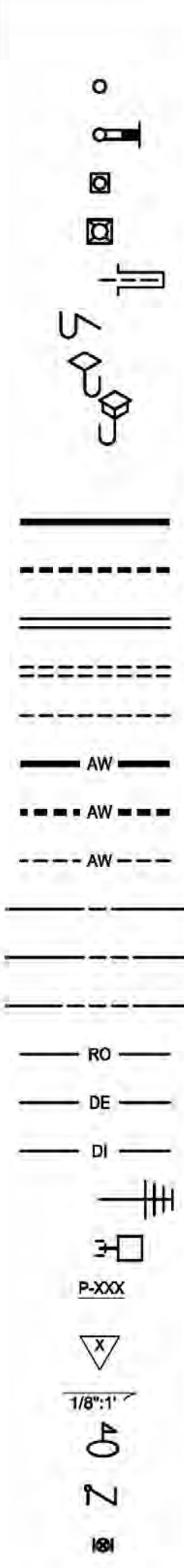
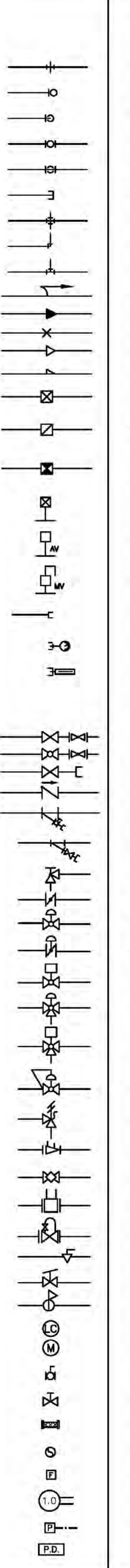
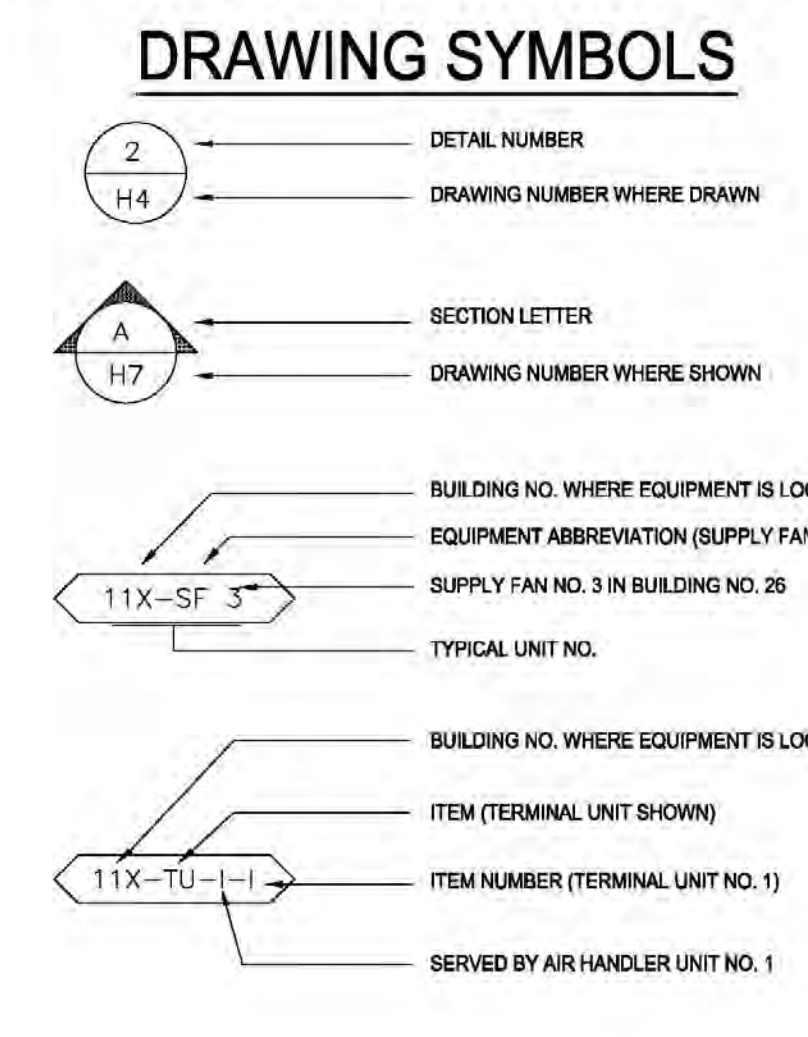
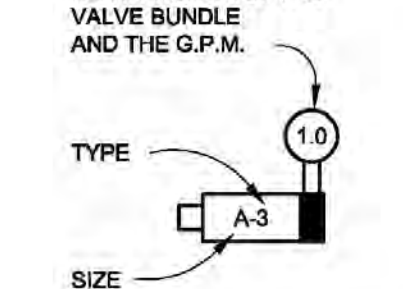
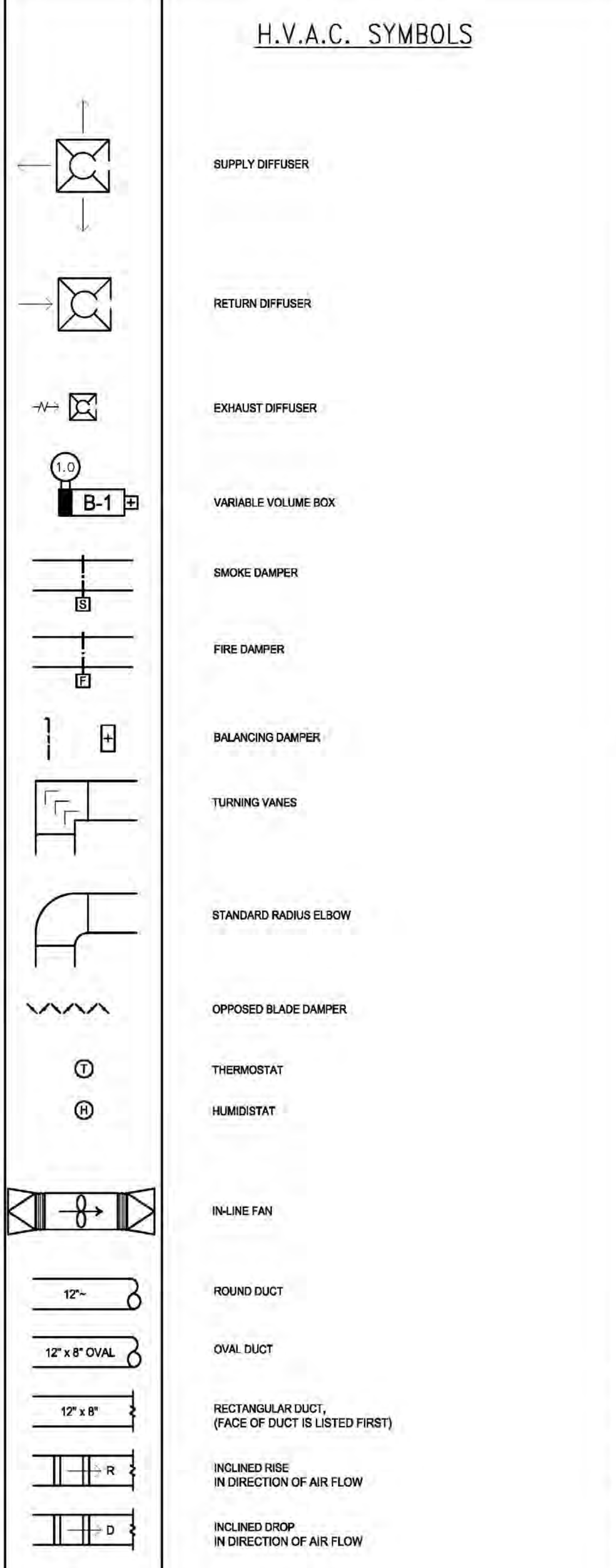
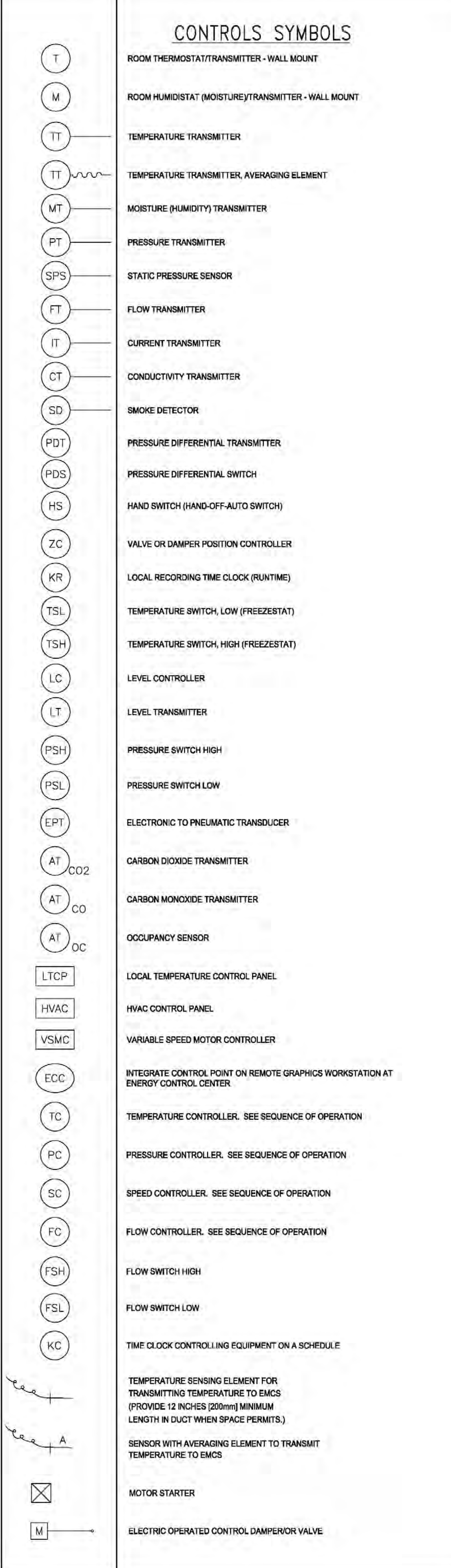
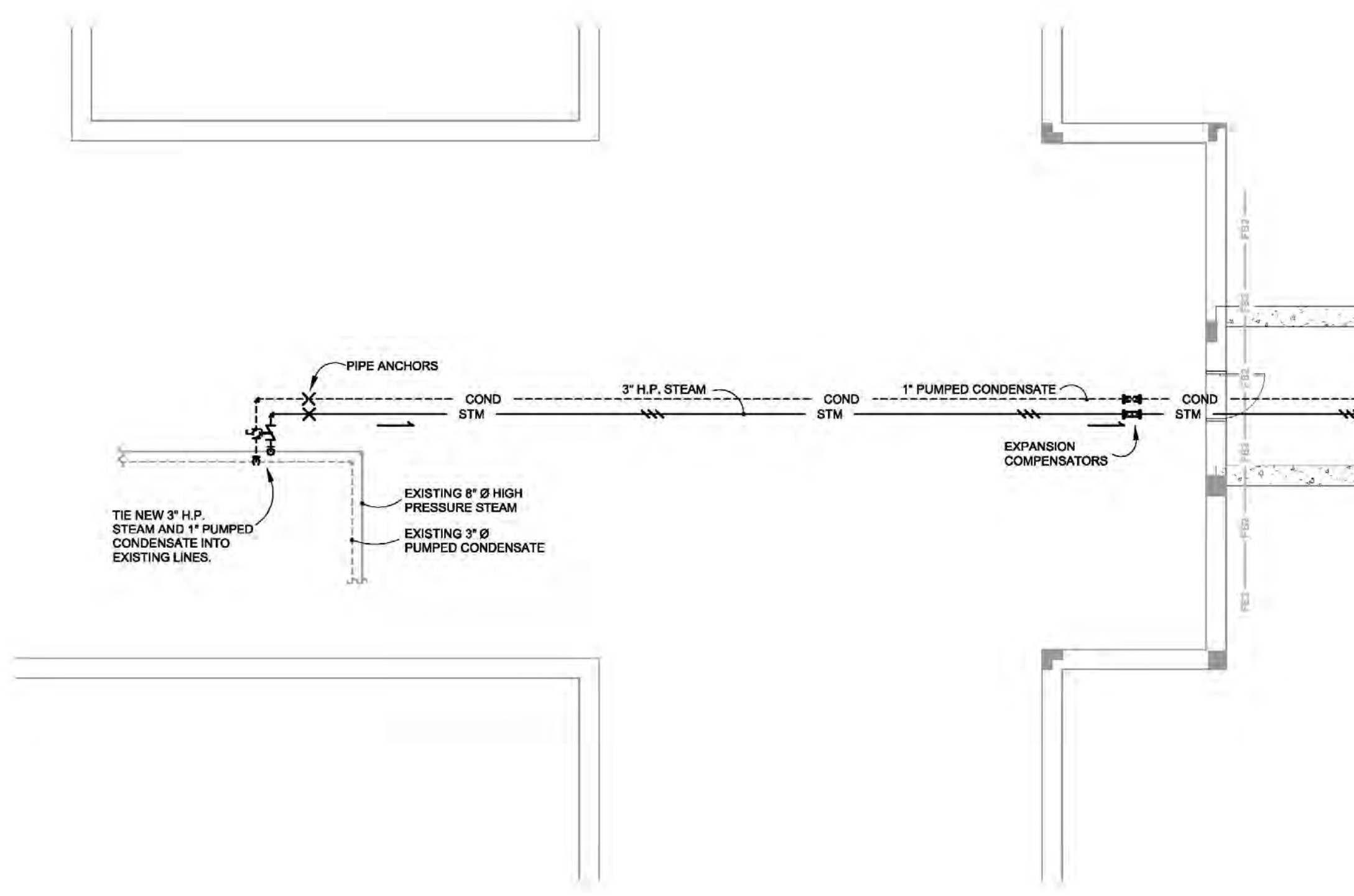


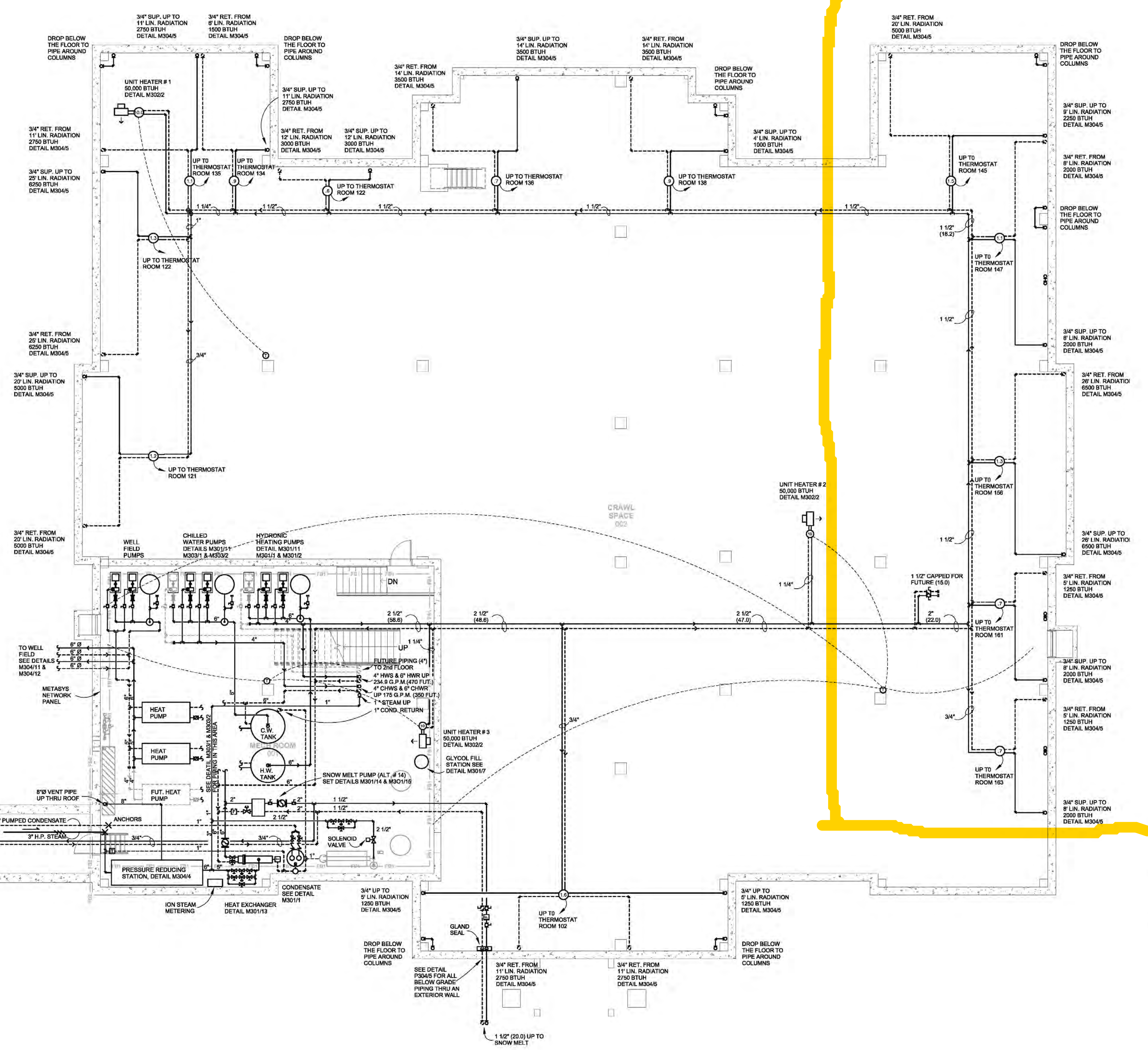
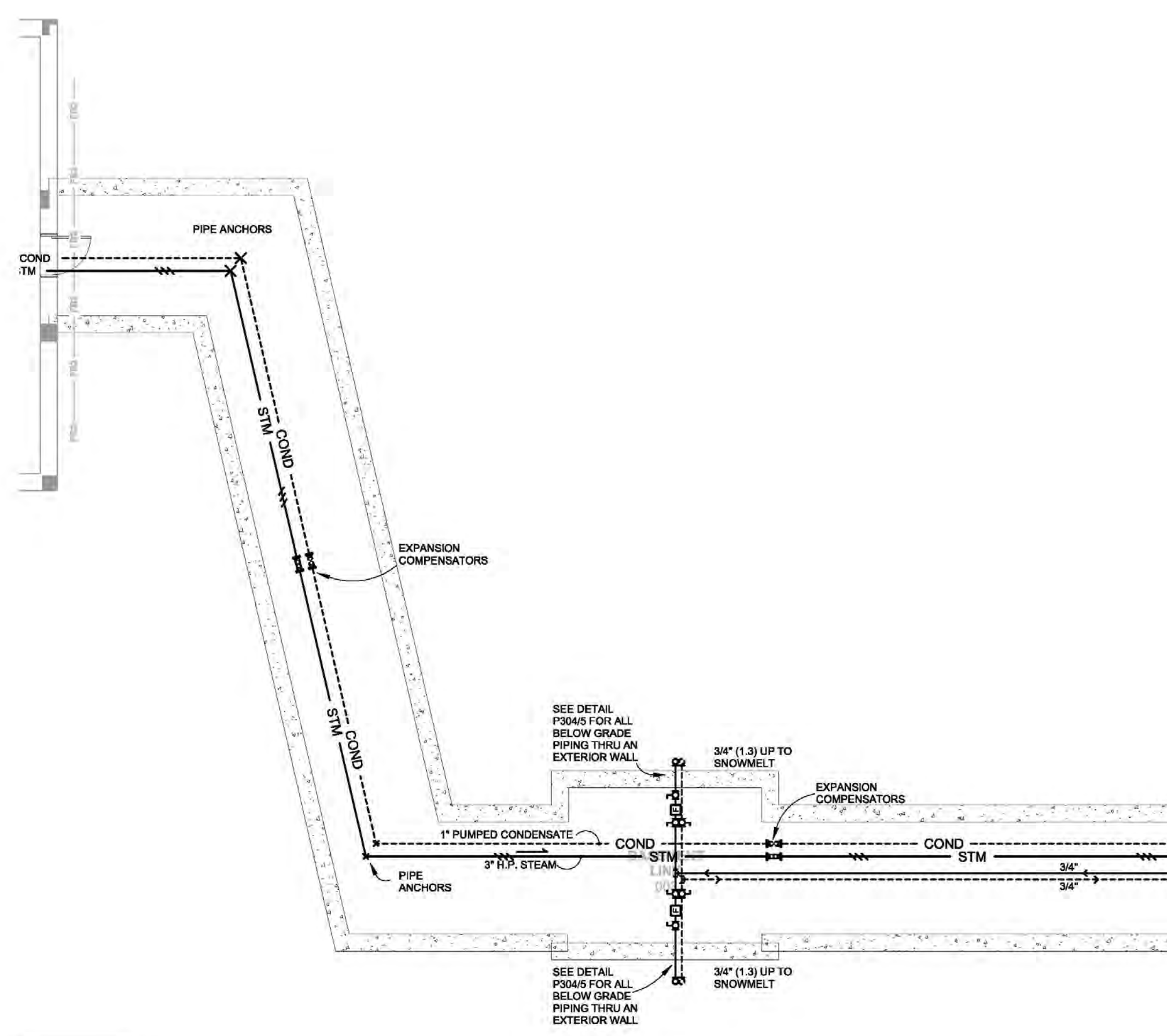
MECHANICAL SYMBOLS SCHEDULE

THIS IS A COMPREHENSIVE SYMBOLS SCHEDULE. NOT ALL SYMBOLS ARE APPLICABLE TO THESE DRAWINGS

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION																										
PLUMBING 		GENERAL PIPING SYMBOLS 		DRAWING SYMBOLS  GENERAL NOTES: DUCT SIZE IS THE SAME AS DIFFUSER NECK SIZE UNLESS OTHERWISE NOTED. DIFFUSER LEGEND: INDICATES TYPE OF DIFFUSER: S = SURFACE, L = LAMINAR, E = EXISTING. INDICATES NECK SIZE EITHER SQUARE DIMENSION OR THE DIAMETER. INDICATES DIFFUSER SIZE, INCHES SQUARE. REFER TO REFLECTED CEILING PLAN FOR EXACT LOCATIONS OF ALL CEILING DIFFUSERS. ALL DIFFUSERS ARE 4-WAY THROW UNLESS INDICATED OTHERWISE ON PLANS BY A HATCHED AREA. VARIABLE VOLUME BOX SCHEDULE: THIS SYMBOL ON THE PLANS INDICATES THE VALVE SIZE AND THE G.P.M.  <table border="1" style="font-size: x-small;"> <thead> <tr> <th>BOX SIZE</th> <th>CFM RANGE</th> <th>BOX TYPE</th> </tr> </thead> <tbody> <tr> <td>"A"</td> <td>0-199</td> <td>1 33% MIN. AIR FLOW - 40" RISE @ LOW FLOW</td> </tr> <tr> <td>"B"</td> <td>200-399</td> <td>2 CONSTANT VOLUME - 40" RISE @ HIGH FLOW</td> </tr> <tr> <td>"C"</td> <td>400-599</td> <td>3 HIGH - LOW - HIGH - 40" RISE @ HIGH FLOW</td> </tr> <tr> <td>"D"</td> <td>600-799</td> <td>4 33% MIN. AIR FLOW - NO REHEAT</td> </tr> <tr> <td>"E"</td> <td>800-1199</td> <td></td> </tr> <tr> <td>"F"</td> <td>1200-2400</td> <td></td> </tr> <tr> <td>"G"</td> <td>2400 & UP</td> <td></td> </tr> </tbody> </table> NOTE: BOX SIZE "F" & "G" MAY BE TWO PARALLEL BOXES		BOX SIZE	CFM RANGE	BOX TYPE	"A"	0-199	1 33% MIN. AIR FLOW - 40" RISE @ LOW FLOW	"B"	200-399	2 CONSTANT VOLUME - 40" RISE @ HIGH FLOW	"C"	400-599	3 HIGH - LOW - HIGH - 40" RISE @ HIGH FLOW	"D"	600-799	4 33% MIN. AIR FLOW - NO REHEAT	"E"	800-1199		"F"	1200-2400		"G"	2400 & UP		H.V.A.C. SYMBOLS 		CONTROLS SYMBOLS 	
BOX SIZE	CFM RANGE	BOX TYPE																															
"A"	0-199	1 33% MIN. AIR FLOW - 40" RISE @ LOW FLOW																															
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"E"	800-1199																																
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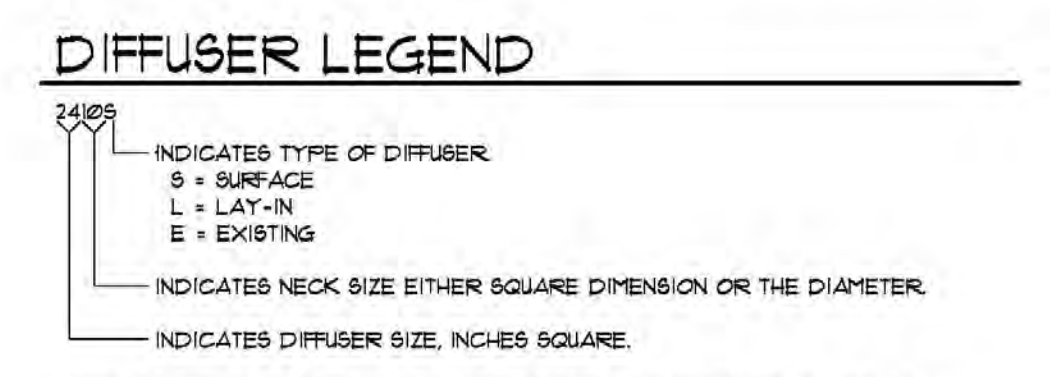
M101
2
EXISTING BUILDING TIE IN
1/8" = 1'-0"



M101
1
LOWER LEVEL PLAN
1/8" = 1'-0"

ALTERNATES
REFER TO ARCHITECTURAL PLANS FOR DESCRIPTION OF ALTERNATES # 1, # 2, # 3, # 4, # 5.

GENERAL NOTES:
DUCT SIZE IS THE SAME AS DIFFUSER NECK SIZE UNLESS OTHERWISE NOTED.



REFER TO REFLECTED CEILING PLAN FOR EXACT LOCATIONS OF ALL CEILING DIFFUSERS. ALL DIFFUSERS ARE 4-WAY THROW UNLESS INDICATED OTHERWISE ON PLANS BY A HATCHED AREA.

VARIABLE VOLUME BOX SCHEDULE

THIS SYMBOL ON THE PLANS INDICATES THE VALVE BUNDLE AND THE G.P.M.

TYPE:

SIZE:

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

BOX SIZE	CFM RANGE	BOX TYPE
"A"	0-199	1 33% MIN. AIR FLOW - 40" RISE @ LOW FLOW
"B"	200-399	2 CONSTANT VOLUME - 40" RISE @ HIGH FLOW
"C"	400-599	3 HIGH - LOW - HIGH - 40" RISE @ HIGH FLOW
"D"	600-799	4 33% MIN. AIR FLOW - NO REHEAT
"E"	800-1099	
"F"	1200-1499	
"G"	1600-1999	
"H"	2000-2499	
"I"	2400-4 UP	

NOTE: BOX SIZE 1" x 10" MAY BE TWO PARALLEL BOXES

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Design Build

Horty Elving & Associates, Inc.

RECORD SET 09/30/16

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

James C. Elving License No. 12852

APPROVED: SERVICE LINE DIRECTOR DATE: _____
APPROVED: REFLECTION CONTROL NURSE DATE: _____
APPROVED: GEMS COORDINATOR DATE: _____
APPROVED: PATIENT SAFETY DATE: _____
APPROVED: PROJECTS SECTION MANAGER DATE: _____
APPROVED: CHIEF OF POLICE DATE: _____
APPROVED: DIRECTOR PMS DATE: _____
APPROVED: SAFETY MANAGER DATE: _____

DRAWING TITLE
MECHANICAL
HYDRONIC PIPING
LOWER LEVEL

PROJECT TITLE
REHABILITATION CENTER
PROJECT #056-332
St. Cloud VA Health Care System

DATE
01/03/2013

PROJ. SCALE
1/8" = 1'-0"

PROJECT NO.
S1430

APPROVED: CHIEF OF STAFF DATE: _____
APPROVED: MEDICAL CENTER DIRECTOR DATE: _____

BUILDING NO.
116

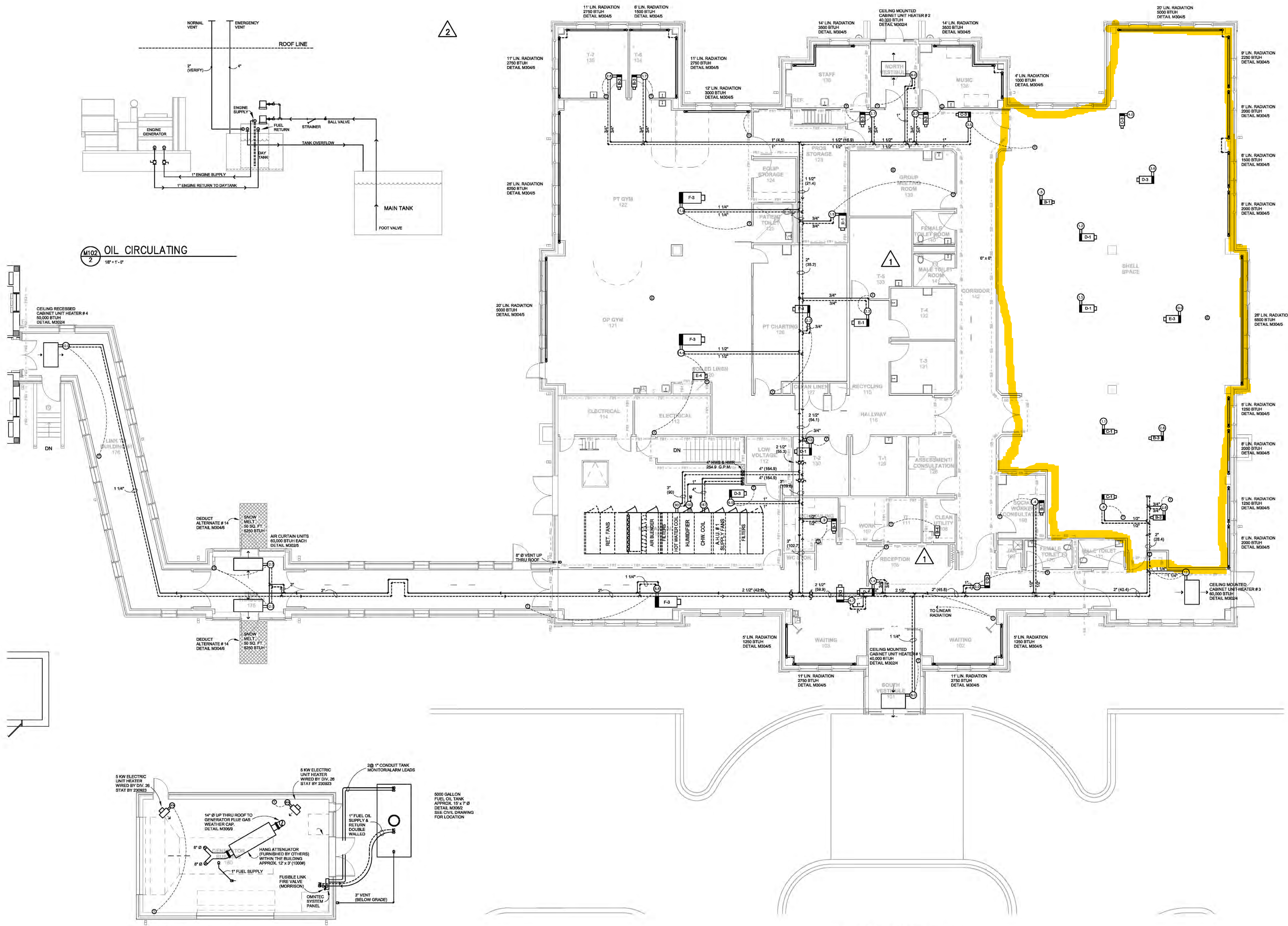
DRAWN BY
XXX

CHECKED BY
XXX

LOCATION
VA MEDICAL CENTER
ST. CLOUD, MN 56303

DRAWING NO.
M101





NEW WORK AREA

ALTERNATES
REFER TO ARCHITECTURAL PLANS FOR DESCRIPTION OF ALTERNATES # 9, # 10, & # 11.

GENERAL NOTES:
DUCT SIZE IS THE SAME AS DIFFUSER NECK SIZE UNLESS OTHERWISE NOTED.

DIFFUSER LEGEND
INDICATES TYPE OF DIFFUSER:
S = SURFACE
L = LAY-IN
E = EXISTING
INDICATES NECK SIZE EITHER SQUARE DIMENSION OR THE DIAMETER.
INDICATES DIFFUSER SIZE, INCHES SQUARE.
REFER TO REFLECTED CEILING PLAN FOR EXACT LOCATIONS OF ALL CEILING DIFFUSERS. ALL DIFFUSERS ARE 4-WAY THROW UNLESS INDICATED OTHERWISE ON PLANS BY A HATCHED AREA.

VARIABLE VOLUME BOX SCHEDULE

THIS SYMBOL ON THE PLANS INDICATES THE VALVE BUNDLE AND THE G.P.M.

TYPE:

BOX SIZE	CFM RANGE	BOX TYPE
"A"	0-199	1 3 3/8" MIN. AIR FLOW - 40" RISE @ LOW FLOW
"B"	200-399	2 CONSTANT VOLUME - 40" RISE @ HIGH FLOW
"C"	400-599	3 HIGH - LOW - HIGH - 40" RISE @ HIGH FLOW
"D"	600-799	4 3 3/8" MIN. AIR FLOW - NO REHEAT
"E"	800-1199	
"F"	1200-2400	
"G"	2400 & UP	NOTE: BOX SIZE "F" & "G" MAY BE TWO PARALLEL BOXES

M102 2
1/8" = 1'-0"

M102 1
1/8" = 1'-0"

M102 2
1/8" = 1'-0"

1	ASI # 9	1/13/19
2	PR # 35	9/10/19
No.	REVISION	DATE

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RECORD SET 09/30/16

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James C. Elving License No. 12852

APPROVED: SERVICE LINE DIRECTOR	DATE	APPROVED: INFECTION CONTROL NURSE	DATE
APPROVED: GEMS COORDINATOR	DATE	APPROVED: PATIENT SAFETY	DATE
APPROVED: PROJECTS SECTION MANAGER	DATE	APPROVED: CHIEF OF POLICE	DATE
APPROVED: DIRECTOR PMS	DATE	APPROVED: SAFETY MANAGER	DATE

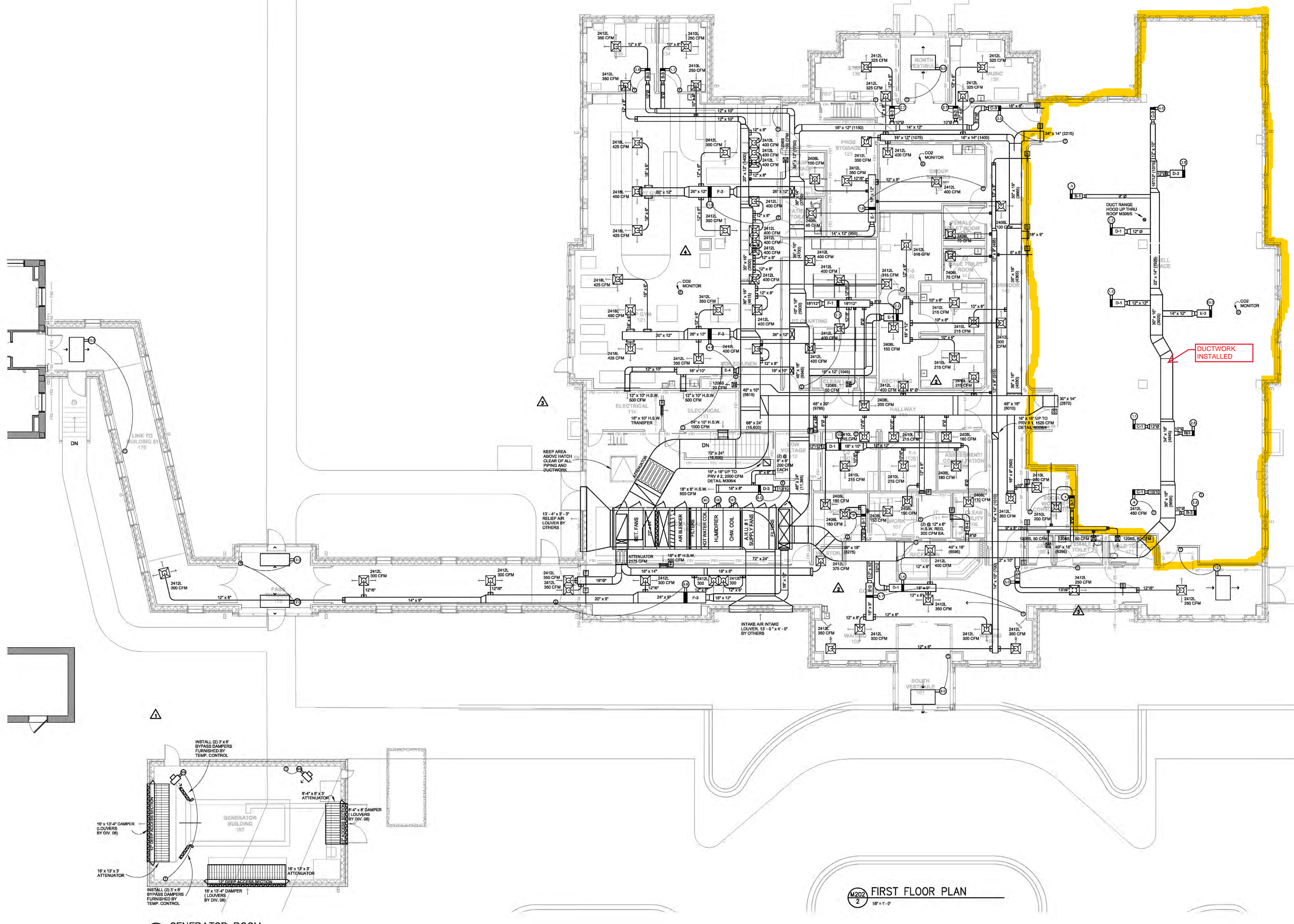
DRAWING TITLE
MECHANICAL
HYDRONIC PIPING
FIRST FLOOR

PROJECT TITLE
REHABILITATION CENTER
PROJECT #656-332
St. Cloud VA Health Care System

DATE: 01/03/2013
PROJ SCALE: 1/8"=1'-0"
PROJECT NO: S1430

BUILDING NO: 116
SHEET NO: XXX
DRAWING NO: M102





AREA OF WORK

DUCTWORK INSTALLED

ALTERNATES
REFER TO ARCHITECTURAL PLANS FOR DESCRIPTION OF ALTERNATES # 9, # 10, & # 11.

GENERAL NOTES:
DUCT SIZE IS THE SAME AS DIFFUSER NECK SIZE UNLESS OTHERWISE NOTED.

DIFFUSER LEGEND

INDICATES TYPE OF DIFFUSER.
S = SURFACE
L = LAY-IN
E = EXISTING

INDICATES NECK SIZE EITHER SQUARE DIMENSION OR THE DIAMETER.

INDICATES DIFFUSER SIZE, INCHES SQUARE.

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VARIABLE VOLUME BOX SCHEDULE

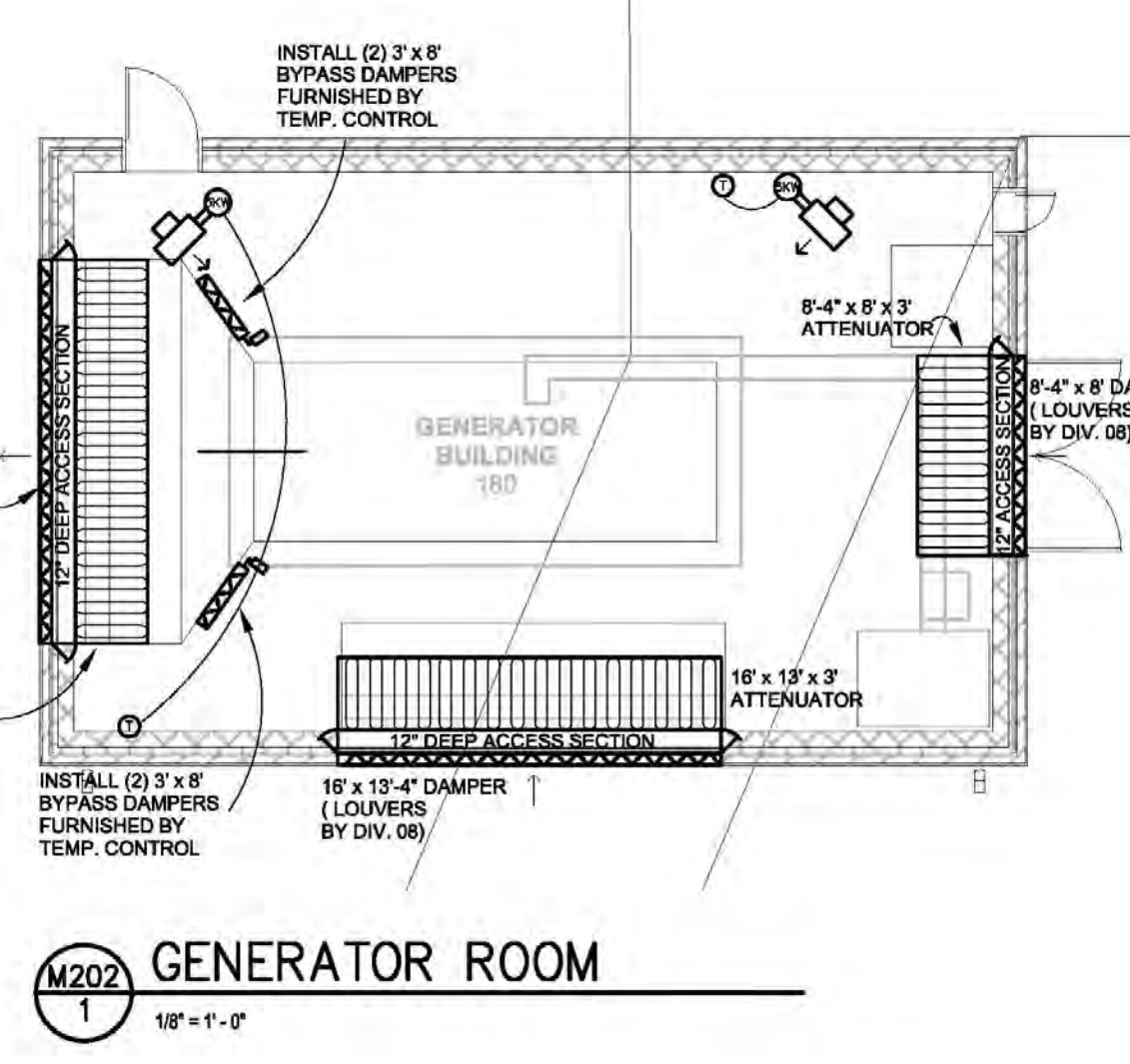
THIS SYMBOL ON THE PLANS INDICATES THE VALVE BUNDLE AND THE G.P.M.



BOX SIZE	CFM RANGE	BOX TYPE
"A"	0-199	1. 3.3% MIN. AIR FLOW - 40° RISE @ LOW FLOW
"B"	200-399	2. CONSTANT VOLUME - 40° RISE @ HIGH FLOW
"C"	400-599	3. HIGH - LOW - HIGH - 40° RISE @ HIGH FLOW
"D"	600-799	4. 3.3% MIN. AIR FLOW - NO REHEAT
"E"	800-1199	
"F"	1200-2400	
"G"	2400 & UP	

NOTE: BOX SIZE "F" & "G" MAY BE TWO PARALLEL BOXES.

M202 FIRST FLOOR PLAN
1/8" = 1'-0"



M202 GENERATOR ROOM
1/8" = 1'-0"

1	PR # 4	1/17/14
2	ASHI # 9	1/13/15
3	PR # 31	6/21/15
4	PR # 37	10/7/15

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RECORD SET 09/30/16

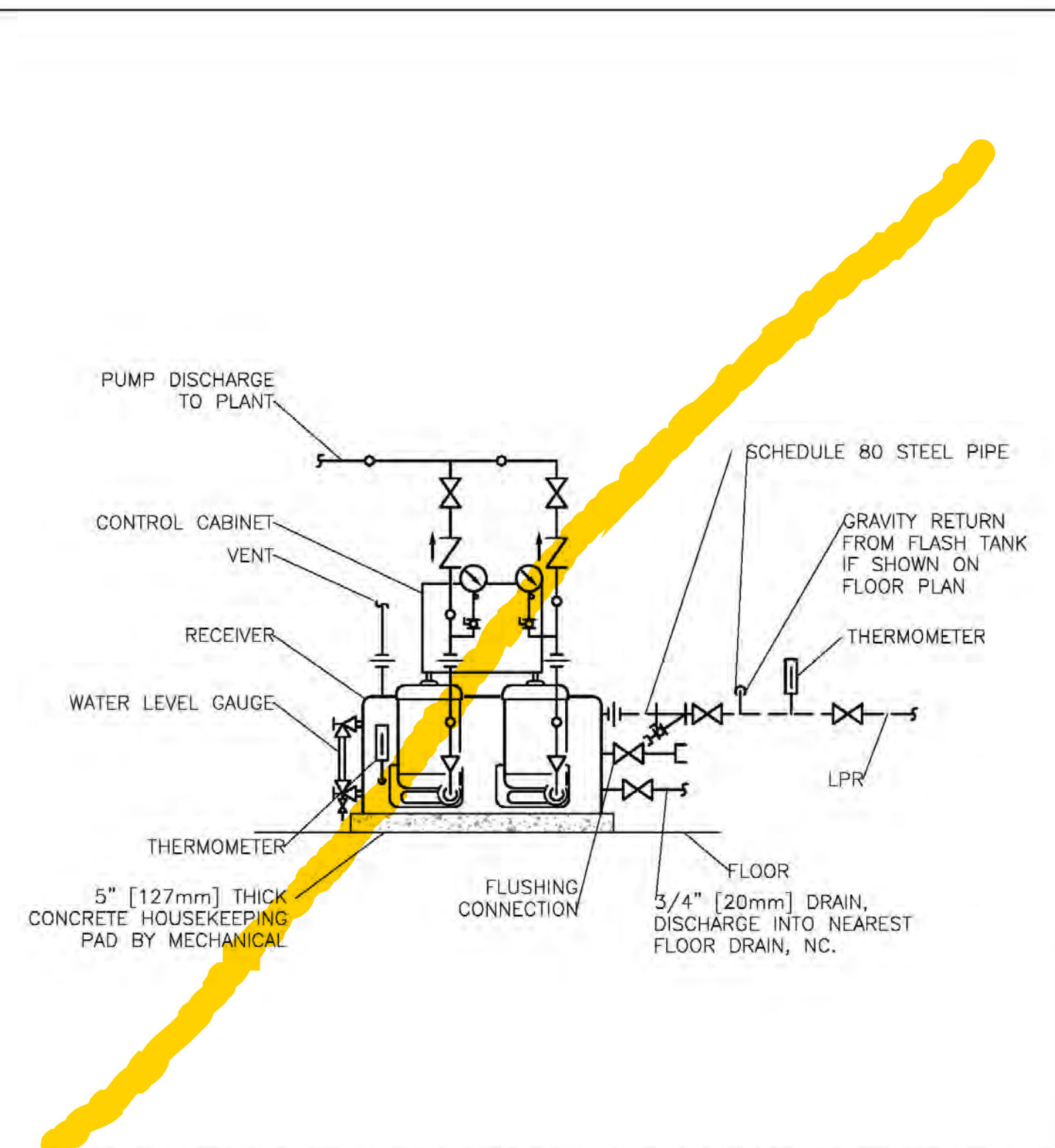
I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
James C. Elving License No. 12852

APPROVED: SERVICE LINE DIRECTOR	DATE	APPROVED: INFECTION CONTROL NURSE	DATE
APPROVED: OEMS COORDINATOR	DATE	APPROVED: PATIENT SAFETY	DATE
APPROVED: PROJECTS SECTION MANAGER	DATE	APPROVED: CHIEF OF POLICE	DATE
APPROVED: DIRECTOR PMS	DATE	APPROVED: SAFETY MANAGER	DATE

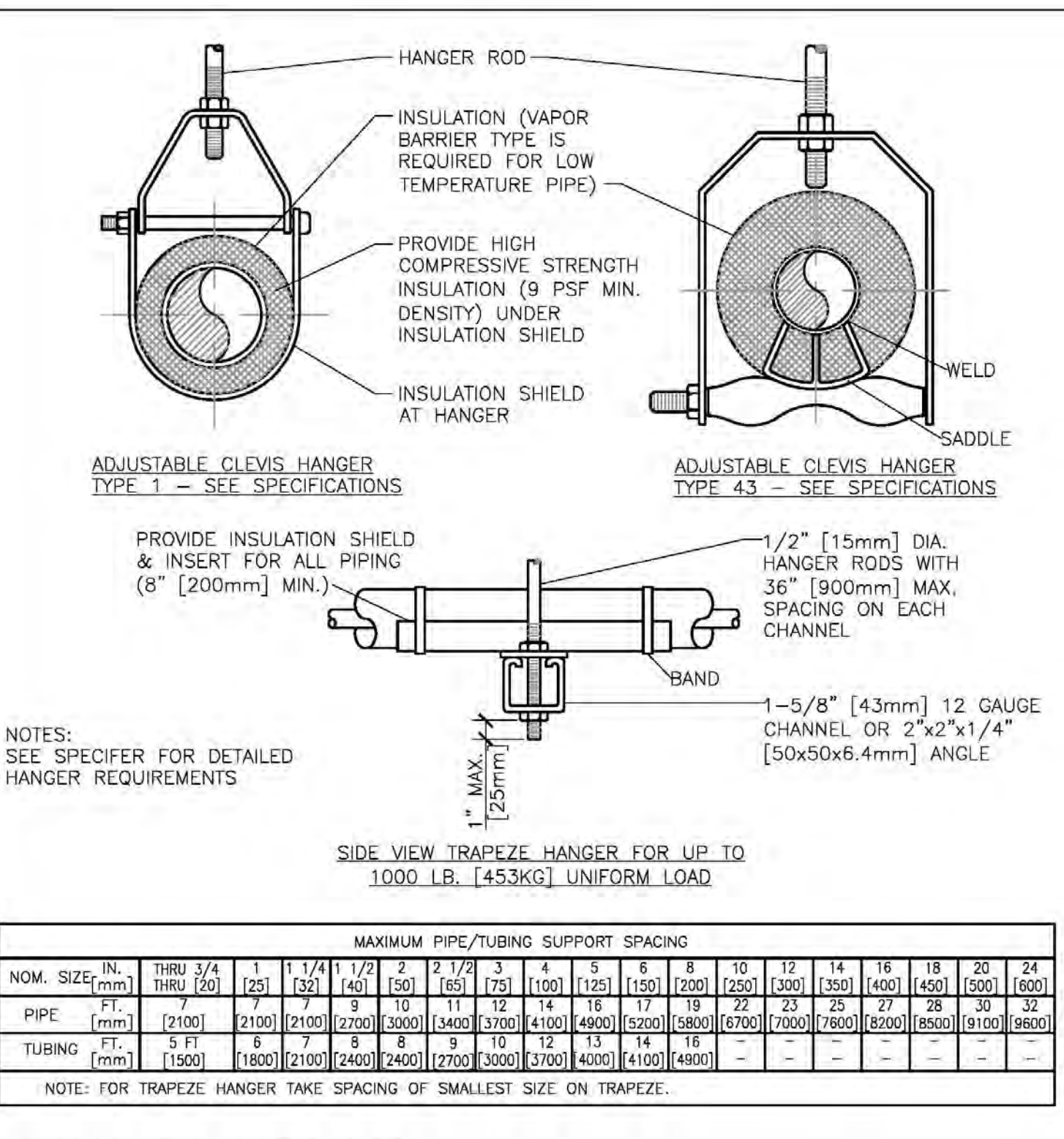
DRAWING TITLE
MECHANICAL VENTILATION FIRST FLOOR

PROJECT TITLE	DATE
REHABILITATION CENTER PROJECT #056-332	01/03/2013
St. Cloud VA Health Care System	PROJ SCALE 1/8"=1'-0"
BUILDING NO. 116	PROJ NO. S1430
DESIGNED BY XXX	DRAWING NO. M202
CHECKED BY XXX	
LOCATION	
VA MEDICAL CENTER ST. CLOUD, MN 56303	

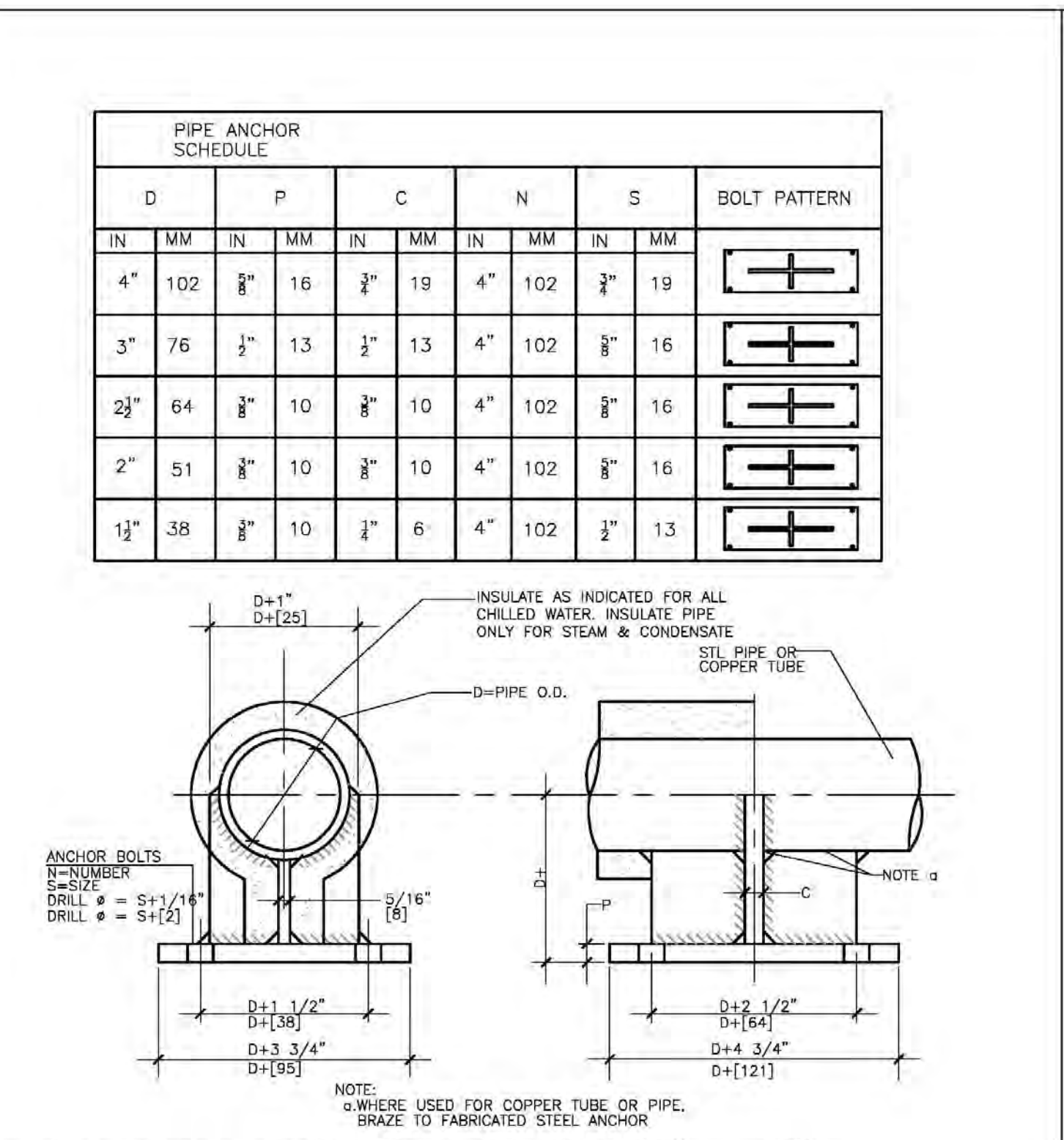




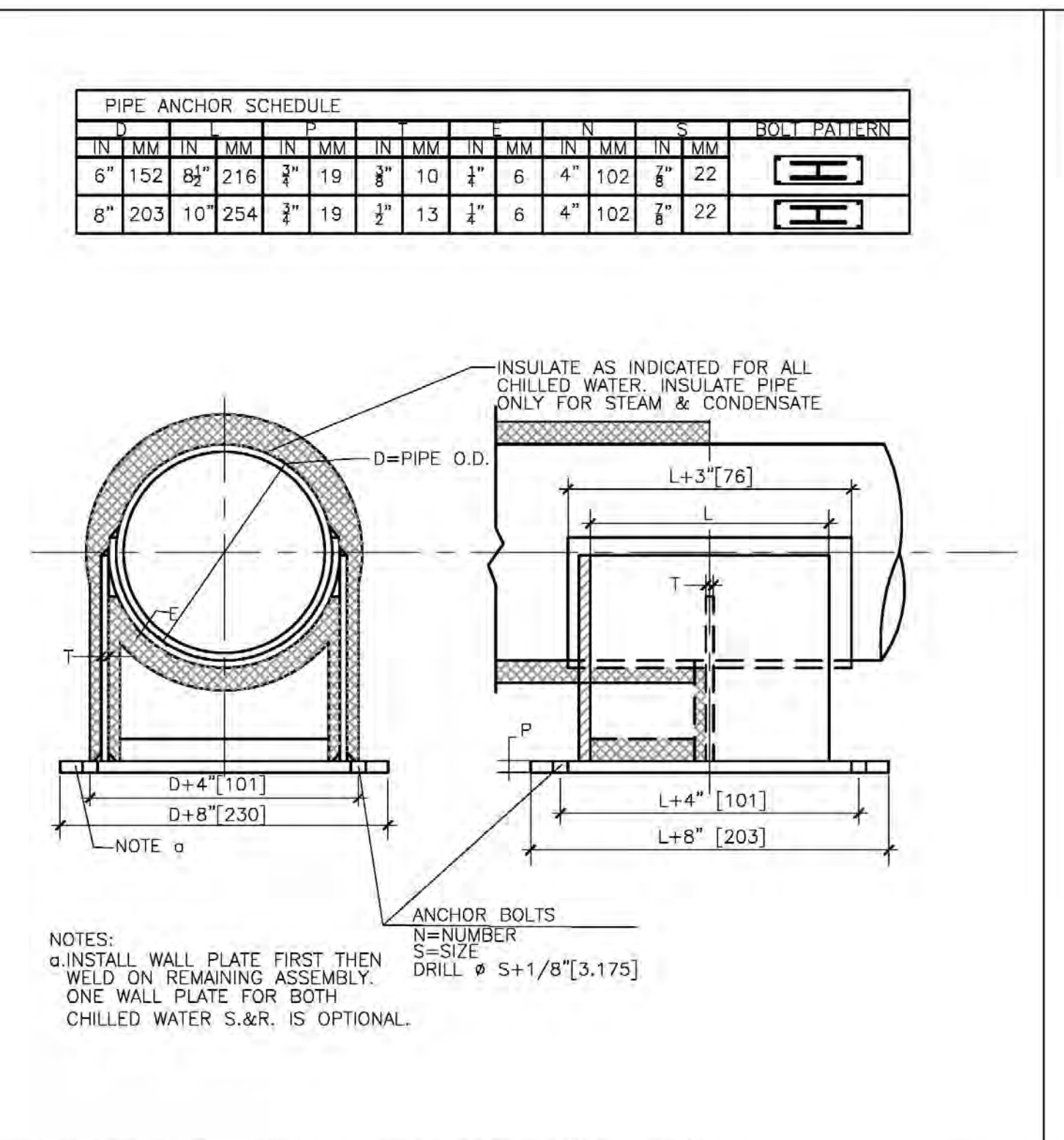
M301 CONDENSATE PUMPS-PIPING CONNECTIONS
NO SCALE



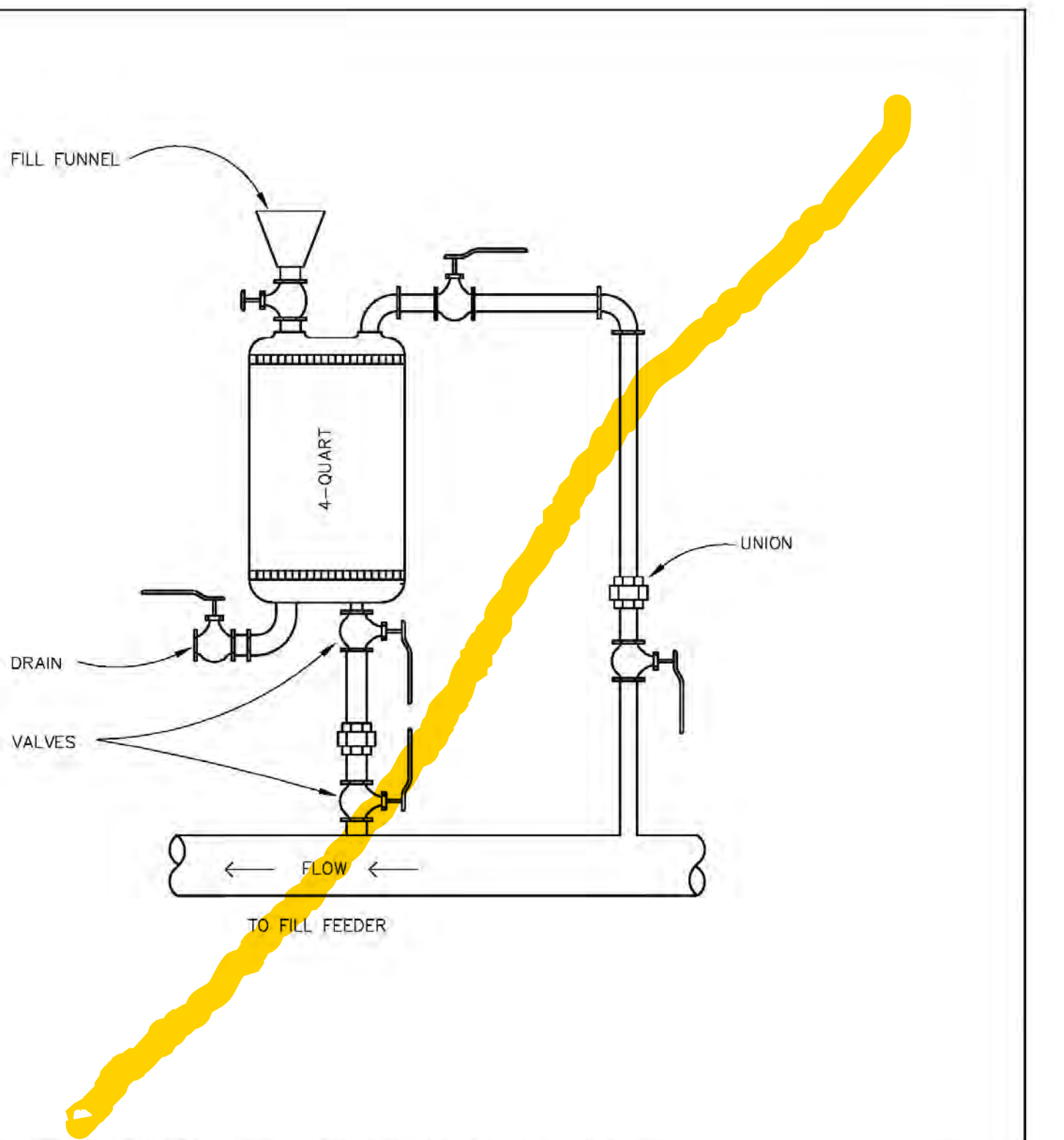
M301 PIPE HANGERS
NO SCALE



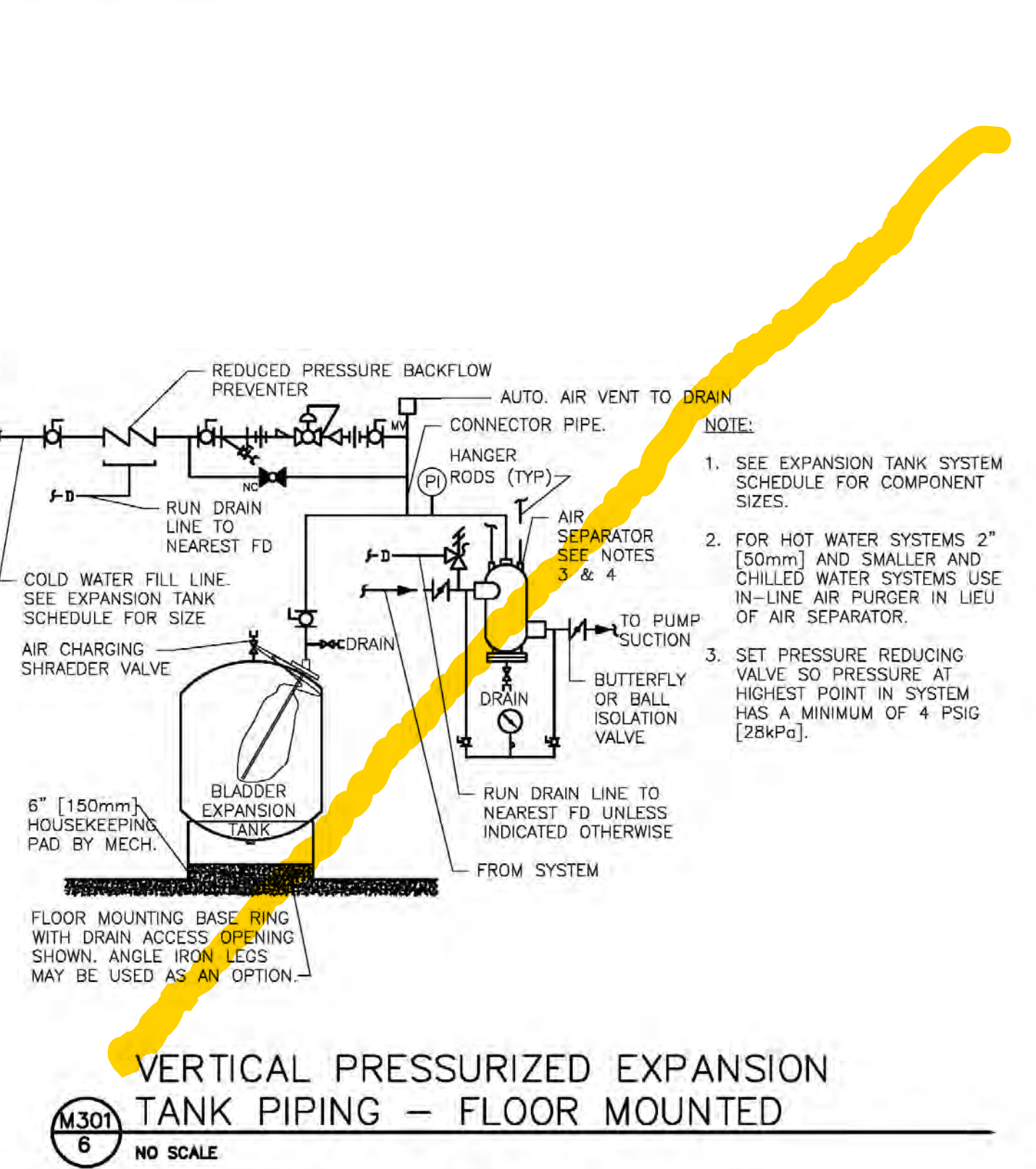
M301 SMALL PIPE ANCHOR 1 1/2" - 4"
NO SCALE



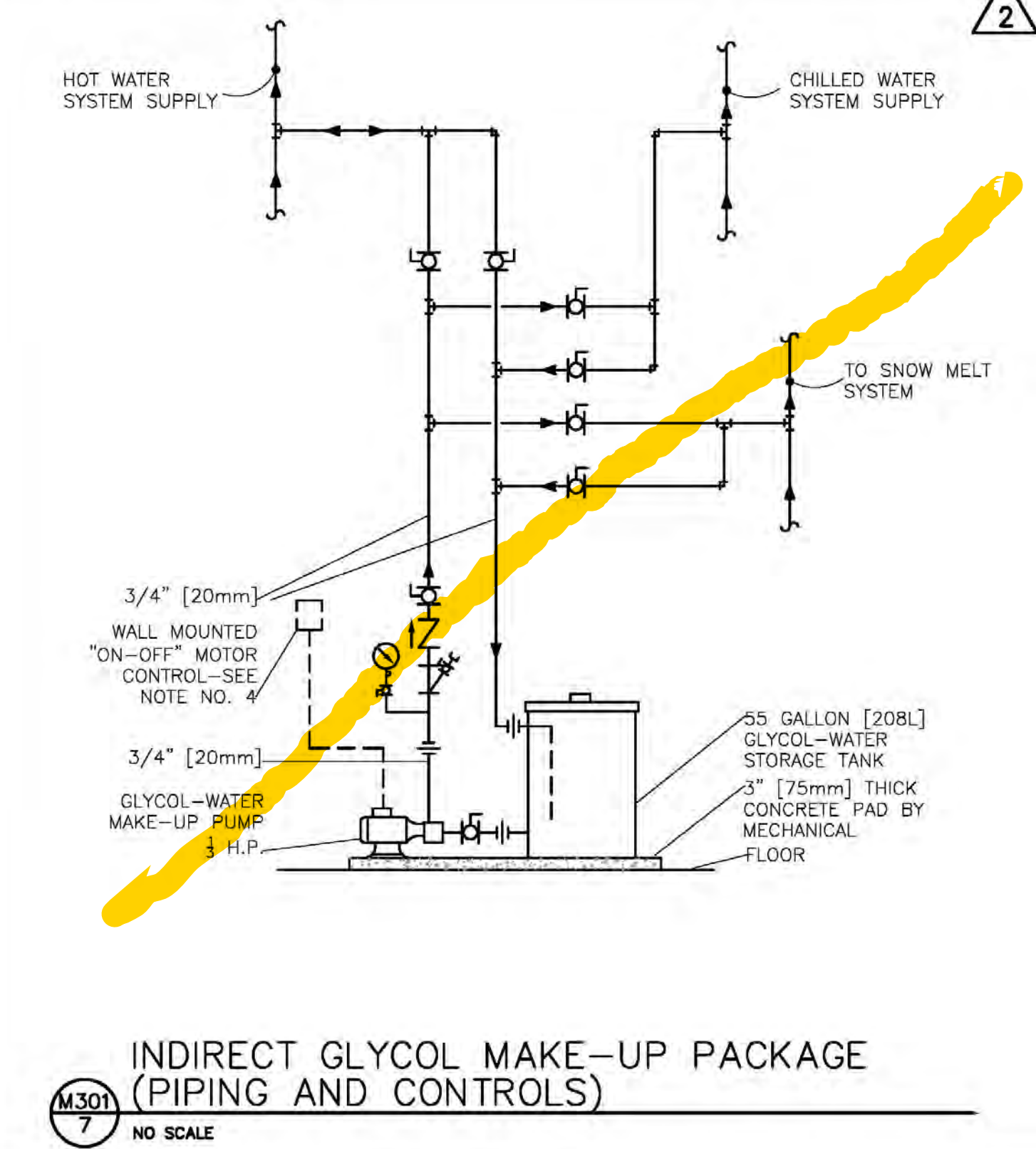
M301 LARGE PIPE ANCHOR 6" - 8"
NO SCALE



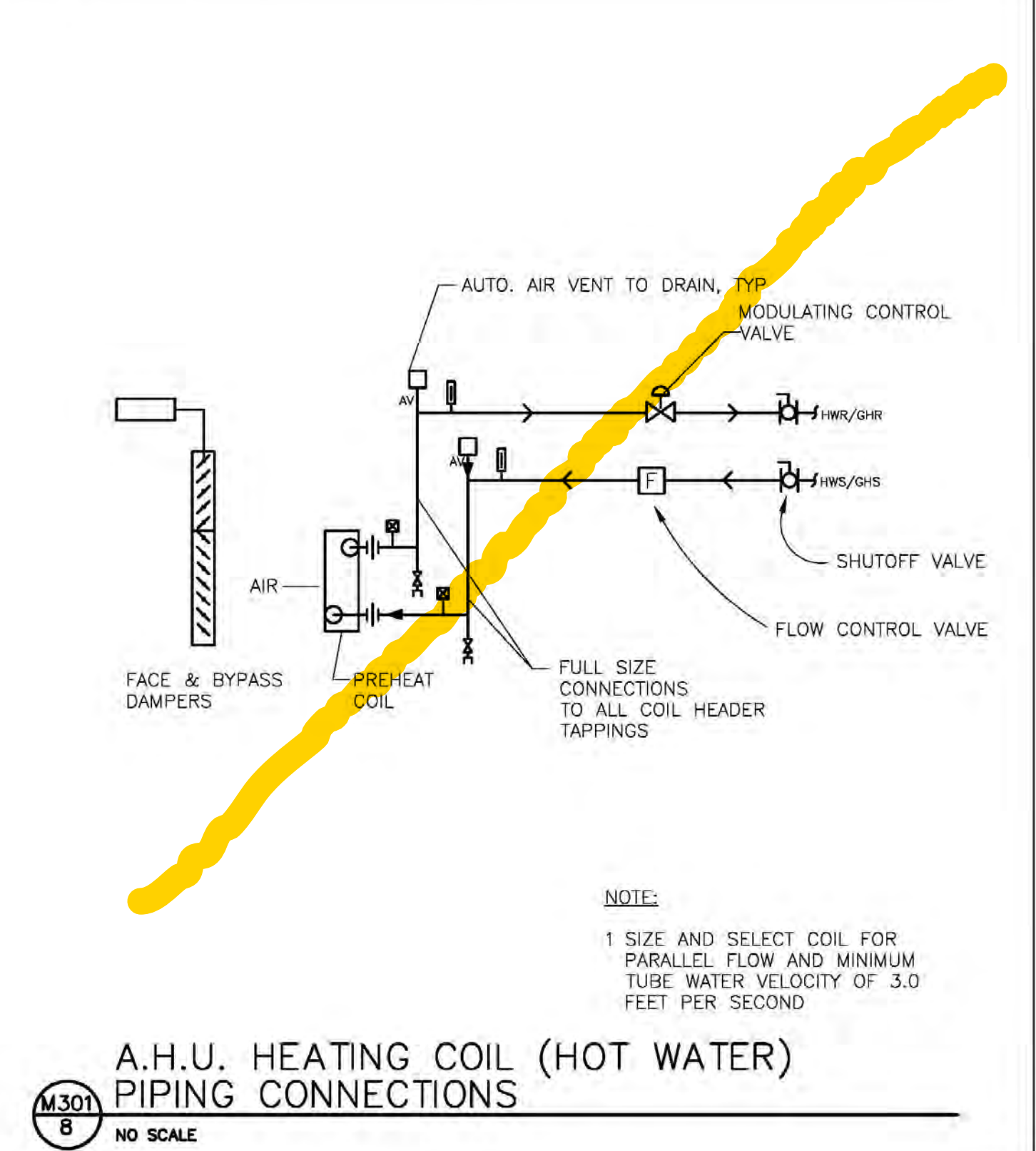
M301 CHEMICAL BYPASS FEEDER
NO SCALE



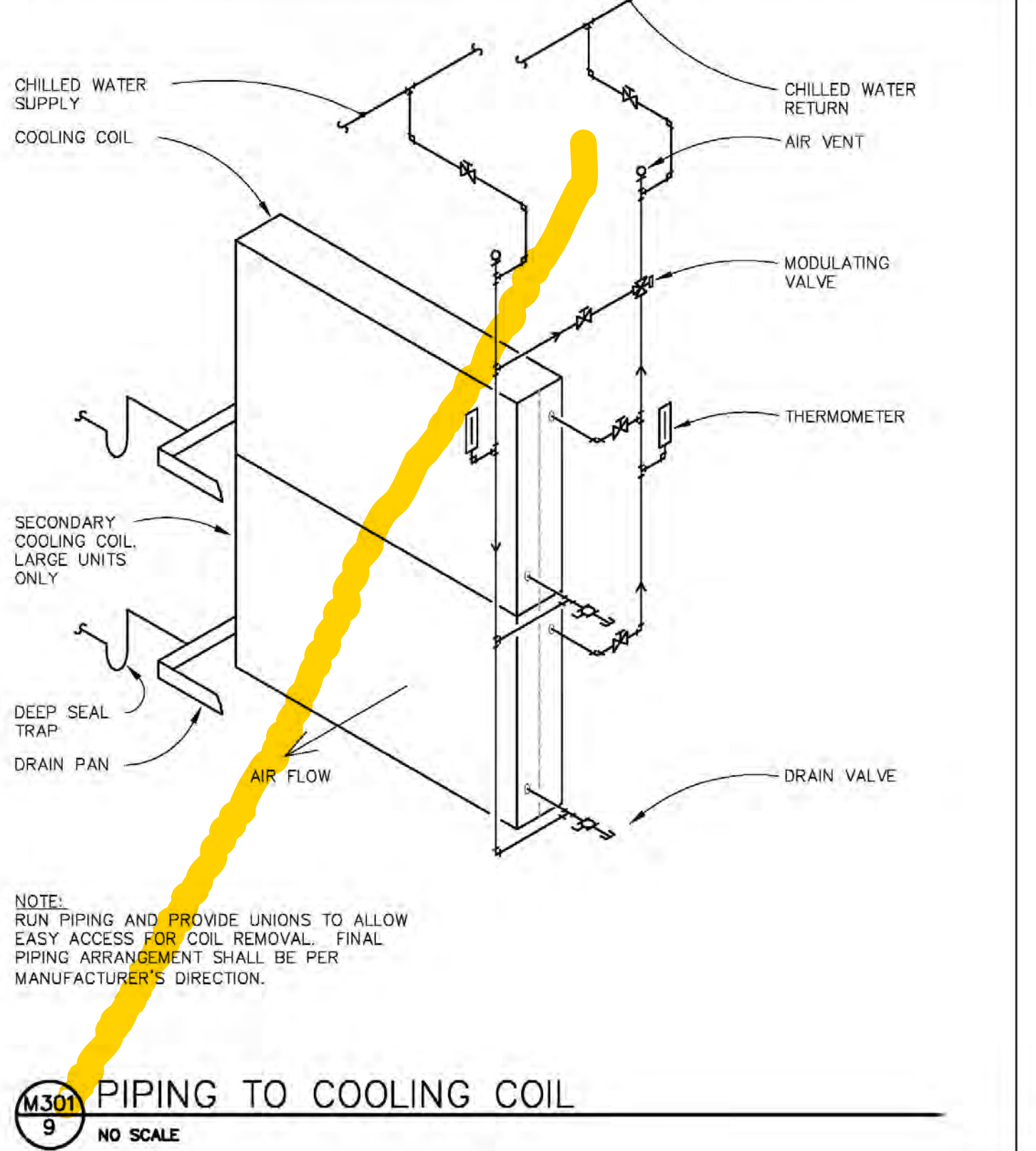
M301 VERTICAL PRESSURIZED EXPANSION TANK PIPING - FLOOR MOUNTED
NO SCALE



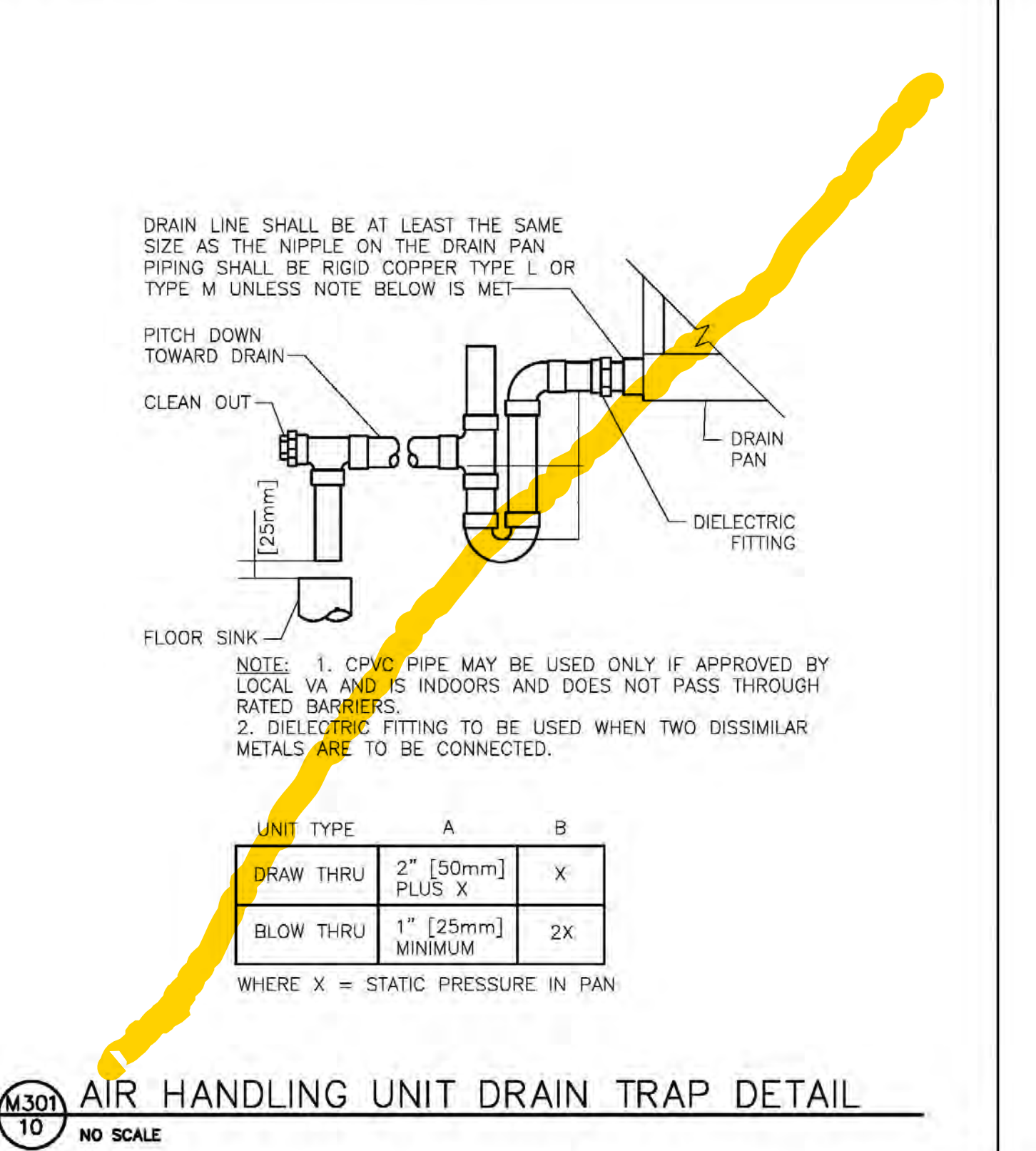
M301 INDIRECT GLYCOL MAKE-UP PACKAGE (PIPING AND CONTROLS)
NO SCALE



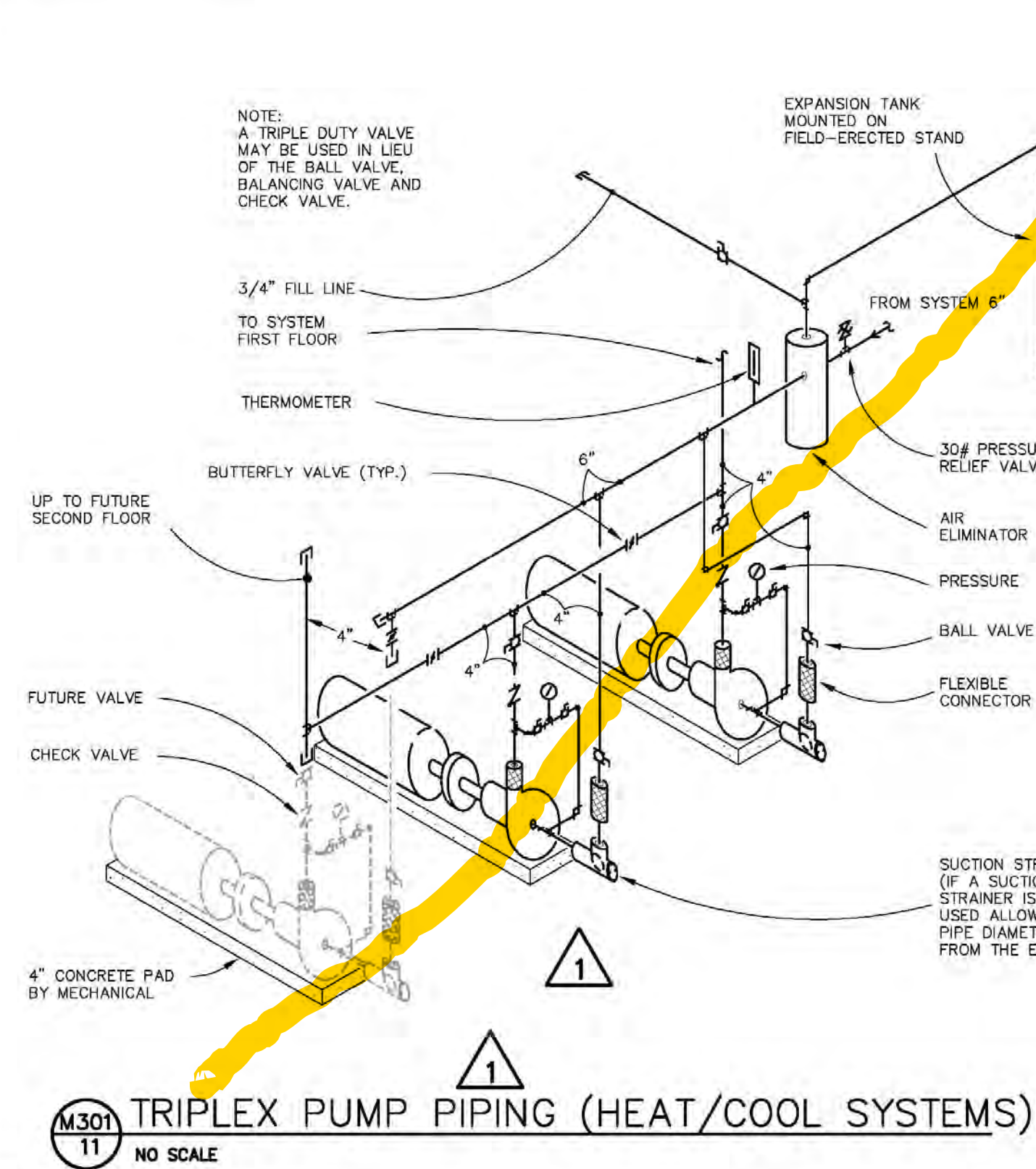
M301 A.H.U. HEATING COIL (HOT WATER) PIPING CONNECTIONS
NO SCALE



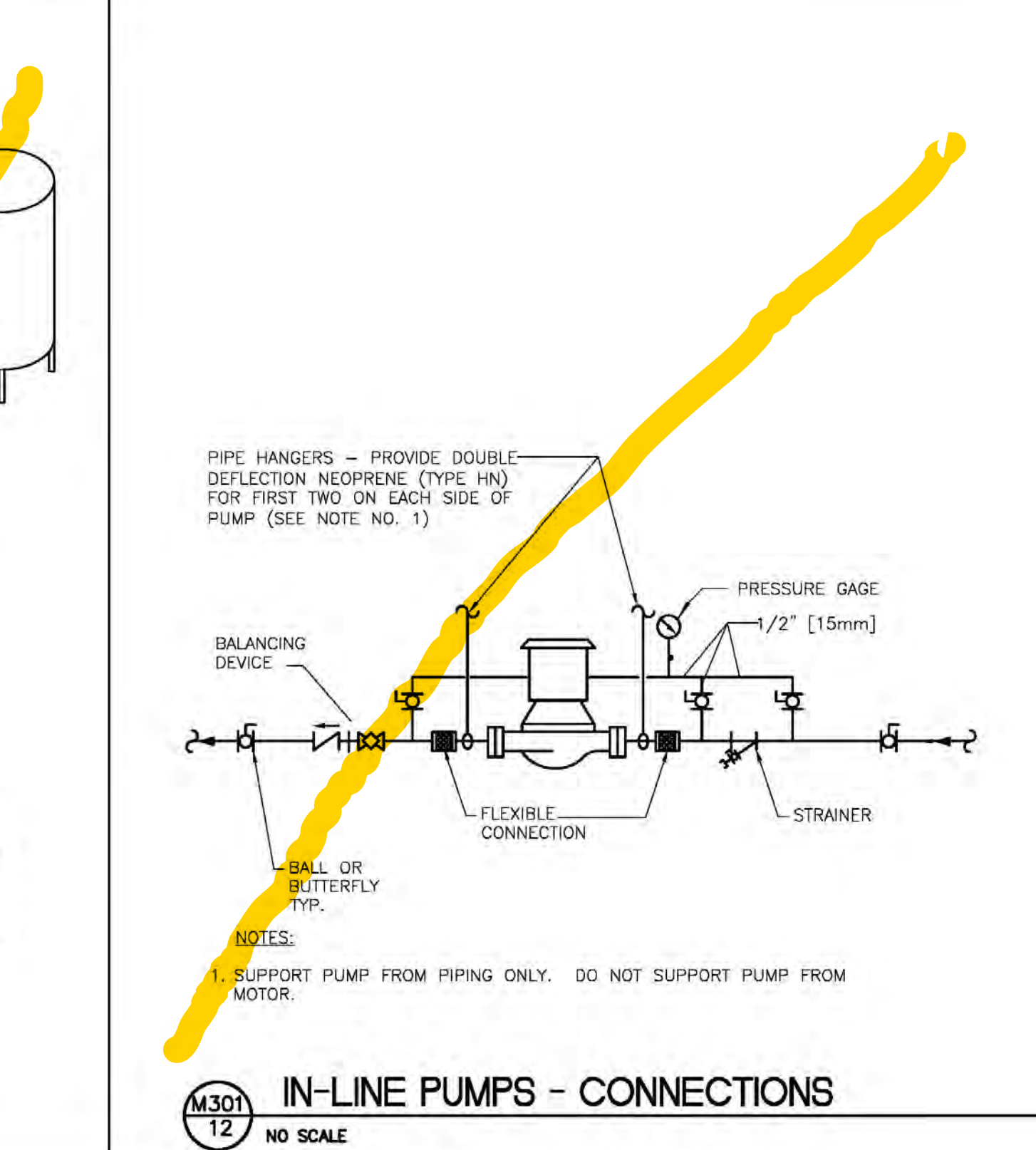
M301 PIPING TO COOLING COIL
NO SCALE



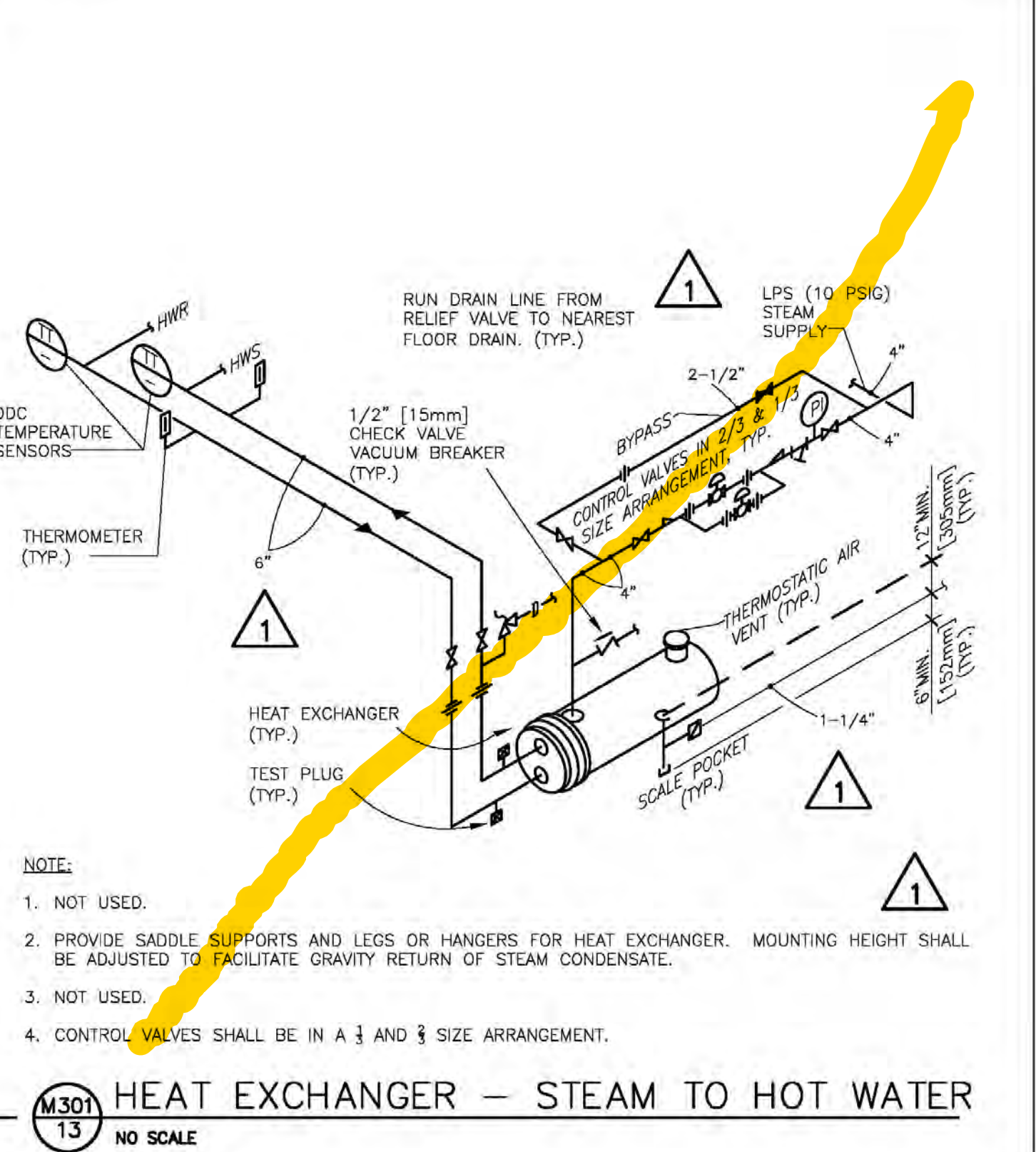
M301 AIR HANDLING UNIT DRAIN TRAP DETAIL
NO SCALE



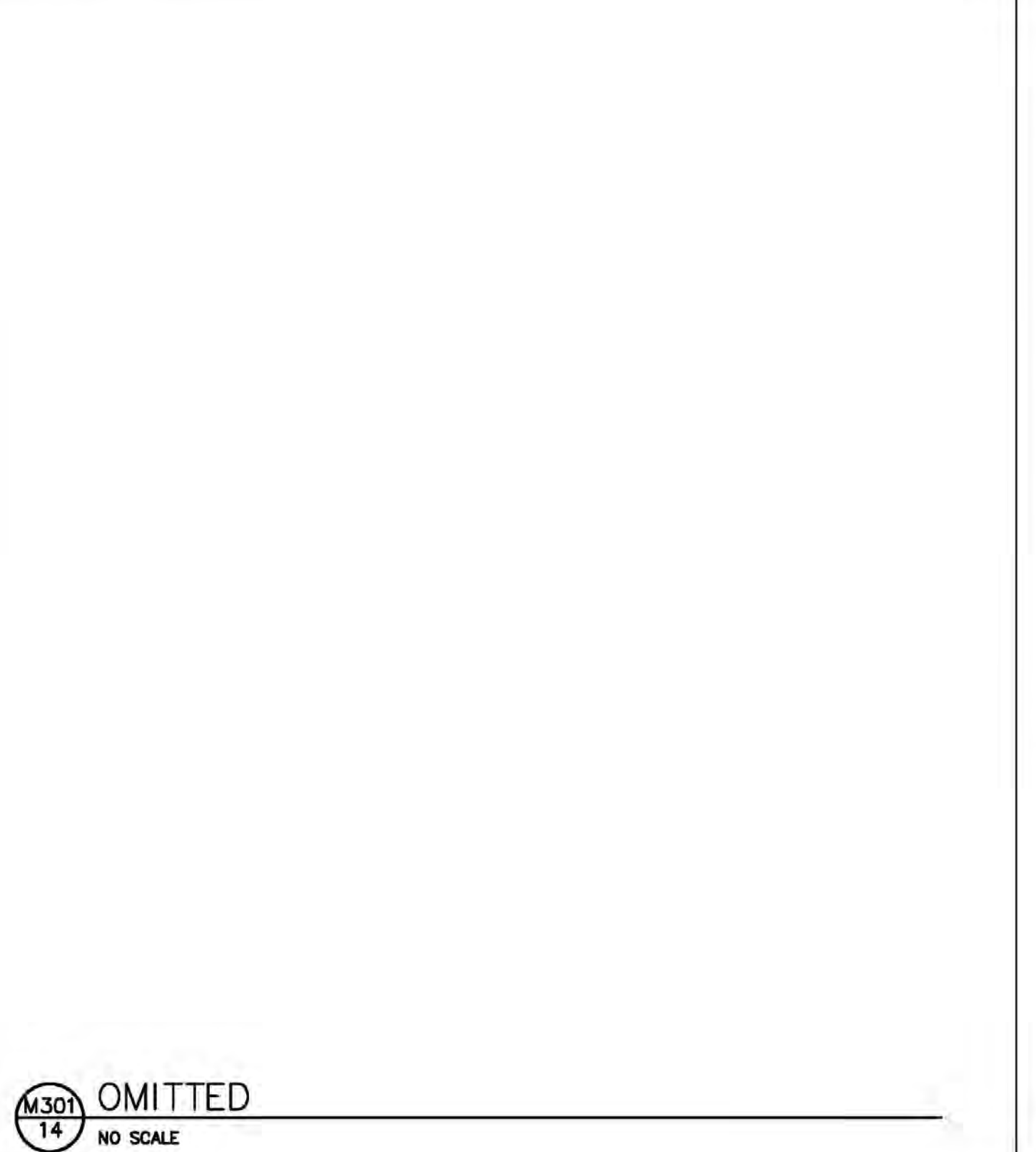
M301 TRIPLEX PUMP PIPING (HEAT/COOL SYSTEMS)
NO SCALE



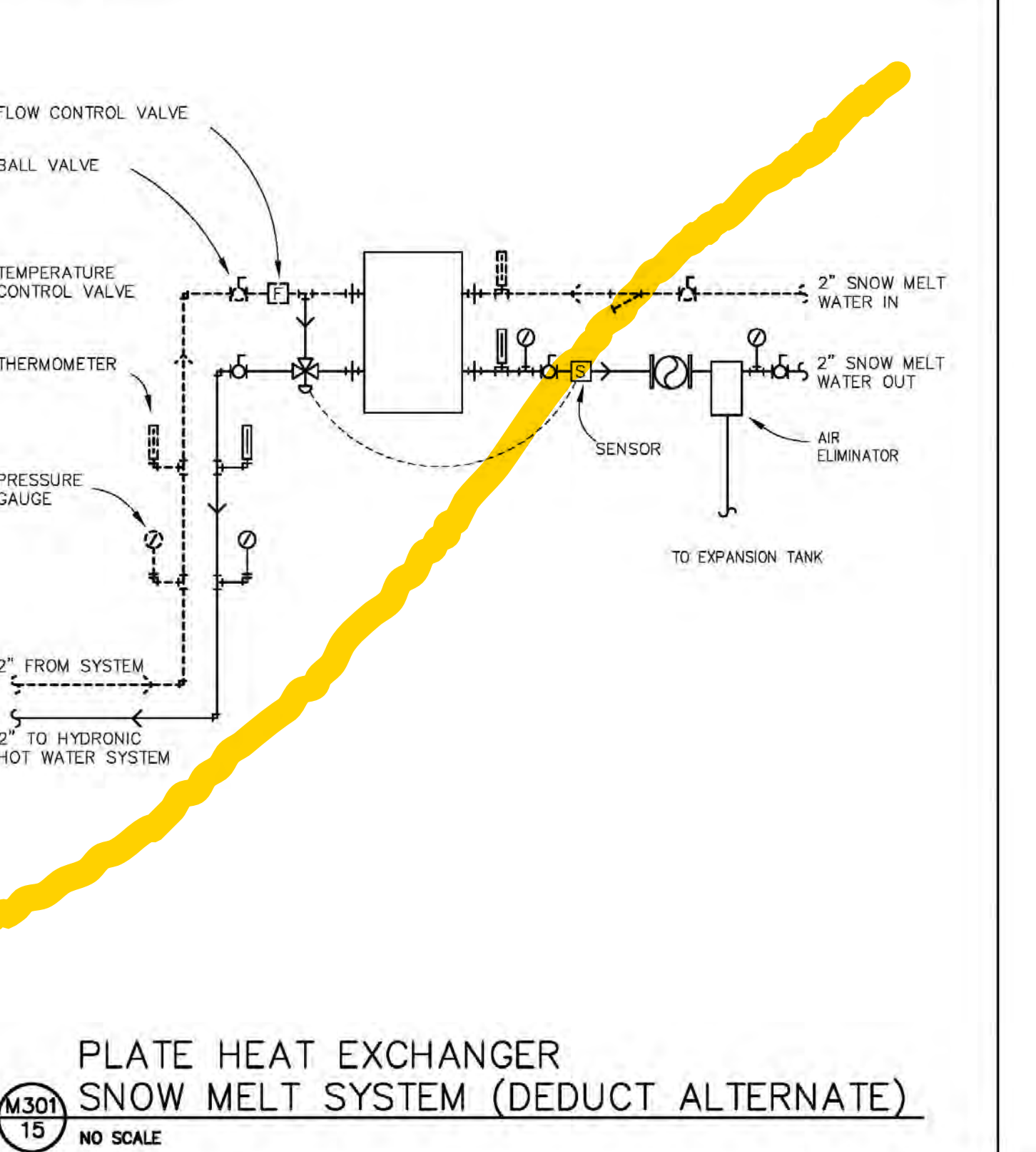
M301 IN-LINE PUMPS - CONNECTIONS
NO SCALE



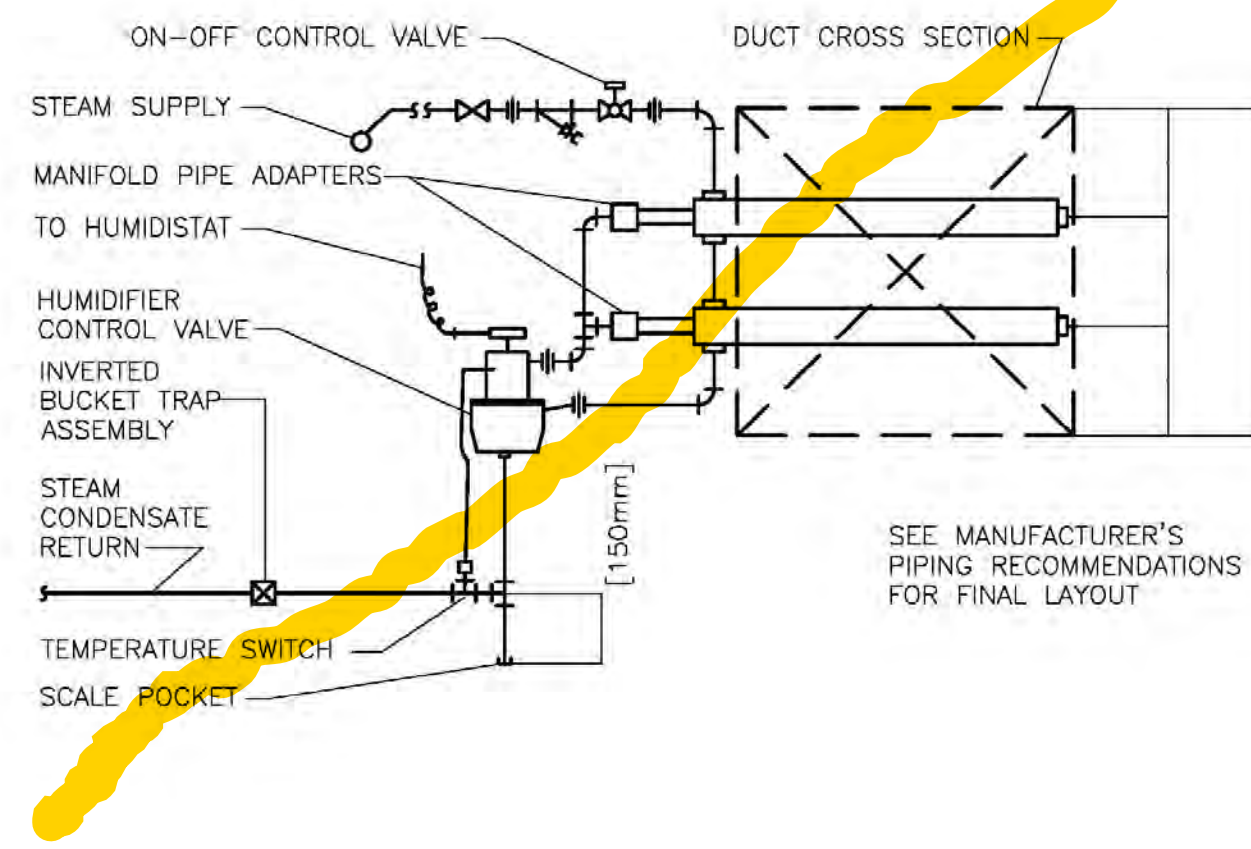
M301 HEAT EXCHANGER - STEAM TO HOT WATER
NO SCALE



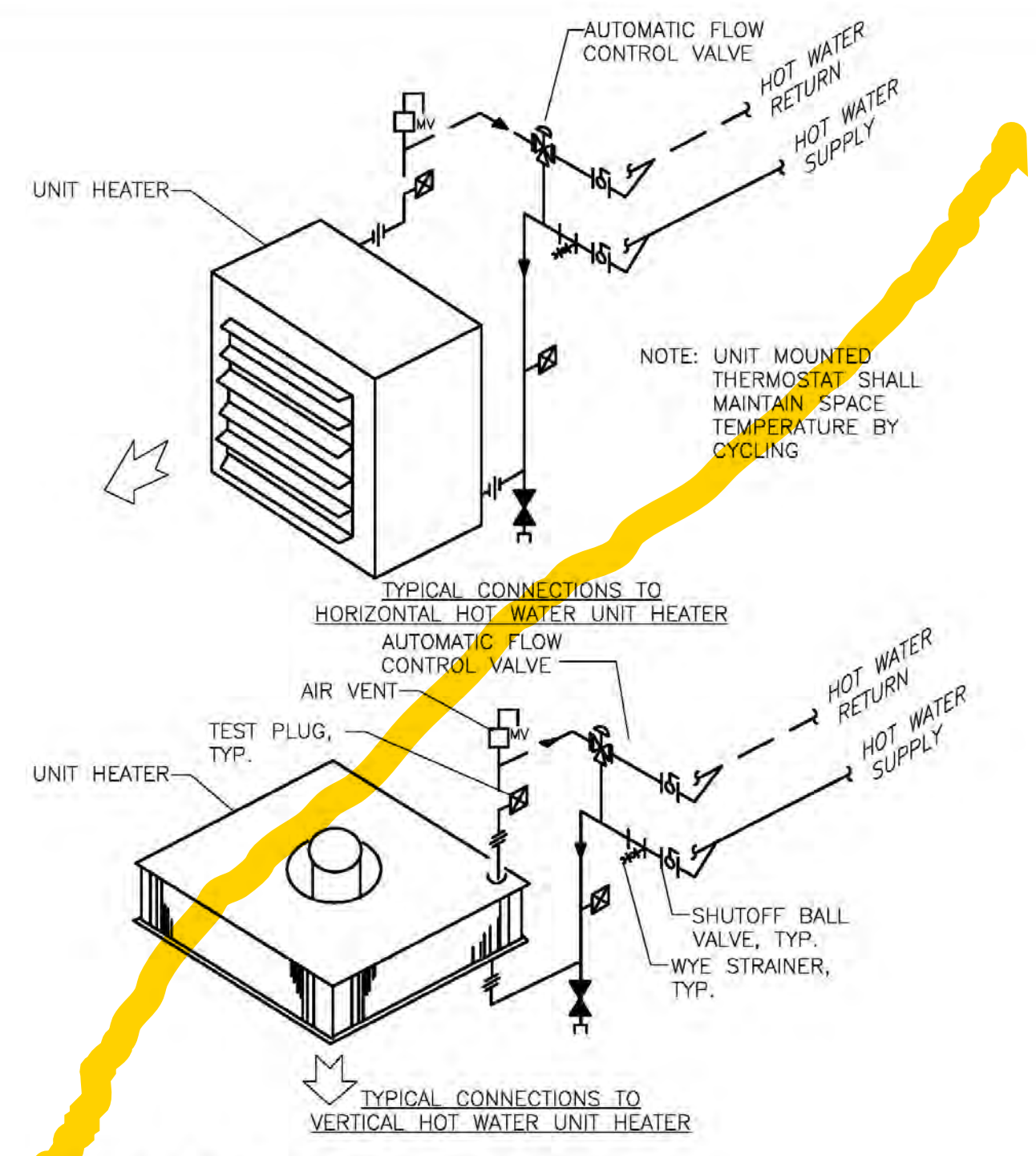
M301 OMITTED
NO SCALE



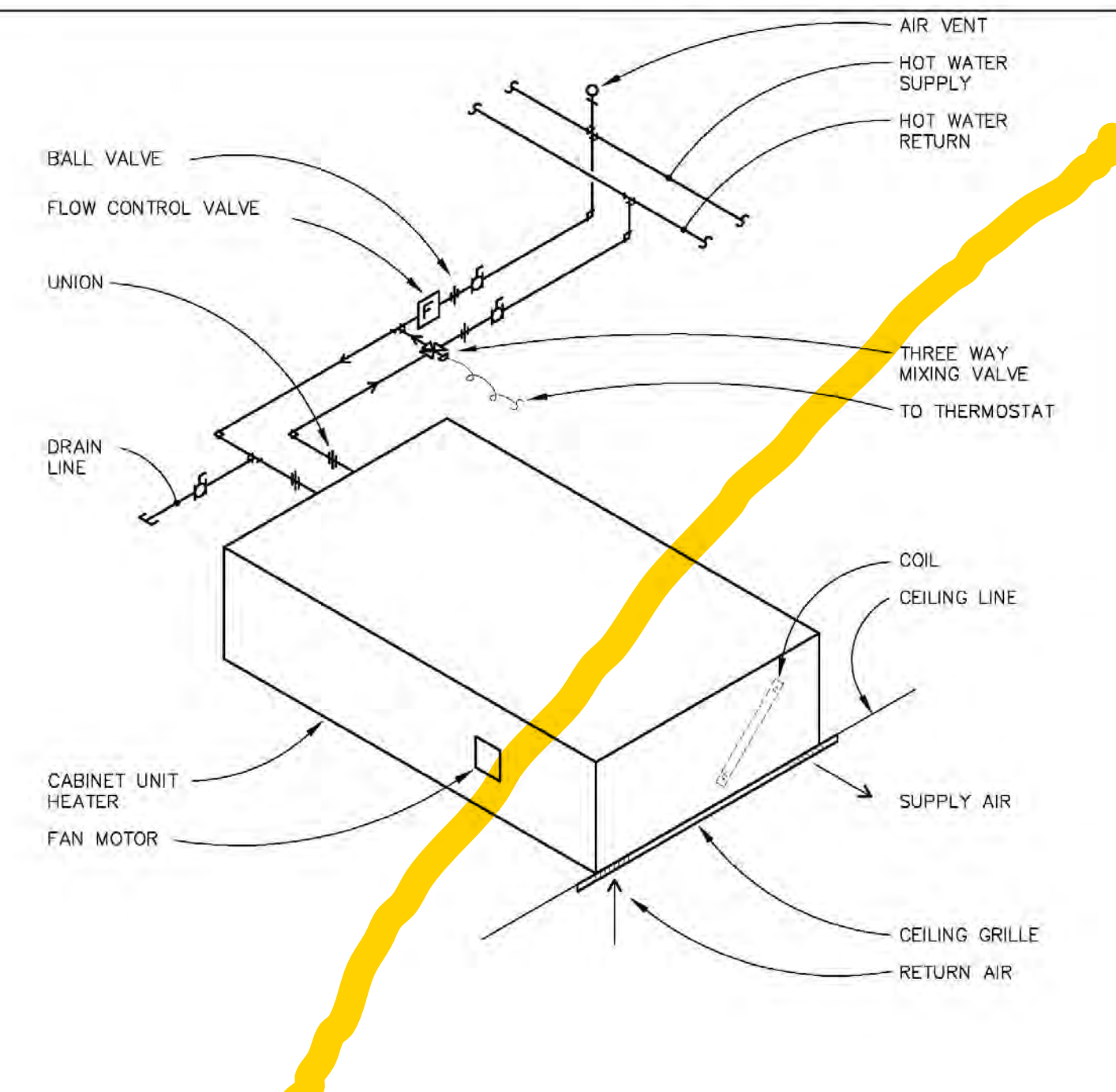
M301 PLATE HEAT EXCHANGER SNOW MELT SYSTEM (DEDUCT ALTERNATE)
NO SCALE



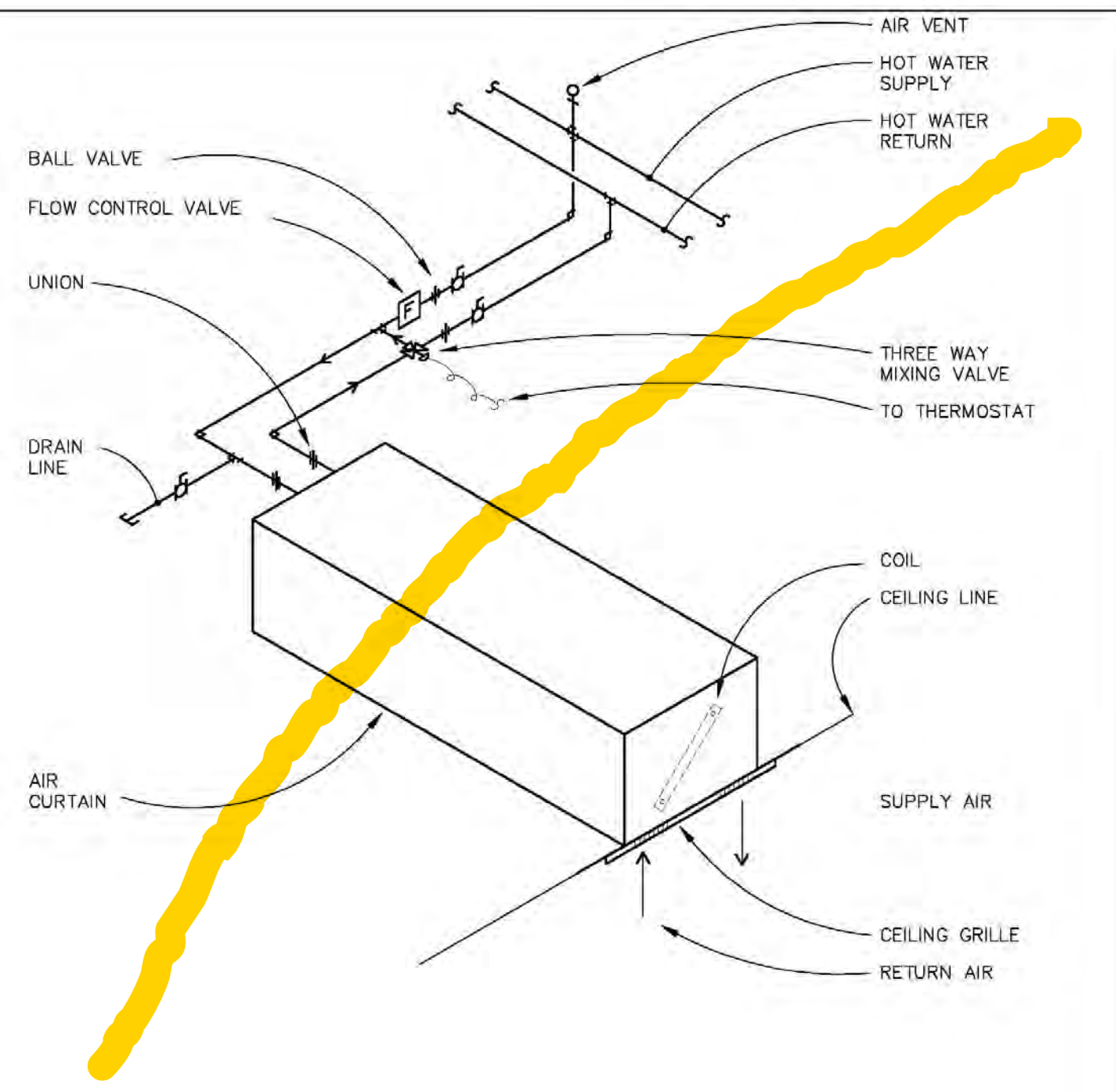
M302 1
STEAM HUMIDIFIER - PIPING CONNECTIONS (MULTIPLE DISPERSION TUBES)
 NO SCALE



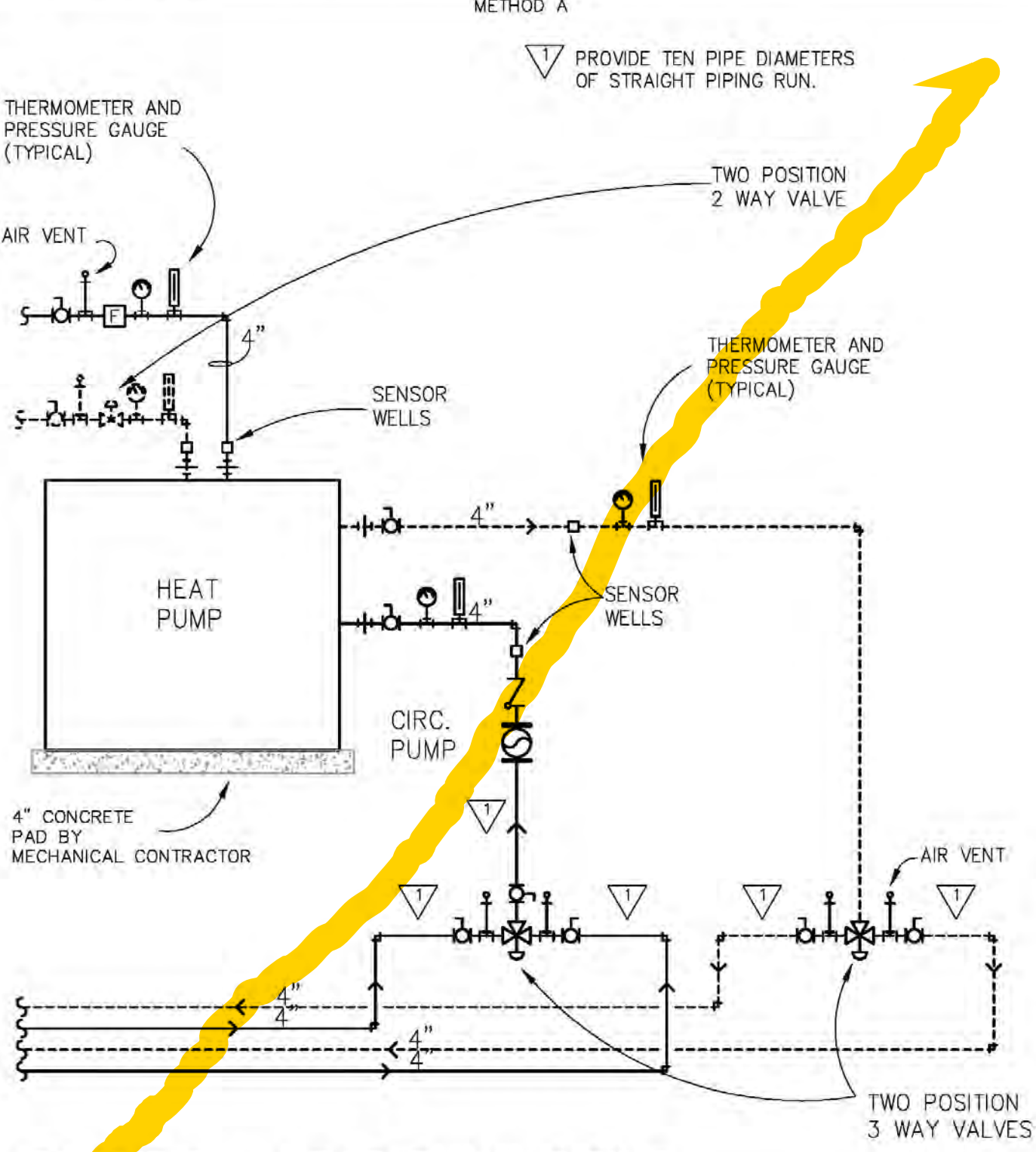
M302 2
UNIT HEATER (HOT WATER) - PIPING CONNECTIONS - 3 WAY VALVE
 NO SCALE



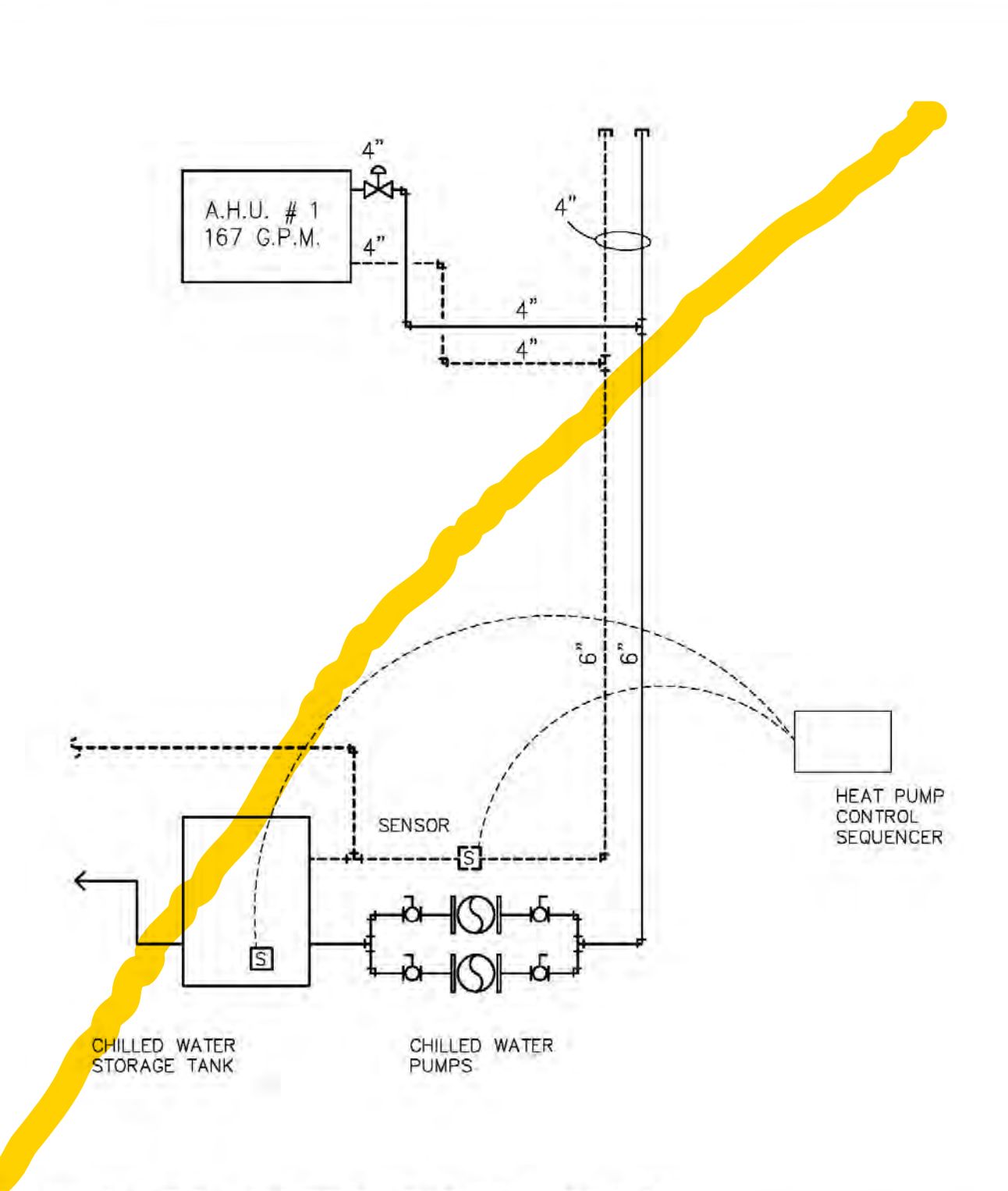
M302 4
PIPING TO CABINET UNIT HEATER (THREE WAY VALVE- CEILING RECESSED)
 NO SCALE



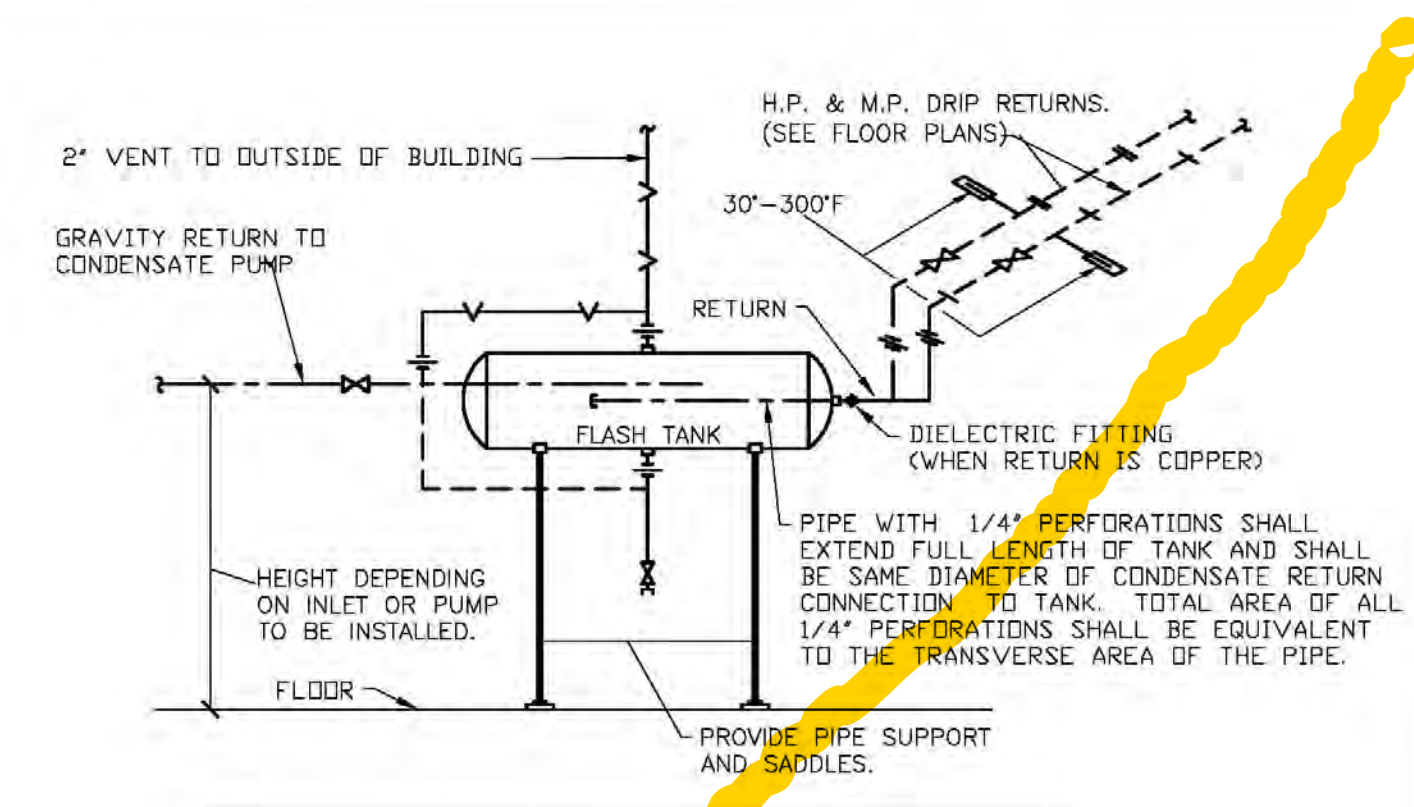
M302 5
PIPING TO AIR CURTAIN (THREE WAY VALVE- CEILING RECESSED)
 NO SCALE



M302 6
TYPICAL HEAT PUMP PIPING
 NO SCALE

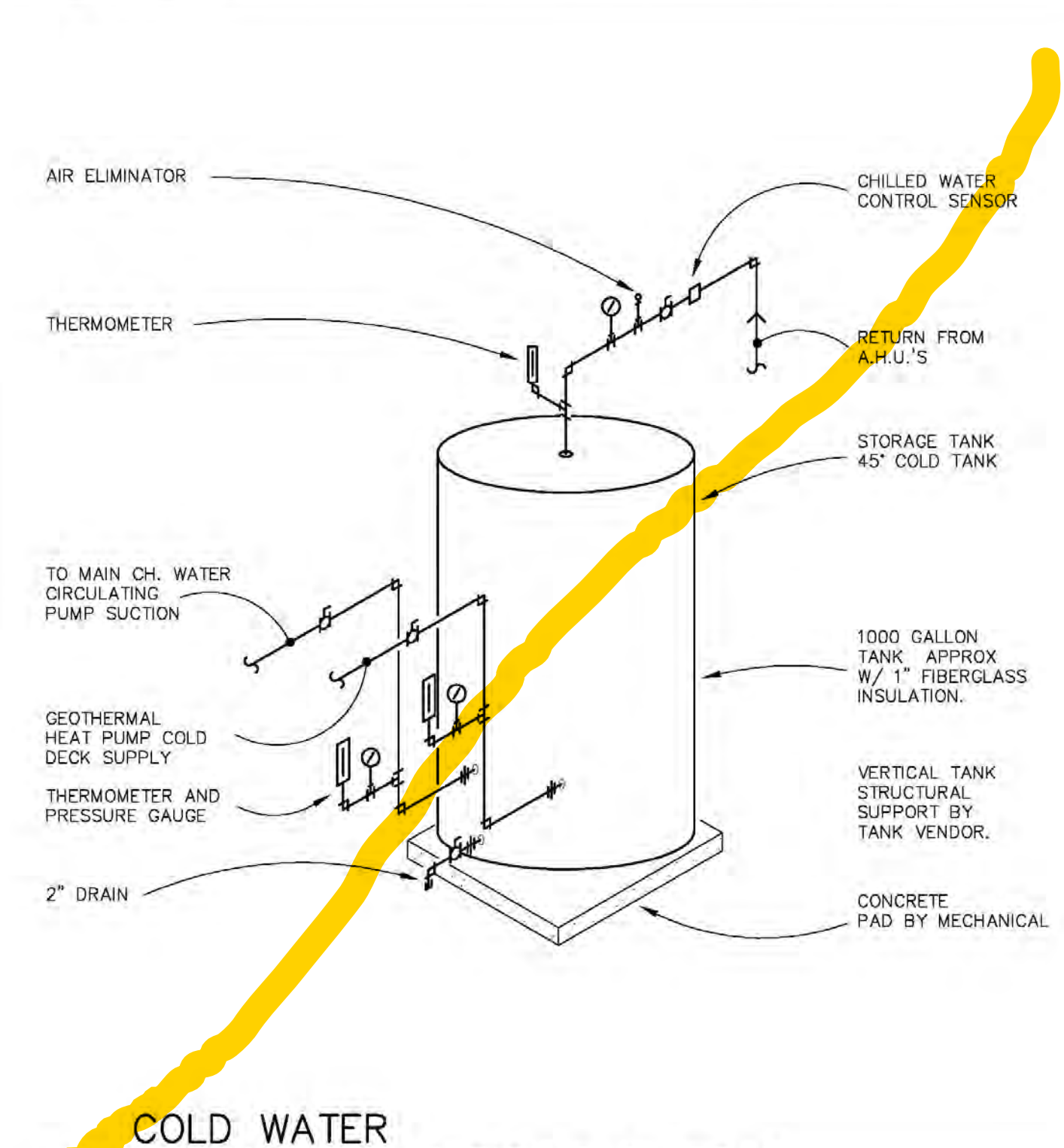


M302 7
CHILLED WATER PIPING DETAIL
 NO SCALE

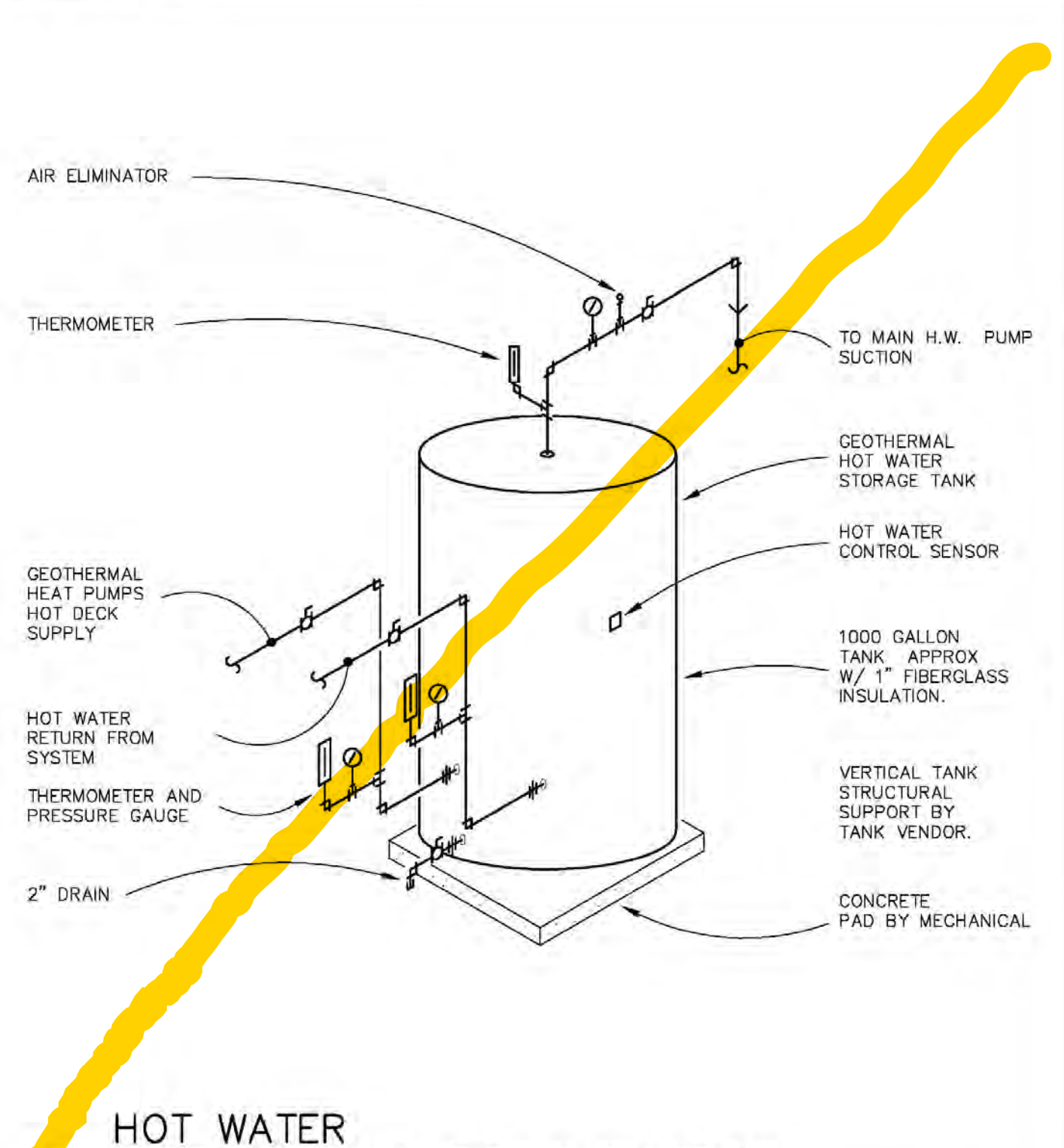


FLASH TANK SCHEDULE		
CONDENSATE PUMP CAPACITY- GPM	APPROX. CAPACITY OF FLASH TANK- GALLONS	SIZE OF FLASH TANK- INCHES
0 THRU 15	16	14 DIA. X 24 LONG
16 - 22	24	14 DIA. X 36 LONG
23 - 30	31	16 DIA. X 36 LONG
31 - 37	37	16 DIA. X 42 LONG
38 - 45	42	16 DIA. X 48 LONG
46 - 60	61	18 DIA. X 34 LONG
61 - 75	75	18 DIA. X 66 LONG
76 - 97	95	24 DIA. X 34 LONG
98 - 150	155	24 DIA. X 78 LONG

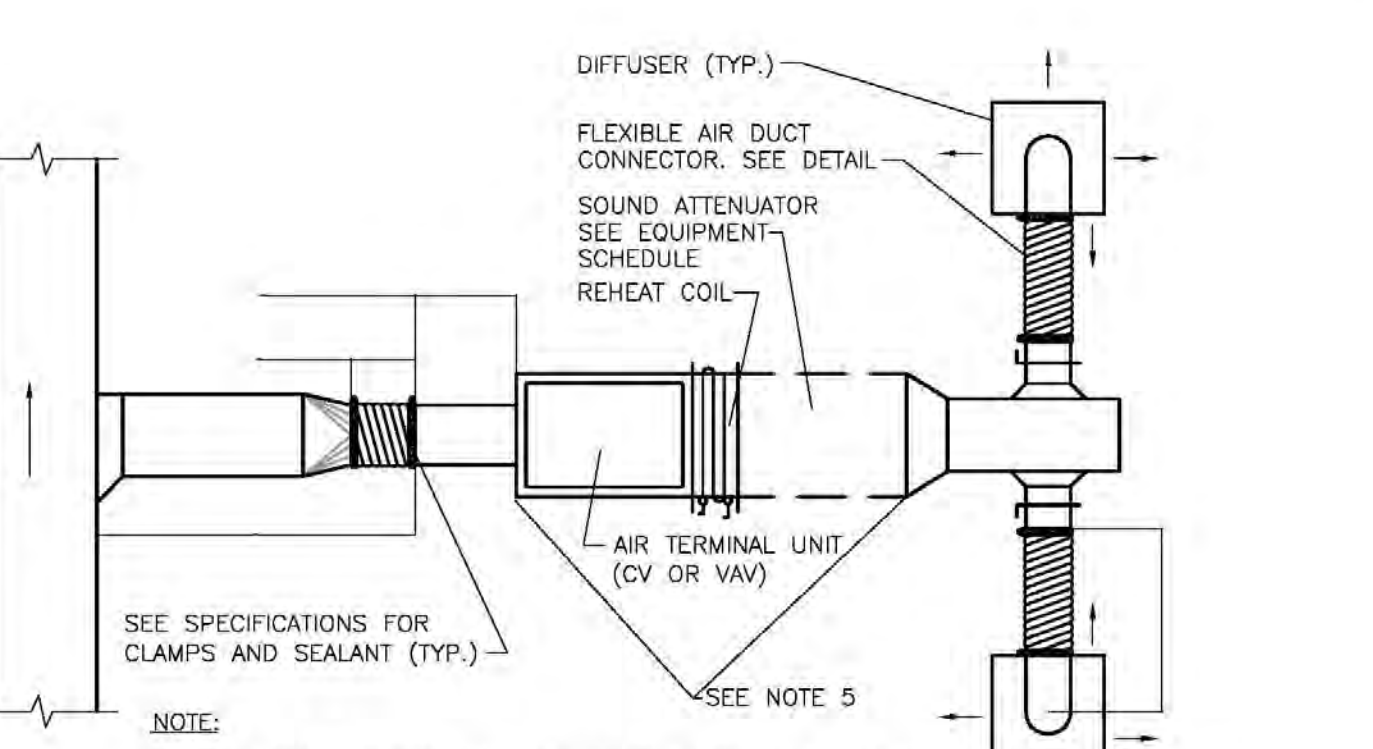
M302 8
TYPICAL CONNECTIONS TO FLASH TANK
 NO SCALE



M302 9
COLD WATER STORAGE TANK PIPING DIAGRAM
 NO SCALE

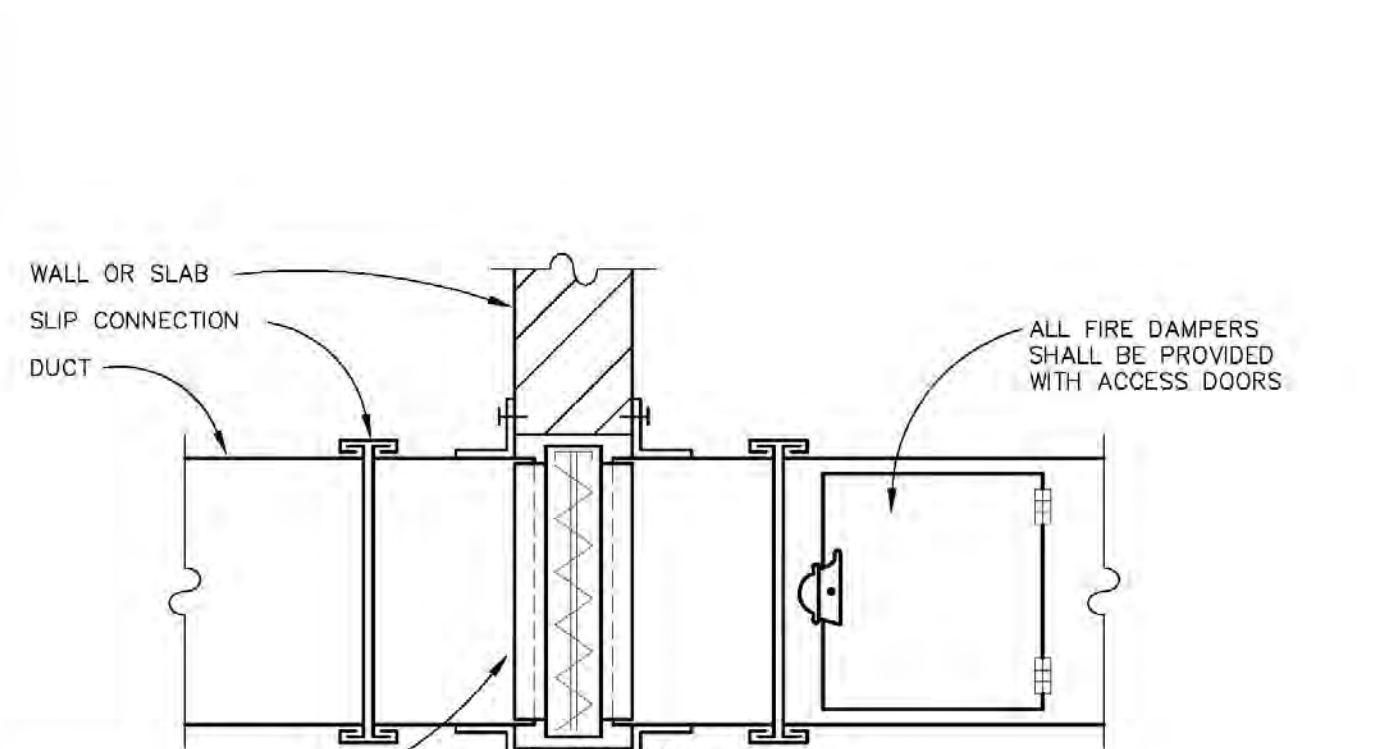


M302 10
HOT WATER STORAGE TANK PIPING DIAGRAM
 NO SCALE



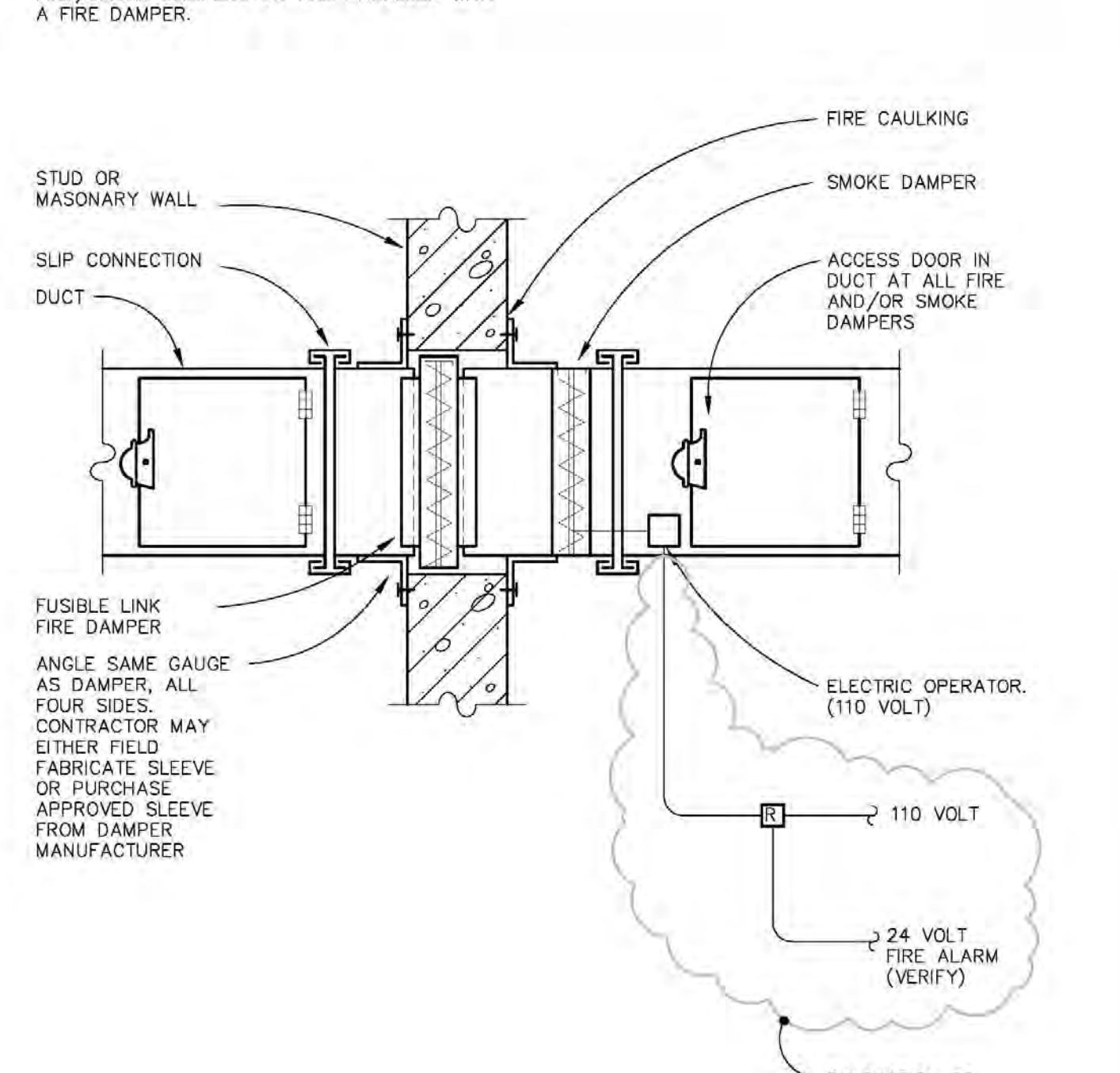
- NOTE:**
- RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET.
 - A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'-0" [900mm].
 - A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET (3 METERS). FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100' [1.84Pa/m].
 - FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'-0" [1500mm]. USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.
 - COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE INSULATION W/VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.

M302 11
DUCT CONNECTIONS - AIR TERMINAL UNITS
 NO SCALE

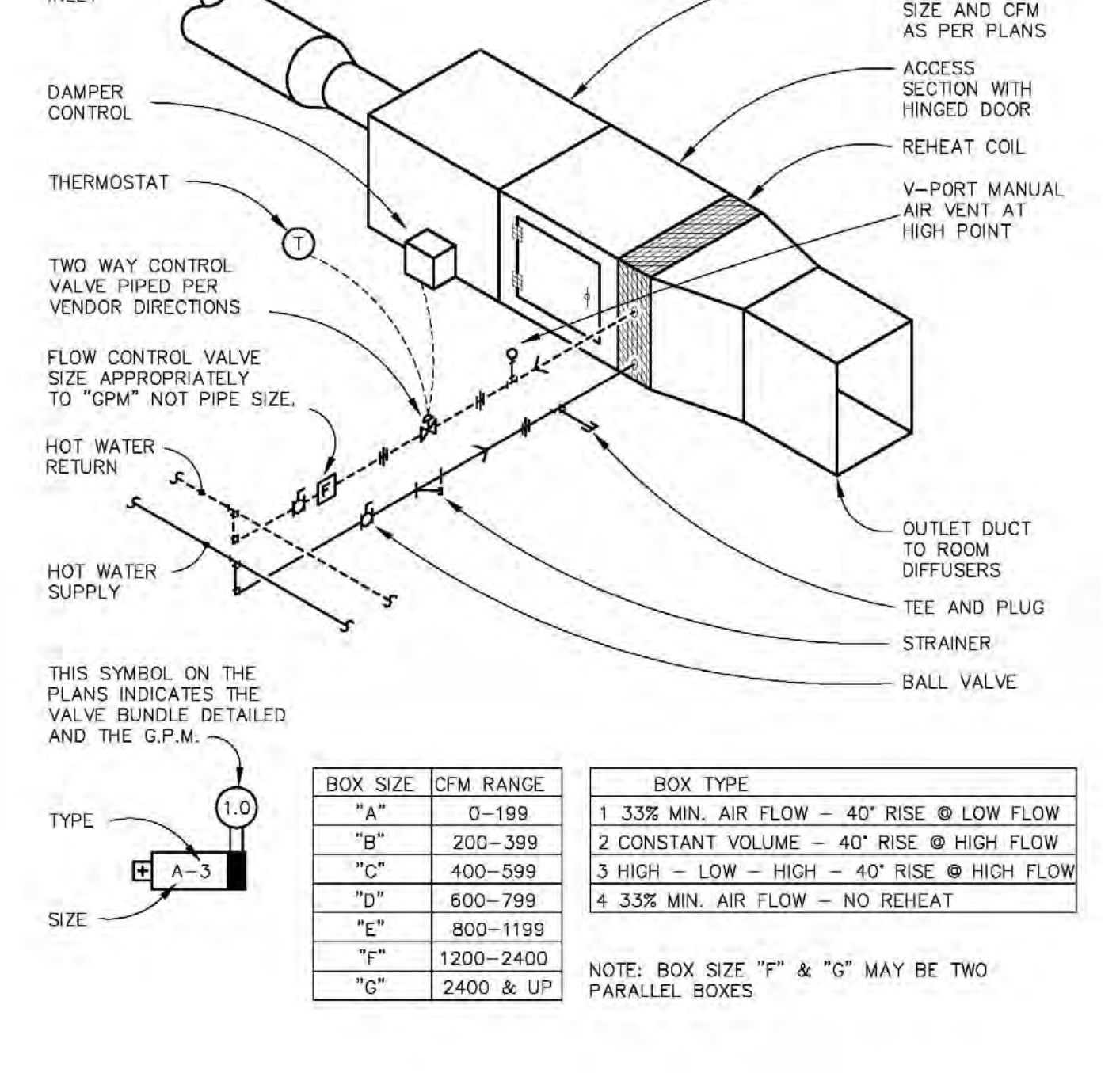


ANGLE SAME GAUGE AS DAMPER ALL FOUR SIDES. CONTRACTOR MAY EITHER FIELD FABRICATE SLEEVE OR PURCHASE APPROVED SLEEVE FROM DAMPER MANUFACTURER.

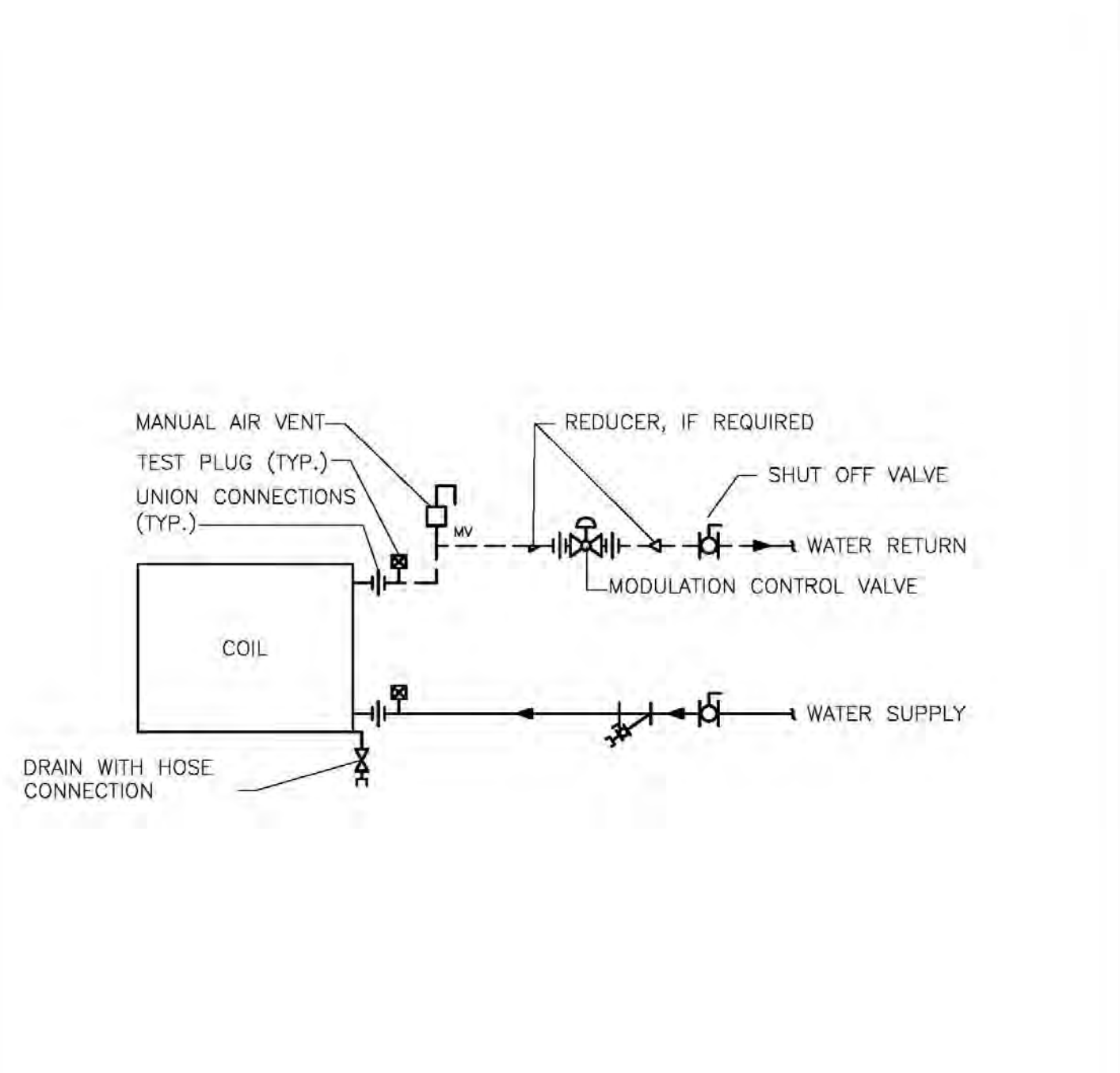
M302 12
TYPICAL FIRE DAMPER
 NO SCALE



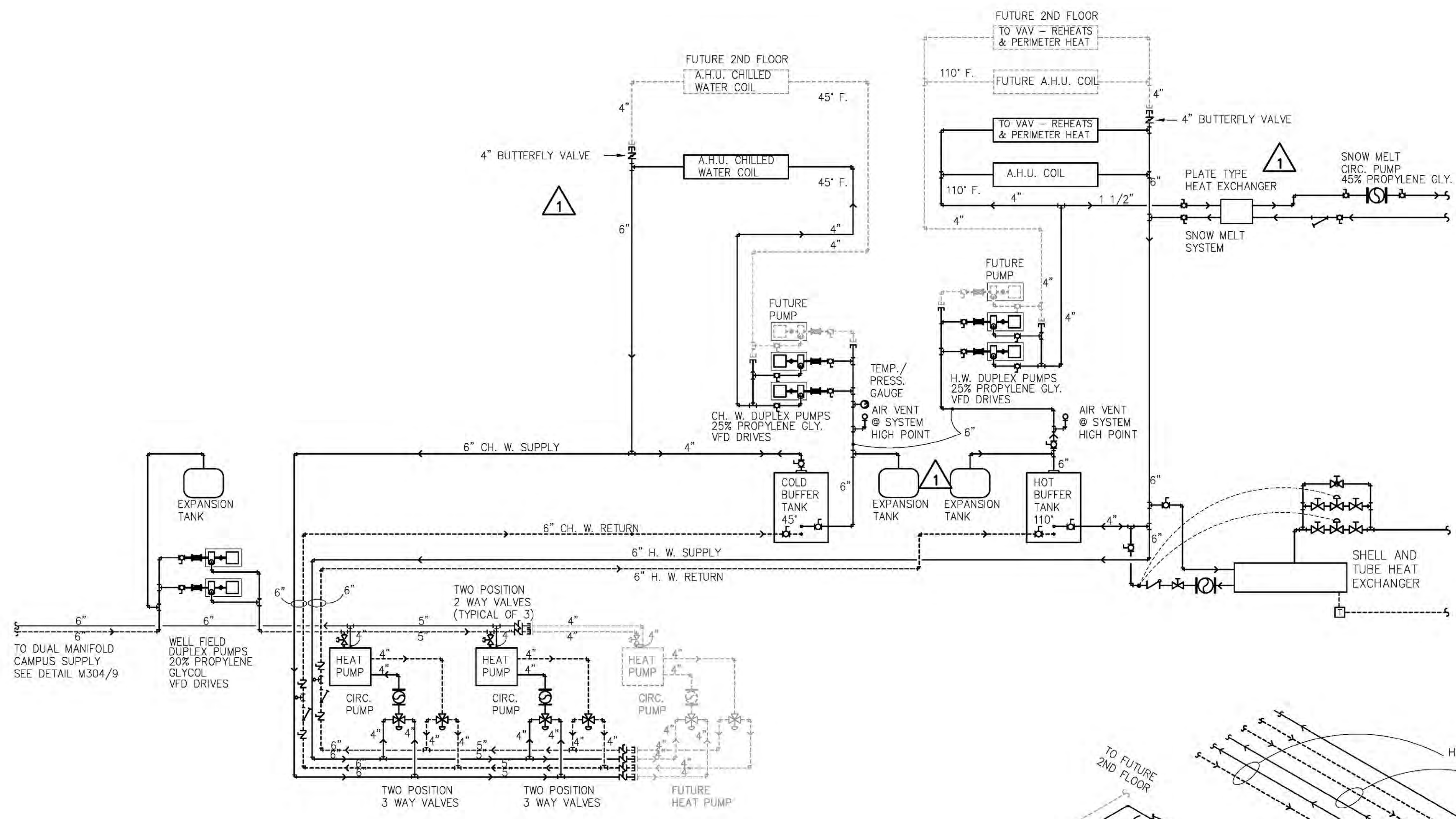
M302 13
SMOKE DAMPER
 NO SCALE



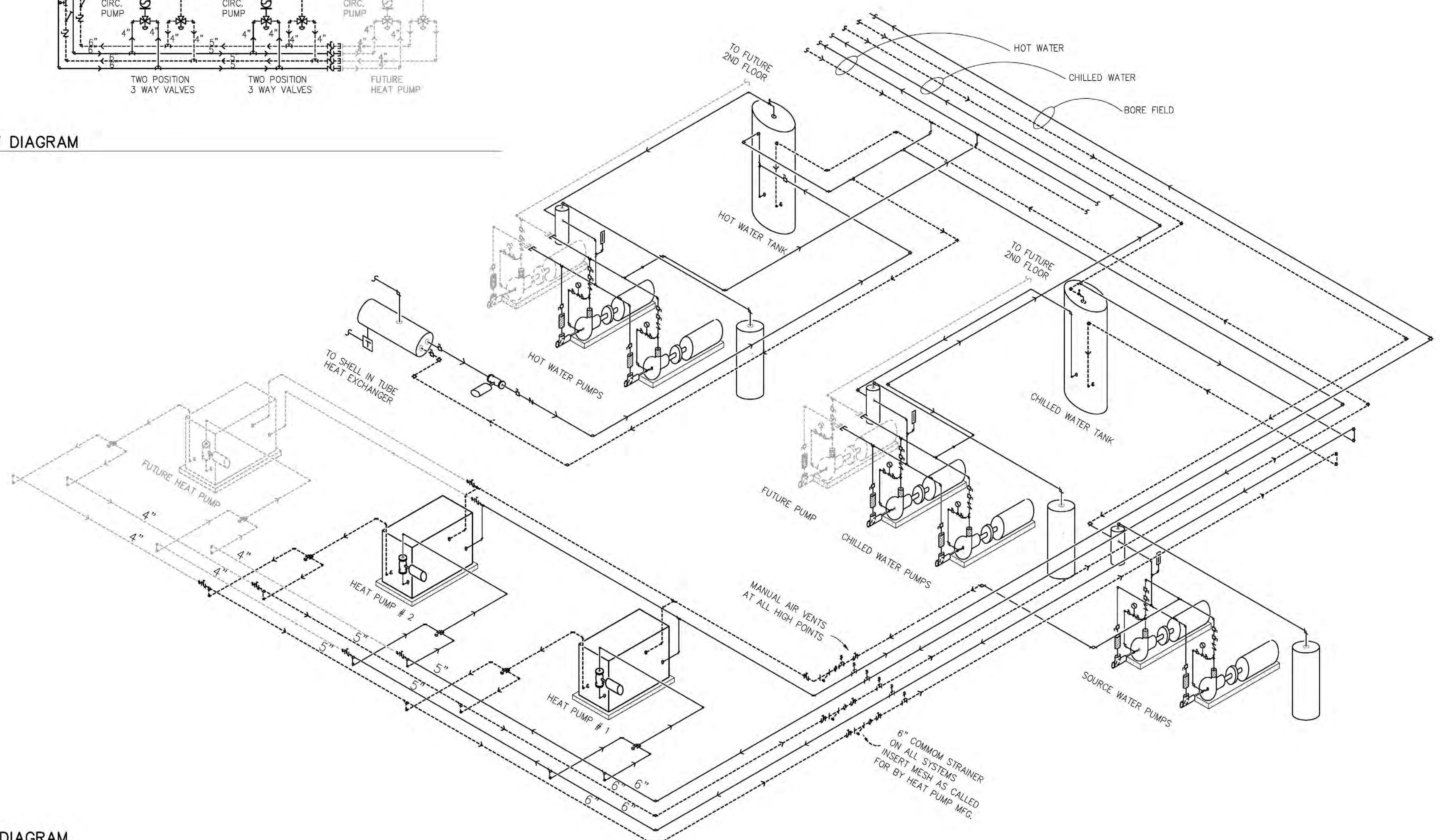
M302 14
VARIABLE VOLUME BOX WITH REHEAT COIL - TWO WAY VALVE
 NO SCALE



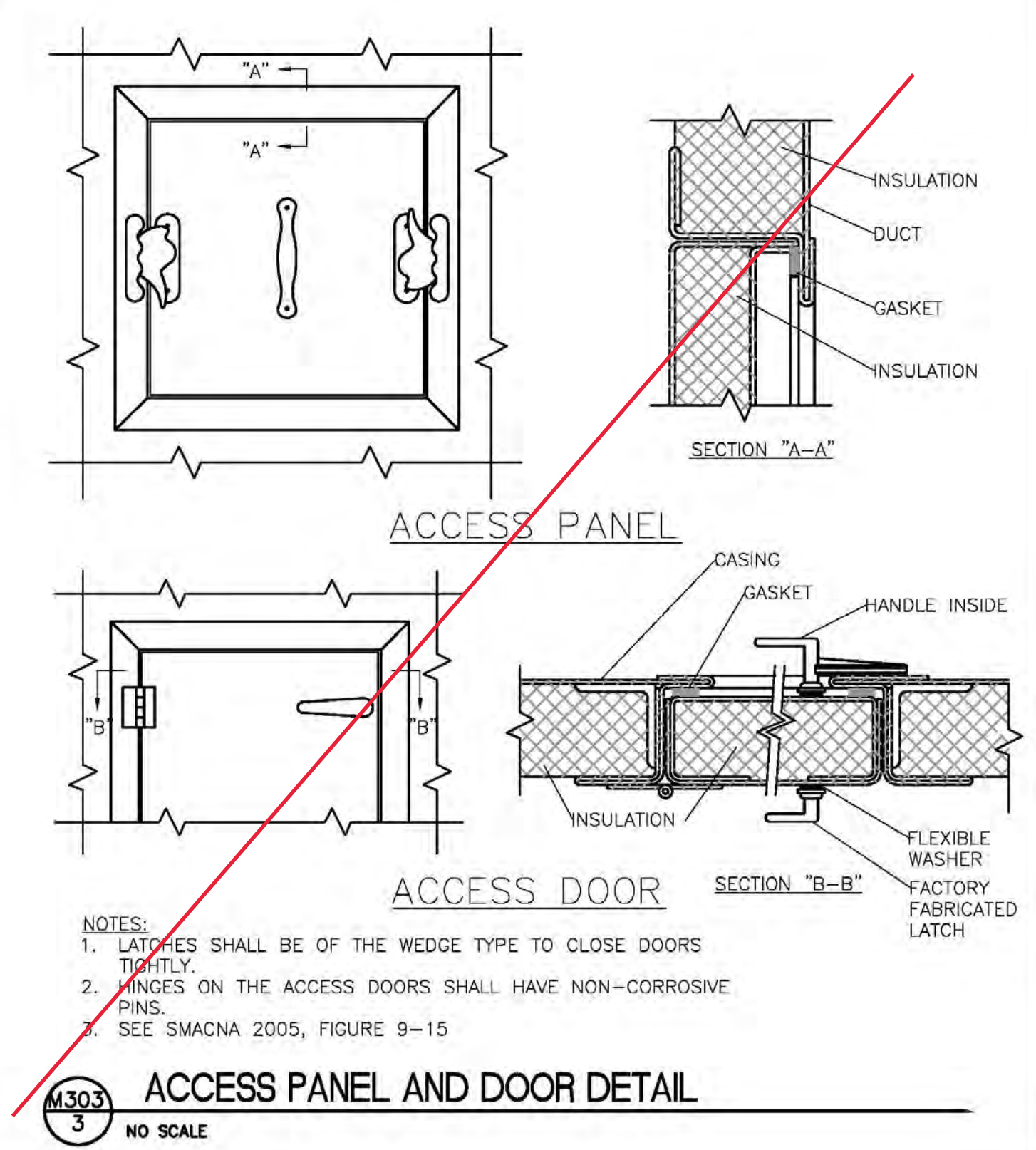
M302 15
TERMINAL UNIT WATER COILS
 NO SCALE



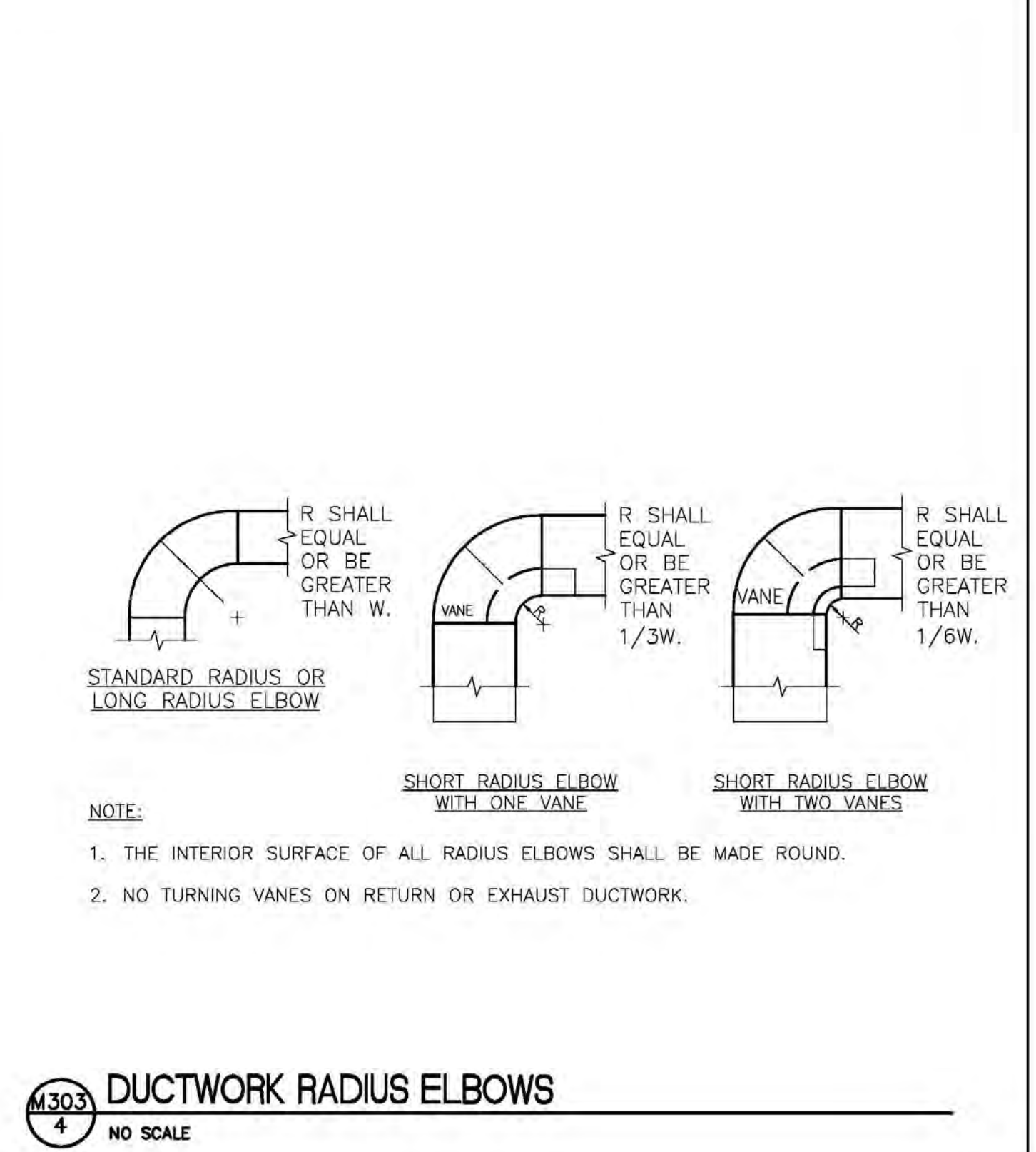
M303 1 NO SCALE
HEAT PUMP FLOW DIAGRAM



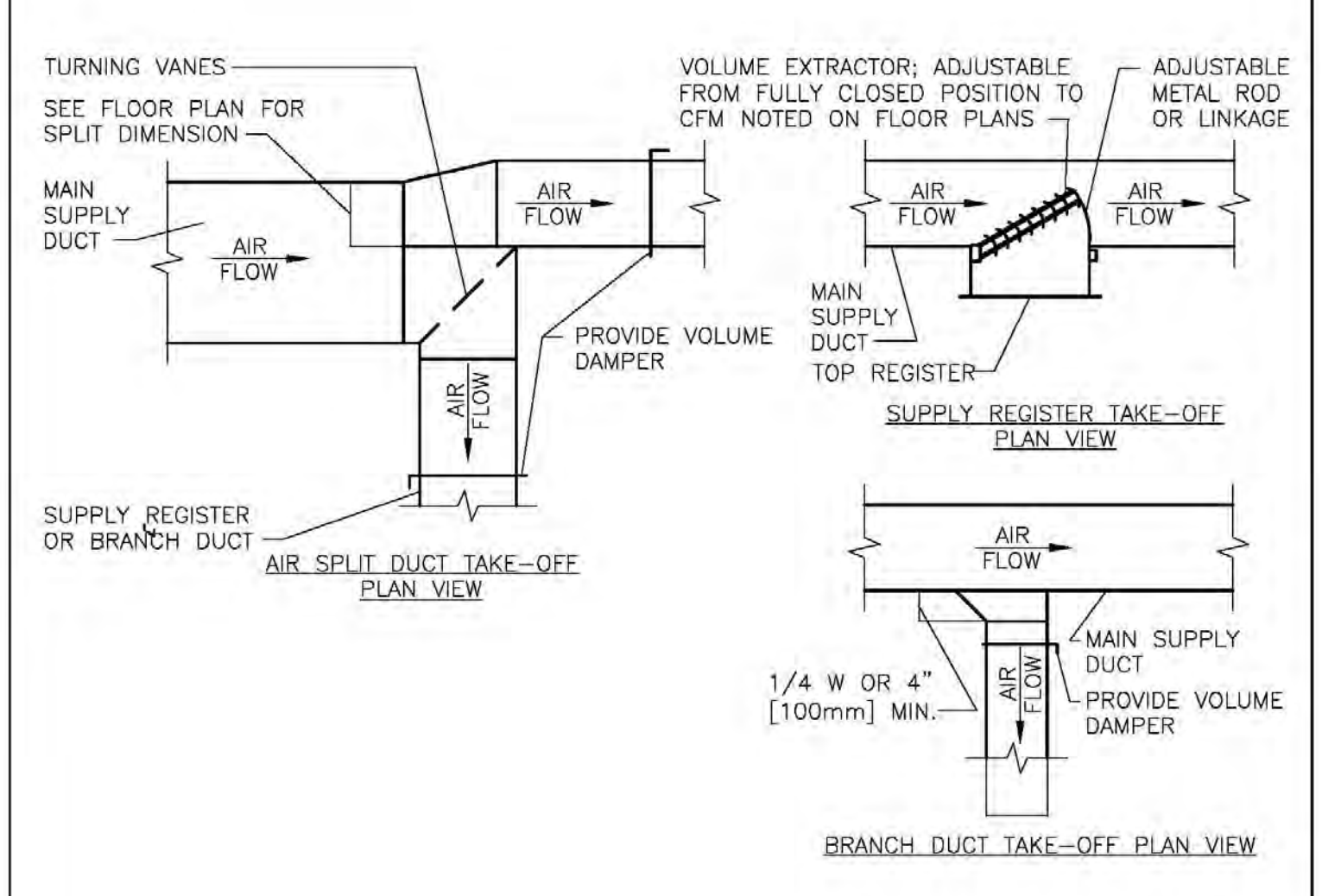
M303 2 NO SCALE
ISOMETRIC FLOW DIAGRAM



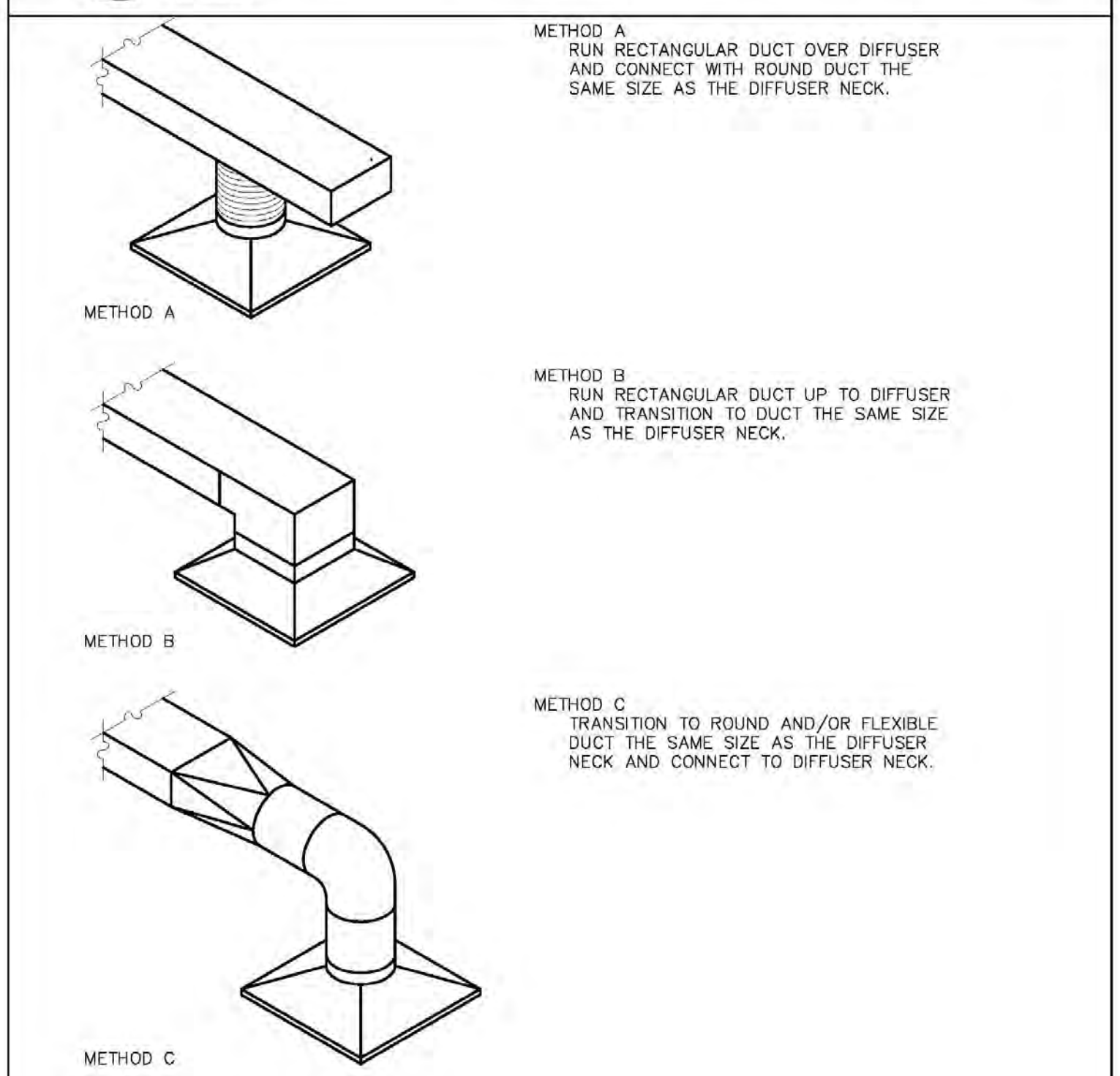
M303 3 NO SCALE
ACCESS PANEL AND DOOR DETAIL



M303 4 NO SCALE
DUCTWORK RADIUS ELBOWS



M303 5 NO SCALE
SUPPLY DUCTWORK TAKE-OFFS



M303 6 NO SCALE
DIFFUSER CONNECTIONS

1	PR # 22	2/2/15
No.	REVISION	DATE

Horty Elving™
505 East Grant Street, Minneapolis, MN 55404-1490
T 612.332.4422 F 612.344.1282 hortyelving.com

Planning
Architecture
Engineering
Interior Design
Construction Management
Design Build
Horty Elving & Associates, Inc.

RECORD SET 09/30/16

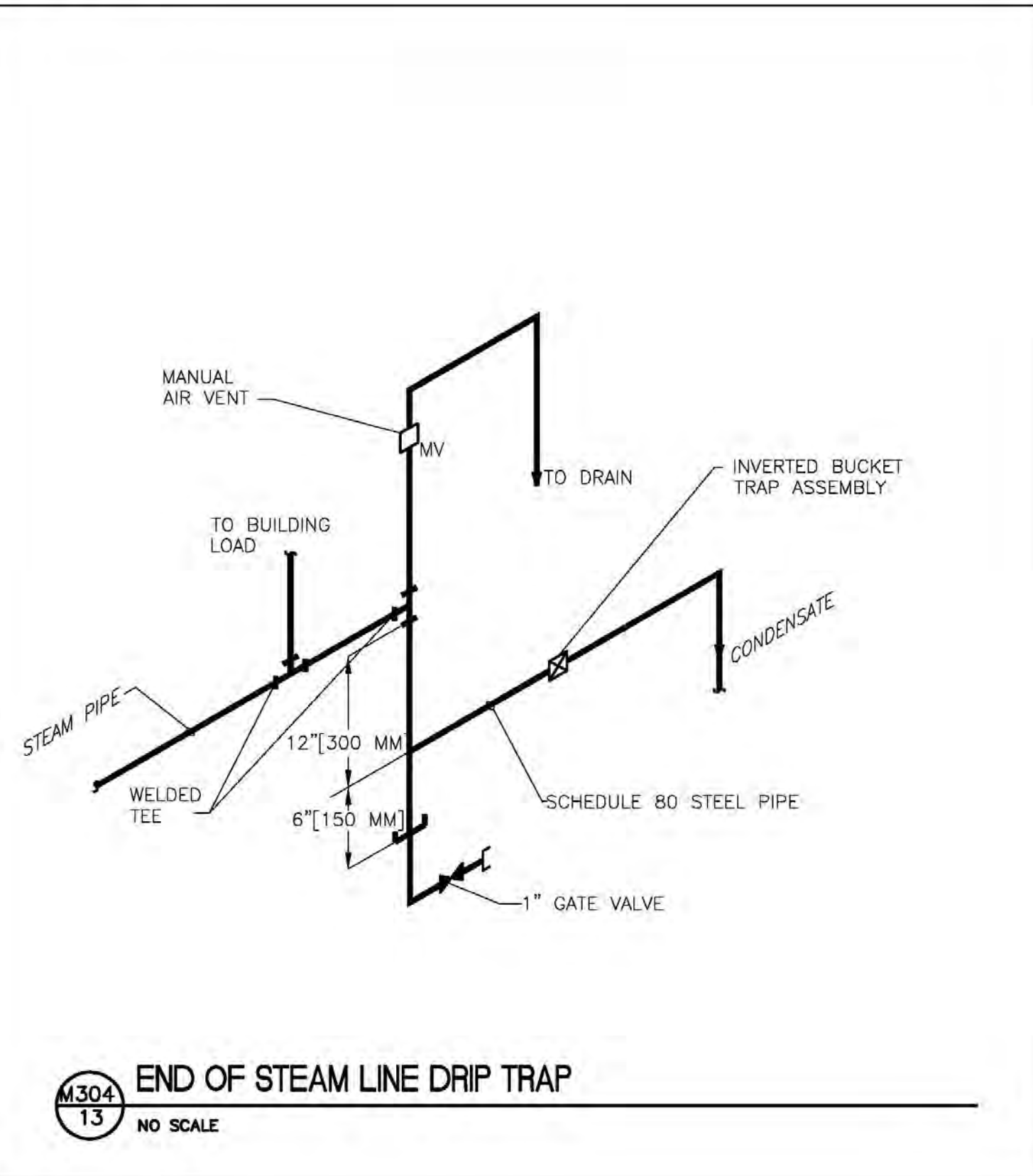
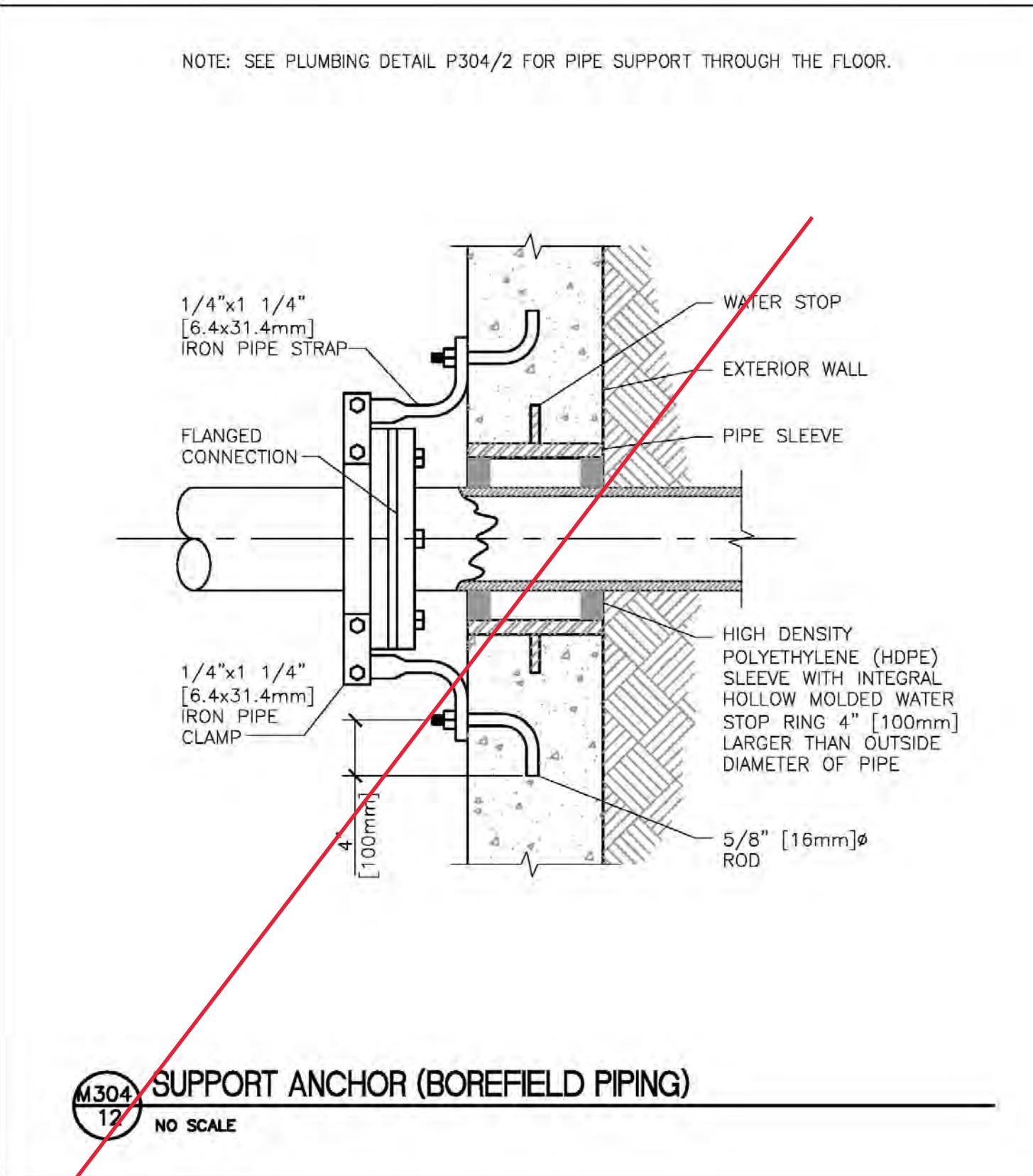
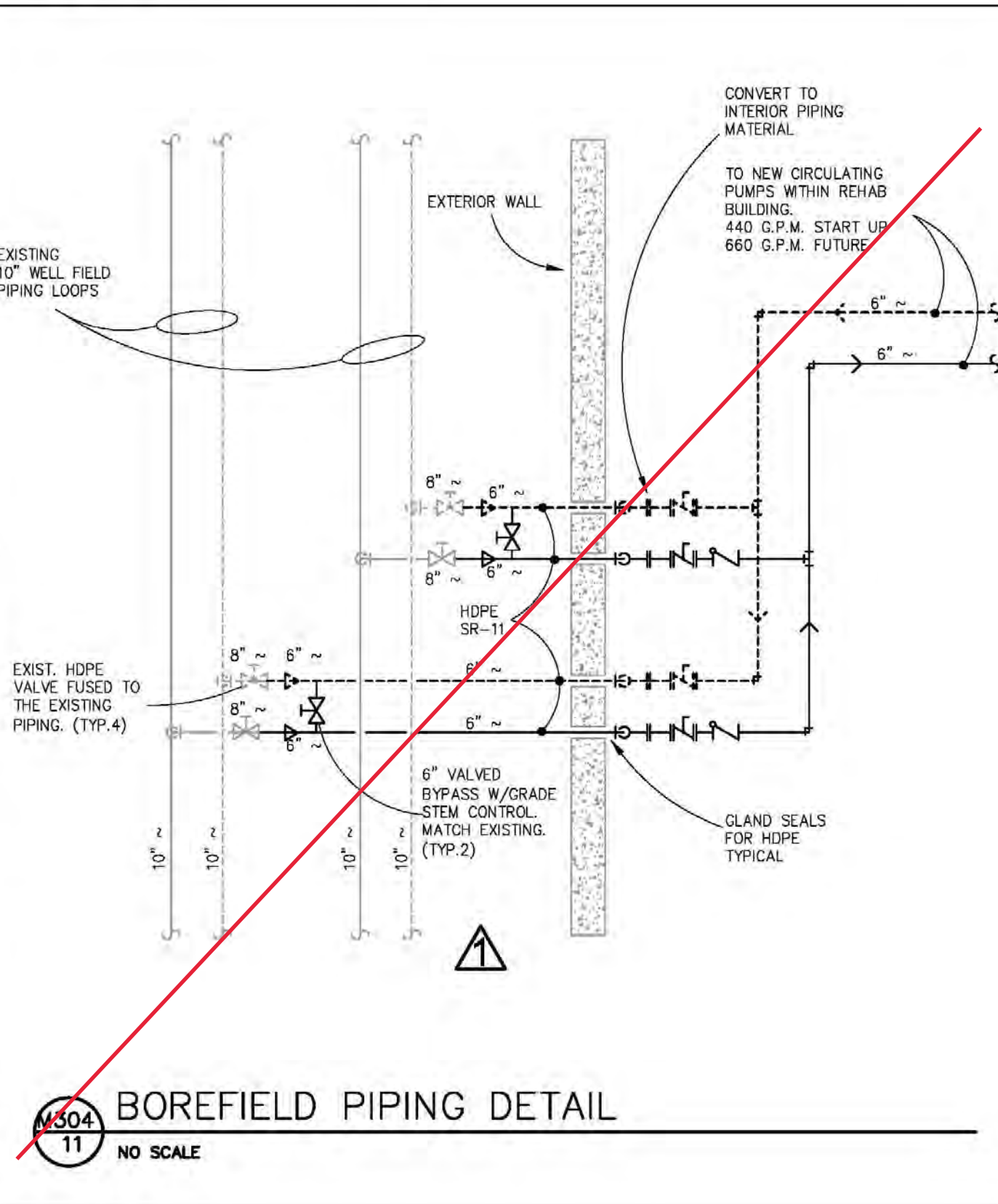
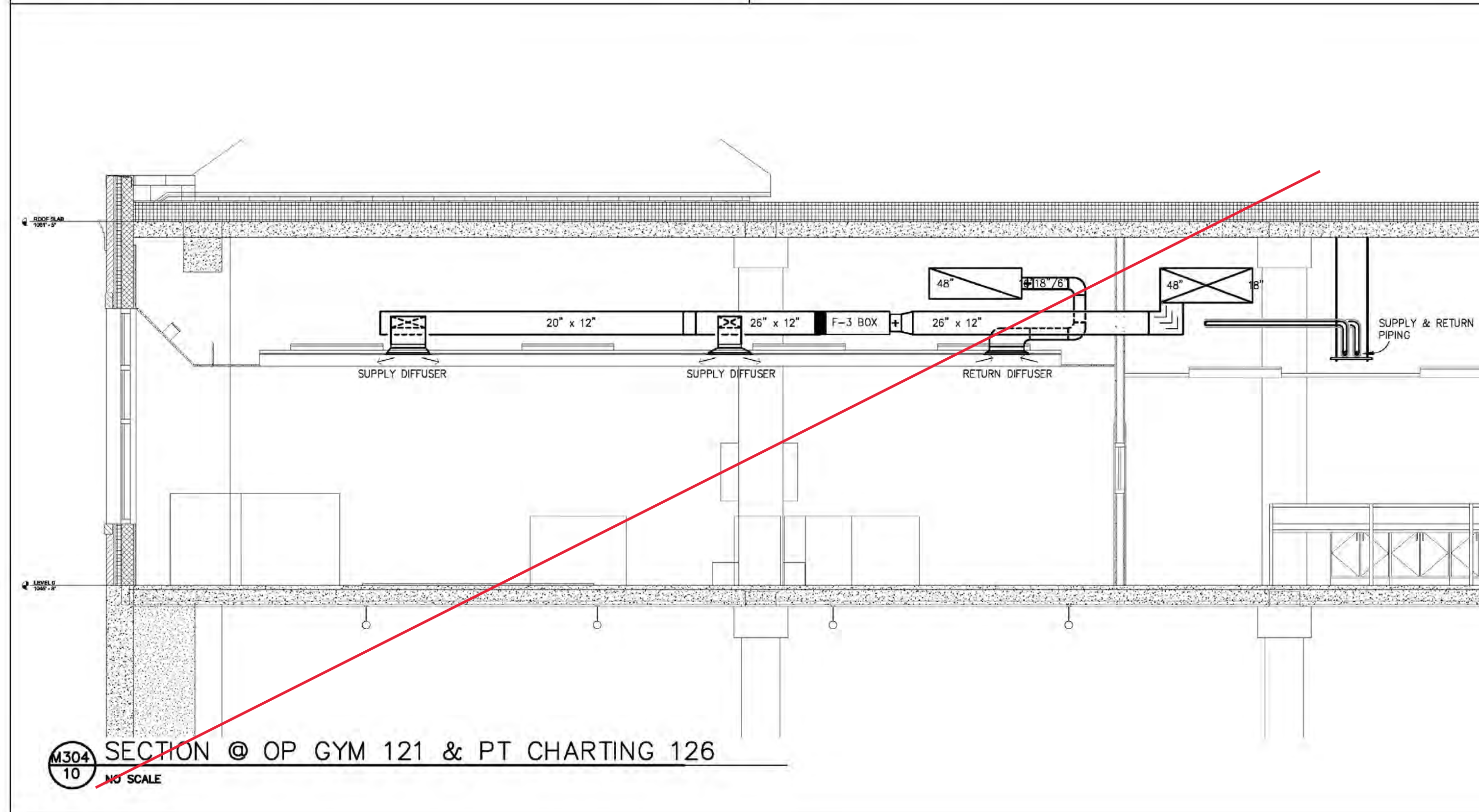
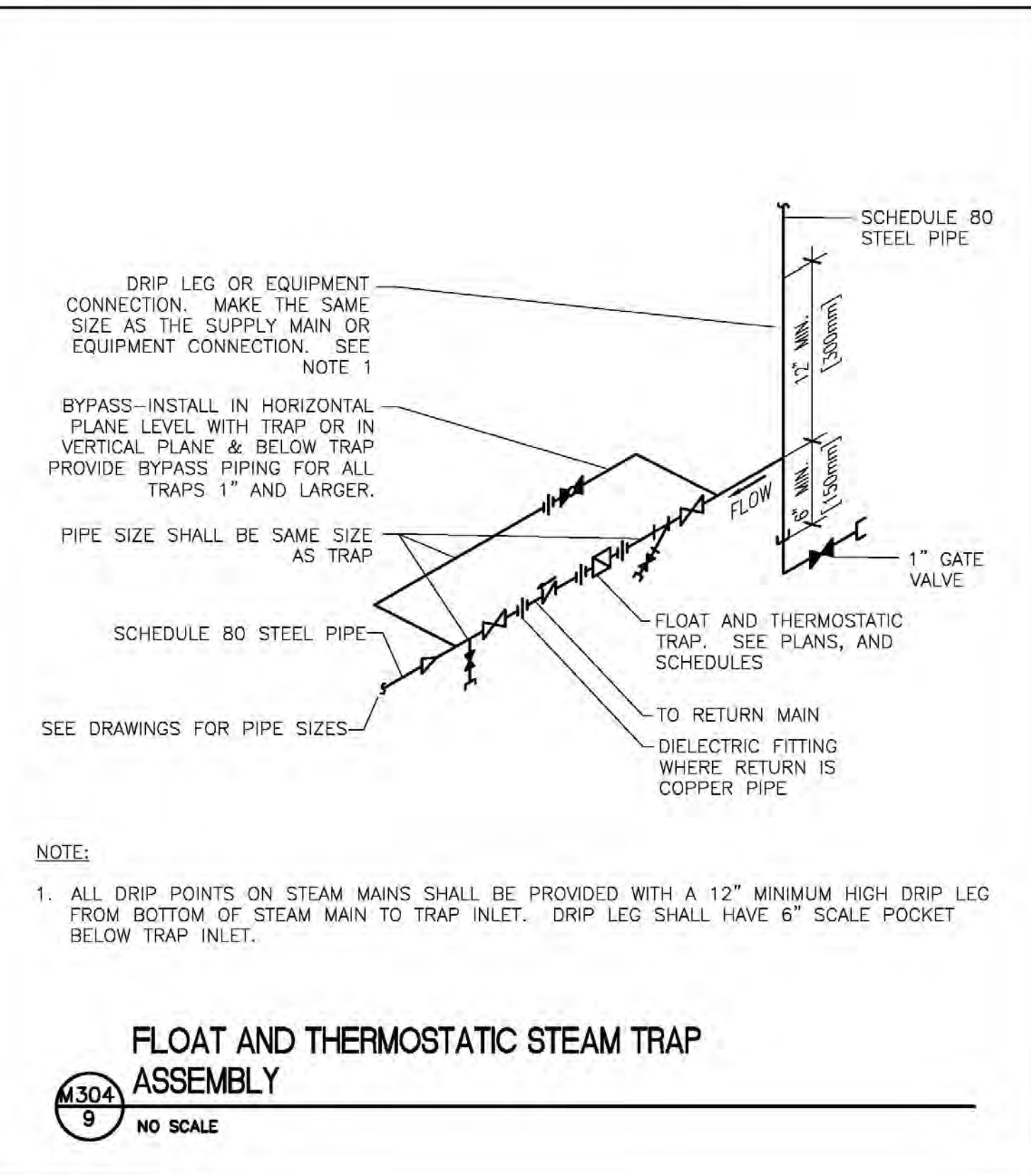
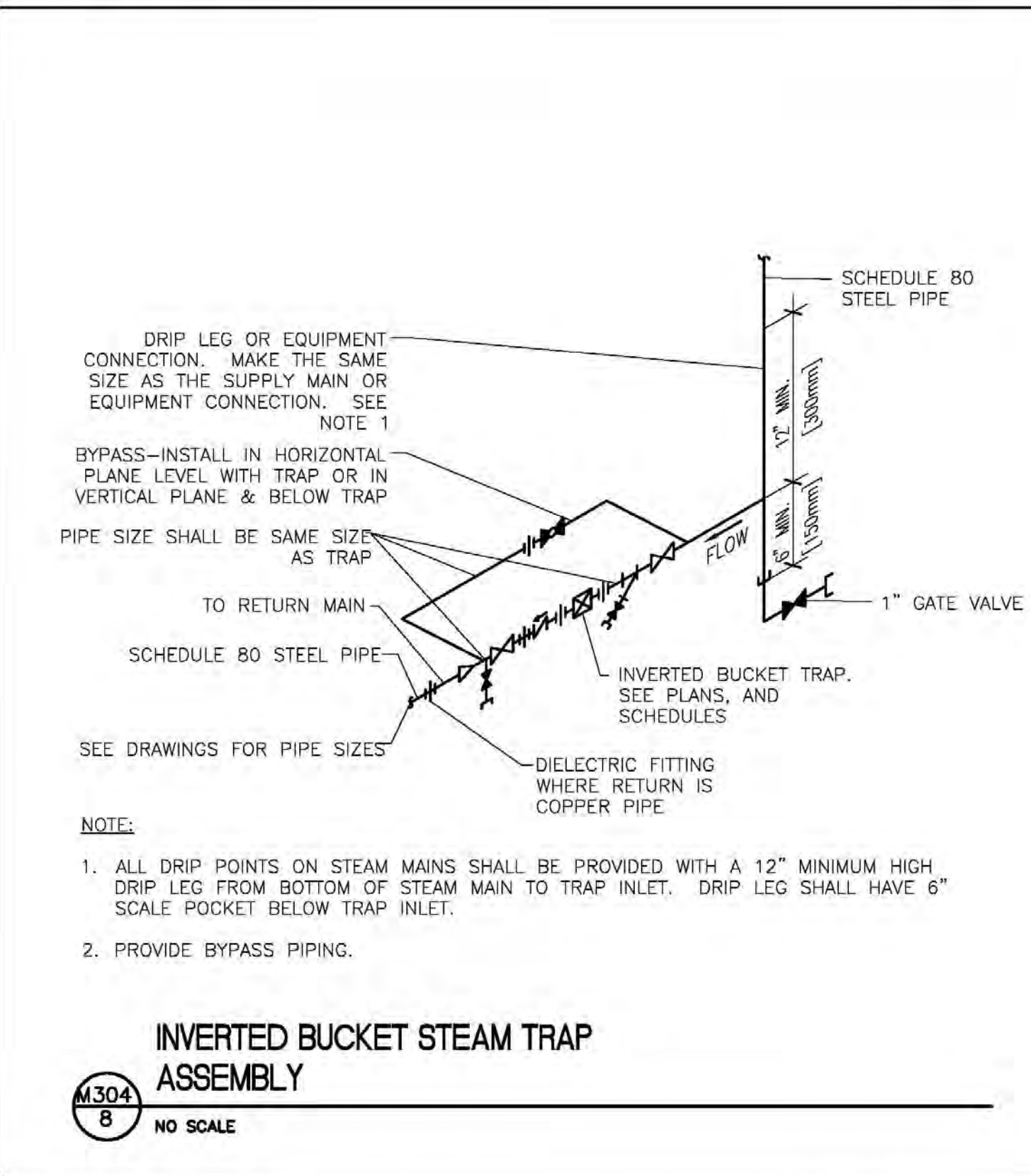
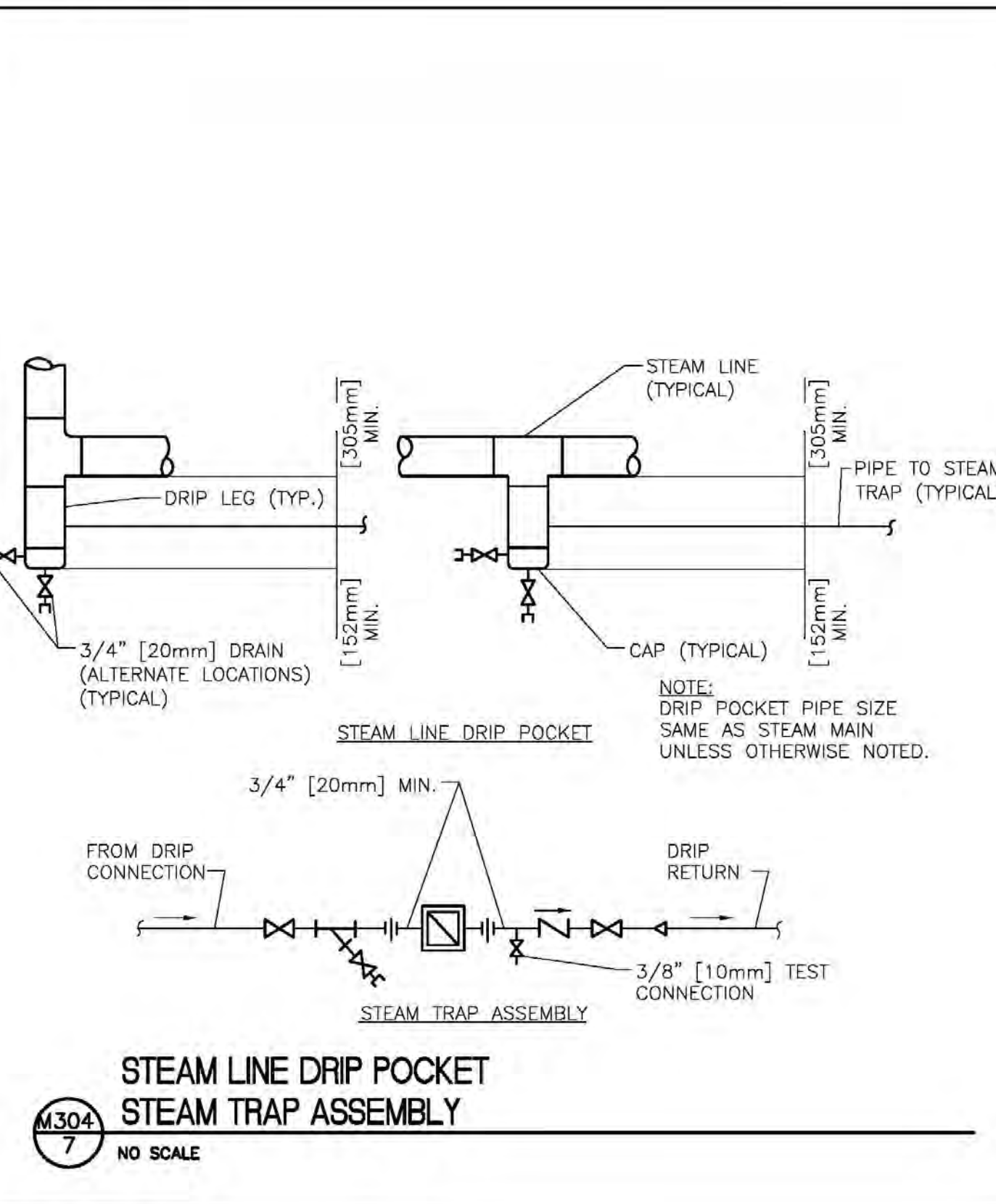
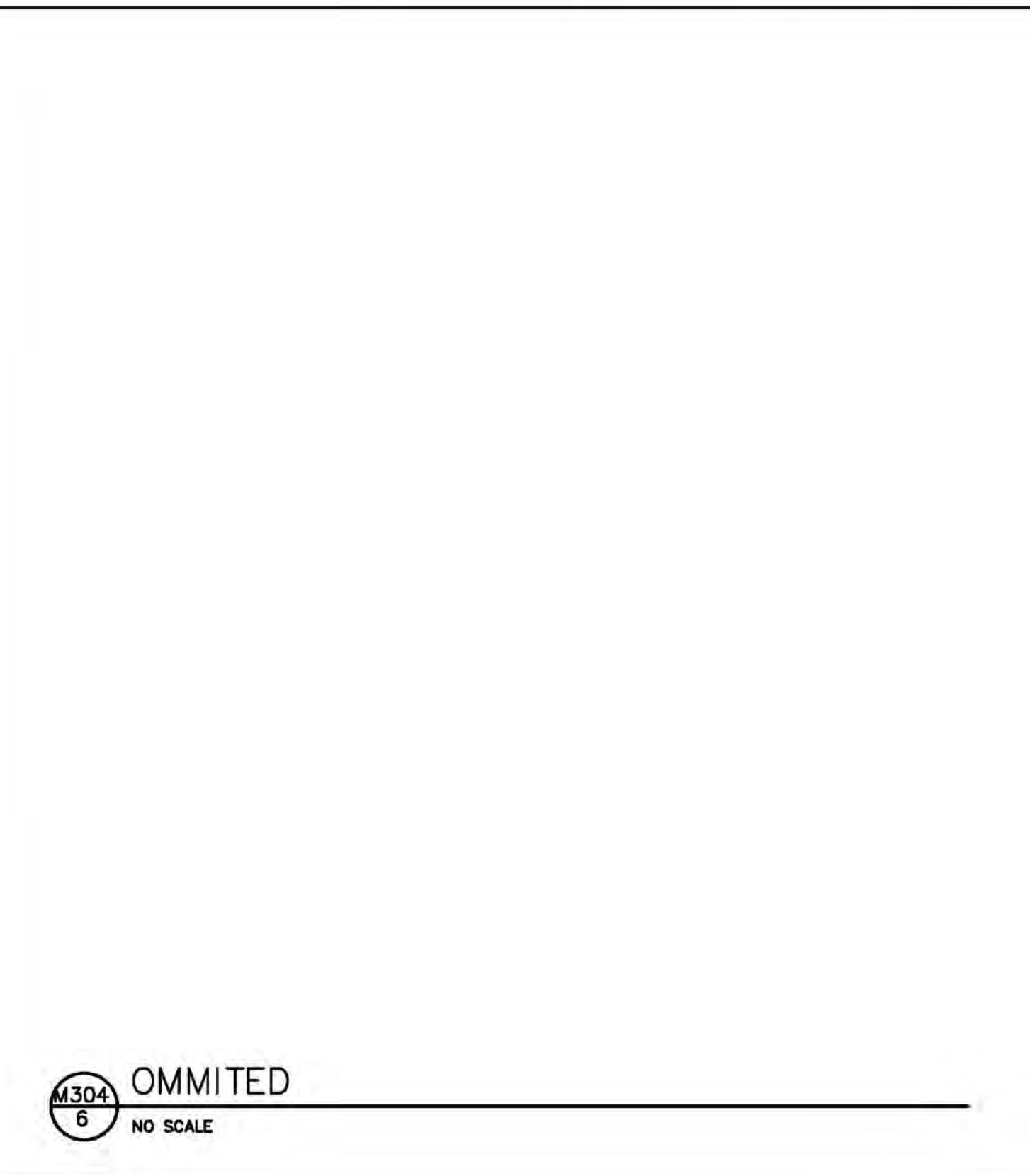
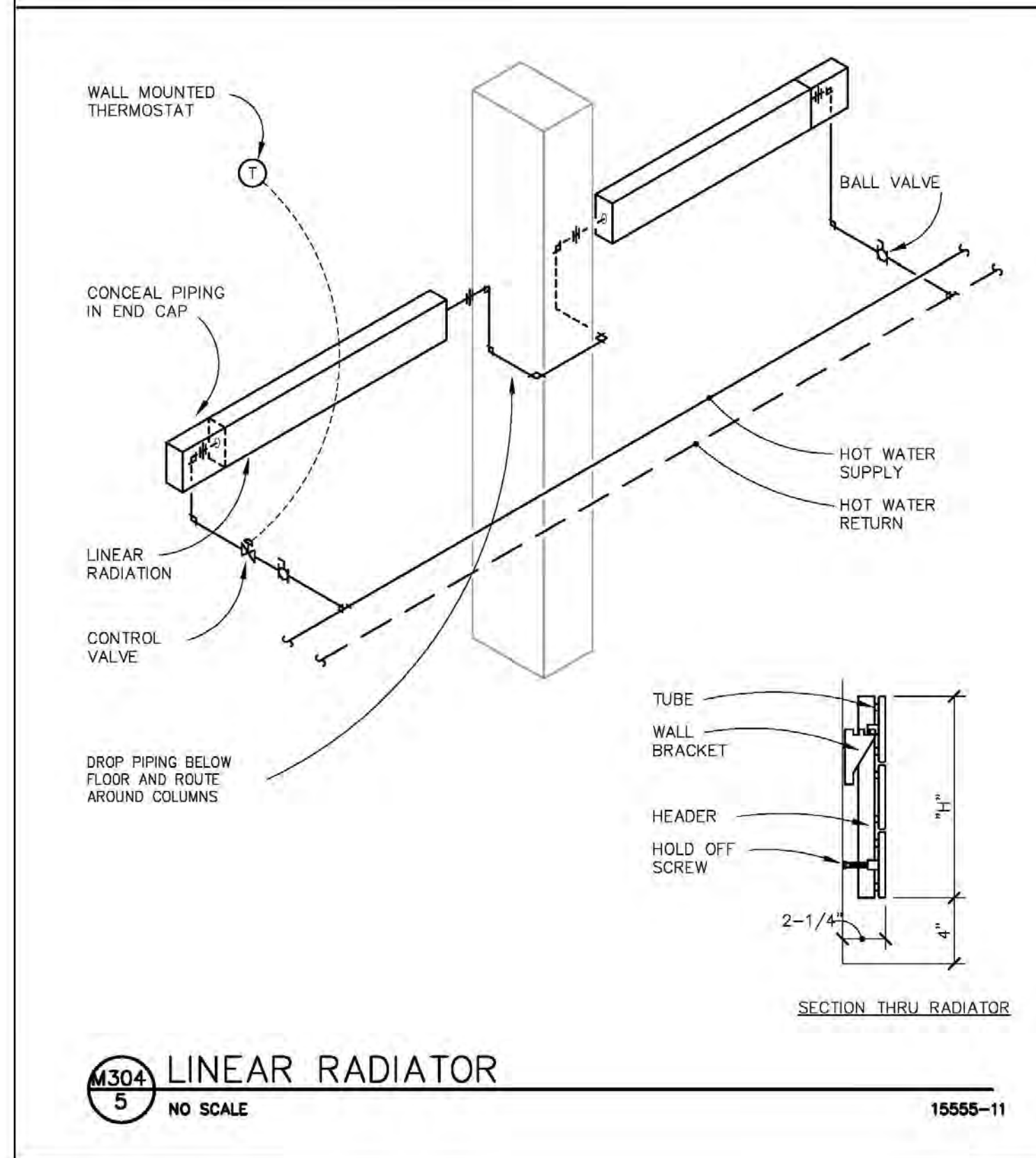
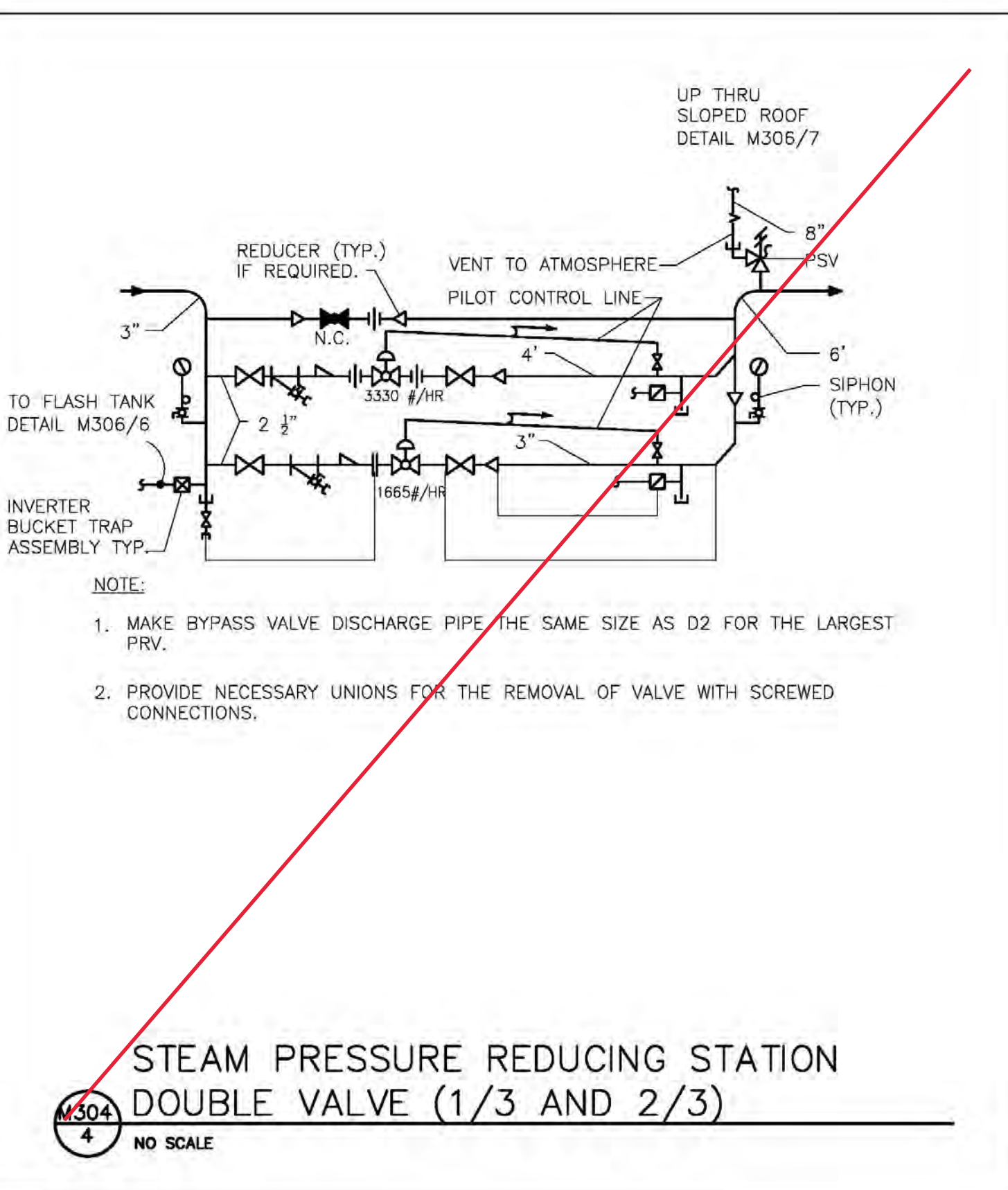
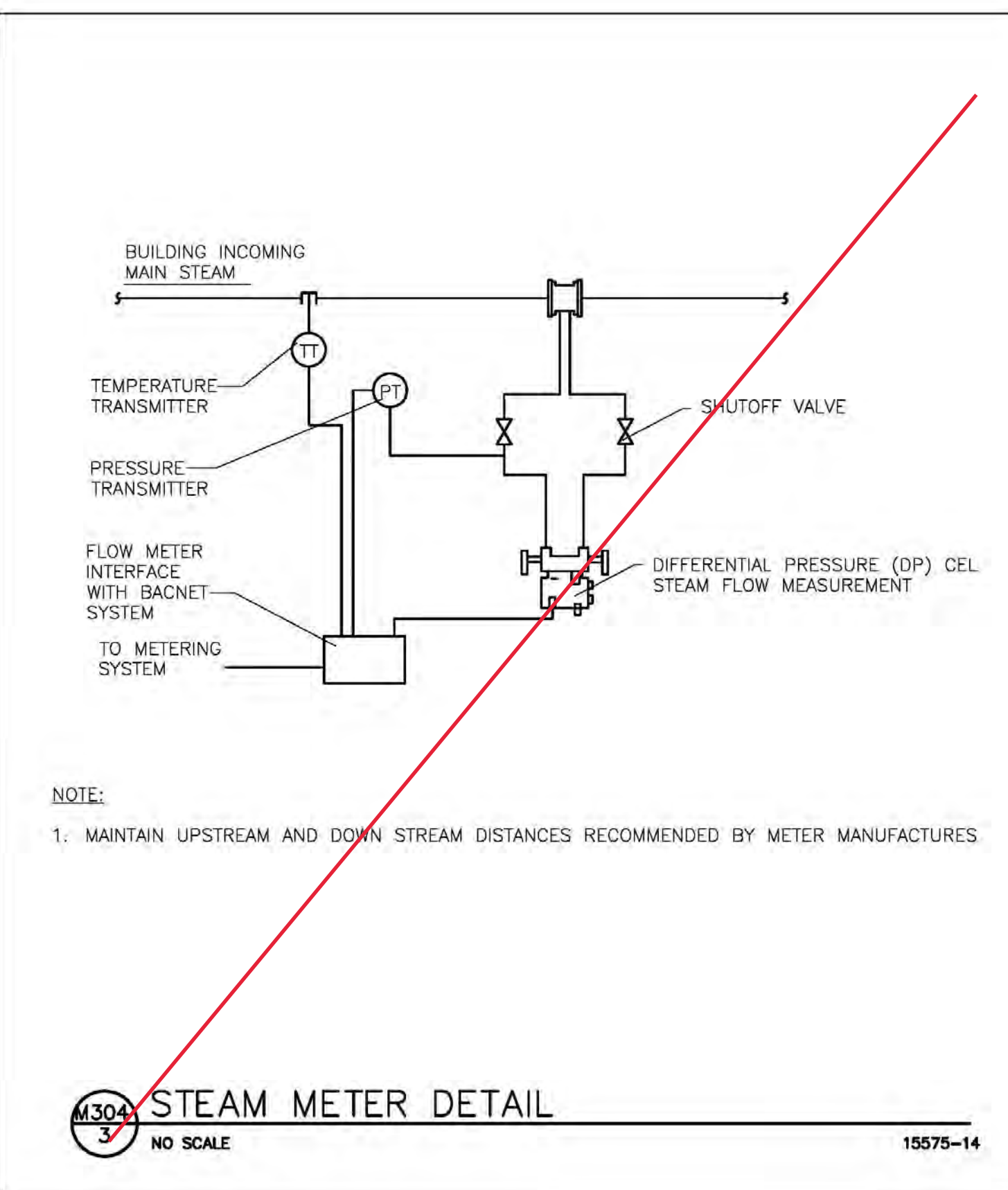
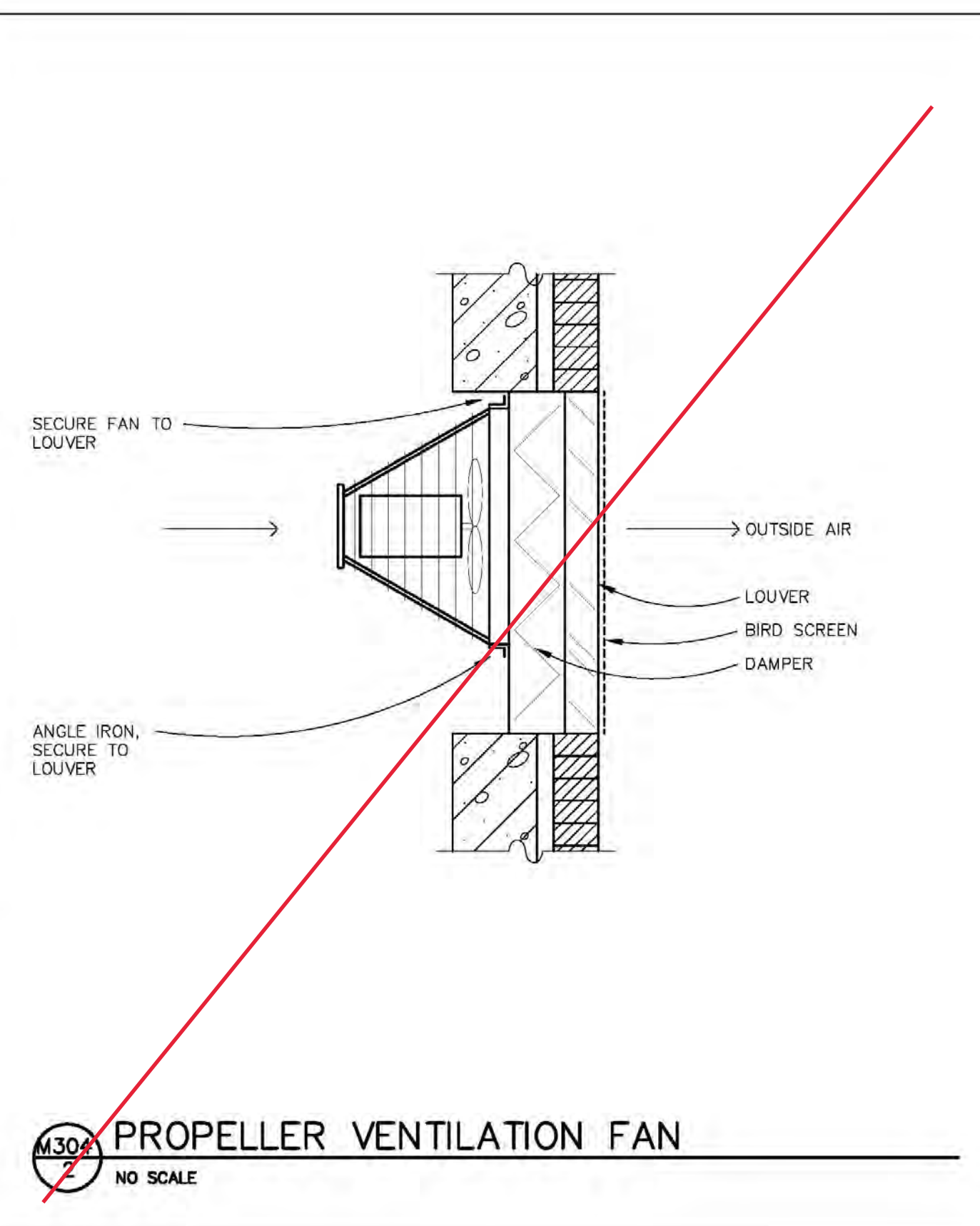
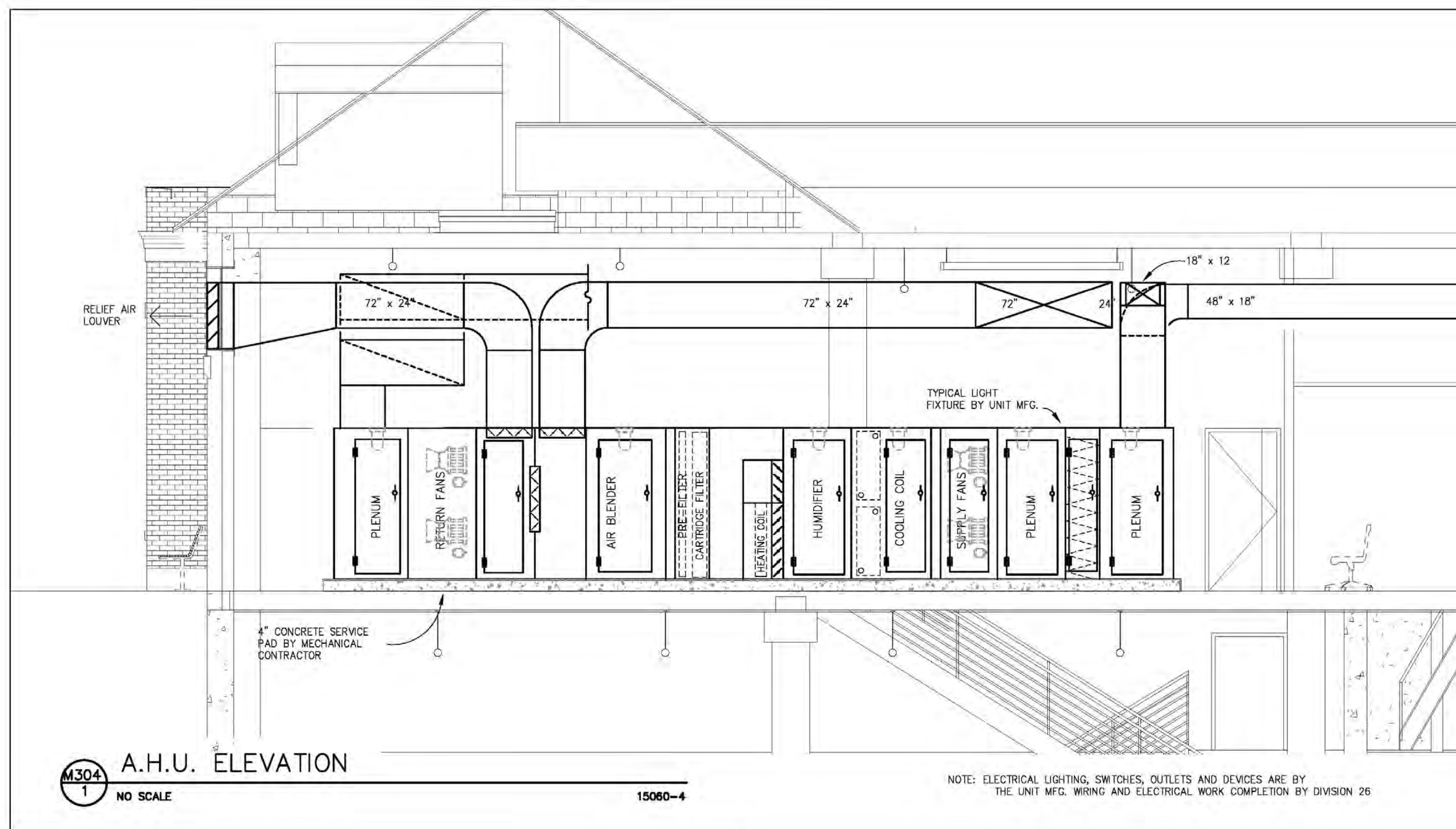
I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
James C. Elving License No. 12852

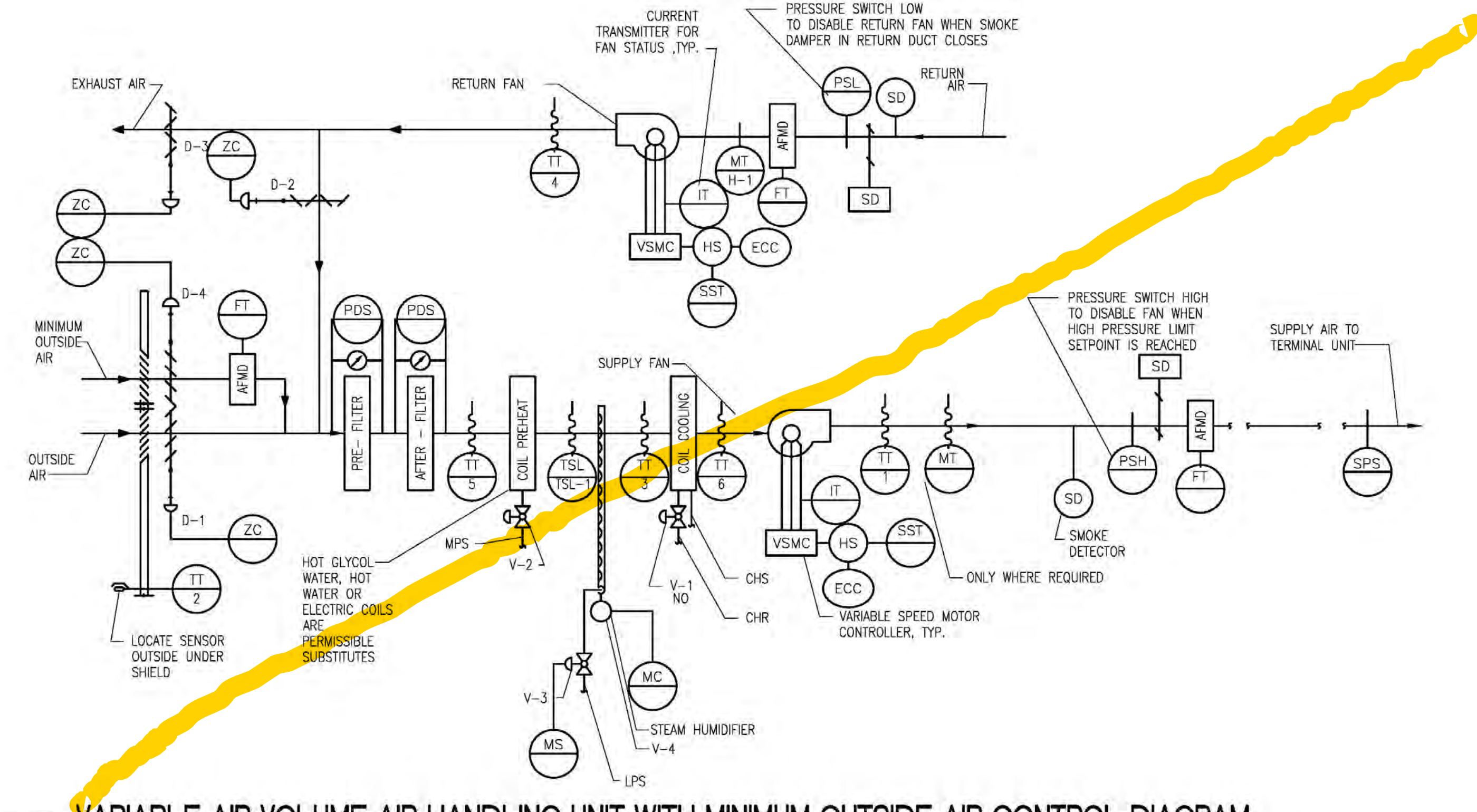
APPROVED: SERVICE LINE DIRECTOR	DATE	APPROVED: INFECTION CONTROL NURSE	DATE
APPROVED: GEMS COORDINATOR	DATE	APPROVED: PATIENT SAFETY	DATE
APPROVED: PROJECTS SECTION MANAGER	DATE	APPROVED: CHIEF OF POLICE	DATE
APPROVED: DIRECTOR PMS	DATE	APPROVED: SAFETY MANAGER	DATE

DRAWING TITLE MECHANICAL DETAILS	
APPROVED: CHIEF OF STAFF	DATE
APPROVED: MEDICAL CENTER DIRECTOR	DATE

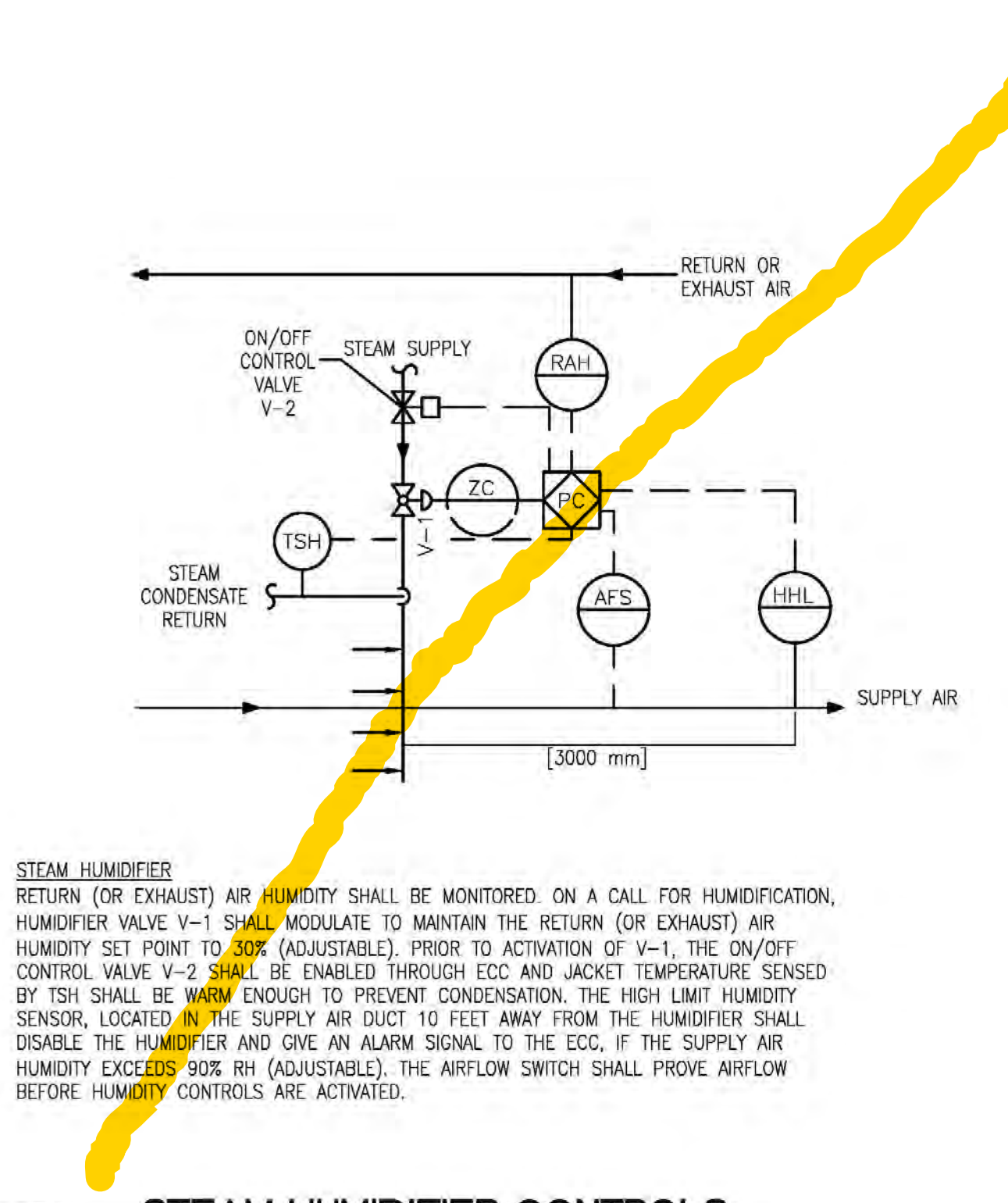
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DRAWING NO. 116	PROJ. SCALE NTS
CHECKED BY XXX	PROJECT NO. S1430
LOCATION VA MEDICAL CENTER ST. CLOUD, MN 56303	DRAWING NO. M303



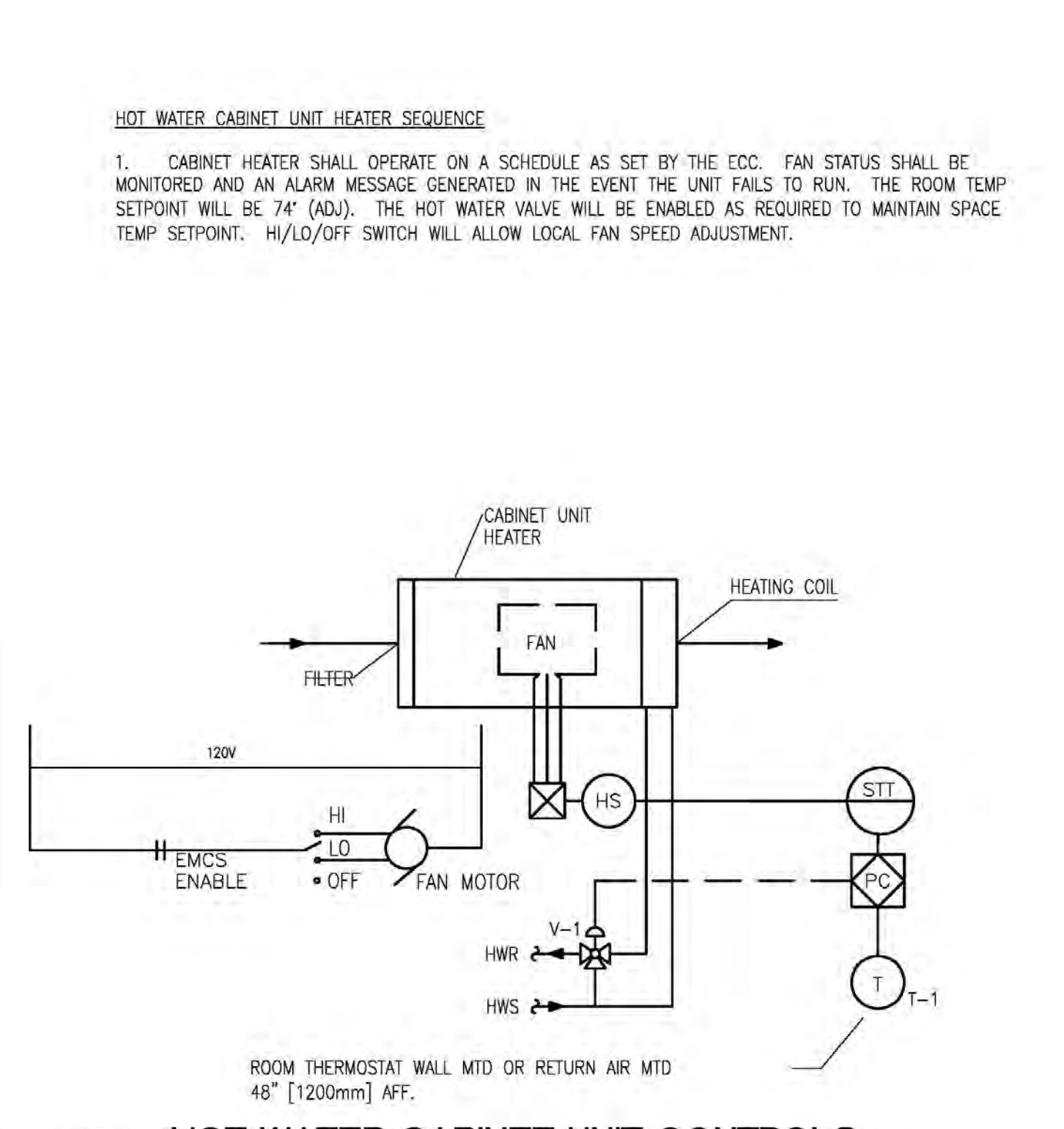




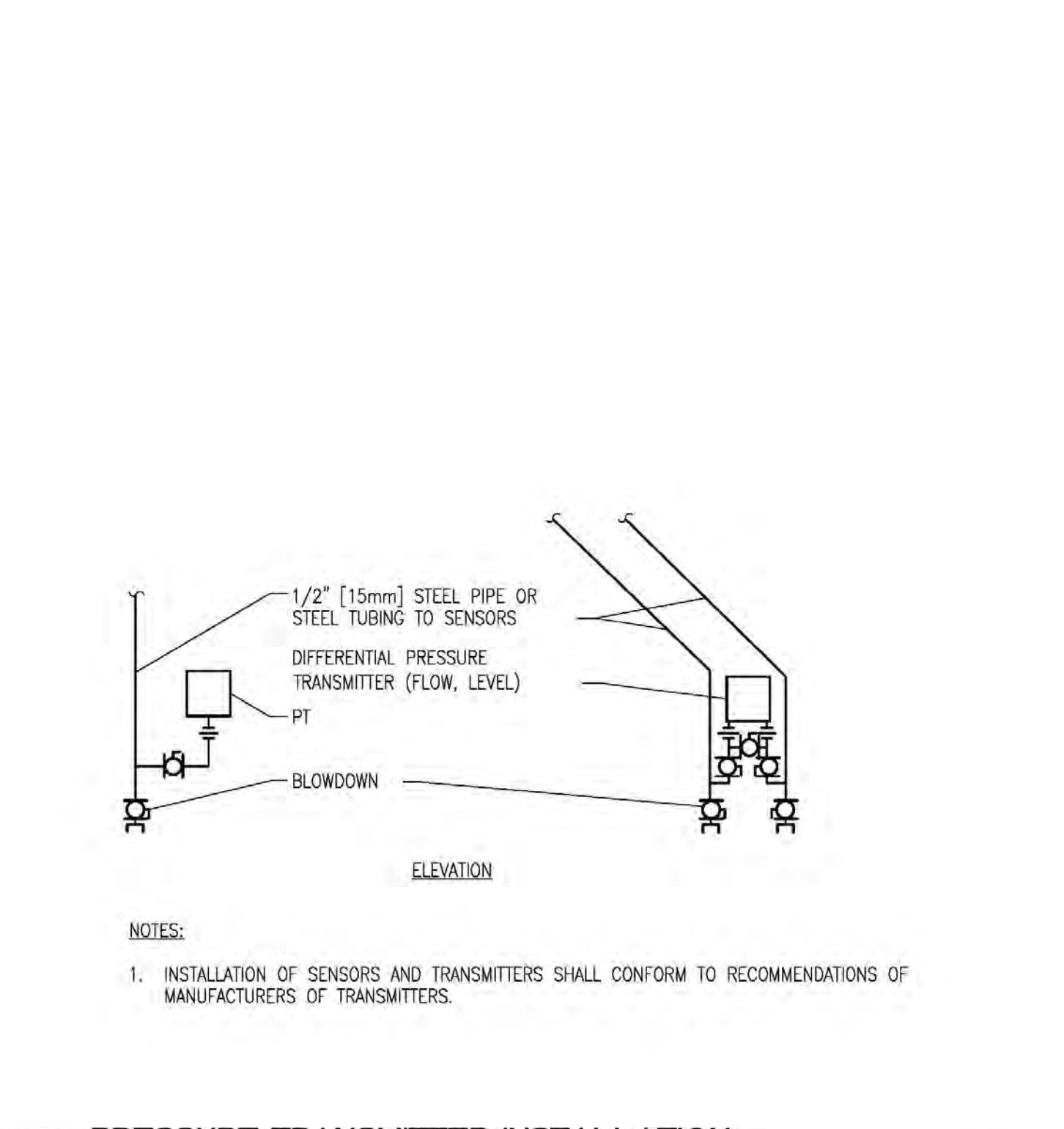
M305 1
NO SCALE
VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR CONTROL DIAGRAM



M305 2
NO SCALE
STEAM HUMIDIFIER CONTROLS



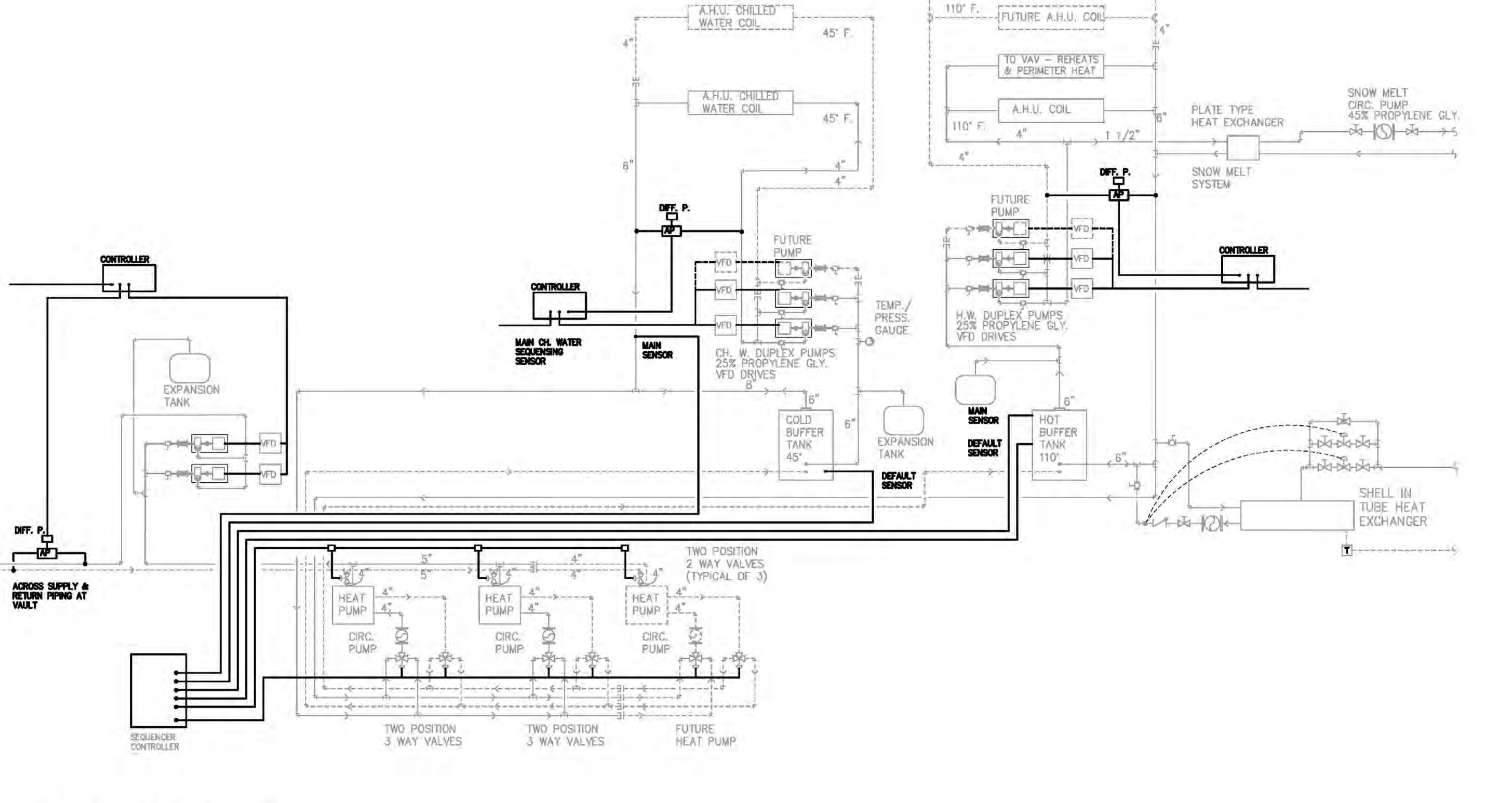
M305 3
NO SCALE
HOT WATER CABINET UNIT CONTROLS



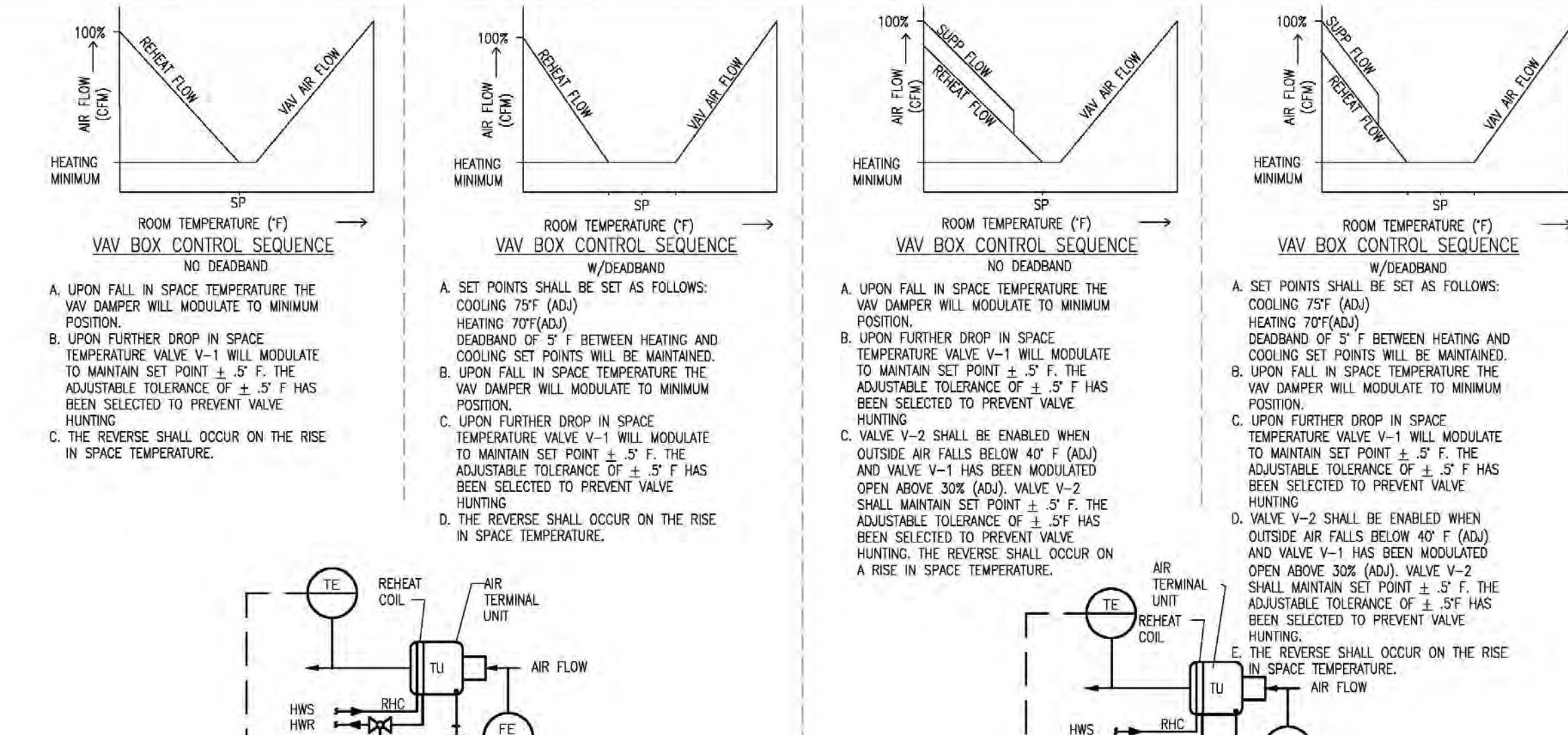
M305 4
NO SCALE
PRESSURE TRANSMITTER INSTALLATION



M305 5
NO SCALE
VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM



M305 5
NO SCALE
HEAT PUMP CONTROL

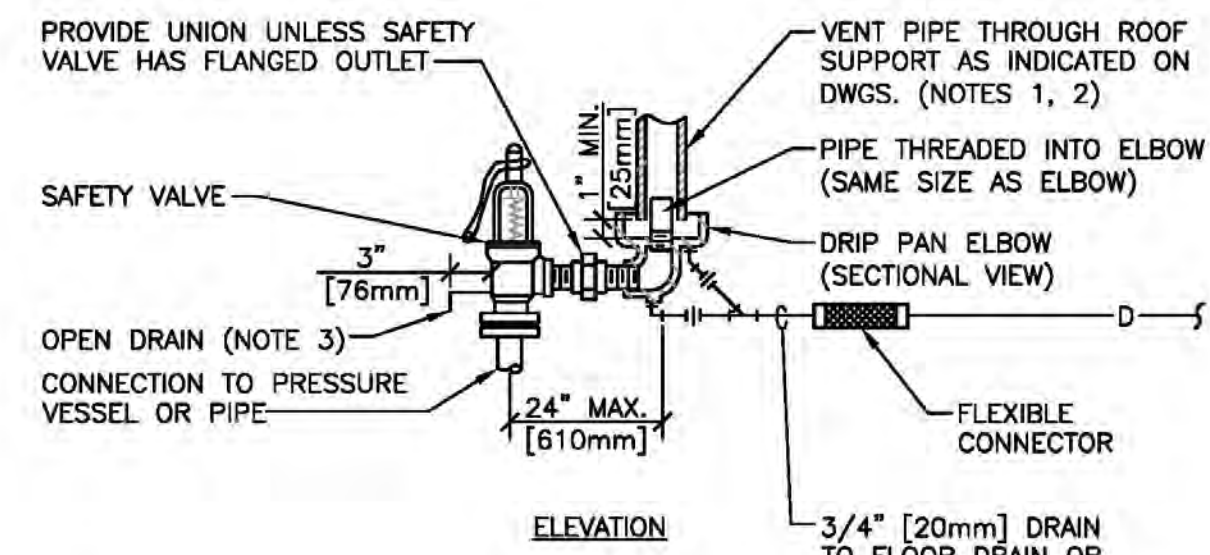


M305 6
NO SCALE
HEAT EXCHANGER CONTROLS (HEATING SYSTEM)

JOB: 0555.09
BUILDING: VA SAMPLE POINTS LIST

SYSTEM COMPONENT	POINT LEGEND	SYSTEM BINARY		SYSTEM ANALOG		SYSTEM SOFTWARE/CONTROL		PAGE:
		ANALOG	BINARY	ANALOG	BINARY	ALARM PROCESSING	APPLICATION/FUNCTION	
SYSTEM: VAV AIR HANDLER								
SYSTEM COMPONENT:								
Return Air Temperature	A1-1 RAT							
Return Air Humidity	A1-2 RAH							
Return Air Flow (cfm)	A1-3 RAF							
Mixed Air Temperature	A1-4 MAT							
Pre-Heat Temperature	A1-5 PHIT							
Cooling Coil Temperature	A1-6 CCT							
Discharge Air Temperature	A1-7 DAT							
Discharge Static Pressure	A1-8 DSP							
Discharge Air Humidity	A1-9 DAH							
Supply Air Flow (cfm)	A1-10 SAF							
OUTSIDE AIR TEMPERATURE	A1-11 OAT							
RETURN LOW PRESSURE	BI-1 RLP							
RETURN FAN STATUS	BI-2 RF-SIS							
SUPPLY FAN STATUS	BI-3 SF-SIS							
MIXED AIR LOW LIMIT	BI-4 TSL-1							
STATIC PRESSURE HIGH LIMIT	BI-5 SPS-2							
HUMIDITY HIGH LIMIT	BI-6 HHL							
SUPPLY FAN VSMC ALARM	BI-7 SF-ALA							
RETURN FAN VSMC ALARM	BI-8 RF-ALA							
RETURN FAN VSMC	AO-1 RF-SPO							FULL COMMUNICATION
SUPPLY FAN VSMC	AO-2 SF-SPO							FULL COMMUNICATION
RETURN AIR DAMPER	AO-3 RAD							
EXHAUST AIR DAMPER	AO-4 EAD							
MINIMUM OUTSIDE AIR DAMPER	AO-5 MAD							
PRE-HEAT VALVE V-1	AO-6 PH-V1							
COILING VALVE V-1	AO-8 CLG-V1							
STEAM HUMIDIFIER VALVE V-4	AO-10 HUM-V4							
RETURN FAN START/STOP	BO-1 RF-SST							
SUPPLY FAN START/STOP	BO-2 SF-SST							
STEAM ISOLATION VALVE V-3	BO-3 HUM-ISO-V3							

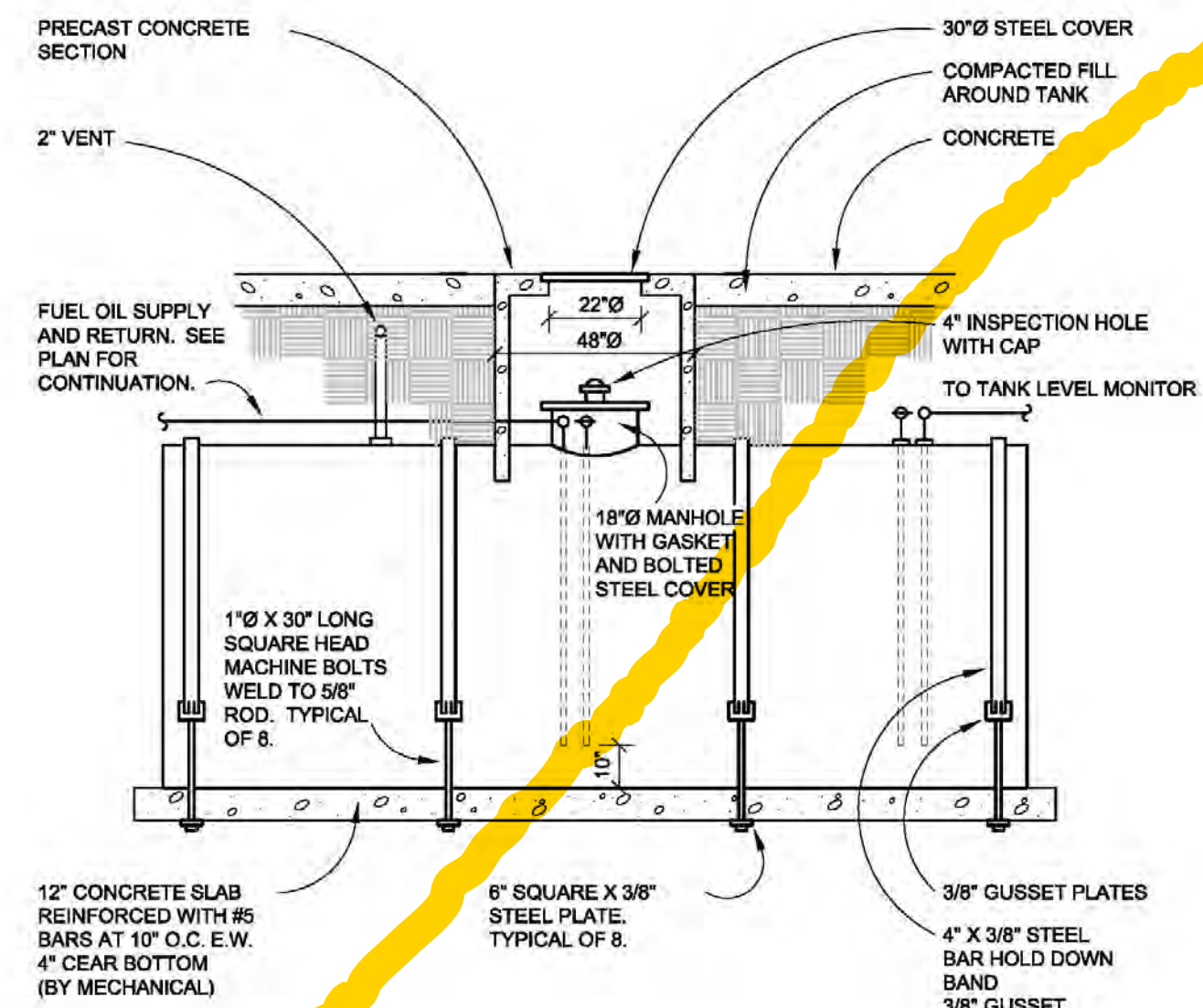
M305 4
NO SCALE
POINTS LIST FOR VAV AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR



NOTES:

- UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1, POWER PIPING CODE, APPENDIX II.
- VENT PIPE SHALL TERMINATE 6" [152mm] MIN. ABOVE FINISHED ROOF.
- DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.
- DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

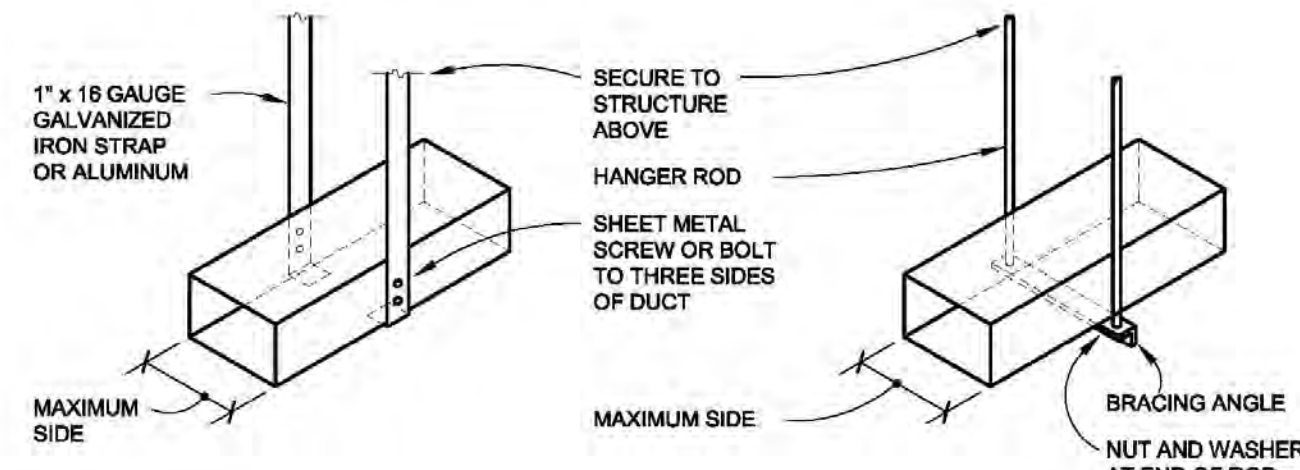
M306 1 STEAM SAFETY VALVE
NO SCALE



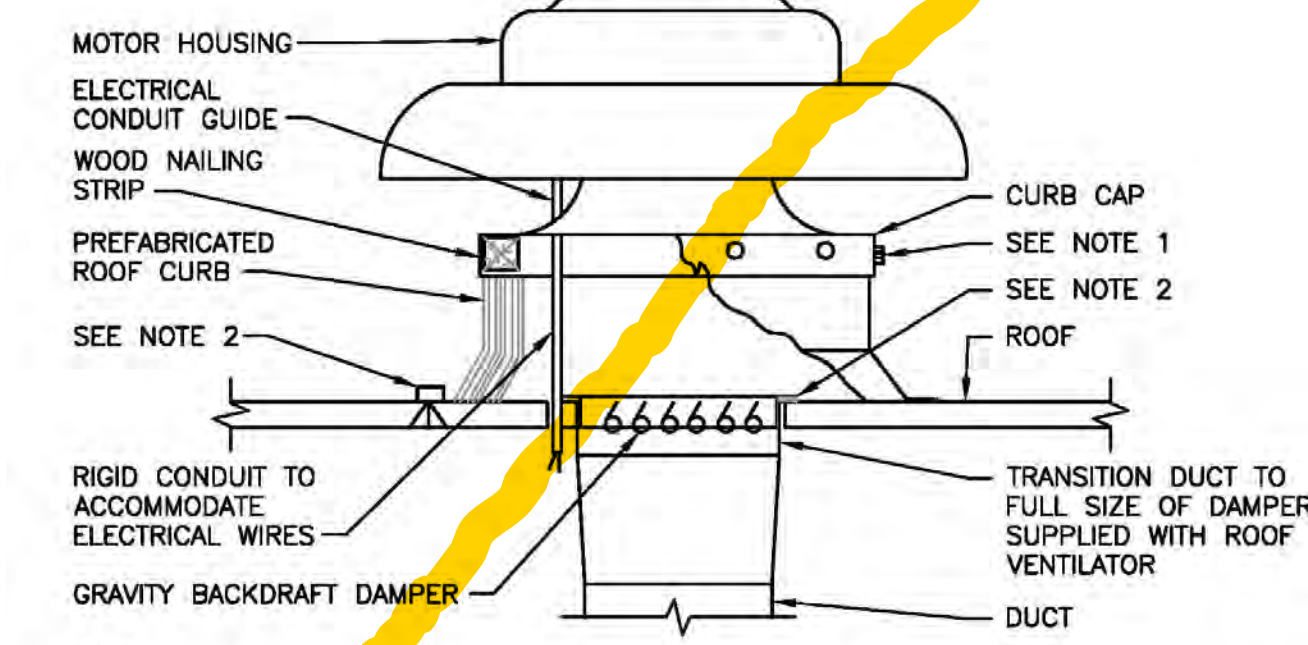
M306 2 FUEL OIL STORAGE TANK
NO SCALE

DUCT SCHEDULE		
DUCT DIMENSION	TYPE	HANGER
UP TO 12"	A	
13" TO 18"	A	
19" TO 30"	AB	
31" TO 42"	B	
43" TO 54"	B	
55" TO 67"	B	
68" TO 84"	C	
85" TO 96"	C	
OVER 96"	D	

HANGER SCHEDULE		
HANGER TYPE	ROD DIAMETER	BRACING ANGLE
"A"	-	-
"B"	5/16"	18° L
"C"	3/8"	3/18° L
"D"	1/2"	14° L



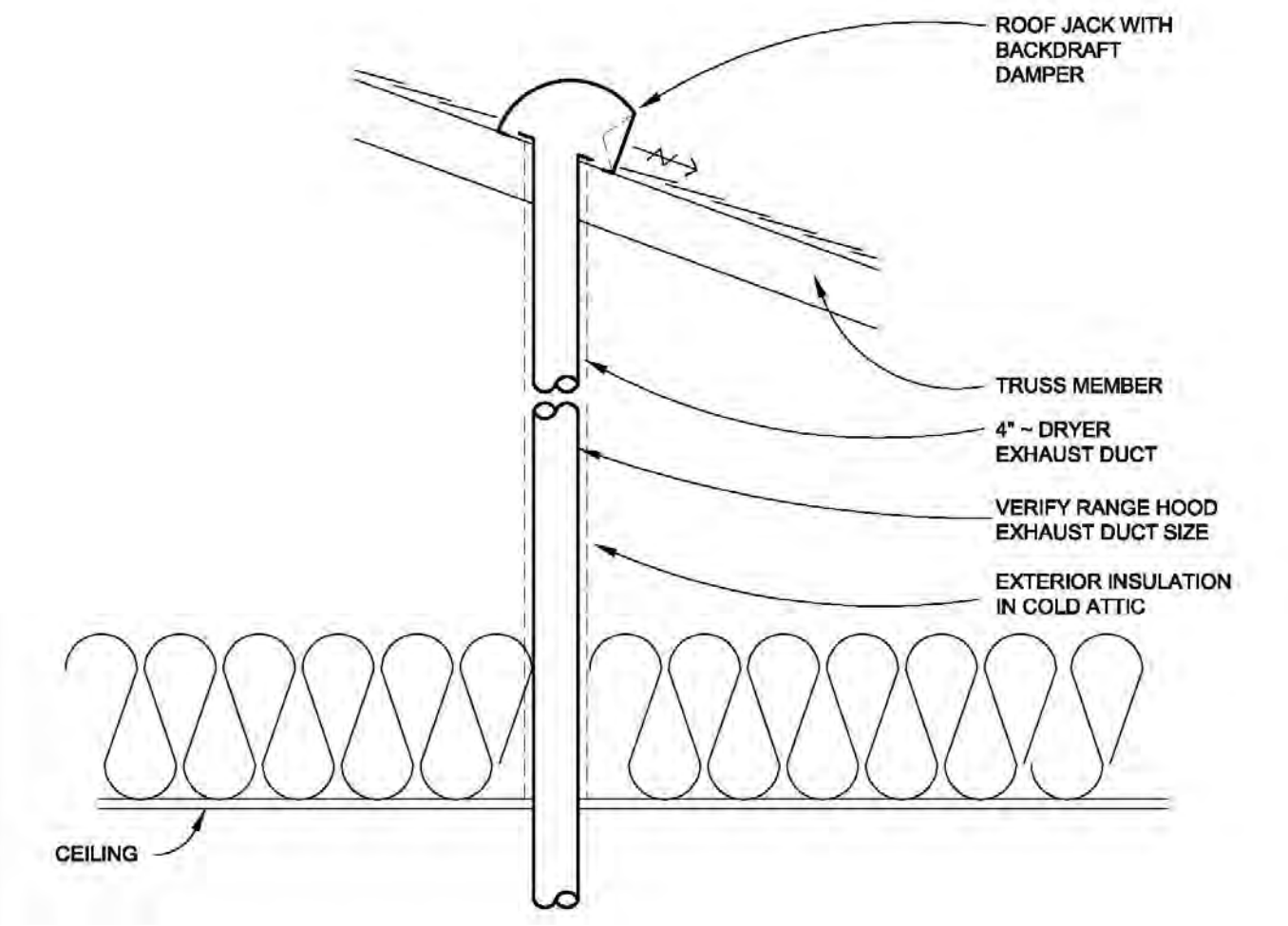
M306 3 DUCT HANGER
NO SCALE



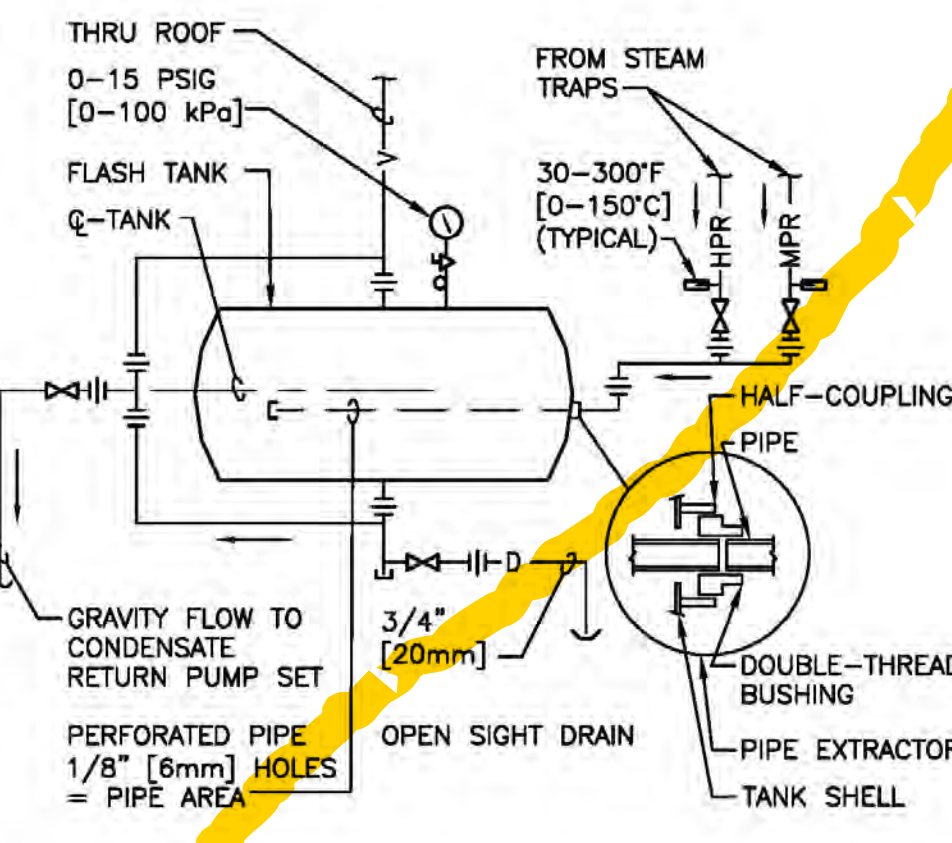
NOTE:

- SECURE CURB CAP TO WOOD NAILING STRIP WITH 3/8" [10mm] CADMIUM PLATED LAG BOLTS NOT OVER 12" [300mm] ON CENTER.
- SECURE ROOF CURB, DUCTWORK AND DAMPER TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF) OR RUST RESISTANT BOLTS (METAL DECK AND BAR JOIST ROOF).
- RUN ELECTRICAL LINES THROUGH CLEARANCE HOLE PROVIDED IN GRAVITY DAMPER, THEN THROUGH VENTILATOR ELECTRICAL CONDUIT GUIDE.

M306 4 POWER ROOF VENTILATOR
NO SCALE



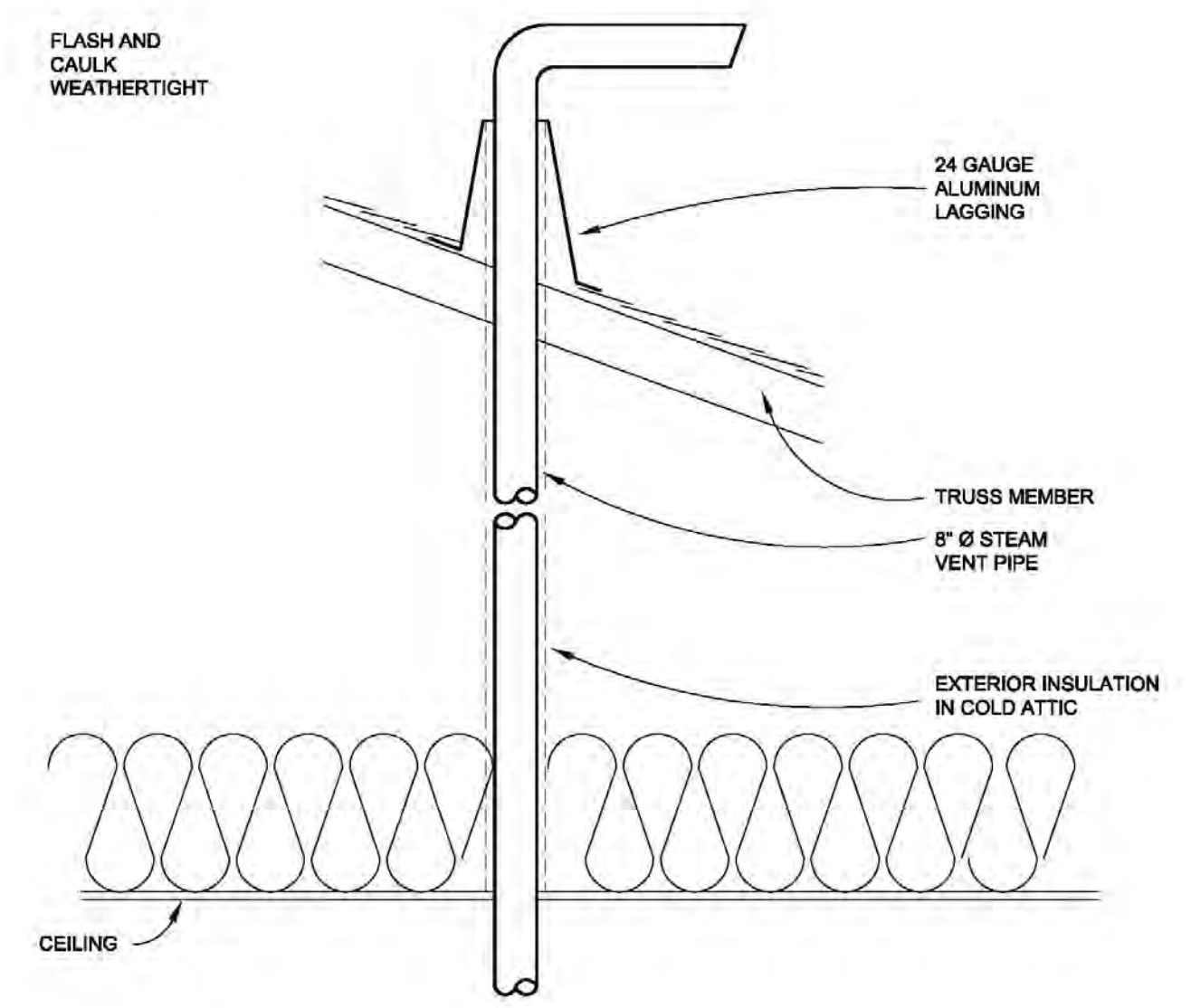
M306 5 RANGE HOOD EXHAUST
NO SCALE



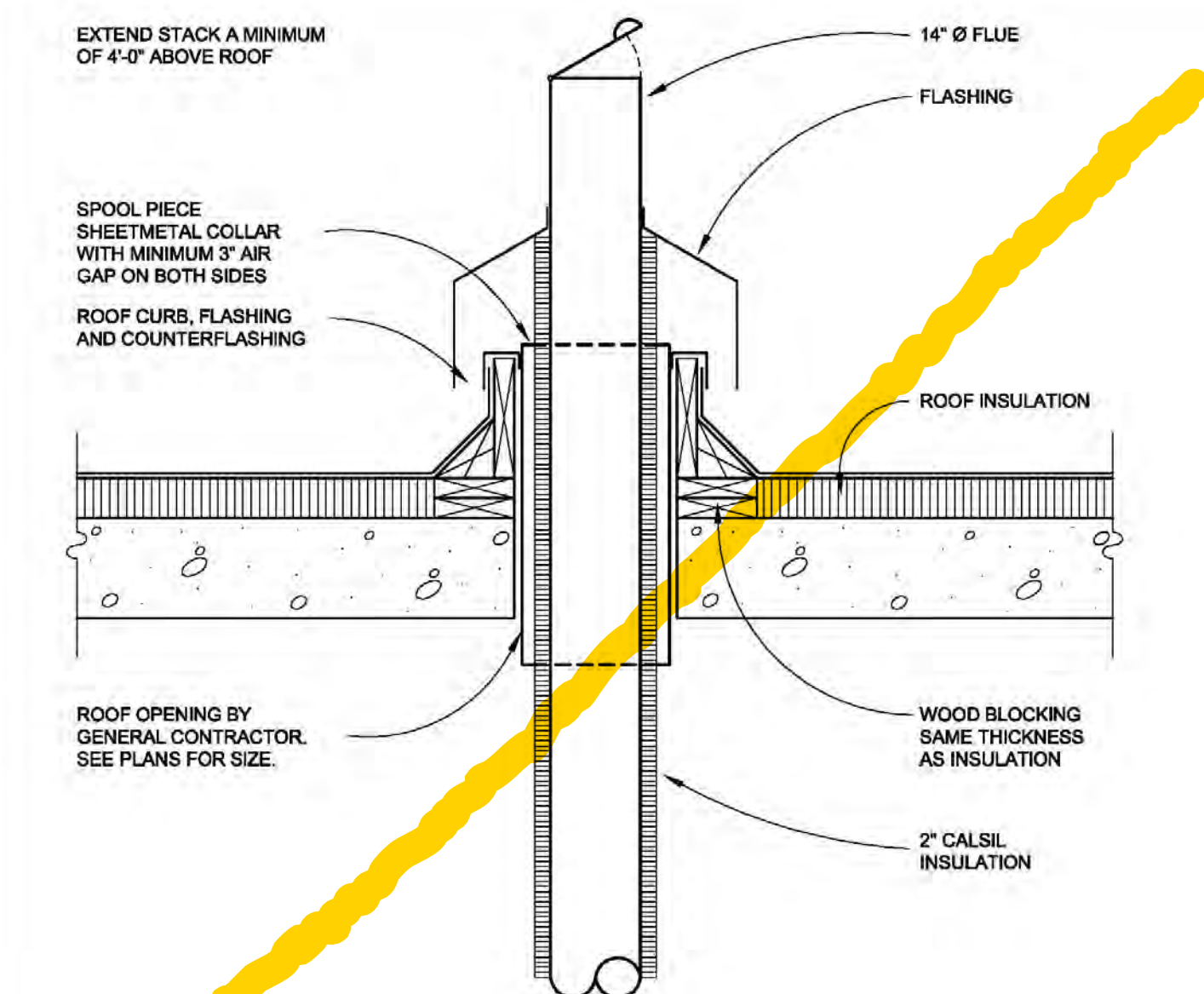
- NOTES:**
- PRESSURE UPSTREAM OF STEAM TRAP.
 - LENGTH x DIAMETER AT CENTER OF TANK PER THOUSAND POUNDS OF CONDENSATE. TANK AT ATMOSPHERIC PRESSURE.

STEAM PRESSURE PSIG [kPa]	TANK AREA SQ. FT. [SQ. M]
150 [1034]	3.71 [0.35]
125 [862]	3.40 [0.32]
110 [758]	3.15 [0.29]
100 [689]	3.00 [0.28]
60 [414]	2.23 [0.21]
30 [207]	1.34 [0.13]

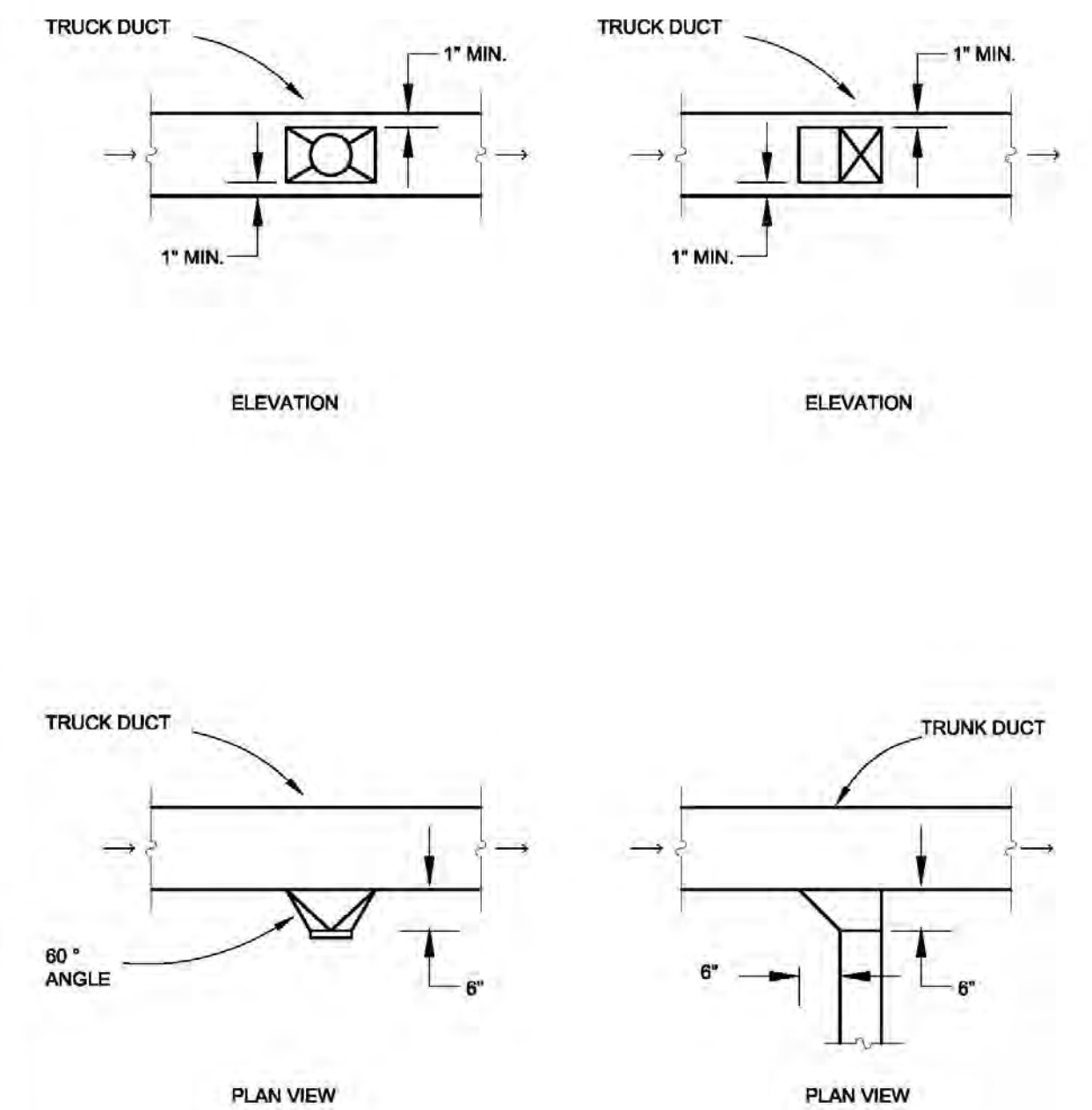
M306 6 FLASH TANK
NO SCALE



M306 7 STEAM VENT PIPE THRU SLOPED ROOF
NO SCALE

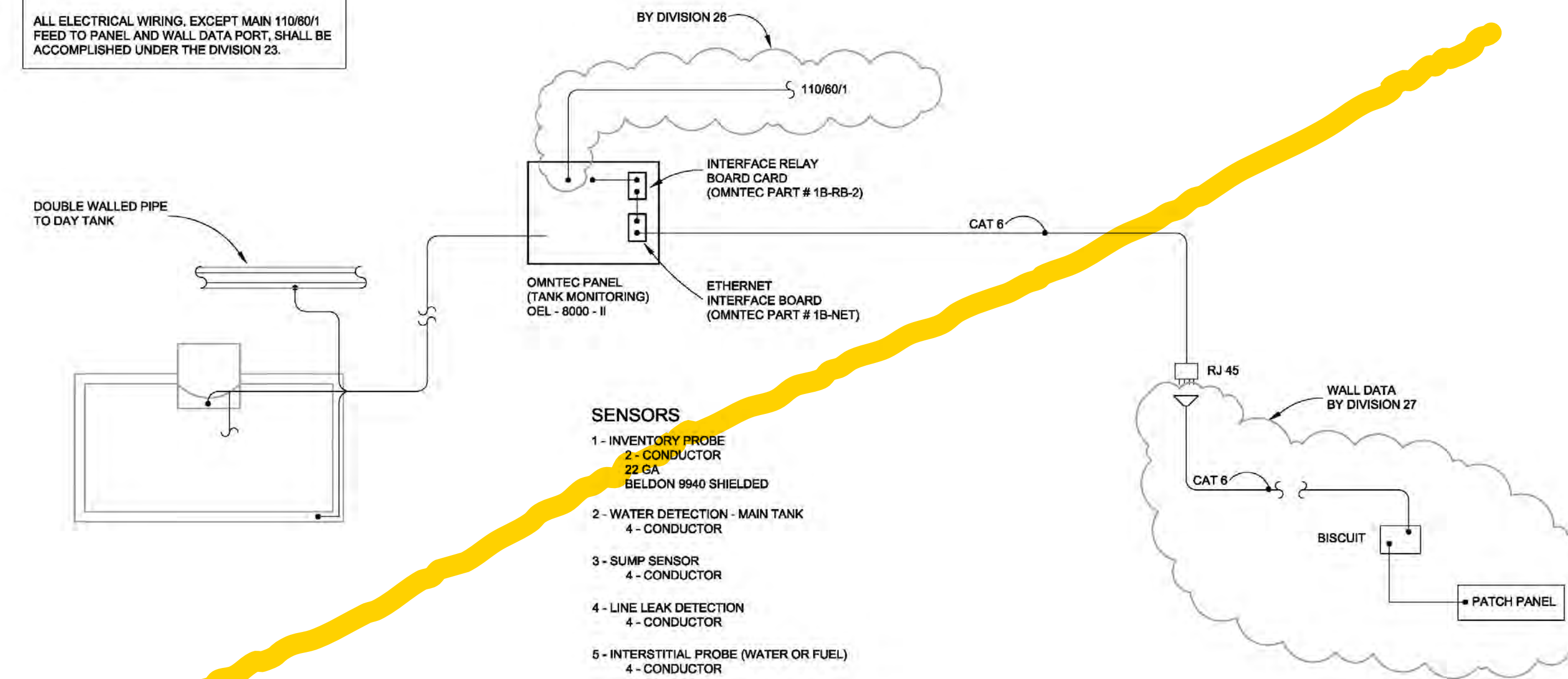


M306 8 GENERATOR FLUE
NO SCALE



M306 10 TYPICAL DUCT TAKE-OFF DETAILS
NO SCALE

FULL COMMISSIONED INSTALLATION BY DIVISION 23
ALL ELECTRICAL WIRING, EXCEPT MAIN 110/80V FEED TO PANEL AND WALL DATA PORT, SHALL BE ACCOMPLISHED UNDER THE DIVISION 23.



M306 11 BURIED TANK MONITORING SYSTEM
NO SCALE

M306 12 NO SCALE

M306 13 NO SCALE

M306 14 NO SCALE

AIR HANDLING UNIT SCHEDULE	
UNIT NUMBER	A.H.U. # 1
LOCATION	MECH. 132
SERVES	ENTIRE BUILDING
MODEL NUMBER	CAH500DDC
SUPPLY FAN	36 1/2" AIRFOIL
CFM	20,840 CFM
TOTAL STATIC PRESSURE	4 1/2"
H.P.	25 H.P.
R.P.M.	1401
VOLTAGE	480/60/3
FILTER BOX	2" PRE-FILTER
	DISCHARGE FILTER
RETURN FAN	40 1/4" AIRFOIL
H.P.	15 H.P.
R.P.M.	1264
HEATING COIL	20" AIR TEMP. RISE
	90 G.P.M. HOT WATER
COOLING COIL	CH. WATER - 175 G.P.M.
NOTES	80°/67° TO 54.3°/53.5°
	105° F. M.W.T.
	AIR BLENDER
	STEAM HUMIDIFIER

HEAT EXCHANGERS		
SYSTEM	HYDRONIC HEATING	SNOW MELTING
LOCATION	MECH.001	MECH.001
LENGTH	6' 0"	PLATE TYPE
DIAMETER	14"	
MODEL NUMBER	SU-146-2	
PRIMARY MEDIA	STEAM	25% PROP. GLYCOL
STEAM OR GPM (10 psig)	2980/HR - 1596" START UP	25 GPM
TEMPERATURE INOUT	-	110°/100°
PRESSURE DROP	5'	-5'
SECONDARY PRODUCT	25% PROP. GLYCOL	45% PROP. GLYCOL
GPM	320 GPM	25 GPM
TEMPERATURE INOUT	110°/120°	95°/105°
PRESSURE DROP	5'	5'

SIZE HEAT EXCHANGER FOR FUTURE LOAD

HEAT PUMP SCHEDULE			
UNIT NUMBER	1	2	3
RATING	70 TONS	70 TONS	70 TONS
WELL FIELD G.P.M.	210 G.P.M.	210 G.P.M.	210 G.P.M.
WELL FIELD P.D.	5'	5'	5'
SYSTEM G.P.M.	210 G.P.M.	210 G.P.M.	210 G.P.M.
SYSTEM P.D.	4'	4'	4'
HEATING OUTPUT	836 MBH @ MAX. 70 KW (3.5) COP MIN.	836 MBH @ MAX. 70 KW (3.5) COP MIN.	836 MBH @ MAX. 70 KW (3.5) COP MIN.
COOLING OUTPUT	70 TONS @ 45° F. (14.0) E.E.R. MIN.	70 TONS @ 45° F. (14.0) E.E.R. MIN.	70 TONS @ 45° F. (14.0) E.E.R. MIN.

VARIABLE AIR VOLUME SCHEDULE						
V.A.V. BOX	LOCATION	REHEAT BTUH	CFM MINIMUM	CFM MAXIMUM	DELTA T	GPM
D-3	H-L-H	102 & 103	22,500	250	40°	4.7
D-1		105	7000	250	30°	1.4
B-1		107 & 108	4500	170	30°	8
D-3	H-L-H	110 & 112	30,000	215	40°	8.0
B-4		111	0	65	20°	0
E-4		113 & 114	0	330	1000°	0
F-1		115, 126, 127	11,500	400	1200°	2.3
F-3	H-L-H	121	77,000	660	2000°	14.4
F-3	H-L-H	122	66,000	660	2000°	11.9
E-1		123, 124, 125, 138	9400	315	950°	1.9
D-1		106, 126, 129, 130	8500	240	740°	1.3
E-1		131, 132, 133, 142	10,700	345	1045°	2.2
C-3	H-L-H	144	17,600	165	500°	3.5
B-3	H-L-H	134	12,400	85	250°	1.7
B-3	H-L-H	135	13,900	115	350°	2.8
B-3	H-L-H	136	13,100	110	325°	2.7
B-3	H-L-H	138	12,100	110	325°	2.5
C-3	H-L-H	145	20,100	165	500°	4.0
D-3	H-L-H	146, 147, 148, 150	18,100	210	625°	3.8
E-1		151, 152, 153	7,800	280	850°	1.6
D-1		155, 156	7,200	250	750°	1.5
E-3	H-L-H	158	49,700	415	1250°	10.0
C-1		160, 165	5400	170	520°	1.1
B-3	H-L-H	161, 162	13,700	135	400°	2.8
B-3	H-L-H	163, 164	14,200	135	400°	2.9
C-3	H-L-H	164	25,000	165	500°	5.0
C-1		166	3800	150	450°	.8
B-1		168	1700	65	200°	.4
F-3	H-L-H	175 & 176	44,000	400	1200°	8.8

NOTE: 105° F. MEAN WATER TEMP.

POWER ROOF VENTILATOR SCHEDULE			
PRV NUMBER	P.R.V. # 1	P.R.V. # 2	PROP. FAN
SYSTEM	GEN EXHAUST	MECH. ROOM 001	CRAWL SPACE VENT.
CFM	1525 CFM	2000 CFM	2500 CFM
S.P.	1 1/4"	3/4"	3/4"
H.P.	1/2 H.P.	1/2 H.P.	1/4 H.P.
CURRENT	110/60/1	110/60/1	110/60/1
MODEL	161HP-5	GB-141-5	

UNIT HEATER SCHEDULE			
UNIT NUMBER	UNIT HEATER # 1	UNIT HEATER # 2	UNIT HEATER # 3
LOCATION	CRAWL SPACE	CRAWL SPACE	MECH ROOM 001
MODE	HOT WATER	HOT WATER	HOT WATER
BTUH	50,000	50,000	50,000
CFM	1000	1000	1000
RPM	1150	1150	1150
H.P.	1/12	1/12	1/12
CURRENT	110/60/1	110/60/1	110/60/1
MODEL	HORIZONTAL	HORIZONTAL	HORIZONTAL
NOTES	105° M.W.T.	105° M.W.T.	105° M.W.T.

CABINET UNIT HEATER SCHEDULE				
UNIT NUMBER	C.U.H. # 1	C.U.H. # 2	C.U.H. # 3	C.U.H. # 4
LOCATION	VEST. 101	VEST. 137	CORR. 104	CORR. 176
MODE	HOT WATER	HOT WATER	HOT WATER	HOT WATER
BTUH	40,000 BTUH	40,000 BTUH	60,000 BTUH	50,000 BTUH
CFM	600 CFM	600 CFM	800 CFM	750 CFM
RPM	1150	1150	1150	1150
H.P.	1/20	1/20	1/20	1/20
CURRENT	110/60/1	110/60/1	110/60/1	110/60/1
MODEL	CEILING RECESSED	CEILING RECESSED	CEILING RECESSED	CEILING RECESSED
NOTES	105° M.W.T.	105° M.W.T.	105° M.W.T.	105° M.W.T.

HYDRONIC ACCESSORIES				
SYSTEM	WELL FIELD	HYDRONIC HEATING	CHILLED WATER	SNOW MELT (ALT.)
EXPANSION TANK NUMBER	1	1	1	1
EXPANSION TANK SIZE	100 GALLON	200 GALLON	100 GALLON	15
TANK FITTING	YES	YES	YES	
AIR PURGE	R-6	R-6	R-6	R-2
TANK DRAIN	YES	YES	YES	YES
GAUGE GLASS SETS	-	-	-	-
RELIEF VALVES	1	1	1	1
RELIEF VALVE PRESSURE SETTING	30 #	30 #	30 #	30 #
COLD WATER SUPPLY	3/4"	3/4"	3/4"	3/4"

CIRCULATING PUMP SCHEDULE														
PUMP NUMBER	PUMP # 1	PUMP # 2	PUMP # 3	PUMP # 4	FUTURE PUMP # 5	PUMP # 6	PUMP # 7	FUTURE PUMP # 8	PUMP # 9	PUMP # 10	FUTURE PUMP # 11	PUMP # 12	PUMP # 13	PUMP # 14
LOCATION	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001	MECH. 001
SYSTEM	WELL FIELD	WELL FIELD	HYDRONIC HEATING	HYDRONIC HEATING	HYDRONIC HEATING	CH. WATER	CH. WATER	CH. WATER	HEAT PUMP	HEAT PUMP	HEAT PUMP	HEAT EXCHANGER	SNOW MELT	CONDENSATE
STYLE	BASE MOUNT	BASE MOUNT	BASE MOUNT	BASE MOUNT	BASE MOUNT	BASE MOUNT	BASE MOUNT	BASE MOUNT	IN-LINE	IN-LINE	IN-LINE	IN-LINE	IN-LINE	DUPLX PUMPS
GPM	660 GPM	660 GPM	310	310	285	175 G.P.M.	175 G.P.M.	175	220 G.P.M.	220 G.P.M.	220 G.P.M.	329	25	10 G.P.M.
HEAD	60'	60'	50'	50'	45'	65'	65'	58'	58'	58'	58'	25'	50'	20 P.S.I.G.
RPM	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
MEDIA	20% PROPYLENE	20% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	25% PROPYLENE	45% PROPYLENE	COND.
H.P.	15 H.P.	15 H.P.	7 1/2 H.P.	7 1/2 H.P.	7 1/2 H.P.	5 H.P.	5 H.P.	5 H.P.	5 H.P.	5 H.P.	5 H.P.	3 H.P.	1 H.P.	2 @ 3/4 H.P.
CURRENT	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3	480/60/3
MODEL	B & G 1510 - 4BC	B & G 1510 - 4BC	B & G 1510 - 2 1/2 B9	B & G 1510 - 2 1/2 B9	B & G 1510 - 2 1/2 B9	B & G 1510 - 2 BC	B & G 1510 - 2 BC	B & G 1510 - 2 BC	B & G 1510 - 2 BC	B & G 1510 - 2 BC	B & G 1510 - 2 BC	B & G 1510 - 2 BC	B & G 1510 - 2 BC	B & G 1510 - 2 BC
NOTES	DUPLX VAR. FREQ. DRIVE	DUPLX VAR. FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE	VARIABLE FREQ. DRIVE

AUXILIARY HEATING UNIT SCHEDULE		
LOCATION	175	175
HEATING DEVICE	AIR CURTAIN	AIR CURTAIN
SIZE	1CA2072	1CA2072
BTUH	60,000 BTUH	60,000 BTUH
GPM	12	12
CONTROL	THERMOSTAT	THERMOSTAT
NOTES	4500 CFM - 78" WIDE TWO MOTORS @ 1/2 H.P.	4500 CFM - 78" WIDE TWO MOTORS @ 1/2 H.P.

NOTE: 105° F. MEAN WATER TEMP.

ATTENUATORS				
SYSTEM	RETURN AIR	RETURN AIR	GENERATOR INTAKE	GENERATOR EXHAUST
CFM	16,800 CFM	2175 CFM	77,500 CFM	73,500 CFM
OCTAVE BAND	FOURTH	FOURTH	FOURTH	FOURTH
CENTER FREQUENCY (Hz)				
MINIMUM DYNAMIC INSERTION LOSS (dB)	11 dba	11 dba	27 dba	27 dba
FACE VELOCITY (FPM)	1383 F.P.M.	750 F.P.M.	480 F.P.M.	480 F.P.M.
APPROXIMATE SIZE	72" x 24"	30" x 14"	10' x 15'	10' x 15'
LENGTH	5'-0"	3'-0"	3'-0"	3'-0"

HUMIDIFIER SCHEDULE	
ROOM NUMBER	A.H.U. # 1
CFM	20,000 CFM
# STEAM	150 #/HR
REL. HUMIDITY	20 %
GPM	-
PROBE LENGTH	-
NOTES	VERIFY LENGTH WITH UNIT MFG.

FUEL OIL TANK	
TYPE	BELOW GRADE
CAPACITY	5000 GALLON
APPROX. DIMENSIONS	15' x 7'
MATERIAL	DOUBLE WALLED ASTM A36 STEEL
NOTES	

STEEL FLAT PLATE BASEBOARD	
TYPE	LINEAR RADIATION
CAPACITY	250 BTUH/LIN. FT.
LENGTH	SEE PLANS
SIZE	SEE SPECIFICATIONS
NOTES	105° F. M.W.T.

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RECORD SET 09/30/16

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
James C. Elving License No. 12852

APPROVED: SERVICE LINE DIRECTOR	DATE	APPROVED: INFECTION CONTROL NURSE	DATE
APPROVED: GEMS COORDINATOR	DATE	APPROVED: PATIENT SAFETY	DATE
APPROVED: PROJECTS SECTION MANAGER	DATE	APPROVED: CHIEF OF POLICE	DATE
APPROVED: DIRECTOR PMS	DATE	APPROVED: SAFETY MANAGER	DATE

DRAWING TITLE	MECHANICAL SCHEDULES
PROJECT TITLE	REHABILITATION CENTER PROJECT #056-332 St. Cloud VA Health Care System
DATE	07/03/2013
PROJ. SCALE	NTS
PROJECT NO.	S1430
DRAWING NO.	M307

St. Cloud VA Health Care System
Brainerd | Montevideo | Alexandria