

5/18/2025 7:51:49 PM

ABBREVIATIONS		ABBREVIATIONS		ABBREVIATIONS		HVAC SYMBOLS (DUCTWORK)		HVAC SYMBOLS (PIPING)		HVAC SYMBOLS (PIPING)	
ABV.	ABOVE	FL	FLOOR	PHX	PLATE & FRAME HEAT EXCHANGE		RECTANGULAR DUCT SUPPLY		PIPE TURNING UP		SIGHTGLASS
AC	AIR CONDITIONER	FLA	FULL LOAD AMPS	PSI	POUNDS PER SQUARE INCH (GAUGE)		RECTANGULAR DUCT RETURN		PIPE TURNING DOWN		FILTER-DRYER
ACT	AIR CURTAIN	FSD	FIRE SMOKE DAMPER	RA	RETURN AIR		RECTANGULAR DUCT EXHAUST		SLOPE RISE IN DIRECTION OF FLOW		LEAK DETECTOR, PROBE TYPE
AD	ACCESS DOOR	FSD/AD	FIRE SMOKE DAMPER/ACCESS DOOR	RF	RETURN FAN		ROUND DUCT SUPPLY		SLOPE DROP IN DIRECTION OF FLOW		LEAK DETECTOR, CABLE TYPE
AFF	ABOVE FINISHED FLOOR	FSD/GA	FIRE SMOKE DAMPER/GRILLE ACCESS	RHC	REHEAT COIL		ROUND DUCT RETURN		PIPE THROUGH BEAM PENETRATION		METER
AHU	AIR HANDLING UNIT	FFSD/AD	FLOOR FIRE SMOKE DAMPER/ACCESS DOOR	RPM	REVOLUTIONS PER MINUTE		ROUND DUCT EXHAUST		WALL SLEEVE WITH WATER STOP		AIR VENT (MANUAL)
AL	ACOUSTICAL LINING	GPM	GALLONS PER MINUTE	RR	RETURN REGISTER		DUCT WITH ACOUSTIC LINING		ELBOW		STRAINER WITH BLOW OFF
ALD	AUTOMATIC LOUVER DAMPER (MOTORIZED)	GX	GENERAL EXHAUST	SA	SUPPLY AIR		DUCT WRAPPED WITH FIRE RATED INSULATION		TEE		FLOW SWITCH
ATC	AUTOMATIC TEMPERATURE CONTROL	SPF	STAIR PRESSURIZATION FAN	SCHW	SECONDARY CHILLED WATER		BRANCH DUCT WITH RADIUSUED SIDE SPLIT - RECTANGULAR DUCT		BRANCH PIPE TOP CONNECTION		Y-STRAINER
B.D.D.	BACK DRAFT DAMPER	HC	HEATING COIL	SD	SMOKE DAMPER		BRANCH DUCT TAP, SINGLE BOOT - RECTANGULAR DUCT		BRANCH PIPE BOTTOM CONNECTION		DRAIN VALVE WITH CAPPED HOSE END
BMS	BUILDING MANAGEMENT SYSTEM	HHW	HEATING HOT WATER	SD/ALD	SMOKE DAMPER AND AUTOMATIC LOUVER COMBINATION		BRANCH DUCT TAP, DOUBLE BOOT - RECTANGULAR DUCT		REDUCER/INCREASER CONCENTRIC		DUPLEX BASKET STRAINER
BOD	BOTTOM OF DUCT	HP	HORSE POWER	SF	SUPPLY FAN		BRANCH DUCT TAP, SINGLE BOOT - ROUND & FLAT OVAL DUCT		REDUCER/DECREASER ECCENTRIC		TEMPERATURE GAUGE
BOIL	BOILER	HTEX	HEAT EXCHANGER	SG	SUPPLY GRILLE		BRANCH DUCT TAP, DOUBLE BOOT - ROUND & FLAT OVAL DUCT		UNION (SCREWED)		PRESSURE GAUGE W/ PIGTAIL AND PETCOCK
BHP	BRAKE HORSE POWER	ID	INSIDE DIMENSION	ST	SOUND TRAP		FLEXIBLE DUCT		BLIND FLANGE		FLEXIBLE COUPLING
BRD	BAROMETRIC RELIEF DAMPER	KW	KILOWATT	SEF	SMOKE EXHAUST FAN		END CAP		BUTTERFLY VALVE		PIPE IN PIPE (FUEL OIL)
BTU	BRITISH THERMAL UNIT	KX	KITCHEN EXHAUST	TOD	TOP OF DUCT		AUTOMATIC DAMPER - OPPOSED BLADE		BALL VALVE - MANUAL (LEVER HANDLE)		HEAT TRACED PIPE
CC	COOLING COIL	LAT	LEAVING AIR TEMPERATURE	TF	TRANSFER FAN		AUTOMATIC DAMPER - PARALLEL BLADE		BALL VALVE - MANUAL (TEE HANDLE)		AIR SEPARATOR
CD	CEILING DIFFUSER	LED	LINEAR EXHAUST DIFFUSER	TG	TOP GRILLE		FIRE SMOKE DAMPER		BALL VALVE - MOTORIZED		EXPANSION TANK
CFM	CUBIC FEET PER MINUTE	LRD	LINEAR RETURN DIFFUSER (CEILING, WALL, SILL, OR FLOOR)	TR	TOP REGISTER		FIRE DAMPER		ISOLATION VALVE (SEE SPEC FOR TYPE)		CHEM SHOT FEEDER
CG	CEILING GRILLE	LSD	LINEAR SUPPLY DIFFUSER (CEILING, WALL, SILL, OR FLOOR)	TD	TRANSFER DUCT		BACKDRAFT DAMPER		BALANCING VALVE		PLATE AND FRAME HEAT EXCHANGER
CO2	CARBON DIOXIDE	LTHW	LOW TEMPERATURE HOT WATER	TRX	TRASH EXHAUST		ROUND FLOOR DIFFUSER (UFAD)		GLOBE VALVE		PUMP
CHW	CHILLED WATER	LVL	LEVEL	TX	TOILET EXHAUST		REGISTER - SIDEWALL/CEILING/FLOOR - SUPPLY		PLUG VALVE		CHECK VALVE (SWING TYPE)
CHWLG	CHILLED WATER LOW GRADE (RADIANT SYSTEM)	LWS	LOUVER WITH WIRE SCREEN	UH	UNIT HEATER		REGISTER/GRILLE - SIDEWALL/CEILING/FLOOR - RETURN/EXHAUST		CHECK VALVE (SILENT TYPE, CENTER GUIDED)		PRESSURE INDEPENDENT CONTROL VALVE (PICV)
CO	CLEAN OUT	LWT	LEAVING WATER TEMPERATURE	VAV	VARIABLE AIR VOLUME		WALL TRANSFER GRILLES		3 WAY CONTROL VALVE (MIXING TYPE)		3 WAY CONTROL VALVE (DIVERTING TYPE)
COD	CABLE OPERATED VOLUME DAMPER	LWT	LEAVING WATER TEMPERATURE	VD	VOLUME DAMPER		LINEAR DIFFUSER/GRILLE - SUPPLY/RETUN/EXHAUST		SOLENOID VALVE		RELIEF VALVE
CDP	CONDENSATE DRAIN PIPING	MAT	MIXED AIR TEMPERATURE	VFD	VARIABLE FREQUENCY DRIVE		PLENUM FOR LINEAR DIFFUSER/GRILLE		BACKFLOW PREVENTOR		BACKFLOW PREVENTER (RPZ TYPE)
CWP	CONDENSER WATER	MAX	MAXIMUM	VRV	VARIABLE REFRIGERANT VOLUME		DUCT SMOKE DETECTOR		AIR VENT (AUTOMATIC)		TEMPERATURE GAUGE (DUCT MOUNTED)
CP	CONDENSATE PUMP RETURN	MBH	THOUSAND BTU PER HOUR	WMS	WIRE MESH SCREEN		DUCT FIRESTAT		PRESSURE GAUGE W/ PIGTAIL AND PETCOCK		
CAV	CONSTANT AIR VOLUME TERMINAL	MBTU	BRITISH THERMAL UNIT (1000 BTU)	(300)	CUBIC FEET OF AIR PER MINUTE OR GALLONS PER MINUTE		AIRFLOW STATION				
DN	DOWN	MIN	MINIMUM				ACOUSTIC TRANSFER DUCT				
EAT	ENTERING AIR TEMPERATURE	MD	MOTORIZED DAMPER				TERMINAL UNIT - VAV BOX - WITH/WITHOUT HEATING COIL				
EF	EXHAUST FAN	NC	NORMALLY CLOSED				TERMINAL UNIT - FAN COIL UNIT				
EHC	ELECTRIC HEATING COIL	NFA	NET FREE AREA				UNIT HEATER				
ET	EXPANSION VESSEL/EXPANSION TANK	NIC	NOT IN THIS CONTRACT				DUCT MOUNTED COIL				
EWT	ENTERING WATER TEMPERATURE	NO	NORMALLY OPEN				DUCT MOUNTED HUMIDIFIER				
EXTK	EXPANSION TANK	NTS	NOT TO SCALE								
FC	FLEXIBLE CONNECTION	OA	OUTSIDE AIR								
FC	FAN COIL UNIT	OAT	OUTSIDE AIR TEMPERATURE								
FD/AD	FIRE DAMPER/ACCESS DOOR	OBD	OPPOSED BLADE DAMPER								
FD/GA	FIRE DAMPER/GRILLE ACCESS	OED	OPEN ENDED DUCT								
FTR	FIN TUBE RADIATOR	P	PUMP								
		PHC	PRE-HEAT COIL								
GENERAL MECHANICAL NOTES											
1. SHOULD THERE BE ANY DISCREPANCIES BETWEEN CONTRACT DOCUMENTS AND SPECIFICATIONS THE GREATER QUALITY OR QUANTITY OF WORK SHALL BE PERFORMED. THIS WORK MUST BE SUBMITTED IN WRITING TO ENGINEER PRIOR TO FINAL BID APPROVAL. NO EXTRAS SHALL BE ALLOWED AFTER THAT TIME. THIS SHALL ALSO PERTAIN TO ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS OR BETWEEN TRADES.											
2. NO MODIFICATIONS TO THE SPECIFICATIONS, CONSTRUCTION DOCUMENTS, OR INTENT OF THE SCOPE OF WORK SHALL BE ALLOWED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE ENGINEER. ALL MODIFICATIONS, CHANGE ORDERS, ALTERNATES AND VALUE ENGINEERING SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT AND ENGINEER FOR REVIEW.											
3. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL TRADES RESPONSIBLE FOR FINAL CONNECTION OR ALL EQUIPMENT.											
4. CONTRACTORS ARE RESPONSIBLE UNDERSTANDING AND BEING EDUCATED ON THE REQUIREMENTS TO OBTAIN NGBS NET ZERO CERTIFICATION AND PHIUS CERTIFICATION, AS WELL AS ALL PREREQUISITE CERTIFICATIONS NEEDED TO OBTAIN PHIUS. RESPONSIBILITY OF THE GENERAL CONTRACTOR AND TRADES TO PROVIDE REQUIRED FIELD TESTING REQUIRED TO OBTAIN CERTIFICATIONS. ALSO, ANY MODIFICATIONS NEEDED TO SYSTEMS AFTER INITIAL TESTING TO PASS RETESTING IF REQUIRED.											
5. IECC 2021 MECHANICAL COMCHECK PERFORMED AND IS IN COMPLIANCE. REFERENCE JOB NAME JOHN GRACE ARMS IN COMCHECK DATABASE FOR REFERENCE											
HVAC GENERAL NOTES											
1. COORDINATE DUCTWORK WITH EXISTING AND NEW SITE CONDITIONS, EQUIPMENT MANUFACTURE AND ALL OTHER TRADES TO PREVENT INTERFERENCES. RESIZE AND FIELD ROUT AS REQUIRED, USE EQUIVALENT DUCT SIZING.											
2. PROVIDE ACCESS AROUND ALL NEW EQUIPMENT PER MANUFACTURER RECOMMENDATIONS AND CODE REQUIREMENTS.											
3. ALL CORING THROUGH FLOORS SHALL BE DONE BY MECHANICAL CONTRACTOR.											
4. ALL DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE, UNLESS OTHERWISE NOTED ON THE DRAWINGS. COORDINATE ROUTING WITH OTHER TRADES TO PREVENT INTERFERENCES.											
5. BALANCE HVAC SYSTEMS AND DISTRIBUTION INCLUDING SUPPLY, RETURN AND OUTDOOR AIR TO INDICATED FLOW RATES, REFER TO VENTILATION SCHEDULE AND HVAC PLAN. IF NOT INDICATED ON DRAWING OR DETAIL, PROVIDE PROPER EQUIPMENT ON THE FIELD TO PROPERLY BALANCE SYSTEMS.											
6. DUCT SIZES TO DIFFUSERS SHALL MATCH NECK OR DIMENSIONS REQUIRED, REFER TO SCHEDULES.											
7. ALL CONCEALED SUPPLY AIR DUCTWORK SHALL BE INSULATED PER SPECIFICATIONS.											
8. SEAL ALL PENETRATIONS THROUGH WALLS PER SPECIFICATION.											
9. COORDINATE EXACT LOCATION OR DIFFUSERS AND RETURN GRILLS WITH ARCHITECTURAL AND ELECTRICAL REFLECTED CEILING PLANS.											
10. COORDINATE THERMOSTAT LOCATIONS WITH ARCHITECT.											
11. PROVIDE SPIN-IN DAMPERS AT ALL ROUND BRANCH DUCT CONNECTIONS TO DIFFUSERS. PROVIDE MANUAL VOLUME DAMPERS AS EACH BRANCH DUCT AT CONNECTION TO MAIN AS WELL AS IN EACH DUCT AFTER BRANCH DUCT SPLITS. THESE ARE NOT INDICATED ON PLANS BUT ARE REQUIRED. CONTRACTOR TO DETERMINE PROPER LOCATIONS TO PROPERLY BALANCE THE SYSTEM.											
GENERAL PIPING NOTES:											
1. COORDINATE NEW PIPING WITH EXISTING SITE CONDITIONS, EQUIPMENT, MANUFACTURER, AND ALL OTHER TRADES TO PREVENT INTERFERENCES.											
2. PROVIDE ACCESS AROUND ALL NEW EQUIPMENT PER MANUFACTURER RECOMMENDATIONS AND CODE REQUIREMENTS.											
3. ALL CORING THROUGH FLOORS AND FLOOR TRENCHING SHALL BE BY MECHANICAL CONTRACTOR.											
4. ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE, COORDINATE ALL ROUTING WITH OTHER TRADES TO PREVENT INTERFERENCES.											
5. BALANCE WATER SYSTEMS TO INDICATED FLOW RATES REQUIRED BY MANUFACTURER OF EQUIPMENT IN EQUIPMENT SCHEDULES.											
6. ALL PIPING SHALL BE INSULATED PER SPECIFICATIONS.											
7. ALL PIPING SHALL BE CONCEALED IN WALLS OR CEILINGS SPACE.											
8. SEAL ALL PENETRATIONS THROUGH WALLS, REFER TO SPECIFICATIONS.											
9. EXPANSION LOOPS (JOINTS) AND GUIDES ARE TO BE USED ON ALL HOT WATER AND HOT WATER RETURN PIPING.											
GENERAL SHEET MECHANICAL NOTES											
1. SEE M-001 FOR ADDITIONAL NOTES											
2. THE DRAWINGS ARE DIAGRAMMATIC AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS AND COORDINATION WITH OTHER TRADES WILL BE REQUIRED. PROVIDE ADDITIONAL FITTINGS AND OFFSETS THAT MAY BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS AND ANY OTHER EXISTING SPACE CONSTRAINTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH ALL TRADES FOR UTILIZATION OF SPACE CONSTRAINTS.											
3. REFER TO ARCHITECT CEILING REFLECTED CEILING PLANS FOR LOCATION OF LIGHTS, CEILING DROPS AND ELEVATIONS.											
4. THE CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL EXISTING ABOVE CEILING EQUIPMENT INCLUDING STRUCTURAL TO AVOID INTERFERENCES.											
5. ALL SUPPLY DUCT WORK SHALL BE INSULATED PER SPECIFICATIONS.											
6. ROUND DUCT BRANCH CONNECTIONS TO DIFFUSERS TO BE SAME SIZE AS DIFFUSER NECK.											
7. PROVIDE DUCT TAP WITH VOLUME DAMPER AT EACH BRANCH TO DIFFUSER DUCT CONNECTION, SPIN -IN FITTINGS MAY BE USED WHERE ROUND DUCTS ARE CONNECTING TO RECTANGULAR DUCTS.											
8. BALANCING THE AIR SYSTEM IS REQUIRED REFER TO HVAC SPECIFICATIONS, NOTES AND DRAWINGS.											
MECHANICAL KEYED SHEET NOTES											
1. KITCHEN EXHAUST HOODS PROVIDED BY ARCHITECT, TRADES TO COORDINATE EXHAUST CONNECTIONS SIZE AND CFM WITH HOOD MANUFACTURER. INSTALL EXHAUST DUCT PER MANUFACTURERS RECOMMENDATIONS, INSTALL CEILING RADIATION DAMPER PER CODE. EXHAUST ROUTING CAN NOT TIE INTO ERV EXHAUST SYSTEM, ROUTE IN MANNER THAT IT DOES NOT INTERFERE WITH ERV DUCT WORK.											
2. TRANSITION TO SUPPLY/RETURN GRILL FOR INLAY OF WINDOW GRILL HEIGHT WILL BE 12" X WIDTH OF EXISTING WINDOW OPENING.											
3. ALL REFRIGERATION LINE SETS RUNNING ALONG EXPOSED EXTERIOR BRICK MUST HAVE UV RESISTANT PLASTIC COVERS. COLOR TO MATCH BRICK AS APPROVED BY ARCHITECT.											
4. ERV EXHAUST DUCT TO SIDE WALL, TERMINATE WITH VENT CAP, BUILT IN BACKDRAFT DAMPER AND BIRD SCREEN. INSTALL DUCT IN TRUSS SPACE WHICH IS NOT KNOWN AT THIS TIME AND NEEDS TO COORDINATE WITH TRUSS MANUFACTURER.											
5. ERV OUTSIDE AIR DUCT TO SIDEWALL TERMINATE WITH OA LOUVER, INSULATE DUCT FROM LOUVER TO ERV UNIT. COORDINATE DUCT ROUTING WITH TRUSS MANUFACTURER AND ARCHITECTURAL DRAWINGS, ALSO INCLUDE RADIATION DAMPER.											
6. REFRIGERANT PIPING UP TO ROOF THROUGH PITCH BOX TO ASSOCIATED CONDENSER. ADHERE TO MANUFACTURER REQUIREMENTS FOR TOTAL LENGTH OF PIPING FOR HEAT PUMP SYSTEM, DO NOT EXCEED LENGTH. ROUTE NEEDED POWER AND CONTROL WIRING FROM HEAT PUMP CONDENSER IN SAME LOCATION WITH REFRIGERANT PIPING.											
7. PROVIDE RETURN AIR FILTER AND RETURN GRILL COMBINATION AND PROVIDE FILTER (MERV 8) AT REQUIRED SIZE.											
8. 4" DRYER EXHAUST TO ROOF OR SIDE WALL, TERMINATE WITH VENT CAP WITH INTEGRAL BACKDRAFT DAMPER. COORDINATE LOCATION WITH OTHER TRADES AND EQUIPMENT TO AVOID INTERFERENCE.											
9. FAN COIL UNIT TO BE HANG ABOVE CEILING WITH PROPER ACCESS PANEL AND CLEARANCE PROVIDED. COORDINATE CONDENSATE DRAIN ROUTING TO NEAREST MECHANICAL FLOOR DRAIN.											
10. THERMOSTAT LOCATION, PROVIDE PROPER CONTROL WIRING BACK TO FAN COIL UNIT.											
11. ERV UNIT, TO BE INTERLOCKED WITH FAN COIL UNIT, SEE MANUFACTURER REQUIREMENTS FOR WIRING.											
12. EXHAUST FAN AND LIGHT COMBO UNIT, ROUTE 6 IN DUCT WORK TO EXHAUST PORT OF THE ERV UNIT. UNIT TO BE CONTROLLED OCCUPANCY, REFER TO ELECTRICAL.											

John Grace Arms
21030 Indian St, Southfield MI 48033
Developed by
John Grace Arms LDHA LLC

SDG

Architects + Planners
607 Shelby Street
Suite 704
Detroit, MI 48226
Tel: 313-961-9000
Fax: 313-964-3233

A & A Engineering & Consulting
28063 Vista Way, South Lyon, MI 48178

REGISTRATION SEAL

STEPHEN M. HENNARD
ENGINEER
No. 6201059975
LICENSED PROFESSIONAL ENGINEER

KEY PLANS

SHEET TITLE

MECHANICAL SYMBOLS AND ABBREVIATIONS

SCALE: AS NOTED

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DATE
10.20.24

BULLETIN 3

5.19.25

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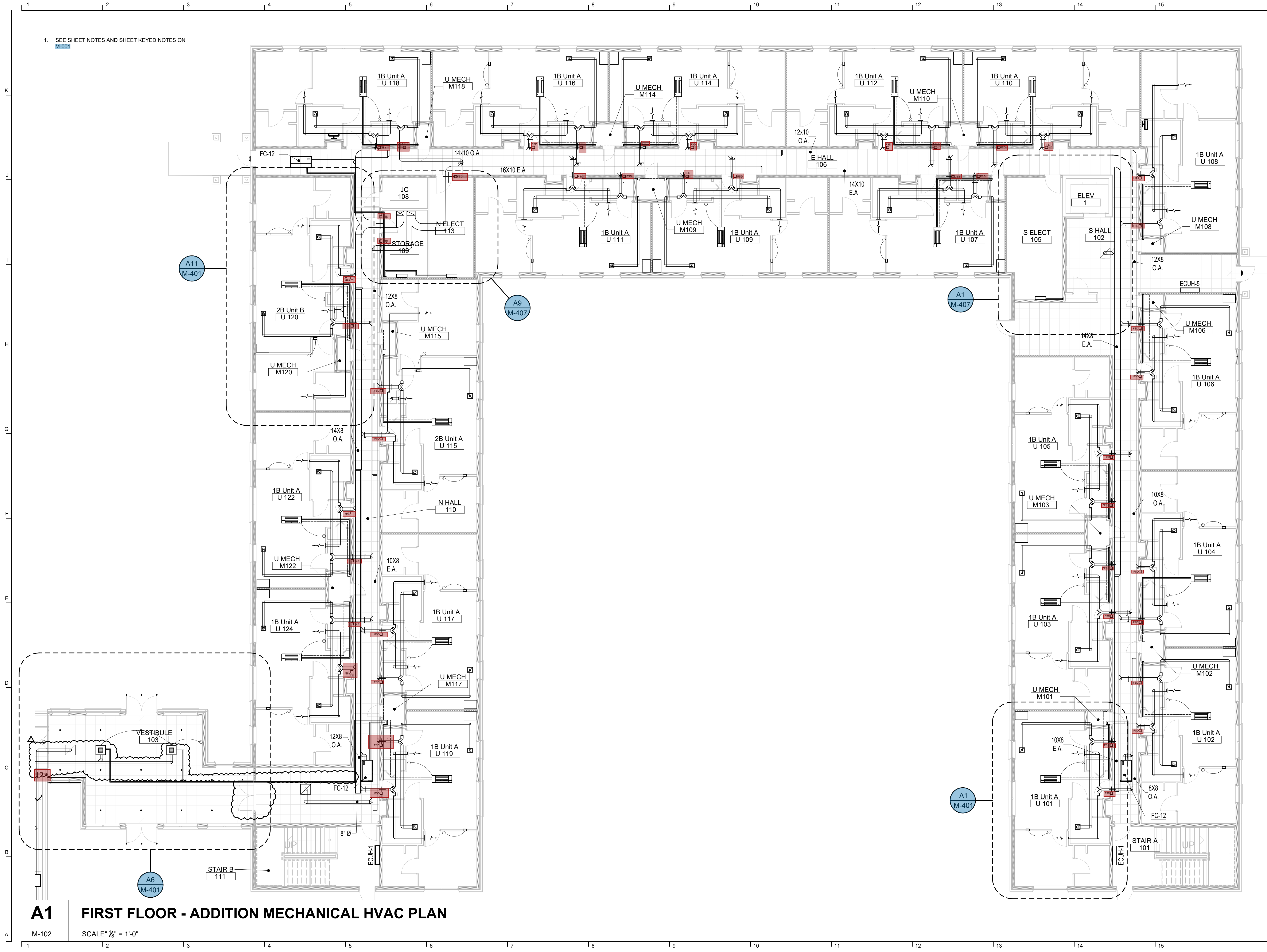
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FILE NO.

M-001

SHEET NO.

3/10/2025 8:26:38 PM



1. SEE SHEET NOTES AND SHEET KEYED NOTES ON
M-001

A1 FIRST FLOOR - ADDITION MECHANICAL HVAC PLAN

M-102 SCALE: 1/8" = 1'-0"

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21030 Indian St, Southfield MI 48033
Developed by
John Grace Arms LDHA LLC

SDG
Architects + Planners
607 Shelby Street
Suite 704
Detroit, MI 48226
Tel: 313-961-0000
Fax: 313-964-3233

A & A Engineering & Consulting
28862 Vista Way, South Lyon, MI 48178

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KEY PLANS

SHEET TITLE
FIRST FLOOR - ADDITION MECHANICAL HVAC PLAN

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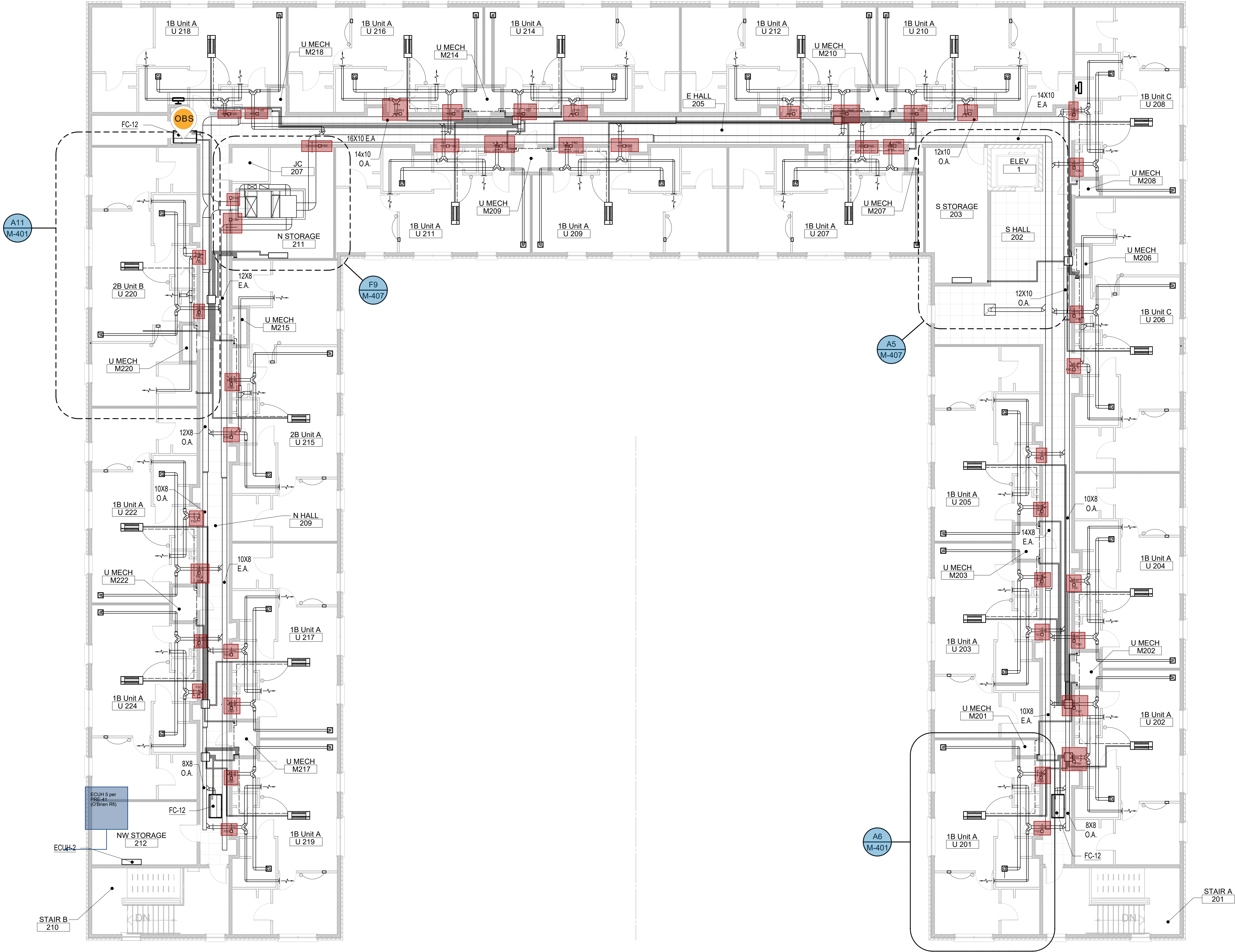
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M-102

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1. SEE SHEET NOTES AND SHEET KEYED NOTES ON
M-001



A1

SECOND FLOOR - ADDITION MECHANICAL HVAC PLAN

M-104

SCALE" $\frac{1}{8}$ " = 1'-0"

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John Grace Arms LDHA LLC

SDG
Architects + Planners
607 Shelby Street
Suite 704
Detroit, MI 48226
Tel: 313-961-0000
Fax: 313-964-3233

A & A Engineering & Consulting
28862 Vista Way, South Lyon, MI 48178

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KEY PLANS

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SECOND FLOOR -
ADDITION MECHANICAL
HVAC PLAN

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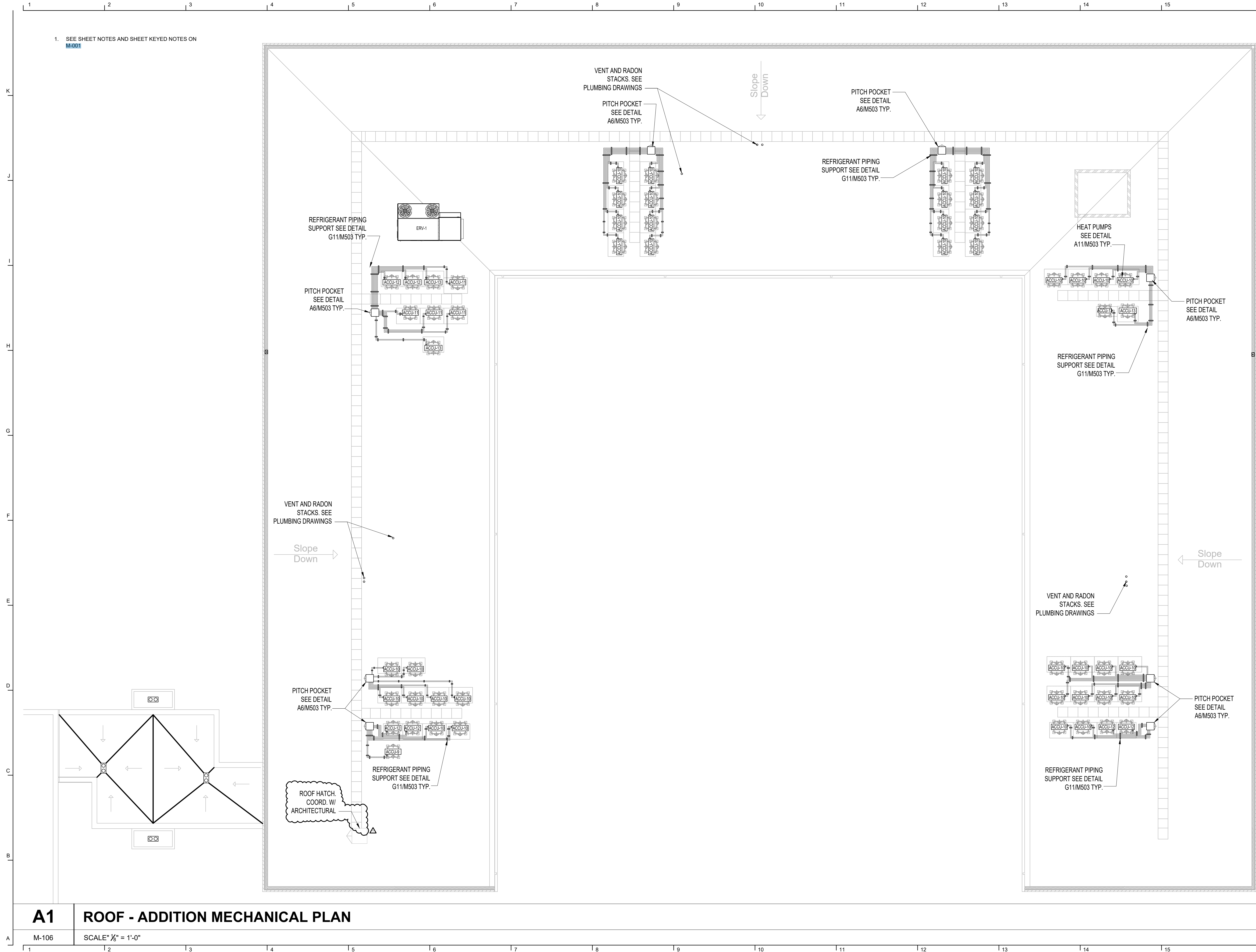
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SHEET TITLE

MECHANICAL HVAC
ENLARGED PLANS

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△ BULLETIN 2	3.05.25
△ BULLETIN 3	5.19.25

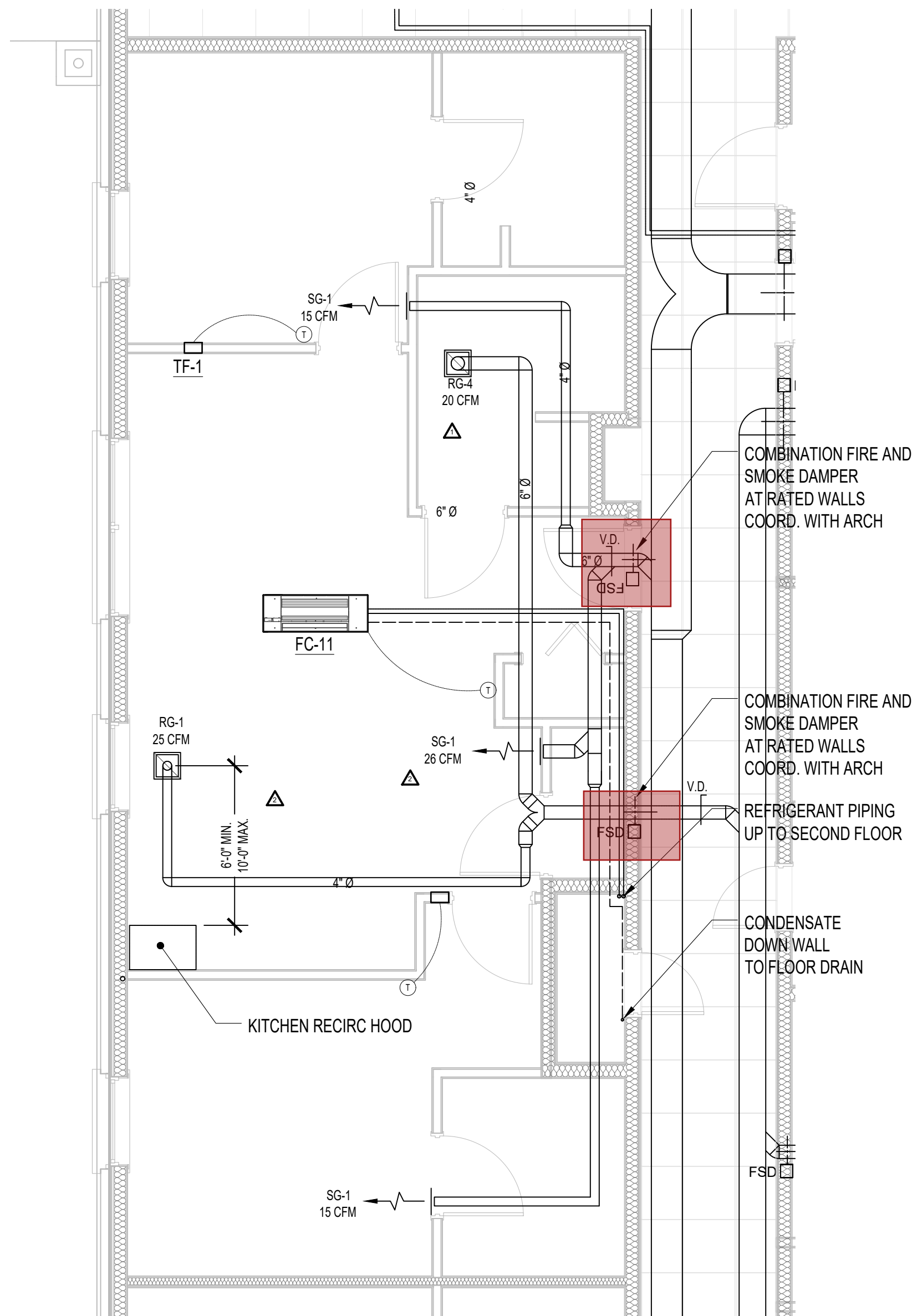
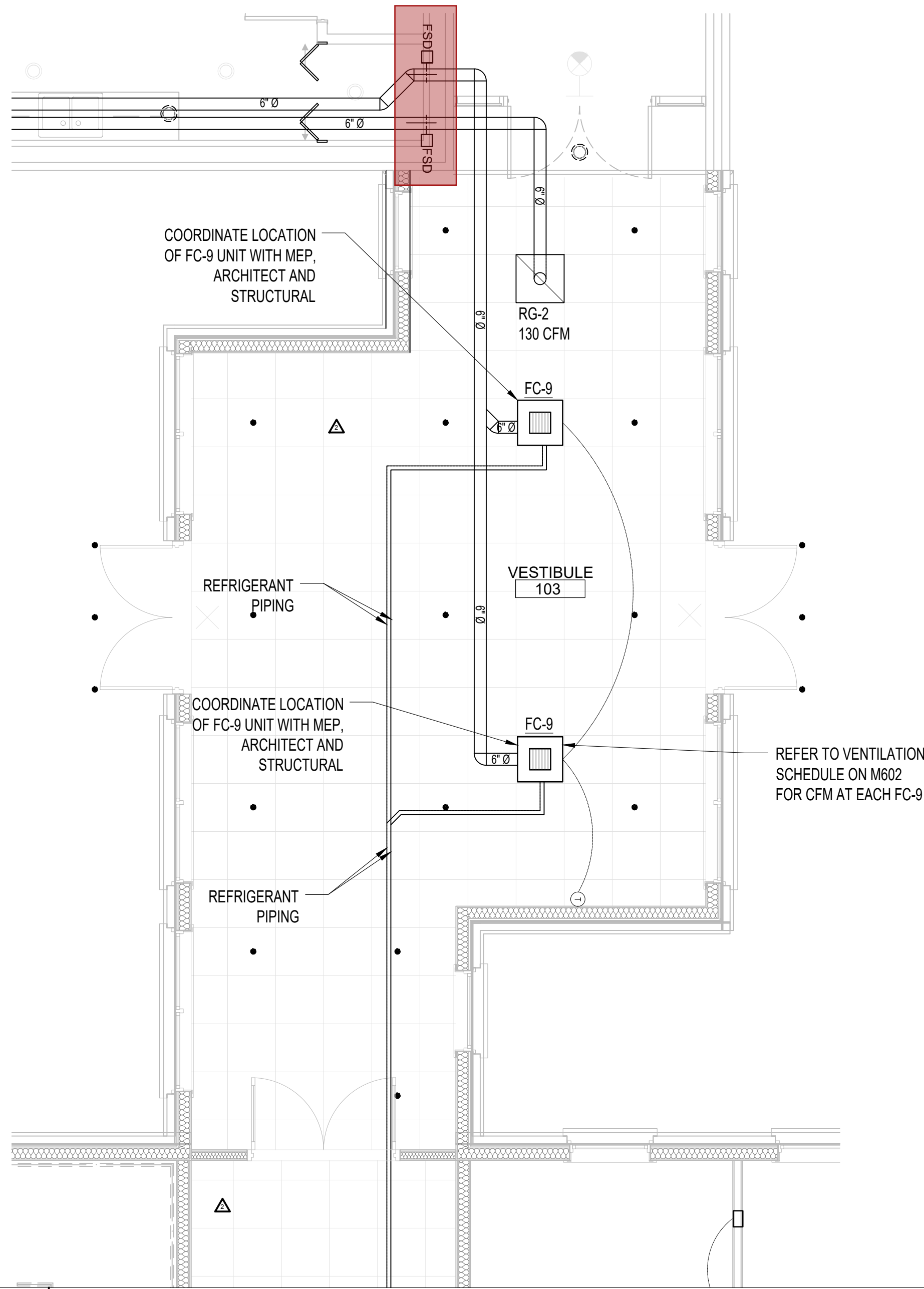
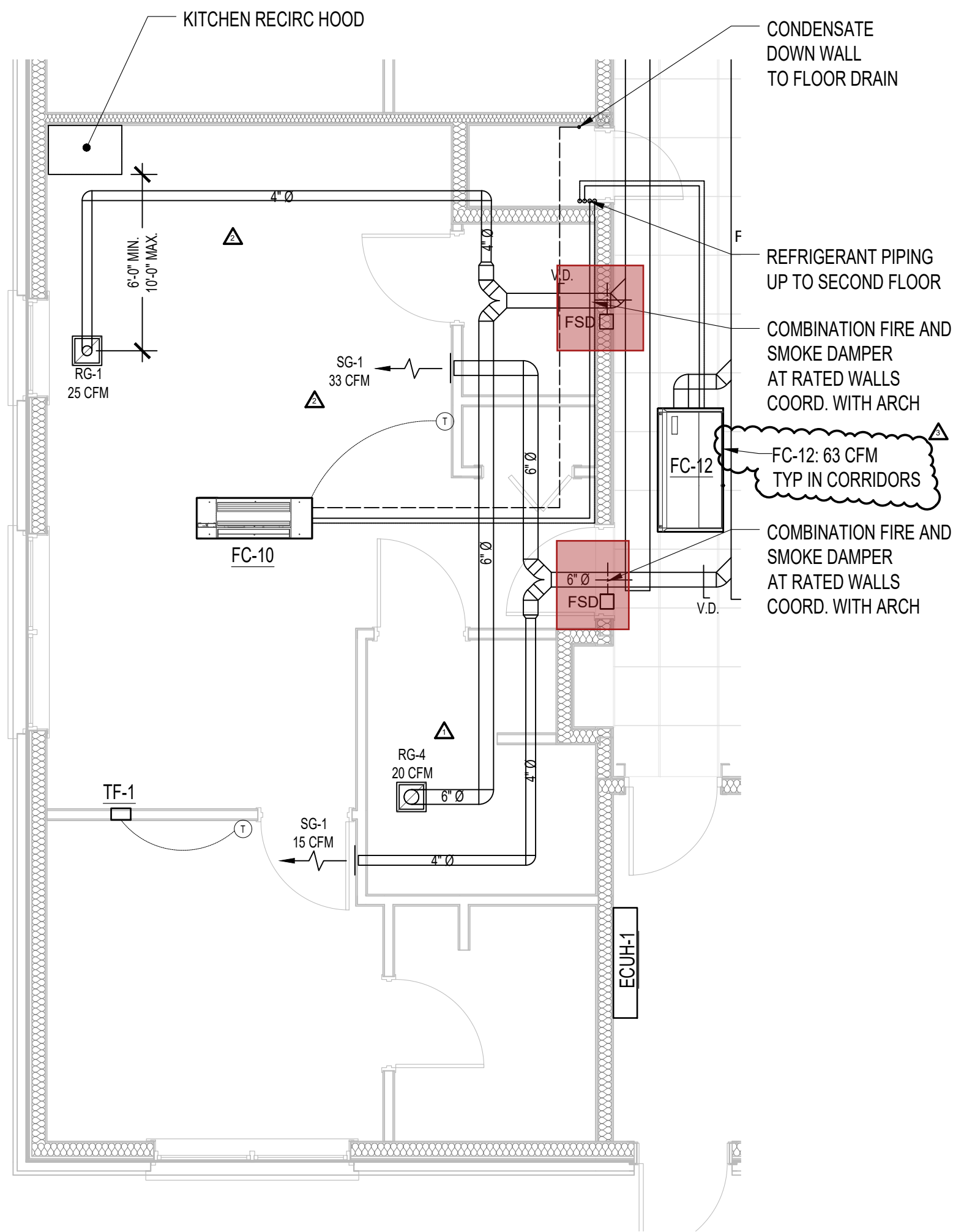
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A6

1B UNIT A - HVAC PLAN

A6

ENLARGED HVAC PLAN

A11

2B UNIT B (A SIM) - HVAC PLAN

M-401

$$1/4" = 1'-0"$$

M-401

$$1/4" = 1'-0"$$

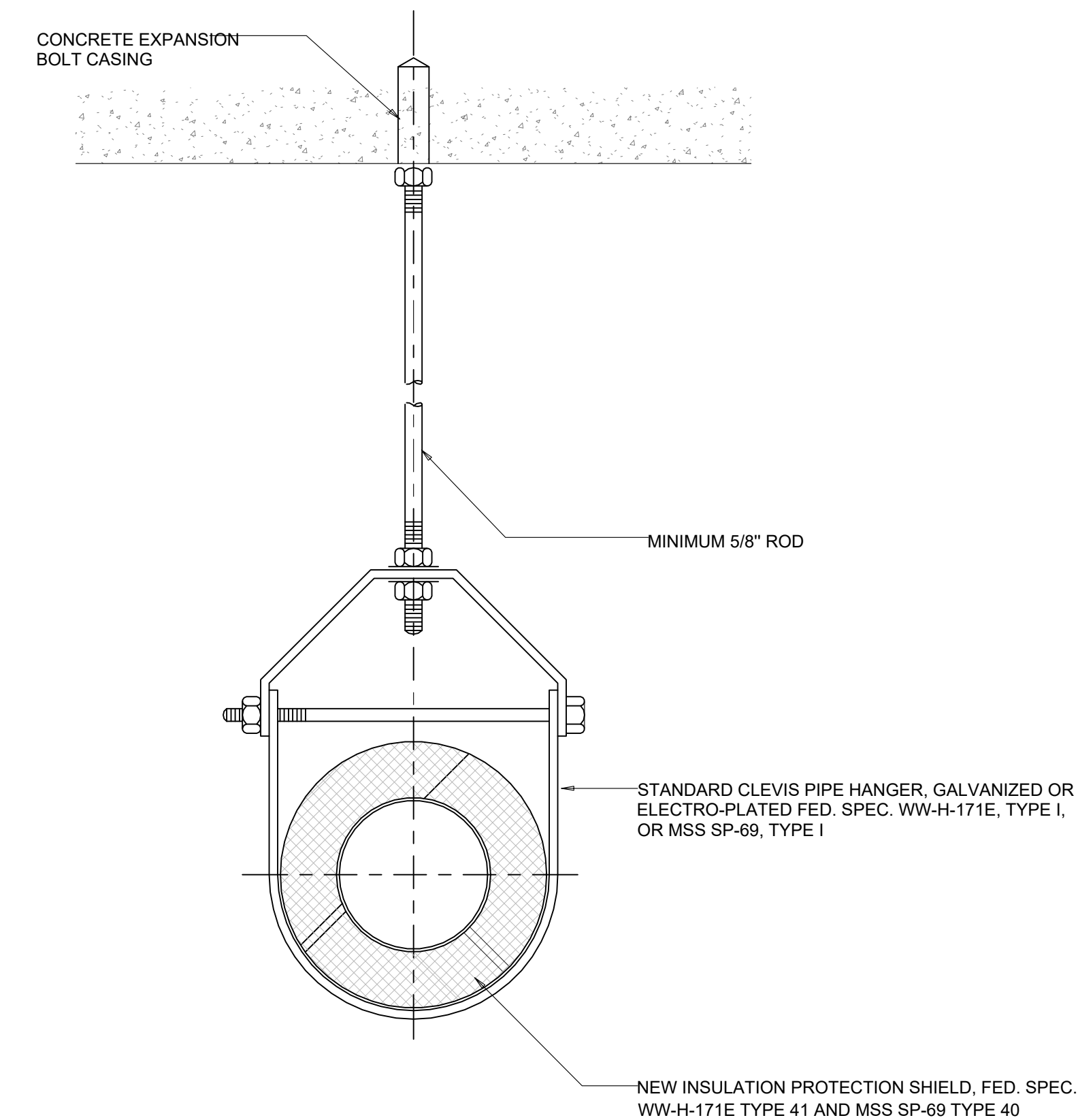
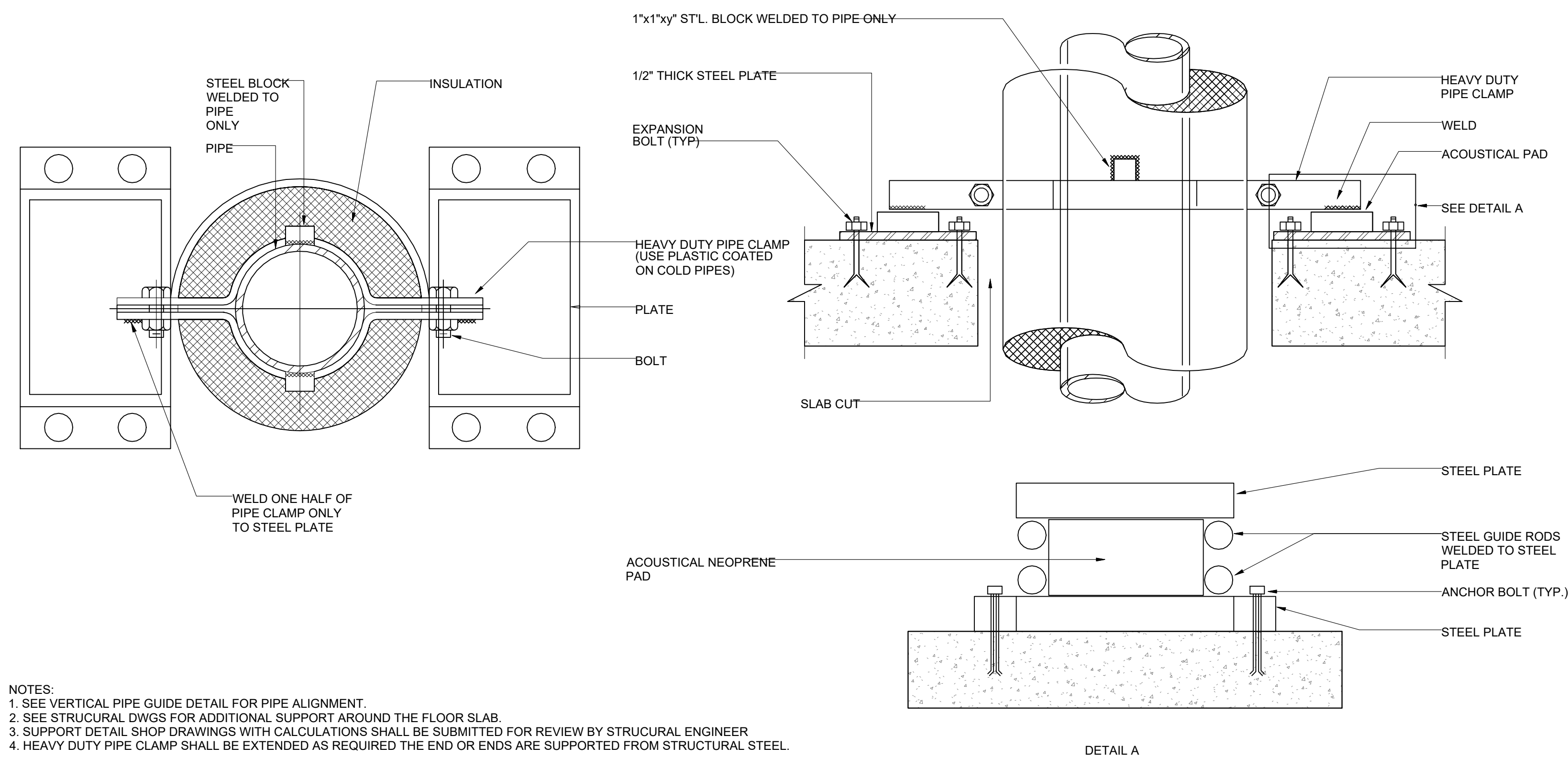
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$$1/4" = 1'-0"$$

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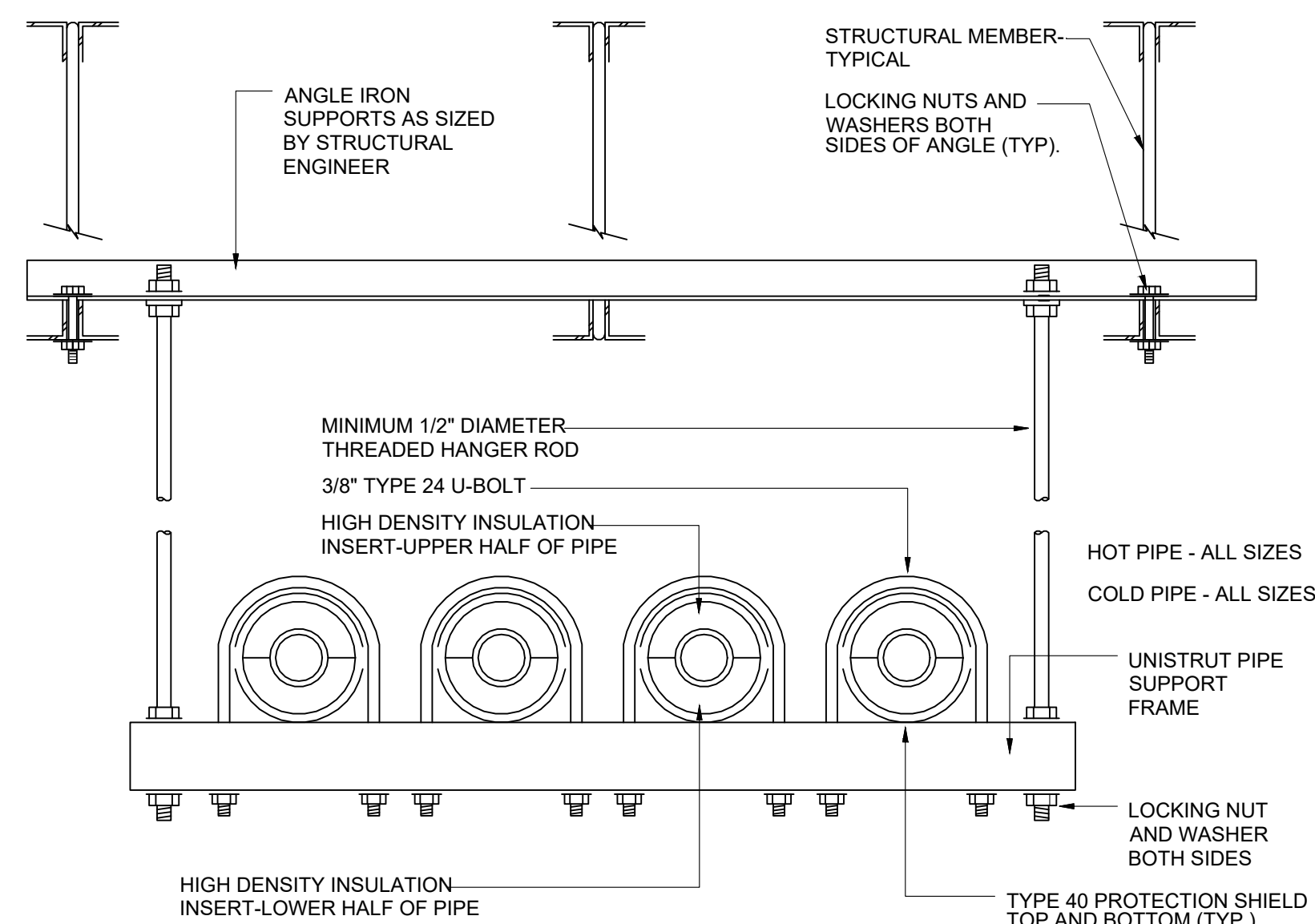
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G1	VERTICAL PIPE SUPPORT
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M-502	NTS
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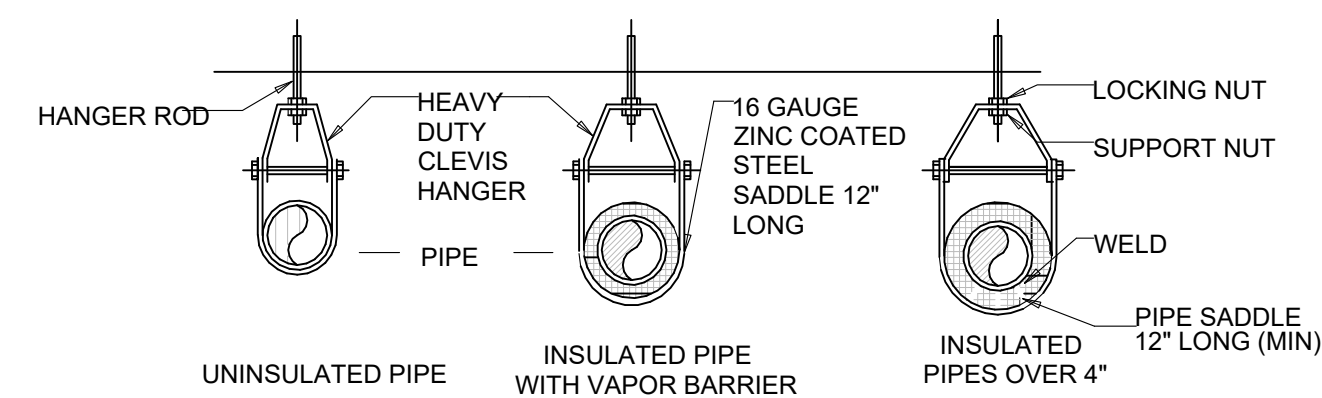
INDIVIDUAL PIPE HANGER ROD & SPACING SCHEDULE											
NOMINAL PIPE OR TUBE SIZE- INCHES	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	--
HANGER ROD SIZE-INCHES	3/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8	7/8	7/8	--
MAXIMUM SPACING BETWEEN INCHES	6	7	9	10	11	12	14	16	17	19	--
MAXIMUM SPACING BETWEEN CU. TUBE SUPPORT IN FEET	6	6	8	9	10	10	12	14	14	16	--

NOTES:

1. TRAPEZE SPACING SHALL BE BASED ON SPACING OF SMALLEST PIPE ON TRAPEZE.
2. TRAPEZE SHALL BE DESIGNED WITH A FACTOR OF SAFETY 5 FOR CENTER OF SPAN CONCENTRATED LOAD.
3. METHOD OF HANGING, TYPE OF INSERT, BEAM CLAMP, ROD, ETC. MUST BE APPROVED BY STRUCTURAL ENGINEER PER SHOP DRAWINGS.
4. FOR ALL UNINSULATED COPPER PIPING, HANGERS SHALL MATCH IN MATERIAL TYPE SO AS TO AVOID DISSIMILAR METAL CORROSION. THE USE OF NEOPRENE OR PVC SADDLES IS UNACCEPTABLE.

A1	TRAPEZE PIPE HANGERS
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M-502	NTS
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INDIVIDUAL PIPE HANGER ROD & SPACING SCHEDULE											
NOMINAL PIPE OR TUBE SIZE-INCHES	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	--
HANGER ROD SIZE-INCHES	3/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8	7/8	7/8	--
MAXIMUM SPACING BETWEEN PIPE SUPPORT-FEET	6	7	9	10	11	12	14	16	17	19	--
MAXIMUM SPACING BETWEEN CU. TUBE SUPPORT-FEET	6	6	8	9	10	10	12	14	14	16	--

NOTES:

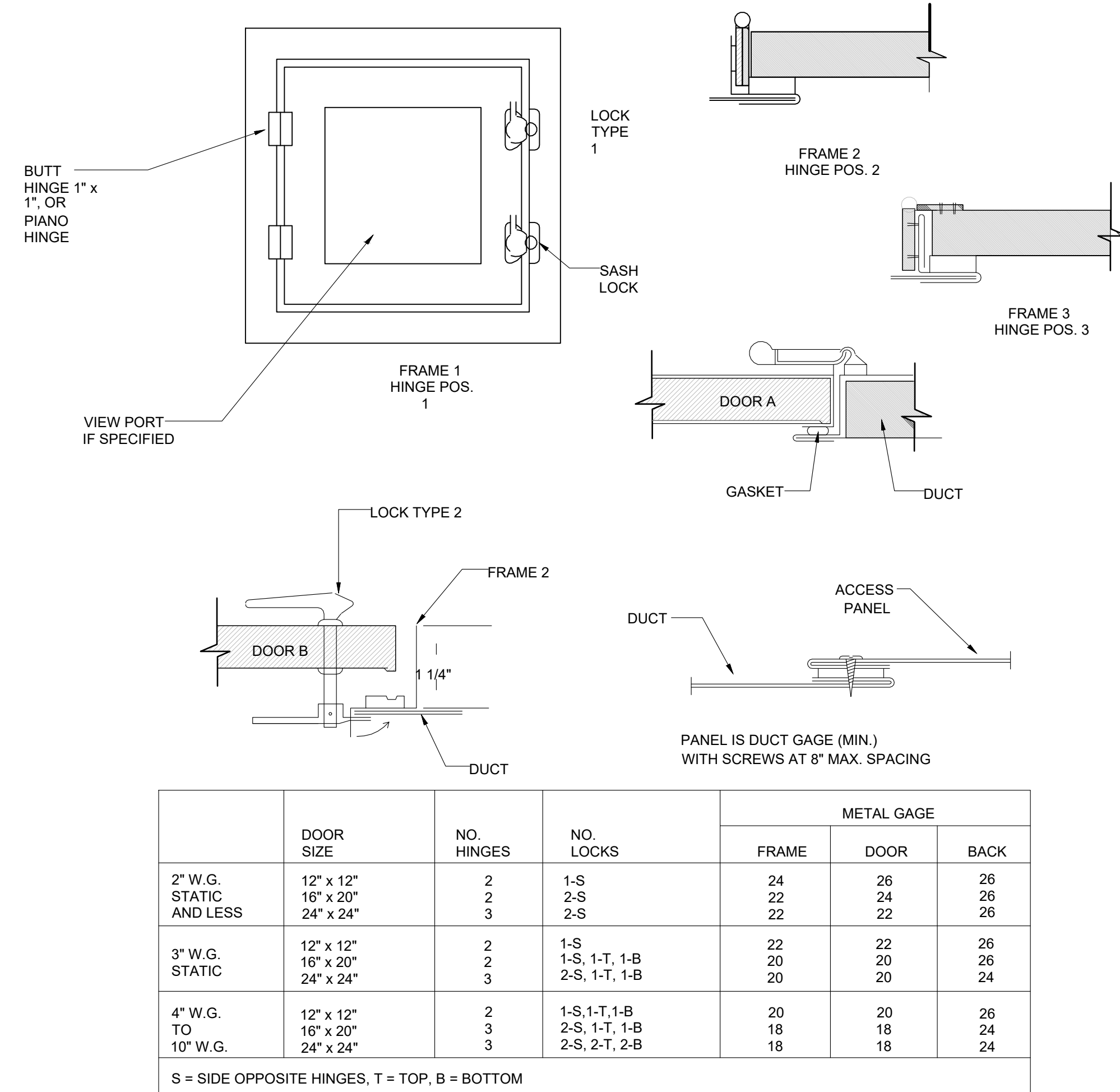
1. TRAPEZE SPACING SHALL BE BASED ON SPACING OF SMALLEST PIPE ON TRAPEZE.
2. TRAPEZE SHALL BE DESIGNED WITH A FACTOR OF SAFETY 5.0 FOR CENTER OF SPAN CONCENTRATED LOAD.
3. METHOD OF CHANGING, TYPE OF INSERT, BEAM CLAMP, ROD, ETC. MUST BE APPROVED BY STRUCTURAL ENGINEER PER SHOP DRAWINGS.
4. FOR ALL UNSULPHATED COPPER PIPING, HANGERS SHALL MATCH IN MATERIAL TYPE SO AS TO AVOID DISSIMILAR METAL CORROSION. THE USE OF NEOPRENE OR PVC SADDLES IS UNACCEPTABLE.

A6 TYPICAL CLEVIS HANGER SUPPORTS

M-502	NTS
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G11 SUPPORT SYSTEM FOR INSULATED PIPES

M-502	NTS
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A11 DUCT ACCESS DOORS

M-502	NTS
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REGISTRATION SEAL



KEY PLANS

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MECHANICAL TYPICAL DETAILS

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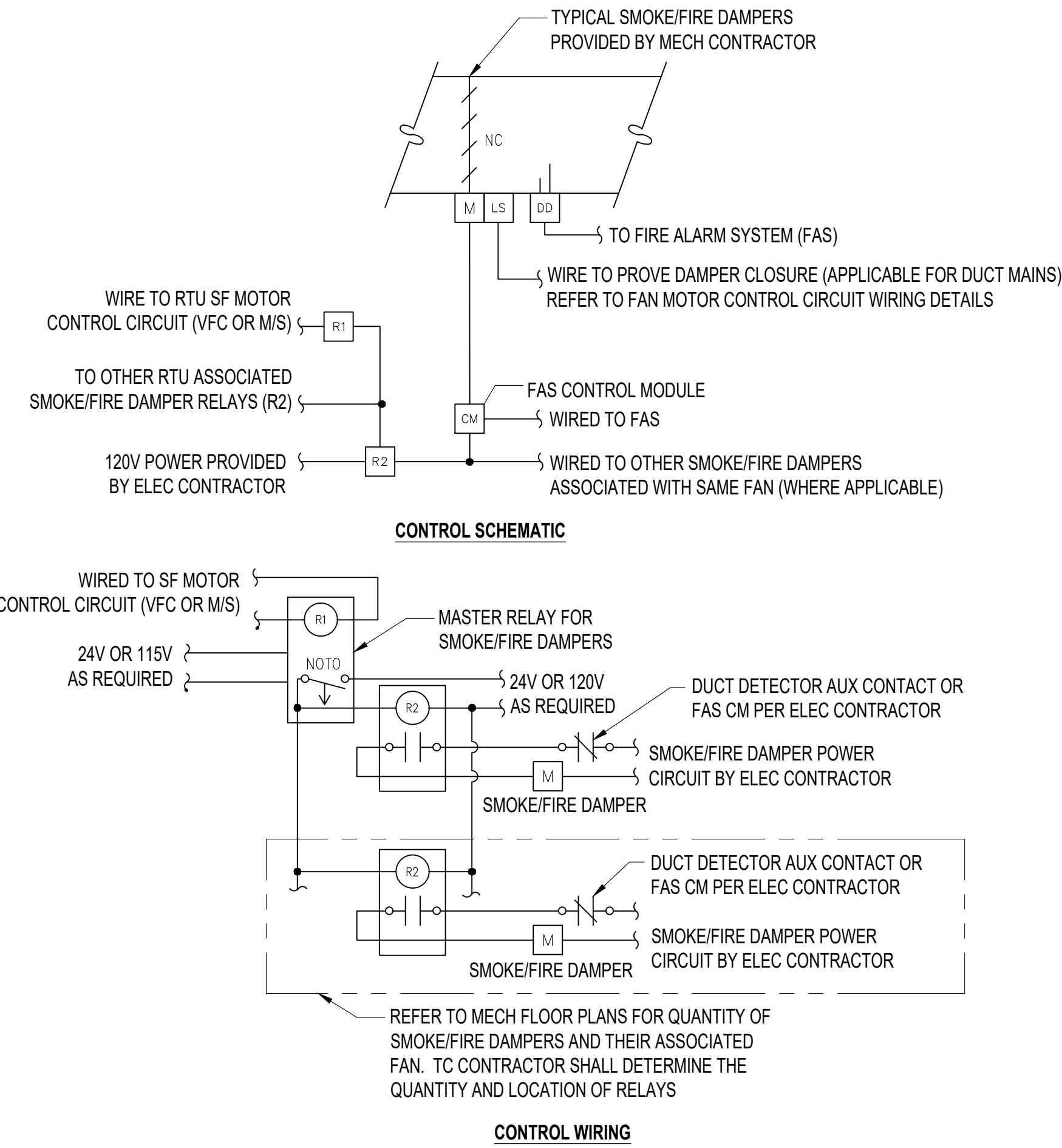
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J
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H
G
F
E
D
C
B
A

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15



- NOTES:
- REFER TO FLOOR PLANS FOR QUANTITY 7 LOCATION OF THE SMOKE/FIRE DAMPERS AND ASSOCIATED HEAT PUMP UNIT
 - ELECTRICAL CONTRACT SHALL PROVIDE 120V POWER REQUIREMENT FOR SMOKE/FIRE DAMPER ACTUATOR(S)
 - TC CONTRACTOR SHALL PROVIDE CONTROL RELAY IN ENCLOSURE FOR SMOKE/FIRE DAMPER CONTROL. IF MULTIPLE POWER CIRCUITS ARE USED FOR SMOKE/FIRE DAMPERS ASSOCIATED WITH COMMON FAN, MULTIPLE CONTROL RELAYS SHALL BE USED AND WIRED IN PARALLEL
 - SMOKE/FIRE DAMPERS SHALL BE SHIPPED AS AN ASSEMBLY FOR INSTALLATION ON SITE AND BEAR THE UL LISTING LABEL
- SEQUENCE OF OPERATION**
- SMOKE/FIRE DAMPERS SHALL BE HARDWIRE INTERLOCKED TO ASSOCIATE FAN CONTROLS AND SHALL OPEN WHEN FAN IS ACTIVATED AND CLOSE WHEN FAN IS DEACTIVATED.
 - WHEN PRODUCTS OF COMBUSTION ARE DETECTED AT DUCT SMOKE/FIRE DETECTOR, FIRE ALARM SYSTEM SHALL CLOSE RESPECTIVE SMOKE/FIRE DAMPERS AND DEACTIVATE ASSOCIATED FAN
 - WHERE APPLICABLE, FIRE/SMOKE/FIRE DAMPER LIMIT (ES) SWITCH SHALL BE HARDWIRE INTERLOCKED TO RESPECTIVE FAN CONTROL CIRCUIT TO PREVENT FAN FROM OPERATING UNTIL DAMPER(S) ARE PROVEN OPEN.

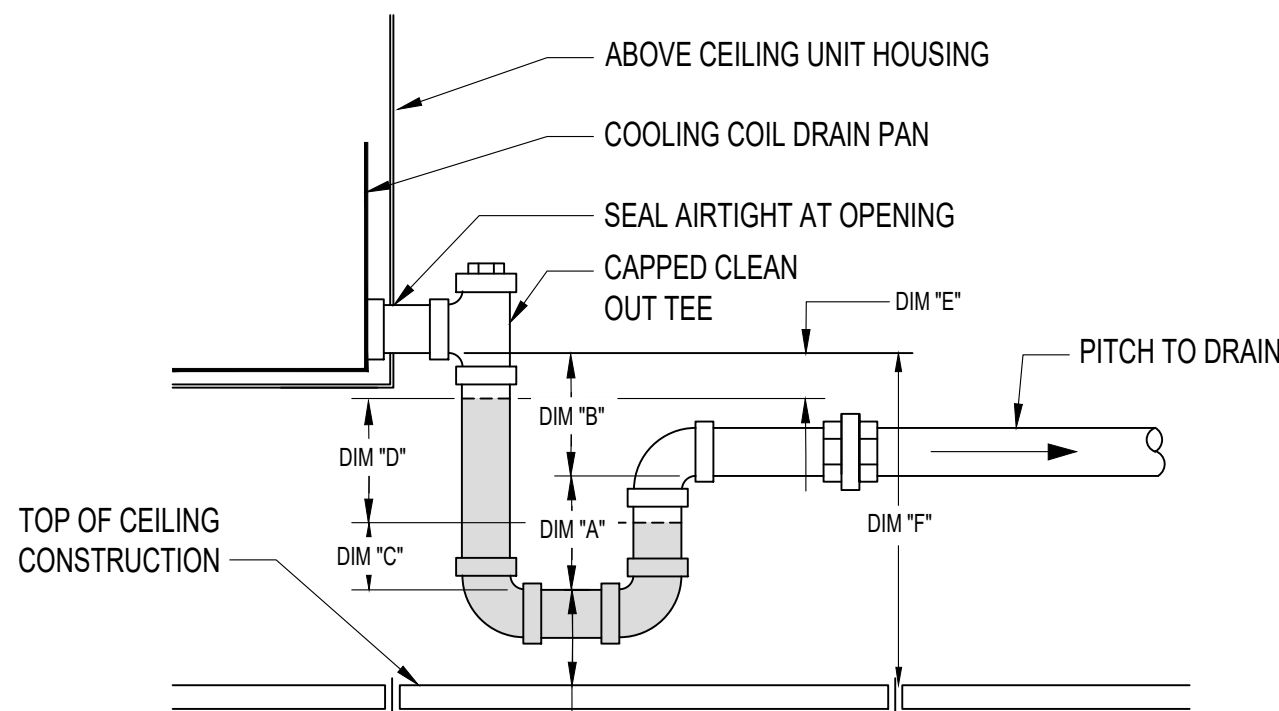
A1 DOAS 1 SMOKE/FIRE CONTROL WIRING

M-505

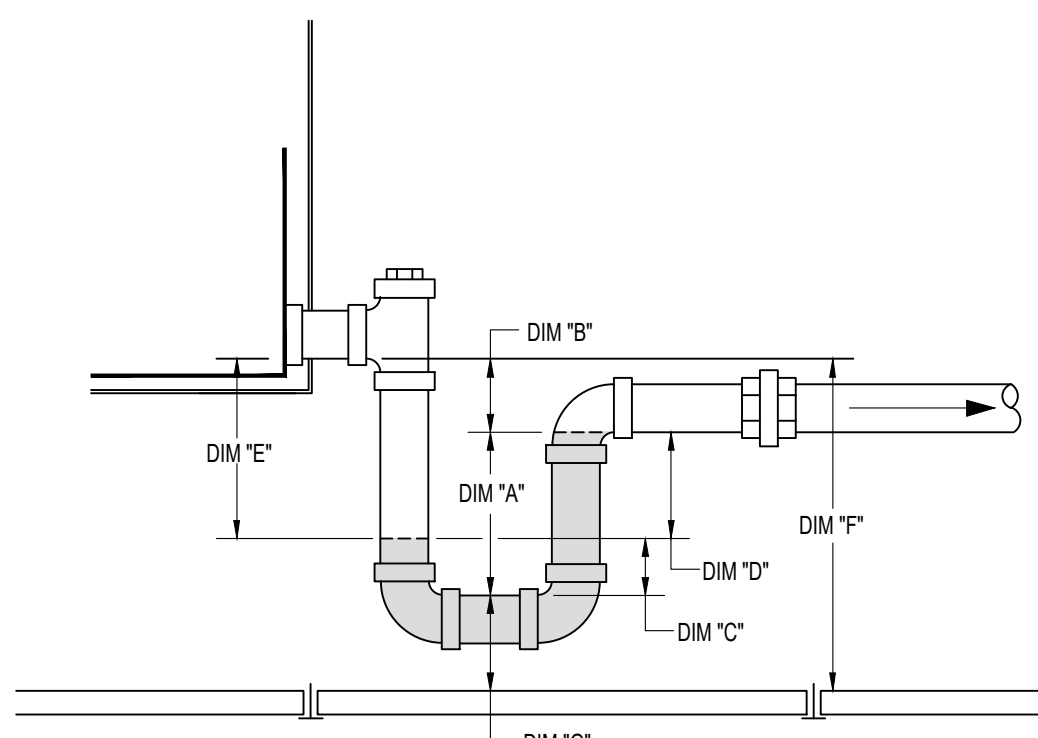
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TRAP DIMENSION TABLE										
TYPE OF SYSTEM		DIMENSIONS "A" (INCHES) MIN.	DIMENSIONS "B" (INCHES)	DIMENSIONS "C" (INCHES) (TRAP SEAL)	DIMENSIONS "D" (INCHES)	DIMENSIONS "E" (INCHES)	DIMENSIONS "F" (INCHES) DRAIN PIPE SIZE (INCHES)			
							1 1/2"	2"	2 1/2", 3"	4"
DRAW THROUGH	-2.1 TO -3	3.5	3.5	2	3	2	10.0	11.0	12.0	13.0
	UP TO -2	3.0	3.0	2	2	2	9.0	10.0	11.0	12.0
BLOW THROUGH	UP TO +2	4.0	2.0	2	2	4	9.0	10.0	11.0	12.0
	+2.1 TO +3	5.0	2.0	2	3	5	10.0	11.0	12.0	13.0

- NOTES:
- REFER TO TERMINAL DEVICES USED FOR COOLING, COMPUTER ROOM AIR CONDITIONING UNITS, FAN COIL UNITS SPLIT SYSTEM AIR CONDITIONING UNIT ETC. FOR (-) OR (+) STATIC PRESSURE AT COIL DRAIN PAN
 - DIMENSION "G" IS MIN: 3" FOR UP TO 1 1/2" DRAIN PIPE 4" FOR 2" DRAIN PIPE 5" FOR 2 1/2" OR 3" DRAIN PIPE 6" FOR 4" DRAIN PIPE



DRAW THROUGH

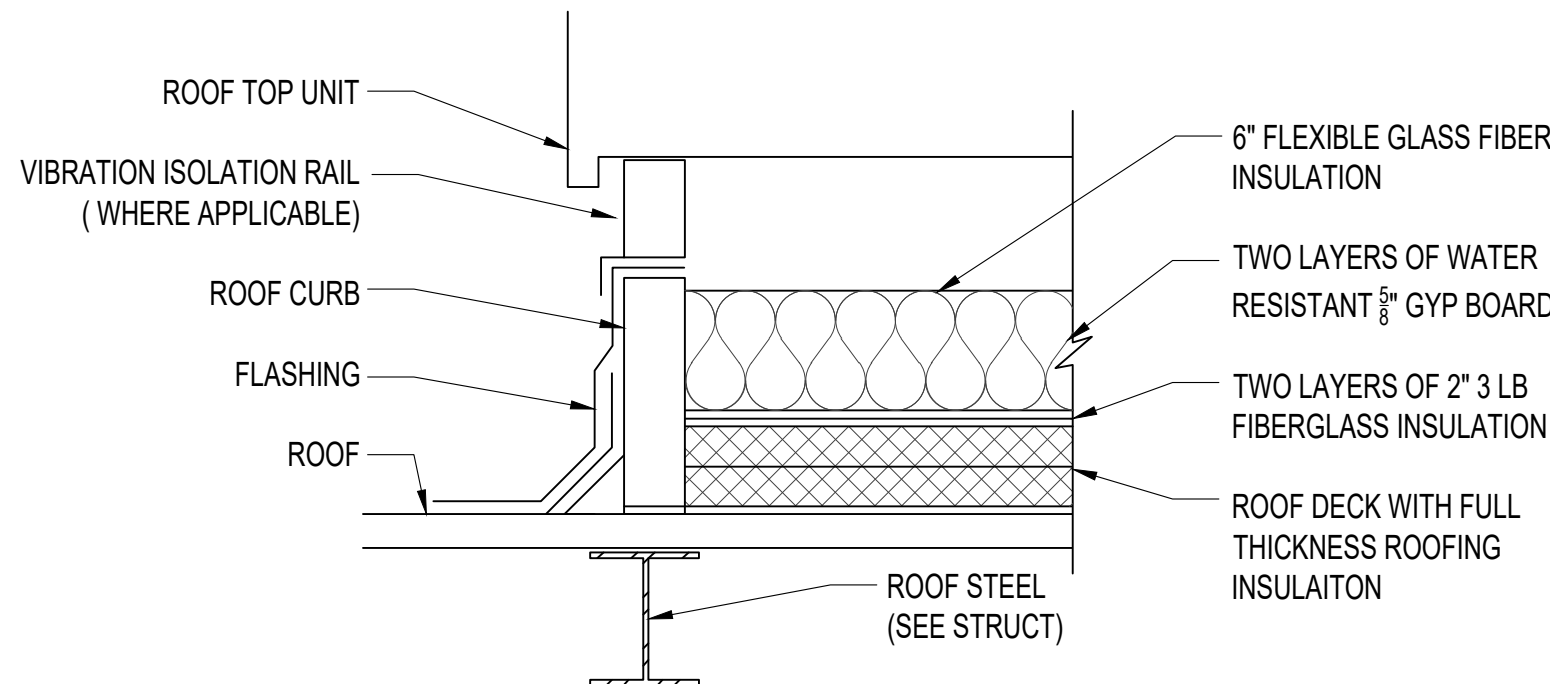


BLOW THROUGH

E6 CONDENSATE DRAIN PAN TRAP DETAIL (ABOVE CEILING UNITS)

M-505

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NOTE: ALL DUCT, PIPING, OR ELECTRICAL CONNECTIONS TO UNIT BELOW CURB SHALL HAVE FLEXIBLE CONNECTIONS. CUT INSULATION, GYP BOARD, ROOFING INSULATION, AND METAL DECKING PENETRATIONS TIGHT TO ITEM PENETRATING ROOF. PACK ALL PENETRATION OPENINGS WITH FLEXIBLE GLASS FIBER

A6 ROOF TOP UNIT CURB DETAIL

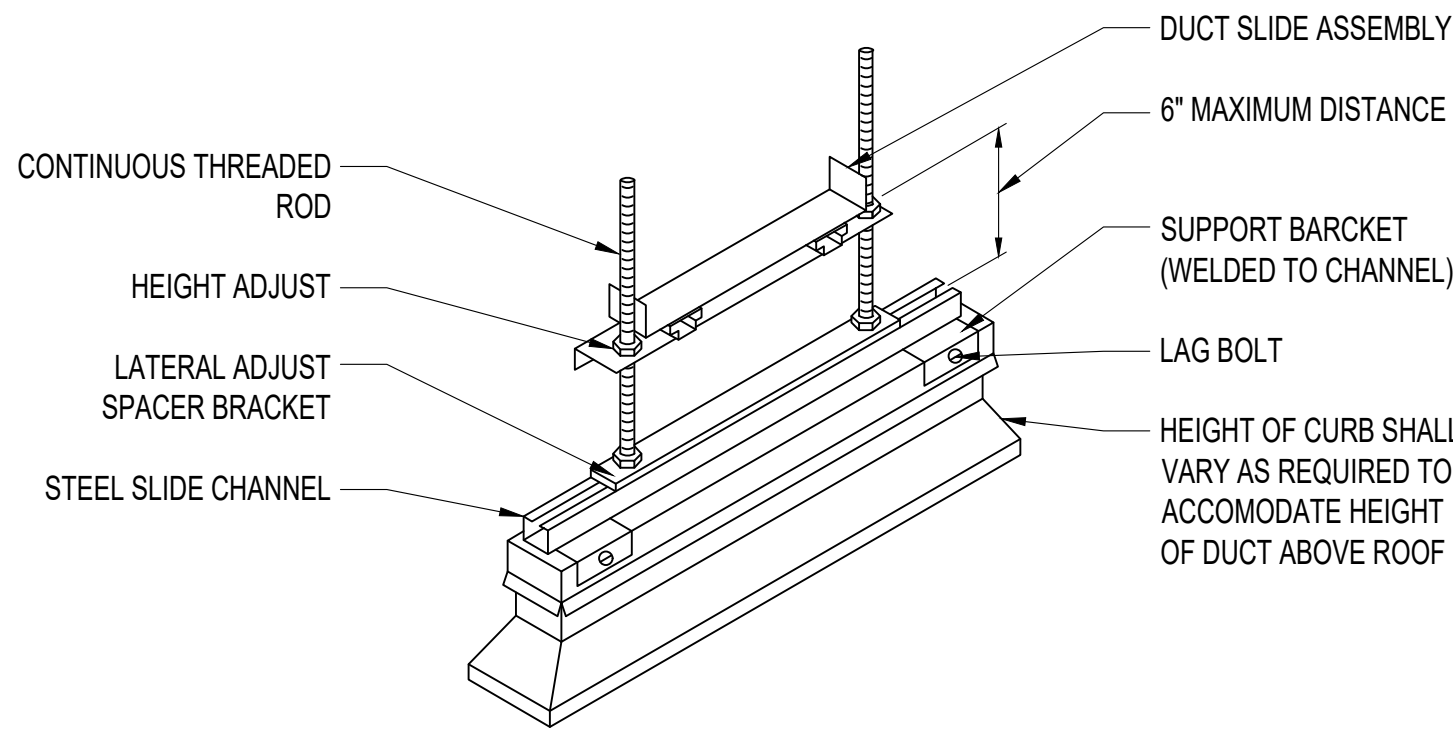
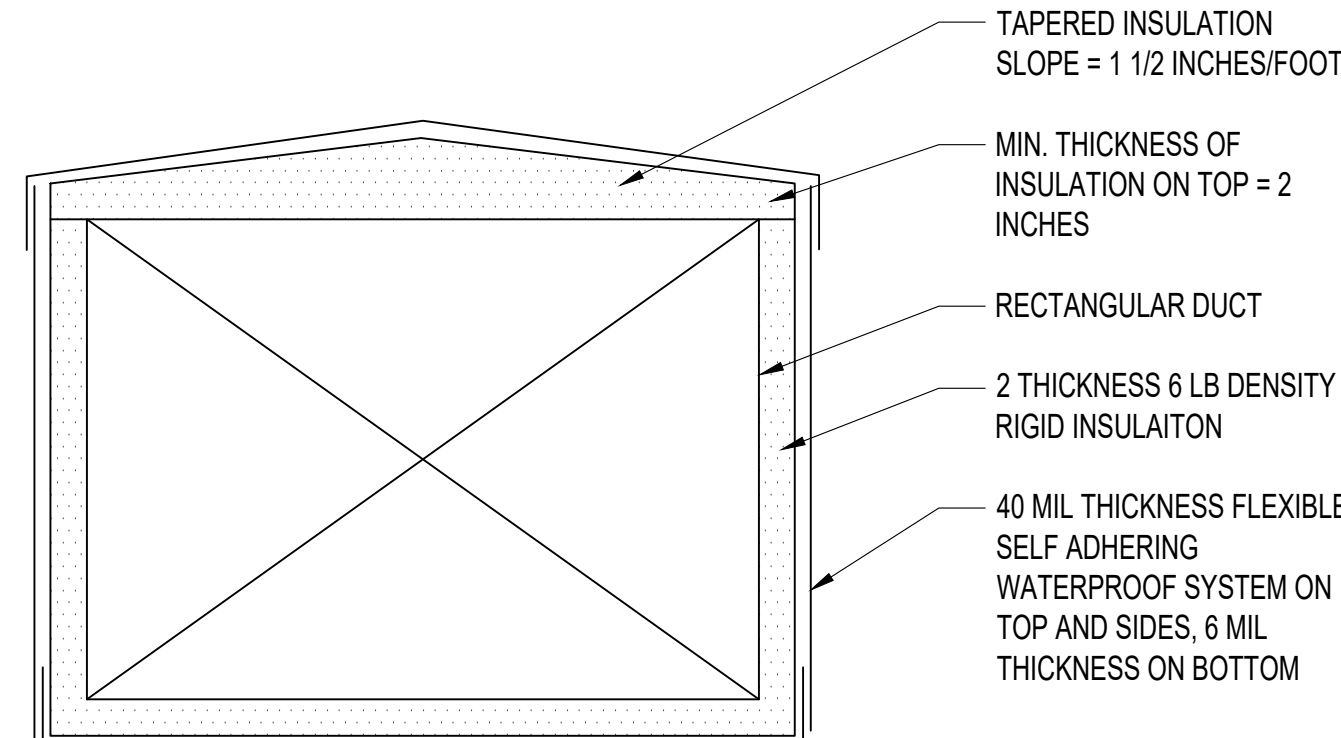
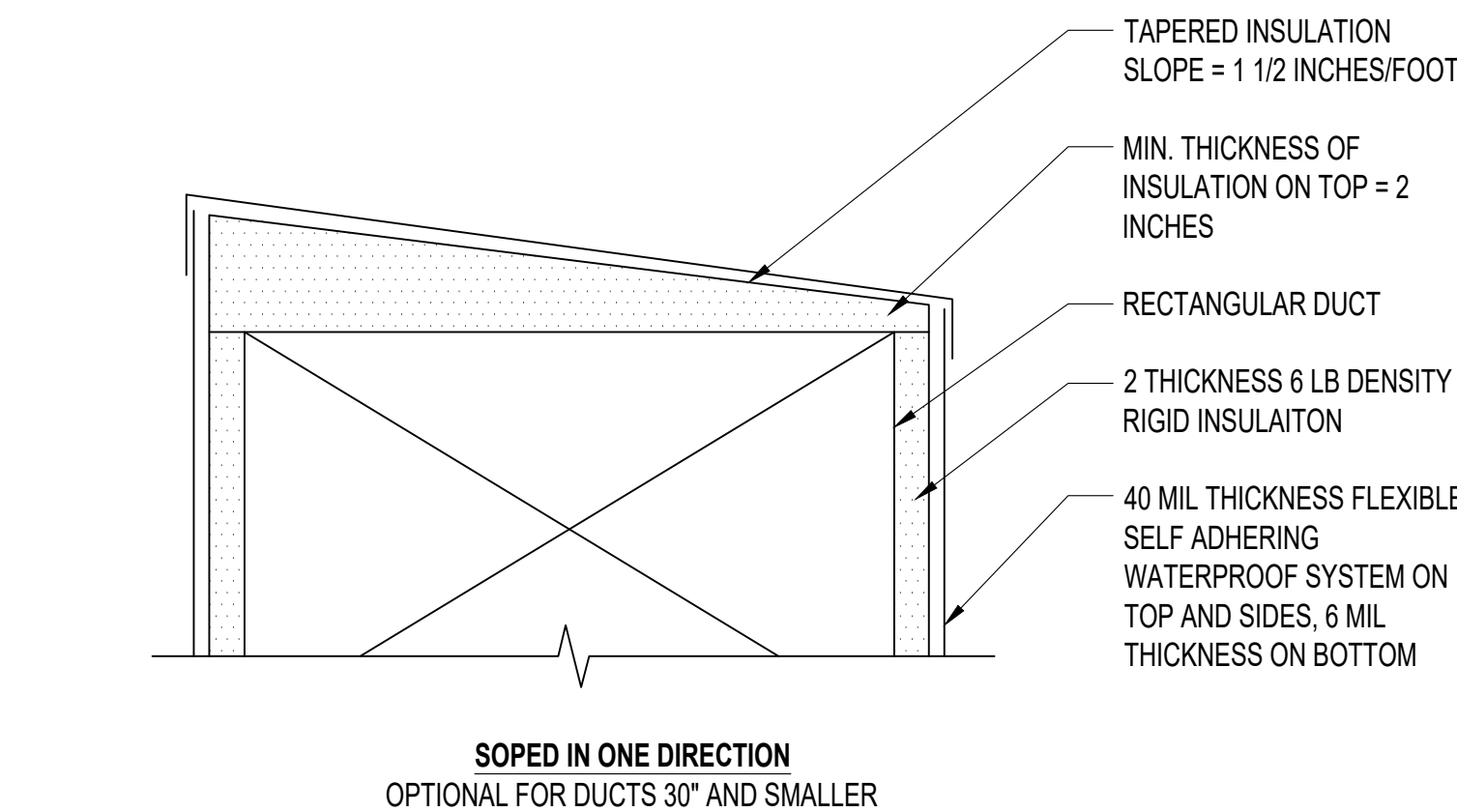
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E11 OUTDOOR DUCT INSULATION DETAIL

M-505

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A11 DUCT MOUNTING PEDESTAL DETAIL

M-505

NTS

John Grace Arms
21030 Indian St, Southfield MI 48033
Developed by
John Grace Arms LDHA LLC

SDG
Architects + Planners
607 Shelby Street
Suite 704
Detroit, MI 48226
Tel: 313-961-0000
Fax: 313-964-3233

A & A Engineering & Consulting
28862 Vista Way, South Lyon, MI 48178

REGISTRATION SEAL



KEY PLANS

SHEET TITLE
**MECHANICAL
TYPICAL DETAILS**

SCALE: AS NOTED

ISSUED FOR
PERMIT
DATE
10.20.24
BULLETIN 3
5.19.25

DRAWN BY
CHECKED
APPROVED

21026.00

FILE NO.
M-505

SHEET NO.

ENERGY RECOVERY VENTILATOR & FAN SCHEDULE

IDENTIFIER	SERVICE	LOCATION	DESIGN AIR FLOW (CFM)										HEAT EXCHANGER										ELECTRICAL DATA										DIMENSIONS (IN)				WEIGHT (LBS)	BASIS OF DESIGN			NOTES
			OUTDOOR AIR		EXHAUST AIR		QTY.	ESP (IN. WC)		MOTOR (HP)		QTY.	ESP (IN. WC)		MOTOR (HP)		QTY.	EAT DB (°F)		LATENT EFFECTIVENESS %		QTY.	MCA		MOCP		VOLTS/PH/Hz		L	W	H		MANUFACTURER	MODEL							
			DB	WB	DB	WB		DB	WB	DB	WB		DB	WB	DB	WB		DB	WB	DB	WB		DB	WB	DB	WB	DB	WB			DB	WB		DB	WB	DB		WB	DB	WB	
ERV -1	Addition – Floor 1 & 2	Roof	2180	1890	1	1.4	1.7	1	1.3	1.9	90	73.4%		0	32	70	240/360	156 1/4	65 1/4	69	3227	Venlicity	VS3000Rte	1, 3, 4, 6, 7																	
ERV -2	Residential units	Residential units	50-100	50-100	1	1.4		1	1.4		95	60%		0	32	70	120/160	28 1/2	23	9 7/8		Panasonic	Imesh-Balance FY-10VCL3	1, 3																	
ERV -3	Hallways & Library Room	Various	60-200	60-200	1	0.4		1	0.4		95	61%		1	32		120/160	27 1/2	30 1/2	19 1/2		Panasonic	Imesh-Balance FY-10VCL3	1, 3																	
ERV -4	Community Room (Gym)	Existing Roof	892	720	1	0.85	0.77	2	0.65	0.70	90.7	73.4	44.4	0	46.3	51.3	208-230/160	81 7/8	22	58 1/2	261-415	RenewAir	HE10-WITH-SS5AH-DG1-L	1, 2, 3																	
TF -1	Addition	Residential Units	60	0	1	0.03											120/160	3	18 3/4	7 3/4		Ijehlund	AS1	5																	

- NOTES:
- Refer to manufacturer cut sheets for effectiveness for various cfm and temperature ranges.
 - Refer to manufacturer cut sheet for roof mounting detail and curb dimensions.
 - Provide access panel in location to access filters and units for proper maintenance and service.
 - Coordinate with architectural and electrical for placement in ceiling and routing of duct work. Refer to additional details and control sequence..
 - Provide 24v relay/transformer FC24 and provide necessary wiring to a 24v adjustable thermostat that meets PHILUS requirements. Coordinate location and finish with other trades and architectural plans.
 - Provide and install roof as required refer to architectural and structural drawings.
 - Unit comes pre packaged with electric pre heater at 480V 3P, MOP 30A, MCA 32.7A. Requires separate circuit

HEAT PUMP - FCU SCHEDULE

IDENTIFIER	SERVICE	TYPE	CONDENSING UNIT	SUPPLY FAN				COOLING				ELECTRICAL DATA				DIMENSIONS (IN)			WEIGHT (LBS)	BASIS OF DESIGN		NOTES		
				SPEED	AIR FLOW (CFM)		ESP (IN. WC)	ROUND PRESSURE LEVEL (RPA)	TON	TOTAL MBH	SENSIBLE MBH		HEATING TOTAL MBH	VOLTAGE	PHASE	MCA	MOCP	W		H	D		MANUFACTURER	MODEL
					OUTSIDE AIR (CFM)	INTERNAL					SHR													
FC-1	Residential units, library, offices.	Ducted	ACCU-1		317	0.2	30	0.75	9	12.5	208	1	0.74	15	31 1/8	7 7/8	27 9/16	42	Mitsubishi	SEZ-KD09NAMRT1 TH	1, 2			
FC-2	Residential units, Corridors, Mechanical	Ducted	ACCU-2		388	0.2	33	1.1	12	15	208	1	0.80	15	39	7 7/8	27 9/16	50	Mitsubishi	SEZ-KD12NAMRT1 TH	1, 2			
FC-3	Residential units, Laundry	Ducted	ACCU-3		429	0.2	33	1.25	15	18	208	1	1.1	20	39	7 7/8	27 9/16	64	Mitsubishi	SEZ-KD18NAMRT1 TH	1, 2			
FC-4	Residential units, Custodial	Ducted	ACCU-4		635	0.2	38	1.5	18	21.6	208	1	1.13	20	46 7/8	7 7/8	27 9/16	62	Mitsubishi	SEZ-KD18NAMRT1 TH	1, 2			
FC-5	Prep Space	Wall Mounted	ACCU-5		701	34	1.87	22.4		21.2	208	1	1	20	43 5/16	12 13/16	9 3/8	37	Mitsubishi	MSZ-GS24NA	1, 2			
FC-6	Community Gym, Reading Room	Wall Mounted	ACCU-6		775	39	2.5	30		32	208	1	1	35	48 1/16	14 3/8	11 5/8	46	Mitsubishi	PXA-A30K4B	1, 2, 3			
FC-7	Offices, Hot Room	Wall Mounted	ACCU-7		437	36	0.75	9		9.6	208	1	1	15	36 7/16	12 11/16	9 3/16	29	Mitsubishi	MUZ-FS09NA	1, 2			
FC-8	Corridors - Existing	Wall Mounted	ACCU-8		514	46	1.5	19		24	208	1	1	20	36 7/16	12 11/16	9 3/16	29	Mitsubishi	MUZ-FS19NA	1, 2			
FC-9	Addition - Lobby	Ceiling Mount	ACCU-9		570-580	38	2.5	30		34	208	1	1	40	33 1/16	11 3/4	33 1/16	67	Mitsubishi	FLA-AS3EAB	1, 2, 3			
FC-10	Residential Units - Living Area	Ceiling Mount	ACCU-10		325	38	0.75	9		12	208	1	1	15	43 3/8	7 5/16	14 3/16	34	Mitsubishi	MLZ-KP09NA2	1, 3, 4, 5, 6			
FC-11	Residential Units - Living Area	Ceiling Mount	ACCU-11		350	40	0.5	6		7.2	208	1	1	15	43 3/8	7 5/16	14 3/16	34	Mitsubishi	MLZ-KP12NA2	1, 3, 4, 5, 6			
FC-12	Corridor - Addition	Ceiling Mount	ACCU-12		530-670	28	2.0	24		28	208	1	1	27	60 3/8	9 11/16	26 3/4	31	Mitsubishi	PCA-A24K4B	1, 2, 3			
FC-13	Mechanical & Storage Rooms	Wall Mount	Various		117-437	40	0.5	9		14	208	1	1	15	36 7/16	12	9 3/16	29	Mitsubishi	MSZ-FS09NA	1, 2, 3, 4, 5			

- NOTES:
- Utilize Mitsubishi Touch MA Controller PAR-CT01MAU-SB, provide routing to location on mechanical drawings and associated wiring per manufacturer specifications.
 - Receive power and control ACCU on roof. Mechanical contractor to coordinate install and routing.
 - PROVIDE CONDENSATE PUMP IF REQUIRED FOR ROUTING OF CONDENSATE DRAIN TO NEAREST AVAILABLE FLOOR DRAIN, REFER TO MANUFACTURER SPECIFICATIONS.
 - INCLUDE SYSTEM CONTROL INTERFERENCE, TEMPERATURE SENSOR AND ALL CONTROLS TO ALLOW OPERATION IN MULTI-ZONE SETUP.
 - PROVIDE ALL WIRING AND PIPING NEEDED TO CONNECT TO BRANCH BOX AS SHOWN ON DRAWINGS.
 - INCLUDE GRILLE MLP-448WU AS REQUIRED.

ELECTRIC DUCT HEATER SCHEDULE+B33:AR58B33:A33:CM62

IDENTIFIER	MANUFACTURER	MODEL	QUANTITY	DESCRIPTION	NOTES
DH-1	RenewAir	EK-121208SCCHR-21-15V-N	1	Ducted electric heater	1,2,3,4
DH-2	RenewAir	EK-XXXX10SCCHL-21-15-N	1	Ducted electric heater	1,2,3,5

- NOTES:
- Voltage for heater is 208/230/160, coordinate with electrical contractor.
 - Provide duct thermostat sensor kit for SCR control. Install per manufacturer specifications for location and wiring. Duct temperature sensor to be in supply side of duct work.
 - Interlock duct heater with fan proof from ERV, do not run duct heater without supply fan running.
 - Protect heater and heater control panel from elements, Refer to mechanical details.
 - Match duct size on drawing to duct heater size to fit properly in duct layout, model number with xxxx designates duct work dimensions.

OUTDOOR HEAT PUMP UNIT SCHEDULE

IDENTIFIER	TYPE	LOCATION	SERVICE	COOLING		HEATING		Refrigerant Type	ELECTRICAL DATA		DIMENSIONS (IN.)			WEIGHT (LBS)	BASIS OF DESIGN		NOTES	
				TOTAL MBH	EER	TOTAL MBH	COP @ 47° F		MOCP	RLA	VOLTS/PH/Hz	H	W		D	MFG'R		MODEL
ACCU-1	Heat Pump Air Cooled Condenser	Roof	FC-1	9	13	12	4.03	R410A	24	13	208/230/160	34 5/8	38 9/16	13	129	Mitsubishi	SUZ-KA09NAHZ	1, 2, 3, 4
ACCU-2	Heat Pump Air Cooled Condenser	Roof	FC-2	12	13	15	3.90	R410A	24	13	208/230/160	34 5/8	38 9/16	13	129	Mitsubishi	SUZ-KA12NAHZ	1, 2, 3, 4
ACCU-3	Heat Pump Air Cooled Condenser	Roof	FC-3	15	12.5	18	2.70	R410A	31	16	208/230/160	34 5/8	38 9/16	13	131	Mitsubishi	SUZ-KA15NAHZ	1, 2, 3, 4
ACCU-4	Heat Pump Air Cooled Condenser	Roof	FC-4	18	13.1	21.6	3.40	R410A	31	16	208/230/160	34 5/8	38 9/16	13	131	Mitsubishi	SUZ-KA18NAHZ	1, 2, 3, 4
ACCU-5	Heat Pump Air Cooled Condenser	Roof	FC-5	22.4	12.6	21.2	4.03	R410A	20	13.6	208/230/160	34 5/8	33 1/16	13	120	Mitsubishi	MUZ-GS24NAHZ	1, 2, 3, 4
ACCU-6	Heat Pump Air Cooled Condenser	Roof	FC-6	30	12.8	32	3.38	R410A	40	18	208/230/160	52 11/16	41 5/16	14 3/16	261	Mitsubishi	PUZ-HA30NKA	1, 2, 3, 4
ACCU-7	Heat Pump Air Cooled Condenser	Roof	FC-7	09	16	9.6	4.54	R410A	15	10	208/230/160	21 5/8	31 1/2	11 1/4	82	Mitsubishi	MUZ-FS09NA	1, 2, 3, 4
ACCU-8	Heat Pump Air Cooled Condenser	Roof	FC-8	15	14	16	4.06	R410A	20	17	208/230/160	34 5/8	33 1/16	13	117	Mitsubishi	MUZ-FS19NA	1, 2, 3, 4
ACCU-9	Heat Pump Air Cooled Condenser	Roof	FC-9	30	14.1	24	4.1	R410A	40	18	208/230/160	52 43/64	41 11/32	12 63/64	261	Mitsubishi	PUZ-HA30NKA	1, 2, 4, 5
ACCU-10	Heat Pump Air Cooled Condenser	Roof	FC-10	9	12.5	14	4.1	R410A	24	10	208/230/160	34 5/8	38 1/16	13	129	Mitsubishi	SUZ-KA09NAHZ	1, 2, 4, 5
ACCU-11	Heat Pump Air Cooled Condenser	Roof	FC-11	12	12.7	18	3.8	R410A	24	10	208/230/160	34 5/8	33 1/16	13	129	Mitsubishi	SUZ-KA12NAHZ	1, 2, 4, 5
ACCU-12	Heat Pump Air Cooled Condenser	Roof	FC-12	24	12.5	28	3.71	R410A	27	9	208/230/160	37 1/8	37 13/32	13	190	Mitsubishi	PUZ-HA24NHAT-R1	1, 2, 4, 5
ACCU-13	Heat Pump Air Cooled Condenser	Roof	FC-13	9	19	14	4.68	R410A	15	9.2	208/230/160	21 5/8	31 1/2	11 1/4	82	Mitsubishi	MUZ-FS06NA	1, 2, 4, 5
ACCU-14	Heat Pump Air Cooled Condenser	Roof	FC-13	36	15	42	4.0	R410A	86		208/230/160	52 11/16	41 11/32	13	278	Mitsubishi	NKZ-SM36NAMHZ2	1, 2, 4, 5, 6

- NOTES:
- 12 IN CONDENSER STAND TO BE SUPPLIED QSMS1201M
 - UTILIZE MICROPARTICULATE FILTER PM2.5 (part number MAC-EMF615FT-E)
 - INSTALL 2-PIECE WIND BAFFLE WB-PA3
 - PROVIDE ALL NECESSARY LINE SETS AT CORRECT SIZE TO CONNECT TO INDOOR UNIT.
 - INSTALL WIND BAFFLE LOW AMBIENT KIT
 - PIPE TO BRANCH BOX (BB-1) PART NUMBER PCA-MK452BC. SUPPORT BRANCH BOX VIA ALL THREAD AND MOUNTING APPROVED BY STRUCTURAL. POWER FOR BRANCH BOX FROM OUTDOOR UNIT. REFER TO MANUFACTURER SPECIFICATIONS FOR WIRING, PIPING PRACTICES AND MOUNTING.

DIFFUSER AND GRILLE SCHEDULE

IDENTIFIER	TYPE	SYSTEM	LOCATION	FRAME	DAMPER	MAX NO	MANUF	MODEL #	REMARKS
FG-1	Wall mounted transfer grill	Wall Transfer Return	Apartments	N			Price	2202	Baked White Enamel, 2, 3
SG-1	Softly supply air register	Supply Air	Various	Y			Price	840 Series	White Finish, 2, 3.
SG-2	Ceiling supply air 24x24 face	Supply Air	Various	Y			Price	ASCO	Baked White Enamel, 1, 2, 3
SG-3	Supply air register	Supply Air	Community Space	Y			Price	89-LA-B12	2, 3
RG-1	Pillar housed return grille	Return Air	Apartments	N			Price	835FF-LH	White B12, 2, 3, 4, 6
RG-2	Ceiling return air 24x24 face	Return Air	Various	N			Price	FDOR Series	White finish, 2, 3.
RG-3	Return air register	Return Air	Community Space	N			Price	97-LA-B12	2, 3
RG-4	Exhaust return grille	Return Air	Apartments	N			Price	830-535	White B12, 2, 3, 4
R-1	Intake & Exhaust Register	OA & Exhaust	Exterior	Y			Price	Primax	WXC 2, 3, 5, 6
R-1	Intake & Exhaust Register	OA & Exhaust	Exterior	N			Price	Accl Series	2, 3, 5, 7

- FRONT BLADES PARALLEL TO SHORT DIMENSION
- COORDINATE INSTALL LOCATION WITH ARCHITECTURAL PLANS. FOR LAYIN DIFFUSERS COORDINATE WITH REFLECTED CEILING PLAN FOR PROPER MOUNTING.
- COORDINATE NECK SIZE WITH MECHANICAL DRAWING DUCT SIZING.
- SURFACE MOUNTING (SM) FOR SOFFIT OR CEILING INSTALLATION
- PAIN'T TO MATCH EXTERIOR BRICK
- IF USED AS INTAKE REMOVE DAMPER
- INTERGRATE BIRD SCREEN OPTION FROM MANUFACTURER
- WHEN LOCATED IN KITCHEN PROVIDE MERV3 1 IN FILTER TO FIT. SIZE TO BE 10IN X 10IN IN KITCHEN AREA AND LOCATED WITH 6FT FROM HOOD SYSTEM.

ELECTRIC UNIT HEATER SCHEDULE

Tag	Location	Type	CFM	Power	Voltage	Phase	Mounting Height	Length	Width	Height	Weight (lbs)	Manufacturer	Model	Remarks
ECUH-1	Addition Stairwells	Wall Mounted	500	6.0 KW	208 V	1	6" ABOVE FF	45"	9 3/4"	26 3/8"	160	Qmark	CU945	CU945-06-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-2	106 and Corridor 212	Wall Mounted	250	5.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU935	CU935-06-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-3	Vestibules - West B & East A	Wall Mounted	250	6.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU935	CU935-06-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-4	Unoccupied rooms 280 & 380	Wall Mounted	250	7.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU935	CU935-07-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-5	Existing room 281 & Addition Entrance	Wall Mounted	250	3.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU935	CU935-03-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
CCU-1	West Vestibule A - 120	Ceiling Mounted	3003	20 KW	208 V	1	Ceiling Height	20 1/4"	75"	16 1/2"	364	Powered Aire	CHD-E-2-72	3, 4, 5, 6

-
- SURFACE MOUNT ELECTRIC CABINET HEATERS TO BLOCK OR BRICK WALL WITH PROPER CLEARANCE PER MANUFACTURER SPECIFICATIONS.
- INTERNAL MOUNTED THERMOSTAT, VERIFY FIELD SETTING TO 60 DEGREES.
- SUPPLY 24V LINE THERMOSTAT WITH LOCKABLE COVER
- SUPPORT VIA MANUFACTURER SPECIFICATIONS, SUBMIT MOUNTING AND SUPPORT STRATEGY TO STRUCTUREAL ENGINEER PRIOR TO INSTALLATION FOR APPROVAL.
- WHITE IN COLOR
- COORDINATE WITH ARCHITECT AND FINISH CONTRACTOR OPENING NEEDED IN CEILING

Apartment/Room Notation	Occupancy Classification	Floor Area (SF)	Quantity	Code Occupent Density / 1000SF	Calculated Occupancy	Number of Plumbing Fixtures	TABLE 403.3 2015 Michigan Mech Code & ASHRE 62.2 Requirements					Design Air Balance					
							Outdoor Air			Calculated Min outdoor air required (cfm)	Zone Air Dist. Eff.	Calculated Min Exhaust Air (cfm)	Minimum room supply air (cfm)	Minimum exhaust air (cfm)	Minimum unit %OA	Outdoor ventilation air (cfm) delivered to space	Supply Air Units
							CFM/ SF	CFM/ PERSON	CFM/ FIXTURE OF SF								
H	Private Dwelling - 1 bedroom, 1 bathroom, living areas	462	1		2			15		38	0.8	0	see plan	50		50	FC 1
G	Private Dwelling - 1 bedroom, 1 bathroom, living areas	469	1		2			15		38	0.8	0	see plan	50		50	FC 1
F	Private Dwelling - 1 bedroom, 1 bathroom, living areas	682	1		2			15		56	0.8	0	see plan	50		60	FC 3
M	Private Dwelling - 1 bedroom, 1 bathroom, living areas	678	1		2			15		56	0.8	0	see plan	50		60	FC 3
C	Private Dwelling - 1 bedroom, 1 bathroom, living areas	484	1		2			15		38	0.8	0	see plan	50		50	FC 1
D	Private Dwelling - 1 bedroom, 1 bathroom, living areas	487	1		2			15		38	0.8	0	see plan	50		50	FC 1
E	Private Dwelling - 1 bedroom, 1 bathroom, living areas	500	1		2			15		38	0.8	0	see plan	50		50	FC 2
B	Private Dwelling - 1 bedroom, 1 bathroom, living areas	607	1		2			15		56	0.8	0	see plan	50		60	FC 3
A	Private Dwelling - 1 bedroom, 1 bathroom, living areas	800	1		2			15		56	0.8	0	see plan	50		60	FC 4
J	Private Dwelling - 1 bedroom, 1 bathroom, living areas	495	1		2			15		38	0.8	0	see plan	50		50	FC 1
K	Private Dwelling - 1 bedroom, 1 bathroom, living areas	513	1		2			15		38	0.8	0	see plan	50		50	FC 1
L	Private Dwelling - 1 bedroom, 1 bathroom, living areas	714	1		2			15		56	0.8	0	see plan	50		60	FC 3
X	Private Dwelling - 1 bedroom, 1 bathroom, living areas	660	1		2			15		56	0.8	0	see plan	50		60	FC 3
W	Private Dwelling - 1 bedroom, 1 bathroom, living areas	713	1		2			15		56	0.8	0	see plan	50		60	FC 3
N, O	Private Dwelling - 2 bedroom, 1 bathroom, living areas	812	1		3			15		56	0.8	0	see plan	50		60	FC 4
Y	Private Dwelling - 2 bedroom, 1 bathroom, living areas	876	1		3			15		56	0.8	0	see plan	50		60	FC 4
Z	Private Dwelling - 2 bedroom, 1 bathroom, living areas	795	1		3			15		56	0.8	0	see plan	50		60	FC 4
141	Breakroom	487	1	25	13	1		0.06	5	110	0.8		701			100	FC 5
131 / 131A	Laundry	628	1	20	13	1		0.06	7.5	160			529	150		150	FC 3
133	Storage	178	1					0.06					437			50	FC 7
132	Breakroom	1096	1	25	28			0.06	5	241			775	175		250	FC 6
140	Conference/meeting	2377	1	50	119			0.06	5	886			1550		100	900	ERV 3, FC 6 (2)
130	Office	212	1	5	1			0.06	5	19			437			50	FC 7
150	Electrical Room	121	1		0												FC 3
151	Storage	414	1		0												FC 3
142, 143	Toilet	78	1		0	1				70		70	0				
101 - 110	Cooridor	3831	1					0.06		230	0.8	0	257	400		350	FC 8
202	Office	274	1	5	2			0.06	5	29			160		16	40	FC 3
201	Cooridor	528	1					0.06		32	0.8	0	260	45	18	40	FC 3
103	Lobby	1040	1	10	11			0.06	7.5	166			1040		18	175	FC 9
1B Unit A & C	Private Dwelling - 1 bedroom, 1 bathroom, living areas		19		2				15	38	0.8	0	See plan	45		48	FC 10 & FC 11
2B Unit A,B & C	Private Dwelling - 2 bedroom, 1 bathroom, living areas		2		3				15	56	0.8	0	See plan	45		△56	FC 10 & FC 11
Various	Cooridor	3156	1					0.06		189	0.8	0	900	200		190	FC 12
105	Electrical room		1														FC 13
113	Electrical room		1												△		FC 13
109	Storage		1														FC 13
115	Mechanical room		1														FC 13
108	Storage		1														FC 13
	Total For Floor 1													1145		1214	
1B Unit A & C	Private Dwelling - 1 bedroom, 1 bathroom, living areas		18		2				15	38	△ 0.8	0	See plan	45△		48	FC 10 & FC 11
2B Unit A,B & C	Private Dwelling - 2 bedroom, 1 bathroom, living areas		3		3				15	56	0.8	0	See plan	45		△56	FC 10 & FC 11
Various	Cooridor	2610	1		0			0.06		157	0.8	0	900	175		162	FC 12
203	Storage		1		0												FC 13
208	Storage		1		0										△		FC 13
211	Mechanical room		1		0												FC 13
207	Storage		1		0												FC 13
	Total For Floor 2										△			1120△		1194	

VIBRATION ISOLATOR APPLICATION SCHEDULE										
EQUIPMENT TYPE	EQUIPMENT CATEGORY	HORESPOWER AND OTHER	RPM	EQUIPMENT LOCATION						KEYED NOTES
				SLAB ON GRADE			UP TO 40 FT (12M) FLOOR SPAN			
				BASE TYPE	ISOLATOR TYPE	MIN. DEF., IN. (MM)	BASE TYPE	ISOLATOR TYPE	MIN. DEF., IN. (MM)	
SUSPEND HEAT PUMPS, FAN COILS, LOCATED INDOORS	ALL	ALL	ALL				A OR B	8a or 8b	1.50 (38)	NOTES 1, 3, 4
BASE MOUNTED CONDENSING UNITS	ALL ALL	≤1HP >1HP	ALL ALL	A OR B A OR B	2 2	0.25 (6) 0.25 (6)	A OR B A OR B	2 4	.25 (64) 2.50 (64)	NOTES 3
SUSPEND DUCTED ROTATING EQUIP.	SMALL FANS, FAN-POWERED BOXES	≤600 CFM >600 CFM	ALL ALL				A A	8a or 8b 8a or 8b	0.50 (13) 0.75 (19)	NOTES 3, 4

NOTES:

1. THRUST RESTRAINTS: PROVIDE THRUST RESTRAINTS BETWEEN FAN DISCHARGE AND DUCT (IN PAIRS, LOCATED ON THE CENTER LINE OF THE DISCHARGE OUTLET OF THE FAN, BRIDGING THE FLEXIBLE DUCT CONNECTOR) FOR ALL FAN HEADS, FOR AXIAL AND CENTRIFUGAL FANS UNITS OPERATING AT 2 INCH OR GREATER TOTAL STATIC PRESSURE AND AS SHOWN ON DRAWINGS. SPRING DEFLECTION SHALL BE LIMITED TO 1/2" ON THE LOAD LATERAL.
2. PIPING RISER ISOLATION: PROVIDE PIPE RISER RESILIENT ANCHORS, SPRING MOUNTS AND RESILIENT PIPE GUIDES CAPABLE OF DISTRIBUTING THE LOADS WITHIN THE BUILDING DESIGN LIMITS AT THE SUPPORT POINTS.
3. HORIZONTAL PIPING VIBRATION ISOLATION: PROVIDE TYPE 8a OR 8b SPRING HANGERS AND SPRING MOUNTS FOR PIPING CONNECTED TO VIBRATION ISOLATED EQUIPMENT. FOR 2" TO 4" DIA. PIPING, PROVIDE SPRING HANGERS AND SPRING MOUNTS AT MINIMUM HORIZONTAL DISTANCES FROM THE ISOLATED EQUIPMENT: UP TO 6" - 50 FEET (1 1/2" MINIMUM DEFLECTION), 8" AND LARGER - 100 FEET (2 1/2" MINIMUM DEFLECTION), WHICHEVER IS GREATER; AND AS SHOWN ON DRAWINGS. THE FIRST 4 HANGERS FROM THE ISOLATED EQUIPMENT SHALL BE TYPE 8b.
4. DUCTWORK VIBRATION ISOLATION: PROVIDE TYPE 8a OR 8b SPRING HANGERS FOR DUCTWORK WITH A CROSS SECTION OF 2 SQUARE FEET OR GREATER. PROVIDE AIR HANDLING UNIT HANGERS AND SPRING MOUNTS FOR RELIEF FANS, AND VIBRATION ISOLATED EQUIPMENT, WHICHEVER IS GREATER; AND AS SHOWN ON DRAWINGS (3/4" MINIMUM DEFLECTION).

BASE TYPES:

BASE TYPE A - NO BASE, ISOLATORS ATTACHED DIRECTLY TO EQUIPMENT
 BASE TYPE B - STRUCTURAL, STEEL RAILS OR BASE
 BASE TYPE C - CONCRETE INERTIA BASE
 BASE TYPE D - CURB - MOUNTED ALUMINUM BASE WITH 1" DEFL. SPRING ISOLATORS
 BASE TYPE E - CURB - MOUNTED STEEL BASE WITH ADJUSTABLE 1", 2" OR 3" DEFL. SPRING ISOLATORS

ISOLATOR TYPES:

ISOLATOR TYPE 1a -	ELASTOMERIC ISOLATION PAD
ISOLATOR TYPE 1b -	ELASTOMERIC ISOLATION PAD WITH STEEL LOAD BEARING PLATE
ISOLATOR TYPE 2 -	ELASTOMERIC FLOOR ISOLATOR
ISOLATOR TYPE 3 -	FREE STANDING SPRING FLOOR ISOLATOR
ISOLATOR TYPE 4 -	RESTRAINED SPRING ISOLATOR
ISOLATOR TYPE 5 -	THRUST RESTRAINT
ISOLATOR TYPE 6 -	AIR SPRING
ISOLATOR TYPE 7 -	ELASTOMERIC HANGERS
ISOLATOR TYPE 8a -	SPRING HANGERS
ISOLATOR TYPE 8b -	SPRING HANGERS WITH VERTICAL - LIMIT STOP

DUCT SYSTEM INSULATION APPLICATION SCHEDULE												
	INSULATION MATERIAL & THICKNESS (INCHES)								FIELD APPLIED JACKET MATERIAL			
	FIBERGLASS BLANKET 75 LB/CU FT.	FIBERGLASS BLANKET 10 LB/CU FT.	FIBERGLASS BOARD 2.25 LB/CU FT.	FIBERGLASS BOARD 6.0 LB/CU FT.	FLEXIBLE ELASTOMERIC	ASTM E2336 2-HOUR FIRE RATED BLANKET	2-HOUR FIRE RATED BLANKET	ALUMINUM	SELF-ADHESIVE (FOR OUTDOOR APPLICATIONS)			
DUCT SYSTEMS LOCATED INDOORS												
SUPPLY AIR, EXCEPT AS NOTED BELOW		1.5								a		
RECTANGULAR SUPPLY AIR IN MECHANICAL ROOMS			1.5									
OUTSIDE AIR AND MIXED AIR, EXCEPT AS NOTED BELOW		1.5										

GENERAL NOTES:

1. THE FOLLOWING PLENUMS, DUCTS AND DUCT ACCESSORIES NOT REQUIRING INSULATION

- a. DOUBLE WALL METAL DUCTS WITH SUFFICIENT INSULATION TO MEET ASHRAE 62.2
- b. EXPOSED SUPPLY DUCT IN CONDITIONED SPACE SERVED BY THAT SYSTEM
- c. FACTORY-INSULATED FLEXIBLE DUCTS
- d. FLEXIBLE CONNECTORS
- e. VIBRATION - CONTROL DEVICES
- f. FACTORY - INSULATED ACCESS PANELS AND DOORS.

SDG
Architects + Planners

607 Shelby Street
Suite 704
Detroit, MI 48226

Tel: 313-961-9000
Fax: 313-964-3233



A & A Engineering & Consulting
28862 Vista Way, South Lyon, MI 48178

REGISTRATION SEAL



KEY PLANS

SHEET TITLE

MECHANICAL VENTILATION SCHEDULE

SCALE: AS NOTED

ISSUED FOR

PERMI

DATE _____

10.20.24

Δ BULLETIN 1

BULLETIN 2

▲ 1999年10月1日

Δ BULLETIN 3

DRAWN BY

CHECKED

APPROVE

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