

MIZZOU NORTH RETROFIT HP BOILERS AND FLUE VENT REPLACEMENT

MIZZOU NORTH

MU PROJECT No. CP141901

UNIVERSITY OF MISSOURI

FOR THE CURATORS OF THE UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI



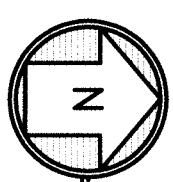
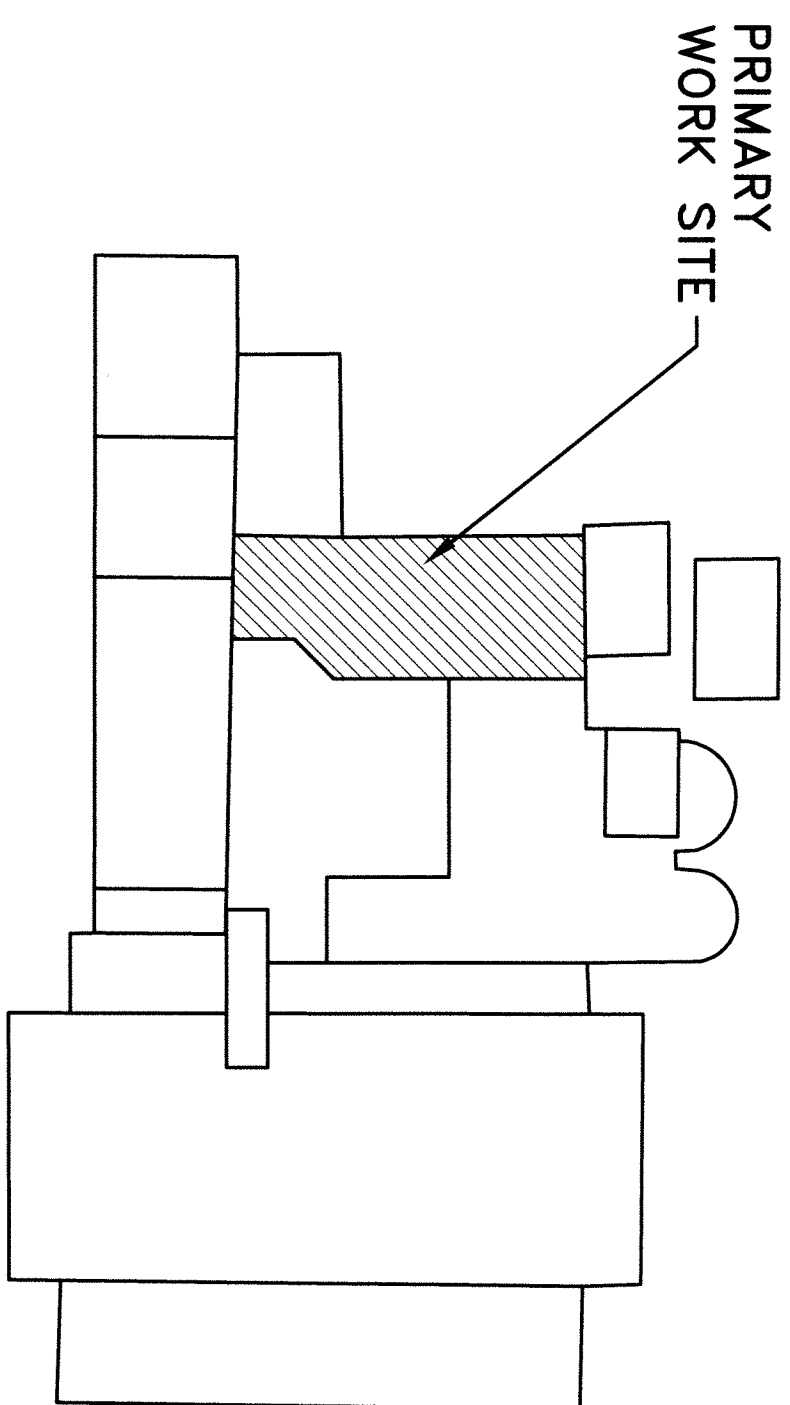
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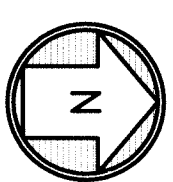
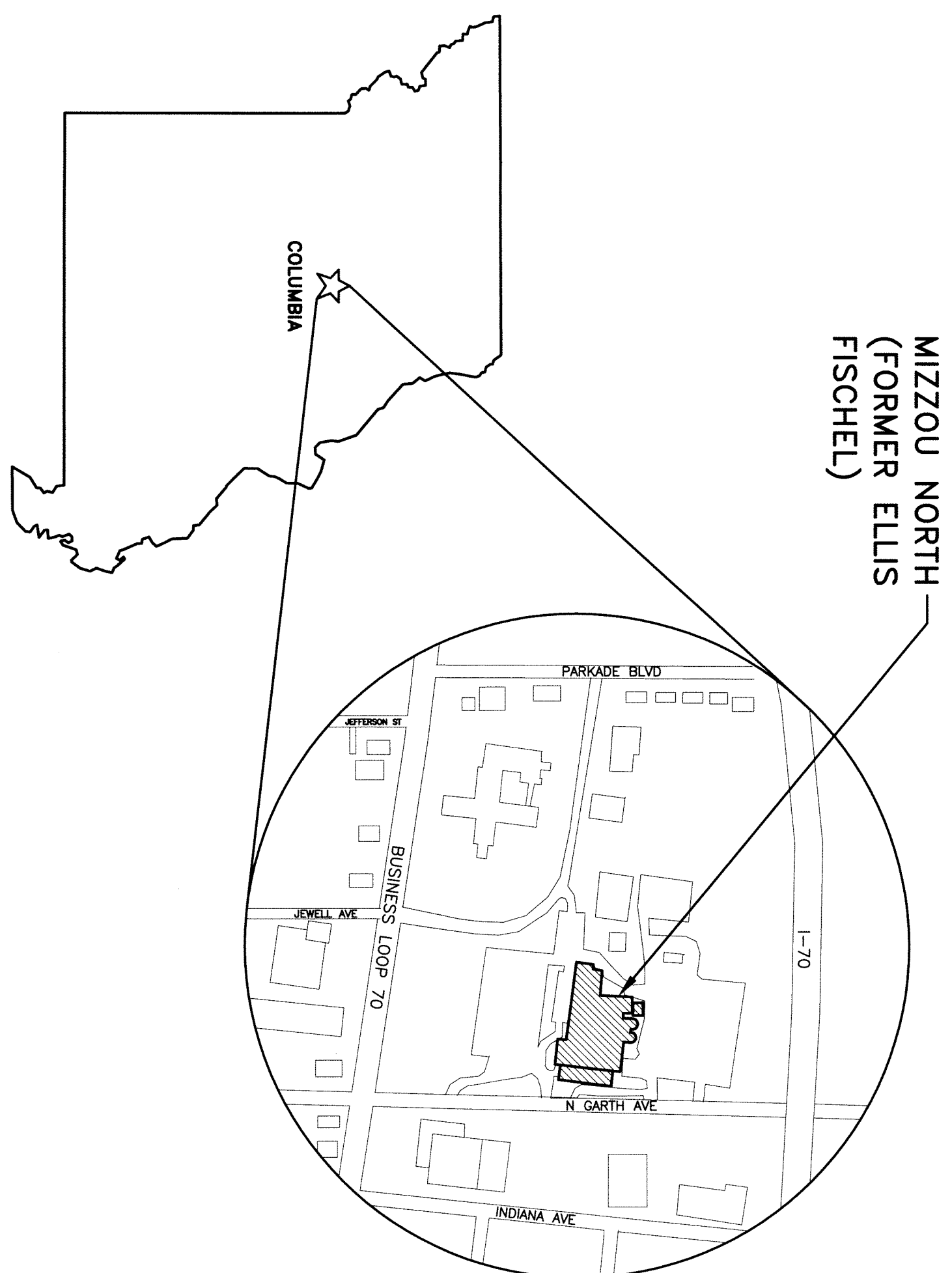


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PROJECT SITE MAP
SCALE: NONE

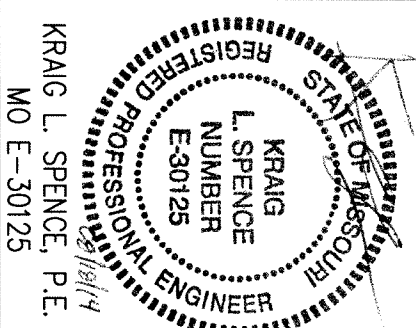


PROJECT VICINITY MAP

SCALE: NONE

1	08/18/14	CONSTRUCTION SET ISSUED
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MISSOURI NORTH - BOILER & VENT REPLACEMENT
COLUMBIA, BOONE COUNTY, MISSOURI 65203

PROJECT NUMBER

CP141901

SHEET

TITLE SHEET



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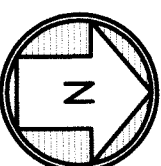
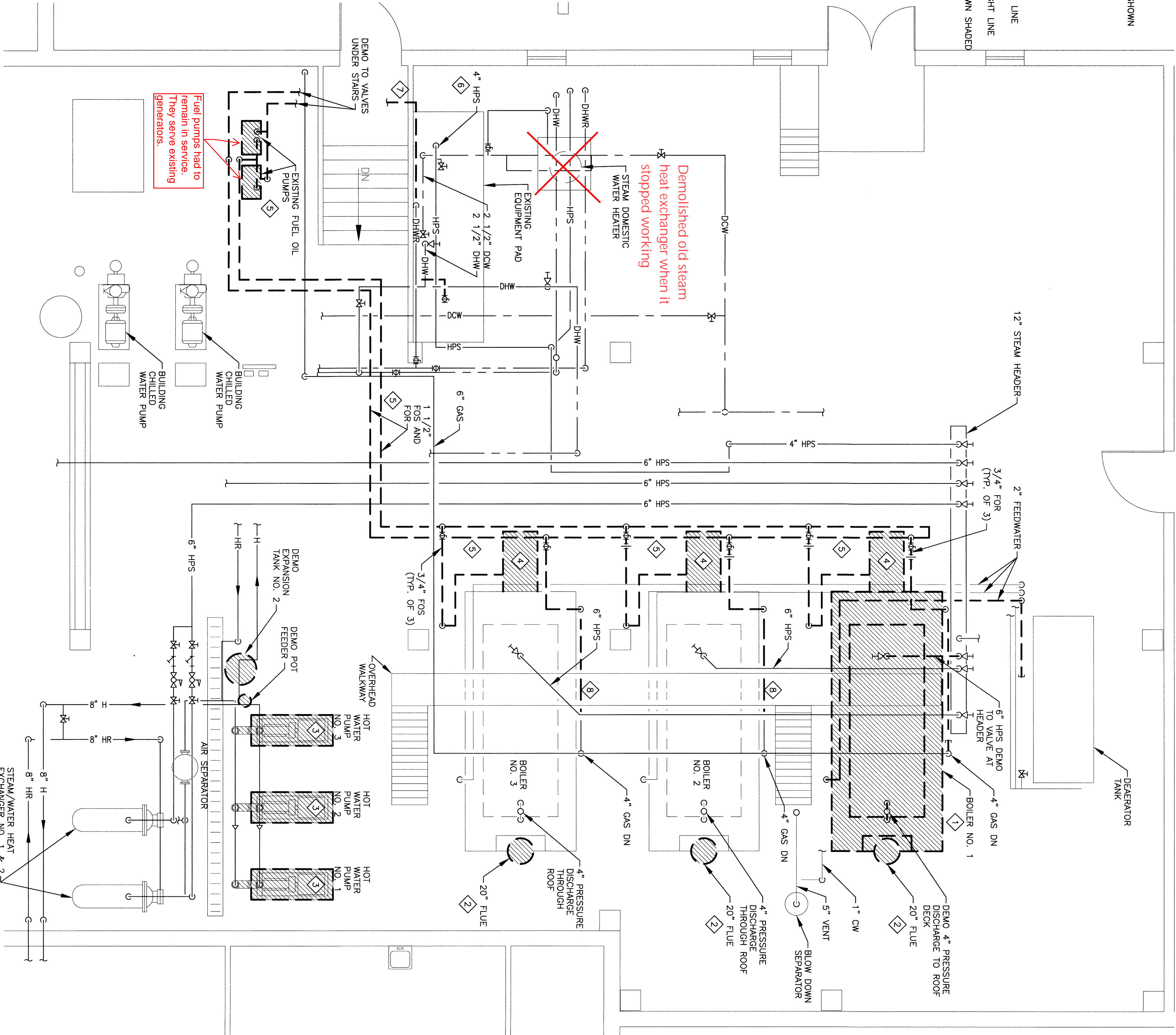
PSE Project E1417.02

STANDARD DRAWING SYMBOLS

- EQUIPMENT OR PLUMBING FIXTURE DESIGNATION
- SECTION NUMBER
- SHEET NUMBER WHERE SECTION IS SHOWN
- DETAIL NUMBER
- DRAWING NUMBER WHERE DETAIL IS SHOWN
- KEYED NOTES
- REVISION
- ROOM NUMBERS
- NEW WORK SHOWN WITH HEAVY DARK LINE
- EXISTING ITEMS SHOWN WITH THIN LIGHT LINE
- EXISTING ITEMS TO BE REMOVED SHOWN SHADED WITH HEAVY DARK LINE
- ABBREVIATIONS**
- AFT ABOVE FINISHED FLOOR
CB CIRCUIT BREAKER
DEMO DEMOLITION
EL ELEVATION
EC ELECTRICAL CONTRACTOR
GC GENERAL CONTRACTOR
GRND GROUND
GRS GALVANIZED RIGID STEEL CONDUIT
MC MECHANICAL CONTRACTOR
PBC PLUMBING CONTRACTOR
PVC POLYVINYL CHLORIDE CONDUIT
TYP TYPICAL

PIPING

- LPS LOW PRESSURE STEAM
LPC LOW PRESSURE CONDENSATE
HPS HIGH PRESSURE STEAM
HPC HIGH PRESSURE CONDENSATE
H HOT WATER SUPPLY
HR HOT WATER RETURN
DOW DOMESTIC COLD WATER
DHW DOMESTIC HOT WATER
DHR DOMESTIC HOT WATER RETURN
FOS FUEL OIL SUPPLY
FOR FUEL OIL RETURN
D DRAIN
CHWS CHILLED WATER SUPPLY
CHWR CHILLED WATER RETURN
MW MAKE-UP WATER
- PIPING SPECIALTIES**
- BLV BALL VALVE
BUV BUTTERFLY VALVE
CV CHECK VALVE
MV MOTORIZED VALVE
TDV TRIPLE DUTY VALVE
BV BALANCE VALVE
PRV PRESSURE REGULATING VALVE
PG PRESSURE GAGE
TM THERMOMETER
FM FLOW METER
IW INSTRUMENT WELL
TG TEMPERATURE GAUGE
STR STRAINER
AAV AUTOMATIC AIR VENT
UN UNION
FL FLANGE
DFR DIRECTION OF FLOW
CR CONCENTRIC REDUCER
TEE (SIDE OUTLET UP)
TEE (SIDE OUTLET DOWN)
ELB ELBOW (TURNED UP)
ELB ELBOW (TURNED DOWN)
CP CAPPED PIPE
NC NEW CONNECTION TO EXISTING



PARTIAL BOILER ROOM MECHANICAL DEMOLITION PLAN

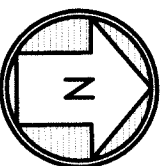
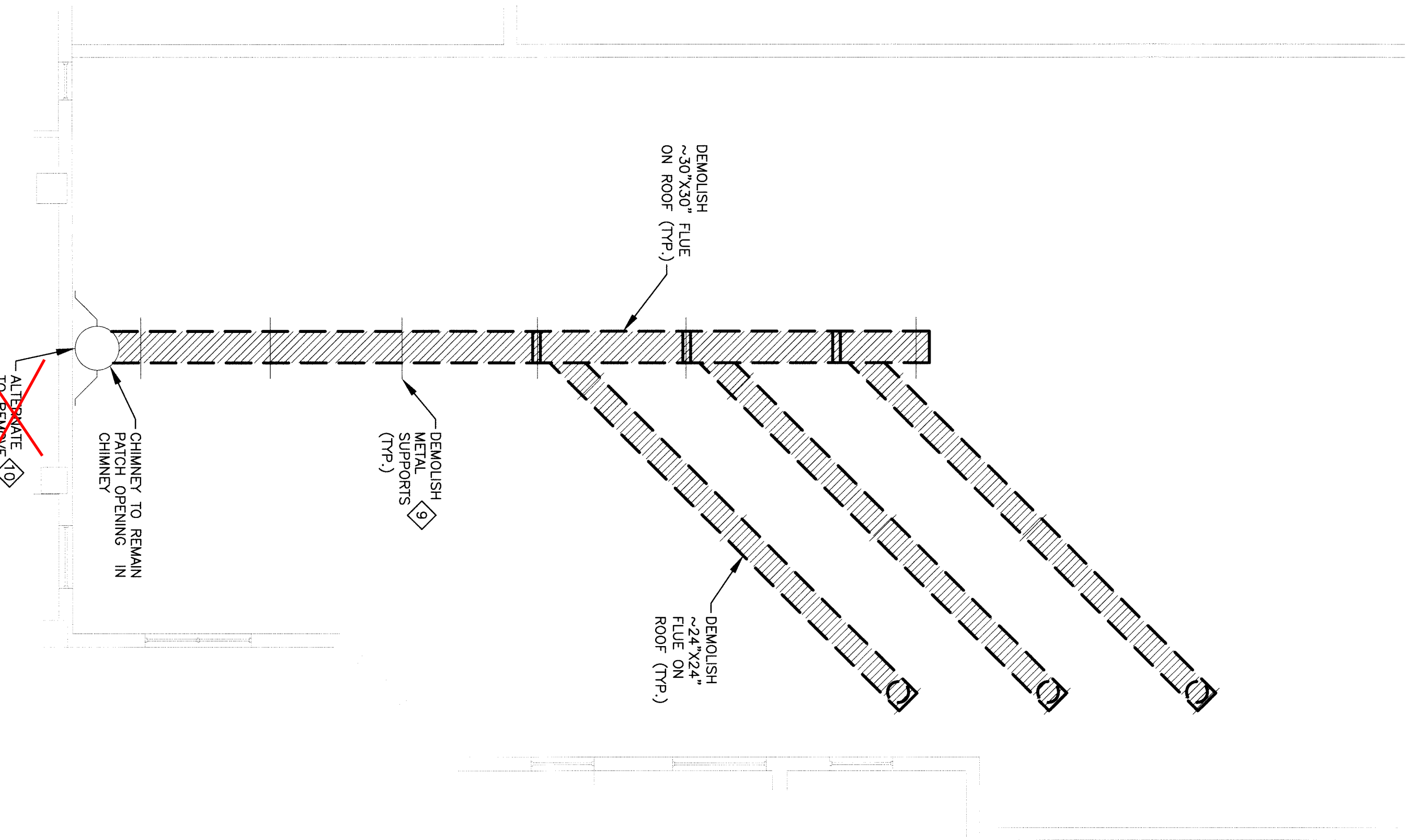
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. COORDINATE WITH OWNER FOR ALL INTERRUPTIONS OF THE BUILDING SYSTEMS.
2. DEMO PIPING AND EQUIPMENT AS SHOWN.
3. STAGE DEMOLITION TO MINIMIZE STEAM AND HOT WATER SYSTEM OUTAGE(S).

DEMOLITION PLAN KEYED NOTES:

- DEMOLISH BOILER #1: Kewanee, Classic III, 350 BHP, DUAL-FUEL, HIGH PRESSURE, STEAM BOILER, INCLUDING ALL PIPING SYSTEM CONNECTIONS CAPPED BACK TO MAINS, FLEU TO ROOF DECK; SEE SPECIFICATIONS.
- DEMOLISH 20" FLEU THROUGH ROOF, ASBESTOS HAS BEEN IDENTIFIED IN INSULATION ON FLEU TO ROOF DECK; SEE SPECIFICATIONS.
- DEMOLISH HOT WATER PUMPS INCLUDING VALVES AND ACCESSORIES IN RISERS.
- DEMOLISH BURNER FROM EXISTING BOILER.
- DEMOLISH FUEL OIL SUPPLY AND RETURN SYSTEM AS INDICATED.
- DEMOLISH END VALVES AND PIPING RISER, CAP PIPING AT HORIZONTAL.
- DEMOLISH CONDENSATE PIPING TO MAIN.
- DEMOLISH EXISTING GAS TRAIL.
- DEMOLISH STEEL SUPPORTS, CUT LEGS OUT OF PITCH POCKETS AND PATCH ROOFING MEMBRANE.
- UNDER ALTERNATE #1: DEMOLISH EXISTING CHIMNEY, INCLUDING ALL WALL SUPPORTS, PATCH ROOFING AND DEMOLISH PATCH ROOF DECK AND ROOFING MEMBRANE TO MATCH EXISTING. -- ALTERNATE NOT ACCEPTED



BOILER ROOM ROOF DEMOLITION PLAN

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

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MECHANICAL DEMOLITION PLAN

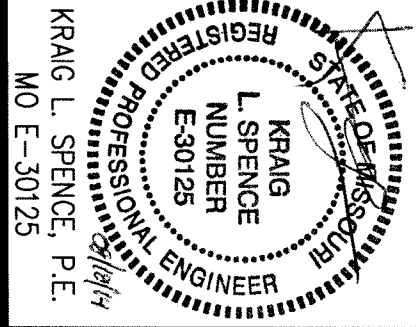
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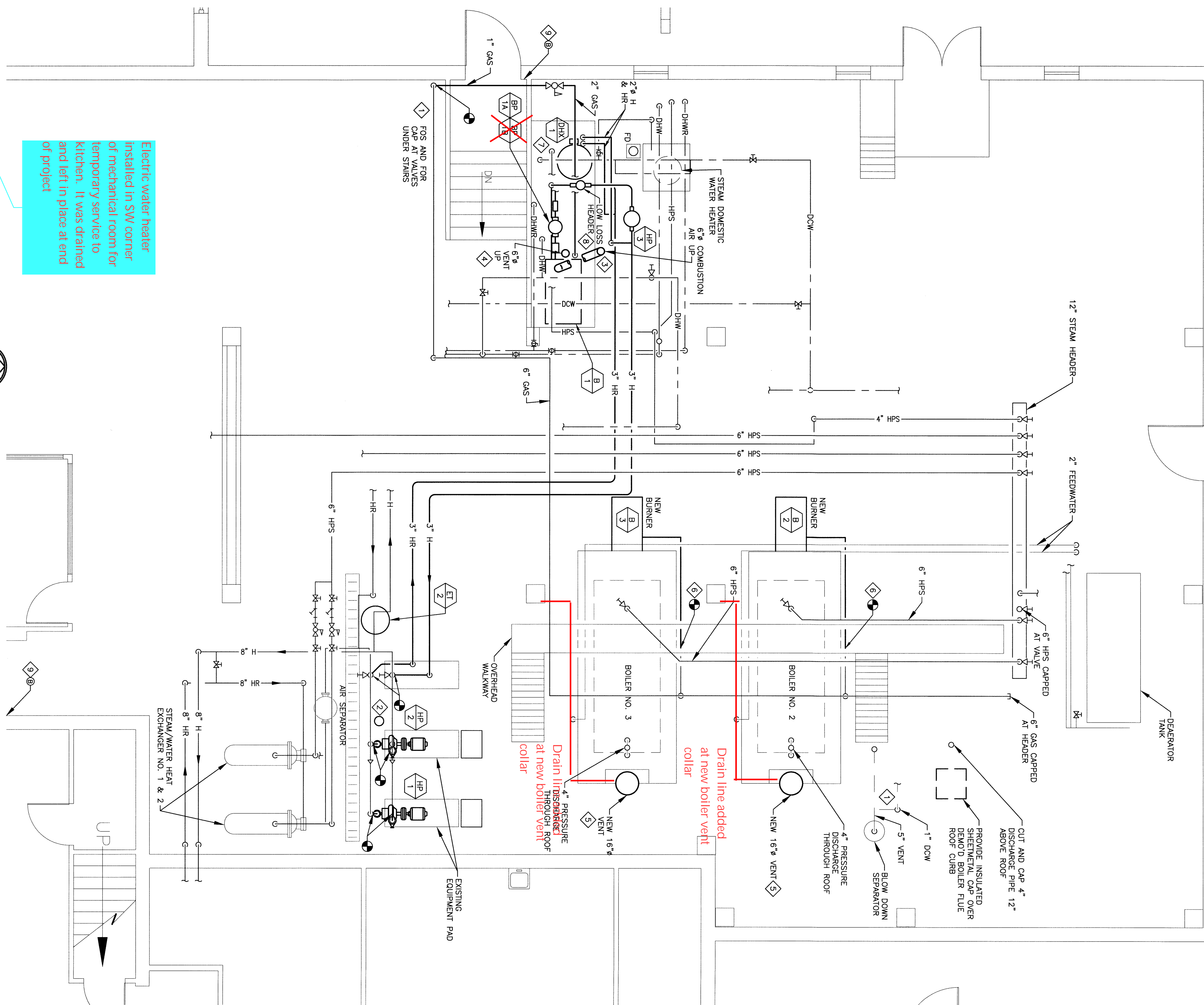
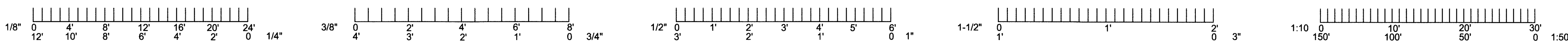
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GENERAL NOTES:

1. COORDINATE WITH OWNER FOR ALL INTERRUPTIONS OF THE BUILDING SYSTEMS.
2. STAGE NEW HOT WATER AND DOMESTIC HOT WATER SYSTEM INSTALLATIONS TO MINIMIZE OUTAGES.
3. SEE INSTALLATION DETAILS ON SHEET M501.
4. REPAIR ANY INSULATION DISTURBED DURING THE PROJECT WORK.
5. COMPLY WITH INTERNATIONAL MECHANICAL CODE.
6. EXISTING COMPARISON AS REQUIRED TO MECHANICAL ROOM BOILERS VIA TWO ROOF MOUNTED PENROTHUSES AND A WALL LOWER. TOTAL COMBINED FREE AREA EXCEEDS SQUARE INCHES. TOTAL INPUT OF BOILERS AT B1 AND B3 = 16,800 MBH; REQUIRING 5,600 SQUARE INCHES FROM PERMANENT HOT WATER OPENING.

MECHANICAL PLAN KEYED NOTES:

- 1 CAP REMAINING PIPING AFTER DEMOLITION
- 2 POT FEEDER TO BE INSTALLED AROUND PUMP HP-2.
- 3 EXTEND COMBUSTION AIR PIPE UP INTO INTAKE AIR FEEDHOUSE
- 4 EXTEND VENT A MINIMUM OF 5'-0" ABOVE ROOF
- 5 MAKE TRANSITION TO BOILER FLUE OUTLET AS NECESSARY. RE-USE EXISTING ROOF PENETRATION. EXTEND VENT A MINIMUM OF 16'-0" ABOVE ROOF. PROVIDE GUT WIRING AT 10'-0" ABOVE ROOF.
- 6 INSTALL NEW GAS TRAIL. CONNECT TO EXISTING GAS PIPING AND VENTS.
- 7 BALANCE HEATING HOT WATER FLOW TO DOMESTIC WATER HEAT EXCHANGER TO 35 GPM.
- 8 LOW LOSS HEADER TYPICAL OF BELL & GOSSETT MODEL PSH-3 OR EQUIVALENT.
- 9 EXISTING EMERGENCY BOILER SHUTDOWN BUTTON INTERLOCKED TO BOILER CONTROLS TO SHUTDOWN BURNER PER ASME-CSDD-1.

HEATING SYSTEM DDC POINTS LIST

PANEL LOCATION: MR 1110

TAG#	TYPE	POINT NAME	DESCRIPTION	DEVICE
501	AI	HWS-T	HW SUPPLY TEMPERATURE	RIDTHERMOWELL
502	AI	HWR-T	HW RETURN TEMPERATURE	RIDTHERMOWELL
503	AI	ST-CC	STATUS	PRESS. TRANSMITTER
504	AO	HWP1-O	HW PUMP 1 OUTPUT	VFD
505	AO	HWP2-O	HW PUMP 2 OUTPUT	VFD
506	AO	HWP3-O	HW PUMP 3 OUTPUT	VFD
507	BI	HWP1-S	HW PUMP 1 STATUS	CURRENT SWITCH
508	BI	HWP2-S	HW PUMP 2 STATUS	CURRENT SWITCH
509	BI	HWP3-S	HW PUMP 3 STATUS	CURRENT SWITCH
510	BI	B1-ALM	BOILER 1 ALARM	BOILER CONTROL PANEL
511	BI	B2-ALM	BOILER 2 ALARM	BOILER CONTROL PANEL
512	BO	B3-ALM	BOILER 3 ALARM	BOILER CONTROL PANEL
513	BO	HWP1-C	HW PUMP 1 COMMAND	CONTROL RELAY
514	BO	HWP2-C	HW PUMP 2 COMMAND	CONTROL RELAY
515	BO	HWP3-C	HW PUMP 3 COMMAND	CONTROL RELAY
516	BO	B1-ENB	BOILER 1 ENABLE	BOILER CONTROL PANEL
517	BO	B2-ENB	BOILER 2 ENABLE	BOILER CONTROL PANEL
518	BO	B3-ENB	BOILER 3 ENABLE	BOILER CONTROL PANEL

SEQUENCE OF OPERATION

BELOW 60 DEG. OA

THE EMS SYSTEM WILL ENABLE THE LEAD BOILER (B2-ENB) AND START THE LEAD HOT WATER PUMP (HWP1-O). ONCE THE PUMP STATUS (HWP1-S) IS PROVEN, THE LEAD STEAM VALVE (ST-ALV) WILL MODULATE TO MAINTAIN HOT WATER SUPPLY TEMPERATURE (HWS-T). THE HOT WATER SUPPLY SETPOINT WILL BE CONTINUOUSLY RESET AS FOLLOWS:

QAT
HWS-SP
20
180
60
140

THE EMS SYSTEM WILL MODULATE THE VFD (HWP1-O) OF THE LEAD PUMP TO MAINTAIN THE DIFFERENTIAL PRESSURE (HW-DP) SETPOINT.

IF THE LEAD PUMP FAILS OR CAN NOT MAINTAIN PRESSURE, THE LAG PUMP WILL START AND CONTROL THE SAME AS THE LEAD PUMP. IF THE LEAD HEX CAN NOT MAINTAIN TEMPERATURE, THE LAG HEX WILL CONTROL AS WELL. IF THE LEAD BOILER FAILS OR CAN NOT MAINTAIN STEAM PRESSURE, THE LAG BOILER WILL BE ENABLED.

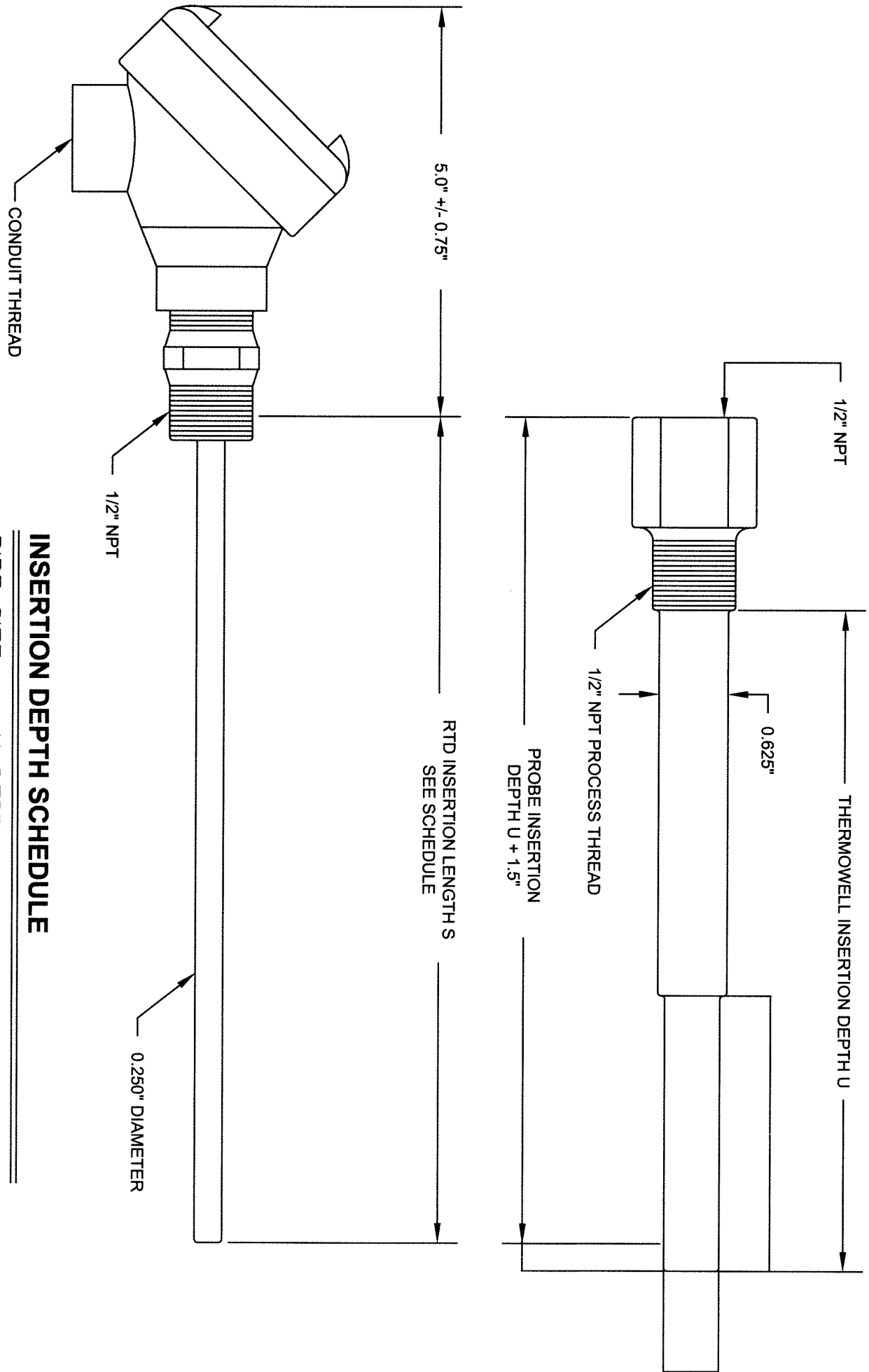
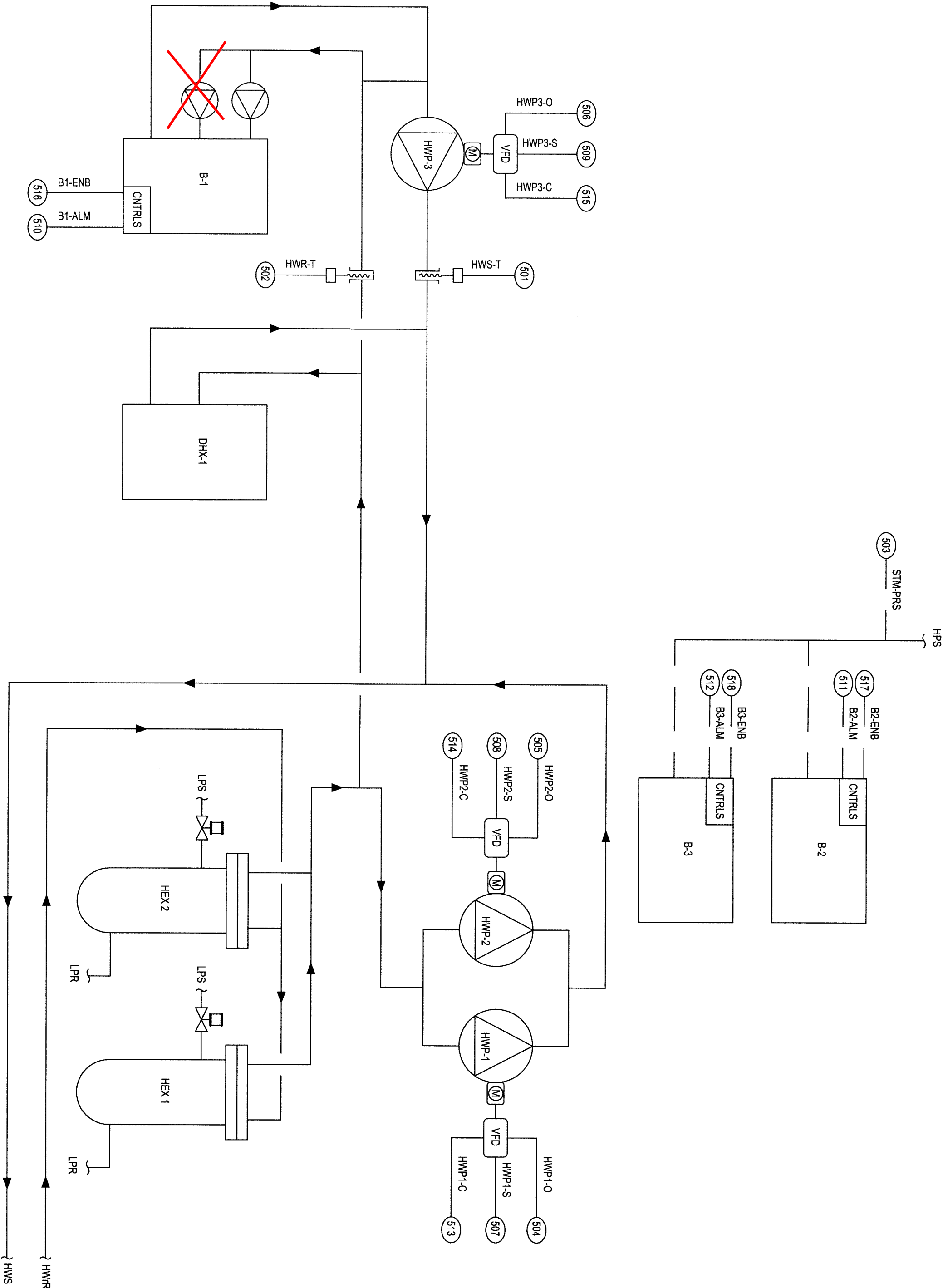
ABOVE 60 DEG. OA
THE EMS SYSTEM WILL ENABLE BOILER 3 (B3-ENB) AND ITS INTERNAL CONTROLS WILL MAINTAIN 140 DEG SUPPLY TEMPERATURE.

THE EMS SYSTEM WILL MODULATE HOW WATER PUMP 3 (HWP3-O) TO MAINTAIN THE DIFFERENTIAL PRESSURE (HW-DP) SETPOINT.

NOTES

- CONNECT CONTROL POINTS TO EXISTING CHILLER METASTS PANEL LOCATED IN SAME MECHANICAL ROOM.
- SOME CONTROL POINTS ARE EXISTING AND ARE NOT SHOWN FOR CLARITY.
- HOT WATER DIFFERENTIAL PRESSURE WILL BE ADDED BY OWNER IN MECH ROOM FOR AH2.

HEATING SYSTEM CONTROL SCHEMATIC



INSERTION DEPTH SCHEDULE

PIPE SIZE	U DEPTH	S LENGTH
4" & DOWN	2"	3.5"
5"	2.5"	4"
6"	3"	4.5"
8"	4"	5.5"

FOR PIPE SMALLER THAN 4" BUSHING AND/OR TEE WILL BE REQUIRED.

HOT WATER RTD/THERMOWELL DETAIL

NO SCALE

DEVICES (SEE SPECS):

- R 24 VAC CONTROL RELAY
- CT CURRENT TRANSFORMER (SWITCH)
- HOA HAND-OFF-AUTO SWITCH
- VFD VARIABLE FREQUENCY DRIVE

TYPICAL: HP-1,2

VARIABLE SPEED PUMP START DETAIL

NO SCALE

