1 CIRCUIT BREAKER AND CONNECT TO FAN COIL UNIT WITH 2#12,1#12G,1/2"C.
  - ◇ IN SPACE AVAILABLE IN EXISTING AGRICULTURAL SHOP SQ. D PANEL, PROVIDE NEW 45/3 CIRCUIT BREAKER AND CONNECT TO AH-1 WITH 3#8,1#10G,3/4"C.
  - ◇ IN SPACE AVAILABLE IN EXISTING AGRICULTURAL SHOP SQ. D PANEL, PROVIDE NEW 20/3 CIRCUIT BREAKER AND CONNECT TO AHU-5 WITH 3#12,1#12G,1/2"C.
  - ◇ CONNECT TO EXISTING 120V EXHAUST FAN CIRCUIT IN THIS AREA WITH 2#12,1#12G,1/2"C.
  - ◇ CONNECT TO EXISTING 480V, 3PH HP CIRCUIT IN THIS AREA WITH 3#12,1#12G,1/2"C.
  - ◇ IN SPACE AVAILABLE IN EXISTING AGRICULTURAL SHOP SQ. D PANEL, PROVIDE NEW 50/3 CIRCUIT BREAKER AND CONNECT TO PHP-01 WITH 3#8,1#10G,3/4"C.
  - ◇ CONNECT TO NEAREST 120V RECEPTACLE CIRCUIT WITH 2#12,1#12G,1/2"C.

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

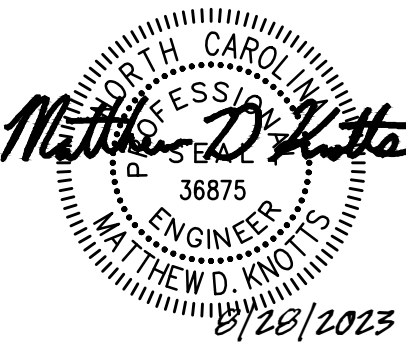
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**1 FLOOR PLAN - AREA B - POWER**  
 SCALE: 1/8" = 1'-0"

- NOTES (APPLY TO ALL PLANS, THIS SHEET):**
- ◇ EXTEND EXISTING 120V FAN COIL UNIT CIRCUIT CURRENTLY SERVING THIS SPACE TO NEW FCU/UV LOCATION WITH 2#12,1#12G,1/2"C.
  - ◇ CONNECT TO EXISTING GYM 208V, 3PH GYM FCU CIRCUIT IN THIS AREA WITH 3#12,1#12G,1/2"C.
  - ◇ IN SPACE AVAILABLE IN EXISTING PANEL AH (480Y/277V, 3PH, 4W, 225A MLO, SIEMENS) PROVIDE NEW 30/3 CIRCUIT BREAKER AND CONNECT TO RHP WITH 3#8,1#8G,3/4"C.
  - ◇ CONNECT TO EXISTING 208V, 1PH AH CIRCUIT IN THIS AREA WITH 2#8,1#10G,3/4"C.
  - ◇ CONNECT TO EXISTING 208V, 1PH HP CIRCUIT IN THIS AREA WITH 2#12,1#12G,1/2"C.
  - ◇ IN SPACE AVAILABLE IN EXISTING AGRICULTURAL SHOP SQ. D PANEL (208Y/120V, 3PH, 4W, 200A MCB, SQ. D NQOD) PROVIDE NEW 20/1 CIRCUIT BREAKER AND CONNECT TO FAN COIL UNIT WITH 2#12,1#12G,1/2"C.



DATE: 11-23-2022  
 DRAWN BY: MDK  
 CHECKED BY: MDK  
 PROJECT:

**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA**  
**FLOOR PLAN - AREA B - POWER**

**REVISION SCHEDULE**

NO.	DATE	REFERENCE

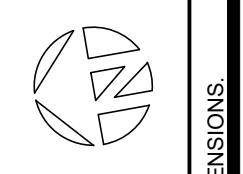




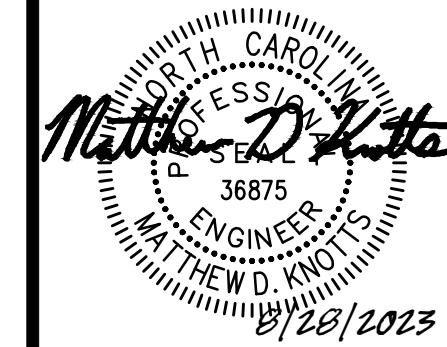






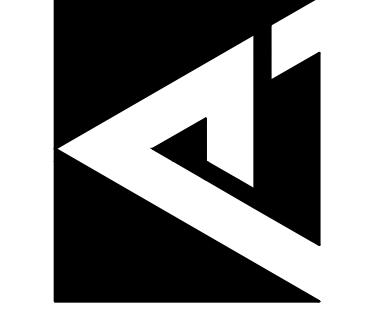


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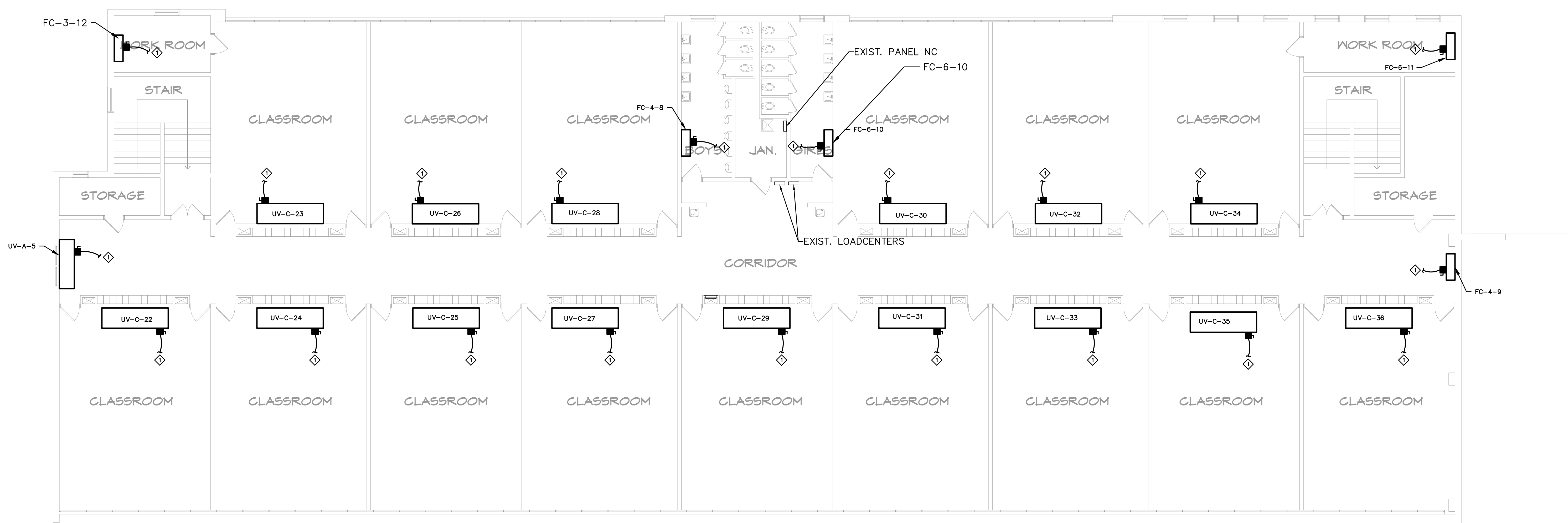
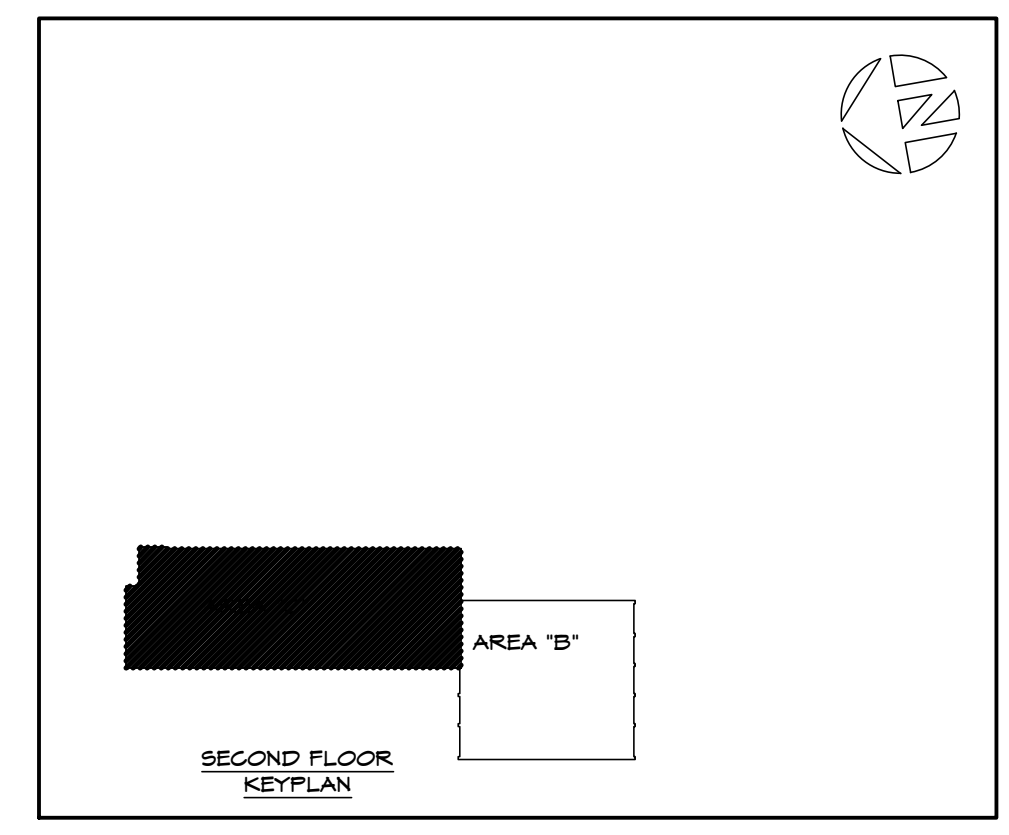


DATE: 11.23.2022  
DRAWN BY: MDK  
CHECKED BY: MDK  
PROJECT: 2218

**SOUTHERN WAYNE HIGH SCHOOL**  
**RENOVATIONS**  
**DUDLEY, NORTH CAROLINA**  
**2nd FLOOR PLANS - AREA C - POWER**

REVISION SCHEDULE	
DATE	REFERENCE

**E305**



**NOTES:**  
◇ EXTEND EXISTING 120V FAN COIL UNIT CIRCUIT CURRENTLY SERVING THIS SPACE TO NEW FCU/UV LOCATION WITH 2#12,1#12G1/2".

**1 2ND FLOOR PLAN - AREA C - POWER**  
SCALE: 1/8" = 1'-0"

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**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 Contractor 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 or 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, fabricate, 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. 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.
- d. 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.
- e. 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".
- f. It is the responsibility of the Contractor to notify the local electrical inspector to schedule the required inspections.

**1.7 ELECTRICAL TESTING:**

- a. Conduct 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 grounds. 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, devices and equipment 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. All tests specified shall be completely documented indicating time of day, date, temperature, and all pertinent test information.
- d. 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.
- e. All elements of the electrical system provided, furnished, installed, or otherwise altered under this contract shall be subjected 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.
- f. 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 Manufacturer's Association and Underwriter's 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. It is the intent of the drawings and specifications that the installation be complete, of finished appearance, and ready for operation. Manufacturers' 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 within 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 tarpaulin. 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 defines the deviations from the specifications.
- 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. It is the intention of these specifications and drawings to call for finished work, tested and ready for operation. Whenever the word "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. 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 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 to the Owner.
- 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 in 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 satisfactorily 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 "Safetyguards 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 remainder of trench shall be backfilled to established grade in 6" layers. The Contractor shall compact between and under a high-frequency vibrator tamper such as Wacker Neuson Soil Compactor or equals by Miltiquip or Weber. Fill shall be compacted to density specified in Earthwork Section for the area through which trench is cut. Where compaction 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 in the same manner as previously specified for stored materials. Protect finished surfaces from splattering mortar, paint, dirt, plaster, etc. Do not install device plates, face plates, canopies, flush cabinet trims, or fixtures on walls or ceilings 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 PAINTING 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.

**SEISMIC RESTRAINT REQUIREMENTS FOR ELECTRICAL SYSTEMS**

**1.1 GENERAL:**

- a. All seismic restraint materials specified herein shall be provided by a single manufacturer to assure a single responsibility for their proper performance. Installation of all seismic restraint materials specified herein shall be accomplished following the manufacturer's written instructions.
- b. The Contractor shall furnish to the seismic restraint materials contractor a complete set of shop drawings and other necessary information for all electrical equipment and components that receive seismic devices. The information to be furnished shall include operating weight of the equipment to be restrained, distribution of weight to support points and dynamic characteristics along with any internal isolation systems to be analyzed. The Contractor shall also furnish a complete layout of conduit, components and equipment to be restrained, including vertical risers, showing size or weight and support points, to the seismic restraint materials contractor for selection and layout of mountings.
- c. The seismic restraint materials contractor shall use the above listed information to design a complete system of seismic mounts in accordance with the contract documents along with the ASCE 7 Standard and the North Carolina State Building Code. The seismic restraint materials Contractor shall analyze all "multiple degree of freedom" systems and provide properly designed restraint systems avoiding all resonance frequencies. To accomplish this, the seismic restraint materials contractor shall employ an Engineer registered in the State of North Carolina to design all restraint systems and prepare a complete set of calculations and shop drawing submittals with his professional Engineer's seal certifying that the design meets all requirements of these contract documents. A seismic design "errors and omissions" insurance certificate must accompany submittals from the Seismic Engineer. Manufacturer's product liability insurance certificates are not acceptable.
- d. The Seismic Engineer or his designated representative shall inspect the project upon completion of the applicable work and provide written certification that the installation is in compliance with the approved shop drawing submittals. This certification shall also bear the professional Engineer's seal and shall become part of the contract closeout documents. All seals shall be signed and dated appropriately.

**2.1 SEISMIC RESTRAINT:**

- a. All required equipment shall be bolted to the structure to allow for seismic acceleration with no failure or displacement. All connections shall be positive bolted type; no friction clamps of any kind are allowed.
- b. Provide cable and connection sets for suspended equipment at each of four corners secured to the building structure.
- c. Floor mounted equipment shall be provided with seismically housed springs or springs with seismic snubbers as determined by the equipment to be restrained.
- d. Seismic restraint systems shall be provided by The VMC Group, Mason Industries, Consolidated Kinetics, or prior approved equal.

**2.2 WIND RESTRAINT:**

- a. All electrical equipment exposed to wind must be evaluated and restrained for wind loading per the requirements of the N.C. Mechanical Code.

**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, 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.
- b. Individually mounted motor starters: Unless otherwise indicated, individually mounted motor starters will be furnished as part of the Division furnishing the driven equipment. Unless otherwise indicated, remote control wiring for Heating, Ventilating, Air Conditioning, and Plumbing equipment will be provided as part of those respective Divisions.

**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 N.C. 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 panelboards, 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 roof 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:**

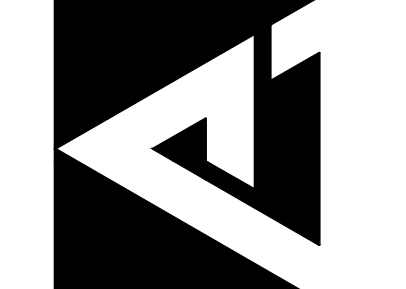
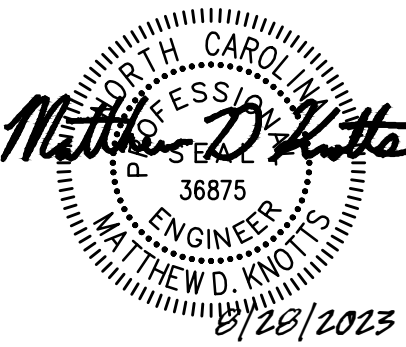
- a. Submit for approval manufacturer's data sheets for all raceway system components.

**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:**

- a. Rigid Metal Conduit shall be zinc-coated Schedule 40 steel or alloy 6063-T42 aluminum with threaded couplings



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NO.	DATE REFERENCE



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 in 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 PVC jacketed liquid-tight complete with liquid-tight connectors.

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 light 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 Kopy-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 Section 16010 Electrical General Requirements.

c. All underground conduits shall have metallized 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. Immediately after installation, conduit openings shall be covered to prevent entrance of foreign matters. Covers shall remain in place throughout the rough-in stage.

k. 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 UL listed as Pressure Cable Connectors 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 binding 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 120/240V, 3-phase, 3-wire power systems, conductor insulation shall be color coded Black (Phase A), Red (Phase B), Blue (Phase C).

d. On 120/240V, 1-phase, 3-wire power systems, conductor insulation shall be color coded Black (Phase A), Red (Phase B), and White (Neutral).

e. Insulation for grounding conductors on all systems shall be Green.

f. 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.

g. Phase sequence shall be "A", "B" and "C" from left to right, top to bottom or front to back when facing equipment.

h. Control and signal wiring shall not use the above-named colors except green for grounding. Any other colors or stripping may be used but the coding shall provide same color or stripping between any two terminals being joined.

i. 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's 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.

c. Cables above ceilings shall be supported from overhead structure clear of ductwork, suspended ceilings, and ceiling hanger wires.

### GROUNDING AND BONDING

#### 1.1 SCOPE:

a. 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 in 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 and 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 U.L. 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 jumpers 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 jumpers shall be sized per NEC Table 250-66 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, 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 jumpers to the enclosure under any of the following conditions:

1. Branch circuit conduit exceeds 1" in size.
2. Feeder conduit regardless of 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.

### BOXES

#### 1.1 SCOPE:

a. Furnish and install outlet boxes, switch boxes, pull boxes, terminal boxes, and junction 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, Raco, 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 conduit hubs of zinc coated malleable iron and no knockouts or extraneous 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 extraneous 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 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:

1. Receptacle and communications outlets shall be installed vertical, 18" up.

2. 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.

3. 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.

4. 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.

d. 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 the 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 WCS96.

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 and to the equipment grounding conductor run with the circuit conductors. "Self-Grounding" type mounting screws will not be accepted as the device grounding method.

#### 2.3 SWITCHES:

a. Switches used for lighting control shall be listed to Fed. Spec. W-5-896E and rated 20 amps, 120-277 VAC, side wired, Hubbell 1221 series.

b. Switches used for disconnecting small single-phase motors and appliances shall be listed to Fed. Spec. W-5-896E and rated 20 or 30 amps to match the branch circuit rating and comply with their horsepower ratings, 120-277 VAC, side wired, Hubbell 1221 and 3031 series.

c. Weatherproof switches shall be equipped with stainless steel covers UL listed for wet locations with cover closed, Pass and Seymour WP-1.

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.

#### 3.1 INSTALLATION:

a. Devices shall be mounted tightly to boxes and be adjusted plumb and level. Devices shall be mounted flush with their associated cover plate. 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 grounded 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.

### 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.

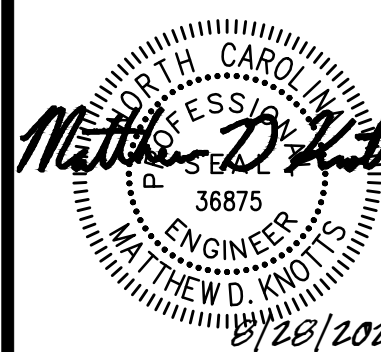
#### 2.1 CONTROL RELAYS:

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.
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.
g. 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. ICS.
b. Pushbuttons shall be designed with the indicated number of normally open circuit-closing contacts, normally closed circuit-opening contacts, or combination thereof.
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.
e. Pushbuttons, selector switches and indicating lights shall be contained in an enclosure suitable for the environment of their location.

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.
b. The rated primary voltage of the transformer shall be not less than the rated voltage of the controller.
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.
e. Exterior Safety Switches that are readily accessible to unauthorized persons shall have their covers padlocked and closed by the Contractor.

PART 3: EXECUTION

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.
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.
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.
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.

2.3 SWITCHING EQUIPMENT:

- a. Fusible switches shall be incorporated into Safety Switches, as hereinafter specified.
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.
c. Enclosure shall have provisions for padlocking circuit breaker 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.
b. Unless otherwise indicated, Distribution Equipment shall be interconnected with wire or cable.
c. Power conductors shall be properly tightened and/or torqued as recommended by the equipment manufacturer.
d. Lugs/terminals shall comply with UL standards UL466A and UL466B.

2.6 IDENTIFICATION:

- a. Group mounted circuit breakers in Panelboards and Switchboards shall be provided with nameplates as described above.
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."
d. Label all receptacles, light switches, and disconnect switches with feeder panel name and branch circuit number.
e. Label all receptacles, light switches, and disconnect switches with feeder panel name and branch circuit number.
f. Label all transformers, power, lighting and distribution panels with name, voltage, # phase, # wires and feeder information.
g. Service equipment shall be marked to indicate the maximum available fault current at the equipment bus as required by NEC 110.
h. All switchboards and panelboards shall be marked to warn of potential electric arc flash hazards as required by NEC 110.

PART 3: EXECUTION

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 SECTION 16100 BASIC MATERIALS AND METHODS.
c. Floor mounted equipment shall be provided with 4" high concrete pads and shall be secured to the concrete pad.
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.
f. Upon completion of the project, furnish to the Owner one complete set of replacement fuses, consisting of three fuses of each type and rating used.
g. Directory cards for Panelboards shall be neatly filed 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.
d. Covers shall be constructed of high-grade flat sheet steel with:
1. Door-in-door construction shall be provided.
2. A flush latch and turnbuckle type lock, so panel door may be held closed without being locked.
3. Four or more cover fasteners of a type which will permit mounting plumb on box.
e. A means shall be provided for readily adjusting projection of panel interior assembly with all connections in place.
f. Panelboard phase and neutral bus work shall be copper.
g. Minimum short circuit rating of any panelboard assembly shall be 10,000A.
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.
k. Unless otherwise indicated and where available for the panelboard type specified, circuit breakers shall be of

the bolt-on type.

- 1. Provide surge suppressor external to 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.

2.2 DISTRIBUTION PANELBOARDS

- a. Panelboards required to have two or more sub-feed breakers rated 100 amperes or greater shall be Distribution Type.
b. Description: NEMA PB 1, circuit breaker type.
c. Panelboard Bus: Copper. One continuous fully rated bus bar per phase with ratings as indicated.
d. Interior trim shall be dead front construction.
e. Main circuit breaker and main lug interiors shall be field convertible for top or bottom incoming feed.
f. Enclosure: NEMA PB 1, Type 1 unless otherwise indicated on drawings.
1. The operating handle of the topmost mounted device shall be no higher than 6 feet 6 inches above the finished floor.
2. Panelboard back-box shall be constructed without pre-punched knockouts.
3. Door-in-door construction shall be provided.
4. Enclosure and front shall be either galvanized steel or stainless steel and shall be finished in manufacturer's standard gray enamel.
5. The enclosure shall be a minimum of 26 inches wide.
g. Minimum fully rated short circuit rating: RMS symmetrical amperage shall be minimum 22,000 amperes unless otherwise indicated on drawings.
h. Molded Case Circuit Breakers: NEMA AB 1, UL 489 listed circuit breakers.
1. Manufactured by the same company manufacturing the panelboard.
2. Circuit breakers used in service entrance equipment should be listed for such use.
3. Include shunt trips where required or as indicated on the contract documents.
4. Rating plugs, where used, shall be front accessible.
5. Breakers shall have minimum interrupting capacity, as indicated for the panelboard on the contract documents.
6. Breaker frame sizes and trips shall be as indicated in the drawings.
7. Circuit breakers shall provide positive indication of ON, OFF, and tripped conditions.
8. All breakers shall be quick-make, quick-break.
9. Multi-pole breakers shall be common trip, resulting in all poles opening simultaneously under trip conditions.

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.
c. Unused openings shall be closed.
d. Only one solid wire is allowable under a screw.
e. Centered above the breakers in each panelboard attach a nameplate indicating panel designation - for example "PANEL A", or "PANEL MDP".
e. Panelboard backboxes shall be mounted with their tops 6'-8" above the floor.

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.
1.2 SUBMITTALS:

- a. Submit for approval complete manufacturer's data sheets for all fixtures.
b. Submit for approval Lighting Fixture samples as requested by the Architect/Engineer.
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.
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 per row.
d. Recessed fixtures in plaster and gypsum board ceilings shall be equipped with plaster frames.
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:
1. 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.
2. 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.
3. Joints between housings and door frames shall be totally free of light leaks.
4. Top access plates to facilitate wiring are optional with the Contractor.

- 5. 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.
6. Troffers for plaster and gypsum board ceilings shall be furnished with plaster frames.
7. 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 fixture.

- 8. Fixtures shall be a regularly cataloged and commonly manufactured product of an established, recognized lighting fixture manufacturer, with published photometric data and Zonal Cavity Coefficients of Utilization based on tests conducted by an independent photometric testing laboratory.
2.2 LED DRIVERS:

- a. General
1. Provide with ten-year operational life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
2. Drivers shall be designed and tested to withstand electrostatic discharges up to 15,000 V without impairment per IEC801-2.
3. 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.
4. Provide a maximum inrush current of 2 amperes for 120V and 277V drivers.
5. Drivers shall withstand up to a 4,000-volt surge without impairment of performance as defined by ANSI C62.41 Category A.
6. Drivers shall be manufactured in a facility that employ ESD reduction practices in compliance with ANSI/ESD S20.20.
7. Drivers shall have a Class A Sound Rating - Inaudible in a 27-dBA ambient.
8. Drivers shall have no visible change in light output with a variation of plus/minus 10 percent line voltage input.
9. Drivers shall have Total Harmonic Distortion less than 20 percent and meet ANSI C82.11 maximum allowable THD requirements.
10. Drivers shall track evenly across:
a. Multiple fixtures.
b. All light levels.
11. Constant current drivers shall:
a. Support from 200mA to 2.1 Amps (in 10mA steps) to ensure a compatible driver exists.
b. Support LED arrays up to 40W or 50W (710mA to 1.05A in 10mA steps).
12. Constant voltage drivers shall:
a. Support from 10V to 40V (in 0.5V steps) to ensure a compatible driver exists.
b. Support LED arrays up to 40W.
13. Configuration tool shall be available to optimize the following for LED fixtures:
a. Light level.
b. Efficacy.
c. Thermal performance.
14. Drivers shall operate properly from a supply voltage of 120 through 277VAC at 60Hz.

2.3 EMERGENCY EXIT LUMINAIRE:

- a. It shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features.
b. Battery shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance.
c. Charger shall be fully automatic solid-state type, full wave rectifying, with current limiting.
d. Pilot light shall indicate the unit is connected to AC power.
e. The entire unit shall be warranted for three years.
f. The use of LED is required due to their reliable performance, low power consumption, and limited maintenance requirements.

- g. The Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours.
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.
b. Pilot light shall indicate the unit is connected to A.C. power.
c. Battery shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance.
d. Charger shall be fully automatic solid-state type, full wave rectifying, with current limiting.
e. The entire unit shall be warranted for three years.
f. The Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours.

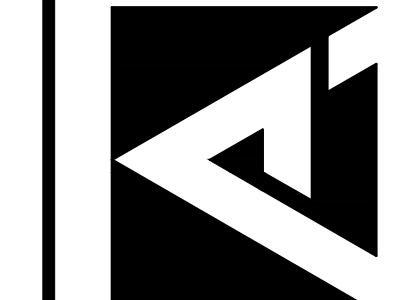
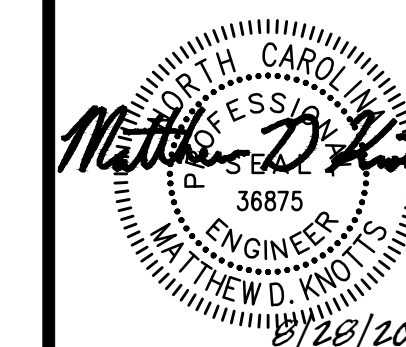
PART 3: EXECUTION

3.1 COORDINATION:

- a. Contractor shall verify ceiling or wall tie in or on which each fixture is to be mounted, and shall furnish wood 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.





- 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 TPN, 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.

- 2. Ditek DTK-HW Series for hard wire AC protection for 120 VAC.

3.4 **SYSTEM TEST AND CERTIFICATION/DEMONSTRATION:**

- a. The fire alarm system shall be fully tested in compliance with Testing Procedures for Signaling Systems (NFPA 72) under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all the functions as specified.
- b. The Fire Alarm System Sub-Contractor shall test:
  - 1. Every alarm initiating device for proper response and program execution.
  - 2. Every notification appliance for proper operation and audible/visual output.
  - 3. All auxiliary control functions such as elevator capture, smoke door and damper release, and functional override of HVAC, ventilation, and pressurization controls.

**EXTENSION OF EXISTING FIRE ALARM SYSTEM, ADDRESSABLE**

1.1 **SCOPE:**

- a. Contractor shall extend the building's existing Gamewell/FCI E3 Series Fire Detection and Alarm System as indicated on the drawings and as specified herein.
- b. Extension shall include all devices, wiring, equipment, raceways, and connections required for a complete and satisfactory operating system, whether every such item is specifically shown or mentioned.
- c. 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.
- d. All devices and installation methods used shall match that of the existing system.

1.2 **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.

1.3 **SUBMITTALS:**

- a. Shop drawings shall be submitted for each item of equipment to be furnished.
- b. Submittal shall include a complete wiring and conduit diagram overlaid on a building floor plan system battery calculations and notification circuits voltage drop calculations, prepared by an authorized representative of the system manufacturer. Diagram shall indicate conductor sizes, quantities, and color coding for each conduit run, as well as required conduit sizes.

1.4 **CLOSEOUT DOCUMENTS:**

- 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 any and all warranty claims.
- c. A scaled plan of the building showing the placement of each individual item of fire alarm equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.

1.5 **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:
  - 1. The sounding of audible signals throughout the facility.
  - 2. The flashing of alarm indicating signal lights.
  - 3. 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.
  - 4. Release of magnetic door holders, shutdown of air handling systems, closing of smoke dampers and other control functions as indicated or required.
  - 5. A local sounding device in the panel shall be activated.
  - 6. Activation (Alarm, Trouble, Supervisory) of the existing Fire Alarm System remaining for the existing building.
  - 7. All automatic programs assigned to the alarm point shall be executed and the associated notification appliance circuits and control relays addressed and activated.
  - 8. Other functions as noted in the drawings or as evidently intended or required.
- c. All strobes shall be synchronized in common spaces.
- d. 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.

3.1 **INSTALLATION:**

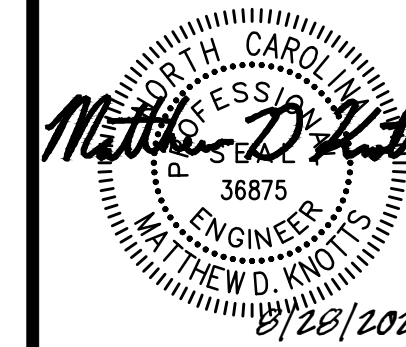
- a. Wiring shall be in accordance with the manufacturer's recommendations for proper system operation.
- b. Cable for monitoring and control of addressable devices shall be no less than a #18 AWG twisted shielded pair. Unless specifically noted or approved otherwise, other conductors shall be of stranded copper not smaller than #14 AWG, with THWN/THHN insulation.
- c. All wiring shall be in a 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. 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.
- e. Automatic detectors shall be located at least three feet from any HVAC diffuser.
- f. All junction and connection boxes shall be painted red for easy identification.
- g. 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.
- h. 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.
- i. All communications with remote fire alarm system monitoring shall continue to be performed by the existing fire alarm system. The new fire alarm system shall notify the existing system with all alarm, trouble and supervisory signals. In addition, the existing fire alarm system shall notify the new fire alarm system with all alarm trouble and supervisory signals.

3.2 **MANUFACTURER'S RESPONSIBILITIES:**

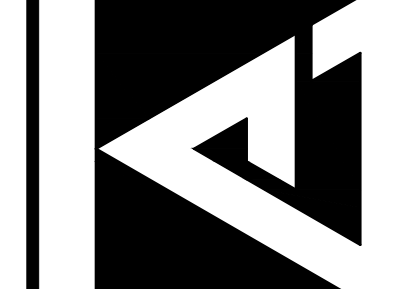
- a. Final system connections shall be made by or under the direct supervision of an authorized representative of the manufacturer, who shall verify to the Architect/Engineer that the system has been left in full and proper operating condition.
- b. Manufacturer shall supply a 2-year warranty from date of manufactured Control System and Field Devices and appliances.

3.3 **SURGE PROTECTION AND GROUNDING:**

- a. All equipment shall be properly grounded. Main panel shall be grounded directly to 'earth ground'. Surge protection and lightning arrestors shall be installed on the AC supply and all initiating, notification, and monitoring circuits. All surge protection shall be Ditek or equivalent.
  - 1. Ditek DTK-LVLP Series for low voltage data and signal line protection.



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DATE: 11-23-2022  
 DRAWN BY: MJK  
 CHECKED BY: MJK  
 PROJECT:

**SOUTHERN WAYNE HIGH SCHOOL RENOVATIONS DUDLEY, NORTH CAROLINA SPECIFICATIONS**

REVISION SCHEDULE	
NO.	REFERENCE

**E403**

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