

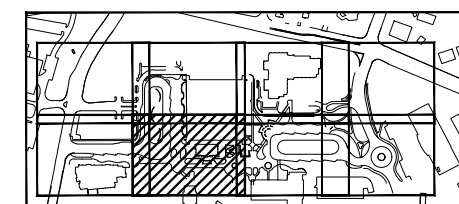
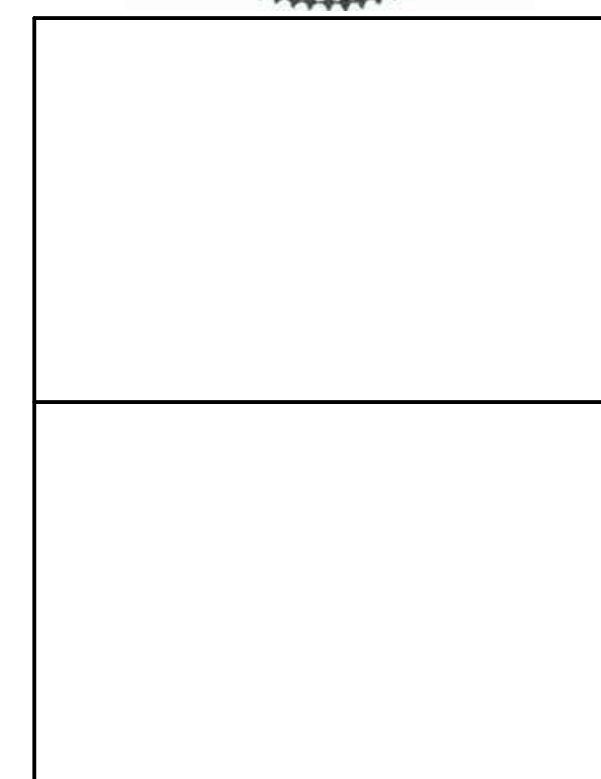


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DAA Project No. B101728-05

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KEY PLAN  
NTS

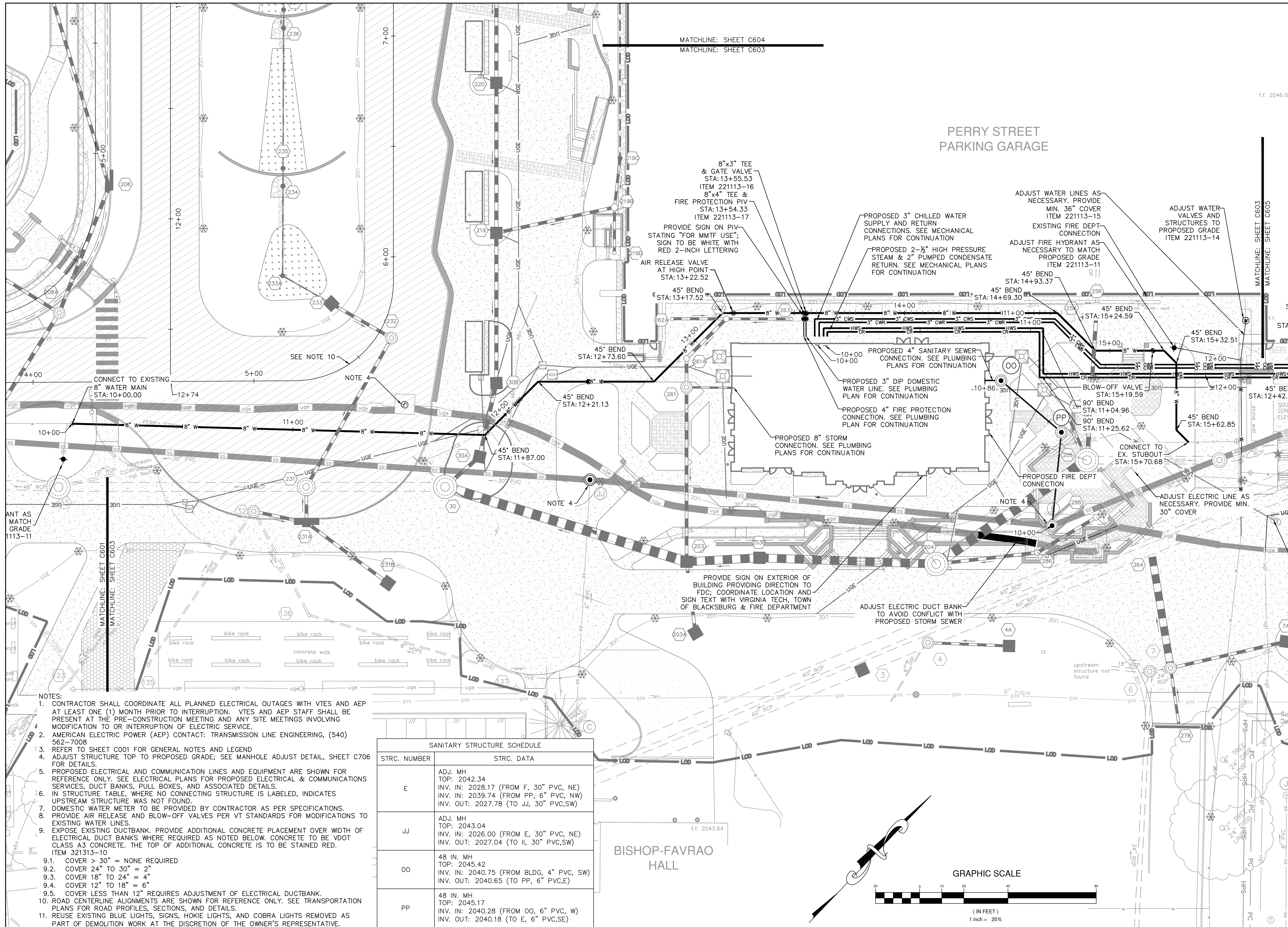
0	ISSUE FOR BID	09-15-2020
NO.	BY	REVISIONS
		DATE

DWG. TITLE

**UTILITY PLAN**

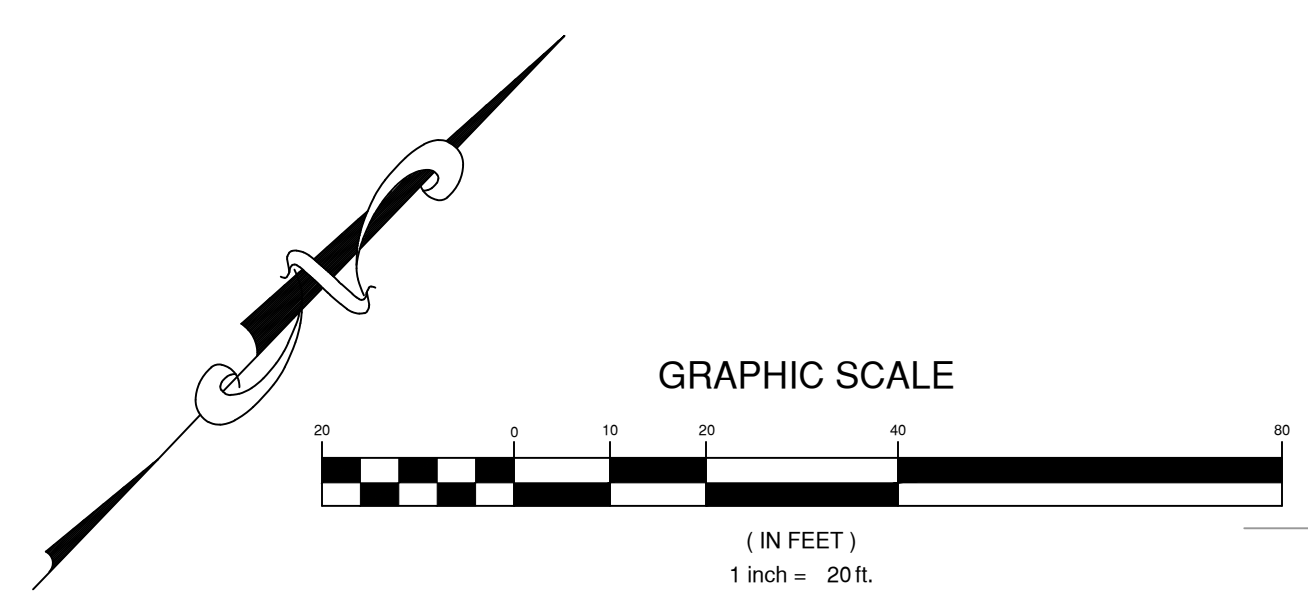
DATE SEPTEMBER 15, 2020  
SCALE 1"=20'  
DWN. AJH/DEP CHK. CAH  
PROJ. No. 449803  
DWG. No.

**C603**



- NOTES:
- CONTRACTOR SHALL COORDINATE ALL PLANNED ELECTRICAL OUTAGES WITH VTES AND AEP AT LEAST ONE (1) MONTH PRIOR TO INTERRUPTION. VTES AND AEP STAFF SHALL BE PRESENT AT THE PRE-CONSTRUCTION MEETING AND ANY SITE MEETINGS INVOLVING MODIFICATION TO OR INTERRUPTION OF ELECTRIC SERVICE.
  - AMERICAN ELECTRIC POWER (AEP) CONTACT: TRANSMISSION LINE ENGINEERING, (540) 562-7008
  - REFER TO SHEET C001 FOR GENERAL NOTES AND LEGEND
  - ADJUST STRUCTURE TOP TO PROPOSED GRADE; SEE MANHOLE ADJUST DETAIL, SHEET C706 FOR DETAILS.
  - PROPOSED ELECTRICAL AND COMMUNICATION LINES AND EQUIPMENT ARE SHOWN FOR REFERENCE ONLY. SEE ELECTRICAL PLANS FOR PROPOSED ELECTRICAL & COMMUNICATIONS SERVICES, DUCT BANKS, PULL BOXES, AND ASSOCIATED DETAILS.
  - IN STRUCTURE TABLE, WHERE NO CONNECTING STRUCTURE IS LABELED, INDICATES UPSTREAM STRUCTURE WAS NOT FOUND.
  - DOMESTIC WATER METER TO BE PROVIDED BY CONTRACTOR AS PER SPECIFICATIONS.
  - PROVIDE AIR RELEASE AND BLOW-OFF VALVES PER VT STANDARDS FOR MODIFICATIONS TO EXISTING WATER LINES.
  - EXPOSE EXISTING DUCTBANK. PROVIDE ADDITIONAL CONCRETE PLACEMENT OVER WIDTH OF ELECTRICAL DUCT BANKS WHERE REQUIRED AS NOTED BELOW. CONCRETE TO BE VDOT CLASS A3 CONCRETE. THE TOP OF ADDITIONAL CONCRETE IS TO BE STAINED RED. ITEM 321313-10
  - COVER > 30" = NONE REQUIRED
  - COVER 24" TO 30" = 2"
  - COVER 18" TO 24" = 4"
  - COVER 12" TO 18" = 6"
  - COVER LESS THAN 12" REQUIRES ADJUSTMENT OF ELECTRICAL DUCTBANK.
  - ROAD CENTERLINE ALIGNMENTS ARE SHOWN FOR REFERENCE ONLY. SEE TRANSPORTATION PLANS FOR ROAD PROFILES, SECTIONS, AND DETAILS.
  - REUSE EXISTING BLUE LIGHTS, SIGNS, HOKIE LIGHTS, AND COBRA LIGHTS REMOVED AS PART OF DEMOLITION WORK AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE.

SANITARY STRUCTURE SCHEDULE	
STRC. NUMBER	STRC. DATA
E	ADJ. MH TOP: 2042.34 INV. IN: 2028.17 (FROM F, 30" PVC, NE) INV. IN: 2039.74 (FROM PP, 6" PVC, NW) INV. OUT: 2027.78 (TO JJ, 30" PVC, SW)
JJ	ADJ. MH TOP: 2043.04 INV. IN: 2026.00 (FROM E, 30" PVC, NE) INV. OUT: 2027.04 (TO II, 30" PVC, SW)
OO	48 IN. MH TOP: 2045.42 INV. IN: 2040.75 (FROM BLDG, 4" PVC, SW) INV. OUT: 2040.65 (TO PP, 6" PVC, E)
PP	48 IN. MH TOP: 2045.17 INV. IN: 2040.28 (FROM OO, 6" PVC, W) INV. OUT: 2040.18 (TO E, 6" PVC, SE)

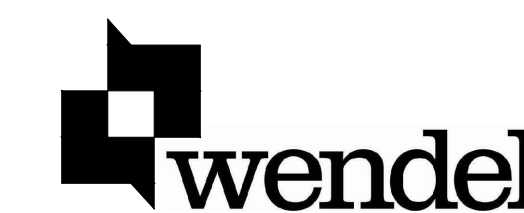


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**MULTI-MODAL TRANSIT FACILITY**

**BID SET**



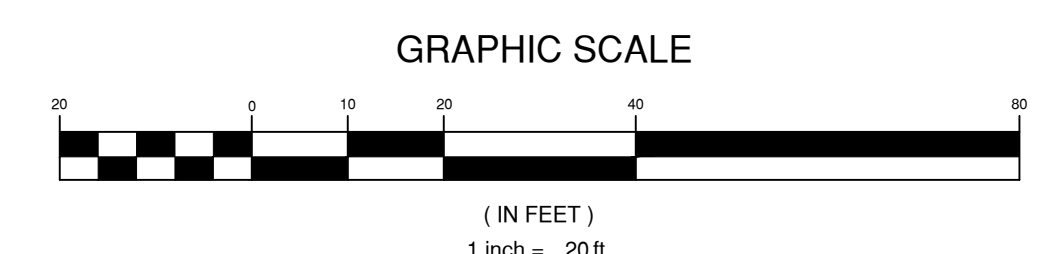
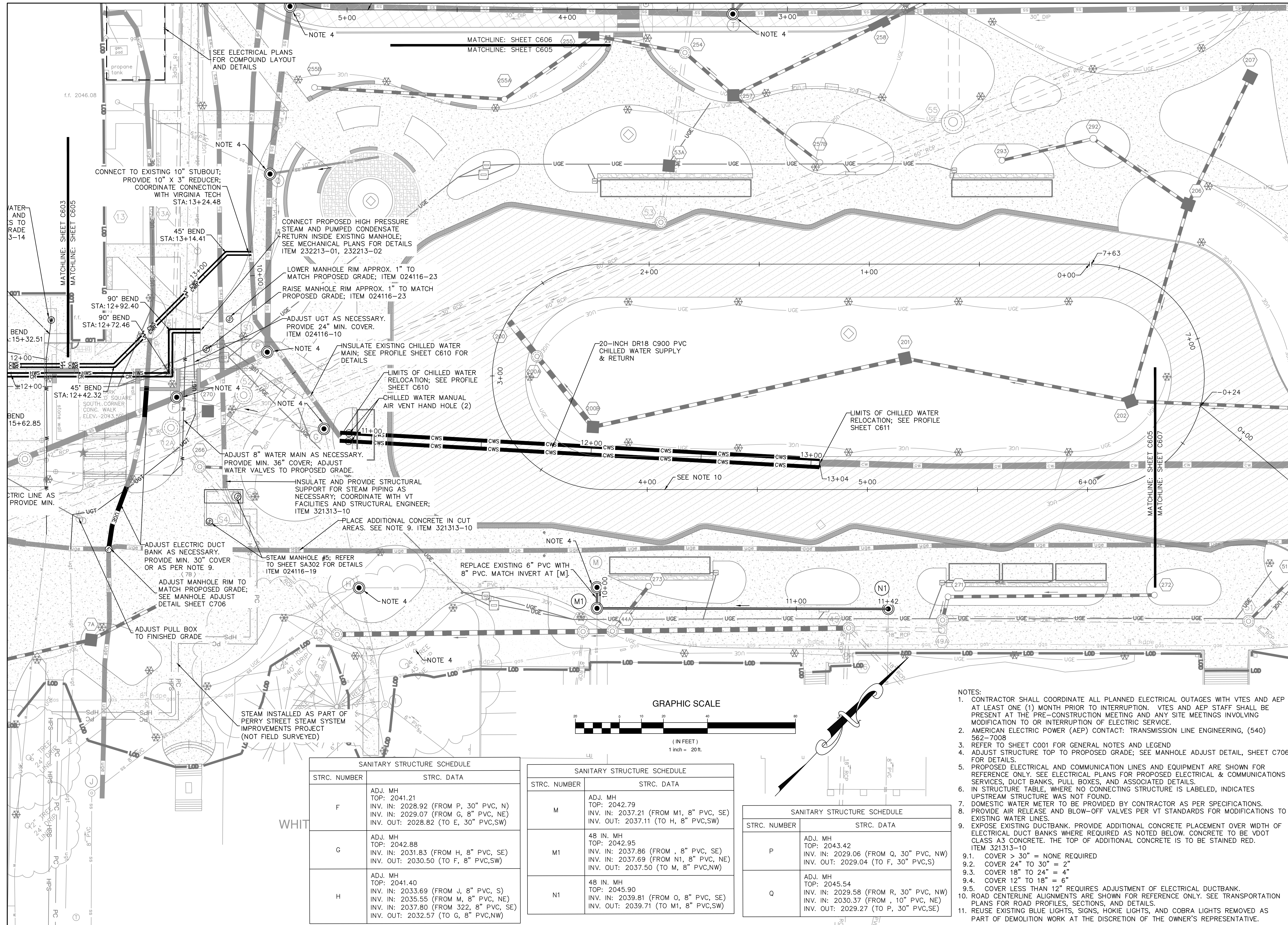
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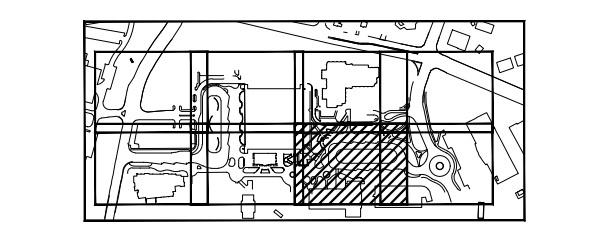
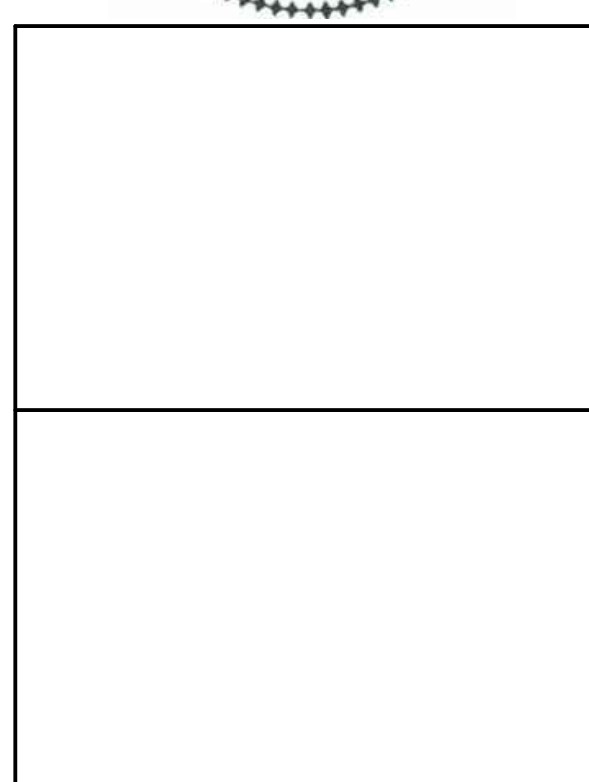


SANITARY STRUCTURE SCHEDULE	
STRC. NUMBER	STRC. DATA
F	ADJ. MH TOP: 2041.21 INV. IN: 2028.92 (FROM P, 30" PVC, N) INV. IN: 2029.07 (FROM G, 8" PVC, NE) INV. OUT: 2028.82 (TO E, 30" PVC, SW)
G	ADJ. MH TOP: 2042.88 INV. IN: 2031.83 (FROM H, 8" PVC, SE) INV. OUT: 2030.50 (TO F, 8" PVC, SW)
H	ADJ. MH TOP: 2041.40 INV. IN: 2033.69 (FROM J, 8" PVC, S) INV. IN: 2035.55 (FROM M, 8" PVC, NE) INV. IN: 2037.80 (FROM 322, 8" PVC, SE) INV. OUT: 2032.57 (TO G, 8" PVC, NW)

SANITARY STRUCTURE SCHEDULE	
STRC. NUMBER	STRC. DATA
M	ADJ. MH TOP: 2042.79 INV. IN: 2037.21 (FROM M1, 8" PVC, SE) INV. OUT: 2037.11 (TO H, 8" PVC, SW)
M1	48 IN. MH TOP: 2042.95 INV. IN: 2037.86 (FROM , 8" PVC, SE) INV. IN: 2037.69 (FROM N1, 8" PVC, NE) INV. OUT: 2037.50 (TO M, 8" PVC, NW)
N1	48 IN. MH TOP: 2045.90 INV. IN: 2039.81 (FROM O, 8" PVC, SE) INV. OUT: 2039.71 (TO M1, 8" PVC, SW)

SANITARY STRUCTURE SCHEDULE	
STRC. NUMBER	STRC. DATA
P	ADJ. MH TOP: 2043.42 INV. IN: 2029.06 (FROM Q, 30" PVC, NW) INV. OUT: 2029.04 (TO F, 30" PVC, S)
Q	ADJ. MH TOP: 2045.54 INV. IN: 2029.58 (FROM R, 30" PVC, NW) INV. IN: 2030.37 (FROM , 10" PVC, NE) INV. OUT: 2029.27 (TO P, 30" PVC, SE)

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KEY PLAN  
UTILITY PLAN

NO.	BY	ISSUE FOR BID	REVISIONS	DATE
0		ISSUE FOR BID		09-15-2020

DATE	SEPTEMBER 15, 2020
SCALE	1"=20'
DWN.	AJH/DEP
CHK.	CAH
PROJ. NO.	449803
DWG. NO.	

**C605**



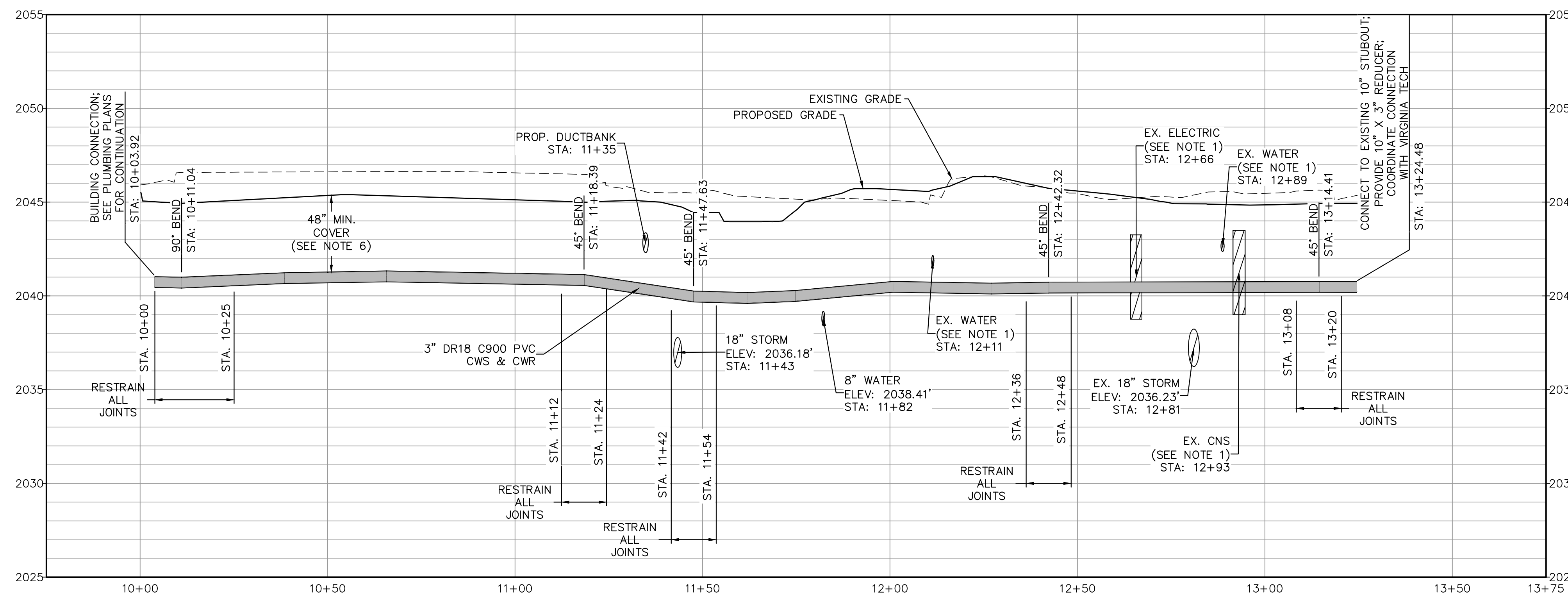
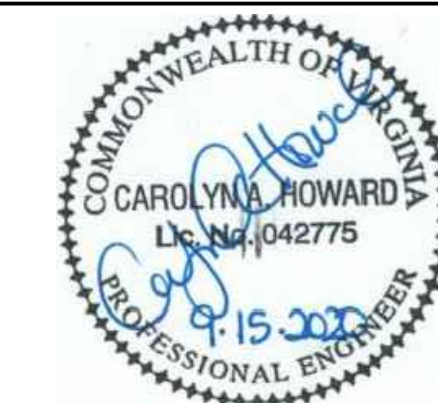
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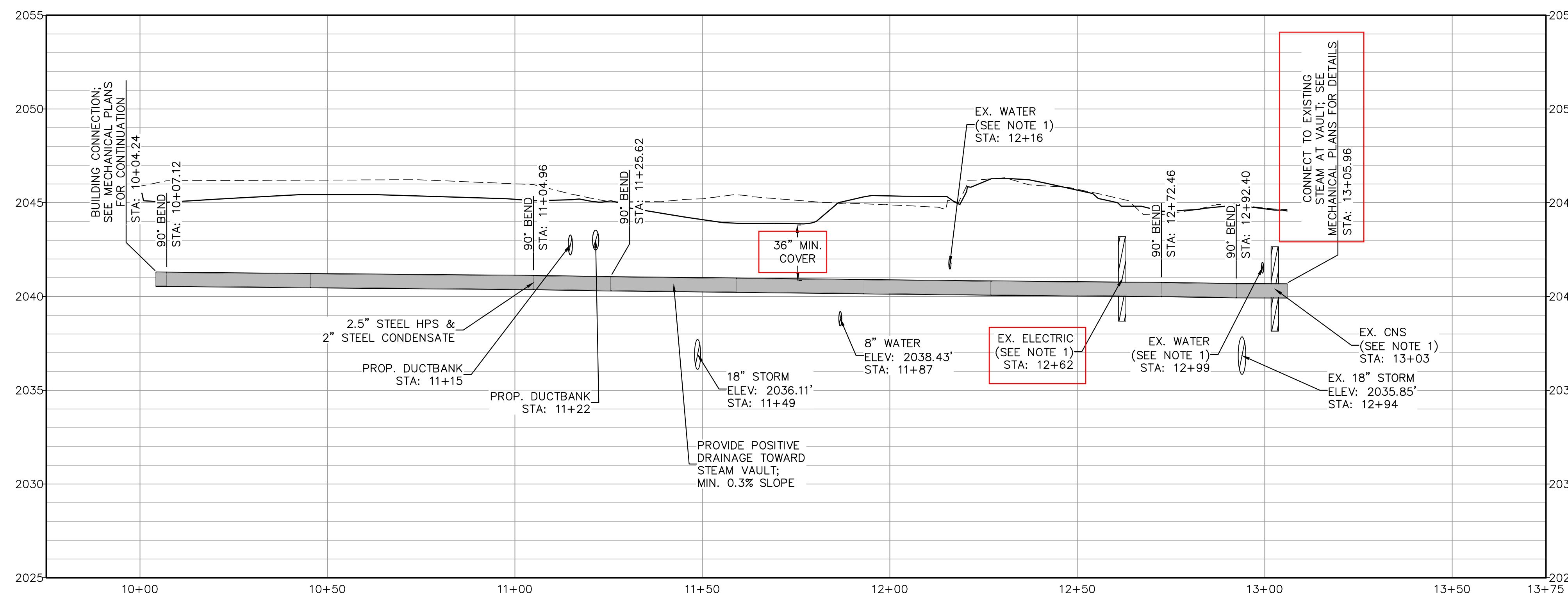


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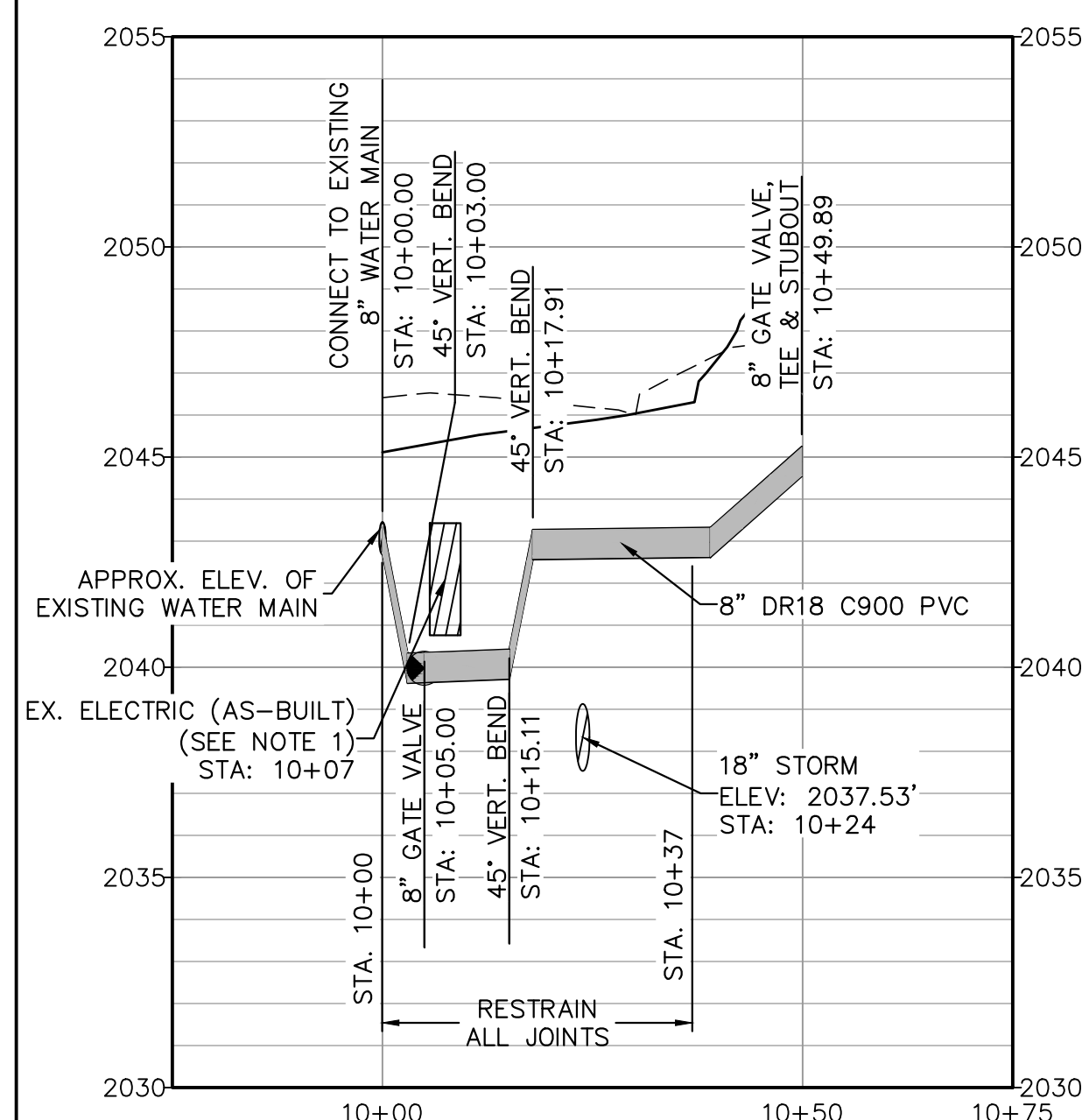
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CHILLED WATER – Scale: H: 1"=20', V: 1"=4'



STEAM – Scale: H: 1"=20', V: 1"=4'



WATER – NORTH STUBOUT  
Scale: H: 1"=20', V: 1"=4'

- NOTES:**
- EXISTING UTILITY DEPTHS SHOWN ARE APPROXIMATE UNLESS OTHERWISE INDICATED; ADJUST PROPOSED AND/OR EXISTING UTILITIES AS NECESSARY TO MAINTAIN MINIMUM SEPARATION AND COVER AS PER VIRGINIA TECH STANDARDS AND SPECIFICATIONS. NOTIFY THE OWNER AND THE ENGINEER IMMEDIATELY OF ANY UTILITY CONFLICTS PRIOR TO CONSTRUCTION, AND THE ENGINEER WILL PROVIDE DIRECTION.
  - RAISE CONFLICTING ELECTRICAL LINES ABOVE OTHER UTILITIES WHERE CONFLICTS OCCUR.
  - ADJUSTED ELECTRICAL DUCT BANKS MUST MEET VTES STANDARDS AND SPECIFICATIONS. IF COVER REQUIREMENTS CANNOT BE MET, ELECTRICAL LINES SHALL BE RELOCATED BELOW OTHER UTILITIES.
  - INSTALL RESTRAINED JOINTS PER MANUFACTURER RECOMMENDATIONS. ITEM 221113-09
  - SEE MECHANICAL PLANS AND SPECIFICATIONS FOR CHILLED WATER AND STEAM DETAILS.
  - CHILLED WATER DEPTH CAN BE REDUCED TO 36 INCHES AS NECESSARY. FOR DEPTHS LESS THAN 36 INCHES, INSULATION SHALL BE PROVIDED.

KEY PLAN  
NTS

NO.	BY	ISSUE FOR BID	REVISIONS	DATE
0		ISSUE FOR BID		09-15-2020

DWG. TITLE

**STEAM & CHILLED WATER PROFILES**

DATE SEPTEMBER 15, 2020

SCALE 1"=20'

DWN. AJH/DEP CHK. CAH

PROJ. No. 449803

DWG. No.

**C610**

## HVAC ABBREVIATIONS

AAV	AUTOMATIC AIR VENT	H	HUMIDIFIER
AC	AIR COMPRESSOR	HC	HEATING COIL
ACCU	AIR COOLED CONDENSING UNIT	HP	HORSEPOWER
ACS DR	ACCESS DOOR	HRU	HEAT RECOVERY UNIT
ACS PNL	ACCESS PANEL	HSTAT	HUMIDISTAT
ACV	AUTOMATIC CONTROL VALVE	HV	HEATING AND VENTILATING UNIT
AFF	ABOVE FINISHED FLOOR	HWB	HOT WATER BOILER
AFG	ABOVE FINISHED GRADE	HWS	HOT WATER SUPPLY
AHU	AIR HANDLING UNIT	HWR	HOT WATER RETURN
ALUM	ALUMINUM	HWCP	HOT WATER CIRCULATING PUMP
AS	AIR SEPARATOR	HX	HEAT EXCHANGER
ASC	ABOVE SUSPENDED CEILING	LAT	LEAVING AIR TEMPERATURE
AVG	AVERAGE	LD	LINEAR DIFFUSER
BAV	BALANCING VALVE	LRI	LOUVERED ROOF INTAKE
BB-E	BASEBOARD - ELECTRIC	LRV	LOUVERED ROOF VENT
BFP	BACKFLOW PREVENTER	LV	LOUVER
BFV	BUTTERFLY VALVE	LWT	LEAVING WATER TEMPERATURE
BFWP	BOILER FEED WATER PUMP	LPS	LOW PRESSURE STEAM
BHP	BRAKE HORSEPOWER	MAU	MAKE-UP AIR UNIT
BMS	BUILDING MANAGEMENT SYSTEM	MAV	MANUAL AIR VENT
BV	BALL VALVE	MC	MECHANICAL CONTRACTOR
CA	COMPRESSED AIR	MPS	MEDIUM PRESSURE STEAM
CA	COMBUSTION AIR	NC	NORMALLY CLOSED
CEB	CONCRETE EQUIPMENT BASE	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NORMALLY OPEN
CHKV	CHECK VALVE	NTS	NOT TO SCALE
CHWP	CHILLED WATER CIRCULATING PUMP	O	OPEN
CHWS	CHILLED WATER SUPPLY	OA	OUTSIDE AIR
CHWR	CHILLED WATER RETURN	OC	ON CENTER
CIR	CAST IRON RADIATOR	OED	OPEN ENDED DUCT
COM	COMMON	PC	PLUMBING CONTRACTOR
CD	CEILING DIFFUSER	PLV	PLUG VALVE
CD	CONDENSATE DRAIN	PRV	PRESSURE REDUCING VALVE
CR	CONDENSATE RETURN	PTAC	PACKAGE TERMINAL AIR CONDITIONER
CT	COOLING TOWER	RA	RETURN AIR
CUH	CABINET UNIT HEATER	RR	RETURN REGISTER
CUV	CLASSROOM UNIT VENTILATOR	RAF	RETURN AIR FAN
CV	CONTROL VALVE	RH	RELATIVE HUMIDITY
DB	DRY BULB	RHC	REHEAT COIL
DCI	DUCT COVERING INSULATION	RL	REFRIGERANT LIQUID LINE
DLI	DUCT LINING INSULATION	RSL	REFRIGERANT SUCTION LINE
DSS	DUCTLESS SPLIT SYSTEM AIR CONDITIONER	RTU	ROOF TOP UNIT
DX	DIRECT EXPANSION	RV	ROOF VENT
EA	EXHAUST AIR	SA	SUPPLY AIR
EAT	ENTERING AIR TEMPERATURE	SR	SUPPLY REGISTER
EC	ELECTRICAL CONTRACTOR	SD	SMOKE DAMPER
EDR	EQUIVALENT DIRECT RADIATION	SF	SUPPLY FAN
ET	EXPANSION TANK	SP	STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE	STN	STRAINER
F	DEGREES FAHRENHEIT	SUH	SUSPENDED UNIT HEATER
FBO	FURNISHED BY OTHERS	TFA	TO FLOOR ABOVE
FCU	FAN COIL UNIT	TFB	TO FLOOR BELOW
FFA	FROM FLOOR ABOVE	UH	UNIT HEATER
FFB	FROM FLOOR BELOW	UV	UNIT VENTILATOR
FID	FIRE DAMPER	VAV	VARIABLE AIR VOLUME
FSD	FIRE/SMOKE DAMPER	VD	VOLUME DAMPER
FT	FLASH TANK	VIB ISO	VIBRATION ISOLATOR
FTR	FINNED TUBE RADIATOR	WB	WET BULB
FURN	FURNACE	WC	WATER COLUMN
GC	GENERAL CONTRACTOR	WIV	WATER INLET VALVE
GLV	GLOBE VALVE	WPD	WATER PRESSURE DROP
GPM	GALLONS PER MINUTE		
GTV	GATE VALVE		
GVTR	GAS VENT THROUGH ROOF		

## GENERAL NOTES

- THIS LEGEND SHEET IS FOR REFERENCE ONLY. NOT ALL SYMBOLS AND/OR ABBREVIATIONS MAY APPLY TO THIS PARTICULAR PROJECT. ANY ADDITIONS OR OMISSIONS FROM THIS LEGEND SHEET DOES NOT IMPLY INCLUSION AND/OR EXCLUSION OF ANY PARTICULAR ITEM FROM THE PROJECT.
- THE PLANS ARE DIAGRAMMATIC AND INDICATE ONLY THE SIZE AND GENERAL ARRANGEMENT OF PIPING, DUCTWORK AND EQUIPMENT. EXACT LOCATION OF ALL ELEMENTS SHALL BE DETERMINED AS WORK PROGRESSES, IN COOPERATION AND COORDINATION WITH THE WORK OF ALL OTHER TRADES. IT IS NOT INTENDED TO SHOW EVERY ITEM OF WORK OR MINOR PIECE OF EQUIPMENT, BUT THE CONTRACTOR SHALL FURNISH AND INSTALL, WITHOUT ADDITIONAL REMUNERATION ANY COMPONENT NECESSARY TO COMPLETE THE SYSTEM IN ACCORDANCE WITH THE BEST PRACTICE OF THE TRADE.
- ITEMS OF WORK OR EQUIPMENT SHOWN ON THE DRAWINGS ONLY, OR CALLED FOR IN THE SPECIFICATIONS ONLY, SHALL BE FURNISHED AND INSTALLED IN THE SAME MANNER AS IF THEY APPEARED ON BOTH THE DRAWINGS AND SPECIFICATIONS.
- DRAWINGS DO NOT INDICATE ALL OFFSETS, CHANGES IN ELEVATIONS, ETC. WHICH MAY BE REQUIRED. THE CONTRACTOR SHALL MAKE SUCH CHANGES IN PIPING AND LOCATION OF EQUIPMENT, ETC. TO ACCOMMODATE WORK WITH THAT OF OTHER CONTRACTORS.
- INSTALL EQUIPMENT, DUCTWORK, AND PIPING TO AVOID INTERFERENCE WITH THE OPERATION OR SERVICING AND MAINTENANCE OF EQUIPMENT.
- CONTRACTOR IS RESPONSIBLE TO PROVIDE ACCESS PANELS AND DOORS WHERE THEY ARE NEEDED TO GAIN ACCESS TO CONCEALED EQUIPMENT.
- PIPES AND/OR DUCTS PENETRATING FIRE WALLS AND FLOORS SHALL BE FIRESTOPPED AS SPECIFIED. REFER TO THE ARCHITECTURAL DRAWINGS FOR FIRE WALL AND FLOOR LOCATIONS.
- ALL DUCT SIZES SHOWN ON DRAWINGS INDICATE CLEAR INSIDE DIMENSIONS.
- ALL PHYSICAL ATTRIBUTES OF EQUIPMENT AND DEVICES ARE BASED ON THOSE MANUFACTURERS LISTED IN THE SPECIFICATIONS AND/OR THE EQUIPMENT SCHEDULES. THE CONTRACTOR IS RESPONSIBLE FOR ALL CHANGES BROUGHT ABOUT BY USE OF ITEMS BY OTHER MANUFACTURERS. THE ARCHITECT/ENGINEER HAS RESERVED THE RIGHT TO REJECT ITEMS BY OTHER MANUFACTURERS IF THOSE ITEMS DO NOT MATCH THE PHYSICAL ATTRIBUTES OF THE MANUFACTURERS LISTED.
- COMPLY WITH THE 2015 STATE OF VIRGINIA MECHANICAL CODES, ASHRAE 90.1-2007, AND OTHER APPLICABLE CODES.

## HVAC SYMBOLS - DUCTWORK

	AIRFLOW - SUPPLY/OUTDOOR AIR		RECTANGULAR DUCTWORK (FIRST NUMBER INDICATES VISIBLE DIMENSION)
	AIRFLOW - RETURN/EXHAUST AIR		ROUND DUCTWORK
			FLAT OVAL DUCTWORK
	"L" INDICATES LINED DUCTWORK		FLEXIBLE DUCTWORK
	RECTANGULAR CEILING DIFFUSER (ARROWS INDICATE DIRECTION OF THROW)		RECTANGULAR ELBOW WITH TURNING VANES
	CIRCULAR CEILING DIFFUSER		VOLUME DAMPER
	RETURN/EXHAUST REGISTER OR GRILLE		FIRE DAMPER
	LINEAR DIFFUSER		SMOKE DAMPER
	SIDEWALL DIFFUSER, REGISTER OR GRILLE		MOTOR OPERATED DAMPER
	DIFFUSER, REGISTER OR GRILLE DESIGNATION TYPE X INDICATES: CD - CEILING DIFFUSER LD - LINEAR DIFFUSER RD - RECTANGULAR CEILING DIFFUSER EG - EXHAUST GRILLE ER - EXHAUST REGISTER RG - RETURN GRILLE RR - RETURN REGISTER TG - TRANSFER GRILLE		VAV BOX (X INDICATES BOX DESIGNATION)
	DUCT MOUNTED COIL		FLEXIBLE DUCT CONNECTION
	SMOKE DETECTOR		DUCT MOUNTED SENSOR X INDICATES: SP - STATIC PRESSURE T - TEMPERATURE H - HUMIDITY V - VELOCITY
	WALL MOUNTED THERMOSTAT		WALL MOUNTED REMOTE SENSOR THERMOSTAT
	WALL MOUNTED TEMPERATURE SENSOR		WALL MOUNTED HUMIDISTAT

## HVAC SYMBOLS - CONTROLS

	DAMPER ACTUATOR		DIRECT EXPANSION REFRIGERANT COIL
	OPPOSED BLADE DAMPER		FIRE DAMPER
	AVERAGING TEMPERATURE SENSOR		ELEC/PNEU TRANSDUCER
	FREEZESTAT		SPACE THERMOSTAT
	PROBE TYPE TEMPERATURE SENSOR		SPACE TEMPERATURE SENSOR
	SMOKE DETECTOR		STATIC PRESSURE SENSOR
	HUMIDITY SENSOR		ROOM DIFFERENTIAL PRESSURE SENSOR
	MOTOR STARTER		TRANSFORMER
	HEATING COIL		CIRCULATING PUMP
	COOLING COIL		FAN

## HVAC SYMBOLS - PIPING DESIGNATIONS

	EXISTING PIPING (REFER TO DESIGNATIONS BELOW FOR TYPE)
	PIPING TO BE REMOVED (REFER TO DESIGNATIONS BELOW FOR TYPE)
	BOILER BLOWDOWN
	CONDENSATE RETURN
	DRAIN
	FEEDWATER
	HOT WATER SUPPLY
	HOT WATER RETURN
	LOW PRESSURE STEAM
	MAKE-UP WATER
	PUMPED DISCHARGE
	REFRIGERANT - LIQUID
	REFRIGERANT - SUCTION
	CHILLED WATER SUPPLY
	CHILLED WATER RETURN
	CONDENSER WATER SUPPLY
	CONDENSER WATER RETURN
	POINT OF CONNECTION

## HVAC SYMBOLS - VALVES & SPECIALTIES

	SHUT-OFF VALVE (GATE, BALL, ETC.)
	BALANCING VALVE (X INDICATES GPM)
	TWO-WAY AUTOMATIC CONTROL VALVE
	THREE-WAY AUTOMATIC CONTROL VALVE
	CHECK VALVE
	STRAINER
	GLOBE VALVE
	PRESSURE REDUCING VALVE
	LOCKING VALVE
	TRIPLE DUTY VALVE
	FLOW CONTROL VALVE
	RELIEF VALVE (X INDICATES T - TEMPERATURE P - PRESSURE PT - COMBINATION PRESS/TEMP)
	STEAM TRAP (X INDICATES T - THERMOSTATIC FT - FLOAT AND THERMOSTATIC IB - INVERTED BUCKET)
	BRANCH CONNECTION - BOTTOM
	BRANCH CONNECTION - TOP
	ELBOW - TURNED DOWN
	ELBOW - TURNED UP
	CAP
	FLEXIBLE CONNECTOR
	DIRECTION OF FLOW
	DIRECTION OF DOWNWARD PITCH
	SENSOR/SWITCH (X INDICATES P - PRESSURE T - TEMPERATURE F - FLOW)
	GAUGE (X INDICATES T - TEMPERATURE P - PRESSURE F - FLOW)
	PRESSURE/TEMPERATURE TAP
	CIRCULATING PUMP
	UNION
	PIPE GUIDE (PG)
	PIPE ANCHOR (PA)
	REDUCER

## BLACKSBURG TRANSIT

BUILDING ADDRESS  
1324 PERRY STREET, BLACKSBURG, VA 24060

## MULTI-MODAL TRANSIT FACILITY BID SET



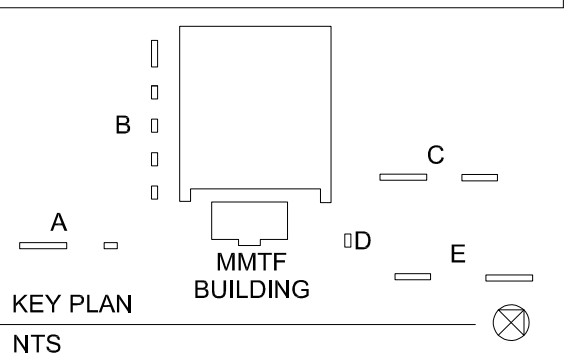
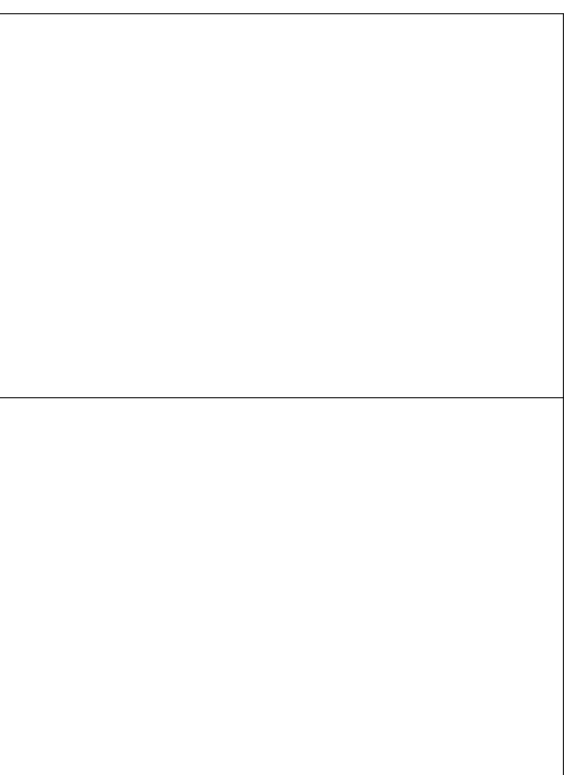
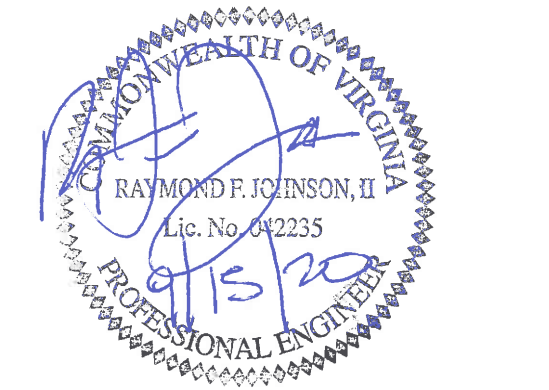
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DAA Project No. B101728-05

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0	BY	BID SET	09-15-2020
		REVISIONS	DATE

DWG. TITLE

## HVAC SYMBOLS, NOTES, & ABBREVIATIONS

DATE SEPTEMBER 15, 2020  
SCALE AS NOTED

DWN. MJB CHK. CCA  
PROJ. No. 449803

DWG. No.

# M001



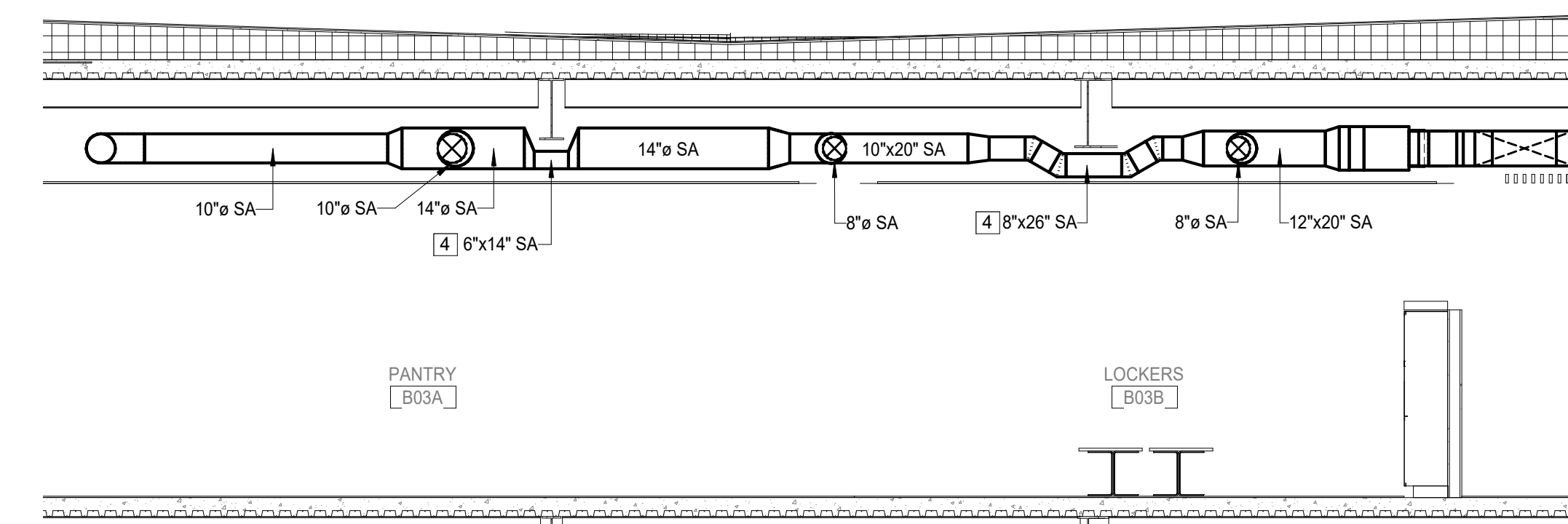
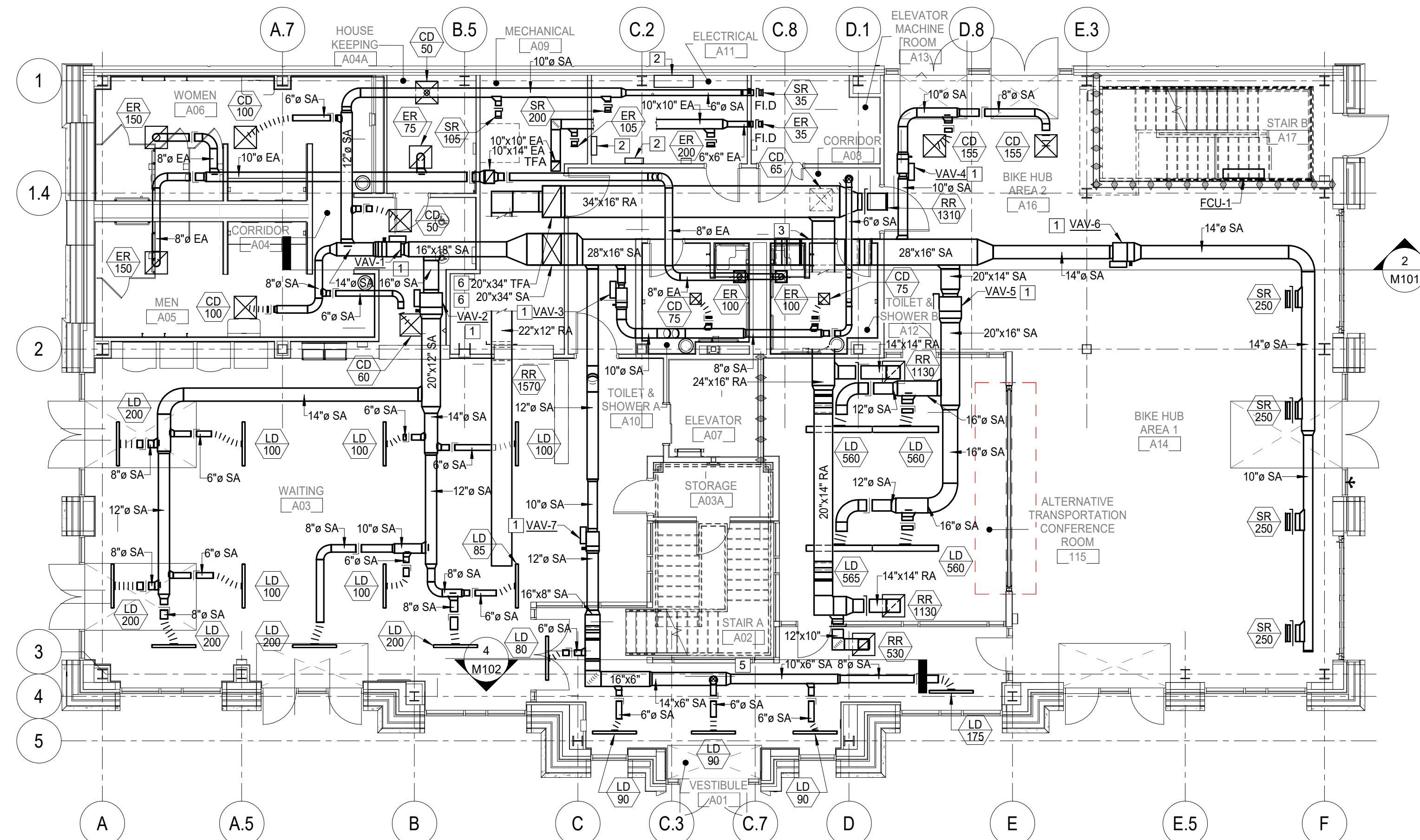
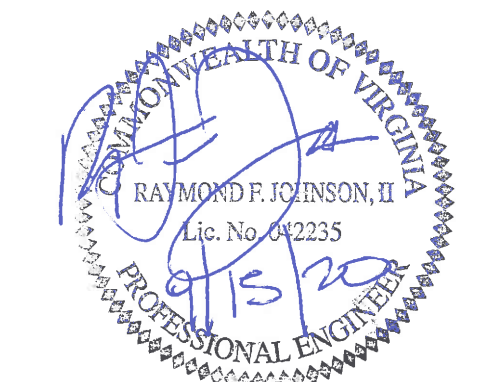
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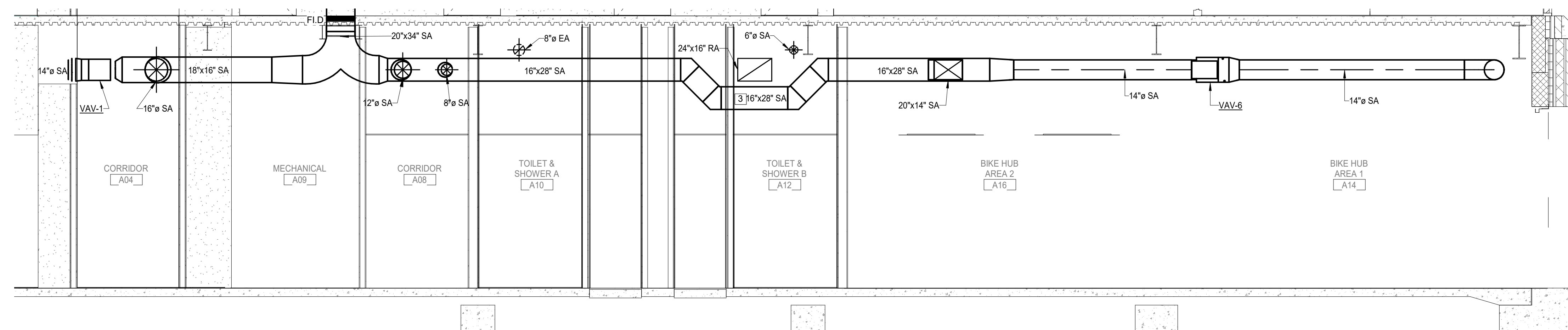
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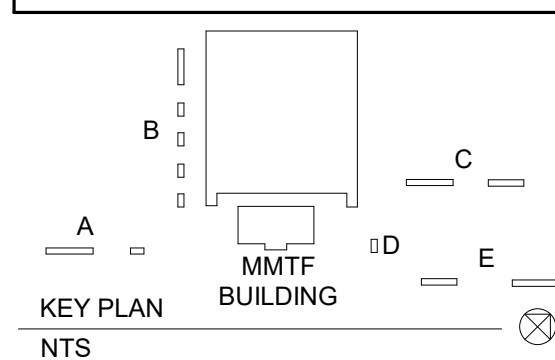


**1 FIRST FLOOR PLAN - DUCTWORK**  
1/8" = 1'-0"

**3 SECOND FLOOR SUPPLY DUCT SECTION**  
1/4" = 1'-0"



**2 FIRST FLOOR SUPPLY DUCT SECTION**  
1/4" = 1'-0"

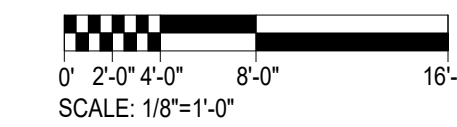


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0		BID SET	9-15-2020

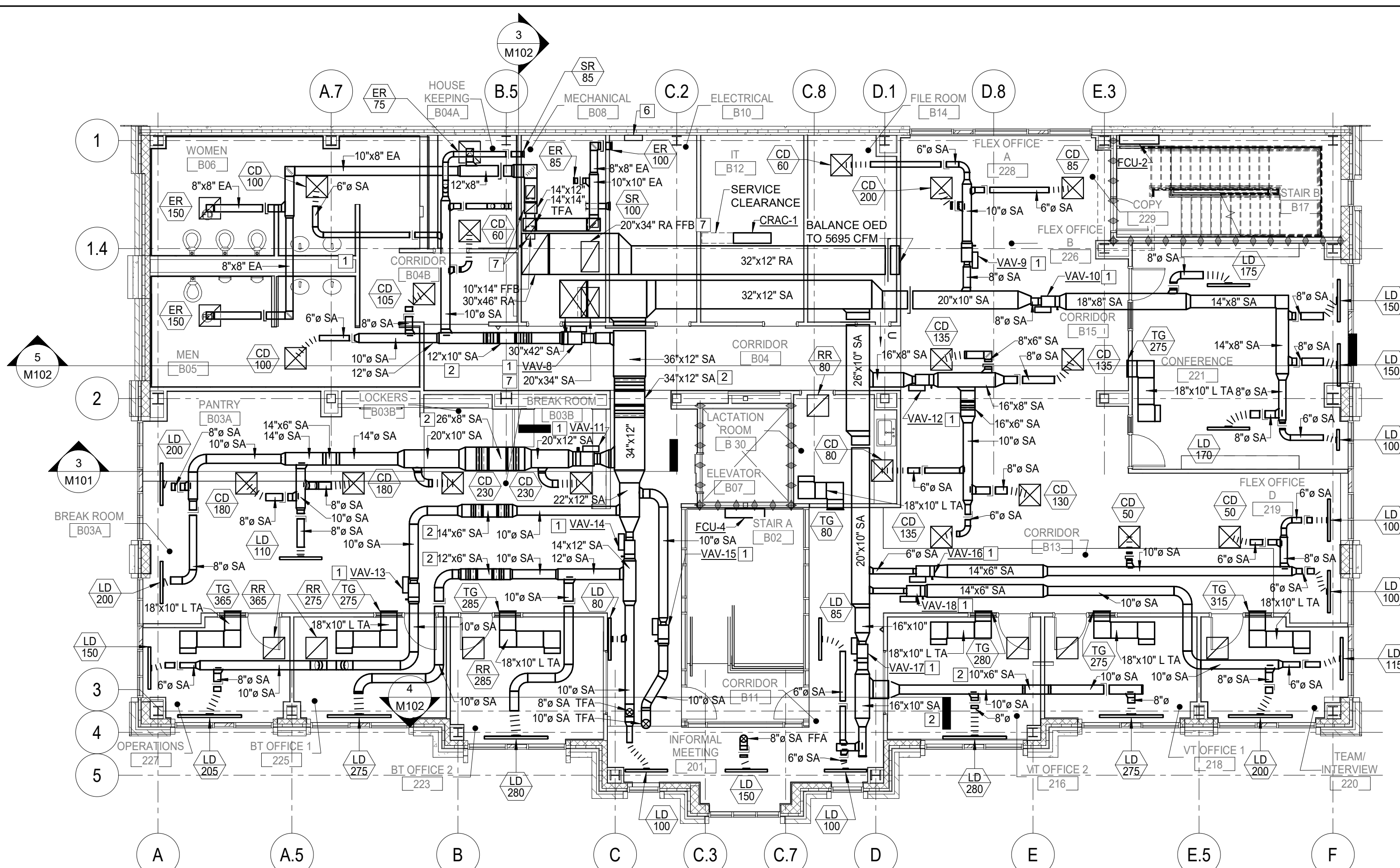
DWG. TITLE

**FIRST FLOOR PLAN - HVAC DUCTWORK**

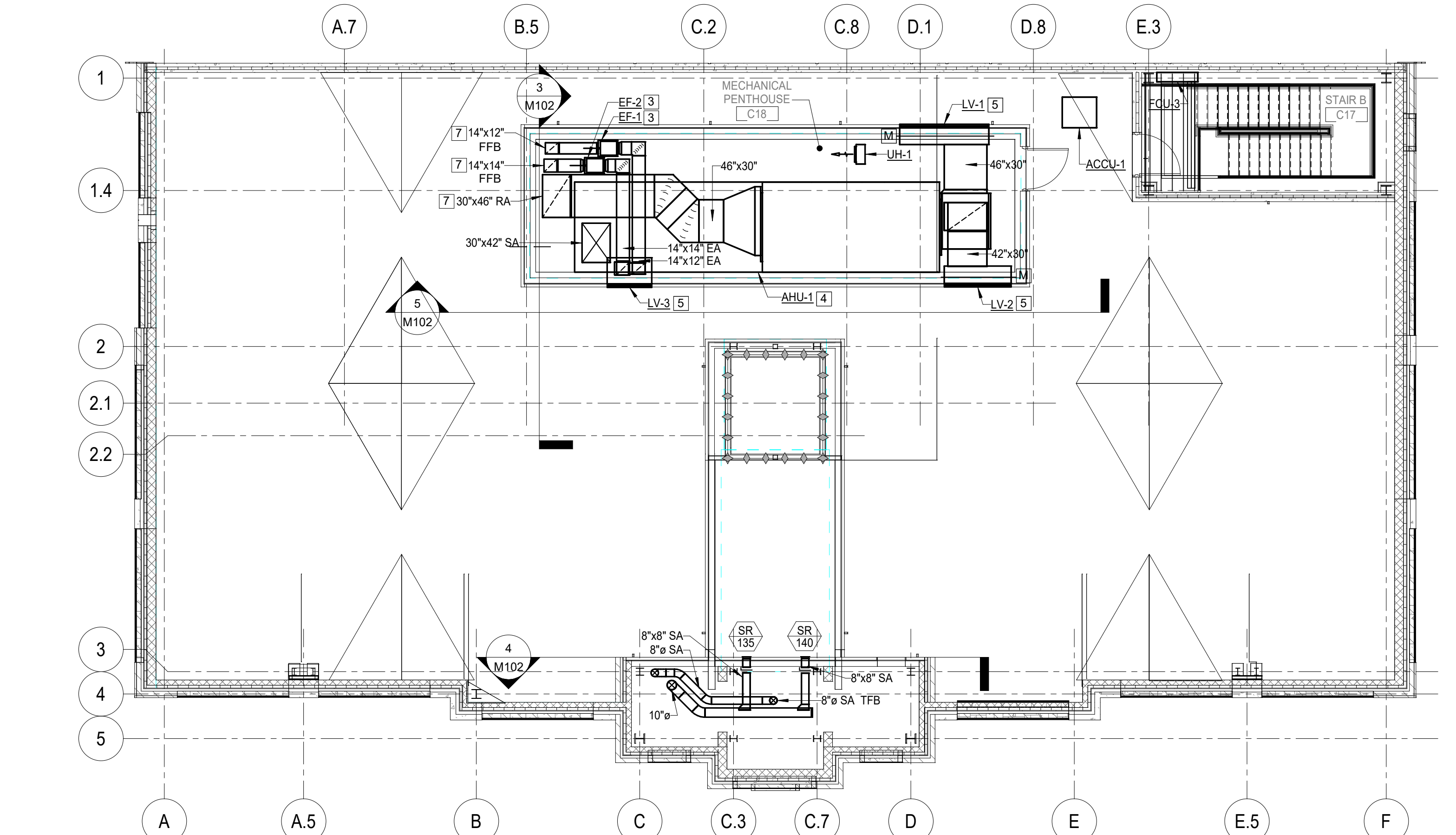
DATE	SEPTEMBER 15, 2020
SCALE	As Indicated
DWN.	MJB
CHK.	RFJ
PROJ. No.	449803
DWG. No.	



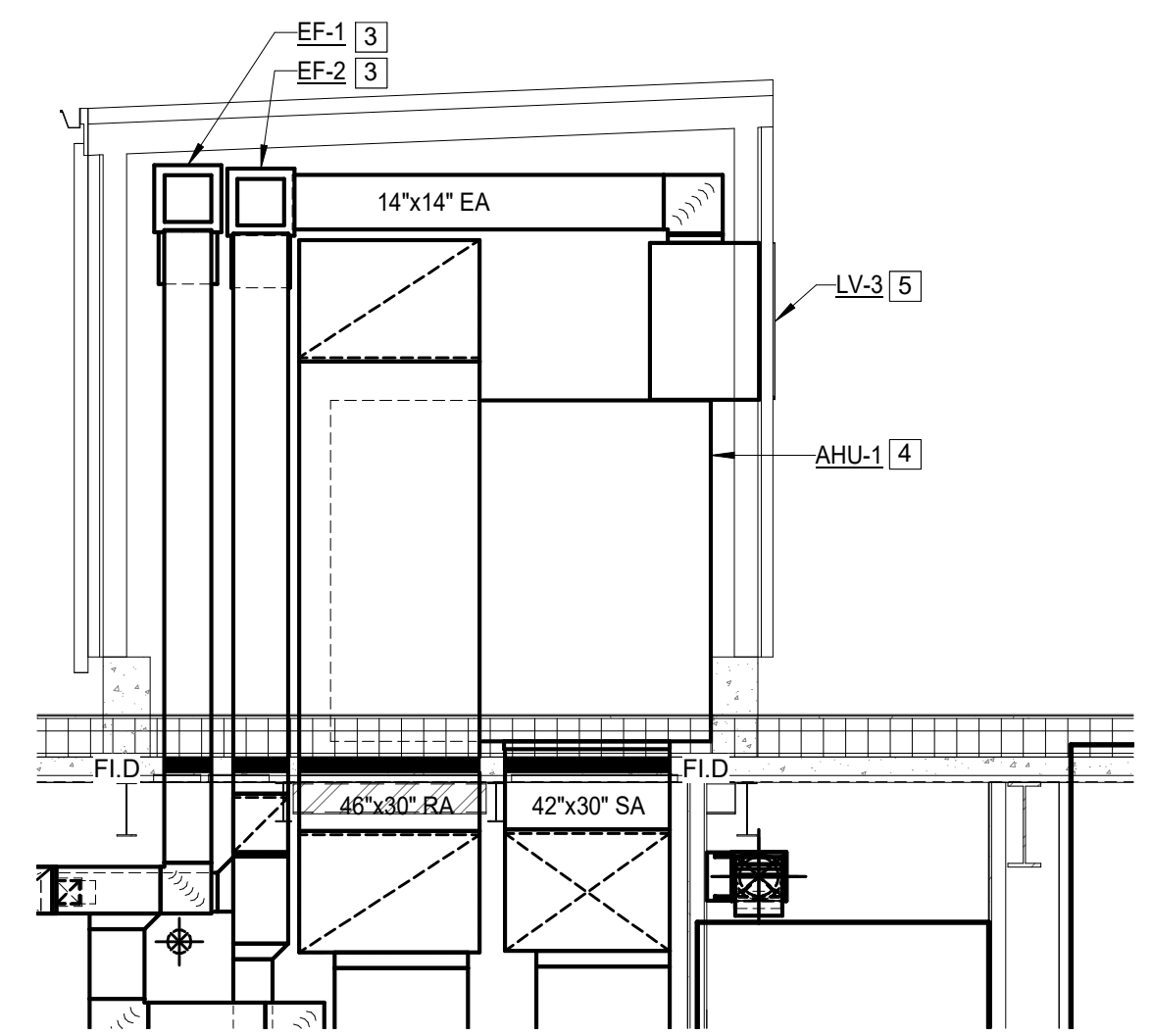
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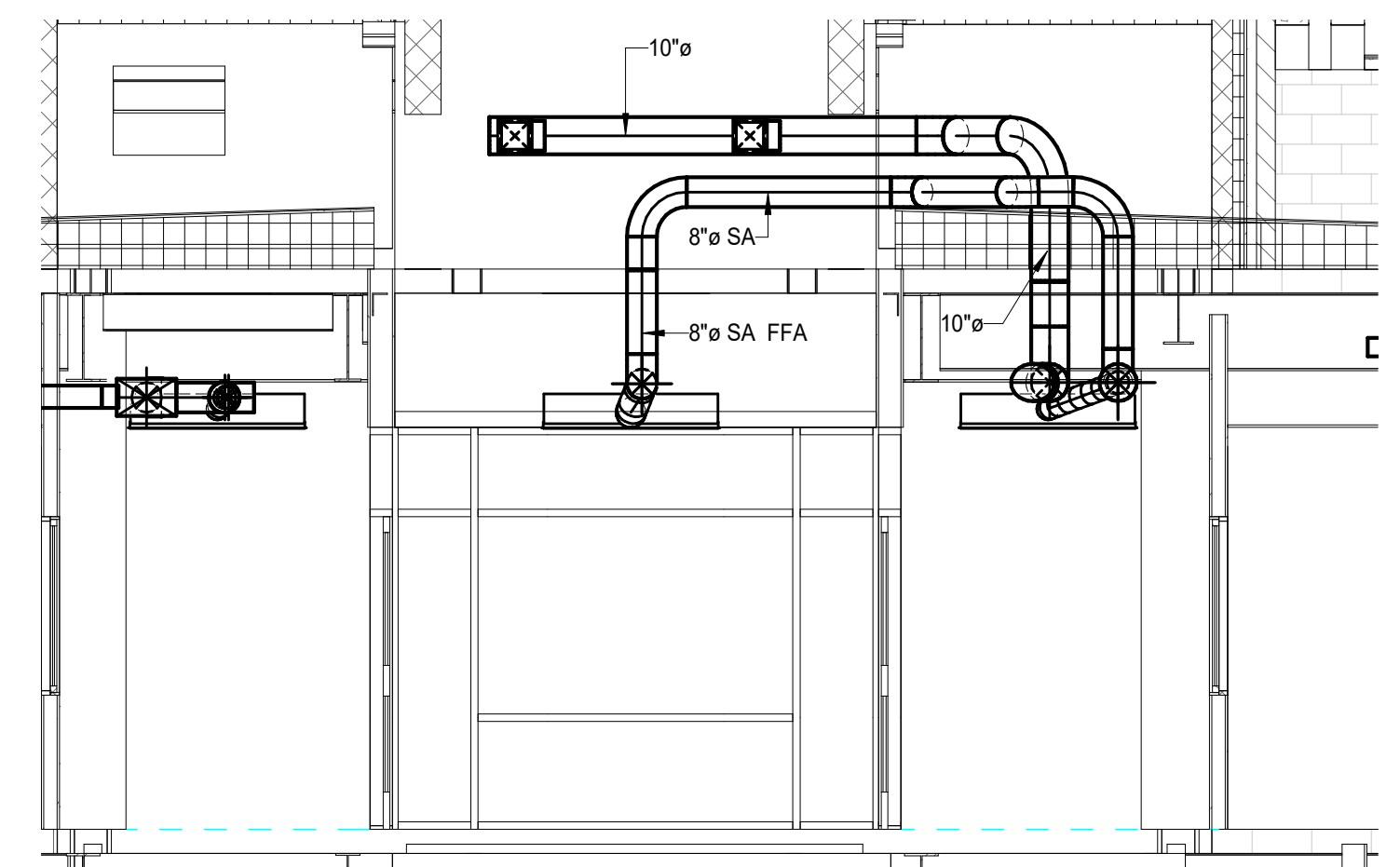
**1 SECOND FLOOR PLAN- DUCTWORK**  
1/8" = 1'-0"



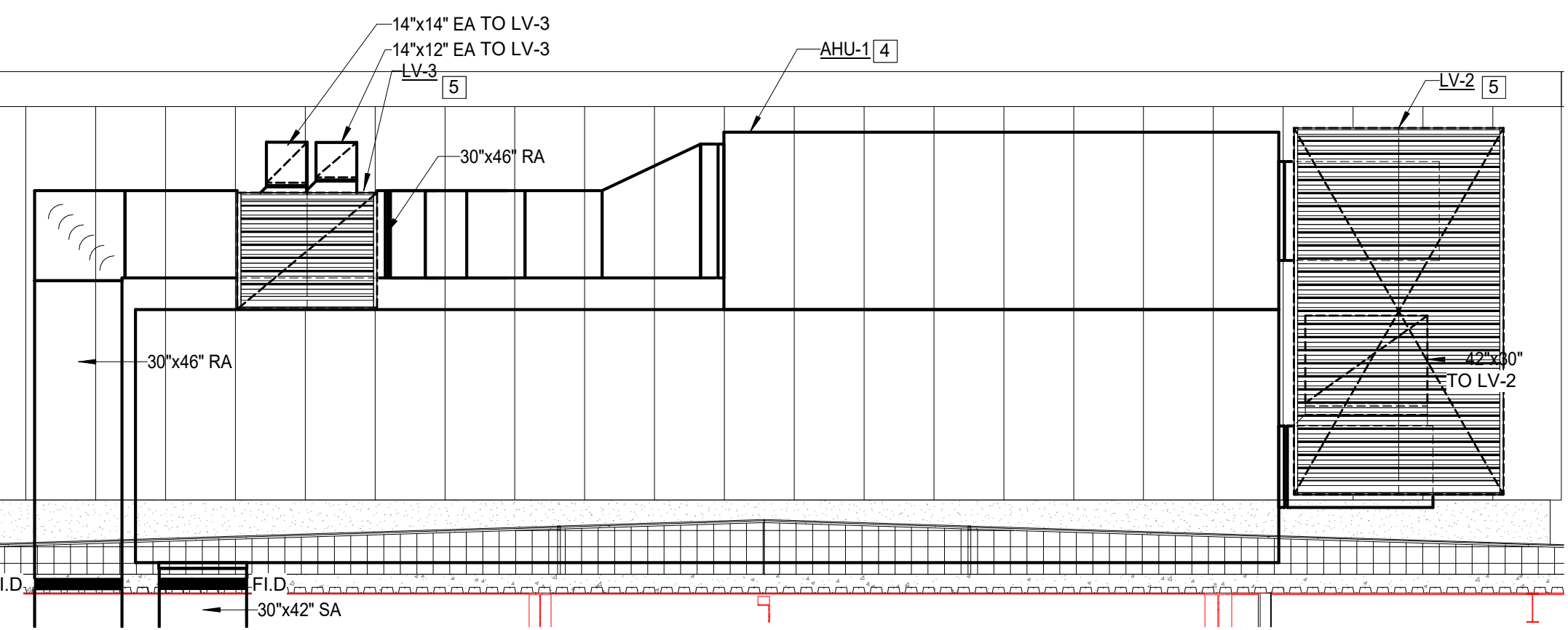
**2 ROOF PLAN- DUCTWORK**  
1/8" = 1'-0"



**3 PENTHOUSE SECTION- DUCTWORK**  
1/4" = 1'-0"



**4 CONFERENCE SPACE 201 SECTION- SUPPLY DUCTWORK**  
1/4" = 1'-0"



**5 PENTHOUSE SECTION- AHU-1**  
1/4" = 1'-0"

**CONSTRUCTION NOTES:**

1. PROVIDE VARIABLE AIR VOLUME BOX AS SCHEDULED. REFER TO DETAIL FOR FURTHER INFORMATION.
2. PROVIDE NECESSARY FITTINGS AND TRANSITIONS TO OFFSET SUPPLY DUCT AROUND STEEL AS REQUIRED.
3. PROVIDE EXHAUST FAN AS SCHEDULED. SUPPORT FAN FROM STRUCTURE ABOVE. REFER TO DETAIL FOR FURTHER INFORMATION.
4. PROVIDE AIR HANDLING UNIT AS SCHEDULED. COORDINATE FINAL LOCATION IN PENTHOUSE WITH ALL TRADES. CONTRACTOR SHALL VERIFY UNIT CLEARANCE IS MAINTAINED FOR SERVICE ACCESSIBILITY AS RECOMMENDED BY THE MANUFACTURER.
5. PROVIDE LOUVER AS SCHEDULED AND SHEET METAL PLENUM INSULATED WITH 1 1/2" THICK BOARD INSULATION.
6. DO NOT INSTALL DUCTWORK ABOVE ELECTRICAL PANEL. PANEL LOCATION SHOWN IS FOR REFERENCE ONLY. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION. COORDINATE WITH ALL OTHER TRADES.
7. PROVIDE FIRE DAMPER IN FLOOR PENETRATION. FIRE DAMPER SHALL BE AIR CURTAIN OUT OF AIR STREAM TYPE.

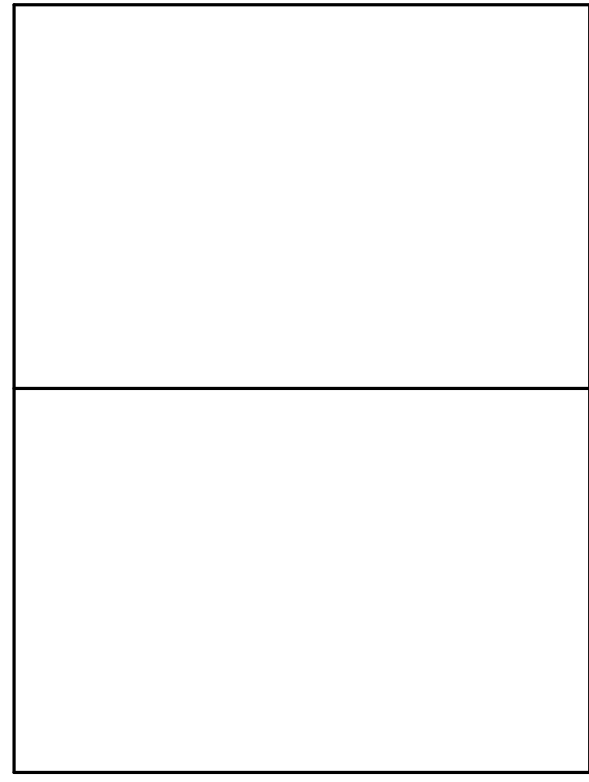
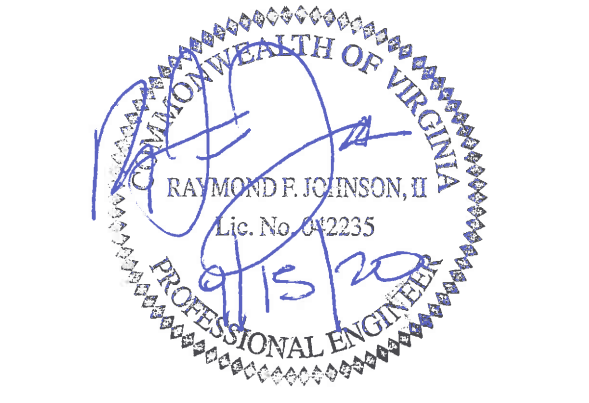


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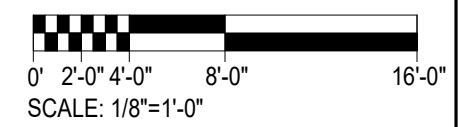
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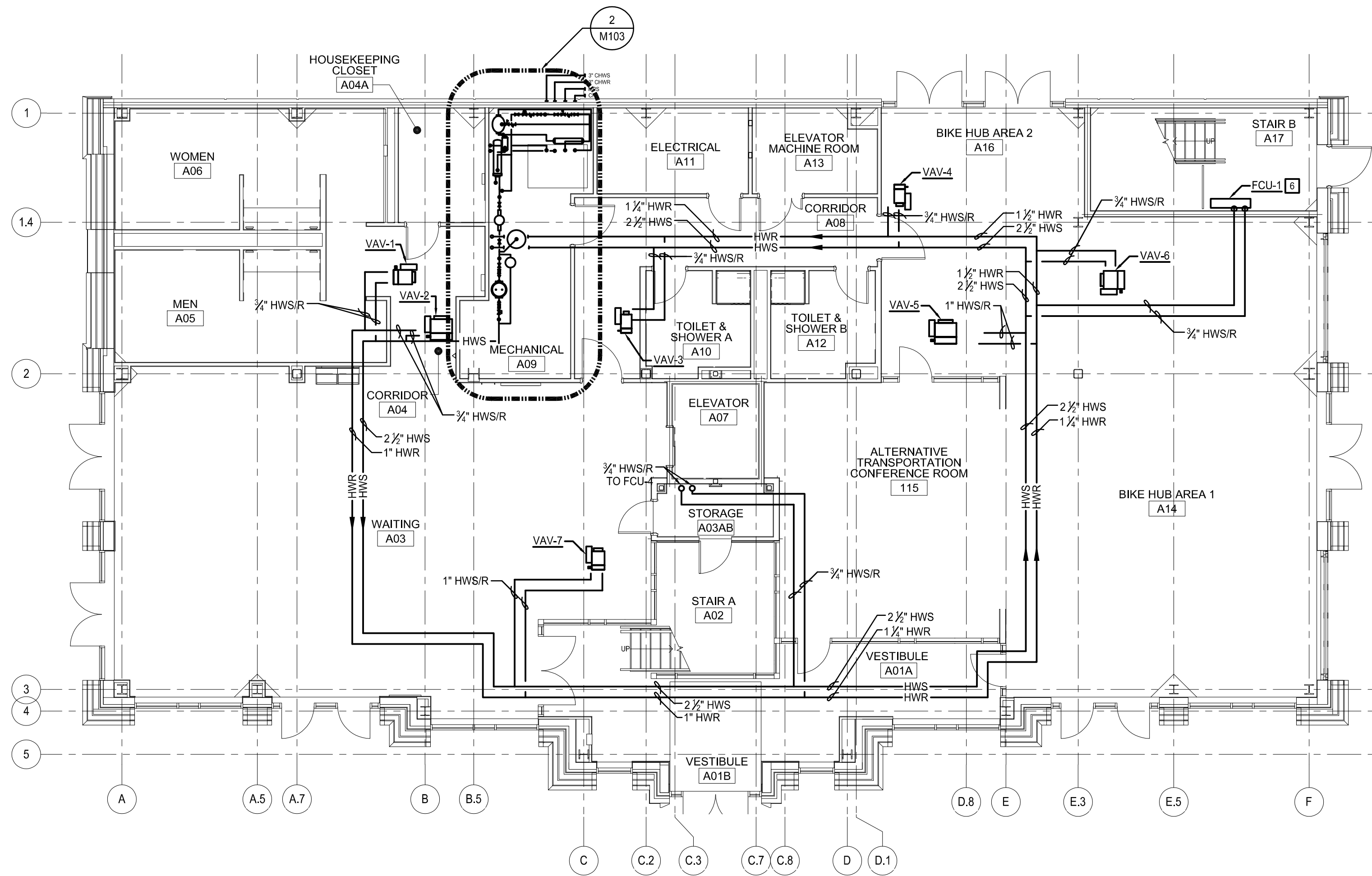


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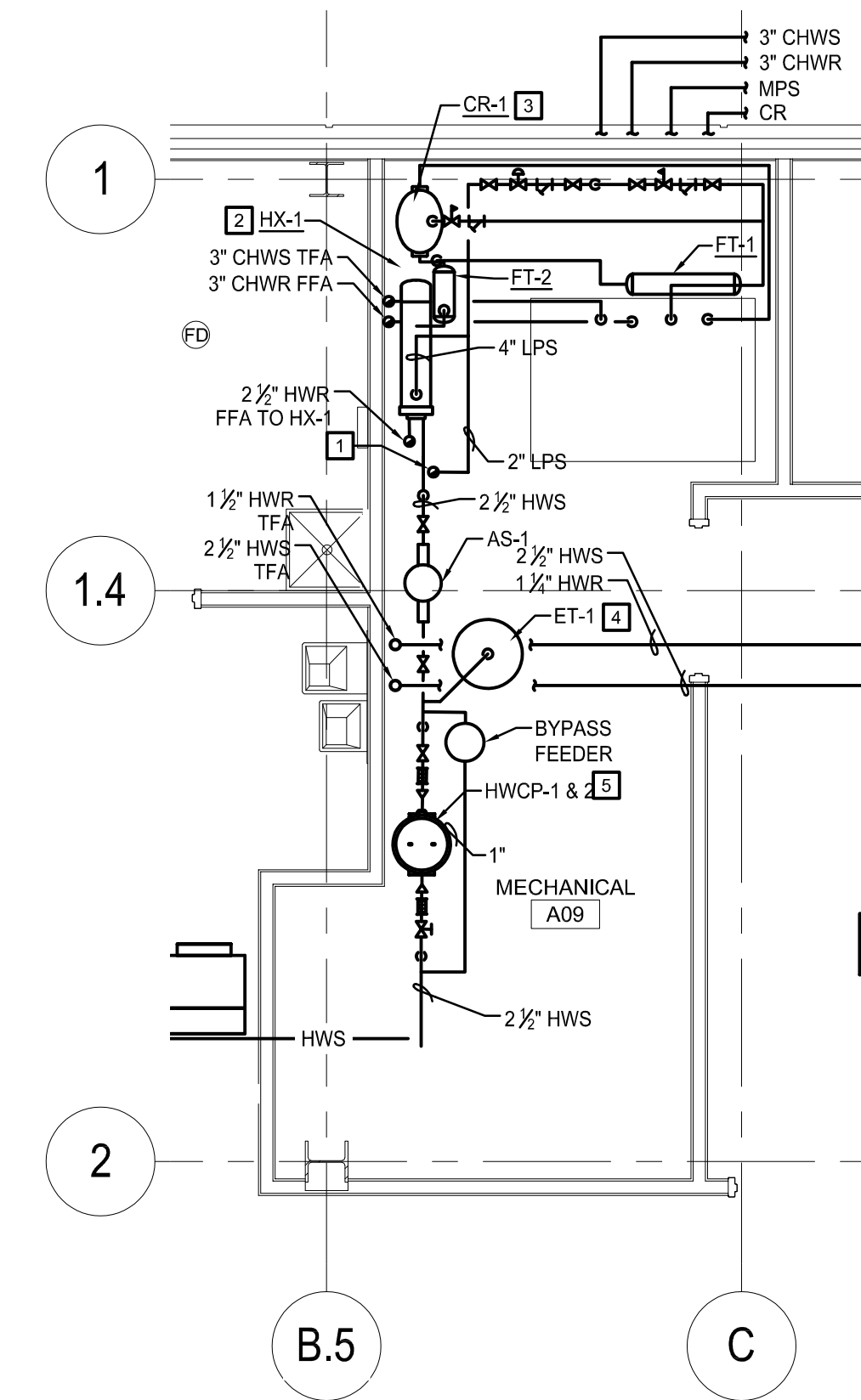
DWG. TITLE  
**SECOND FLOOR PLAN - HVAC DUCTWORK**

DATE	SEPTEMBER 15, 2020
SCALE	As indicated
DWN.	MJB
CHK.	RFJ
PROJ. No.	449803
DWG. No.	





**1 FIRST FLOOR PLAN - HVAC PIPING**  
SCALE: 1/8" = 1'-0"



**2 PARTIAL FIRST FLOOR PLAN - HVAC PIPING**  
SCALE: 1/4" = 1'-0"

**CONSTRUCTION NOTES:**

1. PROVIDE LOW PRESSURE STEAM LINE UP TO DOMESTIC WATER HEATER.
2. PROVIDE SHELL AND TUBE HEAT EXCHANGER AS SCHEDULED. PROVIDE MOUNTING FRAME. PROVIDE NECESSARY HARDWARE REQUIRED FOR MOUNTING. REFER TO DETAIL FOR FURTHER INFORMATION.
3. INSTALL STEAM POWERED CONDENSATE PUMPING TRAP AS SCHEDULED. CONDENSATE PUMP TRAP SHALL BE INSTALLED IN FLOOR PIT. PROVIDE ALL ANCILLARY DEVICES AS REQUIRED FOR COMPLETE INSTALLATION. REFER TO DETAIL FOR FURTHER INFORMATION.
4. PROVIDE EXPANSION TANK AS INDICATED. PROVIDE HOUSEKEEPING PAD. HOUSEKEEPING PAD SHALL EXTEND PAST THE FOOTPRINT 4" IN ALL DIRECTIONS. REFER TO DETAIL FOR FURTHER INFORMATION.
5. PROVIDE HOT WATER CIRCULATING PUMPS AS INDICATED. INSTALL PUMPS STACKED VERTICALLY ON WALL. PROVIDE SUPPORTS PER MANUFACTURERS RECOMMENDATIONS. PROVIDE FLOOR MOUNTED UNISTRUT FRAME.
6. PROVIDE FAN COIL UNIT AS INDICATED. INSTALL FAN COIL UNIT 18" ABOVE FINISHED FLOOR ELEVATION. PROVIDE REQUIRED ANCILLARY DEVICES TO CONNECT INTO HOT WATER. REFER TO DETAIL FOR FURTHER INFORMATION.

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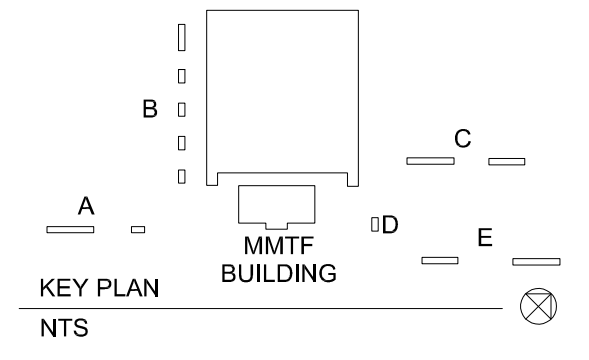
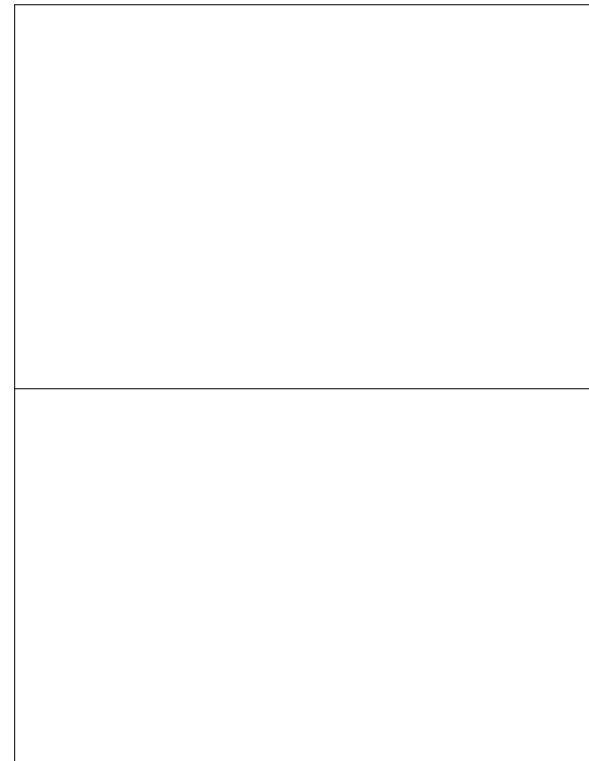
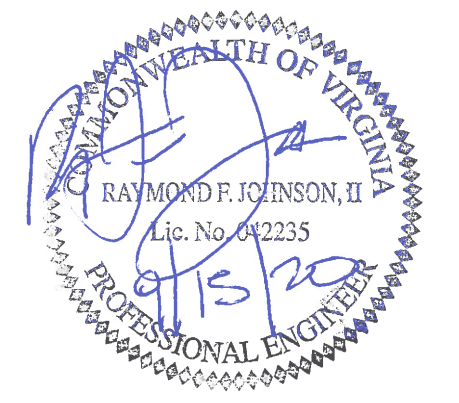
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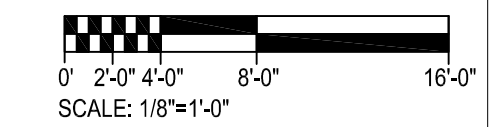


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0			09-15-2020

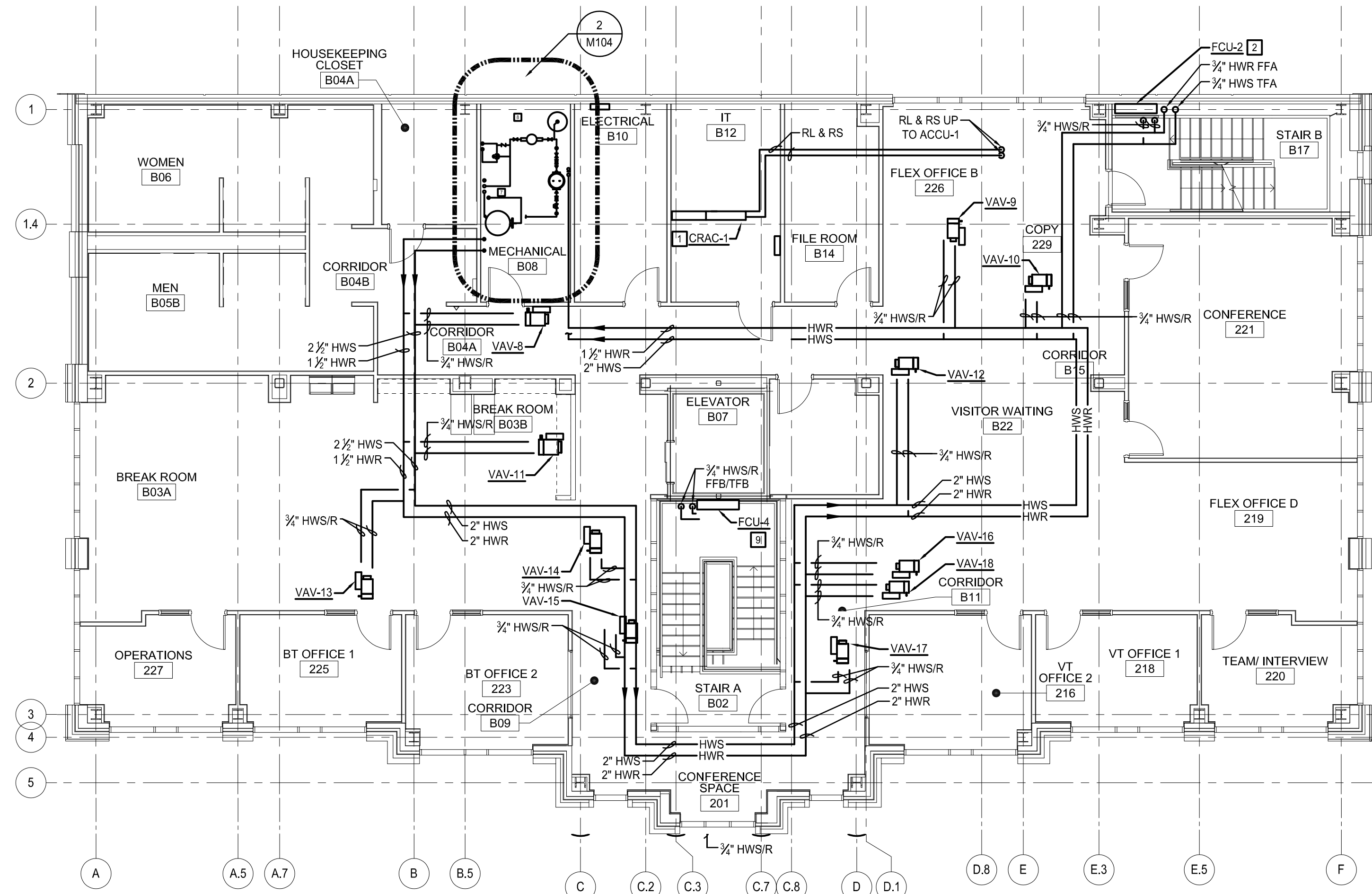
DWG. TITLE

**FIRST FLOOR PLAN - HVAC PIPING**

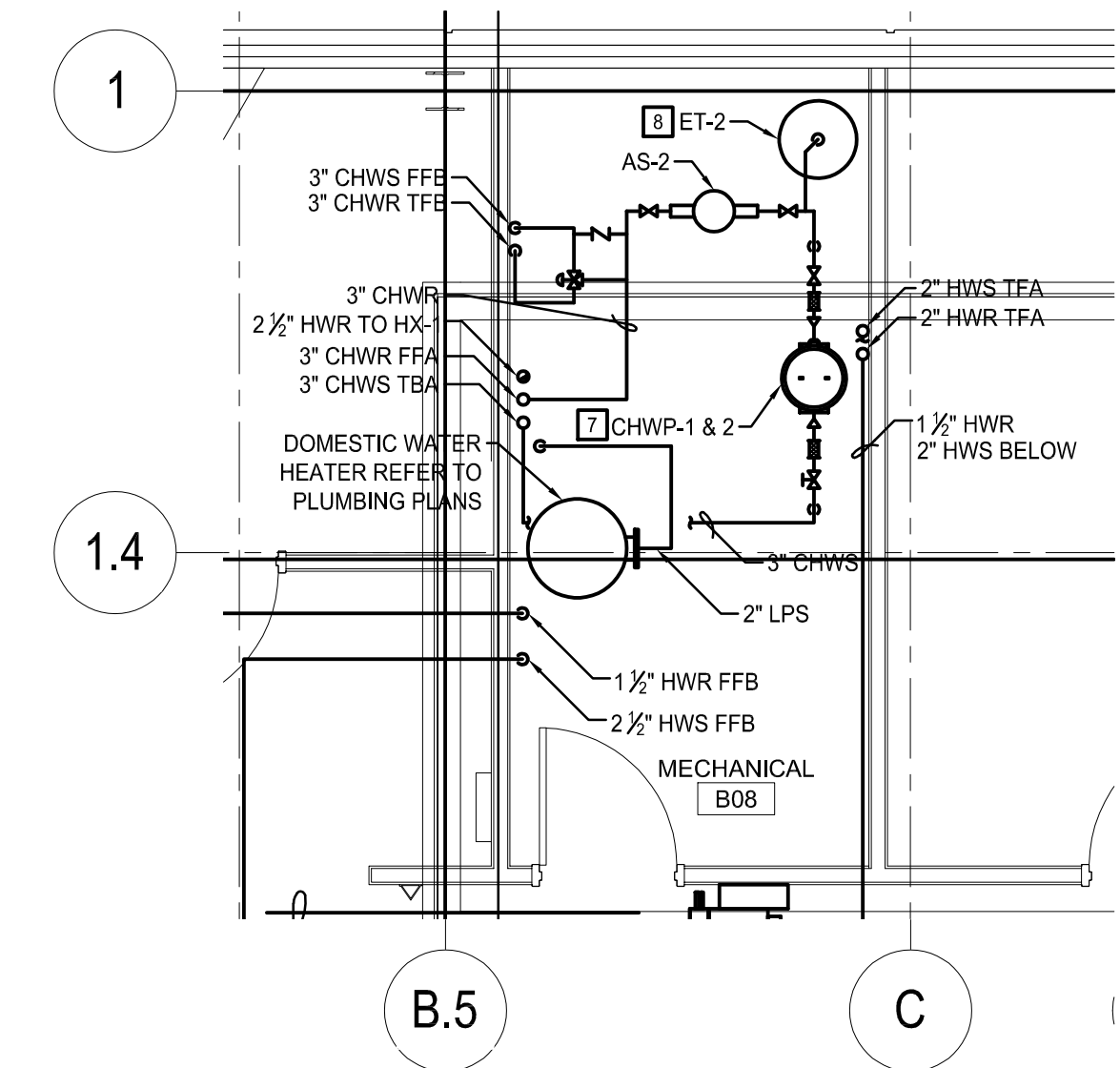
DATE	SEPTEMBER 15, 2020
SCALE	AS NOTED
DWN.	-
CHK.	-
PROJ. No.	449803
DWG. No.	



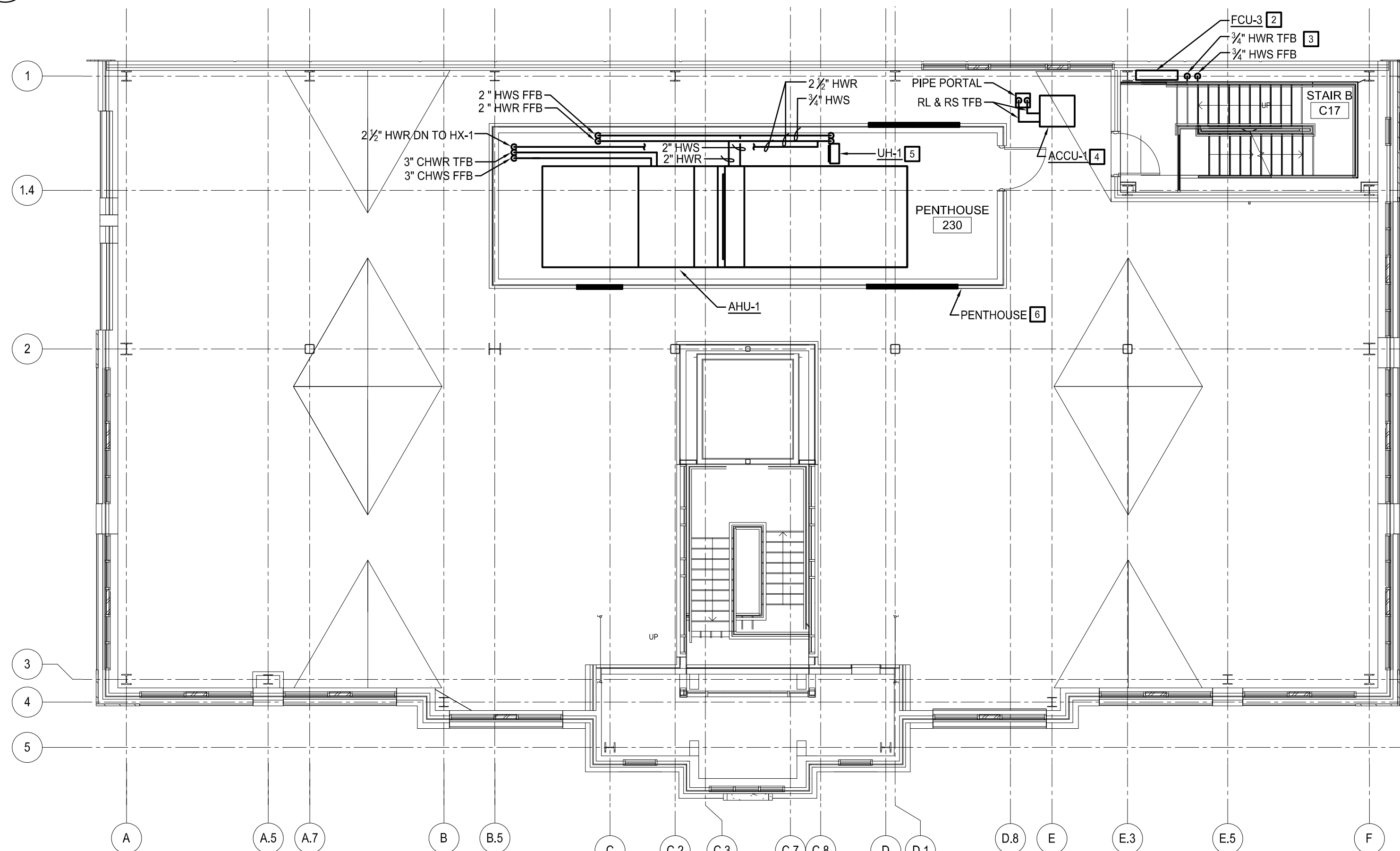
**M103**



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



2 PARTIAL SECOND FLOOR PLAN - HVAC PIPING  
SCALE: 1/4" = 1'-0"



3 ROOF PLAN - HVAC PIPING  
SCALE: 1/8" = 1'-0"

CONSTRUCTION NOTES:

1. PROVIDE COMPUTER ROOM AIR CONDITIONING UNIT AS INDICATED. PROVIDE ALL NECESSARY REFRIGERANT PIPING AND ANCILLARY DEVICES TO CONNECT INTO AIR COOLED CONDENSING UNIT ON ROOF. REFER TO DETAIL FOR FURTHER INFORMATION. PROVIDE CONDENSATE DRAINAGE PIPING AND ROUTE TO NEAREST FLOOR DRAIN. TERMINATE PIPING INDIRECTLY.
2. PROVIDE FAN COIL UNIT AS INDICATED. MOUNT UNIT 18 INCHES ABOVE LANDING ELEVATION. UNIT INSTALLATION SHALL NOT ENCRoACH THE EGRESS PATH OF THE STAIRWAY. REFER TO DETAIL FOR HOT WATER COIL CONNECTION INFORMATION.
3. PROVIDE HOT WATER PIPING AS INDICATED. ROUTE PIPING ALONG WALL OF STAIRWELL, IN BETWEEN THE BEAM AND THE WALL.
4. PROVIDE AIR COOLED CONDENSING UNIT AS INDICATED. PROVIDE EQUIPMENT RAILS FOR MOUNTING. PROVIDE ALL NECESSARY REFRIGERANT PIPING AND ANCILLARY DEVICES TO MAKE A COMPLETE OPERABLE SYSTEM. PROVIDE REFRIGERANT PIPE PORTAL. REFER TO DETAIL FOR FURTHER INFORMATION.
5. PROVIDE HOT WATER UNIT HEATER AS INDICATED. SUPPORT FROM STRUCTURE ABOVE. REFER TO DETAIL FOR FURTHER INFORMATION.
6. PROVIDE MECHANICAL PENTHOUSE. CONTRACTOR SHALL PROVIDE AIR HANDLING UNIT, EXHAUST FANS, LOUVERS, AND UNIT HEATER TO PENTHOUSE MANUFACTURER FOR INSTALLATION. PENTHOUSE SHALL BE INSTALLED AS A SINGLE UNIT. PROVIDE ROOF CURB TO SUPPORT PENTHOUSE. COORDINATE WITH OTHER TRADES ON EXACT LOCATIONS OF ROOF PENETRATIONS AND SERVICES ENTERING THE PENTHOUSE. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION. PENTHOUSE SHALL HAVE CUSTOM COPING ALONG ROOF LINE REFER TO ARCHITECTURAL DRAWINGS FOR FURTHER INFORMATION.
7. PROVIDE CHILLED WATER PUMPS AS INDICATED. INSTALL PUMPS STACKED VERTICALLY ON WALL. PROVIDE SUPPORTS PER MANUFACTURERS RECOMMENDATIONS. PROVIDE FLOOR MOUNTED UNISTRUT FRAME. REFER TO DETAIL FOR FURTHER INFORMATION.
8. PROVIDE EXPANSION TANK AS INDICATED. PROVIDE HOUSEKEEPING PAD. HOUSEKEEPING PAD SHALL EXTEND PAST THE FOOTPRINT 4" IN ALL DIRECTIONS. REFER TO DETAIL FOR FURTHER INFORMATION.
9. PROVIDE FAN COIL UNIT AS INDICATED. MOUNT UNIT 18" ABOVE FINISHED FLOOR ELEVATION OF STAIR LANDING. REFER TO DETAIL FOR COIL CONNECTION INFORMATION.

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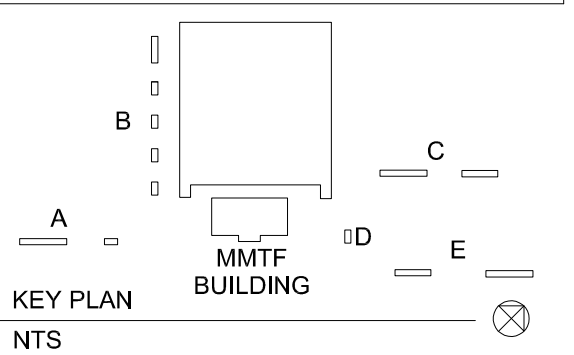
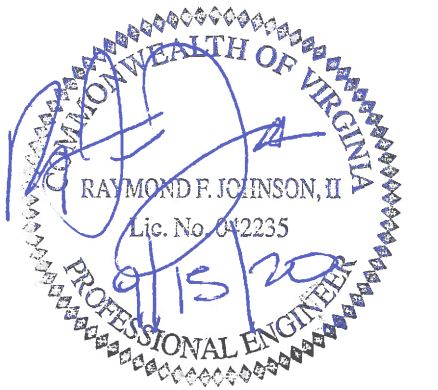
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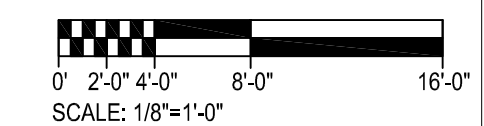


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SECOND FLOOR PLAN - HVAC PIPING

DATE	SEPTEMBER 15, 2020
SCALE	AS NOTED
DWN.	CHK.
PROJ. No.	449803
DWG. No.	



M104





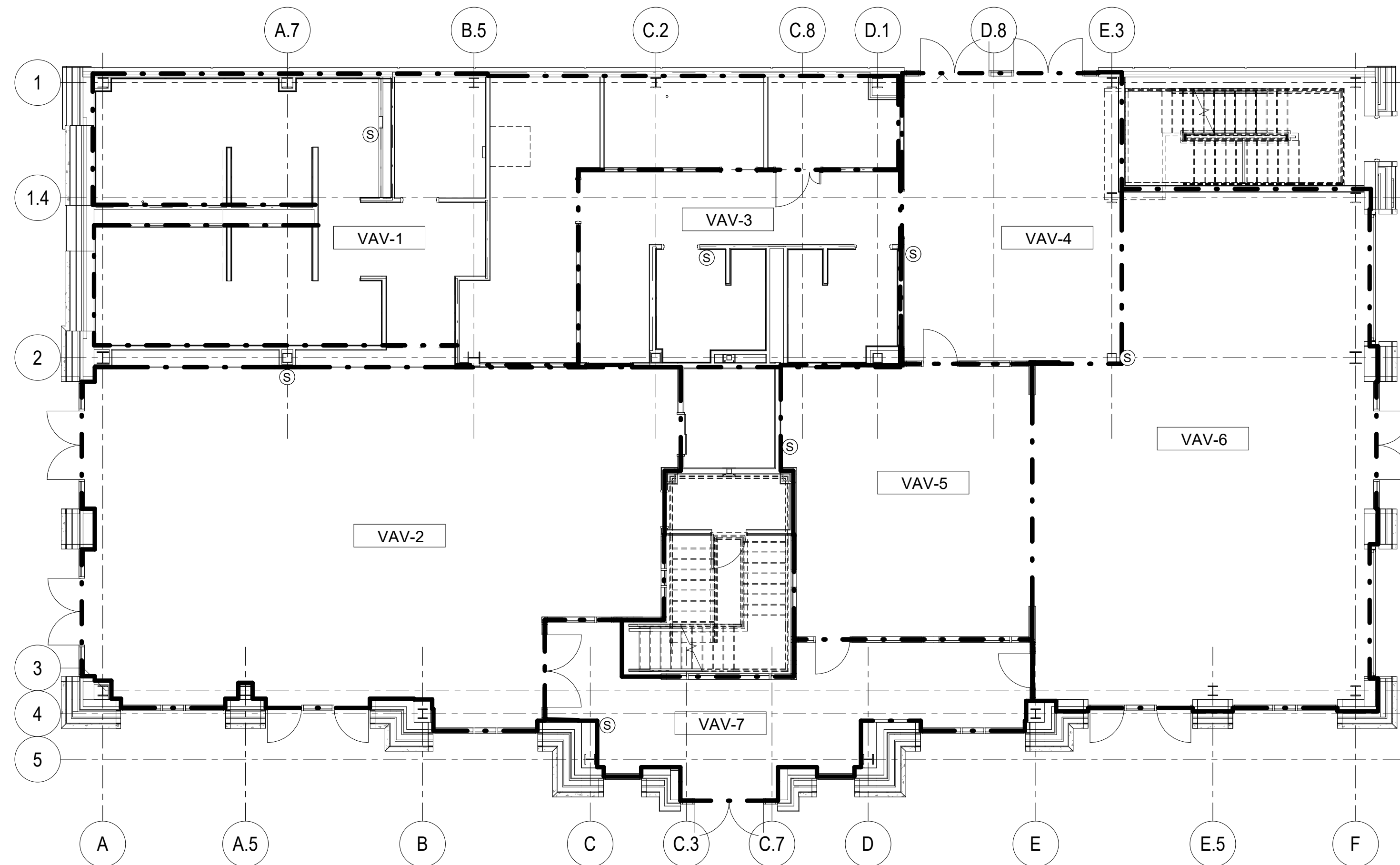
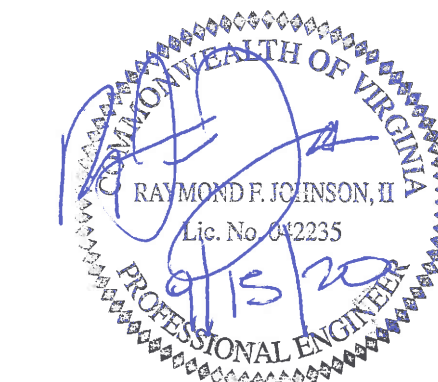
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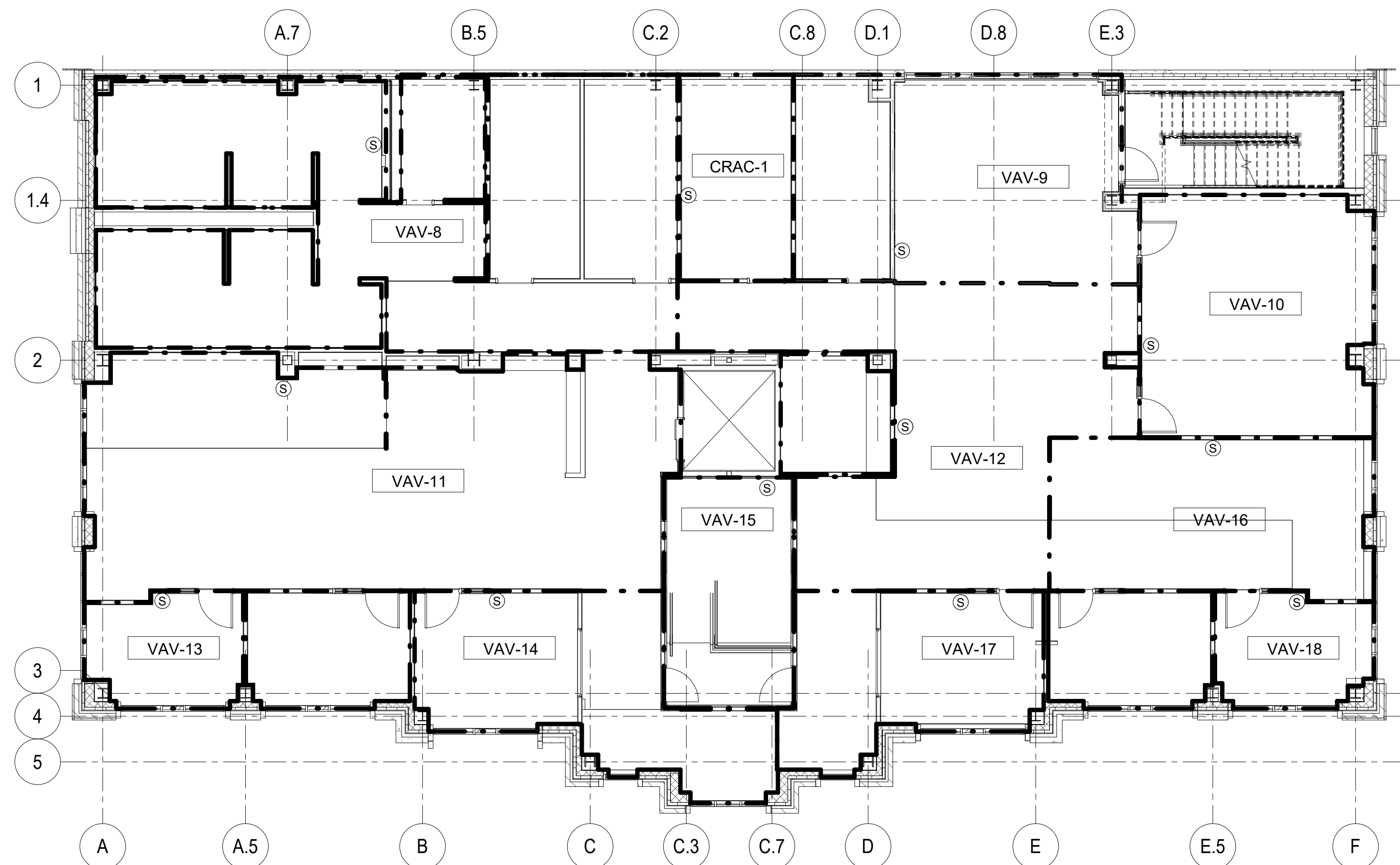
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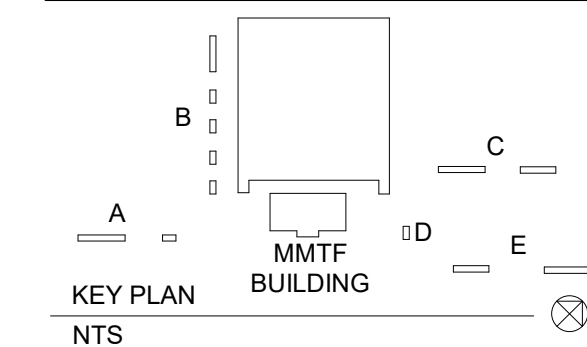
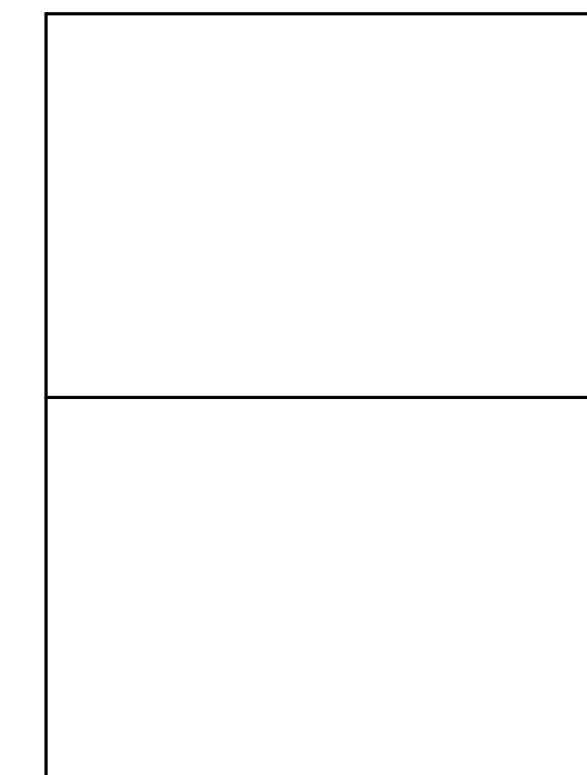
**1 FIRST FLOOR PLAN - ZONING**

1/8" = 1'-0"



**2 SECOND FLOOR PLAN - ZONING**

1/8" = 1'-0"



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**ZONING PLANS**

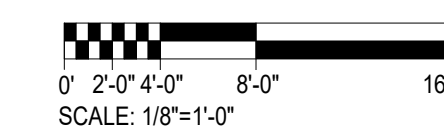
DATE SEPTEMBER 15, 2020

SCALE 1/8" = 1'-0"

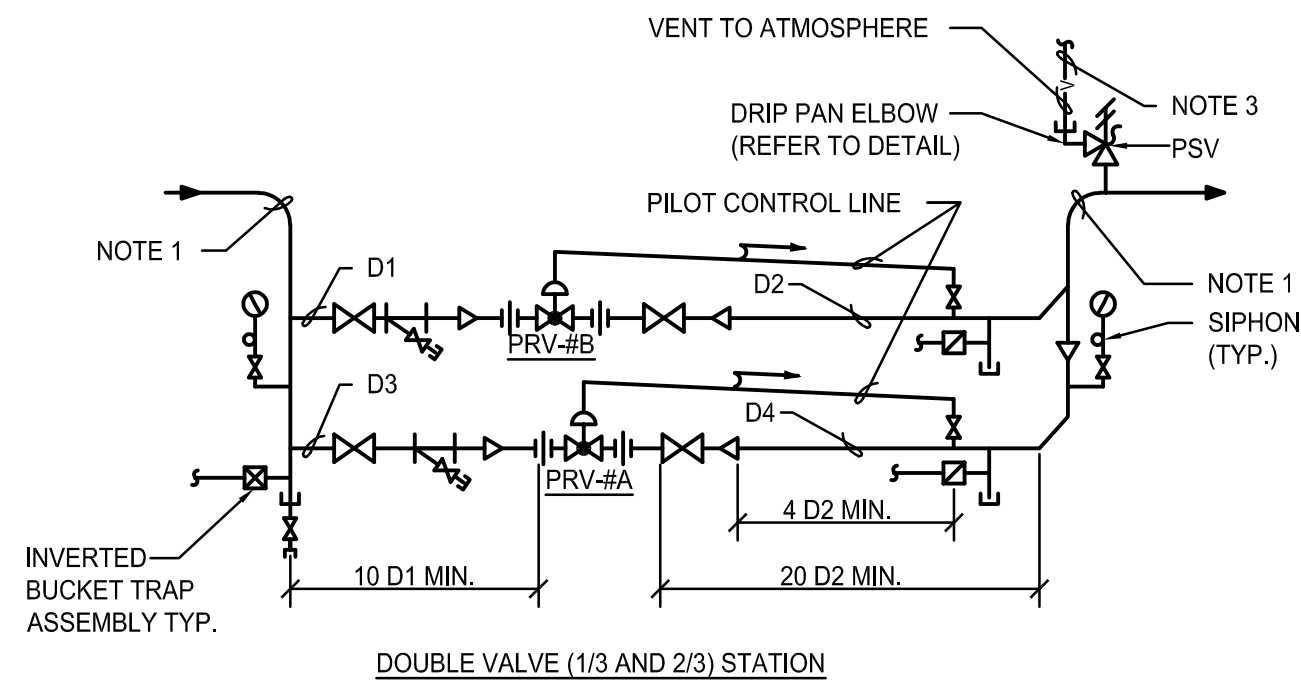
DWN. Author CHK. Checker

PROJ. No. 449803

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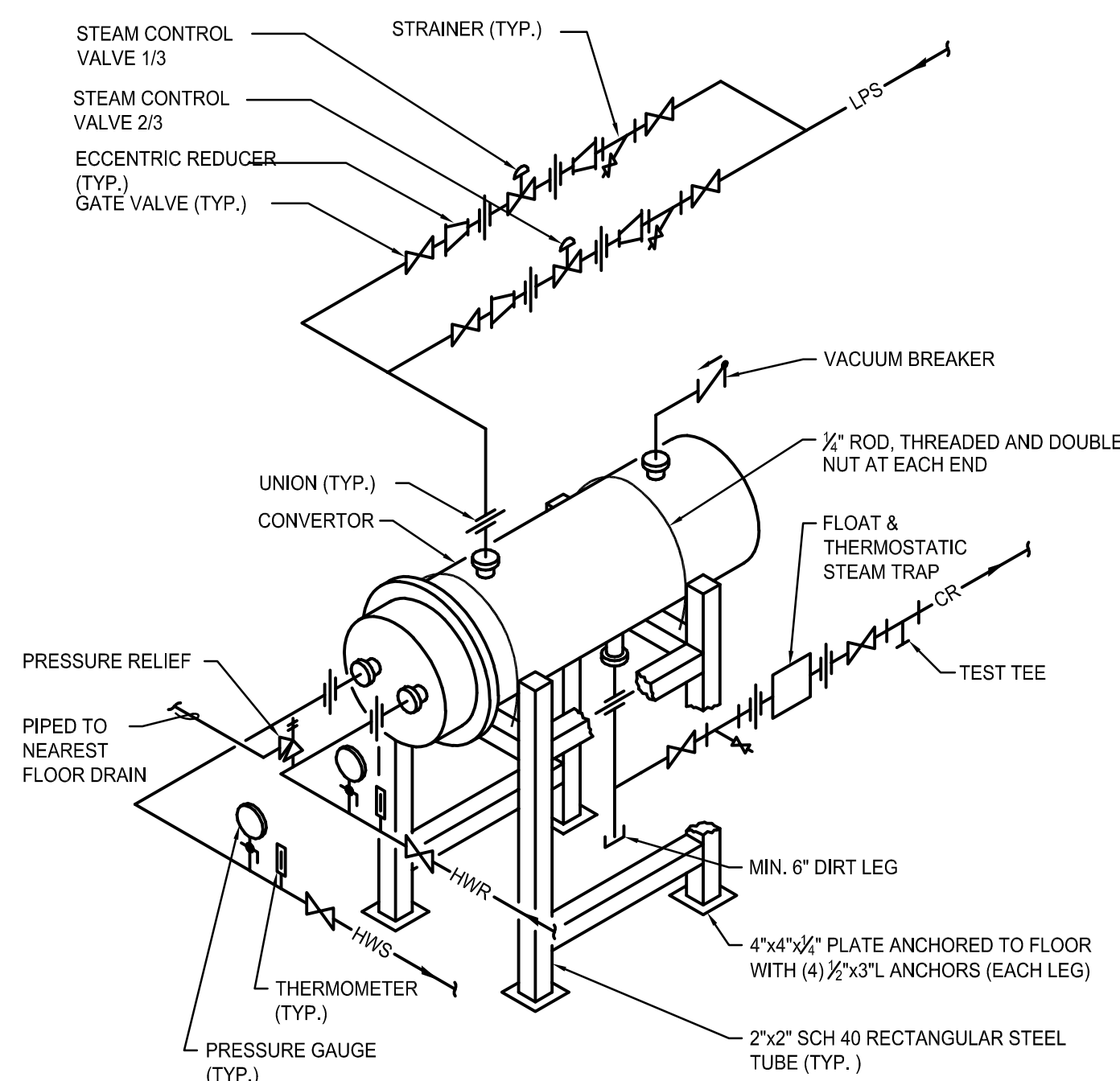


**M105**

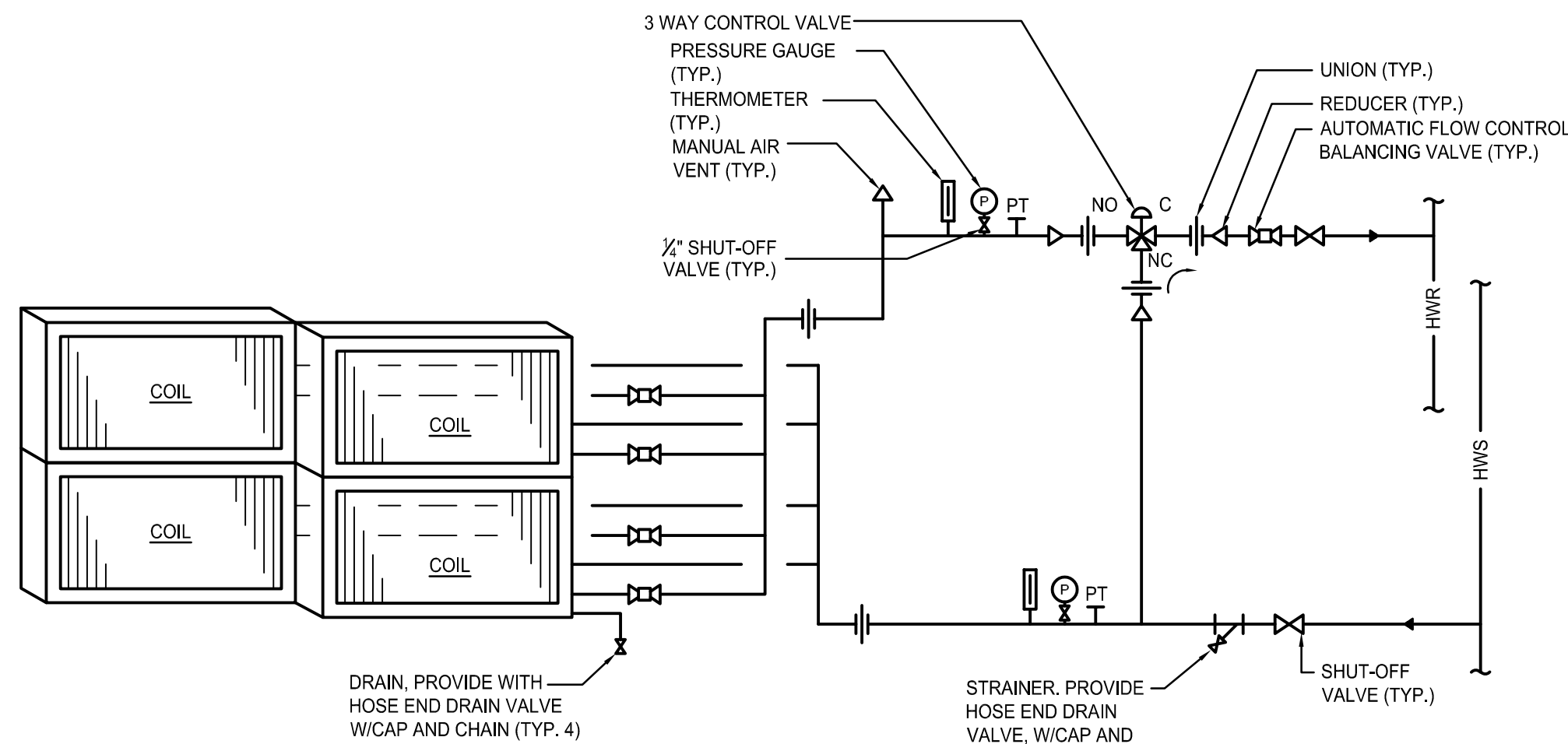


- NOTES:**
- SEE FLOOR PLANS FOR PIPE SIZES.
  - SEE EQUIPMENT SCHEDULES FOR VALVE DATA AND PIPE SIZES D1, D2, D3 AND D4. INSTALL VALVES AS RECOMMENDED BY MANUFACTURER.
  - ROUTE RELIEF VALVE DISCHARGE UP THROUGH ROOF AND TERMINATE WITH GOOSENECK AND INSECT SCREEN.
  - PROVIDE NECESSARY UNIONS FOR THE REMOVAL OF VALVE WITH SCREWED CONNECTIONS.

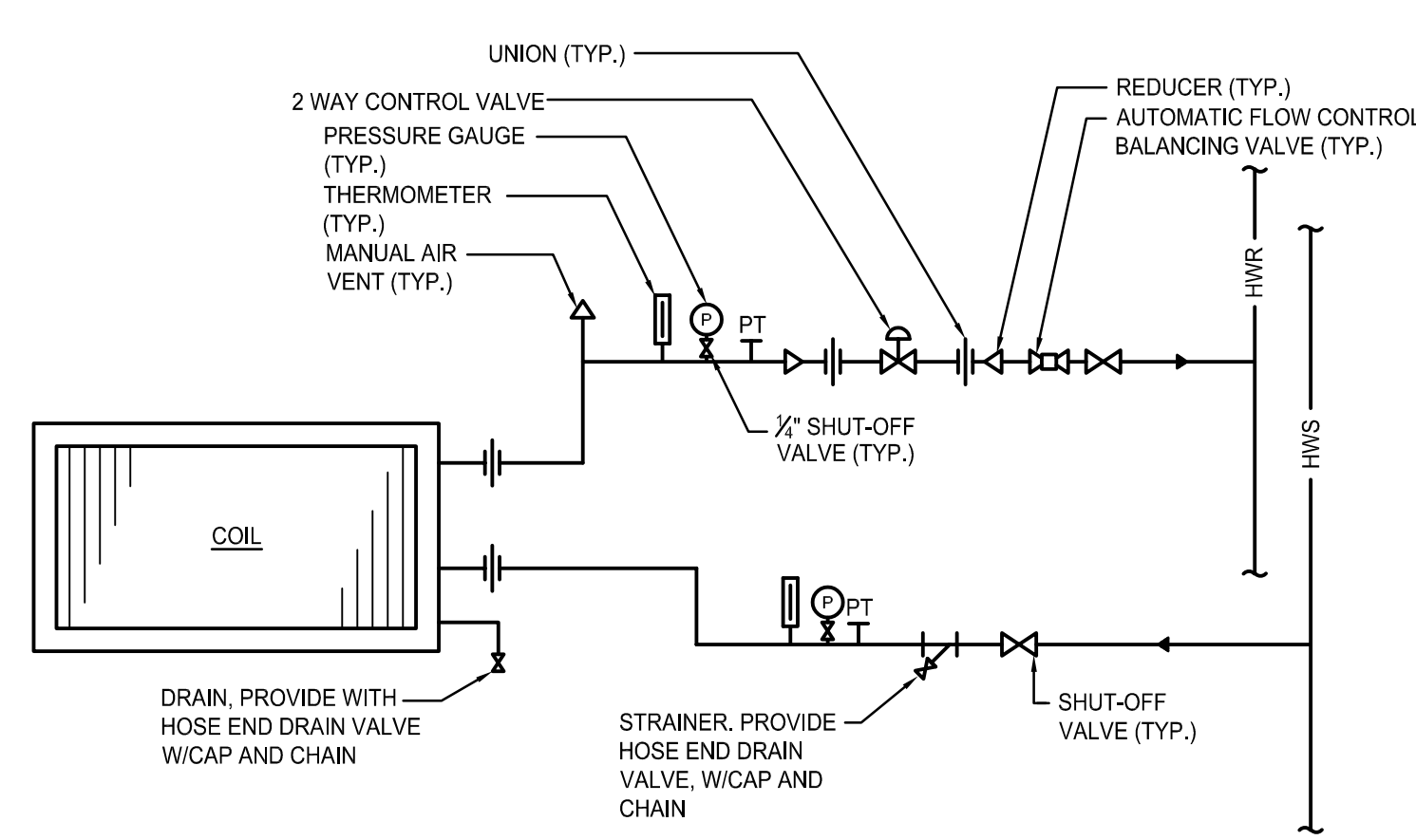
**1 STEAM PRESSURE REDUCING STATION**  
SCALE: NOT TO SCALE



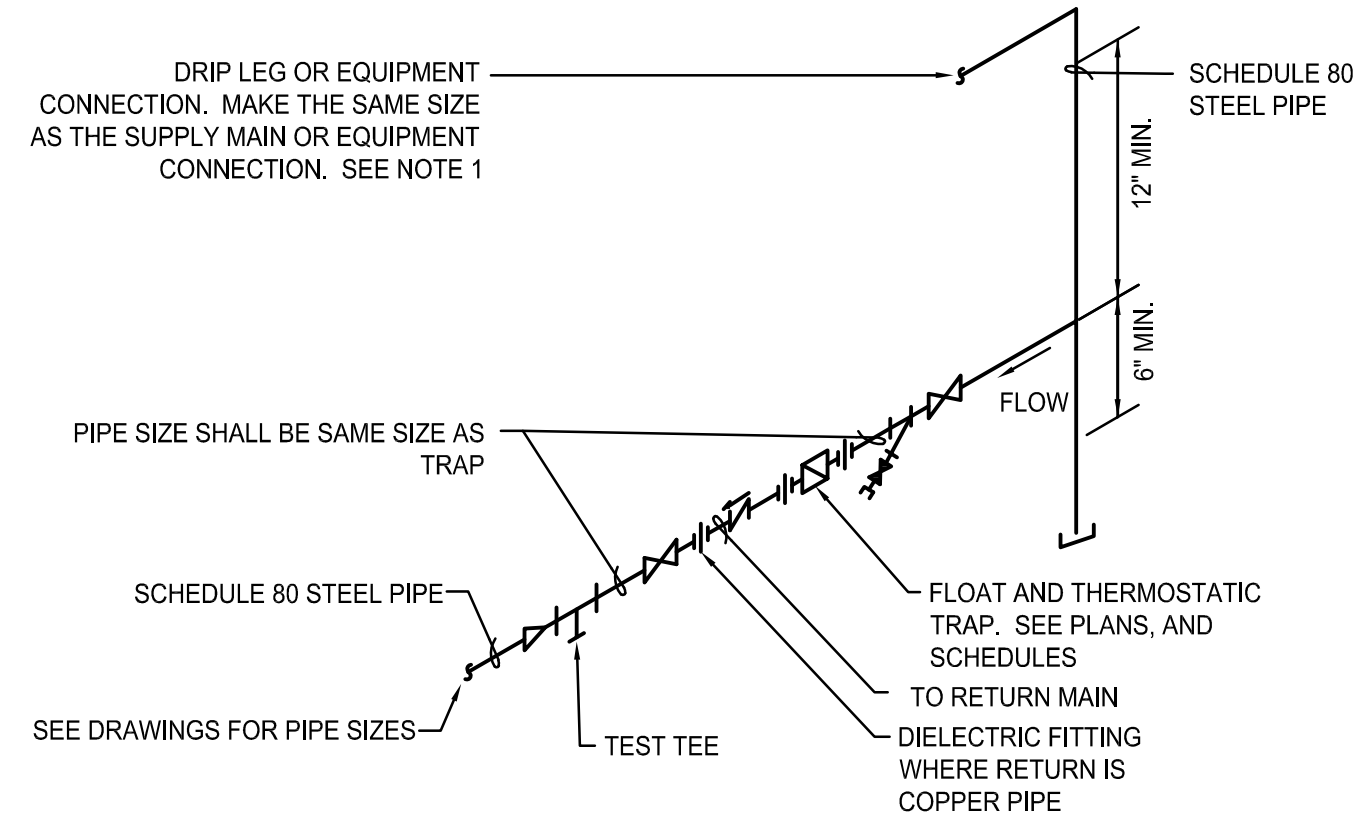
**2 SHELL AND TUBE HEAT EXCHANGER (H.EX)**  
SCALE: NOT TO SCALE



**5 COIL PIPING ARRANGEMENT 3-WAY VALVE (AHU-1)**  
SCALE: NOT TO SCALE

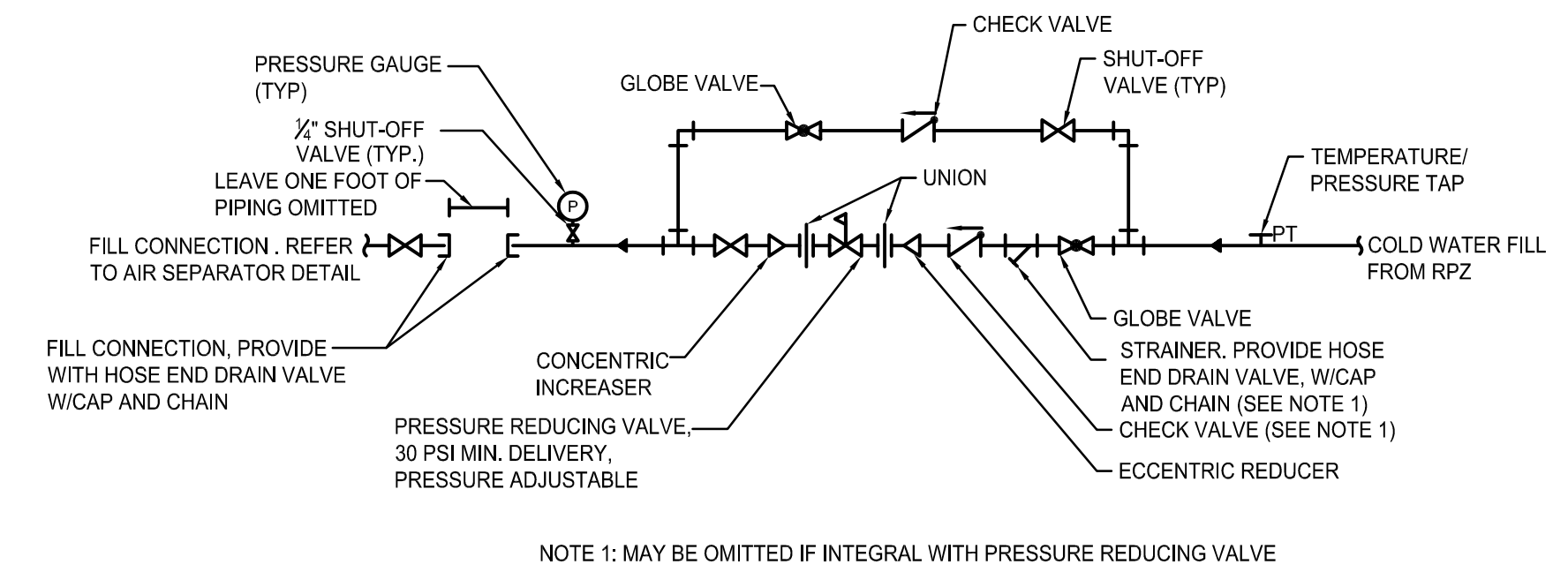


**6 COIL PIPING ARRANGEMENT 2-WAY VALVE**  
SCALE: NOT TO SCALE

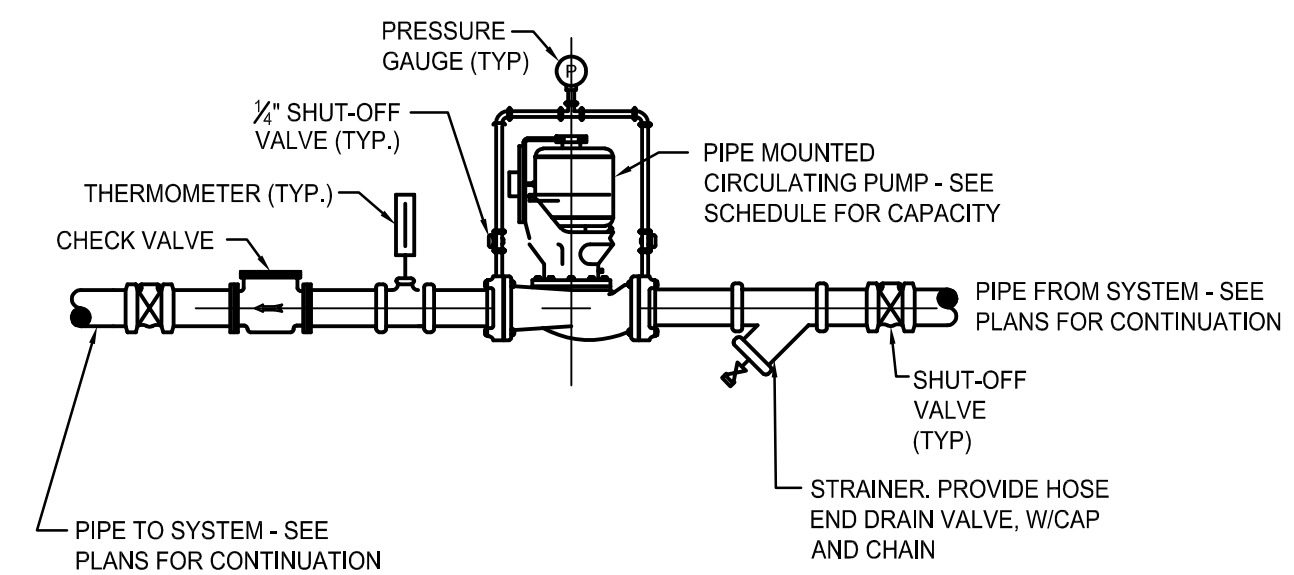


- NOTE:**
- ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

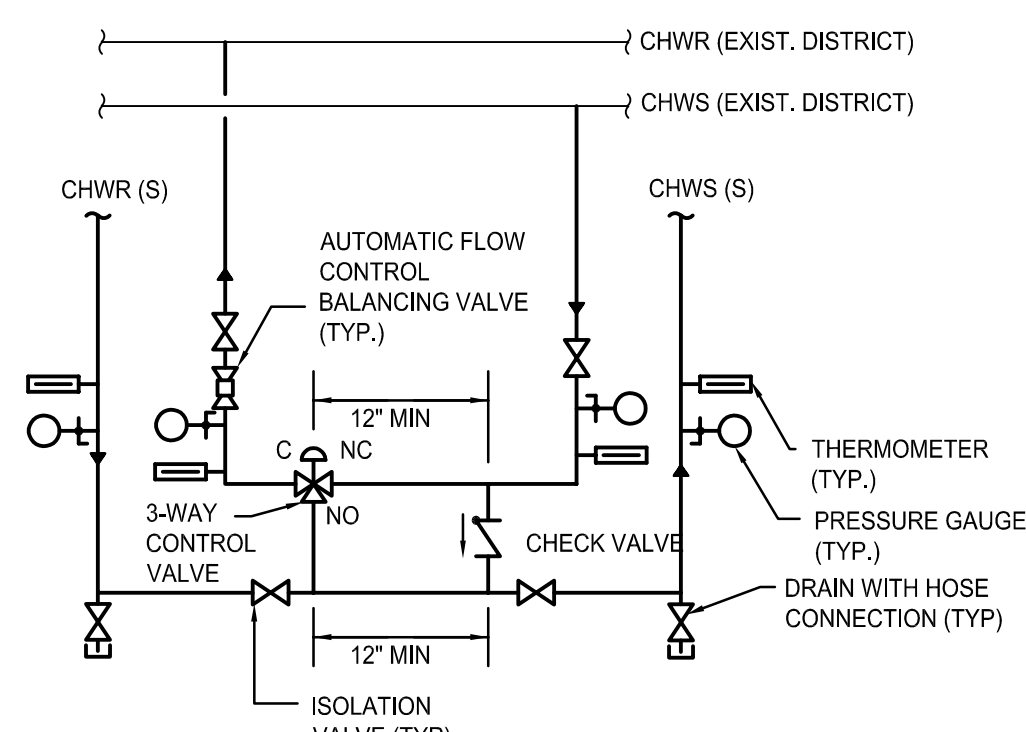
**4 FLOAT AND THERMOSTATIC STEAM TRAP ASSEMBLY**  
SCALE: NOT TO SCALE



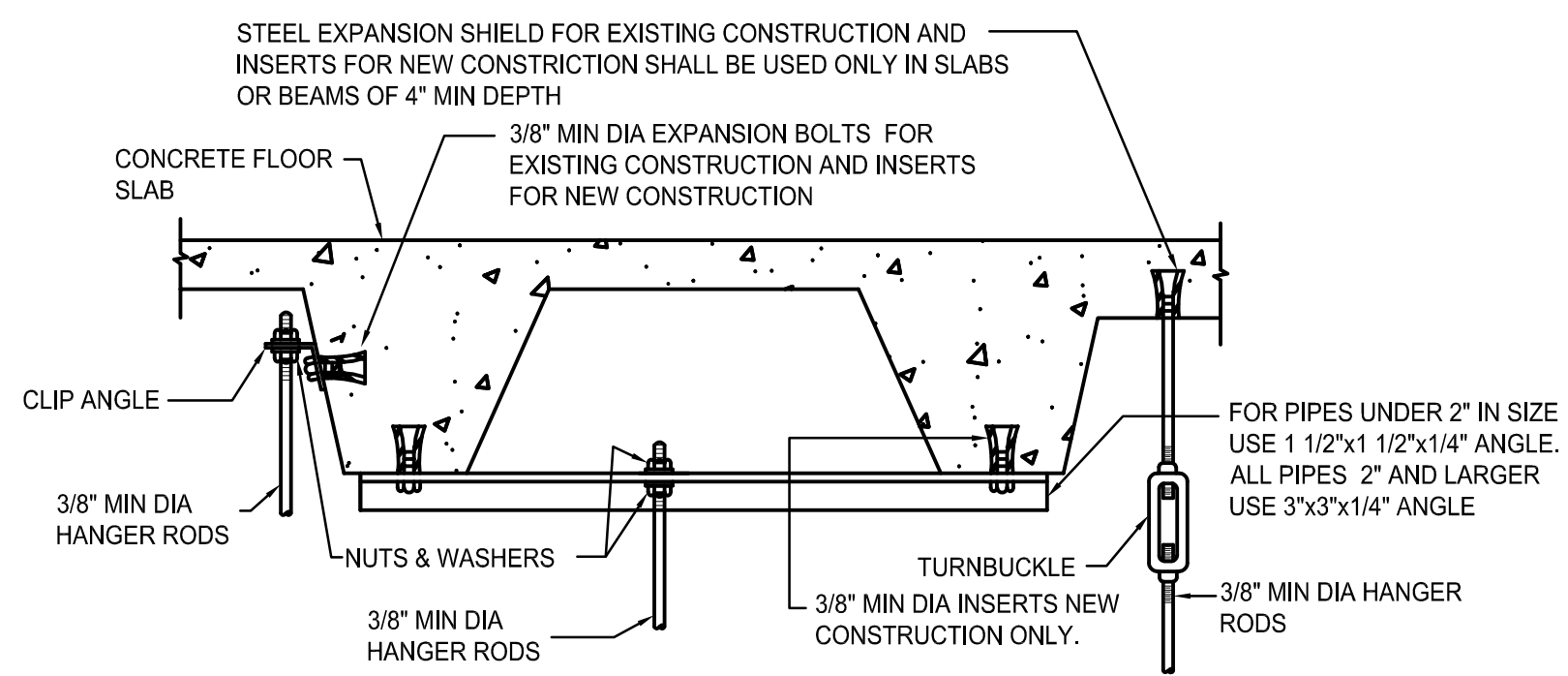
**7 WATER INLET VALVE ASSEMBLY (WIV)**  
SCALE: NOT TO SCALE



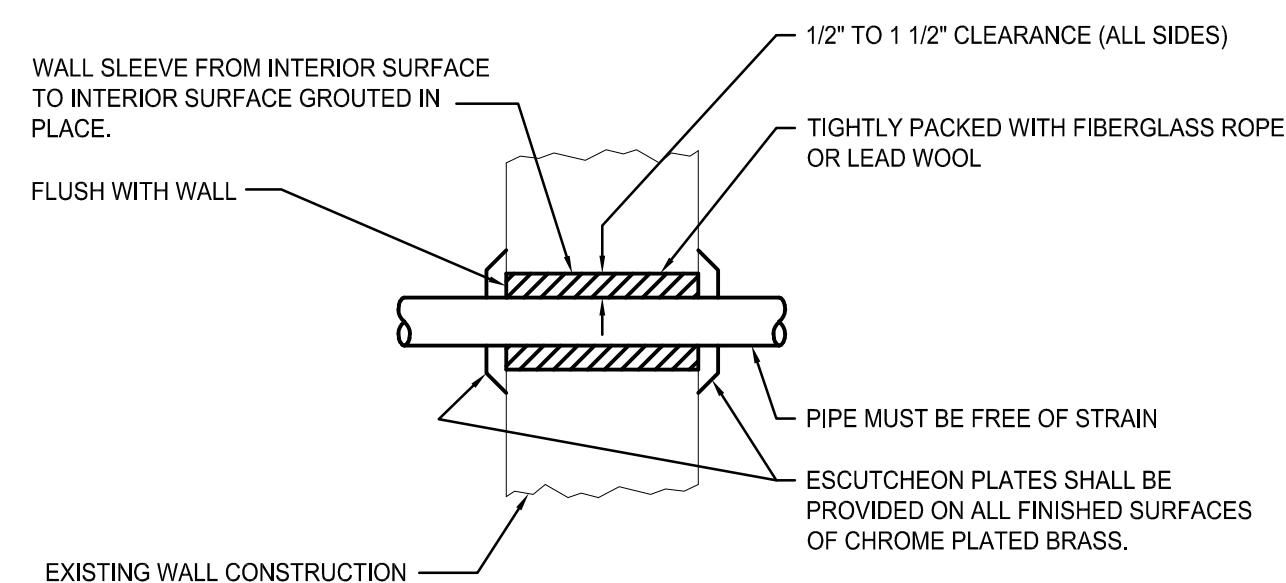
**8 IN-LINE CIRCULATING PUMP**  
SCALE: NOT TO SCALE



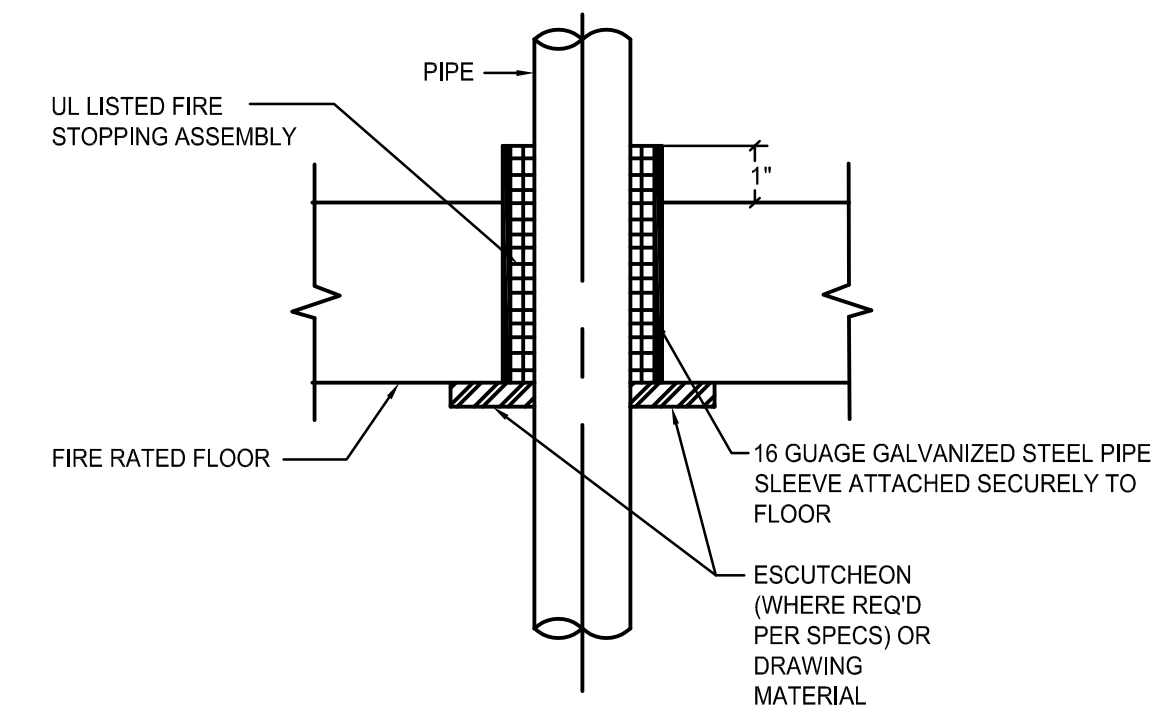
**9 PRIMARY/SECONDARY CROSSOVER**  
SCALE: NOT TO SCALE



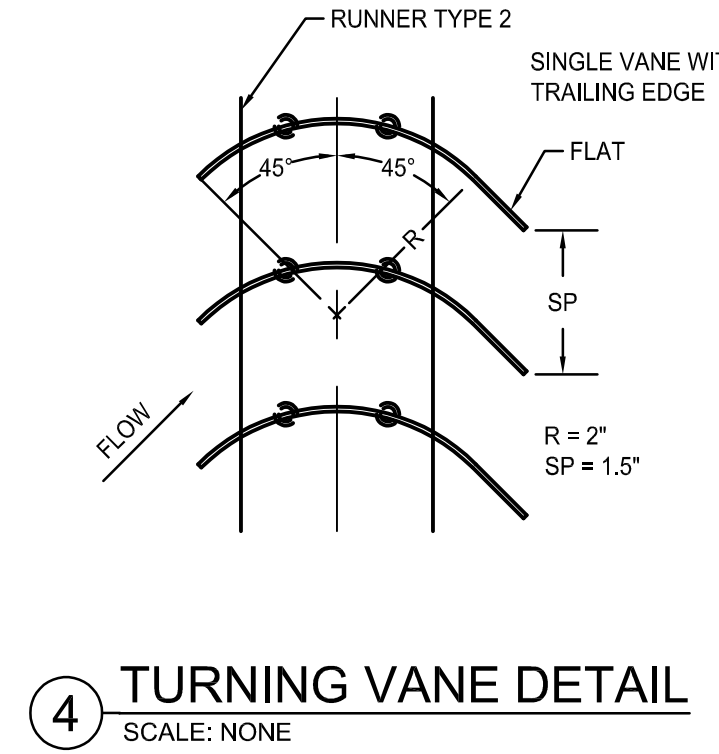
**10 TYPICAL METHOD OF SECURING HANGER RODS IN CONCRETE SLABS AND BEAMS**  
SCALE: NOT TO SCALE



**11 PIPE SLEEVE THROUGH INTERIOR WALL-ABOVE GRADE**  
SCALE: NOT TO SCALE



**12 PIPE THRU FLOOR (RATED) DETAIL**  
SCALE: NOT TO SCALE



**4 TURNING VANE DETAIL**  
SCALE: NONE

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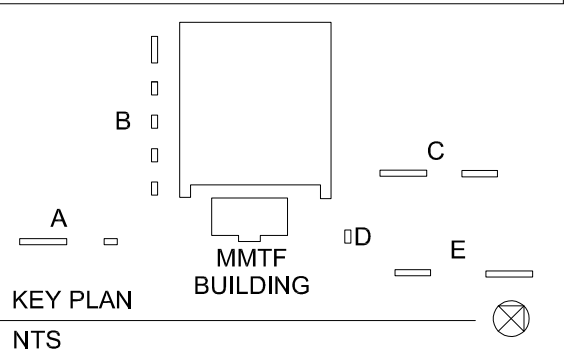
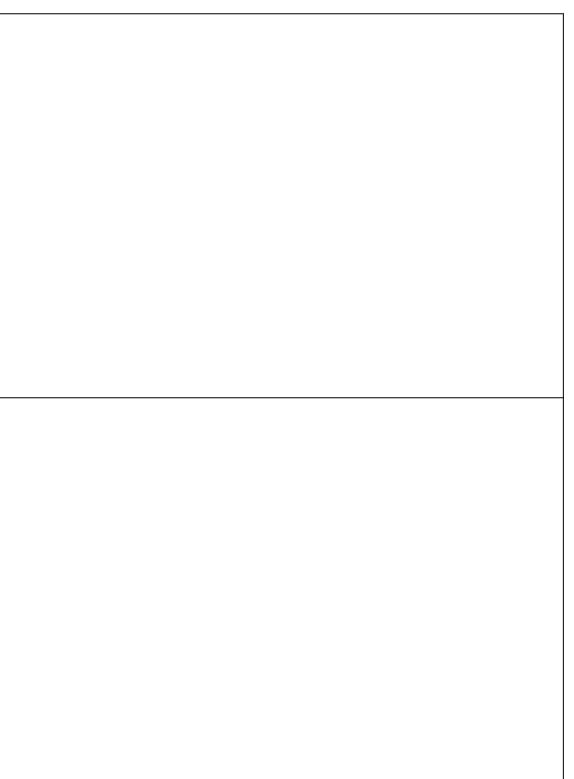
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DWG. TITLE

**DETAILS**

DATE SEPTEMBER 15, 2020

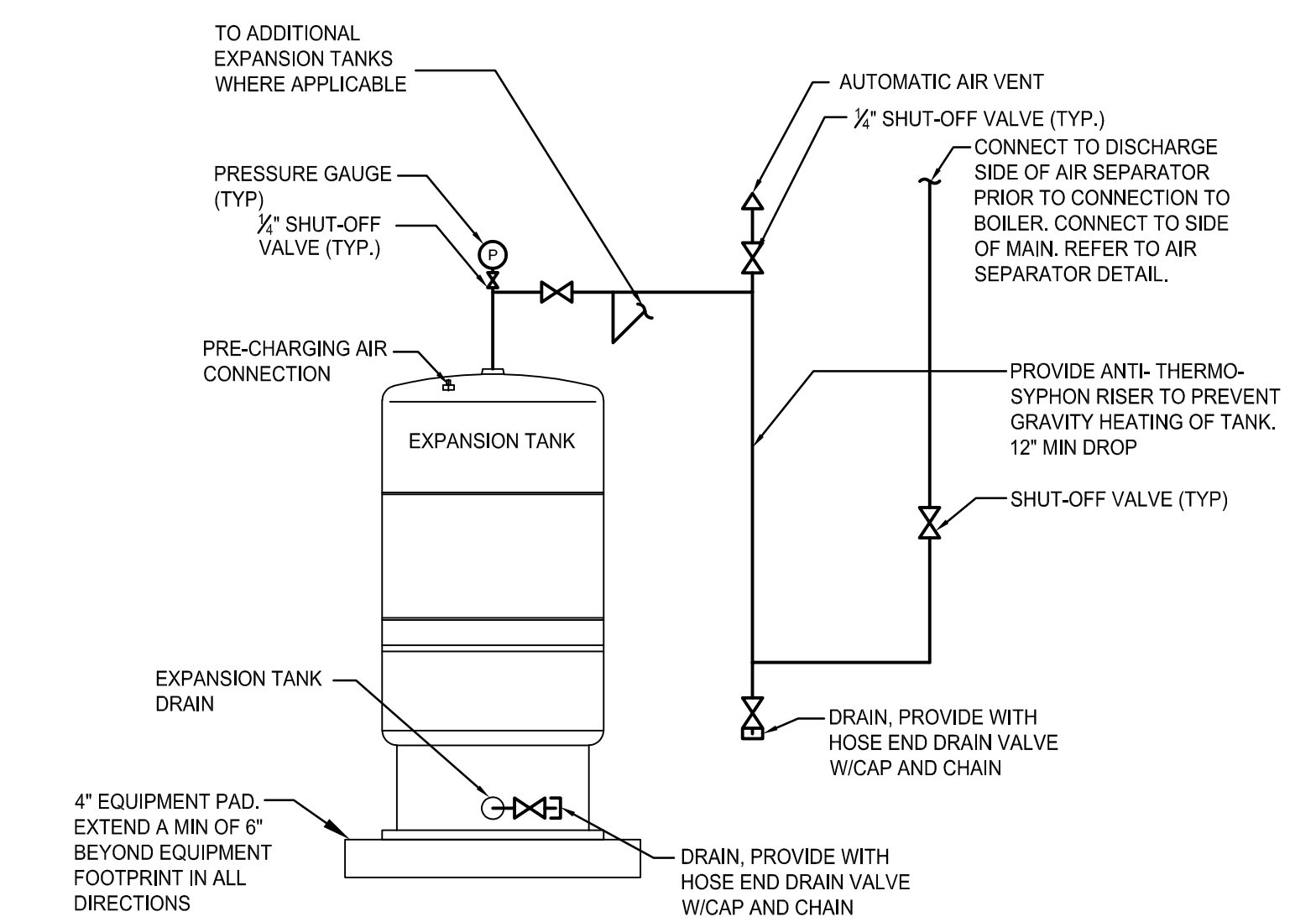
SCALE AS NOTED

DWN. - CHK. -

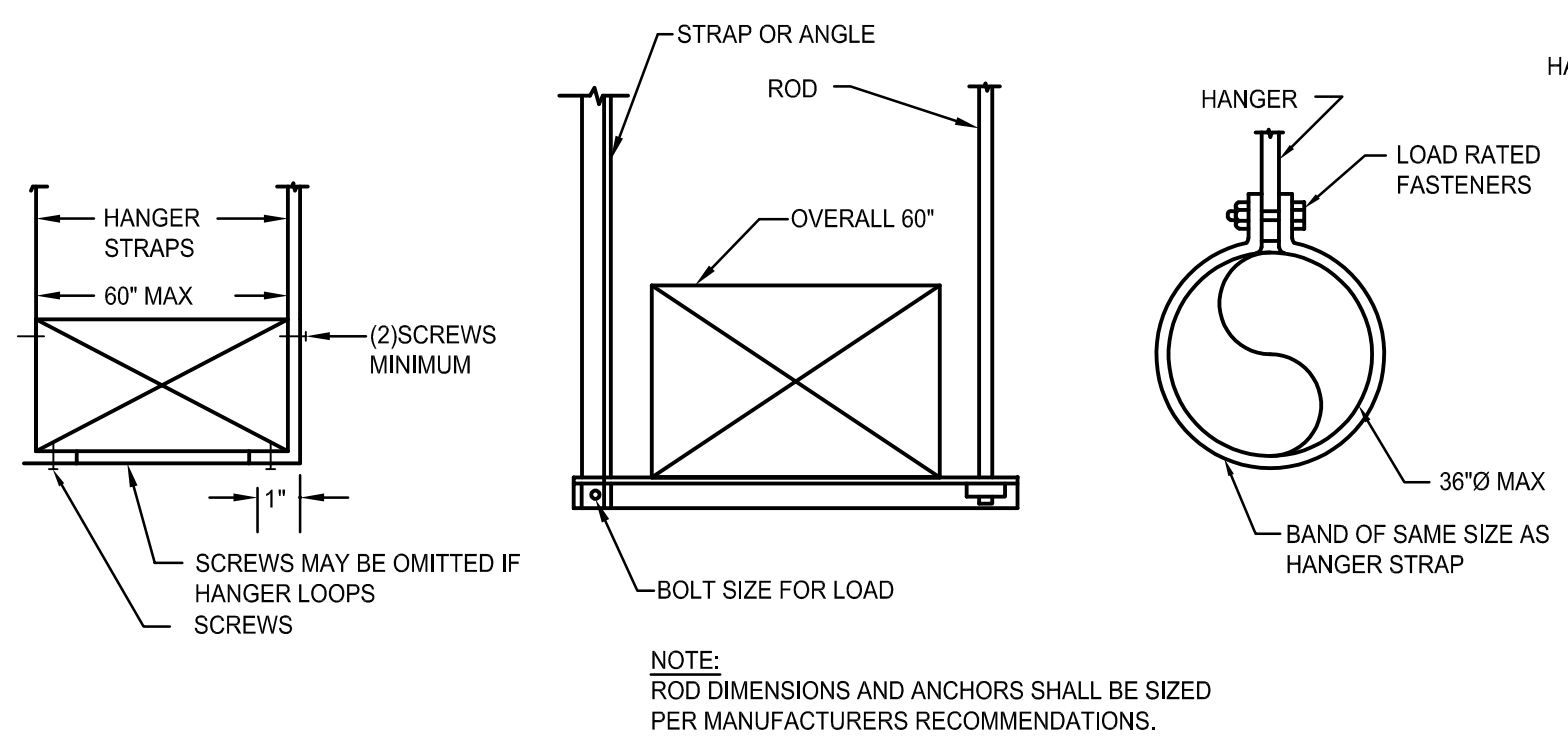
PROJ. No. 449803

DWG. No.

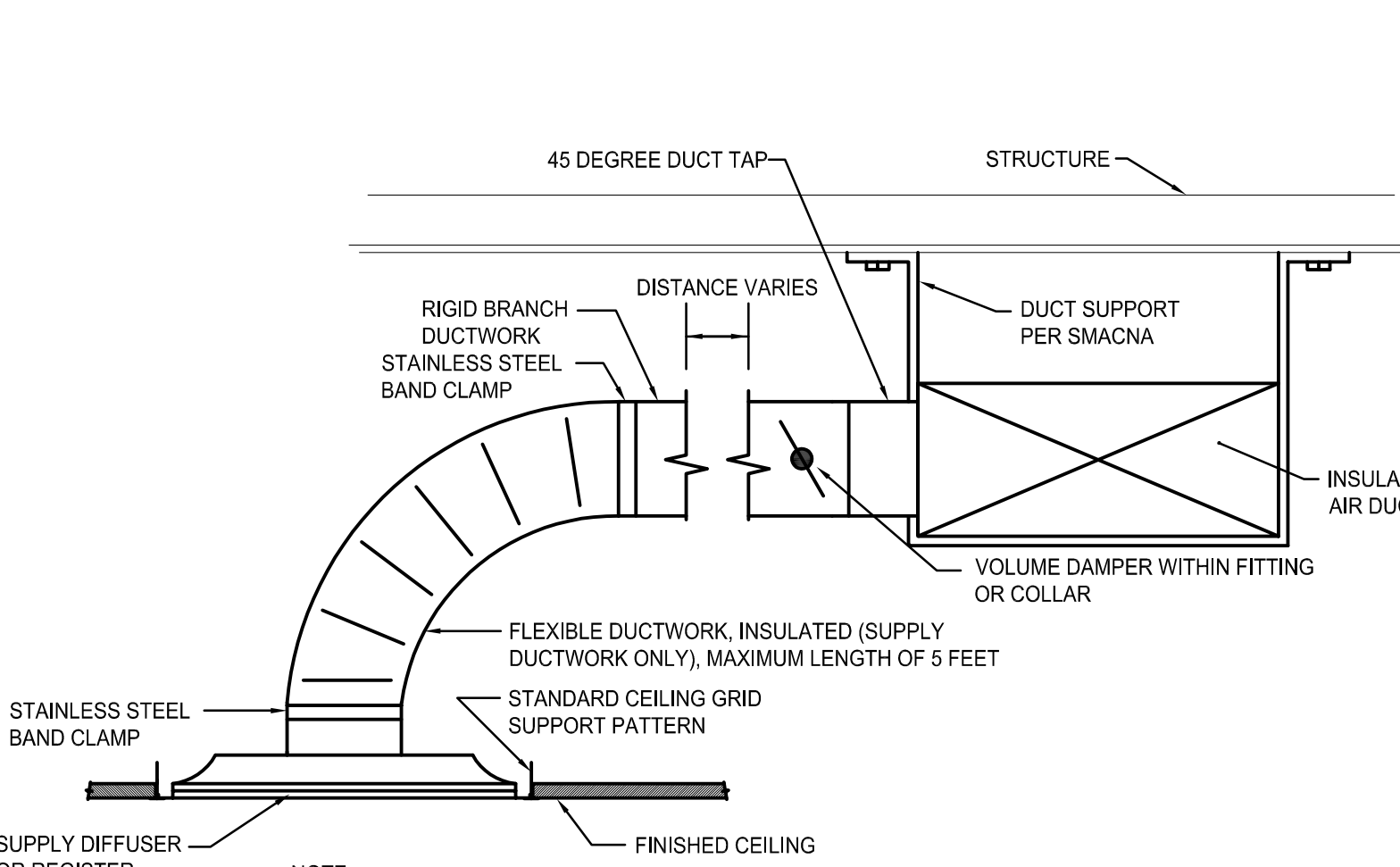
**M201**



**1 TYPICAL EXPANSION TANK**  
SCALE: NOT TO SCALE

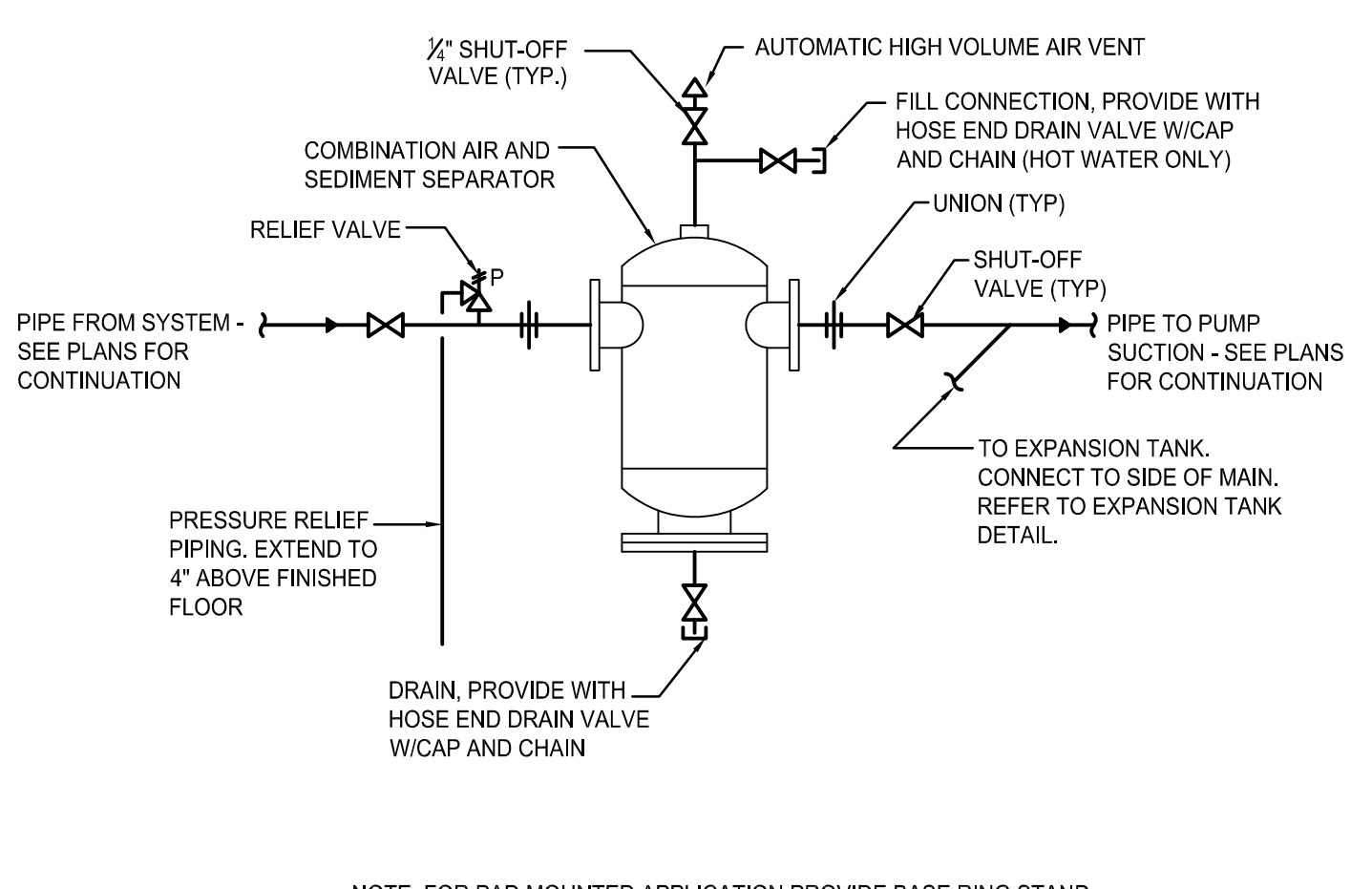


**5 DUCT SUPPORT DETAIL**  
SCALE: NOT TO SCALE



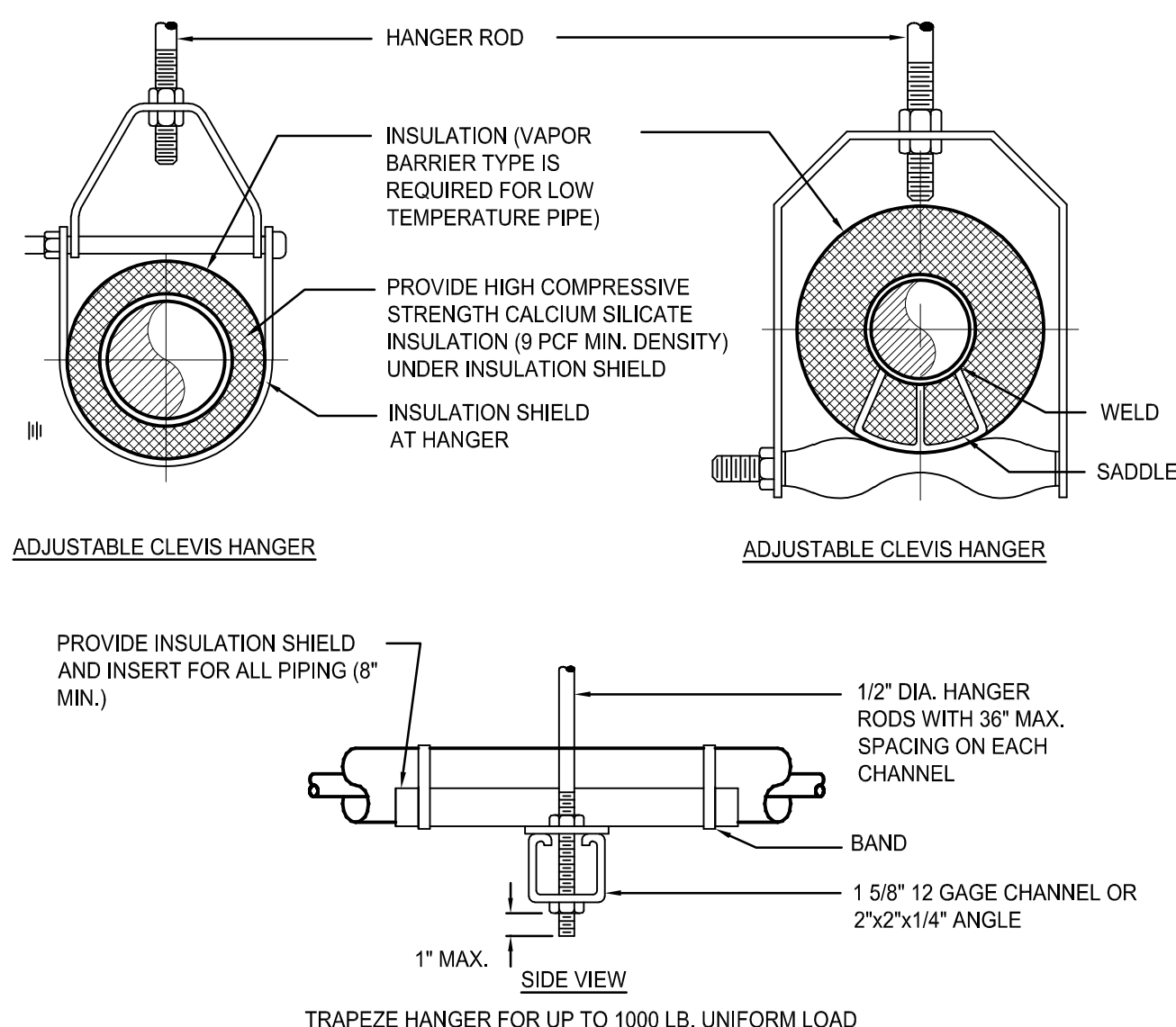
- NOTE:**
- CONTRACTOR TO VERIFY TYPE OF DIFFUSER PRIOR TO PURCHASING TO DETERMINE IF SURFACE MOUNTED OR LAY-IN STYLE IS REQUIRED IN EACH LOCATION.
  - OFFSETS WITH FLEX DUCT SHALL NOT EXCEED 30 DEGREES AND SHALL BE GRADUAL. OFFSETS IN EXCESS OF 30 DEGREES SHALL BE HARD-DUCTED. GRADUAL 90 DEGREE OFFSET IS PERMITTED WHERE SPACE IS AVAILABLE.
  - FLEX DUCT SHALL NOT HAVE MORE THAN 1/2" SAG PER FOOT.
  - LENGTH OF FLEX DUCT SHALL NOT EXCEED 3'-0".
  - PROVIDE DUCT MOUNTED VOLUME DAMPER AS CLOSE TO MAIN DUCT AS POSSIBLE.
  - PROVIDE SINGLE BLADE DAMPERS UP TO 12" HIGH AND ON ROUND DUCT. PROVIDE MULTI BLADE DAMPERS ON ALL DUCTS OVER 12" HIGH PER SMACNA REQUIREMENTS.
  - PROVIDE LOCKING STYLE DAMPER HANDLE REGULATORS WITH HEXAGON NOT, DURO DYNE OR APPROVED EQUAL.

**9 TYPICAL CEILING SUPPLY DIFFUSER DETAIL**  
SCALE: NOT TO SCALE

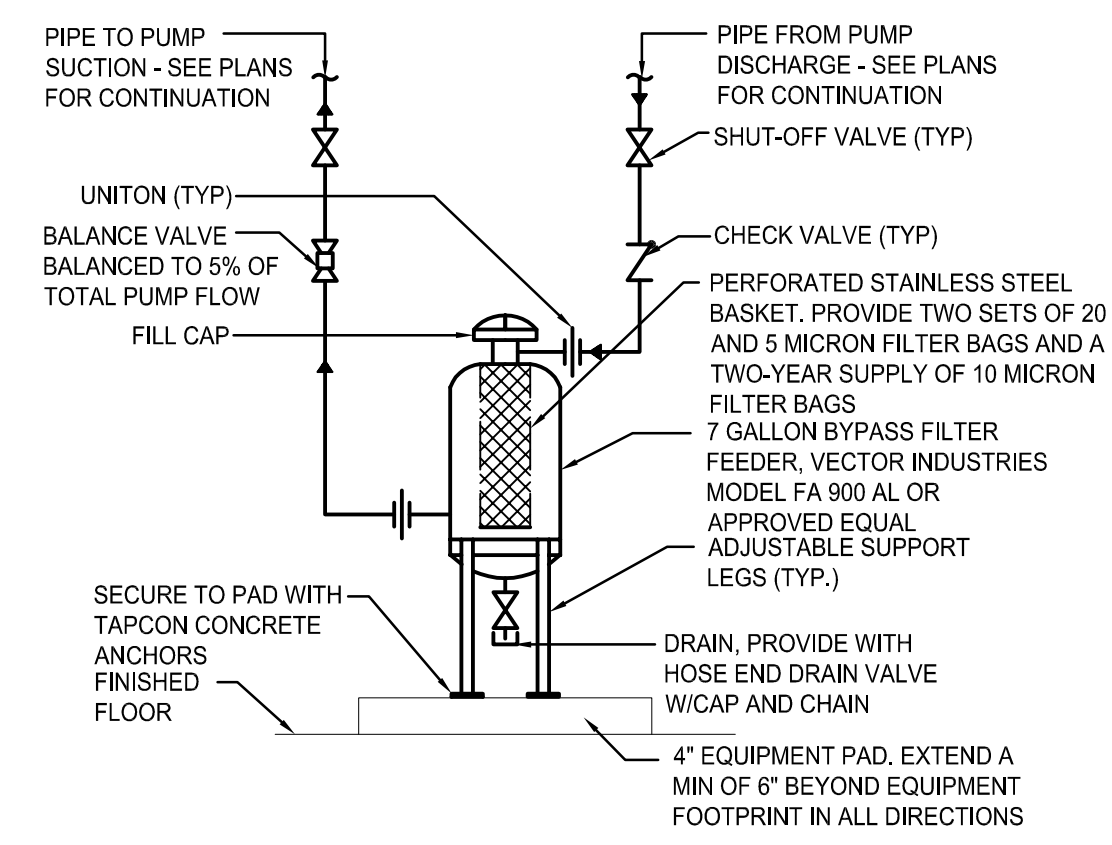


**NOTE:** FOR PAD MOUNTED APPLICATION PROVIDE BASE RING STAND

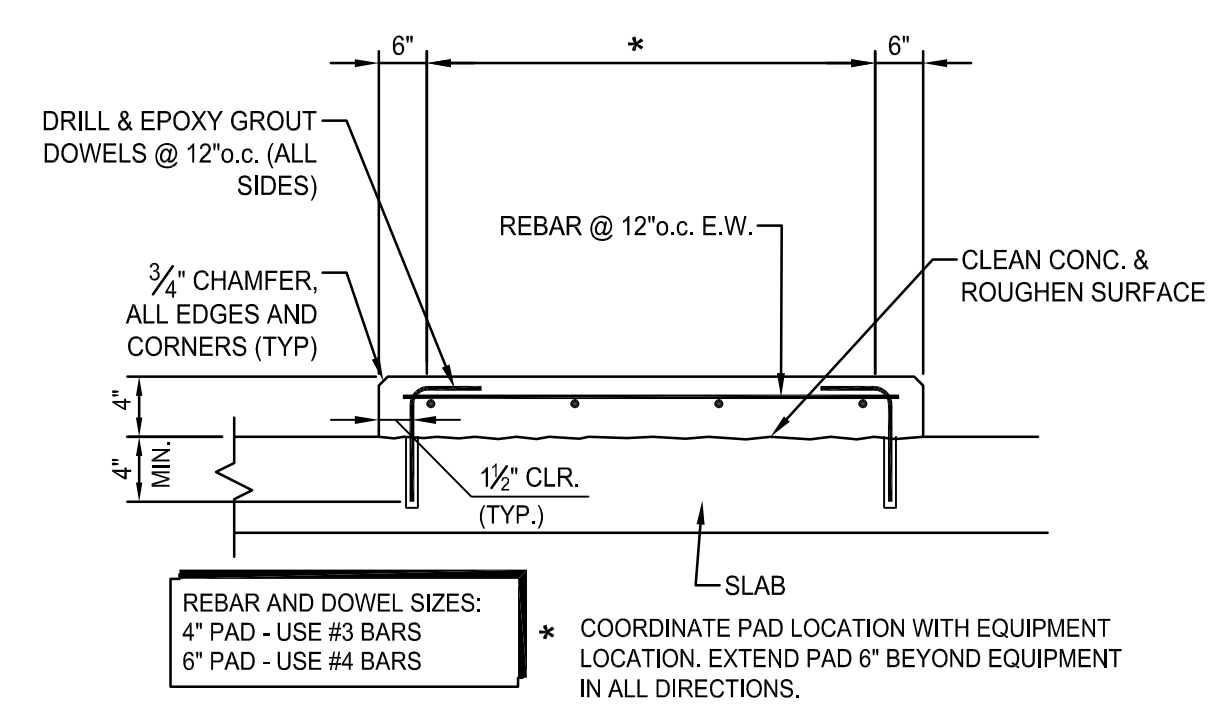
**2 TYPICAL AIR SEPARATOR**  
SCALE: NOT TO SCALE



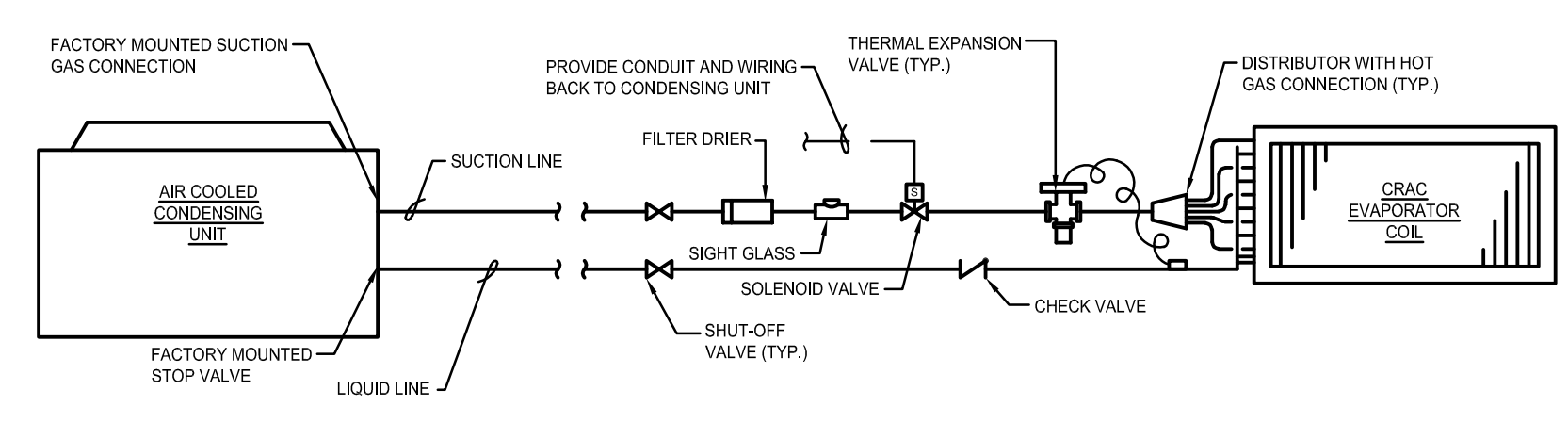
**3 TYPICAL PIPE HANGER DETAIL**  
SCALE: NOT TO SCALE



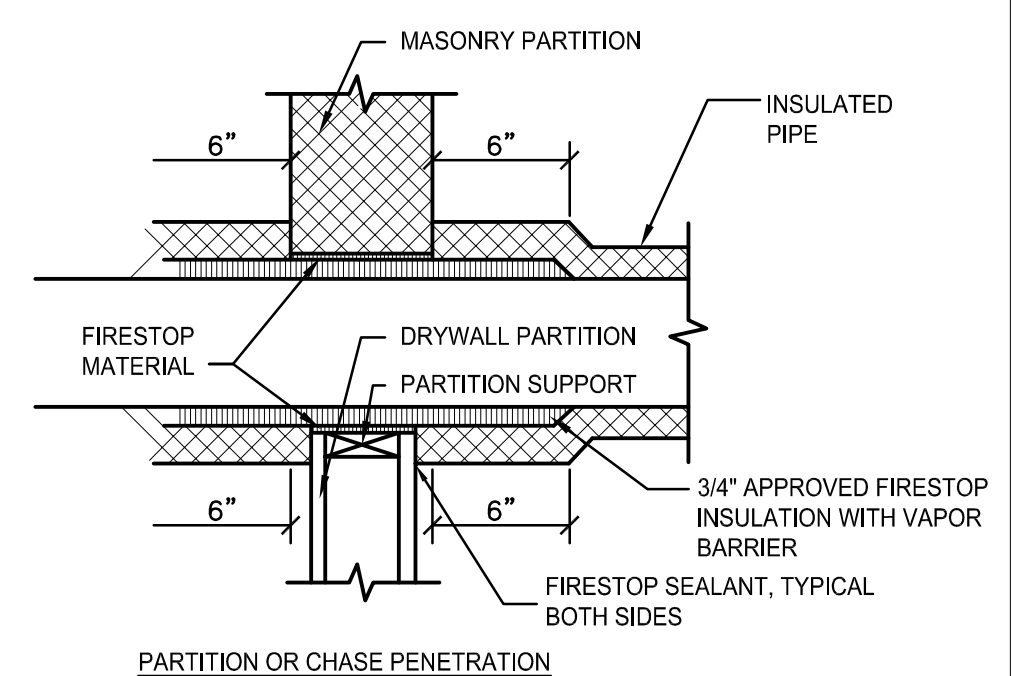
**4 BYPASS FILTER FEEDER**  
SCALE: NONE



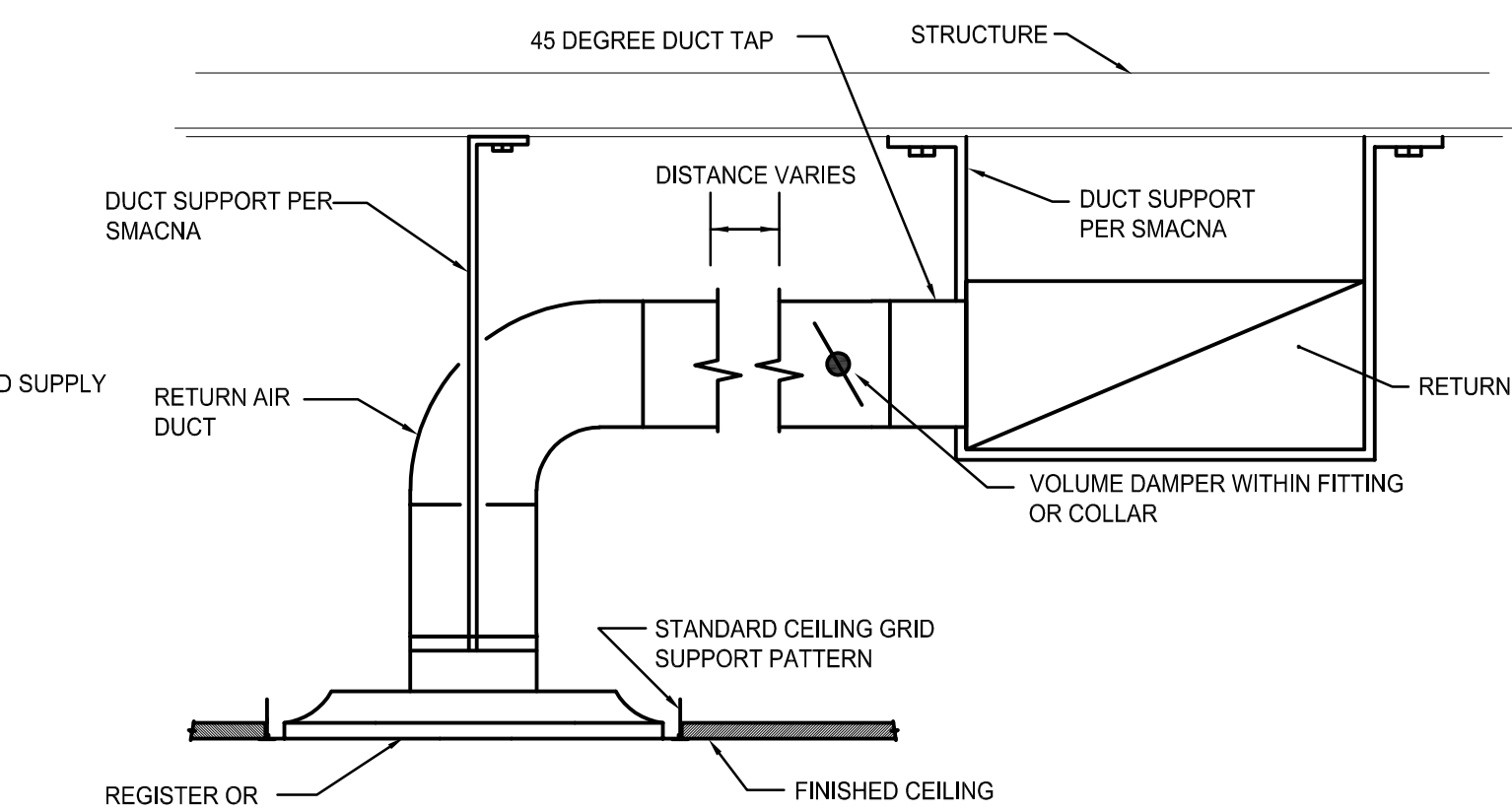
**6 TYPICAL EQUIPMENT PAD**  
SCALE: NOT TO SCALE



**7 AIR COOLED CONDENSING UNIT/ EVAPORATOR COIL REFRIGERANT PIPING DETAIL**  
SCALE: NOT TO SCALE

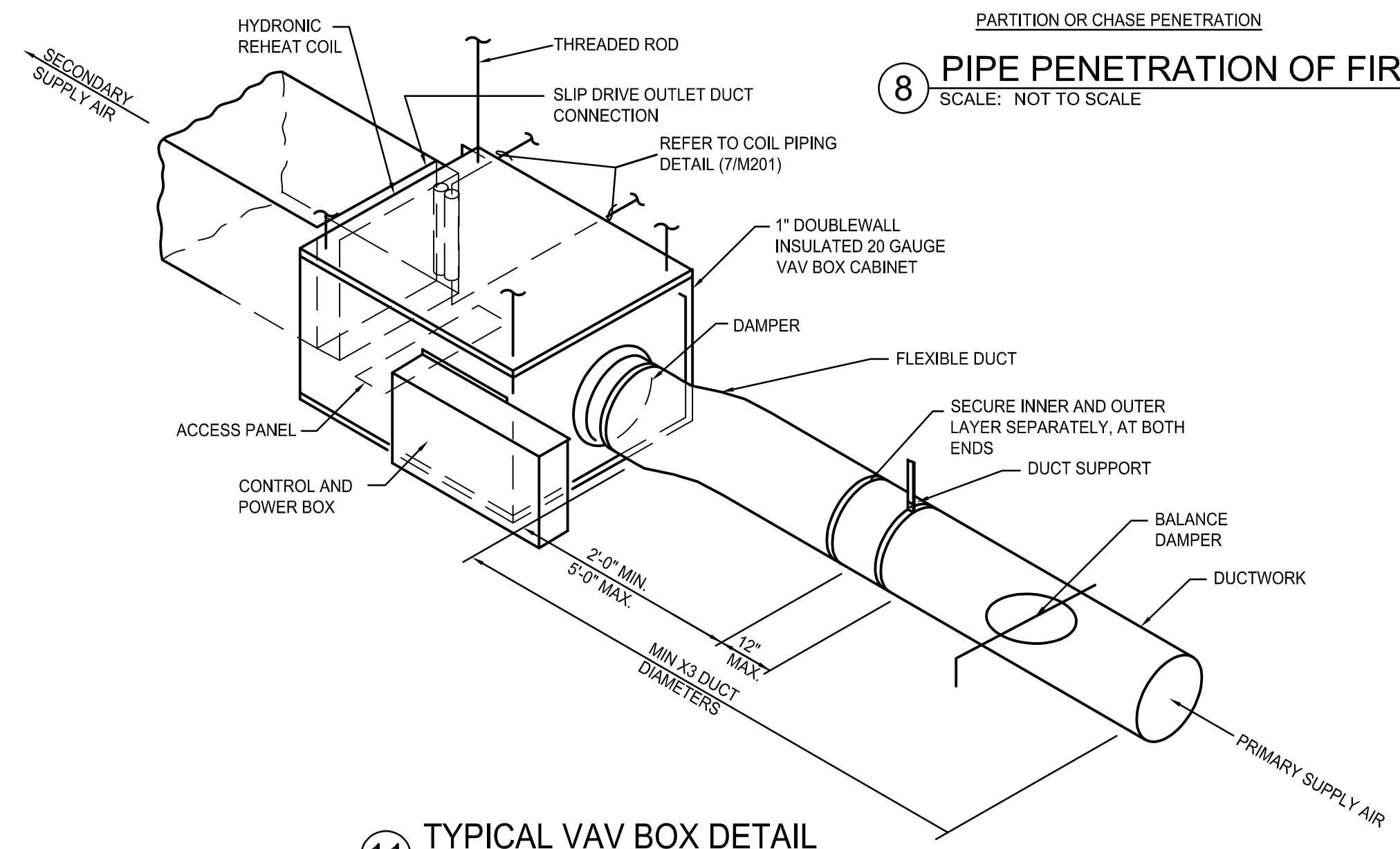


**8 PIPE PENETRATION OF FIRE WALL**  
SCALE: NOT TO SCALE



- NOTE:**
- ALL BRANCH DUCT CONNECTIONS SHALL BE HARD DUCTED TO SQUARE NECKED GRILLS. NO SPIN ON COLLARS OR ROUND FLEXIBLE DUCTWORK SHALL BE ALLOWED.
  - CONTRACTOR TO VERIFY TYPE OF DIFFUSER PRIOR TO PURCHASING TO DETERMINE IF SURFACE MOUNTED OR LAY-IN STYLE IS REQUIRED IN EACH LOCATION.
  - PROVIDE DUCT MOUNTED VOLUME DAMPER AS CLOSE TO MAIN DUCT AS POSSIBLE.
  - PROVIDE SINGLE BLADE DAMPERS UP TO 12" HIGH AND ON ROUND DUCT. PROVIDE MULTI BLADE DAMPERS ON ALL DUCTS OVER 12" HIGH PER SMACNA REQUIREMENTS.
  - PROVIDE LOCKING STYLE DAMPER HANDLE REGULATORS WITH HEXAGON NOT, DURO DYNE OR APPROVED EQUAL.

**10 TYPICAL CEILING RETURN REGISTER DETAIL**  
SCALE: NOT TO SCALE



**11 TYPICAL VAV BOX DETAIL**  
SCALE: NOT TO SCALE

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**wendel**

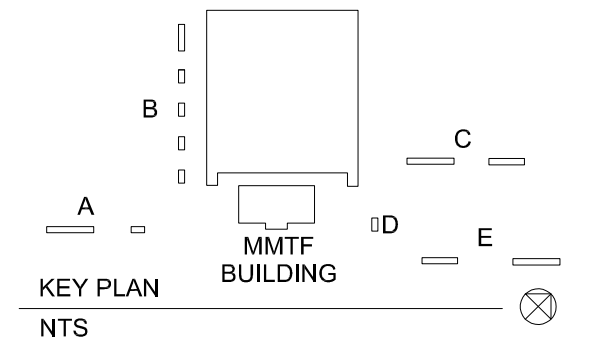
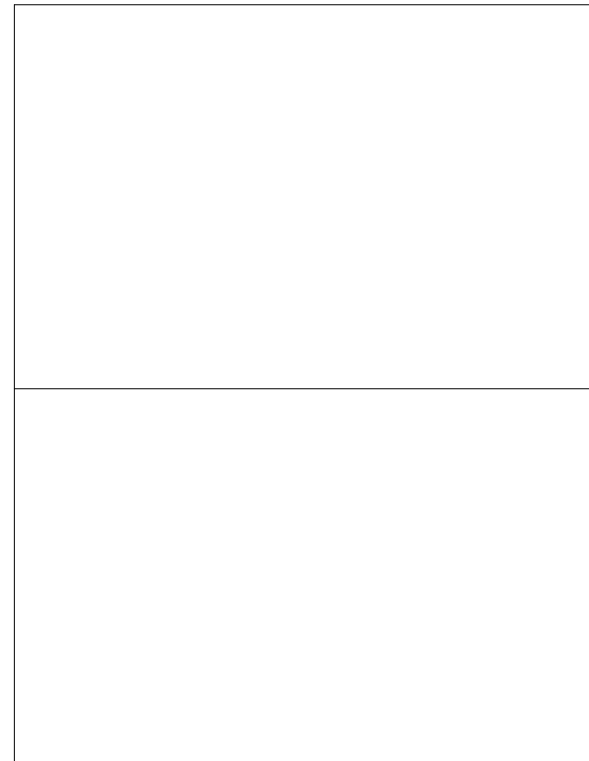
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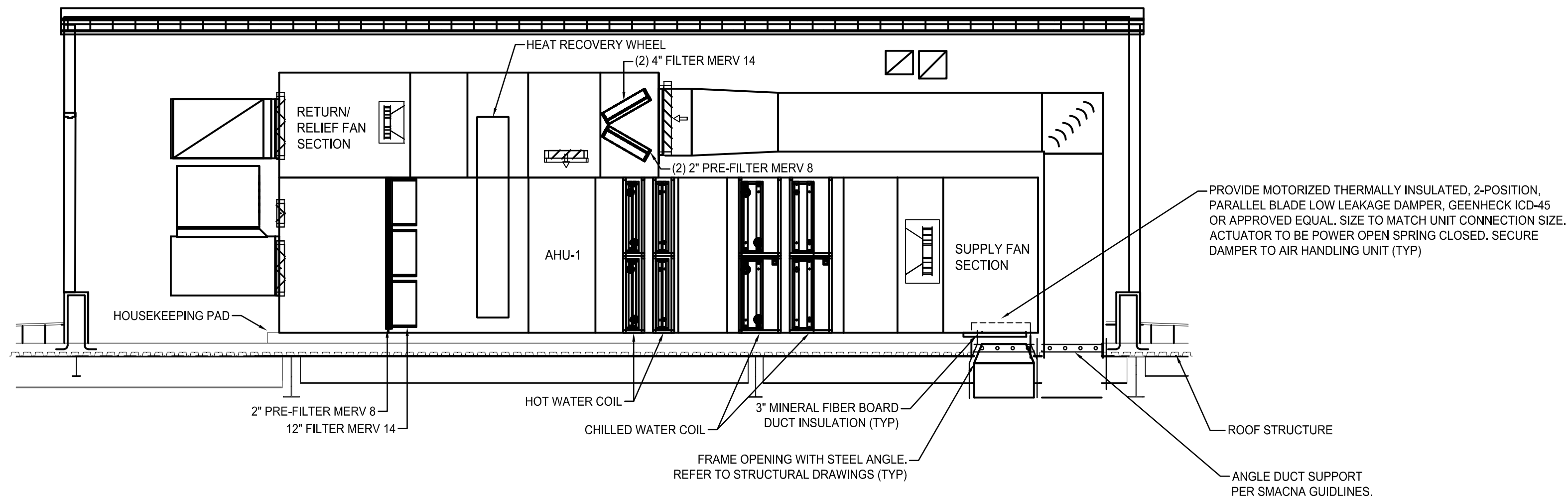
NO.	BY	BID SET REVISIONS	09-15-2020	DATE
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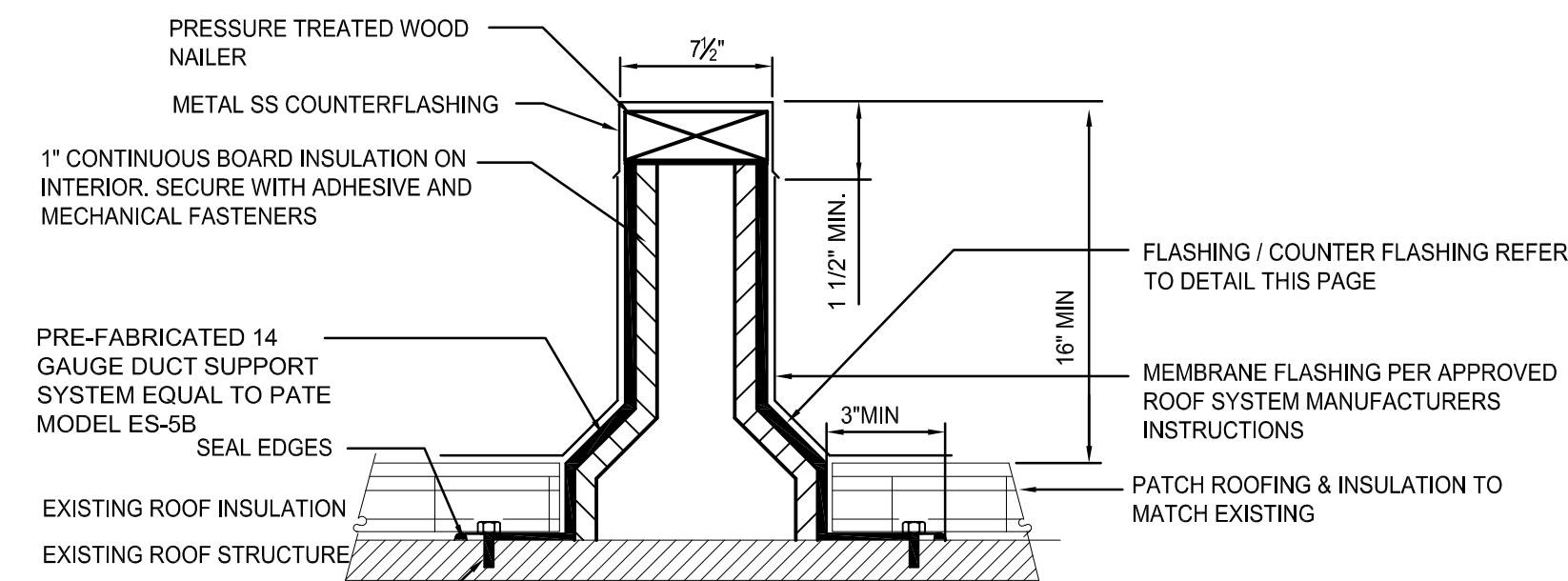
**DETAILS**

DATE	SEPTEMBER 15, 2020
SCALE	AS NOTED
DWN.	CHK.
PROJ. No.	449803
DWG. No.	

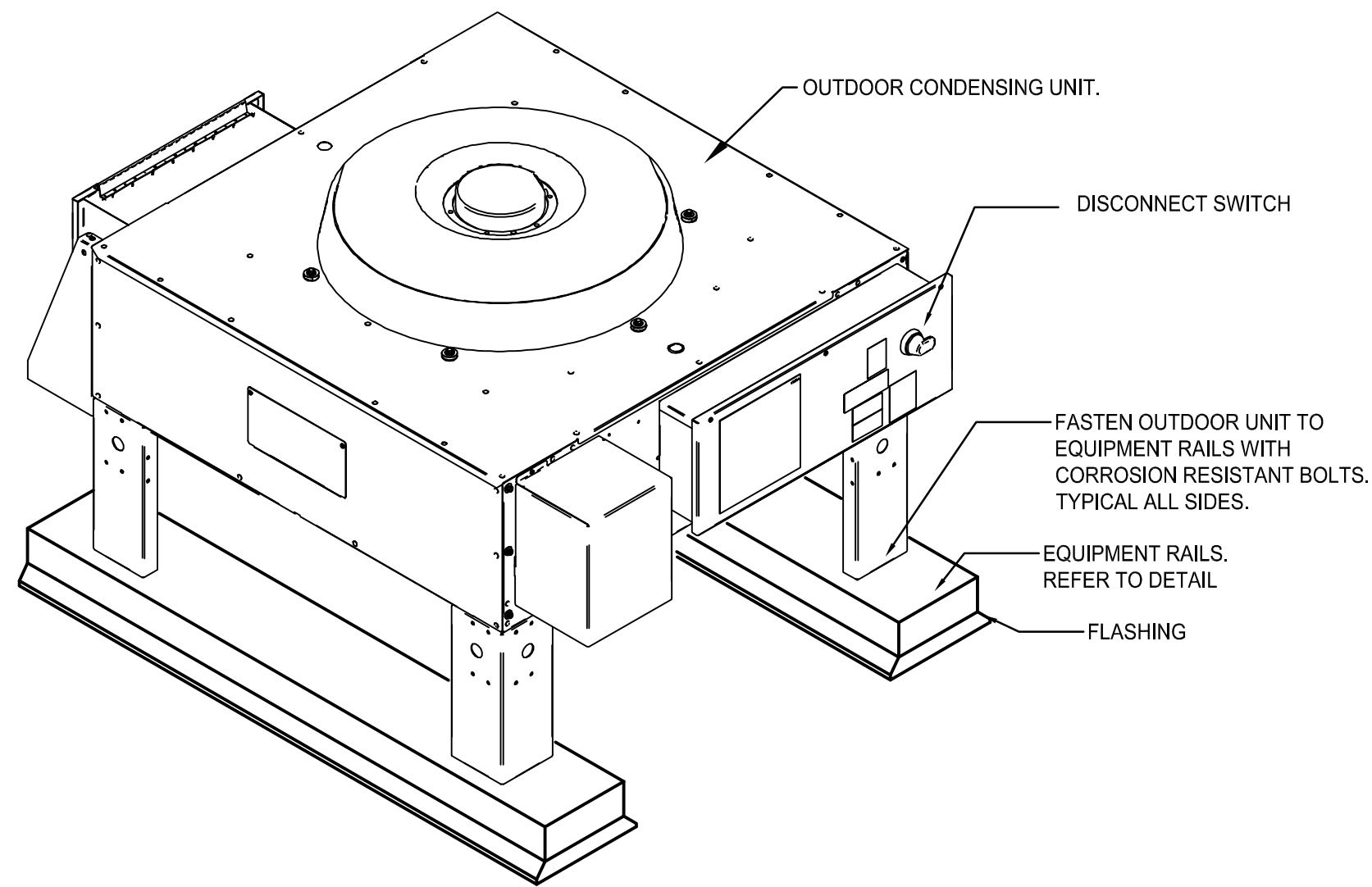
**M202**



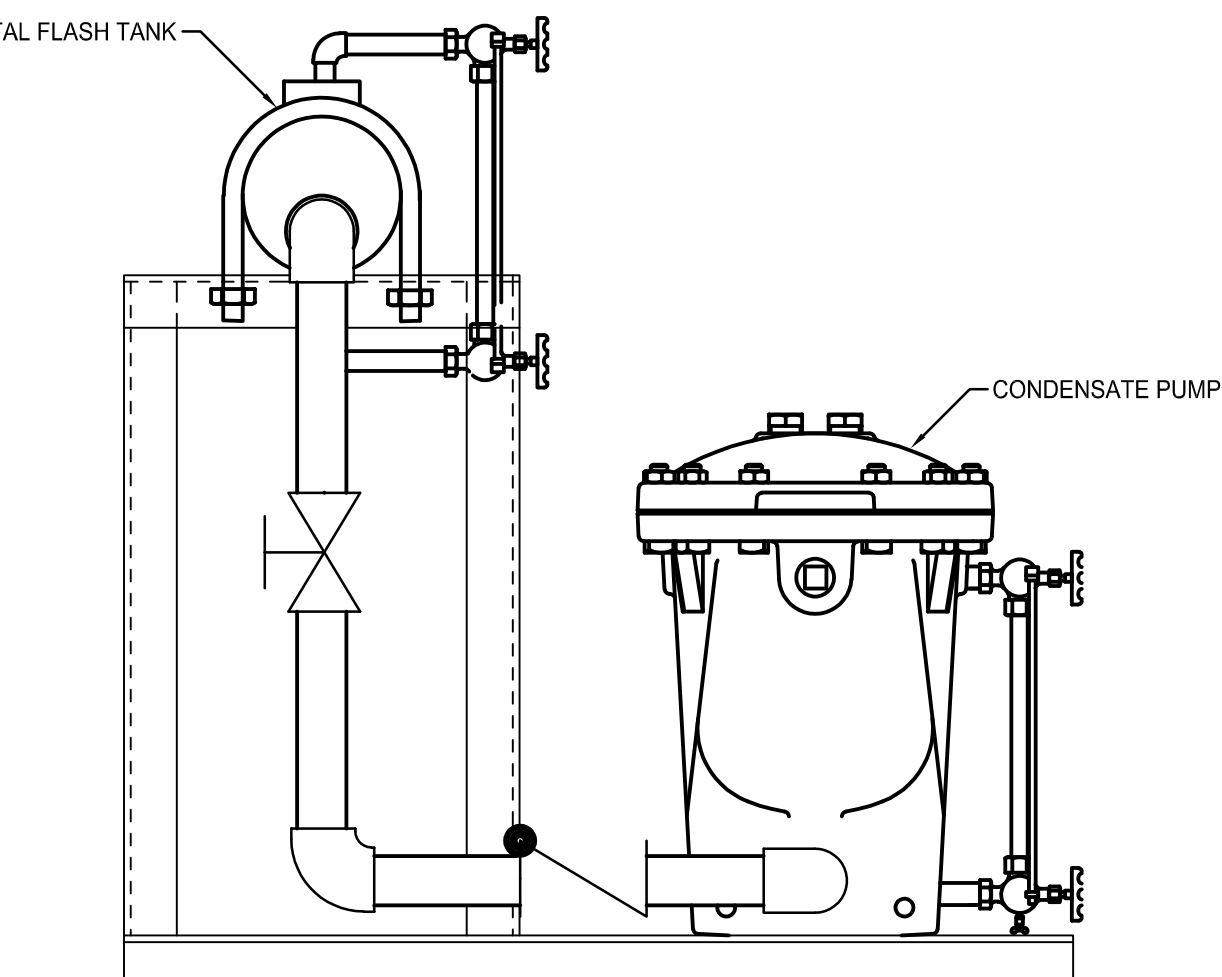
**1 AIR HANDLING UNIT DETAIL**  
SCALE: NOT TO SCALE



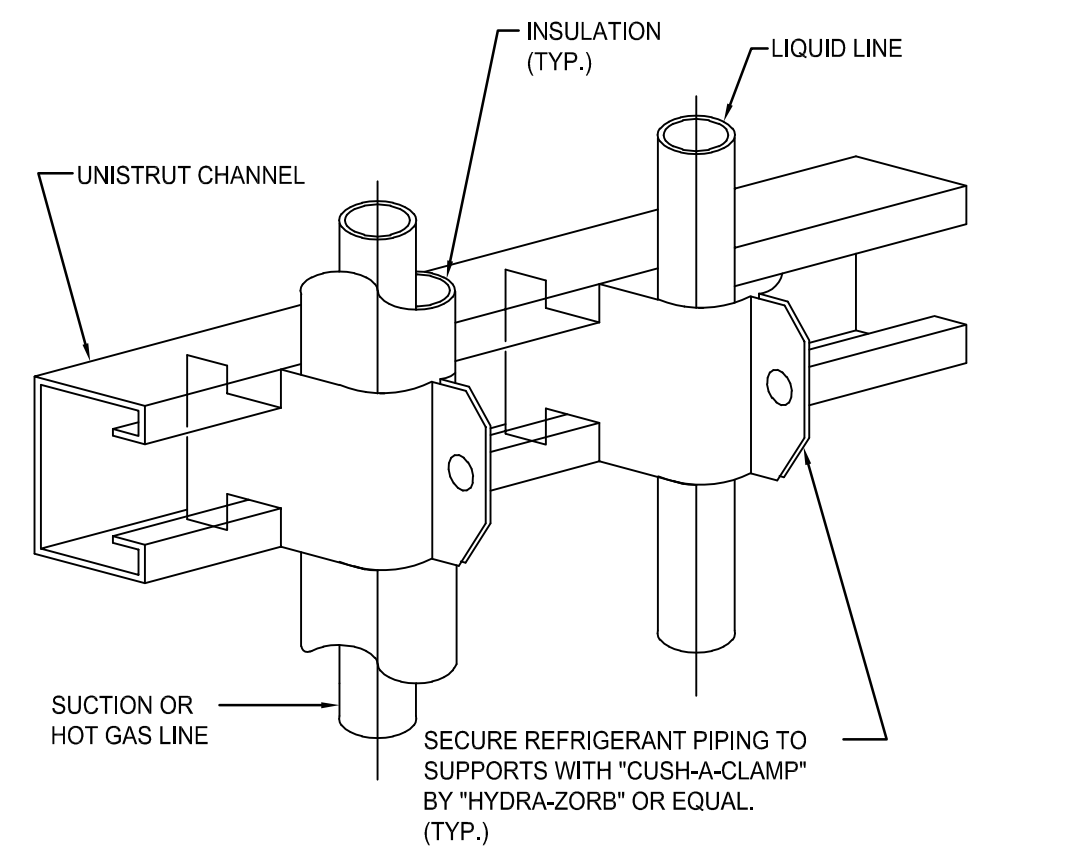
**3 EQUIPMENT SUPPORT RAILS DETAIL**  
SCALE: NOT TO SCALE



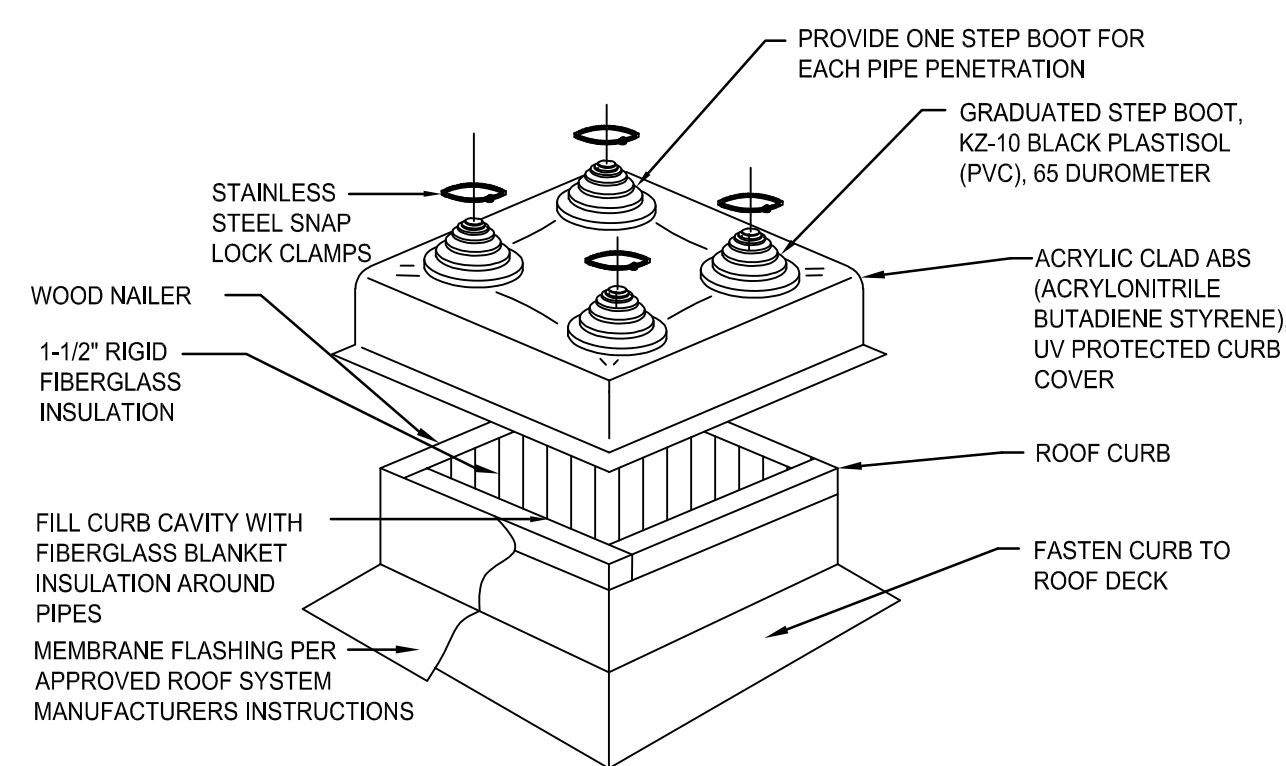
**4 OUTDOOR CONDENSING UNIT DETAIL**  
SCALE: NONE



**6 CONDENSATE RECEIVER DETAIL**  
SCALE: NOT TO SCALE

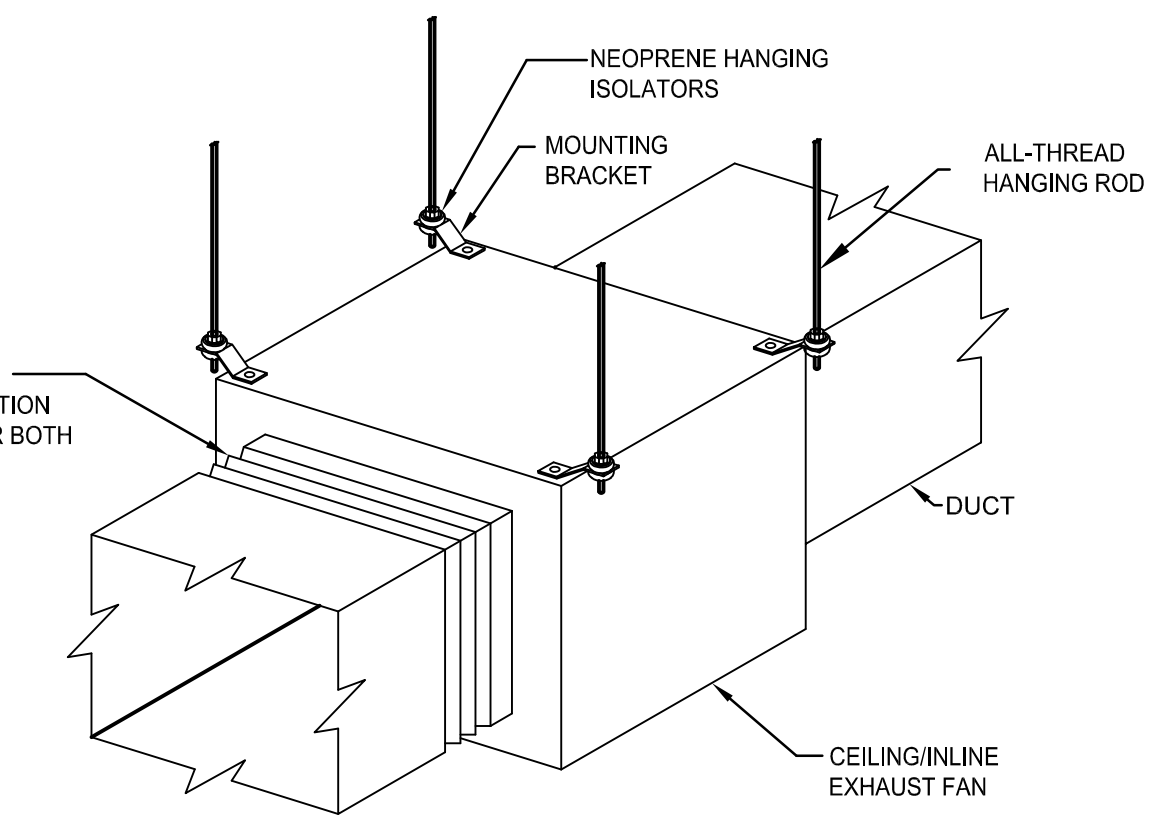


**7 REFRIGERANT PIPE SUPPORT DETAIL**  
SCALE: NONE

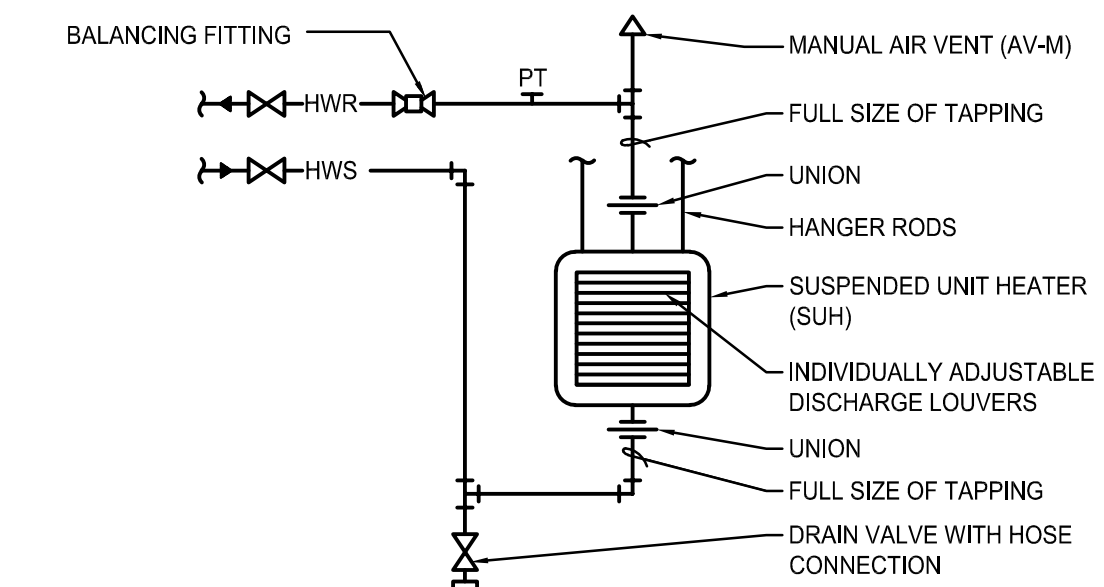


**8 PIPE PORTAL DETAIL**  
SCALE: NONE

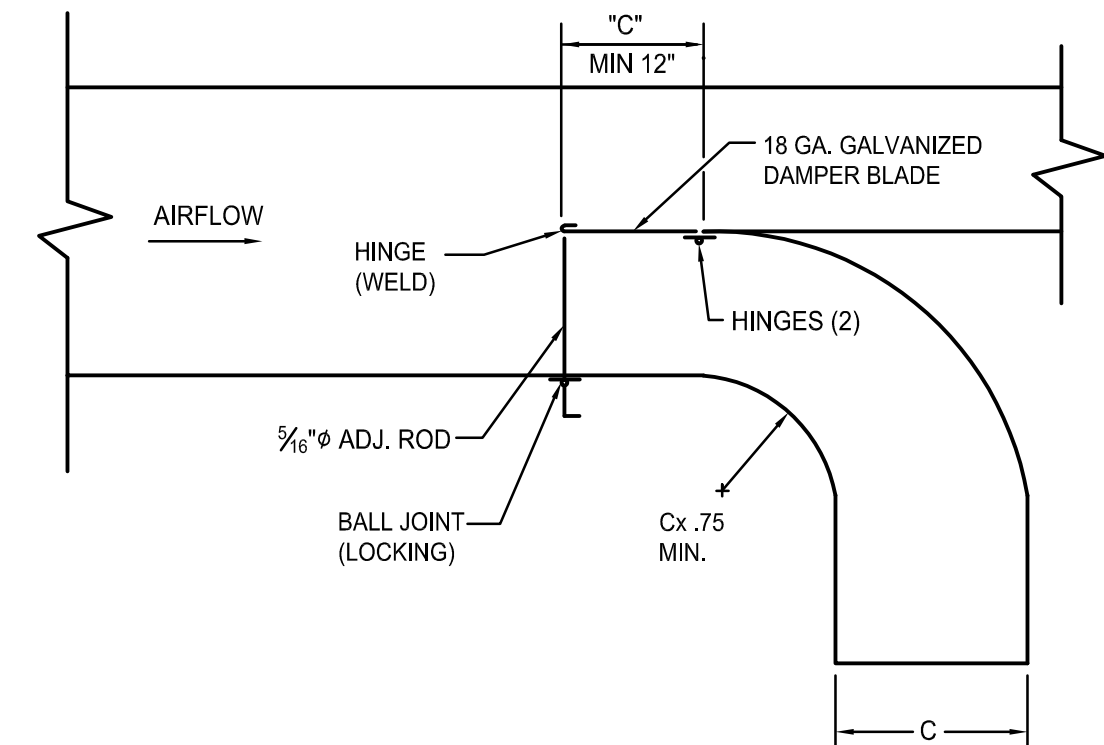
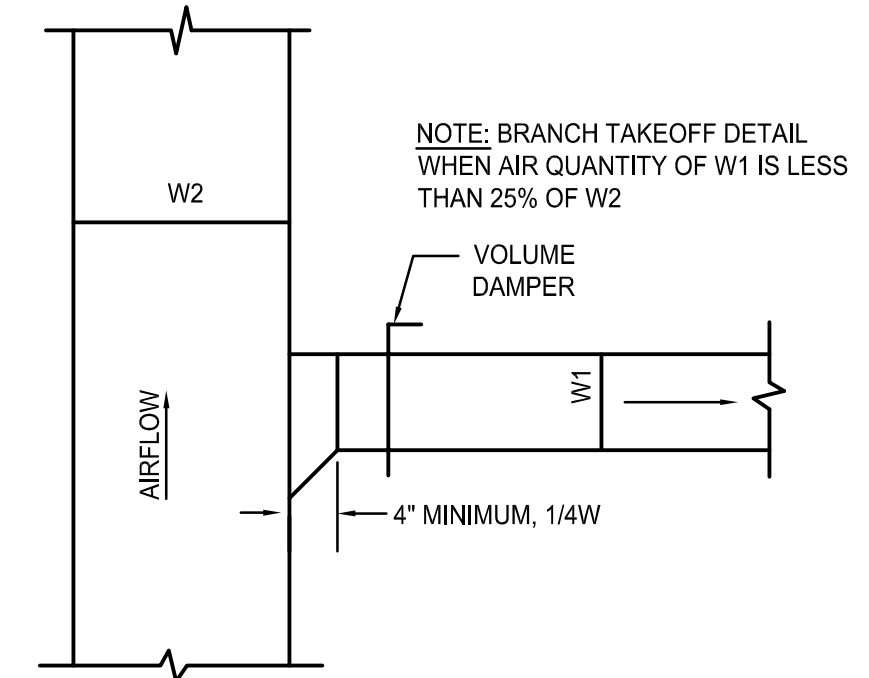
**2 DUCTWORK BRANCH TAKE-OFF DETAIL**  
SCALE: NOT TO SCALE



**5 INLINE EXHAUST FAN DETAIL**  
SCALE: NOT TO SCALE



**9 HOT WATER UNIT HEATER DETAIL**  
SCALE: NOT TO SCALE



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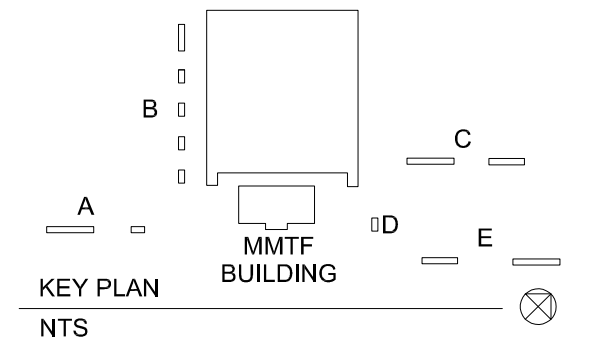
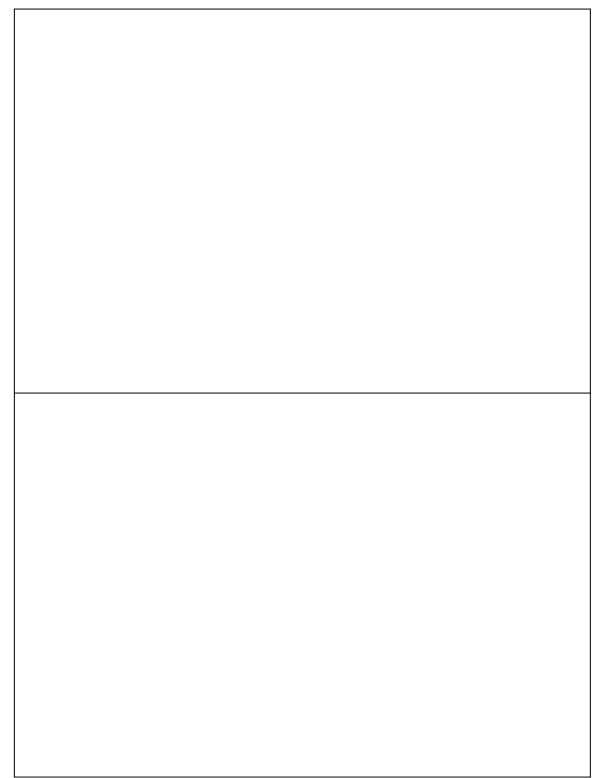
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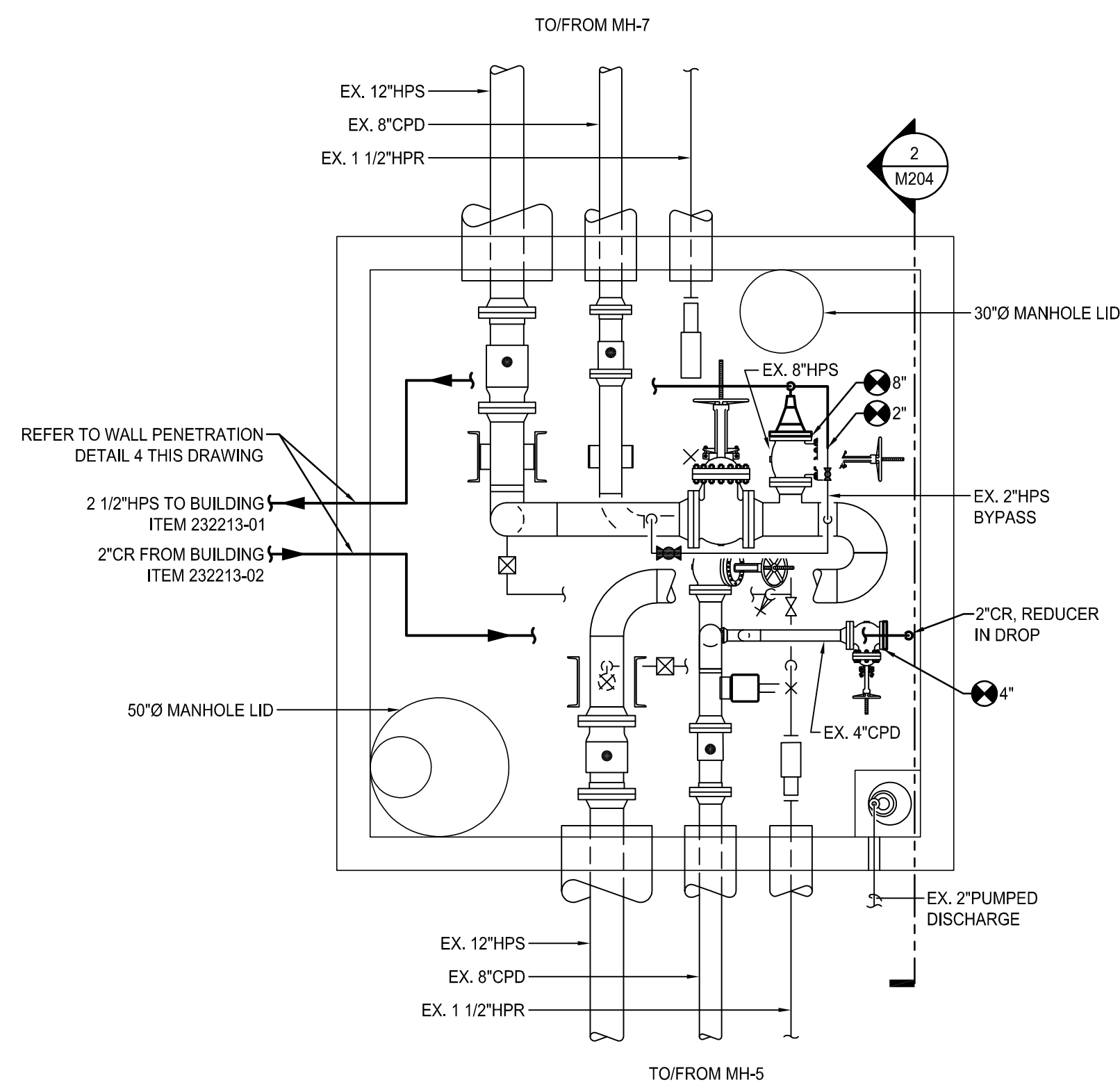
**DETAILS**

DATE SEPTEMBER 15, 2020  
SCALE AS NOTED

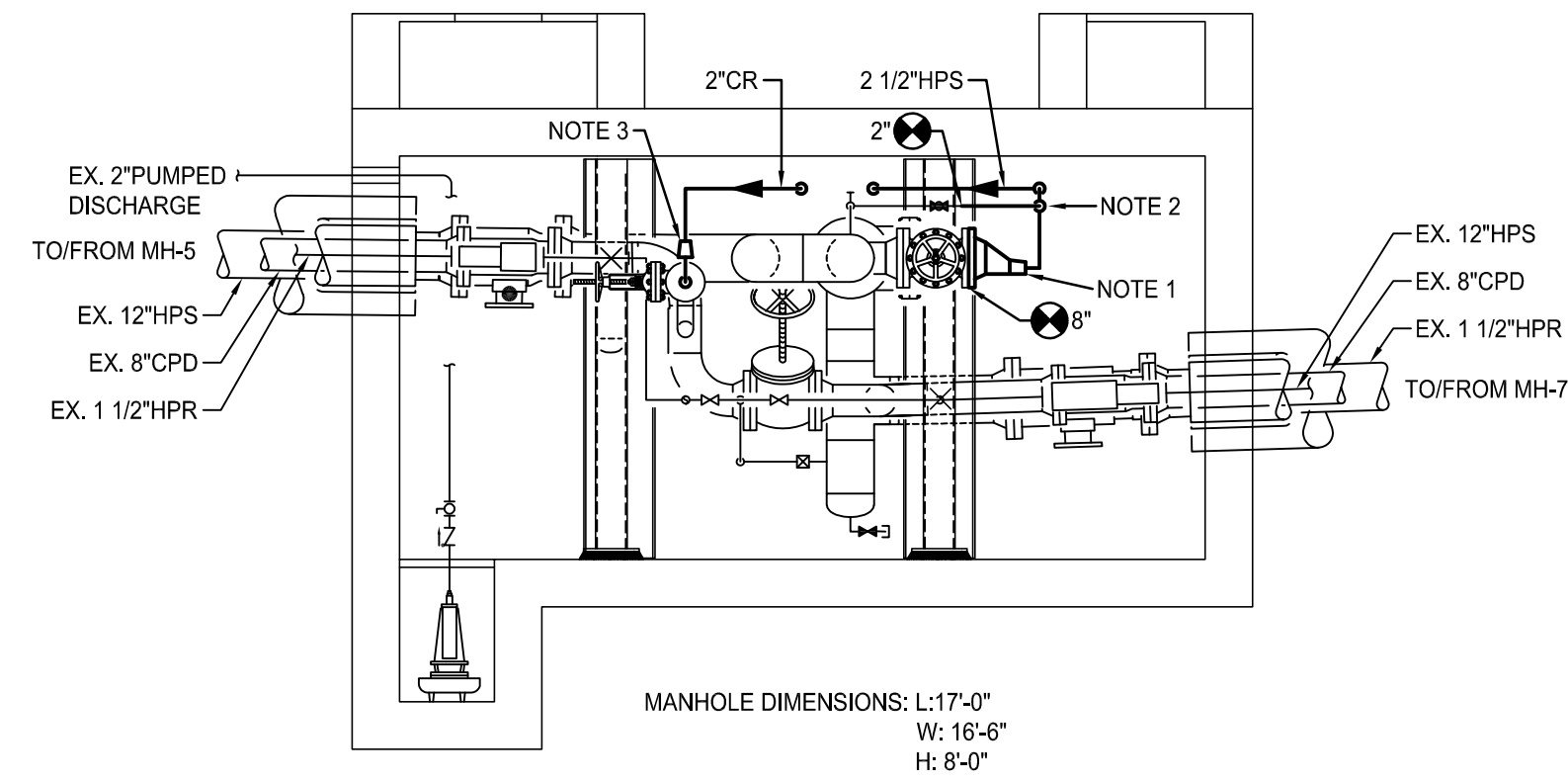
DWN - - - - - CHK - - - - -  
PROJ. No. 449803

DWG. No.

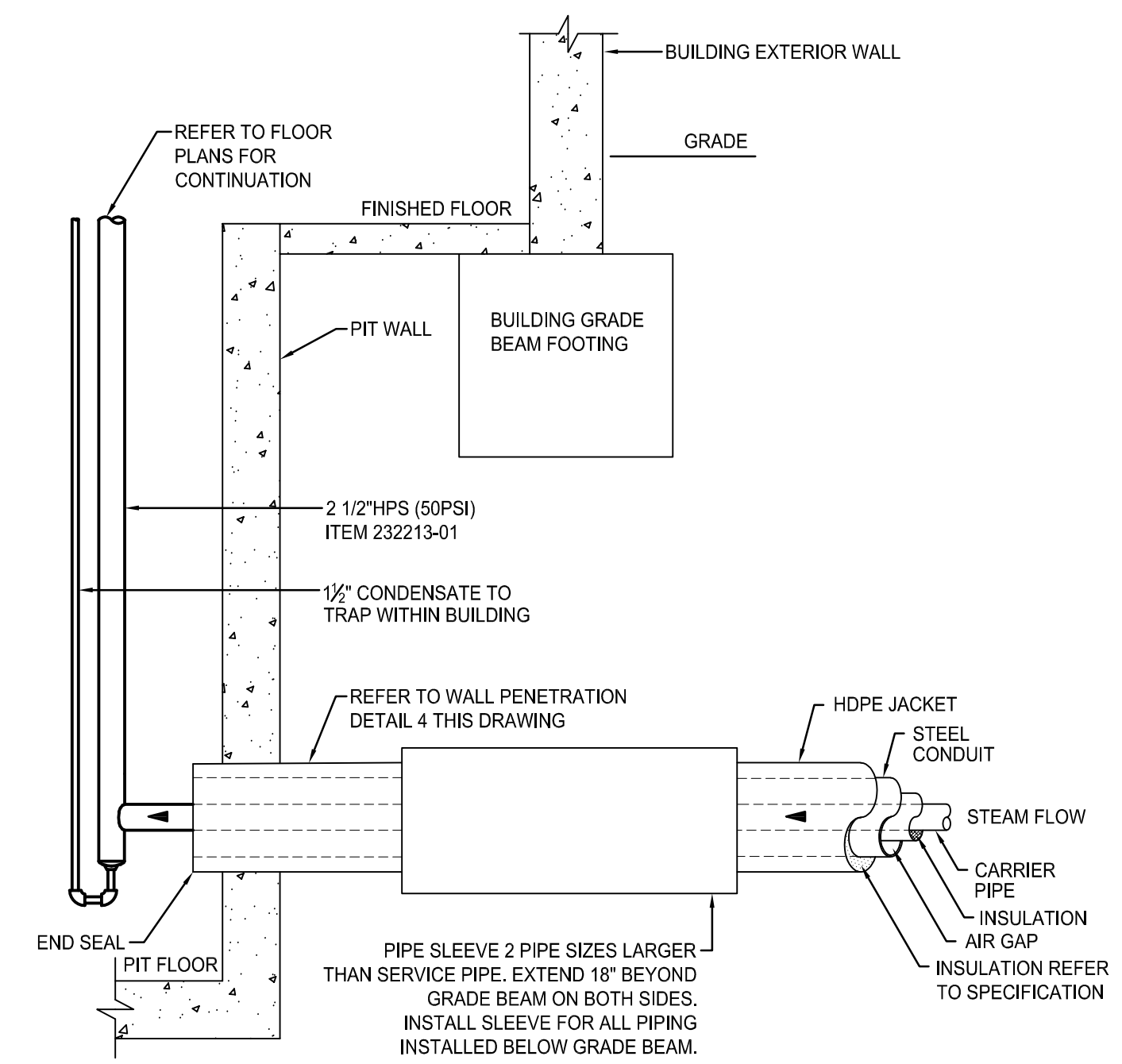
**M203**



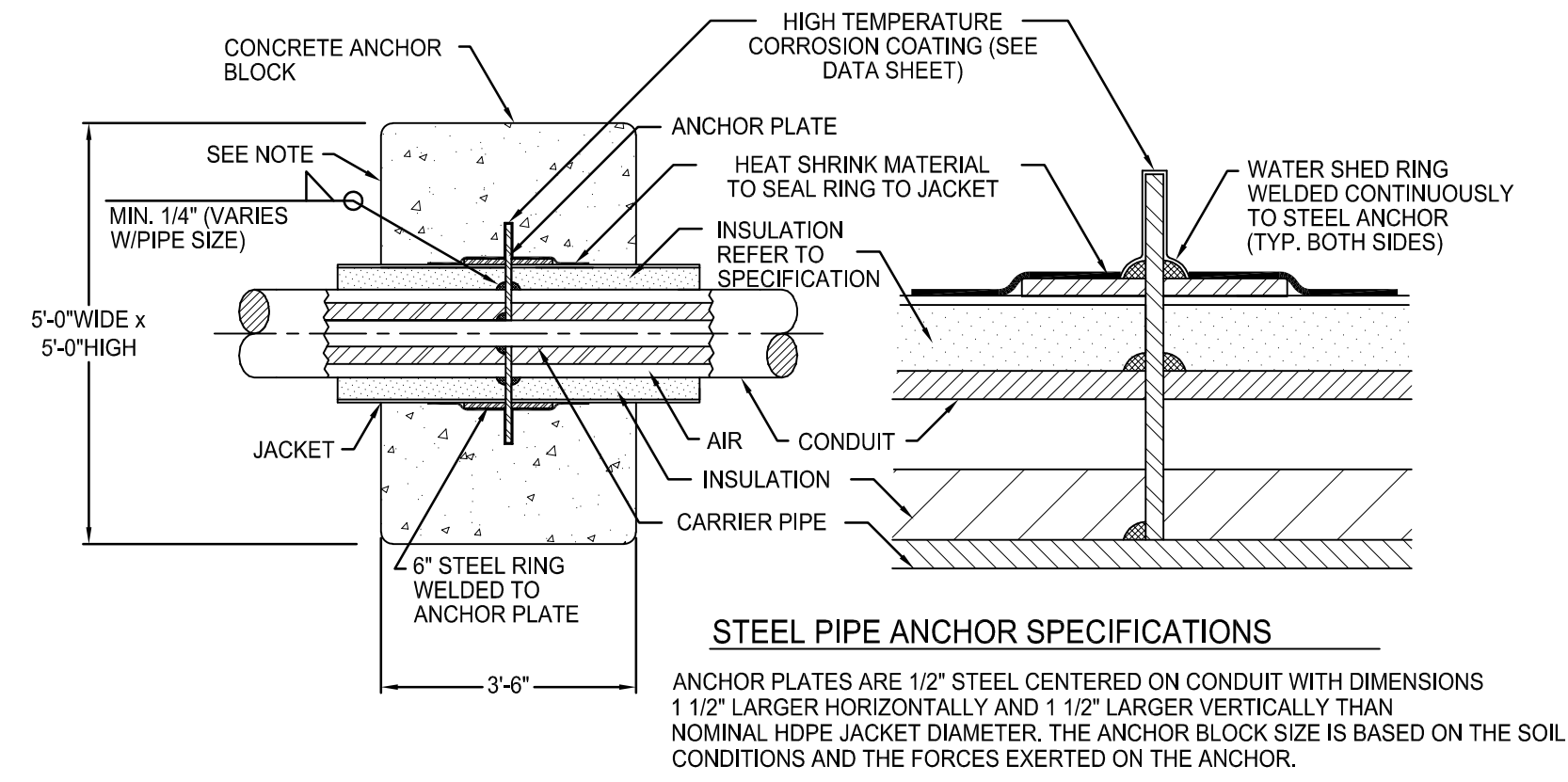
**1 MANHOLE 6 TIE-IN PLAN**  
SCALE: 1/4"=1'-0"



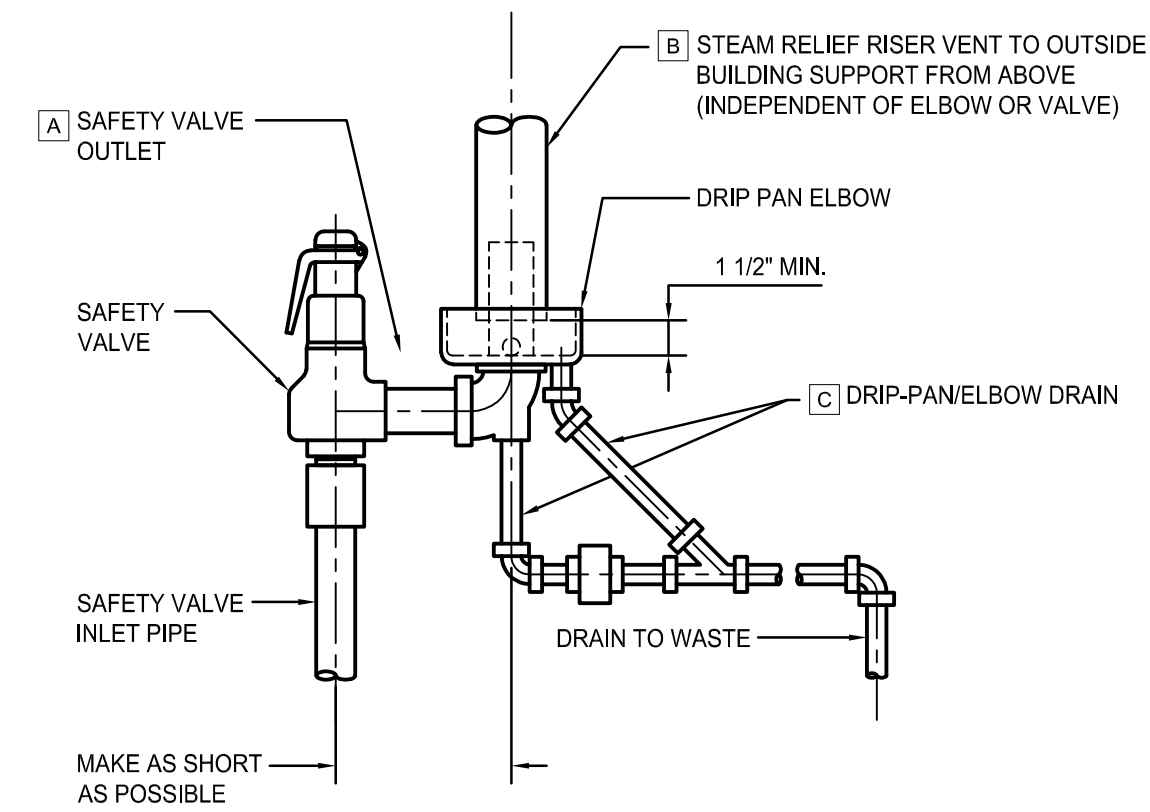
**2 MANHOLE 6 SECTION**  
SCALE: 1/4"=1'-0"



**3 DRIP TEE RISER AT BUILDING DETAIL**  
NOT TO SCALE



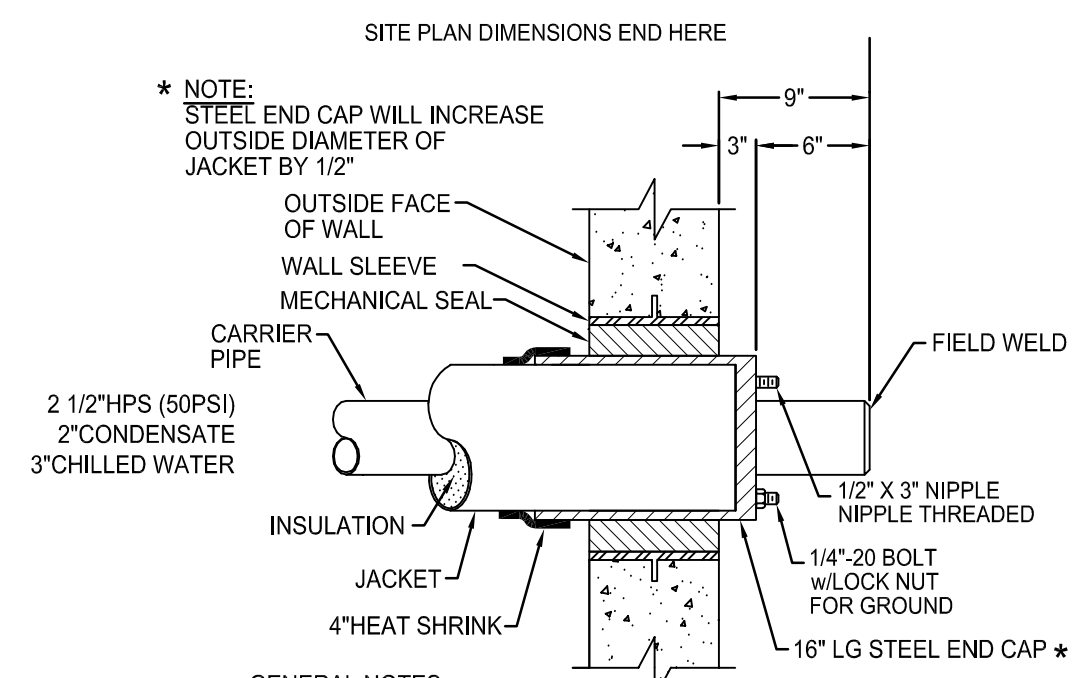
**5 STEAM AND CONDENSATE (ITEM 232213-01 AND ITEM 232213-02) UNDERGROUND ANCHOR DETAIL**  
NOT TO SCALE



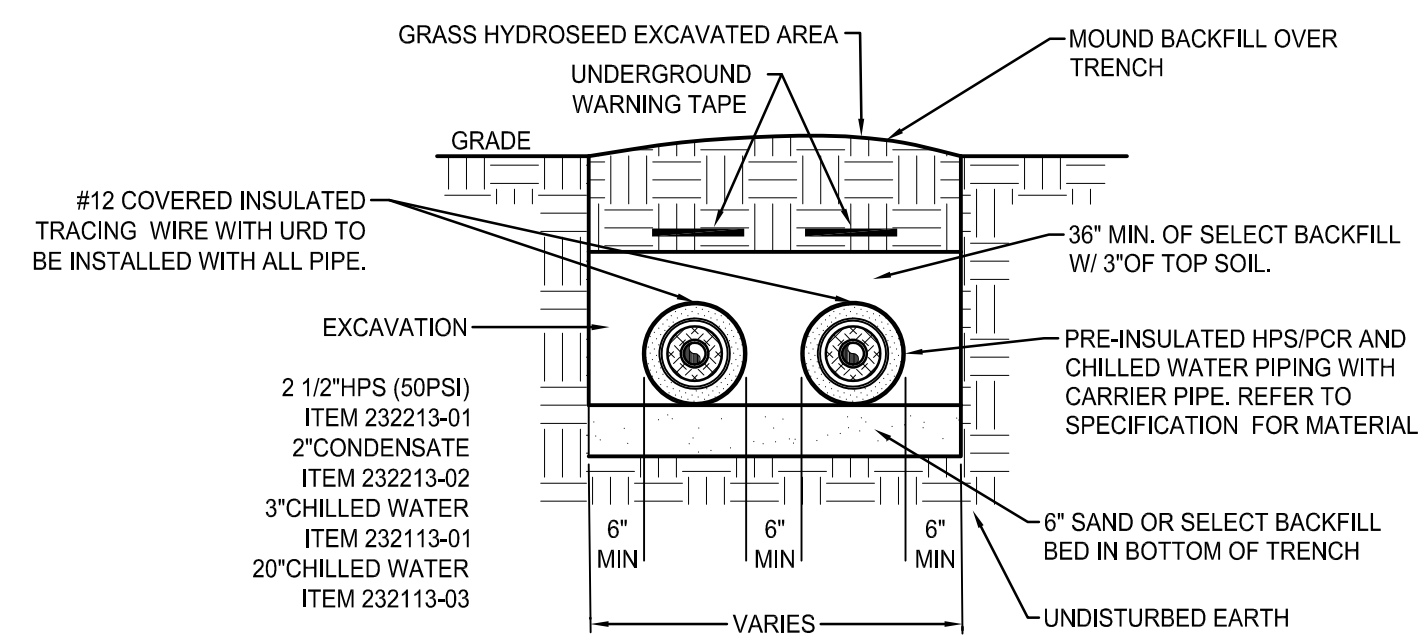
**NOMINAL RISER/VENT AND DRAIN PIPE SIZES**

A VALVE OUTLET PIPE SIZE	B RISER PIPE SIZE	C DRAIN PIPE SIZE
3/4	1 1/2	1/4
1	1 1/2	1/4
1 1/4	2	3/8
1 1/2	2	3/8
2	3	1/2
2 1/2	4	3/4
3	4	3/4
4	6	3/4
6	8	3/4
8	10	1

**7 TYPICAL STEAM SAFETY VALVE DRIP PAN ELBOW INSTALLATION**  
SCALE: NOT TO SCALE



**4 BELOW GRADE WALL PENETRATION AT MANHOLE/BUILDING**  
NOT TO SCALE



**6 PIPE TRENCH DETAIL**  
SCALE: NOT TO SCALE

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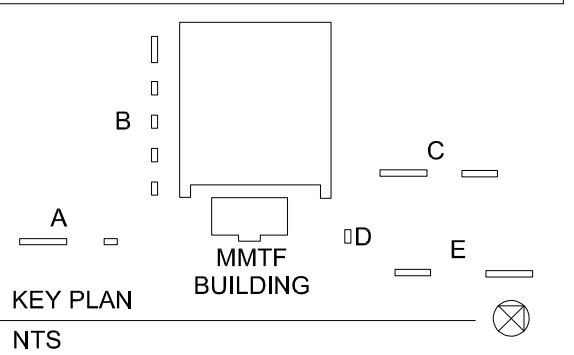
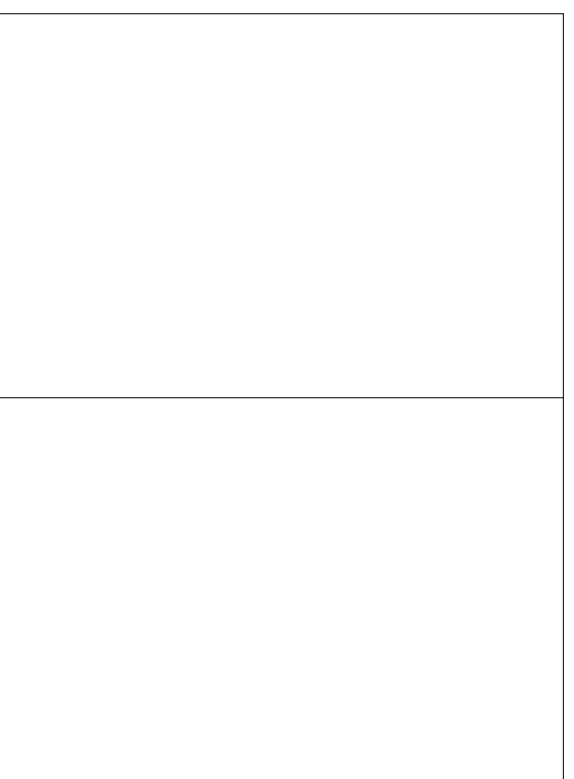
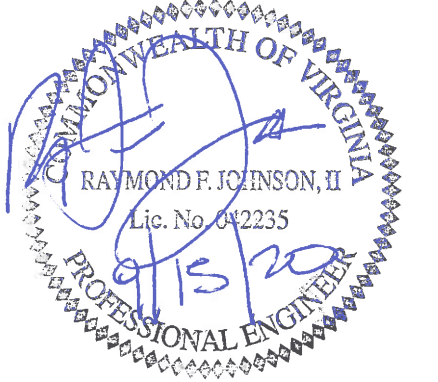
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**DETAILS**

DATE SEPTEMBER 15, 2020

SCALE AS NOTED

DWN. TIP CHK. RFJ

PROJ. No. 449803

DWG. No.

**M204**

AIR HANDLING UNIT (AHU)																											
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	SUPPLY FAN			EXHAUST FAN			MINIMUM/OA FLOW RATE (CFM)	CHILLED WATER COIL							HOT WATER COIL					AIR TO AIR ENERGY RECOVERY SUMMER					
			AIR FLOW RATE (CFM)	EXTERNAL SP (IN. WC)	TOTAL SP (IN. WC)	AIR FLOW RATE (CFM)	EXTERNAL SP (IN. WC)	TOTAL SP (IN. WC)		TOTAL CAP. (MBH)	SENS. CAP. (MBH)	EAT/LAT (°F)	EWbTLWbT (°F)	FLOW RATE (GPM)	EWTLWT (°F)	WPD (FT HD)	NUMBER OF COILS /ROWS	CAPACITY (MBH)	EAT/LAT (°F)	EWTLWT (°F)	FLOW RATE (GPM)	WPD (FT HD)	NUMBER OF COILS /ROWS	OAT (°Fdb/°Fwb)	LAT (°Fdb/°Fwb)	RAT (°Fdb/°Fwb)	PURGE AIR TRANSFERRED (CFM)
AHU-1	INGENIA CAH-2.5-NTM-PU	PENTHOUSE 230	15000	1.00	3.91	13525	1.00	1.27	2750	606.48	397.99	80.25/55.21	68.17/54.71	120.9	45/55	24.4	6	457.2	72.84/101	160/120	23.4	0.3	2	88/72	81.25/68.8	80/68	2750

AIR HANDLING UNIT (AHU) CONT'D																								
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	AIR TO AIR ENERGY RECOVERY WINTER				SUPPLY FAN ELECTRICAL DATA					EXHAUST FAN ELECTRICAL DATA					TOTAL UNIT ELECTRICAL DATA					MAXIMUM DIMENSIONS (LxWxH) (IN)	MAXIMUM WEIGHT (LBS)	NOTES
			OAT (°Fdb/°Fwb)	LAT (°Fdb/°Fwb)	RAT (°Fdb/°Fwb)	PURGE AIR TRANSFERRED (CFM)	MOTOR QUANTITY	MOTOR BHP	MOTOR HP	MOTOR RPM	VOLTS/ PHASE	MOTOR QUANTITY	MOTOR BHP	MOTOR HP	MOTOR RPM	VOLTS/ PHASE	VOLTS/ PHASE	FLA	MCA	MOCOP				
AHU-1	INGENIA CAH-2.5-NTM-PU	PENTHOUSE 230	10/10	64.38/55.13	75/62	2750	1	14.7	15	1800	460/3	1	14.7	20	1800	460/3	460/3	24	30	50	254X105X121	9821	SEE BELOW	

NOTES:

- UNIT SELECTION SHALL UTILIZE PLENUM STYLE SUPPLY AND RETURN FANS WITH PREMIUM EFFICIENCY INVERTER DUTY MOTORS, NEMA MG1.
- PROVIDE 2" THICK DOUBLE WALL GALVANIZED STEEL INSULATED CABINET, ROOF AND WALLS., MINIMUM R-13, OUTSIDE OF CABINET TO BE PAINTED.
- PROVIDE ONE SUPPLY AND ONE RETURN VARIABLE FREQUENCY DRIVE WITH INTEGRAL HAND-OFF-AUTO SELECTION SWITCH AND LOCKABLE DISCONNECT FURNISHED BY UNIT MANUFACTURER. SINGLE DRIVE TO CONTROL SUPPLY FAN AND SINGLE DRIVE TO CONTROL RETURN FAN. PROVIDE WIRING AND CONDUIT BETWEEN FANS AND DRIVE.
- PROVIDE 2" MERV 9 FILTERS.
- PROVIDE SIDE LOADING AND REMOVABLE FILTERS
- FAN STATIC PRESSURES TO BE BASED ON FILTERS IN REPLACEMENT CONDITION (2" WC ALLOWANCE)
- PROVIDE SEPARATE 120V/1Ø POWER CIRCUITING FOR MARINE LIGHTS, OUTLETS, AND ACCESSORIES. REFER TO SPECIFICATIONS FOR LOCATION OF LIGHTS, OUTLETS, AND ACCESSORIES.
- UNIT TO BE PROVIDED WITH SPLIT SECTIONS TO ACCOMMODATE SHIPPING.
- PROVIDE RETURN AND OUTSIDE AIR CONTROL DAMPERS FACTORY MOUNTED WITH UNIT.
- UNIT TO BE FACTORY FABRICATED AS ONE UNIT BY ONE MANUFACTURER.
- PROVIDE FIELD INSTALLED SMOKE DETECTORS COMPATIBLE WITH FIRE ALARM SYSTEM
- PROVIDE STAINLESS STEEL POSITIVELY SLOPED DRAIN PAN.
- UNIT TO BE SUPPLIED TO PENTHOUSE MANUFACTURER FOR ASSEMBLY IN PREMANUFACTURED PENTHOUSE.
- HOT WATER PERFORMANCE SHALL BE BASED ON 33% GLYCOL SOLUTION.
- PROVIDE 12" DEEP FINAL FILTER MERV 13 RATED.

EXHAUST FAN SCHEDULE (EF)													
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	TYPE	MAX AIR FLOW RATE (CFM)	MIN AIR FLOW RATE (CFM)	EXTERNAL S.P. (IN. W.C.)	FAN SPEED (RPM)	SONES	DRIVE TYPE	ELECTRICAL DATA			NOTES
										MOTOR BHP	MOTOR HP	VOLTS/ PHASE	
EF-1	GREENHECK BSQ-100-5	PENTHOUSE 230	INLINE	950	950	0.75	1646	11.5	BELT	0.31	1/2	115/1	SEE BELOW
EF-2	GREENHECK BSQ-90-4	PENTHOUSE 230	INLINE	525	525	0.75	1590	11.0	BELT	0.22	1/4	115/1	SEE BELOW

NOTES:

- PROVIDE VARIABLE FREQUENCY DRIVE WITH INTEGRAL HAND-OFF-AUTO SELECTION SWITCH AND LOCKABLE DISCONNECT.
- PROVIDE SOLID SHAFT WITH ANTI CORROSION COATING AND EXTENDED LUBE LINES.
- PROVIDE WITH OSHA APPROVED BELT GUARD.
- PROVIDE INVERTER DUTY PREMIUM EFFICIENCY MOTOR, CLASS F INSULATION.
- PROVIDE FLEXIBLE DUCT CONNECTION AT FAN INLET AND OUTLET.
- PROVIDE BACKDRAFT DAMPERS AT FAN CONNECTION TO LOUVER PLENUM.

PUMP SCHEDULE													
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	ARRANGEMENT	SERVICE	FLUID/ MEDIA	FLOW RATE (GPM)	IMPELLER SIZE (IN.)	WPD (FT HD)	ELECTRICAL DATA				NOTES
									MOTOR BHP	MOTOR HP	MOTOR RPM	VOLTS/ PHASE	
CHWP- 1 & 2	TACO KS2009D	MECHANICAL B08	INLINE	AHU-1	WATER	121.5	9.5	80	3.78	5	1760	460/3	SEE BELOW
HWCP- 1 & 2	TACO KS2007	MECHANICAL A09	INLINE	AHU-1, VAVs, FCUS, & UH	33% GLYCOL	55	7	48	1.39	2	1760	460/3	SEE BELOW

NOTES:

- PROVIDE VARIABLE FREQUENCY DRIVE WITH INTEGRAL HAND-OFF-AUTO SELECTION SWITCH AND LOCKABLE DISCONNECT.
- PROVIDE PREMIUM EFFICIENCY INVERTER DUTY MOTOR, NEMA M6.
- PROVIDE FINE MESH STRAINER FOR START-UP. PROVIDE SECOND REMOVABLE STAINLESS STEEL FILTER TO BE INSTALLED AFTER INITIAL FLUSH.

COMPUTER ROOM AIR CONDITIONER (CRAC)														
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	ASSOCIATED EQUIPMENT	FAN			TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	EAT		ELECTRICAL DATA			NOTES
				CFM	ESP	HP			DB °F	RH	VOLTS/ PHASE	FLA	MCA	
CRAC-1	STULZ CRS-042-AR	IT B12	ACCU-1	1500	0	1/2	44	12.8	85	50%	460/3	9.3	12.2	SEE BELOW

NOTES:

- PROVIDE WITH DISCONNECT SWITCH, SUPPLY/RETURN GRILLE, SELF-CONTAINED CONTROL WITH REMOTE SENSOR.
- UNIT DIMENSIONS SAHLL BE 77.8"H X 11.6"W X 42.1"L

AIR COOLED CONDENSING UNIT SCHEDULE (ACCU)												
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	ASSOCIATED EQUIPMENT	COOLING			ELECTRICAL DATA			REFRIGERANT TYPE	NOTES	
				NO. OF FANS	NOMINAL CAPACITY (TONS)	SCOP-127	NO. OF CIRCUITS	VOLTS/ PHASE	MCA			FLA
ACCU-1	STULZ SCS-MC-031	ROOF	CRAC-1	1	3.7	2.51	-	460/3	2.9	2.4	R-410A	SEE BELOW

NOTES:

- PROVIDE SINGLE POINT POWER, NON-FUSED NEMA 3R DISCONNECT, AND MOTOR STARTER.
- FINAL REFRIGERANT PIPE SIZES PER MANUFACTURERS RECOMMENDATION. PROVIDE INDOOR UNIT LIQUID PIPE REDUCERS AS REQUIRED. COORDINATE LINE SIZES WITH MANUFACTURER PRIOR TO ORDERING.
- PROVIDE LOW VOLTAGE CONTROL WIRING IN CONDUIT BETWEEN OUTDOOR CONDENSER, INDOOR AIR CONDITIONING UNITS, SENSORS, AND CONTROLLERS.
- PROVIDE BACNET CONTROL INTERFACE.

AIR SEPARATOR SCHEDULE (AS)										
PLAN DESIGNATION	MANUFACTURER MODEL No.	LOCATION	STYLE	FLOW (GPM)	WPD (FT HD)	INLET/OUTLET CONNECTION SIZE (IN.)	HEIGHT (IN.)	DIAMETER (IN.)	NOTES	
AS-1	TACO 4903ADT-125	MECHANICAL A09	INLINE COMB. AIR/DIRT	70	1	3	25.12	12	SEE BELOW	
AS-2	TACO 4904AD-125	MECHANICAL B08	INLINE COMB. AIR/DIRT	140	1.5	4	25.12	12	SEE BELOW	

NOTES:

- PROVIDE HIGH VELOCITY COMBINATION AIR AND DIRT SEPARATOR.
- PROVIDE UNIT SUPPORTS TO SUSPEND UNIT FROM STRUCTURE.

CONDENSATE RECEIVER SCHEDULE (CR)										
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	ARRANGEMENT	RECEIVER	MEDIA	FLOW RATE (GPM)	STEAM PRESSURE (PSI)	HEAD PRESSURE (PSI)	NOTES	
CR-1	ARMSTRONG PT-200 SERIES	MECHANICAL A09	STEAM OPERATED	-	CONDENSATE	-	25	15	SEE BELOW	

NOTES:

- PROVIDE CONCRETE PAD FOR CONDENSATE PUMP LOCATED IN MECHANICAL ROOM.
- REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.

SHELL AND TUBE HEAT EXCHANGER SCHEDULE (HX)														
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	SHELL SIDE			TUBE SIDE								NOTES
			INLET PRES. (PSI)	FLOW RATE (LBS/HR)	TRAP CAPACITY (LBS/HR)	CAPACITY (MBH)	FLOW RATE (GPM)	EWTLWT (°F)	WPD (FT. HD.)	FOULING FACTOR	LENGTH (IN.)	DIAMETER (IN.)		
HX-1	ARMSTRONG WSG-0803-400	MECHANICAL A09	5	1233	3100	1184	55	120/160	2.1	0.006	40 3/4	8 3/8	SEE BELOW	

NOTES:

- REFER TO PIPING DETAIL FOR FURTHER INFORMATION
- PROVIDE STEEL SUPPORT FRAME.

UNIT HEATER SCHEDULE (UH)												
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	AIR FLOW RATE (CFM)	HOT WATER COIL				ELECTRICAL DATA				NOTES
				CAPACITY (MBH)	EAT/LAT (°F)	EWTLWT (°F)	FLOW RATE (GPM)	WPD (FT. HD.)	MOTOR HP	MOTOR RPM	VOLTS/ PHASE	
UH-1	RITTLING RH-33	PENTHOUSE 230	630	15.6	70/92.9	160/140	1.6	0.1	1/15	1550	115/1Ø	SEE BELOW

NOTES:

- PROVIDE OSHA FAN GUARD.
- PROVIDE SPRING MOUNTED HORIZONTAL LOUVERS.
- PROVIDE COPPER HEAT EXCHANGER TUBES WITH ALUMINUM FINNS.
- PROVIDE THERMAL DISCONNECT SWITCH

EXPANSION TANK SCHEDULE (ET)												
PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	TANK TYPE	TANK VOLUME (GAL.)	ACCEPTANCE VOLUME (GAL.)	OPERATING PRESSURE (PSI)	DESIGN TEMP (°F)	HEIGHT (IN.)	DIAMETER (IN.)	INLET (IN.)	APPROX SYSTEM VOLUME (GAL)	NOTES
ET-1	TACO CA-90	MECHANICAL A09	BLADDER	23	23	125	160	32	20	1	X	SEE BELOW
ET-2	TACO CA-90	MECHANICAL B08	BLADDER	23	23	125	160	32	20	1	X	SEE BELOW

NOTES:

- MAX OPERATING PRESSURE OF 30 PSI.
- PROVIDE WITH MOUNTING STAND.
- ASME RATED.
- PROVIDE WITH CARBON STEEL SHELL AND HEAVY DUTY BUTYL RUBBER DIAPHRAGM OR BLADDER.

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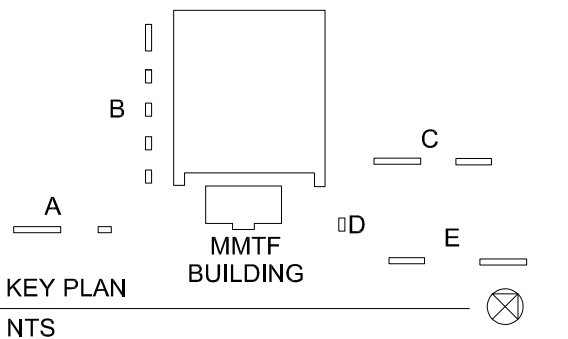
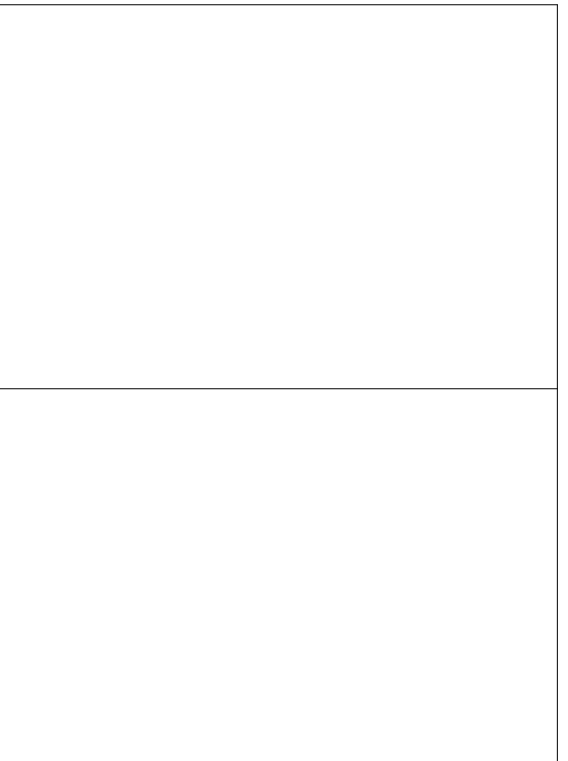
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**SCHEDULES**

DATE SEPTEMBER 15, 2020  
SCALE AS NOTED  
DWN. - CHK. -  
PROJ. No. 449803  
DWG. No.

**M301**

VARIABLE AIR VOLUME BOX SCHEDULE (VAV)

PLAN DESIGNATION	MANUFACTURER MODEL NO.	MAXIMUM AIRFLOW (CFM)	MINIMUM AIRFLOW (CFM)	AIR PRESSURE DROP (IN. WC)	COIL DATA					MAXIMUM NC	INLET DIAMETER (IN)	NOTES
					CAPACITY (MBH)	EAT/LAT (°F)	EWT/LWT (°F)	FLOW RATE (GPM)	WPD (FT HD)			
VAV-1	CARRIER 35E	700	700	0.15	34.20	55/100	160/129	2.26	1.22		12	SEE BELOW
VAV-2	CARRIER 35E	1585	385	0.12	18.71	55/100	160/134	1.5	0.31	17	16	SEE BELOW
VAV-3	CARRIER 35E	215	215	0.10	11.13	55/103	160/137	1	0.26	13	6	SEE BELOW
VAV-4	CARRIER 35E	310	115	0.75	6.11	55/104	160/147	1	0.75	14	8	SEE BELOW
VAV-5	CARRIER 35E	2245	500	0.23	24.28	55/100	160/148	4.3	1.98	22	16	SEE BELOW
VAV-6	CARRIER 35E	1000	355	0.08	17.77	55/101	160/144	2.3	0.63	11	14	SEE BELOW
VAV-7	CARRIER 35E	525	220	0.08	10.69	55/100	160/154	3.45	1.94	12	10	SEE BELOW
VAV-8	CARRIER 35E	550	550	0.16	26.90	55/100	160/132	1.96	0.77		10	SEE BELOW
VAV-9	CARRIER 35E	345	100	0.08	5.00	55/100	160/155	2.1	1.98		6	SEE BELOW
VAV-10	CARRIER 35E	745	135	0.33	6.56	55/100	160/147	1	0.74	25	8	SEE BELOW
VAV-11	CARRIER 35E	1330	300	0.41	14.70	55/100	160/111	0.6	0.12		12	SEE BELOW
VAV-12	CARRIER 35E	615	150	0.40	8.90	55/109	160/124	0.5	0.05		8	SEE BELOW
VAV-13	CARRIER 35E	355	105	0.08	5.86	55/107	160/148	1	0.75	15	8	SEE BELOW
VAV-14	CARRIER 35E	890	150	0.65	12.5	55/100	160/122	0.66	0.09		8	SEE BELOW
VAV-15	CARRIER 35E	275	145	0.16	9.01	55/113	160/142	1	0.26	16	6	SEE BELOW
VAV-16	CARRIER 35E	300	75	0.06	4.00	55/100	160/150	0.78	0.34		6	SEE BELOW
VAV-17	CARRIER 35E	745	150	0.27	9.7	55/104	160/121	0.50	0.05		8	SEE BELOW
VAV-18	CARRIER 35E	315	105	0.14	5.10	55/100	160/150	1.1	0.61	19	6	SEE BELOW

NOTES:  
 1. PROVIDE DIGITAL VAV CONTROLS  
 2. PROVIDE ACCESS DOOR IN VAV BOX FOR VIEWING DAMPER AND COIL  
 3. COORDINATE SUPPLY AIR TAPS WITH VAV NECK CONNECTION SIZE  
 4. HOT WATER COILS SELECTION BASED ON 33% GLYCOL SOLUTION.

LOUVER SCHEDULE (LV)

PLAN DESIGNATION	MANUFACTURER MODEL NO.	SERVICE	LOUVER DIMENSIONS (WxH)	VELOCITY (FFM)	FREE AREA (SQ. FT.)	MATERIAL	PATTERN	FINISH	CONTROL DAMPER	NOTES
LV-1	GREENHECK EHH401	AHU-1	96X96	500	30	ALUMINUM	DRAINABLE	BAKED ENAMEL	INSULATED	SEE BELOW
LV-2	GREENHECK EHH401	AHU-1	72X126	500	30	ALUMINUM	DRAINABLE	BAKED ENAMEL	INSULATED	SEE BELOW
LV-3	GREENHECK EHH401	EF-1 & 2	4X4	500	8	ALUMINUM	DRAINABLE	BAKED ENAMEL	INSULATED	SEE BELOW

NOTES:  
 1. ARCHITECT TO SELECT COLOR.  
 2. PROVIDE 1/2"X1/2" BIRD SCREEN.  
 3. PROVIDE THERMALLY INSULATED, 2-POSITION MOTORIZED DAMPER AND ACTUATOR.  
 4. CAULK ALL SIDES WEATHER TIGHT.  
 5. CONTRACTOR SHALL FIELD VERIFY ALL WALL OPENINGS PRIOR TO ORDERING LOUVER.  
 6. LOUVER TO BE PROVIDED WITH OPTIONAL MOUNTING FLANGES ON ALL FOUR SIDES.  
 7. PROVIDE INSECT SCREEN

AIR INLET AND OUTLET SCHEDULE

PLAN DESIGNATION	CFM RANGE	STATIC PRESSURE (IN. WG)	MANUFACTURER MODEL NO.	TYPE	MATERIAL	NECK SIZE (IN.)	FACE SIZE (IN.)	N.C. LEVEL	NOTES
CD	0-200	.062	PRICE SCD	CEILING DIFFUSER	STAINLESS STEEL	6	24X24	<30	W/ VOLUME DAMPER
CD	200-350	.080	PRICE SCD	CEILING DIFFUSER	STAINLESS STEEL	8	24X24	<30	W/ VOLUME DAMPER
CD	350-550	.060	PRICE SCD	CEILING DIFFUSER	STAINLESS STEEL	10	24X24	<30	W/ VOLUME DAMPER
CD	550-700	.050	PRICE SCD	CEILING DIFFUSER	STAINLESS STEEL	12	24X24	<30	W/ VOLUME DAMPER
CD	700-1000	.060	PRICE SCD	CEILING DIFFUSER	STAINLESS STEEL	14	24X24	<30	W/ VOLUME DAMPER
LD	0-200	.126	PRICE SDB	LINEAR DIFFUSER	ALUMINUM	12	-	<30	(2) SLOT, 3/4" SLOT WIDTH, WITH INSULATED PLENUM, 48" LONG
SR	0-180	.146	PRICE 520D	SUPPLY REGISTER	STAINLESS STEEL	-	6X6	<30	W/ VOLUME DAMPER
SR	180-390	.146	PRICE 520D	SUPPLY REGISTER	STAINLESS STEEL	-	8X8	<30	W/ VOLUME DAMPER
SR	390-550	.094	PRICE 520D	SUPPLY REGISTER	STAINLESS STEEL	-	12X10	<30	W/ VOLUME DAMPER
SR	550-945	.094	PRICE 520D	SUPPLY REGISTER	STAINLESS STEEL	-	20X10	<30	W/ VOLUME DAMPER
ER	0-125	.190	PRICE 635DAL	EXHAUST REGISTER	ALUMINUM	-	6X6	<30	W/ VOLUME DAMPER
ER	125-230	.139	PRICE 635DAL	EXHAUST REGISTER	ALUMINUM	-	8X6	<30	W/ VOLUME DAMPER
ER	230-360	.139	PRICE 635DAL	EXHAUST REGISTER	ALUMINUM	-	10X10	<30	W/ VOLUME DAMPER
ER	360-455	.097	PRICE 635DAL	EXHAUST REGISTER	ALUMINUM	-	12X12	<30	W/ VOLUME DAMPER
ER	455-590	.097	PRICE 635DAL	EXHAUST REGISTER	ALUMINUM	-	14X14	<30	W/ VOLUME DAMPER
ER	590-800	.097	PRICE 635DAL	EXHAUST REGISTER	ALUMINUM	-	16X16	<30	W/ VOLUME DAMPER
ER	800-1240	.062	PRICE 635DAL	EXHAUST REGISTER	ALUMINUM	-	26X18	<30	W/ VOLUME DAMPER
ER	0-300		PRICE 635DAL	EXHAUST REGISTER	ALUMINUM		24X24	<30	W/ VOLUME DAMPER
RR	0-455	.097	PRICE 535D	RETURN REGISTER	STAINLESS STEEL	-	12X12	<30	W/ VOLUME DAMPER
RR	0-1450	.062	PRICE 535D	RETURN REGISTER	STAINLESS STEEL	-	24X24	<30	W/ VOLUME DAMPER
DD	0-450	.0134	PRICE HCD	DRUM DIFFUSER	STAINLESS STEEL	-	18X6	<30	W/ VOLUME DAMPER
DD	450-1000	.106	PRICE HCD	DRUM DIFFUSER	STAINLESS STEEL	-	24X12	<30	W/ VOLUME DAMPER
TG	50-700	.16	PRICE 535	RETURN GRILLE	STAINLESS STEEL	12X12	-	<30	W/ VOLUME DAMPER
TG	700-1500	.16	PRICE 535	RETURN GRILLE	STAINLESS STEEL	24X24	-	<30	W/ VOLUME DAMPER

NOTES:  
 1. VERIFY CEILING TYPE BEFORE SUBMITTING SHOP DRAWINGS. PROVIDE REQUIRED BRACKETS, FLANGES, SURFACE PLATES, ETC. TO MOUNT DIFFUSERS, REGISTERS AND GRILLES IN CEILINGS.

FAN COIL UNIT SCHEDULE (FCU)

PLAN DESIGNATION	MANUFACTURER MODEL NO.	LOCATION	TYPE	AIR FLOW (CFM)	HOT WATER COIL				MOTOR HP	VOLTS/ PHASE	FLA	NOTES
					TOTAL CAP. (MBH)	EAT/ LAT (°F)	EWT/ LWT (°F)	FLOW RATE (GPM)				
FCU-1	RITTLING FW-280-03	STAIR B A17	SURFACE MOUNTED	128	4.7	70/104	160/140	0.5	1/60	115/1	0.35	SEE BELOW
FCU-2	RITTLING FW-280-03	STAIR B B17	SURFACE MOUNTED	128	4.7	70/104	160/140	0.5	1/60	115/1	0.35	SEE BELOW
FCU-3	RITTLING FW-280-03	STAIR B C17	SURFACE MOUNTED	128	4.7	70/104	160/140	0.5	1/60	115/1	0.35	SEE BELOW
FCU-4	RITTLING FW-280-03	STAIR A B02	SURFACE MOUNTED	128	4.7	70/104	160/140	0.5	1/60	115/1	0.35	SEE BELOW

NOTES:  
 1. PROVIDE TWO (2) VARIABLE SPEED ECM MOTORS AND TWO (2) BLOWERS.  
 2. PROVIDE WITH LOUVERED BOTTOM RETURN.  
 3. PROVIDE INSULATED CABINET.  
 4. PROVIDE 1" PLEATED MERV 8 FILTER.  
 5. PROVIDE NON-FUSED UNIT MOUNTED DISCONNECT SWITCH.  
 6. HOT WATER COIL SELECTION BASED ON 33% GLYCOL SOLUTION

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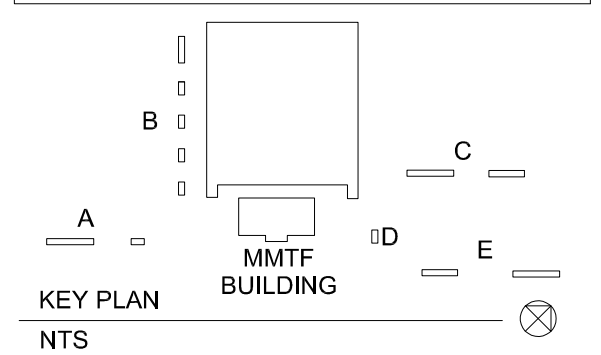
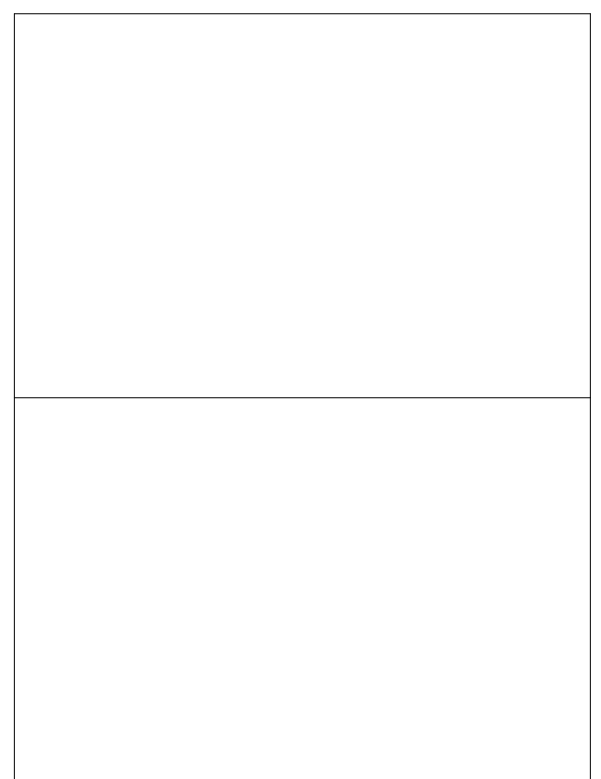
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SCHEDULES

DATE SEPTEMBER 15, 2020

SCALE AS NOTED

DWN. - CHK. -

PROJ. No. 449803

DWG. No.

M302

VENTILATION SCHEDULE														
ROOM NAME	ROOM NUMBER	AREA (SF)	SPACE CLASSIFICATION	DEFAULT OCCUPANCY RATE (PEOPLE/1,000 SF)	OCCUPANCY (PEOPLE)	FLUSH FIXTURES	VENTILATION RATE	VENTILATION RATE UNIT	VENTILATION RATE	VENTILATION RATE UNIT	VENTILATION (CFM)	EXHAUST RATE	EXHAUST RATE UNIT	EXHAUST (CFM)
<b>FIRST FLOOR</b>														
100 MAIN ENTRY	100	285	MAIN ENTRY LOBBIES	10	2.85		5	CFM/PER	0.06	CFM/SF	32.00			
101 WAITING	101	1500	MAIN ENTRY LOBBIES	10	15		5	CFM/PER	0.06	CFM/SF	165.00			
102 PASSAGE	102	133	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	8.00			
103 ELECTRICAL	103	110	ELECTRICAL EQUIPMENT ROOMS	0	0		0	CFM/PER	0.06	CFM/SF	6.6			200
104 EMR	104	86	ELEVATOR MACHINE ROOMS	0	0		0	CFM/PER	0.12	CFM/SF	10.32			35
106 MECHANICAL	106	224	ELECTRICAL EQUIPMENT ROOMS	0	0		0	CFM/PER	0.06	CFM/SF	13.4			105
108 MEN	108	227	TOILET ROOMS AND BATHROOMS,G,H	—		3						50	CFM/FIX	150.00
109 WOMEN	109	274	TOILET ROOMS AND BATHROOMS,G,H	—		3						50	CFM/FIX	150.00
110 CUSTODIAL	110	79	STORAGE ROOMS	0	0		0	CFM/PER	0.12	CFM/SF	9.5			75
111 TOILET & SHOWER A	111	86	SHOWER ROOMS (PER SHOWER HEAD) G,H	—		2						50	CFM/FIX	100.00
112 TOILET & SHOWER B	112	88	SHOWER ROOMS (PER SHOWER HEAD) G,H	—		2						50	CFM/FIX	100.00
113 PASSAGE	113	239	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	15.00			
114A ELEVATOR	114	69	ELEVATOR MACHINE ROOMS	0	0		0	CFM/PER	0.12	CFM/SF	9.00			
115 STAIR A	115	106	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	7.00			
116 ALT TRANSPORT CONF	116	504	CONFERENCE/MEETING	50	20		5	CFM/PER	0.06	CFM/SF	131.00			
118 PASSAGE	118	114	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	7.00			
119 BIKE HUB AREA 1	119	1215	MULTI-USE ASSEMBLY	100	25		7.5	CFM/PER	0.06	CFM/SF	261.00			
120 BIKE HUB AREA 2	120	471	MULTI-USE ASSEMBLY	100	10		7.5	CFM/PER	0.06	CFM/SF	104.00			
121 STAIR B	121	199	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	12.00			
122 STORAGE	122	29	STORAGE ROOMS	0	0		0	CFM/PER	0.12	CFM/SF	4.00			
<b>SECOND FLOOR</b>														
201A INFORMAL MEETING	201A	152	CONFERENCE/MEETING	50	7.6		5	CFM/PER	0.06	CFM/SF	48.00			
201B PASSAGE	201B	76	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	5.00			
201C PASSAGE	201C	76	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	5.00			
202 BT OFFICE 2	202	167	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	16.00			
203 BT OFFICE 1	203	139	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	14.00			
204 OPERATIONS	204	119	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	13.00			
205A BREAK AREA	205A	490	BREAK ROOMS	25	12.25		5	CFM/PER	0.06	CFM/SF	91.00			
205B BREAK ROOM	205B	475	BREAK ROOMS	25	10		5	CFM/PER	0.06	CFM/SF	79.00			
207A PASSAGE	207A	229	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	14.00			
207B PASSAGE	207B	94	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	6.00			
208 MEN	208	227	TOILET ROOMS AND BATHROOMS,G,H	—		3						50	CFM/FIX	150.00
209 WOMEN	209	275	TOILET ROOMS AND BATHROOMS,G,H	—		3						50	CFM/FIX	150.00
210 CUSTODIAL	210	77	STORAGE ROOMS	0	0		0	CFM/PER	0.12	CFM/SF	0.00			75
211 MECHANICAL	211	136	ELECTRICAL EQUIPMENT ROOMS	0	0		0	CFM/PER	0.06	CFM/SF	0.00			85
212 ELECTRICAL	212	141	ELECTRICAL EQUIPMENT ROOMS	0	0		0	CFM/PER	0.06	CFM/SF	0.00			100
213 FILE ROOM	213	140	STORAGE ROOMS	0	0		0	CFM/PER	0.12	CFM/SF	17.00			
215 STAIR A	215	229	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	14.00			
217 IT	217	167	COMPUTER (NOT PRINTING)	4	0		5	CFM/PER	0.06	CFM/SF	11.00			
218 FLEX OFFICE A	218	198	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	17.00			
219 COPY	219	71	COPY	0	0			CFM/PER	0.5	CFM/SF	36.00			
220 STAIR B	220	199	CORRIDORS	0	0		0	CFM/PER	0.06	CFM/SF	12.00			
221 CONFERENCE	221	397	CONFERENCE/MEETING	50	15		5	CFM/PER	0.06	CFM/SF	99.00			
222 FLEX OFFICE B	222	228	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	19.00			
223 VISITOR WAITING	223	486	RECEPTION AREAS	30	14.58		5	CFM/PER	0.06	CFM/SF	103.00			
224 FLEX OFFICE C	224	196	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	17.00			
225 FLEX OFFICE D	225	200	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	17.00			
226 TEAM/ INTERVIEW	226	120	CONFERENCE/MEETING	50	6		5	CFM/PER	0.06	CFM/SF	38.00			
227 VT OFFICE 1	227	139	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	14.00			
228 VT OFFICE 2	228	167	OFFICE SPACE	5	1		5	CFM/PER	0.06	CFM/SF	16.00			

**NOTES:**

1. THESE ARE BASE VALUES USED IN CALCULATING THE CORRECTED OUTSIDE AIR VALUE FOR THE ENTIRE SYSTEM AS OUTLINED IN THE 2015 VIRGINIA MECHANICAL CODE.

**BLACKSBURG TRANSIT**

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**MULTI-MODAL TRANSIT FACILITY**

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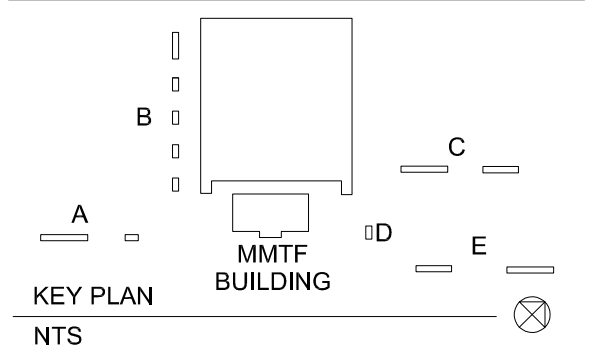
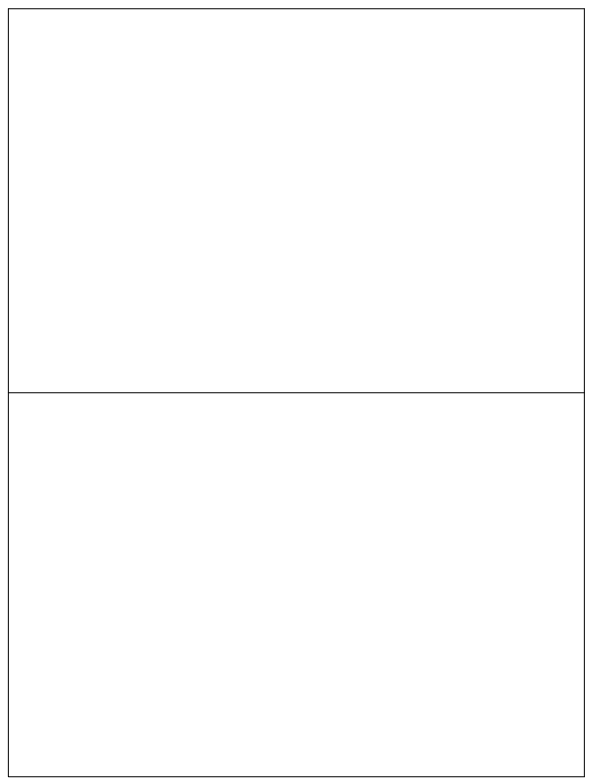
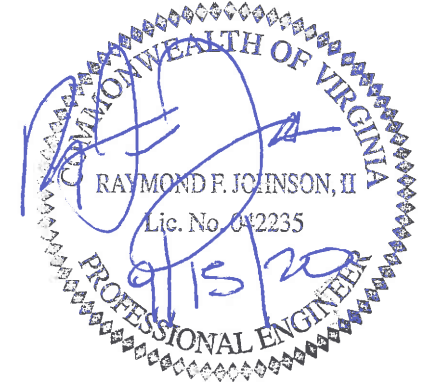
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**SCHEDULES**

DATE SEPTEMBER 15, 2020

SCALE AS NOTED

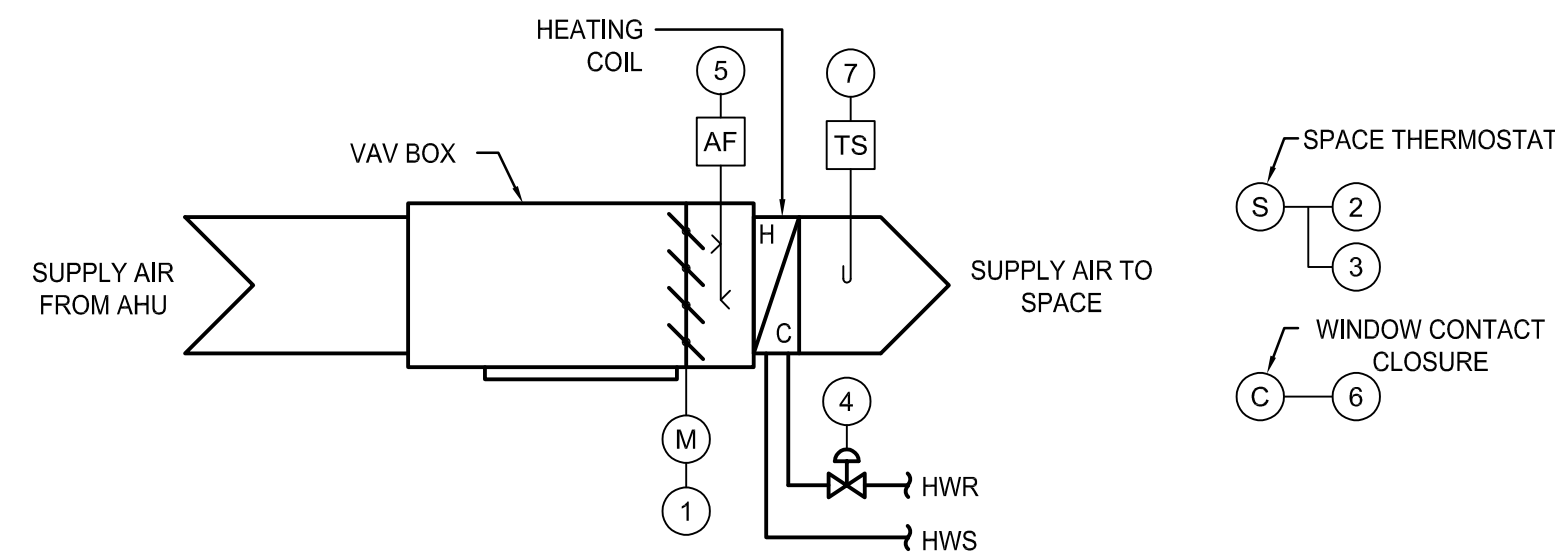
DWN. - CHK. -

PROJ. No. 449803

DWG. No.

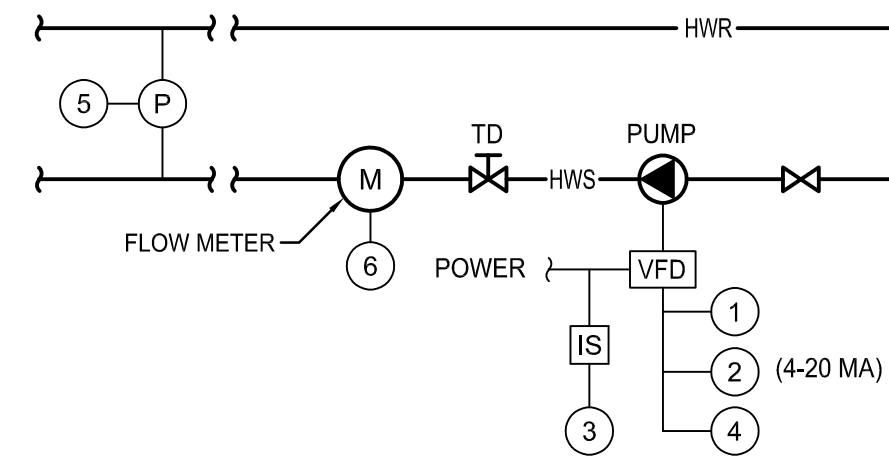
**M303**





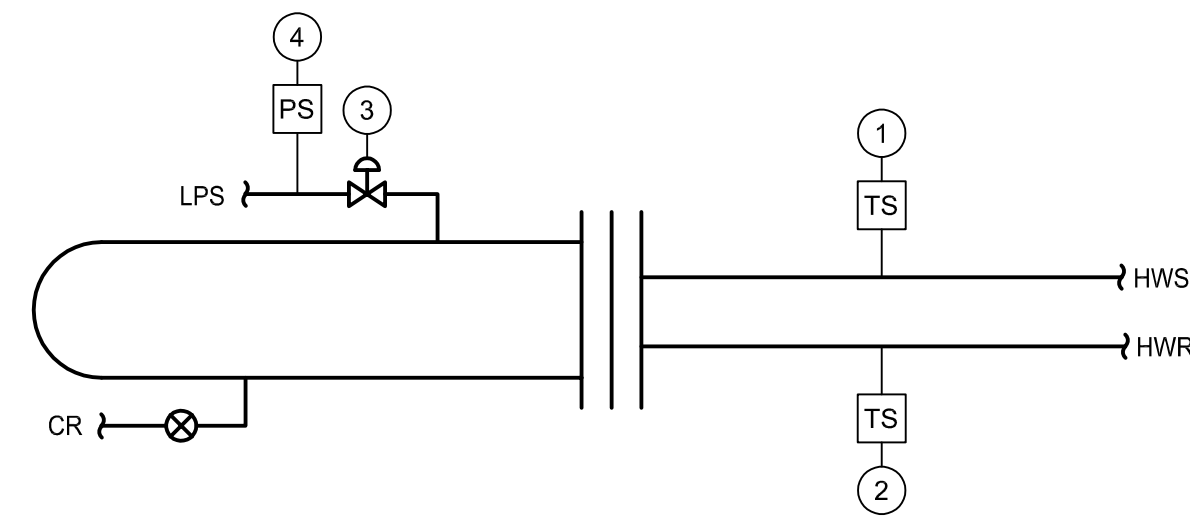
CONTROL POINTS LIST	HARDWARE				SOFTWARE																		
	OUTPUT		INPUT		ALARMS		BMS FUNCTION																
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG	SCHEDULED START/STOP	OPTIMUM START/STOP	VAV ENABLE/DISABLE	DAY/NIGHT SETBACK	ECONOMIZER	TEMPERATURE CONTROL	ENTHALPY RESET	DISCHARGE AIR RESET	STEAM HEAT	HOT WATER BOILER	DX COOLING INTERLOCK	CHILLED WATER RESET	COMBINATION VALVE RESET	VAV CONTROL	MONITOR	COLOR GRAPHICS	
SYSTEM:																							
VARIABLE AIR VOLUME (VAV)																							
POINT DESCRIPTION (X)																							
1. VAV DAMPER																							
2. SPACE TEMPERATURE																							
3. SPACE TEMPERATURE OCCUPIED OVERRIDE SETPOINT																							
4. HOT WATER CONTROL VALVE																							
5. AIRFLOW VOLUME																							
6. WINDOW CONTACT CLOSURE																							
7. LEAVING AIR TEMPERATURE																							

1 VARIABLE AIR VOLUME BOX WITH REHEAT CONTROL POINTS LIST (VAV)  
SCALE: NTS



CONTROL POINTS LIST	HARDWARE				SOFTWARE																		
	OUTPUT		INPUT		ALARMS		BMS FUNCTION																
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG	SCHEDULED START/STOP	OPTIMUM START/STOP	DEMAND LIMITING	DAY/NIGHT SETBACK	VENTILATION	TEMPERATURE CONTROL	HEATING COIL RESET	DISCHARGE AIR RESET	STEAM HEAT	HOT WATER BOILER	DX COOLING INTERLOCK	FURNACE INTERLOCK	CONDENSER WATER RESET	CHILLER DEMAND LIMIT	MONITOR	COLOR GRAPHICS	
SYSTEM:																							
PUMP- VARIABLE SPEED																							
POINT DESCRIPTION (X)																							
1. PUMP STOP/START																							
2. SPEED																							
3. STATUS																							
4. ALARM																							
5. DIFFERENTIAL PRESSURE SENSOR																							
6. FLOW METER																							

2 PUMP CONTROL POINT LIST  
SCALE: NTS



CONTROL POINTS LIST	HARDWARE				SOFTWARE																		
	OUTPUT		INPUT		ALARMS		BMS FUNCTION																
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG	SCHEDULED START/STOP	OPTIMUM START/STOP	DEMAND LIMITING	DAY/NIGHT SETBACK	VENTILATION	TEMPERATURE CONTROL	HEATING COIL RESET	DISCHARGE AIR RESET	STEAM HEAT	HOT WATER BOILER	DX COOLING INTERLOCK	FURNACE INTERLOCK	CONDENSER WATER RESET	CHILLER DEMAND LIMIT	MONITOR	COLOR GRAPHICS	
SYSTEM:																							
SHELL AND TUBE HEAT EXCHANGER																							
POINT DESCRIPTION (X)																							
1. HOT WATER SUPPLY																							
2. HOT WATER RETURN																							
3. STEAM CONTROL VALVE																							
4. STEAM INLET PRESSURE																							

3 STEAM HEAT EXCHANGER CONTROL POINT LIST  
SCALE: NTS



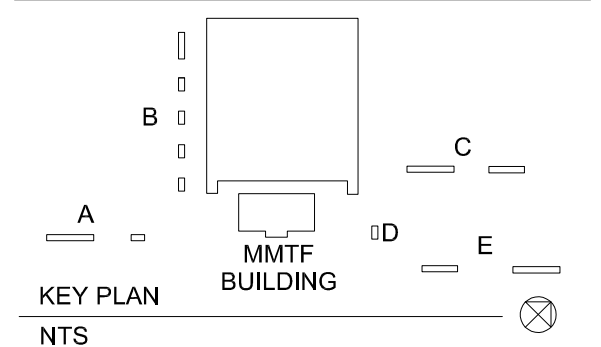
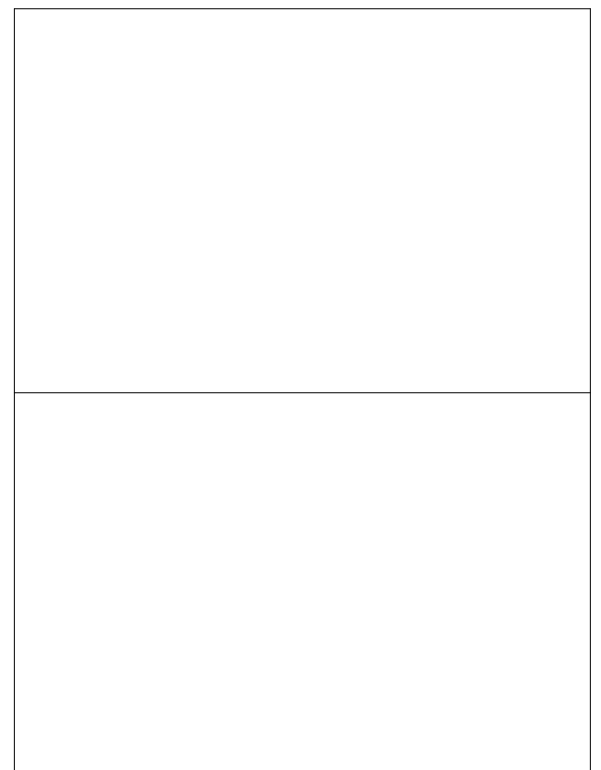
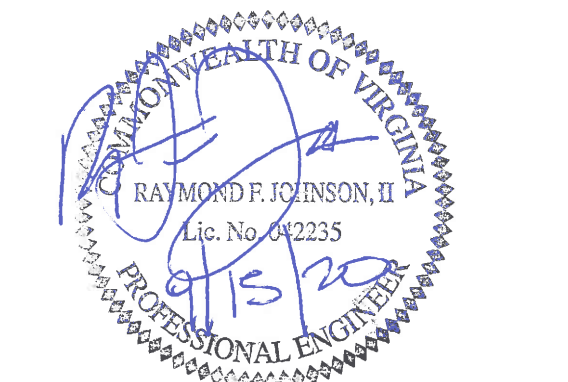
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CONTROL POINTS

DATE SEPTEMBER 15, 2020

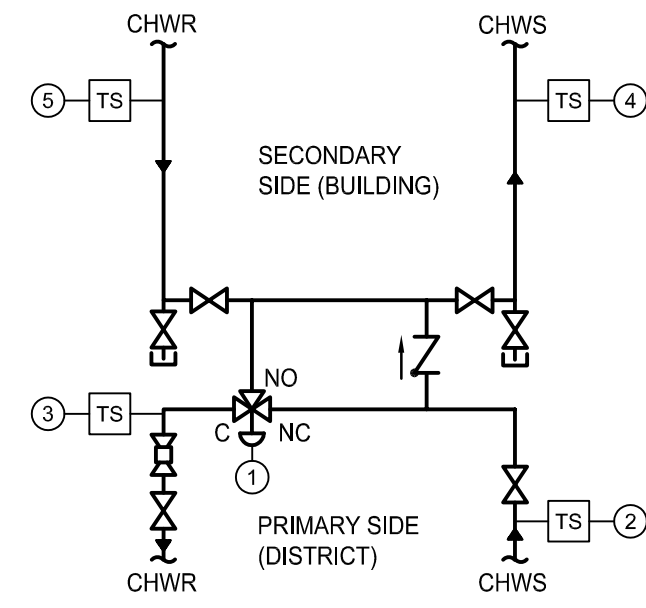
SCALE AS NOTED

DWN. - CHK. -

PROJ. No. 449803

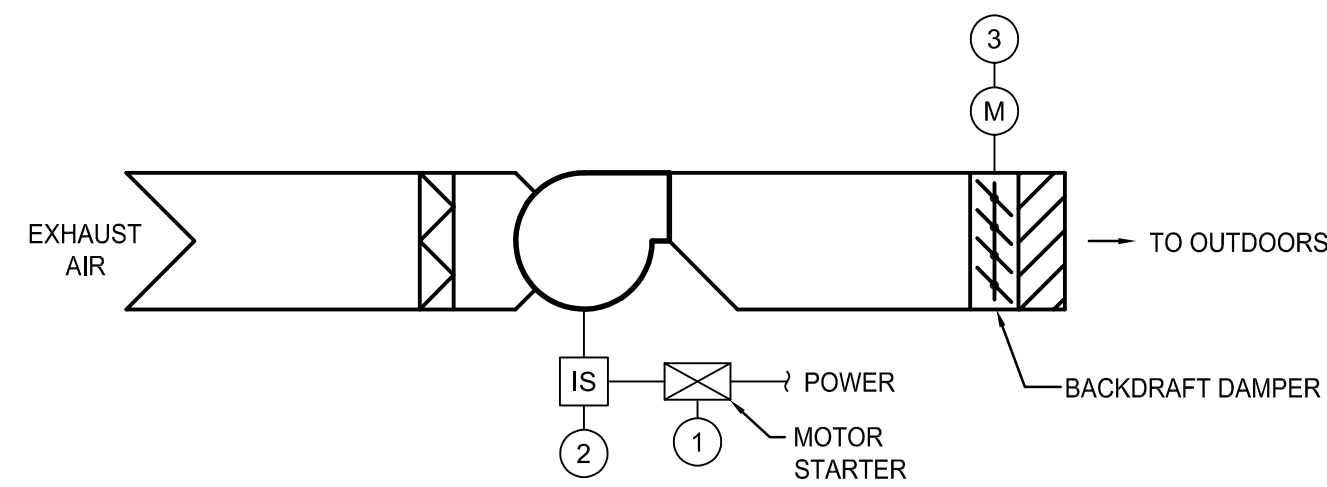
DWG. No.

M401



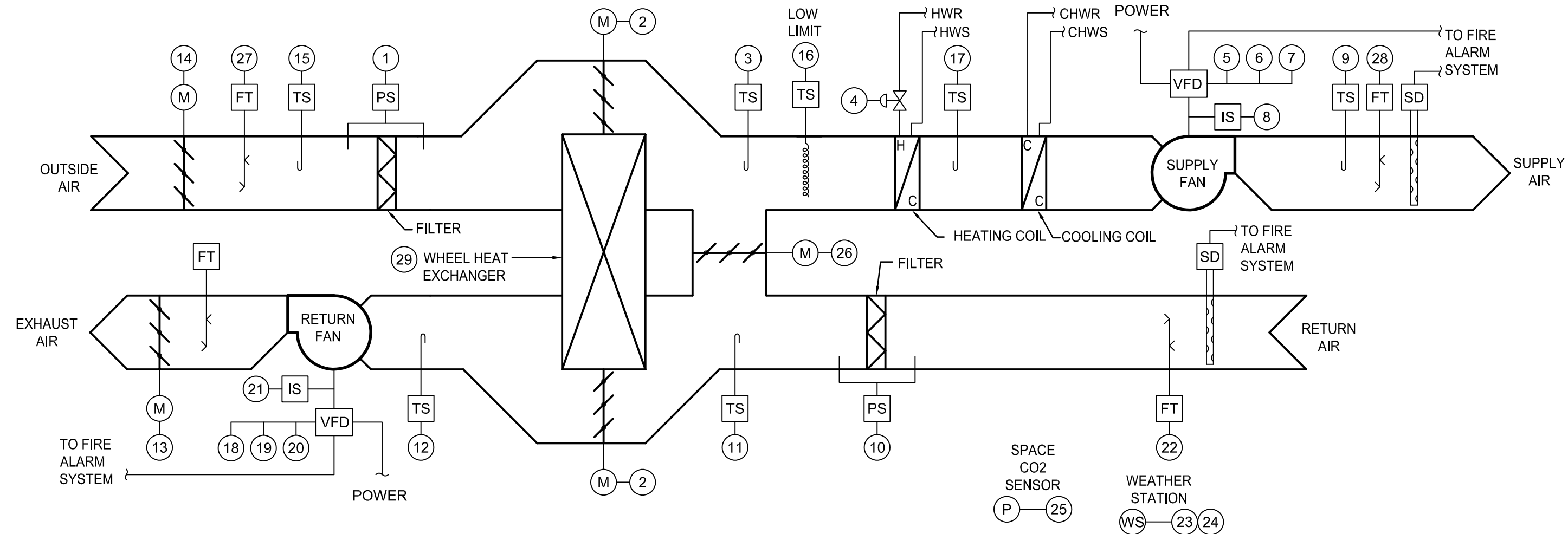
CONTROL POINTS LIST	HARDWARE				SOFTWARE	
	OUTPUT		INPUT		ALARMS	
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG
SYSTEM:						
PRIMARY/SECONDARY						
POINT DESCRIPTION (X)						
1. WATER CONTROL VALVE						
2. DISTRICT CHILLED WATER SUPPLY TEMPERATURE						
3. DISTRICT CHILLED WATER RETURN TEMPERATURE						
4. BUILDING CHILLED WATER SUPPLY TEMPERATURE						
5. BUILDING CHILLED WATER RETURN TEMPERATURE						

1 PRIMARY/SECONDARY LOOP  
SCALE: NOT TO SCALE



CONTROL POINTS LIST	HARDWARE				SOFTWARE	
	OUTPUT		INPUT		ALARMS	
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG
SYSTEM:						
EXHAUST FAN						
POINT DESCRIPTION (X)						
1. FAN STOP/START						
2. FAN STATUS						
3. MOTORIZED DAMPER WITH END SWITCH						

2 EXHAUST FAN CONTROL POINTS LIST  
SCALE: NOT TO SCALE



CONTROL POINTS LIST	HARDWARE				SOFTWARE	
	OUTPUT		INPUT		ALARMS	
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG
SYSTEM:						
AIR HANDLING UNIT (AHU-1)						
POINT DESCRIPTION (X)						
1. OUTSIDE AIR FILTER PRESSURE						
2. BYPASS DAMPER						
3. HX DISCHARGE TEMPERATURE						
4. HEATING COIL VALVE						
5. SUPPLY FAN SPEED						
6. SUPPLY FAN START/STOP						
7. SUPPLY FAN ALARM						
8. SUPPLY FAN STATUS						
9. DISCHARGE TEMPERATURE						
10. RETURN AIR FILTER PRESSURE						
11. RETURN AIR TEMPERATURE						
12. HX EXHAUST TEMPERATURE						
13. EXHAUST DAMPER (UNIT)						
14. OUTSIDE AIR DAMPER						
15. OUTSIDE AIR TEMPERATURE						
16. DISCHARGE TEMPERATURE						
17. HEATING COIL DISCHARGE TEMPERATURE						
18. RETURN FAN SPEED						
19. RETURN FAN START/STOP						
20. RETURN FAN ALARM						
21. RETURN FAN STATUS						
22. RETURN AIR FLOWSTATION						
23. OUTDOOR TEMPERATURE SENSOR						
24. OUTDOOR HUMIDITY SENSOR						
25. CARBON DIOXIDE SENSOR						
26. MIXING DAMPER						
27. OUTSIDE AIR FLOWSTATION						
28. SUPPLY AIR FLOWSTATION						
29. HEAT RECOVERY WHEEL START/STOP						

3 AIR HANDLING UNIT CONTROL POINTS LIST  
SCALE: NOT TO SCALE

CONTROL POINTS LIST	HARDWARE				SOFTWARE	
	OUTPUT		INPUT		ALARMS	
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG
SYSTEM:						
MISCELLANEOUS CONTROL POINTS						
POINT DESCRIPTION (X)						
1. EXPANSION TANK						

4 MISCELLANEOUS CONTROL POINTS  
SCALE: NOT TO SCALE

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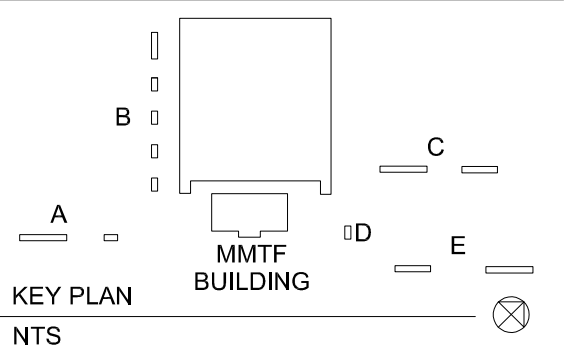
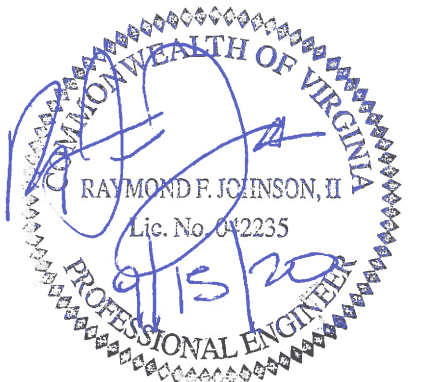
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**CONTROL POINTS**

DATE SEPTEMBER 15, 2020

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PROJ. No. 449803

DWG. No.

**M402**

**BLACKSBURG TRANSIT**

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**MULTI-MODAL TRANSIT FACILITY**

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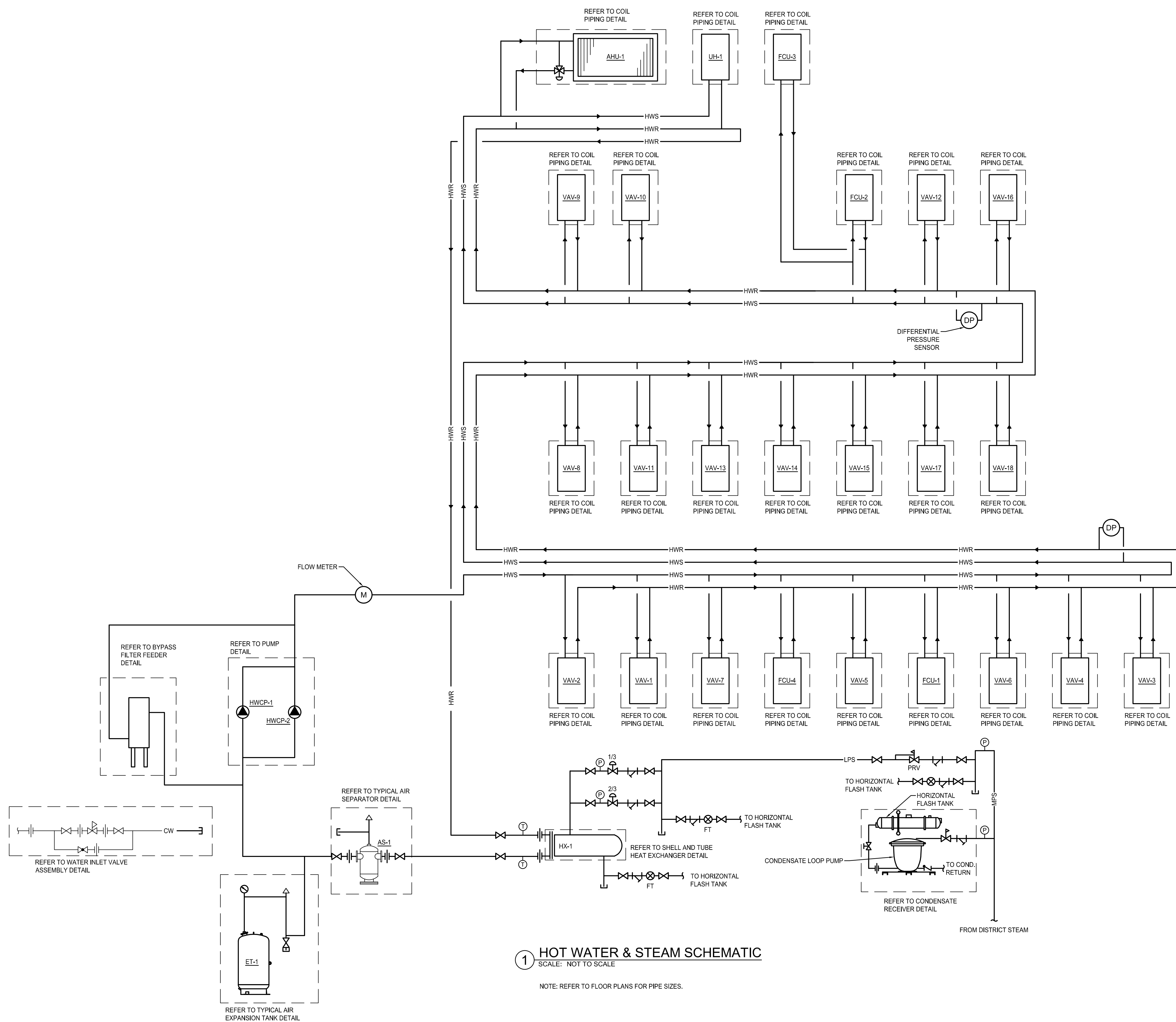
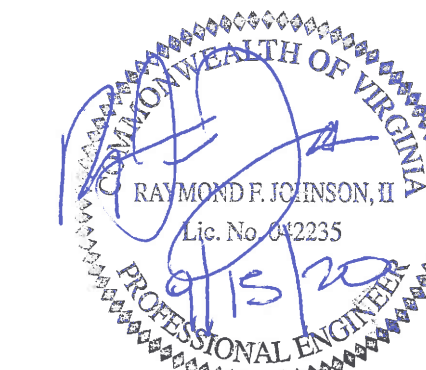
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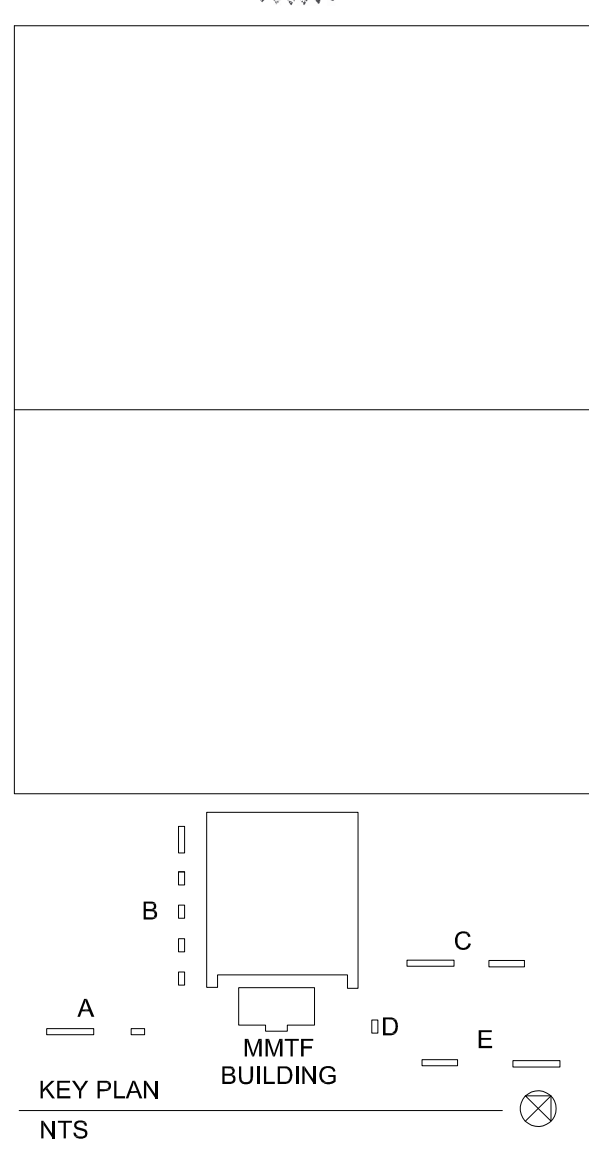
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**1 HOT WATER & STEAM SCHEMATIC**  
SCALE: NOT TO SCALE

NOTE: REFER TO FLOOR PLANS FOR PIPE SIZES.



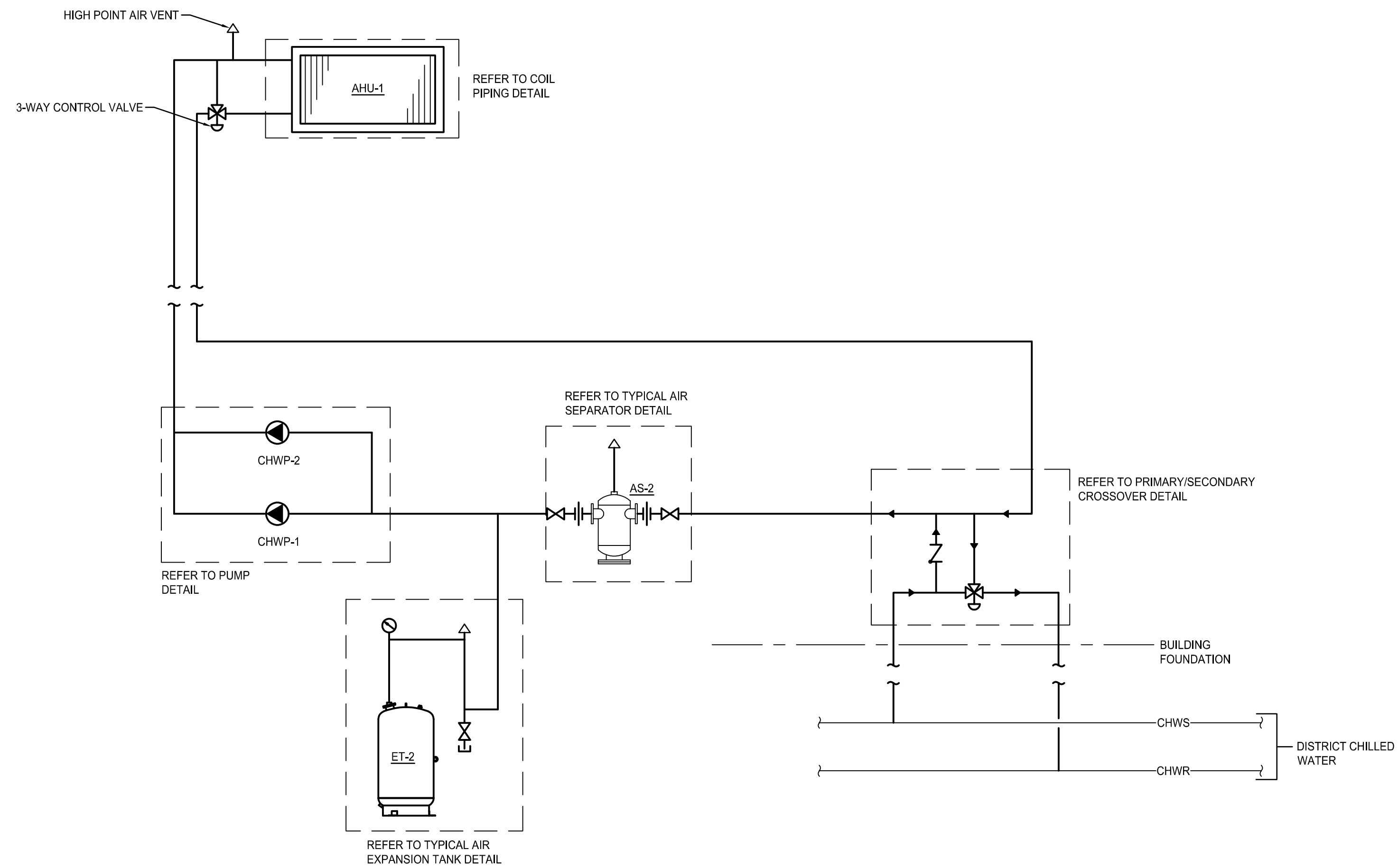
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**SCHEMATICS**

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DWG. No.	

**M501**



1 CHILLED WATER SCHEMATIC  
SCALE: NOT TO SCALE

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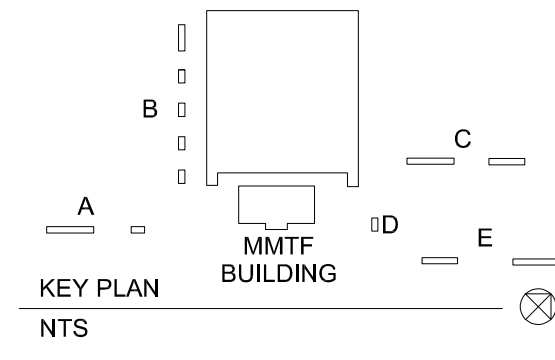
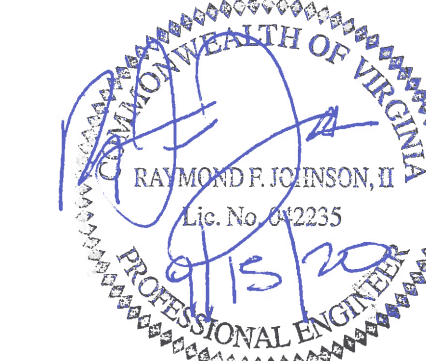
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**SCHEMATICS**

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DWG. No.	

**M502**