PROPOSED ALTERATIONS FOR:

THE RAYNOR

112 S FAYETTEVILLE AVE.

DUNN, NC 28334

APPENDIX B - BUILDING CODE SUMMARY

Name of Project: THE RAYNOR
Address of Project: 112 S FAYETTEVILLE ST Suite #:
Owner or Authorized Agent: ROBERT CAMILLE Phone: 828.231.4019
Fax: Email: rcam09@gmail.com

Owned By: ☒ Privately ☐ City/County ☐ State
Code Enforcement Jurisdiction: ☒ City ☐ County ☐ City/County
Name of Jurisdiction: DUNN

PROJECT SCOPE:

EXISTING BUILDING - CONVERT TO A NEW EVENT CENTER WITH SMALL FOOD COURT BOOTHS, OPEN SEATING AREAS, BAR, MEETING/EVENT ROOM AND TOILETS.

CONTACT: Pierre Mercier

DESIGNER	FIRM	NAME	LICENSE	TELEPHONE
Architect	Studio Forty	Pierre F. Mercier	9059	919.522.8939
Civil				
Electrical	Barrett Woodyard	Chadwick M Vickery	032815	919.747.9884
Fire Alarm	Barrett Woodyard	Chadwick M Vickery	032815	919.747.9884
Plumbing	Barrett Woodyard	Robert F Kowach	057621	919.747.9884
Mechanical	Barrett Woodyard	Robert F Kowach	057621	919.747.9884
Sprinkler/Standpipe				
Structural				

2018 NC BUILDING CODE: ☐ New Building ☐ Addition ☐ Shell/Core ☐ Phased Construction - Shell Core ☐ 1st Time Interior Completion ☒ Interior Alteration

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

CONSTRUCTED: (date) CURRENT USE(S) (Ch. 3): VACANT
RENOVATED: (date) PROPOSED USE(S) (Ch. 3): ASSEMBLY
OCCUPANCY CATEGORY (Table 1604.5) Current: II Proposed: II

BASIC BUILDING DATA:

Construction Type: (check all that apply) ☐ I-A ☐ I-B ☐ II-A ☐ II-B ☐ III-A ☐ III-B ☐ IV ☐ V-A ☒ V-B
Sprinklers: ☐ No ☐ Partial ☒ Yes ☒ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ☒ No Class: ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Primary Fire District: ☒ No ☐ Yes Flood Hazard Area: ☒ No ☐ Yes
Special Inspections Required: ☒ No ☐ Yes

GROSS BUILDING AREA TABLE

Floor	Existing (sq ft)	Alteration	Sub-Total
Mezzanine			
1st Floor	13,657		
Basement			
Total	13,657		

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; Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM; Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4; I-1 Condition: ☐ 1 ☐ 2; I-2 Condition: ☐ 1 ☐ 2; I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5; Mercantile ☐; Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4; Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-Piled ☐ Parking Garage ☐ Open ☐ Enclosed ☒ Repair Garage; Utility and Miscellaneous ☐

Accessory Occupancy Classifications:
Incidental Uses (Table 509)
This separation is not exempt as a Nonseparated use (see exceptions)

- ☐ Furnace room where any piece of equipment is over 400,000 Btu per hour input
- ☐ Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower
- ☐ Refrigerant machine room
- ☐ Hydrogen cutoff rooms, not classified as Group H
- ☐ Incinerator rooms
- ☐ Paint shops, not classified as Group H, located in occupancies other than Group F
- ☐ Laboratories and vocational shops, not classified as Group H located in a Group E or I-2 occupancy
- ☐ Laundry rooms over 100 square feet
- ☐ Group I-3 cells equipped with padded surfaces
- ☐ Group I-2 waste and linen collection rooms
- ☐ Waste and linen collection rooms over 100 square feet
- ☐ Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies
- ☐ Rooms containing fire pumps
- ☐ Group I-2 storage rooms over 100 square feet
- ☐ Group I-2 commercial kitchens
- ☐ Group I-2 laundries equal to or less than 100 square feet
- ☐ Group I-2 rooms or spaces that contain fuel-fired heating equipment

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)

☐ Separated Use (508.4) - See below for area calculations
Fore 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

$$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1.00$$

$$\frac{\quad}{\quad} + \frac{\quad}{\quad} = \leq 1.00$$

$$+ \quad = \leq 1.00$$

Chapter 9: 903.2.1.2: Group A occupancy, non-sprinklered building, cannot exceed 5,000 sf per fire area.

STORY NO.	DESCRIPTION AND USE	(A) BLDG. AREA PER STORY (ACTUAL)	(B) TABLE 506.2[4] AREA	(C) AREA FOR FRONTAGE INCREASE[1, 5]	(D) ALLOWABLE AREA PER STORY OR UNLIMITED[2, 3]
1	A-2 ASSEMBLY	13,657	24,000		24,000

[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 = ft (F)
b. Total Building Perimeter = ft (P)
c. W= (L_1 x w_1 + L_2 x w_2) / F
d. W= (142 x 20 + 409 x 30) / F
e. W= (2840 + 12270) / F = 15,110 / 551 = W = 27.42
f. Ratio (F/P) = (F/P)
g. W = Minimum width of public way = ft (W)
h. Percent of frontage increase If = 100 (F/P - 0.25) x W/30 =
If = 100 (.8503 - 0.25) x 27.42/30 =
If = 100 (.6003) x .914 =
If = 60.03 x .914 = (%)

[2] Unlimited area applicable under conditions of Section 507.
[3] Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2
[4] The maximum area of parking garages must comply with 406.5.4. The maximum area or air traffic control towers must comply with 412.3.1.
[5] Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT

	Allowable	Shown on Plans	Code Reference
Building Height in Feet (Table 504.3)	60'	20'	
Building Height in Stories (Table 504.4)	2	1	

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

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING REQ'D	RATING PROVIDED (W/ REDUCTION)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS
Structural Frame, including columns, girders, trusses		0	0				
Bearing Walls		0	0				
Exterior		0	0				
North							
East							
West							
South							
Interior		0	0				
Non Bearing Walls and Partitions		0	0				
Exterior Walls							
North		0	0				
East		0	0				
West		0	0				
South		0	0				
Interior walls and partitions		0	0				
Floor Construction Including supporting beams and joists		N/A	N/A				
Floor Ceiling Assembly		N/A	N/A				
Columns supporting floors		0	0				
Roof Construction Including supporting beams and joists		0	0				
Roof Ceiling Assembly		0	0				
Columns Supporting Roof		0	0				
Shaft Enclosures - Exit		N/A	N/A				
Shaft Enclosures - Other		N/A	N/A				
Corridor Separation		N/A	N/A				
Occupancy/Fire Barrier Separation		N/A	N/A				
Smoke Barrier Separation		N/A	N/A				
Smoke Partition		N/A	N/A				
Tenant/Dwelling Unit/ Sleeping Unit Separation		N/A	N/A				
Incidental Use Separation		N/A	N/A				

*Indicate section number permitting reduction

PERCENTAGE OF WALL OPENING CALCULATIONS

Fire Separation Distance (feet) From Property Lines	Degree of Openings Protections (Table 705.8)	Allowable Area (%)	Actual Shown on Plans (%)

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting:	☒ Yes	☐ No
Exit Signs:	☒ Yes	☐ No
Fire Alarm:	☒ Yes	☐ No
Smoke Detection Systems:	☐ Yes	☒ No
Carbon Monoxide Detection:	☐ Yes	☒ No
Panic Devices at exit doors:	☒ Yes	☐ No

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: A1

- ☐ Fire and/or smoke rated wall locations (Chapter 7)
- ☐ Assumed and real property line locations (if not on the site plan)
- ☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
- ☒ Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
- ☒ Occupant loads for each area
- ☐ Exit access travel distances (1017)
- ☐ Common path of travel distances [Tables 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 (1005.3)
- ☐ 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) - ALL DOORS
- ☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
- ☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
- ☐ 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 REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED
NONE							

ACCESSIBLE PARKING
(SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES		# OF ACCESSIBLE SPACES PROVIDED			TOTAL # ACCESSIBLE PROVIDED
	REQUIRED	PROVIDED	REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	VAN SPACES WITH 8' ACCESS AISLE	
-			-	-		
TOTAL			-	-		

PLUMBING FIXTURE REQUIREMENTS
(TABLE 2902.1)

USE	WATERCLOSETS			URINALS	LAVATORIES			SHOWERS/ TUBS	DRINKING FOUNTAINS	
	MALE	FEMALE	UNISEX		MALE	FEMALE	UNISEX		REGULAR	ACCESSIBLE
A-2 - 630 persons	4.2	4.2			1.575	1.575				
Bar/Tavern - 62 persons	.775	.775			.826	.826				
	4.975	4.975			2.4	2.4				
REQUIRED	10			0	5			0	0	0
PROVIDED	11			0	6			0	1	1

SPECIAL APPROVALS

Special Approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, ICC, etc., describe below)
N/A

ENERGY SUMMARY

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 is used, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: ☐ (If checked, the remainder of this section is not applicable)
Exempt Building: ☐ Provide code or statutory reference:
Climate Zone: ☐ 3A ☒ 4A ☐ 5A
Method of Compliance:
Energy Code ☐ Performance ☐ Prescriptive
ASHRAE 90.1 ☐ Performance ☐ Prescriptive
OTHER: ☐ Performance (specify source)

THERMAL ENVELOPE (Prescriptive method only)

Roof/Ceiling Assembly (each assembly)
Description of Assembly: Existing roof deck - new R42 rigid insulation added
U-Value of total assembly: .023
R-Value of insulation: R 42
Skylights in each assembly: Existing to remain
U-Value of skylight: N/A
total square footage of skylights in each assembly: N/A

Exterior Walls (each assembly)
Description of Assembly: Existing brick wall, min. 10" thick
U-Value of total assembly:
R-Value of insulation:
Openings (windows or doors with glazing)
U-Value of assembly: .38
Solar head gain coefficient: .28
projection factor: N/A
Door R-Values: .42 glass door .57 insul metal

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

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

Floors slab on grade
Description of Assembly: 4" conc. slab, vapor barrier, 2.5" perimeter insul.
U-Value of total assembly:
R-Value of insulation: 15
Horizontal/vertical requirement: T.O.S. to top of footing
Slab heated: No

LIST OF DRAWINGS

T1 TITLE SHEET & APPENDIX B

ARCHITECTURAL
A1 LIFE SAFETY PLAN
A2 DINING ROOM PLAN
A3 ACTIVITY ROOM PLAN
A4 ENLARGED ACTIVITY AREA PLAN
A5 BAR PLAN AND STOREFRONT ELEVATION
A6 VENUE PLAN AND STOREFRONT ELEVATIONS
A7 ENLARGED TOILET ROOM PLAN
A8 ELEVATIONS AND DETAILS

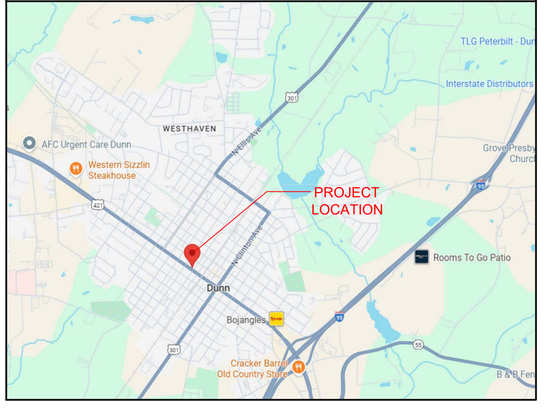
MECHANICAL
M0.1 ABBREVIATIONS, LEGEND, & DETAILS – MECHANICAL
M0.2 DETAILS & SCHEDULES – MECHANICAL
M0.3 SCHEDULES – MECHANICAL
M0.4 COMPLIANCE – MECHANICAL
M0.5 FIRESTOPPING DETAILS – MECHANICAL
M0.6 SPECIFICATIONS – MECHANICAL
M0.7 SPECIFICATIONS – MECHANICAL
M0.8 SPECIFICATIONS – MECHANICAL
M0.9 SPECIFICATIONS – MECHANICAL
M0.10 KITCHEN EQUIPMENT DETAILS
M0.11 KITCHEN EQUIPMENT DETAILS
M0.12 KITCHEN EQUIPMENT DETAILS
M0.13 KITCHEN EQUIPMENT DETAILS
M0.14 KITCHEN EQUIPMENT DETAILS
M0.15 KITCHEN EQUIPMENT DETAILS
M0.16 KITCHEN EQUIPMENT DETAILS
M0.17 KITCHEN EQUIPMENT DETAILS
M0.18 KITCHEN EQUIPMENT DETAILS
M0.19 KITCHEN EQUIPMENT DETAILS
M1.0 FIRST FLOOR DEMO PLAN – MECHANICAL
M1.1 FLOOR PLANS – MECHANICAL
M1.2 ROOF PLAN – MECHANICAL

PLUMBING
NG1.0 FIRST FLOOR DEMO PLAN – NATURAL GAS
NG1.1 NG1.1 – FIRST FLOOR PLAN – NATURAL GAS
NG5.1 ISOMETRICS – NATURAL GAS
P0.1 ABBREVIATIONS, LEGEND, & DETAILS – PLUMBING
P0.2 DETAILS & SCHEDULES - PLUMBING
P0.3 FIRESTOPPING DETAILS – PLUMBING
P0.4 SPECIFICATIONS – PLUMBING
P0.5 SPECIFICATIONS – PLUMBING
P0.6 SPECIFICATIONS – PLUMBING
P1.1 FIRST FLOOR PLAN – PLUMBING – DOMESTIC
P1.2 FIRST FLOOR PLAN – PLUMBING – SAN/VENT
P5.1 ISOMETRICS – PLUMBING – DOMESTIC
P5.2 ISOMETRICS – PLUMBING – SAN/VENT

ELECTRICAL
E0.1 ELECTRICAL LEGEND, NOTES, & SCHEDULES
E0.2 PENETRATION DETAILS
E0.3 ELECTRICAL RISER DIAGRAM & PANEL SCHEDULES
E0.4 ELECTRICAL SPECIFICATIONS
E0.5 ELECTRICAL SPECIFICATIONS
E0.6 ELECTRICAL SPECIFICATIONS
E0.7 ELECTRICAL SPECIFICATIONS
E1.1 FLOOR PLAN – ELECTRICAL
E1.2 ROOF PLAN & MEZZANINE PLAN – ELECTRICAL
E2.1 FLOOR PLAN – LIGHTING

FIRE ALARM
FA0.1 FIRE ALARM NOTES, LEGEND, & DETAILS
FA1.1 FLOOR PLAN – FIRE ALARM

LOCATION MAP:



PIERRE F MERCIER REGISTERED ARCHITECT No. 9059 NORTH CAROLINA RALEIGH, NC 7/25/25

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NEW INTERIOR ALTERATIONS FOR:
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Dunn, NC 28334

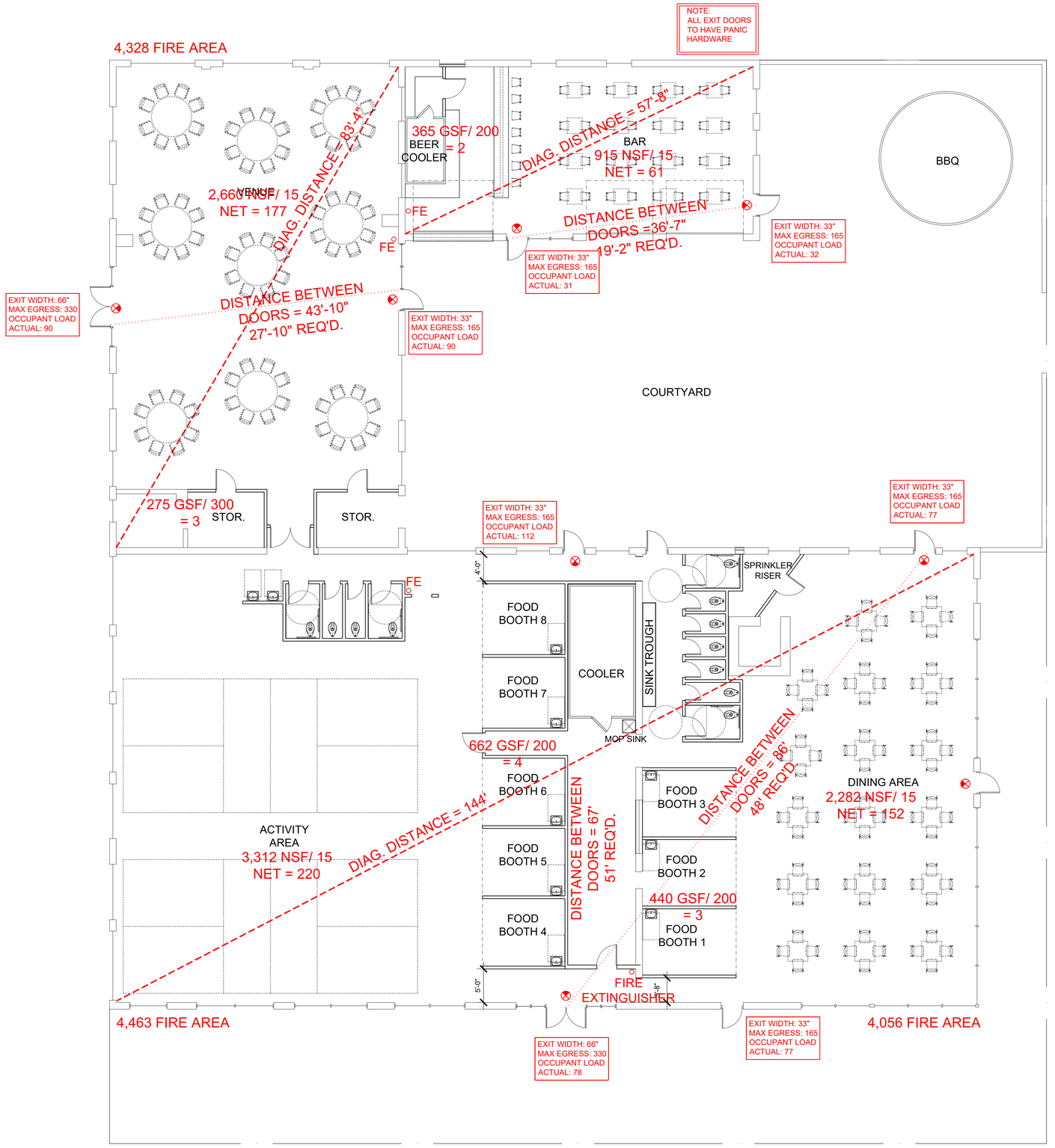
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SHEET NAME: TITLE SHEET & APPENDIX B

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: PFM

SHEET NO.: T1



1 LIFE SAFETY PLAN
1/8" = 1'-0"

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7/25/25

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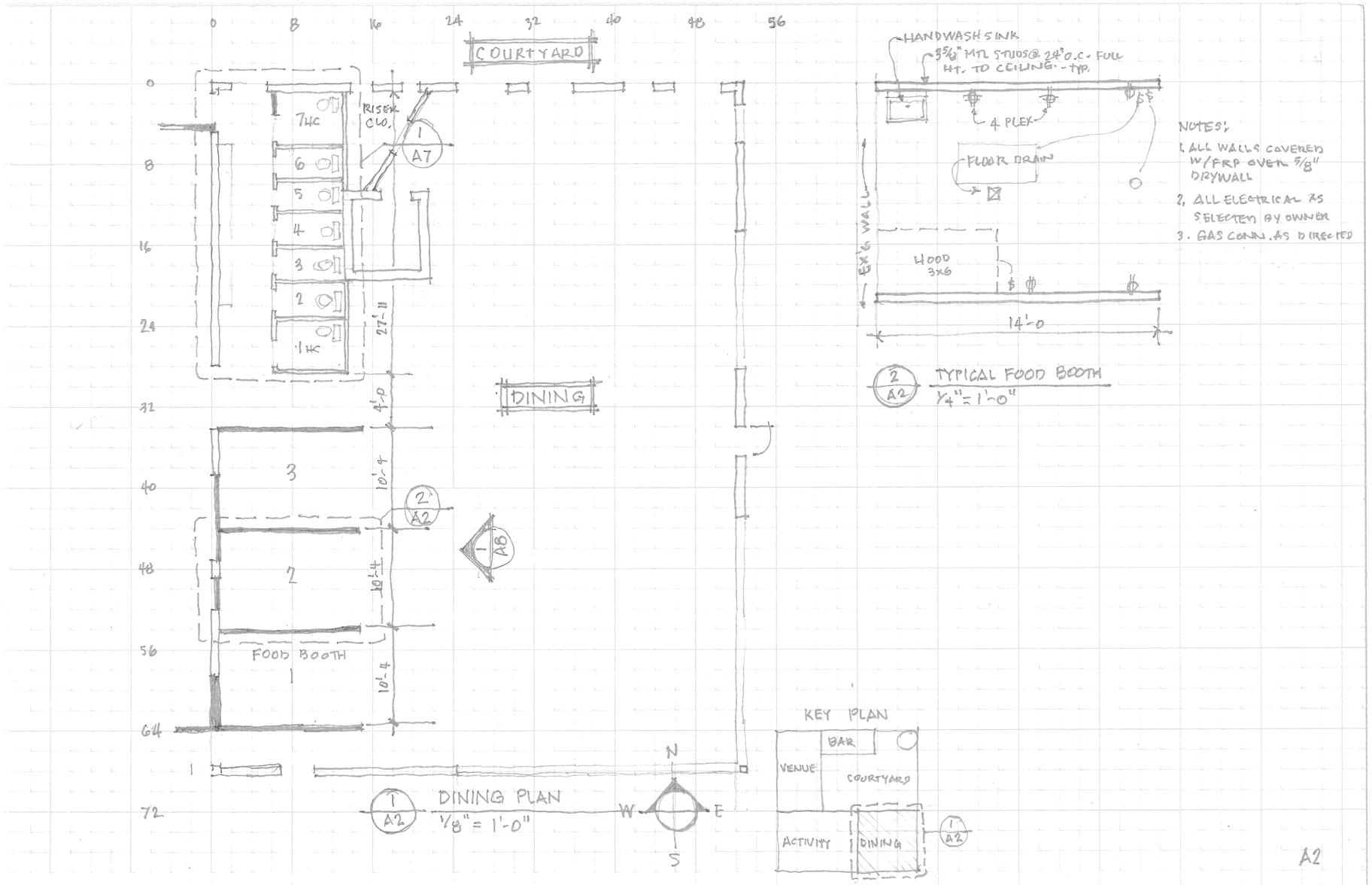
SHEET NAME:
LIFE SAFETY PLAN

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SHEET NO.:
A1



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SHEET NAME:

DINING PLAN

REVISIONS:

DATE: 07.25.25

PROJECT NO.: 25-023

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SHEET NO.:

A2

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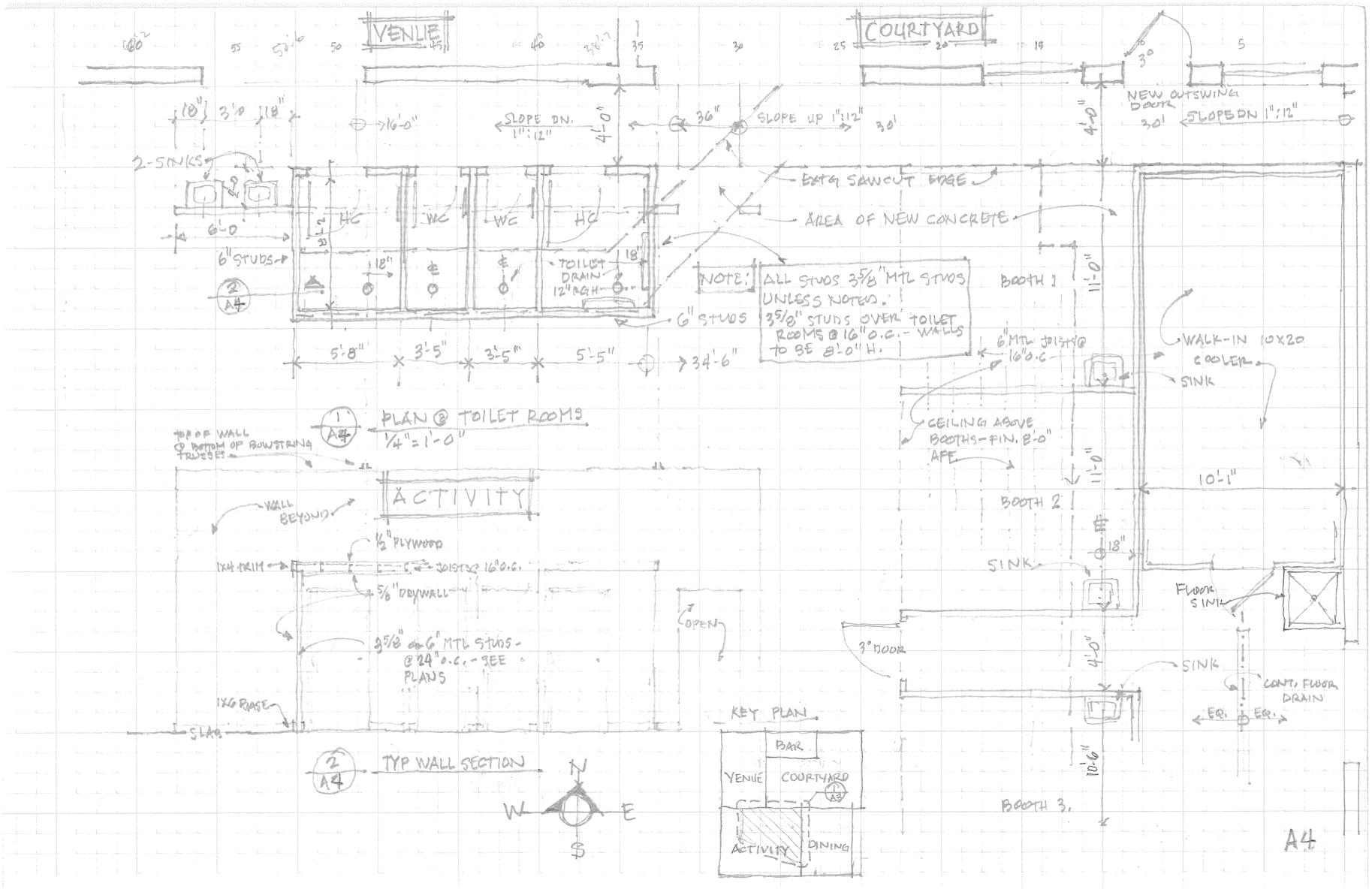
SHEET NAME:
ACTIVITY ROOM PLAN

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
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SHEET NO.:
A3



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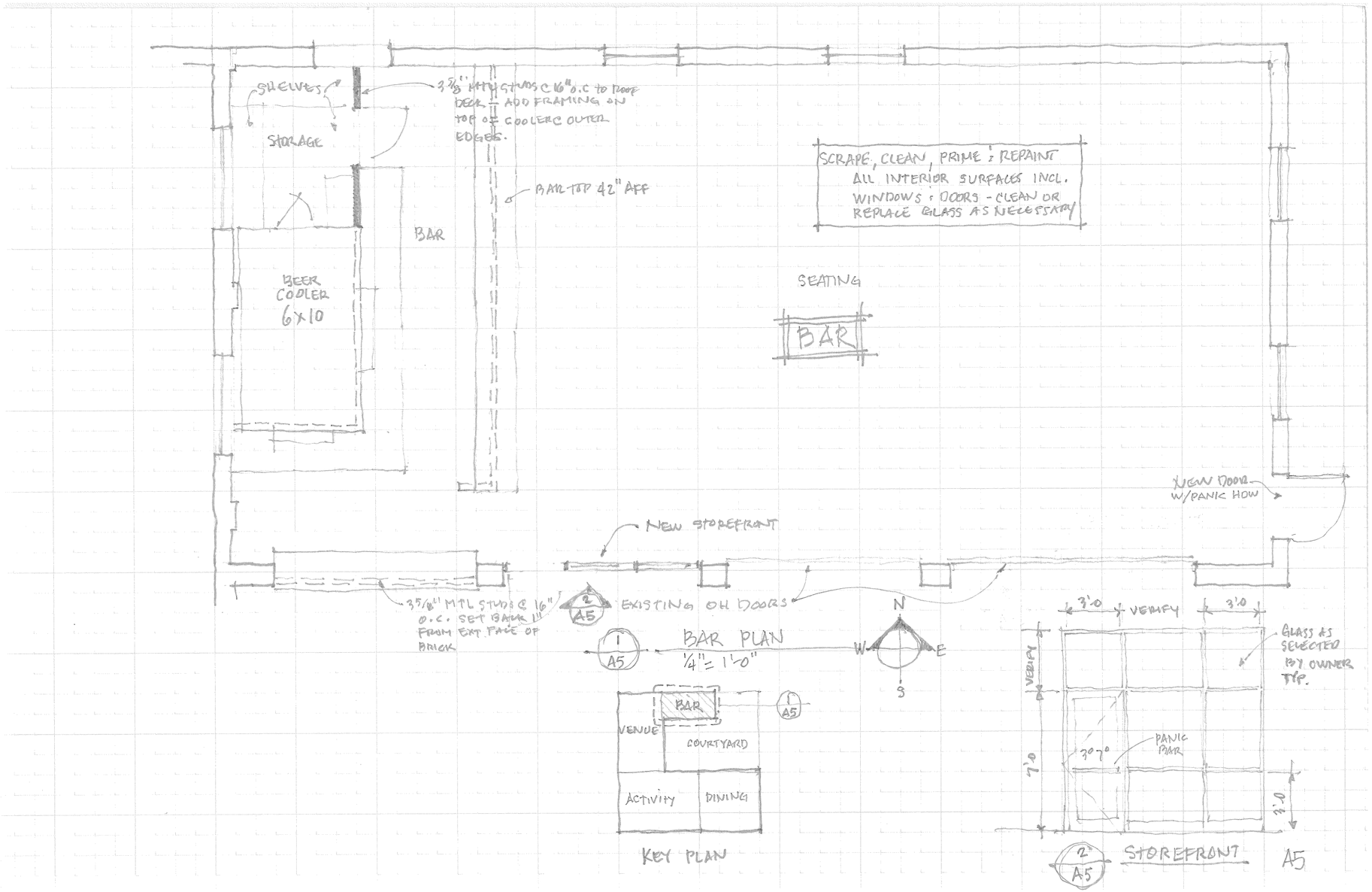
SHEET NAME:
ENLARGED ACTIVITY AREA PLAN

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: PFM

SHEET NO.:
A4

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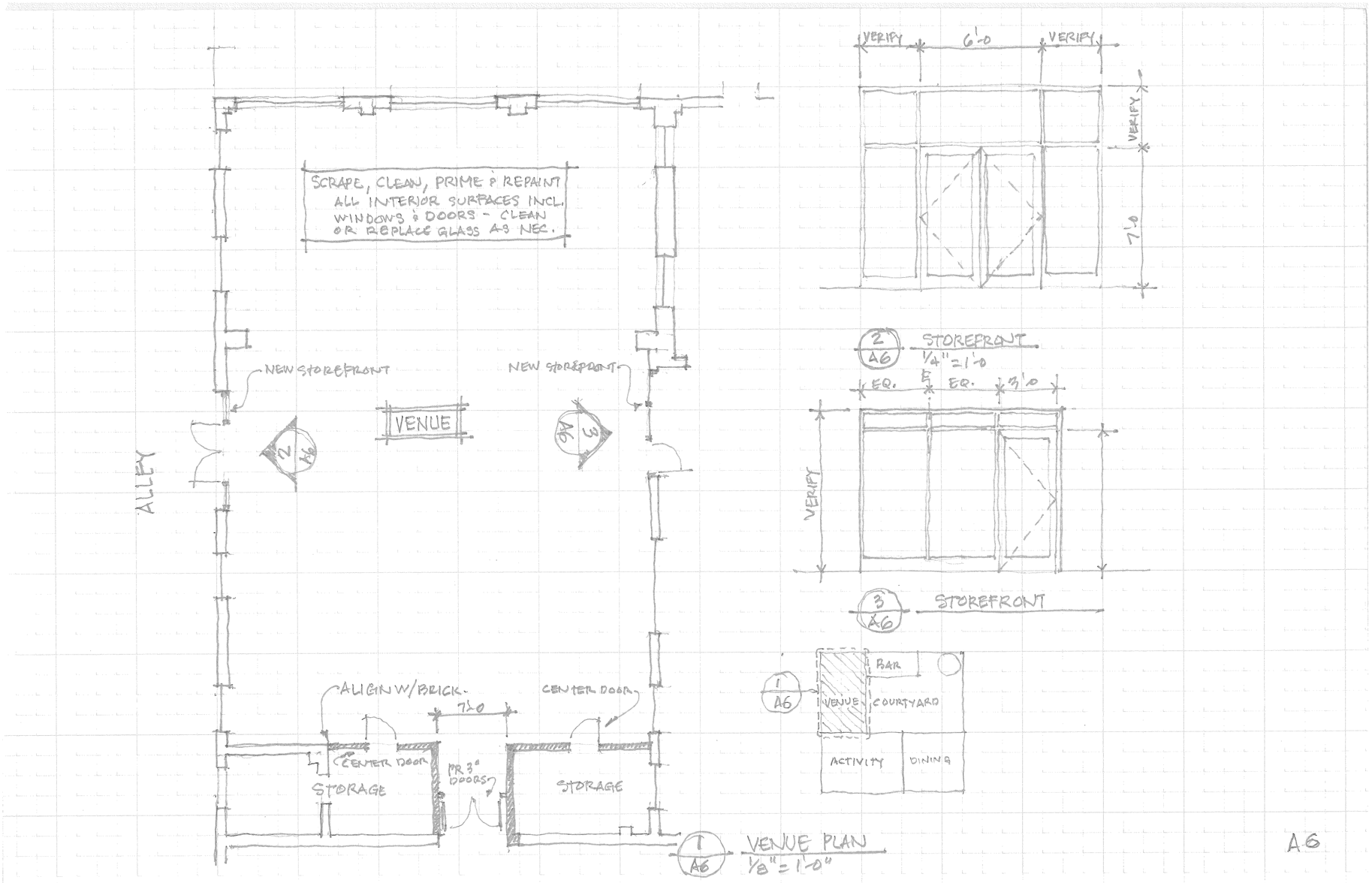
SHEET NAME:
BAR PLAN & STOREFRONT ELEVATION

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: PFM

SHEET NO.:
A5

PERMIT SET



A6

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Dunn, NC 28334

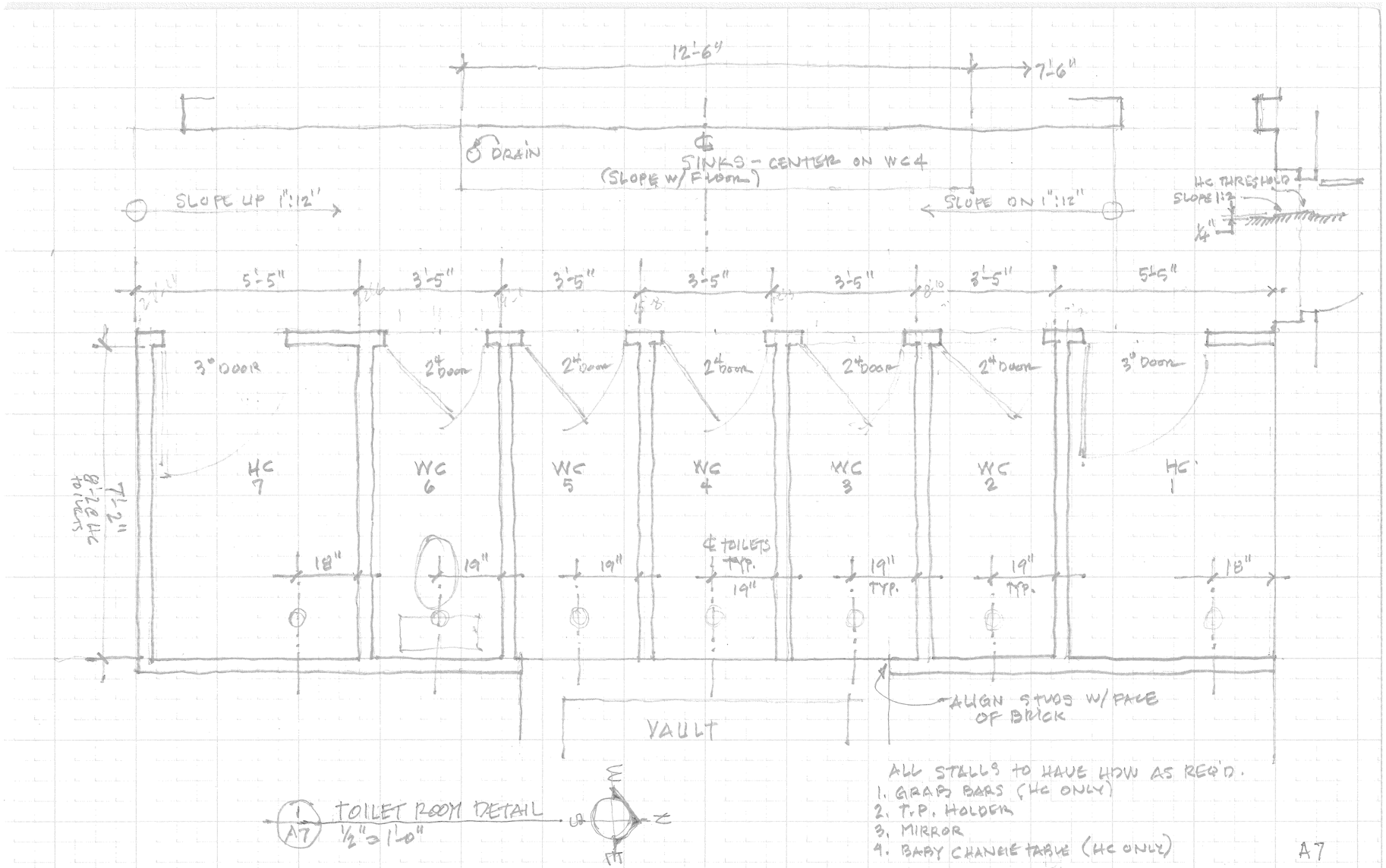
SHEET NAME:
VENUE PLAN & STOREFRONT ELEVATIONS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: PFM

SHEET NO.:
A6

PERMIT SET



PIERRE F MERCIER
REGISTERED ARCHITECT
No. 9059
NORTH CAROLINA
RALEIGH, NC
7/25/25

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Architectural Corporation
52568
North Carolina
RALEIGH, NORTH CAROLINA

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Dunn, NC 28334

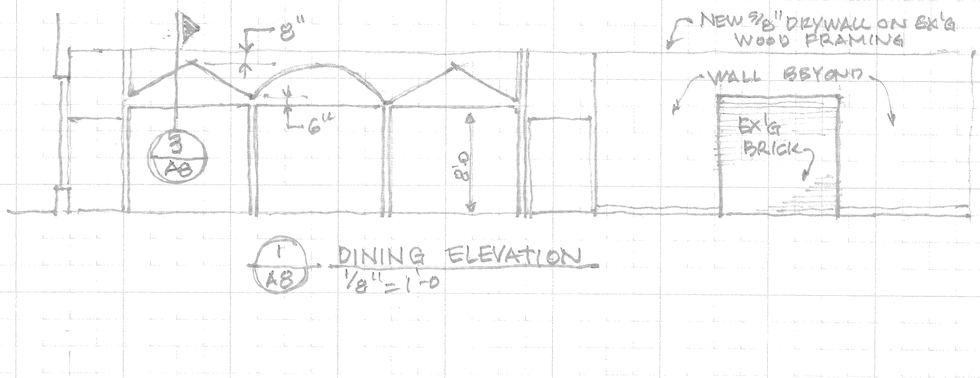
SHEET NAME:
ENLARGED TOILET ROOM PLAN

REVISIONS:

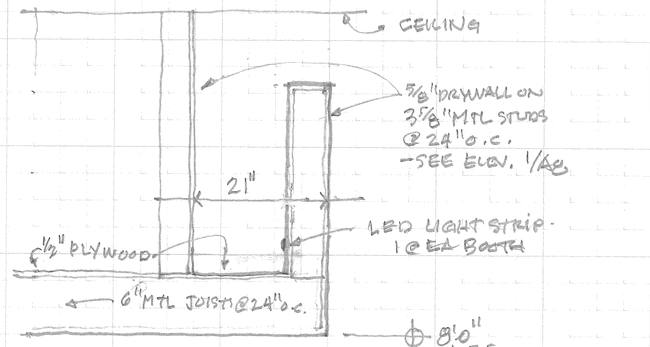
DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: PFM

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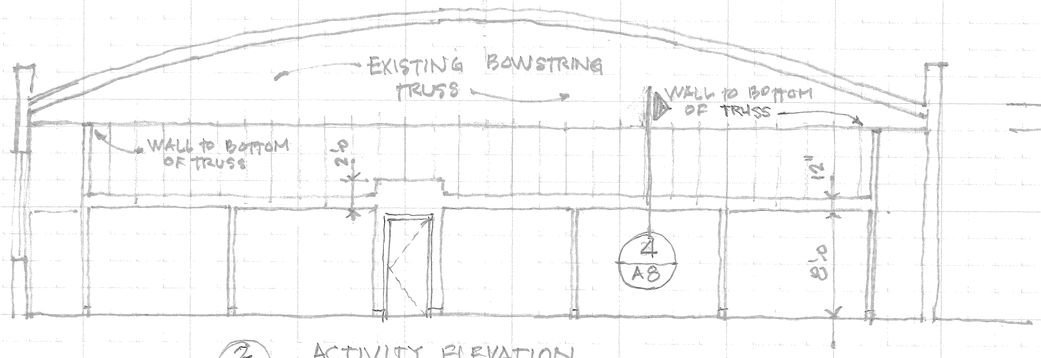
SHEET NO.:
A7



1 / A8 DINING ELEVATION
1/8" = 1'-0



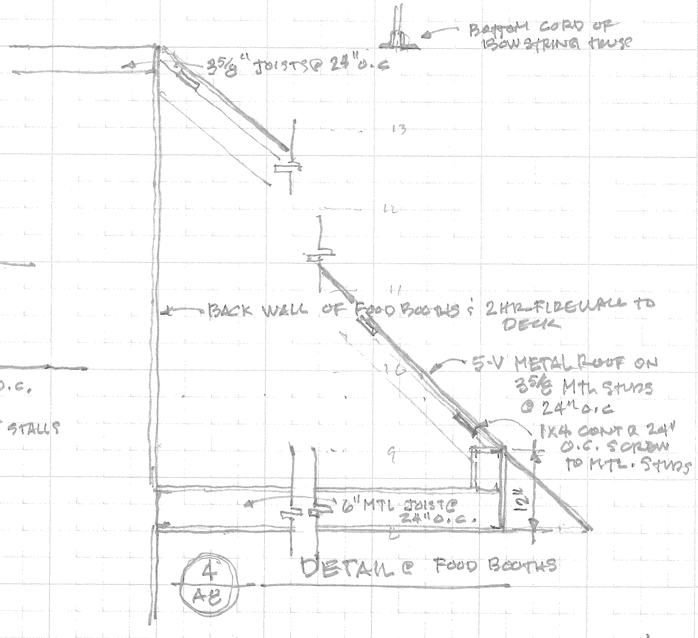
3 / A8 DETAIL
3/4" = 1'-0"



2 / A8 ACTIVITY ELEVATION

GENERAL NOTES:

1. ALL NEW WALLS TO BE 3-5/8" STUDS @ 24" O.C. W/ 5/8" DRYWALL EA SIDE.
2. SOUND INSULATE AROUND ALL TOILET STALLS



4 / A8 DETAIL @ FOOD BOOTHS

A8

PIERRE F MERCIER
REGISTERED ARCHITECT
No. 9059
RALEIGH, NC
7/25/25

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Ave.
Dunn, NC 28334

SHEET NAME:
ELEVATIONS & DETAILS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
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SHEET NO.:
A8

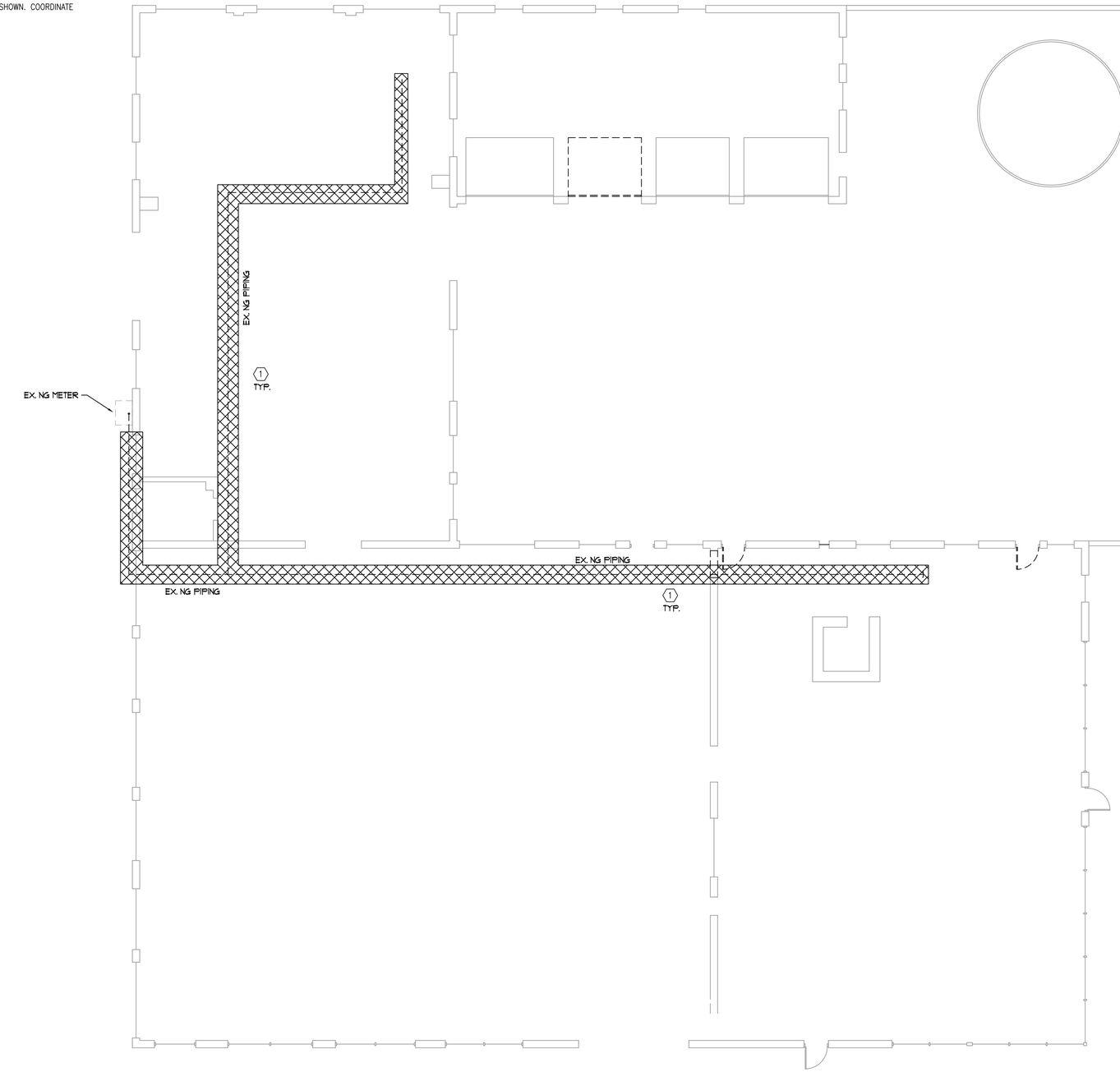
PERMIT SET

GENERAL NOTES
(APPLIES TO ALL SHEETS)

1. REFER TO SHEET M0.5 FOR FIRESTOPPING DETAILS.
2. ALL DUCTWORK SHOWN IS SCHEMATIC IN NATURE AND DOES NOT REFLECT ALL OFFSETS, CHANGES IN ELEVATION, ETC. NECESSARY FOR COORDINATION BETWEEN TRADES. OFFSET & COORDINATE AS REQUIRED.
3. FIELD COORDINATE INSTALLATION OF DUCTWORK, PIPING, EQUIPMENT, ETC. WITH ALL OTHER TRADES.
4. THERMOSTAT/SENSOR PLACEMENT SHALL BE COORDINATED WITH FINAL FURNITURE LAYOUT, ALL WALL-MOUNTED ELECTRICAL DEVICES, EQUIPMENT LAYOUT, ARCHITECT, AND OWNERS REPRESENTATIVE. NEW THERMOSTATS SHALL MATCH BASE BUILDING THERMOSTATS IN EVERY RESPECT. CONTRACTOR SHALL TIE NEW THERMOSTATS INTO BUILDING EMS AND UPDATE IT ACCORDINGLY.
5. EXACT LOCATION OF ALL AIR DISTRIBUTION/RETURN DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL RCP.
6. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND ASCERTAIN ALL EXISTING CONDITIONS. NO ALLOWANCES WILL BE PROVIDED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS. CONTRACTOR SHALL DEMO ALL NON-ESSENTIAL DUCTWORK AND PIPING WHICH IS NOT REQUIRED FOR THIS INSTALLATION. COORDINATE ALL DEMO WITH BUILDING REP BEFORE DEMO WORK COMMENCES.
7. EXISTING WORK SHOWN HERE IS BASED ON SITE VISIT AND/OR PROVIDED INFORMATION. THESE DRAWINGS ARE NOT NECESSARILY ACCURATE FOR EXISTING MATERIALS AND SHOULD NOT BE INTERPRETED TO BE A STRICT REPRESENTATION OF AS-BUILT CONDITIONS.

KEY NOTES
(APPLY THIS SHEET ONLY)

(1) DEMO ALL EXISTING NATURAL GAS PIPING BACK TO METER AS SHOWN. COORDINATE WITH BUILDOUT PLANS.



1 NG1.0 First Floor Demo Plan – Natural Gas
1/8" = 1'-0"

PROJECT NORTH

TRUE NORTH

DATE SIGNED: 07/25/25

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
FIRST FLOOR DEMO PLAN - NATURAL GAS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

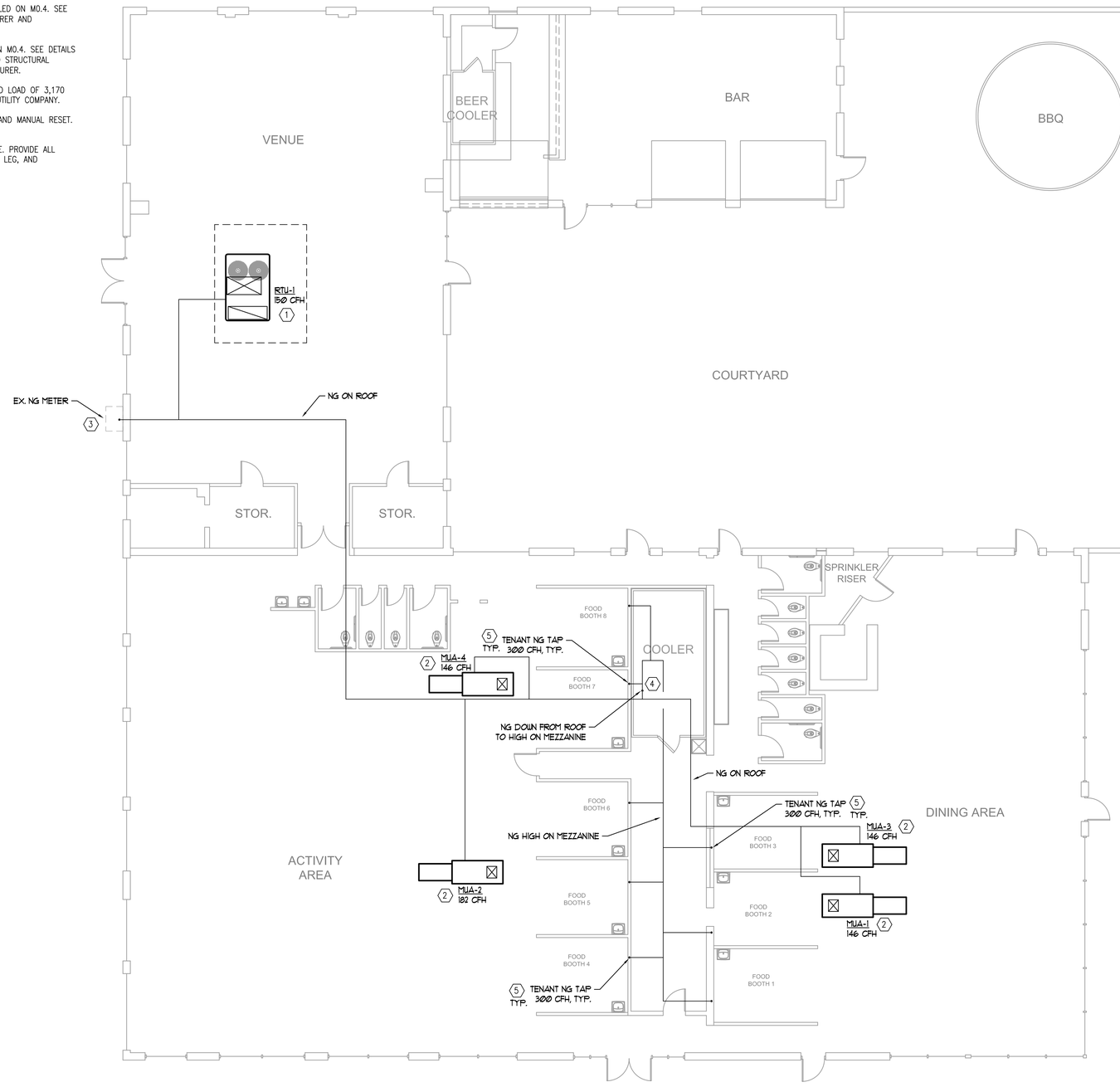
SHEET NO.:
NG1.0

GENERAL NOTES
(APPLIES TO ALL SHEETS)

1. REFER TO SHEET M0.5 FOR FIRESTOPPING DETAILS.
2. ALL DUCTWORK SHOWN IS SCHEMATIC IN NATURE AND DOES NOT REFLECT ALL OFFSETS, CHANGES IN ELEVATION, ETC. NECESSARY FOR COORDINATION BETWEEN TRADES. OFFSET & COORDINATE AS REQUIRED.
3. FIELD COORDINATE INSTALLATION OF DUCTWORK, PIPING, EQUIPMENT, ETC. WITH ALL OTHER TRADES.
4. THERMOSTAT/SENSOR PLACEMENT SHALL BE COORDINATED WITH FINAL FURNITURE LAYOUT, ALL WALL-MOUNTED ELECTRICAL DEVICES, EQUIPMENT LAYOUT, ARCHITECT, AND OWNERS REPRESENTATIVE. NEW THERMOSTATS SHALL MATCH BASE BUILDING THERMOSTATS IN EVERY RESPECT. CONTRACTOR SHALL TIE NEW THERMOSTATS INTO BUILDING EMS AND UPDATE IT ACCORDINGLY.
5. EXACT LOCATION OF ALL AIR DISTRIBUTION/RETURN DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL RCP.
6. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND ASCERTAIN ALL EXISTING CONDITIONS. NO ALLOWANCES WILL BE PROVIDED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS. CONTRACTOR SHALL DEMO ALL NON-ESSENTIAL DUCTWORK AND PIPING WHICH IS NOT REQUIRED FOR THIS INSTALLATION. COORDINATE ALL DEMO WITH BUILDING REP BEFORE DEMO WORK COMMENCES.
7. EXISTING WORK SHOWN HERE IS BASED ON SITE VISIT AND/OR PROVIDED INFORMATION. THESE DRAWINGS ARE NOT NECESSARILY ACCURATE FOR EXISTING MATERIALS AND SHOULD NOT BE INTERPRETED TO BE A STRICT REPRESENTATION OF AS-BUILT CONDITIONS.

KEY NOTES
(APPLY THIS SHEET ONLY)

1. PROVIDE AND INSTALL NEW PACKAGED ROOFTOP UNIT AS SCHEDULED ON M0.4. SEE DETAILS 4, 5, 6/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER.
2. PROVIDE AND INSTALL NEW MAKE-UP AIR UNIT AS SCHEDULED ON M0.4. SEE DETAILS 4, 5, 6/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER. COORDINATE CONTROLS WITH KITCHEN HOOD MANUFACTURER.
3. VERIFY EXISTING GAS METER IS SUFFICIENT FOR TOTAL CONNECTED LOAD OF 3,170 CFH AT A DISCHARGE PRESSURE OF 2.0 PSI. COORDINATE WITH UTILITY COMPANY.
4. PROVIDE HOOD FIRE SUPPRESSION SYSTEM GAS LINE INTERLOCK AND MANUAL RESET. COORDINATE ACCESS AND LOCATION WITH OWNER AND ARCHITECT.
5. PROVIDE EACH TENANT GAS TAP WITH DEDICATED SHUT-OFF VALVE. PROVIDE ALL FUTURE COOKING EQUIPMENT CONNECTIONS WITH GAS COCK, DIRT LEG, AND REGULATOR APPROPRIATE TO APPLIANCE CONNECTION.



1 / NG1.1 First Floor Plan – Natural Gas
1/8" = 1'-0"

PROJECT NORTH TRUE NORTH

NOTE: SEE ISOMETRICS ON SHEET NG5.1 FOR PIPE SIZING.

NOTE: NEW NATURAL GAS PIPING SIZING IS BASED ON A TOTAL EQUIVALENT LENGTH OF 300 FEET, USING TABLE 402.4(5) OF THE 2018 NORTH CAROLINA FUEL GAS CODE.

CHRISTOPHER A. KUCHARSKI
NORTH CAROLINA PROFESSIONAL ENGINEER
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
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Dunn, NC 28334

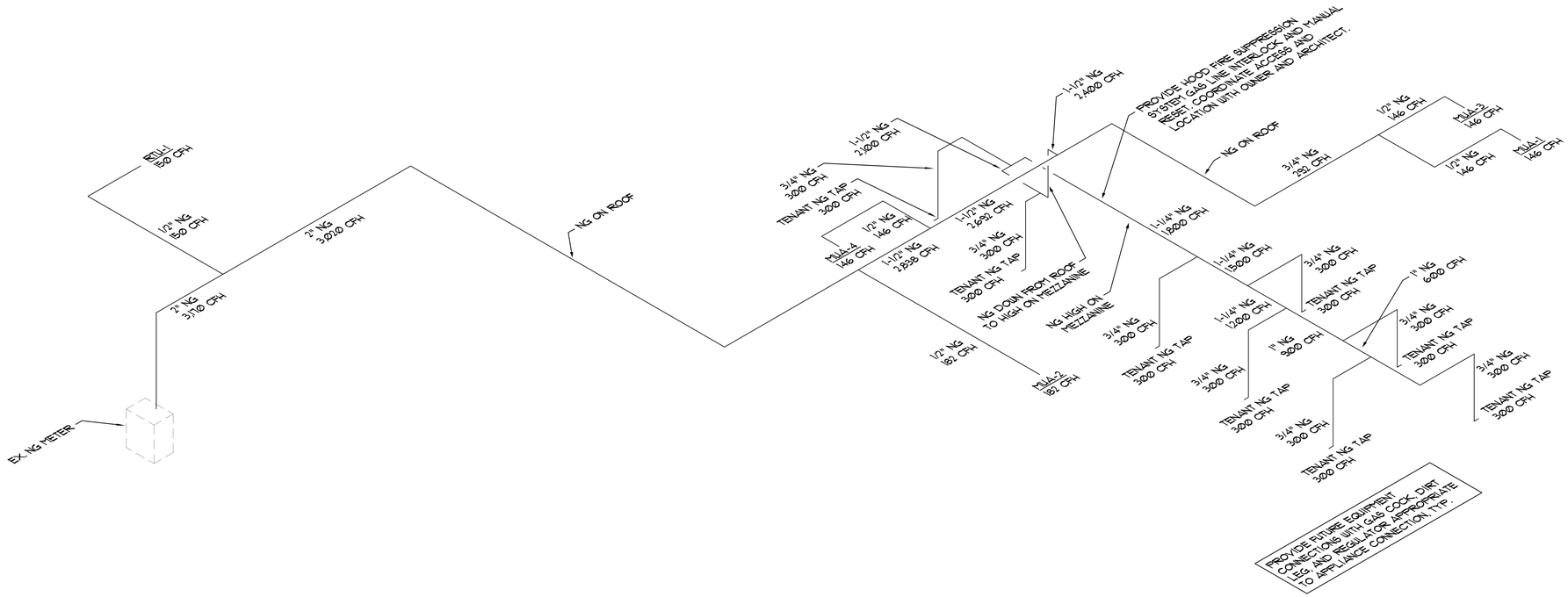
SHEET NAME:
FIRST FLOOR PLAN - NATURAL GAS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
NG1.1



NOTE: NEW NATURAL GAS PIPING SIZING IS BASED ON A TOTAL EQUIVALENT LENGTH OF 300 FEET, USING TABLE 402.4(5) OF THE 2018 NORTH CAROLINA FUEL GAS CODE.

1 / NG5.1 Overall Isometrics – Natural Gas
NOT TO SCALE

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. KNIGHT
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NEW INTERIOR ALTERATIONS FOR:
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112 S Fayetteville Street
Dunn, NC 28334

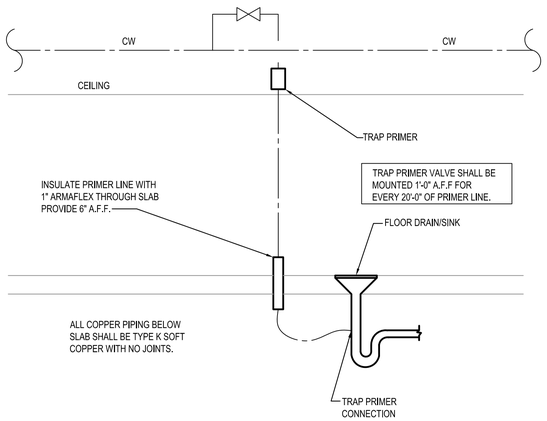
SHEET NAME:
ISOMETRICS - NATURAL GAS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
NG5.1

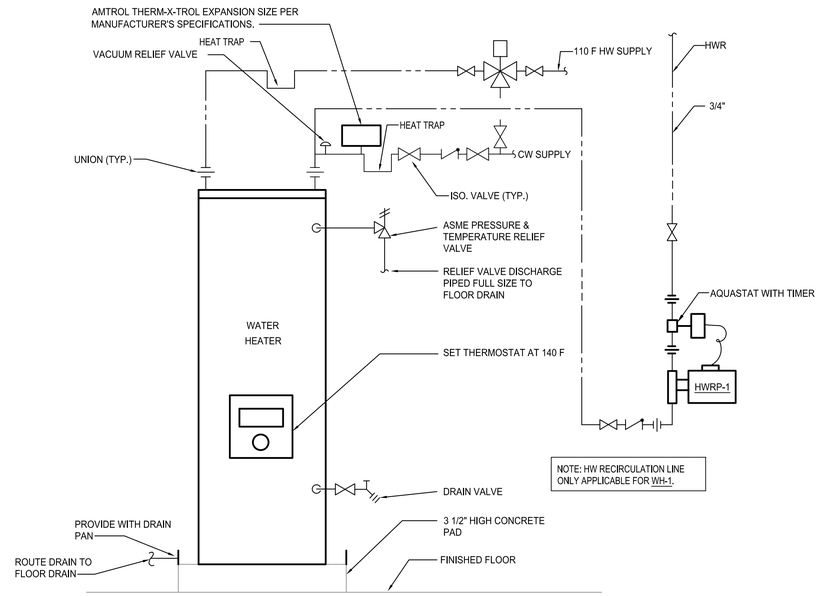


2 P0.1 **FLOOR DRAIN TRAP PRIMER PIPING SCHEMATIC**

NO SCALE

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REFER TO SPECIFICATION SECTION 15400 FOR ADDITIONAL INFORMATION.



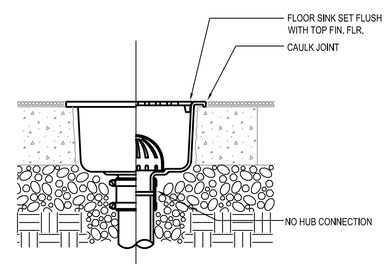
1 P0.1 **WATER HEATER DETAIL**

NO SCALE

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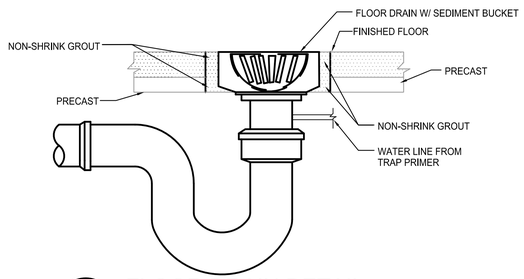
ABBREVIATIONS

A/C	ABOVE CEILING
AAV	AIR ADMITTANCE VALVE
AC	AIR CONDITIONING
AD	ACCESS DOOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ARP	ACID RESISTANCE PIPING
AUTO	AUTOMATIC
B/F	BELOW FLOOR
B/G	BELOW GRADE
B/S	BELOW SLAB
BAL	BALANCING
BHP	BRAKE HORSEPOWER
BCO	BASE CLEANOUT
CO	CLEANOUT
CW	COLD WATER (DOMESTIC)
DN	DOWN
DO	DITTO
DR	DRAIN
DWG	DRAWING
EA	EACH
ECC	ECCENTRIC
EFF	EFFICIENCY
EOD	EMERGENCY OVERFLOW DRAIN
EWT	ENTERING WATER TEMP.
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET
G	GATE
GA	GAUGE
GCO	GRADE CLEANOUT
GPM	GALLONS PER MINUTE
GW	GREASE WASTE
HD	HUB DRAIN
HP	HORSEPOWER
HP	HIGH PRESSURE
HTG	HEATING
HW	HOT WATER (DOMESTIC)
HWR	HOT WATER RETURN
HWRR	HW REVERSE RETURN
HWS	HOT WATER SUPPLY
ID	INSIDE DIMENSION
IE	INVERTED ELEVATION
IN	INCHES
KW	KILOWATTS
LB	POUNDS
LP	LIQUID PROPANE GAS
LWR	LOOP WATER RETURN
LWS	LOOP WATER SUPPLY
MAX	MAXIMUM
MIN	MINIMUM
MFR	MANUFACTURER
NC	NORMALLY CLOSED
NG	NATURAL GAS
NFGH	NON-FREEZE GROUND HYDRANT
NFWH	NON-FREEZE WALL HYDRANT
NO	NORMALLY OPEN
NOM	NOMINAL
OD	OVERFLOW DRAIN
PSI	POUNDS PER SQUARE INCH
RAD	RADIUS
RD	ROOF DRAIN
RED	REDUCER
RTU	ROOFTOP UNIT
SAN	SANITARY
SQ	SQUARE
ST	STORM
TEMP	TEMPERATURE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VENT
VA	VALVE
VTR	VENT THRU ROOF
W	WASTE
WC	WATER COLUMN
WCO	WALL CLEANOUT
WHA	WATER HAMMER ARRESTOR
WT	WEIGHT



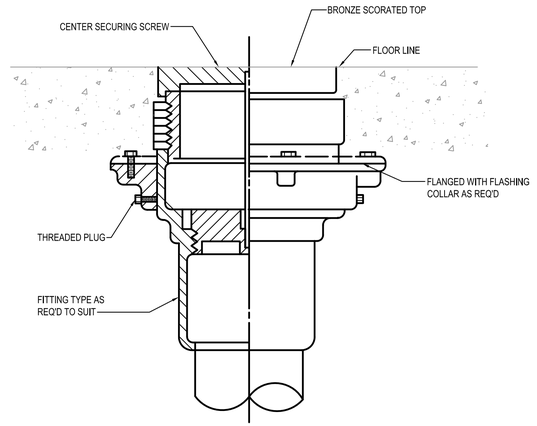
5 P0.1 **FLOOR SINK DETAIL**

NOT TO SCALE



4 P0.1 **FLOOR DRAIN DETAIL**

NO SCALE



3 P0.1 **FLOOR CLEANOUT DETAIL**

NOT TO SCALE

PLUMBING LEGEND

	COLD WATER
	HOT WATER
	HOT WATER RECIRCULATION
	SANITARY
	GREASE
	VENT
	GAS
	EXIST, CW (OTHERS SIM.)
	EXIST, (TYPE NOT SPECIFIED)
	WORK TO BE REMOVED
	CONNECT TO EXISTING
	FLOOR DRAIN
	FLOOR SINK
	FLOOR CLEAN-OUT
	WALL CLEAN-OUT
	HOSE BIBB UON
	SHUT-OFF VALVE

DATE SIGNED: 07/25/25

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
ABBREVIATIONS, LEGEND, & DETAILS - PLUMBING

REVISIONS:

DATE: 07.25.25

PROJECT NO.: 25-023

DRAWN BY: RK

SHEET NO.:
P0.1

PERMIT SET

WH-2

Storage Tank Water Heater Sizing Calculator

Developed by the Plan Review Unit of the Environmental Health Section
NC Division of Public Health

Establishment Name:	**The Raynor**
Address:	**112 S Fayetteville Street, Dunn, NC 28334**

EQUIPMENT						GPH CALCULATED
Enter the description, and number and size of compartments for each sink	Description	Number of compartments	(Inches) Length	Width	Depth	Gallons Per Hour (GPH)
Manual warewashing sink						0
Sink #2						0
Sink #3						0
Bar sink						0
Sinks are calculated at 75% capacity					**Total**	0

Enter type of prep sink and number of sink compartments for each sink	Type of prep sink (vegetable, meat, seafood)	Number of compartments	Gallons Per Hour (GPH)
Prep sink #1			0
Prep sink #2			0
Prep sink #3			0
Prep sinks are calculated at 5 gallons per compartment		**Total**	0

Enter the quantity of equipment	Quantity	Gallons Per Hour (GPH)
Handwashing sinks	**2**	10
Service sink		0
Hose reel		0
Clothes washer		0

Enter a description and estimated gallon per hour (GPH) usage for other equipment	Description	Estimated gallons per hour (GPH) usage	
Other equipment			0
Other equipment			0
Other equipment			0
Handwashing sinks and service sinks are calculated at 5 GPH each. Hose reels are calculated at 5 GPH, clothes washers at 15 GPH, other equipment at the usage entered.		**Total**	10

Enter make, model, and Final Rinse Usage gallons per hour (GPH) for the warewashing machine	Make	Model	Final Rinse Usage (GPH) Found in "Warewashing Machine Specs" tab below or on manufacturer's spec sheet	Gallons Per Hour (GPH)
Warewashing machine	Jackson	Delta 5-E	36	25.2

Enter the quantity of pre-rinse units	Quantity	Gallons Per Hour (GPH)
Pre-rinse		0
Warewashing machines are calculated at 70% of the final rinse usage specified by the manufacturer. Pre-rinses are calculated at 45 GPH.	**Total**	25.2

Recovery Rate Needed (GPH):	**35**

Water Heater Input (BTU or kW) Needed:

Gas Water Heater	Electric Water Heater
27 ,000 BTU at 70°F rise	6 kW at 70°F rise
31 ,000 BTU at 80°F rise	7 kW at 80°F rise
35 ,000 BTU at 90°F rise	8 kW at 90°F rise
39 ,000 BTU at 100°F rise	9 kW at 100°F rise

BOD SELECTION PROVIDES 53 GPH.

WH-1

Storage Tank Water Heater Sizing Calculator

Developed by the Plan Review Unit of the Environmental Health Section
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Establishment Name:	**The Raynor**
Address:	**112 S Fayetteville Street, Dunn, NC 28334**

EQUIPMENT						GPH CALCULATED
Enter the description, and number and size of compartments for each sink	Description	Number of compartments	(Inches) Length	Width	Depth	Gallons Per Hour (GPH)
Manual warewashing sink						0
Sink #2						0
Sink #3						0
Bar sink						0
Sinks are calculated at 75% capacity					**Total**	0

Enter type of prep sink and number of sink compartments for each sink	Type of prep sink (vegetable, meat, seafood)	Number of compartments	Gallons Per Hour (GPH)
Prep sink #1			0
Prep sink #2			0
Prep sink #3			0
Prep sinks are calculated at 5 gallons per compartment		**Total**	0

Enter the quantity of equipment	Quantity	Gallons Per Hour (GPH)
Handwashing sinks	**14**	70
Service sink	**1**	5
Hose reel		0
Clothes washer		0

Enter a description and estimated gallon per hour (GPH) usage for other equipment	Description	Estimated gallons per hour (GPH) usage	
Other equipment			0
Other equipment			0
Other equipment			0
Handwashing sinks and service sinks are calculated at 5 GPH each. Hose reels are calculated at 5 GPH, clothes washers at 15 GPH, other equipment at the usage entered.		**Total**	75

Enter make, model, and Final Rinse Usage gallons per hour (GPH) for the warewashing machine	Make	Model	Final Rinse Usage (GPH) Found in "Warewashing Machine Specs" tab below or on manufacturer's spec sheet	Gallons Per Hour (GPH)
Warewashing machine				0

Enter the quantity of pre-rinse units	Quantity	Gallons Per Hour (GPH)
Pre-rinse	0	0
Warewashing machines are calculated at 70% of the final rinse usage specified by the manufacturer. Pre-rinses are calculated at 45 GPH.	**Total**	0

Recovery Rate Needed (GPH):	**75**

Water Heater Input (BTU or kW) Needed:

Gas Water Heater	Electric Water Heater
58 ,000 BTU at 70°F rise	13 kW at 70°F rise
66 ,000 BTU at 80°F rise	15 kW at 80°F rise
74 ,000 BTU at 90°F rise	16 kW at 90°F rise
82 ,000 BTU at 100°F rise	18 kW at 100°F rise

NOTE: THIS WATER HEATER IS NOT SIZES FOR WAREWASHING. IF WAREWASHING IS ADDED, A SEPARATE WATER MUST BE PROVIDED OR THIS WATER HEATER SIZE MUST BE EVALUATED.

BOD SELECTION PROVIDES 79 GPH.

PLUMBING FIXTURE SCHEDULE

TAG	FIXTURE	CW	HW	SAN/ WASTE	VENT	REMARKS
P-1	WATER CLOSET, FLOOR-MOUNT	3/4"	-	4"	2"	
BASIS OF DESIGN: Kohler Wellworth K-3505. Fixture shall be floor-mounted, siphon jet, elongated style, pressure assist tank-type water closet,1.6 gpf. Fixture shall be 15-1/2" high toilet complete with tank, bowl, pressure assisted flush valve unit, antisyphon float valve, and chrome plated supply stops and level. Include matching open front toilet seat with check hinge and anti-microbial agent. Fixture P-1H shall be similar except it shall utilize Kohler Highline K-3493, 17-1/8" high toilet and shall be mounted in accordance with ADA requirements. Coordinate ADA requirements with Architect.					
P-2	LAVATORY, WALL-MOUNT	1/2"	--	2"	1-1/2"	
BASIS OF DESIGN: Kohler Model K-2035 Pinoir. Fixture shall be wall-mount lavatory, white vitreous china, with concealed carrier, P-trap shroud, and 1 1/4" drain. Fittings shall include Toto TEL105-D10 electronic, touchless deck-mount, chrome-plated, faucet with battery powered automatic sensor with 0.09 gallons per cycle at a 10 second cycle, and anti-scald thermal mixing valve (under counter), chrome-plated tailpieces, chrome grid strainer, P-trap, supply stops and all other trim. Wall supply stops, drains and tailpieces shall be offset wheelchair type. Fixture shall be installed to meet all ADA requirements. Provide and install point of use mixing valve rated in accordance with ASSE 1070 on the hot water connection. Coordinate ADA requirements with Architect.					
P-3	LAVATORY, COUNTERMOUNT	1/2"	1/2"	2"	1-1/2"	
BASIS OF DESIGN: Solid surface, wall-mount, trough sink as selected by the Architect with chrome plated tailpieces, chrome grid drain, P-trap, loose key supply stops, and all other trim, Bradley TLX or approved equal, with quantity of stations as shown, mounted in accordance with ADA requirements. Coordination finish with Architect. Each station shall have automatic faucet and soap dispenser, Sloan EAF-300-0.35 and Sloan ESD-200 or approved equal, deck-mounted, automatic, 0.35 gpm, hardwired, polished chrome finish, transformers, splitters, etc. as needed. Provide and install point of use mixing valve for each faucet rated in accordance with ASSE 1070. Coordinate ADA requirements with Architect.					
P-4	HAND SINK, WALL-MOUNT	1/2"	--	2"	1-1/2"	
BASIS OF DESIGN: Hand sinks shall be specified and provided by Owner. Fixture shall be installed to meet all ADA requirements. Provide and install point of use mixing valve rated in accordance with ASSE 1070 on the hot water connection. Coordinate ADA requirements with Architect.						
P-5	SERVICE SINK	1/2"	1/2"	2"	1-1/2"	
BASIS OF DESIGN: Stern-Williams Serviceptor Model SB-900. Fixture shall be a Terrazzo floor service sink, 24" x 24" x 12" high, complete with one-piece stainless steel cap all-around top edge, cast brass 3" caulked drain with stainless steel strainer. Faucet set shall be Stern-Williams T-10-VB sink fitting complete with wall brace, hose end, vacuum breaker and chrome finish. Provide and install						
FD	FLOOR DRAIN	1/2" TP	--	2-1/2" UON	2"	TP = TRAP PRIMER PER SPECS
FS	FLOOR SINK	1/2" TP	--	2-1/2" UON	2"	TP = TRAP PRIMER PER SPECS
HD	HUB DRAIN	1/2" TP	--	3" UON	2"	TP = TRAP PRIMER PER SPECS

ELECTRIC WATER HEATER SCHEDULE

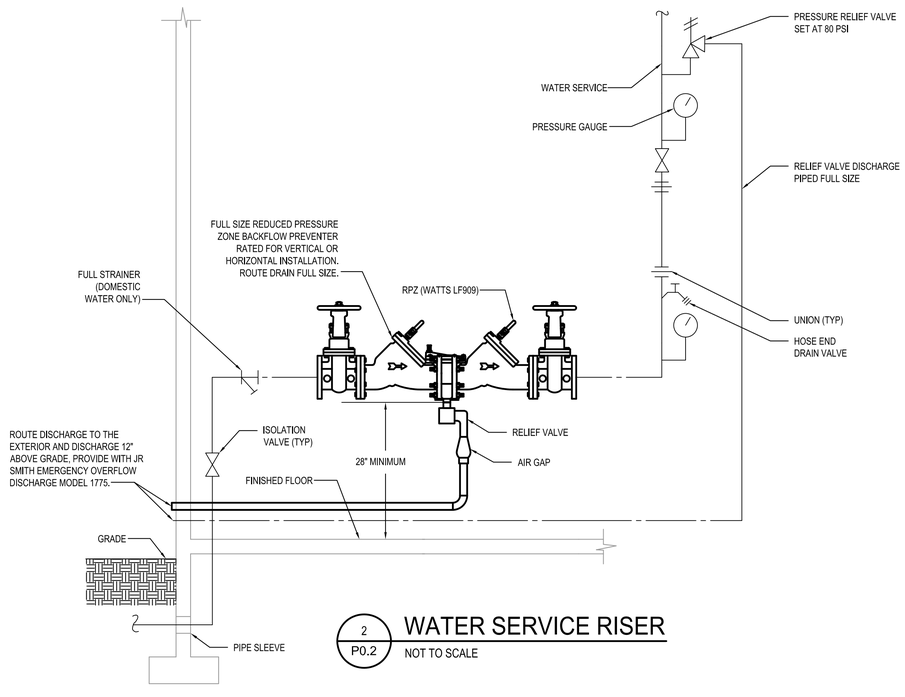
I.D. TAG	TYPE OF WATER HEATER	TANK CAPACITY (GALLONS)	RECOVERY @ 70°F (GPH)	POWER INPUT (KW)	VOLTS/ PHASE	BASIS OF DESIGN	REMARKS
WH-1	TANK	52	79	13.5	208/3	A.O. SMITH DVE-52	1, 2
WH-2	TANK	52	53	9.0	208/3	A.O. SMITH DEN-52	1, 2

(1) FLOOR-MOUNTED. SEE DETAIL 1/P0.1.
(2) PROVIDE EXPANSION TANK ON CW INLET; WATTS SERIES PLT OR EQUAL SIZED PER MANUFACTURER'S RECOMMENDATIONS.

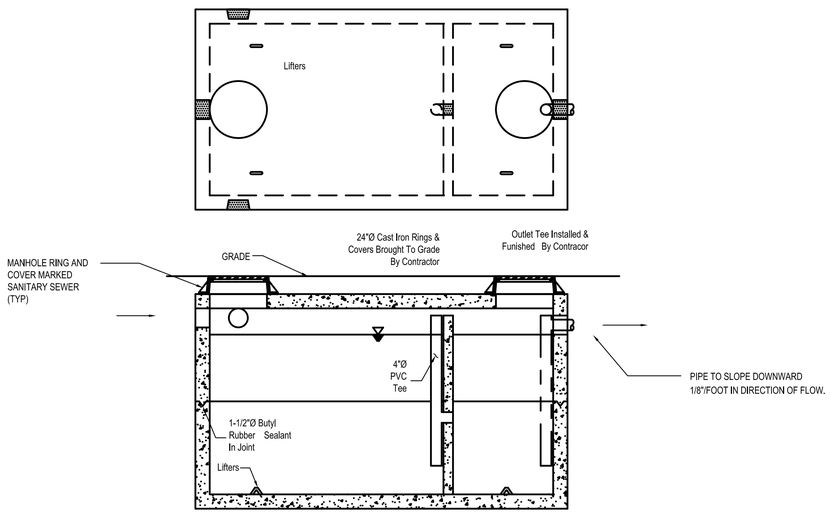
PUMP SCHEDULE

I.D. TAG	FLUID	TYPE OF PUMP	FLOW (GPM)	HEAD (FT.)	MAX. NPSHR (FT.)	MAX. RPM	MOTOR H.P.	VOLTS/ PHASE	MINIMUM EFFICIENCY (%)	BASIS OF DESIGN	REMARKS
HWRP-1	WATER	HW RECIRC.	3	10	-	3,700	F	120/1	-	B&G ecocirc 20-18	1

(1) PROVIDE WITH DISC., AQUASTAT, AND TIMECLOCK TO MATCH OCC. SCH. PUMP SHALL BE NSF 61-RATED, SET TO CONSTANT PRESSURE.



2 / P0.2 WATER SERVICE RISER
NOT TO SCALE



1 / P0.2 GREASE TRAP DETAIL
NO SCALE

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. WOOD
DATE SIGNED: 07/25/25
BW&A Barrett, Woodyard & Associates, Inc.
1255 Crescent Green, Ste. 230
Cary, NC 27518
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NC License # C-2226
BWA Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
DETAILS & SCHEDULES - PLUMBING

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
P0.2

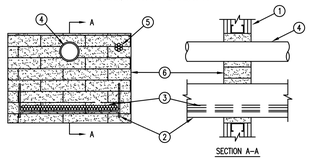
SCHEDULES OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226	SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226
	2	C-AJ-1226		2	C-AJ-1226
	3	C-AJ-1226		3	C-AJ-1226
SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091	SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091
	2	C-AJ-5090, C-AJ-5091		2	C-AJ-5090, C-AJ-5091
	3	C-AJ-5090		3	C-AJ-5090
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-AJ-7046	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-AJ-7046
	2	C-AJ-7046		2	C-AJ-7046
	3	C-AJ-7046		3	C-AJ-7046
MIXED PENETRANTS	1	C-AJ-8041	MIXED PENETRANTS	1	C-AJ-8041
	2	C-AJ-8041		2	C-AJ-8041
	3	C-AJ-8041		3	C-AJ-8041

GYPSUM WALLBOARD ASSEMBLIES		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1164
	2	W-L-1054, W-L-1164
INSULATED PIPES	1	W-L-5029
	2	W-L-5029
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L-7040, W-L-7042
	2	W-L-7040, W-L-7042
MIXED PENETRANTS	1	W-L-8013
	2	W-L-8013

NOTES:
1. JOBSITE CONDITIONS OF EACH THROUGH-PENETRATION FIRESTOP SYSTEM MUST MEET ALL DETAILS OF THE UL-CLASSIFIED SYSTEM SELECTED.
2. WHEN MORE THAN ONE APPLICABLE UL-CLASSIFIED SYSTEM IS LISTED IN THE SCHEDULES, CHOOSE THE UL SYSTEM WHICH IS MOST ECONOMICAL FOR EACH THROUGH-PENETRATION FIRESTOP SYSTEM.
3. COORDINATE WORK WITH OTHER TRADES TO ASSURE THE PENETRATION OPENING SIZES ARE APPROPRIATE FOR PENETRANT LOCATIONS, AND VICE VERSA.

System No. W-L-8013
F Ratings – 1 and 2 Hr (See Item 1)
T Rating – 0 Hr
L Rating At Ambient – 5 CFM/Sq Ft
L Rating At 400 F – 2 CFM/Sq Ft

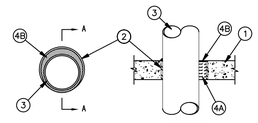


System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1.Wall Assembly – The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, W400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A.Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 in. (51 mm) by 4 in. (102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Additional studs installed to completely frame the opening.
B.Gypsum Board* – 5/8 in. (16 mm) thick, 4 ft (1219 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening is 352 sq in. (2271 sq cm) with max dimension of 22 in. (559 mm) wide.
The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2.Cable Tray* – Max 18 in. (457 mm) wide by max 6 in. (152 mm) deep open-ladder or solid-back cable tray with channel-shaped side rails formed of 0.065 in. (1.65 mm) thick aluminum or 0.060 in. (1.52 mm) thick steel and with 1–1/2 in. (38 mm) wide by 1 in. (25 mm) channel shape rungs spaced 9 in. (229 mm) OC or a 0.029 in. (0.74 mm) thick steel solid back, respectively. One cable tray to be installed in the opening. The max annular space between the cable tray and the periphery of the opening shall be min 1 in. (25 mm) to max 7 in. (178 mm) Cable tray to be rigidly supported on both sides of floor or wall assembly.
3.Cables – Aggregate cross-sectional area of cables in cable tray to be max 30 percent of the cross-sectional area of the cable tray. Any combination of the following types and sizes of copper conductor cables may be used:
A.7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and PVC jacket.
B.100 pair – No. 24 AWG cable with PVC insulation and jacket.
C.1/C, 750 kcmil (or smaller) with PVC insulation and jacket.
4.Through–Penetrants – One or more pipe or tube to be installed within the opening. The total number of through–penetrants is dependent on the size of the opening and types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces and the spacings between the pipes are maintained. The space between the pipe or tube and the periphery of the opening shall be min 1–1/2 in. (38 mm) to max 3–1/4 in. (235 mm). Pipe or tube to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of non–metallic or metallic pipes, or tubes may be used:
A.Polyvinyl Chloride (PVC) Pipe – Max 3 in. (76 mm) diam Schedule 40 solid core PVC pipe (or smaller) for use in stoved (process or supply) or vented (drain, waste or vent) piping system.
B.Steel Pipe – Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
C.Conduit – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.
D.Copper Pipe – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
E.Copper Tube – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.
4A. Pipe Covering – (Not Shown) Nom 1–1/2 in. (38 mm) thick hollow cylindrical heavy density (min 3.5 pcf) (56kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
See Pipe and Equipment Covering and Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 may be used.
5.Cables – Max 1–1/2 in. (38 mm) diam tight bundle of cables installed within the opening and rigidly supported on both surfaces of wall. The space between the cables and periphery of the opening shall range from 1–3/16 in. (30.2 mm) min to a max of 1–1/2 in. (38 mm). Any combination of the following types and sizes of cables may be used:
A.7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
B.25 pair – No. 24 AWG cable with PVC insulation and jacket.
C.Type R GU/59 coaxial cable with PVC outer jacket.
D.24 fiber optic cable with PVC sub unit and outer jacket.
6.Firestop System – The firestop system shall consist of the following:
A.FA, Void or Cavity Material* – Fire Blocks For walls incorporating max 3–5/8 in. (92 mm) steel studs or max 2 (51 mm) by 4 in. (102 mm) wood studs, fire block installed with 5 in. (127 mm) dimension projecting through and centered in opening. For walls constructed of larger steel or wood studs, fire block installed with long dimension passing through and centered in opening. Blocks may or may not be cut flush with both surfaces of wall. When multiple layers of gypsum board are used, blocks may be recessed 1/2 in. (13 mm) from surface of wall. Blocks to be firmly packed in opening. Either one or a combination of the block types specified below may be used.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS 657 Fire Block or CFS–BL Firestop Block
B.FB, Void or Cavity Material* – Sealant or Putty – Fill material to be forced into interstices of cables, between cables and cable trays, around each penetrant and where obvious voids are observed to max extent possible on both surfaces of the penetration.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant, FS–ONE MAX Intumescent Sealant, CP 618 Putty Stick, CP 660 Firestop Foam or CP620 Fire Foam

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

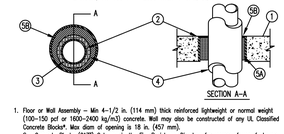
System No. C–AJ–1226
F RATING = 3–HR.
T RATING = 0–HR.
L Rating At Ambient – Less Than 1 CFM/Sq Ft
L Rating At 400 F – 4 CFM/Sq Ft



1. Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 32 in. (813 mm).
2. Metallic Sleeve – (Optional) – Nom 32 in. (813 mm) diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. (76 mm) above floor or beyond both surfaces of wall.
2A. Sheet Metal Sleeve – (Optional) Nom 32 in. (813 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. (76 mm) above floor or beyond both surfaces of wall. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and a max of 1 in. (25 mm) above the top surface of the concrete floor.
2B. Sheet Metal Sleeve – (Optional) – Max 12 in. (305 mm) diam, min 24 ga galv steel provided with a 24 ga galv steel square flange spot welded to the sleeve at approx mid–height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. (102 mm) below the bottom of the deck and a max of 1 in. (25 mm) above the top surface of the concrete floor.
3. Through–Penetrant – One metallic pipe, tube or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between penetrant and periphery of opening shall be min 0 in. (point contact) to max 1–7/8 in. (48 mm). Penetrant may be installed with continuous point contact. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic penetrants may be used:
A. Steel Pipe – Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe – Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
C. Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
D. Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
E. Conduit – Nom 6 in. (152 mm) diam (or smaller) steel conduit.
F. Conduit – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT).
4. Firestop System – The firestop system shall consist of the following:
A. Packing Material – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or sleeve or from both surfaces of wall or sleeve as required to accommodate the required thickness of fill material.
B. FB, Void or Cavity Material* – Sealant – Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or sleeve or with both surfaces of wall or sleeves. At the point or continuous contact locations between penetrant and concrete or sleeve, a min 1/4 in. (6 mm) diam bead of fill material shall be applied at the concrete or sleeve/ pipe penetrant interface on the top surface of floor and on both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

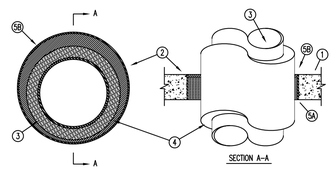
System No. C–AJ–5090
F RATING = 3–HR.
T RATING = 0–HR.
L Rating At Ambient – 4 CFM/Sq Ft
L Rating At 400 F – Less Than 1 CFM/Sq Ft



1. Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 18 in. (457 mm).
See Concrete Blocks (CAZT) Category in the Fire Resistance Directory for names of manufacturers.
2. Metallic Sleeve – (Optional) – Nom 18 in. (457 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. (76 mm) above floor or beyond both surfaces of wall.
3. Through Penetrants – One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
A. Steel Pipe – Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
B. Copper Pipe – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper tubing.
C. Copper Tubing – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
4. Tube Insulation – Plastics+ – Min 1/2 in. (13 mm) to max 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Nom 1 in. (25 mm) thick AB/PVC flexible foam insulation may be used for max 2 hr F and FH Ratings when max 3 in. (76 mm) diam pipe or tubing is used. The annular space shall be min 1/2 in. (13 mm) to max 12 in. (305 mm). When max annular space exceeds 1–1/2 in. (38 mm) the F and FH Ratings are 2 hr.
See Plastics+ (CMFZ2) Category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94–5VA may be used.
5. Firestop System – The firestop system shall consist of the following:
A. Packing Material – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
B. FB, Void or Cavity Material* – Sealant – Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When max annular space exceeds 1–1/2 in. (38 mm) the min thickness of fill material is 1/2 in. (13 mm).
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

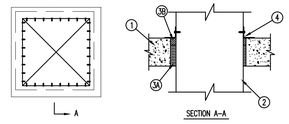
System No. C–AJ–5091
F RATING = 2–HR.
T RATING = 1–HR.
L Rating At Ambient – 4 CFM/Sq Ft
L Rating At 400 F – Less Than 1 CFM/Sq Ft



1.Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 29 in. (737 mm).
See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2.Metallic Sleeve – (Optional) – Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. (76 mm) above floor or beyond both surfaces of wall. If the steel sleeve extends beyond the top surface of the floor or both surfaces of the wall, the T Rating of the firestop system is 0 hr.
2A. Sheet Metal Sleeve – (Optional) – Max 6 in. (152 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approximately mid– height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place flush with bottom surface of floor and may extend a max of 1 in. (25 mm) above the top surface of the floor.
2B. Sheet Metal Sleeve – (Optional) – Max 12 in. (305 mm) diam, min 24 ga galv steel provided with a 24 ga galv steel square flange spot welded to the sleeve at approximately mid– height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place flush with bottom surface of floor and may extend a max of 1 in. (25 mm) above the top surface of the floor.
3. Through–Penetrants – One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. The following types and sizes of metallic pipes or tubing may be used:
A. Steel Pipe – Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe – Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
C. Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
D. Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
4. Pipe Covering – Min 1/2 in. (13 mm) to max 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units jacketed on the outside with an all–service jacket. Longitudinal joints sealed with metal fasteners or factory–applied, self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between the insulated pipe and the edge of the periphery of the opening shall be min 1/2 in. (13 mm) to max 12 in. (305 mm). When thickness of pipe covering is less than 2 in. (51 mm), the T Rating for the firestop system is 0 hr.
See Pipe Equipment Covering – Materials – (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 may be used.
4A. Pipe Covering – (Not Shown) – As an alternate to Item 4, max 2 in. (51 mm) thick cylindrical calcium silicate (min 14 pcf or 224 kg/m3) units sized to the outside diam of the pipe or tube may be used. Pipe insulation secured with stainless steel bands or min 18 AWG stainless steel wire spaced max 12 in. (305 mm) OC. The annular space shall be min 1/2 in. (13 mm) to max 12 in. (305 mm).
5. Firestop System – The firestop system shall consist of the following:
A. Packing Material – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
B. FB, Void or Cavity Material* – Sealant – Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

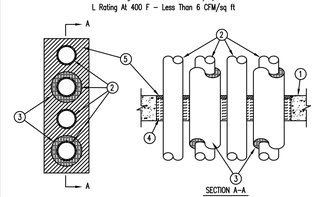
System No. C–AJ–7046
F Rating – 3 Hr
T Rating – 0 Hr



1. Floor or Wall Assembly – Min 4–1/2 in. thick reinforced lightweight or normal weight (100–150 pcf) concrete floor or min 5–1/2 in. thick lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max area of opening is 1139 in. sq with a max dimension of 33–3/4 in.
See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Steel Duct – Nom 32 by 32 by No. 24 GAUGE (or heavier) galv steel duct. One steel duct to be positioned within the firestop system. The annular space shall be min 1/4 in. to max 1–1/2 in. Duct to be rigidly supported on both sides of floor or wall assembly.
3. Firestop System – The firestop system shall consist of the following:
A. Packing Materials – Min 3–1/2 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form between the bare steel duct and the periphery of the opening. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.
B. FB, Void or Cavity Material* – Sealant – Min 1 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – CP 601S Elastomeric Firestop Sealant, CFS–S SIL GG, CFS–S SIL SL GG, (Nonsag only) or CP604 Self–Leveling Firestop Sealant
4. Steel Retaining Angle – Nom 2 in. by 2 in. by No. 16 GAUGE (or heavier) steel angles attached to all four sides of the steel duct on the top surface in both surfaces of the wall. The angles shall be attached with No. 8 (or larger) steel sheet metal screws spaced max of 1 in. from each end and a max of 3 in. OC.

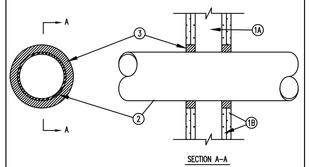
*Bearing the UL Classification Mark

System No. C–AJ–8041
F RATING = 3–HR.
T RATING = 0 and 1 HR.
L Rating At Ambient – 10 CFM/sq ft
L Rating At 400 F – Less Than 6 CFM/sq ft



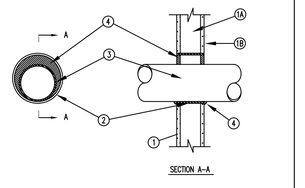
1. Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max area of opening is 192 sq in. (1239 cm2) with max dimension of 24 in. (610 mm).
See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through–Penetrants – A max of 4 pipes, conduits or tubing to be installed within the opening. The space between pipes, conduits or tubing shall be 1–1/2 in. (38 mm) min to max 2–1/2 in. (64 mm). The space between pipes, conduits or tubing and periphery of opening shall be min 1–5/8 in. (41 mm) to max 2–1/2 in. (64 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
A. Steel Pipe – Nom 3 in. (76 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Copper Tubing – Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing.
C. Copper pipe – Nom 3 in. (76 mm) diam (or smaller) regular (or heavier) copper pipe.
D. Conduit – Nom 3 in. (76 mm) diam (or smaller) electrical metallic tubing or steel conduit.
3. Pipe Covering* – (Optional) – Max 1 in. (25 mm) thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory–applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt strip tape supplied with the product. A nom annular space of 1–1/2 in. (38 mm) is required within the firestop system. The T, FT and FTH Rating is 1 hr when 1 in. thick pipe covering is used. The T, FT and FTH Rating is 0 hr when pipe covering is less than 1 in. or is omitted.
See Pipe and Equipment Covering – Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. Packing Material – Min 4 in. (102 mm) thickness of min 4.0 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
5. FB, Void or Cavity Material* – Sealant – Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant.
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W–L–1054
F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/Sq Ft
L Rating At 400 F – 4 CFM/Sq Ft



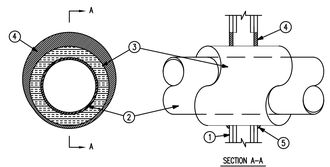
1.Wall Assembly – The 1 or 2 hr fire–rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, W400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A.Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw–attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
B.Gypsum Board* – 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32–1/4 in. (819 mm) for steel stud walls. Max diam of opening is 14–1/2 in. (368 mm) for wood stud walls.
The F and FH Ratings of the firestop system are equal to the fire rating of the wall assembly.
2. Through–Penetrants – One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2–1/4 in. (57 mm). Pipe may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
A. Steel Pipe – Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe – Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
C. Conduit – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.
D. Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
E. Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) regular (or heavier) copper pipe.
3. FB, Void or Cavity Material* – Sealant – Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W–L–1164
F Ratings – 1 and 2 Hr (See Items 1 and 4)
T Rating – 0 Hr



1.Wall Assembly – The 1 or 2 hr fire–rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, W400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A.Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw–attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
B.Gypsum Board* – The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening in steel stud walls is 32 in. (813 mm). Max diam of openings in wood stud walls is 14–1/2 in. (368 mm).
The hourly F, FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2.Steel Sleeve – Nom 32 in. (813 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe sleeve friction fit in nom 32 in. (813 mm) diam circular opening cut through gypsum board layers. Length of steel sleeve to be equal to thickness of wall.
3.Through–Penetrant – One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and the steel sleeve shall be min of 0 in. (point contact) to max 1–7/8 in. (48 mm) Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
A. Steel Pipe – Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe – Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
C. Conduit – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.
D. Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
E. Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) regular (or heavier) copper pipe.
4.FB, Void or Cavity Material*–Sealant – Min 5/8 in. (16 mm) and 1–1/4 in. (32 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly for 1 or 2 hr rated walls, respectively. Min 1/2 in. (13 mm) diam bead of caulk applied to the penetrant/gypsumboard interface at the point contact location on both sides of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–ONE Sealant or FS–ONE MAX Intumescent Sealant
*Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W–L–5029
F Ratings – 1 and 2 Hr (See Item 1)
T Ratings – 1/2, 3/4, 1 and 1–3/4 Hr (See Item 3)
L Rating At Ambient – 4 CFM/Sq Ft
L Rating At 400 F – Less Than 1 CFM/Sq Ft



1.Wall Assembly – The 1, 2 or 3 hr fire–rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A.Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw–attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
B.Gypsum Board* – Min 5/8 in. (16 mm) thick with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 18–5/8 in. (473 mm).
The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2.Through–Penetrants – One metallic pipe or tubing to be installed within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
A.Steel Pipe – Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B.Iron Pipe – Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
C.Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing. When the hourly F or FH Rating of the firestop system is 3 hr, the nom diam of copper tube shall not exceed 4 in. (102 mm).
D.Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe. When the hourly F or FH Rating of the firestop system is 3 hr, the nom diam of copper pipe shall not exceed 4 in. (102 mm).
3.Pipe Coverings* – Nom 1, 1–1/2 or 2 in. (25, 38 or 51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory–applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. For 1 and 2 hr F and FH Ratings, the annular space between insulated penetrant and periphery of opening shall be min 0 in. (point contact) to max 1–7/8 in. (48 mm). For 3 hr F and FH Ratings, the annular space shall be min 0 in. (point contact) to max 1–1/4 in. (32 mm).
See Pipe and Equipment Covering – Materials (BRGU) category in the Building Material Directory for the names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
The hourly T, FT, FTH Ratings of the firestop system for 1/2 hr for 1 hr rated walls, for

SECTION 22 05 00

COMMON WORK RESULTS FOR PLUMBING

1.0 GENERAL

1.01 DESCRIPTION

A. This Division 22 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the plumbing systems as specified herein and as shown.

B. All work specified in this Section is governed by the Common Work Results for Plumbing 22 05 00.

C. The General Provisions and Division 1, including the general, supplementary and other conditions and other Divisions, as appropriate, apply to work specified in this Division.

1.02 EXISTING CONDITIONS

A. Attention is called to the fact that the work is to be performed within an existing, operational facility. Prior to the submission of bids, each bidder shall visit the project site, thoroughly investigate and be familiar with all existing conditions which will affect their work; especially the work to be performed above the existing ceilings.

B. Connect new work to existing work in a neat and workmanlike manner. Where an existing structure must be cut or existing utilities interfere, such obstructions shall be bypassed, removed, replaced or relocated, patched and repaired. Work disturbed or damaged shall be replaced or repaired to its prior condition.

C. Prior to the start of any demolition or construction, secure the services of a qualified, EPA Certified Asbestos Abatement Agency to check the existing insulation, etc. for asbestos. Should asbestos be found, do not proceed with demolition or construction; notify the Architect in any case in writing of the Agency's findings.

1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable standards for materials, equipment and workmanship, and to provide operable plumbing systems complete in every respect.

B. The engineering drawings are diagrammatic, intended to show general arrangement and sizes of system components, and shall not be scaled. Rather, the architectural and structural drawings shall govern space constraints, dimensions and finishes. All offsets and fittings which will be necessary to accomplish the finished installation shall be provided at no additional cost or increase in the Contract.

1.04 SPACE PRIORITY

A. Ensure optimum use of available space for materials and equipment installed above ceilings. Allocate space in the order of priority as listed below except as otherwise detailed. Items are listed in the order of priority, with items of equal importance listed under a single priority number.
1. Gravity flow piping systems
2. Vent piping systems
3. Recessed lighting fixtures
4. Concealed HVAC terminals and equipment
5. Air duct systems
6. Sprinkler piping systems
7. Pressurized piping systems
8. Electrical conduit, wiring, control air tubing

B. Order of space priority does not dictate installation sequence. Installation sequence shall be as required to install all affected trades.

C. The work of this Division 22 shall not obstruct access for installation, operation and maintenance of the work of any other Division.

D. All major items of equipment shall be arranged so as to provide a minimum of 28" clear aisle space. Additional space shall be provided between and around equipment for maintenance and proper operation as shown in the Equipment Manufacturer's literature.

1.05 COORDINATION

A. Coordinate all work under this Division 22 with work under all other Divisions, providing adjustment as necessary.

B. Coordination of space requirements with respect to Division 26 shall be performed such that:

1. No equipment, piping or ductwork, other than electrical, shall be installed within 42" of switchboards or panelboards.
2. No piping or ductwork which ever operates at a temperature in excess of 120°F shall be installed within 3" of any electrical conductor.

C. All items mounted in or below the ceiling, and all items penetrating the ceiling, shall be coordinated with the architectural reflected ceiling plans. If any items are not shown on these plans, or any items need to be relocated for coordination purposes, prepare a reflected ceiling plan and submit it to the Architect for approval.

1.06 CODE COMPLIANCE

A. All workmanship and materials provided under this Division 22 shall comply with all laws, ordinances, codes and regulations of all Federal, State and Local Authorities Having Jurisdiction.

B. All fire suppression, plumbing, heating, ventilating, and air conditioning materials and workmanship shall comply with all local, state, and federal codes and the following standards as minimum requirements:
1. NFPA 70, National Electrical Code, 2023 Edition
2. Life Safety Code (NFPA 101) – 2015 Edition
3. All other NFPA Codes and Standards – Applicable Editions
4. North Carolina State Building Code – 2024 Edition
5. North Carolina State Energy Code – 2024 Edition
6. North Carolina State Fire Prevention Code – 2024 Edition
7. North Carolina State Mechanical Code – 2024 Edition
8. North Carolina State Plumbing Code – 2024 Edition
9. ASME A17.1 Safety Code for Elevators and Escalators – 2013 Edition
10. North Carolina Accessibility Code – 2024 Edition
11. American with Disabilities Act, January 26, 1992
12. American National Standard Handicapped Code, A117.1 – 1986 Edition

C. Secure and pay all fees associated with all permits and licenses required for execution of the Contract. Arrange for all inspections required by City, County, State and other Authorities Having Jurisdiction, and deliver certificates of approval to the Architect.

D. The code requirements are strictly a minimum and shall be met without incurring additions to the Contract. Where requirements of the drawings or specifications exceed the code requirements, the work shall be provided in accordance with these drawings or specifications. In the event of conflict or ambiguity between the various codes, the most stringent requirement shall govern.

1.07 ELECTRICAL REQUIREMENTS AND INTERFACE

A. All electrical equipment and wiring provided under this Division 22 shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 26.

B. All power wiring and final connections to equipment shall be provided under Division 26.

C. Control components, all interlocks (control valves, leak sensors, etc.) and control wiring (120 volt, single phase and less) shall be provided under this Division 22 as required to achieve the specified control sequences.

D. All control wiring over 30 volts shall be installed by a Licensed Electrician working under this Division 22.

1.08 SLEEVES, SEALS AND ESCUTCHEONS

A. Sleeves shall be provided through all pipe penetrations of concrete or masonry walls, elevated floors and roofs, except those plumbing piping penetrations for fixtures, vents, etc.

B. Sleeves shall be fabricated from Schedule 40 steel pipe through 10" and Standard Wall steel pipe for sleeve sizes 12" and larger. All sleeves penetrating exterior walls, underground walls, pit or vault walls shall be provided with a 3" x 3/8" thick waterstop ring welded completely to the midpoint of the sleeve.

C. All sleeves penetrating exterior walls, underground walls, pit or vault walls and elevated floors shall be packed and sealed watertight.

D. Sleeves through roofs shall extend above the roof surface and be flashed watertight.

E. Sleeves through walls shall be cut and finished flush with each surface of the wall in which they are installed.

F. Sleeves through elevated floors shall extend at least ½" above the finished floor and be sealed waterproof between the sleeve and slab.

G. Sleeves shall be sized to provide a minimum of 1/2" clearance between the inside surface of the sleeve and the outside finished surface of the pipe plus any insulation specified.

H. Fire-stops shall be provided as specified herein. All annular spaces between piping and sleeves which do not require fire-stops shall be packed with mineral wool and caulked.

I. Fire-stopping or packing at elevated floor penetrations shall be level with or above the elevation of the top of sleeve to prevent any water ponding on top of the sleeve.

J. Provide round, chrome-plated escutcheons on all exposed piping penetrations passing through walls, floors, partitions and ceilings.

K. All penetrations through rated slabs, walls, etc. shall be in accordance with UL listed systems. Provide rated box-out, fire caulking, etc. as needed to ensure fire rating is maintained in compliance with UL listed systems.

1.09 FIRESTOPS

A. Where piping, conduit, etc. pass through fire partitions, fire walls and floors, a firestop shall be provided that will ensure an effective barrier against the spread of fire, smoke and gases. Firestop material shall be packed tight and completely fill gaps between the ductwork, piping, conduit, etc. and the perimeter of their rough openings.

B. All penetrations shall be in accordance with UL 1479 or ASTM E 814 listed systems, and products used shall be specifically applicable for the appropriate installation conditions. Assemblies shall provide a minimum rating equal to the construction penetrated. Products shall be by HILTI, 3M, or ProSet.

C. Installation shall be by a Qualified Installer. Installer shall be certified, licensed, or otherwise qualified by the Firestopping Manufacturer as having the necessary training to install the Manufacturer's specific product.

D. Installer shall have at least one of the following qualifications:
1. FM 4991 Approved Contractor
2. UL Approved Contractor
3. HILTI, 3M, or ProSet Accredited Fire Stop Specialty Contractor

E. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach label permanently on both sides of penetrated construction in a visible location. The label shall include the following:
1. The words "Warning – Through Penetration Firestop System–Do Not Disturb"
2. Through Penetration firestop system designation and Manufacturer
3. Date of Installation

1.10 CORE DRILLING

A. Cutting of holes through concrete and masonry shall be by diamond core or concrete saw. Pneumatic hammer, impact electric and hand or manual hammer type drills will not be allowed, except as permitted by the Architect where required by limited working space. Locate holes such that they will not affect structural sections such as ribs or beams. Holes shall be laid out well in advance of the installation. These layout locations shall be approved by the Architect prior to drilling.

1.11 IDENTIFICATION OF PIPING

A. All aboveground plumbing systems piping and valves sized 3/4" and larger which are installed in accessible locations (including piping above removable ceilings and behind access panels) shall be identified in strict conformance with the "Scheme for the Identification of Piping Systems" (ANSI A13.1).

B. Piping labels in exposed areas shall be oriented and located in coordination with the Architect.

C. System names shall, at minimum, uniquely identify the system and performance category – i.e. 140°F Hot Water Supply, High Pressure Cold Water, etc.

D. Specialized piping (grease waste, acid waste, fuel piping, etc.) installed underground shall be labeled. The label shall be corrosion resistant or shall be permanently marked.

E. Each identification marker shall include the following:
1. Proper color-coded background
2. Proper color of legend in relation to background color
3. Proper legend letter size
4. Proper marker length
5. Direction of flow arrow shall be included on each marker

F. Locations for pipe markers shall be as follows:
1. Adjacent to each valve and fitting
2. At each branch and riser take off
3. At each pipe passage through walls, floors and ceilings
4. On all straight pipe runs every 25 feet except that piping underground required to be labeled shall be labeled every 10 feet or more often as required by the AHJ

G. Identification markers may be stenciled or shall be Setmark Pipe Markers, as manufactured by Seton Name Plate Corporation.

H. All valves shall be identified with the appropriate service designation and valve number brass valve tags. Each valve tag shall be 19 gauge brass with 1/4" black-filled letters over 1/2" black-filled numbers. Tags shall be fastened to valves with brass "S" hooks or brass jack chain. Brass tags and fasteners shall be as manufactured by Seton Name Plate Corporation.

I. Provide charts of all valves. Valve charts shall include the following items:
1. Valve identification Number
2. Location
3. Purpose/Material

2.0 PRODUCTS

2.01 BID BASIS AND SUBSTITUTION PROCEDURES

A. Manufacturer names, series and model numbers, as noted or specified, are for the purpose of describing type, capacity, and quality of equipment, materials and products to be used. Unless "or equal" is specifically stated, bids shall be based only on the specified "basis of design" Manufacturer. The listing of a particular manufacturer as an "equal" or "acceptable substitute" manufacturer shall not be misconstrued as approving, nor allowing the substitution of, that Manufacturer's standard product in place of the basis of design. No consideration will be given to a product which would require dimensional, spatial or aesthetic changes to the project. "Acceptable substitute" and "equal" manufacturers shall only bid those products which exactly match the size and other characteristics of the specified basis of design. Any changes to other disciplines and trades of work required by an "or equal" or "substitute" product shall be duly considered and priced accordingly prior to bidding or pricing. The decision as to whether or not a proposed substitute or "equal" product is actually equal to that specified shall rest solely with the Architect.

B. Requests to provide "equal" products in lieu of those specified shall be submitted to the Architect in writing at least ten (10) days prior to final pricing and execution of the Contract. No consideration will be given to substitute products after final pricing and execution of the Contract.

C. Any "or equal" product or proposed product substitution which will cause a change in the appearance, dimensions or design of any part of the building, structure, electrical system, or any other engineered systems shall be accompanied by a scaled drawing and written description of the required change(s) for approval by the Architect. If deemed necessary by the Architect, design changes shall be signed and sealed by a registered Professional Engineer, currently licensed in this State. This shall be performed under the Contractor selecting the substitution's scope.

D. Any and all changes due to a substitution of basis of design equipment including but not limited to electrical connection, physical size, access, piping connections, controls, etc. shall be solely the responsibility of Contractor selecting the substitution.

2.02 MINIMUM STANDARDS

A. Every piece of energy consuming equipment, all fire suppression products and life safety equipment shall comply with the following standards as applicable; especially in regard to prevailing codes:
1. Factory Mutual Laboratories (FM)
2. Industrial Risk Insurers (IRI)
3. Underwriters Laboratories, Inc. (UL)
4. ADC: Air Diffusion Council
5. AGA: American Gas Association
6. AMCA: Air Moving and Conditioning Association, Inc.
7. ANSI: American National Standards Institute
8. API: American Petroleum Institute
9. AHRI: Air Conditioning, Heating, and Refrigeration Institute
10. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
11. ASME: American Society of Mechanical Engineers
12. ASTM: American Society of Testing and Materials
13. AWWA: American Water Works Association
14. IBR: Institute of Boiler and Radiator Manufacturers
15. MSS: Manufacturers Standardization Society
16. NBBPVI: National Board of Boiler and Pressure Vessel Inspectors
17. NEMA: National Electrical Manufacturer's Association
18. OSHA: Occupational Safety & Health Administration
19. PDI: Plumbing Drainage Institute
20. PPI: Plastic Pipe Institute
21. CISPI: Cast Iron Soil Piping Institute

2.03 PIPE HANGERS AND SUPPORTS

A. Pipe hangers, hanger rods, trapeze type hangers, upper attachments and other supports shall be selected based on pipe size (plus insulation of pipes specified to be insulated) and the weight of the medium being transported or the medium used for testing, whichever is greater. Provide all hangers and rods, turnbuckles, angles, channels, and other structural supports to support the piping systems. Rods for pipe hangers shall be full size of the Hanger Manufacturer's catalog listed rod size for each type hanger specified. Hangers and supports shall be Michigan, ITT Grinnell or B-Line.

B. All material utilized for the hanging and support of the piping systems shall be manufactured products which are specifically intended for the purpose of hanging piping systems. The use of wire, steel straps, plastic ties, etc. is strictly prohibited.

C. Pipe hangers selected for supporting horizontal insulated piping shall be sized to fit around the outside of the pipe insulation. Insulated piping shall be supported on galvanized shields.

1. Shields shall be as follows:
   a. Pipes 2" and smaller: 18 gauge x 12" long
   b. Pipes 2 1/2" and larger: 16 gauge x 18" long

2. Shields shall be 180 degrees around the lower half of the pipe at all pipe hangers, except that on trapeze hangers, pipe racks and floor supported horizontal pipes, shields shall be 360 degrees around the entire pipe.

D. Pipe hangers touching copper piping shall be copper plated or the piping shall be dielectrically isolated from any steel hangers or clamps that are used. Note the requirement for domestic water piping requires the hangers to be installed over the insulation.

E. Steel rods, framing and clamps shall be plated or primed to prevent rust formation.

F. All piping installed outside the building shall be secured to the structure. Coordinate with the Structural Engineer as needed. It is the Contractor's responsibility to design and coordinate all supports. All supports shall be designed to withstand all code-required wind and seismic loads.

G. Wind and seismic roof supports for piping shall be Mifab CZ or approved equal.

3.0 EXECUTION

3.01 GENERAL

A. All piping, valves, and fittings shall be products of a domestic Manufacturer and made in the USA.

B. Provide and install shut-off valves at any and all equipment including water heaters, domestic booster pumps, recirculation pumps, storage and pressure tanks, etc. and at any locations required by code, such as branch lines from risers serving more than one fixture. Shut-offs shall be in addition to those specifically shown or noted in the Contract Documents.

3.02 SUBMITTALS

A. Before preparing submittals, study all Contract Drawings and specifications in detail, obtain manufacturer's recommended instructions, and have submittals prepared based on specific equipment and material proposed for installation. An officer of the contracting firm shall sign all shop drawings (certifying conformance with plans and specifications) before submitting to the Architect or releasing to the field.

B. The submittal process shall not be utilized as an avenue to substitute products after the execution of the contract. Should an unspecified or unequal product be submitted, it will be rejected. If a second attempt at substitution is made during the resubmittal of the same product, then no more reviews of that product will be performed without direct compensation to the Engineer being paid for the additional services required for the third review and any further reviews.

C. All submittals shall be submitted and returned electronically.

D. Submittals will not be accepted for review unless they:
1. Comply with the requirements of Division 1.
2. Include complete information pertaining to all appurtenances and accessories.
3. Are submitted as complete packages which pertain to all related items in Division 22. Separate packages shall be submitted as follows:
   a. All plumbing equipment, piping, specialties, and components
   b. All plumbing fixtures
4. Are properly marked with equipment, service or function identification as related to the project and are marked with pertinent specification paragraph number.

E. Submit catalog information, factory assembly drawings, field installation drawings and certifications as required for complete explanation and description of all items of equipment. The submittal data shall provide ample, unquestionable compliance with the Contract Documents.

F. Review of submittals shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly identified and separately submitted in the form of a letter that is enclosed with the submittals.

G. Submittals are required on all manufactured equipment, especially energy consuming equipment. Submittals shall include, but are not limited to, the following items of equipment:
1. Piping and Piping Specialties
2. Insulation
3. Water Heaters
4. Pumps
5. Plumbing Fixtures
6. Piping Shop Drawings
7. Firestopping Products and Applicable UL Firestop Details

3.03 EXCAVATION, TRENCHING AND BACKFILLING

A. Perform all excavation, trenching and backfilling for underground work under this Division 22. During excavation, the excavated material shall be piled back from the banks of the trench to avoid overloading, slides or cave-ins. Do not exceed the angle of repose unless written approval is obtained in advance from the Architect for shoring, bracing or other alternate excavation methods. All excavated material not used for backfilling shall be removed from the building and disposed of as indicated or directed by the Architect. Take measures to prevent surface water from flowing into trenches and other excavations and any water accumulating therein shall be removed by pumping. All excavation shall be made by open cut. Tunneling shall not be allowed.

B. The bottom of all trenches shall be evenly graded to provide firm support and an even bearing surface. Pipe shall be laid on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that the barrel of the pipe rests evenly on the bottom of the trench along the entire length of the pipe.

C. Pipe shall be inspected and tested prior to backfilling. Trench shall be handfilled to a minimum of 12" above the top of pipe with suitable earth (free of rocks, trash, large clods and organic material) and compacted to a minimum 95% proctor. After the first layer is completed, subsequent layers shall be filled and compacted the same as the first layer. Settling the backfill with water shall not be permitted.

3.04 INSTALLATION REQUIREMENTS

A. All equipment shall be installed in strict conformance with the recommendations of the Equipment Manufacturer, as indicated on the Drawings, and as specified.

B. Provide installation manuals for each piece of equipment. Submit in separately bound volumes after review of submittals.

C. Provide supplementary steel framing and welded steel equipment support stands as required for proper hanging and support of the plumbing systems. Steel angles, channels and tubing utilized for such framing shall be selected for a maximum deflection of 1/360th of the span.

3.05 CLEANING, LUBRICATION AND ADJUSTMENT

A. The exterior surfaces of all plumbing equipment, piping, conduit, etc., shall be cleaned and free of all dirt, grease, oil, paint splatter, and other construction debris.

B. Bearings that require lubrication shall be lubricated in strict accordance with the manufacturer's recommendations.

C. All control equipment, valves, equipment settings, pressure tanks, etc. shall be adjusted to the settings required for the performance specified.

D. All materials, equipment, etc. subject to weather, corrosion, dust, debris, water etc. to be installed or utilized for the project shall be fully protected. This is inclusive of piping and duct openings and internal fan ventilation intakes and discharges. This Division's scope includes protection and remediation of any and all Division materials, etc. including cleaning, vacuuming, dusting, etc. required for a clean system and operation. Insulation and equipment with electrical connections subject to water shall be replaced in their entirety. Coordinate with all other trades and schedules.

3.06 PAINTING

A. All uncoated and uninsulated steel surfaces exposed to sight inside the building, such as piping, equipment hangers and supports, which are not provided with factory prime coat or galvanizing, shall be cleaned and painted with one coat of rust inhibiting primer. In addition, all surfaces in finished spaces shall also be painted with two coats of finish paint in a color selected by the Architect.

B. Steel items exposed outside the building, such as equipment supports, uninsulated piping and hangers which are not factory painted or galvanized shall be cleaned and painted with one coat of rust inhibiting primer and two coats of asphaltic base aluminum paint. Insulated steel pipes outside the building shall be cleaned and painted with one coat of rust inhibiting primer before installing insulation.

C. Factory painted equipment that has been scratched or marred shall be repainted to match the original factory color.

3.07 PIPING LEAK TESTING

A. Sanitary, waste, and vent piping shall be tested with water before installing fixtures. Water test shall be applied to the system either in its entirety or to the individual sections. Each opening except the highest opening of the section under test shall be plugged, and the section shall be filled with water and tested with a head of water of at least ten (10) feet above the highest point in the system. The water shall be kept in the portion under test, for at least thirty (30) minutes; no drop in the water level will be acceptable.

B. The water piping systems shall be tested at a minimum pressure of 125 psi, or 1.5 times the system operating conditions, whichever is greater, and proved tight at this pressure for not less than thirty (30) minutes or longer if required to permit inspection of all joints. No loss in pressure will be permitted.

C. All leaks shall be repaired by tightening, remaking joints, or replacing pipe and fittings. Caulking of joints shall not be permitted.

D. See specification section 23 11 23 for testing requirements of natural gas piping. System shall be part of Division 22 scope unless otherwise arranged within the Contract. Coordinate with Division 23.

3.08 RECORD (AS-BUILT) DRAWINGS

A. At the completion of the project, provide a set of reproducible prints to the Architect which reflects all changes, deviations and revisions made to the original design documents. Locations of all underground piping and utilities shall be clearly shown and dimensioned from permanent reference points such as building column lines. Record drawings shall be produced in electronic format compatible with AUTOCAD. Furnish electronic copies of all drawings in dwg. format, and two (2) bond copies of all drawing sheets. As-Builts for electronic incorporation by the Design Team, as applicable, shall be redline mark-ups of the Construction Documents.

3.09 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS

A. Complete operating and maintenance manuals shall be provided to the Owner. Four copies shall be provided. Each copy shall be bound in a separate 3-ring, loose leaf notebook. Operating instructions shall be provided for each plumbing system, and shall each include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instructions shall be provided for each piece of equipment. A control system wiring diagram shall be included in each operating and maintenance manual.

B. Prior to final acceptance or beneficial occupancy, provide the services of a Competent Technician for not less than one (1) day to instruct the Owner in the operation of the plumbing systems.

3.10 MINIMUM HANGER SPACING

A. Pipe hangers or supports shall be provided within 18" of each horizontal fitting, equipment connection, valve, etc. and within 18" of the centerline of horizontal or vertical changes in direction summing to 90° or more. Specific attention is called to turns into vertical risers.

B. Piping supports shall be provided, at a minimum, in accordance with the greater of the below or code minimum. Where the below or code does not address support for specific piping, supports shall be in accordance with manufacturer's requirements.

Piping Material	Max. Horz. Spacing	Max. Vert. Spacing
Cast-iron pipe	5'	15'
Copper pipe	12'	10'
Copper tubing ≤ 1-1/4" dia.	6'	10'
Copper tubing ≥ 1-1/2" dia.	10'	10'
PVC pipe	4'	10'*

*Midstory guide required for piping 2" diameter and smaller

C. Riser clamps shall be provided at each floor penetration. For pressurized piping systems, provide vibration isolation at all riser clamps with two (2) pad-type mountings consisting of a minimum 3/8" thick ribbed or waffled elastomeric pads bonded between minimum 16-gauge galvanized steel separator plates. Pads shall be sized for a deflection of 0.12" to 0.16". Pads shall be minimum 3"x3" square.

3.11 WARRANTY

A. All work provided under this Division 22 shall be subject to a minimum one year warranty. The warranty shall include prompt repair or replacement of equipment or system failures and shall include all parts and labor. In addition, all compressors shall carry an additional four year parts-only warranty. Extended warranties shall be provided on all other equipment so specified in other Sections.

3.12 COORDINATION DRAWINGS

A. All Contractors and SubContractors, as applicable, shall be responsible for the preparation of electronic drawings 1/4" per foot scale shop drawings of all building levels.

B. The General Contractor shall manage and control the coordination process. The General Contractor Team shall be responsible for all documents and file distribution.

C. Each trade shall mark conduit, pipe, duct, and equipment with elevations on

DATE SIGNED: 07/25/25
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BW&A Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
SPECIFICATIONS - PLUMBING

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
P0.4

electronic drawings provided by the Sheet Metal SubContractor.

D. Each Contractor and SubContractor shall date the drawings when received. Sequence of transmittal of the drawings shall be as follows:
   1. The Mechanical SubContractor with all sheet metal and piping work shown to the Plumbing SubContractor.
   2. From Plumbing SubContractor with all plumbing work shown to Fire Protection SubContractor.
   3. From Fire Protection SubContractor with all fire protection work shown to Mechanical SubContractor.
   4. From Mechanical SubContractor with all mechanical piping work shown to Electrical SubContractor.
   5. From Electrical SubContractor with all electrical work shown to Mechanical SubContractor.
   6. This process shall iterate as needed for full and final coordination by all parties.

E. Each trade shall sign and date final coordination drawings. The General Contractor shall maintain up-to-date drawings at the job site and shall provide one set of prints of final coordinated drawings to Mechanical, Plumbing, Fire Protection, and Electrical SubContractors, and the Owner's Representative.

F. Each Contractor and SubContractor shall coordinate all work with other trades prior to installation.

G. Any field changes shall be similarly coordinated and documented in the As-Builts.

H. Upon completion of the coordination drawings, provide the Engineer a full set of shop drawings for their review. Shop drawings shall meet the below requirements.

3.13 SHOP DRAWINGS

A. Shop drawings per the submittal requirements shall be submit to the Design Team with adequate time for multiple rounds of review. Shop drawings shall show "As-Built" conditions including elevations, offsets, transitions, and accessories. Shop drawings shall indicate all code and manufacturer's recommended clearances, access, and coordinate the clearance and access requirements with all other trades.

B. Shop drawings that use keynotes direct from the Design Documents shall not be acceptable as they do not demonstrate coordination with all other trades, necessary transitions, etc.

C. Shop drawings shall be provided as complete packages in parallel with all trades to document coordination. Floor-by-floor or otherwise piecemeal shop drawings are generally not acceptable.

3.14 OWNER TRAINING

A. Owner training shall be provided for all systems and equipment and shall include the following:
   1. 8-hours of training for each type of equipment
   2. 16-hours for overall system operational training

B. A training summary and schedule shall be submitted to the Architect for approval within ninety (90) days of the date of substantial completion.

C. Training timing will vary and shall be assumed to include multiple sessions as required by the Owner.

3.15 BID REQUIREMENTS

A. The Contractor shall include all systems, equipment and accessories shown on the plans and specifications.

B. The Contractor is responsible for providing all Contract Documents to all SubContractors. All systems, equipment and accessories shall be included in the bid, whether shown on the SubContractor applicable plans or other design documents.

C. Should any discrepancy occur in the Contract Documents, the Contractor shall provide a request for clarification prior to bid or note the discrepancy in the bid and provide an appropriate cost allowance in the bid.

D. The Contractor shall acknowledge that the Contract Documents are diagrammatic and shall provide all systems, equipment and accessories required for a complete facility. Any areas that appear to be void of systems or inappropriate systems shall be noted in the bid. No post bid change order shall be considered for areas or discrepancies not noted in the bid.

E. All installation coordination and means and methods and labor and materials required for proper system installation shall be included.

F. These requirements are in addition to bid procedures and requirements of the RFP or general specifications.

END OF SECTION

SECTION 22 07 00

PLUMBING INSULATION

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for Plumbing Section 22 05 00.

B. This Section 22 07 00 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the insulation of the plumbing systems as specified herein and as shown. These systems include, but are not limited to, the following:
   1. Sanitary waste and vent systems
   2. Domestic water systems

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete and operable plumbing systems complete with insulation, which are free of unreasonable noise, vibration and sweating, and fabricated so as to fit the space allotted.

B. The word "piping" is defined to mean all piping, fittings, joints, hangers, coatings, valves, cocks, insulation and accessories necessary for the plumbing systems described, shown and specified.

1.03 ACCEPTABLE MANUFACTURERS

A. Insulation products shall be as manufactured by Owens Corning, Knauf, Manville, Certainteed, Dow, Armacell, or Armstrong.

2.0 PRODUCTS

2.01 PLUMBING INSULATION

A. All pipe insulation products shall have a permanent composite insulation, jacket and adhesive fire and smoke hazard rating as tested by procedure ASTM-84, NFPA 255 and UL 723 not exceeding Flame Spread 25 or Smoke Developed 50.

B. Blanket-type insulation on ice maker drains (through p-trap) shall have an average thermal conductivity (k-value) not to exceed 0.27 BTU per inch/h·ft^2·°F at a mean temperature of 75°F. Insulation shall have a minimum density of 1 lb/cu.ft. and shall be 2" thick.

C. Preformed insulation for all domestic hot water piping shall be minimum 1-1/2" thick for piping less than or equal to 1-1/2" diameter, 2" thick for piping above 1-1/2" in diameter, preformed fiberglass pipe insulation with white all-service jacket. All longitudinal joints shall be lapped, self-sticking type with all butt joints, tears, etc. sealed with a matching white vapor barrier tape. Elbows shall be mitered or may be Zeston covers filled with equivalent fiberglass insulation. The maximum conductivity (k-value) of the insulation shall be 0.23 BTU per inch/h·ft^2·°F at 75°F.

D. Insulation shall be continuous over all valve bodies, fittings, and wall and floor penetrations. Do not insulate unions on hot water piping; nor instruments, gauges, valve handwheels, etc. on any piping.

E. All piping insulation covering water-carrying piping which is subject to bursting from freezing temperatures shall have oversized insulation to accommodate heating cable. See specification 23 05 33.

F. Closed-cell insulation shall be provided over all piping called to have insulation that is installed below ground. Closed-cell piping insulation shall match the thicknesses for above ground piping, 25/50 Armaflex or Rubatex. All glues and coatings shall be products of the same manufacturer as the insulation. The insulation shall be installed by the slip-on method; slitting of the insulation is prohibited and shall be cause for rejection.

3.0 EXECUTION

3.01 ARRANGEMENT

A. Follow the general piping layout, arrangement, schematics and details. Provide all offsets, vents, drains and connections necessary to accomplish the installation. Fabricate piping accurately to measurements established at the project site to avoid interference with ductwork, other piping, equipment, openings, electrical conduits and light fixtures. Make suitable provision for expansion and contraction with expansion loops and offsets.

3.02 INSULATION INSTALLATION

A. Provide insulation over all above ground hot water piping, except that no insulation is required on cold water lines installed inside interior plumbing chases (those chases with no exterior wall). In addition, no insulation is required for cold water piping outside the building vapor barrier and designed to be drained down for freeze-protection, such as parking deck hose bibbs for washdown.
   1. All joints and tears shall be sealed with matching white vapor barrier tape

B. See specification 23 23 00 for HVAC refrigerant piping insulation requirements.

END OF SECTION

SECTION 22 10 00

PLUMBING PIPING

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for Plumbing Section 22 05 00.

B. This Section 22 10 00 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the plumbing systems as specified herein and as shown. These systems include, but are not limited to, the following:
   1. Sanitary, waste, and vent systems
   2. Domestic water systems

C. Provide all final plumbing connections to all equipment furnished by Owner.

D. Provide isolation valve and reduced pressure backflow preventer or vacuum breaker at the service entrance and at those connections (especially to kitchen equipment) required by local plumbing code.

E. Note: See specification Section 23 11 23 for natural gas piping. Natural gas piping shall be part of this Division's scope unless otherwise coordinated. Coordinate with all trades.

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete and operable plumbing systems as shown and specified which are free of leaks, properly vented, free of unreasonable noise, vibration and sweating, and fabricated so as to fit the space allotted and to exhibit a minimum resistance to fluid flow.

B. The word "piping" is defined to mean all piping, fittings, joints, hangers, coatings, valves, cocks, insulation and accessories necessary for the plumbing systems described, shown and specified.

1.03 GENERAL REQUIREMENTS

A. Provide all reducing fittings, flanges, couplings and unions of the size and type of material to match the piping connections at each fixture, piece of equipment, valve and accessory.

B. Union joints, couplings or flanges shall be provided in each pipe connected to each piece of equipment, fixture and elsewhere as indicated and specified. Unions shall match the piping system in which they are installed.

C. Unions or flanges shall be provided between all copper to steel connections. These unions shall be dielectric, insulating type.

D. All changes in direction and branches shall be made with manufactured fittings.

E. The use of offset-type reducers is strictly prohibited in any piping system.

F. In all water piping systems, changes in horizontal pipe sizes shall be made with eccentric reducers installed flat on top for proper air venting. Reducing tees, reducing elbows and concentric reducers shall only be allowed in water piping systems for changing pipe sizes in vertical risers and for making connections to equipment and accessories from vertical risers.

G. All pipe joints shall be cut square and all burrs shall be removed.

H. Open ends of pipes not currently being handled shall be plugged during installation to keep dirt, water, and foreign material out of the system.

I. Sanitary, waste, and vent piping shall slope down in the direction of flow as shown on the drawings or as prescribed by Code, but not less than 1 percent.

J. All vents through roof (VTRs) shall be offset just below the roof such that their termination points are at least 15 ft from any outside air intake of any HVAC unit; special attention is called to packaged rooftop and dedicated make-up air units.

K. Trap primers shall be provided at all floor drains, floor sinks, trench drains, and hub drains except trap primers may be omitted where drain routes to the storm system. Route water piping from nearest cold-water line and as allowed by code. Trap primer shall be tapped off the top of the horizontal line, have an isolation valve, and be at least 1' in elevation above the connection for every 20' of downstream piping.

L. All piping, valves, and fittings shall be provided by a domestic Manufacturer and manufactured in the USA.

2.0 PRODUCTS

2.01 SANITARY WASTE AND VENT SYSTEMS

A. All underground sanitary waste and vent piping shall be PVC, DWV Solid Wall Schedule 40 with socket-type, solvent welded joints in sizes up to 12". All PVC piping shall be installed in accordance to ASTM D2321.

B. All aboveground sanitary, waste, and vent piping shall be PVC except that sanitary, waste and vent piping located within return air plenums, including throughout future tenant space, shall be hubless cast iron soil pipe. Piping shall be DWV Solid Wall Schedule 40 with socket-type, solvent welded joints in sizes up to 12".
   1. Above ground installation of PVC piping shall be specifically indicated on the shop drawings or submitted in a confirming RFI, as applicable.
   2. Piping aboveground shall match the requirements for the underground piping as above.
   3. Sanitary, waste, and vent piping less than or equal to 2.5" may be copper DWV. Piping shall meet ASTM B 75, B 88, B 251, and B 306.
   4. Drain piping from equipment, such as kitchen warewashers, pot sinks, etc. with high temperature discharge shall be Type L hard drawn copper tubing with wrought copper fittings and soldered joints.

C. Cleanouts shall be provided at the locations indicated and, as a minimum, where required by Code. Floor cleanouts shall be a minimum of 4" and shall be complete with a flush plug and removable, scoriated bronze floor plate. Provide carpet buttons in carpeted areas. Wall cleanouts shall be threaded cleanout tees and plugs with polished stainless steel coverplate with centerset screw.

D. Floor drains in toilets and finished areas shall be JR Smith 2000 Series with 6" Type B square adjustable strainers finished in satin nickel bronze or equal products by Josam or Zurn. Provide vandalproof secured tops.

E. Hub drains (HD) shall be made with a reducer fitting with opening at least one nominal size larger than the connected piping as scheduled. HDs shall be sized to receive all discharges without splashing.

F. Type "K" floor drains in kitchens and food service areas shall be JR Smith 2000 Series with sediment bucket and 8" type "B" square adjustable strainer finished in nickel bronze or equal products by Josam or Zurn. Provide vandalproof secured tops.

G. Floor sinks (FS) in kitchens and food service areas shall be JR Smith 3007-NB Series with 6" deep type 304 stainless steel body, removable stainless steel sediment bucket, 12 1/2" square nickel bronze top and non-puncturing flashing clamps or equal products by Aco, Josam, or Zurn. Grate configuration shall be coordinated with Kitchen Equipment Consultant to ensure proper opening for equipment served; otherwise provide a full grate with openings cut out for equipment served.

2.02 DOMESTIC WATER SYSTEM

A. Underground domestic water service entrance piping 3" and smaller in size shall be Type K hard drawn copper tubing with wrought copper fittings. All joints shall be brazed.

B. All underground copper branch lines (1/2" and 3/4" only) shall be continuous lengths of soft Type K copper tubing with no joints allowed underground.

C. Aboveground domestic water system piping 3" in size and smaller shall be Type L hard drawn copper tubing with wrought copper fittings and soldered joints.

D. All valves in potable water systems shall be "lead-free" type.

E. All valves ¼" and smaller shall be "full-port" type, and greater than ¼" may be "reduced-port" type.

F. Gate valves (water entrances only) shall be constructed with a gray iron, non-rising stem, outside screw and yoke (OS&Y), full port. Stem to be adjustable graphite packing, ANSI 372 Lead Free, bronze mounted seat rings, solid wedge, back seat protection, with malleable iron handwheels. Valve shall meet MSS-SP70, Apollo Valves 611F or approved equals by Hammond/ Milwaukee, Nibco, or Stockham.

G. Ball valves:
   1. Valves 2 inch and smaller shall be two-piece bronze body, full port with solid, smooth bore chrome plated brass ball, meeting MSS-SP110 and rated for no less than 300 psi. Seats shall be reinforced TFE with Teflon packing ring and threaded adjustable packing nut. Valves on insulated lines will be provided with stem extensions to provide clearance for two inches of pipe insulation. Valves to be Apollo Valves 77C, Hammond/Milwaukee UP8301, or Watts B-6080.

H. Balancing valves:
   1. Valves shall be NSF/ANSI 61/372 certified and suitable for potable water applications. Valve shall be suitable for the greater of 125 psig pressure and 40°F to 250°F temperature or the system's operating conditions. Valve shall provide positive shut-off and be rated for 300 psig. Each balancing valve shall be equipped with two gauge taps with check valves and drip caps. Balancing valves shall be Bell and Gossett Circuit-Setter Plus or equal by Nexus, FlowDesign, or Watts. Provide preformed insulation to encase valve assembly in insulated piping.
   2. Valves up to 3" shall have lead-free brass body, full-port ball constructed of 304 stainless steel, and shall have calibrated nameplate with memory stop. Balancing valves shall be Bell and Gossett Circuit-Setter Plus or equal by Nexus, FlowDesign, or Watts. After the test and balance is complete, provide to the Owner a differential pressure gauge to match the balancing valves. Autoflow valves are acceptable as a substitution provided the flow cartridge is replaceable and the flowrate is clearly and permanently labeled.

I. Check valves:
   1. Valves in water systems shall be NSF/ANSI 61/372 certified and suitable for potable water applications. Valve shall be swing-type, bronze body, brass seat, Apollo Valves 161S-LF up to 200 psi CWP, or equal by Milwaukee UP968 or Hammond.
   2. All check valves on pump discharges shall be non-slam type.
   3. All check valves shall be installed in an orientation allowed by the manufacturer's recommendations.
   4. All check valves installed in insulated piping systems shall have the check valve location explicitly labeled on the outside of the insulation.

J. Backflow preventer at water service entrance shall be Watts Series LF009 or LF909 reduced pressure zone (RPZ) principle backflow preventer complete with strainer and shut-off valves. RPZ air gap drain shall be sized for the larger of the manufacturer's recommendation or the requirements of the AHJ and shall be piped outside of building to a concrete splashblock unless otherwise indicated.

K. Backflow preventers at carbonated beverage machines shall meet ASSE 1022 and all other appliances shall meet ASSE 1024. Backflow preventers shall be approved by the AHJ. ASSE 1022 ports shall be piped with copper tubing to an indirect drain location. Backflow preventers at dishwashers shall meet ASSE 1020 unless otherwise noted. Other equipment and appliances shall be protected from backflow as required by Code and/or manufacturer's requirements.

L. Water connections to appliances shall be made with flexible copper tubing or commercial grade double-reinforced stainless steel braided hose, no less than 3/8" in size, or the connections size of the appliance, whichever is greater.

M. Water pressure reducing valves (PRV) shall be the self-contained direct operating type with brass or iron body, stainless steel seat, stainless steel spring, and sealed spring cage. The strainer shall have bronze body with 20 mesh stainless steel screen. Strainer shall be attached with a bronze nipple. The unit shall be constructed in accordance with ASSE 1003 and shall bear the seal of approval. The capacities shall be based on maximum reduced pressure fall-off, as defined in ASSE 1003, of 10 psi. Pressure regulators shall be Watts Regulator LF223S or Watts Regulator LF115 (for setpoints indicated outside 25-75 psi), or approved equal. PRV shall be appropriate for the discharge pressure as noted on the plans. Confirm with product pressure ranges.

N. Point of use mixing valves shall be Leonard 170-LF or an approved equal with lead-free construction, vandal resistant adjustment cap, and integral inlet check valves. Mixing valve shall be ASSE 1070 rated. Mixing valve shall be sized by the Manufacturer for the fixture(s) served. Mixing valve shall have no more than 0.25 gpm minimum flowrate required.

O. All water hammer arresters (WHA) shall be size A, B, C, D, E or F, as required for the fixture units served; Josam, JR Smith, Watts, or Zurn. WHAs shall conform to ASSE 1010. WHAs in potable water applications shall be lead-free.

P. Soldered joints shall be made with tin-antimony/silver solder. Solder containing lead shall not be permitted.

Q. Saddle valves and "T" fittings that rely on puncturing the piping main are disallowed.

R. Thermometers and pressure gauges shall be products of Trerice, Weksler, or Weiss. Select all devices to operate within 20% of the midpoint of their scales under normal operating conditions. Gauges provided on pumps shall be compound type.

S. Pressure and temperature (P&T) test plugs shall be constructed of brass with two (2) self-closing Nordel cores and be complete with cap and gasket. Plugs shall be as manufactured by Peterson or Lancaster. Provide a complete test kit to the Owner at the time of final inspection. Test kit shall be complete with pressure gauge, thermometer, probes and carrying case.

3.0 EXECUTION

3.01 ARRANGEMENT

A. Follow the general piping layout, arrangement, schematics and details. Provide all offsets, vents, drains and connections necessary to accomplish the installation. Fabricate piping accurately to measurements established at the project site to avoid interference with ductwork, other piping, equipment, openings, electrical conduits and light fixtures. Make suitable provision for expansion and contraction with expansion loops and offsets.

B. Water hammer arresters shall be installed at the top of each riser and on each fixture branch in accordance with Plumbing and Drainage Institute Standard WH201. WHAs shall also be installed at all water service to appliances with quick-closing valves, such as clothes washers, kitchen warewashers, icemakers, water fountains with electronic valves, etc.

C. Fittings, unions, joints, couplings (including no-hub couplings), etc. shall not be within slabs.

D. All potable domestic water connections to equipment shall be provided with backflow prevention as required by the specification section and code.

E. Pressure gauges and thermometers called to be permanently installed shall be easily visible from a standing position on the ground.

3.02 UNDERGROUND WATER PIPING

A. All domestic water piping shall have a minimum cover of 3'-0", or below the frost line, whichever is deeper, except piping at least 20' from any exterior wall may be installed 3" or more below the bottom of the slab.

B. For water piping 2" and above, provide concrete thrust blocks at all changes of direction and secure all mechanical joints with restraining rods.

C. All copper water lines, or other material subject to corrosion, shall be protected from corrosion with a continuous plastic sheathing or coating and wrapping. This sheathing or coating and wrapping shall be extended 6" to 12" above finished floor. The protection shall be installed on the outside of any insulation required.

3.03 DISINFECTION

A. All domestic water piping installed under this Division shall be disinfected with chlorine before it is placed into operation. The chlorinating material shall be liquid chlorine conforming to Federal Specification BB-C-120 and shall be introduced to the system by experienced Operators only. The chlorine solution applied to the piping sections or system shall contain at least fifty (50) parts per million of available chlorine and shall remain in the sections or system for a period of not less than twenty-four (24) hours. Alternatively, the system may be disinfected with 200 parts per million of available chlorine and shall remain in the sections or system for a period of not less than three (3) hours. During the disinfection period, all valves shall be opened and closed at least four times. After the disinfection period, the chlorinated water shall be flushed from the system with clear water and the valves operated at least twice until the residual chlorine content is not greater than two-tenths parts per million (0.2 PPM). Submit certification to the Architect that the system was disinfected.

END OF SECTION

SECTION 22 30 00

PLUMBING EQUIPMENT

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for Plumbing Section 22 05 00.

B. This Section 22 30 00 and the accompanying drawings cover the provisions of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the water heating systems as specified herein and as shown. These systems include, but are not limited to, the following:
   1. Water Heaters
   2. Hot Water Circulator

1.02 GENERAL REQUIREMENTS

A. All plumbing equipment installed in locations with a water hardness of 25 grains per gallon or more, shall be resistant to corrosion. Where copper materials are in the water stream, it shall be Cupro-Nickel of not more than 90% copper.

B. All water heaters shall be NSF/ANSI 61 certified "lead free" for potable water service.

C. All water heaters shall have ASME rated temperature and pressure relief valve(s). Valve(s) shall be provided by the Manufacturer and sized for the discharge location noted in the plans.

D. All water heaters and tanks shall be glass-lined, 1600°F fired, with a working pressure of 150 psi, a test pressure of 300 psi, or the system pressure at the installation location, whichever is greater, and shall have magnesium anodes for electrolytic protection. Separate storage tanks may also be cement-lined. Tanks shall be ASTM stamped.

E. All water heaters shall meet or exceed the energy efficiency requirements of the latest version of ASHRAE 90.1.

F. All water heaters and pumps shall be UL approved and labeled, and be AGA certified where applicable.

G. All water heaters and pumps shall be NEMA rated appropriate for the installation location in which they are installed.

H. Water heater controls shall include an operating thermostat and manual reset high limit control for each heating element or burner. The safety high limit control shall prevent over heating in the event of a thermostat failure.

I. All controls shall be factory-wired and require no external power source.

J. Water heaters and tanks shall have drain with external access and hose end connection.

2.0 PRODUCTS

2.01 WATER HEATER

A. The water heater shall be as scheduled. Acceptable substitute Manufacturers are AO Smith, Lochinvar, State, Rheem, and Bradford White, subject to substitution requirements. Water heaters shall be commercial-grade.

B. The immersion heating elements shall be low watt density with a plated incoloy sheath material for long life. The heating elements shall mount in individual screw-in tank flanges.

C. All field electrical wiring connections to the water heater shall be made to a main terminal block. All internal wiring shall be made to solderless terminal lug wiring connections. Wiring to be color coded for ease of servicing. The water heater shall be factory assembled, wired and tested.

2.02 HOT WATER CIRCULATOR

A. Hot water circulator shall be as scheduled. Acceptable substitute Manufacturers are B&G, Goulds, and Grundfos, subject to substitution requirements.

B. Hot water circulators used in potable water system shall be lead-free.

3.0 EXECUTION

3.01 INSTALLATION

A. The water heaters and accessories shall be installed in strict accordance with the Manufacturer's recommendations and the Contract Documents.

B. All temperature and pressure relief valves shall be piped full size to an indirect waste such as the nearest floor drain, service sink, sink tailpiece, etc. Piping shall be in accordance with specification 22 10 00 for DWV services. Size shall be in accordance with Manufacturer's requirements.

C. All water heaters shall have internal heat traps or shall have heat traps installed in the cold water and hot water piping. Instantaneous water heaters shall be provided with heat traps unless Manufacturer documentation specifically allows exclusion.

D. Water heaters shall be completely encased in high density insulation of sufficient value to meet the energy efficiency standards of latest version of ASHRAE 90.1 or shall be factory insulated with non-CFC polyurethane closed-cell foam insulation. Provide removable insulation panels to maintain access to all required components.

E. All water heaters or boilers subject to condensing under normal steady-state operating conditions shall be provided and installed with accessory condensate neutralization kits.

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Dunn, NC 28334

SHEET NAME:
SPECIFICATIONS - PLUMBING

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
P0.5

3.02 WARRANTY

A. Provide 5-year limited warranty on all tanks, and 1-year limited warranty on parts unless otherwise noted.

END OF SECTION

SECTION 22 40 00

PLUMBING FIXTURES

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this section is governed by the Common Work Results for Plumbing Section 22 05 00.

B. This Section 22 40 00 and the accompanying drawings cover the provisions of all labor, fixtures, equipment, appliances and materials, and performing all operations in connection with the construction and installation of the plumbing fixtures and trim as specified herein and as shown.

C. All finishes shall be as selected by the Architect. Where the Architect does not have a preference, finishes shall be in accordance with this specification.

D. All exposed piping, valves, stops, P-traps, etc. shall be chrome-plated. Also, all exposed piping penetrations through walls, floors or ceilings shall be provided with chrome-plated cast brass escutcheons.

E. All P-traps shall be minimum 17-gauge brass.

F. All exposed P-traps subject to contact, such as those below wall-mounted or counter-mounted lavatories, shall be provided with insulated covers as required.

G. All exposed supply stops for hot water, such as those below wall-mounted or counter-mounted lavatories, shall be provided with insulated covers as required. Where there are hot and cold water supply stops together, cold water supply stops shall match insulated cover of hot water supply stop.

H. Provide all final connections to all equipment and fixtures furnished by Owner.

I. Unless otherwise specified in an individual fixture description, all enameled cast-iron and porcelain fixtures shall be white.

J. All lavatories and other hand-washing fixtures shall be provided and installed with ASSE 1070 point-of-use mixing valve on the hot water connection. Mixing valve shall be set to provide no more than 110°F hot water.

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, adjusted, clean plumbing fixtures as shown and specified, which are free of leaks, noise, air, vibration and waterflow fluctuations.

1.03 BASIS OF DESIGN

A. The basis of design is as outlined for each fixture in the 2.0 PRODUCTS subsection. Any proposed substitutions shall be proven equal in all respects to the equipment specified as the basis of design.

1.04 ACCEPTABLE MANUFACTURERS

A. Acceptable fixture manufacturers for each type of fixture is as follows:
   1. Water Closets – American Standard, Kohler, Sloan, TOTO, and Zurn
   2. Lavatories – American Standard, Bradley, Crane, Kohler, Sloan, TOTO, and Zurn.
   3. Lavatory Faucets – American Standard, Bradley, Chicago, Delany, Grohe, Kohler, Sloan, TOTO, and Zurn
   4. Breakroom/Kitchen/Pantry/Etc. Sinks – American Standard, Elkay, Grohe, Just, and Kohler
   5. Breakroom/Kitchen/Pantry/Etc. Faucets – American Standard, Chicago, Delta, Elkay, Just, Kohler, and Zurn
   6. Service and Laundry Sinks – Fiat, Kohler, Mustee, ProFlo, and Stern-Williams
   7. Service and Laundry Faucets – American Standard, Delta, Elkay, Fiat, Kohler, T&S Brass, Speakman, and Stern-Williams

2.0 PRODUCTS

2.01 Plumbing fixtures shall be as scheduled or approved equal.

3.0 EXECUTION

3.01 INSTALLATION

A. Units shall be installed as indicated and in conformance with the manufacturer's recommendations. Coordinate the actual units to be provided with all trades.

B. All plumbing fixtures shall be free of leaks, provided completely finished, trimmed, adjusted, cleaned and ready for use. They shall be properly secured to the structure by the use of thru-bolting, backplates, carriers, expansion shields (for floor mounting only) or toggle bolts.

C. Wall hung fixtures supported on chair carriers shall be bolted to the floor slab. Carefully coordinate space requirements and fixture mounting height requirements with supports being furnished.

D. Fixtures supported with wall hangers on masonry chase walls shall be fastened to the wall with not less than 3/8" bolts which shall pass through the wall and through a 1/4" x 4" wide steel backplate on the unfinished chase wall side.

E. Where fixtures are hung on single masonry walls without a pipe chase behind, they shall be mounted with 3/8" toggle bolts.

F. Fixtures on steel stud walls shall have a 1/4" x 4" wide steel backplate wired with 1/16" steel wire to the studs. Bolts not less than 3/8" shall secure the fixtures through the fixture hanger and the backplate.

G. All mounting holes provided in fixtures shall be used for support. In addition to the main hangers, 1/4" toggle bolts shall secure the bottom of all wall hung fixtures at each drilling provided for this purpose.

H. Mount wall-hung fixtures at the heights indicated on the Architectural Drawings or as prescribed by local code. Special attention is called to the installation requirements of the ANSI Handicap Code.

3.02 CLEANING AND ADJUSTMENT

A. The units shall be cleaned, tested and field-adjusted to provide optimum flow and drainage. Specific attention is called to adjustment of automatic flush valves and faucets for empirical conditions.

B. All strainers, aerators, etc. shall be fully cleaned after all piping and fixture flushing.

END OF SECTION

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NEW INTERIOR ALTERATIONS FOR:
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Dunn, NC 28334

SHEET NAME:
SPECIFICATIONS - PLUMBING

REVISIONS:

DATE: 07.25.25

PROJECT NO.: 25-023

DRAWN BY: RK

PERMIT SET

SHEET NO.:
P0.6

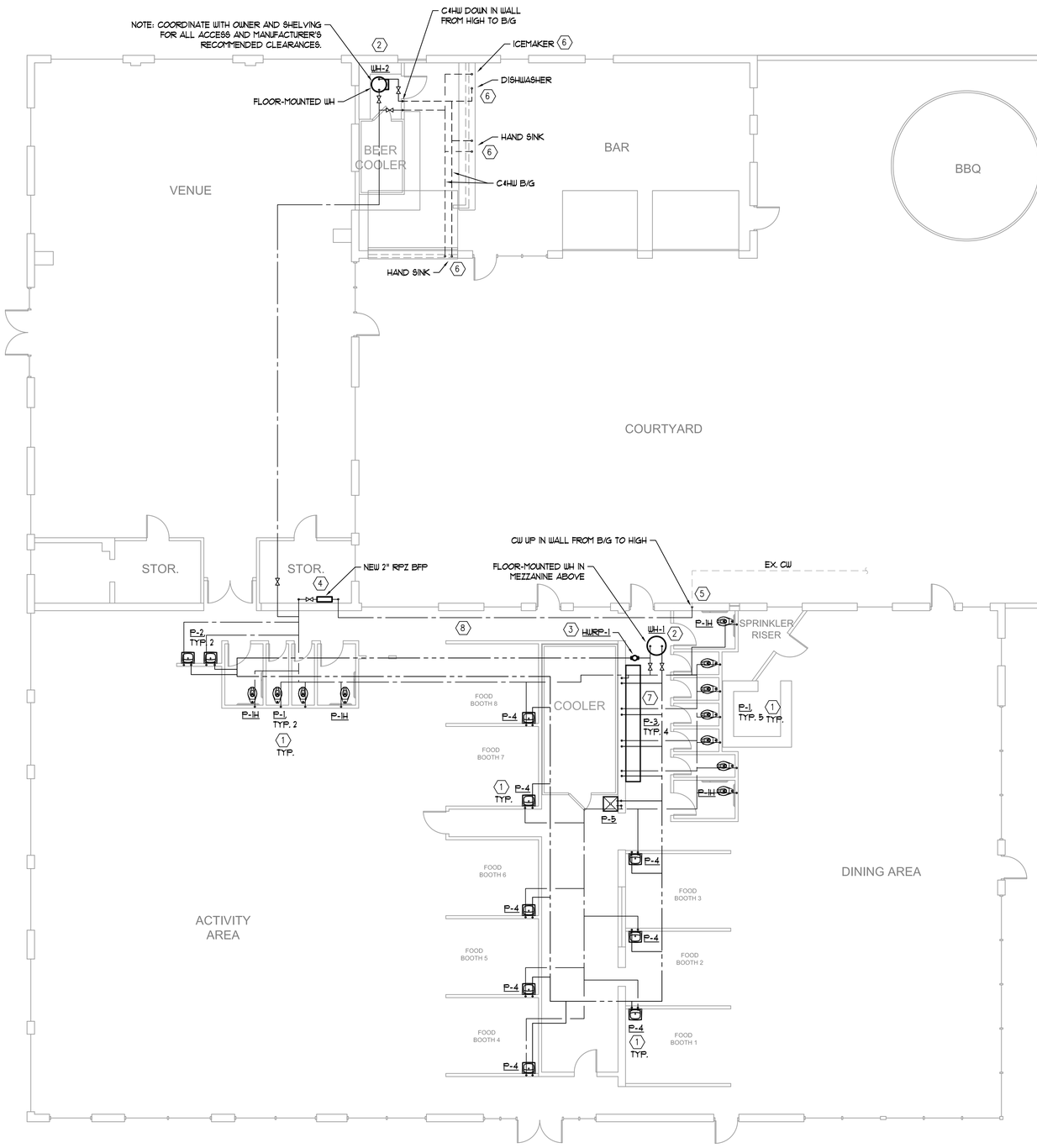
GENERAL NOTES
(APPLIES TO ALL SHEETS)

1. ALL PLUMBING SHUTOFF VALVES SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT AND SHALL BE EASILY ACCESSED FOR FUTURE OPERATION.
2. ALL HORIZONTAL SANITARY AND WASTE PIPING SHALL BE SLOPED AT 1/8" PER FOOT, UNLESS OTHERWISE NOTED, IN DIRECTION OF FLOW.
3. REFER TO SHEET P0.3 FOR FIRESTOPPING DETAILS AND 1/P0.2 FOR TRAP PRIMERS.
4. ALL PIPING SHOWN IN SCHEMATIC IN NATURE AND DOES NOT REFLECT ALL OFFSETS, CHANGES IN ELEVATION, ETC. COORDINATION BETWEEN TRADES IS NECESSARY. OFFSET AS NEEDED.
5. FIELD COORDINATE INSTALLATION OF PIPING, FIXTURES, EQUIPMENT, ETC. WITH ALL OTHER TRADES.
6. EXISTING WORK SHOWN HERE IS BASED ON SITE VISIT AND/OR PROVIDED INFORMATION. THESE DRAWINGS ARE NOT NECESSARILY ACCURATE FOR EXISTING MATERIALS AND SHOULD NOT BE INTERPRETED TO BE A STRICT REPRESENTATION OF AS-BUILT CONDITIONS.
7. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND ASCERTAIN ALL EXISTING CONDITIONS. NO ALLOWANCES WILL BE PROVIDED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS. CONTRACTOR SHALL DEMO ALL NON-ESSENTIAL DUCTWORK AND PIPING WHICH IS NOT REQUIRED FOR THIS INSTALLATION. COORDINATE ALL DEMO WITH BUILDING REP BEFORE DEMO WORK COMMENCES.
8. EXPOSED DUCTWORK, PIPING, CONDUIT, ETC. IN OPEN CEILING AREAS SHALL BE PAINTED. COORDINATE COLOR WITH ARCHITECT. DO NOT PAINT NAMEPLATES, LABELS, OR EQUIPMENT INFORMATION.
9. GC SHALL COORDINATE EXACT FLOOR DRAIN LOCATIONS WITH KITCHEN CONSULTANT AND CONCRETE SUBCONTRACTORS. LIGHTLY SLOPE KITCHEN AND BAR SLABS TOWARDS FDs.

KEY NOTES
(APPLY THIS SHEET ONLY)

1. PROVIDE AND INSTALL NEW PLUMBING FIXTURE AS SCHEDULED ON P0.2.
2. PROVIDE AND INSTALL NEW WATER HEATER AS SCHEDULED ON P0.2. SEE DETAIL 1/P0.1.
3. PROVIDE AND INSTALL NEW HOT WATER RECIRCULATION PUMP AS SCHEDULED ON P0.2. SEE DETAIL 1/P0.1.
4. PROVIDE AND INSTALL NEW 2" RPZ BACKLOW PREVENTER IN LOCATION SHOWN, WATTS LF009 OR APPROVED EQUAL. SEE DETAIL 2/P0.2.
5. CONNECT NEW 2" CW PIPING TO SITE AS SHOWN. COORDINATE EXACT LOCATION AND INVERT WITH CIVIL ENGINEER.
6. COORDINATE BAR EQUIPMENT CONNECTIONS WITH OWNER.
7. COORDINATE TROUGH SINK WATER CONNECTIONS WITH OWNER.
8. NEW CW PIPING UPSTREAM OF BACKFLOW PREVENTER SHALL BE LABELED 'DO NOT TAP'.

NOTE: SEE ISOMETRICS ON SHEET P5.1 FOR PIPE SIZING.



1 / P1.1 First Floor Plan – Plumbing – Domestic
1/8" = 1'-0"

PROJECT NORTH
TRUE NORTH

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NEW INTERIOR ALTERATIONS FOR:
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Dunn, NC 28334

SHEET NAME:
FIRST FLOOR PLAN - PLUMBING - DOMESTIC

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

SHEET NO.:
P1.1

PERMIT SET

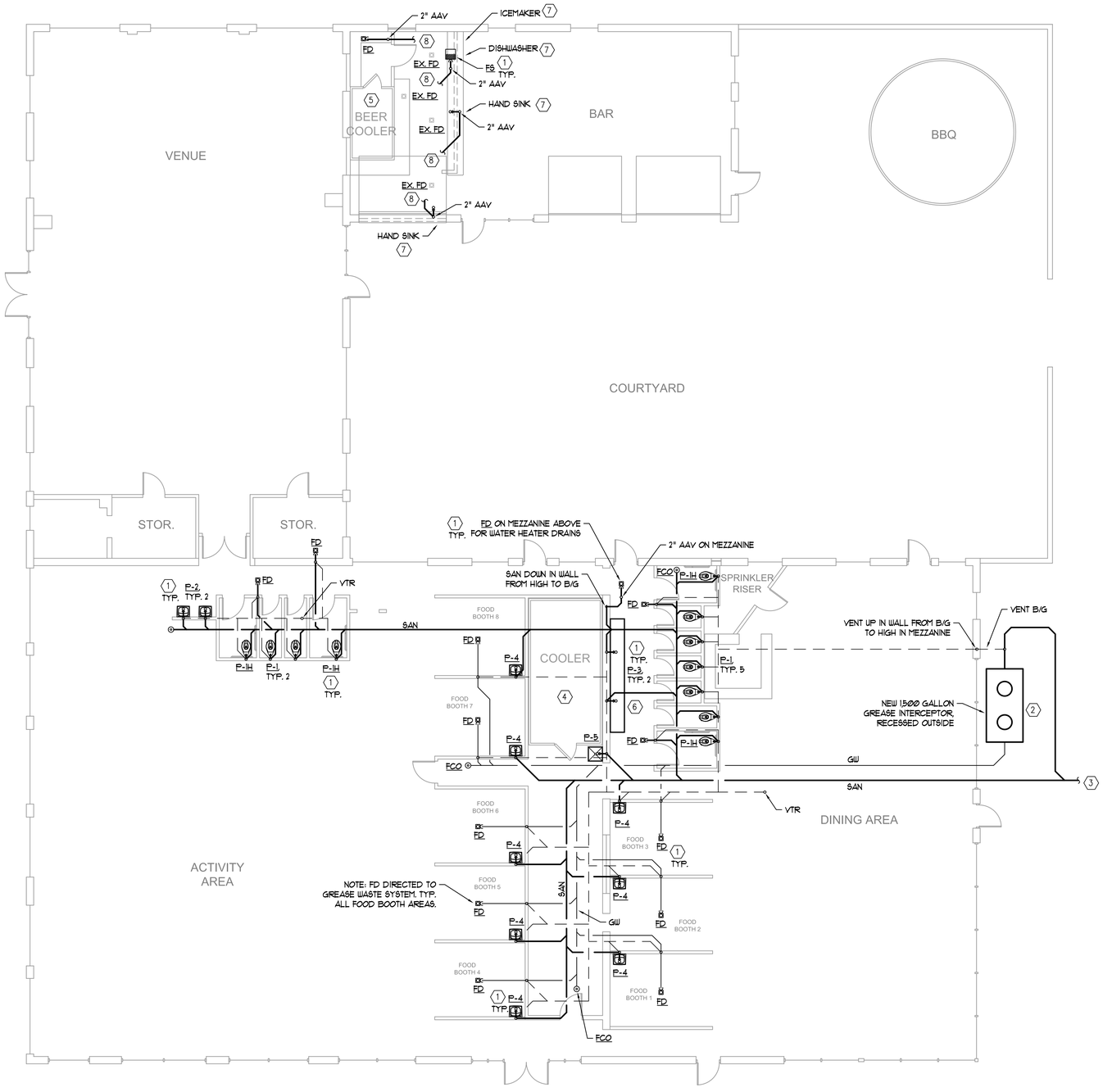
GENERAL NOTES
(APPLIES TO ALL SHEETS)

1. ALL PLUMBING SHUTOFF VALVES SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT AND SHALL BE EASILY ACCESSED FOR FUTURE OPERATION.
2. ALL HORIZONTAL SANITARY AND WASTE PIPING SHALL BE SLOPED AT 1/8" PER FOOT, UNLESS OTHERWISE NOTED, IN DIRECTION OF FLOW.
3. REFER TO SHEET P0.3 FOR FIRESTOPPING DETAILS AND 1/P0.2 FOR TRAP PRIMERS.
4. ALL PIPING SHOWN IN SCHEMATIC IN NATURE AND DOES NOT REFLECT ALL OFFSETS, CHANGES IN ELEVATION, ETC. COORDINATION BETWEEN TRADES IS NECESSARY. OFFSET AS NEEDED.
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8. EXPOSED DUCTWORK, PIPING, CONDUIT, ETC. IN OPEN CEILING AREAS SHALL BE PAINTED. COORDINATE COLOR WITH ARCHITECT. DO NOT PAINT NAMEPLATES, LABELS, OR EQUIPMENT INFORMATION.
9. GC SHALL COORDINATE EXACT FLOOR DRAIN LOCATIONS WITH KITCHEN CONSULTANT AND CONCRETE SUBCONTRACTORS. LIGHTLY SLOPE KITCHEN AND BAR SLABS TOWARDS FDs.

KEY NOTES
(APPLY THIS SHEET ONLY)

1. PROVIDE AND INSTALL NEW PLUMBING FIXTURE AS SCHEDULED ON P0.2.
2. PROVIDE AND INSTALL NEW 1,500 GALLON GREASE INTERCEPTOR BELOW GRADE AS SHOWN. SEE DETAIL 1/P0.2. COORDINATE EXACT LOCATION WITH OWNER AND CIVIL ENGINEER.
3. CONNECT 4" SANITARY PIPING TO SITE AS SHOWN. COORDINATE EXACT LOCATION AND INVERT WITH CIVIL ENGINEER.
4. ROUTE WALK-IN COOLER EVAPORATOR CONDENSATE DRAIN TO MOP SINK NEARBY.
5. ROUTE WALK-IN BEER COOLER EVAPORATOR DRAIN TO FLOOR DRAIN SERVING WATER HEATER NEARBY.
6. COORDINATE TROUGH SINK DRAINS WITH OWNER.
7. COORDINATE BAR EQUIPMENT CONNECTIONS WITH OWNER.
8. CONNECT NEW SANITARY PIPING TO NEAREST EXISTING SANITARY PIPING OF EQUAL OR GREATER SIZE.

NOTE: SEE ISOMETRICS ON SHEET P5.2 FOR PIPE SIZING.



1 / P1.2 First Floor Plan – Plumbing – San/Vent
1/8" = 1'-0"

PROJECT NORTH TRUE NORTH

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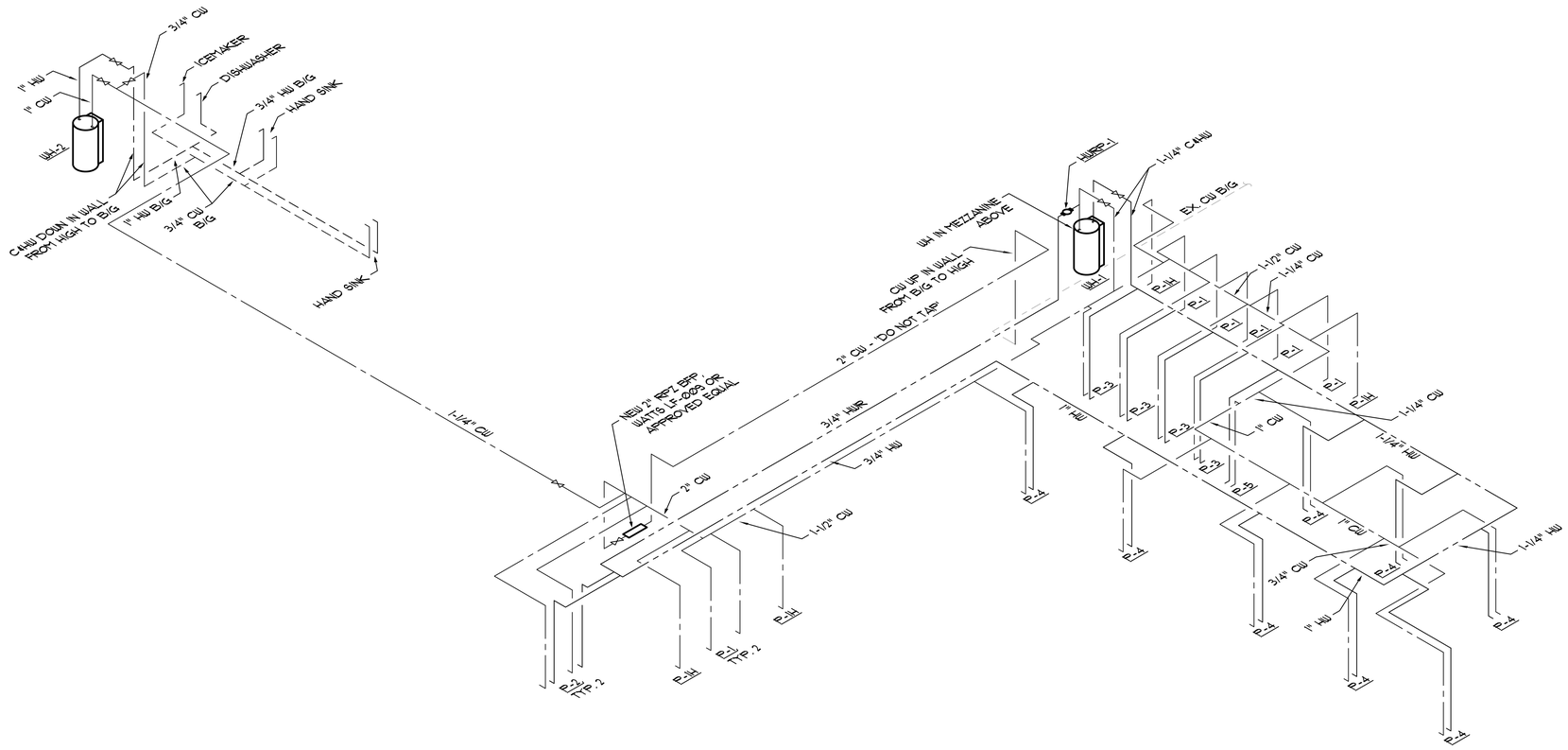
SHEET NAME:
FIRST FLOOR PLAN - PLUMBING - SAN/VENT

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

SHEET NO.:
P1.2

PERMIT SET



1 P5.1 Overall Isometrics – Plumbing – Domestic
NOT TO SCALE

DATE SIGNED: 07/25/25

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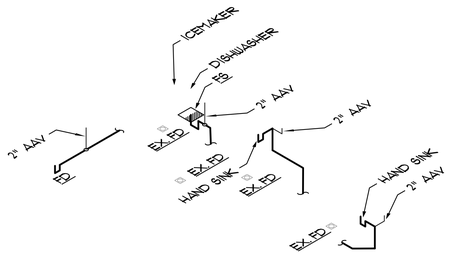
SHEET NAME:
ISOMETRICS - PLUMBING - DOMESTIC

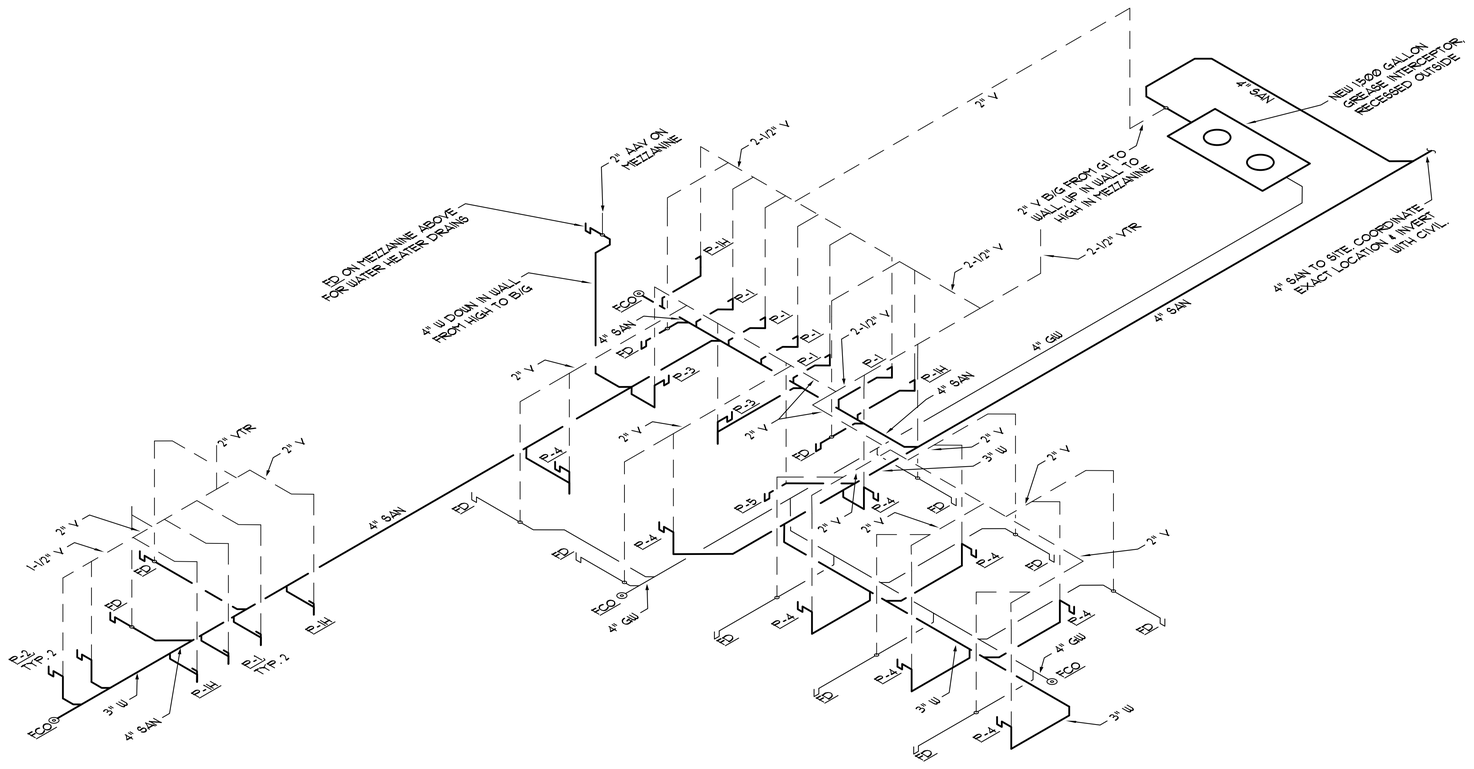
REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
P5.1





1 / P5.2 Overall Isometrics – Plumbing – San/Vent
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CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. WOODYARD
DATE SIGNED: 07/25/25
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

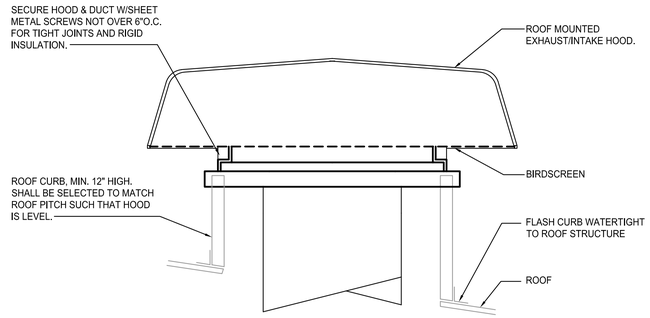
SHEET NAME:
ISOMETRICS - PLUMBING - SAN/VENT

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
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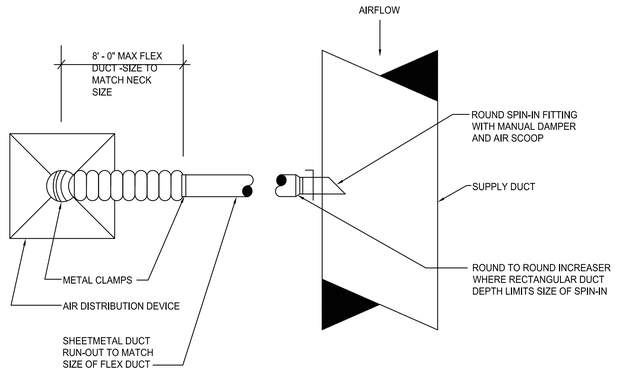
SHEET NO.:
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2 M0.1 ROOF MOUNTED EXHAUST/INTAKE HOOD

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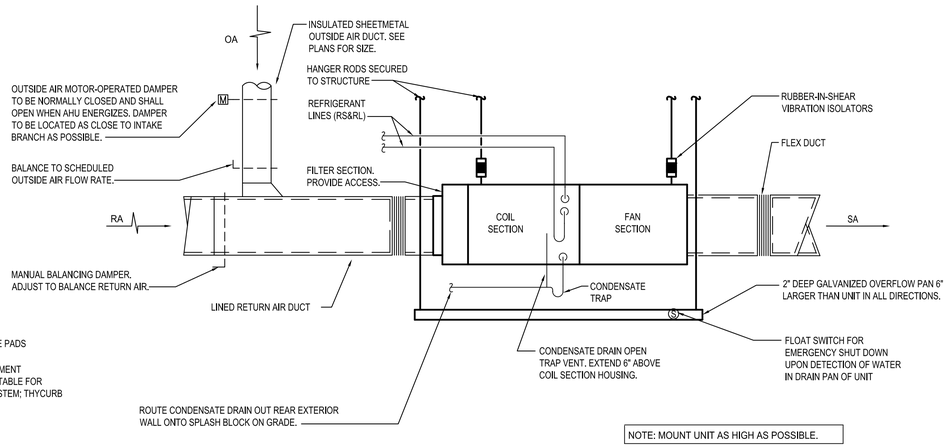
1 M0.1 DIFFUSER CONNECTION DETAIL

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ABBREVIATIONS

A/C	ABOVE CEILING
AC	AIR CONDITIONING
AD	ACCESS DOOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AUTO	AUTOMATIC
B/F	BELOW FLOOR
B/G	BELOW GRADE
BAL	BALANCING
BDD	BACKDRAFT DAMPER
BFLY	BUTTERFLY
BHP	BRAKE HORSEPOWER
BOD	BASIS OF DESIGN/BOTTOM OF DUCT
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CO	CLEANOUT
COND	CONDENSATE
CSR	CURVED SUPPLY REGISTER
CU	CONDENSING UNIT
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
dB	DECIBELS
DB	DRY BULB
DO	DITTO
DN	DOWN
DWG	DRAWING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
ECC	ECCENTRIC
EF	EXHAUST FAN
EFF	EFFICIENCY
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
EXH	EXHAUST
F	FAHRENHEIT
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FSD	FIRE/SMOKE DAMPER
FT	FEET
GA	GAUGE
GPM	GALLONS PER MINUTE
HD	HUB DRAIN
HP	HORSEPOWER
HTG	HEATING
HHWR	HEATING HOT WATER RETURN
HWRR	HOT WATER REVERSE RETURN
HHWS	HEATING HOT WATER SUPPLY
HZ	HERTZ
ID	INSIDE DIMENSION
IN	INCHES
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS
LG	LINEAR GRILLE
LRG	LINEAR RETURN GRILLE
LWR	LOOP WATER RETURN
LWS	LOOP WATER SUPPLY
MAX	MAXIMUM
MD	MANUAL DAMPER
MIN	MINIMUM
MOD	MOTOR OPERATED DAMPER
MFR	MANUFACTURER
NC	NORMALLY CLOSED
NG	NATURAL GAS
NO	NORMALLY OPEN
NOM	NOMINAL
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIMENSION
PIU	POWERED INDUCTION UNIT
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RAD	RADIUS
RAG	RETURN AIR GRILLE
RAR	RETURN AIR REGISTER
RED	REDUCER
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SAN	SANITARY
SD	SMOKE DAMPER
SEN	SENSIBLE
SP	STATIC PRESSURE
SPS	STATIC PRESSURE SENSOR
SQ	SQUARE
SR	SUPPLY REGISTER
SS	SPLIT SYSTEM
ST	STORM
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VENT
VA	VALVE
VAV	VARIABLE AIR VOLUME
VTR	VENT THRU ROOF
WB	WET BULB
WC	WATER COLUMN
WT	WEIGHT

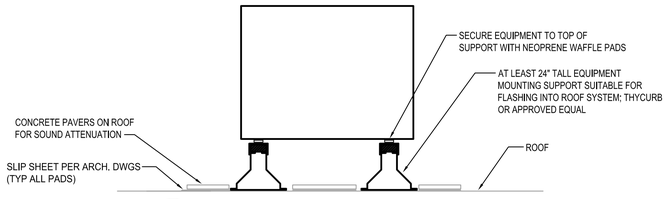


NOTE: MOUNT UNIT AS HIGH AS POSSIBLE.

3 M0.1 INDOOR UNIT DETAIL

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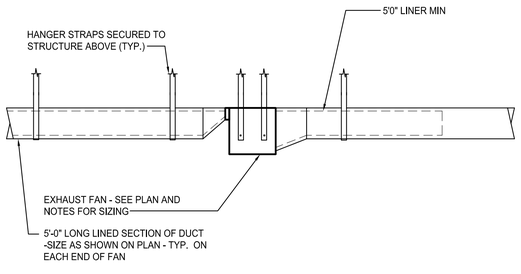
4 M0.1 CONDENSING UNIT DETAIL

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MECHANICAL LEGEND

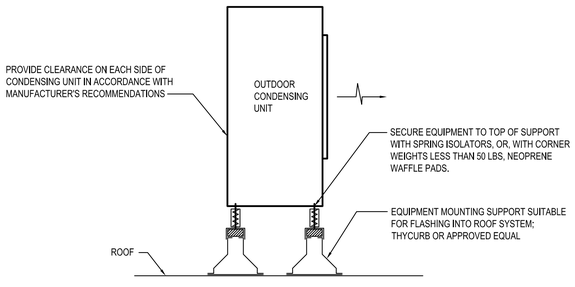
	CEILING DIFFUSER
	CEILING RETURN AIR GRILLE
	CEILING EXHAUST GRILLE
	SUPPLY REGISTER
	SLOT DIFFUSER UON
	FIRE DAMPER UON
	MANUAL VOLUME DAMPER UON
M	MOTOR OPERATED DAMPER
T	THERMOSTAT
H	HUMIDISTAT
CO2	CARBON DIOXIDE SENSOR
SD	SMOKE DETECTOR
	CONNECT TO EXISTING
	EXISTING WORK
	NEW WORK
	WORK TO BE REMOVED
R	GAS PRESSURE REGULATOR



7 M0.1 INLINE FAN DETAIL

NOT TO SCALE

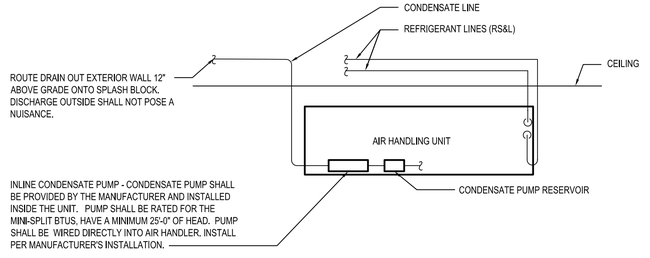
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6 M0.1 CONDENSING UNIT DETAIL

NO SCALE

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5 M0.1 WALL MOUNTED DUCTLESS MINI-SPLIT AIR HANDLER UNIT DETAIL

NO SCALE

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NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT CHRISTOPHER A. KUCHAR
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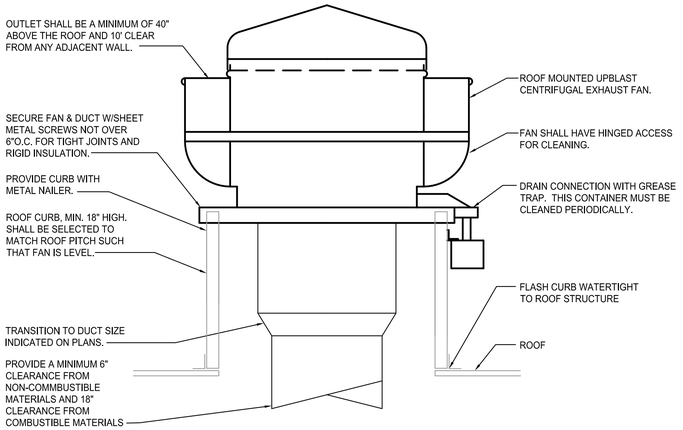
SHEET NAME:
ABBREVIATIONS, LEGEND, & DETAILS - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

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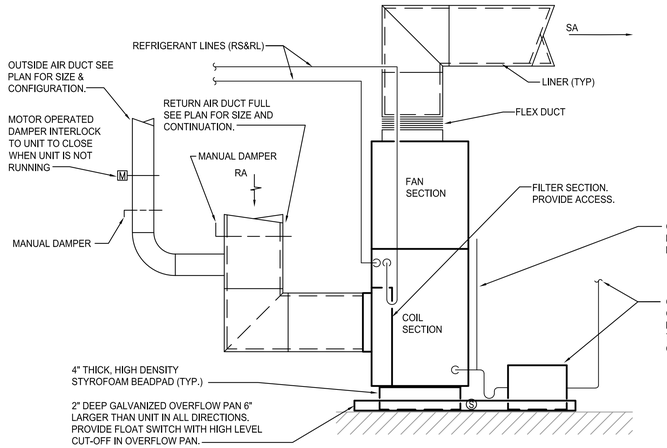
SHEET NO.:
M0.1



3 M0.2 GREASE EXHAUST UPBLAST EXHAUST FAN DETAIL

NOT TO SCALE

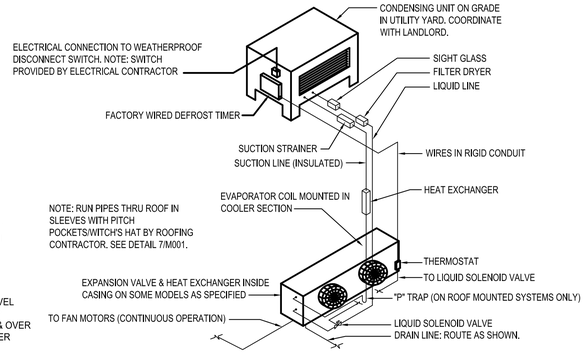
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2 M0.2 INDOOR UNIT DETAIL

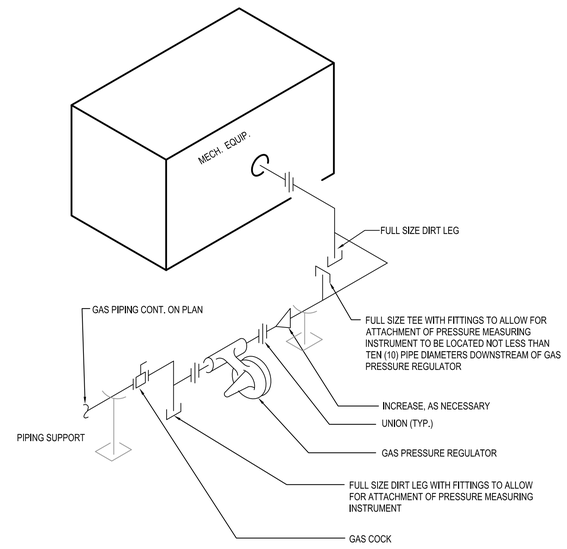
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1 M0.2 WALK-IN COOLER/FREEZER DETAIL

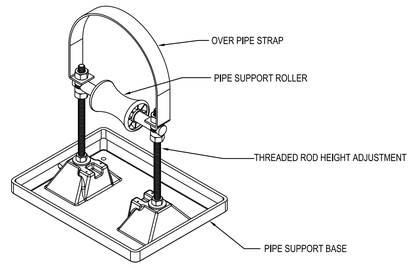
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6 M0.2 GAS CONNECTION DETAIL

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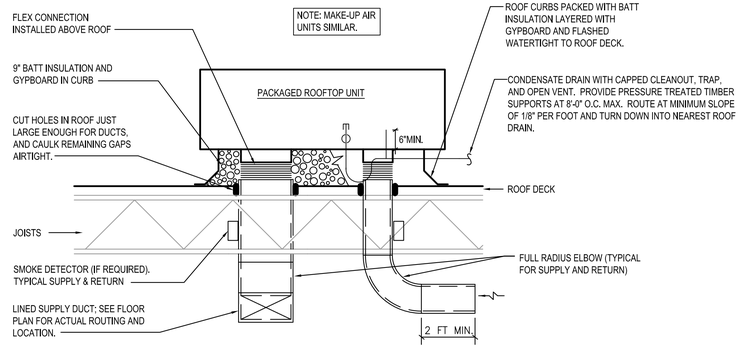
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5 M0.2 ROOFTOP PIPE SUPPORT DETAIL

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4 M0.2 ROOFTOP UNIT DETAIL

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FAN SCHEDULE

I.D. TAG	CAPACITY (CFM)	SP (IN. WC)	MOTOR HP	DRIVE	MAX. FAN RPM	MAX NOISE	VOLTS/ PHASE	TYPE OF FAN	WEIGHT (LBS)	BASIS OF DESIGN	REMARKS
EF-1	350	0.25	1/25	D	1,239	48 dBA	120/1	INLINE	50	GREENHECK SQ-90	1, 2, 3
EF-2	200	0.25	1/15	D	1,592	49 dBA	120/1	INLINE	40	GREENHECK SQ-70-VG	1, 2, 3
KEF-1	3,000	1.3	2	D	1,211	17.4 SONES	208/3	UPBLAST	220	CAPTIVEAIRE DU180HFA	4, 5
KEF-2	3,000	1.3	2	D	1,211	17.4 SONES	208/3	UPBLAST	220	CAPTIVEAIRE DU180HFA	4, 5
KEF-3	3,000	1.3	2	D	1,211	17.4 SONES	208/3	UPBLAST	220	CAPTIVEAIRE DU180HFA	4, 5
KEF-4	3,000	1.3	2	D	1,211	17.4 SONES	208/3	UPBLAST	220	CAPTIVEAIRE DU180HFA	4, 5

(1) PROVIDE FAN WITH BIRD SCREEN, PREMIUM EFFICIENCY MOTOR, VIB. ISO. MOUNTS, GRAVITY BACKDRAFT DAMPER, AND SPEED CONTROLLER FOR BALANCING.
(2) FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED HOURS. INTERLOCK TO TIMER.
(3) FAN SHALL BE HUNG FROM STRUCTURE ABOVE.
(4) INSTALL PER MANUFACTURER RECOMMENDATIONS.
(5) PROVIDE AND INSTALL WITH ROOF CURB IN COORDINATION WITH STRUCTURAL ENGINEER AND MANUFACTURER.

SPLIT SYSTEM SCHEDULE

			FAN COIL UNIT DATA									CONDENSING UNIT DATA						
I.D. TAG	BOD TOTAL CAPACITY (MBH)	BOD SENSIBLE CAPACITY (MBH)	AIRFLOW (CFM)	EXT. SP (IN. WC) (1)	OUTSIDE AIR (CFM)	MAX HP	COIL EAT °F db	COIL EAT °F wb	VOLTS/ PHASE	HEATING SECTION TYPE	HEATING SECTION CAPACITY (3)	WEIGHT (LBS)	AMBIENT TEMP. (°F)	VOLTS/ PHASE	STAGES	MIN. SEER	MIN. HSPF	WEIGHT (LBS)	BASIS OF DESIGN	REMARKS
AHU/CU-1	57.5	43.6	1,975	0.3	395	3/4	80.0	67.0	208/1	HP/ELEC	34.8 / 7.2 kW	200	95.0	208/3	1	14.3	8.0	250	TRANE 5TEM6D06 / 5TWA4060	4, 5, 6, 7, 9
AHU/CU-2	57.5	43.6	1,975	0.3	395	3/4	80.0	67.0	208/1	HP/ELEC	34.8 / 7.2 kW	200	95.0	208/3	1	14.3	8.0	250	TRANE 5TEM6D06 / 5TWA4060	4, 5, 6, 7, 9
AHU/CU-3	57.5	43.6	1,975	0.3	395	3/4	80.0	67.0	208/1	HP/ELEC	34.8 / 7.2 kW	200	95.0	208/3	1	14.3	8.0	250	TRANE 5TEM6D06 / 5TWA4060	4, 5, 6, 7, 9
AHU/CU-4	57.5	43.6	1,975	0.3	395	3/4	80.0	67.0	208/1	HP/ELEC	34.8 / 7.2 kW	200	95.0	208/3	1	14.3	8.0	250	TRANE 5TEM6D06 / 5TWA4060	4, 5, 6, 7, 9
AHU/CU-5	57.5	43.6	1,975	0.3	395	3/4	80.0	67.0	208/1	HP/ELEC	34.8 / 7.2 kW	200	95.0	208/3	1	14.3	8.0	250	TRANE 5TEM6D06 / 5TWA4060	4, 5, 6, 7, 9
AHU/CU-6	57.5	43.6	1,975	0.3	395	3/4	80.0	67.0	208/1	HP/ELEC	34.8 / 7.2 kW	200	95.0	208/3	1	14.3	8.0	250	TRANE 5TEM6D06 / 5TWA4060	4, 5, 6, 7, 9
AHU/CU-7	57.5	43.6	1,975	0.3	395	3/4	80.0	67.0	208/1	HP/ELEC	34.8 / 7.2 kW	200	95.0	208/3	1	14.3	8.0	250	TRANE 5TEM6D06 / 5TWA4060	4, 5, 6, 7, 9
AHU/CU-8	30.0	23.1	775	--	--	F	80.0	67.0	208/1	HP	21.0	60	95.0	208/1	1	19.8	9.9	200	MITSUBISHI PKA-A30 / PUZ-A30	6, 7, 8
AHU/CU-9	30.0	23.1	775	--	--	F	80.0	67.0	208/1	HP	21.0	60	95.0	208/1	1	19.8	9.9	200	MITSUBISHI PKA-A30 / PUZ-A30	6, 7, 8
AHU/CU-10	30.0	23.1	775	--	--	F	80.0	67.0	208/1	HP	21.0	60	95.0	208/1	1	19.8	9.9	200	MITSUBISHI PKA-A30 / PUZ-A30	6, 7, 8

(1) THIS IS THE S.P. EXTERNAL TO THE ENTIRE FAN COIL UNIT ASSEMBLY (WET COIL, CASING, CLEAN FILTERS, AND FURNACE LOSSES ARE NOT INCLUDED IN THIS EXT. SP).
(2) B = BELT DRIVE, D = DIRECT DRIVE.
(3) THIS IS THE MINIMUM OUTPUT CAPACITY (KW FOR ELEC, MBH FOR GAS OR HEAT PUMP). HP RATING AT 17°F UON.
(4) PROVIDE THE FOLLOWING ACCESSORIES FOR THE FAN COIL UNIT: VIBRATION ISOLATORS, CONDENSATE PUMP (LITTLE GIANT MODEL VCMA-15ULT OR APPROVED EQUAL), AND PROGRAMMABLE ELECTRONIC THERMOSTAT.
(5) PROVIDE THE CONDENSING UNIT WITH LOW AMBIENT COOLING ACCESSORIES/CONTROLS.
(6) PROVIDE INDOOR UNIT WITH SINGLE POINT OF ELECTRICAL CONNECTION.
(7) PROVIDE A2L SPLIT SYSTEM WITH CODE REQUIRED REFRIGERANT MONITOR.
(8) PROVIDE THE FOLLOWING ACCESSORIES FOR THE FAN COIL UNIT: INTERNAL CONDENSATE PUMP AND 7-DAY PROGRAMMABLE THERMOSTAT.
(9) PROVIDE SMOKE DETECTORS IN SUPPLY DUCTWORK FOR AUTOMATIC SHUTDOWN IN COMPLIANCE WITH NFPA 72. DETECTORS SHALL BE SUPPLIED BY DIV. 26 AND INSTALLED BY DIV. 23.

GENERAL SPLIT SYSTEM NOTES:
1. CONTRACTOR SHALL COORDINATE THE REQUIRED SIZING OF ALL REFRIGERANT LINE SETS WITH THE HVAC UNIT MFR. PROVIDE WITH ALL ACCESSORIES, FITTINGS, ETC., AS NEEDED FOR A FULL AND COMPLETE SYSTEM BASED ON THE SPECIFIC INSTALLATION AND LINE LENGTHS.

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. KOLB
DATE SIGNED: 07/25/25
BW&A Barrett, Woodyard & Associates, Inc.
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Cary, NC 27518
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
DETAILS & SCHEDULES - MECHANICAL

REVISIONS:

DATE: 07.25.25

PROJECT NO.: 25-023

DRAWN BY: RK

SHEET NO.:
M0.2

PERMIT SET

AIR BALANCE - WORST CASE

EQUIPMENT	EXHAUST (CFM)	OUTSIDE AIR (CFM)	MAKE-UP AIR (CFM)
KEF-1	3000		
KEF-2	3000		
KEF-3	3000		
KEF-4	3000		
MUA-1			2400
MUA-2			3000
MUA-3			2400
MUA-4			2400
EF-1	350		
EF-2	200		
AHU-1		395	
AHU-2		395	
AHU-3		395	
AHU-4		395	
AHU-5		395	
AHU-6		395	
AHU-7		395	
TOTAL	-12550	2765	10200
NET PRESSURE = (+) 415 CFM			

AIR BALANCE - TYPICAL

EQUIPMENT	EXHAUST (CFM)	OUTSIDE AIR (CFM)	MAKE-UP AIR (CFM)
KEF-1	0		
KEF-2	0		
KEF-3	3000		
KEF-4	3000		
MUA-1			0
MUA-2			0
MUA-3			2400
MUA-4			2400
EF-1	350		
EF-2	200		
AHU-1		395	
AHU-2		395	
AHU-3		395	
AHU-4		0	
AHU-5		395	
AHU-6		395	
AHU-7		395	
TOTAL	-6550	2370	4800
NET PRESSURE = (+) 620 CFM			

AIR BALANCE - MIMINUM

EQUIPMENT	EXHAUST (CFM)	OUTSIDE AIR (CFM)	MAKE-UP AIR (CFM)
KEF-1	0		
KEF-2	0		
KEF-3	0		
KEF-4	0		
MUA-1			0
MUA-2			0
MUA-3			0
MUA-4			0
EF-1	350		
EF-2	200		
AHU-1		0	
AHU-2		0	
AHU-3		395	
AHU-4		0	
AHU-5		395	
AHU-6		395	
AHU-7		0	
TOTAL	-550	1185	0
NET PRESSURE = (+) 635 CFM			

MAKE-UP AIR UNIT SCHEDULE

I.D. TAG	OA AIRFLOW	SUPPLY FAN SECTION: EXT. SP (IN. WC)	SUPPLY FAN SECTION: DESIGN HP	COOLING SECTION: TYPE	COOLING SECTION: BOD TOTAL CAP. (MBH)	COOLING SECTION: BOD SENS. CAP. (MBH)	HEATING SECTION: TYPE	HEATING SECTION: CAPACITY (MBH) (6)	WINTER CONDITIONS: EAT °F db	EAT °F wb	Unit LAT °F db	Unit LAT °F wb	WEIGHT (LBS)	VOLTS/ PHASE	BASIS OF DESIGN	REMARKS
MUA-1	2,400	0.5	1	--	--	--	GAS	145.3 / 133.7	27.0	-	80.0	--	800	208/3	CAPTIVEAIRE A2-D.250-20D	2, 3, 4, 5, 7, 8
MUA-2	3,000	0.5	1.5	--	--	--	GAS	181.6 / 167.1	27.0	-	80.0	--	800	208/3	CAPTIVEAIRE A2-D.250-20D	2, 3, 4, 5, 7, 8
MUA-3	2,400	0.5	1	--	--	--	GAS	145.3 / 133.7	27.0	-	80.0	--	800	208/3	CAPTIVEAIRE A2-D.250-20D	2, 3, 4, 5, 7, 8
MUA-4	2,400	0.5	1	--	--	--	GAS	145.3 / 133.7	27.0	-	80.0	--	800	208/3	CAPTIVEAIRE A2-D.250-20D	2, 3, 4, 5, 7, 8

(1) THIS IS THE SP EXTERNAL TO THE ENTIRE FAN COIL UNIT ASSEMBLY (WET COIL, CASING, CLEAN FILTERS, AND FURNACE LOSSES ARE NOT INCLUDED IN THIS EXT. SP)
(2) PROVIDE WITH INTAKE WEATHERHOOD, MOTORIZED LOW-LEAKAGE OA DAMPERS, HAIL GUARD, DIRTY FILTER SENSOR, 2" 30 % FILTERS, AND HINGED DOORS.
(3) UNIT SHALL BE INTERLOCKED TO ASSOCIATED KITCHEN EXHAUST FAN CONTROL PANEL AND ENERGIZE UPON FAN'S ACTIVATION. DISCHARGE TEMP. SHALL BE CONTROLLED BETWEEN 62-82°F AS MEASURED BY DUCT-MOUNTED TEMP. SENSOR. PROVIDE WITH USER-ACCESSIBLE CONTROL PANEL FOR SETPOINT ADJUSTMENT.
(4) PROVIDE UNIT WITH POWERED GFI SERVICE RECEPTACLE, SINGLE-POINT ELECTRICAL CONNECTION, AND DISCONNECT. COORDINATE WITH DIVISION 26.
(5) UNIT SHALL BE BOTTOM DISCHARGE.
(6) INPUT/OUTPUT CAPACITY.
(7) PROVIDE WITH 24" HIGH FULL PERIMETER INSULATED ROOF CURB, RAIN HOOD WITH BIRD SCREEN, LOW LEAKAGE MOTORIZED BACKDRAFT DAMPER, MIXED FLOW DIRECT DRIVE FAN WITH DOWN DISCHARGE CONNECTION AND NEOPRENE VIBRATION ISOLATORS, STRUCTURALLY REINFORCED, UNITIZED HOUSING AND BASE OF G90 GALVANIZED STEEL, GRAY POLYESTER FINISH, AND HINGED ACCESS DOORS AND FULL PERIMETER GASKET FOR ALL MODULES.
(8) PROVIDE WITH SMOKE DETECTOR IN SUPPLY. COORDINATE SMOKE DETECTOR TYPE WITH DISCHARGE TEMPERATURE. INTERLOCK TO FIRE ALARM SYSTEM.

PACKAGED ROOFTOP UNIT SCHEDULE

I.D. TAG	SUPPLY AIRFLOW (CFM)	OUTSIDE AIR (CFM)	EXT. SP (IN. WC) (1)	MOTOR HP	BOD TOTAL CAPACITY (MBH)	BOD SENSIBLE CAPACITY (MBH)	AMBIENT TEMP (°F)	COIL EAT °F db	COIL EAT °F wb	HEATING TYPE	HEATING INPUT	HEATING OUTPUT	EER	SEER2/ IEER	COP	HSPF	VOLTS/ PHASE	MCA	MOCP	SCCR RATING	BASIS OF DESIGN	APPROX WEIGHT (LBS)	REMARKS
RTU-1	4,000	480	0.50	2.75	116.0	97.0	95.0	80.0	67.0	GAS	150.0	120.0	11.2	12.7	--	--	208/3	49.0	60.0	*ASK ELEC.	TRANE YSC120	1,500	2, 3, 4, 5

(1) THIS IS THE SP EXTERNAL TO THE ENTIRE UNIT ASSEMBLY (WET COIL, CASING, CLEAN FILTERS, AND FURNACE LOSSES ARE NOT INCLUDED IN THIS EXTERNAL SP).
(2) PROVIDE WITH INTEGRAL DISCONNECT. COORD. WITH DIV. 26.
(3) PROVIDE SMOKE DETECTORS IN SUPPLY AND RETURN DUCTWORK FOR AUTOMATIC SHUTDOWN IN COMPLIANCE WITH NFPA 72. DETECTORS SHALL BE SUPPLIED BY DIV. 26 AND INSTALLED BY DIV. 23.
(4) PROVIDE WITH 7-DAY PROGRAMMABLE TSTAT.
(5) PROVIDE UNIT WITH DIFFERENTIAL-ENTHALPY ECONOMIZER AND BAROMETRIC RELIEF.

CHRISTOPHER A. KOLLER
NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT
DATE SIGNED: 07/25/25

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BW'A Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
SCHEDULES - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.3

COMcheck Software Version COMcheckWeb
Mechanical Compliance Certificate

Project Information

Energy Code:	2015 IECC
Project Title:	2025-0294 Dunn Event Center
Location:	Dunn, North Carolina
Climate Zone:	4a
Project Type:	Alteration

Construction Site: Owner/Agent: Designer/Contractor:

Mechanical Systems List

Quantity System Type & Description

1 AHU/CU-1 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 34 kBtu/h,
Proposed Efficiency = 8.20 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 57 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 14.30 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 1975 CFM, 0.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

Note: NCEC does not require economizers for units <65 MBH. Compliance is met, typ. all heat pumps.

1 AHU/CU-2 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 34 kBtu/h,
Proposed Efficiency = 8.20 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 57 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 14.30 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 1975 CFM, 0.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-3 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 34 kBtu/h,
Proposed Efficiency = 8.20 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 57 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 14.30 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 1975 CFM, 0.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-4 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 34 kBtu/h,
Proposed Efficiency = 8.20 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 57 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 14.30 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 1975 CFM, 0.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-5 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 34 kBtu/h,
Proposed Efficiency = 8.20 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 57 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 14.30 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 1975 CFM, 0.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-6 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 34 kBtu/h,
Proposed Efficiency = 8.20 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 57 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 14.30 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 1975 CFM, 0.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-7 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 34 kBtu/h,
Proposed Efficiency = 8.20 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 57 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 14.30 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 1975 CFM, 0.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-8 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 21 kBtu/h,
Proposed Efficiency = 9.90 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 30 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 19.80 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 2.5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 2 Supply, Constant Volume, 775 CFM, 0.2 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-9 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 21 kBtu/h,
Proposed Efficiency = 9.90 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 30 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 19.80 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 2.5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 2 Supply, Constant Volume, 775 CFM, 0.2 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 AHU/CU-10 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 21 kBtu/h,
Proposed Efficiency = 9.90 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 30 kBtu/h, , No Economizer , Economizer exception: None
Proposed Efficiency = 19.80 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: 2.5 TON -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 2 Supply, Constant Volume, 775 CFM, 0.2 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP
SYSTEM COMPLIANCE FAILS: Economizer requirements have not been met.
Total proposed cooling capacity without economizer (489 kBtu/h) must be <= Total allowable cooling capacity without economizer (300 kBtu/h)

1 RTU-1 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 120 kBtu/h
Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE
Cooling: 1 each - Single Package DX Unit, Capacity = 116 kBtu/h, Air-Cooled Condenser, Air Economizer
Proposed Efficiency = 11.20 EER, Required Efficiency = 11.00 EER
Proposed Part Load Efficiency = 12.70 IEER, Required Part Load Efficiency = 12.60 IEER
Fan System: RTU-1 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 3 Supply, Constant Volume, 4000 CFM, 2.8 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP

1 MUA-1 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 134 kBtu/h
Proposed Efficiency = 92.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE
Fan System: MUA-1 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 4 Supply, Constant Volume, 2400 CFM, 1.0 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP

1 MUA-2 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 167 kBtu/h
Proposed Efficiency = 92.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE
Fan System: MUA-2 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 5 Supply, Constant Volume, 3000 CFM, 1.5 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP

1 MUA-3 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 134 kBtu/h
Proposed Efficiency = 92.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE
Fan System: MUA-1 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 4 Supply, Constant Volume, 2400 CFM, 1.0 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP

1 MUA-4 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 134 kBtu/h
Proposed Efficiency = 92.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE
Fan System: MUA-1 -- Compliance (Motor nameplate HP and fan efficiency method) : Passes

Fans:
FAN 4 Supply, Constant Volume, 2400 CFM, 1.0 motor nameplate hp, 0.0 fan efficiency grade, 0.0 total fan efficiency, 0.0 design fan efficiency , fan exception: Single fan <= 5HP

1 WH-1:
Electric Storage Water Heater, Capacity: 52 gallons w/ Circulation Pump
Proposed Efficiency: 0.82 SL, %/h (if > 12 kW), Required Efficiency: 0.82 SL, %/h (if > 12 kW)

1 WH-2:
Electric Storage Water Heater, Capacity: 52 gallons
No minimum efficiency requirement applies

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2015 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Chris Karp - Mechanical Engineer	Sheet is Signed.	7/25/2025
Name - Title	Signature	Date

VENTILATION CALCULATIONS

Quantity of spaces, Q	Zone Identification	Occupancy Category	Zone Floor Area Ez (SF)	Zone Population Pz	Outdoor Airflow Rate Required per Person Rp (CFM/Person)	Outdoor Airflow Rate Required per Unit Area	Zone Air Distribution Effectiveness Ez	Breathing Zone Outdoor Airflow Vbz (CFM/SF)	Design Zone Outdoor Airflow Voz (CFM/SF)	Total OA Required Q x Voz	OA Supplied (CFM)
Dining Area (1)			2,326	48	-	-	1.0	-	-	779	790
1	Dining Ext E	Dining	567	16	7.5	0.18	1.0	222	222	222	303
1	Dining Ext N	Dining	308	2	7.5	0.18	1.0	70	70	70	91
1	Dining Ext S	Dining	314	10	7.5	0.18	1.0	132	132	132	175
1	Dining Int	Dining	1,137	20	7.5	0.18	1.0	355	355	355	223
Food Booths			2,586	8	-	-	0.8	-	-	379	790
1	Corr Ext N	Corridor	247	0	0	0.06	0.8	15	19	19	106
1	Corr Ext S	Corridor	170	0	0	0.06	0.8	10	13	13	121
1	Corr Int	Corridor	486	0	0	0.06	0.8	29	36	36	72
1	Food Booth 1	Dining	139	1	7.5	0.18	0.8	33	41	41	52
1	Food Booth 2	Dining	139	1	7.5	0.18	0.8	33	41	41	52
1	Food Booth 3	Dining	139	1	7.5	0.18	0.8	33	41	41	52
1	Food Booth 4	Dining	124	1	7.5	0.18	0.8	30	37	37	49
1	Food Booth 5	Dining	124	1	7.5	0.18	0.8	30	37	37	49
1	Food Booth 6	Dining	124	1	7.5	0.18	0.8	30	37	37	49
1	Food Booth 7	Dining	131	1	7.5	0.18	0.8	31	39	39	49
1	Food Booth 8	Dining	131	1	7.5	0.18	0.8	31	39	39	49
1	Restrooms L	Restroom	264	0	0	0	0.8	0	0	0	30
1	Restrooms R	Restroom	368	0	0	0	0.8	0	0	0	60
Activity Area (2)			490	30	-	-	0.8	-	-	787	1,185
1	Activity Area Ext S	Fitness	205	3	20	0.06	0.8	72	90	90	288
1	Activity Area Ext W	Fitness	150	3	20	0.06	0.8	69	86	86	350
1	Activity Area Int	Fitness	135	24	20	0.06	0.8	488	610	610	550
Venue			906	60	-	-	0.8	-	-	418	800
1	Venue Ext E	Conference	205	10	5	0.06	0.8	62	78	78	167
1	Venue Ext N	Conference	150	10	5	0.06	0.8	59	74	74	143
1	Venue Ext W	Conference	135	10	5	0.06	0.8	58	73	73	197
1	Venue Int	Conference	83	30	5	0.06	0.8	155	194	194	240
1	Storage L	Storage	183	0	0	0	0.8	0	0	0	28
1	Storage R	Storage	150	0	0	0	0.8	0	0	0	25

Notes:
(1) All spaces within the Dining Area directly communicate with one another. Outside air requirement is met.
(2) All spaces within the Activity Area directly communicate with one another. Outside air requirement is met.

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Method of Compliance:
☒ Prescriptive ☐ Energy cost Budget

Thermal Zone 4A
winter dry bulb: 24.2 deg F
summer dry bulb: 92.5 deg F

Interior design conditions
winter dry bulb: 70 deg F
summer dry bulb: 75 deg F
relative humidity: 50%

Total tenant heating load N/A

Total tenant cooling load N/A

Mechanical Spacing Conditioning System
Unitary
description of unit N/A
heating efficiency N/A
cooling efficiency N/A
heat output of unit N/A
cooling output of unit N/A
Boiler
total boiler output N/A
Chiller
total chiller capacity N/A

List equipment efficiencies

Equipment schedules with motors (mechanical systems)
motor horsepower
number of phases
minimum efficiency N/A
motor type
# of poles

CHRISTOPHER A. KARP
NORTH CAROLINA PROFESSIONAL ENGINEER
DATE SIGNED: 07/25/25
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BWA Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
COMPLIANCE - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.4

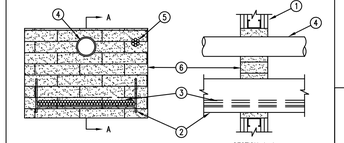
SCHEDULES OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226	SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226
	2	C-AJ-1226		2	C-AJ-1226
	3	C-AJ-1226		3	C-AJ-1226
SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091	SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091
	2	C-AJ-5090, C-AJ-5091		2	C-AJ-5090, C-AJ-5091
	3	C-AJ-5090		3	C-AJ-5090
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-AJ-7046	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-AJ-7046
	2	C-AJ-7046		2	C-AJ-7046
	3	C-AJ-7046		3	C-AJ-7046
MIXED PENETRANTS	1	C-AJ-8041	MIXED PENETRANTS	1	C-AJ-8041
	2	C-AJ-8041		2	C-AJ-8041
	3	C-AJ-8041		3	C-AJ-8041

GYPSUM WALLBOARD ASSEMBLIES		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1164
	2	W-L-1054, W-L-1164
INSULATED PIPES	1	W-L-5029
	2	W-L-5029
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L-7040, W-L-7042
	2	W-L-7040, W-L-7042
MIXED PENETRANTS	1	W-L-8013
	2	W-L-8013

NOTES:
1. JOBSITE CONDITIONS OF EACH THROUGH-PENETRATION FIRESTOP SYSTEM MUST MEET ALL DETAILS OF THE UL-CLASSIFIED SYSTEM SELECTED.
2. WHERE MORE THAN ONE APPLICABLE UL-CLASSIFIED SYSTEM IS LISTED IN THE SCHEDULES, CHOOSE THE UL SYSTEM WHICH IS MOST ECONOMICAL FOR EACH THROUGH-PENETRATION FIRESTOP SYSTEM.
3. COORDINATE WORK WITH OTHER TRADES TO ASSURE THE PENETRATION OPENING SIZES ARE APPROPRIATE FOR PENETRANT LOCATIONS, AND VICE VERSA.

System No. W-L-8013
F Ratings – 1 and 2 Hr (See Item 1)
T Rating – 0 Hr
L Rating At Ambient – 5 CFM/Sq Ft
L Rating At 400 F – 2 CFM/Sq Ft



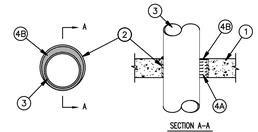
SECTION A–A

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. Wall Assembly – The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 in. (51 mm) by 4 in. (102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Additional studs installed to completely frame the opening.
   B. Gypsum Board* – 5/8 in. (16 mm) thick, 4 ft (1219 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening is 352 sq in. (2271 sq cm) with max dimension of 22 in. (559 mm) wide.
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. Cable Tray* – Max 18 in. (457 mm) wide by max 6 in. (152 mm) deep open-ladder or solid-back cable tray with channel-shaped side rails formed of 0.065 in. (1.65 mm) thick aluminum or 0.060 in. (1.52 mm) thick steel and with 1–1/2 in. (38 mm) wide by 1 in. (25 mm) channel shape rungs spaced 9 in. (229 mm) OC or a 0.029 in. (0.74 mm) thick steel solid back, respectively. One cable tray to be installed in the opening. The max unoccupied space between the cable tray and the periphery of the opening shall be min 1 in. (25 mm) to max 7 in. (178 mm) Cable tray to be rigidly supported on both sides of floor or wall assembly.
3. Cables – Aggregate cross-sectional area of cables in cable tray to be max 30 percent of the cross-sectional area of the cable tray. Any combination of the following types and sizes of copper conductor cables may be used:
   A. 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and PVC jacket.
   B. 100 pair – No. 24 AWG cable with PVC insulation and jacket.
   C. 1/C, 750 kcmil (or smaller) with PVC insulation and jacket.
4. Through–Penetrants – One or more pipe or tube to be installed within the opening. The total number of through–penetrants is dependent on the size of the opening and types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces and the spacings between the pipes are maintained. The space between the pipe or tube and the periphery of the opening shall be min 1–1/2 in. (38 mm) to max 9–1/4 in. (235 mm). Pipe or tube to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of non–metallic or metallic pipes, or tubes may be used:
   A. Polyvinyl Chloride (PVC) Pipe – Max 3 in. (76 mm) diam Schedule 40 solid core PVC pipe (or smaller) for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Steel Pipe – Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
   C. Conduit – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.
   D. Copper Pipe – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   E. Copper Tube – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.
4A. Pipe Covering – (Not Shown) Nom 1–1/2 in. (38 mm) thick hollow cylindrical heavy density (min 3.5 pcf) (56kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
   See Pipe and Equipment Covering and Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 may be used.
5. Cables – Max 1–1/2 in. (38 mm) diam tight bundle of cables installed within the opening and rigidly supported on both surfaces of wall. The space between the cables and periphery of the opening shall range from 1–3/16 in. (30.2 mm) min to a max of 1–1/2 in. (38 mm). Any combination of the following types and sizes of cables may be used:
   A. 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
   B. 25 pair – No. 24 AWG cable with PVC insulation and jacket.
   C. Type R QJ/59 coaxial cable with PVC outer jacket.
   D. 24 fiber optic cable with PVC tight and outer jacket.
6. Firestop System – The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* – Fire Blocks For walls incorporating max 3–5/8 in. (92 mm) steel studs or max 2 (51 mm) by 4 in. (102 mm) wood studs, fire block installed with 5 in. (127 mm) dimension projecting through and centered in opening. For walls constructed of larger steel or wood studs, fire block installed with long dimension passing through and centered in opening. Blocks may or may not be cut flush with both surfaces of wall. When multiple layers of gypsum board are used, blocks may be recessed 1/2 in. (13 mm) from surface of wall. Blocks to be firmly packed in opening. Either one or a combination of the block types specified below may be used.
      HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS 657 Fire Block or CFS–BL Firestop Block
   B. Fill, Void or Cavity Material* – Sealant or Putty – Fill material to be forced into interstices of cables, between cables and cable trays, around each penetrant and where obvious voids are observed to max extent possible on both surfaces of the penetration.
      HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–ONE Sealant, FS–ONE MAX Intumescent Sealant, CP 618 Putty Stick, CP 680 Firestop Foam or CP620 Fire Foam

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. C–AJ–1226
F RATING = 3–HR.
T RATING = 0–HR.
L Rating At Ambient – Less Than 1 CFM/Sq Ft
L Rating At 400 F – 4 CFM/Sq Ft



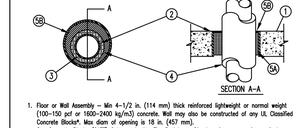
SECTION A–A

1. Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 32 in. (813 mm).
2. Metallic Sleeve – (Optional) Nom 32 in. (813 mm) diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. (76 mm) above floor or beyond both surfaces of wall.
3. Through Penetrants – One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. Steel Pipe – Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. Copper Pipe – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper tubing.
   C. Copper Tubing – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
4. Tube Insulation – Plastisces – Min 1/2 in. (13 mm) to max 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Nom 1 in. (25 mm) thick AB/PVC flexible foam insulation may be used for max 2 hr F and FH Ratings when max 3 in. (76 mm) diam pipe or tubing is used. The annular space shall be min 1/2 in. (13 mm) to max 12 in. (305 mm). When max annular space exceeds 1–1/2 in. (38 mm) the F and FH Ratings are 2 hr.
   See Plastisces (QMTZ2) Category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94–3VA may be used.
5. Firestop System – The firestop system shall consist of the following:
   A. Packing Material – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* – Sealant – Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall or sleeves. At the point or continuous contact locations between penetrant and concrete or sleeve, a min 1/4 in. (6 mm) diam bead of fill material shall be applied at the concrete or sleeve/ pipe penetrant interface on the top surface of floor and on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. C–AJ–5090
F RATING = 3–HR.
T RATING = 0–HR.
L Rating At Ambient – 4 CFM/Sq Ft.
L Rating At 400 F – Less Than 1 CFM/Sq Ft.



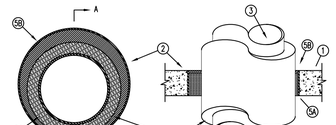
SECTION A–A

1. Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 18 in. (457 mm).
   See Concrete Blocks (QAZT) Category in the Fire Resistance Directory for names of manufacturers.
2. Metallic Sleeve – (Optional) – Nom 18 in. (457 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. (76 mm) above floor or beyond both surfaces of wall.
3. Through Penetrants – One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. Steel Pipe – Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. Copper Pipe – Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper tubing.
   C. Copper Tubing – Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
4. Tube Insulation – Plastisces – Min 1/2 in. (13 mm) to max 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Nom 1 in. (25 mm) thick AB/PVC flexible foam insulation may be used for max 2 hr F and FH Ratings when max 3 in. (76 mm) diam pipe or tubing is used. The annular space shall be min 1/2 in. (13 mm) to max 12 in. (305 mm). When max annular space exceeds 1–1/2 in. (38 mm) the F and FH Ratings are 2 hr.
   See Plastisces (QMTZ2) Category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94–3VA may be used.
5. Firestop System – The firestop system shall consist of the following:
   A. Packing Material – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* – Sealant – Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall or sleeves. At the point or continuous contact locations between penetrant and concrete or sleeve, a min 1/4 in. (6 mm) diam bead of fill material shall be applied at the concrete or sleeve/ pipe penetrant interface on the top surface of floor and on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. C–AJ–5091
F RATING = 2–HR.
T RATING = 1–HR.
L Rating At Ambient – 4 CFM/Sq Ft
L Rating At 400 F – Less Than 1 CFM/Sq Ft

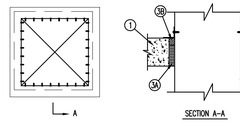


SECTION A–A

1. Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 29 in. (737 mm).
   See Concrete Blocks (QAZT) category in the Fire Resistance directory for names of manufacturers.
2. Metallic Sleeve – (Optional) – Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. (76 mm) above floor or beyond both surfaces of wall. If the steel sleeve extends beyond the top surface of the floor or both surfaces of the wall, the T Rating of the firestop system is 0 hr.
2A. Steel Metal Sleeve – (Optional) – Max 6 in. (152 mm) diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approximately mid– height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place flush with bottom surface of floor and may extend a max of 1 in. (25 mm) above the top surface of the floor.
2B. Sheet Metal Sleeve – (Optional) – Max 12 in. (305 mm) diam, min 24 ga galv steel provided with a 24 ga galv steel square flange spot welded to the sleeve at approximately mid– height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. (51 mm) larger than the sleeve diam. The sleeve is to be cast in place flush with bottom surface of floor and may extend a max of 1 in. (25 mm) above the top surface of the floor.
3. Through Penetrants – One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. (point contact) to max 1–1/4 in. (32 mm).
   A. Steel Pipe – Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe – Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
4. Pipe Covering – Min 1/2 in. (13 mm) to max 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units jacketed on the outside with an all–service jacket. Longitudinal joints sealed with metal fasteners or factory–applied, self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between the insulated pipe and the edge of the periphery of the opening shall be min 1/2 in. (13 mm) to max 12 in. (305 mm). When thickness of pipe covering is less than 2 in. (51 mm), the T Rating for the firestop system is 0 hr.
   See Pipe Equipment Covering – Materials – (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4A. Pipe Covering – (Not Shown) – As an alternate to Item 4, max 2 in. (51 mm) thick cylindrical calcium silicate (min 14 pcf or 224 kg/m3) units sized to the outside diam of the pipe or tube may be used. Pipe insulation secured with stainless steel bands or min 18 AWG stainless steel wire spaced max 12 in. (305 mm) OC. The annular space shall be min 1/2 in. (13 mm) to max 12 in. (305 mm).
5. Firestop System – The firestop system shall consist of the following:
   A. Packing Material – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* – Sealant – Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
      HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. C–AJ–7046
F Rating – 3 Hr
T Rating – 0 Hr

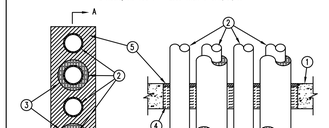


SECTION A–A

1. Floor or Wall Assembly – Min 4–1/2 in. thick reinforced lightweight or normal weight (100–150 pcf) concrete floor or min 5–1/2 in. thick lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max area of opening is 1139 in. sq with a max dimension of 33–3/4 in.
   See Concrete Blocks (QAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Steel Duct – Nom 32 by 32 by No. 24 GAUGE (or heavier) galv steel duct. One steel duct to be positioned within the firestop system. The annular space shall be min 1/4 in. to max 1–1/2 in. Duct to be rigidly supported on both sides of floor or wall assembly.
3. Firestop System – The firestop system shall consist of the following:
   A. Packing Materials – Min 3–1/2 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form between the bare steel duct and the periphery of the opening. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* – Sealant – Min 1 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
      HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – CP 601S Elastomeric Firestop Sealant, CFS–S SIL GG, CFS–S SIL SL (fluoro only) or CP604 Self–Leveling Firestop Sealant
4. Steel Retaining Angle – Nom 2 in. by 2 in. by No. 16 GAUGE (or heavier) steel angles attached to all four sides of the steel duct on the top surface or both surfaces of the wall. The angles shall be attached with No. 8 (or larger) steel sheet metal screws spaced max of 1 in. from each end and a max of 3 in. OC.

*Bearing the UL Classification Mark

System No. C–AJ–8041
F RATING = 3–HR.
T RATING = 0 and 1 HR.
L Rating At Ambient – 10 CFM/sq ft
L Rating At 400 F – Less Than 6 CFM/sq ft

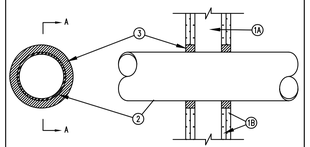


SECTION A–A

1. Floor or Wall Assembly – Min 4–1/2 in. (114 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100–150 pcf or 1600–2400 kg/m3) concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max area of opening is 192 sq in. (1239 cm2) with max dimension of 24 in. (610 mm).
   See Concrete Blocks (QAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through–Penetrants – A max of 4 pipes, conduits or tubing to be installed within the opening. The space between pipes, conduits or tubing shall be 1–1/2 in. (38 mm). The space between pipes, conduits or tubing and periphery of opening shall be min 1–5/8 in. (41 mm) to max 2–1/2 in. (64 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe – Nom 3 in. (76 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Copper Tubing – Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing.
   C. Copper pipe – Nom 3 in. (76 mm) diam (or smaller) regular (or heavier) copper pipe.
   D. Conduit – Nom 3 in. (76 mm) diam (or smaller) electrical metallic tubing or steel conduit.
3. Pipe Covering* – (Optional) – Max 1 in. (25 mm) thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory–applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. A nom annular space of 1–1/2 in. (38 mm) is required within the firestop system. The T, FT and FTH Rating is 1 hr when 1 in. thick pipe covering is used. The T, FT and FTH Rating is 0 hr when pipe covering is less than 1 in. or is omitted.
   See Pipe and Equipment Covering – Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. Packing Material – Min 4 in. (102 mm) thickness of min 4.0 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant.

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W-L-1054
F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/Sq Ft
L Rating At 400 F – 4 CFM/Sq Ft



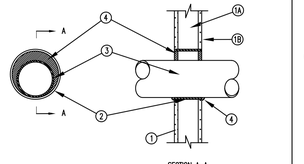
SECTION A–A

1. Wall Assembly – The 1 or 2 hr fire–rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw–attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* – 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32–1/4 in. (819 mm) for steel stud walls. Max diam of opening is 14–1/2 in. (368 mm) for wood stud walls.
   The F and FH Ratings of the firestop system are equal to the fire rating of the wall assembly.
2. Through–Penetrants – One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2–1/4 in. (57 mm). Pipe may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe – Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe – Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
   C. Conduit – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT).
4. Firestop System – The firestop system shall consist of the following:
   A. Packing Material – Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or sleeve or from both surfaces of wall or sleeve as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* – Sealant – Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or sleeve or with both surfaces of wall or sleeves. At the point or continuous contact locations between penetrant and concrete or sleeve, a min 1/4 in. (6 mm) diam bead of fill material shall be applied at the concrete or sleeve/ pipe penetrant interface on the top surface of floor and on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W-L-1164
F Ratings – 1 and 2 Hr (See Items 1 and 4)
T Rating – 0 Hr



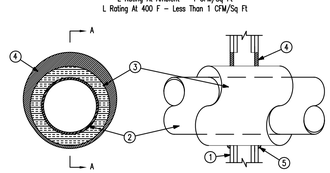
SECTION A–A

1. Wall Assembly – The 1 or 2 hr fire–rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw–attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* – The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening in steel stud walls is 32 in. (813 mm). Max diam of openings in wood stud walls is 14–1/2 in. (368 mm).
   The hourly F, FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. Steel Sleeve – Nom 32 in. (813 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe sleeve friction fit in nom 32 in. (813 mm) diam circular opening cut through gypsum board layers. Length of steel sleeve to be equal to thickness of wall.
3. Through–Penetrant – One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and the steel sleeve shall be min 0 in. (point contact) to max 1–7/8 in. (48 mm) Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe – Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe – Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
   C. Conduit – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.
   D. Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) regular (or heavier) copper pipe.
3. FIL Void or Cavity Material* – Sealant – Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC – FS–One Sealant or FS–ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W-L-5029
F Ratings – 1 and 2 Hr (See Item 1)
T Ratings – 1/2, 3/4, 1 and 1–3/4 Hr (See Item 3)
L Rating At Ambient – 4 CFM/Sq Ft
L Rating At 400 F – Less Than 1 CFM/Sq Ft



SECTION A–A

1. Wall Assembly – The 1, 2 or 3 hr fire–rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2–1/2 in. (64 mm) wide for 1 and 2 hr F and FH rating and 3–1/2 in. (89 mm) wide for 3 hr F and FH rating and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* – Min 5/8 in. (16 mm) thick with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 18–5/8 in. (473 mm).
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through Penetrants – One metallic pipe or tubing to be installed within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. Steel Pipe – Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe – Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. Copper Tubing – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing. When the hourly F or FH Rating of the firestop system is 3 hr, the nom diam of copper tube shall not exceed 4 in. (102 mm).
   D. Copper Pipe – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe. When the hourly F or FH Rating of the firestop system is 3 hr, the nom diam of copper pipe shall not exceed 4 in. (102 mm).
3. Pipe Covering* – Nom 1, 1–1/2 or 2 in. (25, 38 or 51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory–applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. For 1 and 2 hr F and FH Ratings, the annular space between insulated penetrant and periphery of opening shall be min 0 in. (point contact) to max 1–1/8 in. (48 mm). For 3 hr F and FH Ratings, the annular space shall be min 0 in. (point contact) to max 1–1/4 in. (32 mm).
   See Pipe and Equipment Covering – Materials (BRGU) category in the Building Material Directory for the names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used. Pipe insulation secured with pressure pipe.
   The hourly T, FT, FTH Ratings of the firestop system are 1/2 hr for 1 hr rated walls and 1 hr for 2 hr rated walls. For 3 hr rated walls, the hourly T, FT and FTH Ratings when steel and iron pipes are used are 1 hr. For 3 hr rated walls, the hourly T, FT and FTH Ratings when copper penetrants are used are 1–1/4 hr for 2 in. (51 mm) thick pipe covering and 0 hr for pipe covering thickness less than 2 in. (51 mm).
3A. Pipe Covering* – (Not Shown) – As an alternate to Item 3, max 2 in. (51 mm) thick cylindrical calcium silicate (min 14 pcf) units sized to the outside diam of the pipe or tube may be used. Pipe insulation secured with stainless steel bands or min 18 AWG stainless steel wire spaced max 12 in. (305 mm) O

SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

1.0 GENERAL

1.01 DESCRIPTION

A. This Division 23 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the air conditioning, ventilating, heating, fire suppression and plumbing systems as specified herein and as shown.

B. The General Provisions and Division 01, including the general, supplementary and other conditions and other Divisions, as appropriate, apply to work specified in this Division.

1.02 EXISTING CONDITIONS

A. Attention is called to the fact that the work is to be performed within an existing, operational facility. Prior to the submission of bids, each bidder shall visit the project site, thoroughly investigate and be familiar with all existing conditions which will affect their work; especially the work to be performed above the existing ceilings.

B. Connect new work to existing work in a neat and workmanlike manner. Where an existing structure must be cut or existing utilities interfere, such obstructions shall be bypassed, removed, replaced or relocated, patched and repaired. Work disturbed or damaged shall be replaced or repaired to its prior condition.

C. Prior to the start of any demolition or construction, secure the services of a qualified, EPA Certified Asbestos Abatement Agency to check the existing insulation, etc. for asbestos. Should asbestos be found, do not proceed with demolition or construction; notify the Architect in any case in writing of the Agency's findings.

1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable standards for materials, equipment and workmanship, and to provide operable mechanical systems complete in every respect.

B. The engineering drawings are diagrammatic, intended to show general arrangement and sizes of system components, and shall not be scaled. Rather, the architectural and structural drawings shall govern space constraints, dimensions and finishes. All offsets and fittings which will be necessary to accomplish the finished installation shall be provided at no additional cost or increase in the Contract.

1.04 SPACE PRIORITY

A. Ensure optimum use of available space for materials and equipment installed above ceilings. Allocate space in the order of priority as listed below except as otherwise detailed. Items are listed in the order of priority, with items of equal importance listed under a single priority number.
1. Gravity flow piping systems
2. Vent piping systems
3. Recessed lighting fixtures
4. Concealed HVAC terminals and equipment
5. Air duct systems
6. Sprinkler piping systems
7. Pressurized piping systems
8. Electrical conduit, wiring, control air tubing

B. Order of space priority does not dictate installation sequence. Installation sequence shall be as required to install all affected trades.

C. The work of this Division 23 shall not obstruct access for installation, operation and maintenance of the work of any other Division.

D. All major items of equipment shall be arranged so as to provide a minimum of 28" clear aisle space. Additional space shall be provided between and around equipment for maintenance and proper operation as shown in the Equipment Manufacturer's literature.

1.05 COORDINATION

A. Coordinate all work under this Division 23 with work under all other Divisions, providing adjustment as necessary.

B. Coordination of space requirements with respect to Division 26 shall be performed such that:

1. No equipment, piping or ductwork, other than electrical, shall be installed within 42" of switchboards or panelboards.

2. No piping or ductwork which ever operates at a temperature in excess of 120°F shall be installed within 3" of any electrical conductor.

C. All items mounted in or below the ceiling, and all items penetrating the ceiling, shall be coordinated with the architectural reflected ceiling plans. If any items are not shown on these plans, or any items need to be relocated for coordination purposes, prepare a reflected ceiling plan and submit it to the Architect for approval.

D. Variable-Frequency Drives shall be provided under Division 23 and installed by Division 26. See specification 26 29 23 Variable – Frequency Motor Controllers.

E. Fused disconnects shall be provided under this Division 23 for all equipment connected directly to bus duct, and rating shall match bus duct rating. Coordinate with Division 26.

1.06 CODE COMPLIANCE

A. All workmanship and materials provided under this Division 23 shall comply with all laws, ordinances, codes and regulations of all Federal, State and Local Authorities Having Jurisdiction.

B. All fire suppression, plumbing, heating, ventilating, and air conditioning materials and workmanship shall comply with the following codes and standards as minimum requirements:
1. NFPA 70, National Electrical Code, 2023 Edition
2. Life Safety Code (NFPA 101) – 2015 Edition
3. All other NFPA Codes and Standards – Applicable Editions
4. North Carolina State Building Code – 2024 Edition
5. North Carolina State Energy Code – 2024 Edition
6. North Carolina State Fire Prevention Code – 2024 Edition
7. North Carolina State Mechanical Code – 2024 Edition
8. North Carolina State Plumbing Code – 2024 Edition
9. North Carolina Accessibility Code – 2024 Edition
10. American with Disabilities Act, January 26, 1992
11. American National Standard Handicapped Code, A117.1 – 1986 Edition
12. ASME A17.1 Safety Code Elevators and Escalators, 2013 Edition

C. Secure and pay all fees associated with all permits and licenses required for execution of the Contract. Arrange for all inspections required by City, County, State and other Authorities Having Jurisdiction, and deliver certificates of approval to the Architect.

D. The code requirements are strictly a minimum and shall be met without incurring additions to the Contract. Where requirements of the drawings or specifications exceed the code requirements, the work shall be provided in accordance with these drawings or specifications. In the event of conflict or ambiguity between the various codes, the most stringent requirement shall govern.

1.07 ELECTRICAL REQUIREMENTS AND INTERFACE

A. All electrical equipment and wiring provided under this Division 23 shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 26.

B. Electric controls, contactors, starters, pilot lights, push buttons, etc., shall be provided complete as part of the motor, heater or other equipment which it operates. All electrical components shall be in conformance with the requirements of the National Electrical Code and Division 26. Starters shall be wye-delta, closed transition type. Reference Division 26 and the electrical engineering drawings for those motor starters provided under that Division 26. All starters not shown shall be provided under this Division 23. Unless specified otherwise under other individual equipment Sections, motor starters shall conform to the following minimum requirements:

1. Starters for motors 1/3 horsepower or smaller shall be manual unless remote or automatic starting is required, in which case the starters shall be magnetic, full voltage, non-reversing, single-speed, unless otherwise indicated. All other starters shall be magnetic.

2. Each starter for a three-phase motor shall be furnished with three (3) overload relays sized for the full load running current of the motor actually provided. Provide an external "HAND-OFF-AUTO" selector switch with red "RUNNING" light. Provide a green pilot light to indicate motor "STOPPED". Each pilot light shall have a legend plate indicating reason for signal.

3. Each overload relay shall have a normally open alarm contact which will close only when actuated by an overload (not to be confused with N.O. or N.C. auxiliary contacts). These contacts shall be properly wired to their respective blue pilot light provided on the starter front cover and having a "TRIPPED" legend plate.

4. Individually mounted motor starters shall be in a NEMA Type 1 general purpose enclosure in unfinished areas and shall be flush mounted in all finished areas. All starters mounted in exterior areas shall have a NEMA 3R enclosure. Each starter shall have a laminated nameplate to indicate equipment unit number, function and circuit number.

5. All motor starters, push buttons and pilot lights shall be of the same Manufacturer as the switchboard and shall be General Electric, Square D, Siemens I.T.E., or Westinghouse.

C. Motor starters for the following equipment shall be provided under this Division 23 by the Manufacturer of the equipment:
1. Packaged air conditioning equipment
2. Water chillers
3. Other equipment hereinafter specified in other Sections to be provided with integral starters

D. Unless otherwise noted or specified in individual Sections, all 3-phase motors shall be standard NEMA continuous duty "B" type, with Class B insulation, open drip-proof frame for indoor service, TEFC for outdoor service and a service factor of 1.15. All motors 5 HP and larger shall be U.S. Motors Hi-Efficiency Model or Reliance XE Hi-Efficiency Model.

E. All power wiring and final connections to equipment shall be provided under Division 26.

F. Control components, all interlocks, (VAVs, actuators, smoke dampers, fire/smoke dampers, motor-operated dampers, fire alarm motors, etc.) and control wiring (277 volt, single phase and less) shall be provided under this Division 23 as required to achieve the specified control sequences. All electrical connections shall be specifically coordinated with Division 26 and any necessary scope included as part of Division 23.

G. All control wiring over 30 volts shall be installed by a licensed Electrician working under this Division 23.

1.08 SLEEVES, SEALS AND ESCUTCHEONS

A. Sleeves shall be provided through all pipe and ductwork penetrations of concrete or masonry walls, elevated floors and roofs, except those piping penetrations for equipment, etc.

B. Sleeves shall be fabricated from Schedule 40 steel pipe through 10" and Standard Wall steel pipe for sleeve sizes 12" and larger. All sleeves penetrating exterior walls, underground walls, pit or vault walls shall be provided with a 3" x 3/8" thick waterstop ring welded completely to the midpoint of the sleeve.

C. All sleeves penetrating exterior walls, underground walls, pit or vault walls and elevated floors shall be packed and sealed watertight.

D. Sleeves through roofs shall extend above the roof surface and be flashed watertight.

E. Sleeves through walls shall be cut and finished flush with each surface of the wall in which they are installed.

F. Sleeves through floors in mechanical rooms or other back of house spaces shall be installed with the top no less than 1/2" above the finished floor to allow for leak protection. Space between the top of the fire-stopping and top of the sleeve shall be packed with mineral wool and caulked to not allow water ponding within the sleeve.

G. Sleeves shall be sized to provide a minimum of 1/2" clearance between the inside surface of the sleeve and the outside finished surface of the pipe plus any insulation specified.

H. Fire-stops shall be provided as specified herein. All annular spaces between piping and sleeves, which do not require fire-stops, shall be packed with mineral wool and caulked.

I. Provide round, chrome-plated escutcheons on all exposed piping and ductwork penetrations passing through walls, floors, partitions and ceilings. Escutcheons shall be painted and caulked in coordination with Architect. Note that escutcheons should be only attached to the wall as piping and ductwork may move slightly during operation.

1.09 FIRESTOPS

A. Where piping, conduit, etc. pass through fire partitions, fire walls and floors, a firestop shall be provided that will ensure an effective barrier against the spread of fire, smoke and gases. Firestop material shall be packed tight and completely fill gaps between the ductwork, piping, conduit, etc. and the perimeter of their rough openings.

B. All penetrations shall be in accordance with UL 1479 or ASTM E 814 listed systems, and products used shall be specifically applicable for the appropriate installation conditions. Assemblies shall provide a minimum rating equal to the construction penetrated. Products shall be by HILTI, 3M, or ProSet.

C. Installation shall be by a Qualified Installer. Installer shall be certified, licensed, or otherwise qualified by the Firestopping Manufacturer as having the necessary training to install the Manufacturer's specific product.

D. Installer shall have at least one of the following qualifications:
1. FM 4991 Approved Contractor
2. UL Approved Contractor
3. HILTI, 3M, or ProSet Accredited Fire Stop Specialty Contractor

E. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach label permanently on both sides of penetrated construction in a visible location. The label shall include the following:
1. The words "Warning – Through Penetration Firestop System–Do Not Disturb"
2. Through Penetration firestop system designation and Manufacturer
3. Date of Installation

1.10 CORE DRILLING

A. Cutting of holes through concrete and masonry shall be by diamond core or concrete saw. Pneumatic hammer, impact electric and hand or manual hammer type drills will not be allowed, except as permitted by the Architect where required by limited working space. Locate holes such that they will not affect structural sections such as ribs or beams. Holes shall be laid out well in advance of the installation. These layout locations shall be approved by the Architect prior to drilling.

2.0 PRODUCTS

2.01 BID BASIS AND SUBSTITUTION PROCEDURES

A. Manufacturer names, series and model numbers, as noted or specified, are for the purpose of describing type, capacity, and quality of equipment, materials and products to be used. Unless "or equal" is specifically stated, bids shall be based only on the specified "basis of design" Manufacturer. The listing of a particular manufacturer as an "equal" or "acceptable substitute" manufacturer shall not be misconstrued as approving nor allowing the substitution of that Manufacturer's standard product in place of the basis of design. No consideration will be given to a product, which would require dimensional, spatial or aesthetic changes to the project. "Acceptable substitute" and "equal" manufacturers shall only bid those products, which exactly match the size and other characteristics of the specified basis of design. Any changes to other disciplines and trades of work required by an "or equal" or "substitute" product shall be duly considered and priced accordingly prior to bidding or pricing. The decision as to whether or not a proposed substitute or "equal" product is actually equal to that specified shall rest solely with the Architect.

B. Requests to provide "equal" products in lieu of those specified shall be submitted to the Architect in writing at least ten (10) days prior to final pricing and execution of the Contract. No consideration will be given to substitute products after final pricing and execution of the Contract.

C. Any "or equal" product or proposed product substitution which will cause a change in the appearance, dimensions or design of any part of the building, it structure, electrical system or any other engineered systems shall be accompanied by a scaled drawing and written description of the required change(s) for approval by the Architect. If deemed necessary by the Architect, Owner, or AHJ, design changes shall be signed and sealed by a registered Professional Engineer, currently licensed in this State. This shall be performed under the Contractor's scope who selects the substitution.

D. Any and all changes due to a substitution of basis of design equipment including but not limited to electrical connection, physical size, access, duct or piping connections, controls, etc. shall be solely the responsibility of substituting Contractor.

2.02 MINIMUM STANDARDS

A. Every piece of energy consuming equipment, all fire suppression products and life safety equipment shall comply with the following standards as applicable; especially in regard to prevailing codes:
1. Factory Mutual Laboratories (FM)
2. Industrial Risk Insurers (IRI)
3. Underwriters Laboratories, Inc. (UL)
4. ADC: Air Diffusion Council
5. AGA: American Gas Association
6. AMCA: Air Moving and Conditioning Association, Inc.
7. ANSI: American National Standards Institute
8. API: American Petroleum Institute
9. AHRI: Air Conditioning, Heating, and Refrigeration Institute
10. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
11. ASME: American Society of Mechanical Engineers
12. ASTM: American Society of Testing and Materials
13. AWWA: American Water Works Association
14. IBR: Institute of Boiler and Radiator Manufacturers
15. MSS: Manufacturers Standardization Society
16. NBBPVI: National Board of Boiler and Pressure Vessel Inspectors
17. NEMA: National Electrical Manufacturer's Association
18. OSHA: Occupational Safety & Health Administration
19. PDI: Plumbing Drainage Institute
20. PPI: Plastic Pipe Institute
21. SMACNA: Sheet Metal and Air Conditioning Contractors National Association, Inc.

3.0 EXECUTION

3.01 SUBMITTALS

A. Before preparing submittals, study all Contract Drawings and specifications in detail, obtain manufacturer's recommended instructions, and have submittals prepared based on specific equipment and material proposed for installation. An officer of the Contracting Firm shall sign all shop drawings (certifying conformance with plans and specifications) before submitting to the Architect or releasing to the field.

B. The submittal process shall not be utilized as an avenue to substitute products after the execution of the contract. Should an unspecified or unequal product be submitted, it will be rejected. If a second attempt at substitution is made during the resubmittal of the same product, then no more reviews of that product will be performed without direct compensation to the Engineer being paid for the additional services required for the third review and any further reviews.

C. All submittals shall be submitted and returned electronically.

D. Submittals will not be accepted for review unless they:
1. Comply with the requirements of Division 1
2. Include complete information pertaining to all appurtenances and accessories
3. Are submitted as complete packages which pertain to all related items in Division 23. Separate packages shall be submitted as follows:
   a. All HVAC equipment and components
   b. The automatic controls and EMS
4. Are properly marked with equipment, service, or function identification as related to the project and are marked with pertinent specification paragraph number

E. Submit catalog information, factory assembly drawings, field installation drawings and certifications as required for complete explanation and description of all items of equipment. The submittal data shall provide ample, unquestionable compliance with the Contract Documents.

F. Review of submittals shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly identified and separately submitted in the form of a letter that is enclosed with the submittals.

G. Submittals are required on all manufactured equipment, especially energy consuming equipment. Submittals shall include, but are not limited to, the following items of equipment:
1. Piping and Piping Specialties
2. Ductwork and Piping Insulation
3. Split Systems
4. Packaged Rooftop Units including proposed controller and points list
5. Air Distribution Devices
6. Ductwork Accessories (Including All Dampers)
7. Fans
8. Make-Up Air Units including proposed controller and points list
9. Kitchen Hoods (for coordination)
10. T&B Company Certifications and Final Report
11. Control Diagrams, System, and Components
12. Ductwork and Piping Shop Drawings
13. Firestopping Products and Applicable UL Firestop Details

3.02 INSTALLATION REQUIREMENTS

A. All equipment shall be installed in strict conformance with the recommendations of the Equipment Manufacturer, as indicated on the Drawings and as specified.

B. Provide installation manuals for each piece of equipment. Submit in separately bound volumes after review of submittals.

C. Provide supplementary steel framing and welded steel equipment support stands as required for proper hanging and support of the mechanical systems. Steel angles, channels and tubing utilized for such framing shall be selected for a maximum deflection of 1/360th of the span.

D. All roof curbs shall be a minimum of 12" high and selected for the various roof pitches. Curbs installed on roofs having pitches of not more than 1/4" per foot may be standard curbs shimmed level with steel channels or Zs to provide suitable support and flashing surfaces.

3.03 CLEANING, LUBRICATION AND ADJUSTMENT

A. The exterior surfaces of all mechanical equipment, piping, ductwork, conduit, etc., shall be cleaned and free of all dirt, grease, oil, paint splatter, and other construction debris.

B. Ducts, plenums, and air unit casings shall be cleaned of all debris and either vacuumed or blown free of all rubbish, dirt, and dust before installing grilles, registers or diffusers.

C. Bearings that require lubrication shall be lubricated in strict accordance with the manufacturer's recommendations.

D. All control equipment shall be adjusted to the settings required for the performance specified.

E. Fans shall be adjusted to the speed indicated by the Manufacturer to meet the installed final system pressure at the airflows indicated. Any additional sheaves and belts required for final adjustments shall be provided with no increase in the Contract amount.

F. Any fans operated during construction shall have temporary filters. Temporary filters shall be changed regularly to minimize contamination of the equipment and duct systems. Permanent filters shall be installed prior to final inspection.

G. All coils shall be thoroughly cleaned and combed prior to final inspection.

H. All materials, equipment, etc. subject to weather, corrosion, dust, debris, water etc. to be installed or utilized for the project shall be fully protected. This is inclusive of piping and duct openings and internal fan ventilation intakes and discharges. This Division's scope includes protection and remediation of any and all Division materials, etc. including cleaning, vacuuming, dusting, etc. required for a clean system and operation. Insulation and equipment with electrical connections subject to water shall be replaced in their entirety. Coordinate with all other trades and schedules.

3.04 PAINTING

A. All uncoated and uninsulated steel surfaces exposed to sight inside the building, such as piping, equipment hangers and supports which are not provided with factory prime coat or galvanizing, shall be cleaned and painted with one coat of rust inhibiting primer. In addition, all surfaces in finished spaces shall also be painted with two coats of finish paint in a colour selected by the Architect.

B. All ductwork surfaces, piping, supports, etc. visible through grilles, registers and diffusers in finished areas shall be painted flat black. All ductwork, equipment, piping, supports, air distribution, etc. visible in exposed finished areas shall be painted a colour selected by the Architect, except that nameplates shall not be painted.

C. Steel items exposed outside the building, such as equipment supports, uninsulated piping and hangers, which are not factory painted or galvanized, shall be cleaned and painted with one coat of rust inhibiting primer and two coats of asphaltic base aluminum paint. Insulated steel pipes outside the building shall be cleaned and painted with one coat of rust inhibiting primer before installing insulation.

D. Factory painted equipment that has been scratched or marred shall be repainted to match the original factory color.

3.05 DUCTWORK AND PIPING LEAK TESTING

A. Insulated and concealed ductwork and piping shall be tested for leaks in place before backfilling, concealing or covering. Tests shall be conducted in the presence of the Architect or their designated Representative.

B. All low pressure ductwork (design operating pressure of 1.0" WC ESP or less) shall be tested by the operation of the system to which it is connected.

C. All visible and audible air leaks from the ductwork systems shall be repaired.

D. See specification section 23 11 23 for testing requirements of natural gas piping. System shall be part of Division 22 scope unless otherwise arranged within the Contract. Coordinate with Division 22.

E. All refrigerant piping shall be 100% tested with the applicable ASHRAE standard – latest version.

F. All leaks shall be repaired by tightening, remaking joints, or replacing pipe and fittings. Caulking of joints shall not be permitted.

3.06 RECORD (AS-BUILT) DRAWINGS

A. At the completion of the project, provide a set of reproducible prints to the Architect which reflects all changes, deviations and revisions made to the original design documents. Locations of all underground piping and utilities shall be clearly shown and dimensioned from permanent reference points such as building column lines. Record drawings shall be produced in electronic format compatible with AUTOCAD. Furnish electronic copies of all drawings in dwg. format, and two (2) bond copies of all drawing sheets.

3.07 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS

A. Complete operating and maintenance manuals shall be provided to the Owner. Four copies shall be provided. Each copy shall be bound in a separate 3-ring, loose-leaf notebook. Operating instructions shall be provided for each mechanical system, and shall each include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instructions shall be provided for each piece of equipment. A control system wiring diagram shall be included in each operating and maintenance manual.

B. Prior to final acceptance or beneficial occupancy, provide the services of a Competent Technician for not less than two (2) days to instruct the Owner in the operation of the mechanical systems.

3.08 TESTING AND BALANCING

A. Testing and balancing of the HVAC system shall be performed as specified in Section 23 05 93. Note that this work is to be performed under a separate Contract directly under the General Contractor. Submit four (4) copies of the test and balance report directly to the Architect.

3.09 WARRANTY

A. All work provided under this Division 23 shall be subject to a minimum one year warranty. The warranty shall include prompt repair or replacement of equipment or system failures and shall include all parts, refrigerant, and labor. In addition, all compressors shall carry an additional four year parts-only warranty. Extended warranties shall be provided on all other equipment so specified in other Sections.

3.10 COORDINATION DRAWINGS

A. All Contractors and SubContractors, as applicable, shall be responsible for the preparation of electronic drawings 1/4" per foot scale shop drawings of all building levels.

B. The General Contractor shall manage and control the coordination process. The General Contractor Team shall be responsible for all documents and file distribution.

C. Each trade shall mark conduit, pipe, duct, and equipment with elevations on electronic drawings provided by the Sheet Metal SubContractor.

D. Each Contractor and SubContractor shall date the drawings when received. Sequence of transmittal of the drawings shall be as follows:
1. The Mechanical SubContractor with all sheet metal and piping work shown to the Plumbing Sub-Contractor
2. From Plumbing SubContractor with all plumbing work shown to Fire Protection SubContractor
3. From Fire Protection SubContractor with all fire protection work shown to Mechanical SubContractor
4. From Mechanical SubContractor with all mechanical piping work shown to Electrical SubContractor
5. From Electrical SubContractor with all electrical work shown to Mechanical SubContractor
6. This process shall iterate as needed for full and final coordination by all parties

E. Each trade shall sign and date final coordination drawings. The General Contractor shall maintain up-to-date drawings at the job Site and shall provide one set of prints of final coordinated drawings to Mechanical, Plumbing, Fire Protection, and Electrical SubContractors, and the Owner's Representative.

F. Each Contractor and SubContractor shall coordinate all work with other trades prior to installation.

G. Any field changes shall be similarly coordinated and documented in the As-Builts.

H. Upon completion of the coordination drawings, provide the Engineer a full set of shop drawings for their review. Shop drawings shall meet the below requirements.

3.11 SHOP DRAWINGS

A. Shop drawings per the submittal requirements shall be submit to the Design Team with adequate time for multiple rounds of review. Shop drawings shall show "As-Built" conditions including elevations, offsets, transitions, and accessories. Shop drawings shall indicate all code and manufacturer's recommended clearances, access, and coordinate the clearance and access requirements with all other trades.

B. Shop drawings that use keynotes direct from the Design Documents shall not be acceptable as they do not demonstrate coordination with all other trades, necessary transitions, etc.

C. Shop drawings shall be provided as complete packages in parallel with all trades to document coordination. Floor-by-floor or otherwise piecemeal shop drawings are generally not acceptable.

3.12 OWNER TRAINING

A. Owner training shall be provided for all systems and equipment and shall include the following:
1. 8-hours of training for each type of equipment
2. 24-hours of training for HVAC controls
3. 16-hours for overall system operational training

B. A training summary and schedule shall be submitted to the Architect for approval within ninety (90) days of the date of substantial completion.

C. Training timing will vary and shall be assumed to include multiple sessions as

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DATE SIGNED: 07/25/25
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
SPECIFICATIONS - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.6

required by the Owner.

3.13 BID REQUIREMENTS

A. The Contractor shall include all systems, equipment and accessories shown on the plans and specifications.

B. The Contractor is responsible for providing all design documents to all SubContractors. All systems, equipment and accessories shall be included in the bid, whether shown on the SubContractor applicable plans or other design documents.

C. Should any discrepancy occur in the Design Documents, the Contractor shall provide a request for clarification prior to bid or note the discrepancy in the bid and provide an appropriate cost allowance in the bid.

D. The Contractor shall acknowledge that the Design Documents are diagrammatic and shall provide all systems, equipment and accessories required for a complete facility. Any areas that appear to be void of systems or inappropriate systems shall be noted in the bid. No post bid change order shall be considered for areas or discrepancies not noted in the bid.

E. All installation coordination and means and methods and labor and materials required for proper system installation shall be included.

F. These requirements are in addition to bid procedures and requirements of the RFP or general specifications.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 05 93 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the testing and balancing (T&B) of the heating, ventilating and air conditioning (HVAC) systems as specified herein and as shown. These systems include, but are not limited to, the following:
1. Supply distribution systems
2. Return and exhaust air systems
3. Heating, ventilating and air conditioning equipment (all scheduled equipment as a minimum)

1.02 INTENT

A. It is the intent of this Section of the specifications to provide a complete operable and balanced HVAC system as shown and specified which is reasonably airtight, comfortable and free of objectionable noise and vibration.

1.03 SCOPE OF WORK

A. HVAC test and balance shall be performed by an Independent Agency certified by the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB) under direct contract to the General Contractor. All work performed by this Agency shall be performed by qualified Technicians under the direct supervision of an AABC or NEBB Certified Test and Balance Engineer. The Agency shall be independent and shall not be associated in any way with the installing HVAC SubContractor.

B. The Test and Balance shall be performed by one (1) of the following companies:

1. Palmetto Air and Water Balance –
Alan Tew
Phone: (919) 460-7730
atew@palmettoairbalance.com

2. Research Air Flo
Contact: Joel Shannon (770) 452-8292
Contact: (919) 387-5788 (Raleigh)
Contact: (704) 321-0491 (Charlotte)
joel@researchairflo.com

3. TAB Services
Contact: Thomas Sockwell (803) 517-8002
tsockwell@tabservices.com

C. HVAC Test and Balance shall be performed in accordance with the 7th edition of the AABC National Standards, 2016 for Total System Balance or the NEBB Procedural Standards for TAB of Environmental Systems, 8th Edition, 2015 together with the NEBB TAB Manual for Technicians, 2nd Edition.

D. The final Test and Balance report shall serve to substantiate compliance with the intent of the Contract Documents, specifically the HVAC systems.

E. HVAC Test and Balance shall not begin until the systems are substantially complete.

F. Upon the completion of the Test and Balance work, the Agency shall submit four (4) copies of the complete HVAC Test and Balance Report directly to the Architect.

G. The Agency, as a part of its contract with the General Contractor, shall act as an Authorized Inspection Agency, responsible to the General Contractor and the Architect and shall, during the test and balance, list those items which require correction or have not been installed in accordance with the Contract Documents.

H. The Agency shall plainly mark the settings of all valves, dampers and other adjustable devices. If a balancing device is provided with a memory stop, it shall be set, locked and marked.

I. The Agency shall record all of the final set points on all variable speed drives.

1.04 SUBMITTALS

A. The name and certification of the Agency, along with the name and certification of the Certified Test and Balance Engineer, shall be submitted to the Architect for review within 30 days after the award of the General Contract.

B. The selected Agency shall submit to the Owner:
1. Procedural Manual
2. Report Forms
3. AABC or NEBB Performance Guaranty
4. Instrument List and Calibration Dates
5. Schedule
6. Floorplans as Needed to Uniquely Identify Device Locations

C. A reviewed copy of each of the above shall be returned to the Agency before the HVAC Test and Balance begins.

D. If a complete submittal in accordance with these requirements is not received within 60 days from award of the General Contract, then the Architect reserves the right to select the Agency.

2.0 PRODUCTS

2.01 (Not applicable).

3.0 EXECUTION

3.01 GENERAL CONTRACTOR'S DUTIES

A. The General Contractor shall provide the following, within 10 days after his receipt, to the Agency:
1. Contract Drawings
2. Contract applicable specification Division 23 (others as applicable)
3. Addenda
4. Change orders
5. Reviewed submittals

B. The General Contractor shall start-up and maintain the HVAC systems and shall continue the operation of the HVAC systems during each day of testing and balancing. Start-up and operation shall include, as a minimum, the following:
1. All equipment operable and in safe condition.
2. Temperature control system complete.
3. Proper thermal overload protection in place for electrical equipment.
4. Ductwork leakage rates not exceeding those specified and all duct systems clean of debris.
5. Air transfer systems shall have:
a. Correct fan rotation and RPM.
b. Coil fins cleaned and combed.
c. Filters clean and in place.
d. Access doors closed.
e. All dampers in place and open.
f. All grilles, registers and diffusers installed.

C. Provide sufficient time before final completion date so that testing and balancing can be accomplished. Coordinate the submitted T&B schedule.

D. Provide immediate labor and tools to make required corrections and repairs without undue delay.

E. The General Contractor and his SubContractors shall cooperate fully with the Agency to provide the following:
1. Access to HVAC system components.
2. The right to adjust the systems.

F. Any conditions which prevent a proper HVAC Test and Balance shall be reported by the Agency to the General Contractor and Architect within 7 days of their discovery.

G. If it is determined by the Agency and confirmed by the Architect that drive changes or additional balancing dampers are required, the Contractor shall obtain and install all necessary components.

H. The Agency shall cooperate with the Architect and the Contractor and all his SubContractors to perform the work in such a manner as to meet the job schedule.

I. The Agency shall verify that all system components are in place and in proper working order prior to leaving the project.

J. All reported and recorded data shall represent true measured conditions.

K. Where equipment uses variable speed drives, and where feasible, VFDs shall be used as the primary balancing method prior to adjustment or balancing of valves, dampers, etc.

END OF SECTION

SECTION 23 07 13

DUCT INSULATION

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 07 13 and the accompanying drawings cover the provisions of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the ductwork systems as specified herein and as shown. These systems include, but are not limited to, the following:
1. Insulation for typical ductwork
2. Duct liner
3. Insulation for grease exhaust ductwork

1.02 INTENT

A. It is the intent of this Section of the specifications to provide a complete operable duct system as shown and specified which is reasonably airtight, free of noise, vibration and sweating, and fabricated so as to fit into the space allotted and to exhibit a minimum resistance to airflow.

2.0 PRODUCTS

2.01 DUCT LINER

A. Duct liner shall be one inch thick, 1 ½ lb. density fibrous glass with one face coated with a black fire retardant compound. The permanent composite fire and smoke hazard rating of the liner shall be stenciled on the liner face and shall be:
1. Maximum Flame Spread 25
2. Maximum Smoke Developed 50

2.02 TYPICAL DUCT INSULATION

A. Duct insulation shall be 2.2" thick, minimum 3/4 lb. density fiberglass, installed R ≥ 6.0, with an FSKL 0.00035" thick aluminum foil jacket, reinforced with fiberglass scrim. Thermal conductivity shall be a maximum of K = 0.29 at 75'F mean temperature, or a maximum of K=0.27 at 25% compression.

B. Insulation adhesive shall be Benjamin Foster 85-20. Tape shall be aluminum foil and shall be SMACNA listed and labeled.

C. The composite NFPA 90A and 90B, ASTM E84, UL rating of the installed insulation shall not exceed 25/50.

D. The grease exhaust ductwork shall have zero-clearance to combustibles wrap from the hood connection to discharge termination. Coordinate the insulation with all required access panels, drains, etc. as required by NFPA 96.

2.03 INSULATION FOR GREASE EXHAUST DUCTWORK

A. Grease exhaust ductwork insulation shall be fire-wrap, 3M Fire Barrier, Unifrax FyreWrap, or equal, as necessary to reduce the maximum ductwork surface temperature to 120'F or less or as required by the clearances to combustibles, limited-combustibles, and non-combustibles.

B. Ductwork and insulation may be provided as part of a complete zero-clearance to combustibles system, Ampco, Metal-Fab, Zero-Clear, Schebler, Captive-Aire, or approved equal and shall be listed and labeled in accordance with UL 2221. Coordinate all access hatches, drains, etc. as required by NFPA 96. System shall be complete with drains, access hatches, flanged sections rated for passing through rated walls, etc. as required by NFPA 96.

3.0 EXECUTION

3.01 INSTALLATION

A. Ductwork shall be installed in strict accordance with SMACNA, UL, and NFPA standards.

B. Duct liner shall be provided throughout all return air, transfer, and plenums. Duct liner shall also be provided for the following minimum distances, through the first elbow(s), or as otherwise indicated on the drawings, whichever is greater, downstream of each unit indicated below:
1. Packaged rooftop unit – 25 ft
2. Split system air handling unit – 5 ft

C. Straight runs only shall be factored into the above distance requirements. Elbows, etc. within the length shall be lined but shall not count towards the length requirement.

D. Duct liner shall not be installed within six inches of a damper, including fire and/or smoke dampers. Metal nosings are required on the upstream side of the exposed insulation. Where lining has been interrupted, external insulation is required.

E. Duct liner shall be cut to provide overlapped and compressed longitudinal corner joints. Liner shall be installed with the coated surface facing the air stream. Duct liner shall be adhered to the ductwork with a 100% coverage of the sheet metal surfaces using a fire-retardant adhesive applied by spraying. Coat all exposed leading edges and all transverse joints with fire retardant adhesive. The liner shall be additionally secured using metal pins welded to the duct and speed washers. All leading edges shall be secured with sheet metal airfoils.

F. Inside the vapor barrier of the building: All supply air ductwork which is not lined shall be insulated. All outside air ductwork shall be insulated. Insulation shall be cut slightly longer than circumference of duct to insure full thickness at corners. All insulation shall be applied with edges tightly banded. Insulation shall be adhered to duct with fire resistant adhesive. Adhesive shall be applied so that insulation conforms to duct surfaces uniformly and firmly. In addition to the adhesive, the insulation shall be additionally secured to the bottom of all ducts 18" or wider by means of welded pins and speed clips. The protruding end of the pins shall be cut off flush after the speed clips have been applied. The vapor barrier facing shall be thoroughly sealed with tape where the pins have pierced through. All joints shall be sealed with 2" wide SMACNA tape. Any cuts or tears shall be sealed with SMACNA tape.

G. If the grease exhaust ductwork is route to within 18" of combustibles, 9" of limited combustibles, or 3" of non-combustibles, it shall be insulated. These requirements include any partitions, walls, floors, ceilings, roofs, etc. that the ductwork may penetrate.

H. All outside air ductwork located in conditioned or semi-conditioned spaces shall be externally insulated similar to supply ductwork.

END OF SECTION

SECTION 23 11 23

NATURAL GAS PIPING

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for Plumbing Section 22 05 00.

B. This Section 23 11 23 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the systems as specified herein and as shown. These systems include, but are not limited to, the following:
1. Natural gas systems

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete and operable system as shown and specified which is free of leaks, properly vented, free of unreasonable noise, vibration, and fabricated so as to fit the space allotted.

B. The word "piping" is defined to mean all piping, fittings, joints, hangers, coatings, valves, cocks, and accessories necessary for the system described, shown, and specified.

1.03 GENERAL REQUIREMENTS

A. Provide all reducing fittings, flanges, couplings and unions of the size and type of material to match the piping connections at each fixture, piece of equipment, valve, and accessory.

B. All pipe and fittings shall be products of a domestic Manufacturer.

C. Union joints, couplings or flanges shall be provided in each pipe line connected to each piece of equipment, fixture and elsewhere as indicated and specified. Unions shall match the piping system in which they are installed.

1. Unions or flanges shall be provided between all copper to steel connections. These unions shall be dielectric, insulating type.

D. All changes in direction and branches shall be made with manufactured fittings.

E. All pipe joints shall be cut square and all burrs shall be removed.

F. Open ends of pipe lines not currently being handled shall be plugged during installation to keep dirt, water, and foreign material out of the system.

G. This scope shall be part of Division 22 scope unless otherwise arranged within the Contract. Coordinate with Division 22.

1.04 IDENTIFICATION OF PIPING

A. See specification Section 22 05 00 for all requirements.

B. In addition, the natural gas piping shall be painted yellow, in accordance with ANSI standards, with paint suitable for the piping location. Paint shall be corrosion-resistant and continuous through all supports, penetrations, sleeves, etc.

2.0 PRODUCTS

2.01 NATURAL GAS PIPING

A. Piping shall be Schedule 40 black steel complying with ANSI B36.10 or ASTM A 53. Fittings shall be steel or malleable iron. Joints shall be threaded or welded.

B. Gas cocks shall meet ANSI B16.33.

2.02 PIPE HANGERS AND SUPPORTS

A. See specification Section 22 05 00 for all requirements.

2.03 REGULATORS

A. Regulators shall be appropriate for the installation in which they are installed, including weather-rated as appropriate. Provide and install all accessories as necessary.

B. Regulators installed inside or within 15' of any outside air intake, including doors and operable windows, shall be ventless. Where ventless regulators are not available, regulator shall have vent piped to outside in accordance with manufacturer's recommendations. Route and size shall be in accordance with manufacturer's recommendations.

3.0 EXECUTION

3.01 ARRANGEMENT

A. Follow the general piping layout, arrangement, schematics and details. Provide all offsets, vents, drains and connections necessary to accomplish the installation. Fabricate piping accurately to measurements established at the project site to avoid interference with ductwork, other piping, equipment, openings, electrical conduits and light fixtures. Make suitable provision for expansion and contraction with expansion loops and offsets.

3.02 MINIMUM HANGER SPACING

A. See specification 22 05 00 for all requirements.

3.03 INSTALLATION

A. Piping not subject to corrosion (i.e. polypropylene) does not require a PVC sleeve.

B. Piping installed outside shall be elevated above grade a minimum of 3.5" and shall be securely supported.

C. Piping penetrating floor slabs, walls, etc. shall be protected from damage and corrosion as required by Code.

D. Regulators shall be provided under this scope for each gas-fired equipment without appropriate regulators provided by the Equipment Manufacturer. Coordinate with all equipment. Regulators shall be appropriate for the pressures and capacity of the equipment and installation location.

3.04 TESTING AND PURGING

A. All new gas piping shall be pressure tested at 3 psi or 1.5 times the design pressure, whichever is greater, for a time period of 0.5 hours per 500 cubic feet of pipe volume, not to exceed 24 hours.

B. All gas piping 2.5" and larger shall be purged with an inert gas prior to operation, with the piping purge lengths as required by Code.

END OF SECTION

SECTION 23 23 00

REFRIGERANT PIPING SYSTEMS

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC 230500.

B. This Section 23 23 00 and the accompanying drawings cover the provisions of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the piping systems as specified herein and as shown for the heating, ventilating and air conditioning (HVAC) systems. These piping systems include, but are not limited to, the following:

1. Refrigerant suction and liquid piping (RS&RL)
2. Condensate drains (DR)
3. Refrigerant suction and liquid piping insulation

C. All insulation products installed indoors shall meet ASTM E 84, UL 723, NFPA 90A, and 90B requirements for Flame Spread Rating 25 and Smoke Developed Rating 50.

D. Insulation products in air plenum spaces shall be listed and labeled and have a fire hazard rating not more than 25 for flame developed and not more than 50 for smoke developed.

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete and operable piping systems as shown and specified which are free of leaks, properly vented, free of noise, vibration, and sweating, and fabricated so as to fit the space allotted and to exhibit a minimum resistance to fluid flow. It is also the intent of this Section of the specifications to provide a complete piping insulation system which is free of gaps and tears, properly fitted and finished, free of sweating, and fabricated so as to fit the space allotted and to exhibit a negligible heat transfer.

B. The word "piping" is defined to mean all piping, fittings, joints, hangers, coatings, valves, test and sensor wells and accessories necessary for the refrigerant piping systems described, shown, and specified.

1.03 GENERAL REQUIREMENTS

A. Provide all reducing fittings, flanges, couplings and unions of the size and type of material to match the piping to each piece of equipment, valve, and accessory.

B. Union joints, couplings or flanges shall be provided in each pipeline connected to each piece of equipment and elsewhere as indicated and specified. Unions shall match the piping system in which they are installed.

1. Unions or flanges shall be provided between all copper to steel connections in water-carrying piping. These unions shall be dielectric, insulating type.

C. All changes in direction and branches shall be made with manufactured fittings.

D. All pipe joints shall be cut square and all burrs shall be removed.

E. Fabrication of a bull-head tee connection is strictly prohibited.

F. Open ends of pipelines not currently being handled shall be plugged during installation to keep dirt, water, and foreign material out of the system.

G. Horizontal refrigerant and drain piping shall slope down in the direction of flow at a minimum slope of 1/8" per foot of run.

H. All insulation products installed indoors shall meet NFPA 90A, 90B and 255 requirements for Flame Spread Rating 25 and Smoke Developed Rating 50.

1.04 FIRE-STOPS

A. Where pipes pass through fire partitions, fire walls and floors, install a fire-stop that shall provide an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight and completely fill clearances between pipes and openings. Fire-stop material shall conform to the following:
1. Fire-stopping material shall maintain its dimensions and integrity while preventing the passage of flame, smoke, and gases under conditions of installation and use when exposed to the ASTM E119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Fire-stopping material shall be noncombustible as defined by ASTM E136; and in addition, for insulation materials melt point shall be a minimum of 1700'F for 1-hour protection and 1850'F for 2-hour protection. Fire-stopping material shall be Dow-Corning RTV Foam or an approved equal.

1.05 ACCEPTABLE MANUFACTURERS

A. Insulation products shall be as manufactured by Owens Corning, Knauf, Manville, Certainteed, Dow, or Armacell.

2.0 PRODUCTS

2.01 PIPE AND FITTINGS

A. All pipe and fittings shall be products of a domestic manufacturer.

B. Pipe and fittings shall be as listed and outlined below:

SERVICE		MATERIAL TYPE	SIZES
1. Refrigerant Suction and Liquid	1	All	
2. Drains*	2	All	

*Note: As an option, on cooling coil condensate drains (which are not installed in a plenum) the drain piping may be schedule 40 PVC with solvent joints; subject to advance approval by the Local Authorities. Fittings shall meet ASTM D2466 and solvent shall meet ASTM D2564.

C. The pipe, fittings and joints shall be as outlined below:
1. Material Type 1:
a. Pipe – Type L hard drawn copper tubing meeting ASTM B88 or ASTM B280.
b. Fittings – Wrought copper meeting ASTM B16.22.
c. Joints – Silver brazed with sil-fos or silver solder.

2. Material Type 2:
a. Pipe – Copper drainage tube DWV meeting ASTM B306.
b. Fittings – Wrought copper solder-joint drainage fittings meeting ASME B16.29.
c. Joints – Soldered with a solder meeting ASTM B32.

2.02 PIPE HANGERS AND SUPPORTS

A. Pipe hangers, trapeze hangers, upper attachments, rods, and other supports shall be selected based on pipe size and material contained therein. Provide all hangers, rods, turnbuckles, angles, channels, and other supports to securely support the piping systems from the building structure.

B. All materials utilized for the hanging and support of the piping systems shall be manufactured products which are specifically intended for the purpose of hanging piping systems. The use of wire, steel straps, plastic ties, etc. is strictly prohibited.

C. Supports and hangers shall be selected to fit around the pipe (and insulation unless otherwise specified herein) and provide adequate movement for expansion of the piping systems. Anchors shall be provided to restrict and control such movement within offsets and expansion loops.

D. All hangers and supports shall be selected at a minimum factor of safety of five based on the ultimate tensile strength of the material.

E. Intermediate pipe supports shall be provided between building structural members so as not to exceed maximum support spacing specified and shall be structural steel angles (minimum 2 1/2" x 2 1/2" x 1/4"). In steel construction, intermediate supports shall be securely clamped to steel beams and to steel joists, and in no case shall supports be attached to roof decks.

F. For suspending pipes from concrete beams, upper attachments shall be side beam bracket utilizing bolts in sleeves set in top portions of the beams. Where sleeves are not used, provide expansion shields or power-actuated fasteners.

G. Hanger rods for pipe hangers shall be as follows:

HANGER ROD SIZE	NOMINAL PIPE SIZE
3/8"	2" and smaller
1/2"	2 1/2" and larger

H. Pipe hangers selected for supporting horizontal insulated piping shall be sized to fit around the outside of the pipe insulation.

I. Provide pipe saddles and shields on all insulated piping as outlined below:
1. All insulated piping shall be supported on galvanized shields.

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DATE SIGNED: 07/25/25
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
SPECIFICATIONS - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.7

a. Shields shall be as follows:
   (i) Pipes 2" and smaller: 18-gauge x 12" long.
   (ii) Pipes 2 1/2" and larger: 16-gauge x 18" long.
   (b) Shields shall be 180 degrees around the lower half of the pipe at all pipe hangers, except that on trapeze hangers, pipe racks and floor supported horizontal pipes, shields shall be 360 degrees around the entire pipe.

J. All piping installed outside the building shall be secured to the structure. Coordinate with the Structural Engineer as needed. It is the Contractor's responsibility to design and coordinate all supports. All supports shall be designed to withstand all code-required wind and seismic loads.

K. Wind and seismic roof supports for piping shall be Mifab CZ or approved equal.

2.03 VALVES

A. All valves shall have the manufacturer's name or trademark and the working pressure cast or stamped on the valve body.

B. All valves shall be designed and constructed for refrigerant service.

2.04 PIPING INSULATION

A. Flexible elastomeric foam closed-cell insulation shall be provided over all refrigerant suction piping, cooling coil condensate, and other services as specified or noted. Refrigerant suction piping insulation shall be 1-1/2" thick 25/50 AP Armaflex, black. Insulation shall be wrapped by listed and labeled product in return air plenums. Cooling coil condensate insulation shall be 1" thick ArmaFlex Ultra. All glues and coatings shall be products of the same Manufacturer as the insulation. Insulation shall comply with ASTM C534, Type I for tubular materials. Insulation shall be listed and labeled per UL 723 at 25/50 when used in return air plenums.

B. Insulation shall be continuous over all valve bodies, fittings, and wall and floor penetrations.

3.0 EXECUTION

3.01 ARRANGEMENT

A. Piping shall follow the general layout, arrangement, schematics, and details. Provide all offsets, vents, drains, charging ports and connections necessary to accomplish the installation. Fabricate piping accurately to measurements established at the project site to avoid interference with ductwork, other piping, equipment, openings, electrical conduits and light fixtures. Make suitable provision for expansion and contraction with expansion loops and offsets.

3.02 MINIMUM HANGER SPACING

A. Pipe hangers or supports shall be provided within 18" of each horizontal fitting, equipment connection, valve, etc. and at not more than the following spacings along horizontal runs of straight, plain piping:

Pipe Size	Maximum Span
2" and smaller	8 ft.
2 1/2" and larger	12 ft.

3.03 REFRIGERANT PIPING INSTALLATION

A. All refrigerant piping shall be sized in accordance with the air conditioning equipment manufacturer's written instructions. Provide charging ports, solenoid valves, service valves, dryers, etc. at each piece of equipment.

B. All brazing shall be done while the line is being flushed with carbon dioxide, nitrogen, or other inert gases.

C. The inside of all tubing shall be thoroughly cleaned and internally wiped with a lintless, dry cloth.

D. Suction lines shall drop below their coils before any horizontal run.

E. Provide oil traps at least every ten feet for extended vertical risers.

F. All oil traps shall be constructed from close-radius type fittings.

G. Dryer cores shall be installed to remove horizontally or downward.

H. Install external equalizer downstream of its expansion valve sensing bulb.

I. Install expansion sensing valve bulb on top centerline of piping up to 5/8" size; install 45 degrees down from the horizontal centerline on pipe sizes 7/8" and larger.

J. Refrigerant piping located in concealed locations shall be located a minimum of 1.5" from studs, joists, or similar members or shall be continuously protected by steel shield plates minimum 0.0575" thick, a minimum of 2" beyond the adjacency.

K. Refrigerant piping shall be identified, on the outside of any insulation as applicable, in accordance with ANSI A13.1 in intervals not exceeding 20' and within 5' of assembly penetrations. Identification shall indicate refrigerant designation and safety group classification. A2L refrigerants shall include the label "WARNING - Risk of Fire. Flammable Refrigerant.".

L. Refrigerant piping shall be tested in accordance with ASME B31.5. Piping shall be pressurized at the lower of the lowest design pressure or lowest pressure relief setting. The design pressures shall be listed on the condensing unit nameplate.

M. The Installing Contractor shall sign and issue a certificate of piping test in accordance with ASHRAE 15 for all systems with 55 lbs or more of refrigerant. The certificate shall indicate the test date, photograph of the pressure gage at test pressure, refrigerant designation, test medium, and the field test pressure on the high and low sides of the system.

N. Each refrigeration system shall have a permanent legible sign, securely attached, indicating the name and address of the Installer, the refrigerant number and amount, the lubricant identity and amount, and field test pressure.

3.04 CLOSED-CELL PIPING INSULATION INSTALLATION

A. Insulation shall be provided on all refrigerant suction and indoor cooling coil condensate drain lines. The insulation shall be installed by the slip-on method; slitting of the insulation is prohibited and shall be cause for rejection, except that AP ArmaFlex Lapseal with interior adhesive liner and wide adhesive lap seal is acceptable. All elbows shall be mitered, and all such joints and butt joints shall be tightly made and glued.

B. All insulation installed outdoors shall be coated with a glossy white, ultraviolet protective coating applied in two coats.

3.05 OWNER'S RESPONSIBILITIES

A. Note that the Owner shall be responsible for periodic tests of detectors, alarms, mechanical ventilation, etc. in accordance with Manufacturer's specifications and requirements, and the requirements of the AHJ.

B. For systems containing 55 lbs or more of refrigerant, the person in charge of the premises shall provide a schematic drawing giving directions of operation of the system. Emergency shutdown procedures, including precautions in case of a breakdown or leak, shall be posted near the refrigerant compressor and address the shutdown instructions, the contact information to obtain service, the contact information for all entities to be contacted in the event of a reportable incident.

END OF SECTION

SECTION 23 31 00

HVAC DUCTS, ACCESSORIES, AND CASINGS

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 31 00 and the accompanying drawings cover the provisions of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the ductwork systems as specified herein and as shown. These systems include, but are not limited to, the following:
1. Supply air ductwork
2. Return, transfer and relief air ductwork
3. Exhaust ductwork
4. Grease exhaust ductwork (from kitchen hoods)
5. Outside air ductwork
6. Ductwork accessories

1.02 INTENT

A. It is the intent of this Section of the specifications to provide a complete operable duct system as shown and specified which is reasonably airtight, free of noise, vibration and sweating, and fabricated so as to fit into the space allotted and to exhibit a minimum resistance to airflow.

1.03 DESIGN AND CONSTRUCTION - DUCTWORK

A. Ductwork shall be provided in strict accordance with the third edition - 2005 - of the SMACNA HVAC Duct Construction Standards - Metal and Flexible, NFPA No. 90A, 90B, 91 and 96, and UL 181. Where SMACNA tables have an option between different gauges and supports, the heavier gauge shall be used.

B. Ductwork dimensions shown are net, clear, inside dimensions with no allowance shown for duct liner. All ductwork specified to be lined shall be 2" larger than shown in each dimension to compensate for the liner. Ductwork shall be square, rectangular, round, spiral or flat oval as noted. Conversion of duct shapes and sizes shown shall be accomplished without increasing air velocities or friction losses and is subject to prior approval by the Architect and Engineer.

C. Elbows shall be either full radius type (inside radius equal to duct width), five-gore radiused flat-oval type or, in low pressure systems only, mitered with double-thickness turning vanes except that lined ductwork for low pressure returns and transfers shall not have turning vanes.

D. Abrupt changes in duct sizes and shapes shall not be permitted. The total angle of diverging transitions shall be not more than 15 degrees; converging transitions shall be not more than 30 degrees unless otherwise noted or required due to structural constraints.

E. Offsets, transitions, rises and drops are not individually called out on the Design Drawings. They shall be provided as required to fit the ductwork into the allocated spaces.

F. Transition rectangular ductwork on bottom and sides. Maintain top of ductwork level and as high as possible.

G. All ductwork shall be constructed for standard 1" WC static pressure class at 2500 FPM with Class C seals and is herein defined as "low pressure ductwork".

H. Grease exhaust ductwork joints shall be continuously welded and be liquid tight.

I. Provide the following types of ductwork material for the services indicated:

1. Galvanized sheetmetal: supply, return, exhaust, outside air
2. Black steel: grease exhaust

2.0 PRODUCTS

2.01 GALVANIZED SHEETMETAL

A. Galvanized sheetmetal shall be lock-forming grade G90-ASTM A 653 hot dip galvanized steel sheets. Sheetmetal shall be galvanized with not less than 0.90 ounces of zinc per square foot on both sides of the sheet.

2.02 SPIRAL DUCT

A. Spiral duct shall be utilized for all flat-oval and round ductwork in medium and high-pressure systems.

B. Spiral duct shall be the product of United McGill Corporation, R.V. Money, Eastern Sheet Metal, or an approved equal.

C. Spiral duct with internal ribs is not acceptable.

D. Spiral duct shall conform to SMACNA 2005 Standards. Lighter gauges, etc. due to standing ribs are not acceptable.

E. Spiral duct in exposed ceiling applications shall have slip fittings, minimum Class 3 for 2" WG negative pressure to 10" WG positive pressure, with EPDM gaskets. Coordinate assembly with ductwork insulation.

2.03 DOUBLE-WALL DUCTWORK

A. See Section 23 07 13 for insulation. Ductwork installed inside a building shall have duct liner insulation sandwiched between two (2) layers of sheetmetal in accordance with SMACNA standards. All joints shall be permanently sealed airtight. Inner ductwork shall be perforated.

2.04 BLACK STEEL

A. Black steel utilized for grease exhaust ductwork shall be minimum 0.054" thick (16 gauge MSG) black carbon steel.

B. Access panels shall be secured to the duct in a similar manner to the prescribed in NFPA 96-2011 for the hood-to-duct connection.

C. Ductwork shall have access panels, traps, slope, etc. as required by NFPA 96-2011 and the prevailing Code.

D. Grease exhaust ductwork shall be constructed with smooth elbows and transitions. There shall be no obstructions that could collect grease, including but not limited to: flanges, ductwork overlaps, transitions, turning vanes, access hatch lips, etc.

2.05 DAMPERS

A. Manual Volume Dampers

1. Single blade butterfly dampers are acceptable up to 12" round or 12" x 12" square. Dampers larger than these dimensions shall be multi-blade type. Single blade dampers shall be constructed of 16 gauge or heavier galvanized sheetmetal.

2. No multi-blade damper blade shall exceed 8" in width. All multiple blade dampers shall be constructed of 16 gauge galvanized steel or heavier. The damper frame shall be 16 gauge or heavier. The damper action shall be opposed-blade type.

3. Each blade shall pivot on a 1/2" cadmium plated, cold-rolled steel axle which pivots within self-lubricating, Oilite bronze bearings.

4. The top and bottom edges of each rectangular damper blade shall be crimped for stiffness.

5. The operating rod for all dampers shall be extended outside the damper frame for attachment of an operator. Each operator shall have a position indicator and locking quadrant.

6. All dampers utilized for introduction of outside air shall have flexible, gasketed edge and end seals. The leakage rate shall be less than 4 CFM per SF of face area against a 1" WC differential pressure, based on a nominal 48" x 48" damper size.

7. All dampers utilized for exhaust or relief air shall have flexible, gasketed edge and end seals. The leakage rate shall be less than 4 CFM per SF of face area against a 1" WC differential pressure, based on a nominal 48" x 48" damper size.

8. Dampers to be installed in insulated ductwork shall have standoffs sufficient to allow for insulation and vapor barrier integrity.

9. Manual volume dampers shall be as manufactured by Louvers & Dampers, Inc., Pottorff, Greenheck, Nailor, Ruskin, or an approved equal.

B. Control Dampers

1. Control dampers shall be of the same construction as manual volume dampers, except that no manual operator and quadrant is required. The operating rod shall be suitable for operation by an automatic pneumatic or electric operator.

C. Backdraft Dampers

1. Backdraft dampers shall be sized according to their installation location and noted pressure setting. Damper pressure setting shall be adjustable and shall be accessible from outside ductwork or via access hatch, as applicable.

2.06 LOW-PRESSURE DUCT BRANCHES

A. Splitter dampers shall be provided at all low-pressure ductwork branches. All low-pressure ductwork branches shall be radiused or 45 degree take-offs; straight taps are unacceptable. The length of the damper blade shall be the same as the width of the widest duct section at the split, but in no case shall blade length be less than 12". Each operator rod shall have a locking swivel joint.

2.07 FLEXIBLE DUCT

A. Flexible ductwork shall be Class 1, UL 181 air duct and meet NFPA 90A and 90B Standards.

B. The internal duct surface shall be acoustically rated, core layers bonded to a coated steel wire helix. The external jacket shall be a fiberglass, bi-directionally reinforced, metallized vapor barrier with a standing, triple ply seam. Fiberglass insulation shall be provided between the duct surface and the jacket to achieve a minimum R-4.2. Any flex duct outside the building thermal envelope shall be R-8 in Climate Zones 1-4 and R-12 in Climate Zones 5-8.

C. Flexible ductwork shall be suitable for 10" WG positive pressure and 0.5" WG negative pressure in sizes 4" through 12" ID, and 6" WG positive pressure and 0.5" WG negative pressure in sizes 14-16" ID.

D. Flexible ductwork, insulation and insulation cover shall be suitable for ceiling return air plenum installation and shall comply with all applicable codes and standards regarding such ceiling plenum installations.

E. Flexible duct shall be ATCO or an approved equal.

F. The maximum allowable installed length of flexible ductwork shall be as follows:

1. 8'-0" on low-pressure supply air systems limited to short runouts and end of runs connected to round neck supply diffusers and registers.

2. 2'-0" on connections from round neck grilles to sheetmetal ductwork on return, exhaust and transfer ductwork.

G. Provide a spin-in fitting with integral scoop and volume damper at all flexible run-out connections in low-pressure supply air ductwork only, except locations where spin-in fittings would project more than 50% into the projecting ductwork dimension.

H. Flexible ductwork shall not pass through wall, floors, or ceilings.

2.08 FLEXIBLE CONNECTIONS

A. Provide flexible duct connections at the inlet and outlet of each belt-driven fan, indoor unit, fan coil unit, air handling unit, etc., and at all other locations indicated. Flexible connections shall be fabricated from a gloss fabric coated on both sides with neoprene. Minimum weight shall be 30 oz. per sq. yard. Flexible connections shall be used for vibration isolation only and shall not be used to correct connection misalignment.

2.09 DUCT HARDWARE

A. Duct hardware shall be as manufactured by Young Regulator or an approved equal.

3.0 EXECUTION

3.01 INSTALLATION

A. Ductwork shall be installed in strict accordance with SMACNA, UL, and NFPA standards.

B. Flexible ducts utilized in the low-pressure ductwork systems shall be installed without kinks or bends which are less than a centerline radius equal to or greater than twice the diameter of the flexible duct being installed.

C. Ductwork labels, including factory labels, tags, etc. except equipment nameplates shall be removed to the satisfaction of the Architect in all exposed areas.

D. Dampers shall be adjustable. Where dampers are not or will not be accessible without access panels, provide and install remote balancing cable control system, Young Regulator or equal. Adjustment shall be from a nearby accessible area.

E. Ductwork exposed to sight from tenant spaces or common areas shall be:
1. Round or oval ductwork shall be spiral with single-wall, internally-insulated Johns Manville Spiracoustic Plus. Ductwork shall be supported with aircraft cable. System shall be installed in accordance with Manufacturer's recommendations.
2. Rectangular ductwork shall be single-wall, internally-insulated. Ductwork shall be supported with rod and Unistrut or trapeze wire suspension system as selected by Architect.

END OF SECTION

SECTION 23 34 00

HVAC FANS

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 34 00 and the accompanying drawings cover the provision of all labor, equipment, appliances and materials, and performing all operations in connection with the construction and installation of the fans as specified herein and as shown. These fans include, but are not limited to the following:
1. Roof-mounted upblast exhaust fans
2. Ceiling/cabinet fans

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, adjusted fans as shown and specified which are free of excessive noise, vibration and airflow fluctuations.

1.03 BASIS OF DESIGN

A. The basis of design is as scheduled. Any proposed substitutions shall be proven equal in all aspects to the equipment specified as the basis of design. Particular attention is called to the requirements of Section 23 05 00.

1.04 ACCEPTABLE SUBSTITUTE MANUFACTURERS

A. Acceptable substitute manufacturers are Carnes, Cook, Acme, PennBarry, Twin City, Price, and Greenheck. Acceptable manufacturers for kitchen grease exhaust fans are Captive-Aire, Viking, and Greenheck.

2.0 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. All non-filtered fans shall be factory tested, rated and certified in accordance with the requirements of AMCA Standard No. 210 and shall be labeled accordingly. Filtered fans may be non-labeled but must be rated in an AMCA approved laboratory in accordance with 210.

B. All roof-mounted fans shall be constructed such that water cannot enter the building through the fan regardless of whether or not the fan is operating. Fans shall be provided with drain connection and piped to the nearest roof drain as applicable.

C. Fans installed outside or otherwise subject to weather shall have a weatherproof enclosure over the motor compartment. All components, including VFDs, shall have enclosures and be appropriate for the installation locations.

D. All roof-mounted fans shall be provided complete with roof curbs. Roof curbs shall be of aluminum construction, insulated, canted and complete with wood nailer strips. Insulation shall meet NFPA 25/50 flame spread/smoke developed ratings.

E. All exhaust fans (except those utilized for grease exhaust service) shall be provided complete with gravity-type backdraft dampers.

F. All electric motors and equipment shall be UL labeled.

G. Refer to Division 26 of these specifications and to the electrical Contract Drawings for electrical characteristics and connections to all equipment. Coordinate all electric motors and other equipment with these electrical documents.

H. All kitchen grease exhaust fans shall be listed by UL 762 and cUL, and meet all requirements of NFPA 96 and all applicable local codes.

I. Roof curbs for kitchen exhaust fans shall meet NFPA 96 requirements. Specific attention is called to clearance requirements.

J. All motors associated with kitchen exhaust fans shall be located outside of the airstream.

2.02 CEILING/CABINET EXHAUST FANS

A. Ceiling/cabinet exhaust fans shall be Greenheck Model SQ, or an approved equal. Fans shall be provided with speed controller for balancing.

2.03 ROOF-MOUNTED KITCHEN UPBLAST EXHAUST FANS

A. Roof-mounted kitchen exhaust fans shall be as scheduled, or an approved equal.

3.0 EXECUTION

3.01 INSTALLATION

A. Fans shall be installed as indicated and in conformance with the manufacturer's recommendations. Coordinate the actual units to be provided with all trades.

3.02 ADJUSTMENT

A. The fans shall be tested and adjusted after installation to provide the capacities indicated.

END OF SECTION

SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 37 13 and the accompanying drawings cover the provisions of all labor, equipment, appliances and materials, and performing all operations in connection with the construction and installation of air distribution devices as specified herein and as shown. These units include, but are not limited to the following:
1. Exhaust Grilles (EG)
2. Supply Registers (SR)
3. Curved Supply Registers (CSR)
4. Return Air Registers (RAR)
5. Round Diffusers (RD)

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, adjusted air distribution devices as shown and specified which are free of excessive noise, vibration and airflow fluctuations.

1.03 SELECTION CRITERIA

A. All air distribution devices shall be selected in accordance with the following minimum criteria unless otherwise noted below or on the drawings:

1. Method of mounting shall be compatible with the ceiling, wall or duct surface which it mounts on or in; i.e. lay-in, surface mounting, plaster frame, duct collar, etc. The architectural drawings shall be referenced to determine the mounting method for each device. All flanges on surface mounted devices shall be provided with a gasket.

2. Finish of all ceiling mounted devices shall be selected to match the color of the adjacent ceiling. Finish of all wall mounted devices shall be primer which is compatible with the finish coating specified for the adjacent wall; finish coat will be applied under Division 9.

1.04 BASIS OF DESIGN

A. The basis of design is Titus. Any proposed substitutions shall be proven equal in all respects to the equipment specified as the basis of design. Any modifications to ductwork, controls, ceilings, building structure, etc., that result from any substitution shall be coordinated with all trades. This coordination shall occur before delivery of equipment and any modifications shall be performed without incurring additions to the Contract.

1.05 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers are Price, Carnes, Metal Aire, Krueger, Nailor, and Titus UON, provided that their units, performance, appearance and physical characteristics are equal in all respects for this specific project.

2.0 PRODUCTS

2.01 DESCRIPTION

A. Exhaust Grilles (EG)

1. Exhaust grilles shall be hollow core, perforated face, lay-in type; Titus PAR. Opposed blade dampers shall be provided with each EG. Performance data shall be in accordance with ADC 162R4. All other characteristics shall be equal to the ceiling diffusers.

B. Supply Registers (SR)

1. Supply registers shall be surface mounted, steel with aluminum blades, adjustable double-deflection type complete with opposed blade dampers for balancing purposes. The outermost set of deflection blades shall be parallel to the long dimension of the SR and the innermost set of deflection blades shall be parallel to the short dimension of the SR. The registers shall be tested in accordance with ADC standards and shall be selected to provide design airflow at a maximum NC of 35. SRs shall be Titus 272R.

C. Curved Supply Registers (CSR)

1. Curved registers shall be duct mounted, aluminum, radius end cap, radius to match the installation duct system, adjustable double-deflection type complete with air scoop dampers for balancing purposes. The outermost set of deflection blades shall be parallel to the long dimension of the CSR and the innermost shall be parallel to the short dimension of the CSR. The register shall have foam gasketing. The register shall be tested in accordance with ADC standards and shall be selected to provide design airflow at a maximum NC of 35. CSRs shall be Titus S300F and be mounted directly to the duct where not externally insulated, or flush with the exterior insulation, as applicable.

D. Return Air Registers (RAR)

1. Return air registers shall be surface mounted, steel registers with curved hemmed edge blades with an opposed blade damper. Damper blades shall be gang operated by means of a key which can be removed after balancing. RARs shall be Titus 350ZRL.

E. Round Diffusers (RD)

1. Round diffusers shall have four cone assembly; Titus TMRA. The airflow discharge pattern shall be field adjustable from horizontal to vertical. Diffuser performance data shall be in accordance with ADC equipment test code 162R4. Diffusers shall be tested in accordance with ADC standards and deliver airflow at a maximum NC of 35. Devices 12" diameter and larger shall have radial sliding blade damper (for secondary balancing) and equalizing grid. The register shall be tested in accordance

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NEW INTERIOR ALTERATIONS FOR:
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112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
SPECIFICATIONS - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.8

with ANSI Standard 70 and shall be selected to provide design airflow at a maximum NC of 35.

3.0 EXECUTION

3.01 INSTALLATION

A. Air distribution devices shall be installed as indicated and in conformance with the manufacturer's recommendations. The color, frame, and border types shall be coordinated with Architectural requirements and shall be selected to install in the finished surface indicated.

B. All air distributions devices to be reused shall be installed the same way as indicated for new devices. All existing color, frame, and border types shall modified as required to match new device requirements.

C. All air distribution devices with blade orientations shall be coordinated with Architect. Specific attention is called to devices in exposed ceiling areas, including wall-mounted.

3.02 ADJUSTMENT

A. Grilles, registers, diffusers, etc. shall be tested and adjusted to provide the scheduled air flow capacities.

B. All devices shall have adjustable and accessible volume dampers. Where dampers are not or will not be accessible without access panels, provide and install remote balancing cable control system, Young Regulator or equal. Adjustment shall be from the face of the air distribution device, coordinated with the Air Distribution Manufacturer. Coordinate the location and size of the damper with the installation.

C. All adjustable air distribution devices located within three feet of any wall or kitchen hood shall be set to blow directly away from, or parallel to, the wall or hood. All air distribution patterns near kitchen hoods shall be coordinated with the Kitchen Hood Manufacturer.

END OF SECTION

SECTION 23 74 00

PACKAGED OUTDOOR HVAC EQUIPMENT

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 74 00 and the accompanying drawings cover the provisions of all labor, equipment, appliances and materials, and performing all operations in connection with the construction and installation of the packaged rooftop units as specified herein and as shown. This work includes, but is not limited to, the following:
1. Packaged rooftop units including curbs and accessories
2. Control system (interlocked to the units)

C. Units shall be self-contained, rooftop curb-mounted, single package type. The rooftop units shall be completely factory-assembled as a unitary package complete with operating controls and shall be completely piped, internally wired and fully charged with refrigerant. Only one electrical power connection shall be required.

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, adjusted single package rooftop units, as shown and specified which are free of excessive noise and vibration.

1.03 BASIS OF DESIGN

A. The basis of design is as scheduled. Any proposed substitutions or equals by other manufacturers shall be proven equal in all respects to the equipment specified as the basis of design. Particular attention is called to the requirements of Section 23 05 00.

B. Acceptable substitute manufacturers are Trane, Carrier, and Daikin.

2.0 PRODUCTS

2.01 CURB

A. Each unit shall be provided with a full perimeter roof curb. The roof curb shall be of the same Manufacturer as the unit, shall support the unit and provide a watertight enclosure to protect ductwork and utility services. Curb design shall comply with National Roofing Contractors Association requirements. Supply/return air opening gasketing shall be provided. Channel shall be provided allowing for adjustment of return air opening location to match the building structural frame indicated.

B. All duct and utility connections shall be routed through bottom of unit within the curb perimeter.

2.02 UNIT CABINETS

A. Rooftop unit cabinets shall be formed, galvanized steel construction with welded base assembly. Galvanized steel surfaces shall be bonderized and painted with baked acrylic enamel for complete weather protection. All sheet metal screws shall be stainless steel. The outside air dampers shall be low leak gasketed dampers which must match and interlock with the single package rooftop units. Cabinets shall be fully insulated.

B. Unit cabinets shall be designed for curb mounting and mate with the full perimeter roof curb for a complete weathertight seal. Unit sides shall overhang the curb to form protective drip lip.

C. Access doors for the filter section and the fan section of all units sized 20 nominal tons and larger shall be hinged, walk-in type.

2.03 COMPRESSOR SECTION

A. Compressor section refrigeration system shall be factory charged, ready for operation, providing minimum two stage cooling capacity (50% and 100%) on units of over 5 tons capacity, minimum of three stages on units of nominal 20 and 25 tons and minimum of four stages on units larger than 25 nominal tons. Compressor protection shall include high and low pressure control, outdoor ambient protection, compressor sump heat, three-phase overload protection, anticycling timer providing a minimum five (5) minute time shut down of unit on interruption of power or automatic control shutoff. Compressors shall have factory-installed service valves, vibration isolators, crankcase heaters, liquid line sight glasses, filter driers, and liquid line service valves.

2.04 EVAPORATOR COILS

A. Coils shall be aluminum plate fins mechanically bonded to copper tubes. They shall be of an intertwined design for equal circuit loading and to ensure a fully active coil on part-load operation to provide evenly conditioned air. Aluminum tubes shall not be acceptable.

2.05 FANS

A. Fans shall be either single or double wheels, forward-curved, Class 1 type, and mounted on a common shaft with adjustable sheave drive. All fans shall be statically and dynamically balanced and tested in the factory. Fan shall not pass through its first critical speed in order to meet the scheduled performance. Fan shaft shall be mounted on not less than two grease-lubricated ball bearings with all fan wheels mounted inboard of the bearings. The fan and motor assembly shall be mounted on a common base; on units with motor sizes larger than five (5) HP, the entire assembly shall be isolated from the rest of the unit by double deflection vibration isolators.

B. Motors on VFDs shall have shaft-grounding rings.

2.06 GAS HEATING SECTION

A. Gas heating sections shall be mounted downstream of evaporator coils and shall be certified by AGA for use on natural gas. Heating shall be accomplished with a minimum of two stages on units 7.5 tons nominal and larger.

B. Heat exchanger shall be fabricated from stainless steel, stress-relieved and free-floating.

C. The unit shall utilize an electronic, spark-ignition pilot light; not a standing pilot.

D. Each heating system shall include an induced draft combustion air exhaust fan protected by centrifugal switches, heat limit switches, time-delay relay, flame roll-out switches and pilot sensors. Heating controls shall consist of a redundant gas valve, intermittent pilot ignition with electric spark ignition system. Each unit shall be AGA certified.

2.07 CONTROLS AND ACCESSORIES

A. All operating and safety controls shall be factory-installed and shall include solid state compressor overload protection, magnetic contactors, thermostatic expansion valve, refrigerant line drier and automatic damper motors.

B. Controls on electric heat section shall meet NEMA specifications and requirements.

C. During night setback operation, morning warm-ups after night setbacks and whenever the unit is off, the outside air dampers shall be fully closed and admit no outside air.

D. Interlocks shall be made to the duct-mounted smoke detectors in each unit's supply and return ductwork to shut the unit off and fully close the return air dampers to prevent migration of smoke upon its detection.

E. Provide a factory mounted disconnect and integral powered duplex GFI convenience outlet on all units. Coordinate with Division 26.

F. Provide downflow units with accessory condensate overflow switch in the primary drain pan. Switch shall be interlocked to shut the unit off in an overflow situation.

G. Provide with integral refrigerant leak detector. Upon detection, fan shall be fully enabled.

2.08 CONTROLS

A. A 24 volt transformer shall be provided to accommodate controls and accessories. Each unit shall be complete with an indoor thermostat and control panel complete with the following minimum list of features and capabilities:

1. Seven day programmable electronic thermostat for programming heating and cooling temperatures as well as night setback times and temperatures.

2. Battery back-up to protect the programs for up to 24 hours after a power failure.

3. Manual overrides and a failsafe program.

2.09 FILTERS

A. Units shall have 2-inch thick, low velocity throwaway filters in commercially available sizes. Filters shall be not less than 30%/30% average dust spot efficient when tested in accordance with ASHRAE Test Standard 52.2-2007; Farr 30/30 or an approved equal.

2.10 AIRSIDE ECONOMIZER

A. A differential enthalpy airside economizer shall be provided with each unit. The economizer shall be factory-assembled complete with dampers, electrical actuators, exhaust fans and all controls.

B. The outside air dampers shall be low-leakage type, with a maximum leakage of 3% at 3" WC static pressure. The dampers shall be spring operated to close during power failure.

C. The differential enthalpy sensor shall be adjustable for temperature and humidity setpoints.

D. If the cooling load is satisfied by the airside economizer alone, no mechanical refrigeration shall be initiated, and the economizer dampers shall be modulated to maintain the desired discharge air temperature. The economizer shall modulate up to its full open position to meet the cooling load. When the economizer is at its maximum outside air position and further cooling is required, mechanical refrigeration shall be utilized. When the enthalpy of the outside air is above its setpoint and during normal heating cycles, the outside air damper shall be at its minimum outdoor air position.

E. Provide with barometric relief on all units, set by T&B to maintain positive building pressure.

F. The position of the return and outside air dampers shall also be controlled as specified elsewhere in response to unit and external controls.

3.0 EXECUTION

3.01 INSTALLATION

A. The packaged rooftop units and associated controls shall be installed in strict accordance with the manufacturer's recommendations.

B. The control system shall be completely wired under this Division 23. Wiring shall be in accordance with the NEC and shall meet all requirements for this installation.

3.02 STARTUP

A. Provide the services of a factory-trained and qualified Service Technician employed by the Unit Manufacturer who shall inspect the installation including external control interlock and electrical power connections; supervise leak testing, initial operation, calibration of operating and safety controls and supervise electrical testing including insulation resistance of motors and voltage balance between phases during starting and running.

B. This Service Technician shall forward a report in four (4) copies to the Owner when the unit is in safe and proper operating condition. This report shall include all pressure and control settings, meg readings, voltage readings per phase during start and run, and shall list minor discrepancies to be corrected that affect safe and reliable operation. One additional copy of the report shall be left in the unit control panel. One copy of bound installation, operation, maintenance service and parts brochures, including applicable serial numbers, full unit description and parts ordering sources, shall be placed in the unit control panel at the time of startup; four (4) additional copies shall be forwarded to the Owner.

END OF SECTION

SECTION 23 74 23.13

PACKAGED, DIRECT-FIRED, OUTDOOR, HEATING-ONLY MAKEUP-AIR UNITS

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 74 23.13 and the accompanying drawings cover the provisions of all labor, equipment, appliances and materials, and performing all operations in connection with the construction and installation of the burners as specified herein and as shown. This work includes, but is not limited to, the following:
1. Burner assemblies
2. Gas train
3. Control system (interlocked to the gas train and central control system)

C. Units shall be completely factory-assembled as three (3) packages complete with individual "loose" control items for field mounting. The gas train shall be completely piped. The control panel shall be internally wired.

D. The only "loose" control items for field installation shall be:
1. Ignition transformer
2. UV flame scanner
3. Blower proving switch
4. Control thermocouple
5. High-limit thermocouple

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, adjusted burner units, as shown and specified, which are free of hot spots.

1.03 BASIS OF DESIGN

A. The basis of design is as scheduled. Acceptable substitutes are Greenheck, Captive-Aire, and Cambridge. Any proposed substitutions or equals by other manufacturers shall be proven equal in all respects to the equipment specified as the basis of design. Particular attention is called to the requirements of Section 23 05 00.

1.04 CERTIFICATION

A. Units shall be certified by AGA. Gas train shall be IRI/FM approved.

2.0 PRODUCTS

2.01 BURNER ASSEMBLY

A. Burner plates shall be stainless steel.

B. Burner bodies shall be ductile iron.

C. Burners shall be fully factory-assembled and complete with end plates, spark ignitor and pilot.

2.02 GAS TRAIN

A. Gas train components shall consist of not less than the following: main gas cock, main gas pressure regulator, main gas control valve, pilot gas cock, pilot gas pressure regulator, pilot solenoid gas valve, intermittent spark ignition system, high limit control and high and low pressure gas controls. Gas pressure regulators shall be capable of reducing 5 to 15 psig entering gas pressure to the required operating pressure. Where indoors, regulators shall be listed for unvented use.

B. Units shall be provided with solid state electronic modulating gas valve with duct mounted temperature sensor. Gas valve shall modulate down to 20% of rated input to provide constant leaving air temperature. The temperature selector shall be mounted in the control cabinet.

2.03 CONTROL PANEL

A. Cabinet shall be NEMA 12 construction with an enamel finish.

B. Alarm horn and indicator lights.

C. Step down transformers shall be provided as required.

D. Units shall be factory-wired for single point electrical connection.

E. Provide circuits and screw terminals for connection to fire alarm panel and central control system.

3.0 EXECUTION

3.01 INSTALLATION

A. Burner unit shall be installed where shown on Drawings in strict accordance with manufacturer recommendations. Do not mount rigidly to assure adequate expansion.

B. All piping, power and control wiring shall be provided to complete the installation.

END OF SECTION

SECTION 23 81 26

SPLIT-SYSTEM AIR-CONDITIONERS

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.

B. This Section 23 81 26 and the accompanying drawings cover the provision of all labor, equipment, appliances and materials, and performing all operations in connection with the construction and installation of the split systems as specified herein and as shown. This work includes, but is not limited to, the following:
1. Split system fan coil, heating section and condensing units
2. Control system (interlocked to all split system components)

C. Split system units shall be self-contained, automatic, packaged units. These units shall be completely factory-assembled as unitary packages complete with operating controls, internal wiring and piping and fully charged with refrigerant. Only one electrical power connection shall be required for each unit.

D. Units shall be UL listed and cooling capacities shall be certified in accordance with ANSI/AHRI 210/240.

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, adjusted split systems, as shown and specified, which operate efficiently and automatically, and are free of excessive noise and vibration.

1.03 BASIS OF DESIGN

A. The basis of design is as scheduled. Acceptable alternate manufactures include Trane, Carrier, Mitsubishi, Lennox, and Daikin for ducted systems, and Carrier, Mitsubishi, LG, Hitachi, and Daikin for ductless mini-splits. Any proposed substitutions shall be submitted in accordance with the prior approval requirements.

2.0 PRODUCTS

2.01 UNIT CASINGS

A. Unit casings shall be formed, galvanized steel construction with welded assembly. Galvanized steel surfaces shall be bonderized and painted with baked acrylic enamel for complete weather protection. Accessories and components shall match and interlock with all other split system components. Fan coil unit casings shall be fully internally insulated with liner which meets NFPA 25/50 flame spread/smoke developed ratings.

2.02 CONDENSING UNITS

A. Condensing unit refrigeration systems shall be factory-charged and ready for operation. All units with capacities greater than five (5) tons shall be provided with minimum 2-stage (50% and 100%) cooling. Compressor(s) shall be direct drive, 3600 RPM, hermetic reciprocating type with centrifugal oil pump, crankcase heater and internal pressure relief valve. Compressor(s) shall have internal spring isolation and sound muffling and exhibit minimum vibration transmission and noise. Anti-recycle timers shall be provided to prevent excessive cycling of compressors thru utilization of a minimum five (5) minute time shutdown of unit on interruption of power or controlled shutdown.

B. Condensing unit condenser fans shall be direct-driven, propeller blade type. Condensing unit heat rejection shall be vertically upward.

2.03 COILS

A. Evaporator and condenser coils shall be copper tubing mechanically bonded to heavy duty aluminum fins. Aluminum tubes shall not be acceptable.

2.04 ELECTRIC HEATING SECTIONS

A. Electric heating sections shall be UL listed with nickel-chromium open coil resistance heating elements. Each heater shall be protected by an automatic reset high-limit thermostat and manual reset high-limit thermostat for the primary and secondary overcurrent/thermal protection. A proof of airflow/fan interlock shall also be provided. Controls shall provide for multiple stage start-up and operation.

2.05 CONTROLS AND ACCESSORIES

A. All operating and safety controls which are internal to each unit shall be factory-installed and shall include, as a minimum, solid state compressor overload protection, magnetic contactors, thermostatic expansion valve(s), refrigerant line drier(s), outdoor fan and compressor cycling thermostats, high and low limit protection against excessive temperatures or pressures.

B. A 24 volt transformer shall be provided to accommodate an accessory 24 volt indoor thermostat complete with an electronic programmable night setback, separate automatic heat/cool settings, auto/manual fan control and seasonal selector. Thermostat shall provide staging of the cooling and heating to match the stages of each component.

C. Controls on electric heat section shall meet NEMA specifications and requirements.

D. Provide with integral refrigerant leak detector. Upon detection, fan shall be fully enabled.

2.06 FILTERS

A. Units shall have minimum 1 inch thick, low velocity, glass fiber throwaway filters in commercially available sizes.

3.0 EXECUTION

3.01 INSTALLATION

A. The split systems and associated controls shall be installed in strict accordance with the manufacturer's recommendations.

B. The control system shall be completely wired under this Division 23. Wiring shall be in accordance with the NEC and shall meet all requirements for this installation.

3.02 STARTUP

A. Provide the services of a factory-trained and qualified Service Technician employed by the Unit Manufacturer who shall inspect the installation including external interlock and power connections; supervise leak testing, initial operation, calibration of operating and safety controls and supervise electrical testing including insulation resistance of motors and voltage balance between phases during starting and running.

B. This Service Technician shall forward a report in four (4) copies to the Owner when the unit is in safe and proper operating condition. This report shall include all pressure and control settings, meg readings, voltage readings per phase during start and run, and shall list minor discrepancies to be corrected that affect safe and reliable operation. One additional copy of the report shall be left in the unit control panel. One copy of bound installation, operation, maintenance service and parts brochures, including applicable serial numbers, full unit description and parts ordering sources, shall be placed in the unit control panel at the time of startup; four (4) additional copies shall be forwarded to the Owner.

END OF SECTION

DATE SIGNED: 07/25/25

BW&A Barrett, Woodyard & Associates, Inc.
1255 Crescent Green, Ste. 230
Cary, NC 27518
Phone: (919) 747-9884
NC License # C-2226
BWA Project #: 2025-0294

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PO BOX 30086
RALEIGH, NC 27622
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
SPECIFICATIONS - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.9

FOR QUESTIONS, CALL THE
Sales & Service
REGION 23
PHONE: (919) 573 - 1522
EMAIL: info@ventilationdirect.com

HOOD INFORMATION – JOB#7619295

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S) WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP	TOTAL SUPPLY CFM	HOOD CONSTRUCTION	HOOD CONFIG END TO END	HOOD CONFIG ROW
1	KH-1	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE
2	KH-2	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE
3	KH-3	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE
4	KH-4	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE
5	KH-5	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE
6	KH-6	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE
7	KH-7	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE
8	KH-8	5424 VX-2-PSP-F	VENTILATION DIRECT	6' 0"	600 DEG	I	HEAVY	250	1500			4"	14"	1500	1403	-0.296"	1200	430 SS WHERE EXPOSED	ALONE	ALONE

HOOD INFORMATION

HOOD NO	TAG	FILTER(S) TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	LIGHT(S) QTY	TYPE	WIRE GUARD	UTILITY CABINET(S) LOCATION	SIZE	FIRE SYSTEM TYPE	FIRE SYSTEM SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
1	KH-1	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	LEFT	12"x54"x24"			DCV-1111	1 LIGHT 1 FAN	YES	517 LBS
2	KH-2	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	LEFT	12"x54"x24"	TANK FS	4.0/4.0/4.0			YES	776 LBS
3	KH-3	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	LEFT	12"x54"x24"			DCV-1111	1 LIGHT 1 FAN	YES	517 LBS
4	KH-4	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	LEFT	12"x54"x24"	TANK FS	4.0/4.0/4.0			YES	776 LBS
5	KH-5	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	RIGHT	12"x54"x24"			DCV-1111	1 LIGHT 1 FAN	YES	517 LBS
6	KH-6	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	RIGHT	12"x54"x24"	TANK FS	4.0/4.0/4.0			YES	776 LBS
7	KH-7	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	RIGHT	12"x54"x24"	TANK FS	4.0/4.0/4.0			YES	776 LBS
8	KH-8	SS BAFFLE WITH HANDLES	4	20"	16"	30%	2	RECESSED ROUND	NO	RIGHT	12"x54"x24"			DCV-1111	1 LIGHT 1 FAN	YES	517 LBS

KITCHEN EQUIPMENT BY OTHERS.
PROVIDED FOR REFERENCE AND
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REVISIONS

	DESCRIPTION	DATE:
1		
2		
3		
4		

Ventilation Direct
www.ventilationdirect.com
Sales & Service
14480 New Falls of Neuse Rd, Suite 149-283, Raleigh, NC, 27614 PHONE: (919) 573 - 1522 FAX: 919 573 5231 EMAIL: info@ventilationdirect.com

Preliminary Drawing –
Not for Construction
Use for quoting
purposes only

The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025

DWG.#: 7619295

DRAWN BY: zach.walsh

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 1

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. KERR
DATE SIGNED: 07/25/25
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BWA Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
KITCHEN EQUIPMENT DETAILS

REVISIONS:

DATE: 07.25.25

PROJECT NO.: 25-023

DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.10

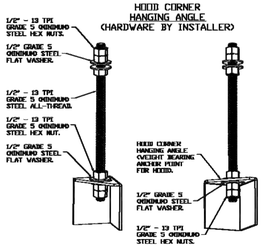
HOOD OPTIONS

HOOD NO	TAG	OPTION
1	KH-1	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.
2	KH-2	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.
3	KH-3	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.
4	KH-4	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.
5	KH-5	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.
6	KH-6	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.
7	KH-7	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.
8	KH-8	FIELD WRAPPER 14.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 80.00" HIGH X 84.00" LONG 430 SS VERTICAL.
		WRAPPER CHANNEL - FRONT, LEFT, RIGHT.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		INSULATION FOR BACK OF HOOD.

PERFORATED SUPPLY PLENUM(S)

HOOD NO	TAG	POS	LENGTH	WIDTH	HEIGHT	TYPE	RISER(S) WIDTH	LENG	DIA	CFM	SP
1	KH-1	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"
2	KH-2	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"
3	KH-3	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"
4	KH-4	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"
5	KH-5	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"
6	KH-6	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"
7	KH-7	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"
8	KH-8	Front	84"	16"	6"	MUA	12"	24"		600	0.162"
						MUA	12"	24"		600	0.162"

HOOD CORNER HANGING ANGLE (HARDWARE BY INSTALLER)



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

KITCHEN EQUIPMENT BY OTHERS. PROVIDED FOR REFERENCE AND COORDINATION ONLY.

(S) GREASE DUCT & CHIMNEY SPECIFICATIONS:

PROVIDE GREASE DUCT EQUAL TO VENTILATION DIRECT MODEL "VDW" ROUND 20 GAUGE 430 STAINLESS STEEL DUCTWORK. MODEL "VDW" IS LISTED TO UL-1978 AND IS INSTALLED USING "V" CLAMP LOCKING CONNECTIONS SEALED WITH 3M FIRE BARRIER 2000 PLUS. MODEL "VDW" DOES NOT REQUIRE WELDING PROVIDING IT HAS BEEN INSTALLED PER THE MANUFACTURES INSTALLATION GUIDE.

PROVIDE RATED ACCESS DOORS AT EVERY CHANGE IN DIRECTION AND EVERY 12' ON CENTER. PER MANUFACTURES LISTING MODEL "VDW" HORIZONTAL RUNS LESS THAN 75 FT. CAN BE SLOPED 1/16" PER 12", HORIZONTAL RUNS MORE THAN 75 FT. CAN BE SLOPED 3/16" PER 12". DUCT SHOULD BE SLOPED AS MUCH AS POSSIBLE TO REDUCE THE CHANCE OF GREASE ACCUMULATION IN HORIZONTAL RUNS.

IF THE DUCT OR CHIMNEY IS WITHIN 18 INCHES OF COMBUSTIBLE MATERIAL, PROVIDE UL-2221 OR UL-103 HT LISTED DOUBLE WALL GREASE DUCT OR DOUBLE WALL CHIMNEY EQUAL TO VENTILATION DIRECT MODEL "VDW- 2R, 2R TYPE HT, 3R, OR 3Z" ROUND 20 GAUGE 430 STAINLESS INNER DUCT INSULATED WITH A 24 GAUGE 430 STAINLESS OUTER SHELL.

VENTILATION DIRECT RECOMMENDS THE USE OF LISTED, PRE-FABRICATED ROUND GREASE EXHAUST DUCT TO REDUCE STATIC PRESSURE IN THE SYSTEM, MINIMIZE INSTALLATION AND INSPECTION TIMES, AND ENSURE DUCT IS LIQUID TIGHT

HVAC DISTRIBUTION NOTE

HIGH VELOCITY DIFFUSERS OR HVAC RETURNS SHOULD NOT BE PLACED WITHIN TEN (10) FEET OF THE EXHAUST HOOD. PERFORATED DIFFUSERS ARE RECOMMENDED.

VERIFY CEILING HEIGHT

___' - ___"

HEIGHT REQUIRED TO VERIFY THAT HOOD FITS SPACE AND TO SIZE THE ENCLOSURE PANELS

CUSTOMER APPROVAL TO MANUFACTURE:

APPROVED AS NOTED ☐

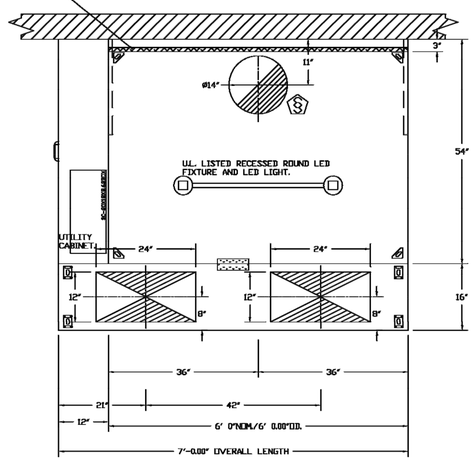
APPROVED WITH NO EXCEPTION TAKEN ☐

REVISE AND RESUBMIT ☐

SIGNATURE: _____

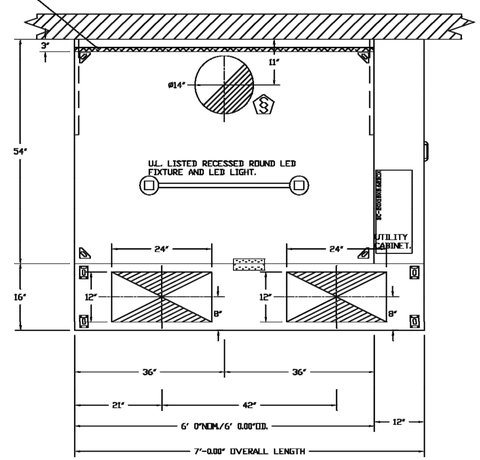
YOUR TITLE _____ DATE _____

1" LAYER OF INSULATION FACTORY INSTALLED IN INTERNAL BACK STANDOFF. MEETS 0 INCH REQUIREMENTS FOR CLEARANCE TO COMBUSTIBLE SURFACES.



PLAN VIEW - HOOD #1 (KH-1), #2 (KH-2), #3 (KH-3), #4 (KH-4)
6' 0.00" LONG 5424VX-2-PSP-F

1" LAYER OF INSULATION FACTORY INSTALLED IN INTERNAL BACK STANDOFF. MEETS 0 INCH REQUIREMENTS FOR CLEARANCE TO COMBUSTIBLE SURFACES.



PLAN VIEW - HOOD #5 (KH-5), #6 (KH-6), #7 (KH-7), #8 (KH-8)
6' 0.00" LONG 5424VX-2-PSP-F

PATENT NUMBERS

AC-PSP (UNITED STATES) - US PATENT 7963830 B2.
AC-PSP WALL (CANADA) - CA PATENT 2820509.
AC-PSP ISLAND (CANADA) - CA PATENT 2520330.

REVISIONS

	DESCRIPTION	DATE:
△		
△		
△		
△		

Ventilation Direct
Sales & Service
www.ventilationdirect.com
14460 New Falls of Neuse Rd, Suite 149-283, Raleigh, NC, 27614 PHONE: (919) 673 - 1522 FAX: 9198731523 EMAIL: info@ventilationdirect.com

Preliminary Drawing - Not for Construction Use for quoting purposes only

The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025

DWG.#: 7619295

DRAWN BY: zach.walsh

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 2

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. WALSH
DATE SIGNED: 07/25/25
BW&A Barrett, Woodyard & Associates, Inc.
1255 Crescent Green, Ste. 230
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Phone: (919) 747-9884
NC License # C-2226
BWA Project #: 2025-0294

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studio forty
ARCHITECTURE + SPACE PLANNING
PO BOX 30066
RALEIGH, NC 27622
PH. 919.787.1853
STUDIOFORTY.NET

NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME: KITCHEN EQUIPMENT DETAILS

REVISIONS:

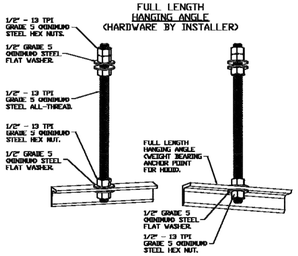
DATE: 07.25.25

PROJECT NO.: 25-023

DRAWN BY: RK

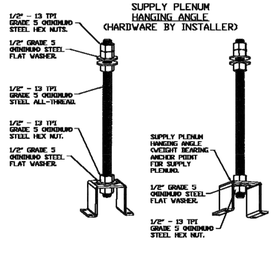
SHEET NO.: M0.11

PERMIT SET



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION ABOVE CEILING ANCHORS. SINGLE HEX NUT BENEATH HANGING ANGLE IS ACCEPTABLE FOR FULL LENGTH HANGING ANGLES. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.



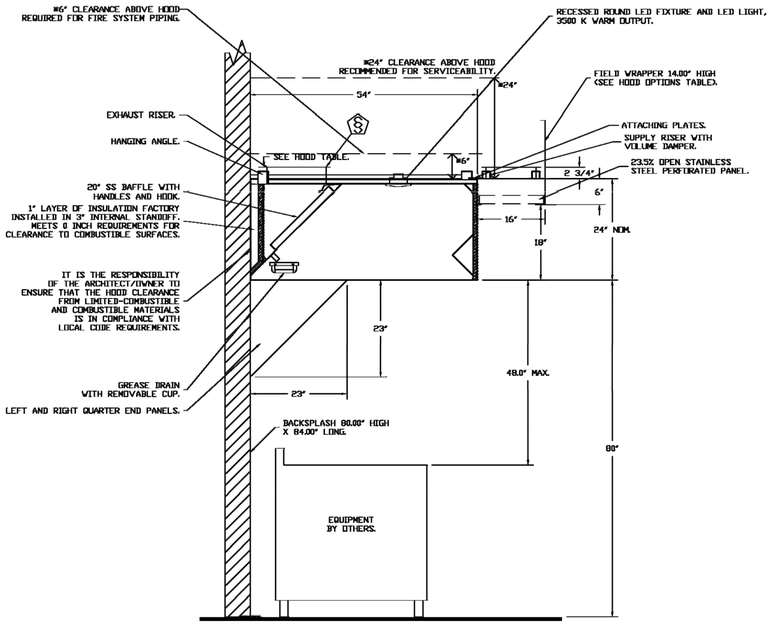
ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION ABOVE CEILING ANCHORS. SINGLE HEX NUT BENEATH HANGING ANGLE IS ACCEPTABLE FOR PSP HANGING ANGLES. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

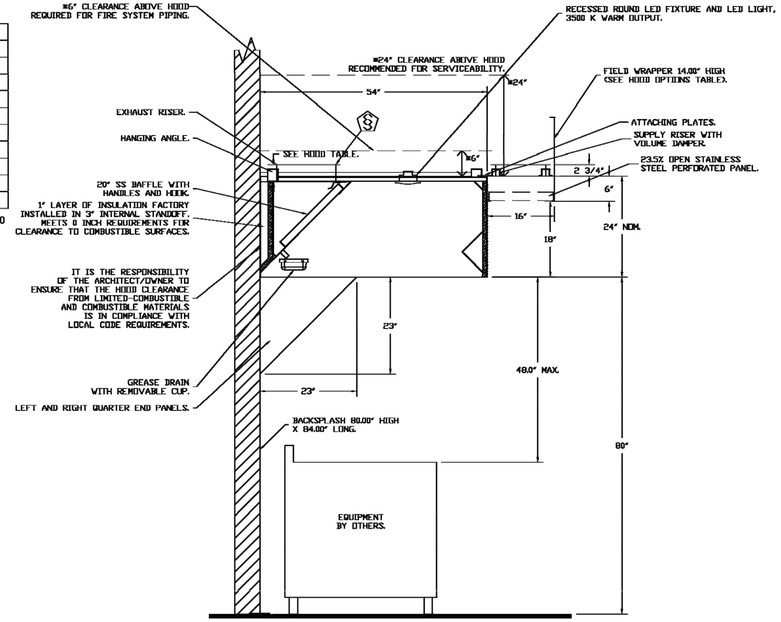
CLEARANCE TO COMBUSTIBLES

HOODS #	SURFACE	*CLEARANCE
1,2,3,4	TOP	18"
	FRONT	0"
	BACK	0"
	LEFT	0"
	RIGHT	18"
5,6,7,8	TOP	18"
	FRONT	0"
	BACK	0"
	LEFT	18"
	RIGHT	0"

- *0" CLEARANCE TO COMBUSTIBLES CONFORMS TO UL710 STANDARD.
- HOOD MOUNTED UTILITY CABINETS REQUIRE 36" SERVICE CLEARANCE.

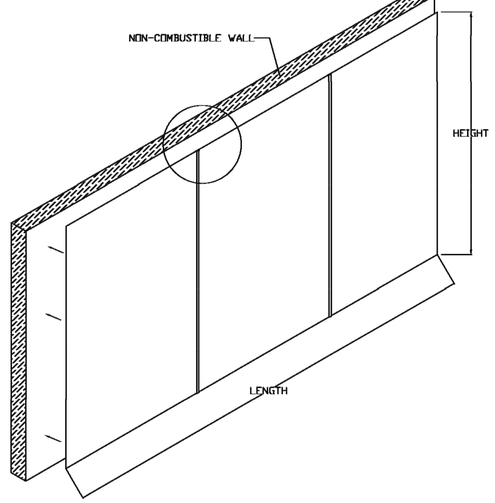


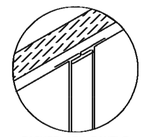
SECTION VIEW - MODEL 5424VX-2-PSP-F
HOOD - #5 (KH-5), #6 (KH-6), #7 (KH-7), #8 (KH-8)



SECTION VIEW - MODEL 5424VX-2-PSP-F
HOOD - #1 (KH-1), #2 (KH-2), #3 (KH-3), #4 (KH-4)

BACKSPLASH





- BACKSPLASH IS NOT INSULATED AND IS UNSUITABLE FOR INSTALL AGAINST COMBUSTIBLE WALLS

KITCHEN EQUIPMENT BY OTHERS.
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REVISIONS

	DESCRIPTION	DATE:
△		
△		
△		
△		

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14460 New Falls of Neuse Rd, Suite 149-293, Raleigh, NC, 27614 PHONE: (919) 573 - 1522 FAX: 9192731523 EMAIL: info@ventilationdirect.com

Preliminary Drawing - Not for Construction Use for quoting purposes only

The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025
DWG.#: 7619295
DRAWN BY: zach.walsh
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO. 3

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT CHRISTOPHER A. WALSH
DATE SIGNED: 07/25/25
BW&A Barrett, Woodyard & Associates, Inc.
1255 Crescent Green, Ste. 230
Cary, NC 27518
Phone: (919) 747-9884
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NEW INTERIOR ALTERATIONS FOR:
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112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
KITCHEN EQUIPMENT DETAILS

REVISIONS:
DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

SHEET NO.:
M0.12

PERMIT SET

FIRE SYSTEM INFORMATION – JOB#7619295

FIRE SYSTEM NO	TAG	TYPE	SIZE	MAX FP	DESIGN FP	INSTALLATION	
						SYSTEM	LOCATION ON HOOD
1		TANK FS	4.0/4.0/4.0	60	46	FIRE CABINET LEFT	LEFT, HOOD 2
2		TANK FS	4.0/4.0/4.0	60	46	FIRE CABINET LEFT	LEFT, HOOD 4
3		TANK FS	4.0/4.0/4.0	60	46	FIRE CABINET RIGHT	RIGHT, HOOD 6
4		TANK FS	4.0/4.0/4.0	60	46	FIRE CABINET RIGHT	RIGHT, HOOD 7

GAS VALVE(S)

FIRE SYSTEM NO	TAG	TYPE	SIZE	SUPPLIED BY
1		SC ELECTRICAL	2.000	VENTILATION DIRECT
2		SC ELECTRICAL	2.000	VENTILATION DIRECT
3		SC ELECTRICAL	2.000	VENTILATION DIRECT
4		SC ELECTRICAL	2.000	VENTILATION DIRECT

FIRE SYSTEM PARTS LIST KEY 1

FIRE SYSTEM NO	TAG	KEY NUMBER - PART DESCRIPTION	QTY BY FACTORY	QTY BY DIST	FIRE SYSTEM NO	TAG	KEY NUMBER - PART DESCRIPTION	QTY BY FACTORY	QTY BY DIST
1		0 - 0 - TANK FIRE SUPPRESSION POST-DISCHARGE PROCEDURE UTILITY CABINET LABEL SHEET.	1	0	2		0 - 0 - TANK FIRE SUPPRESSION POST-DISCHARGE PROCEDURE UTILITY CABINET LABEL SHEET.	1	0
		0 - 0 - TANK FIRE SUPPRESSION MAINTENANCE GUIDE UTILITY CABINET LABEL SHEET.	1	0			0 - 0 - TANK FIRE SUPPRESSION MAINTENANCE GUIDE UTILITY CABINET LABEL SHEET.	1	0
		0 - 0 - 12-F28021-32144-UT-360 DUCT FIRE THERMOSTAT WITH 12 FOOT WIRE LEADS. NO, CLOSE ON TEMP RISE AT 360°F. (A0034310).	2	0			0 - 0 - 12-F28021-32144-UT-360 DUCT FIRE THERMOSTAT WITH 12 FOOT WIRE LEADS. NO, CLOSE ON TEMP RISE AT 360°F. (A0034310).	2	0
		0 - 0 - 32-00002 QUIK SEAL - 1/2" (UL).	2	0			0 - 0 - 32-00002 QUIK SEAL - 1/2" (UL).	2	0
		0 - 0 - 361091 3/8" BRASS PLUG.	4	0			0 - 0 - 361091 3/8" BRASS PLUG.	4	0
		0 - 0 - 4429K153 1/2" MALE NPT TO 1/2" FEMALE NPT ELBOW, BRASS.	3	0			0 - 0 - 4429K153 1/2" MALE NPT TO 1/2" FEMALE NPT ELBOW, BRASS.	3	0
		0 - 0 - 4429K422 1/2" X 1/4" BRASS REDUCING BUSHING.	2	0			0 - 0 - 4429K422 1/2" X 1/4" BRASS REDUCING BUSHING.	2	0
		0 - 0 - 79425 3/8" NPT FEMALE TO 1/2" MALE PROPRESS ADAPTER.	4	0			0 - 0 - 79425 3/8" NPT FEMALE TO 1/2" MALE PROPRESS ADAPTER.	4	0
		0 - 0 - 79525 1/2" 90 PRO-PRESS ELBOW WITH 1/2" NPT FEMALE CONNECTION, VIEGA.	2	0			0 - 0 - 79525 1/2" 90 PRO-PRESS ELBOW WITH 1/2" NPT FEMALE CONNECTION, VIEGA.	2	0
		0 - 0 - 79580 1/2" X 1/2" PRO-PRESS TEE X 1/2" NPT FEMALE CONNECTION, VIEGA.	3	0			0 - 0 - 79580 1/2" X 1/2" PRO-PRESS TEE X 1/2" NPT FEMALE CONNECTION, VIEGA.	3	0
		0 - 0 - 87-120042-001 SECONDARY ACTUATOR VALVE (SVA) - SINGLE ACTUATOR, REQUIRES PRIMARY RELEASE ACTUATOR, TANK FIRE SUPPRESSION.	2	0			0 - 0 - 87-120042-001 SECONDARY ACTUATOR VALVE (SVA) - SINGLE ACTUATOR, REQUIRES PRIMARY RELEASE ACTUATOR, TANK FIRE SUPPRESSION.	2	0
		0 - 0 - 87-120045-001 HOSE, SECONDARY ACTUATOR HOSE, 7.5" BRAIDED STAINLESS STEEL, TANK FIRE SUPPRESSION.	2	0			0 - 0 - 87-120045-001 HOSE, SECONDARY ACTUATOR HOSE, 7.5" BRAIDED STAINLESS STEEL, TANK FIRE SUPPRESSION.	2	0
		0 - 0 - 87-300001-001 TANK - PRESSURIZED TANK USED FOR TANK FIRE SUPPRESSION.	3	0			0 - 0 - 87-300001-001 TANK - PRESSURIZED TANK USED FOR TANK FIRE SUPPRESSION.	3	0
		0 - 0 - 87-300030-001 PRIMARY ACTUATOR KIT (PAK) - ACTUATOR AND RELEASE SOLENOID ASSEMBLY, ONE NEEDED PER FIRE SYSTEM, SUPERVISED, TANK FIRE SUPPRESSION.	1	0			0 - 0 - 87-300030-001 PRIMARY ACTUATOR KIT (PAK) - ACTUATOR AND RELEASE SOLENOID ASSEMBLY, ONE NEEDED PER FIRE SYSTEM, SUPERVISED, TANK FIRE SUPPRESSION.	1	0
		0 - 0 - 87-300033-001 DIN CONNECTOR, CANFIELD PART #5J560-201-EU0A, TANK FIRE SUPPRESSION, SUBMINATURE SOLENOID CONNECTION (CED VENDOR 303777).	1	0			0 - 0 - 87-300033-001 DIN CONNECTOR, CANFIELD PART #5J560-201-EU0A, TANK FIRE SUPPRESSION, SUBMINATURE SOLENOID CONNECTION (CED VENDOR 303777).	1	0
		0 - 0 - 87-300152-001 HARDWARE, SVA BOLTS, TANK FIRE SUPPRESSION.	12	0			0 - 0 - 87-300152-001 HARDWARE, SVA BOLTS, TANK FIRE SUPPRESSION.	12	0
		0 - 0 - 90554559PC PRO PRESS 1/2 PRESS X PRESS 90 ELBOW L.D.	6	0			0 - 0 - 90554559PC PRO PRESS 1/2 PRESS X PRESS 90 ELBOW L.D.	6	0
		0 - 0 - 90972009PC PRO PRESS PC611 1/2 PRESS TEE L.D.	9	0			0 - 0 - 90972009PC PRO PRESS PC611 1/2 PRESS TEE L.D.	9	0
		0 - 0 - 98694A115 HARDWARE, DATANKLOCK LOCKING BRACKET SQUARE NUTS 5/16" ZINC, TANK FIRE SUPPRESSION.	6	0			0 - 0 - 98694A115 HARDWARE, DATANKLOCK LOCKING BRACKET SQUARE NUTS 5/16" ZINC, TANK FIRE SUPPRESSION.	6	0
		0 - 0 - A0034332 JUNCTION BOX FOR MANUAL PULL STATION. 1.5" DEEP BACK BOX, RED COLOR.	1	0			0 - 0 - A0034332 JUNCTION BOX FOR MANUAL PULL STATION. 1.5" DEEP BACK BOX, RED COLOR.	1	0
		0 - 0 - A31484 1/4" NPT SCHRADER VALVE AND CAP, JB INDUSTRIES. 1/4" FLARE X 1/4" MPT HALF UNION. USED ON TANK SERVICE PORT.	2	0			0 - 0 - A31484 1/4" NPT SCHRADER VALVE AND CAP, JB INDUSTRIES. 1/4" FLARE X 1/4" MPT HALF UNION. USED ON TANK SERVICE PORT.	2	0
		0 - 0 - BI145 3/8" BLACK IRON 90 ELL.	4	0			0 - 0 - BI145 3/8" BLACK IRON 90 ELL.	4	0
		0 - 0 - DATANKLOCK DISCHARGE ADAPTER TANK LOCKING PLATE FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0			0 - 0 - DATANKLOCK DISCHARGE ADAPTER TANK LOCKING PLATE FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0
		0 - 0 - SLPCON-03FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 2' GAP. KIT CONTAINS 5 FEET OF BLACK MG WIRE, 5 FEET OF TAN MG WIRE, 3 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	2	0			0 - 0 - SLPCON-03FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 2' GAP. KIT CONTAINS 5 FEET OF BLACK MG WIRE, 5 FEET OF TAN MG WIRE, 3 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0
		0 - 0 - SLPCON-05FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 4' GAP. KIT CONTAINS 7 FEET OF BLACK MG WIRE, 7 FEET OF TAN MG WIRE, 5 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0			0 - 0 - SLPCON-10FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 9' GAP OR BACK TO BACK HOODS. KIT CONTAINS 12 FEET OF BLACK MG WIRE, 12 FEET OF TAN MG WIRE, 10 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0
		0 - 0 - SLPCON-20FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN HOODS WITH UPTO 19' GAP. KIT CONTAINS 22 FEET OF BLACK MG WIRE, 22 FEET OF TAN MG WIRE, 20 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0			0 - 0 - SLPCON-20FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN HOODS WITH UPTO 19' GAP. KIT CONTAINS 22 FEET OF BLACK MG WIRE, 22 FEET OF TAN MG WIRE, 20 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0
		0 - 0 - TANK STRAP TANK STRAP - USED FOR TANK FIRE SUPPRESSION.	9	0			0 - 0 - TANK STRAP TANK STRAP - USED FOR TANK FIRE SUPPRESSION.	9	0
		0 - 0 - TFS-UCTANKBRACKET TANK BRACKET FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0			0 - 0 - TFS-UCTANKBRACKET TANK BRACKET FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0
		0 - 0 - WK-283952-000 DISCHARGE ADAPTER, TANK FIRE SUPPRESSION.	3	0			0 - 0 - WK-283952-000 DISCHARGE ADAPTER, TANK FIRE SUPPRESSION.	3	0
		16 - 16 - 79210 1/2" X 3/8" NPT MALE ADAPTER, VIEGA.	10	0			16 - 16 - 79210 1/2" X 3/8" NPT MALE ADAPTER, VIEGA.	10	0
		16 - 16 - OL-F NOZZLE - TANK PROTECTION APPLIANCE COVERAGE NOZZLE (INCLUDES METAL BLOW OFF CAP, LANYARD, USED WITH CHROME-PLATED PIPE).	10	0			16 - 16 - OL-F NOZZLE - TANK PROTECTION APPLIANCE COVERAGE NOZZLE (INCLUDES METAL BLOW OFF CAP, LANYARD, USED WITH CHROME-PLATED PIPE).	10	0
		26 - 26 - QSA-3/8 QUIK SEAL - 3/8" (UL).	10	0			26 - 26 - QSA-3/8 QUIK SEAL - 3/8" (UL).	10	0
		34 - 34 - A0034331 24VDC SINGLE ACTION MANUAL ACTUATION DEVICE (PUSH/PULL STATION) WITH PROTECTIVE COVER, ONE (1) NORMALLY OPEN CONTACT. RED COLOR.	1	0			34 - 34 - A0034331 24VDC SINGLE ACTION MANUAL ACTUATION DEVICE (PUSH/PULL STATION) WITH PROTECTIVE COVER, ONE (1) NORMALLY OPEN CONTACT. RED COLOR.	1	0

KITCHEN EQUIPMENT BY OTHERS.
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REVISIONS

	DESCRIPTION	DATE:
1		
2		
3		
4		

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The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025

DWG.#: 7619295

DRAWN BY: zach.walsh

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 4

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. KOLLAR
DATE SIGNED: 07/25/25
BW&A Barrett, Woodyard & Associates, Inc.
1255 Crescent Green, Ste. 230
Cary, NC 27518
Phone: (919) 747-9884
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112 S Fayetteville Street
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SHEET NAME:
KITCHEN EQUIPMENT DETAILS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

SHEET NO.:
M0.13

PERMIT SET

FIRE SYSTEM PARTS LIST KEY 2

FIRE SYSTEM NO	TAG	KEY NUMBER - PART DESCRIPTION	QTY BY FACTORY	QTY BY DIST	FIRE SYSTEM NO	TAG	KEY NUMBER - PART DESCRIPTION	QTY BY FACTORY	QTY BY DIST
3		0 - 0 - TANK FIRE SUPPRESSION POST-DISCHARGE PROCEDURE UTILITY CABINET LABEL SHEET.	1	0	4		0 - 0 - TANK FIRE SUPPRESSION POST-DISCHARGE PROCEDURE UTILITY CABINET LABEL SHEET.	1	0
		0 - 0 - TANK FIRE SUPPRESSION MAINTENANCE GUIDE UTILITY CABINET LABEL SHEET.	1	0			0 - 0 - TANK FIRE SUPPRESSION MAINTENANCE GUIDE UTILITY CABINET LABEL SHEET.	1	0
		0 - 0 - 12-F28021-32144-0T-360 DUCT FIRE THERMOSTAT WITH 12 FOOT WIRE LEADS. NO, CLOSE ON TEMP RISE AT 360°F. (A0034310).	2	0			0 - 0 - 12-F28021-32144-0T-360 DUCT FIRE THERMOSTAT WITH 12 FOOT WIRE LEADS. NO, CLOSE ON TEMP RISE AT 360°F. (A0034310).	2	0
		0 - 0 - 32-00002 QUIK SEAL - 1/2" (UL).	2	0			0 - 0 - 32-00002 QUIK SEAL - 1/2" (UL).	2	0
		0 - 0 - 361091 3/8" BRASS PLUG.	4	0			0 - 0 - 361091 3/8" BRASS PLUG.	4	0
		0 - 0 - 4429K153 1/2" MALE NPT TO 1/2" FEMALE NPT ELBOW, BRASS.	3	0			0 - 0 - 4429K153 1/2" MALE NPT TO 1/2" FEMALE NPT ELBOW, BRASS.	3	0
		0 - 0 - 4429K422 1/2" X 1/4" BRASS REDUCING BUSHING.	2	0			0 - 0 - 4429K422 1/2" X 1/4" BRASS REDUCING BUSHING.	2	0
		0 - 0 - 79425 3/8" NPT FEMALE TO 1/2" MALE PROPRESS ADAPTER.	4	0			0 - 0 - 79425 3/8" NPT FEMALE TO 1/2" MALE PROPRESS ADAPTER.	4	0
		0 - 0 - 79525 1/2" 90 PRO-PRESS ELBOW WITH 1/2" NPT FEMALE CONNECTION, VIEGA.	2	0			0 - 0 - 79525 1/2" 90 PRO-PRESS ELBOW WITH 1/2" NPT FEMALE CONNECTION, VIEGA.	2	0
		0 - 0 - 79580 1/2" X 1/2" PRO-PRESS TEE X 1/2" NPT FEMALE CONNECTION, VIEGA.	3	0			0 - 0 - 79580 1/2" X 1/2" PRO-PRESS TEE X 1/2" NPT FEMALE CONNECTION, VIEGA.	3	0
		0 - 0 - 87-120042-001 SECONDARY ACTUATOR VALVE (SVA) - SINGLE ACTUATOR, REQUIRES PRIMARY RELEASE ACTUATOR, TANK FIRE SUPPRESSION.	2	0			0 - 0 - 87-120042-001 SECONDARY ACTUATOR VALVE (SVA) - SINGLE ACTUATOR, REQUIRES PRIMARY RELEASE ACTUATOR, TANK FIRE SUPPRESSION.	2	0
		0 - 0 - 87-120045-001 HOSE, SECONDARY ACTUATOR HOSE, 7.5' BRAIDED STAINLESS STEEL, TANK FIRE SUPPRESSION.	2	0			0 - 0 - 87-120045-001 HOSE, SECONDARY ACTUATOR HOSE, 7.5' BRAIDED STAINLESS STEEL, TANK FIRE SUPPRESSION.	2	0
		0 - 0 - 87-300001-001 TANK - PRESSURIZED TANK USED FOR TANK FIRE SUPPRESSION.	3	0			0 - 0 - 87-300001-001 TANK - PRESSURIZED TANK USED FOR TANK FIRE SUPPRESSION.	3	0
		0 - 0 - 87-300030-001 PRIMARY ACTUATOR KIT (PAK) - ACTUATOR AND RELEASE SOLENOID ASSEMBLY, ONE NEEDED PER FIRE SYSTEM, SUPERVISED, TANK FIRE SUPPRESSION.	1	0			0 - 0 - 87-300030-001 PRIMARY ACTUATOR KIT (PAK) - ACTUATOR AND RELEASE SOLENOID ASSEMBLY, ONE NEEDED PER FIRE SYSTEM, SUPERVISED, TANK FIRE SUPPRESSION.	1	0
		0 - 0 - 87-300033-001 DIN CONNECTOR, CANFIELD PART #5J560-201-EU0A, TANK FIRE SUPPRESSION, SUBMINATURE SOLENOID CONNECTION (CED VENDOR 30377).	1	0			0 - 0 - 87-300033-001 DIN CONNECTOR, CANFIELD PART #5J560-201-EU0A, TANK FIRE SUPPRESSION, SUBMINATURE SOLENOID CONNECTION (CED VENDOR 30377).	1	0
		0 - 0 - 87-300152-001 HARDWARE, SVA BOLTS, TANK FIRE SUPPRESSION.	12	0			0 - 0 - 87-300152-001 HARDWARE, SVA BOLTS, TANK FIRE SUPPRESSION.	12	0
		0 - 0 - 9055455PC PRO PRESS 1/2 PRESS X PRESS 90 ELBOW LD.	9	0			0 - 0 - 90554550C PRO PRESS 1/2 PRESS X PRESS 90 ELBOW LD.	9	0
		0 - 0 - 9097200PC PRO PRESS PC611 1/2 PRESS TEE LD.	9	0			0 - 0 - 9097200PC PRO PRESS PC611 1/2 PRESS TEE LD.	9	0
		0 - 0 - 98694A115 HARDWARE, DATANKLOCK LOCKING BRACKET SQUARE NUTS 5/16" ZINC, TANK FIRE SUPPRESSION.	6	0			0 - 0 - 98694A115 HARDWARE, DATANKLOCK LOCKING BRACKET SQUARE NUTS 5/16" ZINC, TANK FIRE SUPPRESSION.	6	0
		0 - 0 - A0034332 JUNCTION BOX FOR MANUAL PULL STATION. 1.5" DEEP BACK BOX, RED COLOR.	1	0			0 - 0 - A0034332 JUNCTION BOX FOR MANUAL PULL STATION. 1.5" DEEP BACK BOX, RED COLOR.	1	0
		0 - 0 - A31484 1/4" NPT SCHRADER VALVE AND CAP, JB INDUSTRIES. 1/4" FLARE X 1/4" NPT HALF UNION. USED ON TANK SERVICE PORT.	2	0			0 - 0 - A31484 1/4" NPT SCHRADER VALVE AND CAP, JB INDUSTRIES. 1/4" FLARE X 1/4" NPT HALF UNION. USED ON TANK SERVICE PORT.	2	0
		0 - 0 - B1145 3/8" BLACK IRON 90 ELL.	4	0			0 - 0 - B1145 3/8" BLACK IRON 90 ELL.	4	0
		0 - 0 - DATANKLOCK DISCHARGE ADAPTER TANK LOCKING PLATE FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0			0 - 0 - DATANKLOCK DISCHARGE ADAPTER TANK LOCKING PLATE FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0
		0 - 0 - SLPCON-03FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 2' GAP. KIT CONTAINS 5 FEET OF BLACK MG WIRE, 5 FEET OF TAN MG WIRE, 3 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0			0 - 0 - SLPCON-03FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 2' GAP. KIT CONTAINS 5 FEET OF BLACK MG WIRE, 5 FEET OF TAN MG WIRE, 3 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0
		0 - 0 - SLPCON-10FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 9' GAP OR BACK TO BACK HOODS. KIT CONTAINS 12 FEET OF BLACK MG WIRE, 12 FEET OF TAN MG WIRE, 10 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0			0 - 0 - SLPCON-10FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN END TO END HOODS WITH LESS THAN A 9' GAP OR BACK TO BACK HOODS. KIT CONTAINS 12 FEET OF BLACK MG WIRE, 12 FEET OF TAN MG WIRE, 10 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0
		0 - 0 - SLPCON-20FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN HOODS WITH UPTO 19' GAP. KIT CONTAINS 22 FEET OF BLACK MG WIRE, 22 FEET OF TAN MG WIRE, 20 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0			0 - 0 - SLPCON-20FT SUPERVISED LOOP CONNECTION KIT. CONTAINS THE PARTS NEEDED TO CONNECT THE SUPERVISED LOOP BETWEEN HOODS WITH UPTO 19' GAP. KIT CONTAINS 22 FEET OF BLACK MG WIRE, 22 FEET OF TAN MG WIRE, 20 FEET OF FLEXIBLE CONDUIT, AND TWO 7/8" CONNECTORS.	1	0
		0 - 0 - TANK STRAP TANK STRAP - USED FOR TANK FIRE SUPPRESSION.	9	0			0 - 0 - TANK STRAP TANK STRAP - USED FOR TANK FIRE SUPPRESSION.	9	0
		0 - 0 - TFS-UCTANKBRACKET TANK BRACKET FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0			0 - 0 - TFS-UCTANKBRACKET TANK BRACKET FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	3	0
		0 - 0 - WK-283952-000 DISCHARGE ADAPTER, TANK FIRE SUPPRESSION.	3	0			0 - 0 - WK-283952-000 DISCHARGE ADAPTER, TANK FIRE SUPPRESSION.	3	0
		16 - 16 - 79210 1/2" X 3/8" NPT MALE ADAPTER, VIEGA.	10	0			16 - 16 - 79210 1/2" X 3/8" NPT MALE ADAPTER, VIEGA.	10	0
		16 - 16 - OL-F NOZZLE - TANK PROTECTION APPLIANCE COVERAGE NOZZLE (INCLUDES METAL BLOW OFF CAP, LANYARD, USED WITH CHROME-PLATED PIPE).	10	0			16 - 16 - OL-F NOZZLE - TANK PROTECTION APPLIANCE COVERAGE NOZZLE (INCLUDES METAL BLOW OFF CAP, LANYARD, USED WITH CHROME-PLATED PIPE).	10	0
		26 - 26 - QSA-3/8 QUIK SEAL - 3/8" (UL).	10	0			26 - 26 - QSA-3/8 QUIK SEAL - 3/8" (UL).	10	0
		34 - 34 - A0034331 24VDC SINGLE ACTION MANUAL ACTUATION DEVICE (PUSH/PULL STATION) WITH PROTECTIVE COVER, ONE (1) NORMALLY OPEN CONTACT. RED COLOR.	1	0			34 - 34 - A0034331 24VDC SINGLE ACTION MANUAL ACTUATION DEVICE (PUSH/PULL STATION) WITH PROTECTIVE COVER, ONE (1) NORMALLY OPEN CONTACT. RED COLOR.	1	0

KITCHEN EQUIPMENT BY OTHERS.
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The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025

DWG.#: 7619295

DRAWN BY: zach.walsh

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 5

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. WALSH
DATE SIGNED: 07/25/25
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BWA Project #: 2025-0294

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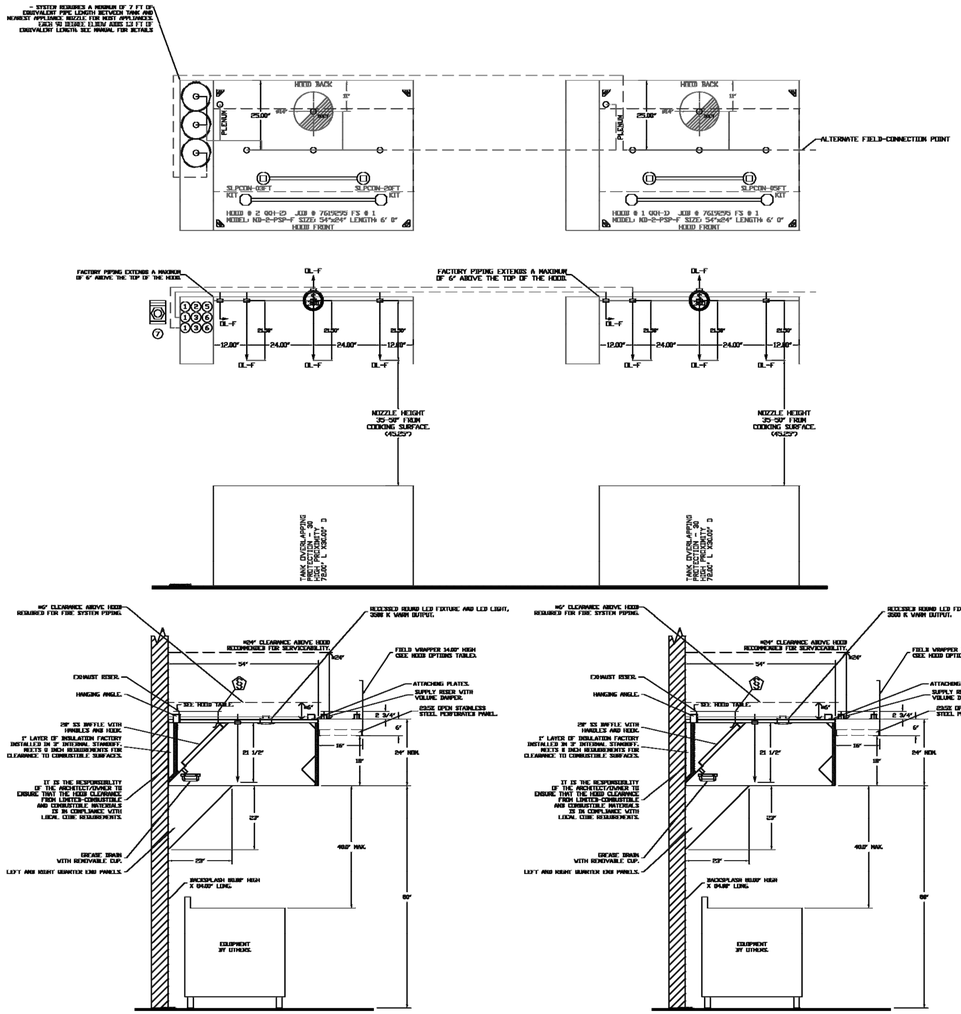
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KITCHEN EQUIPMENT DETAILS

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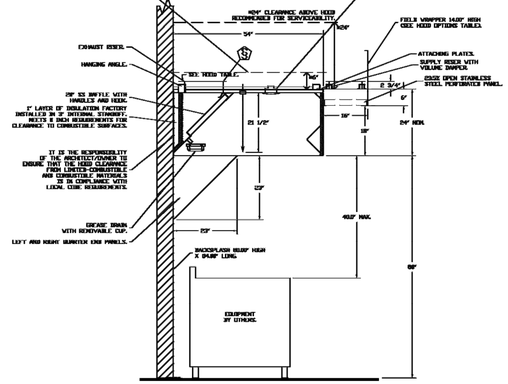
DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.14



SECTION VIEW – MODEL 6424VX-2-PSP-F
HOOD – #2



SECTION VIEW – MODEL 6424VX-2-PSP-F
HOOD – #1

NOTES
- FIELD PIPE DROPS AS SHOWN
  PIPING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- FIELD INSTALLED DROP: FACTORY WILL PROVIDE QTY 2 60IN LONG PIECES OF CHROME PLATED PIPING SHIPPED LOOSE TO BE FIELD-INSTALLED.
- SHIP LOOSE DROP: FACTORY WILL PROVIDE THE EXACT CHROME PIPE LENGTH NEEDED SHIPPED LOOSE TO BE FIELD-INSTALLED.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- OVERLAPPING COVERAGE SHALL NOT BE USED ON ANY APPLIANCE WITH AN OBSTRUCTION.
- IF APPLICABLE, EXTENDED PRE-PIPED DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.

- APPLIANCE DIMENSIONS LISTED REPRESENT THE COOKING SURFACE SIZE, NOT THE OVERALL APPLIANCE SIZE.

- THIS PRE-ENGINEERED FIRE SYSTEM COMPLIES WITH UL 300 REQUIREMENTS.

- OL-F NOZZLE PART NUMBER REPLACES 3070-3/8H-10-SS

JOB #: 7619295
JOB NAME: THE RAYNOR

SYSTEM SIZE: TANK-SP-3 DESIGN FP: 46, MAXIMUM FP: 60.
HOOD # 1 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 14" DIA.
HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.
HOOD # 2 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 14" DIA.
HOOD # 2 METAL BLOW-OFF CAPS INCLUDED.

- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.
- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450°F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

AGENT DISTRIBUTION PIPING LIMITATIONS	
PIPE SECTION	MAX PIPE LENGTH (FT)
MAX SUPPLY LINE TO FIRST OVERLAPPING NOZZLE	42
OVERLAPPING NOZZLE APPLIANCE BRANCH	18
DEDICATED NOZZLE APPLIANCE BRANCH	18

LEGEND – FIRE CABINET TANK SYSTEM

1 4 GALLON TANK.
2 PRIMARY ACTUATOR RELEASE.
3 SECONDARY ACTUATOR RELEASE.
4 PRESSURE SUPERVISION SWITCH.
5 PRIMARY HOSE ASSEMBLY.
6 SECONDARY HOSE ASSEMBLY.
7 REMOTE MANUAL ACTUATION DEVICE.

KITCHEN EQUIPMENT BY OTHERS.
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The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025
DWG.#: 7619295
DRAWN BY: zach.walsh
SCALE: 1/2" = 1'-0"
MASTER DRAWING
SHEET NO. 6

DATE SIGNED: 07/25/25

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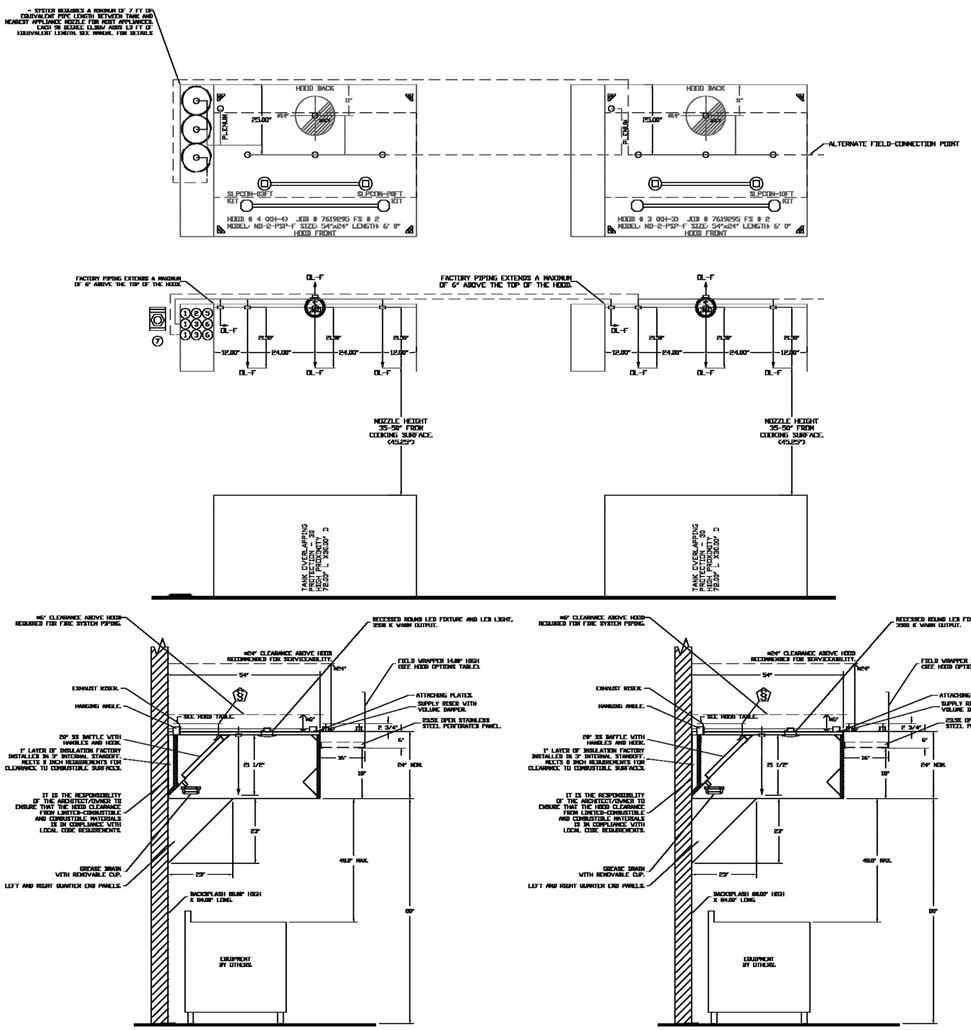
SHEET NAME:
KITCHEN EQUIPMENT DETAILS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.15



NOTES
- FIELD PIPE DROPS AS SHOWN
  PIPING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- FIELD INSTALLED DROP: FACTORY WILL PROVIDE QTY 2 60IN LONG PIECES OF CHROME PLATED PIPING SHIPPED LOOSE. TO BE FIELD-INSTALLED.
- SHIP LOOSE DROP: FACTORY WILL PROVIDE THE EXACT CHROME PIPE LENGTH NEEDED SHIPPED LOOSE TO BE FIELD-INSTALLED.
- RELOCATE NOZZLES: IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- OVERLAPPING COVERAGE SHALL NOT BE USED ON ANY APPLIANCE WITH AN OBSTRUCTION.
- IF APPLICABLE, EXTENDED PRE-PIPED DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.

- APPLIANCE DIMENSIONS LISTED REPRESENT THE COOKING SURFACE SIZE, NOT THE OVERALL APPLIANCE SIZE.

- THIS PRE-ENGINEERED FIRE SYSTEM COMPLIES WITH U.L. 300 REQUIREMENTS.

- OL-F NOZZLE PART NUMBER REPLACES 3070-3/8H-10-SS

JOB #: 7619295.
JOB NAME: THE RAYNOR.

SYSTEM SIZE: TANK-SP-3 DESIGN FP: 46, MAXIMUM FP: 60.
HOOD # 3 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 14" DIA.
HOOD # 3 METAL BLOW-OFF CAPS INCLUDED.
HOOD # 4 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 14" DIA.
HOOD # 4 METAL BLOW-OFF CAPS INCLUDED.

- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.
- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450°F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

AGENT DISTRIBUTION PIPING LIMITATIONS	
PIPE SECTION	MAX PIPE LENGTH (FT)
MAX SUPPLY LINE TO FIRST OVERLAPPING NOZZLE	42
OVERLAPPING NOZZLE APPLIANCE BRANCH	10
DEDICATED NOZZLE APPLIANCE BRANCH	10

LEGEND – FIRE CABINET TANK SYSTEM

1 4 GALLON TANK.
2 PRIMARY ACTUATOR RELEASE.
3 SECONDARY ACTUATOR RELEASE.
4 PRESSURE SUPERVISION SWITCH.
5 PRIMARY HOSE ASSEMBLY.
6 SECONDARY HOSE ASSEMBLY.
7 REMOTE MANUAL ACTUATION DEVICE.

KITCHEN EQUIPMENT BY OTHERS.
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DUNN, NC, 28334

DATE: 7/3/2025
DWG.#: 7619295
DRAWN BY: zach.walsh
SCALE: 1/2" = 1'–0"
MASTER DRAWING
SHEET NO. 7

CHRISTOPHER R. WOODARD
SEAL L-2226
NORTH CAROLINA PROFESSIONAL ENGINEER
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Phone: (919) 747-9884
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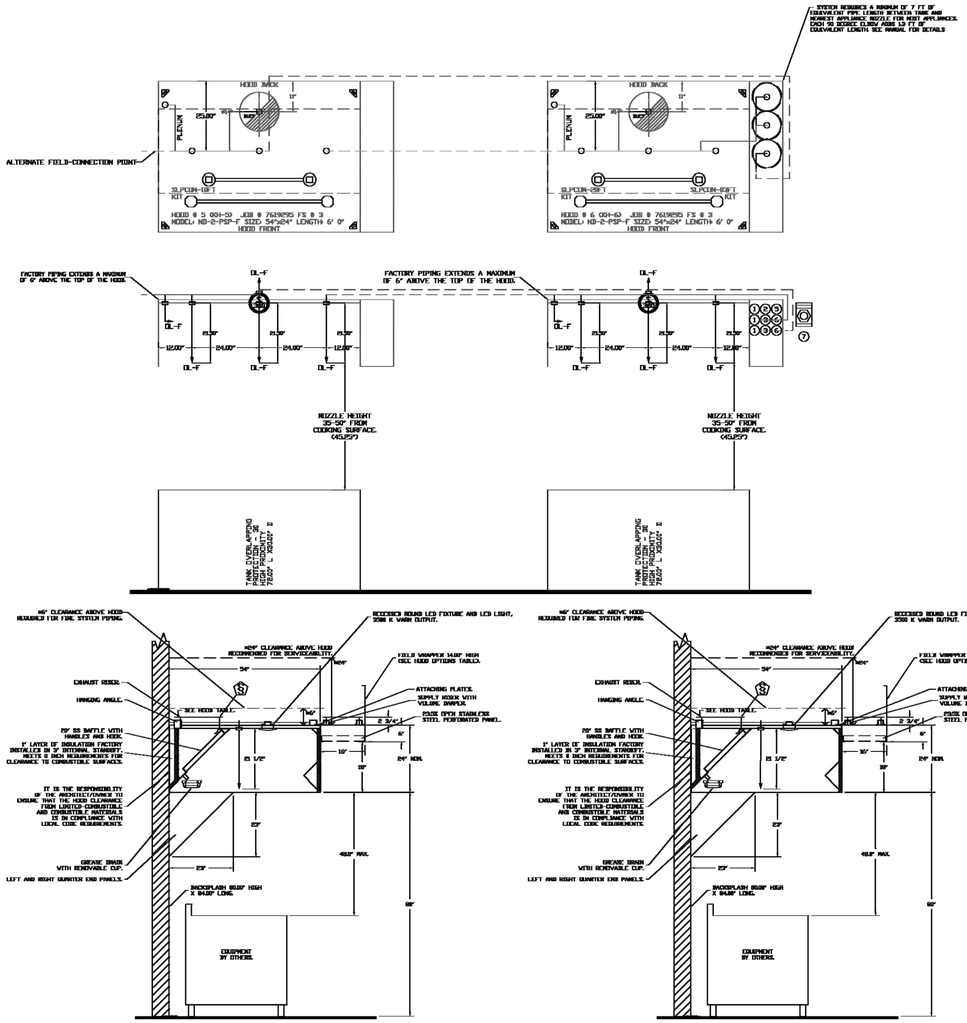
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KITCHEN EQUIPMENT DETAILS

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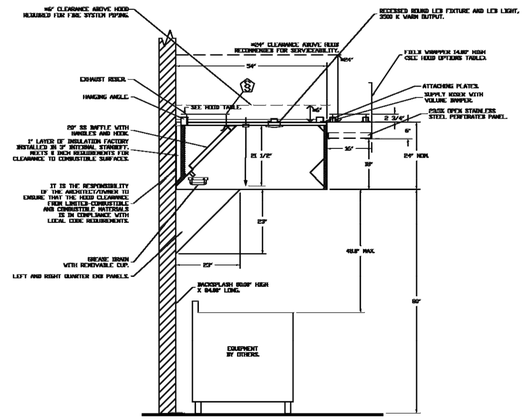
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SECTION VIEW – MODEL 6424VX-2-PSP-F HOOD – #5



SECTION VIEW – MODEL 6424VX-2-PSP-F HOOD – #6

NOTES
- FIELD PIPE DROPS AS SHOWN
  PIPING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- FIELD INSTALLED DROP: FACTORY WILL PROVIDE QTY 2 600IN LONG PIECES OF CHROME PLATED PIPING SHIPPED LOOSE TO BE FIELD-INSTALLED.
- SHIP LOOSE DROP: FACTORY WILL PROVIDE THE EXACT CHROME PIPE LENGTH NEEDED SHIPPED LOOSE TO BE FIELD-INSTALLED.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- OVERLAPPING COVERAGE SHALL NOT BE USED ON ANY APPLIANCE WITH AN OBSTRUCTION.
- IF APPLICABLE, EXTENDED PRE-PIPED DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.

- APPLIANCE DIMENSIONS LISTED REPRESENT THE COOKING SURFACE SIZE, NOT THE OVERALL APPLIANCE SIZE.

- THIS PRE-ENGINEERED FIRE SYSTEM COMPLIES WITH U.L. 300 REQUIREMENTS.

- DL-F NOZZLE PART NUMBER REPLACES 3070-3/8H-10-SS

JOB #: 7619295
JOB NAME: THE RAYNOR.

SYSTEM SIZE: TANK-SP-3 DESIGN FP: 46, MAXIMUM FP: 60.
HOOD # 5 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 1/4" DIA.
HOOD # 5 METAL BLOW-OFF CAPS INCLUDED.
HOOD # 6 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 1/4" DIA.
HOOD # 6 METAL BLOW-OFF CAPS INCLUDED.

- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.
- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450°F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

AGENT DISTRIBUTION PIPING LIMITATIONS	
PIPE SECTION	MAX PIPE LENGTH (FT)
MAX SUPPLY LINE TO FIRST OVERLAPPING NOZZLE	42
OVERLAPPING NOZZLE APPLIANCE BRANCH	18
ISOLATED NOZZLE APPLIANCE BRANCH	18

LEGEND – FIRE CABINET TANK SYSTEM

1 4 GALLON TANK.
2 PRIMARY ACTUATOR RELEASE.
3 SECONDARY ACTUATOR RELEASE.
4 PRESSURE SUPERVISION SWITCH.
5 PRIMARY HOSE ASSEMBLY.
6 SECONDARY HOSE ASSEMBLY.
7 REMOTE MANUAL ACTUATION DEVICE.

KITCHEN EQUIPMENT BY OTHERS.
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DATE: 7/3/2025
DWG.#: 7619295
DRAWN BY: zach.walsh
SCALE: 1/2" = 1'-0"
MASTER DRAWING

SHEET NO. 8

DATE SIGNED: 07/25/25

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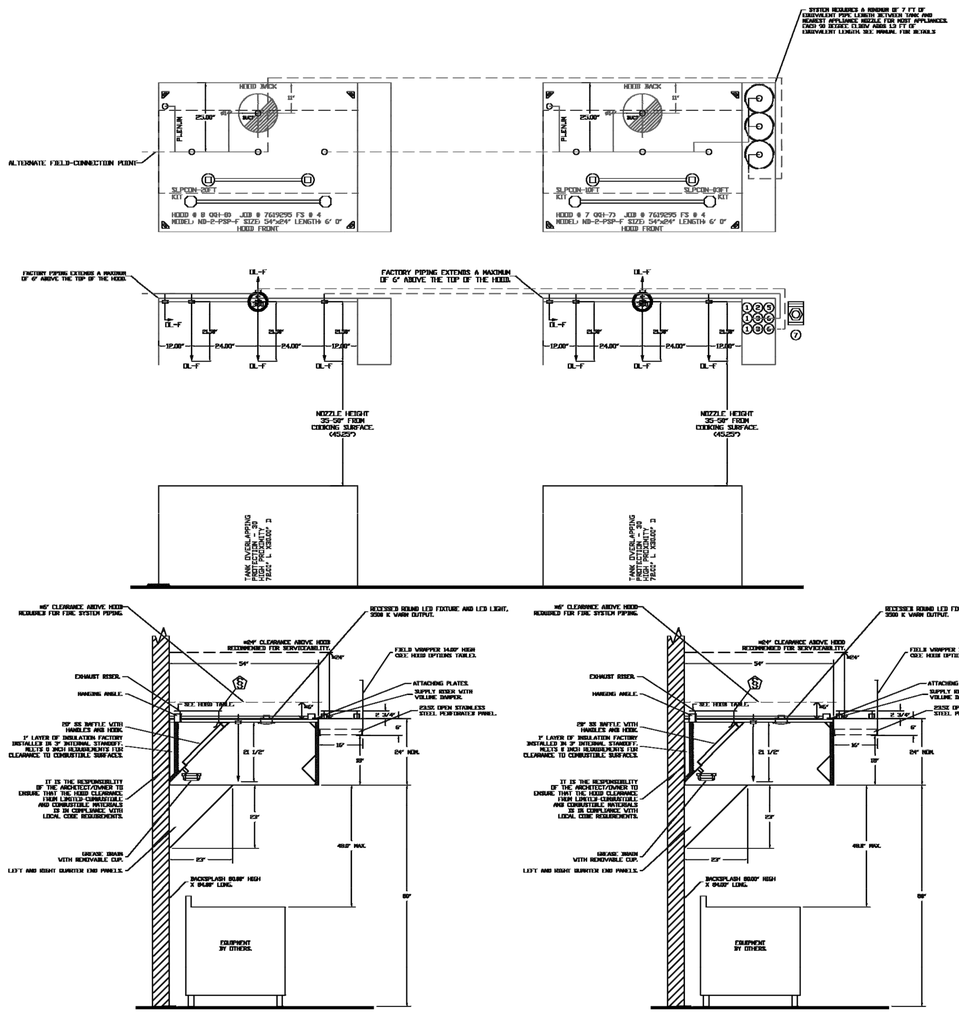
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DATE: 07.25.25
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SHEET NO.:
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SECTION VIEW – MODEL 5424VX-2-PSP-F HOOD – #8

SECTION VIEW – MODEL 5424VX-2-PSP-F HOOD – #7

NOTES
- FIELD PIPE DROPS AS SHOWN
PIPING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- FIELD INSTALLED DROPS FACTORY WILL PROVIDE QTY 2 60IN LONG PIECES OF CHROME PLATED PIPING SHIPPED LOOSE TO BE FIELD-INSTALLED.
- SHIP LOOSE DROPS FACTORY WILL PROVIDE THE EXACT CHROME PIPE LENGTH NEEDED SHIPPED LOOSE TO BE FIELD-INSTALLED.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- OVERLAPPING COVERAGE SHALL NOT BE USED ON ANY APPLIANCE WITH AN OBSTRUCTION.
- IF APPLICABLE, EXTENDED PRE-PIPED DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.

- APPLIANCE DIMENSIONS LISTED REPRESENT THE COOKING SURFACE SIZE, NOT THE OVERALL APPLIANCE SIZE.

- THIS PRE-ENGINEERED FIRE SYSTEM COMPLIES WITH UL. 300 REQUIREMENTS.

- DL-F NOZZLE PART NUMBER REPLACES 3070-3/8H-10-SS

JOB #: 7619295.
JOB NAME: THE RAYNOR.

SYSTEM SIZE: TANK-SP-3 DESIGN FP: 46. MAXIMUM FP: 60.
HOOD # 7 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 1/4" DIA.
HOOD # 7 METAL BLOW-OFF CAPS INCLUDED.
HOOD # 8 6' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 1/4" DIA.
HOOD # 8 METAL BLOW-OFF CAPS INCLUDED.

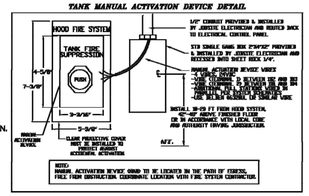
- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.
- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450°F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

AGENT DISTRIBUTION PIPING LIMITATIONS	
PIPE SECTION	MAX PIPE LENGTH (FT)
MAX SUPPLY LINE TO FIRST OVERLAPPING NOZZLE	42
OVERLAPPING NOZZLE APPLIANCE BRANCH	18
DEDICATED NOZZLE APPLIANCE BRANCH	18

LEGEND – FIRE CABINET TANK SYSTEM

1 4 GALLON TANK.
2 PRIMARY ACTUATOR RELEASE.
3 SECONDARY ACTUATOR RELEASE.
4 PRESSURE SUPERVISION SWITCH.
5 PRIMARY HOSE ASSEMBLY.
6 SECONDARY HOSE ASSEMBLY.
7 REMOTE MANUAL ACTUATION DEVICE.

TANK MANUAL ACTIVATION DEVICE DETAIL

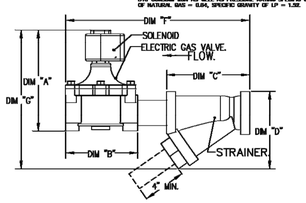


GAS VALVES AND STRAINERS															
	GAS VALVE SIZING					GAS VALVE DIMENSIONS						INSTALLATION	PART NUMBERS		
	TYPE	SIZE	VOLTAGE	MIN. INLET PRESSURE	MAX. INLET PRESSURE	FLOW AT 1 IN.W.C. DROP NATURAL GAS	FLOW AT 1 IN.W.C. DROP PROPANE	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	DIM "F"	PIPE ORIENTATION	GAS VALVE PART NUMBER	STRAINER PART NUMBER	GAS VALVE/STRAINER KIT
GAS VALVE FOR FSP8, FSP8, FSP8, FSP4	ELECTRICAL	2"	120 VAC	5 PSI (3.50 W.C.)	5 PSI (139 W.C.)	3,340,000 BTU/HR	1,900,000 BTU/HR	7-5/8"	6-3/8"	7-1/4"	7-13-16"	15-5/8"	13-15/16"	HORIZONTAL/VERTICAL	0314080	4417608	CKSGVA2

BUYING GAS VALVES ONLY/SELECTED ORIENTATION
3/4"-2" SIZING GAS VALVES CAN BE MOUNTED WITH THE SOLENOID IN ANY POSITION AT OR ABOVE HORIZONTAL. 2 1/2"-3" SIZING GAS VALVES MUST BE MOUNTED WITH THE SOLENOID VERTICAL AND UPRIGHT. 3500 GAS VALVES MUST BE MOUNTED WITH THE SOLENOID VERTICAL AND UPRIGHT.

ALL GAS VALVES/STRAINERS
PROPER CLEARANCE MUST BE PROVIDED IN ORDER TO SERVICE THE STRAINER. A MINIMUM OF 4" (10.2 MM) CLEARANCE MUST BE PROVIDED AT THE BASE OF THE STRAINER. CUSTOMER MUST VERIFY WITH CUSTOMER/FSP AS WELL AS PRESSURE DROPS (SPECIFIC GRAVITY OF NATURAL GAS = 0.64, SPECIFIC GRAVITY OF LP = 1.52).

CALCULATIONS
TO CALCULATE GAS FLOW FOR OTHER THAN 1 IN.W.C. PRESSURE DROP
NEW BTU/HR = (BTU/HR AT 1 IN.W.C. PRESSURE DROP) X NEW PRESSURE DROP$^{.5}$
TO CALCULATE GAS FLOW FOR OTHER THAN 0.64 SPECIFIC GRAVITY
NEW BTU/HR = (BTU/HR AT 0.64) X (0.64 / NEW SPECIFIC GRAVITY)$^{.5}$.



KITCHEN EQUIPMENT BY OTHERS. PROVIDED FOR REFERENCE AND COORDINATION ONLY.

REVISIONS	
DESCRIPTION	DATE:

Ventilation Direct
www.ventilationdirect.com
Sales & Service
14460 New Falls of Neuse Rd, Suite 149-293, Raleigh, NC, 27614 PHONE: (919) 573 - 1522 FAX: 9195731523 EMAIL: info@ventilationdirect.com

Preliminary Drawing - Not for Construction Use for quoting purposes only

The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025
DWG.#: 7619295
DRAWN BY: zach.walsh
SCALE: 1/2" = 1'-0"
MASTER DRAWING

SHEET NO. 9

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. BARRETT
DATE SIGNED: 07/25/25
BW&A Barrett, Woodyard & Associates, Inc.
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BWA Project # 2025-0294

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STUDIOFORTY.NET

NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
KITCHEN EQUIPMENT DETAILS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

SHEET NO.:
M0.18

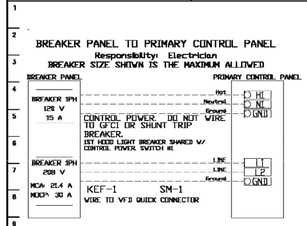
ELECTRICAL PACKAGE – JOB#7619295

NO	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED	
				LOCATION	QUANTITY		FAN TAG	TYPE
1		DCV-1111	UTILITY CABINET LEFT	UTILITY CABINET LEFT	1 LIGHT	SMART CONTROLS DCV	KEF-1	EXHAUST
				HOOD # 1	1 FAN		KMUA-1	SUPPLY
2		DCV-1111	UTILITY CABINET LEFT	UTILITY CABINET LEFT	1 LIGHT	SMART CONTROLS DCV	KEF-2	EXHAUST
				HOOD # 3	1 FAN		KMUA-2	SUPPLY
3		DCV-1111	UTILITY CABINET RIGHT	UTILITY CABINET RIGHT	1 LIGHT	SMART CONTROLS DCV	KEF-3	EXHAUST
				HOOD # 5	1 FAN		KMUA-3	SUPPLY
4		DCV-1111	UTILITY CABINET RIGHT	UTILITY CABINET RIGHT	1 LIGHT	SMART CONTROLS DCV	KEF-4	EXHAUST
				HOOD # 8	1 FAN		KMUA-3	SUPPLY

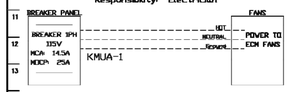
JOB NO 7619295 | MODEL NUMBER DCV-1111 | JOB NAME The Raynor | DRAWN BY | DATE 7/3/2025 | SCHEMATIC TYPE INSTALL | DWG NO ECP #1-1

DESCRIPTION OF OPERATION:
Demand Control Ventilation, w/ control for 1 Exhaust Fan, 1 Supply Fan, Exhaust on in Fire, Lights out in Fire, Fans modulate based on duct temperature, INVERTER DUTY 3 PHASE MOTOR REQUIRED FOR USE WITH VFD. Fans temperature sensors located on duct. For field installation,Verify distance between VFD and Rotary additional cost could apply if distance exceeds 50 Feet.

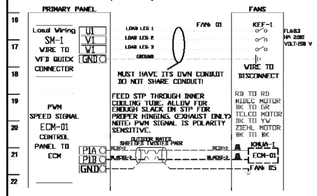
BREAKER PANEL TO PRIMARY CONTROL PANEL
Responsibility: Electrician
BREAKER SIZE SHOWN IS THE MAXIMUM ALLOWED



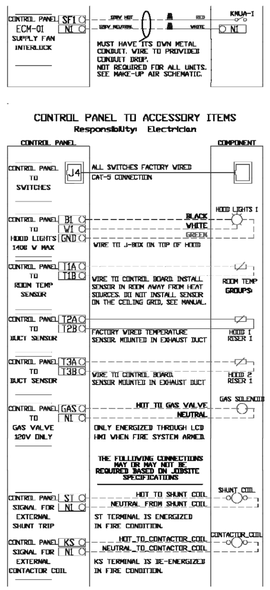
BREAKER PANEL TO FANS
Responsibility: Electrician

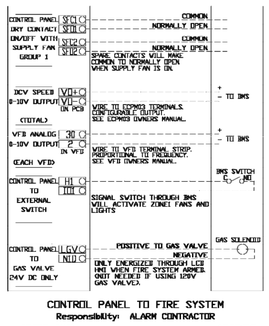


CONTROL PANEL TO FANS
Responsibility: Electrician

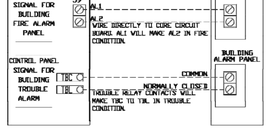


CONTROL PANEL TO ACCESSORY ITEMS
Responsibility: Electrician

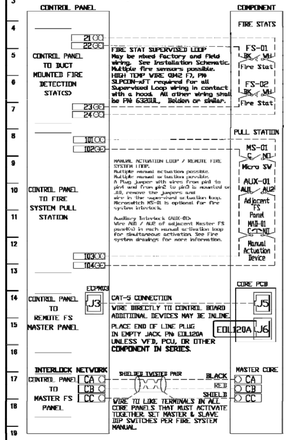




CONTROL PANEL TO FIRE SYSTEM
Responsibility: ALARM CONTRACTOR



CONTROL PANEL TO FIRE SYSTEM
Responsibility: CERTIFIED INSTALLER



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REVISIONS

	DESCRIPTION	DATE
1		
2		
3		
4		

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Sales & Service
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www.ventilationdirect.com

Preliminary Drawing - Not for Construction Use for quoting purposes only

The Raynor
112 S Fayetteville St,
DUNN, NC, 28334

DATE: 7/3/2025
DWG.#: 7619295
DRAWN BY: zach.walsh
SCALE: 3/4" = 1'-0"
MASTER DRAWING
SHEET NO. 18

CHRISTOPHER A. BARRETT — NORTH CAROLINA PROFESSIONAL ENGINEER
DATE SIGNED: 07/25/25
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NC License # C-2226
BWA Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME: KITCHEN EQUIPMENT DETAILS

REVISIONS:
DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

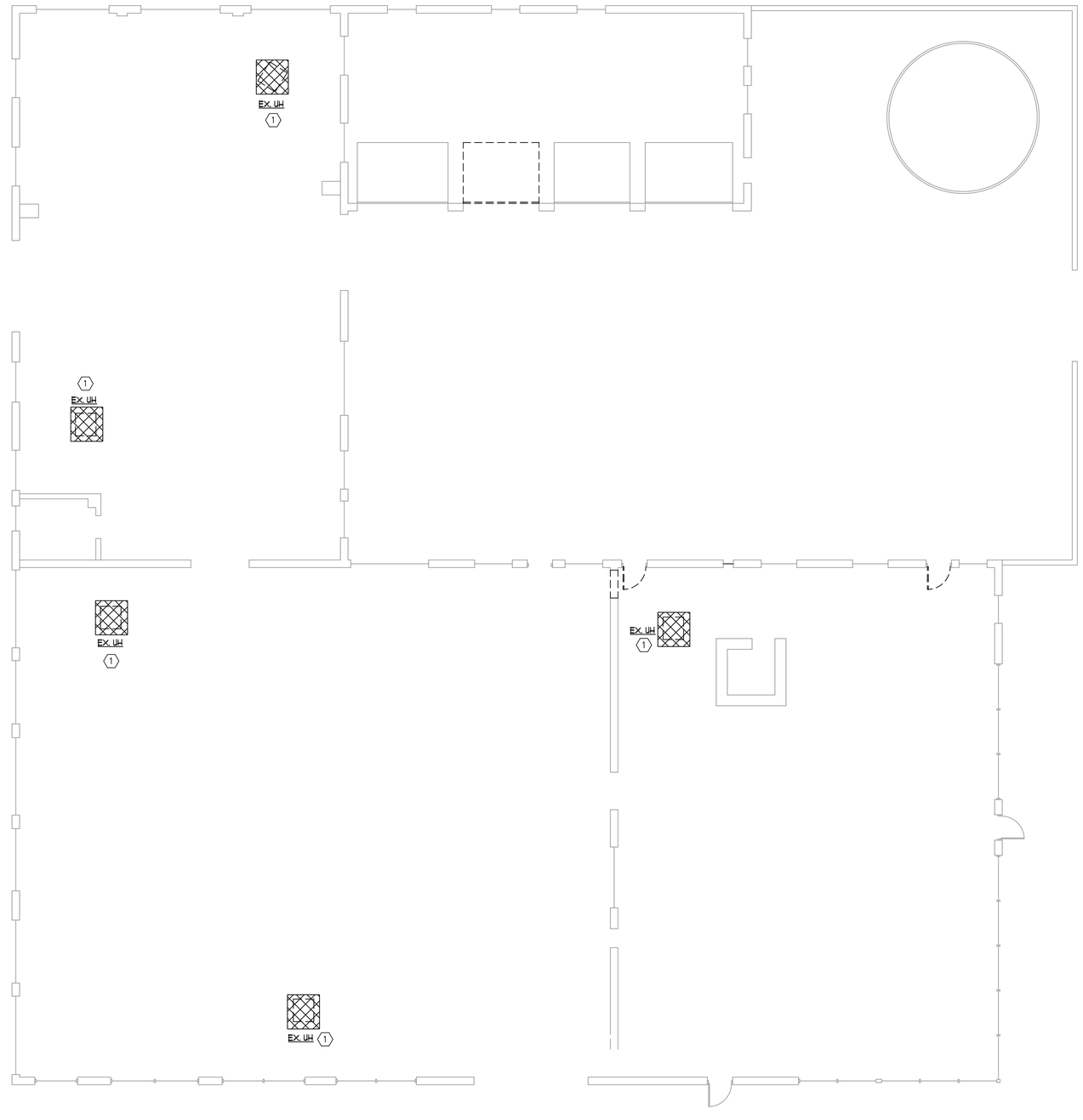
SHEET NO.: M0.19

GENERAL NOTES
(APPLIES TO ALL SHEETS)

1. REFER TO SHEET M0.5 FOR FIRESTOPPING DETAILS.
2. ALL DUCTWORK SHOWN IS SCHEMATIC IN NATURE AND DOES NOT REFLECT ALL OFFSETS, CHANGES IN ELEVATION, ETC. NECESSARY FOR COORDINATION BETWEEN TRADES. OFFSET & COORDINATE AS REQUIRED.
3. FIELD COORDINATE INSTALLATION OF DUCTWORK, PIPING, EQUIPMENT, ETC. WITH ALL OTHER TRADES.
4. THERMOSTAT/SENSOR PLACEMENT SHALL BE COORDINATED WITH FINAL FURNITURE LAYOUT, ALL WALL-MOUNTED ELECTRICAL DEVICES, EQUIPMENT LAYOUT, ARCHITECT, AND OWNERS REPRESENTATIVE. NEW THERMOSTATS SHALL MATCH BASE BUILDING THERMOSTATS IN EVERY RESPECT. CONTRACTOR SHALL TIE NEW THERMOSTATS INTO BUILDING EMS AND UPDATE IT ACCORDINGLY.
5. EXACT LOCATION OF ALL AIR DISTRIBUTION/RETURN DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL RCP.
6. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND ASCERTAIN ALL EXISTING CONDITIONS. NO ALLOWANCES WILL BE PROVIDED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS. CONTRACTOR SHALL DEMO ALL NON-ESSENTIAL DUCTWORK AND PIPING WHICH IS NOT REQUIRED FOR THIS INSTALLATION. COORDINATE ALL DEMO WITH BUILDING REP BEFORE DEMO WORK COMMENCES.
7. EXISTING WORK SHOWN HERE IS BASED ON SITE VISIT AND/OR PROVIDED INFORMATION. THESE DRAWINGS ARE NOT NECESSARILY ACCURATE FOR EXISTING MATERIALS AND SHOULD NOT BE INTERPRETED TO BE A STRICT REPRESENTATION OF AS-BUILT CONDITIONS.

KEY NOTES
(APPLY THIS SHEET ONLY)

(1) DEMO EXISTING UNIT HEATER AS SHOWN. DEMO ALL ASSOCIATED PIPING, WIRING, ETC.



1 / M1.0 First Floor Demo Plan – Mechanical
1/8" = 1'-0"

PROJECT NORTH

TRUE NORTH

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. KOLB
DATE SIGNED: 07/25/25
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
FIRST FLOOR DEMO PLAN - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

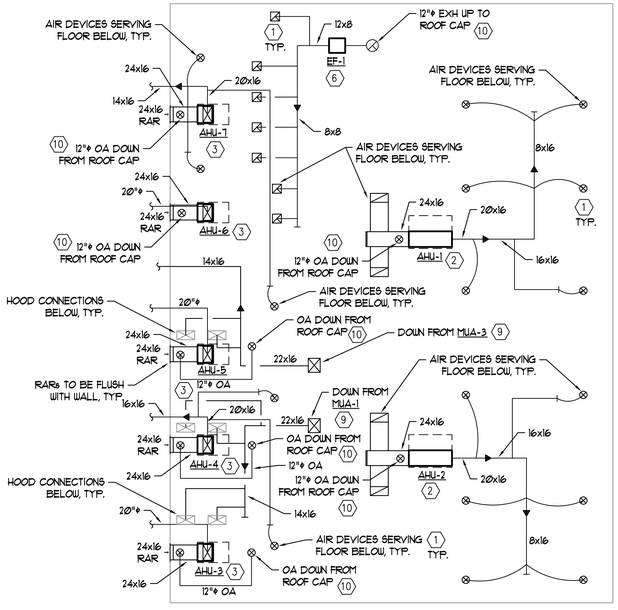
SHEET NO.:
M1.0

GENERAL NOTES
(APPLIES TO ALL SHEETS)

1. REFER TO SHEET M0.5 FOR FIRESTOPPING DETAILS.
2. ALL DUCTWORK SHOWN IS SCHEMATIC IN NATURE AND DOES NOT REFLECT ALL OFFSETS, CHANGES IN ELEVATION, ETC. NECESSARY FOR COORDINATION BETWEEN TRADES. OFFSET & COORDINATE AS REQUIRED.
3. FIELD COORDINATE INSTALLATION OF DUCTWORK, PIPING, EQUIPMENT, ETC. WITH ALL OTHER TRADES.
4. THERMOSTAT/SENSOR PLACEMENT SHALL BE COORDINATED WITH FINAL FURNITURE LAYOUT, ALL WALL-MOUNTED ELECTRICAL DEVICES, EQUIPMENT LAYOUT, ARCHITECT, AND OWNERS REPRESENTATIVE. NEW THERMOSTATS SHALL MATCH BASE BUILDING THERMOSTATS IN EVERY RESPECT. CONTRACTOR SHALL TIE NEW THERMOSTATS INTO BUILDING EMS AND UPDATE IT ACCORDINGLY.
5. EXACT LOCATION OF ALL AIR DISTRIBUTION/RETURN DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL RCP.
6. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND ASCERTAIN ALL EXISTING CONDITIONS. NO ALLOWANCES WILL BE PROVIDED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS. CONTRACTOR SHALL DEMO ALL NON-ESSENTIAL DUCTWORK AND PIPING WHICH IS NOT REQUIRED FOR THIS INSTALLATION. COORDINATE ALL DEMO WITH BUILDING REP BEFORE DEMO WORK COMMENCES.
7. EXISTING WORK SHOWN HERE IS BASED ON SITE VISIT AND/OR PROVIDED INFORMATION. THESE DRAWINGS ARE NOT NECESSARILY ACCURATE FOR EXISTING MATERIALS AND SHOULD NOT BE INTERPRETED TO BE A STRICT REPRESENTATION OF AS-BUILT CONDITIONS.

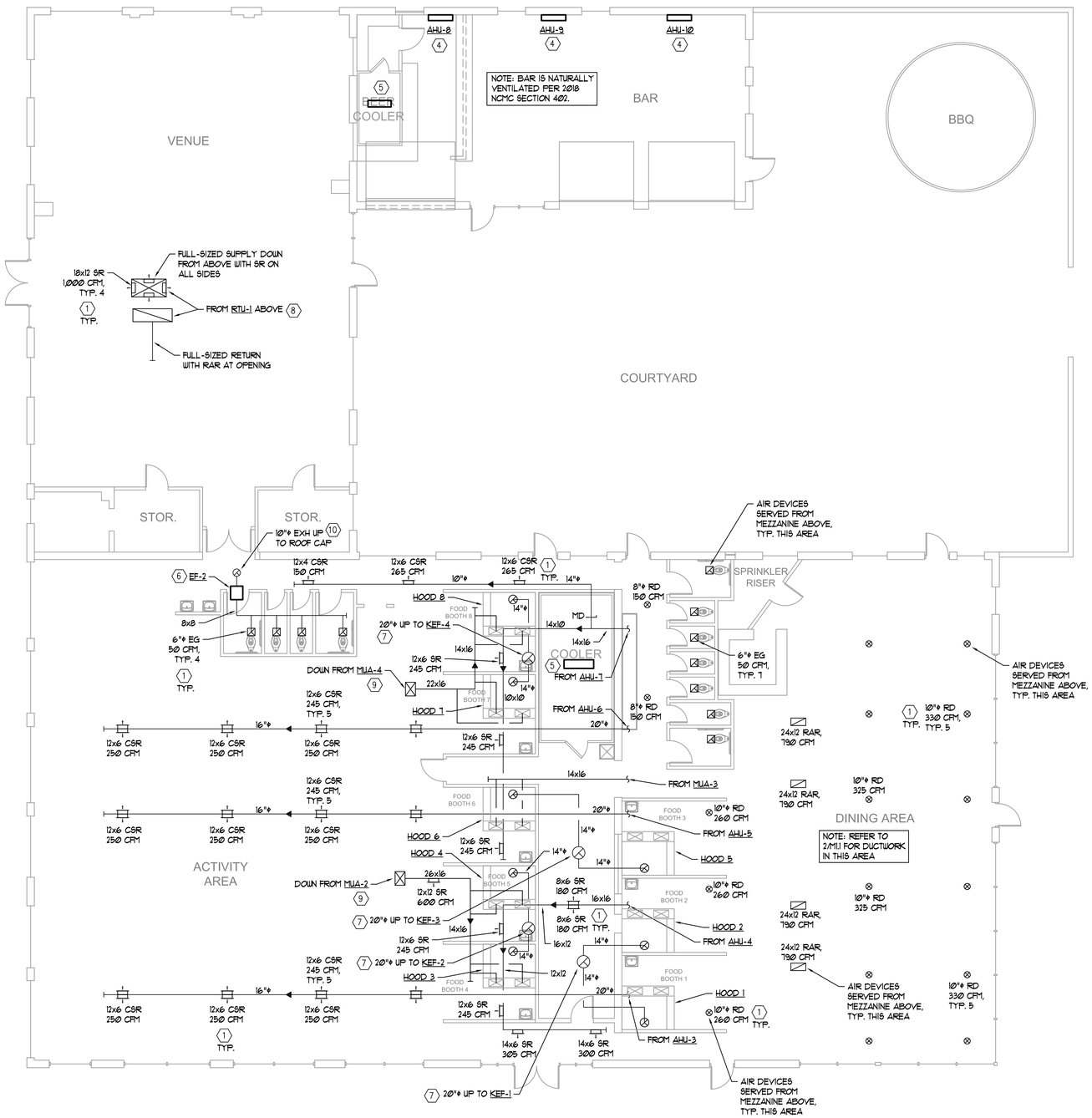
KEY NOTES
(APPLY THIS SHEET ONLY)

1. PROVIDE AND INSTALL NEW AIR DEVICE OF NECK SIZE SHOWN AND BALANCE TO INDICATED AIRFLOW. SEE DETAIL 1/M0.1.
2. PROVIDE AND INSTALL NEW SPLIT SYSTEM AS SCHEDULED ON M0.3. SEE DETAILS 3, 4/M0.1.
3. PROVIDE AND INSTALL NEW SPLIT SYSTEM AS SCHEDULED ON M0.3. SEE DETAILS 4/M0.1 AND 2/M0.2.
4. PROVIDE AND INSTALL NEW SPLIT SYSTEM AS SCHEDULED ON M0.3. SEE DETAILS 5, 6/M0.1.
5. WALK-IN COOLER BY OTHERS. SEE DETAILS 6/M0.1 AND 1/M0.2. COORDINATE ELECTRICAL REQUIREMENTS WITH DIV. 26.
6. PROVIDE AND INSTALL NEW FAN AS SCHEDULED ON M0.3. SEE DETAIL 7/M0.1.
7. PROVIDE AND INSTALL NEW FAN AS SCHEDULED ON M0.3. SEE DETAIL 3/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER. COORDINATE CONTROLS WITH KITCHEN HOOD MANUFACTURER.
8. PROVIDE AND INSTALL NEW PACKAGED ROOFTOP UNIT AS SCHEDULED ON M0.4. SEE DETAILS 4, 5, 6/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER.
9. PROVIDE AND INSTALL NEW MAKE-UP AIR UNIT AS SCHEDULED ON M0.4. SEE DETAILS 4, 5, 6/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER. COORDINATE CONTROLS WITH KITCHEN HOOD MANUFACTURER.
10. SEE DETAIL 3/M0.1 FOR EXHAUST/INTAKE ROOF CAPS. MAINTAIN MINIMUM 10 FEET CLEARANCE BETWEEN ANY EXHAUST AND INTAKE SOURCES.



2 M1.1 Mezzanine Plan – Mechanical
1/8" = 1'-0"

PROJECT NORTH TRUE NORTH



1 M1.1 First Floor Plan – Mechanical
1/8" = 1'-0"

PROJECT NORTH TRUE NORTH

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. WOOD
DATE SIGNED: 07/25/25
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BW&A Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
FLOOR PLANS - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

PERMIT SET

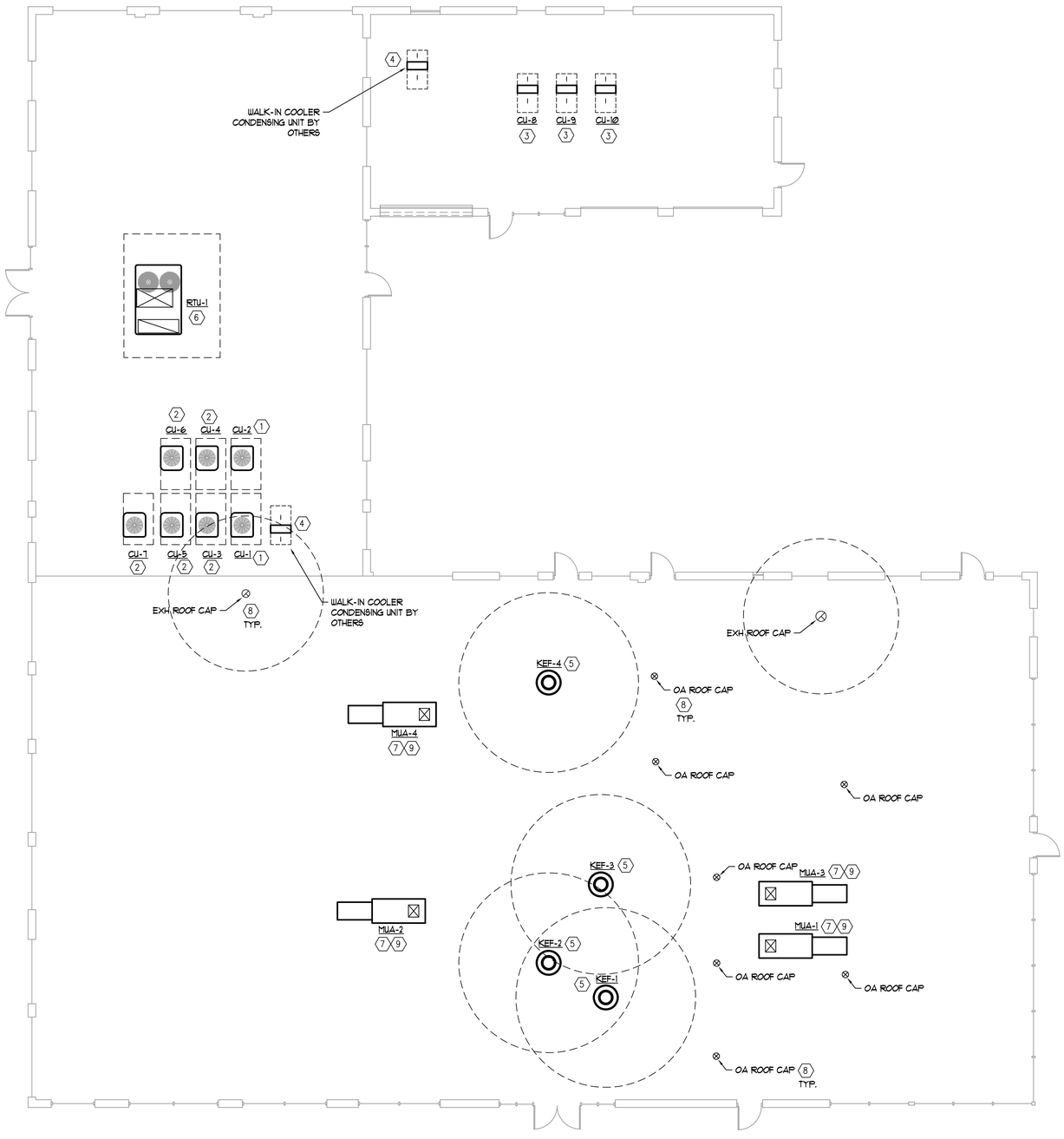
SHEET NO.:
M1.1

GENERAL NOTES
(APPLIES TO ALL SHEETS)

1. REFER TO SHEET M0.5 FOR FIRESTOPPING DETAILS.
2. ALL DUCTWORK SHOWN IS SCHEMATIC IN NATURE AND DOES NOT REFLECT ALL OFFSETS, CHANGES IN ELEVATION, ETC. NECESSARY FOR COORDINATION BETWEEN TRADES. OFFSET & COORDINATE AS REQUIRED.
3. FIELD COORDINATE INSTALLATION OF DUCTWORK, PIPING, EQUIPMENT, ETC. WITH ALL OTHER TRADES.
4. THERMOSTAT/SENSOR PLACEMENT SHALL BE COORDINATED WITH FINAL FURNITURE LAYOUT, ALL WALL-MOUNTED ELECTRICAL DEVICES, EQUIPMENT LAYOUT, ARCHITECT, AND OWNERS REPRESENTATIVE. NEW THERMOSTATS SHALL MATCH BASE BUILDING THERMOSTATS IN EVERY RESPECT. CONTRACTOR SHALL TIE NEW THERMOSTATS INTO BUILDING EMS AND UPDATE IT ACCORDINGLY.
5. EXACT LOCATION OF ALL AIR DISTRIBUTION/RETURN DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL RCP.
6. CONTRACTOR SHALL VISIT SITE PRIOR TO BID AND ASCERTAIN ALL EXISTING CONDITIONS. NO ALLOWANCES WILL BE PROVIDED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS. CONTRACTOR SHALL DEMO ALL NON-ESSENTIAL DUCTWORK AND PIPING WHICH IS NOT REQUIRED FOR THIS INSTALLATION. COORDINATE ALL DEMO WITH BUILDING REP BEFORE DEMO WORK COMMENCES.
7. EXISTING WORK SHOWN HERE IS BASED ON SITE VISIT AND/OR PROVIDED INFORMATION. THESE DRAWINGS ARE NOT NECESSARILY ACCURATE FOR EXISTING MATERIALS AND SHOULD NOT BE INTERPRETED TO BE A STRICT REPRESENTATION OF AS-BUILT CONDITIONS.

KEY NOTES
(APPLY THIS SHEET ONLY)

1. PROVIDE AND INSTALL NEW SPLIT SYSTEM AS SCHEDULED ON M0.3. SEE DETAILS 3, 4/M0.1.
2. PROVIDE AND INSTALL NEW SPLIT SYSTEM AS SCHEDULED ON M0.3. SEE DETAILS 4/M0.1 AND 2/M0.2.
3. PROVIDE AND INSTALL NEW SPLIT SYSTEM AS SCHEDULED ON M0.3. SEE DETAILS 5, 6/M0.1.
4. WALK-IN COOLER BY OTHERS. SEE DETAILS 6/M0.1 AND 1/M0.2. COORDINATE ELECTRICAL REQUIREMENTS WITH DIV. 26.
5. PROVIDE AND INSTALL NEW FAN AS SCHEDULED ON M0.3. SEE DETAIL 3/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER. COORDINATE CONTROLS WITH KITCHEN HOOD MANUFACTURER.
6. PROVIDE AND INSTALL NEW PACKAGED ROOFTOP UNIT AS SCHEDULED ON M0.4. SEE DETAILS 4, 5, 6/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER.
7. PROVIDE AND INSTALL NEW MAKE-UP AIR UNIT AS SCHEDULED ON M0.4. SEE DETAILS 4, 5, 6/M0.2. COORDINATE ROOF CURB WITH MANUFACTURER AND STRUCTURAL ENGINEER. COORDINATE CONTROLS WITH KITCHEN HOOD MANUFACTURER.
8. SEE DETAIL 3/M0.1 FOR EXHAUST/INTAKE ROOF CAPS. MAINTAIN MINIMUM 10 FEET CLEARANCE BETWEEN ANY EXHAUST AND INTAKE SOURCES.
9. VERIFY WITH EQUIPMENT MANUFACTURER IF EQUIPMENT IS CONDENSING OR NON-CONDENSING. IF CONDENSING, PROVIDE EQUIPMENT WITH CONDENSATE NEUTRALIZATION KIT AND COORDINATE DISCHARGE LOCATION WITH OWNER.



1 M1.2 Roof Plan – Mechanical
1/8" = 1'-0"

PROJECT NORTH
TRUE NORTH

CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER A. WOOD
DATE SIGNED: 07/25/25
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BW-A Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
ROOF PLAN - MECHANICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: RK

SHEET NO.:
M1.2

PERMIT SET

PROJECT TYPE

[X] New Construction (C405) [ ] Addition (C502) [ ] Alterations (C503)

When 'New Construction' is selected, indicate NCECC Section C406 method of compliance below. If project is other than 'New Construction', compliance with referenced section is 'N/A'.

Unless specifically exempt below, the contractor shall obtain the services of a NC licensed engineering professional to perform all required commissioning services of all lighting and lighting control systems in the project scope in compliance with NCECC Section C408.

NCECC 2018 SECTION C406 – COMPLIANCE STATEMENT

Method of Compliance

a. C406.1.1 More Efficient HVAC Performance ____
b. C406.1.2 Reduced Lighting Power Density ____
c. C406.1.3 Enhanced Lighting Controls ____
d. C406.1.4 On-Site Supply of Renewable Energy ____
e. C406.1.5 Dedicated Outdoor Air System ____
f. C406.1.6 Higher Efficiency Service Water Heating ____

Refer to the following sheet for demonstration of compliance: N/A

NCECC 2018 SECTION C408 – SYSTEM COMMISSIONING

[ ] Exempt (For Alterations only per NCECC C503.1 Exception 2.g.)

Refer to 2018 NCECC Appendix C1 for required statement of system commissioning to be presented to the AHJ at final inspections.

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance
Prescriptive ___X___ Performance _____ Energy Cost Budget _____

Provide a standard riser diagram which indicates designated points for check metering.
Provide a standard panel schedule description which idenifies different enduse loads.

Standard riser diagram is on Sheet E0.3
Standard panel schedules are on Sheet E0.3

Lighting Schedule
lamp type required in fixture — See lighting fixture schedule on Sheet E0.1
number of lamps in fixture
ballast type used in the fixture
number of ballasts in fixture
total wattage per fixture
total interior wattage specified vs. allowed
Dining & Multipurpose Occupancy (gross area): 12,474.1 sq. ft.
Per 2018 North Carolina Energy Code:

Allowable	Specified
DINING: TOTAL DINING = 7299.5 WATTS	DINING = 2570 WATTS
BAR: 1,300 SQ. FT. X 1.07 W/SF = 1,391 WATTS	
FAMILY DINING: 6,638.8 SQ. FT. X 0.89 W/SF = 5,908.5 WATTS	
MULTIPURPOSE =4,535.3 SQ. FT. X 1.23 W/SF = 5,578.4 WATTS	MULTIPURPOSE = 900 WATTS

total exterior wattage specified vs. allowed

Allowable	Specified
TOTAL = 9,240 WATTS	144 WATTS
MAIN ENTRANCE: 257 FT x 120W/LF = 5,140 WATTS	
OTHER DOORS: 175FT x 20 W/LF = 3,500 WATTS	
BASE SITE ALLOWANCE: 600 W	

Equipment schedules with motors (not used for mechanical systems):
motor horsepower N/A
number of phases N/A
minimum efficiency N/A
motor type N/A
# of poles N/A

ELECTRICAL DESIGNER STATEMENT
I hereby certify that the design of this building complies with the electrical systems, service systems and equipment requirements of the 2018 North Carolina Energy Code.

signed SHEET IS SIGNED date 07/25/2025

Name Chadwick M. Vickery

Title Project Engineer

ELECTRICAL GENERAL NOTES

1. ALL WORK IN THIS DIVISION SHALL COMPLY WITH ALL LOCAL BUILDING CODES, LAWS, REGULATIONS, ORDINANCES, AND THE REQUIREMENTS OF THE 2020 NATIONAL ELECTRICAL CODE.
2. THE CONTRACTOR SHALL KEEP A RECORD OF THE CHANGES WHICH ARE IN CONFLICT WITH THESE DRAWINGS AND SPECIFICATIONS. AT THE COMPLETION OF HIS WORK HE SHALL SUBMIT "AS BUILT" PRINTS AND ELECTRONIC CAD FILES TO THE OWNER.
3. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND DO NOT NECESSARILY SHOW EVERY FITTING AND DETAIL. ALL WORK SHALL BE INSTALLED SO THAT JUNCTION BOXES AND COMPONENTS WILL BE ACCESSIBLE FOR SERVICE.
4. ALL SYSTEMS, EQUIPMENT, COMPONENTS, WORK, ETC. PROVIDED UNDER THIS DIVISION SHALL BE COVERED BY A ONE YEAR GUARANTEE STARTING AT THE TIME OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. ANY DEFECTS IN THE WORK, SYSTEMS, EQUIPMENT, OR COMPONENTS FOUND DURING THIS YEAR SHALL BE CORRECTED AT NO CHARGE. THE GUARANTEE SHALL INCLUDE PROVIDING ALL NECESSARY CUTTING, PATCHWORK, REPAINTING, ETC. TO MAKE THE WORK COMPLETE AND NEW.
5. ALL CONDUCTORS SHALL BE COPPER WITH TYPE "THW" OR "THHN" WITH 90-DEGREE INSULATION TEMPERATURE RATING. THE MINIMUM WIRE SIZE SHALL BE #12 A.W.G.
6. ALL CONDUIT SHALL BE CONCEALED IN THE WALLS OR ABOVE THE CEILING UNLESS OTHERWISE NOTED. ALL HOMERUN CIRCUITRY SHALL BE 2#12, 1#12G, 3/4" CONDUIT UNLESS NOTED OTHERWISE. ALL NON-HOMERUN CIRCUITRY SHALL BE 2#12, 1#12G, 1/2" CONDUIT UNLESS NOTED OTHERWISE.
7. ALL WORK MUST BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER ACCORDING TO GENERALLY ACCEPTED PRINCIPALS OF FIRST CLASS WORKMANSHIP.
8. ALL PENETRATIONS THRU WALLS, FLOORS, AND CEILINGS SHALL BE FIRE STOPPED PER N.E.C. 300.21. ALL UPPER SLAB PENETRATIONS SHALL BE SLEEVED AND SEALED PER OWNER'S REQUIREMENTS.
9. ALL ROOF PENETRATIONS SHALL BE AS AUTHORIZED BY OWNER AND IN ACCORDANCE WITH OWNER REQUIREMENTS. MAINTAIN ROOF WATERTIGHT INTEGRITY.
10. PROVIDE JUNCTION BOX WITH 3/4" EMT STUBBED UP TO 6" ABOVE ACCESSIBLE CEILING IN NEAREST WALL AT EACH TELEPHONE, DATA, AND COMBINATION TELEPHONE/DATA OUTLET. PROVIDE PULSTRING AND BUSHINGS AT THE TERMINATION ABOVE CEILING.
11. FASTEN ALL RECESSED LIGHTING FIXTURES TO STRUCTURE OR GRID PER N.E.C. 410.10 & 410.36.
12. PROVIDE ALL GROUNDING AS REQUIRED BY N.E.C.
13. PROVIDE #12 A.W.G. GROUND CONDUCTOR FOR ALL MECHANICAL EQUIPMENT UNLESS OTHERWISE NOTED. ALL EQUIPMENT SHALL BE GROUNDED AT THE PANEL WHICH FEEDS THE EQUIPMENT.
14. PROVIDE A SEPARATE GREEN, INSULATED, #12 A.W.G. EQUIPMENT GROUNDING CONDUCTOR ROUTED WITH THE BRANCH CIRCUIT HOMERUN CONDUCTORS.
15. DEVICE MOUNTING HEIGHTS ARE TO BE MEASURED TO THE DEVICE CENTERLINE UNLESS NOTED OTHERWISE.
16. ALL SWITCHES FOR FANS, LIGHTS, ETC. WHICH ARE SHOWN TO BE MOUNTED IN THE SAME GENERAL AREA SHALL SHARE A MULTI-GANG COVER PLATE AS REQUIRED.
17. AT COMPLETION OF PROJECT, REMOVE ALL TEMPORARY CONSTRUCTION CIRCUITING, WIRING, CABLING, AND LIGHTING SYSTEMS.
18. PROVIDE A PRINTED PANEL SCHEDULE FOR ALL PANELS. CORRECTLY LABEL ALL CIRCUITS, SPARES AND SPACES. NOTIFY DESIGN ENGINEER OF ANY DISCREPANCY OF PANEL LABELS.
19. COORDINATE RECEPTACLE NEMA TYPE AND VOLTAGE WITH COPIERS AND EQUIPMENT.
20. ALL CABLE USED IN PLENUM SHALL BE PLENUM-RATED.
21. ARMORED CABLE MAY BE USED IN WALLS AND MILLWORK ONLY AND MUST BE MC TYPE (WITH GROUND). ALL CONDUIT TO AND ABOVE THE PLENUM SHALL BE EMT.
22. ALL DEVICES SHALL HAVE WHITE COVER WHERE APPLICABLE AND ALLOWED BY ALL CODE.
23. CONTRACTOR SHALL CLEAN SITE AT END OF PROJECT. ALL DUST, DEBRIS, OILS, SPRAYS, FINGERPRINTS, AND LABELS SHALL BE REMOVED FROM ALL EXPOSED FINISHED SURFACES.
24. ALL SHADED OR HALF-SHADED LUMINAIRES SHOWN ON DRAWINGS SHALL BE EQUIPPED WITH A BATTERY BACK-UP. ANY FIXTURE USED FOR PATH OF EGRESS ILLUMINATION SHALL BE UNSWITCHED AND REMAIN ON CONTINUOUSLY.
25. RELOCATE EXISTING J-BOXES SERVING ELECTRICAL, FIRE ALARM, AND OTHER SYSTEMS TO AN ACCESSIBLE LOCATION WHERE NEW CEILINGS ARE SCHEDULED THAT RENDER THE J-BOXES INACCESSIBLE (i.e. GYP CEILING, SPECIALTY CEILINGS). EXTEND/MODIFY EXISTING CONDUIT, CABLING, ETC. AS REQUIRED FOR RELOCATION

ELECTRICAL DEMO NOTES

1. REFER TO THE ARCHITECTURAL DEMOLITION PLANS FOR SCOPE RELATED TO THE LAYOUT OF WALLS, CEILINGS, ETC. TO BE REMOVED.
2. COORDINATE ALL POWER SHUT-DOWNS WITH THE ONSITE FACILITIES MANAGEMENT TEAM.
3. REMOVE ALL EXISTING DEVICES (RECEPTACLES, DATA OUTLETS, SWITCHES, EMPTY JUNCTION BOXES, ETC.) ASSOCIATED WITH ANY WALLS OR OTHER PARTITIONS IDENTIFIED TO BE REMOVED. REMOVE ALL ASSOCIATED CONDUIT AND WIRING BACK TO ITS SOURCE. RE-LABEL ALL NEW SPARE BREAKERS AS "SPARE" IN THE APPROPRIATE PANEL SCHEDULES.
4. REMOVE ALL EXISTING DEVICES (RECEPTACLES, DATA OUTLETS, SWITCHES, EMPTY JUNCTION BOXES, ETC.) ON EXISTING TO REMAIN WALLS, BOTH INTERIOR AND PERIMETER, UNLESS SPECIFICALLY SHOWN AS EXISTING TO REMAIN ON SHEETS ELSEWHERE IN THIS SET. REMOVE ALL ASSOCIATED CONDUIT AND WIRING BACK TO ITS SOURCE. RE-LABEL ALL NEW SPARE BREAKERS AS "SPARE" IN THE APPROPRIATE PANEL SCHEDULES.
5. NO BLANK COVERPLATES SHALL BE ALLOWED. REFER TO ARCHITECTURAL SET FOR DETAILS CONCERNING PATCHING OF EXISTING OPENINGS BASED ON THE PARTITION TYPE IT CURRENTLY RESIDES.
6. REMOVE ALL EXISTING LIGHT FIXTURES AND EXIT SIGNS FROM THE SCOPE OF WORK AREA UNLESS SPECIFICALLY IDENTIFIED AS "EXISTING TO REMAIN" (EX) OR "EXISTING TO BE RELOCATED" (RE). REMOVE ALL ASSOCIATED CONDUIT AND WIRING BACK TO ITS SOURCE. RE-LABEL ALL NEWLY SPARED BREAKERS AS "SPARE" IN THE APPROPRIATE PANEL SCHEDULES.
7. FOR ANY MECHANICAL EQUIPMENT BEING REMOVED, REMOVE ALL WIRING, CONDUIT, AND ASSOCIATED DISCONNECTS BACK TO ITS SOURCE. COORDINATE EXACT UNITS BEING REMOVED WITH DIVISION 22 & 23. RE-LABEL ALL NEW SPARE BREAKERS AS "SPARE" IN THE APPROPRIATE PANEL SCHEDULES.
8. REMOVE ALL ABANDONED EMPTY CONDUIT AND JUNCTION BOXES FROM THE CEILING SPACE.
9. COORDINATE WITH THE TENANT AND/OR LANDLORD EXACTLY WHICH DEVICES AND EQUIPMENT ARE REQUIRED TO BE TURNED OVER TO THE OWNER ONCE REMOVED.
10. PROVIDE ADEQUATE PROTECTION OF ANY EXISTING TO REMAIN DEVICE OR FIXTURE SUCH THAT IT IS NOT DAMAGED DURING THE CONSTRUCTION PROCESS.

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER CATALOG NO.	LAMPS QTY.	LAMPS TYPE	BALLAST QTY.	BALLAST TYPE	TOTAL WATTS	VOLTAGE	DESCRIPTION
A	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3500K	1	ELECTRONIC DRIVER	35.8	120	4' LINEAR FIXTURE WITH WHITE POLYESTER POWDER COAT BONDED FINISH. 5261 LUMENS. 0-10V DIMMING.
B	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3000K	1	ELECTRONIC DRIVER	43	120	2' ROUND STEM MOUNTED FIXTURE WITH SPUN ALUMINUM HOUSING AND GALVANIZED FINISH. 4000 LUMENS. 0-10V DIMMING.
C	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3000K	1	ELECTRONIC DRIVER	30.3	120	4" DOWNLIGHT WITH WHITE REFLECTOR. 80 CRI, 1000 LUMENS. 0-10V DIMMING.
D	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3000K	1	ELECTRONIC DRIVER	20	120	DECORATIVE PENDANT LED LIGHT FIXTURE.
F1	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3000K	1	ELECTRONIC DRIVER	50	120	72" CEILING FAN
F2	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3000K	1	ELECTRONIC DRIVER	50	120	96" CEILING FAN
G	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3000K	1	ELECTRONIC DRIVER	30	120	SURFACE CEILING MOUNTED EXTERIOR LED LIGHT FIXTURE.
H	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3500K	1	ELECTRONIC DRIVER	16	120	EXTERIOR DOWNLIGHT WITH DIE-CAST ALUMINUM FINISH. 3000 LUMEN. PROVIDE WITH INTEGRAL 90 MINUTE BATTERY UNIT.
T	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	1	LED 3000K	1	ELECTRONIC DRIVER	11	120	4' TRACK LIGHTING WITH DIE-CAST ALUMINUM AND FROSTED TIR LENS. 0-10V DIMMING.
X	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	-	LED (RED)	1	ELECTRONIC DRIVER	-	120	WHITE THERMOPLASTIC COMBINATION EXIT SIGN / EMERGENCY FIXTURE, CEILING OR WALL MOUNT 96" AFF OR 4" BELOW FINISHED CEILING. PROVIDE RED LETTERING. PROVIDE DIRECTIONAL ARROWS AND NUMBER OF FACES AS INDICATED. SEE LIGHTING PLAN. PROVIDE WITH INTEGRAL 90 MINUTE BATTERY UNIT.
Z	SUPPLIED BY OWNER; INSTALLED BY CONTRACTOR	2	LED	1	ELECTRONIC DRIVER	-	120	WHITE THERMOPLASTIC WALL MOUNTED EMERGENCY BUGEYE FIXTURE. PROVIDE WITH INTEGRAL 90 MINUTE BATTERY UNIT.

NOTES:
1. ALL FIXTURES SHALL BE UL LISTED AND APPROVED BY ARCHITECT/OWNER PRIOR TO ORDERING.
2. FIXTURES "X", "Z" & FIXTURES DESIGNATED AS EMERGENCY WITH AN "E" SHALL BE WIRED "UNSWITCHED".
3. ALL REMOTE BALLAST LOCATIONS SHALL BE REVIEWED AND APPROVED BY THE ARCHITECT PRIOR TO INSTALLATION.
4. COORDINATE MOUNTING HEIGHTS OF ALL SUSPENDED FIXTURES WITH ARCHITECT PRIOR TO INSTALLATION.

ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION	ON CENTER MTG. HT.
	CONCEALED CONDUIT IN CEILING OR WALL	
	CONCEALED CONDUIT IN FLOOR OR UNDERGROUND	
	EXPOSED CONDUIT	
	CIRCUIT HOMERUN TO PANEL; EACH ARROWHEAD = 1 CIRCUIT	
	NO. OF CONDUCTORS IN CONDUIT; EACH CROSSHATCH = 1 WIRE	
	FLEXIBLE CONDUIT OR S.O. CORD	
	CONDUIT STUBBED UP OR TURNED DOWN	
	PLYWOOD BACKBOARD	
	WALL MOUNTED DUPLEX RECEPTACLE OUTLET	18" AFF U.N.O.
D	WALL MOUNTED DUPLEX RECEPTACLE OUTLET, DEDICATED	18" AFF U.N.O.
	WALL MOUNTED DUPLEX RECEPTACLE OUTLET WITH (2) USB PORTS	18" AFF U.N.O.
	WALL MOUNTED G.F.C.I. DUPLEX RECEPTACLE OUTLET	18" AFF U.N.O.
WP	WALL MOUNTED G.F.C.I. DUPLEX RECEPTACLE OUTLET - WEATHER RESISTANT 'WR' TYPE	
	WALL MOUNTED DOUBLE DUPLEX RECEPTACLE OUTLET	18" AFF U.N.O.
	WALL MOUNTED DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER	②
	WALL MOUNTED G.F.C.I. DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER	②
	WALL MOUNTED SPECIAL RECEPTACLE OUTLET	AS REQUIRED
J	JUNCTION BOX - SIZE AND MOUNTING AS REQUIRED	AS REQUIRED
	FLUSH FLOOR BOX WITH QUAD RECEPTACLE AND DATA/AV PROVISIONS. SEE ELECTRICAL PLANS FOR EXACT MODEL.	①
TV	RECESSED WALL BOX WITH DUPLEX RECEPTACLE, CABLE FEED, AND AV PROVISIONS AT WALL MOUNTED TV LOCATION. SEE ELECTRICAL PLANS FOR EXACT MODEL.	① ②
	WALL MOUNTED COMBINATION TELEPHONE/DATA OUTLET	18" AFF U.N.O.
	480/277 VOLT PANELBOARD	
	208/120 VOLT PANELBOARD	
	WALL MOUNTED S.P.S.T. TOGGLE SWITCH	48" AFF
3	WALL MOUNTED 3-WAY TOGGLE SWITCH	48" AFF
D	WALL MOUNTED DIMMER SWITCH - AS REQUIRED	48" AFF
T	WALL MOUNTED TIMER SWITCH	48" AFF
P	WALL MOUNTED TOGGLE SWITCH WITH PILOT LIGHT	48" AFF
OS	DUAL TECH WALL MOUNTED OCCUPANCY SENSOR SWITCH	48" AFF
DOS	DUAL TECH WALL MOUNTED DIMMING OCCUPANCY SENSOR SWITCH	48" AFF
OS	CEILING MOUNTED OCCUPANCY SENSOR SWITCH. 120/277V.	
DL	CEILING MOUNTED DAYLIGHT HARVESTING SENSOR.	
M	MOTOR-RATED TOGGLE SWITCH	AS REQUIRED
M2	MOTOR-RATED, TWO-POLE TOGGLE SWITCH	AS REQUIRED
S 30/3/F	DISCONNECT SWITCH (FRAME/POLES/FUSE-IF REQUIRED)	
	COMBINATION MOTOR STARTER (VFD)/DISCONNECT SWITCH (PROVIDE BY DIVISION 23)	
	MOTOR STARTER (PROVIDE BY DIVISION 23)	
HP	MOTOR - NUMBER INDICATES HORSEPOWER (F=FRACTIONAL)	
M	MOTOR-OPERATED DAMPER (PROVIDED BY DIVISION 23)	
	EXIT SIGN - CEILING, WALL MOUNTED	
	LED LIGHT FIXTURE.	
	LED LIGHT FIXTURE ON BATTERY BACKUP (90 MINUTE).	
	LED STRIP LIGHT FIXTURE.	
CR	CARD READER DEVICE - PROVIDE JUNCTION BOX WITH 3/4" CONDUIT, WITH PULLSTRINGS, TO 2-GANG JUNCTION BOX LOCATED ABOVE ACCESSIBLE CEILING ON SECURE SIDE. PROVIDE 3/4" CONDUIT, WITH PULLSTRINGS, FROM 2-GANG JUNCTION BOX TO I.T. ROOM. THE 'F' IN PARENTHESIS SHOWN FLOOR PLANS DENOTES AS A FUTURE DEVICE. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH SECURITY VENDOR. PROVIDE ALL CONDUITS AND INFRASTRUCTURE REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM.	
RX	REQUEST TO EXIT DEVICE - PROVIDE JUNCTION BOX WITH 3/4" CONDUIT, WITH PULLSTRINGS, TO 2-GANG JUNCTION BOX LOCATED ABOVE ACCESSIBLE CEILING. THE 'F' IN PARENTHESIS SHOWN FLOOR PLANS DENOTES AS A FUTURE DEVICE. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH SECURITY VENDOR. PROVIDE ALL CONDUITS AND INFRASTRUCTURE REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM.	
	SECURITY CAMERA - PROVIDE CEILING MOUNTED JUNCTION BOX AND 3/4" CONDUIT, WITH PULLSTRINGS, TO ABOVE NEAREST ACCESSIBLE CEILING. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH SECURITY VENDOR. SEE SECURITY DRAWINGS FOR ADDITIONAL INFORMATION.	
U.N.O.	UNLESS NOTED OTHERWISE	
AFF/AFG	ABOVE FINISHED FLOOR/ABOVE FINISHED GRADE	
BC	BELOW CEILING	
AC	ABOVE COUNTER	
WP	WEATHER PROOF	

NOTES:
① PROVIDE ALL ACCESSORIES AND FITTINGS NEEDED FOR COMPLETE INSTALLATION
② COORDINATE EXACT MOUNTING HEIGHT AND REQUIREMENTS WITH ARCHITECT.

GENERAL NOTES:
1. EACH MULTIWIRE BRANCH CIRCUIT SHALL BE PROVIDED WITH A MEANS THAT WILL SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE POINT WHERE THE BRANCH CIRCUIT ORIGINATES PER NEC 210.4(B).

NORTH CAROLINA PROFESSIONAL SEAL 049515 ENGINEER CHADWICK M. VICKERY
DATE SIGNED: 07/25/25

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
ELECTRICAL LEGEND, NOTES, & SCHEDULES

REVISIONS:

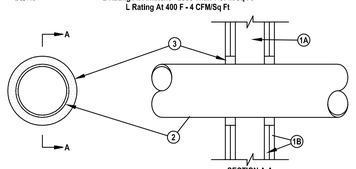
DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

PERMIT SET

SHEET NO.:
E0.1

System No. W-L-1054

F Ratings - 1 and 2 Hr (See Items 1 and 3)
T Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/Sq Ft
L Rating At 400 F - 4 CFM/Sq Ft



SECTION A-A

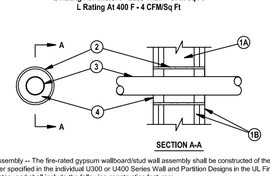
1. Wall Assembly -- The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs -- Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* -- 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. for steel stud walls. Max diam of opening is 14-1/2 in. for wood stud walls. The F Rating of the firestop system is equal to the fire rating of the wall assembly.
2. Through-Penetrants -- One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. Pipe may be installed with continuous joint contact. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe -- Nom 30 in diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe -- Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit -- Nom 4 in diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.
   D. Copper Tubing -- Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe -- Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material* -- Sealant -- Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-One Sealant

*Bearing the UL Classification Mark

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December 4, 2002

System No. W-L-2075

F Ratings - 1 & 2 Hr (See Item 4)
T Ratings – 1 and 2 Hr (see Item 4)
L Rating At Ambient - Less Than 1 CFM/Sq Ft
L Rating At 400 F - 4 CFM/Sq Ft



SECTION A-A

1. Floor or Wall Assembly -- The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs -- Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* -- Nom 5/8 in. thick gypsum wallboard, as specified in the individual Wall and Partition Design. Max diam of opening is 4 in.
2. Metallic Sleeve -- (Optional) -- Nom 4 in. diam (or smaller) Schedule 40 (or thinner) steel pipe cast into wall assembly with joint compound and installed flush with wall surfaces.
3. Electrical Nonmetallic Tubing+ -- Nom 2 in. diam (or smaller) corrugated wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC). Tubing to be rigidly supported on both sides of wall assembly. A nom annular space of 3/4 in. is required within the firestop system.
   See Electrical Nonmetallic Tubing (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.
4. Fill, Void or Cavity Material* -- Sealant -- Installed symmetrically on both sides of the wall. The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. Fill material applied within the annulus, flush with each end of the steel sleeve at the thickness shown in the table below:

F Rating Hr	T Rating Hr	Fill Mtl Depth In.
1	0	5/8
2	2	1-1/4

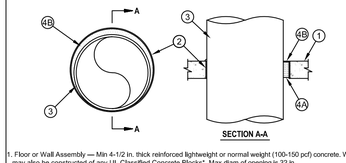
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-One Sealant

+Bearing the UL Listing Mark
*Bearing the UL Classification Marking

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January 9, 2003

System No. C-AJ-1226

F Rating — 3 Hr
T Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/Sq Ft
L Rating At 400 F — 4 CFM/Sq Ft



SECTION A-A

1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 32 in.
2. Metallic Sleeve — (Optional) Nom 32 in. diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. above floor or beyond both surfaces of wall.

2A. Sheet Metal Sleeve — (Optional) Max 6 in. diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. below the bottom of the deck and a max of 1 in. above the top surface of the concrete floor.

2B. Sheet Metal Sleeve — (Optional) - Max 12 in. diam, min 24 ga galv steel provided with a 24 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. below the bottom of the deck and a max of 1 in. above the top surface of the concrete floor.

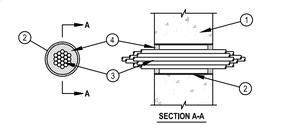
3. Through-Penetrant — One metallic pipe, tube or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between penetrant and periphery of opening shall be min 0 in. (point contact) to max 1-7/8 in. Penetrant may be installed with continuous joint contact. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic penetrants may be used:
   A. Steel Pipe — Nom 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C. Copper Pipe — Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
   D. Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Conduit — Nom 6 in. diam (or smaller) steel conduit.
   F. Conduit — Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT).
4. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 4 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or sleeve or from both surfaces of wall or sleeve as required to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* — Sealant — Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of floor or sleeve or with both surfaces of wall or sleeve. At the point or continuous contact locations between penetrant and concrete or sleeve, a min 1/4 in. diam bead of fill material shall be applied at the concrete or sleeve/ pipe penetrant Interface on the top surface of floor and on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant

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June 27, 2007

System No. W-J-3060

F Rating - 2 Hr
T Rating - 0 Hr



SECTION A-A

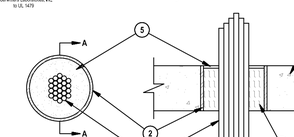
1. Wall Assembly — Min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 4 in (102 mm). Max diam of opening is 5-1/2 in. (138 mm) when sleeve (Item 2) is employed.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Steel Sleeve — (Optional) — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) of Schedule 5 (or heavier) steel pipe or min 0.016 thick (28 MSG or 0.4 mm) galv steel sleeve friction fit or cast into wall flush with wall surfaces. When Schedule 5 steel pipe or EMT is used, sleeve may extend up to 18 In. (457 mm) beyond the wall surfaces. As an option when Schedule 5 steel pipe or EMT is used, sleeve may extend continuously beyond one wall surface.
3. Cables — Aggregate cross sectional area of cables to be max 45 percent of the cross sectional area of the opening. Cables installed either concentrically or eccentrically within the firestop system. The annular space between cables and the periphery of the opening to be min 0 in. (point contact) to max 1 in. (25 mm). Cables to be rigidly supported on both sides of wall assembly. The following types of cables may be used:
   A. 7/C No. 12 AWG cable with PVC insulation and outer jacket.
   B. Max 25 pair No. 24 AWG telephone cable with PVC insulation and outer jacket.
   C. Max RG 59 (or smaller) coaxial cable with polyethylene insulation and PVC jacket.
   D. Max RG 6/U coaxial cable with fluorinated ethylene insulation and jacketing.
   E. Multiple 24 fiber optic communication cable with PVC jacket, have a max outside diam of 5/8 in. (16 mm).
   F. Max four pair No. 22 AWG Cat 5 or Cat 6 computer cables.
   G. Through Penetrating Product*—Max three copper connector No. 8 AWG Metal-clad Cable+.
      AFC CABLE SYSTEMS INC
   H. Through Penetrating Product* — Any cables, Metal-Clad Cable+ or Armored Cable+ currently Classified under the Through Penetrating Products category.
   See Through Penetrating Product (XHLY) category in the Fire Resistance Directory for names of manufacturers.
4. Fill, Void or Cavity Material* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. An additional 1/2 in. (13 mm) bead of fill material shall be applied around the perimeter of sleeve on both sides of the wall when sleeve extends beyond surface of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S Sealant, CP606 Sealant, FS-ONE Sealant or CP618 Putty

*Bearing the UL Classification Mark
+Bearing the UL Listing Mark

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July 18, 2011

System No. C-AJ-3180

F Rating - 3 Hr
T Rating = 0 Hr



SECTION A-A

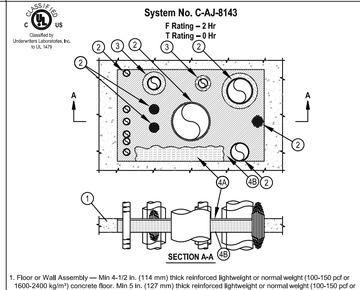
1. Floor or Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600 2400 kg/m3) concrete floor or min 4-3/4 in. (121 mm) thick reinforced lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 6 in (152 mm).
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Steel Sleeve — (Optional) — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
3. Cables — Aggregate cross-sectional area of cables in opening to be max 45 percent of the aggregate cross-sectional area of the opening. Cables to be rigidly supported on both sides of floor or wall assembly. Any combination of the following types and sizes of metallic conductor or fiber optic cable may be used:
   A. Max 500 kcmil single copper conductor power cable with thermoplastic insulation and polyvinyl chloride (PVC) jacket.
   B. Max 300 pair No. 24 AWG copper conductor telecommunication cables with polyvinyl chloride (PVC) insulation and jacket material.
   C. Max 7/C copper conductor No. 12 AWG multiconductor power and control cables with polyvinyl chloride (PVC) or cross-linked polyethylene (XLPE) insulation and PVC jacket.
   D. Multiple fiber optical communication cables jacketed with PVC and having a max outside diam of 1/2 in. (13 mm).
   E. Max 3/C copper conductor No. 12 AWG with bare aluminum ground, polyvinyl chloride (PVC) insulated steel, Metal-clad cable.
   F. Max 3/C with ground 2/0 AWG copper conductor SER cable with cross-linked polyethylene (XLPE) insulation and polyvinyl chloride (PVC) jacket.
   G. RG/U coaxial cable with polyethylene (PE) insulation and polyvinyl chloride (PVC) jacket having a max outside diameter of ¼ in. (13 mm).
   H. Fire Resistive Cables* - Max 1-1/4 in. (32 mm) diam single conductor or multi conductor Type MI cable. A min 1/8 in. (3 mm) separation shall be maintained between MI cables and any other types of cable.
4. Packing Material — Min 4-1/4 in. (108 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor to accommodate the required thickness of fill material.
5. Fill, Void or Cavity Material* — Sealant — Min 1/4 in. (6.4 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant.

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October 23, 2006

System No. C-AJ-8143

F Rating – 2 Hr
T Rating – 0 Hr



SECTION A-A

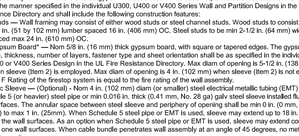
1. Floor or Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete floor. Min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. Max size of opening is 1440 in 2 (9,290 cm2) with a max dimension of 48 in. (1219 mm).
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through-Penetrant — One cable tray and one or more pipes, tubes or cable bundles may be installed within the opening. The total number of through-penetrants is dependent on the size of the opening and the types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces are maintained. The annular space between cable tray and all other penetrants shall be min 3 in. (76 mm). The annular space between individual cables and cable bundles shall be a min 1/2 in. (13 mm). The annular space between individual cables and cable bundles and other penetrants shall be a min 1/2 in. (13 mm) except that a min 2 in. (51 mm) shall be maintained between the cables and copper pipes and tubes greater than a nom 3 in. (76 mm) diam and steel and iron pipes and conduits greater than a nom 4 in. (102 mm) diam. The annular space between metallic pipes, conduit and tubes and insulated pipes and tubes shall be a min 2 in. (51 mm). The annular space between nom 3 in (76mm) diam (and smaller) copper pipes and tubes and between nom 4 in (102mm) diam (and smaller) steel and iron pipes and conduits shall be min 1/2 in. (13 mm). The annular space between nom 2 in. (51 mm) diam (and smaller) metallic pipes and conduits shall be min 0 in. (point contact). The annular space between insulated penetrants or the cable tray and the periphery of opening shall be min 1/2 in. (13 mm). The annular space between all other penetrants and the periphery of opening shall be min 0 in. (point contact). A max annular space in the system shall be 12 in. (305 mm). Penetrants to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used.
   A. Metallic Pipes — The following types of metallic pipes, tubes or conduits may be used:
      1. Copper Tubing — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tube.
      2. Copper Pipe — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
      3. Steel Pipe — Nom 24 in. (610 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
      4. Iron Pipe — Nom 24 in. (610 mm) diam (or smaller) cast or ductile iron pipe.
      5. Conduit — Nom 4 in. (102 mm) diam (or smaller) electric metallic tubing (EMT) or nom 6 in. (152 mm) diam (or smaller) rigid steel conduit.
   B. Cables Bundles — Max 4 in. (102 mm) diam tightly bundled cables. Any combination of the following types and sizes of cables may be used:
      1. Max 500 kcmil single copper or aluminum conductor power cable with thermoplastic insulation and polyvinyl chloride (PVC) jacket.
      2. Max 300 pair No. 24 AWG copper conductor telecommunication cables with PVC insulation and jacket materiail.
      3. Max 7/C copper conductor No. 12 AWG multi-conductor power and control cables with PVC or cross-linked polyethylene (XLPE) insulation and PVC jacket.
      4. Multiple fiber optical communication cables jacketed with PVC and having a max outside diam of 1/2 in.
      5. Max 3/C No. 12 AWG steel clad cable with copper conductors and PVC insulation material.
   C. Individual Cables — Any of the following types and sizes of individual (non-bundled) cables may be used:
      1. Max 3/C No. 2/0 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TECK 90 cable.
      2. Through Penetrating Product* — Any cables, Armored Cable+ or Metal Clad Cable+ currently Classified under the Through Penetrating Product category.
      See Through Penetrating Product (XHLY) category in the Fire Resistance Directory for names of manufacturers.
      3. Max 500 kcmil single copper or aluminum conductor power cable with thermoplastic insulation and polyvinyl chloride (PVC) jacket.
      4. Max 300 pair No. 24 AWG copper conductor telecommunication cables with PVC insulation and jacket material.
      5. Max 7/C copper conductor No. 12 AWG multi-conductor power and control cables with PVC or cross-linked polyethylene (XLPE) insulation and PVC jacket.
      6. Multiple fiber optical communication cables jacketed with PVC and having a max outside diam of 1/2 in.
      7. Max 3/C No. 12 AWG steel clad cable with copper conductors and PVC insulation material.
      8. Max 4C/750 kcmil (or smaller) aluminum or copper conductor metal clad cable with aluminum or steel armor, with or without PVC jacket.
   D. Cable Tray* — (Not Shown) — Max 24 in. (610 mm) wide by 6 in. (152 mm) deep open-ladder steel or aluminum cable tray. Aggregate cross-sectional area of cable tray to be max 40 percent of the cross-sectional area of the cable tray based on a min 3 in. cable loading depth. Any combination of the types and sizes of cables described in Item 2B may be used. Cable tray to be rigidly supported on both sides of floor or wall assembly.
3. Pipe Insulation — (Optional) - Pipes and tubes of the sizes noted below may be provided with one of the following types of pipe insulations:
   A. Pipe Covering* — Nom 1-1/2 in. (38 mm) thick (or thinner) hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket for pipes with a nom diam of 8 in. (203 mm) (or smaller) or tubes with a nom diam of 4 in. (102 mm) (or smaller). Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
      See Pipe and Equipment Covering - Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   B. Pipe Covering* — Nom 2 in. (51 mm) thick (or thinner) hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket for pipes or tubes with a nom diam of 2 in. (51 mm) (or smaller). Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
      See Pipe and Equipment Covering - Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   C. Tube Insulation-Plastics* — Nom 1 in. (25 mm) thick (or thinner) acrylonitrile butadiene/polyvinyl chloride (ABPVC) flexible foam furnished in the form of tubing for pipes or tubes with a nom diam of 2 in. (51 mm) (or smaller).
      See Plastics (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
4. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 4 in. (102 mm) thickness of 4 pcf (64 kg/m³) mineral wool batt insulation tightly packed into the opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material - Sealant* — Min 1/2 In. (13 mm) thickness of fill material applied within the annulus flush with the top surface of the floor or both surfaces of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant

*Bearing the UL Classification Mark

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July 18, 2011

System No. W-L-3065

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0 and ¼ Hr (See Item 3)



SECTION A-A

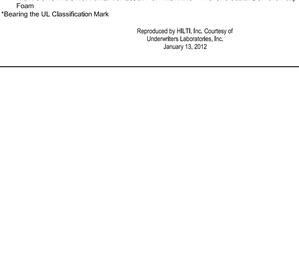
1. Wall Assembly — The 1 or 2 fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board, with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 5-1/2 In. (138 mm) when sleeve (Item 2) is employed. Max diam of opening is 4 In. (102 mm) when sleeve (Item 2) is not employed.
   The F Rating of the firestop system is equal to the fire rating of the wall assembly.
2. Metallic Sleeve — (Optional) - Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or Schedule 5 (or heavier) steel pipe or min 0.016 in. thick (0.41 mm, No. 28 ga) galv steel sleeve installed flush with wall surfaces. The annular space between steel sleeve and periphery of opening shall be min 0 In. (0 mm, point contact) to max 1 in. (25mm). When Schedule 5 steel pipe or EMT is used, sleeve may extend up to 18 In. (457 mm) beyond the wall surfaces. As an option when Schedule 5 steel pipe or EMT is used, sleeve may extend continuously beyond one wall surfaces. When cable bundle penetrates wall assembly at an angle of 45 degrees, no metallic sleeve is used.
3. Cables — Aggregate cross-sectional area of cable in opening to be max 45 percent of the cross-sectional area of the opening. The annular space between the cable bundle and the periphery of the opening to be min 0 In. (0 mm, point contact) to max 1 in. (25 mm) Cables to be rigidly supported on both sides of the wall assembly. Cable bundle, using cables described below, may penetrate the wall at an angle not greater than 45 degrees. Any combination of the following types and sizes of copper conductor cables may be used:
   A. Max 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
   B. Max 25 pair No. 24 AWG telephone cable with PVC insulation and jacket.
   B1. Max 4 pr No. 22 AWG Cat 5 or Cat 6 computer cables.
   C. Type RG6/U coaxial cable with polyethylene (PE) insulation and PVC jacket having a max outside diameter of ½ in. (13 mm).
   C1. Max RG 6/U coaxial cable with fluorinated ethylene insulation and jacketing.
   D. Multiple fiber optical communication cable jacketed with PVC and having a max OD of 5/8 in. (16 mm).
   E. Through Penetrating Products*— Max three copper conductor No. 8 AWG .Metal-Clad Cable+.
   AFC CABLE SYSTEMS INC
   F. Max 3/C (with ground)(or smaller) No. 8 AWG copper conductor cable with PVC insulation and jacketing.
   G. Max 3/4 in. (19 mm) diam copper ground cable with or without a PVC jacket.
   H. Fire Resistive Cables* - Max 1-1/4 in. (32 mm) diam single conductor or multi conductor Type MI cable. A min 1/8 in. (3 mm) separation shall be maintained between MI cables and any other types of cable.
   I. Max 4/C with ground 300 kcmil (or smaller) aluminum SER cable with PVC insulation and jacket.
   J. Through Penetrating Product* - Any cables, Metal-Clad Cable+ or Armored Cable+ currently Classified under the Through Penetrating Products category.
   K. Maximum 3/C No. 8 AWG metal-clad cable.
   L. Maximum 5/8 diam fiber-optic cable with PVC jacket.
   For cable bundle penetrating the wall assembly at an angle of 45 degrees, the T rating is ½ hr for a 2 hr wall assembly.
   See Through Penetrating Product (XHLY) category in the Fire Resistance Directory for names of manufacturers.
4. Fill, Void or Cavity Material* — Sealant or Putty — Fill material applied within the annulus, flush with each end of the steel sleeve or wall surface. Fill material installed symmetrically on both sides of the wall. A min 5/8 in. (16 mm) thickness of sealant is required for the 1 or 2 hr F Rating . An additional 1/2 in. (13 mm) diam bead of fill material shall be applied around the perimeter of sleeve on both sides of the wall when sleeve extends beyond surface of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S, CP606, FS-One Sealants or CP618 Putty

*Bearing the UL Classification Mark
+Bearing the UL Listing Mark

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March 15, 2012

System No. W-L-8013

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — 5 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating At 400 F — 2 CFM/sq ft	FTH Rating — 0 Hr
	L Rating At Ambient — 5 CFM/sq ft
	L Rating At 400 F — 2 CFM/sq ft



SECTION A-A

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 in. (51 mm) by 4 in. (102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Additional studs installed to completely frame the opening.
   B. Gypsum Board* — 5/8 in. (16 mm) thick, 4 ft (1219 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the Individual Wall and Partition Design. Max area of opening is 352 sq in. (2271 sq cm) with max dimension of 22 in. (559 mm) wide.
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. Cable Tray* — Max 18 in. (457 mm) wide by max 6 in. (152 mm) deep open-ladder or solid-back cable tray with channel-shaped side rails formed of 0.065 in. (1.65 mm) thick aluminum or 0.060 in. (1.52 mm) thick steel and with 1-1/2 in. (38 mm) wide by 1 in. (25 mm) deep channel shape rungs spaced 9 in. (229 mm) OC or a 0.029 in. (0.74 mm) thick steel solid back, respectively. One cable tray to be installed in the opening. The max annular space between the cable tray and the periphery of the opening shall be min 1 in. (25 mm) to max 7 in. (178 mm) Cable tray to be rigidly supported on both sides of floor or wall assembly.
3. Cables — Aggregate cross-sectional area of cables in cable tray to be max 30 percent of the cross-sectional area of the cable tray. Any combination of the following types and sizes of copper conductor cables may be used:
   A. 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and PVC jacket.
   B. 100 pair - No. 24 AWG cable with PVC insulation and jacket.
   C. 1/C, 750 kcmil (or smaller) with PVC insulation and jacket.
4. Through-Penetrants — One or more pipe or tube to be installed within the opening. The total number of through-penetrants is dependent on the size of the opening and types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces and the spacings between the pipes are maintained. The space between the pipe or tube and the periphery of the opening shall be min 1-1/2 in. (38 mm) to max 9-1/4 in. (235 mm). Pipe or tube to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of non-metallic or metallic pipes, or tubes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Max 3 in. (76 mm) diam Schedule 40 solid core PVC pipe (or smaller) for use In closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Steel Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
   C. Conduit — Nom 6 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) diam steel conduit.
   D. Copper Pipe — Nom 4 In. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   E. Copper Tube — Nom 4 In. (102 mm) diam (or smaller) Type L (or heavier) copper tube.

4A. Pipe Covering — (Not Shown) Nom 1-1/2 in. (38 mm) thick hollow cylindrical heavy density (min 3.5 pcf) (56kg/m³) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
   See Pipe and Equipment Covering and Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 may be used.

5. Cables — Max 1-1/2 in. (38 mm) diam tight bundle of cables installed within the opening and rigidly supported on both surfaces of wall. The space between the cables and periphery of the opening shall range from 1-3/16 in. (30.2 mm) min to a max of 1-1/2 in. (38 mm). Any combination of the following types and sizes of cables may be used:
   A. 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
   B. 25 pair — No. 24 AWG cable with PVC insulation and jacket.
   C. Type R GU/59 coaxial cable with PVC outer jacket.
   D. 24 fiber optic cable with PVC sub unit and outer jacket.
6. Firestop System — The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* — Fire Blocks For walls incorporating max 3-5/8 in. (92 mm) steel studs or max 2 (51 mm) by 4 in. (102 mm) wood studs, fire block installed with 5 in. (127 mm) dimension projecting through and centered in opening. For walls constructed of larger steel or wood studs, fire block Installed with long dimension passing through and centered in opening. Blocks may or may not be cut flush with both surfaces of wall. When multiple layers of gypsum board are used, blocks may be recessed 1/2 in. (13 mm) from surface of wall. Blocks to be firmly packed in opening. Either one or a combination of the block types specified below may be used.
      HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS 657 Fire Block or CFS-BL Firestop Block
   B. Fill, Void or Cavity Material* — Sealant or Putty - Fill material to be forced into interstices of cables, between cables and cable trays, around each penetrant and where obvious voids are observed to max extent possible on both surfaces of the penetration.
      HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant, CP 618 Putty Stick or CP620 Fire Foam

*Bearing the UL Classification Mark

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January 13, 2012

SCHEDULES OF THROUGH PENETRATION FIRESTOP SYSTEMS					
GYPSUM WALLBOARD ASSEMBLIES			**CONCRETE OR BLOCK WALLS**		
TYPE OF PENETRANT	**F-RATING**	**UL-CLASSIFIED SYSTEM**	**TYPE OF PENETRANT**	**F-RATING**	**UL-CLASSIFIED SYSTEM**
METAL PIPES OR CONDUIT	1	WL 1054	SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226
	2	WL 1054		2	CAJ 1226
NON-METALLIC PIPE OR CONDUIT	1	WL 2075		3	CAJ 1226
	2	WL 2075	SINGLE OR BUNDLED CABLES	1	WJ 3060
SINGLE OR BUNDLED CABLES	1	WL 3065		2	WJ 3060
	2	WL 3065		3	CAJ 3180
MIXED PENETRANTS	1	WL 8013	MIXED PENETRANTS	1	CAJ 8143
	2	WL 8013		2	CAJ 8143

NOTES:

1. Jobsite conditions of each through-penetration firestop system must meet ALL details of the UL-Classified System selected.
2. Where more than one applicable UL-Classified System is listed in the schedules, choose the UL System which is most economical for each through-penetration firestop system.
3. Coordinate work with other trades to assure that penetration opening sizes are appropriate for penetrant locations, and vice versa.

NICHOLAS PAUL VICKERY
NORTH CAROLINA
SEAL
038515
REGISTERED
ENGINEER
NICHOLAS M. VICKERY
DATE SIGNED: 07/25/25

BW&A Barrett, Woodyard & Associates, Inc.
1255 Crescent Green, Ste. 230
Cary,

NEW PANEL MDP

VOLTAGE: 120 / 208 AMP: 800
PHASE: 3 MAIN: MCB

DESCRIPTION	kVA	BKR	CKT	PH	CKT	BKR	kVA	DESCRIPTION
PANEL A	8.48	125/3	1	A	2	35/3	2.50	CU-4
---	9.34	---	3	B	4	---	2.50	---
---	8.79	---	5	C	6	---	2.50	---
PANEL B	14.46	150/3	7	A	8	35/3	2.50	CU-5
---	13.43	---	9	B	10	---	2.50	---
---	12.26	---	11	C	12	---	2.50	---
PANEL C	12.91	150/3	13	A	14	35/3	2.50	CU-6
---	12.82	---	15	B	16	---	2.50	---
---	13.87	---	17	C	18	---	2.50	---
RTU1	4.70	60/3	19	A	20	35/3	2.50	CU-7
---	4.70	---	21	B	22	---	2.50	---
---	4.70	---	23	C	24	---	2.50	---
CU-1	2.50	35/3	25	A	26	300/3	29.22	PANEL D
---	2.50	---	27	B	28	---	28.82	---
---	2.50	---	29	C	30	---	26.22	---
CU-2	2.50	35/3	31	A	32	20/1	1.00	REC - COOLER EVAPORATOR
---	2.50	---	33	B	34			SPACE
---	2.50	---	35	C	36			SPACE
CU-3	2.50	35/3	37	A	38			SPACE
---	2.50	---	39	B	40			SPACE
---	2.50	---	41	C	42			SPACE

*EXISTING TO REMAIN

TOTAL CONNECTED (kVA)	
A TOTAL	88.3
B TOTAL	86.6
C TOTAL	83.3
CONN. kVA	258.2
CONN. amps	716.8

VLL	PH
208	3

LOADS (kVA)	
52.6	RECEPTACLES
138.8	HEATING
9.2	AIR COND.
0.0	MISC.
9.0	LIGHTING
22.5	WATER HEATERS

TOTAL DEMAND LOAD

HEATING: 100%	=	138.8 kVA
LIGHTING: 125%	=	11.3 kVA
WATER HEATERS: 125%:	=	28.1 kVA
MISC: 100%	=	0.0 kVA
AIR CONDITIONING: 100%	=	9.2 kVA
RECEPTACLES: 100% 1ST 10kVA + 50% REMAINING:	=	31.3 kVA
TOTAL DEMAND LOAD KVA	=	218.7 kVA
TOTAL DEMAND LOAD AMPS:	=	607.1 AMP

NEW PANEL A

VOLTAGE: 120 / 208 AMP: 125
PHASE: 3 MAIN: MLO

DESCRIPTION	kVA	BKR	CKT	PH	CKT	BKR	kVA	DESCRIPTION
REC - RESTROOM ENTRY	0.72	20/1	1	A	2	20/1	0.26	LTS - TOILET DINING AREA
REC - WAKING COOLER ACTIVITY	1.00	20/1	3	B	4	20/1	0.70	LTS - DINING AREA HALLWAY
REC - RESTROOM GFCI	1.00	20/1	5	C	6	20/1	0.90	LTS - DINING AREA
REC - DINING AREA	0.90	20/1	7	A	8	20/1	0.10	LTS - DINING AREA EXTERIOR
REC - DINING AREA	0.72	20/1	9	B	10	20/1	0.54	REC - BOOTH 6
REC - BOOTH 1	0.54	20/1	11	C	12	20/1	0.72	REC - BOOTH 6
REC - BOOTH 1	0.72	20/1	13	A	14	20/1	0.50	LTS - HOOD BOOTH 6
LTS - HOOD BOOTH 1	0.50	20/1	15	B	16	20/1	0.54	REC - BOOTH 7
REC - BOOTH 2	0.54	20/1	17	C	18	20/1	0.72	REC - BOOTH 7
REC - BOOTH 2	0.72	20/1	19	A	20	20/1	0.50	LTS - HOOD BOOTH 7
LTS - HOOD BOOTH 2	0.50	20/1	21	B	22	20/1	0.54	REC - BOOTH 8
REC - BOOTH 3	0.54	20/1	23	C	24	20/1	0.72	REC - BOOTH 8
REC - BOOTH 3	0.72	20/1	25	A	26	20/1	0.50	LTS - HOOD BOOTH 8
LTS - HOOD BOOTH 3	0.50	20/1	27	B	28	15/1	1.40	MISC - HOOD C. PANEL BTH 1
REC - BOOTH 4	0.54	20/1	29	C	30	15/1	1.40	MISC - HOOD C. PANEL BTH 3
REC - BOOTH 4	0.72	20/1	31	A	32	15/1	1.40	MISC - HOOD C. PANEL BTH 5
LTS - HOOD BOOTH 4	0.50	20/1	33	B	34	15/1	1.40	MISC - HOOD C. PANEL BTH 7
REC - BOOTH 5	0.54	20/1	35	C	36			SPACE
REC - BOOTH 5	0.72	20/1	37	A	38			SPACE
LTS - HOOD BOOTH 5	0.50	20/1	39	B	40			SPACE
LTS - BOTH/TOILETS ACT. AREA	0.63	20/1	41	C	42			SPACE

TOTAL CONNECTED (kVA)	
A TOTAL	8.5
B TOTAL	9.3
C TOTAL	8.8
CONN. kVA	26.6
CONN. amps	73.9

VLL	PH
208	3

LOADS (kVA)	
14.4	RECEPTACLES
0.0	HEATING
0.0	AIR COND.
5.6	MISC.
6.6	LIGHTING
0.0	WATER HEATERS

TOTAL DEMAND LOAD

HEATING: 100%	=	0.0 kVA
LIGHTING: 125%	=	8.2 kVA
WATER HEATERS: 125%:	=	0.0 kVA
MISC: 100%	=	5.6 kVA
AIR CONDITIONING: 100%	=	0.0 kVA
RECEPTACLES: 100% 1ST 10kVA + 50% REMAINING:	=	12.2 kVA
TOTAL DEMAND LOAD KVA	=	26.0 kVA
TOTAL DEMAND LOAD AMPS:	=	72.3 AMP

NEW PANEL B

VOLTAGE: 120 / 208 AMP: 125
PHASE: 3 MAIN: MLO

DESCRIPTION	kVA	BKR	CKT	PH	CKT	BKR	kVA	DESCRIPTION
REC - VENUE	0.72	20/1	1	A	2	15/3	1.25	MISC - KEF-2
REC - VENUE	1.00	20/1	3	B	4	---	1.25	---
REC - VENUE	0.54	20/1	5	C	6	---	1.25	---
REC - VENUE	0.90	20/1	7	A	8	15/3	1.25	MISC - KEF-3
REC - ACTIVITY AREA	0.90	20/1	9	B	10	---	1.25	---
REC - ACTIVITY AREA	0.72	20/1	11	C	12	---	1.25	---
REC - ACTIVITY AREA	0.72	20/1	13	A	14	15/3	1.25	MISC - KEF-4
REC - ACTIVITY AREA	0.36	20/1	15	B	16	---	1.25	---
LTS - VENUE/STOR.	0.90	20/1	17	C	18	---	1.25	---
LTS - ACTIVITY AREA	0.70	20/1	19	A	20	20/2	1.35	CU - V - VENUE COOLER
LTS - ACTIVITY AREA FANS	0.32	20/1	21	B	22	---	1.35	---
LTS - VENUE EXTERIOR	0.03	20/1	23	C	24	20/2	1.35	CU - B - BAR COOLER
REC - GFCI ROOF	0.72	20/1	25	A	26	---	1.35	---
EF-2	0.50	20/1	27	B	28	20/1	1.00	REC - COOLER EVAPORATOR
WH-2	3.00	35/3	29	C	30			SPACE
---	3.00	---	31	A	32			SPACE
---	3.00	---	33	B	34			SPACE
MISC - KEF-1	1.25	15/3	35	C	36			SPACE
---	1.25	---	37	A	38			SPACE
---	1.25	---	39	B	40			SPACE
REC - GFI ROOF	0.72	20/1	41	C	42			SPACE

TOTAL CONNECTED (kVA)	
A TOTAL	14.5
B TOTAL	13.4
C TOTAL	12.3
CONN. kVA	40.2
CONN. amps	111.5

VLL	PH
208	3

LOADS (kVA)	
8.3	RECEPTACLES
5.4	HEATING
0.5	AIR COND.
15.0	MISC.
2.0	LIGHTING
9.0	WATER HEATERS

TOTAL DEMAND LOAD

HEATING: 100%	=	5.4 kVA
LIGHTING: 125%	=	2.4 kVA
WATER HEATERS: 125%:	=	11.3 kVA
MISC: 100%	=	15.0 kVA
AIR CONDITIONING: 100%	=	0.5 kVA
RECEPTACLES: 100% 1ST 10kVA + 50% REMAINING:	=	8.3 kVA
TOTAL DEMAND LOAD KVA	=	42.9 kVA
TOTAL DEMAND LOAD AMPS:	=	119.1 AMP

NEW PANEL C

VOLTAGE: 120 / 208 AMP: 150
PHASE: 3 MAIN: MLO

DESCRIPTION	kVA	BKR	CKT	PH	CKT	BKR	kVA	DESCRIPTION
REC - BAR ICE MACHINE	1.00	20/1	1	A	2	20/1	0.90	REC - GARAGE DOOR
REC - BAR DISH WASHER	1.00	20/1	3	B	4	20/1	1.00	REC - ENTRY
REC - BAR REACH IN COOLER	1.00	20/1	5	C	6	20/1	0.90	REC - BAR FRONT
REC - BAR FRONT COUNTER	1.00	20/1	7	A	8	20/1	0.72	REC - BAR FRONT
REC - BAR FRONT COUNTER	1.00	20/1	9	B	10	20/1	0.90	REC - BAR EXTERIOR
REC - BAR FRONT COUNTER	1.00	20/1	11	C	12	20/1	1.00	REC - BAR EXTERIOR
REC - BAR FRONT COUNTER	0.54	20/1	13	A	14	20/1	0.36	REC - BAR EXTERIOR
REC - BAR BACK TV	0.36	20/1	15	B	16	20/1	0.54	REC - BBQ
REC - BAR BACK	0.72	20/1	17	C	18	20/1	0.72	REC - BBQ
REC - BAR BACK TV	0.36	20/1	19	A	20	20/1	1.00	REC - WALK IN COOLER
REC - BAR BACK TV	1.00	20/1	21	B	22	20/1	0.30	LTS - BAR
REC - BAR BACK TV	0.36	20/1	23	C	24	20/1	0.17	LTS - BAR
REC - BAR BACK BB COOLER	1.00	20/1	25	A	26	20/1	0.03	LTS - BAR EXTERIOR
REC - BAR BACK TV	0.36	20/1	27	B	28	20/1	1.00	REC - AHU-8
REC - BACK	1.00	20/1	29	C	30	25/2	2.00	CU-8
REC - BACK	1.00	20/1	31	A	32	---	2.00	---
REC - BAR BACK TV	0.36	20/1	33	B	34	25/2	2.00	CU-9
REC - BAR BACK BEER	1.00	20/1	35	C	36	---	2.00	---
REC - BAR BACK	1.00	20/1	37	A	38	25/2	2.00	CU-10
REC - BAR BACK	1.00	20/1	39	B	40	---	2.00	---
REC - ENTRY	1.00	20/1	41	C	42	20/1	1.00	REC - GFI ROOF

TOTAL CONNECTED (kVA)	
A TOTAL	12.9
B TOTAL	12.8
C TOTAL	13.9
CONN. kVA	39.6
CONN. amps	109.9

VLL	PH
208	3

LOADS (kVA)	
27.1	RECEPTACLES
12.0	HEATING
0.0	AIR COND.
0.0	MISC.
0.5	LIGHTING
0.0	WATER HEATERS

TOTAL DEMAND LOAD

HEATING: 100%	=	12.0 kVA
LIGHTING: 125%	=	0.6 kVA
WATER HEATERS: 125%:	=	0.0 kVA
MISC: 100%	=	0.0 kVA
AIR CONDITIONING: 100%	=	0.0 kVA
RECEPTACLES: 100% 1ST 10kVA + 50% REMAINING:	=	18.6 kVA
TOTAL DEMAND LOAD KVA	=	31.2 kVA
TOTAL DEMAND LOAD AMPS:	=	86.5 AMP

NEW PANEL D

VOLTAGE: 120 / 208 AMP: 300
PHASE: 3 MAIN: MLO

DESCRIPTION	kVA	BKR	CKT	PH	CKT	BKR	kVA	DESCRIPTION
AHU-1 MEZZANINE ABOVE DINING	4.30	60/2	1	A	2	15/3	0.58	AIR - MUA-1
---	4.30	---	3	B	4	---	0.58	---
AHU-2 MEZZANINE ABOVE DINING	4.30	60/2	5	C	6	---	0.58	---
---	4.30	---	7	A	8	15/3	1.00	AIR - MUA-2
AHU-3 MEZZANINE ABOVE DINING	4.30	60/2	9	B	10	---	1.00	---
---	4.30	---	11	C	12	---	1.00	---
AHU-4 MEZZANINE ABOVE DINING	4.30	60/2	13	A	14	15/3	0.58	AIR - MUA-3
---	4.30	---	15	B	16	---	0.58	---
AHU-5 MEZZANINE ABOVE DINING	4.30	60/2	17	C	18	---	0.58	---
---	4.30	---	19	A	20	15/3	0.58	AIR - MUA-4
AHU-6 MEZZANINE ABOVE DINING	4.30	60/2	21	B	22	---	0.58	---
---	4.30	---	23	C	24	---	0.58	---
AHU-7 MEZZANINE ABOVE DINING	4.30	60/2	25	A	26			SPACE
---	4.30	---	27	B	28			SPACE
REC - GFCI MEZZANINE	0.90	20/1	29	C	30			SPACE
EF-1 MEZZANINE ABOVE DINING	0.50	20/1	31	A	32			SPACE
WH-1 MEZZANINE ABOVE DINING	4.50	50/3	33	B	34			SPACE
---	4.50	---	35	C	36			SPACE
---	4.50	---	37	A	38			SPACE
HWRP-1 MEZZANINE	0.10	20/1	39	B	40			SPACE
REC - GFCI ROOF	0.90	20/1	41	C	42			SPACE

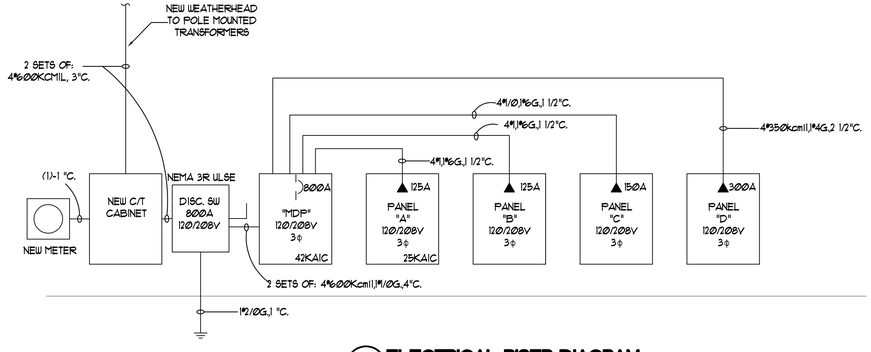
TOTAL CONNECTED (kVA)	
A TOTAL	29.2
B TOTAL	28.8
C TOTAL	26.2
CONN. kVA	84.3
CONN. amps	233.9

VLL	PH
208	3

LOADS (kVA)	
1.8	RECEPTACLES
60.2	HEATING
8.7	AIR COND.
0.0	MISC.
0.0	LIGHTING
13.5	WATER HEATERS

TOTAL DEMAND LOAD

HEATING: 100%	=	60.2 kVA
LIGHTING: 125%	=	0.0 kVA
WATER HEATERS: 125%:	=	16.9 kVA
MISC: 100%	=	0.0 kVA
AIR CONDITIONING: 100%	=	8.7 kVA
RECEPTACLES: 100% 1ST 10kVA + 50% REMAINING:	=	1.8 kVA
TOTAL DEMAND LOAD KVA	=	87.5 kVA
TOTAL DEMAND LOAD AMPS:	=	243.0 AMP



1 E0.3 **ELECTRICAL RISER DIAGRAM**
NO SCALE

NOTE: PROVIDE U.L. SERIES RATINGS FOR A.I.C. VALUES INDICATED. WHERE NO VALUES ARE SHOWN, ASSUME MINIMUM RATINGS OF 41,100 A.I.C. FOR 208V/3ϕ.

NOTE: CONTRACTOR TO PROVIDE FAULT CURRENT PLAQUES PER NEC 408.6.

NICOLE PRESTON MARIE 025315 ENGINEER EDWICK M. VICKERY
DATE SIGNED: 07/25/25

BW&A Barrett, Woodyard & Associates, Inc.
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NC License # C-2226
BWA Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
ELECTRICAL RISER DIAGRAM & PANEL SCHEDULES

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

PERMIT SET

SHEET NO.:
E0.3

SECTION 260500 – COMMON REQUIREMENTS FOR ELECTRICAL

1.1 SCOPE

A. DIVISION 26 INCLUDES ALL SPECIFICATIONS IN THE 260000 SERIES AND THE ACCOMPANYING ELECTRICAL DRAWINGS. PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT, AND ALL NECESSARY OPERATIONS TO PROVIDE THE COMPLETE SCOPE OF THE ELECTRICAL SYSTEMS INTENDED UNDER THIS DIVISION. DIVISION 26 IS NOT A STAND–ALONE DOCUMENT, BUT A PART OF THE COMPLETE PROJECT DOCUMENTS.

B. ATTENTION IS CALLED TO THE FACT THAT THERE ARE MANY INTERFACES BETWEEN THE WORK REQUIRED IN THIS DIVISION AND THE WORK REQUIRED IN OTHER DIVISIONS. PROVIDE THE NECESSARY INTERFACE AND COORDINATION WITH OTHER DIVISIONS TO PROVIDE A COMPLETE PROJECT.

1.2 EXISTING CONDITIONS

A. ATTENTION IS CALLED TO THE FACT THAT THE WORK IS TO BE PERFORMED WITHIN AN EXISTING, OPERATIONAL FACILITY. PRIOR TO THE SUBMISSION OF BIDS, EACH BIDDER SHALL VISIT THE PROJECT SITE, THOROUGHLY INVESTIGATE AND BE FAMILIAR WITH ALL EXISTING CONDITIONS, WHICH WILL AFFECT THEIR WORK; ESPECIALLY THE WORK TO BE PERFORMED ABOVE THE EXISTING CEILINGS.

B. WHEN THIS PROJECT IS FINISHED, THE WORK UNDER THIS DIVISION SHALL BE COMPLETE IN EVERY RESPECT, COMPLETELY INTEGRATED WITH ALL THE EXISTING SYSTEMS, AND LEFT IN PERFECT OPERATING CONDITION. THE ELECTRICAL SERVICE TO THE BUILDING SHALL NOT BE INTERRUPTED AT ANY TIME WITHOUT WRITTEN COORDINATION OF THE BUILDING'S OWNER. ALL EXISTING ELECTRICAL EQUIPMENT REMOVED DURING THE PROJECT SHALL BE REMOVED FROM THE SITE AFTER INSPECTION OF THE BUILDING'S OWNER. ALL EXISTING ELECTRICAL SYSTEMS REQUIRED TO BE OPERATING AT THE PROJECT'S COMPLETION OR REQUIRED TO REMAIN IN USE DURING THE PROJECT SHALL BE RECONNECTED, REPLACED, REROUTED OR OTHERWISE MADE TO FIT WITH PROPER WORKMANSHIP TECHNIQUES AND LEFT IN SAFE WORKING ORDER.

C. CONNECT NEW WORK TO EXISTING WORK IN A NEAT AND WORKMANLIKE MANNER. WHERE AN EXISTING STRUCTURE MUST BE CUT OR EXISTING UTILITIES INTERFERE, SUCH OBSTRUCTIONS SHALL BE BYPASSED, REMOVED, REPLACED OR RELOCATED, PATCHED AND REPAIRED. WORK DISTURBED OR DAMAGED SHALL BE REPLACED OR REPAIRED TO ITS PRIOR CONDITION.

1.3 CODES AND REGULATIONS

A. ALL WORK UNDER THIS DIVISION SHALL COMPLY WITH ALL LOCAL BUILDING CODES, LAWS, REGULATIONS, ORDINANCES AND THE REQUIREMENTS OF THE 2020 NATIONAL ELECTRICAL CODE.

B. WHERE CONFLICTS OF INSTALLATION REQUIREMENTS OCCUR BETWEEN THE AFOREMENTIONED CODES, REGULATIONS OR THE CONTRACT DOCUMENTS, THE MOST RESTRICTIVE SHALL GOVERN.

C. OBTAIN ALL PERMITS AND LICENSES AND PAY ALL FEES REQUIRED BY LOCAL AUTHORITIES. ARRANGE FOR ALL NECESSARY INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION AND PROVIDE WRITTEN CERTIFICATES OF APPROVAL TO THE PROJECT OWNER OR HIS DESIGNATED REPRESENTATIVE.

1.4 DEFINITIONS

A. CONTRACT DOCUMENTS: THE COMPLETE SET OF PROJECT DRAWINGS AND SPECIFICATIONS.

B. PROVIDE: FURNISH, INSTALL AND CONNECT.

C. WORK: ALL MATERIALS INSTALLED, INCLUDING ALL LABOR TO PROVIDE COMPLETE SYSTEM.

D. WIRING OR WIRED: ALL WIRE OR CABLE INSTALLED IN CONDUIT FROM PANELBOARD TO EQUIPMENT AND CONNECTED AT BOTH ENDS WITH ALL REQUIRED BOXES, CONNECTORS, COUPLINGS, ETC.

E. CONDUIT: RIGID STEEL CONDUIT INTERMEDIATE METAL CONDUIT (I.M.C.), ELECTRICAL METALLIC TUBING (EMT) PLASTIC CONDUIT (PVC), ELECTRICAL NON–METAL TUBING (ENT), OR FLEXIBLE STEEL CONDUIT.

1.5 DRAWINGS AND SPECIFICATIONS

A. THE DRAWINGS AND SPECIFICATIONS TOGETHER ARE TO BE CONSIDERED AS THE CONTRACT DOCUMENTS. ANY WORK SHOWN IN ONE AND NOT SHOWN IN THE OTHER, OR IMPLIED BY EITHER, SHALL BE PROVIDED TO GIVE A COMPLETE PROJECT.

B. SHOULD ANY CONFLICTS EXIST BETWEEN THE DRAWINGS AND SPECIFICATIONS OR THERE IS AN ITEM SHOWN/CALLED FOR WHICH IS NOT CLEARLY DEFINED, IMMEDIATELY SUBMIT A REQUEST FOR CLARIFICATION. NO ADDITIONAL MONIES WILL BE GRANTED LATER WHEN A CONFLICT IS RESOLVED OR AN ITEM IS MORE CLEARLY DEFINED.

C. THE DRAWINGS ARE SCHEMATIC AND ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF OUTLETS, ETC. OR THE ROUTING OF CONDUIT.

D. THE EXACT LOCATION OF EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS (MECHANICAL EQUIPMENT, ELEVATORS, LIGHTS, ETC.) SHALL BE AS LOCATED BY OTHER DIVISIONS OF THE CONTRACT DOCUMENTS. REFER TO THE ARCHITECTURAL, STRUCTURAL AND MECHANICAL DOCUMENTS FOR DIMENSIONS AND DETAILS OF BUILDING CONSTRUCTION AND PROVIDE WORK DESCRIBED IN THIS DIVISION SO THAT IT CONFORMS TO THE DETAILS OF THE PROJECT. THE RIGHT IS RESERVED TO RELOCATE ANY RECEPTACLE, SWITCH OR OTHER OUTLET A MAXIMUM OF 10'–0" BEFORE IT IS PERMANENTLY INSTALLED WITHOUT INCURRING ADDITIONS TO THE CONTRACT AMOUNT.

1.6 SITE VISIT

A. VISIT THE SITE AND BECOME FAMILIAR WITH ALL ASPECTS OF THE SITE AND EXISTING CONDITIONS BEFORE SUBMITTING CONTRACT PRICE.

B. NO ALLOWANCE WILL BE MADE FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS.

1.7 DEVIATIONS

A. NO DEVIATIONS FROM THE CONTRACT DOCUMENTS SHALL BE MADE WITHOUT THE FULL KNOWLEDGE AND WRITTEN CONSENT OF THE ARCHITECT.

B. IF THE EXISTING CONDITIONS MAKE IT DESIRABLE TO MODIFY THE CONTRACT DOCUMENTS IN REGARD TO ANY ITEM, PROVIDE A WRITTEN REQUEST TO THE ARCHITECT.

2.1 STANDARDS FOR MATERIALS AND WORKMANSHIP

A. ALL MATERIALS USED SHALL BE NEW AND SHALL BE STAMPED WITH THE LABEL OF UNDERWRITERS LABORATORIES, INC. (UL).

B. ALL MATERIALS SHALL MEET THE STANDARDS OF THE FOLLOWING ASSOCIATIONS AND INSTITUTES WHERE APPLICABLE:

1. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
2. AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)
3. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
4. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
5. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)

C. MANUFACTURER'S NAMES AND CATALOG NUMBERS SPECIFIED HEREIN ARE INTENDED TO DESCRIBE THE MATERIAL AND SET THE STANDARD OF QUALITY. ALL BIDS SHALL BE BASED ON MATERIAL SPECIFIED. REQUESTS FOR APPROVAL OF MATERIAL NOT SPECIFIED SHALL BE CONSIDERED IF THE REQUEST IS IN WRITTEN FORM AND SUBMITTED TO THE ARCHITECT NO LATER THAN FOURTEEN (14) DAYS BEFORE BID DATE. ALL REQUESTS SHALL CONFORM WITH THE PROVISIONS OF THE GENERAL AND SUPPLEMENTARY CONDITIONS.

D. SAMPLES OF MATERIALS REQUESTED TO BE SUBSTITUTED SHALL BE FURNISHED UPON THE REQUEST OF THE ARCHITECT.

2.2 SHOP DRAWINGS AND SUBMITTAL

A. THE ENGINEER'S REVIEW OF SHOP DRAWINGS OR SUBMITTALS IS A CURSORY REVIEW TO CHECK FOR GENERAL COMPLIANCES OF SUBMITTALS WITH THE DESIGN INTENT OF THE CONTRACT DOCUMENTS. THE ENGINEER'S REVIEW DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY OF COMPLYING WITH THE CONTRACT DOCUMENTS. ALL COORDINATION OF THE WORK IN STRICT COMPLIANCE WITH THE CONTRACT DOCUMENTS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

B. THE FOLLOWING ITEMS SHALL BE SUBMITTED FOR REVIEW:

1. CONDUIT AND WIRE
2. DEVICES
3. COVERPLATES
4. FUSES
5. OVERCURRENT DEVICES
6. DISCONNECT SWITCHES
7. LIGHTING FIXTURES
8. MOTOR STARTERS
9. PANELBOARDS
10. FIRE ALARM SYSTEM

C. ALL SHOP DRAWINGS AND SUBMITTALS SHALL BE SUBMITTED IN COMPLIANCE WITH THE REQUIREMENTS OF THE GENERAL AND SUPPLEMENTARY CONDITIONS. NO MORE THAN FOUR (4) COPIES OF SUBMITTAL DATA WILL BE REVIEWED. ANY ADDITIONAL COPIES WILL BE RETURNED UNMARKED. THE RESPONSIBILITY OF COPYING REVIEW COMMENTS ON ANY ADDITIONAL COPIES WILL REST SOLELY WITH THE CONTRACTOR.

D. ALL SUBMITTALS SHALL BEAR THE NAME OF THE MANUFACTURER TO BE USED.

E. ALL SHOP DRAWINGS AND SUBMITTALS SHALL INCLUDE A STAMPED INDICATION SIGNIFYING THAT THE SUBMITTAL HAS BEEN REVIEWED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS BY THE CONTRACTOR. THIS STAMPED INDICATION ALSO REPRESENTS THE FACT THAT THE CONTRACTOR HAS CHECKED THIS SUBMITTAL FOR ITS INTERACTION WITH ALL OTHER DIVISIONS AND CERTIFIES BY HIS SIGNATURE OR INITIALS THAT ALL COORDINATION HAS TAKEN PLACE. THE STAMP SHALL INCLUDE THE DATE, NAME OF THE CONTRACTING FIRM, THE SIGNATURE OF THE CONTRACTOR, CERTIFICATION OF COMPLIANCE AND APPROVAL. THIS STAMP SHALL BE ON THE SUBMITTAL BEFORE THE ENGINEER WILL REVIEW IT.

F. THE ENGINEER WILL REVIEW AN INDIVIDUAL SUBMITTAL NOT MORE THAN TWICE. IF THE SUBMITTAL IS REJECTED AGAIN ON THE SECOND REVIEW, THE CONTRACTOR WILL BARE ALL RESPONSIBILITY FOR PAYING FOR THE ENGINEER'S TIME FOR ADDITIONAL REVIEWS. SUCH PAYMENTS TO THE ENGINEER SHALL BE WITHHELD FROM THE NEXT MONTHLY PAY APPLICATION.

2.3 RECORD (AS–BUILT) DRAWINGS AND MAINTENANCE MANUALS

A. AT JOB COMPLETION, SUBMIT TO THE ARCHITECT, A SET OF PRINTS SHOWING ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS. THE DRAWINGS SHALL ALSO HAVE DIMENSIONS LOCATING ALL UNDERGROUND CONDUITS.

B. AT JOB COMPLETION, SUBMIT TO THE ARCHITECT, THREE (3) SETS OF MAINTENANCE AND INSTRUCTION MANUALS FOR ALL EQUIPMENT FURNISHED ON THE PROJECT.

3.1 COORDINATION

A. COORDINATE ALL SPACE REQUIREMENTS WITH ALL OTHER DIVISIONS BEFORE INSTALLING ANY WORK. INSTALL WORK SUCH THAT ADEQUATE SPACE WILL BE ALLOTTED FOR ALL OTHER WORK FROM OTHER DIVISIONS TO BE INSTALLED AND ALSO WILL ALLOW ROOM FOR FUTURE ACCESS FOR REPAIR AND MAINTENANCE.

B. ANY WORK INSTALLED WITHOUT PROPER COORDINATION SHALL BE RELOCATED AT THE ARCHITECT'S DIRECTION WITHOUT INCREASING THE CONTRACT PRICE.

C. DURING THE BIDDING PROCESS OR THE PRICING FOR A GUARANTEED MAXIMUM PRICE, COORDINATE WITH ALL OTHER DIVISIONS FOR THE TOTAL AMOUNT OF WORK REQUIRED IN DIVISION 26. ANY WORK SHOWN OR IMPLIED IN ANOTHER DIVISION REQUIRING WORK IN DIVISION 26 SHALL BE INCLUDED IN THE CONTRACT PRICE REGARDLESS OF WHETHER OR NOT IT IS ADDRESSED IN DIVISION 26.

3.2 PROTECTION OF MATERIALS

A. ALL EQUIPMENT SHALL HAVE THE ORIGINAL FINISH WHEN THE BUILDING IS TURNED OVER TO THE OWNER.

B. PROTECT EQUIPMENT DURING CONSTRUCTION FROM DIRT, WATER, CHEMICAL, MECHANICAL DAMAGE, ETC. PROTECT ALL CONDUIT OPENINGS SO THAT NO FOREIGN MATERIAL WILL ENTER THE CONDUIT.

3.3 CORING, CUTTING AND PATCHING

A. SET SLEEVES FOR CONDUIT ACCURATELY BEFORE THE CONCRETE FLOORS ARE POURED, OR SET BOXES ON THE FORMS SO AS TO LEAVE OPENINGS IN THE FLOORS IN WHICH THE REQUIRED SLEEVES CAN BE SUBSEQUENTLY LOCATED. FILL IN THE VOIDS AROUND THE SLEEVES WITH CONCRETE.

B. SHOULD THE PERFORMANCE OF THIS PRELIMINARY WORK BE NEGLECTED AND SHOULD CUTTING BE REQUIRED IN ORDER TO INSTALL CONDUIT, THEN THE EXPENSE OF THE CUTTING AND RESTORING OF SURFACES TO THEIR ORIGINAL CONDITIONS SHALL BE ACCOMPLISHED WITHOUT INCURRING ADDITIONS TO THE CONTRACT.

3.4 CONNECTION TO EQUIPMENT

A. EQUIPMENT FURNISHED BY THE OWNER OR UNDER OTHER SECTIONS, SUCH AS MECHANICAL EQUIPMENT, ELEVATORS, ESCALATORS, SIGNS, KITCHEN EQUIPMENT, ETC., WILL BE INSTALLED BY OTHERS. PROVIDE ELECTRICAL SERVICE AND MAKE THE ELECTRICAL CIRCUIT CONNECTION TO THIS EQUIPMENT.

B. PROVIDE PVC INSULATED FLEXIBLE CORD SETS FOR ALL CORD AND PLUG CONNECTED BUILDING APPLIANCES AND EQUIPMENT. CORDS SHALL BE SIZED IN ACCORDANCE WITH ELECTRICAL CIRCUITS INDICATED. MULTIPLE CONDUCTOR CORDS SHALL BE "SO" CABLE WITH PVC JACKET AND GREEN INSULATED GROUND CONDUCTOR.

3.5 EQUIPMENT ANCHORING

A. ALL ITEMS OF ELECTRICAL EQUIPMENT, SUCH AS SWITCHBOARDS, MOTOR CONTROL CENTERS, TRANSFORMERS, STANDBY GENERATOR, ETC., SHALL BE SECURELY ANCHORED TO THE BUILDING STRUCTURE. THE ANCHORING SHALL BE ACCOMPLISHED BY UTILIZING A MINIMUM SIZE OF 3/8" STEEL ANCHOR BOLTS IN THE STRUCTURE AND TO THE ITEM OF EQUIPMENT. A MINIMUM OF TWO (2) ANCHOR BOLTS SHALL BE PROVIDED ON EACH SIDE OF EACH ITEM OF EQUIPMENT WITH THE FOLLOWING EXCEPTIONS:

EXCEPTION NO. 1: IF THE EQUIPMENT MANUFACTURER INCLUDES MORE THAN TWO (2) ANCHOR HOLES PER SIDE IN THE BASE OR BASE FRAME OF THE EQUIPMENT ITEM, THEN THERE SHALL BE ONE ANCHOR FOR EACH ANCHOR HOLE.

EXCEPTION NO. 2: IF THE EQUIPMENT MANUFACTURER RECOMMENDS A PARTICULAR QUANTITY GREATER THAN TWO (2) PER SIDE, THEN THAT QUANTITY OF ANCHORS SHALL BE PROVIDED.

3.6 TESTS, DEMONSTRATION AND INSTRUCTIONS

A. TEST ALL SYSTEMS DESCRIBED IN THIS DIVISION IN THE PRESENCE OF THE OWNER OR A DESIGNATED REPRESENTATIVE UPON COMPLETION OF THE WORK. DEMONSTRATE THAT THE INSTALLATION IS IN ACCORDANCE WITH CONTRACT DOCUMENTS.

B. ANY WORK FOUND NOT TO BE IN COMPLIANCE WITH THE CONTRACT DOCUMENTS SHALL BE REPAIRED OR REPLACED WITHOUT INCURRING ANY ADDITIONS TO THE CONTRACT PRICE.

C. PROVIDE TO THE OWNER, ALL INSTRUCTION ON MAINTENANCE AND OPERATION OF ALL SYSTEMS AND EQUIPMENT PROVIDED UNDER THIS DIVISION. PROVIDE ALL NECESSARY TOOLS AND PERSONNEL TO THOROUGHLY PRESENT THESE INSTRUCTIONS.

3.7 GUARANTEE

A. ALL SYSTEMS, EQUIPMENT, COMPONENTS, WORK, ETC. PROVIDED UNDER THIS DIVISION SHALL BE COVERED BY A ONE YEAR GUARANTEE STARTING AT THE TIME OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. ANY DEFECTS IN THE WORK, SYSTEMS, EQUIPMENT OR COMPONENTS FOUND DURING THIS YEAR SHALL BE CORRECTED AT NO CHARGE. THE GUARANTEE SHALL INCLUDE PROVIDING ALL NECESSARY CUTTING, PATCHWORK, REPAINTING, ETC. TO MAKE THE WORK COMPLETE AND NEW.

B. PRESENT THIS GUARANTEE AND ANY ADDITIONAL WARRANTIES OR GUARANTEES ON FURNISHED EQUIPMENT OR SYSTEMS TO THE ARCHITECT. ALL EQUIPMENT OR SYSTEM GUARANTEES ARE IN ADDITION TO THE GENERAL GUARANTEE.

END OF SECTION 260500

SECTION 260519 – LOW–VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 V AND LESS)

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. THIS SECTION DESCRIBES THE BASIC MATERIALS AND INSTALLATION METHODS THAT ARE ACCEPTABLE AND APPLICABLE TO DIVISION 26.

2.1 CONDUCTORS

A. CONDUCTORS SHALL BE COPPER OF 98% CONDUCTIVITY, 600 VOLT INSULATION. SIZES SPECIFIED ARE AMERICAN WIRE GAUGE (AWG) FOR NO. 4/0 AND SMALLER AND CIRCULAR MILS (MCM) FOR ALL SIZES LARGER THAN NO. 4/0. CONDUCTORS NO. 10 AWG AND SMALLER SHALL BE SOLID AND TYPE "THHN" OR "THWN" INSULATION. NO. 8 AND LARGER SHALL BE STRANDED AND TYPE "THW" OR "XHHW" INSULATION.

3.1 WIRING

A. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT. NO CONDUCTORS SHALL BE PULLED INTO THE CONDUIT UNTIL THE CONDUIT SYSTEM IS COMPLETE AND PLASTER HAD DRIED. WIRE PULLING LUBRICANTS SHALL BE GARDNER–BENDER "WIREAIDE" OR IDEAL "YELLOW 77".

B. CONDUCTORS SHALL BE CONTINUOUS FROM OUTLET TO OUTLET AND FROM OUTLET TO JUNCTION BOX OR PULL BOX. ALL SPLICES AND JOINTS SHALL BE CAREFULLY AND SECURELY MADE TO BE MECHANICALLY AND ELECTRICALLY SOLID WITH PRESSURE TYPE CONNECTORS, GARDNER BENDER "WINGGARD" OR IDEAL "WINGNUT". TAPE SHALL BE "SCOTCH" NO. 33 FOR INDOOR AND NO. 88 FOR OUTDOOR OR GARDNER BENDER NO. 95–661. WHERE CONNECTION IS MADE TO ANY TERMINALS OF MORE THAN 30 AMPERES CAPACITY AND WHERE CONDUCTORS LARGER THAN NO. 10 ARE CONNECTED TO ANY TERMINAL, COPPER TERMINAL LUGS SHALL BE BOLTED TO THE CONDUCTORS. WHERE MULTIPLE CONNECTIONS ARE MADE TO THE SAME TERMINAL, INDIVIDUAL LUGS FOR EACH CONDUCTOR SHALL BE USED.

C. ALUMINUM CONDUCTORS, IF USED FOR SERVICE CONDUCTORS, SHALL BE MADE WITH HIGH COMPRESSION LUGS AS MANUFACTURED BY SQUARE D, IDEAL OR MAC.

D. EACH CONDUIT SHALL HAVE A MINIMUM OF TWO (2) CONDUCTORS PULLED IN UNLESS THAT PARTICULAR CONDUIT IS NOTED AS BEING FOR SYSTEMS OTHER THAN ELECTRICAL CIRCUITRY AND/OR FUTURE USE OR UNLESS NOTED OTHERWISE.

E. CONDUCTORS FOR LIGHTING AND RECEPTACLE CIRCUITS SHALL HAVE COLOR CODED JACKETS. THE WIRING SHALL BE COLOR CODED WITH THE SAME COLOR USED WITH ITS RESPECTIVE PHASE THROUGH THE ENTIRE JOB AS FOLLOWS:

208/120 VOLT SYSTEM
PHASE A – BLACK
PHASE B – RED
PHASE C – BLUE
NEUTRAL – WHITE
GROUND – GREEN

F. THE FEEDER AND SERVICE ENTRANCE CONDUCTORS SHALL BE COLOR CODED BY THE USE OF COLORED PLASTIC TAPE APPLIED WITHIN 6" OF EACH CONDUCTOR END.

G. BRANCH CIRCUIT CONDUCTORS SHALL NOT BE SMALLER THAN NO. 12 AND WHERE THE HOME RUN FROM CENTER OF LOAD EXCEEDS 100'–0", THE CONDUCTORS FROM HOME RUN OUTLET TO PANEL SHALL BE NO. 10 MINIMUM.

H. FOR BRANCH CIRCUITS TERMINATING IN OUTLET WITHOUT DEVICE, LEAVE MINIMUM OF 12" OF SLACK WIRE COILED FOR CONNECTION OF EQUIPMENT. ALL CONDUCTORS SHALL BE IDENTIFIED WITH PROPER CIRCUIT NUMBERS AT TERMINALS, JUNCTION BOXES AT PANELBOARDS WITHIN 6" OF CONDUCTOR ENDS.

END OF SECTION 260519

SECTION 260526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. THIS SECTION DESCRIBES THE BASIC GROUNDING MATERIALS AND INSTALLATION METHODS THAT ARE ACCEPTABLE AND APPLICABLE TO DIVISION 26.

2.1 MANUFACTURERS

A. ALL GROUND CONNECTIONS IN THE BUILDING SYSTEM GROUND SHALL BE DONE WITH CADWELD.

3.1 GROUNDING

A. GROUND CONNECTIONS SHALL BE IN ACCORDANCE WITH THE 2020 NATIONAL ELECTRICAL CODE.

B. PROVIDE AN INSULATED GREEN BONDING JUMPER FROM THE GROUNDING LUG OF ALL RECEPTACLES TO A STEEL CITY "GEE" CLIP OR A SHEET METAL MACHINE SCREW IN THE OUTLET BOX. THE GROUND WIRE INSTALLED BEHIND THE DEVICE MOUNTING SCREWS WILL NOT BE ACCEPTABLE.

C. PROVIDE ONE (1) NO. 6 AWG IN A 3/4" CONDUIT FROM THE SYSTEM GROUND TO THE TELEPHONE COMPANY MAIN DISTRIBUTION FRAME OR SERVICE CABINET AND TO EACH TELEPHONE BACKBOARD.

END OF SECTION 260526

SECTION 260534 – CONDUIT

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. THIS SECTION DESCRIBES THE BASIC ELECTRICAL MATERIALS AND INSTALLATION METHODS THAT ARE ACCEPTABLE AND APPLICABLE TO DIVISION 26.

2.1 MANUFACTURERS

A. STEEL CONDUIT APPROVED MANUFACTURERS ARE ALLIED, TRIANGLE AND REPUBLIC.

B. PVC AND ENT CONDUIT APPROVED MANUFACTURERS ARE CARLON AND TRIANGLE.

C. CONDUIT FITTINGS APPROVED MANUFACTURERS ARE RACO, STEEL CITY, O.Z. GEDNEY, THOMAS & BETTS AND APPLETON.

2.2 CONDUIT

A. GALVANIZED RIGID STEEL CONDUIT SHALL BE LOW CARBON, HOT–DIPPED GALVANIZED BOTH INSIDE AND OUT WITH THREADED JOINTS.

B. INTERMEDIATE METAL CONDUIT (IMC) SHALL BE STEEL, GALVANIZED BOTH INSIDE AND OUT WITH THREADED JOINTS.

C. ELECTRICAL METALLIC TUBING (EMT) SHALL BE STEEL, GALVANIZED BOTH INSIDE AND OUT.

D. PLASTIC CONDUIT (PVC) SHALL BE SCHEDULE 40 PVC HEAVY WALL TYPE. A GROUNDING CONDUCTOR SHALL BE PROVIDED.

E. ELECTRICAL NON–METALLIC TUBING (ENT) SHALL BE OF SUCH MATERIAL THAT IT IS RESISTANT TO MOISTURE, CHEMICAL ATMOSPHERES AND IS FLAME RETARDANT. A GROUNDING ELECTRODE CONDUCTOR SHALL BE PROVIDED.

F. FLEXIBLE METAL CONDUIT SHALL BE FLEXIBLE STEEL CONDUIT TUBING AND SHALL MEET UNDERWRITERS LABORATORIES STANDARD FOR FLEXIBLE STEEL CONDUIT.

G. LIQUID–TIGHT FLEXIBLE METAL CONDUIT AND LIQUID–TIGHT NON–METALLIC CONDUITS SHALL BE LIQUID–TIGHT AND SUNLIGHT RESISTANT.

2.3 CONDUIT FITTINGS

A. RIGID CONDUIT AND IMC CONDUIT FITTINGS SHALL BE ZINC–COATED, FERROUS METAL AND TAPER THREADED TYPE.

B. EMT FITTINGS SHALL BE ZINC–COATED STEEL AND HEXNUT COMPRESSION OR SET–SCREW TYPE. EMT CONNECTORS SHALL HAVE INSULATED THROATS.

C. PVC FITTINGS, ELBOWS AND CEMENT SHALL BE PRODUCED BY THE SAME MANUFACTURER. ALL JOINTS SHALL BE SOLVENT WELDED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

D. CONDUIT CONNECTIONS TO SWITCHBOARDS, MOTOR CONTROL CENTERS, TRANSFORMERS, PANEL CABINETS, AND PULL BOXES SHALL HAVE GROUNDING WEDGE LUGS BETWEEN THE BUSHING AND THE BOX OR LOCKNUTS DESIGNED TO BITE INTO THE METAL.

E. EACH CONDUIT END SHALL BE PROVIDED WITH EITHER AN INSULATED THROAT CONNECTOR OR SEPARATE LOCKNUT AND INSULATED BUSHING. BUSHING SHALL BE INSTALLED BEFORE ANY WIRE IS PULLED.

F. EXPANSION FITTINGS SHALL BE PROVIDED IN ALL CONDUIT WHICH CROSSES AND EXPANSION JOINT.

2.4 SMOKE AND FIRE STOP FITTINGS

A. SMOKE AND FIRE STOP FITTINGS SHALL BE UL LISTED FOR THAT PURPOSE. THE FITTINGS USED TO SEAL CONDUIT EITHER ON THE OUTSIDE OF THE CONDUIT OR INTERNALLY SHALL HAVE HEAT ACTIVATED INTUMESCENT MATERIAL, WHICH EXPANDS TO FILL ALL VOIDS.

B. SMOKE AND FIRE STOP FITTINGS SHALL BE O.Z./GEDNEY "FIRE–SEAL" OR DOW CORNING SILICONE RTV FOAM WITH AN HOURLY FIRE–RATING EQUAL TO OR HIGHER THAN THE RATING OF THE FLOOR, CEILING OR WALL THROUGH WHICH THE CONDUIT PASSES. THE SEALS FOR CONDUIT SHALL BE OF THE FLANGED TYPE.

3.1 CONDUIT

A. RIGID STEEL (OR IMC) SHALL BE USED FOR SERVICE ENTRANCE AND ALL FEEDERS AND BRANCH CIRCUITS WHERE EXPOSED TO DAMAGE.

B. EMT SHALL BE USED FOR BRANCH CIRCUITS, FIRE ALARM AND TELEPHONE WHEN NOT UNDERGROUND OR IN CONCRETE IN CONTACT WITH THE EARTH.

C. SCHEDULE 40 PVC MAY BE USED FOR ALL UNDERGROUND FEEDERS, SERVICE ENTRANCE CONDUCTORS WHEN ENCASED IN 4" OF CONCRETE ON ALL SIDES, OR UNDER THE LOWEST FLOOR SLAB.

D. CONDUIT SHALL BE CONTINUOUS FROM OUTLET TO OUTLET, FROM OUTLET TO CABINET, JUNCTION BOX AND PULL BOX. CONDUIT SHALL ENTER AND BE SECURED TO ALL BOXES, ETC., IN SUCH A MANNER THAT EACH SYSTEM WILL BE ELECTRICALLY CONTINUOUS FROM SERVICE TO ALL OUTLETS SUCH THAT A GOOD GROUND IS PROVIDED. ALL CONDUIT FROM CABINETS AND JUNCTION BOXES SHALL TERMINATE IN APPROVED OUTLET BOXES OR CONDUIT FITTINGS. CONDUIT CONNECTIONS TO ANY BOX WHICH HAS NO THREADED HUB SHALL BE DOUBLE LOCKNUTTED.

E. PROVIDE JUNCTION BOXES OR PULL BOXES WHERE SHOWN AND WHERE NECESSARY TO AVOID EXCESSIVE RUNS OR TOO MANY BENDS BETWEEN OUTLETS. THE CONDUIT SIZES SHOWN MAY INCREASE IF DESIRED TO FACILITATE THE PULLING OF CABLES.

F. ALL CONDUIT SHALL BE CONCEALED UNLESS INDICATED OTHERWISE. INSTALL EXPOSED CONDUIT PARALLEL WITH OR AT RIGHT ANGLES TO THE BUILDING WALLS AND SUPPORT FROM WALLS OR CEILINGS AT INTERVALS REQUIRED BY CODE WITH APPROVED GALVANIZED IRON CLAMPS OR HANGERS. CONCEALED CONDUIT ABOVE THE CEILING SHALL BE SUPPORTED INDEPENDENT OF CEILING CONSTRUCTION. WHERE CEILINGS OF LAY–IN TYPE ARE USED, CONDUIT MUST BE INSTALLED HIGH ENOUGH TO PERMIT REMOVAL OF CEILING PANELS AND LIGHTING FIXTURES. USE THREADED RODS AND HANGERS FOR SUPPORTING SINGLE CONDUIT. USE TRAPEZE HANGERS CONSISTING OF DOUBLE–NUTTED THREADED RODS AND "UNISTRUT" CHANNELS OR ANGLES OF 12 GAUGE MINIMUM STEEL FOR SUPPORTING MULTIPLE CONDUIT.

G. MINIMUM SIZE CONDUIT FOR BRANCH CIRCUITS SHALL NOT BE SMALLER THAN 1/2". HOME RUNS SHALL EXTEND FROM OUTLETS SHOWN TO PANEL DESIGNATED. HOME RUNS SHOWN SHALL NOT BE COMBINED. HOME RUN CONDUIT SHALL NOT BE SMALLER THAN 3/4".

H. AT COUPLINGS, CONDUIT ENDS SHALL BE THREADED SO THAT THEY MEET IN THE COUPLING. RIGHT AND LEFT HAND COUPLINGS SHALL NOT BE USED; CONDUIT COUPLINGS OF THE ERIKSON TYPE SHALL BE USED AT LOCATIONS REQUIRING SUCH JOINTS.

I. ALL CONDUIT FOR FUTURE USE, FOR TELEPHONE WIRE, OR FOR DATA COMMUNICATION CABLE, SHALL BE LEFT WITH NO. 16 GAUGE WIRE PULLED IN THEM OR A PULL LINE AS MANUFACTURED BY IDEAL, AND THE ENDS SECURELY CORKED OR CAPPED.

J. EXPANSION FITTINGS SHALL BE INSTALLED IN ALL CONDUIT WHICH PASS THROUGH THE CROSS–SECTIONAL AREA OF EXPANSION JOINTS.

K. PROVIDE NON–HARDENING ELASTIC TYPE DUCT SEAL COMPOUND, NEER NO. DC., 3M CO. "SCOTCHFIL", OR GARDNER BENDER DUCT SEAL, FOR EACH CONDUIT ENTERING THE BUILDING FROM OUTSIDE AND FOR EACH CONDUIT PASSING FROM ONE SPACE INTO ANOTHER WHICH IS NORMALLY AT A LOWER TEMPERATURE.

L. PROVIDE WATERTIGHT CONDUIT HUBS ON CONDUIT TERMINATING IN A BOX OR CABINET EXPOSED TO THE WEATHER.

M. SPACE IN SLEEVES OR AROUND CONDUIT THAT PASS THROUGH FIRE RESISTIVE OR FIRE RATED WALLS, PARTITIONS, FLOORS OR CEILINGS SHALL BE CLOSED BY PACKING WITH AN UNLABELED FIRE RESISTIVE MATERIAL THAT WILL MAINTAIN THE RATING OF THE BARRIER PENETRATED.

3.2 FLEXIBLE CONDUIT

A. PVC EXTRUDED COVER FLEXIBLE CONDUIT SHALL BE USED IN MAKING SHORT FLEXIBLE CONNECTIONS TO ROTATING OR VIBRATING MACHINERY OR EQUIPMENT. THE FLEXIBLE CONDUIT AT THESE LOCATIONS SHALL BE AS SHORT AS POSSIBLE, BUT SHALL HAVE A MINIMUM LENGTH OF 12".

B. A GREEN STRANDED BONDING JUMPER SHALL BE INSTALLED OUTSIDE OF ALL FLEXIBLE CONDUIT THAT EXTENDS DIRECTLY FROM A NON–FLEX CONDUIT TO A ROTATING OR VIBRATING MACHINE. WHERE A JUNCTION BOX IS USED, THE GREEN STRANDED BONDING JUMPER SHALL BE INSTALLED INSIDE THE FLEXIBLE CONDUIT AND ATTACHED TO THE JUNCTION BOX AND TO THE MACHINE. WHEN THE BONDING JUMPER IS INSTALLED OUTSIDE OF THE FLEXIBLE CONDUIT, PLASTIC WIRE STRAPS SHALL BE USED 6" O.C. TO SECURE THE JUMPER TO THE FLEXIBLE CONDUIT.

C. FLEXIBLE METAL (MC) CONDUIT SYSTEM MAY BE UTILIZED WHERE CONCEALED IN W

END OF SECTION 260537

SECTION 260553 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. THIS SECTION DESCRIBES THE BASIC ELECTRICAL MATERIALS AND INSTALLATION METHODS THAT ARE ACCEPTABLE AND APPLICABLE TO DIVISION 26.

2.1 MATERIALS

A. NAMEPLATES SHALL HAVE 3/8" HIGH ENGRAVED LETTERS.

B. 120 OR 208 VOLTS: WHITE CORE LAMINATED BAKELITE WITH BLACK FINISH.

3.1 INSTALLATION

A. PROVIDE SPECIFIED NAMEPLATES ON THE MAIN SWITCHBOARD, DISTRIBUTION PANELS, FEEDER SWITCHES, FEEDER BREAKERS, PANELBOARDS MOTOR CONTROL CENTERS, DISCONNECT SWITCHES, CONTACTORS, STARTERS, TRANSFORMERS, BUS–PLUGS, START–STOP PUSH BUTTONS AND MOTOR SWITCHES.

B. PROVIDE NAMEPLATES ON EVERY DEVICE IN THE MAIN SWITCHBOARD, DISTRIBUTION PANELS AND MOTOR CONTROL CENTERS.

C. NAMEPLATES FOR SURFACE MOUNTED EQUIPMENT SHALL BE INSTALLED ON THE EXTERIOR OF EQUIPMENT WITH SHEETMETAL SCREWS. NAMEPLATES FOR FLUSH OR RECESSED MOUNTED EQUIPMENT SHALL BE INSTALLED ON THE INSIDE OF THE PANEL DOOR OR COVER WITH EPOXY CEMENT.

END OF SECTION 260553

SECTION 262416 – PANELBOARDS

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. PROVIDE A COMPLETE ELECTRICAL DISTRIBUTION SYSTEM. THE SYSTEM SHALL INCLUDE THE SERVICE ENTRANCE, MAIN SWITCHBOARD, FEEDERS, TRANSFORMERS, DISTRIBUTION PANELS, PANELBOARDS, BUSWAY, REMOTE CONTROL SWITCHES, CONTACTORS, ETC., TO PROVIDE A COMPLETE SYSTEM.

C. SHOP DRAWINGS FOR EQUIPMENT SPECIFIED IN THIS SECTION SHALL SHOW THAT ALL SPECIFIED REQUIREMENTS HAVE BEEN

2.1 MANUFACTURERS

A. PANELBOARDS SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, SQUARE D, SIEMENS, OR EATON.

B. ALL DISTRIBUTION SWITCHGEAR (BRANCH CIRCUIT PANELBOARDS, DISTRIBUTION PANELBOARDS, TRANSFORMERS, BUSWAY, SWITCHES, ETC.) SHALL BE THE UNIT RESPONSIBILITY OF ONE MANUFACTURER. ALL COMPONENT PARTS OF THE ABOVE LISTED ITEMS SHALL BE OF THE SAME MANUFACTURER EXCEPT WHERE A WRITTEN REQUEST FOR DEVIATION FROM THIS REQUIREMENT HAS BEEN APPROVED PRIOR TO BID DATE.

2.2 BRANCH CIRCUIT PANELBOARDS

A. PANELBOARDS (PANELS) SHALL BE GENERAL PURPOSE ENCLOSURES AND SHALL BE SURFACE OR FLUSH MOUNTED AS INDICATED. PANELS SHALL BE OF THE AUTOMATIC CIRCUIT BREAKER TYPE, FACTORY ASSEMBLED BY THE MANUFACTURER OF THE CIRCUIT BREAKERS. PANELS SHALL BE FOR THE VOLTAGE INDICATED WITH THE QUANTITY OF POLES AND AMPACITY OF CIRCUIT BREAKERS SHOWN.

B. BOXES AND TRIM SHALL BE MADE FROM CODE GAUGE STEEL. BOXES SHALL BE SUFFICIENT SIZE TO PROVIDE A MINIMUM GUTTER SPACE OF 4" ON ALL SIDES. BOXES SHALL BE MINIMUM 20" WIDTH AND 5 3/4" DEPTH.

C. HINGED DOOR COVERING ALL DEVICE HANDLES SHALL BE INCLUDED IN ALL PANEL TRIM. DOORS SHALL HAVE FLUSH–TYPE CYLINDER LOCK AND CATCH, EXCEPT THAT DOORS OVER 48" IN HEIGHT SHALL HAVE AUXILIARY FASTENERS AT TOP AND BOTTOM OF DOOR IN ADDITION TO FLUSH–TYPE CYLINDER LOCK AND CATCH. DOOR HINGES SHALL BE CONCEALED. ALL LOCKS SHALL BE KEYED ALIKE. DIRECTORY FRAME AND CARD HAVING A TRANSPARENT COVER SHALL BE FURNISHED EACH PANEL DOOR.

D. TRIMS FOR FLUSH PANELS SHALL OVERLAP THE BOX BY AT LEAST 3/4" ALL AROUND. SURFACE TRIMS SHALL HAVE THE SAME WIDTH AND HEIGHT AS THE BOX. TRIMS SHALL BE MOUNTABLE BY A SCREWDRIVER WITHOUT THE NEED FOR SPECIAL TOOLS. AFTER INSTALLATION, TRIM MOUNTING MECHANISM OR HARDWARE SHALL NOT BE ACCESSIBLE WHEN PANEL DOOR IS CLOSED AND LOCKED.

E. ALL EXTERIOR AND INTERIOR STEEL SURFACES OF THE TRIM SHALL BE CLEANED AND FINISHED WITH GRAY PAINT OVER A RUST–INHIBITING PHOSPHATIZED COATING.

F. ALL INTERIORS SHALL BE COMPLETELY FACTORY ASSEMBLED WITH PROTECTIVE DEVICES, WIRE CONNECTORS, ETC. ALL WIRE CONNECTORS, EXCEPT SCREW TERMINALS, SHALL BE OF THE ANTI–TURN SOLDERLESS TYPE AND ALL SHALL BE SUITABLE FOR COPPER OR ALUMINUM WIRE.

G. INTERIORS SHALL BE SO DESIGNED THAT DEVICES CAN BE REPLACED WITHOUT DISTURBING ADJACENT UNITS AND WITHOUT REMOVING THE MAIN BUS CONNECTORS, AND SHALL BE SO DESIGNED THAT DEVICES MAY BE CHANGED WITHOUT MACHINING, DRILLING OR TAPPING.

H. BUS BARS FOR THE MAINS SHALL BE OF COPPER SIZED IN ACCORDANCE WITH U.L. STANDARDS. FULL SIZE BARS SHALL BE INCLUDED. BUS BAR TAPS FOR PANELS WITH SINGLE POLE BRANCHES SHALL BE ARRANGED FOR SEQUENCE PHASING OF THE BRANCH CIRCUIT DEVICES.

I. PHASE BUSSING SHALL BE FULL HEIGHT WITHOUT REDUCTION. CROSS AND CENTER CONNECTORS SHALL BE OF THE SAME MATERIAL AS THE BUS.

J. THE NEUTRAL BUS SHALL UTILIZE SETSCREWS TO BOND THE NEUTRAL WIRE TO THE NEUTRAL BUS THROUGH HOLES DRILLED IN THE NEUTRAL BAR. A SHEET COPPER NEUTRAL BUS UTILIZING FLATHEAD SCREWS TO HOLD THE NEUTRAL WIRES WILL NOT BE ACCEPTABLE.

K. SPACES FOR FUTURE DEVICES SHALL BE INCLUDED AS INDICATED AND SHALL BE BUSSED FOR THE MAXIMUM RATED DEVICE THAT CAN BE FITTED INTO THEM.

L. ALL CIRCUIT BREAKERS SHALL BE MANUALLY OPERATED, THERMAL–MAGNETIC, AUTOMATIC, OF THE AMPACITY AND POLES AS INDICATED. THEY SHALL BE QUICK–MAKE, QUICK–BREAK, BOTH ON MANUAL AND AUTOMATIC OPERATION. BREAKERS SHALL BE OVER–THE–CENTER TOGGLE OPERATING TYPE, WITH THE HANDLE GOING TO A POSITION BETWEEN ON AND OFF TO INDICATE AUTOMATIC TRIPPING. ALL MULTI–POLE BREAKERS SHALL HAVE INTERNAL COMMON TRIP. BREAKERS SHALL HAVE A MINIMUM OF 10,000 RMS SYMMETRICAL AMPERES INTERRUPTING CAPACITY UNLESS DESIGNATED OTHERWISE. THE BREAKERS FURNISHED SHALL BE DETERMINED BY THE SPECIFICATIONS AND BY THE MINIMUM U.L. LABELED RMS SYMMETRICAL AMPERES INTERRUPTING CAPACITY AT CIRCUIT VOLTAGE. ALL CIRCUIT BREAKERS SHALL BE BOLTED ON AND RIGIDLY BRACED.

M. PANELS HAVING SUB–FEED LUGS FOR FEEDING THROUGH SHALL HAVE 8" MINIMUM EXTRA GUTTER SPACE AT THE LUG END AND ON ONE SIDE.

N. EACH PANEL AS A COMPLETE UNIT SHALL HAVE A SHORT–CIRCUIT CURRENT RATING EQUAL TO OR GREATER THAN THE EQUIPMENT RATING INDICATED.

2.3 DISTRIBUTION PANELBOARDS

A. DISTRIBUTION PANELBOARDS (PANELS) SHALL BE OF THE CIRCUIT BREAKER TYPE, FACTORY ASSEMBLED BY THE MANUFACTURER OF THE CIRCUIT BREAKERS, COMPLETE WITH FRONT DOOR COVER. THE MAIN BREAKER AND THE BRANCH CIRCUIT BREAKERS SHALL BE AS INDICATED. THE MAIN BUS SHALL BE 98% CONDUCTIVITY SILVER PLATED COPPER, RATED AS AND OF CAPACITY EQUAL TO OR GREATER THAN THE RATING OR SETTING OF THE OVER–CURRENT PROTECTIVE DEVICE NEXT BACK IN THE LINE. PANEL SHALL BE SUITABLE FOR THE VOLTAGE AND PHASE INDICATED. PROVIDE 25% GROUND BUS.

B. PANELS SHALL BE FLUSH OR SURFACE MOUNTED AS INDICATED, WITH BAKED–ON ENAMEL TRIM, ADJUSTABLE TRIM CLAMPS AND DOOR WITH CHROMIUM PLATED COMBINATION CYLINDER LOCK AND CATCH, ALL LOCKS KEYED ALIKE. PROVIDE A SPECIFIED NAMEPLATE FOR EACH DEVICE AND A BLANK (NOT ENGRAVED) NAMEPLATE FOR EACH SPARE BREAKER OR SPACE.

C. THE NEUTRAL BUS SHALL UTILIZE SETSCREWS TO BOND THE NEUTRAL BUS THROUGH HOLES DRILLED IN THE NEUTRAL BAR. A SHEET COPPER NEUTRAL BUS UTILIZING FLATHEAD SCREWS TO HOLD THE NEUTRAL WIRES WILL NOT BE ACCEPTABLE.

D. ALL CIRCUIT BREAKERS SHALL BE MANUALLY OPERATED, THERMAL–MAGNETIC, AUTOMATIC, OF THE AMPACITY AND POLES AS INDICATED. THEY SHALL BE QUICK–MAKE, QUICK–BREAK BOTH ON MANUAL AND ON AUTOMATIC OPERATION. BREAKERS SHALL BE OVER–THE–CENTER TOGGLE OPERATING TYPE, WITH THE HANDLE GOING TO A POSITION BETWEEN "ON" AND "OFF" TO INDICATE AUTOMATIC TRIPPING. ALL MULTI–POLE BREAKERS SHALL HAVE INTERNAL COMMON TRIP.

E. THE INTERRUPTING CAPACITY OF THE BREAKERS FURNISHED SHALL BE 10,000 RMS SYMMETRICAL UNLESS INDICATED OTHERWISE.

F. ALL MAIN CIRCUIT BREAKERS SHALL BE MOLDED CASE AND VERTICALLY MOUNTED. ALL VERTICALLY MOUNTED MOLDED CASE CIRCUIT BREAKERS SHALL BE MOUNTED SO THAT THE HANDLE IS UP FOR "ON" AND DOWN FOR "OFF", WHEN VIEWED FROM THE NORMAL STANDING POSITION. ALL VERTICALLY MOUNTED MOLDED CASE MAIN CIRCUIT BREAKERS SHALL BE UL APPROVED FOR FEEDING IN THE BOTTOM AND OUT THE TOP.

G. ALL CIRCUIT BREAKERS, INCLUDING ANY CONNECTORS TO THE MAIN BUS, SHALL BE BOLTED AND RIGIDLY BRACED.

H. SPACES FOR FUTURE INSTALLATION OF MOLDED CASE CIRCUIT BREAKERS ARE SPECIFICALLY BY RANGE OF TRIP RATHER THAN A SINGLE TRIP SIZE OR FRAME SIZE. THE SPACES SO SCHEDULED SHALL BE COMPLETE WITH ALL BUS AND REQUIRED BUS CONNECTORS SUCH THAT FUTURE BREAKERS CAN BE INSTALLED WITHOUT ADDING OR CHANGING BUS CONNECTORS ON THE MAIN BUS AND WITHOUT USING A LARGER (FRAME SIZE) OR MORE EXPENSIVE BREAKER THAN THE TRIP SIZE AND INTERRUPTING CAPACITY WOULD REQUIRE. IF THE BUS CONNECTORS FURNISHED ON THE MAIN BUS WILL NOT COVER THE TRIP RANGE SPECIFIED, THEN DUPLICATE SETS OF CONNECTORS SHALL BE FURNISHED ON THE MAIN BUS FOR EACH FRAME SIZE REQUIRED.

3.1 INSTALLATION

A. PROVIDE A TYPEWRITTEN DIRECTORY UNDER PLASTIC FOR ALL PANELBOARDS WITH SPARES MARKED IN PENCIL.

B. PROVIDE ALL NECESSARY HARDWARE TO LEVEL AND SECURE THE PANELBOARDS AS REQUIRED BY THE MANUFACTURER'S INSTRUCTIONS. MAKE ALL ELECTRICAL CONNECTIONS FOR SUPPLY AND LOAD CIRCUITS AND LEAVE IN OPERATING CONDITION.

C. CLEAN ENCLOSURE OF ALL PANELBOARDS OF ALL FOREIGN MATTER, INCLUDING DUST.

D. REMOVE ALL RUST MARKS AND REPAINT TO LEAVE PANELBOARDS IN NEW CONDITION.

E. ALL FLOOR MOUNTED DISTRIBUTION EQUIPMENT SHALL BE MOUNTED ON A 4" HIGH CONCRETE PAD.

END OF SECTION 262416

SECTION 262419 – MOTOR CONTROLS AND WIRING

1.1 SCOPE

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. ALL MOTORS SHALL BE PROVIDED UNDER DIVISION 23.

C. A MOTOR STARTER SHALL BE PROVIDED UNDER THIS SECTION FOR EACH MOTOR EXCEPT FOR THOSE SPECIFIED IN DIVISION 23 TO BE FURNISHED WITH INTEGRAL STARTERS. MOTOR STARTERS SHALL BE INSTALLED SEPARATELY MOUNTED ADJACENT TO THE MOTOR SERVED.

D. MOTOR POWER WIRING IS DEFINED AS THOSE CONDUCTORS BETWEEN THE ENERGY SOURCE AND THE MOTOR. THIS POWER WIRING SHALL BE TERMINATED AT THE MOTOR TERMINALS.

E. ALL CONTROL WIRING REQUIRED FOR AUTOMATIC STARTING AND STOPPING OF MOTORS SHALL BE PROVIDED UNDER DIVISION 23 UNLESS SPECIFICALLY SHOWN ON THE ELECTRICAL DRAWINGS.

F. POWER WIRING SHALL BE CONNECTED THROUGH ALL LINE VOLTAGE CONTROL DEVICES SUCH AS FIRESTATS AND THERMOSTATS.

2.1 MOTOR STARTERS

A. STARTERS FOR MOTORS 1/3 HORSEPOWER OR SMALLER SHALL BE MANUAL UNLESS REMOTE OR AUTOMATIC STARTING IS REQUIRED, IN WHICH CASE THE STARTERS SHALL BE MAGNETIC, FULL VOLTAGE, NON–REVERSING, SINGLE–SPEED, UNLESS OTHERWISE INDICATED. ALL OTHER STARTERS SHALL BE MAGNETIC.

B. EACH STARTER FOR A THREE–PHASE MOTOR SHALL BE FURNISHED WITH THREE (3) OVERLOAD RELAYS SIZED FOR THE FULL LOAD RUNNING CURRENT OF THE MOTOR ACTUALLY PROVIDED. PROVIDE AN EXTERNAL "HAND–OFF–AUTO" SELECTOR SWITCH WITH GREEN "RUNNING" LIGHT. PROVIDE A RED PILOT LIGHT TO INDICATE MOTOR "STOPPED". EACH PILOT LIGHT SHALL HAVE A LEGEND PLATE INDICATING REASON FOR SIGNAL.

C. EACH OVERLOAD RELAY SHALL HAVE A NORMALLY OPEN ALARM CONTACT WHICH WILL CLOSE ONLY WHEN ACTUATED BY AN OVERLOAD (NOT TO BE CONFUSED WITH N.O. OR N.C. AUXILIARY CONTACTS). THESE CONTACTS SHALL BE PROPERLY WIRED TO THEIR RESPECTIVE BLUE PILOT LIGHT PROVIDED ON THE STARTER FRONT COVER AND HAVING A "TRIPPED" LEGEND PLATE.

D. INDIVIDUALLY MOUNTED MOTOR STARTERS SHALL BE IN A NEMA TYPE 1 GENERAL PURPOSE ENCLOSURE IN UNFINISHED AREAS AND SHALL BE FLUSH MOUNTED IN ALL FINISHED AREAS. ALL STARTERS MOUNTED IN EXTERIOR AREAS SHALL HAVE A NEMA 3R ENCLOSURE. EACH STARTER SHALL HAVE A LAMINATED NAMEPLATE TO INDICATE DIVISION 23 UNIT NUMBER, FUNCTION AND CIRCUIT NUMBER.

E. A CONTROL POWER TRANSFORMER SHALL BE PROVIDED AT EACH MOTOR STARTER FOR CONNECTION TO THE CONTROLS PROVIDED UNDER DIVISION 23. THE CONTROL POWER TRANSFORMER SHALL BE MOUNTED INSIDE THE MOTOR STARTER ENCLOSURE. ALL CONTROL TRANSFORMERS AT 50 VA OR GREATER SHALL HAVE PRIMARY FUSING. COORDINATE ALL CONTROL EQUIPMENTS WITH DIVISION 23 AND EQUIPMENT MANUFACTURERS.

F. ALL MOTOR STARTERS, PUSH BUTTONS AND PILOT LIGHTS SHALL BE OF THE SAME MANUFACTURER AS THE SWITCHBOARD AND SHALL BE GENERAL ELECTRIC, SQUARE D, SIEMENS, JOSLYN CLARK CONTROLS OR CUTLER–HAMMER.

2.2 COMBINATION STARTERS

A. COMBINATION STARTERS SHALL CONSIST OF A CIRCUIT BREAKER AND A MOTOR STARTER MOUNTED IN A COMMON NEMA TYPE 1 GENERAL PURPOSE ENCLOSURE.

B. THE MOTOR STARTER COMPONENTS SHALL BE AS SPECIFIED IN PARAGRAPH 2.1 FOR MOTOR STARTERS.

C. THE CIRCUIT BREAKER COMPONENT SHALL BE A MINIMUM 22,000 RMS INTERRUPTING CAPACITY AND SHALL BE AS REQUIRED IN SECTION 262413.

3.1 INSTALLATION

A. PROVIDE POWER WIRING TO AND INSTALL ALL MOTOR STARTERS, UNLESS INTEGRALLY FACTORY MOUNTED ON A PIECE OF EQUIPMENT.

B. PROVIDE POWER WIRING TO ALL MOTORS EXCEPT PACKAGED UNITS THAT ARE PREWIRED BETWEEN THE STARTER AND MOTOR.

C. WHERE LINE VOLTAGE CONTROL DEVICES ARE MOUNTED AT, ON OR INSIDE A UNIT, SUCH AS AQUASTATS, FIRESTAT FOR SINGLE PHASE DEVICES, ETC., THE POWER WIRING TO THE UNIT SHALL BE CONNECTED THROUGH SUCH A CONTROL DEVICE.

D. ON FINAL INSPECTION, IT SHALL BE DEMONSTRATED TO THE ARCHITECT OR HIS REPRESENTATIVE, THAT EACH OVERLOAD RELAY CONTROL CIRCUIT IS PROPERLY WIRED AND FUNCTIONING CORRECTLY BY MANUALLY TRIPPING EACH OVERLOAD RELAY INDIVIDUALLY, ONE AT A TIME. THIS INSPECTION PROCEDURE SHALL NOT INVOLVE REMOVING ANY WIRING OR DISCONNECTING ANY CURRENT CARRYING PARTS.

END OF SECTION 262419

SECTION 262726 – WIRING DEVICES

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. THIS SECTION DESCRIBES THE BASIC ELECTRICAL MATERIALS AND INSTALLATION METHODS THAT ARE ACCEPTABLE AND APPLICABLE TO DIVISION 26.

2.1 WALL SWITCHES

A. WALL SWITCHES SHALL BE PLASTIC, TOTALLY ENCLOSED, QUIET TYPE, SELF–GROUNDING, 120 VOLT, 20 AMP RATING AND SHALL MATCH EXISTING IF POSSIBLE AND EQUAL THE FOLLOWING:

1. SINGLE POLE: HUBBELL NO. CS1221, OR EQUAL BY LEVITON, P&S, OR COOPER.
2. DOUBLE POLE–HUBBELL NO. CS1222, OR EQUAL BY LEVITON, P&S, OR COOPER.
3. THREE–WAY: HUBBELL NO. CS1223, OR EQUAL BY LEVITON, P&S, OR COOPER.
4. FOUR–WAY: HUBBELL NO. CS1224, OR EQUAL BY LEVITON, P&S, OR COOPER.

B. COLOR SHALL BE AS SELECTED BY ARCHITECT.

C. FLUSH MOTOR SWITCHES WITH RED PILOT LIGHT AND WITH OVERLOAD PROTECTION FOR FRACTIONAL HORSEPOWER MOTORS SHALL BE HUBBELL NO. HBL1221PL OR APPROVED EQUAL BY P&S, OR LEVITON.

D. KEY SWITCHES SHALL BE HUBBELL NO. HBL1221L 20A SERIES OR APPROVED EQUAL BY P&S, OR LEVITON.

2.2 WALL MOUNTED OCCUPANCY SWITCHES

A. THE PASSIVE INFRARED SENSOR SHALL BE A COMPLETELY SELF–CONTAINED CONTROL SYSTEM THAT REPLACES A STANDARD TOGGLE SWITCH. SENSOR SHALL HAVE GROUND WIRE FOR SAFETY. SWITCHING MECHANISM SHALL BE A LATCHING AIR GAP RELAY, COMPATIBLE WITH ELECTRONIC BALLASTS, COMPACT FLUORESCENT AND INDUCTIVE LOADS. TRIAC AND OTHER HARMONIC GENERATING DEVICES SHALL NOT BE ALLOWED.

B. SENSOR SHALL COVER UP TO 1000 SQ. FT. FOR WALKING MOTION, WITH A FIELD OF VIEW OF 180 DEGREES.

C. SENSOR SHALL HAVE SYSTEM WHICH PROVIDES SUPERIOR 180 DEGREE COVERAGE.

D. SENSOR SHALL OPERATE AT 120 VAC OR 277 VAC.

E. SENSOR SHALL HAVE NO MINIMUM LOAD REQUIREMENT AND SHALL BE CAPABLE OF SWITCHING FROM 0 TO 500 WATT INCANDESCENT; 0 TO 800 WATTS FLUORESCENT OR 1/6 HP @ 120 VAC, 60 HZ; AND 0 TO 1200 WATTS FLUORESCENT OR 1/3 HP @ 277 VAC, 60 HZ.

F. FOR ACCURACY AND CONSISTENCY, SENSOR SHALL HAVE A DIP SWITCH CONTROLLED, DIGITAL TIME DELAY ADJUSTABLE FROM 15 SECONDS TO 30 MINUTES.

G. SENSOR SHALL HAVE STANDARD 5 YEAR WARRANTY AND SHALL BE UL AND CUL LISTED.

H. SENSOR SHALL BE WATTSTOPPER WI SERIES, LEVITON DECORA SERIES, OR APPROVED EQUAL BY ENGINEER.

2.3 RECEPTACLES

A. DUPLEX RECEPTACLES SHALL BE PLASTIC, TWO–POLE, THREE WIRE, SELF–GROUNDING, SIDE WIRED, 125 VOLT, 15 AMP RATING AND SHALL MATCH EXISTING IF POSSIBLE AND BE EQUAL TO THE FOLLOWING:

1. DUPLEX RECEPTACLES SHALL BE HUBBELL NO. 5262A SERIES, OR EQUAL BY LEVITON, P&S, OR COOPER.
2. TAMPER RESISTANT TYPE SHALL BE HUBBELL NO. CR15*TR SERIES, OR EQUAL BY LEVITON, P&S, OR COOPER.
3. ISOLATED GROUND TYPE SHALL BE HUBBELL NO. CR5252IG SERIES, OR EQUAL BY LEVITON, P&S, OR COOPER.
4. HOSPITAL GRADE (HG) TYPE SHALL BE HUBBELL NO. HBL8200 SERIES, OR EQUAL BY LEVITON, P&S, OR COOPER.

B. SINGLE RECEPTACLES SHALL BE TWO–POLE, THREE WIRE, SELF–GROUNDING, SIDE WIRED, 125 VOLTS AND 20A RATING AND SHALL BE EQUAL TO THE FOLLOWING:

1. SINGLE RECEPTACLES SHALL BE HUBBELL NO. HBL5361 SERIES, OR EQUAL BY LEVITON, P&S, OR COOPER.
2. ISOLATED GROUND TYPE TO BE HUBBELL NO. IG–5361 SERIES, OR EQUAL BY LEVITON, P&S, OR COOPER.

C. GROUND FAULT CIRCUIT INTERRUPT (GFI) RECEPTACLES SHALL BE WEATHER RESISTANT TYPE (WR) HUBBELL GFWRST20, OR EQUAL BY P&S, LEVITON, OR COOPER. PROVIDE WITH "WHILE–IN–USE" WEATHERPROOF EXTRA DUTY COVER.

D. COLOR SHALL BE AS SELECTED BY THE ARCHITECT.

2.4 COVERPLATES

A. COVERPLATES FOR FLUSH MOUNTED DEVICES SHALL BE STANDARD SIZE (COLOR OR FINISH TO BE SELECTED BY ARCHITECT), HUBBELL "P" SERIES OR EQUAL BY LEVITON, P&S, OR COOPER.

B. TELEPHONE OUTLET COVERPLATES SHALL HAVE SAME FINISH AS ABOVE AND HAVE A BRUSHED HOLE IN THE CENTER.

C. COVERPLATES FOR EXTERIOR DEVICES SHALL BE DIE CAST ALUMINUM WEATHERPROOF "WHILE–IN–USE", HUBBELL WP26M OR EQUAL BY LEVITON, P&S, OR COOPER.

3.1 WALL SWITCHES AND RECEPTACLES

A. WHERE MORE THAN ONE DEVICE IS INDICATED AT A LOCATION, THE DEVICES SHALL BE GANG–MOUNTED IN COMBINED MULTI–GANG BOXES AND COVERED JOINTLY BY A COMMON COVERPLATE. PROVIDE BARRIERS AS REQUIRED BY THE DEVICES AND VOLTAGES BEING USED.

3.2 COVERPLATES

A. ALL JUNCTION BOXES, OUTLET BOXES, MULTI–GANG SWITCH BOXES, UTILITY BOXES, ETC., SHALL BE COVERED WITH A COVERPLATE. THE COVERPLATE SHALL BE A FINISHED PLATE AS SPECIFIED UNLESS DESIGNATED OTHERWISE.

B. COVERPLATES SHALL BE MOUNTED VERTICALLY UNLESS DESIGNATED OTHERWISE.

END OF SECTION 262726

SECTION 262813 – FUSES

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. THIS SECTION DESCRIBES THE BASIC ELECTRICAL MATERIALS AND INSTALLATION METHODS THAT ARE ACCEPTABLE AND APPLICABLE TO DIVISION 26.

2.1 MANUFACTURERS

A. ACCEPTABLE MANUFACTURERS ARE COOPER BUSSMANN, LITTELFUSE, OR FERRAZ SHAWMUT.

2.2 FUSES

A. PROVIDE ALL FUSES FOR THE PROJECT. ALL FUSES SHALL BE OF THE SAME MANUFACTURER. ALL FUSES SHALL BE OF THE HIGH INTERRUPTING RATING (200,000 AMPS), CURRENT LIMITING TYPE AND MANUFACTURED BY COOPER BUSSMANN. FUSES SHALL BE PROVIDED FOR EACH FUSE CUTOUT AND THE SPECIFIED QUANTITY OF FUSES SHALL BE FURNISHED FOR SPARES.

B. CIRCUITS 0 TO 600 AMPERE SHALL BE PROTECTED BY REJECTION TYPE, CURRENT LIMITING BUSSMANN LOWPEAK DUAL ELEMENT FUSES LPN–RK (250 VOLTS) OR LPS–RK (600 VOLTS). ALL DUAL–ELEMENT FUSES SHALL HAVE SEPARATE OVERLOAD AND SHORT–CIRCUIT CLEARING CHAMBER. THE FUSE MUST HOLD 500% OF RATED CURRENT FOR A MINIMUM OF 10 SECONDS AND BE LISTED BY UNDERWRITER'S LABORATORIES, INC., WITH AN INTERRUPTING RATING OF 200,000 AMPERES RMS SYMMETRICAL. THE FUSES SHALL BE UL CLASS RK–1.

C. CIRCUITS 601 TO 6000 AMPERE SHALL BE PROTECTED BY CURRENT LIMITING BUSSMANN HI–CAP TIME–DELAY FUSES KRP–C. FUSES SHALL EMPLOY "O" RINGS AS POSITIVE SEALS BETWEEN THE END BELLS AND THE GLASS MELAMINE FUSE BARREL. THE TERMINALS SHALL BE OPENED. FUSES SHALL BE TIME–DELAY AND MUST HOLD 500% OF RATED CURRENT FOR A MINIMUM OF 4 SECONDS, CLEAR 20 TIMES RATED CURRENT IN 0.1 SECONDS OR LESS AND BE LISTED BY UNDERWRITER'S LABORATORIES, INC., WITH AN INTERRUPTING RATING OF 200,000 AMPERES RMS SYMMETRICAL. THE FUSES SHALL BE UL CLASS L.

3.1 INSTALLATION

A. FURNISH AND TURN OVER TO THE OWNER A MINIMUM OF ONE (1) SET OF SPARE FUSES (SET CONSISTING OF THREE FUSES) FOR EACH TYPE AND RATING OF FUSE USED. WHEN THE NUMBER OF FUSE SETS OF THE SAME TYPE AND RATING ACTUALLY INSTALLED EXCEEDS FIVE (5) SETS, FURNISH AN ADDITIONAL SPARE SET OF FUSES FOR EACH FIVE (5) OR FRACTION THEREOF.

B. PROVIDE A CABINET IN WHICH TO STORE ALL SPARE FUSES, COOPER BUSSMANN CATALOG NO. SFC–FUSE–CAB.

END OF SECTION 262813

SECTION 262818 – ENCLOSED SWITCHES

1.1 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. THIS SECTION DESCRIBES THE BASIC ELECTRICAL MATERIALS AND INSTALLATION METHODS THAT ARE ACCEPTABLE AND APPLICABLE TO DIVISION 26.

1.2 RELATED SECTIONS

A. SECTION 262813 – FUSES

2.1 MANUFACTURERS

A. ENCLOSED SWITCHES SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, SQUARE D, SIEMENS, OR CUTLER–HAMMER.

B. ALL DISTRIBUTION SWITCHGEAR (BRANCH CIRCUIT PANELBOARDS, SWITCHBOARD, DISTRIBUTION PANELBOARDS, TRANSFORMERS, BUSWAY, SWITCHES, ETC.) SHALL BE THE UNIT RESPONSIBILITY OF ONE MANUFACTURER. ALL COMPONENT PARTS OF THE ABOVE LISTED ITEMS SHALL BE OF THE SAME MANUFACTURER EXCEPT WHERE A WRITTEN REQUEST FOR DEVIATION FROM THIS REQUIREMENT HAS BEEN APPROVED PRIOR TO BID DATE.

2.2 DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE "HEAVY–DUTY" TYPE, ENCLOSED SWITCHES OF QUICK–MAKE, QUICK–BREAK CONSTRUCTION. SWITCHES SHALL BE HORSEPOWER RATED FOR 600 VOLTS AC AS REQUIRED. LUGS SHALL BE UL LISTED FOR COPPER AND ALUMINUM.

B. SWITCHES SHALL BE FURNISHED IN NEMA I GENERAL PURPOSE ENCLOSURE UNLESS NOTED OTHERWISE. SWITCHES LOCATED ON THE EXTERIOR OF THE BUILDING OR IN "WET" LOCATIONS SHALL HAVE NEMA 3R ENCLOSURES.

C. FUSED DISCONNECT SWITCHES SHALL HAVE REJECTION TYPE FUSE CLIPS WITH DUAL ELEMENT, CURRENT LIMITING FUSES OF RATING SHOWN.

3.1 INSTALLATION

A. DISCONNECT SWITCHES SHALL BE MOUNTED TO STRUCTURE. DISCONNECT SWITCHES SHALL NOT BE MOUNTED TO MECHANICAL EQUIPMENT OR DUCTWORK.

B. PADLOCKING PROVISIONS SHALL BE PROVIDED FOR PADLOCKING IN THE OFF POSITION.

END OF SECTION 262818

SECTION 265100 – INTERIOR LIGHTING

1.1 DESCRIPTION

A. ALL WORK IN THIS SECTION SHALL COMPLY WITH THE PROVISIONS OF SECTION 260500.

B. PROVIDE ALL LIGHTING FIXTURES AND LAMPS AS SPECIFIED HEREIN AND AS SHOWN ON THE DRAWINGS.

C. CONFIRM EXACT LOCATIONS OF ALL LIGHTING FIXTURES BY COORDINATION WITH THE ARCHITECT'S REFLECTED CEILING PLANS AND MECHANICAL EQUIPMENT ABOVE OR ON THE CEILING.

D. CONFIRM ALL CEILING TYPES BEFORE ORDERING LIGHTING FIXTURES.

E. EACH LIGHTING FIXTURE SHALL HAVE BEEN TESTED AND CERTIFIED FOR PROPER OPERATION BY THE FIXTURE MANUFACTURER FOR THE TYPE MOUNTING AND CEILING ON/IN, WHICH IT IS INSTALLED.

2.1 LIGHTING FIXTURES

A. EACH LIGHTING FIXTURE SHALL BE AS SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE CORRESPONDING WITH ITS FIXTURE TYPE INDICATION (LETTER).

B. MOST LIGHTING OUTLETS ARE LETTERED OR GROUPS OF OUTLETS ARE INDICATED BY A LETTER.

C. EACH LIGHTING FIXTURE SHALL HAVE A MANUFACTURER'S LABEL AFFIXED AND SHALL COMPLY WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION.

D. THE LIGHTING FIXTURES THAT ARE INDICATED BY THE LETTERS SHALL BE AS INDICATED ON THE LIGHTING FIXTURE SCHEDULE.

2.2 LAMPS

A. THE TYPE LAMPS SHALL BE AS SPECIFIED FOR EACH LIGHTING FIXTURE IN THE LIGHTING FIXTURE SCHEDULE.

B. THE LAMP CATALOG NUMBER IS THE CATALOG NUMBER IS GENERALLY FOR SYLVANIA LIGHTING AND IS GIVEN AS A STANDARD OF THE QUALITY AND PERFORMANCE REQUIRED. EQUAL LAMPS BY GENERAL ELECTRIC OR PHILIPS WILL BE ACCEPTABLE. WHEN A LAMP MANUFACTURER'S NAME IS USED ALONG WITH THE CATALOG NUMBER IN THE LIGHTING FIXTURE SCHEDULE, IT IS CONSIDERED UNEQUALED BY ANY OTHER LAMP AND SHALL NOT BE SUBSTITUTED FOR. THE LAMP PERFORMANCE WITH ENERGY CONSERVING BALLASTS FURNISHED UNDER THIS SECTION SHALL BE CERTIFIED BY A NATIONALLY RECOGNIZED INDEPENDENT TESTING LABORATORY.

2.3 BALLASTS

A. FLUORESCENT BALLAST SHALL BE ELECTRONIC TYPE MANUFACTURED BY MOTOROLA, MAGNETEK OR ADVANCE.

B. BALLAST SHALL OPERATE LAMPS AT A FREQUENCY OR 25 KHZ OR HIGHER WITH LESS THAN 2% LAMP FLICKER.

C. BALLAST SHALL OPERATE AT AN INPUT VOLTAGE OF 108 – 132 VAC (120V LINE) OR 249 – 305 VAC (277V LINE) AT AN INPUT FREQUENCY OF 60 HZ. LIGHT OUTPUT SHALL REMAIN C

COMPONENTS.

F. COMPATIBILITY OF DIMMING SWITCHES FOR CONTROL OF DIMMABLE LED DRIVERS SHALL BE CONFIRMED WITH LED FIXTURE MANUFACTURER.

2.7 RECESSED INCANDESCENT FIXTURES

A. ALL RECESSED INCANDESCENT FIXTURES SHALL COMPLY WITH ARTICLE 410.115(B) OF THE N.E.C.

2.8 FLUORESCENT FIXTURES

A. ALL INDOOR FLUORESCENT FIXTURES UTILIZING DOUBLE ENDED LAMPS OR THAT ARE SUPPLIED FROM MULTI-WIRE BRANCH CIRCUITS, SHALL HAVE A DISCONNECTING MEANS THAT COMPLIES WITH ARTICLE 410.130(G) OF THE N.E.C.

3.1 SUPPORT OF LIGHTING FIXTURES

A. ALL LIGHTING SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE. THE FIXTURES SHALL BE SUPPORTED IN A MANNER THAT WILL INSURE THE FIXTURE WEIGHT BEING EQUALLY DISTRIBUTED FROM EACH SUPPORT AND THE FIXTURE REMAINING IN A LEVEL POSITION.

B. FLUORESCENT FIXTURES INSTALLED RECESSED IN A SUSPENDED CEILING SYSTEM SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE WITH TWO (2) 12 GAUGE WIRES ON DIAGONAL CORNERS OF THE FIXTURE. IN ADDITION, THE FIXTURE SHALL BE CLIPPED TO MEMBERS OF THE CEILING SUSPENSION SYSTEM.

C. FLUORESCENT FIXTURES INSTALLED IN OR ON ANY CEILING OTHER THAN A SUSPENDED CEILING SYSTEM SPECIFICALLY MENTIONED ABOVE SHALL BE SUPPORTED WITH CONCEALED STEEL RODS. RODS SHALL BE 1/4" DIAMETER MINIMUM AND SHALL BE LOCATED WHERE RECOMMENDED BY THE FIXTURE MANUFACTURER. PROVIDE A MINIMUM OF TWO (2) SUPPORTS FOR EACH 4' OR 8' FIXTURE CHASSIS. SUPPORTS SHALL BE MAXIMUM OF 48" CENTERS. FOR INCANDESCENT FIXTURES, STEEL HANGING WIRE MAY BE USED BY ATTACHING THE WIRE TO THE FIXTURE MOUNTING FRAME.

D. PENDANT MOUNTED INCANDESCENT FIXTURES SHALL BE STEM SUPPORTED BY A FIXTURE STUD MOUNTED IN THE OUTLET BOX. SUSPENDED FLUORESCENT FIXTURES SHALL HAVE MOUNTING STEMS LOCATED AS PER THE MANUFACTURER'S RECOMMENDATIONS, BUT IN NO CASE SHALL HAVE LESS THAN TWO (2) STEMS PER CHASSIS.

3.2 AIMING OF ADJUSTABLE LIGHT FIXTURES

A. ALL FIXTURES WITH LAMP POSITION, TILT, SHUTTERS, ROTATION, OR OTHER TYPES OF ADJUSTMENTS DURING THE FINAL INSPECTION. FIXTURES SERVING AREAS WHERE DAY LIGHTING IS PREDOMINANT WILL BE ADJUSTED AFTER SUNSET.

3.3 LIGHTING FIXTURES IN MILLWORK

A. SPECIAL ATTENTION SHALL BE GIVEN TO LIGHTING FIXTURES INDICATED TO BE MOUNTED WITHIN, UNDER, ON OR OTHERWISE INCORPORATED INTO MILLWORK OR CABINETRY.

B. REFER TO THE ARCHITECTURAL DRAWINGS AND DETAILS FOR SPECIFIC DIMENSIONS. THIS COORDINATION SHALL OCCUR PRIOR TO ORDERING FIXTURES TO ASSURE FIXTURES WILL FIT THE SPACE LIMITATIONS OF THE MILLWORK.

C. THIS REQUIREMENT IS INTENDED TO PRECLUDE INCURRING ADDITIONS TO THE CONTRACT DUE TO FIXTURES BEING TOO SMALL OR TOO LARGE FOR THE SPACE.

3.4 FINAL PREPARATION

A. ALL PLASTIC COVERS SHALL BE REMOVED FROM FLUORESCENT FIXTURES.

B. CLEAN ALL LENS AND REFLECTORS FROM DEBRIS, FINGERPRINTS, DUST, ETC.

C. ALL LAMPS SHALL BE OPERATING AT THE TIME OF THE FINAL INSPECTION AND FOR A PERIOD OF SIX (6) MONTHS AFTER THE FINAL ACCEPTANCE OF THE PROJECT BY THE OWNER.

END OF SECTION 265100

SECTION 283100 – FIRE DETECTION AND ALARM

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section of the specification includes the, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, and coordinated system.

B. The fire alarm system shall comply with requirements of the NFPA Standard 72' for Protected Premises Signaling Systems and all local codes and regulations. The system shall be electrically supervised and monitor the integrity of all conductors.

C. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto the Signaling Line Circuits.

D. The system shall be an active/interrogative type system where each transponder is repetitively scanned, causing a signal to be transmitted to the local fire alarm control panel/node indicating that the transponder and its associated initiating device and notification appliance circuit wiring is functional. Loss of this signal at the local FACP shall result in a trouble indication on both the FACP display and at the network display, as specified hereinafter for the particular input.

E. The system shall be arranged such that not less than 20 percent additional transponders may be inserted into any network communication loop.

F. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site. To guide the final checkout and to ensure the systems integrity, the submitting company shall employ NICET Level IV minimum managers and engineers. Proof of NICET level training shall be included as part of submittal package and kept on site with personnel.

G. The Contractor shall make arrangements and pay all fees in connection with the testing of the Life Safety System. All system devices shall be tested for their correct operation, except non-restorable type heat detectors which shall be sample tested. All tests carried out shall meet the requirements of the local authority having jurisdiction.

1.2 SCOPE

A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance to the project specifications and drawings.

B. Basic Performance
1. Each SLC loop shall be wired NFPA 72 Class B, Style 4.
2. Initiation Device Circuits (IDC) shall be wired (NFPA Class B, Style B) as part of an addressable device connected by the SLC circuit.
3. Notification Appliance Circuits (NAC) shall be wired (NFPA Class B, Style Y) as part of an addressable device connected by the SLC circuit or a panel circuit.
4. NAC speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone, whichever is greater.
5. NAC speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.

C. Basic System Functional Operation
1. As part of the fire alarm and voice communication system; when a fire alarm condition is detected and reported by one of the system initiating devices (except the smoke detectors located in air supply path of the stairwell and/or elevator shaft pressurization fans), the following functions shall immediately occur:
a. FACP will sound and display the alarm condition showing the device address, location, zone information, time/date, and device type.
b. The remote annunciator will sound and display the same information as shown on the FACP display unit.
c. The speaker outputs for the floor of the alarm, floor above, floor below, elevator cabs and stairwells shall be activated for alarm evacuation message until silenced. All speakers shall sound the fire alerting tone followed by an evacuation message. When the message ends, the alerting tone shall resume. Other sequences for alarm evacuation messaging may be directed by drawings.
d. All strobes on floors with activated speaker outputs shall flash in a synchronized pattern per floor.
e. Release all magnetically held smoke doors.
f. Provide signals to the mechanical controls including smoke dampers to shut down or reroute air-handling systems to prevent the recirculation of smoke and to start the stair and elevator shaft pressurization fans.
g. Activate signals to the stairwell electric door locks as applicable.
h. Provide a DACT (Digital Alarm Communicator Transmitter) and a signal via DACT for connection to a central station or local municipal fire department (connection and leased line, if required, shall be provided by building owner).
i. Initiate a preprogrammed timing sequence.
j. Additionally, actuation of a lobby elevator smoke detector shall cause immediate non-stop return of all automatic elevators served by that lobby to the primary discharge level; except that, when the alarm has been initiated on the primary discharge level, the elevators shall be returned to the designated alternate discharge level per the requirements of ANSI ASME A17.1.
k. Additionally, actuation of any elevator equipment room or shaft smoke detector shall cause immediate non-stop return of all automatic elevators served by that equipment room or shaft, to the primary discharge level per the requirements of ANSI ASME A17.1. Provide all required signals from FACP to elevator controls for smoke detector in elevator machine room per the requirements of ANSI ASME A17.1
l. Additionally, actuation of any smoke detector located in the air handling units and/or equipment rooms shall activate signals to the mechanical controls indicating the floor of occurrence.
m. The fire alerting tone shall be a low to high "slow whoop" from 200 Hz to 830 Hz lasting 2.5 seconds. Operation of the hand held microphone button shall override the alarm tone.
n. It shall be possible to silence the alarm signals by operating the signal silence switch. However, the activation of another zone shall repeat the entire alarm process, thus causing the signals to resound.
o. Each speaker circuit will have a manual selector switch. Operation of this switch will activate the speakers and fire lights associated with that circuit.
p. Silencing the alarm shall cause all speakers to silence. Firelights will continue to flash.
q. Fire pump normal power availability, fire pump phase reversal and fire pump run status shall be monitored. Loss of normal power, phase reversal shall annunciate as supervisory alarms and pump running shall annunciate as an alarm.
r. Provide a signal to activate the elevator shunt trip breaker upon activation of the heat detector in the elevator shaft.

2. General Operation
a. Power failures, opens, grounds or any disarrangement of the system wiring or components shall be indicated by a visual and audible trouble signal. The audible trouble signal may be silenced, however, the trouble LED shall remain lit until the system has been returned to normal operating condition.
b. All manual controls shall be supervised so that all switches must be returned to the normal automatic position to clear system supervisory signal.
c. Each independently supervised circuit shall include discrete amber "Trouble" LED to indicate disarrangement conditions per circuit.
d. Supervise the incoming power to the system so that any power failure shall be audibly and visually indicated at both the control panel and the graphic annunciator.
e. Provide low/high air supervisory signal for dry automatic sprinkler system.
f. Provide running, power fault, and phase reversal trouble signals for fire pump.
g. Provide running and power fault trouble signals for the generator.
h. Provide signal circuit and auxiliary function disconnect capability by disconnect switch or keypad to facilitate testing without disruption.

4. Mechanical Controls
a. Provide a separate panel with hand-off-auto switches for manual override of air handling units. The switches shall allow the person at the central control station to override the automatic operation of all air handling systems in the building individually. When the three position switch is in the "AUTO" position, the HVAC unit, fan or exhaust system shall run subject to the mechanical controls and life safety functions. When the three position switch is in the "ON" position, the HVAC unit, fan or exhaust system shall run, overriding the mechanical controls and life safety shutdowns. When the three position switch is in the "OFF" position, the HVAC unit, fans or exhaust system shall be turned off, overriding the mechanical controls and life safety controls. A green LED shall be illuminated whenever an HVAC unit, fan or exhaust system is running. An amber LED shall be illuminated whenever an HVAC unit, fan or exhaust system is off. The LED's shall be labeled as such. Provide the wiring between each switch and its respective piece of mechanical equipment. Quantities of switches shall be confirmed with Division 23 and cabinet size shall be as required by the quantities of switches.

1.3 SUBMITTALS

A. General
1. Copies of all submittals shall be submitted to the Architect/Engineer for review prior to acceptance of system.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.

B. Shop Drawings
1. Drawings shall include the following minimum requirements for submittal:
a. Point-to-point wiring/conduit layout for all devices on 1/8" scale.
b. Device placement showing all addresses and device ID.
c. All panel and equipment terminations.
d. All circuit voltage drop and current calculations spread sheets.
2. All battery calculation spreadsheets.
3. Legend reflecting device description, manufacturer, model number, and back-box requirement.
4. Wiring legend reflecting wire function, type, and recommended manufacturer's part number.
5. Full sequence of operations.
6. Power supply and amplifier calculations.
7. Specification data sheets on each individual system component.
8. BDA SYSTEM DRAWINGS (IF REQUIRED)

C. Data Sheets
1. Submit simultaneously with the shop drawings, complete manufacturer's technical data sheets showing product description, listings, and specs.
2. Copies of NICET II and IV certifications.
3. Copy of company UL listing certificate.

1.4 APPLICABLE STANDARDS AND SPECIFICATIONS:

A. The specifications and standards listed below form a part of this specification. The system shall comply with the latest standards.
1. National Fire Protection Association (NFPA), USA:
NFPA 13 Sprinkler Systems
NFPA 17A Wet Chemical Extinguishing Systems
Clean Agent Extinguishing Systems
NFPA 70 National Electrical Code
Specifically Article 760
NFPA 72 National Fire Alarm Code
NFPA 101 Life Safety Code
2. North Carolina State Building Code
3. American National Standard A17.1-1980
4. Underwriter's Laboratories Fire Resistance Directory
5. Local and State Building Codes
6. ADA Public Law 101-336
7. All requirements of the Authority Having Jurisdiction (AHJ)

1.5 APPROVALS

A. The system shall have proper listing, approval and labeling from the following nationally recognized agencies:
1. FM Factory Mutual Systems
2. UL Underwriters Laboratories

1.6 SYSTEM FEATURES

A. The system shall include the following features as a minimum:
1. During an alarm condition, the LCD annunciator shall display the activated alarm until acknowledged. This shall allow determination of where the last alarm has taken place.
2. Ground fault detection in wiring on either plus or minus side.
3. Separate alarm and trouble shall be displayed on the LCD annunciator.
4. Resound feature
5. "Dead Front" design control panel with all LED alarm trouble and power on indicators and all switches located behind a locked tempered glass door.
6. Solid state construction.
7. All alarm initiating circuit wiring, signal circuit wiring, speaker circuit wiring and emergency phone circuit wiring shall be supervised.
8. Automatic transfer to standby batteries upon power failure.
9. Lightning and surge protection.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. The FACP and peripheral devices shall be manufactured by:
1. Simplex
2. Notifier
3. Edwards
4. Siemens

2.2 CONDUIT AND WIRE

A. ALL FIRE ALARM WIRING SHALL BE INSTALLED IN CONDUIT.
1. WIRING SHALL BE IN ACCORDANCE WITH LOCAL, STATE AND NATIONAL CODES (E.G., NEC ARTICLE 760) AND AS RECOMMENDED BY THE MANUFACTURER OF THE FIRE ALARM SYSTEM.
2. ALL WIRE AND CABLE SHALL BE LISTED AND/OR APPROVED BY A RECOGNIZED TESTING AGENCY FOR USE WITH A PROTECTIVE SIGNALING SYSTEM.
3. THE FIRE AL4RM CONTROL PANEL SHALL BE CONNECTED TO A SEPARATE DEDICATED BRANCH CIRCUIT, MAXIMUM 20 AMPERES FROM THE GENERATOR PO¥/ER SOURCE.
4. CONDUIT AND Y/IRE INSTALLATIONS SHALL MEET THE SURVIVABILITY REQUIREMENTS OF NFPA 72.
B. CONDUIT SHALL BE INSTALLED AS REQUIRED BY SPECIFICATION SECTION 26 05 34.
C. ALL BOXES UTILIZED FOR FIRE ALARM CABLING SHALL BE PAINTED RED.

2.3 MAIN FIRE ALARM CONTROL PANEL

A. The FACP shall be completely microprocessor based.

B. System Capacity and General Operation:
1. Configure size of panel to operate number of SLC circuits in a fashion so that each circuit handles no greater than 70% load of capacity or a maximum of 5 floors per circuit.
2. The fire alarm control panel shall include a full-featured operator interface and backlit 80-character Liquid Crystal Display (LCD).
3. The system shall be fully field programmable from the display panel. Panels requiring the use of external keyboards for programming and changes are not acceptable.
4. The FACP shall provide the minimum following features:
a. Drift compensation to extend detector accuracy over life.
b. Detector sensitivity test, per NFPA 72, Chapter 7.
c. Maintenance alert, to warn of excessive smoke detector dirt or dust accumulation.
d. Multiple sensitivity levels for alarm, selected by detector.
e. System status reports to display and printer. Provide printer.
f. Alarm verification, with verification counters.
g. Cross zoning with the capability of counting two detectors in alarm.
h. Walk test.
i. UL-1076 security monitor points.
j. Control-by-time with holiday schedules.
k. Day/night automatic adjustment of detector sensitivity.
l. Device blink control for sleeping areas.
m. Releasing capability.
n. Pre-Alarm.
o. Selectable sensitivity levels, three minimum.
p. History Storage, with a minimum of 400 events.
q. Point Enable/Disable.
r. Point Read (status and level of obscuration).
s. Output point for connection to any building EMS.
t. Generator monitoring functions to include generator running, generator fault and generator switch not on automatic.
t. Disconnect switches to disable notification, audible appliances, visual strobes, and auxiliary function points for testing purposes.
u. Alarm sensitivity testing at the FACP.
v. Provide all zones or alphanumeric point of address designations in property operation's terminology.

C. Signaling Line Circuits (SLC)
1. Each SLC interface shall provide power to communicate with 99 intelligent detectors (ionization, photoelectric or thermal) and 99 intelligent modules (monitor or control).
2. Each SLC circuit shall not exceed 70%, load capacity or cover more than 5 floors.

D. Serial Interface
1. The system shall include two serial EIA-232 interfaces. Each interface shall be a means of connecting UL Listed Electronic Data Processing (EDP) peripherals.
2. One serial port shall support a serial printer.
3. One serial port shall support a CRT/NRT device.
4. The system shall include an EIA-485 port for the serial connection of annunciators and remote LCD displays.

E. Field Charging Power Supply (FCPS): The FCPS is a device designed for use as either a remote 24-volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24-volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries. Provide batteries to support 60-hour standby with ten minutes of alarm indication at the end of this period. Battery charger shall be capable of recharging all batteries to seventy percent capacity in twelve hours.
2. The Field Charging Power Supply shall have four outputs (two Style Y/Z and two Style Y) shall be available for connection to the Notification devices.
3. Provide 20-watt spare capacity in each electrical room on each floor for tenant audible circuits. Locate in a junction box clearly labeled "tenant fire alarm audible circuits."
4. Provide two (2) each Field Charging Power Supply (DC) per floor to allow for tenant build-out expansion of NAC devices. At no time shall there exceed 70% load capacity of any FCPS on any of the common levels. Provide power capacity as follows:

Floor Size	Capacity
<25,000 gross sq. ft.	6 amps DC
25,001 to 35,000 gross sq. ft.	10 amps DC
35,001 gross sq. ft. and greater	consult manufacturer

5. Locate audible (where required) and visual power supplies adjacent to one another and in a location within each room approved by the engineer.
6. Provide battery capacity and amplifier capacity in the main fire control panel for addition of tenant devices described above.

F. Audio Amplifiers
1. The audio amplifiers will provide audio power (@ 25 Volts RMS) for distribution to the speaker circuits.
2. The amplifier shall include audio input and amplified output supervision; back up input, and automatic switchover to back up (if primary amplifier should fail).
3. Amplifiers shall be available in 30, 100, and 120-watt versions.
4. Provide amplifiers sized to accommodate each speaker being set at a one-watt tap with twenty watts reserve per floor.
5. Hardwired indicating appliance circuits (fire lights and speakers) shall be Style Y per NFPA 72. Provide one light circuit per floor and provide one speaker circuit per floor, one speaker circuit per stairwell and, one speaker circuit per elevator cab.
6. Hardwired telephone circuits shall be Style Y per NFPA 72. Provide one fire fighters telephone circuit per elevator, one per elevator lobby, one per stairwell and one for the fire pump room.
7. Provide at least two on board relays to operate door holders etc.
g. Provide necessary modules to operate remote supervised relays for fan control, elevator control, etc.

G. FIRE AL4RM SYSTEM NETWORK
1. THE FIRE ALARM SYSTEM NETWORK SHALL CONSIST OF ALL NECESSARY HARD¥/ARE AND SOFT\/CARE EQUIPMENT TO PERFORM THE FIRE ALARM AND DETECTION OPERATIONS.
2. NODES (FACPS) AS DEFINED FOR THI5 SPECIFICATION SHALL BE INTELLIGENT, MICROPROCESSOR BASED DEVICES THAT CONNECT TO, AND HANDLE NETWORK COMMUNICATIONS IN A BROADCAST MESSAGE FORMAT USING A MASTER SLAVE CONFIGURATION. CONTROL BY EVENT PROGRAMS FOR EACH NODES IN THE SYSTEM BEING ABLE TO RESPOND TO BROADCAST MESSAGES SHALL BE DISTRIBUTED AMONG THE NODES.
3. BY PROGRAMMABLE SELECTIONS AT EACH NODE:
a. THE SPECIFIC DETAIL INFORMATION OF ANY POINT CONNECTED TO ANY NODE IN THE NETWORK MAY BE ACCESSIBLE TO THE NETWORK.
b. ANY POINT INFORMATION MAY BE INCORPORATED INTO THE CUSTOM CONTROL PROGRAM OF ANY NODE AND OPERATED UPON AS THOUGH THAT POINT WAS PHYSICALLY CONNECTED TO THAT NODE.
c. POINTS WITHIN EACH NODE SHALL BE ABLE TO BE GROUPED BY AREA, TYPE OF DEVICE, TYPE OF FUNCTION, OR ANY OTHER USER SELECTABLE CATEGORY, AND CUSTOM LABELED AS A GROUP. A GROUP SHALL BE ACTED UPON AS THOUGH IT ¥/AS A POINT FOR THE PURPOSE OF INTERACTION WITH THE NODE CUSTOM CONTROL BY EVENT PROGRAM.

H. FIRE ALARM SYSTEM NETWORK GENERAL REQUIREMENTS
1. FURNISH AND INSTALL ALL NET¥/ORK FIRE ALARM SYSTEM EQUIPMENT AS DEFINED BY THESE SPECIFICATIONS, TO BE ¥/IRED, CONNECTED, AND LEFT IN FIRST CLASS OPERATING CONDITION.

2. NIORK OPERATIONS SHALL BE MA COMMUNICATION LINKS THAT CONNECT ALL NET\WORK NODES AND INCLUDE DATA TRANSFER. ALL COMMUNICATIONS WIRING SHALL BE ELECTRICALLY SUPERVISED.

3. THE NET¥/ORK SHALL OPERATE USING A FULL DUPLEX, RS--422 COMMUNICATION TECHNIQUE AT A DATA RATE OF 9600 BAUD. THE NODE TO NODE COMMUNICATION SHALL BE ON 2 PAIR SHIELDED T¥/ISTED CABLE OR FIBER NET\YORK.

4. TO ENSURE COMPATIBILITY WITH GRO\¥TH AND FUTURE EXPANSION OF THE FIRE ALARM SYSTEM THE PROPOSED NET//ORK SHALL HAVE A CAPACITY OF 250 NODES. NETWORKS THAT DO NOT PROVIDE A MINIMUM OF 250 NODES ARE UNACCEPTABLE.

I. FIRE AL4RM NETWORK OPERATION
1. NET\YORK OPERATION FOR ANU MANUAL OR AUTOMATIC FIRE ALARM INITIATING DEVICE ACTIVATION SHALL BE AS FOLLOWS:
a. THE NODE CONNECTED TO THE ALARMED DEVICE SHALL OPERATE IN ACCORDANCE WITH ITS PROGRAMMED RESPONSE.
6. THE CHANGE IN STATUS SHALL BE REPORTED TO THE NETWORK MASTER. IT SHALL BE UPDATED WITH THE ALARM CONDITION TO INCLUDE:
1) PUBLIC POINT NODE IDENTIFICATION AND POINT LOCATION.
2) NON-PUBLIC POINT NODE IDENTIFICATION AND POINT LOCATION.
3) THE RED ALARM LED SHALL FLASH ON THE MONITORING NODE, AND ON ALL CONNECTED NETWORK NODES PROGRAMMED TO RECOGNIZE THAT ALARM, UNTIL THE ALARM HAS BEEN MANUALLY ACKNOWLEDGED. WHEN THE ALARM HAS BEEN ACKNOWLEDGED, THIS SAME LED SHALL LATCH ON. A SUBSEQUENT ALARM RECEIVED AFTER ANY ACKNOWLEDGEMENT SHALL AGAIN FLASH THE SAME LED'S.
4) THE SOURCE OF ALARM SHALL ANNUNCIATE VIA ENGLISH LANGUAGE DESCRIPTION ON THE ALPHANUMERIC DISPLAY AT THE MONITORING NODE AND ALL OTHER NODES PROGRAMMED TO RESPOND TO THAT ALARM.
5) ALL NODES SHALL RESPOND TO THE ALARM INFORMATION IN ACCORDANCE WITH THEIR INDIVIDUALLY PROGRAMMED RESPONSE WHICH MAY INCLUDE OPERATION OF CONTROL FUNCTIONS BOTH CONNECTED TO THAT NODE AND ON OTHER NODES IF PUBLIC.
6) INPUT FROM ANY PANEL NODE MAY AUTOMATICALLY ACTIVATE AN OUTPUT AT ANY OR ALL OTHER PANEL NODES ON THE NETWORK.
7) ALL ALARM CONDITIONS SHALL BE VISUALLY INDICATED AT THE MASTER NODE AND AT ALL REMOTE ANNUNCIATORS AS PROGRAMMED.
8) ALL ALARMS SHALL BE RECORDED WITH THE TIME AND DATE ON THE DESIGNATED NET\YORK PRINTER.
9) THE NIORK OPERATION SHALL BE SUCH THAT THE ALARM OPERATION OF ANY ALARM--INITIATING DEVICE SHALL NOT PREVENT THE SUBSEQUENT ALARM OPERATION OF ANY OTHER INITIATING DEVICE DUE TO WIRING OR POWER LIMITATIONS.
2. TIME KEEPING
a. NETWORK TIME SYNCHRONIZATION Y/ITH SECONDS RESOLUTION ACCURACY SHALL BE PROVIDED BY THE MASTER CONTROL PANEL. DURING PERIODS WITHOUT ANY TIME OR DATE CHANGES, THE NETWORK SHALL MAINTAIN TIME SYNCHRONIZATION BY NET\YORK COMMUNICATION ONCE EVERY 24 HOURS. IN THE EVENT THAT THE NET¥/ORK TIME KEEPING FUNCTION IS UNAVAILABLE, EACH NODE SHALL MAINTAIN ITS OWN LOCAL TIME AND DATE REFERENCE USING AN INTERNAL CLOCK CONTROLLED BY ITS CPU CARD.
3. EMERGENCY OPERATION
a. IN THE EVENT OF FAILURE OF THE NODE CPU OR LOSS OF TOTAL COMMUNICATION THE NETY/ORK MASTER CONTROL THE FOLLOWING SEQUENCE SHALL TAKE PLACE.
b. LOSS OF THE NODE CPU OR LOSS OF COMMUNICATION SHALL BE ANNUNCIATED ON THE NETWORK MASTER DISPLAY.
c. REMOTE ANNUNCIATORS SHALL INDICATE LOSS OF COMMUNICATION.
d. A TROUBLE SHALL BE TRANSMITTED TO THE MONITORING STATION.

2.4 SYSTEM COMPONENTS
A. SPEAKERS
1. ALL SPEAKERS SHALL OPERATE ON 25 VRMS OR WITH FIELD SELECTABLE OUTPUT TAPS FROM 0.25 TO 2.0 WATTS.

2. SPEAKERS IN CORRIDORS AND PUBLIC SPACES SHALL PRODUCE A NOMINAL SOUND OUTPUT OF 84 DBA AT 10 FEET (3M) ¥/HEN SET AT ONE WATT AS MEASURED PER UL STANDARD 1480.

3. FREQUENCY RESPONSE SHALL BE A MINIMUM OF 400 HZ TO 4000 HZ.

4. THE BACK OF EACH SPEAKER SHALL BE SEALED TO PROTECT THE SPEAKER CONE FROM DAf4AGE AND DUST.

5. SPEAKERS SHALL BE BONE WHITE IN COLOR.

6. PROVIDE A UNIT COST TO ADD T\YO SPEAKERS PER 25,000 SQ.FT. THIS UNIT COST SHALL BE APPLIED TO ADDITIONAL SPEAKERS THAT MAY BE REQUIRED AT THE REQUEST OF THE FIRE MARSHAL DURING FIELD INSPECTIONS

B. STROBE LIGHTS
1. ALL STROBE LIGHTS SHALL MEET THE REQUIREMENTS OF THE ADA, UL STANDARD 1971.

2. STROBE INTENSITY AND FLASH RATE SHALL MEET THE REQUIREMENTS OF UL 1971, ADA AND NFPA 72.

3. STROBE UNIT SHALL MOUNT TO A FOUR INCH SOUARE ELECTRICAL OUTLET BOX. THE STROBE LIGHT SHALL HAVE A WHITE LENS WITH RED "FIRE" IMPRINTED ON IT. WHEN THE UNIT IS COMBINATION 5PEAKER/STROBE, THE SPEAKER PORTION SHALL COMPLY ¥/ITH THE REQUIREMENTS STATED IN A. ABOVE.

4. ALL STROBES SHALL HAVE SELECTABLE OUTPUT INTENSITIES FROM 15 TO 110 CD. THE INTENSITY SELECTED SHALL MEET NFPA 72 REQUIREMENTS FOR THE LAYOUT SHOWN ON THE DRAWINGS.

5. STROBE SPACING SHALL BE AS FOLLOWS:
a. STROBES SHALL BE SPACED A MAXIMUM OF 100'-0' APART IN CORRIDORS AND WITHIN 15'-0' OF THEEND OF EVERY CORRIDOR TO COMPLY WITH THE REQUIREMENTS OF NFPA 72.
b. STROBES IN OPEN AREAS SHALL BE PROVIDED TO COMPLY WITH NFPA 72.
c. PROVIDE STROBES IN PUBLIC SPACES SUCH AS RESTROOM, KITCHENS, BREAKROOMS, CAFETERIAS, CONFERENCE ROOMS, TRAINING ROOM, AND ANY OTHER SPACE WHERE SIX OR MORE PEOPLE ARE LIKELY TO GATHER.

6. PROVIDE A UNIT COST TO ADD FIVE STROBES INCLUDING REQUIRED SIGNAL CIRCUITS PER 25,000 SO. FT. THIS UNIT COST SHALL BE APPLIED TO ADDITIONAL STROBES THAT MAY BE REQUIRED AT THE REQUEST OF THE FIRE MARSHAL DURING FIELD INSPECTIONS.

C. MANUAL FIRE ALARM STATIONS
1. MANUAL FIRE AL4RM STATIONS SHALL BE DUAL--ACTION, NON-CODED, NON-BREAK GLASS TYPE, EQUIPPED WITH KEY LOCK SO THAT THEY MAY BE TESTED WITHOUT OPERATING THE HANDLE.
2. STATIONS MUST BE DESIGNED SUCH THAT AFTER AN ACTUAL ACTIVATION, THEY CANNOT BE RESTORED TO NORMAL EXCEPT BY KEY RESET. UNITS SHALL BE MASTER KEYED WITH CONTROL EQUIPMENT.
3. AN OPERATED STATION SHALL AUTOMATICALLY CONDITION ITSELF SO AS TO BE VISUALLY DETECTED, AS OPERATED, AT A MINIMUM

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
ELECTRICAL SPECIFICATIONS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

PERMIT SET

SHEET NO.:
E0.6

DISTANCE OF 100 FEET (30.5 M) FRONT OR SIDE. THIS SHALL BE ACHIEVED WITH THE PULL LEER REMAINING AT A RIGHT ANGLE TO THE STATION BODY UNTIL RESET.

4. THE STATION BODY SHALL BE CONSTRUCTED SO THAT CHIPS AND SCRATCHES WILL NOT EXPOSE METAL.
5. MANUAL FIRE ALARM STATIONS SHALL BE LOCATED AS REQUIRED BY NFPA 101 AND THE INTERNATIONAL BUILDING CODE.

D. DUCT SMOKE DETECTORS

1. DUCT SMOKE DETECTORS SHALL BE ADDRESSABLE TYPE \YITH VISUAL ALARM AND PO¥ER INDICATORS. PROVIDE REMOTE LED/TEST STATIONS WHERE DUCT DETECTORS ARE MOUNTED IN NON--VISIBLE AREAS SUCH AS ABOVE CEILING.
2. EACH DETECTOR SHALL BE INSTALLED UPON THE COMPOSITE SUPPLY/RETURN AIR DUCTS(S), WITH PROPERLY SIZED AIR SAMPLING TUBES WHERE REQUIRED. PROVIDE SMOKE DETECTORS IN EACH RETURN AIR PATH OF ANY MECHANICAL EQUIPMENT THAT MOVES AIR IN EXCESS OF 2000 CFM TO MEET THE REQUIREMENTS OF NFPA 72 AND 90A. PROVIDE SMOKE DETECTORS IN EACH SUPPLY AND RETURN AIR PATH OF ANY MECHANICAL EOUIPMENT THAT MOVES AIR IN EXCESS OF 15,000 CFM TO MEET THE REQUIREMENTS OF NFPA 72 AND 90A. CONFIRM QUANTITIES OF SMOKE DETECTORS REQUIRED FOR MECHANICAL EQUIPMENT WITH DIVISION 23. ROOM DETECTORS MAY BE USED TO ACCOMPLISH SMOKE DETECTION IN THE SUPPLY/RETURN AIR PATHS IF THE APPLICATION PERMITS.
3. EACH DUCT DETECTOR SHALL BE INSTALLED ALONG WITH ADDRESSABLE CONTROL MODULE AS NEEDED FOR FAN SHUTDOWN AND/OR SMOKE CONTROL. DETECTORS ZONED WITH OTHER DEVICES SHALL BE CAPABLE OF OPERATING ITS CONTROL MODULE EVEN IF ALL OTHER DEVICES ON THEIR CIRCUIT HAVE GONE INTO ALARM.
4. DUCT DETECTORS SHALL BE INSTALLED BY THE MECHANICAL CONTRACTOR AND ELECTRICALLY CONNECTED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR.

E. SMOKE DAMPERS

1. SMOKE DAMPERS SHALL BE PROVIDED BY DIVISION 23.
2. PROVIDE A SMOKE DETECTOR AT EACH SMOKE DAMPER LOCATION TO MEET THE REQUIREMENTS OF NFPA 72. CONFIRM QUANTITIES OF SMOKE DETECTORS REQUIRED FOR SMOKE DAMPERS WITH DIVISION23. PROVIDE 120 VOLT POWER AS REQURED FOR OPERATION OF SMOKE DAMPERS.

F. LCD ALPHANUMERIC DISPLAY REMOTE ANNUNCIATOR

1. THE ALPHANUMERIC DISPLAY ANNUNCIATOR SHALL BE A SUPERVISED, BACKLIT LCD DISPLAY CONTAINING A MINIMUM OF EIGHTY, (80) CHARACTERS FOR ALARM ANNUNCIATION IN CLEAR ENCLISH TEXT. ANNUNCIATOR SHALL BE LOCATED AS SHOWN ON THE DRAWINGS OR AT THE LOCATION SELECTED BY THE LOCAL FIRE DEPARTMENT.
2. THE LCD ANNUNCIATOR SHALL DISPLAY ALL ALARM, SUPERVISORY, AND TROUBLE CONDITIONS FROM THE FACP VIA THE SERIAL CARD.

2.5 SYSTEM COMPONENTS -- ADDRESSABLE DEVICES

A. ADDRESSABLE DEVICES -- GENERAL

1. DETECTORS SHALL BE INTELLIGENT (ANALOG) AND ADDRESSABLE, AND SHALL CONNECT ¥/ITH TWO ¥/IRES TO THE FIRE ALARM CONTROL PANEL SIGNALING LINE CIRCUITS.
2. ADDRESSABLE PHOTOELECTRIC SMOKE AND THERMAL DETECTORS SHALL PROVIDE ALARM AND POWER/POLLING LEDS. LED(S) SHALL FLASH UNDER NORMAL CONDITIONS AND LED(S) SHALL BE PLACED INTO STEADY ILLUMINATION BY THE CONTROL PANEL, INDICATING AN ALARM CONDITION.
3. THE FIRE ALARM CONTROL PANEL SHALL PERMIT DETECTOR SENSITIVITY ADJUSTMENT THROUGH FIELD PROGRAMMING OF THE SYSTEM.
4. DETECTORS WILL OPERATE IN AN ANALOG FASHION, WHERE THE DETECTOR SIMPLY MEASURES ITS DESIGNED ENVIRONMENT VARIABLE AND TRANSMITS AN ANALOG VALUE TO THE FACP BASED ON REAL--TIME MEASURED VALUES. THE FACP SOFTWARE, NOT THE DETECTOR, SHALL MAKE THE ALARM/NORMAL DECISION, THEREBY ALLOWING THE SENSITIVITY OF EACH DETECTOR TO BE SET IN THE FACP PROGRAM AND ALLOWING THE SYSTEM OPERATOR TO VIEW THE CURRENT ANALOG VALUE OF EACH DETECTOR.
5. ALL FIELD WIRING IS TO BE TERMINATED ON THE DETECTOR BASE, NOT ON THE SENSOR HEAD. ADDRESSING OF DETECTORS SHALL BE VIA INTEGRAL DECADE SWITCHES BUILT INTO SENSOR. DEVICES REQUIRING SEPARATE ADDRESSING MEANS WILL NOT BE ACCEPTED.
6. ANY ADDITIONAL EQUIPMENT REQUIRED TO PROGRAM DEVICES ARE NOT ACCEPTABLE.

B. INTELLIGENT PHOTOELECTRIC SMOKE DETECTOR

1. THE DETECTORS SHALL USE THE PHOTOELECTRIC (LIGHT--SCATTERING) PRINCIPAL TO MEASURE SMOKE DENSITY AND SHALL, ON COMMAND FROM THE CONTROL PANEL, SEND DATA TO THE PANEL REPRESENTING THE ANALOG LEVEL OF SMOKE DENSITY.
2. PROVIDE PHOTOELECTRIC SMOKE DETECTOR HEADS \YITH BASES AS REQUIRED. DETECTORS SHALL BE OF THE SOLID STATE PHOTOELECTRIC TYPE UTILIZING A STABLE LED LIGHT SOURCE AND A SILICONE PHOTO DIODE AS THE RECEIVING ELEMENT TO FORM A HIGHLY ACCURATE MEANS OF SMOKE DETECTION. INTERNAL DETECTOR CIRCUITS SHALL BE SHIELDED AGAINST ELECTRICAL INTERFERENCE AND RESISTANT TO TRANSIENTS, NOISE AND, RF INTERFERENCE. DETECTOR SHALL BE LOW/ PROFILE, THE COMPLETE UNIT INCLUDING BASE SHALL NOT EXCEED 1.875 INCHES IN DEPTH. DETECTOR SHALL HAVE A DUAL PURPOSE RED LED THAT FLASHES CONTINUOUSLY TO SHOW THAT THE DEVICE IS OPERATING AND, THAT COMES ON STEADY TO SHOW THAT THE DE\/ICE IS IN ALARM.
3. NOMINAL DETECTOR SENSITIVITY SHALL BE 1.4? PER FOOT OBSCURATION ¥/ITH A RANGE OF 1? TO 1.84 . REGARDLESS OF SENSITIVITY SETTINGS, THE DETECTOR'S STABILITY SHALL BE UNAFFECTED BY HIGH AIR VELOCITY. NO RADIOACTIVE MATERIALS SHALL BE USED.
4. PROVIDE SMOKE DETECTORS IN ELEVATOR LOBBIES, AT STAIRWELL DOORS, IN TELEPHONE ROOMS, ELECTRICAL ROOMS, MECHANICAL ROOMS, ELEVATOR PITS, TOP OF THE ELEVATOR SHAFT, ADJACENT TO THE FIRE ALARM CONTROL PANEL, FIRE PUMP ROOM, COMPUTER ROOMS AS DEFINED BY NFPA 90, PUMP ROOMS AND ELEVATOR MACHINE ROOMS.

C. LINEAR BEAM SMOKE DETECTOR

1. EACH BEAM SHALL BE COMPRISED OF A SOLID STATE INFRARED (IR) TRANSMITTER, PHOTODIODE RECEIVER AND MICROPROCESSOR BASED CONTROL MODULE. SHOULD IR OUTPUT BE ATTENUATED BELOW THE DESIRED ALARM OBSCURATION LEVEL AS A RESULT OF SMOKE INTERFERENCE AN ALARM WILL BE ANNUNCIATED. TOTAL OBSCURATION OF THE BEAM IS ANNUNCIATED AS A BEAM BLOCKAGE TROUBLE SIGNAL. ALL WIRING FROM THE CONTROL MODULE TO THE TRANSMITTER AND RECEIVER HEADS IS SUPERVISED.
2. THE PROJECTED BEAM SMOKE DETECTOR SYSTEM SHALL HAVE AN OPERATING RANGE OF 10 METER (33 FT.) TO 100 METER (330 FT.) AND BE LISTED FOR SPACING THE BEAM 30 FT. FROM A \YALL AND 60 FT. ON CENTER. THE TRANSMIWER AND RECEIVER OPTICAL ELEMENTS SHALL BE ADJUSTABLE +/-- 90 DEGREES HORIZONTALLY AND +/-- TO DEGREES VERTICALLY. THE SENSITIVITY SHALL BE FIELD SELECTABLE FROM 7? TO SOA OBSCURATION.

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4. PROVIDE SMOKE DETECTORS IN ELEVATOR LOBBIES, AT STAIRWELL DOORS, IN TELEPHONE ROOMS, ELECTRICAL ROOMS, MECHANICAL ROOMS, ELEVATOR PITS, TOP OF THE ELEVATOR SHAFT, ADJACENT TO THE FIRE ALARM CONTROL PANEL, FIRE PUMP ROOM, COMPUTER ROOMS AS DEFINED BY NFPA 90, PUMP ROOMS AND ELEVATOR MACHINE ROOMS.

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2. THE PROJECTED BEAM SMOKE DETECTOR SYSTEM SHALL HAVE AN OPERATING RANGE OF 10 METER (33 FT.) TO 100 METER (330 FT.) AND BE LISTED FOR SPACING THE BEAM 30 FT. FROM A \YALL AND 60 FT. ON CENTER. THE TRANSMIWER AND RECEIVER OPTICAL ELEMENTS SHALL BE ADJUSTABLE +/-- 90 DEGREES HORIZONTALLY AND +/-- TO DEGREES VERTICALLY. THE SENSITIVITY SHALL BE FIELD SELECTABLE FROM 7? TO SOA OBSCURATION.

D. INTELLIGENT THERMAL DETECTORS

1. THERMAL DETECTORS SHALL BE INTELLIGENT ADDRESSABLE DEVICES RATED AT 135 DEGREES FAHRENHEIT (58 DEGREES CELSIUS) AND HAVE A RATE-OF-RISE ELEMENT RATED AT 15 DEGREES F (9.A DEGREES C) PER MINUTE. IT SHALL CONNECT VIA NO '//IRES TO THE FIRE ALARM CONTROL PANEL SIGNALING LINE CIRCUIT.

E. ADDRESSABLE DRY CONTACT MONITOR MODULE

1. ADDRESSABLE MONITOR MODULES SHALL BE PROVIDED TO CONNECT ONE SUPERVISED IDC ZONE OF CONVENTIONAL ALARM INITIATING DWICES (ANY N.O. DRY CONTACT DEVICE SUCH AS FLOW, TAMPER, RELEASE SYSTEMS, ETC.) TO ONE OF THE FIRE ALARM CONTROL PANEL SLCS.
2. THE IDC ZONE SHALL BE SUITABLE FOR STYLE D OR STYLE B OPERATION. AN LED SHALL BE PROVIDED THAT SHALL FLASH UNDER NORMAL CONDITIONS, INDICATING THAT THE MONITOR MODULE IS OPERATIONAL AND IN REGULAR COMMUNICATION WITH THE CONTROL PANEL.
3. FOR DIFFICULT TO REACH AREAS, THE MONITOR MODULE SHALL BE AVAILABLE IN A MINIATURE PACKAGE AND SHALL BE NO LARGER THAN 2-3/4 INCH (70 MM) X 1-1/4 INCH (31.7 MM) X 1/2 INCH (12.7 MM). THIS VERSION NEED NOT INCLUDE STYLE D OR AN LED.
4. MONITOR MODULE SHALL BE PROVIDED FOR ALL SPRINKLERS FLOW AND TAMPER SWITCHES. SWITCHES ARE FURNISHED AND INSTALLED BY OTHERS AND ELECTRICALLY CONNECTED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR. VERIFY QUANTITIES AND PROTECTION SHOP DRAWINGS. PROVIDE CONNECTIONS TO DEVICES PER FIRE PROTECTION SHOP DRAWINGS.

F. ADDRESSABLE CONTROL MODULE:

1. ADDRESSABLE CONTROL MODULES SHALL BE PROVIDED TO SUPERVISE AND CONTROL THE OPERATION OF ONE CONVENTIONAL NACS OF COMPATIBLE, 24 VDC POWERED, POLARIZED AUDIO/VISUAL NOTIFICATION APPLIANCES. FOR FAN SHUTDOWN AND OTHER TO OPERATE AS A DRY CONTRACT RELAY. EACH RELAY SHALL HAVE A RED LED MOUNTED ON ITS COVER TO INDICATE IF THAT RELAY HAS BEEN ACTIVATED.
2. THE CONTROL MODULE NAC MAY BE WIRED FOR STYLE Z OR STYLE Y (CLASS A/B) WITH UP TO 1 AMP OF INDUCTIVE A/V SIGNAL, OR 2 AMPS OF RESISTIVE A/V SIGNAL OPERATION, OR AS A DRY CONTACT (FORM-C) RELAY. THE RELAY COIL SHALL BE MAGNETICALLY LATCHED 70 REDUCE WIRING CONNECTION REQUIREMENTS, AND TO INSURE THAT 100 OF ALL AUXILIARY RELAY OR NACS MAY BE ENERGIZED AT THE SAME TIME ON THE SAME PAIR OF WIRES.

G. DOOR HOLDERS

1. PROVIDE DOOR HOLDERS FOR \YALL MOUNTING AND FOR FLOOR MOUNTING. DOOR HOLDERS SHALL OPERATE ON NENTY--FOUR VOLT DC POWER AND EACH HOLDER SHALL NOT DRAW MORE THAN SEVENTY MILLIAMPS OF POWER. COORDINATE QUANTITIES OF DOOR HOLDERS REQUIRED WITH ARCHITECT'S DOOR SCHEDULE.

2.6 BATTERIES

A. THE BATTERIES SHALL BE SEALED, 12 VOLT NOMINAL (T\YO REQUIRED)
B. THE BATTERY SHALL HAVE SUFFICIENT CAPACITY 70 POWER THE FIRE ALARM SYSTEM FOR THE TIME REQUIRED IN NFPA 72. THIS TIME SHALL BE BASED ON THE TYPE OF SYSTEM INSTALLED. AT THE END OF THIS PERIOD THE SYSTEM SHALL BE CAPABLE OF OPERATING ALL ALARM NOTIFICATION APPLIANCES USED FOR EVACUATION OR TO DIRECT AID TO THE LOCATION OF AN EMERGENCY FOR 5 MINUTES UPON A NORMAL AC POWER FAILURE.

2.7 ELEVATOR VISUAL SIGNAL (NC A FLA)

A. PROVIDE 1/8' DIAMETER MINIMUM RED LED MOUNTED IN A SINGLE GANG POLISHED STAINLESS STEEL COVERPLATE. ENGRAVE NAMEPLATE "DO NOT USE ELEVATOR" WITH 1/8" HIGH BLACK FILLED LETTERS. COORDINATE INSTALLATION OF THIS DEVICE WITH THE ARCHITECT PRIOR TO ROUGH--IN TO ASSURE THIS COMPONENT IS INTEGRATED INTO THE ARCHITECTURE OF ALL ELEVATOR LOBBIES.
B. PROVIDE WEATHERPROOF, CASKETED COVERPLATE FOR ELEVATOR LOBBIES IN PARKING DECKS AND SIMILAR DAMP LOCATIONS.

2.8 FIRE DEPARTMENT COMMUNICATION SYSTEM

A. PROVIDE A TWO--WAY VOICE COMMUNICATION AMPLIFIED RADIO SYSTEM. THE EMERGENCY RESPONDER RADIO COVERAGE SYSTEM INSTALLATION AND COMPONENTS SHALL COMPLY WITH ALL APPLICABLE FEDERAL REGULATIONS INCLUDING, BUT NOT LIMITED TO, FCC 47 CFR PART 90.219.
B. MINIMUM RADIO COVERAGE INTO BUILDING: A MINIMUM VOICE QUALITY OF DAQ 3.4 (SEE TSB--88--B) (FOR DIGITAL RADIO SYSTEM) AND CIRCUIT MERIT 3 (FOR ANALOG SYSTEMS) BE PRESENT IN ALL AREAS OF THE BUILDING WHEN TRANSMITTED FROM THE AGENCY'S RADIO SYSTEM. FOR PURPOSES OF THIS SECTION, 95 BUILDING COVERAGE IS CONSIDERED TO BE ALL AREAS OF THE BUILDINC.
C. MINIMUM SIGNAL STRENGTH OUT OF BUILDING: A MINIMUM SIGNAL STRENGTH OF 20 DB 5 DB ABOVE THE NOISE FLOOR SHALL BE PROVIDED TO AND FROM THE AGENCY'S RADIO SYSTEM WHEN TRANSMITTED OR RECEIVED FROM ALL AREAS OF THE BUILDING. MINIMUM INBOUND AND OUTBOUND SIGNAL STRENGTHS OF -95 DBMARE REQUIRED. FOR PURPOSES OF THIS SECTION, 95? BUILDING COVERAGE IS CONSIDERED TO BE ALL AREAS OF THE BUILDING.
D. TECHNICAL CRITERIA MAINTAINED BY THE AGENCY: THE AGENCY SHALL MAINTAIN A DOCUMENT OF TECHNICAL INFORMATION SPECIFIC TO THEIR REQUIREMENTS. THIS DOCUMENT SHALL CONTAIN AS A MINIMUM, THE FREQUENCIES REQUIRED, THE LOCATION AND EFFECTIVE RADIATED POWER (ERP) OF RADIO SITES USED BY THE IN--BUILDING SYSTEM, THE MAXIMUM PROPAGATION DELAY (IN MICROSECONDS) AND OTHER SUPPORTING TECHNICAL INFORMATION.
E. AMPLIFICATION SYSTEMS ALLOWED: BUILDING AND STRUCTURES WHICH CANNOT SUPPORT THE REQUIRED LEVEL OF RADIO COVERAGE SHALL BE EQUIPPED WITH A RADIATING CABLE SYSTEM AND/OR A DISTRIBUTED ANTENNA SYSTEM (DAS) WITH FCC CERTIFIED BI--DIRECTIONAL AMPLIFIERS (BDA'S) (AKA BI--DIRECTIONALAMPLIFIERS), OR SYSTEMS OTHERWISE APPROVED BY THE AGENCY IN ORDER TO ACHIEVE THE REQUIRED ADEQUATE RADIO COVERAGE.
F. BATTERY SYSTEMS: THE ACTIVE COMPONENTS OF THE INSTALLED SYSTEM OR SYSTEMS SHALL BE CAPABLE OF OPERATING ON AN INDEPENDENT BATTERY SYSTEM FOR A PERIOD OF AT LEASTI¥/ENTY--FOUR (24) HOURS WITHOUT EXTERNAL PO\PER INPUT. THE BATTERY SYSTEM SHALL AUTOMAITCALLY CHARGE IN THE PRESENCE OF EXTERNAL POY/ER INPUT.
G. BI--DIRECTIONAL AMPLIFIER (BDA) REQUIREMENTS: BI--DIRECTIONAL AMPLIFIERS (BDA'S) SHALL MEET THE FOLLO\RING REQUIREMENTS AS WELL AS ANY OTHER REQUIREMENTS DETERMINED BY THE AGENCY,AS FOLLOWS:

1. ALL BI--DIRECTIONAL AMPLIFIER (BDA) COMPONENTS SHALL BE CONTAINED IN ONE (1) NEMA 4 TYPE WATERPROOF CABINET. PERMANENT EXTERNAL FILTERS AND ATTACHMENTS ARE NOT PERMITTED.
2. THE BATTERY SYSTEM SHALL BE CONTAINED IN ONE (1) NEMA 4 TYPE WATERPROOF CABINET.
3. THE SYSTEM SHALL BE CAPABLE OF PROVIDING AUTOMATIC ALARMING OF MALFUNCTIONS OF THE BI--DIRECTIONAL AMPLIFIER (BDA) AND BATTERY SYSTEM. ANY RESULTING ALARM SHALL BE TRANSMITTED TO THE AGENCY'S DESIGNATED RECIPIENT BY MEANS SPECIFIED BY THE AGENCY, INCLUDING BUT NOT LIMITED TO AUTOMATIC STANDARD TELEPHONE DIAL--UP CIRCUIT, TCP/IP NETWORK CIRCUIT, RS232 INTERFACE, ETC.
4. PRODUCTS USED IN SUCH SYSTEMS MUST HAVE FCC CERTIFICATION PRIOR TO INSTALLATION; PENDING FCC CERTIFICATION IS NOT ACCEPTABLE.
5. ALL BI--DIRECTIONAL AMPLIFIERS (BDA'S) MUST BE COMPATIBLE WITH BOTH ANALOG AND DIGITAL COMMUNICATIONS SIMULTANEOUSLY AT THE TIME OF INSTALLATION.

H. ADDITIONAL FREQUENCIES AND CHANGE OF FREQUENCIES: THE BUILDING O'//NER WILL BE REQUIRED TO MODIFY OR EXPAND THE PUBLIC SAFE IN-BUILDING SYSTEM AT THEIR EXPENSE IN THE RENT FREQUENCY CHANGES ARE REQUIRED BY THE FCC OR ADDITIONAL FREQUENCIES ARE MADE AVAILABLE BY THE FCC.

THIS IS AN ADVISORY STATEMENT THAT THE BUILDING O¥/NER MAY SELECT EQUIPMENT AND DISTRIBUTION COMPONENTS THAT ARE CAPABLE OF SUCH CHANGES. PRIOR APPROVAL OF AN IN--BUILDINGSYSTEM ON PREVIOUS FREQUENCIES DOES NOT EXEMPT THIS SECTION.

1. MINIMUM QUALIFICATIONS OF PERSONNEL: THE MINIMUM QUALIFICATIONS OF THE SYSTEM DESIGNER AND LEAD INSTALLATION PERSONNEL SHALL INCLUDE BOTH OF THE FOLLOWING:
   1. VALID FCC--ISSUED GENERAL RADIO OPERATOR'S LICENSE.
   2. CERTIFICATION OF IN--BUILDING SYSTEM TRAINING ISSUED BY A NATIONALLY RECOGNIZED ORGANIZATION, SCHOOL OR A CERTIFICATE ISSUED BY THE MANUFACTURER OF THE EQUIPMENT BEING INSTALLED.
J. UPON COMPLETION OF INSTALLATION, THE BUILDING OWNER SHALL HAVE THE RADIO SYSTEM TESTED TO VERIFY THAT 7//0--WAY COVERAGE ON EACH FLOOR OF THE BUILDING IS NOT LESS THAN 90 PERCENT. THE TEST PROCEDURE SHALL BE CONDUCTED PER IFC SECTION 510.5.3.
K. THE EMERGENCY RESPONDER RADIO COVERAGE SYSTEM SHALL BE MAINTAINED OPERATIONAL AT ALL TIMES IN ACCORDANCE WITH THE IFC SECTION 510.6. AGENCY PERSONNEL SHALL HAVE THE RIGHT TO ENTER ONTO THE PROPERTY AT ANY REASONABLE TIME TO CONDUCT FIELD TESTING TO VERIFY THE REQUIRED LEVEL OF RADIO COVERAGE.

PART 3 -- EXECUTION

3.1 INSTALLATION

A. PROVIDE ALL EQUIPMENT, Y/IRING, CONDUIT, AND OUTLET BOXES REQUIRED FOR THE ERECTION OF A COMPLETE AND OPERATING SYSTEM IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND NATIONAL CODES, THE MANUFACTURER'S RECOMMENDATIONS, THESE PLANS, AND SPECIFICATIONS. COLOR CODE SHALL BE USED THROUGHOUT.

3.2 TEST

A. THE MANUFACTURER'S AUTHORIZED REPRESENTATIVE SHALL PROVIDE SUPERVISION OF FINAL SYSTEM PANEL CONNECTIONS, PERFORM A COMPLETE FUNCTIONAL TEST OF THE SYSTEM, AND SUBMIT A WRITTEN REPORT TO THE CONTRACTOR ATTESTING TO THE PROPER OPERATION OF THE SYSTEM.

3.3 FINAL INSPECTION

A. UPON COMPLETION OF THE INSTALLATION, THE ELECTRICAL CONTRACTOR SHALL PROVIDE TO THE ARCHITECT, WITH A COPY TO THE MANUFACTURER'S REPRESENTATIVE, A SIGNED WRITTEN STATEMENT ATTESTING THAT ALL SYSTEMS EQUIPMENT WAS INSTALLED IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN ACCORDANCE WITH WIRING DIAGRAMS, INSTRUCTIONS AND DIRECTIONS PROVIDED TO THE CONTRACTOR BY THE MANUFACTURER.

3.4 INSTRUCTION

A. INSTRUCTION SHALL BE APPROVED AS REQUIRED FOR OPERATING THE SYSTEM. HANDS--ON DEMONSTRATIONS OF THE OPERATION OF ALL SYSTEM COMPONENTS SHALL BE PROVIDED AND SHALL INCLUDE ONE SESSION FOR A PERIOD OF 8 HOURS. ADDITIONAL TIME THAT MAY BE REQUIRED FOR END-USER TRAINING WILL BE AT ADDED COST TO OWNER.

3.5 GUARANTEE

A. ALL EQUIPMENT AND ¥/IRING SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR A T\YO YEAR PERIOD FROM THE START UP AND BENEFICIAL USE OF THE SYSTEM. WARRANTY SERVICE FOR THE EQUIPMENT SHALL BE PROVIDED BY THE MANUFACTURER'S FACTORY TRAINED REPRESENTATIVE DURING NORMAL WORKING HOURS, MONDAY THROUGH FRIDAY EXCLUDING HOLIDAYS. EMERGENCY SERVICE PROVIDED AT TIMES OTHER THAN AS STIPULATED ABOVE SHALL BE AVAILABLE FROM THE SAME SOURCE AT ADDITIONAL COST TO THE OWNER.

5.6 INSPECTIONS

A. UPON SATISFACTORY COMPLETION OF THE SYSTEM TEST, THE MANUFACTURER'S REPRESENTATIVE SHALL PRESENT FOR THE OWNER'S CONSIDERATION, A PROPOSAL TO PROVIDE SEMI--ANNUAL INSPECTION AND TESTS OF THE SYSTEM.

END OF SECTION 283100

NICOLE PRICE MICKEY 036515 ENGINEER
DATE SIGNED: 07/25/25
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1255 Crescent Green, Ste. 230
Cary, NC 27518
Phone: (919) 747-9884
NC License # C-2226
BWA Project #: 2025-0294

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

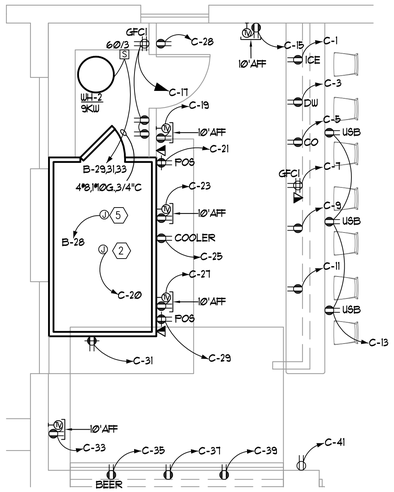
SHEET NAME:
ELECTRICAL SPECIFICATIONS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

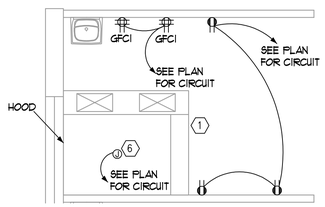
PERMIT SET

SHEET NO.:
E0.7



2 E1.1 BAR PARTIAL FLOOR PLAN – ELECTRICAL

1/4"=1'-0"



3 E1.1 TYPICAL FOOD BOOTH FLOOR PLAN – ELECTRICAL

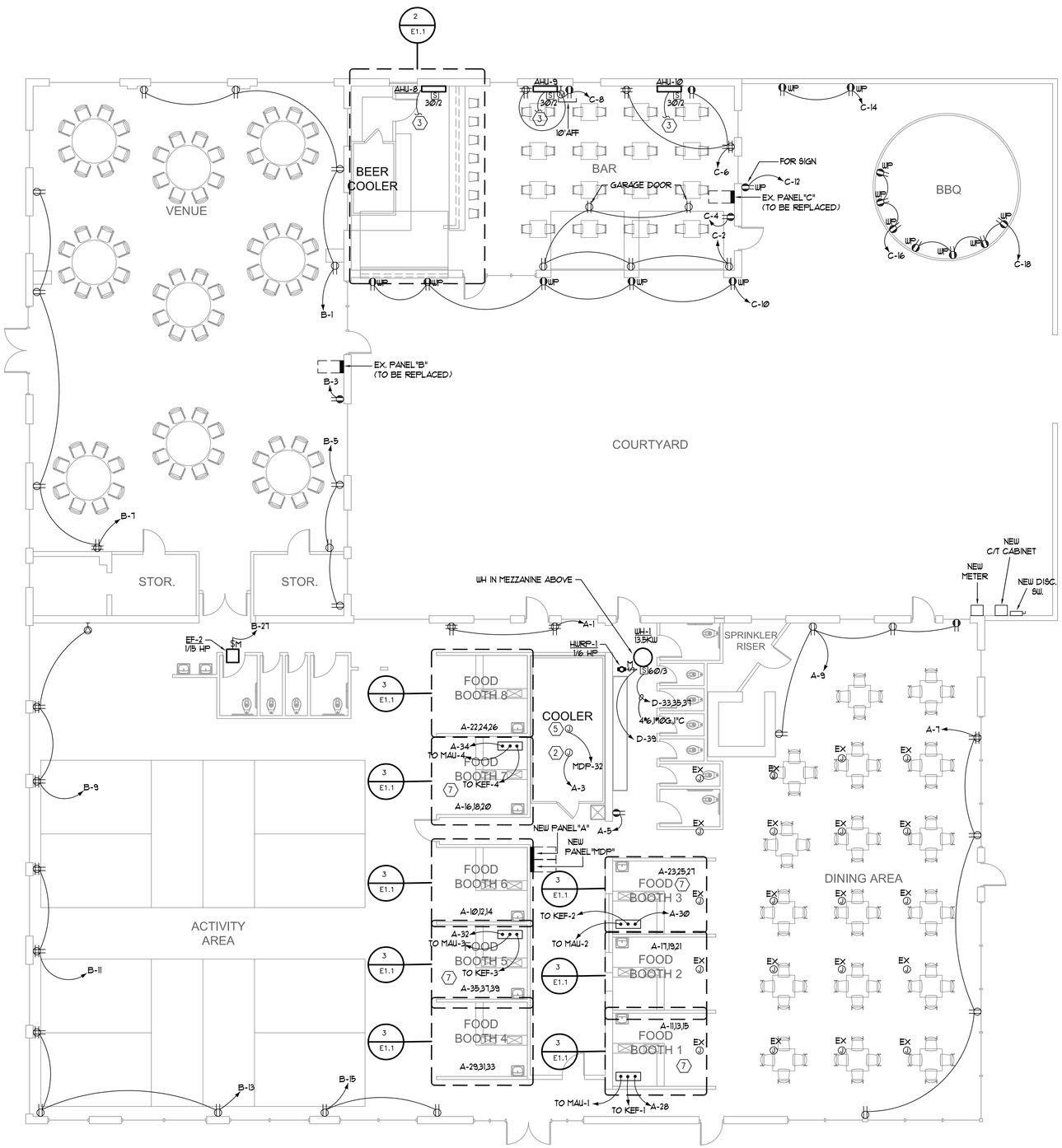
1/4"=1'-0"

GENERAL NOTES
(APPLY THIS SHEET ONLY)

1. "EX" INDICATES EXISTING DEVICE LOCATION TO REMAIN. "RE" INDICATES EXISTING DEVICE LOCATION TO BE INSTALLED IN NEW LOCATION. ALL OTHER DEVICES SHALL BE CONSIDERED NEW. IF NEW DEVICE INDICATED IN CLOSE PROXIMITY TO EXISTING DEVICE, UTILIZE EXISTING DEVICE LOCATION. ELECTRICIAN TO FIELD VERIFY WORKING CONDITION OF EXISTING RECEPTACLES AND PROVIDE NEW DEVICES AS REQUIRED. EXISTING DEVICE LOCATIONS TO BE MAINTAINED EVEN IF NO EXISTING DEVICE IS INDICATED ON THE PLANS IN A ROOM OR AREA.
2. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL NEW DEVICES WITH ARCHITECTURAL DRAWINGS AND OTHER TRADES PRIOR TO INSTALLATION. CENTER ALL RECEPTACLES ON WALLS U.O.N.
3. COORDINATE THE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT, TERMINAL UNITS, ETC. WITH DIVISION 23.
4. EMT CONDUIT SHALL BE UTILIZED IN EXPOSED CEILING AREAS AND FOR HOMERUNS TO THE PANELBOARDS. MC SHALL BE UTILIZED IN ALL WALLS AND CONCEALED CEILING AREAS.
5. EMT CONDUIT SHALL BE UTILIZED IN EXPOSED CEILING AREAS AND FOR HOMERUNS TO THE PANELBOARDS. MC SHALL BE UTILIZED IN ALL WALLS AND CONCEALED AREAS.
6. RECEPTACLES SHALL BE INSTALLED PER ANSI A 117.1.

KEY NOTES
(APPLY THIS SHEET ONLY)

1. ALL APPLIANCES AND EQUIPMENT TO BE SELECTED BY OWNER.
2. PROVIDE CONNECTION TO COOLER PROVIDED LIGHTS.
3. INDOOR UNIT POWERED BY OUTDOOR UNIT
4. PROVIDE CONNECTION TO INDOOR EVAPORATOR.
5. PROVIDE CONNECTION TO COOLER PROVIDED EVAPORATOR.
6. PROVIDE CONNECTION TO HOOD SUPPLIED LIGHT.
7. HOOD CONTROL PANEL. PROVIDE 120/1P CIRCUIT FOR POWER TO CONTROL PANEL. COORDINATE ALL CONTROL WIRING TO SUPPLY/EXHAUST UNITS AND ADDITIONAL COMPONENTS DOWNSTREAM OF CONTROL PANEL WITH HOOD MANUFACTURER AND DIVISION 23. REFER TO SHEETS M1.1 AND M1.2 FOR DETAILS PROVIDED BY MANUFACTURER. COORDINATE SECONDARY HOOD CONNECTION WITH ARCHITECT/OWNER.



1 E1.1 FLOOR PLAN – ELECTRICAL

1/8"=1'-0"

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036315 EDWICK M. VICKERY

DATE SIGNED: 07/25/25

BW&A Barrett, Woodyard & Associates, Inc.
1255 Crescent Green, Ste. 230
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

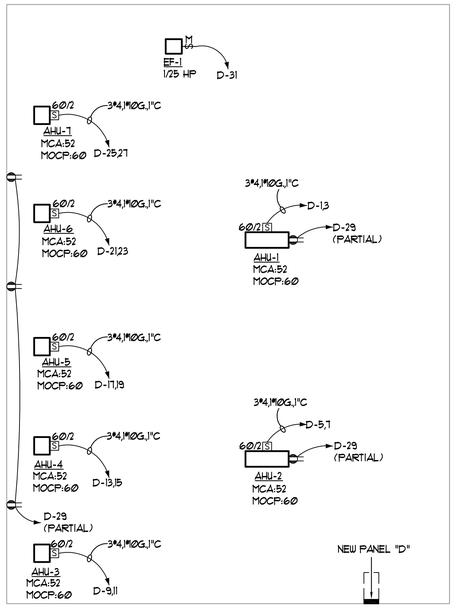
SHEET NAME:
FLOOR PLAN - ELECTRICAL

REVISIONS:

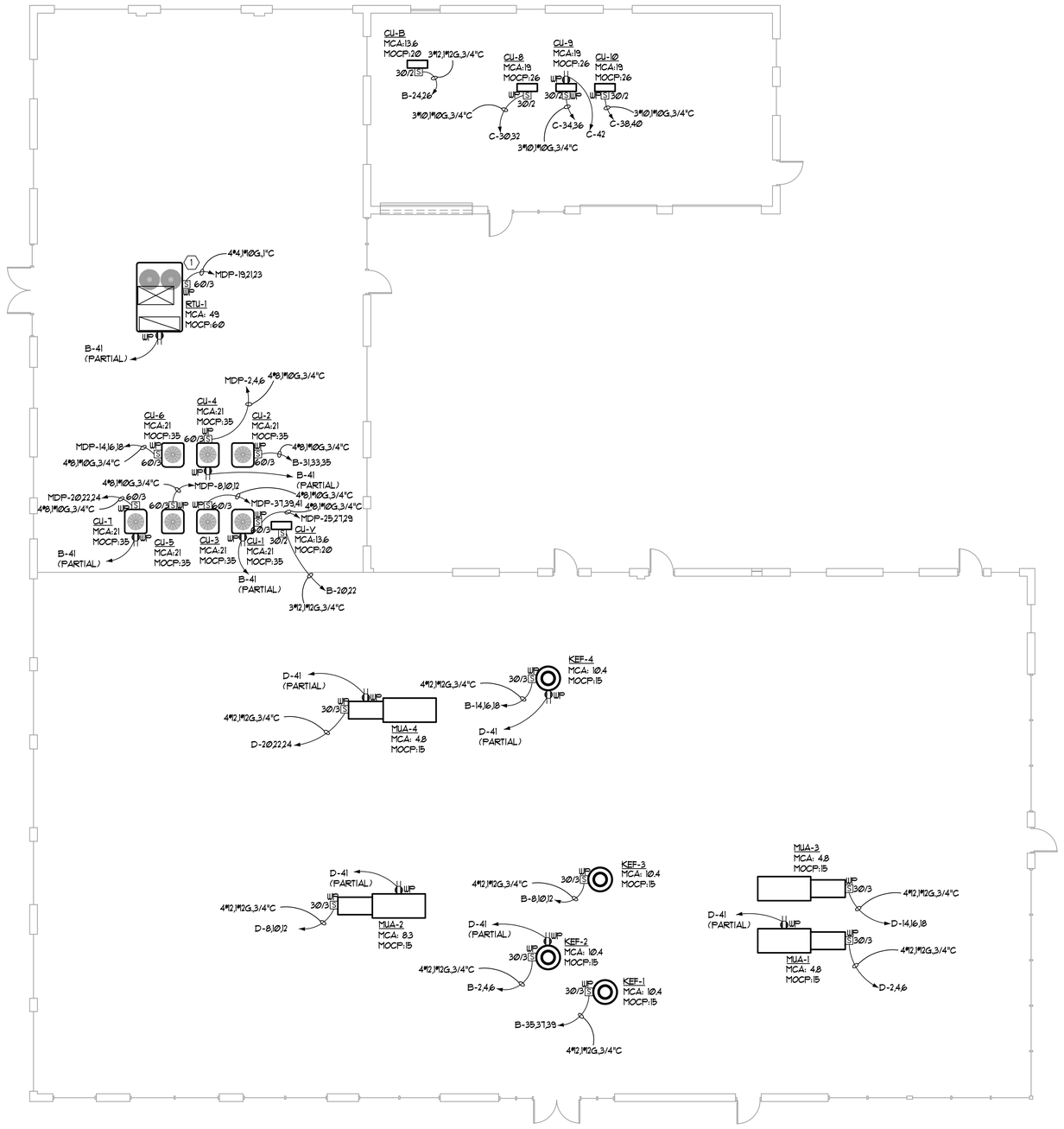
DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

PERMIT SET

SHEET NO.:
E1.1



2 E1.2 MEZZANINE PLAN – ELECTRICAL
1/8"=1'-0"



1 E1.2 ROOF PLAN – ELECTRICAL
1/8"=1'-0"

GENERAL NOTES
(APPLY THIS SHEET ONLY)

1. "EX" INDICATES EXISTING DEVICE LOCATION TO REMAIN. "RE" INDICATES EXISTING DEVICE LOCATION TO BE INSTALLED IN NEW LOCATION. ALL OTHER DEVICES SHALL BE CONSIDERED NEW. IF NEW DEVICE INDICATED IN CLOSE PROXIMITY TO EXISTING DEVICE, UTILIZE EXISTING DEVICE LOCATION. ELECTRICIAN TO FIELD VERIFY WORKING CONDITION OF EXISTING RECEPTACLES AND PROVIDE NEW DEVICES AS REQUIRED. EXISTING DEVICE LOCATIONS TO BE MAINTAINED EVEN IF NO EXISTING DEVICE IS INDICATED ON THE PLANS IN A ROOM OR AREA.
2. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF ALL NEW DEVICES WITH ARCHITECTURAL DRAWINGS AND OTHER TRADES PRIOR TO INSTALLATION. CENTER ALL RECEPTACLES ON WALLS U.O.N.
3. COORDINATE THE EXACT LOCATION OF ALL MECHANICAL EQUIPMENT, TERMINAL UNITS, ETC. WITH DIVISION 23.
4. EMT CONDUIT SHALL BE UTILIZED IN EXPOSED CEILING AREAS AND FOR HOMERUNS TO THE PANELBOARDS. MC SHALL BE UTILIZED IN ALL WALLS AND CONCEALED CEILING AREAS.
5. EMT CONDUIT SHALL BE UTILIZED IN EXPOSED CEILING AREAS AND FOR HOMERUNS TO THE PANELBOARDS. MC SHALL BE UTILIZED IN ALL WALLS AND CONCEALED AREAS.
6. RECEPTACLES SHALL BE INSTALLED PER ANSI A 117.1.

KEY NOTES
(APPLY THIS SHEET ONLY)

1 PROVIDE AND INSTALL DUCT DETECTORS IN SUPPLY AND RETURN OF RTU. COORDINATE INSTALLATION WITH DIVISION 23.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 035315 EDWICK M. VICKERY
DATE SIGNED: 07/25/25

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NEW INTERIOR ALTERATIONS FOR:
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112 S Fayetteville Street
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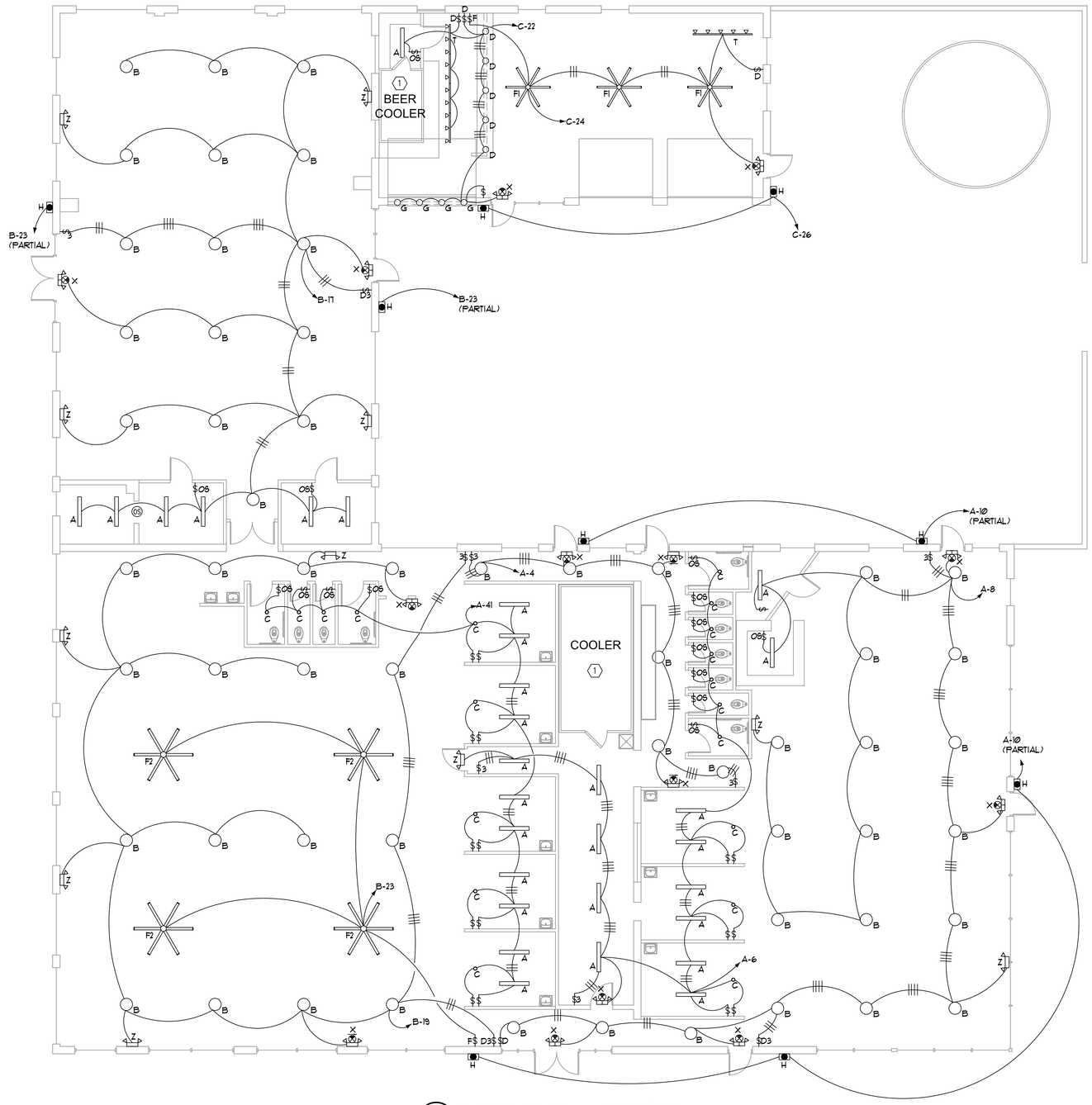
SHEET NAME:
ROOF PLAN & MEZZANINE PLAN - ELECTRICAL

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

PERMIT SET

SHEET NO.:
E1.2



1 E2.1 FLOOR PLAN – LIGHTING
1/8"=1'-0"

GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. COORDINATE EXACT LOCATIONS AND MOUNTING HEIGHTS OF LIGHT FIXTURES AND DEVICES WITH ARCHITECT. COORDINATE SWITCH AND OUTLET WALL COVER COLOR WITH ARCHITECT.
2. PROVIDE CONTINUOUS, UNSWITCHED HOT TO ALL EXIT SIGNS AND EMERGENCY LIGHT FIXTURES.
3. ALL SWITCH LOCATIONS SHALL BE APPROVED BY THE ARCHITECT PRIOR TO ROUGH-IN OR INSTALLATION.
4. ALL SWITCHES SHALL BE LABELED WITH CIRCUIT NUMBER.

KEY NOTES:
(APPLY THIS SHEET ONLY)

1 COOLER LIGHTS BY COOLER MANUFACTURER/INSTALLER.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045315 EDWICK M. VICKERY
DATE SIGNED: 07/25/25

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
FLOOR PLAN - LIGHTING

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

SHEET NO.:
E2.1

PERMIT SET

FIRE ALARM SYSTEM INPUT/OUTPUT MATRIX

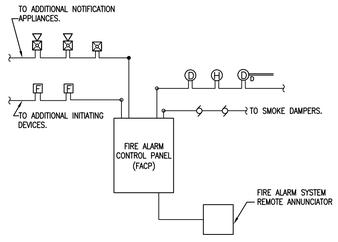
SYSTEM OUTPUTS

FACP ANNUNCIATION | NOTIFICATION | REQUIRED FIRE SAFETY CONTROL

SYSTEM INPUTS		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	
1	FIRE ALARM SYSTEM AC POWER FAILURE			●	●							●															1
2	FIRE ALARM SYSTEM LOW BATTERY					●	●						●														2
3	OPEN CIRCUIT					●	●						●														3
4	GROUND FAULT					●	●						●														4
5	NOTIFICATION APPLIANCE CIRCUIT SHORT					●	●						●														5
6	BUILDING MANUAL PULL STATIONS	●	●					●	●	●	●			●													6
7	CORRIDOR SMOKE DETECTORS	●	●					●	●	●	●			●	●												7
8	AREA SMOKE DETECTORS	●	●					●	●	●	●			●	●												8
9	HVAC AIR DUCT SMOKE DETECTORS			●	●			●				●															9
10	HOOD OR ROOM FIRE SUPPRESSION SYSTEM ALARM	●	●					●	●	●	●			●	●												10
11	SPRINKLER TAMPER SWITCH			●	●			●				●															11
12	SPRINKLER WATER FLOW IN BUILDING	●	●					●	●	●	●			●	●												12

FIRE ALARM GENERAL NOTES:

1. ALL FIRE ALARM CABLING SHALL BE IN EMT CONDUIT AS NOTED IN SPECIFICATION SECTION 260534.
2. COORDINATE FIRE ALARM SYSTEM REPROGRAMMING WITH LANDLORD. AT THE CONCLUSION OF THIS PROJECT, THE FIRE ALARM SYSTEM SHALL BE TESTED IN ACCORDANCE WITH THE 2018 EDITION OF NFPA 72 SECTION 10.4.1.2, "REACCEPTANCE TESTING", INCLUDING THE REQUIREMENT FOR TESTS OF RANDOMLY SELECTED EXISTING DEVICES LOCATED OUTSIDE THE AREA OF CONSTRUCTION.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO KEEP THE BUILDING FIRE ALARM SYSTEM FUNCTIONAL DURING THE PERFORMANCE OF THIS PROJECT. ANY FIRE ALARM SHUT DOWN SHALL BE CONDUCTED ONLY ON INDIVIDUAL ZONES AND NOT THE ENTIRE SYSTEM. IF A WHOLE BUILDING-WIDE FIRE ALARM SHUTDOWN IS REQUIRED, THE CONTRACTOR SHALL NOTIFY THE LANDLORD AND SUBMIT A FIRE WATCH PLAN TO THE LOCAL FIRE MARSHAL AT LEAST ONE WEEK IN ADVANCE. THE CONTRACTOR MUST RECEIVE APPROVAL FROM THE OWNER PRIOR TO SHUTTING DOWN THE FIRE ALARM SYSTEM.
4. THE TECHNICIANS WHO MAKE ANY CONNECTIONS TO (OR PERFORM ANY PROGRAMMING FOR) THE FIRE ALARM SYSTEM SHALL BE TRAINED AND INDIVIDUALLY CERTIFIED BY THE MANUFACTURER OF THE FACP MODEL/SERIES BEING INSTALLED. THIS TRAINING AND CERTIFICATION MUST HAVE OCCURRED WITHIN THE MOST RECENT 24 MONTHS.
5. ALL FIRE ALARM WIRING IN OPEN CEILING AREA SHALL BE IN CONDUIT AND ROUTED IN PARALLEL / PERPENDICULAR WITH THE STRUCTURE. EMT CONDUIT SHALL BE UTILIZED IN EXPOSED CEILINGS, SURFACE MOUNTED WALL AREAS. MC CAN BE UTILIZED IN ALL WALLS AND CONCEALED CEILING AREAS. ALL EXPOSED CONDUIT SHALL BE PAINTED TO MATCH THE SURFACE WHERE INSTALLED IF REQUIRED BY ARCHITECT.



2 / FA0.1 FIRE ALARM RISER
NO SCALE

FIRE ALARM SYMBOL LEGEND

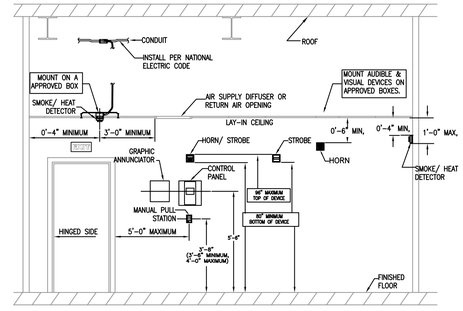
SYMBOL	DESCRIPTION	ON CENTER MTG. HT.
⊠◁( ) cd	FIRE ALARM ADA APPROVED WALL MOUNTED HORN/STROBE ALARM. ENTIRE LENS SHALL NOT BE LESS THAN 80" AND NOT GREATER THAN 96" AFF. ( ) cd = CANDELA RATING INDICATED ON PLAN	80" A.F.F.
⊠ ( ) cd	FIRE ALARM ADA APPROVED WALL MOUNTED VISUAL ALARM. ENTIRE LENS SHALL NOT BE LESS THAN 80" AND NOT GREATER THAN 96" AFF. ( ) cd = CANDELA RATING INDICATED ON PLAN	80" A.F.F.
⊗◁( ) cd	FIRE ALARM ADA APPROVED CEILING MOUNTED HORN/STROBE ALARM. ENTIRE LENS SHALL NOT BE GREATER THAN 10'-0" AFF. ( ) cd = CANDELA RATING INDICATED ON PLAN	
⊗ ( ) cd	FIRE ALARM ADA APPROVED CEILING MOUNTED VISUAL ALARM. ( ) cd = CANDELA RATING INDICATED ON PLAN	
FACP	FIRE ALARM CONTROL PANEL	
FAA	FIRE ALARM ANNUNCIATOR	
FABP	FIRE ALARM BOOSTER PANEL	
(H)	HEAT DETECTOR	
(D)⊣(D)	FIRE ALARM SMOKE DETECTOR – WALL MTD., CEILING MTD.	12" BC
(F)	FIRE ALARM PULL STATION	48" A.F.F.
(D)	DUCT MOUNTED SMOKE DETECTOR	
(?)(D)	SMOKE DETECTOR OR DUCT MOUNTED SMOKE DETECTOR IN RETURN AIR PATH PER NFPA.	
(M)	FIRE ALARM MAGNETIC DOOR HOLD. COORDINATE WITH ARCHITECT.	
* (F)	FIRE ALARM CONNECTION TO SPRINKLER FLOW SWITCH	
* (T)	FIRE ALARM CONNECTION TO SPRINKLER TAMPER SWITCH	
FSD —●—	FIRE/SMOKE DAMPER – COORDINATE WITH DIVISION 23	

LEGEND NOTES:

1. DEVICE BOXES IN RATED WALLS SHALL MEET STANDARD BUILDING CODE SECTION 706.4.
2. COORDINATE DEVICE HEIGHTS WITH ARCHITECT'S PLANS AND ELEVATIONS.
3. ALL FIRE ALARM DEVICES SHALL BE 110 CD AND 75 DBA UNLESS NOTED OTHERWISE.
4. ALL FIRE HORNS AND STROBES SHALL BE WHITE UNLESS DIRECTED OTHERWISE BY OWNER AND ARCHITECT.

*NOTE: : CONTRACTOR SHALL COORDINATE THE LOCATION AND QUANTITY OF ALL FLOW SWITCHES AND TAMPER SWITCHES WITH SPRINKLER SHOP DRAWINGS. PROVIDE CONNECTIONS WHERE REQUIRED.

NFPA 72 AND ADA DEVICE INSTALLATION REQUIREMENTS



1 / FA0.1 FIRE ALARM DEVICE MOUNTING DETAIL
NO SCALE

FIRE ALARM STATEMENT:

THIS SET OF FIRE ALARM DESIGN DRAWINGS IS NOT APPROVED FOR CONSTRUCTION. CITY OF DUNN APPROVED SHOP DRAWINGS ARE REQUIRED ON SITE PRIOR TO INSTALLATION OF FIRE ALARM SYSTEM. ENGINEER SHALL REVIEW SHOP DRAWINGS PRIOR TO SUBMITTAL TO THE CITY OF DUNN. FAILURE TO OBTAIN APPROVED SHOP DRAWINGS PRIOR TO INSTALLATION WILL RESULT IN ISSUANCE OF A "STOP WORK ORDER."

NICOLE M. WICKER
NOTARY PUBLIC
WAKE COUNTY, NC
COMMISSION EXPIRES
MAY 26, 2026
ENGINEER
EDWICK M. WICKERY
DATE SIGNED: 07/25/25

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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
FIRE ALARM NOTES, LEGEND, & DETAILS

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

PERMIT SET

SHEET NO.:
FA0.1

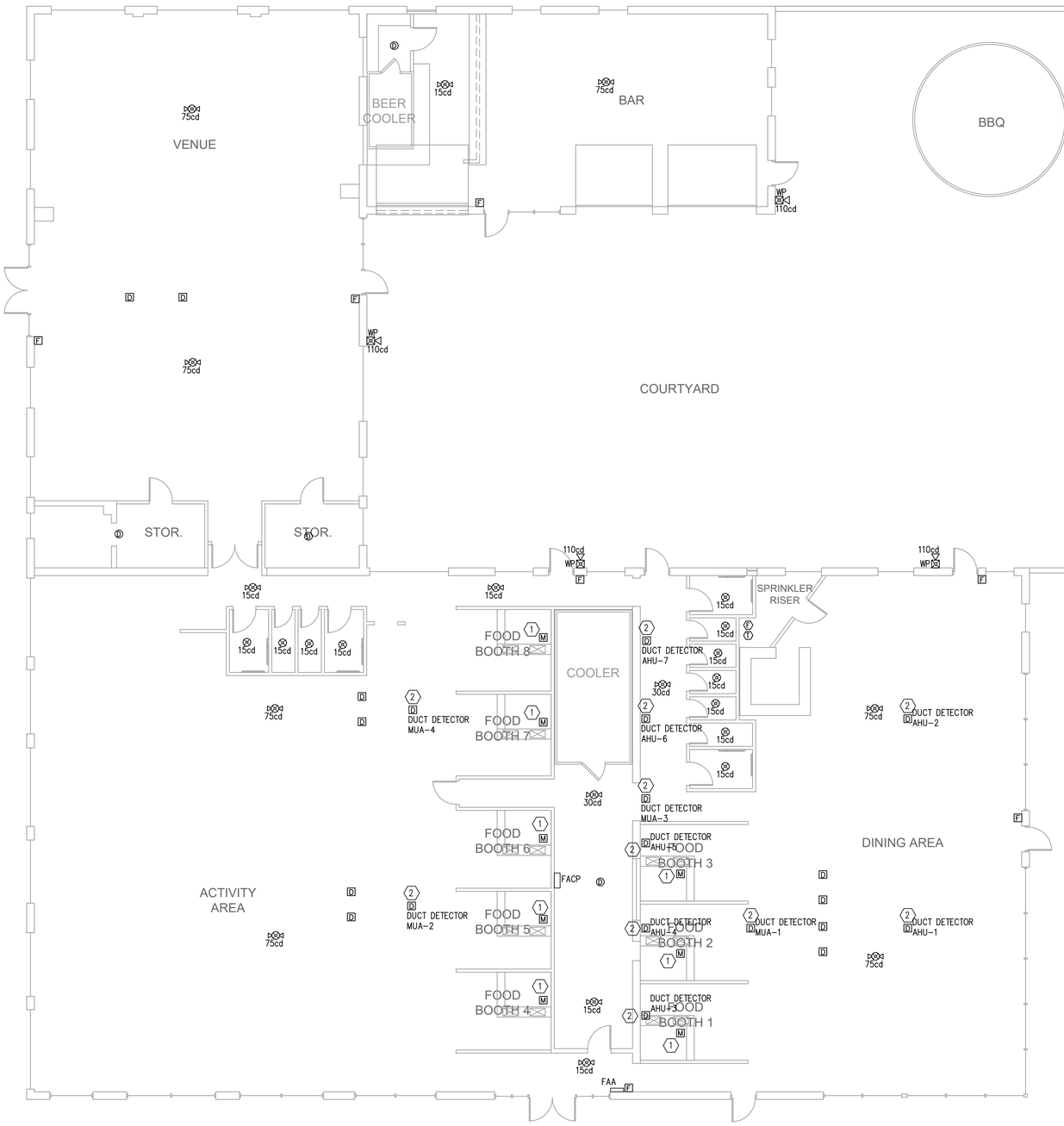
GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. ALL FIRE ALARM CABLING SHALL BE IN EMT CONDUIT AS NOTED IN SPECIFICATION SECTION 26 05 34 3.1.B.
2. ALL FIRE ALARM DEVICES SHALL BE ADA APPROVED.
3. ALL FIRE ALARM DEVICES, INCLUDING SPEAKERS, VISUALS, SMOKE DETECTORS, ETC. SHALL BE CONNECTED TO THE BASE BUILDING FIRE ALARM SYSTEM BY A LICENSED FIRE ALARM CONTRACTOR. COORDINATE CONNECTIONS WITH SYSTEM MANUFACTURER.
4. FIRE ALARM SOUND LEVELS AND INTELLIGIBILITY SHALL COMPLY WITH CHAPTER 9 OF THE NC STATE BUILDING CODE.

KEY NOTES:
(APPLY THIS SHEET ONLY)

(1) PROVIDE CONNECTION TO MONITOR MODULE FOR HOOD ANSUL FIRE SUPPRESSION SYSTEM. COORDINATE ALL REQUIREMENTS WITH HOOD MANUFACTURER. COORDINATE CONNECTION TO BASE BUILDING FIRE ALARM SYSTEM WITH LANDLORD.

(2) COORDINATE EXACT DUCT DETECTOR PLACEMENT WITH MECHANICAL CONTRACTOR.



1 FA1.1 FLOOR PLAN – FIRE ALARM
1/8"=1'-0"

NICOLE PRESTON MCKINNEY 036515 ENGINEER KENDRICK M. WICKERY
DATE SIGNED: 07/25/25
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NEW INTERIOR ALTERATIONS FOR:
THE RAYNOR
112 S Fayetteville Street
Dunn, NC 28334

SHEET NAME:
FLOOR PLAN - FIRE ALARM

REVISIONS:

DATE: 07.25.25
PROJECT NO.: 25-023
DRAWN BY: JM

PERMIT SET

SHEET NO.:
FA1.1