DUCTWORK ELEMENTS

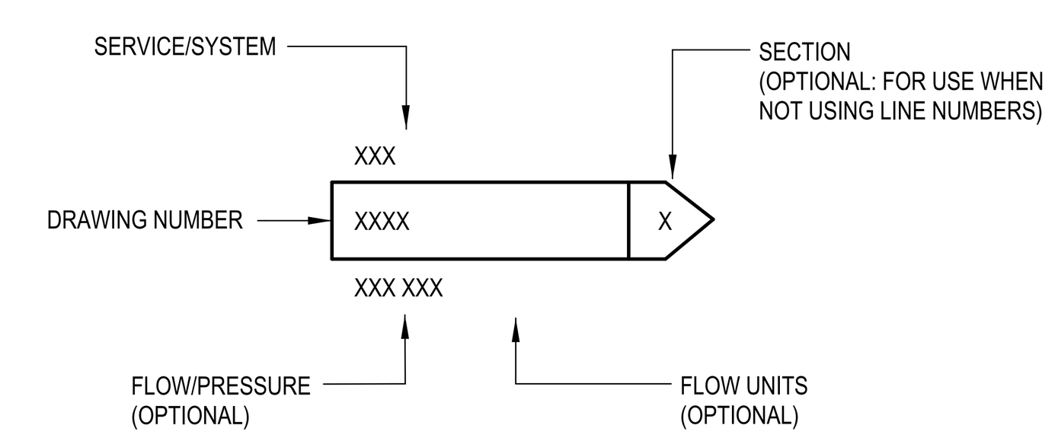
DOUBLE LINE | SINGLE LINE

- EXISTING DUCTWORK TO REMAIN
- EXISTING DUCTWORK TO BE REMOVED
- NEW DUCTWORK
- MANUAL VOLUME DAMPER (VD)
- BLAST GATE (BG)
- ACCESS DOOR (AD)
- RADIUS ELBOW (R=1.5W)
- SQUARE THROAT ELBOW - VANED
- SQUARE THROAT ELBOW - UNVANED
- DROP OR RISE IN DIRECTION OF AIR FLOW (D / R)
- FLEXIBLE CONNECTION (FXC)
- CEILING MOUNTED SUPPLY AIR DIFFUSER, REGISTER OR GRILLE (FLOW ARROWS DEPICT THROW DIRECTIONS)
- CEILING MOUNTED RETURN AND/OR EXHAUST AIR REGISTER OR GRILLE
- SIDEWALL MOUNTED AIR REGISTER OR GRILLE (AD-XX SIZE CFM)
- HUMIDIFIER
- OPPOSED BLADE CONTROL DAMPER
- PARALLEL BLADE CONTROL DAMPER
- BACKDRAFT DAMPER (BDD)
- FIRE DAMPER 1-1/2 HOUR RATING UNLESS NOTED OTHERWISE (X)
- SUPPLY AIR
- RETURN OR EXHAUST AIR
- OUTDOOR AIR
- UNDERCUT DOOR (HEIGHT REQUIRED INDICATED IN INCHES) (UC-X CFM)
- DOOR LOUVER (FREE AREA REQUIRED INDICATED IN SQUARE FEET) (DL X.X)
- FLEXIBLE DUCTWORK

REFERENCE SYMBOLS

- X / X-X: EQUIPMENT IDENTITY (SEE MECHANICAL EQUIPMENT ABBREVIATION LIST); EQUIPMENT NUMBER; SYSTEM NUMBER (IF APPLICABLE)
- INDICATES PLAN OR DETAIL NUMBER; INDICATES DRAWING ON WHICH PLAN OR DETAIL APPEARS
- INDICATES SECTION LETTER; INDICATES DRAWING ON WHICH SECTION APPEARS
- CONNECT TO EXISTING
- TERMINATION POINT OF DEMOLITION
- CONNECT TO MANUFACTURER'S PREPIPED CONNECTION
- PREPURCHASED OR OWNER PROVIDED EQUIPMENT
- FURNISHED BY MANUFACTURER
- KEYED NOTE INDICATOR
- REVISION INDICATOR
- INDICATES MATCH POINT ON SAME SHEET
- VENDOR PACKAGE (—VP—VP—)
- DIRECTION OF FLOW ARROW

REFERENCE FLAG



NOTE ABBREVIATIONS

ABV	ABOVE
AD	AIR DEVICE
AE	AIR EXTRACTOR
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
AP	ACCESS PANEL
ATC	AUTOMATIC TEMPERATURE CONTROL
AVG	AVERAGE
BAS	BUILDING AUTOMATION SYSTEM
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BLW	BELOW
BM	BELLMOUTH
BMS	BUILDING MANAGEMENT SYSTEM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
CEH	CANOPY EXHAUST HOOD
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
CLG	CEILING
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
COL	COLUMN
COMP	COMPRESSOR
CON	CONCENTRIC
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CV	CONTROL VALVE
D	DEPTH
DB	DRY BULB
DIA	DIAMETER
DIAG	DIAGRAM
DIFF	DIFFERENTIAL
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DWG	DRAWING
DX	DIRECT EXPANSION
(E)	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECC	ECCENTRIC
EDR	EQUIVALENT DIRECT RADIATION
EER	ENERGY EFFICIENCY RATING
EFF	EFFICIENCY
EL	ELEVATION
ELEC	ELECTRIC
ELEV	ELEVATOR
EMS	ENERGY MANAGEMENT SYSTEM
ENT	ENTERING
EQ	EQUAL
EQUIP	EQUIPMENT
(ER)	EXISTING TO BE RELOCATED
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EX	EXHAUST AIR
°F	DEGREES FAHRENHEIT
(F)	FUTURE
FA	FROM ABOVE
FB	FROM BELOW
FD	FLOOR DRAIN
FH	FINNED HEIGHT
FIN	FINISHED
FL	FINNED LENGTH
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FRICT	FRICTION
FT	FEET
FTB	FLOOR TO BOTTOM
FTC	FLOOR TO CENTERLINE
FV	FACE VELOCITY
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GN	GENERAL NOTE
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRS/LB	GRAINS PER POUND
H	HEIGHT
HB	HOSE BIBB
HD	HEAD
HP	HORSEPOWER
HTE	HEAT TRACE ELECTRIC
HTR	HEATER
HTS	HEAT TRACE STEAM
HZ	HERTZ
ID	INSIDE DIMENSION/DIAMETER
IN	INCHES
INCL	INCLUDING
INT	INTERNAL
KW	KILOWATT
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LB	POUND
LBS/HR	POUNDS PER HOUR
LH	LATENT HEAT
LRA	LOCKED ROTOR AMPS
LVG	LEAVING
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MBH	THOUSANDS OF BTU PER HOUR
MED	MEDIUM
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTD	MOUNTED
NC	NORMALLY CLOSED
NC-D	DISCHARGE NOISE CRITERIA
NC-R	RADIATED NOISE CRITERIA
NEG	NEGATIVE
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OB	OFF BOTTOM
OC	ON CENTER
OCC	OCCUPIED
OED	OPEN END DUCT
OD	OUTSIDE DIMENSION/DIAMETER
OPG	OPENING
OS	OPEN SITE
OT	OFF TOP
OV	OUTLET VELOCITY
OWS	OPERATOR WORKSTATION
OZ	OUNCE
PD	PRESSURE DROP
PERF	PERFORATED
PNEU	PNEUMATIC
POS	POSITIVE
PRESS	PRESSURE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
QTY	QUANTITY
(R)	REMOVE EXISTING
(RE)	RELOCATED EXISTING
R	RADIUS
RA	RETURN AIR
RBF	RUN BELOW FLOOR
RBG	RUN BELOW GRADE
RD	ROOF DRAIN
RH	RELATIVE HUMIDITY
RLA	RATED LOAD AMPS
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SCCR	SHORT CIRCUIT CURRENT RATING
SCFM	CFM, STANDARD CONDITIONS
SCH	SCHEDULE
SCHEM	SCHEMATIC
SG	SPECIFIC GRAVITY
SH	SENSIBLE HEAT
SN	SHEET NOTE
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SQ	SQUARE
S/S	STAINLESS STEEL
SST	SUPPORT STEEL
ST	STEAM TRAP
STD	STANDARD
STL	STEEL
STM	STEAM
STRUC	STRUCTURAL
SUCT	SUCTION
SYS	SYSTEM
TA	TO ABOVE
TAD	TRANSFER AIR DUCT
TB	TO BELOW
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TH	TOTAL HEAT
TP	TOTAL PRESSURE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UNOCC	UNOCCUPIED
V	VOLTS
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE (REFER TO VFC)
VI	VIBRATION ISOLATOR
VOLT	VOLTAGE
VTR	VENT THRU ROOF
W	WIDTH
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WG	WATER GAUGE
WMS	WIRE MESH SCREEN
WT	WEIGHT

GENERAL DEMOLITION NOTES

1. GENERAL DEMOLITION NOTES APPLY TO ALL MECHANICAL DEMOLITION DRAWINGS.
2. PROVIDE ADEQUATE COVERING OF ALL OPEN ENDS OF DUCTWORK AND PIPING TO PREVENT DUST, DIRT, AND DEBRIS FROM ENTERING DURING CONSTRUCTION.
3. ALL RETURN AIR PLENUM INTAKES SHALL BE FILTERED DURING CONSTRUCTION TO PREVENT SYSTEM CONTAMINATION. FILTERS SHALL BE REPLACED AT REGULAR INTERVALS. REMOVE FILTER AND REPLACE W/ NEW AT PROJECT COMPLETION.
4. PRIOR TO ANY DEMOLITION, THE CONTRACTOR SHALL VERIFY THE OPERATION OF ALL EXISTING TERMINAL UNITS, FAN COIL UNITS, HEAT PUMPS, AND OTHER EQUIPMENT INDICATED TO BE REUSED. ANY DEFICIENCIES SHALL BE NOTED AND FORWARDED TO THE ENGINEER.

GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE CLIENT STANDARDS AND STATE / LOCAL CODES.
2. REFER TO THE PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. WHEREVER THE WORD "PROVIDE" APPEARS IN THESE DRAWINGS, IT SHALL MEAN FURNISH AND INSTALL WITH ALL REQUIRED ASSOCIATED WORK, MATERIALS, EQUIPMENT, AND APPURTENANCES.
4. WHEREVER THE WORD "INSTALL" APPEARS IN THESE DRAWINGS, IT SHALL MEAN TO RECEIVE, HANDLE, INSPECT FOR PROPER CONDITION, AND INSTALL WITH ALL REQUIRED ASSOCIATED WORK MATERIALS, EQUIPMENT, AND APPURTENANCES.
5. WHEREVER THE WORD "FURNISH" APPEARS IN THESE DRAWINGS, IT SHALL MEAN TO PURCHASE AND DELIVER TO THE INSTALLING CONTRACTOR DEVICES, EQUIPMENT, AND ACCESSORIES AS NOTED OR SPECIFIED.
6. WHEREVER THE WORD "REMOVE" APPEARS IN THESE DRAWINGS, IT SHALL MEAN TO SAFE-OFF, DISCONNECT, AND REMOVE.
7. ALL WORK SHALL BE PERFORMED IN A CLEAN AND WORKMANLIKE MANNER. CARE SHALL BE EXERCISED TO MINIMIZE ALL INCONVENIENCE OR DISTURBANCE TO OTHER AREAS OF THE BUILDING WHICH ARE TO REMAIN IN OPERATION. ISOLATE WORK AREAS BY MEANS OF TEMPORARY PARTITIONS AND/OR TARPS TO KEEP DUST AND DIRT WITHIN THE CONSTRUCTION AREA.
8. NO PIPING, EQUIPMENT, ETC. SHALL BE REMOVED, DISCONNECTED OR SHUT DOWN WITHOUT PRIOR REVIEW WITH THE OWNER AND/OR ENGINEER TO CONFIRM THAT AREAS TO REMAIN IN OPERATION WILL NOT BE AFFECTED. IF AREAS NOT WITHIN THE SCOPE OF WORK ARE AFFECTED BY ANY SHUTDOWN, REMOVAL OR DISCONNECTION, SUFFICIENT ADVANCE NOTICE SHALL BE GIVEN TO THE OWNER INDICATING WHICH AREAS WILL BE AFFECTED, WHEN THE PROPOSED SHUTDOWN WILL OCCUR, AND FOR HOW LONG A PERIOD OF TIME.
9. ALL ITEMS INDICATED AS BEING DEMOLISHED OR REMOVED SHALL BE DISPOSED OF OFF-SITE. THE CONTRACTOR SHALL IDENTIFY AND CLEARLY MARK A SECURE LOCATION COORDINATED WITH THE CLIENT TO STORE ANY ITEMS IDENTIFIED AS EXISTING TO BE RELOCATED (ER).
10. DESIGN DRAWINGS ARE DIAGRAMMATIC, THE MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO PROCEEDING WITH ALL WORK. WHERE DISCREPANCIES OCCUR BETWEEN THESE DOCUMENTS AND EXISTING CONDITIONS, THE DISCREPANCY SHALL BE REPORTED TO THE OWNER AND/OR ENGINEER FOR RESOLUTION. ANY POTENTIAL CONFLICTS THAT MAY AFFECT THE MECHANICAL CONTRACTOR'S WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY FOR RESOLUTION.
11. ALL SHUT DOWNS OF EXISTING SYSTEMS SHALL BE SCHEDULED AND APPROVED BY THE OWNER PRIOR TO COMMENCEMENT OF SAID WORK.
12. CLEAN THE JOB SITE DAILY AND REMOVE FROM THE PREMISES ALL DIRT AND DEBRIS CAUSED BY THE PERFORMANCE OF THE WORK INCLUDED IN THIS CONTRACT.
13. USE OF THE OWNER'S ELEVATORS AND BUILDING CORRIDORS FOR THE HANDLING OF NEW AND/OR REMOVED EQUIPMENT AND MATERIALS SHALL BE AT THE DIRECTION OF THE OWNER AND SHALL BE COORDINATED WITH THEIR OPERATIONS.
14. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFEKEEPING OF THEIR OWN PROPERTY ON THE JOB SITE. OWNER ASSUMES NO RESPONSIBILITY FOR PROTECTION OF PROPERTIES AGAINST FIRE, THEFT AND ENVIRONMENTAL CONDITIONS.
15. CARE SHALL BE TAKEN DURING CONSTRUCTION TO PROTECT ALL EXISTING BUILDING SYSTEMS, EQUIPMENT, AND SERVICES THAT ARE ALREADY INSTALLED. DAMAGE TO SUCH SYSTEMS OR EQUIPMENT CAUSED DURING CONSTRUCTION SHALL BE REPAIRED AND/OR REPLACED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE BUILDING OWNER.
16. EXCEPT WHERE INDICATED AS BEING RELOCATED, EXISTING MATERIALS THAT ARE REMOVED SHALL NOT BE REUSED IN NEW SYSTEMS.
17. PROVIDE ALL NECESSARY TEMPORARY OR PERMANENT CAPS OR PLUGS FOR PIPING. DO NOT LEAVE PIPING OPEN ENDED.
18. THE MECHANICAL CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO FABRICATION, PURCHASE, AND/OR INSTALLATION OF ANY WORK.
19. THE BALANCING CONTRACTOR SHALL TAKE AIRFLOW (CFM) AND PRESSURE READINGS PRIOR TO THE START OF WORK ON ALL DUCTWORK THAT SERVES THE PROJECT AREA AND AREAS NOT PART OF THIS PROJECT BUT WHERE AIRFLOW TO THOSE AREAS IS AFFECTED BY THIS PROJECT'S WORK. AFTER MODIFICATIONS TO AIR SYSTEMS COVERED UNDER THIS PROJECT ARE COMPLETED, THE BALANCING CONTRACTOR SHALL BALANCE THE NON-AFFECTED AREAS TO THEIR ORIGINAL AIRFLOW AND PRESSURE OR NEW AIRFLOW AND PRESSURE IF NOTED.
20. IF MECHANICAL CONTRACTOR ENCOUNTERS WHAT APPEARS TO BE A HAZARDOUS OR QUESTIONABLE MATERIAL, THEY SHALL DISCONTINUE WORK IMMEDIATELY AND CONTACT THE OWNER'S REPRESENTATIVE.
21. USE OF OWNER'S UTILITIES (I.E., ELECTRICITY, WATER, HVAC, ETC.) FOR WORK INDICATED ON THESE DOCUMENTS SHALL BE APPROVED BY THE OWNER PRIOR TO COMMENCEMENT OF SAID WORK.
22. THE MECHANICAL CONTRACTOR SHALL CONFORM TO OWNER'S SAFETY AND SECURITY GUIDELINES IN THE PERFORMANCE OF ALL WORK INCLUDED IN THIS CONTRACT.
23. CONTRACTOR SHALL KEEP ONE SET OF THE CONTRACT DESIGN DRAWINGS AT THE SITE AT ALL TIMES AND MARK ALL DEVIATIONS FROM THE CONTRACT DRAWINGS AND ANY DATA THAT IS PERTINENT FOR COMPLETION OF RECORD DOCUMENTS. AT COMPLETION OF THE PROJECT, TRANSFER MARKS TO A SET OF REPRODUCIBLE DRAWINGS AND DELIVER THIS SET OF "RED-LINE DRAWINGS" TO OWNER/GENERAL CONTRACTOR PRIOR TO FINAL ACCEPTANCE.

Conditions:

1.Prior to installation, shop drawings for boilers (including water heaters which exceed 120 gal, 210 degrees, 200,000 BTU or 57KW) shall be submitted to the Division of Boilers for review and approval. KRS 236.060, Section 2801.2, 2018 KBC

Required Inspections:

1.HVAC Final: After installation is complete

PIPING ELEMENTS/VALVING

- ANCHOR (A)
- AIR VENT - AUTOMATIC (EXTEND DISCHARGE TO DRAIN) (AV)
- AIR VENT - MANUAL (AV)
- BACKFLOW PREVENTOR (BFP)
- EXPANSION JOINT
- EXPANSION LOOP (WxH)
- FLEXIBLE CONNECTION (FXC)
- FLOW METER (FM)
- GAUGE WITH GAUGE COCK AND SIPHON - STEAM (GA (RANGE))
- GAUGE WITH GAUGE COCK AND SNUBBER - WATER (GA (RANGE))
- GUIDE (G)
- PIPE CAP
- PIPE ELBOW - TURNED UP
- PIPE ELBOW - TURNED DOWN
- PIPE TEE - TURNED UP
- PIPE TEE - TURNED DOWN
- ELECTRIC HEAT TRACED PIPING (—HTE—HTE—)
- STEAM HEAT TRACED PIPING (—HTS—HTS—)
- PUMP
- PUMP SUCTION DIFFUSER (PSD)
- REDUCER - CONCENTRIC
- REDUCER - ECCENTRIC (FLAT ON BOTTOM)
- REDUCER - ECCENTRIC (FLAT ON TOP)
- REGULATOR BACKPRESSURE - SELF-CONTAINED
- REGULATOR BACKPRESSURE - EXTERNAL TAP
- REGULATOR - DIFFERENTIAL PRESSURE
- RISE OR DROP IN DIRECTION OF FLOW (R / D)
- SANITARY CONNECTION (TRI-CLAMP)
- SLOPE
- STATION - CONTROL VALVE (REFER TO DETAILS) (CVS)
- STATION - PRESSURE REDUCING / REGULATING VALVE (REFER TO DETAILS) (PRV)
- STEAM TRAP
- STEAM LEAK DETECTOR
- STRAINER - BASKET
- STRAINER - WYE
- STRAINER - WYE WITH BLOWOFF VALVE - STEAM
- STRAINER - WYE WITH BLOWOFF VALVE - WATER
- TEMPERATURE SENSOR WELL
- TEST PORT STATION
- THERMOMETER - GLASS (TH (RANGE))
- THERMOMETER - DIAL (TI, TH (RANGE))
- UNION - SCREWED
- UNION - FLANGED
- VACUUM BREAKER
- VALVE - AUTOMATIC FILL
- VALVE - BALANCING
- VALVE - BALL
- VALVE - BUTTERFLY
- VALVE - CHECK - LIFT
- VALVE - CHECK - NON-RETURN/STOP
- VALVE - CHECK - SILENT
- VALVE - CHECK - SWING
- VALVE - CONTROL - FLOAT OPERATED
- VALVE - GATE - ANGLE
- VALVE - GATE
- VALVE - GLOBE - ANGLE
- VALVE - GLOBE
- VALVE - LOCKSHIELD
- VALVE - PLUG
- VALVE - PRESSURE REDUCING / REGULATING VALVE - EXTERNAL TAP (PRV)
- VALVE - PRESSURE REDUCING / REGULATING VALVE - SELF-CONTAINED (PRV)
- VALVE - QUICK CLOSING FUSIBLE LINK
- VALVE - QUICK OPENING FUSIBLE LINK
- VALVE - QUICK OPENING BLOWDOWN
- VALVE - SAFETY/RELIEF
- VALVE - SLOW OPENING BLOWDOWN
- VALVE - TRIPLE DUTY

NOTE: NOT ALL SYMBOLS AND ABBREVIATIONS ARE REPRESENTED ON THIS COVER SHEET AND SOME DEVICES MAY BE DRAWN TO REPRESENT THEIR ACTUAL APPEARANCE. REFER TO ALL CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.

PIPING LINE DESIGNATIONS

(light line)	EXISTING PIPING TO REMAIN (SERVICE AS INDICATED)
(line)	EXISTING PIPING TO BE REMOVED (SERVICE AS INDICATED)
(heavy line)	NEW PIPING (SERVICE AS INDICATED)
BD	BOILER BLOWDOWN - BOTTOM
BSD	BOILER SURFACE BLOWDOWN
BF	BOILER FEEDWATER
CA	COMPRESSED AIR
CF	CHEMICAL FEED
CFC	CHEMICAL FREE CONDENSATE
CFS	CHEMICAL FREE STEAM
CR	CONDENSER WATER RETURN
CS	CONDENSER WATER SUPPLY
CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
D	DRAIN
DTR	DUAL TEMPERATURE WATER RETURN
DTS	DUAL TEMPERATURE WATER SUPPLY
EQ	EQUALIZER LINE
EXH	EXHAUST
FL	FILL LINE
FOG	FUEL OIL GAUGE
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOV	FUEL OIL VENT
GR	GLYCOL RETURN
GS	GLYCOL SUPPLY
GCWR	GLYCOL CHILLED WATER RETURN
GCWS	GLYCOL CHILLED WATER SUPPLY
GHWR	GLYCOL HEATING WATER RETURN
GHWS	GLYCOL HEATING WATER SUPPLY
HG	HOT GAS
HPC	HIGH PRESSURE STEAM CONDENSATE
HPS	HIGH PRESSURE STEAM
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LPC	LOW PRESSURE STEAM CONDENSATE
LPS	LOW PRESSURE STEAM
MPC	MEDIUM PRESSURE STEAM CONDENSATE
MPS	MEDIUM PRESSURE STEAM (REFER TO HPS IN SPECS)
MU	MAKE-UP WATER
NPW	NON-POTABLE WATER
OF	OVERFLOW
PC	PUMPED CONDENSATE
PCWR	PROCESS CHILLED WATER RETURN
PCWS	PROCESS CHILLED WATER SUPPLY
PS	PURE STEAM
PSC	PURE STEAM CONDENSATE
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
C-XX	CONDENSATE - NOMINAL OPERATING PRESSURE OF ASSOCIATED STEAM SYSTEM
S-XX	STEAM - NOMINAL OPERATING PRESSURE
SW	SOFT WATER
TWR	TOWER WATER RETURN
TWS	TOWER WATER SUPPLY
V	VENT

CONTROLS & P&ID ABBREVIATIONS

AT (XXX)	ANALYSIS TRANSMITTER FOR CO_2, O_2, ETC.
FS	FLOW SWITCH
H	HUMIDITY SENSOR
PDS	DIFFERENTIAL PRESSURE SWITCH
PDT	DIFFERENTIAL PRESSURE TRANSMITTER
SD	SMOKE DETECTOR
T	TEMPERATURE SENSOR
TC	TEMPERATURE CONTROLLER (FURNISHED W/ EQUIPMENT)
TS	TEMPERATURE SWITCH
M	ACTUATOR - MOTOR OPERATOR FOR VALVE OR DAMPER
(symbol)	ACTUATOR - PNEUMATIC OPERATOR FOR VALVE OR DAMPER
SV	ACTUATOR - SOLENOID OPERATOR FOR VALVE OR DAMPER
CP	CONTROL PANEL - PROJECT DEFINED
BCP	BUILDING CONTROLLER PANEL
ECM	ELECTRIC COMMUNICATION MOTOR
EMS	ENVIRONMENTAL MONITORING SYSTEM
SCR	SILICONE CONTROLLED RECTIFIER
VFC	VARIABLE FREQUENCY CONTROLLER
CV	CHECK VALVE
FC	FAIL CLOSED
FL	FAIL LAST
FO	FAIL OPEN
LC	LOCKED CLOSED
LO	LOCKED OPEN
MV	MANUAL VALVE
NC	NORMALLY CLOSED (NOT FAIL POSITION)
NO	NORMALLY OPEN (NOT FAIL POSITION)
PCV	PRESSURE CONTROL VALVE
PRV	PRESSURE REDUCING / REGULATING VALVE
PSV	PRESSURE SAFETY / RELIEF VALVE
SV	SOLENOID VALVE
TCV	TEMPERATURE CONTROL VALVE

REFER TO INSTRUMENTATION & CONTROL COVER SHEET FOR ADDITIONAL INFORMATION

EQUIPMENT ABBREVIATIONS

X / X-X

AB	AIR BLENDER
AC	AIR CONDITIONING UNIT
ACC	AIR COOLED CONDENSING UNIT
ACU	AIR CURTAIN UNIT
AHU	AIR HANDLING UNIT
AM	AIR MEASURING DEVICE
AS	AIR SEPARATOR
B	BOILER
B-HW	BOILER - HOT WATER
B-ST	BOILER - STEAM
BFS	BOILER FEED SET
BDHR	BLOWDOWN HEAT RECOVERY
BDS	BLOWDOWN SEPARATOR
BDT	BLOWDOWN TANK
BT	BUFFER TANK
CB	CHILLED BEAM
CC	COOLING COIL
CF	CHEMICAL FEED UNIT
CH	CHILLER
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
CRAH	COMPUTER ROOM AIR HANDLER
CST	CONDENSATE SURGE TANK
CT	COOLING TOWER
CTF	COOLING TOWER FILTER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CVE	CONSTANT VOLUME TERMINAL UNIT - EXHAUST
CVR	CONSTANT VOLUME TERMINAL UNIT - RETURN
CVS	CONSTANT VOLUME TERMINAL UNIT - SUPPLY
D	AUTOMATIC DAMPER
DA	DEAERATOR
DC	DUST COLLECTOR
DCR	DRY COOLER
DDH	DESSICANT DEHUMIDIFIER
DH	DOOR HEATER
DOAS	DEDICATED OUTDOOR AIR SYSTEM
EBR	ELECTRIC BASEBOARD RADIATION
EDH	ELECTRIC DUCT HEATER
EEA	EXHAUST EXTRACTION ARM
EF	EXHAUST AIR FAN
ERC	ENERGY RECLAIM COIL
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
F	FILTER
FCU	FAN COIL UNIT
FFU	FAN FILTER UNIT (HEPA)
FGE	FLUE GAS ECONOMIZER
FM	FLOW METER
FS	FUME SCRUBBER
FT	FLASH TANK
FTR	FINNED TUBE RADIATION
H	HUMIDIFIER
HC	HEATING COIL
HX	HEAT EXCHANGER
HP	HEAT PUMP
HRU	HEAT RECOVERY UNIT
HTU	HEAT TRANSFER UNIT
HV	HEATING AND VENTILATING UNIT
HWBR	HOT WATER BASEBOARD RADIATION
HWC	HOT WATER CONVERTER
IRH	INFRARED HEATER
LFM	LAMINAR FLOW MODULE
MAU	MAKEUP AIR UNIT
MB	MIXING BOX
OAF	OUTDOOR AIR FAN
OAH	OUTDOOR AIR INTAKE HOOD
P	PUMP
P-BF	PUMP - BOILER FEED
P-C	PUMP - CONDENSER WATER
P-CF	PUMP - CHEMICAL FEED
P-CH	PUMP - CHILLED WATER
P-CO	PUMP - CONDENSATE
P-DC	PUMP - DRY COOLER
P-ER	PUMP - ENERGY RECLAIM
P-FO	PUMP - FUEL OIL
P-GH	PUMP - GLYCOL HEATING WATER
P-HW	PUMP - HEATING WATER
P-TR	PUMP - TRANSFER
P-TW	PUMP - TOWER WATER
PH	PREHEAT COIL
PHE	PENTHOUSE
PRV	PRESSURE REDUCING / REGULATING VALVE
PSV	PRESSURE / SAFETY RELIEF VALVE
R	REFRIGERATION UNIT
RAD	RADIANT HEATER
RAF	RETURN AIR FAN
RAH	RELIEF AIR HOOD
RAU	RECIRC AIR UNIT
RCF	RECIRC AIR FAN
RF	RELIEF AIR FAN
RH	REHEAT COIL
RTU	ROOFTOP UNIT
RV	RELIEF VALVE
SAD	SOUND ATTENUATING DEVICE
SAF	SUPPLY AIR FAN
SCC	STEAM CONDENSATE COOLER
SG	STEAM GENERATOR FOR HUMIDIFICATION
SV	SAFETY VALVE
TAF	TERMINAL AIR FILTER
TF	TRANSFER AIR FAN
TU	TERMINAL AIR UNIT
TUE	TERMINAL AIR UNIT - EXHAUST
TUFP	TERMINAL AIR UNIT - FAN POWERED
TUR	TERMINAL AIR UNIT - RETURN
TUS	TERMINAL AIR UNIT - SUPPLY
UH	UNIT HEATER
WF	WATER FILTER
WS	WATER SOFTENER
VAV	VARIABLE VOLUME TERMINAL UNIT
VE	VESSEL (STORAGE TANK)
VVE	VARIABLE VOLUME TERMINAL UNIT - EXHAUST
VVR	VARIABLE VOLUME TERMINAL UNIT - RETURN
VVS	VARIABLE VOLUME TERMINAL UNIT - SUPPLY

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Approved with Conditions
gforsyth 10/28/2024

REV	DATE	DESCRIPTION
0	01/19/2024	PERMIT AND CONSTRUCTION ISSUE
A	12/14/2023	OWNER REVIEW ISSUE

KEY PLAN

CLIENT

ADM
1260 PACIFIC AVENUE,
ERLANGER, KY 41018

PROJECT TITLE

PAC2 FERMENTATION LABORATORY

DRAWING TITLE

MECHANICAL COVER SHEET

PROJECT MANAGER	DRAWN BY
SDA	GND

PROJECT LEADS

ARCHITECTURE	ENGINEERING
ALM	GND

QUALITY REVIEWS

DISCIPLINE REVIEW	QC REVIEW	QA REVIEW
MJW	MJW	JES

SEAL

STATE OF KENTUCKY
MARTIN J. WENDEL, JR.
31564
LICENSED PROFESSIONAL ENGINEER
1/19/2024
Martin J Wendel JR. PE
KY Professional Engineer
NO. 31564

CONSTRUCTION ISSUE DATE	PROJECT NUMBER	FILE NAME
01/19/2024	23395	23395-MEP

DRAWING NUMBER

M0.01

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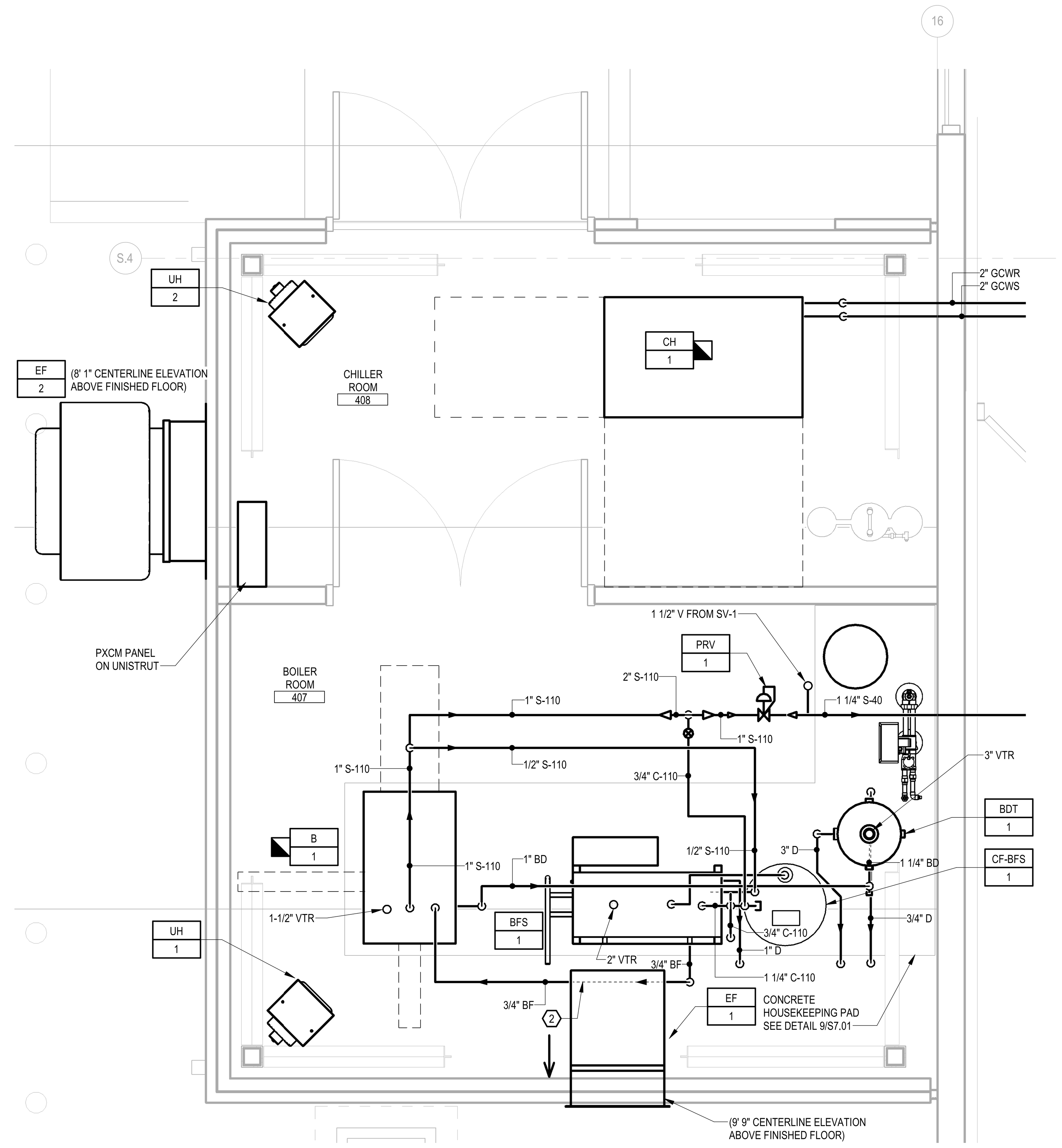
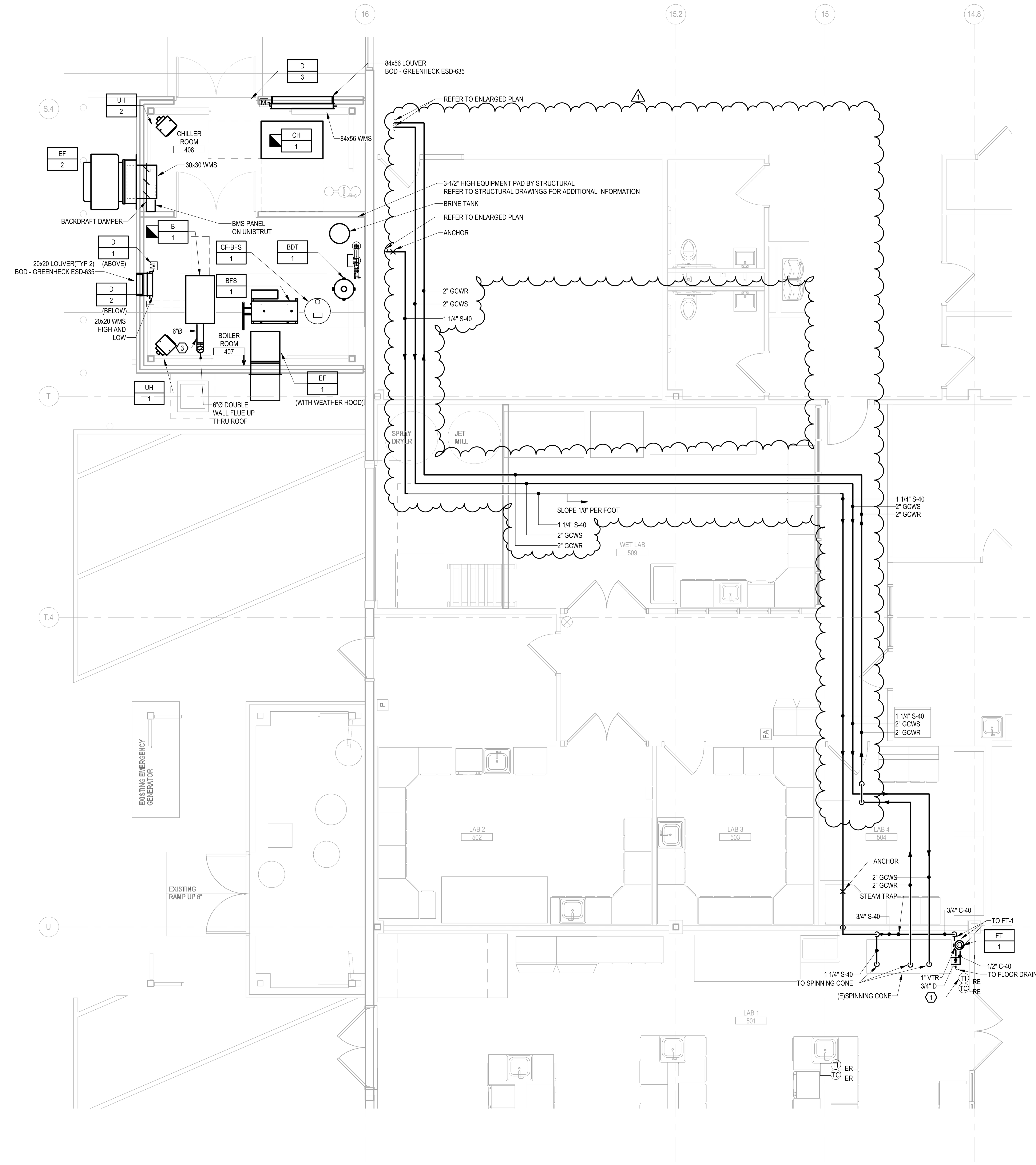


1 / M1.01 — ENLARGED PARTIAL FIRST FLOOR PIPING PLAN

1/2" = 1'-0"



2 / M1.01 — PARTIAL FIRST FLOOR DUCTWORK AND PIPING PLAN

1/4" = 1'-0"

SHEET NOTES

1. PIPING SHOWN ON THIS DRAWING IS FOR GENERAL ROUTING. REFER TO PIPING DIAGRAMS FOR PIPING SPECIALTIES.

KEYED NOTES

1 RELOCATE EXISTING TEMPERATURE INDICATOR AND TEMPERATURE CONTROLLER TO LAB BENCH COLUMN. ADDITIONAL WIRING SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR.

2 PIPE 3/4" BF PIPE ABOVE BOTH THE BOILER, B-1 AND BOILER FEEDSET, BFS-1.

3 MINIMUM HORIZONTAL RUN OF 2'-0" FROM BOILER FLUE OUTLET.

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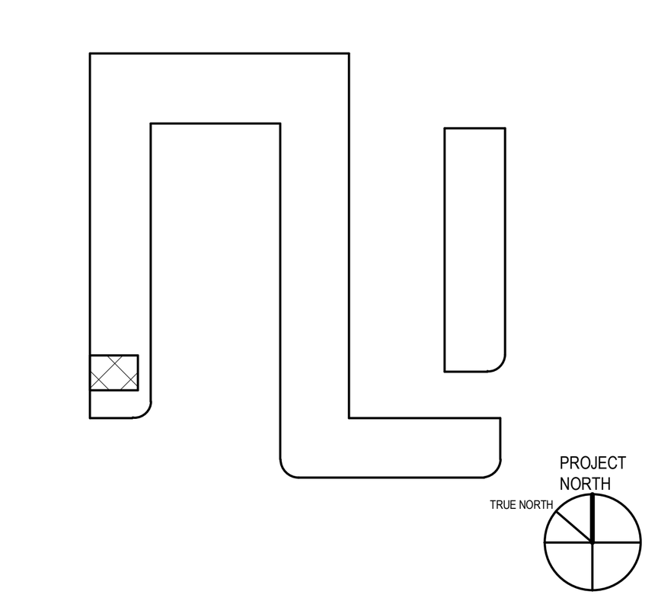
1	09/23/2024	REISSUE FOR PERMIT
0	01/19/2024	PERMIT AND CONSTRUCTION ISSUE
A	12/14/2023	OWNER REVIEW ISSUE
REV	DATE	DESCRIPTION

KEY PLAN



CLIENT

ADM
1260 PACIFIC AVENUE, ERLANGER, KY 41018

PROJECT TITLE

PAC2 FERMENTATION LABORATORY

DRAWING TITLE

MECHANICAL
PARTIAL FIRST FLOOR
DUCTWORK AND PIPING PLANS

PROJECT MANAGER	DRAWN BY
SDA	GND
PROJECT LEADS	
ARCHITECTURE	ENGINEERING
ALM	GND

QUALITY REVIEWS

DISCIPLINE REVIEW	QC REVIEW	QA REVIEW
MJW	MJW	JES

SEAL: STATE OF KENTUCKY — MARTIN J. WENDEL, JR. — 31564 — LICENSED PROFESSIONAL ENGINEER

Martin J. Wendel, JR. PE
Kentucky Professional
Engineer No. 31564

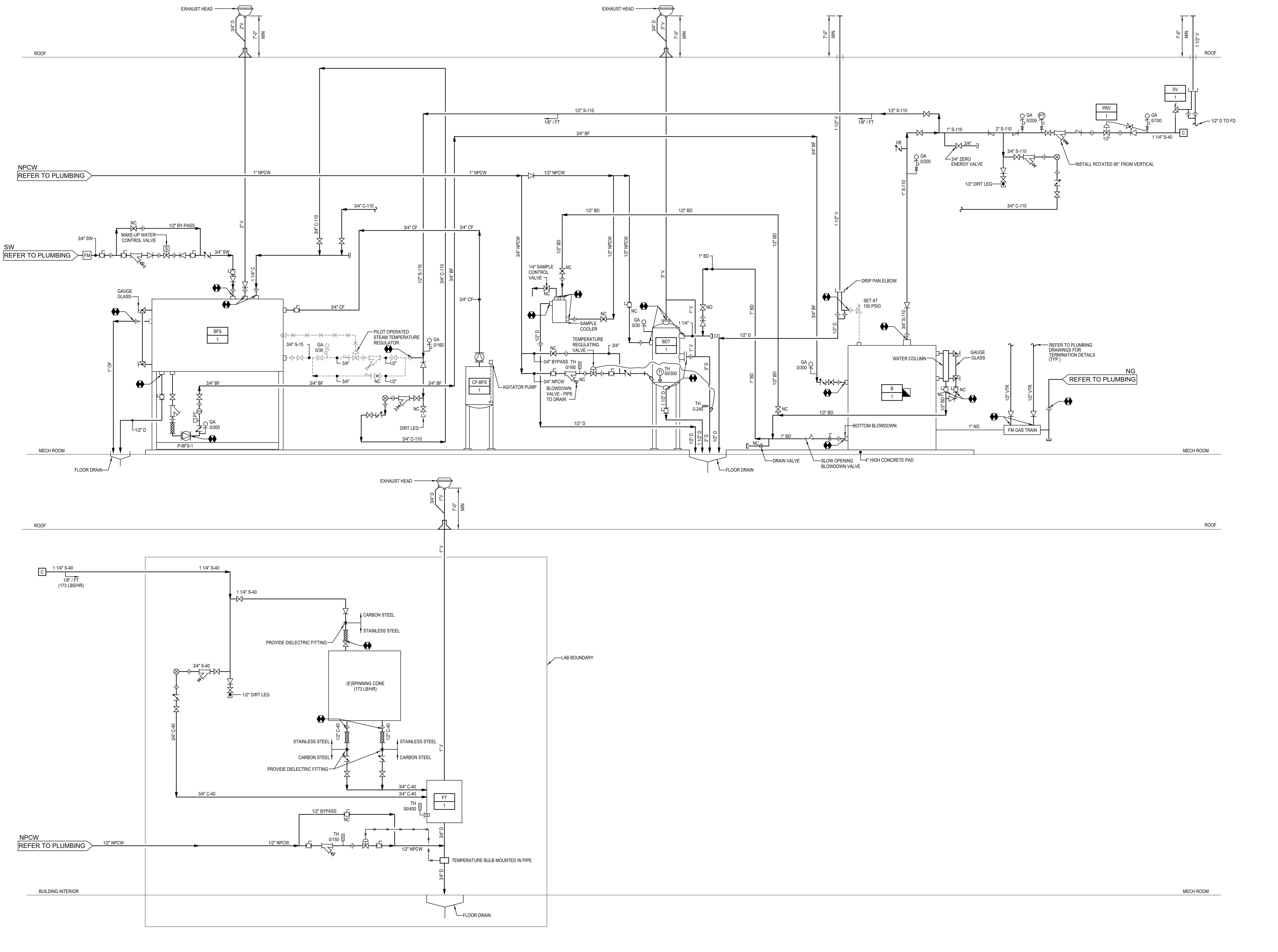
CONSTRUCTION ISSUE DATE	PROJECT NUMBER	FILE NAME
01/19/2024	23395	23395-MEP

DRAWING NUMBER

M1.01

SHEET NOTES

1. NOT ALL PIPING COMPONENTS ARE SHOWN ON THE DIAGRAM. REFER TO MECHANICAL DETAILS FOR ADDITIONAL PIPING AND PIPE ACCESSORIES ARRANGEMENTS.



1
M7.01

PIPING FLOW DIAGRAM - STEAM GENERATION

NO SCALE

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KEY PLAN

CLIENT
ADM
1260 PACIFIC AVENUE, ERLANGER, KY 41018

PROJECT TITLE
PAC2 FERMENTATION LABORATORY

DRAWING TITLE
MECHANICAL PIPING FLOW DIAGRAM - STEAM GENERATION

PROJECT MANAGER	DRAWN BY
SDA	GND
PROJECT LEADS	
ARCHITECTURE	ENGINEERING
ALM	GND

QUALITY REVIEWS

DISCIPLINE REVIEW	QC REVIEW	QA REVIEW
MJW	MJW	JES

SEAL
STATE OF KENTUCKY
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NO. 31564

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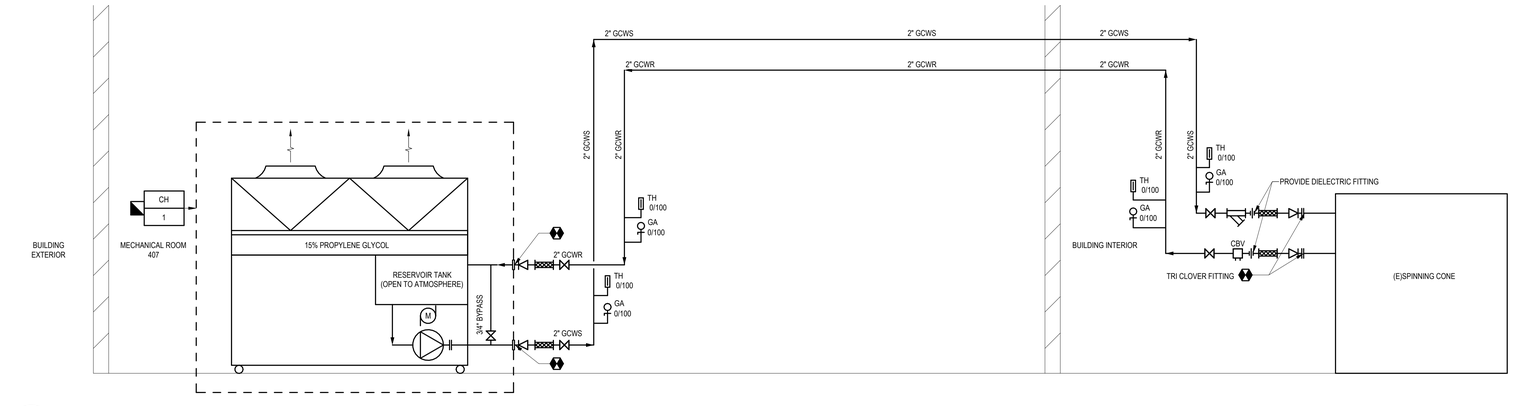
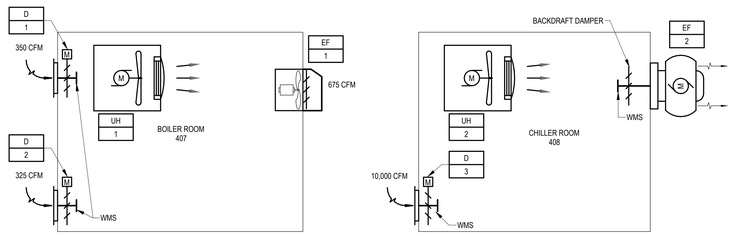
DRAWING NUMBER
M7.01



1 / M7.02 PIPING FLOW DIAGRAM - GLYCOL CHILLED WATER

NO SCALE



2 / M7.02 AIR FLOW DIAGRAM

NO SCALE

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KEY PLAN

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PROJECT TITLE

PAC2 FERMENTATION LABORATORY

DRAWING TITLE

MECHANICAL
PIPING FLOW DIAGRAM - GLYCOL CHILLED WATER AND AIRFLOW DIAGRAM

PROJECT MANAGER	DRAWN BY
SDA	GND
PROJECT LEADS	
ARCHITECTURE	ENGINEERING
ALM	GND
QUALITY REVIEWS	
DISCIPLINE REVIEW	QC REVIEW	QA REVIEW
MJW	MJW	JES

SEAL

STATE OF KENTUCKY · MARTIN J. WENDEL, JR. · 31564 · LICENSED PROFESSIONAL ENGINEER

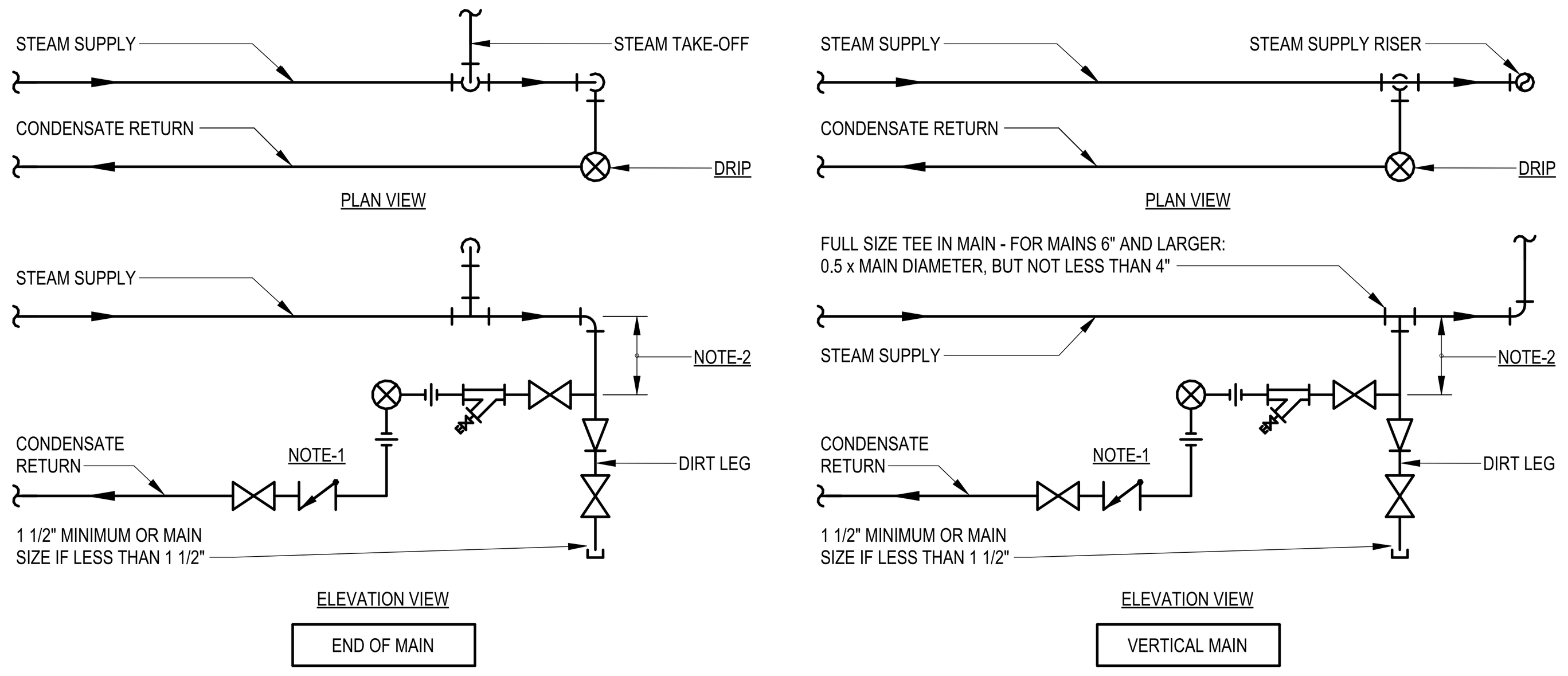
1/19/2024
Martin J Wendel JR. PE
KY Professional Engineer
NO. 31564

CONSTRUCTION ISSUE DATE	PROJECT NUMBER	FILE NAME
01/19/2024	23395	23395-MEP

DRAWING NUMBER

M7.02

1/19/2024 8:53:24 AM C:\Revit_User_Files\23395-MEP_GDOmmen2W250.rvt

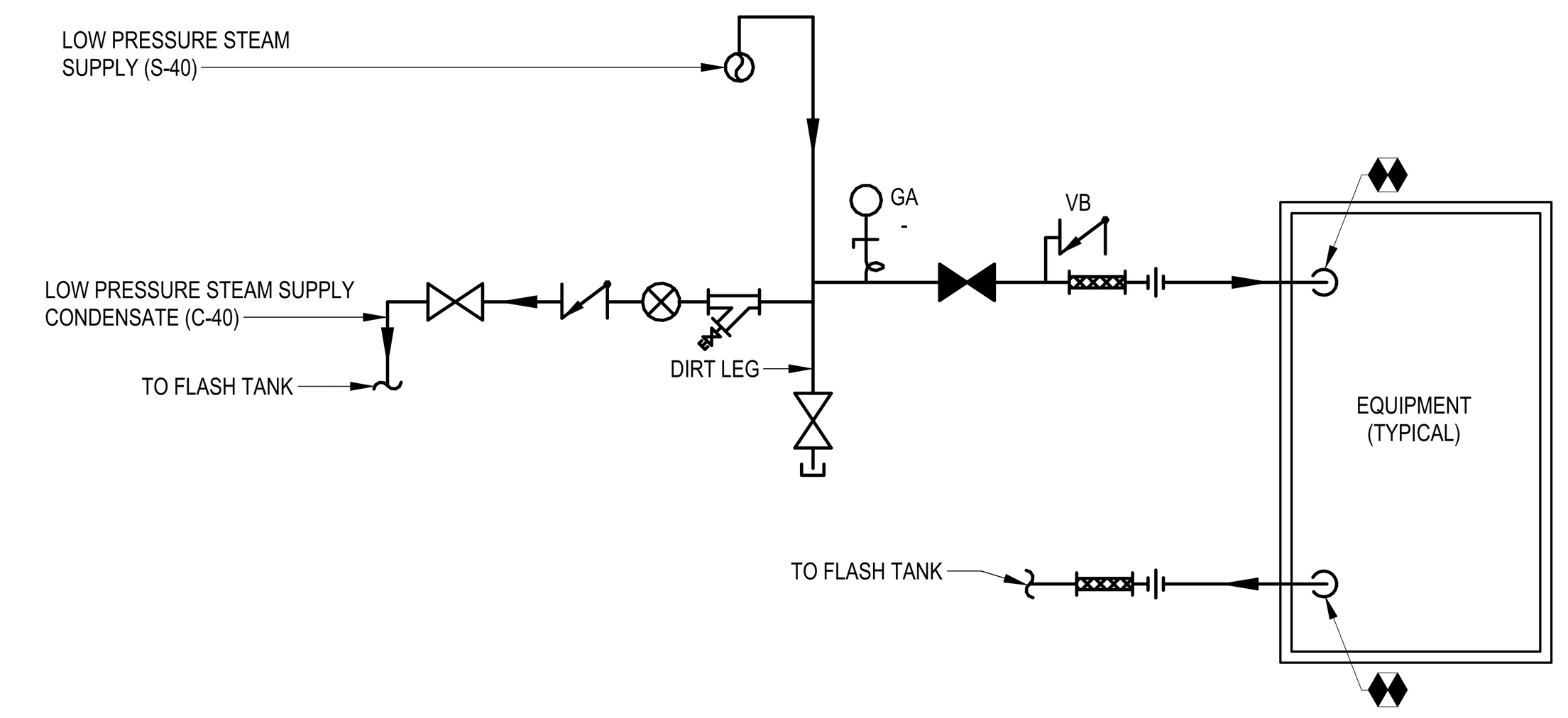


NOTES:

1. PROVIDE CHECK VALVE ONLY WHEN CONDENSATE IS TO BE LIFTED ABOVE TRAP INLET
2. FOR SUPERVISED WARMUP: 1.5 x PIPE DIAMETER, BUT NOT LESS THAN 8"

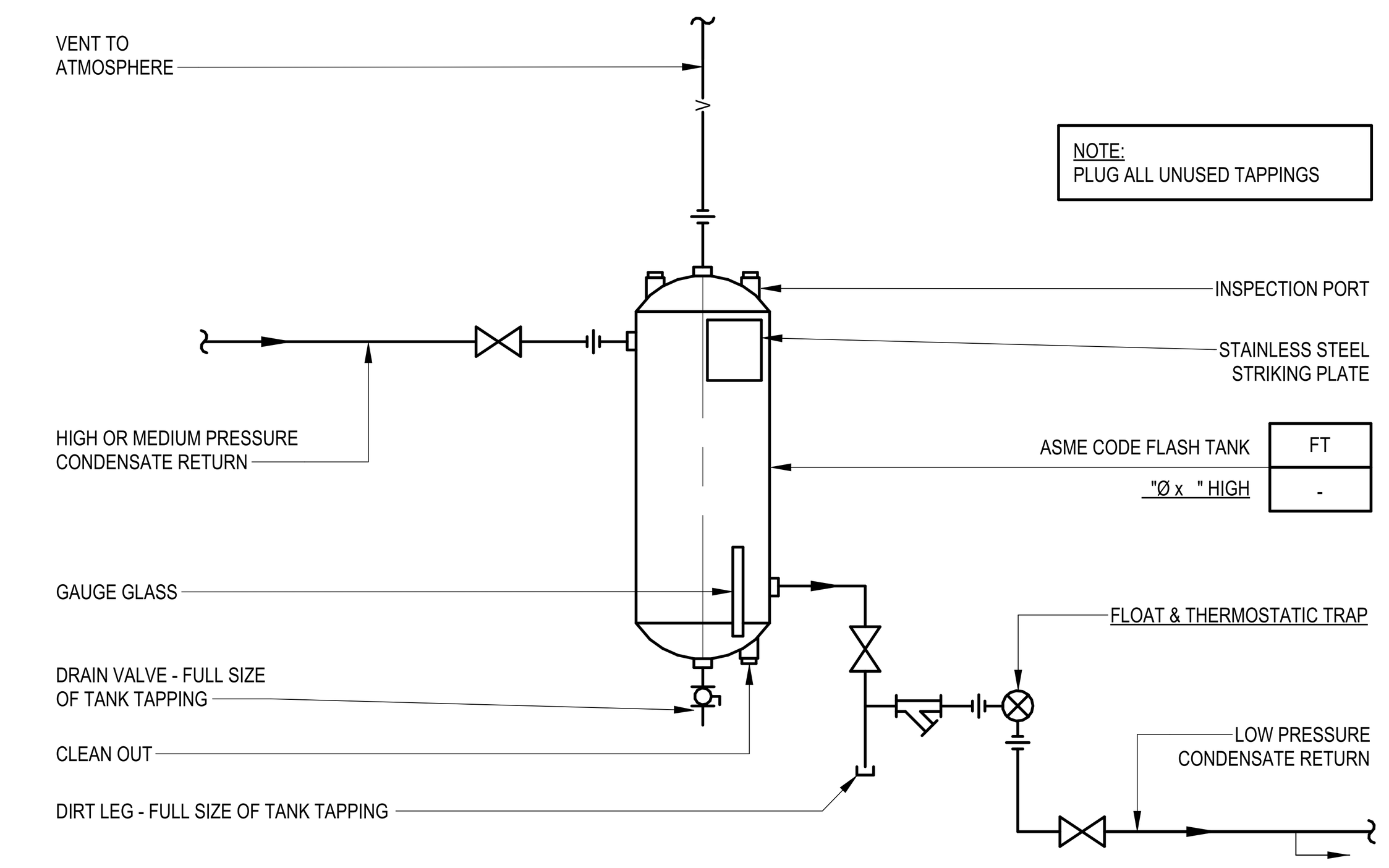
1 M8.01 DETAIL - TYPICAL STEAM DRIPS

NO SCALE



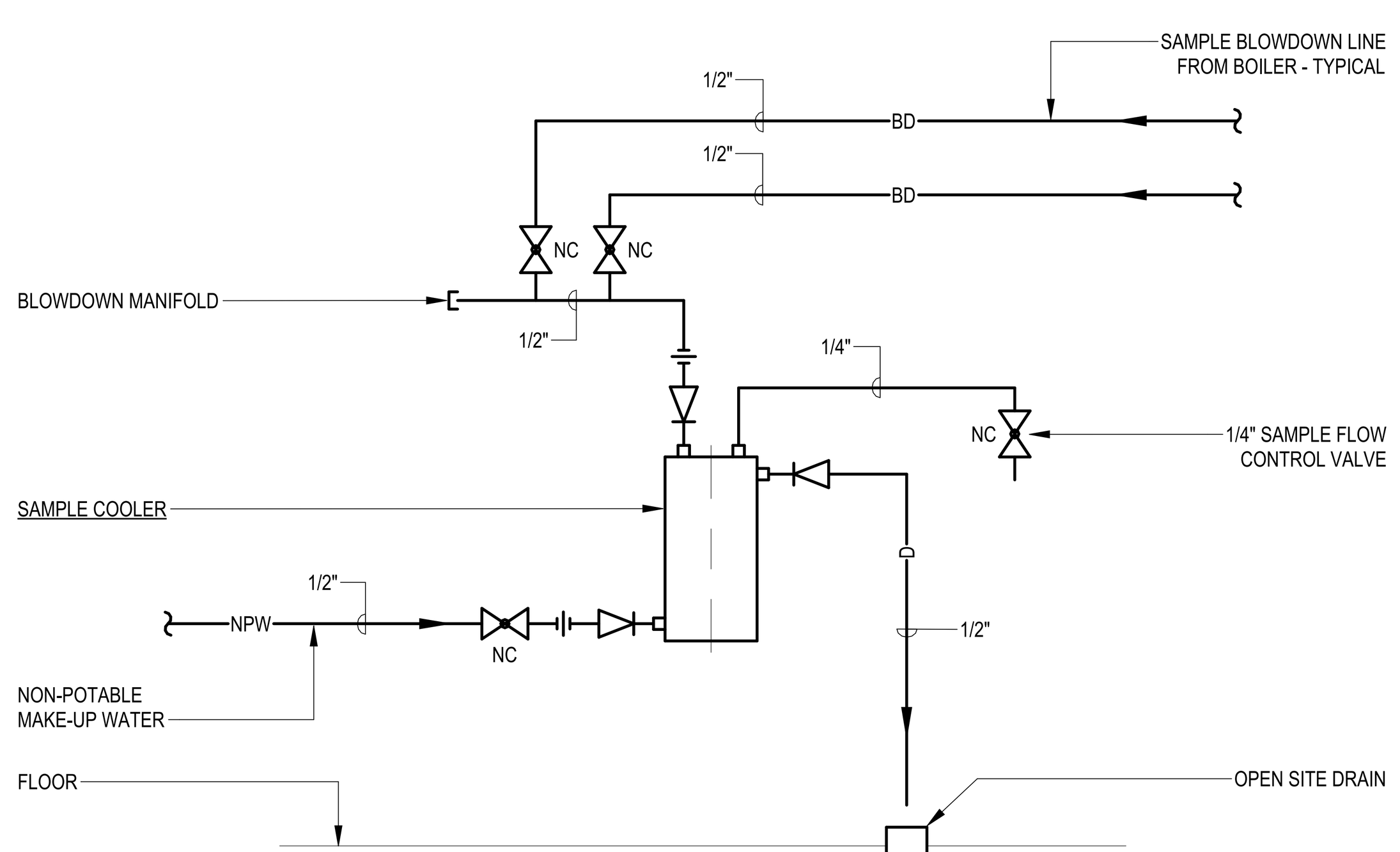
2 M8.01 DETAIL - STEAM/COND CONNECTION TO EQUIPMENT

NO SCALE



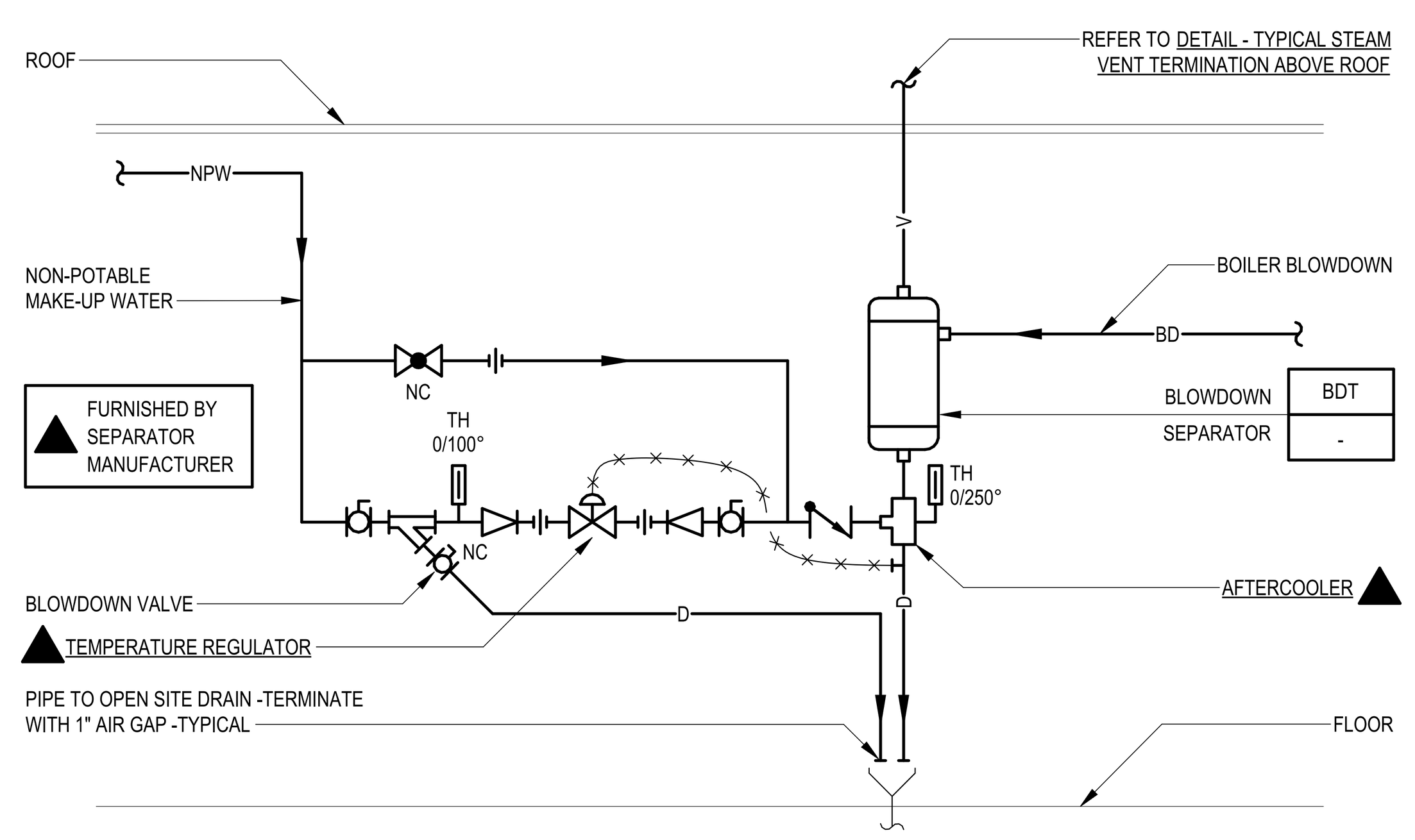
3 M8.01 DETAIL - TYPICAL FLASH TANK - VERTICAL ATMOSPHERIC

NO SCALE



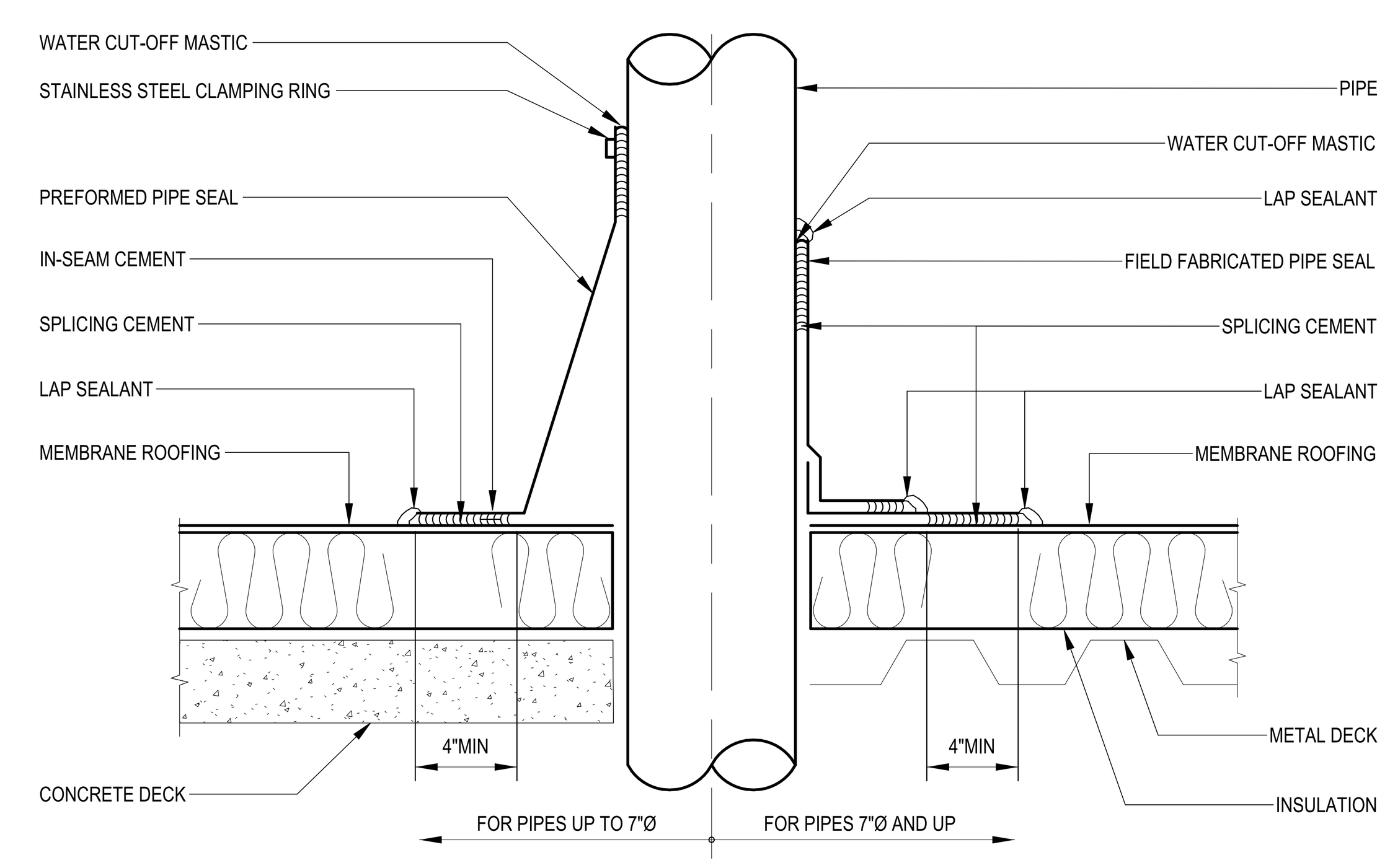
4 M8.01 DETAIL - TYPICAL BOILER BLOWDOWN - SAMPLE COOLER

NO SCALE



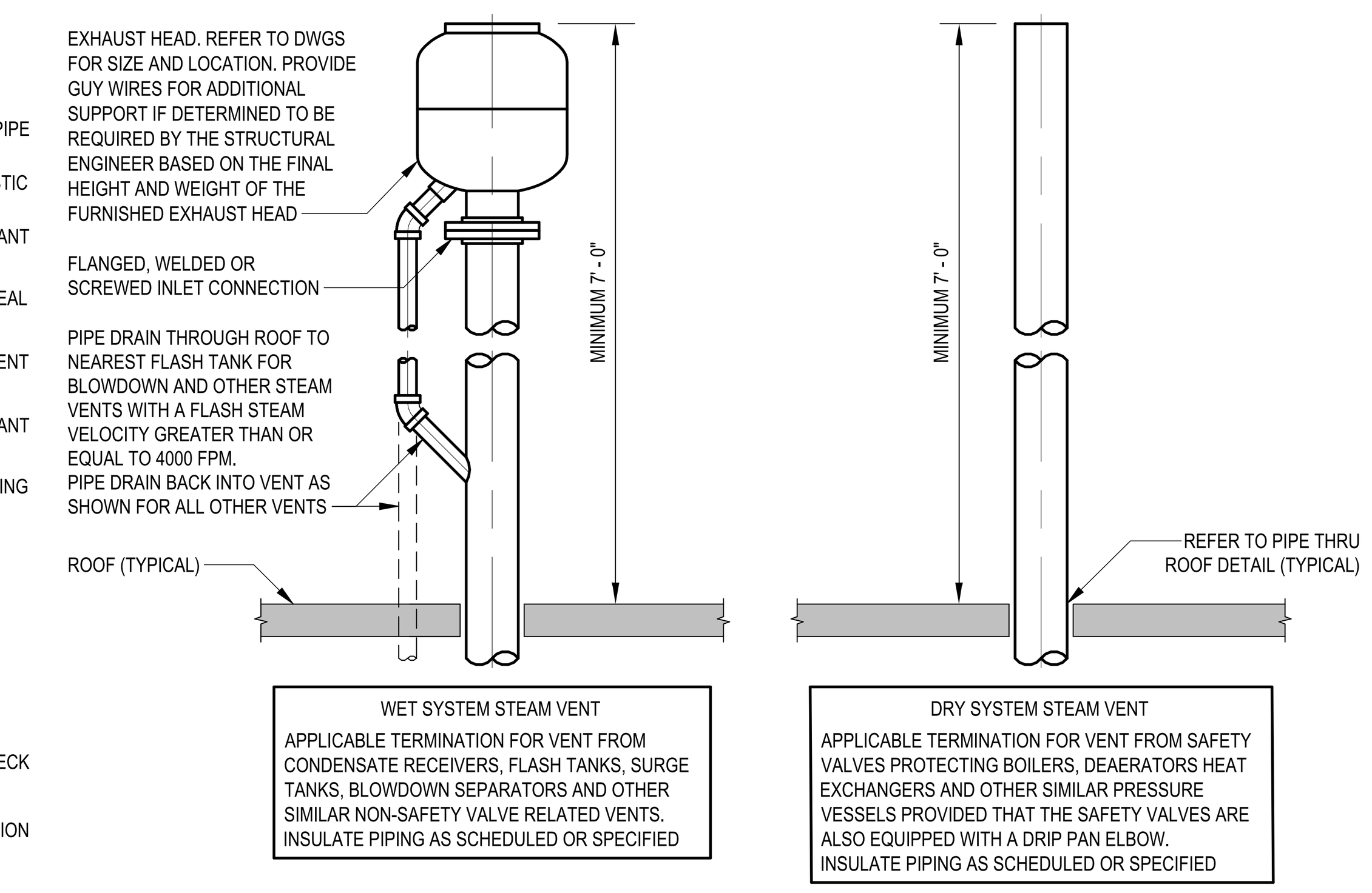
5 M8.01 DETAIL - TYPICAL BLOWDOWN SEPARATOR

NO SCALE



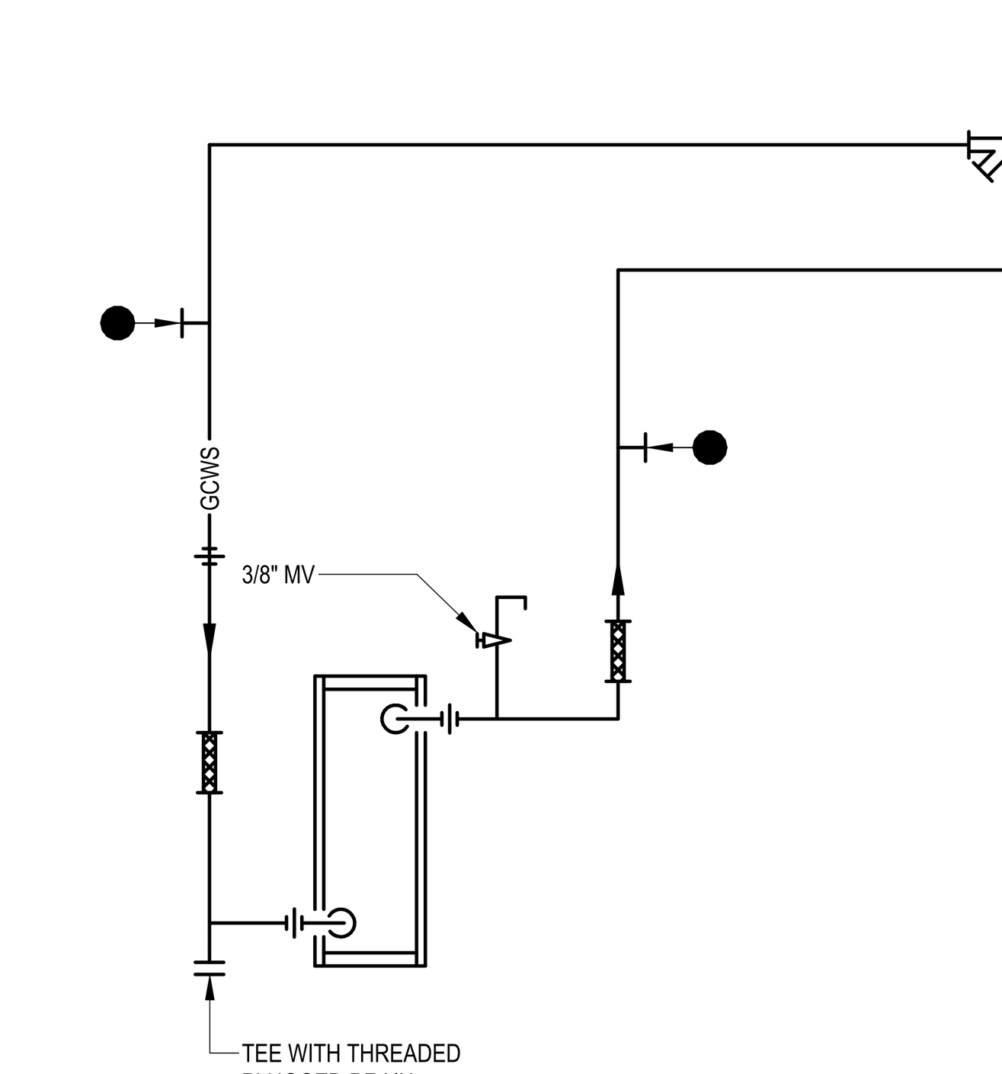
6 M8.01 DETAIL - TYPICAL PREFORMED AND FIELD FABRICATED PIPE SEALS

NO SCALE



7 M8.01 DETAIL - TYPICAL STEAM VENT TERMINATION ABOVE ROOF

NO SCALE



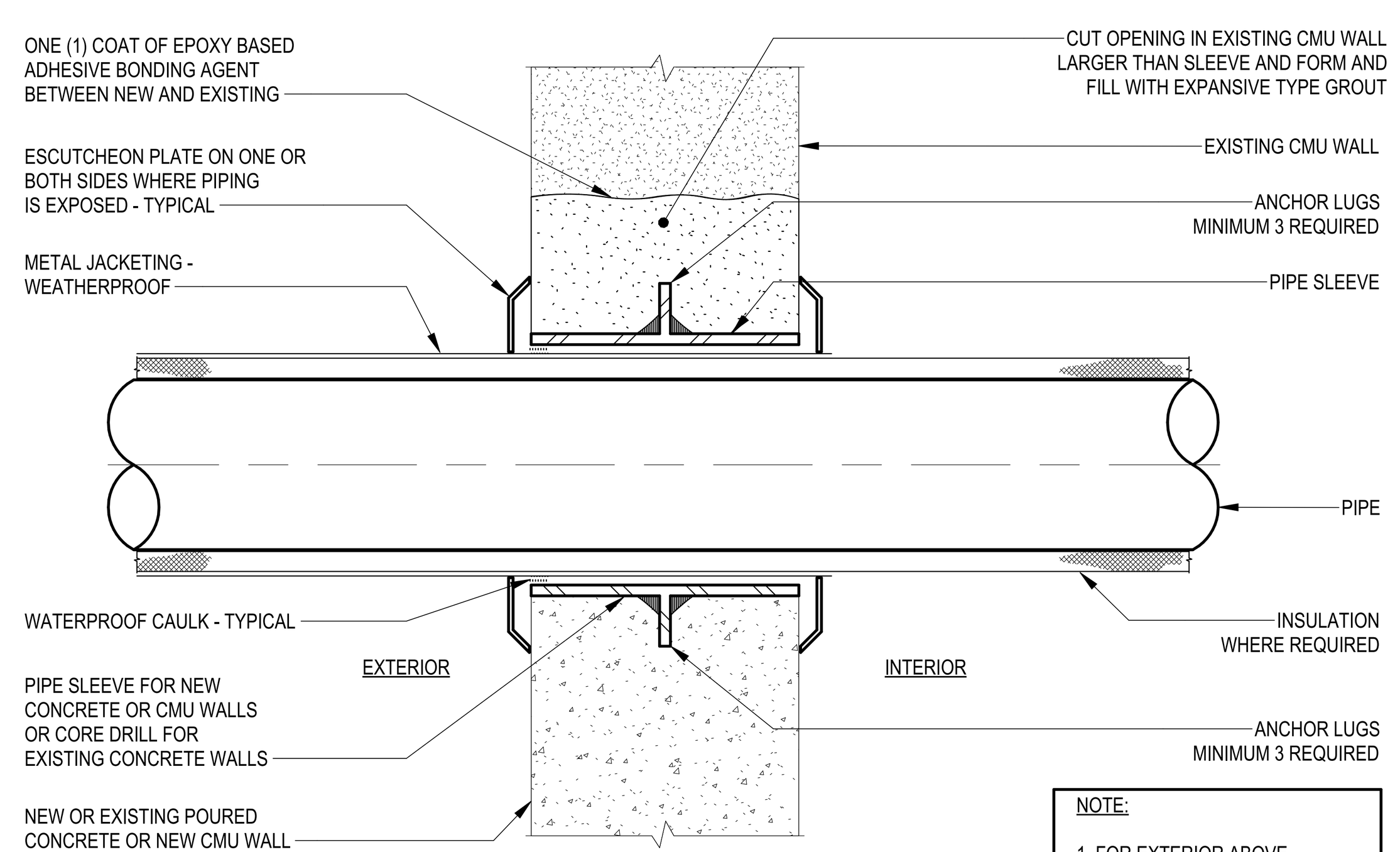
PRESSURE AND/OR TEMPERATURE TEST STATION

NOTES:

1. CHILLED WATER SUPPLY AND RETURN: BALL VALVE - UP TO 2" BUTTERFLY VALVE - 2 1/2" AND UP
2. CHILLED WATER RETURN: CIRCUIT BALANCING VALVE - UP TO 12"

8 M8.01 DETAIL - TYPICAL GLYCOL CHILLED WATER CONNECTION TO EQUIPMENT

NO SCALE

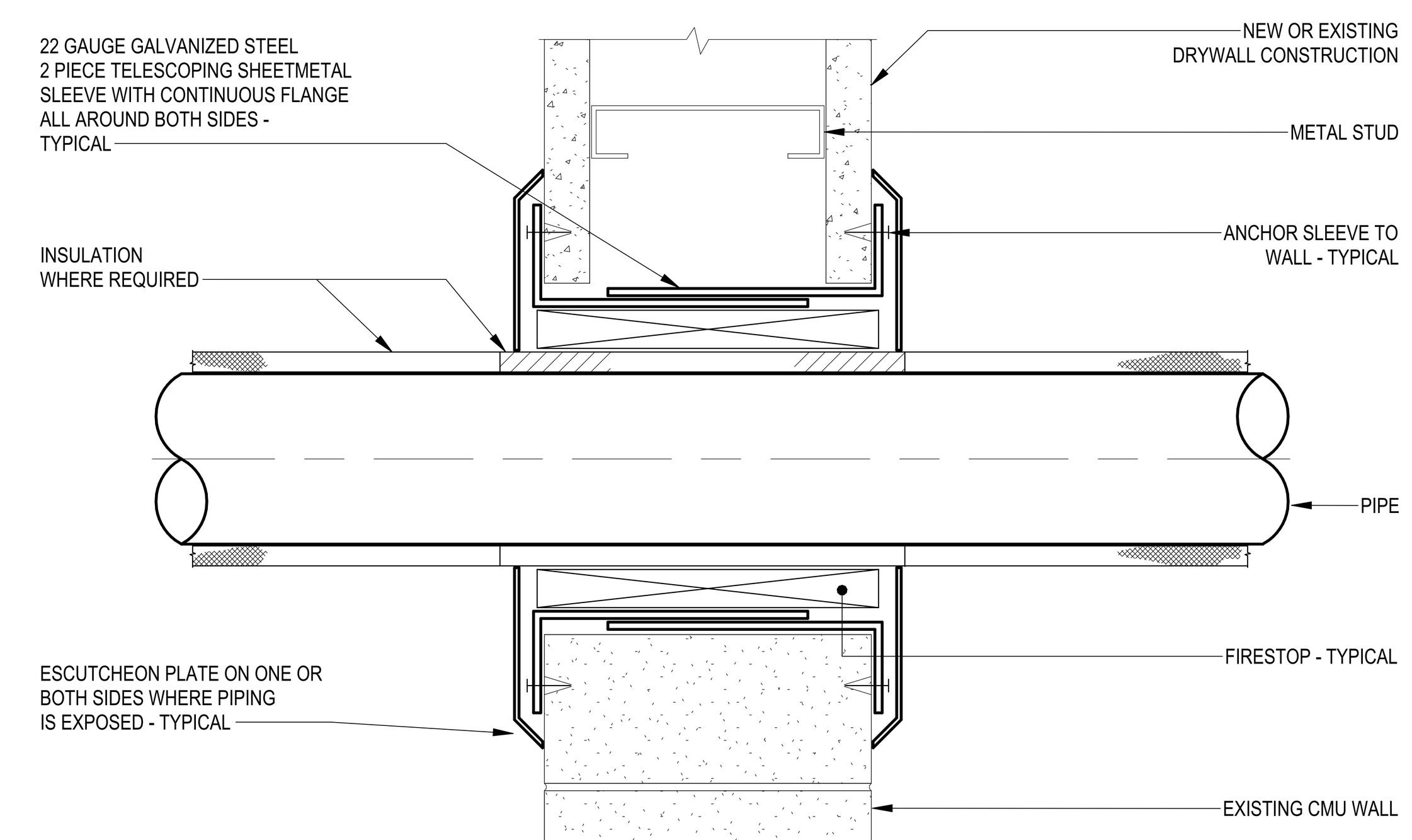


NOTE:

1. FOR EXTERIOR ABOVE GRADE WALLS ONLY

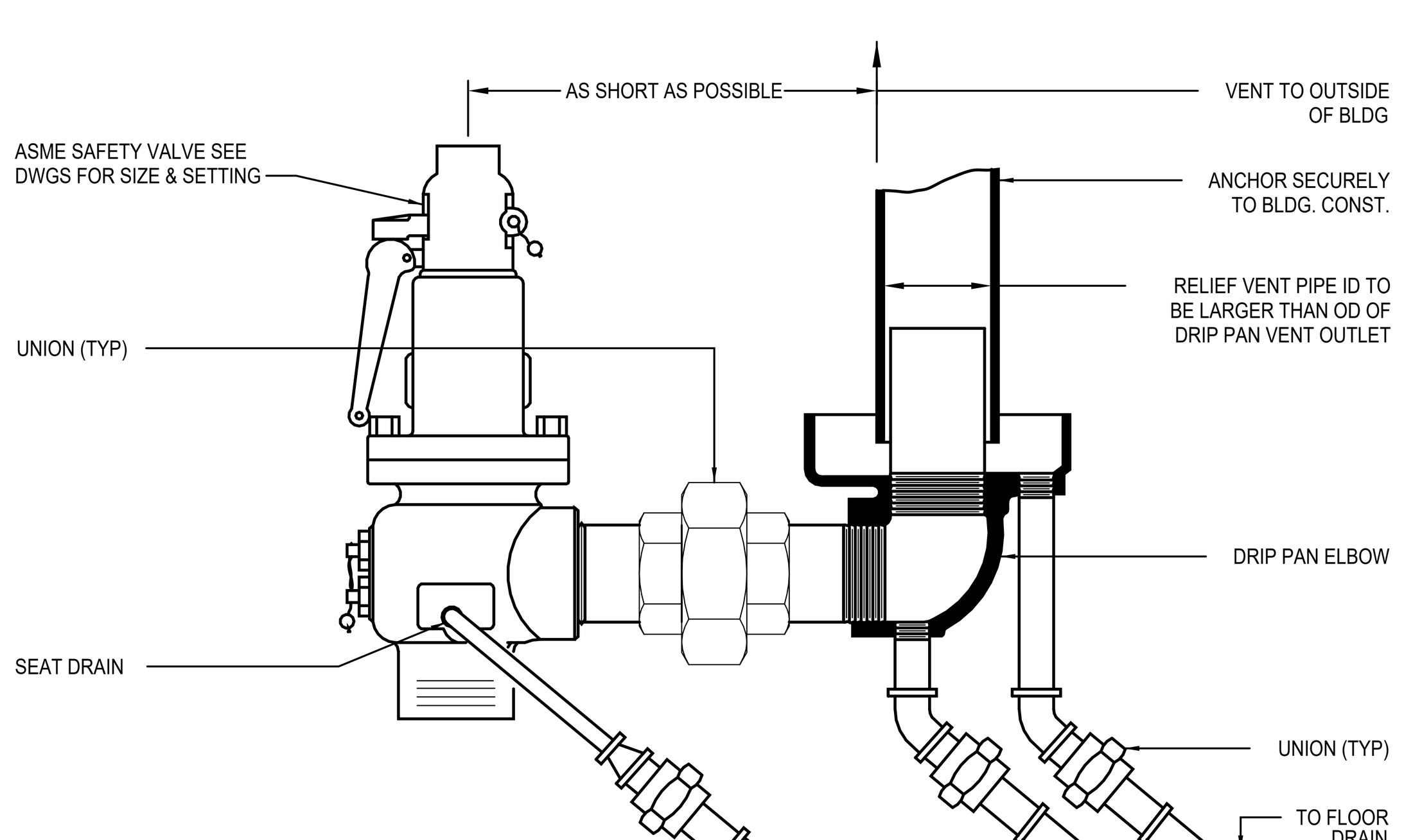
9 M8.01 DETAIL - TYPICAL PIPE SLEEVE

NO SCALE



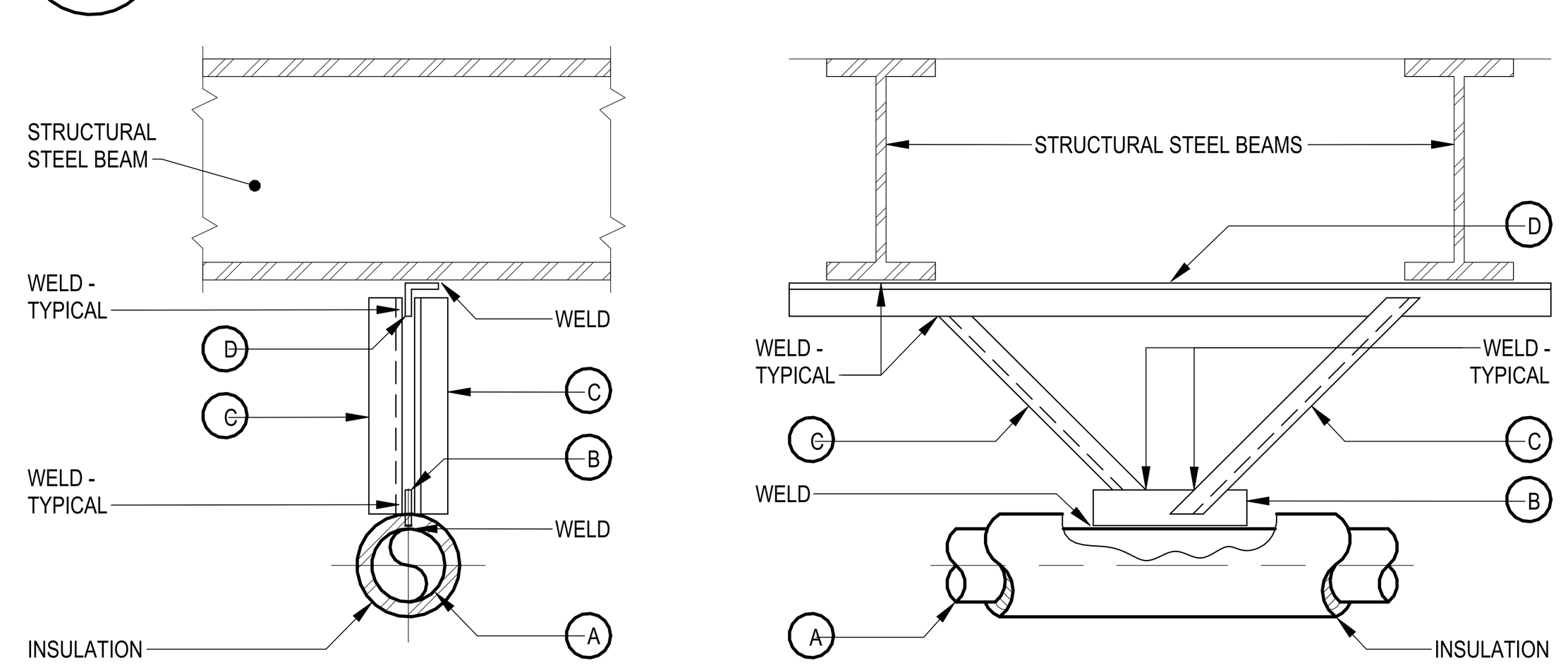
10 M8.01 DETAIL - TYPICAL PIPE SLEEVE

NO SCALE



11 M8.01 DETAIL - TYPICAL SAFETY VALVE PIPING

NONE



NOTE:

1. ALL DIMENSIONS ARE GIVEN IN INCHES.

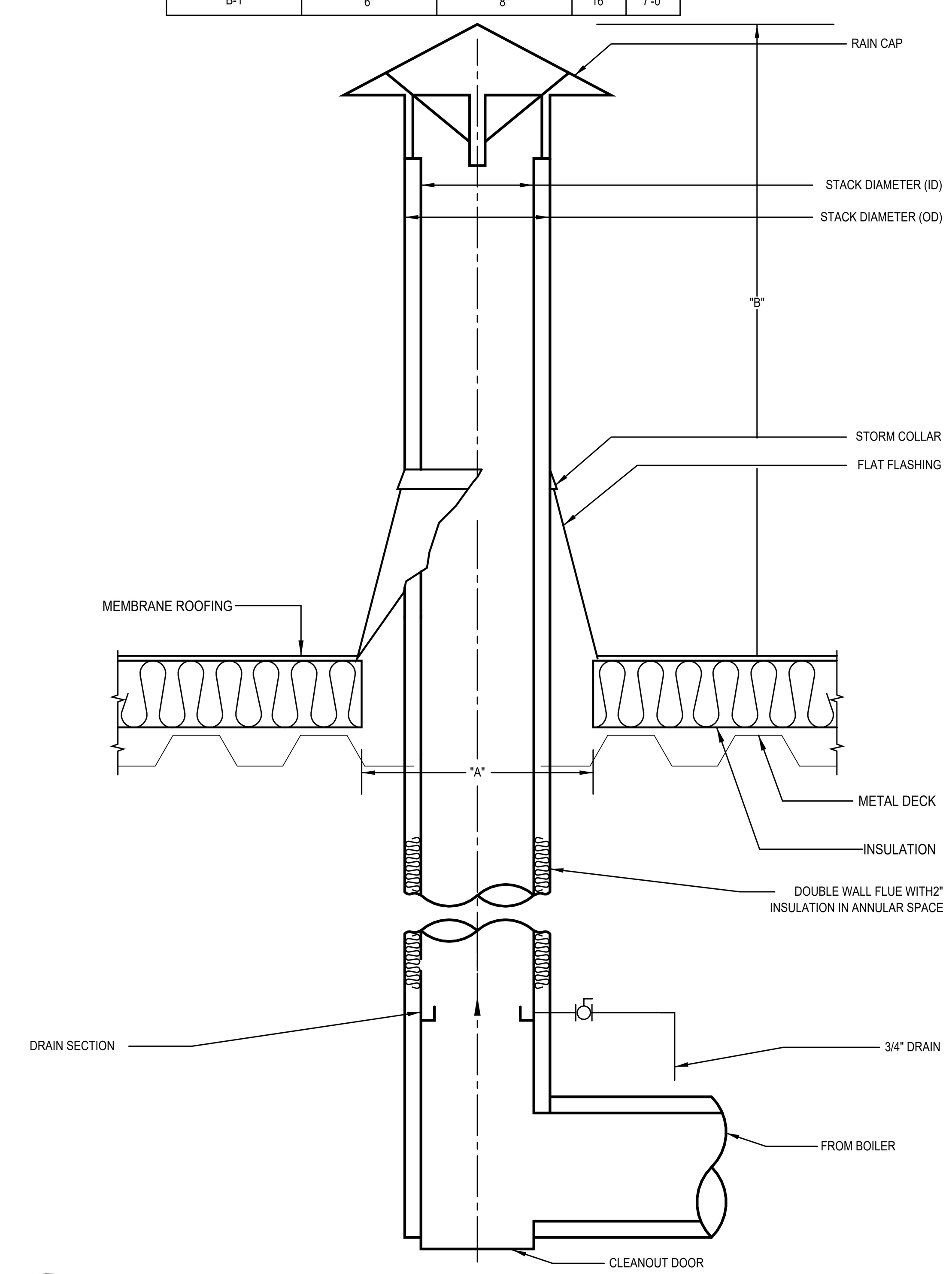
PIPE SIZE (A)	PLATE SIZE (B)	ANGLE SIZE (C)	ANGLE SIZE (D)	MAXIMUM OPERATING PRESSURE PSI
2 1/2" & DN	15x4x1/4	2x2x1/4	3x3x1/4	125
3" THRU 6"	18x4-1/2x3/8	3x3x1/4	3x3x5/16	125
8" THRU 12"	22x5x1/2	4x4x3/8	4x4x1/2	125
14" & UP	REVIEW WITH STRUCTURAL ENGINEER			

12 M8.01 DETAIL - TYPICAL PIPE ANCHOR

NO SCALE

STACK DIMENSIONS

BOILER NO	STACK DIAMETER (ID)	STACK DIAMETER (OD)	A	B
B-1	6"	8"	16"	7'-0"



13 M8.01 DETAIL - TYPICAL FLUE DUCT THRU ROOF

NONE

ARCHITECT / ENGINEER

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REV	DATE	DESCRIPTION
0	01/19/2024	PERMIT AND CONSTRUCTION ISSUE
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KEY PLAN

CLIENT

ADM
1260 PACIFIC AVENUE,
ERLANGER, KY 41018

PROJECT TITLE

PAC2 FERMENTATION LABORATORY

DRAWING TITLE

MECHANICAL DETAILS

PROJECT MANAGER	DRAWN BY
SDA	GND
ARCHITECTURE	ENGINEERING
ALM	GND

QUALITY REVIEWS

DISCIPLINE REVIEW	QC REVIEW	QA REVIEW
MJW	MJW	JES

SEAL: STATE OF KENTUCKY, MARTIN J. WENDEL JR., 31564, LICENSED PROFESSIONAL ENGINEER

1/19/2024
Martin J Wendel JR. PE
KY Professional Engineer
NO. 31564

CONSTRUCTION ISSUE DATE	PROJECT NUMBER	FILE NAME
01/19/2024	23395	23395-MEP

DRAWING NUMBER

M8.01

REFRIGERATION UNIT DATA (AIR-COOLED)

				15% PROPYLENE GLYCOL					PUMPS						CONDENSER FANS		ELECTRICAL						VIBRATION ISOLATION				
NUMBER	SYSTEM/SERVING	NET TONS	TYPE	GPM	EWT °F	LWT °F	PD FT	NO OF PASSES	QTY	TEMP RANGE °F	GPM	EXTERNAL TDH FEET	NPSH FT	AMBIENT AIR °F ON UNIT	QTY	V-PH-HZ	UNIT POWER KW	V-PH-HZ	OIL HEATER CIRC VOLT	STARTER TYPE	%POWER FACTOR	SCCR AMPS	TYPE	DEFL /IN	BASIS OF DESIGN	COMMENTS	TOTAL OPERATING WT/LBS
CH-1	SPINNING CONE	10	SCROLL	24	47	35	23.1	1	1	35-47	24	111	5	95	2	480-3-60	12.8	460-3-60	-	-	-	5,000	-	-	ADVANTAGE MGD-10	1, 2	1100

1. PROVIDE AUTOMATIC LOW FLOW BYPASS VALVE.
2. PROVIDE 25 GALLON - OPEN TO ATMOSPHERE RESERVOIR
3. ELECTRICAL SHALL PROVIDE DISCONNECT.
4. PROVIDE HIGH WATER TEMPERATURE AND LOW WATER PRESSURE AUDIBLE/VISUAL ALARM AND MODBUS RTU COMMUNICATION.

BOILER DATA

								CAPACITIES						ELECTRICAL								
											FIRING RATE											
NUMBER	SYSTEM/SERVING	BOILER HP	TYPE	STEAM OR WATER	DESIGN PSI	OPER PSI	TYPE OF FUEL	MBH OUTPUT	LBS/HR STEAM	MBH WATER	MBH GAS	MBH OIL	NAT GAS PRESS "H2O	FAN HP	OIL PUMP HP	OIL HEAT WATTS	AIR COMP HP	V-PH-HZ	CONTROL CIRCUIT VOLTAGE	BASIS OF DESIGN	COMMENTS	TOTAL OPERATING WT/LBS
B-1	STEAM	6	VERTICAL TUBELESS	STEAM	150	115	NATURAL GAS	201	207	-	242	N/A	7 - 13	0.33	N/A	N/A	N/A	208-3-60	-	FULTON ICS-6	1, 2	1850

1. PROVIDE DIGITAL CONTROLLER WITH BACNET/IP CONNECTIVITY TO BAS FOR REMOTE MONITORING, SETPOINT RESET, AND ENABLE/DISABLE SUPERVISORY CONTROL.

FAN DATA

								MOTOR			VIBRATION ISOLATION				
NUMBER	SYSTEM/SERVING	CFM	SP "H20	FAN TYPE	CLASS	FAN RPM	MAX OUT VEL FPM	HP	RPM	V-PH-HZ	TYPE	DEFL /IN	BASIS OF DESIGN	COMMENTS	TOTAL OPERATING WT/LBS
EF-1	BOILER ROOM 407	675	1	WALLMOUNT	1	1750	302	1/2	1800	460-3-60	A/3	.75	GREENHECK AER-20	1, 3, 4, 5	77
EF-2	CHILLER ROOM 408	10000	1	WALLMOUNT	1	776	1818	5	1800	460-3-60	B/3	1.5	GREENHECK CUBE-300-50	2, 3, 4, 5	257

GENERAL NOTE: PROVIDE VIBRATION ISOLATION PER THE LATEST ASHRAE APPLICATIONS HANDBOOK AND AS PER SPECIFICATIONS.
VIBRATION ISOLATION BASE TYPE DESCRIPTION: A=NO BASE, B=STRUCTURAL STEEL RAILS , C=CONCRETE INERTIA BASE, D=CURB-MOUNTED BASE.
VIBRATION ISOLATION TYPES: 1=PAD/RUBBER/FIBER, 2=RUBBER FLOOR ISOLATOR OR HANGER, 3=SPRING FLOOR ISOLATOR OR HANGER, 4=RESTRAINED SPRING ISOLATOR.

1. PROVIDE WALL HOUSING MOUNTING OPTION WITH MOTOR GUARD, AND WEATHER HOOD WITH BIRD SCREEN.
2. PROVIDE WALL HOUSING MOUNTING OPTION.
3. PROVIDE BACKDRAFT DAMPER.
4. PROVIDE VFD RATED MOTOR. ELECTRICAL SHALL PROVIDE VARIABLE FREQUENCY DRIVE.
5. ELECTRICAL SHALL PROVIDE NORMAL POWER. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.

AUTOMATIC DAMPER DATA

NOTE: PROVIDE ACCESS DOOR AT EACH DAMPER

			SIZE INCHES				DAMPER FUNCTION					
NUMBER	SYSTEM/SERVING	MAXIMUM CFM	L	W	Ø	BLADE ARRANGEMENT	CONTROL	SMOKE	FIRE/SMOKE	MONITORED	BASIS OF DESIGN	COMMENTS
D-1	BOILER ROOM INTAKE	350	20	20	-	PARALLEL	X	-	-	X	RUSKIN CD-60	1
D-2	BOILER ROOM INTAKE	325	20	20	-	PARALLEL	X	-	-	X	RUSKIN CD-60	1
D-3	CHILLER ROOM INTAKE	10000	84	56	-	PARALLEL	X	-	-	X	RUSKIN CD-60	1

1. FURNISH WITH 24V ACTUATORS.

PIPING CONSTRUCTION SCHEDULE

TYPICAL SERVICE APPLICATION	PIPE SIZE	PIPE MATERIAL	FITTINGS / JOINTS ASSOCIATED WITH PIPE MATERIAL	COMMENTS
BOILER FEEDWATER, MEDIUM AND HIGH PRESSURE STEAM	≤2"	SCHEDULE 80 STEEL PIPE	CLASS 3000 FORGED STEEL SOCKET WELDED OR CLASS 2000 THREADED.	
	>2"	SCHEDULE 40 STEEL PIPE	WROUGHT-STEEL FITTINGS WITH WALL THICKNESS TO MATCH PIPE, CLASS 300 FLANGES, AND FLANGE FITTINGS; AND WELDED AND FLANGED JOINTS.	
BLOWDOWN, STEAM CONDENSATE, DRAIN, OVERFLOW AND VENT	≤2"	SCHEDULE 80 STEEL PIPE	CLASS 3000 FORGED STEEL SOCKET WELDED OR CLASS 2000 THREADED.	
	>2"	SCHEDULE 80 STEEL PIPE	WROUGHT-STEEL FITTINGS WITH WALL THICKNESS TO MATCH PIPE, CLASS 300 FLANGES, AND FLANGE FITTINGS; AND WELDED AND FLANGED JOINTS.	
GLYCOL CHILLED WATER	≤2"	TYPE L, DRAWN-TEMPER COPPER TUBING; OR	WROUGHT-COPPER FITTINGS WITH 95-5 SOLDER SOLDERED.	

PIPING INSULATION SCHEDULE

					INDOOR	
TYPICAL SERVICE APPLICATION	SERVICE TEMPERATURE RANGE	K' VALUE CONDUCTIVITY (Btu*in/(h*ft^2*°F)	PIPE SIZE (IN.)	INSULATION THICKNESS (IN.)	INSULATON TYPE	JACKET
CHILLED WATER	35 - 60°F	0.21 - 0.27 @ MEAN TEMP. OF 75°F	3/8" - 1"	0.5	FIBERGLASS	PVC
			1 1/2" - 16"	1		
LPS, LPC, MPC, HPC, PC, CS (0 - 15 PSIG)	201 - 250°F	0.27 - 0.28 @ MEAN TEMP. OF 150°F	3/8" - 3"	2.5	FIBERGLASS	PVC
			4" - 8"	3		
			10" - 16"	4		
MPS, HPS (16 PSIG -120PSIG)	251 - 350°F	0.29 - 0.32 @ MEAN TEMP. OF 200°F	< 1"	3	FIBERGLASS	PVC
			1"	4		
			≥ 1.5"	4.5		

NOTE 1: REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND OPTIONS. ALTERNATIVE INSULATIONS USED WITH 'K' VALUES OUTSIDE THE RANGE INDICATED SHALL HAVE THEIR THICKNESS CALCULATED AS INDICATED IN IECC-2021.

UNIT HEATER DATA (ELECTRIC)

			MOTOR				ELECTRIC						
NUMBER	LOCATION	BTU/HR 60°F EAT	CFM	HP	RPM	V-PH-HZ	KW	V-PH-HZ	TYPE	ARRANGEMENT	BASIS OF DESIGN	COMMENTS	TOTAL OPERATING WT/LBS
UH-1	BOILER ROOM 407	10236	125	0.03	-	-	3	460-3-60	CEILING MOUNT	-	REZNOR EUH	1	49
UH-2	CHILLER ROOM 408	10236	125	0.03	-	-	3	460-3-60	CEILING MOUNT	-	REZNOR EUH	1	49

1. ELECTRICAL SHALL PROVIDE DISCONNECT.

BLOWDOWN TANK DATA

		CAPACITY GALLONS		PIPE CONNECTIONS								
NUMBER	SYSTEM/SERVING	TOTAL	OVERFLOW	INLET	OUTLET	DRAIN	VENT	QUENCH	OPERATING PRESSURE PSIG	BASIS OF DESIGN	COMMENTS	TOTAL OPERATING WT/LBS
BDT-1	BOILER BLOWDOWN - BOTTOM	22	10	1-1/4"	3"	1-1/2"	3"	3/4"	0	FULTON F-30 BLOW-OFF	-	300

BOILER FEEDWATER PUMP SET DATA

				PUMPS				MOTOR					
				QUANTITY									
NUMBER	SYSTEM/SERVING	TOTAL BOILER HP	RECIEVER CAPACITY GALLONS	OPER	STAND	GPM PER PUMP	DISCH PSIG	QTY	HP	RPM	V-PH-HZ	BASIS OF DESIGN	COMMENTS
BFS-1	STEAM	6	46	1	-	3	395	1	2	-	460-3-60	FULTON MODEL HT-30	1

1. PROVIDE BOILER FEED SET WITH SIMPLEX PUMP SYSTEM, CHEMICAL FEED INJECTION, SKID MOUNTED CONTROL PANEL, AND PREHEAT PIPING.

CHEMICAL FEED EQUIPMENT DATA

		CHEMICAL TANK		PUMP/MOTOR					
NUMBER	SYSTEM/SERVING	MATERIAL	CAP/ GALS	QTY	HP EACH	MIN DISCH PSI	V-PH-HZ	BASIS OF DESIGN	COMMENTS
CF-BFS-1	BOILER FEEDSET	POLYETHYLENE	50	1	-	15	120-1-60	FULTON DELUXE CHEMICAL FEED SYSTEM	-

FLASH TANK DATA

NUMBER	SYSTEM/SERVING	FLASH STEAM LB/HR	FLASH STEAM PRESS PSI	LB FLASH PER LB COND	OVERALL DIM (IN) DxL	BASIS OF DESIGN	COMMENTS	TOTAL OPERATING WT/LBS
FT-1	SPINNING CONE	20.5	0	0.133	2x36	-	-	-

PRESSURE REDUCING VALVE DATA

			CAPACITY							
NUMBER	INLET PRESS PSIG	OUTLET PRESS PSIG	REQ'D LBS/HR	MAX LBS/HR	INLET VELOCITY FPM	OUTLET VELOCITY FPM	SIZE	SPL dBA	BASIS OF DESIGN	COMMENTS
PRV-1	110	40	173	192	4908	10696	1/2"	-	SPIRAX SARCO 25P REDUCED PORT	-

SAFETY VALVE DATA

NUMBER	CAPACITY LBS/HR (NOTE 1)	SET PRESS PSIG	SIZE	BASIS OF DESIGN	COMMENTS
SV-1	532	75	1/2IN x 3/4IN	KUNKLE MODEL 6010	1, 2

1. BASED ON 10% ACCUMULATION.
2. ORIFICE SIZE D.

ARCHITECT / ENGINEER

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STRUCTURAL ENGINEER

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CIVIL ENGINEER

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Planning & Development Services
of Kenton County
Building Plan Review
Approved with Conditions
gforsyth 10/28/2024

REV	DATE	DESCRIPTION
0	01/19/2024	PERMIT AND CONSTRUCTION ISSUE
A	12/14/2023	OWNER REVIEW ISSUE

KEY PLAN

CLIENT

ADM
1260 PACIFIC AVENUE,
ERLANGER, KY 41018

PROJECT TITLE

PAC2 FERMENTATION LABORATORY

DRAWING TITLE

MECHANICAL SCHEDULES

PROJECT MANAGER	DRAWN BY
SDA	GND

PROJECT LEADS

ARCHITECTURE	ENGINEERING
ALM	GND

QUALITY REVIEWS

DISCIPLINE REVIEW	QC REVIEW	QA REVIEW
MJW	MJW	JES

SEAL

STATE OF KENTUCKY
MARTIN J. WENDEL, JR.
31564
LICENSED PROFESSIONAL ENGINEER

1/19/2024

Martin J Wendel JR. PE
KY Professional Engineer
NO. 31564

CONSTRUCTION ISSUE DATE	PROJECT NUMBER	FILE NAME
01/19/2024	23395	23395-MEP

DRAWING NUMBER

M9.01