

NEWTON CORRECTIONAL FACILITY 9404.00 DOC NCF CRC BOILER REPLACEMENT

PROJECT
LOCATION



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COORDINATE PHASING/SEQUENCING WITH REPRESENTATIVE TO MINIMIZE SHUTDOWN TIME. REMOVE AND INSTALL ONE BOILER AT THE TIME.



IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
CENTRAL PROCUREMENT ENTERPRISES (CPE)
HOOVER STATE OFFICE BUILDING, LEVEL 3
1305 EAST WALNUT
DES MOINES, IA 50319-0105

NEWTON CORRECTIONAL FACILITY
9404.00 DOC NCF CRC BOILER REPLACEMENT
307 S 60TH AVE W
NEWTON, IA 50208

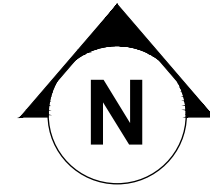
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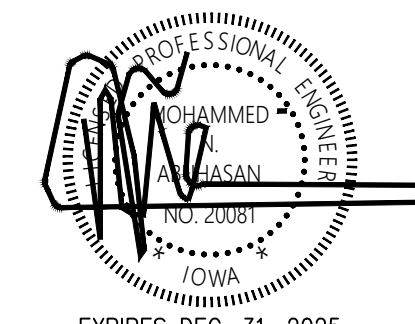
SHEET TITLE
COVER SHEET & DRAWING INDEX

G00

A
G00 NEWTON CORRECTIONAL FACILITY
NO SCALE



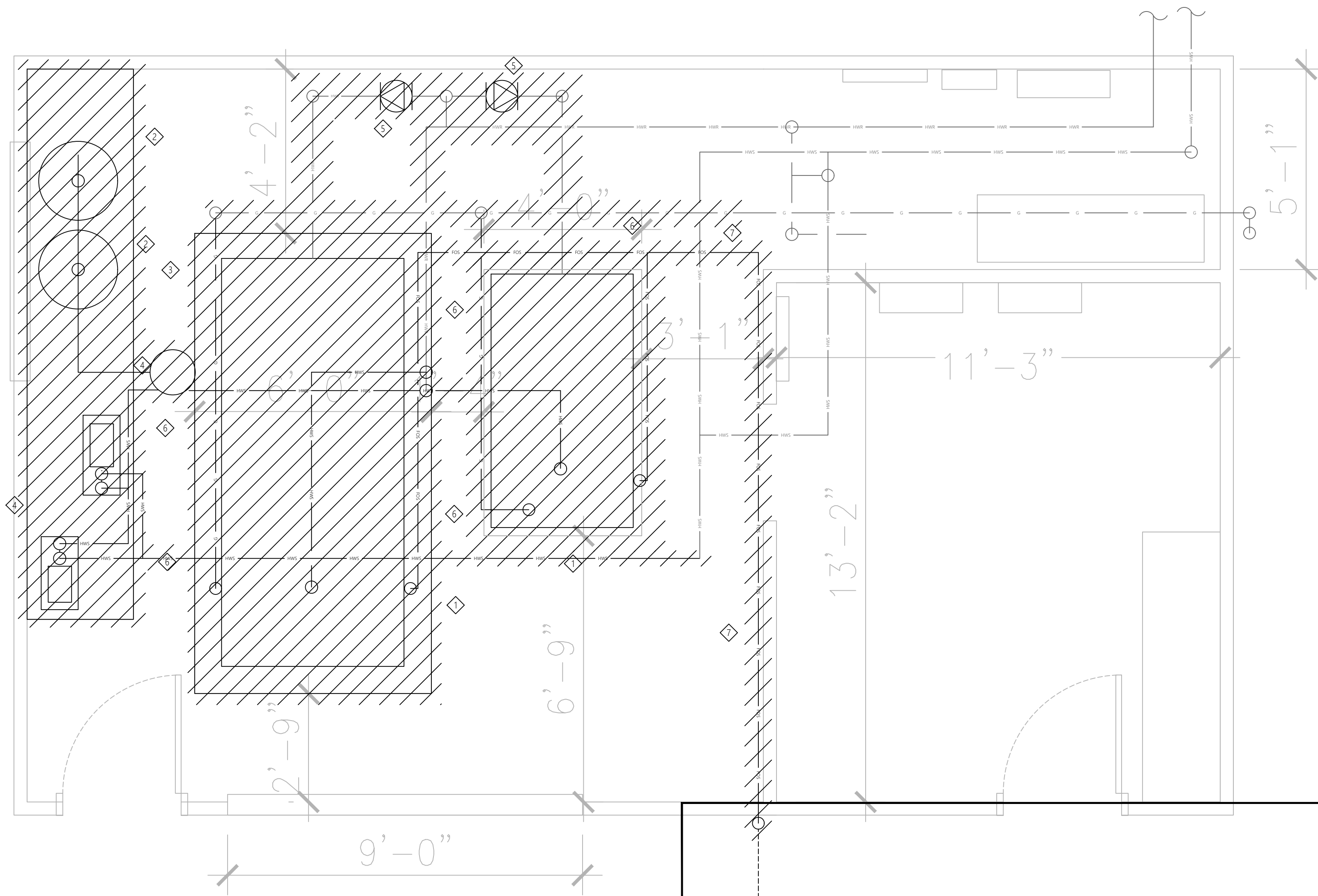
I HEREBY CERTIFY THAT THE PORTION OF THIS TECHNICAL SUBMISSION DESCRIBED BELOW WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION. I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

SIGNATURE: 
NAME: MOHAMMED N. ABU-HASAN
DATE: DEC. 31, 2025
LICENSE RENEWAL DATE: DEC. 31, 2025
PAGES OR DIVISIONS COVERED BY THIS CERTIFICATION: _____

EXPIRES DEC. 31, 2025

MEP ENGINEER:
IE INNOVATIVE ENGINEERS, INC.
2871 Heinz Rd. Suite B, Iowa City, IA 52240
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www.innovativeengineersinc.com

EVERYTHING OUTSIDE OF BID PACKAGE II IS CONSIDERED BID PACKAGE I.



MECHANICAL KEYED NOTES:

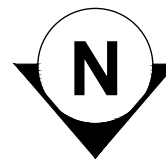
- ◇ REMOVE EXISTING HOT WATER BOILER AND HOUSEKEEPING PAD. PREPARE SPACE FOR INSTALLATION OF NEW CONCRETE PAD AND BOILER (2 TYP.) SEE GENERAL NOTE 5 BELOW.
- ◇ REMOVE EXISTING EXPANSION TANKS AND PIPING.
- ◇ REMOVE EXISTING AIR SEPARATOR.
- ◇ REMOVE EXISTING SYSTEM CIRCULATOR PUMPS.
- ◇ REMOVE EXISTING BOILER PUMPS AND PIPING DOWNSTREAM OF PUMPS.
- ◇ REMOVE PIPING IN AREAS OF DEMOLITION. PREPARE REMAINING PIPING FOR RECONNECTION TO NEW EQUIPMENT. (TYP.)
- ◇ REMOVE EXISTING FUEL OIL PIPE. RESTORE GRADE PER SUDAS RECOMMENDATIONS TO MATCH EXISTING.
- ◇ REMOVE CONCRETE TANK CAP SLAB AND EXISTING 10,000 GAL BURIED FUEL OIL TANK. PUMP OUT UNUSABLE FUEL OIL AND DISPOSE OF PER EPA APPROVED METHOD. COORDINATE ALL FUEL TANK DISPOSAL ACTIVITIES WITH OWNER AND IOWA DNR REQUIREMENTS AND PERMITS. ARRANGE FOR ANY REQUIRED SOIL CONTAMINATION TESTS. REMOVE EMPTY TANK FOR SALVAGE. FILL EXCAVATION AND RESTORE TO GRADE. OWNER TO BE CREDITED TANK SALVAGE RETURNS. GRADE RESTORATION TO FOLLOW GUIDELINES IN CURRENT SUDAS DOCUMENT.

- ◇ REMOVE 18" AND 12" EXISTING BOILER FLUES. PREPARE EXISTING ROOF OPENINGS FOR RE-USE. EXISTING BOILER FLUES NOT SHOWN FOR CLARITY.

GENERAL MECHANICAL DEMOLITION NOTES:

1. M.C. SHALL VERIFY THE EXISTING CONDITIONS AT THE PROJECT SITE BEFORE SUBMITTING BID.
2. THE M.C. SHALL VISIT THE SITE TO VERIFY DEVICES AND EQUIPMENT NOT SHOWN.
3. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN DEMOLITION REMOVAL, CAPPING, ABANDONING, DISCONNECTING OF EXISTING MECHANICAL EQUIPMENT AND MATERIAL. ALL CUTTING, PATCHING, REPAIRING, REPLACEMENT AND REFINISHING, SHALL MATCH THE EXISTING CONSTRUCTION AS NEARLY AS POSSIBLE.
4. THE OWNER SHALL HAVE THE FIRST CHOICE TO ACCEPT EXISTING DEVICES AND EQUIPMENT BEING REMOVED AND NOT REUSED.
5. BOILER REPLACEMENT IS TO BE PHASED. CURRENTLY INCOPERABLE BOILER 1 (BURNHAM) IS TO BE REPLACED FIRST WHILE BOILER 2 (KEWANEE) REMAINS IN OPERATION. BOILER 2 IS THEN TO BE REPLACED AFTER BOILER 1 IS BROUGHT ON LINE. COORDINATE THE PHASED REPLACEMENT WITH OWNER.

A MECHANICAL PLAN
M01 SCALE 1/2" = 1'-0"



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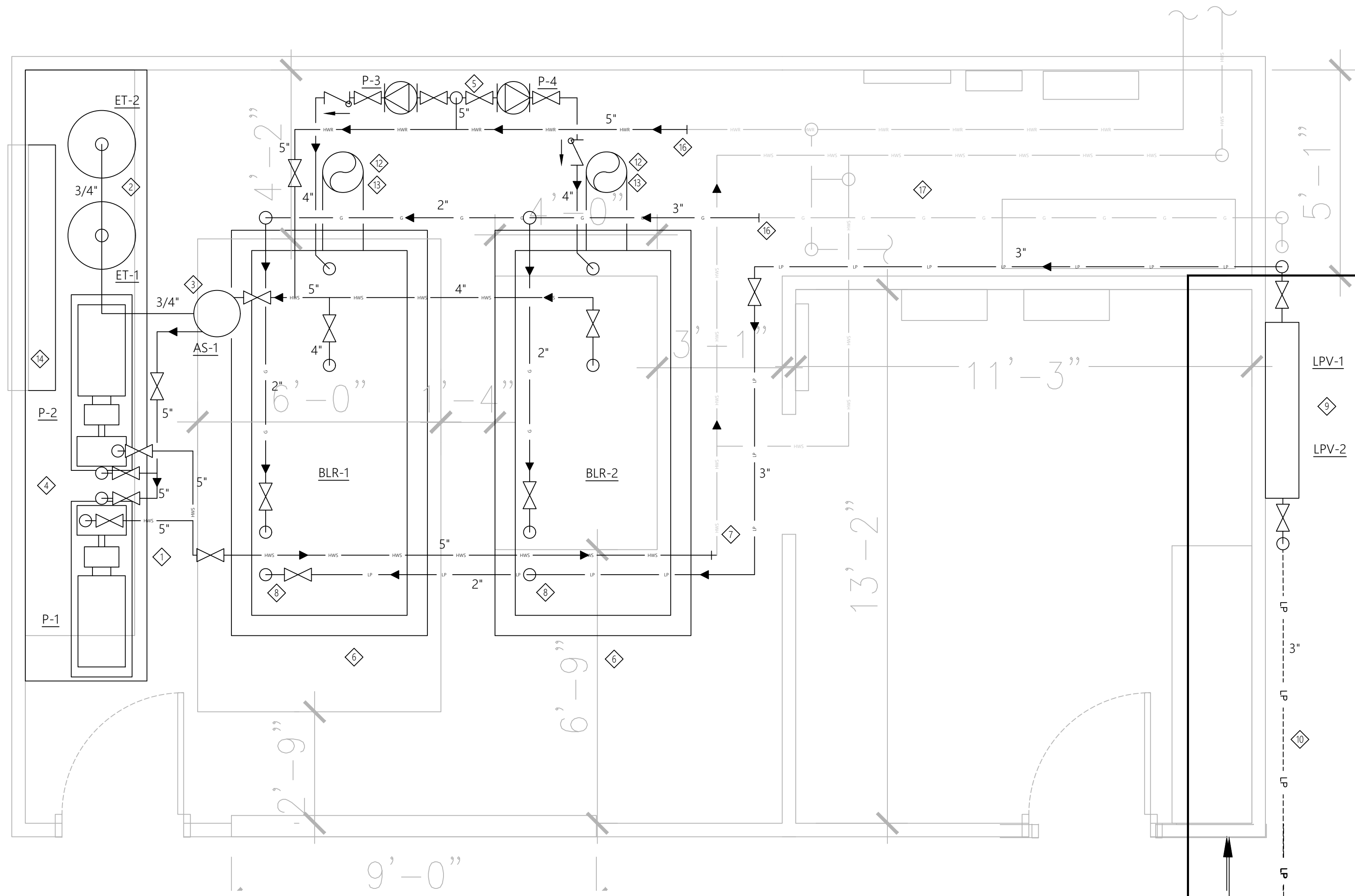
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SHEET TITLE
MECHANICAL DEMOLITION PLAN

M01

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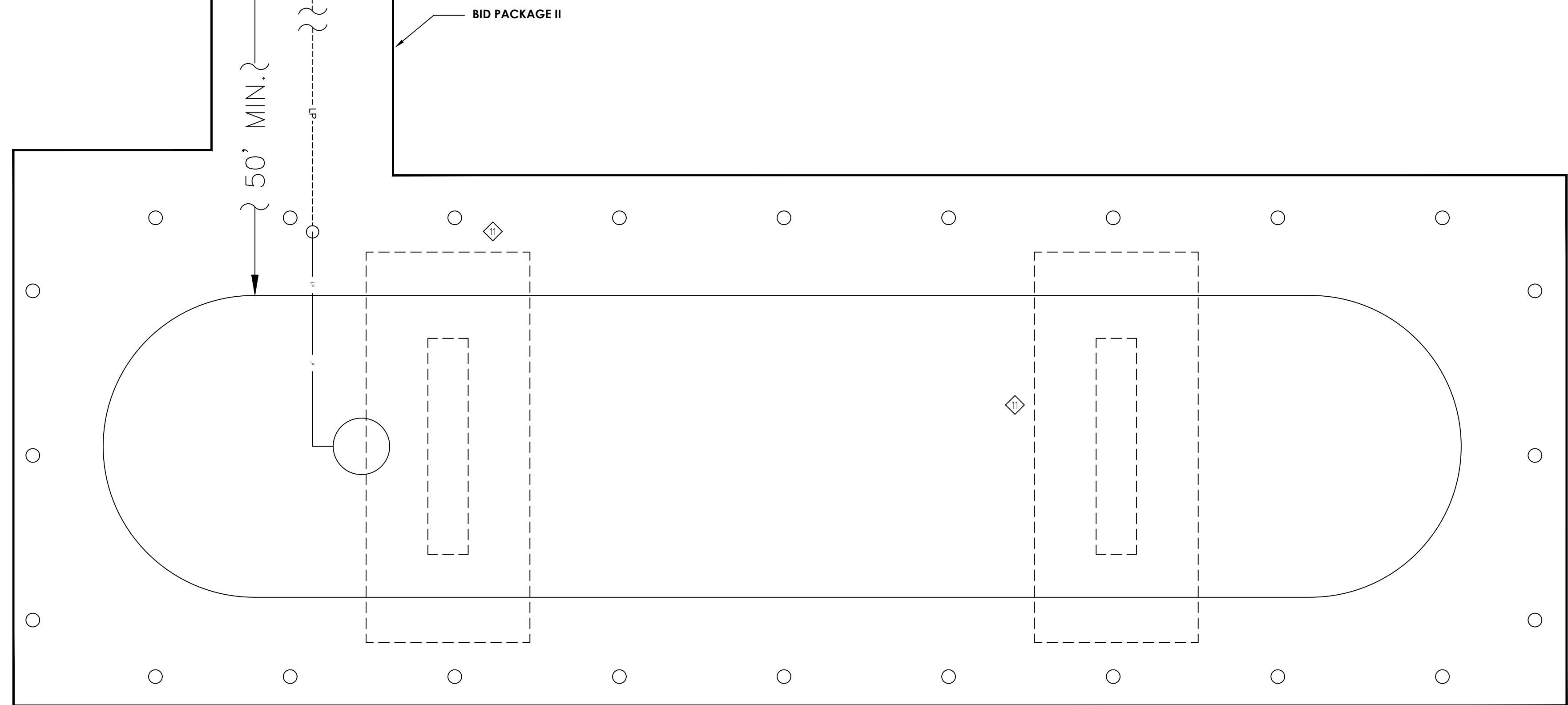
MECHANICAL KEYED NOTES:

- ◇ INSTALL NEW 4" CONCRETE HOUSEKEEPING PAD FOR MOUNTING EXPANSION TANKS AND PUMP.
- ◇ INSTALL NEW EXPANSION TANKS.
- ◇ INSTALL NEW AIR SEPARATOR.
- ◇ INSTALL NEW SYSTEM CIRCULATION PUMPS.
- ◇ INSTALL NEW BOILER PUMPS. CONNECT TO BOILER RETURN WATER PORT.
- ◇ INSTALL NEW 4" CONCRETE HOUSEKEEPING PAD AND BOILER. SEE GENERAL NOTE 5 ON SHEET M01.
- ◇ RECONNECT HEATING SUPPLY WATER TO EXISTING SYSTEM HOT WATER SUPPLY PIPING.
- ◇ ROUTE NEW LP PIPING AND CONNECT TO LP FUEL CONNECTION ON BOILERS.
- ◇ MOUNT STACKED LP VAPORIZERS ON EXTERIOR WALL OF BUILDING.
- ◇ ROUTE NEW BURIED LP LINE TO NEW LP TANKS.
- ◇ INSTALL NEW 10,000 GAL LP TANK. COORDINATE EXACT SITE LOCATION WITH OWNER. MAINTAIN MINIMUM 50 FOOT CODE REQUIRED DISTANCE FROM BUILDINGS. PROVIDE CONCRETE SADDLE PIERS PER MANUFACTURER'S RECOMMENDATION. INSTALL CONCRETE BOLLARDS AROUND LP TANK ON 4 FOOT CENTERS. SEE DETAILS.
- ◇ CONNECT NEW 12 INCH BOILER FLUE TO NEW BOILER AND ROUTE NEW STACK THROUGH EXISTING ROOF OPENING.
- ◇ REPAIR ROOF PENETRATION AROUND NEW BOILER FLUE STACK. REPAIR ROOF PER ROOFING MANUFACTURER'S REQUIREMENTS TO MAINTAIN ROOF WARRANTY. CONTACT INFORMATION FOR EXISTING ROOF SYSTEM: ANDREW PRITCHARD, ACADEMY ROOFING AND SHEET METAL, 6361 NE 14TH ST., DES MOINES, IA 50313, 515-964-2345
- ◇ REPAIR EXISTING OPERABLE OUTDOOR AIR LOUVER AND CONNECT NEW DUCTWORK TO SPLIT ROOM COMBUSTION AIR. SEE DETAIL E, SHEET M03.
- ◇ RECONNECT NEW NATURAL GAS LINE TO EXISTING.
- ◇ RECONNECT NEW HEATING HOT WATER RETURN LINE TO EXISTING LINE.
- ◇ EXISTING PIPING IN TUNNEL AREA IS TO REMAIN EXCEPT AS NOTED.

GENERAL MECHANICAL NOTES:

1. M.C. SHALL VERIFY THE EXISTING PIPING SIZES AND EQUIPMENT LOCATION.
2. REFER TO PIPING DETAILS FOR LOCATION OF VALVES AND ADDITIONAL PIPING SPECIALTIES.
3. M.C. TO OPERATE ALL EXISTING VALVES TO VERIFY THAT ALL VALVES ARE FUNCTIONAL. BASE BID IS TO INCLUDE COST FOR NEW VALVES REQUIRED FOR NEW CONSTRUCTION AND AN ALLOWANCE FOR AN ASSUMED 6 (SIX) 4" REPLACEMENT VALVES IN OTHER SYSTEM AREAS. ADJUSTMENTS LESS THAN SIX REPLACEMENT VALVES ARE TO BE ADJUSTED BY CREDIT AMOUNT. INCLUDE BID ALTERNATE TO PROVIDE ADDITIONAL VALVES OVER 6 ON A UNIT PRICE BASIS.

A MECHANICAL PLAN
M02 SCALE: 1/2" = 1'-0"



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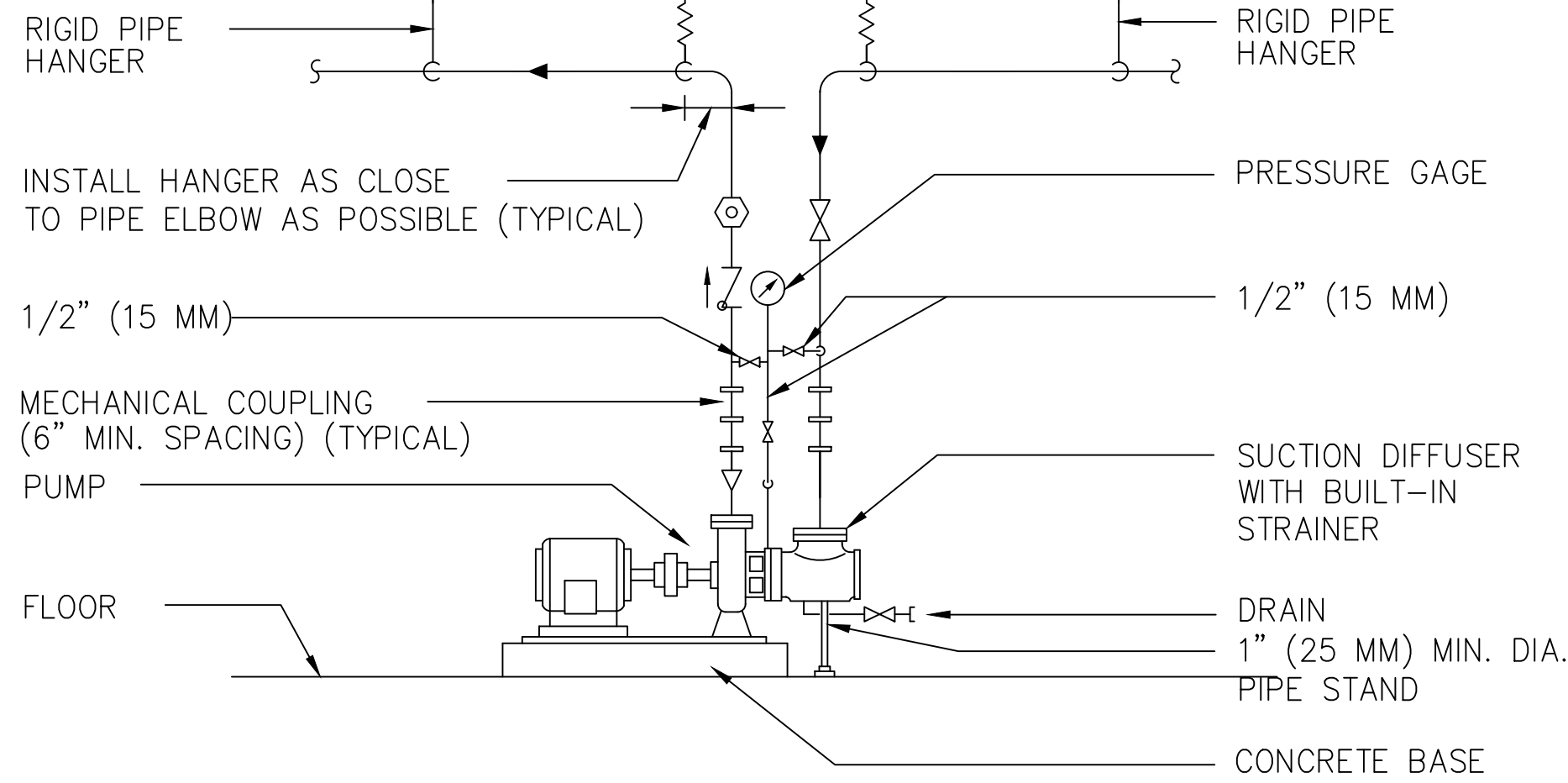
MECHANICAL PLAN

M02

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FIRST 3 HANGERS FOR EACH PIPE AND BRANCH SHALL BE SPRING & NEOPRENE TYPE. TYPE "H" FOR 4" (100 MM) DIA. PIPE & SMALLER. TYPE "H-P" FOR 5" (125 MM) DIA. PIPE & LARGER.

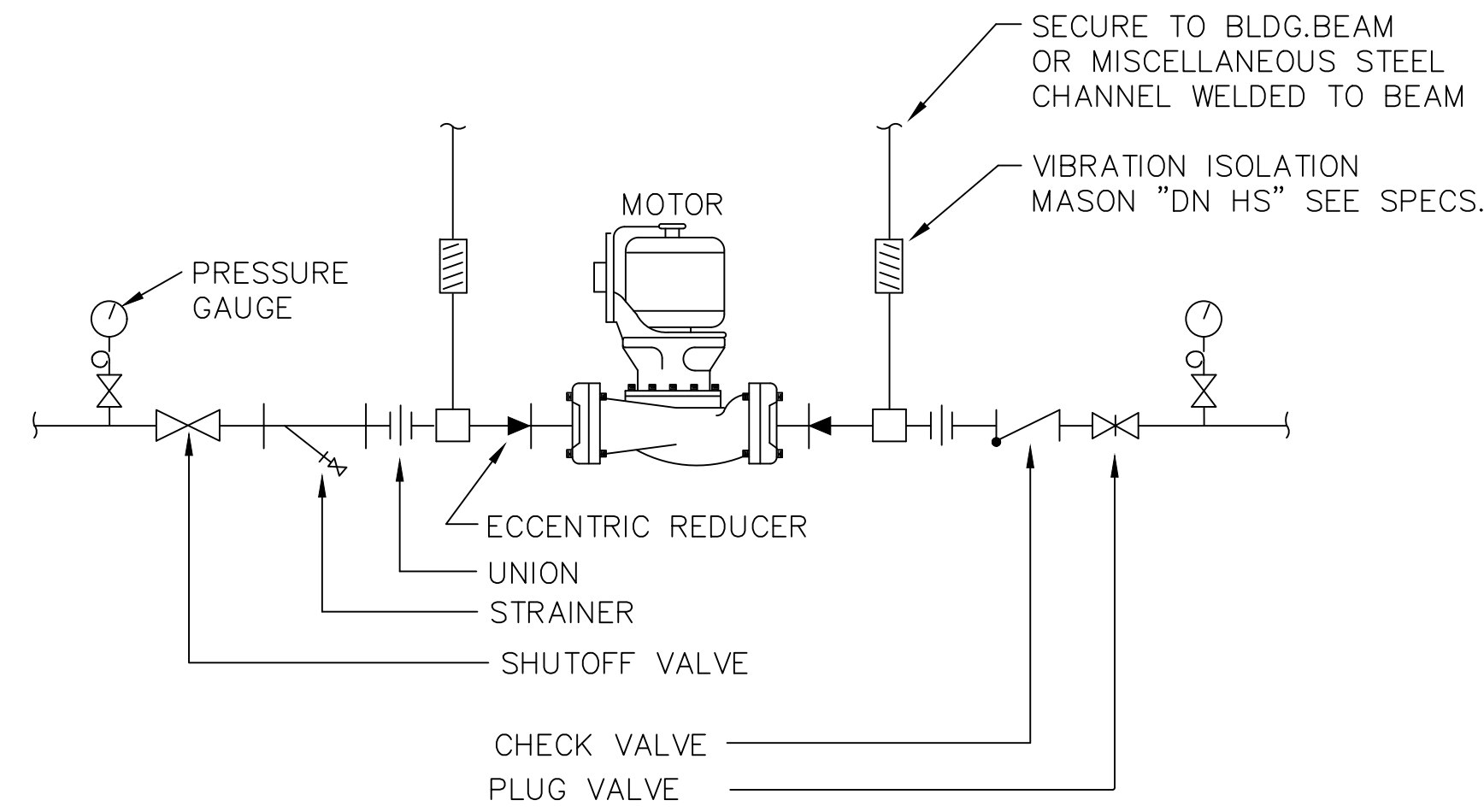


A TYPICAL PIPING CONNECTIONS TO FLOOR MOUNTED PUMPS

M03 NOT TO SCALE

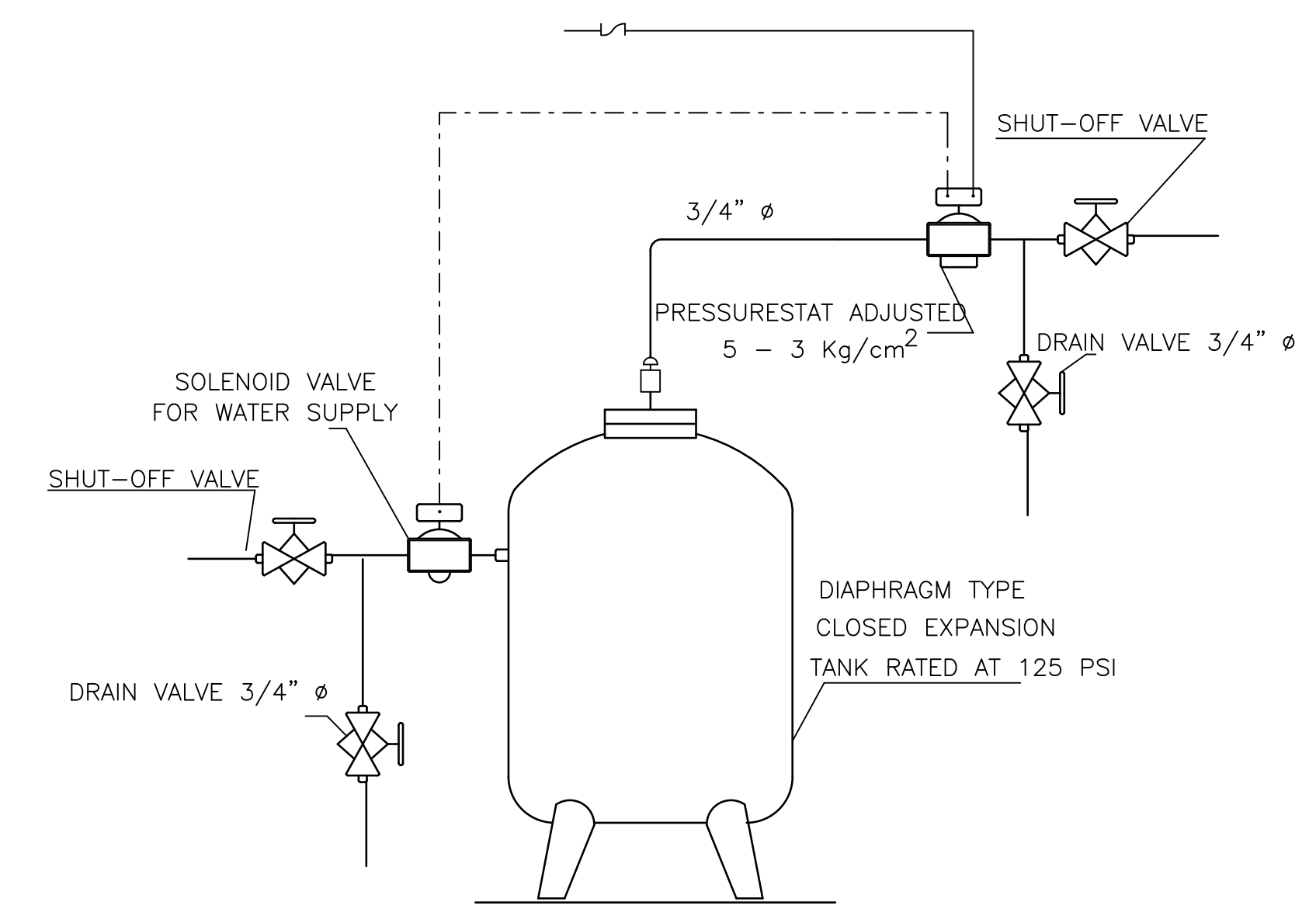
NOTES:

SEE SPECIFICATION SECTION "PUMPS" FOR Y STRAINER OPTION



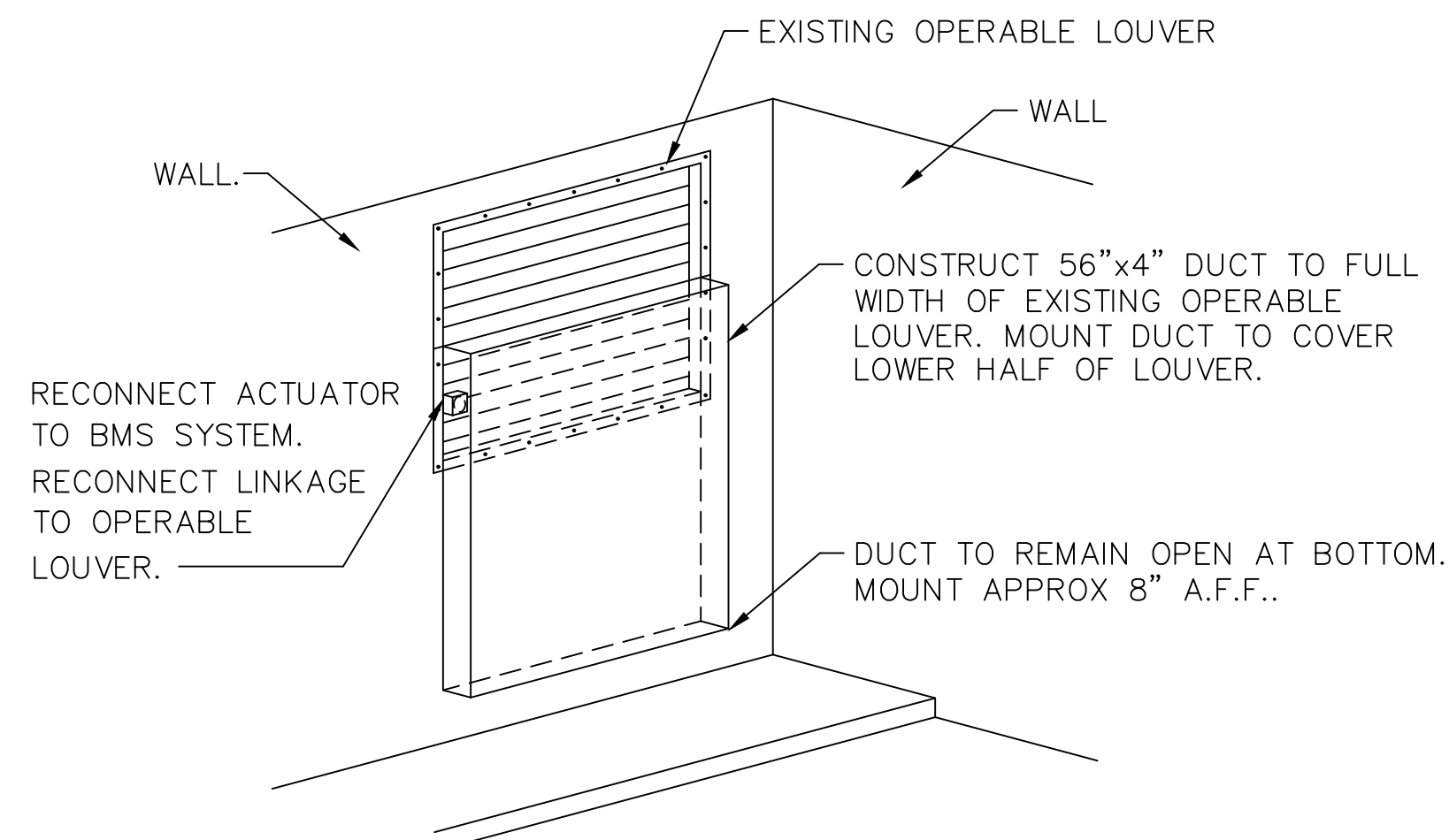
B TYPICAL IN-LINE PUMP CONNECTION

M03 NOT TO SCALE



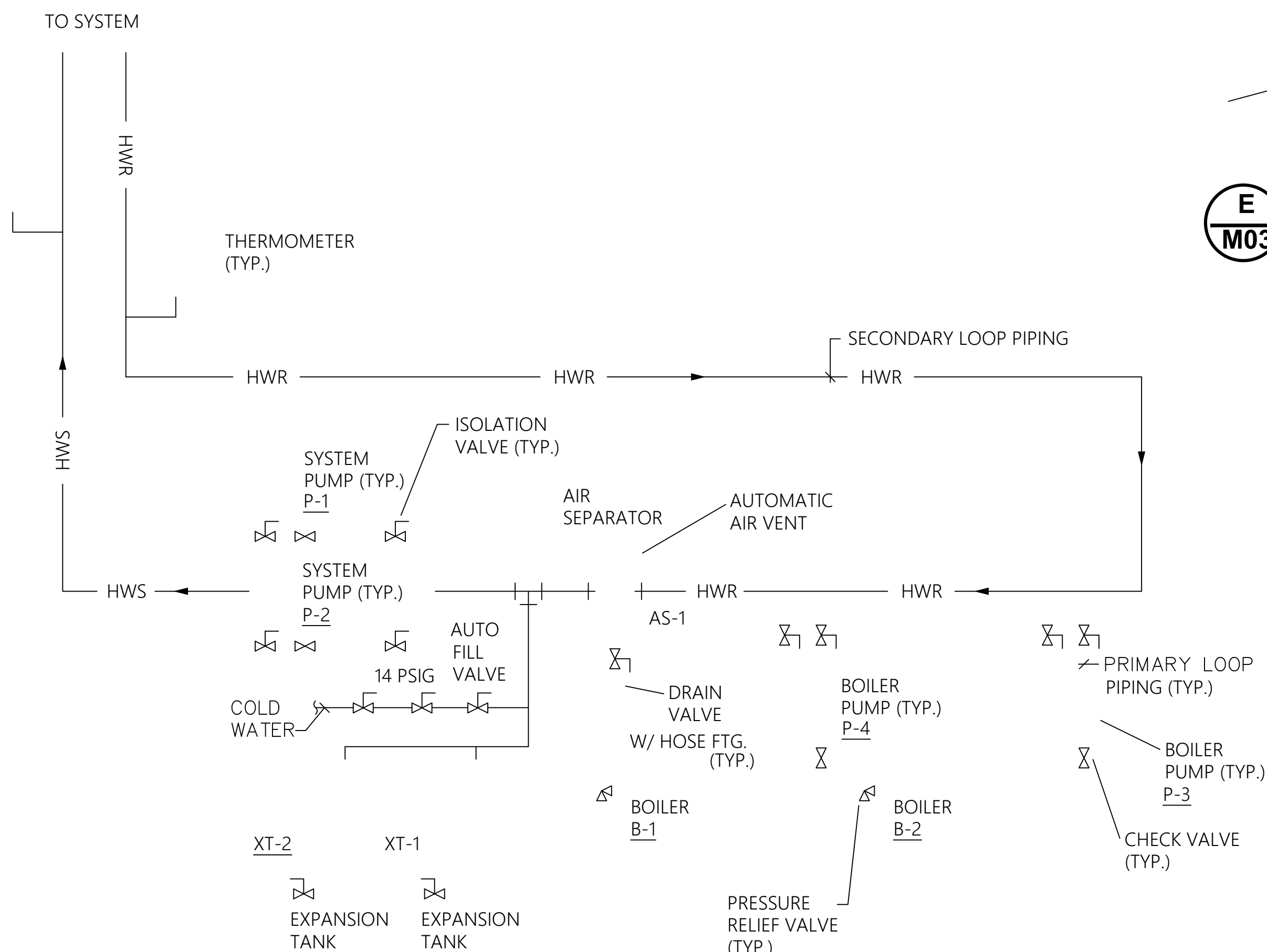
C TYPICAL EXPANSION TANK CONNECTION

M03 NOT TO SCALE



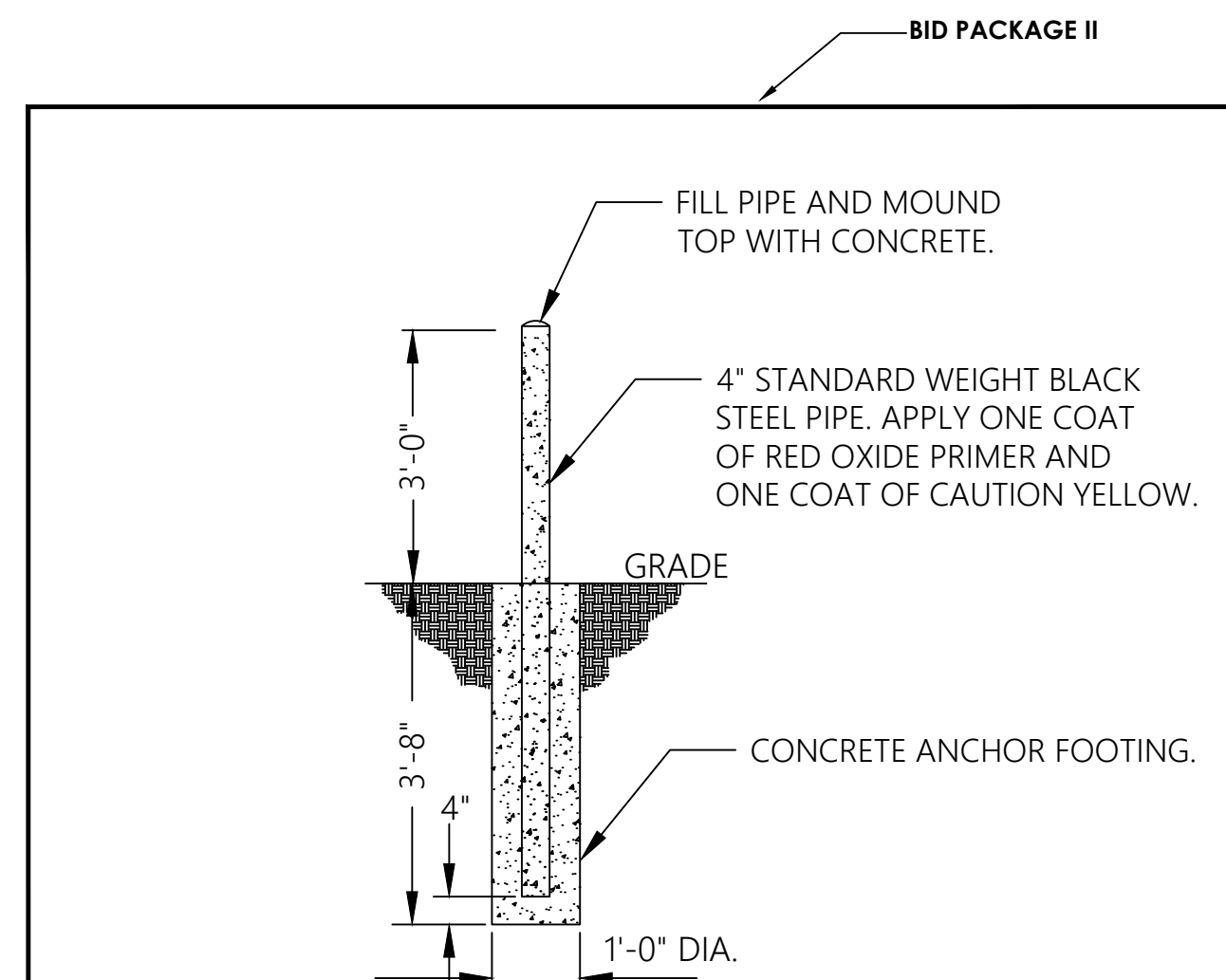
E COMBUSTION AIR DUCTWORK

M03 NOT TO SCALE



D HEATING HOT WATER SCHEMATIC

M03 NOT TO SCALE



F SAFETY BOLLARD DETAIL

M03 NOT TO SCALE

Heating Hot Water – Control Sequence

- All heating hot water equipment shall function in both normal and emergency power mode.
- Space heating shall be provided via circulation of hot water as provided by two hot water boilers. Hot water pumps are designed to operate as duty-standby units for circulation of heating hot water to all points of use.
- Each hot water pump is to be controlled by the existing BAS controlling a motor VFD. VFD's are to have hand-off auto (h-o-a) switches; units shall be in auto position when available for operation as controlled by the BAS.
- Upon a call for heating, either by any air handler unit, cabinet unit heater, fan coil unit, terminal box or unit heater, the following shall occur.
 - Pumps shall lead/lag on a weekly basis based upon runtime. (one pump is duty and one pump is stand-by)
 - BAS shall alternate pumps weekly on Tuesday at 11:00 am based upon runtime, sequencing equipment in order of least to greatest accumulated yearly runtime, where the lowest runtime unit is indexed as lead/first, and highest runtime unit is indexed as lag/last.
 - If unit selected as duty pump is unavailable for operation due to maintenance, failure, or selection of off position at unit (H-O-A) switch, the standby pump shall become the duty pump.
- Upon failure of the duty hot water pump, the BAS shall automatically initiate the start-up of the standby pump, and signal an alarm to the BAS.
- Hot water pump flow shall be maintained until there are no systems requesting heating. Each pump shall be provided with a current sensor to operate as a flow proof of that pumping unit. Any pump energized through the EMS system which does not give positive indication of flow shall signal an alarm after 90 seconds. Continued lack of flow proof for an energized pump to a period of 180 seconds shall de-energize that pump and initiate the startup of the standby unit.
- Two differential pressure sensors will provide input to the BAS. Each sensor shall have an adjustable set point (provided by TAB contractor). The BAS shall modulate the VFD's of both duty pumps to maintain DP setpoint for both sensors by calculating the difference between each sensor and its set point. The maximum difference shall be input into the VFD control loop.
- On the call for heating, the BAS is to signal the individual control panel on the selected duty boiler. Boilers will be scheduled for duty/standby by the BAS similar to the pump scheduling above.
- The two boilers will be set to operate shall operate in a lead/lag configuration. Upon initiation of heating system, the duty boiler shall slowly ramp up while the boiler circulation pump simultaneously energizes. System loop circulation pumps will simultaneously energize. The boiler shall modulate the boiler burner to maintain hot water supply temperature based on an outdoor air temperature reset schedule. The ratio shall be 180°F HW at 5° of outside air and 130°F HW at 60°F of outside air (field adjustable).
- Should one boiler fail to maintain proper hot water supply temperature alone, BAS will signal the designated lag boiler to fire to maintain hot water supply temperature.
- System is to shut down if discharge water temperature is +15°F (adj.) from setpoint, or on loss of water flow. Alarm BMS.
- Upon a loss or inability to maintain hot water supply temperature, an alarm shall signal the BAS.
- Incoming hot water supply temperature and flow rate shall be monitored and totalized by the B.A.S. Provide vortex shedding type meter.



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MECHANICAL DETAILS

M03

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SCHEDULE ABBREVIATIONS:			
BHP	BRAKE HORSE POWER	MAX. MBH	MAXIMUM THOUSANDS OF BTU/HOUR
BTUH	BRITISH THERMAL UNIT PER HOUR	MCA	MINIMUM CIRCUIT AMPACITY
CAP.	CAPACITY	MHP	MOTOR HORSEPOWER
CFM	CUBIC FEET PER MINUTE	MIN.	MINIMUM
DIM.	DIMENSION	MOC	MAXIMUM OVERCURRENT PROTECTION
EFF	EFFICIENCY	NO.	NUMBER
EWT	ENTERING WATER TEMPERATURE	OA	OUTSIDE AIR
FLA	FULL LOAD AMPS	OC	OVER-CURRENT PROTECTION
FPM	FEET PER MINUTE	PSI	POUNDS PER SQUARE INCH
FT.	FEET	REQ'D	REQUIRED
GAL	U.S. GALLON	RLA	RATED LOAD AMPS
GPM	GALLON PER MINUTE	RPM	REVOLUTIONS PER MINUTE
H	HEIGHT	SCFM	STANDARD CUBIC FEET PER MINUTE
HP	HORSEPOWER	SQ. FT.	SQUARE FEET
HR	HOOR	TEMP	TEMPERATURE
IN.	INCH	VOLT	VOLTAGE
IN.	INCH	W	WIDTH
KW	KILOWATTS	WC	WATER COLUMN
L	LENGTH		
LB	POUNDS		
LF	LINEAR FEET		
LWT	LEAVING WATER TEMPERATURE		

APPLICABLE CODES	
CONTRACTOR SHALL COMPLY WITH APPLICABLE CODES AND LOCAL AMENDMENTS	
BUILDING CODE:	INTERNATIONAL BUILDING CODE 2015
MECHANICAL CODE:	INTERNATIONAL MECHANICAL CODE 2021
PLUMBING CODE:	UNIFORM PLUMBING CODE 2021-AMENDED
LIFE SAFETY CODE:	NFPA 101 2021
MODEL ENERGY CODE:	IECC 2012
ELECTRICAL CODE:	NEC 2020 EDITION

EXPANSION TANK SCHEDULE

TAG	MANUFACTURER	MODEL	SERVICE	TYPE	CAPACITY (GAL)	MAXIMUM ACCEPTANCE (GAL)	DIMENSION (INCHES)	COMMENTS
ET-1	TACO	PAX500-150	HEATING HOT WATER	VERTICAL BLADDER	132.0	61	85"H X 24"Φ	
ET-2	TACO	PAX500-150	HEATING HOT WATER	VERTICAL BLADDER	132.0	61	85"H X 24"Φ	

NOTES:
1.

HOT WATER BOILER SCHEDULE

SYMBOL	NOMINAL BHP	FUEL	INLET FUEL PRESSURE	TURNDOWN RATIO	INPUT MBTU/HR	OUTPUT MBTU/HR	EWT °F	LWT °F	MAXIMUM PRESSURE	ELECTRICAL			MANUFACTURER	MODEL	REMARKS		
										AMP	VOLT-PHASE	DISCONNECT				CONTROLLER/STARTER BY (NOTE A)	
												BY (NOTE A)					TYPE (NOTE B)
BLR-1	116	NG/LP	14" WC	5:1	4,000	3,879	160°	180°	160 PSIG	12	208/3	EC	FUSED	MFR	THERMAL SOLUTIONS	4000	1
BLR-2	116	NG/LP	14" WC	5:1	4,000	3,879	160°	180°	160 PSIG	12	208/3	EC	FUSED	MFR	THERMAL SOLUTIONS	4000	1

NOTES:
1. DUAL FUEL BOILER. NATURAL GAS PRIMARY FUEL, LP BACKUP FUEL.

PUMP SCHEDULE

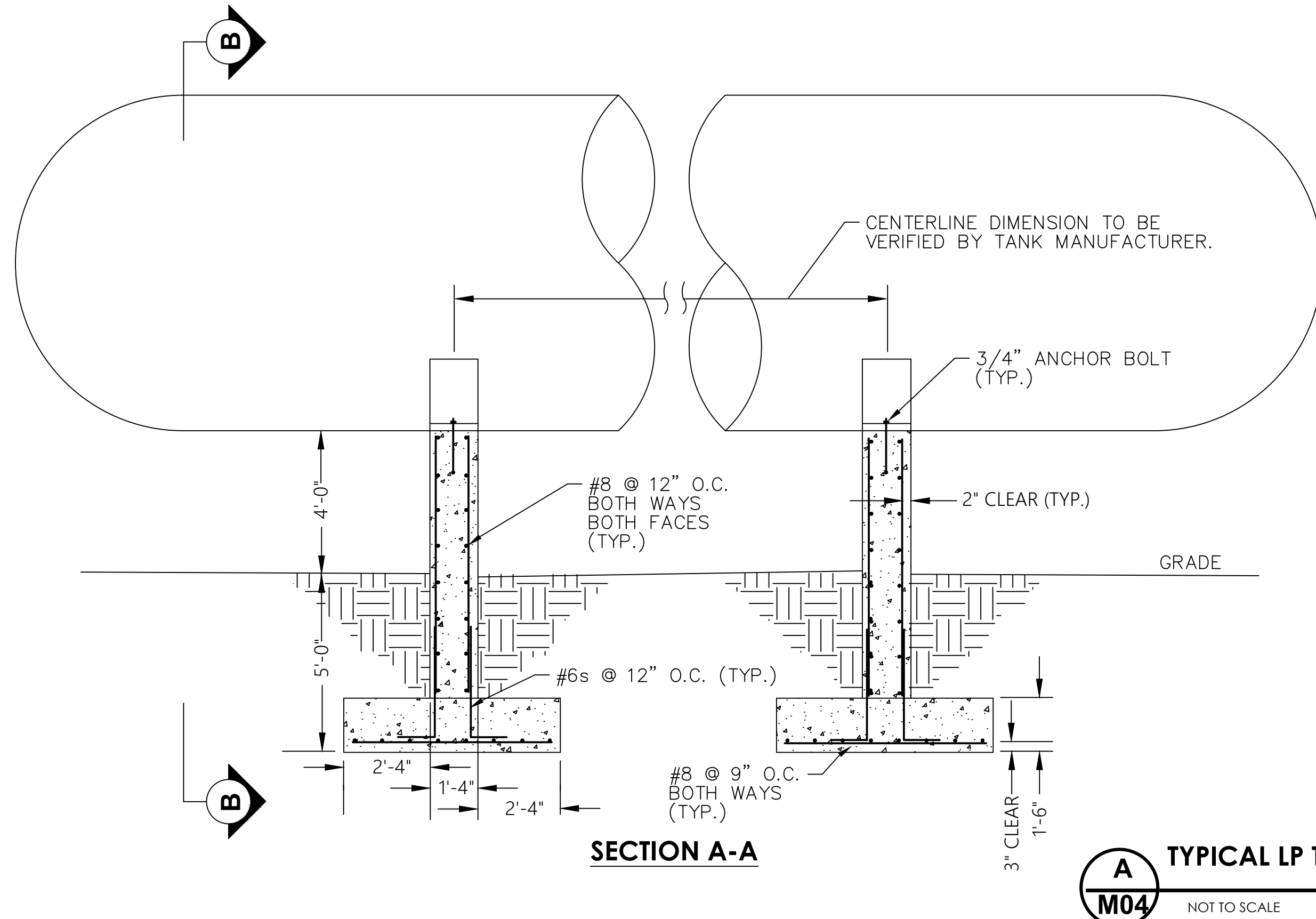
SYMBOL	SERVICE	TYPE	GPM	PUMP FT. HEAD AT DESIGN	MINIMUM PUMP EFFICIENCY	INLET/IMPEL. SIZE IN.	VIBRATION ISOLATION		ELECTRICAL						MANUFACTURER	SERIES	MODEL	REMARKS	
							TYPE	DEFL.	HP (NOTE E)	RPM	VOLT-PHASE	DISCONNECT		CONTROLLER/STARTER					
												BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)					TYPE (NOTE C)
P-1	HEATING SYSTEM	CLOSE COUPLED	400.0	16	77.0%	6 / 6.85	SPRING	0.75	3.0	1,160	208/3	EC	FUSED	EC	VFD/B	TACO	FI	5009D	1
P-2	HEATING SYSTEM	CLOSE COUPLED	400.0	16	77.0%	6 / 6.85	SPRING	0.75	3.0	1,160	208/3	EC	FUSED	EC	VFD/B	TACO	FI	5009D	1
P-3	BOILER	IN-LINE	380.0	25	83.00%	5/ 8.15	SPRING	0.75	3.0	1,160	208/3	EC	FUSED	EC	VFD/B	TACO	CI	4009D	1
P-4	BOILER	IN-LINE	380.0	25	83.00%	5/ 8.15	SPRING	0.75	3.0	1,160	208/3	EC	FUSED	EC	VFD/B	TACO	CI	4009D	1

NOTES:
1. PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.

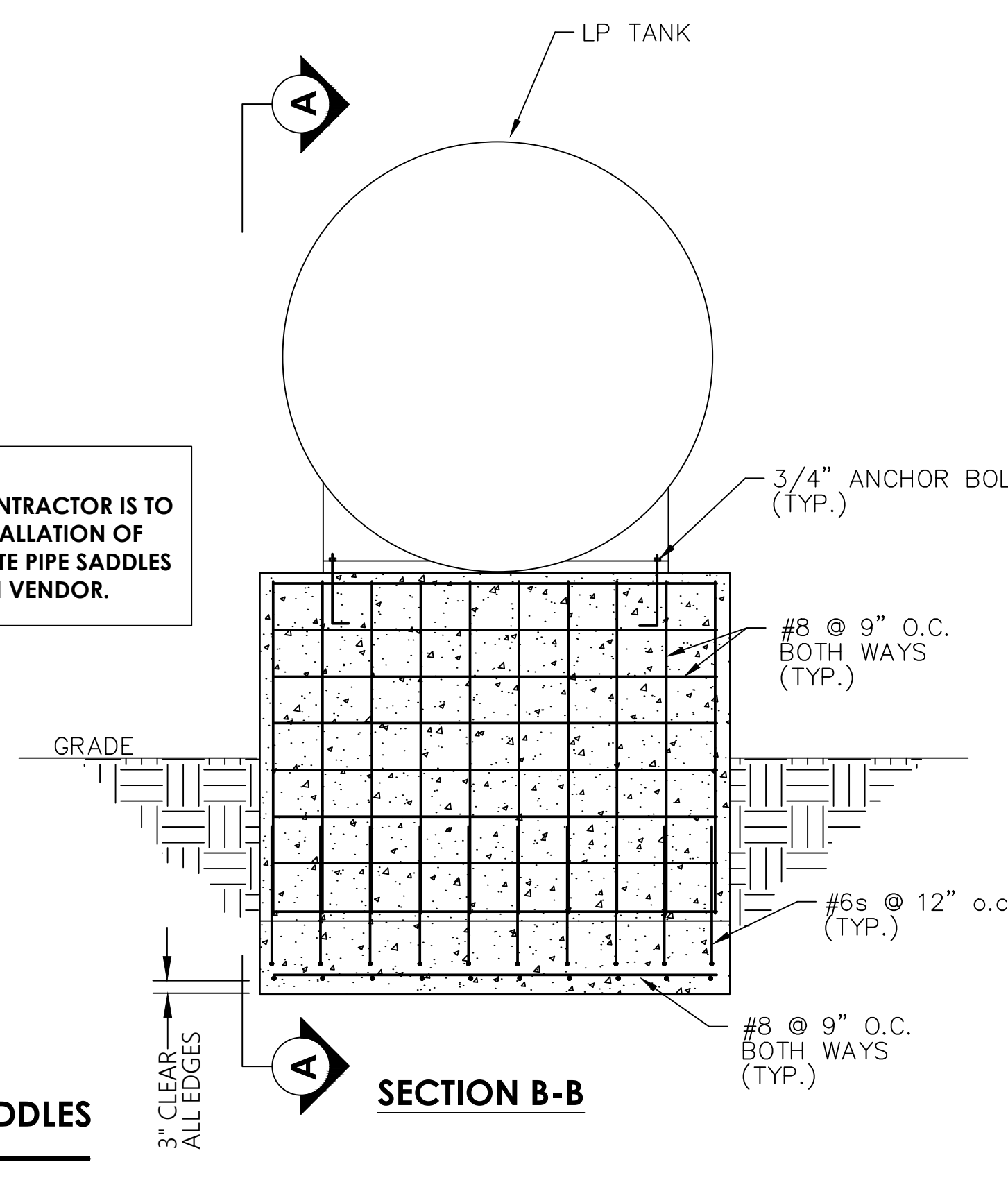
LP VAPORIZER SCHEDULE

TAG	SERVICE	TYPE	VAPORIZING CAPACITY		MAXIMUM PRESSURE (PSIG)	DIMENSIONS			ELECTRICAL				MANUFACTURER	MODEL	REMARKS	
			GAL/HR	MBTU/HR		L (IN)	H (IN)	W (IN)	VOLT-PHASE	MCA	MOP	DISCONNECT BY TYPE				
LPV-1	LP GAS SYSTEM	DRY ELECTRIC	50.0	4500	4	67.4	9.5	8.3	208/3	24.80	208/3	EC	FUSED	ALGAS SDI	ZIMMER Z100	1
LPV-2	LP GAS SYSTEM	DRY ELECTRIC	50.0	4500	4	67.4	9.5	8.3	208/3	24.80	208/3	EC	FUSED	ALGAS SDI	ZIMMER Z100	1

NOTES:
1. MOUNT IN PARALLEL CONFIGURATION.



NOTE:
MECHANICAL CONTRACTOR IS TO COORDINATE INSTALLATION OF PRECAST CONCRETE PIPE SADDLES AND LP TANK WITH VENDOR.



AIR SEPARATOR SCHEDULE

TAG	MANUFACTURER	MODEL	SERVICE	TYPE	CAPACITY (GPM)	DIMENSION (INCHES)	COMMENTS
AS-1	TACO	ACT05F	HEATING HOT WATER	CENTRIFUGAL	550	29"H x 14"Φ	1

NOTES:
1. PROVIDE WITH REMOVABLE STRAINER

SYMBOLS

- HWS — HOT WATER HEATING SUPPLY
- HWR — HOT WATER HEATING RETURN
- LP — LIQUIFIED PETROLEUM (LP) GAS VAPOR
- LPL — LP LIQUID
- G — NATURAL GAS
- ▶ DIRECTION OF FLOW
- ⊥ TOP CONNECTION, 45° OR 90°
- ⊥ BOTTOM CONNECTION, 45° OR 90°
- | SIDE CONNECTION
- ⊥ CAPPED OUTLET
- ⊥ RISE OR DROP IN PIPE
- ⊥ UNION
- ⊙ POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
- ⊥ STRAINER
- ⊥ THERMOMETER
- ⊥ PRESSURE GAGE
- ⊥ WATER FLOW MEASURING DEVICE
- /// EXISTING EQUIPMENT TO DEMOLISH

BID PACKAGE II



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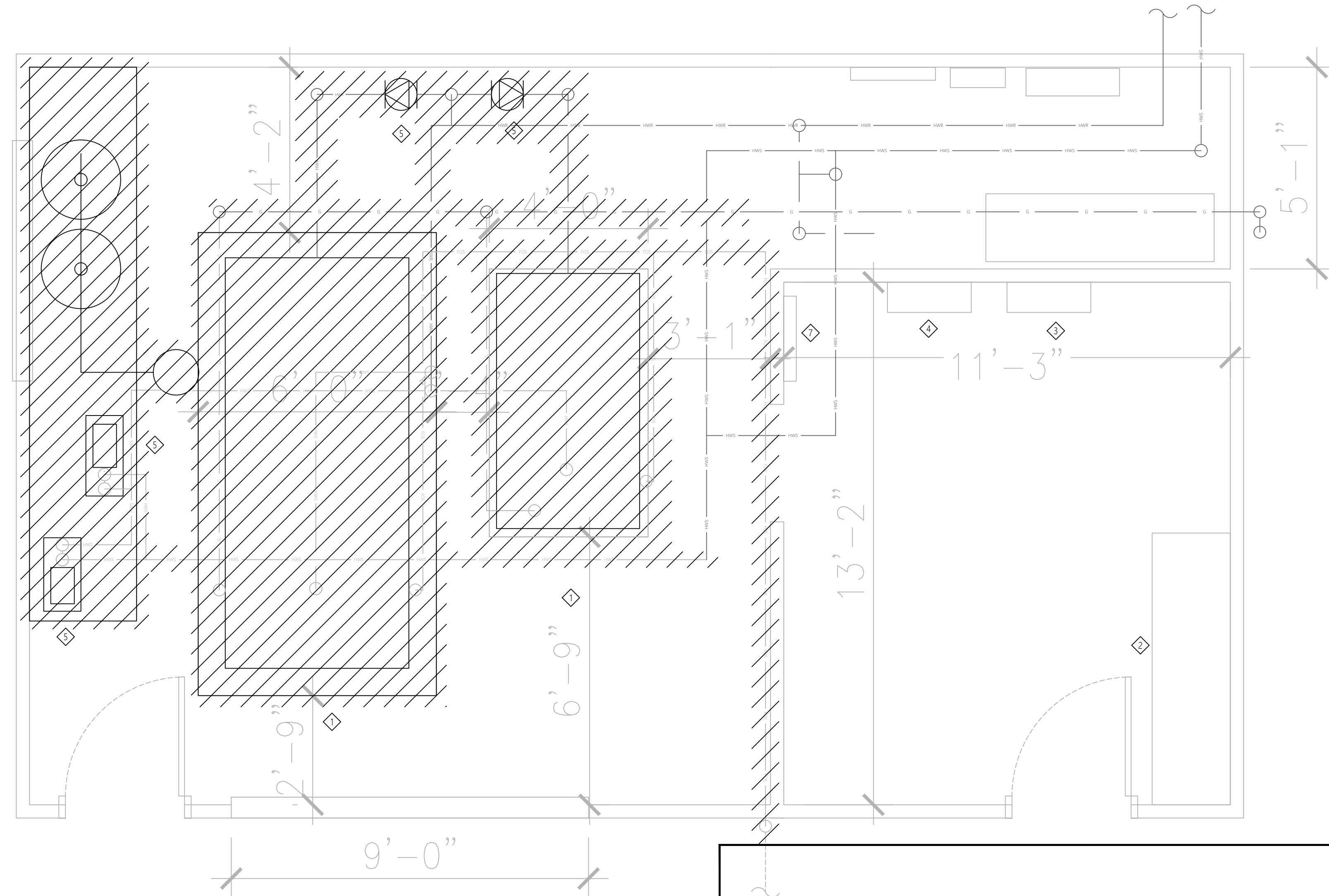
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GENERAL ELECTRICAL DEMOLITION NOTES:

1. E.C. SHALL VERIFY THE EXISTING CONDITIONS AT THE PROJECT SITE BEFORE SUBMITTING BID.
2. THE E.C. SHALL VISIT THE SITE TO VERIFY DEVICES AND EQUIPMENT NOT SHOWN.
3. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN DEMOLITION REMOVAL, CAPPING, ABANDONING, DISCONNECTING OF EXISTING ELECTRICAL EQUIPMENT AND MATERIAL. ALL CUTTING, PATCHING, REPAIRING, REPLACEMENT AND REFINISHING, SHALL MATCH THE EXISTING CONSTRUCTION AS NEARLY AS POSSIBLE.
4. THE OWNER SHALL HAVE THE FIRST CHOICE TO ACCEPT EXISTING DEVICES AND EQUIPMENT BEING REMOVED AND NOT REUSED.

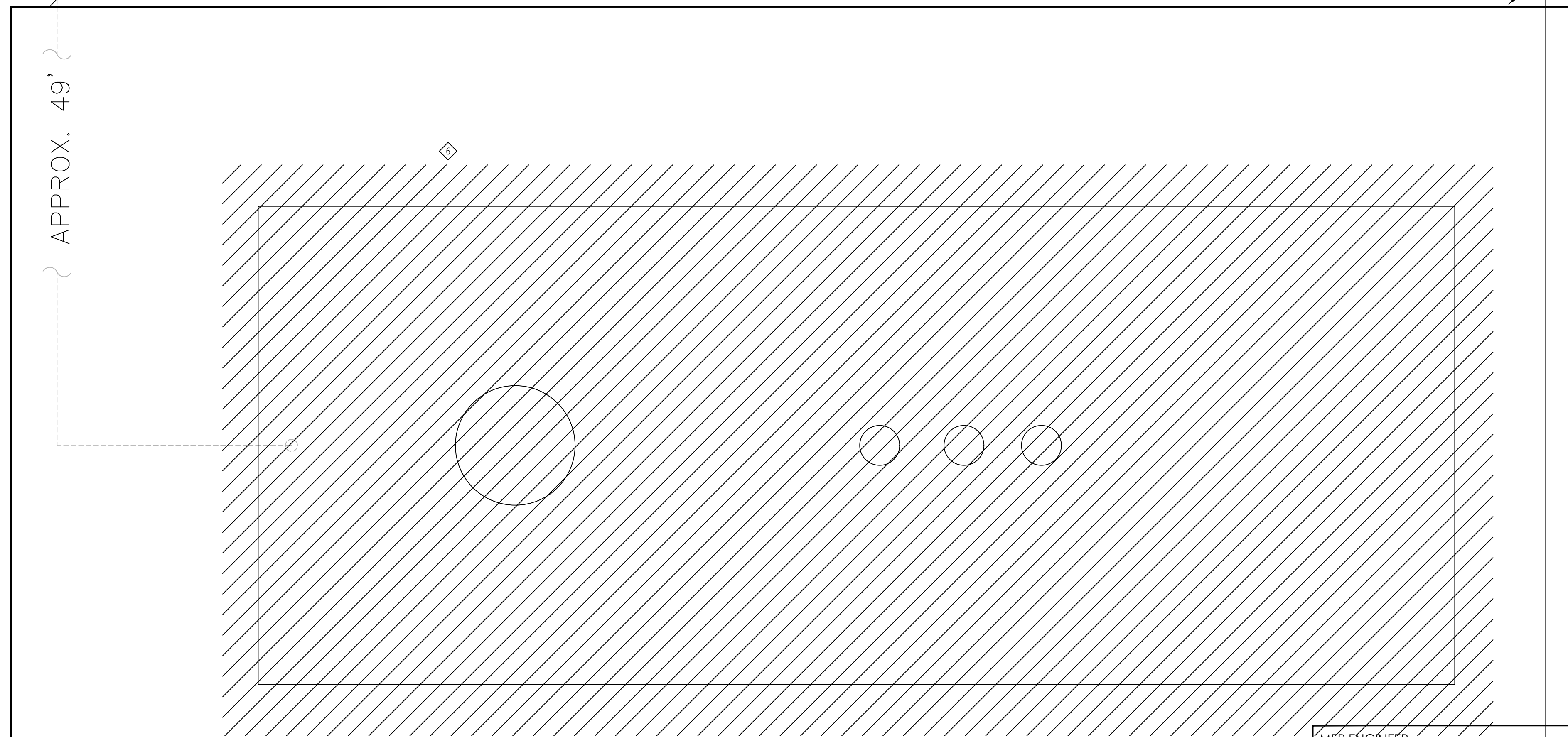
DEMOLITION KEY NOTES

- ◇ EXISTING BOILER TO BE REMOVED. REMOVE CIRCUITRY BACK TO THE SERVING PANEL.
- ◇ DISTRIBUTION SWITCHBOARD MANUFACTURED BY WESTINGHOUSE TO REMAIN. 2500A, 3PH, 4W IS EXISTING TO REMAIN.
- ◇ EXISTING 400A AUTOMATIC TRANSFER SWITCH TO REMAIN.
- ◇ EXISTING 400A EMERGENCY PANEL LABELED "EM" IN THE FIELD IS TO REMAIN.
- ◇ EXISTING PUMP TO BE REMOVED. REMOVE CONDUIT AND WIRING BACK TO THE SERVING PANEL.
- ◇ TANK TO BE REMOVED. REMOVE CONTROLS WIRING BACK TO THE SERVING PANEL.
- ◇ EXISTING ELECTRICAL EQUIPMENT TO REMAIN.

BID PACKAGE II

BID PACKAGE II

A
E01 **ELECTRICAL DEMOLITION PLAN**
SCALE 1/2" = 1'-0"



IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
CENTRAL PROCUREMENT ENTERPRISES (CPE)
HOOPER STATE OFFICE BUILDING, LEVEL 3
1305 EAST WALNUT
DES MOINES, IA 50319-0105

NEWTON CORRECTIONAL FACILITY
9404.00 DOC NCF CRC BOILER REPLACEMENT
307 S 60TH AVE W
NEWTON, IA 50208

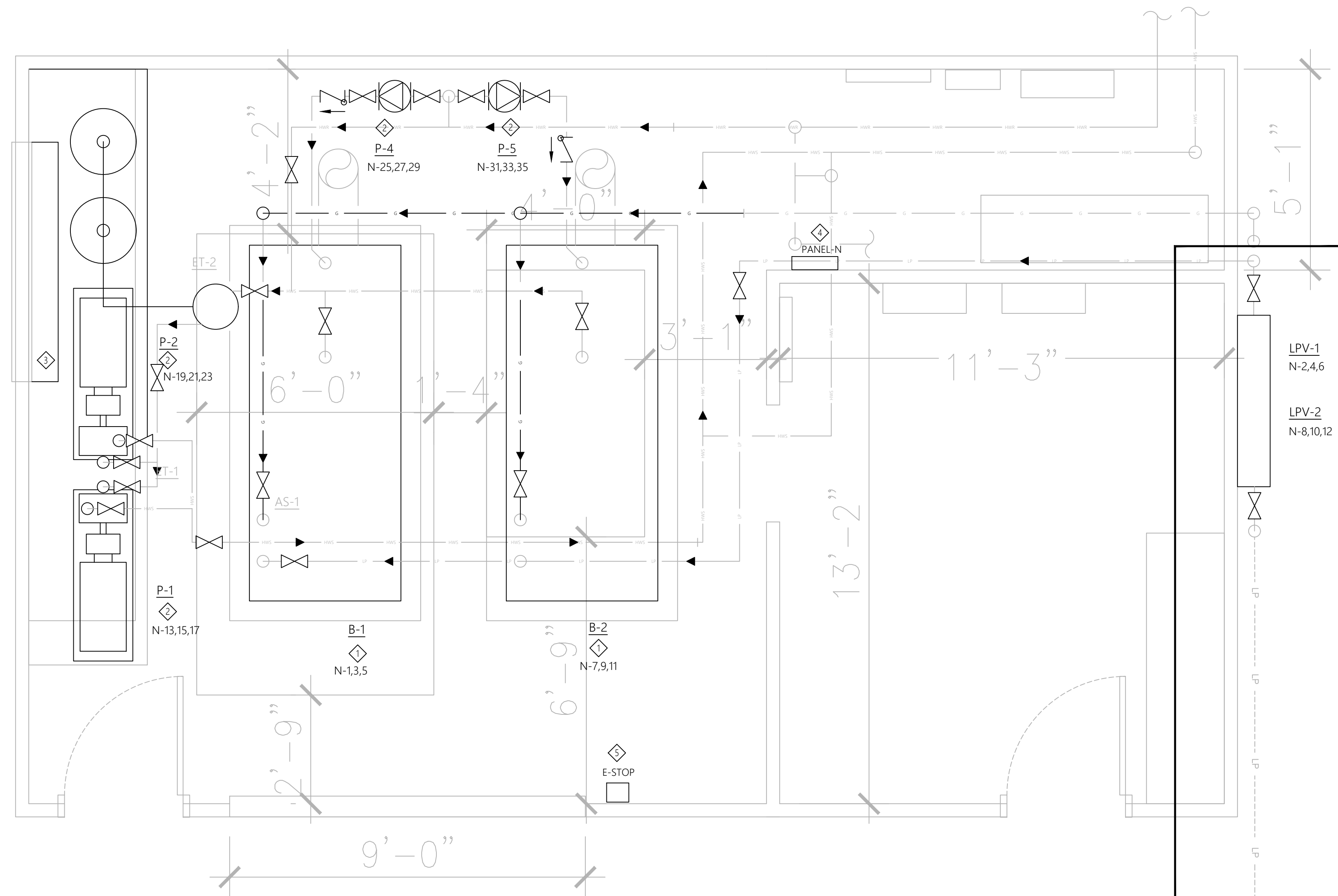
MARK	DATE	DESCRIPTION
1	8/27/2024	OUT FOR BID

PROJECT NO: **101323**
DATE: **8/27/2024**
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SHEET TITLE
ELECTRICAL DEMOLITION PLAN

E01

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A
E02
SCALE 1/2" = 1'-0"



EVERYTHING OUTSIDE OF BID PACKAGE II IS CONSIDERED BID PACKAGE I.

- GENERAL POWER NOTES:**
1. TYPICAL LIGHTING HOMERUN CIRCUITS SHALL BE #12 PHASE WIRE, #12 NEUTRAL WIRE, #12 GND, 3/4". FOR 120V, 20A HOMERUN CIRCUITS THAT EXCEED 100 FOOT FEEDER LENGTH, OVERSIZE CONDUCTOR TO #10 DUE TO VOLTAGE DROP.
 2. 120V HOMERUN CIRCUITS SHALL CONTAIN NO MORE THAN (3) HOT OR SWITCHED CONDUCTORS PER CONDUIT.
 3. CONTRACTOR SHALL INSTALL DISCONNECT SWITCHES SUCH THAT NEC CLEARANCES ARE MET. LOCATIONS OF DISCONNECTS ARE DIAGRAMMATIC.
 4. EXPOSED RIGID GALVANIZED STEEL CONDUIT IS ACCEPTABLE FOR DEVICE DROPS. PROVIDE FLEX SEAL-TIGHT FOR EQUIPMENT CONNECTIONS.

- ELECTRICAL KEY NOTES**
- ◇ NEW BOILER. PROVIDE NEW CIRCUITRY. FEED FROM NEW PANEL-N.
 - ◇ NEW PUMP. PROVIDE NEW CIRCUITRY. FEED FROM NEW PANEL-N.
 - ◇ LOUVER ACTUATOR. PROVIDE A NEW 120V CIRCUIT.
 - ◇ RE-USE EXISTING E-STOP TO SERVE NEW BOILERS.
 - ◇ PROVIDE A NEW 100A BRANCH PANEL-N, 3PH, 4W.
 - ◇ NEW LP VAPORIZERS. PROVIDE POWER PER MANUFACTURER RECOMMENDATIONS. REFERENCE ELECTRICAL SCHEDULES ON SHEET E03 FOR ADDITIONAL INFORMATION.

BID PACKAGE II

BID PACKAGE II



IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
CENTRAL PROCUREMENT ENTERPRISES (CPE)
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OUT FOR BID	MARK	DATE	DESCRIPTION
8/27/2024	1		

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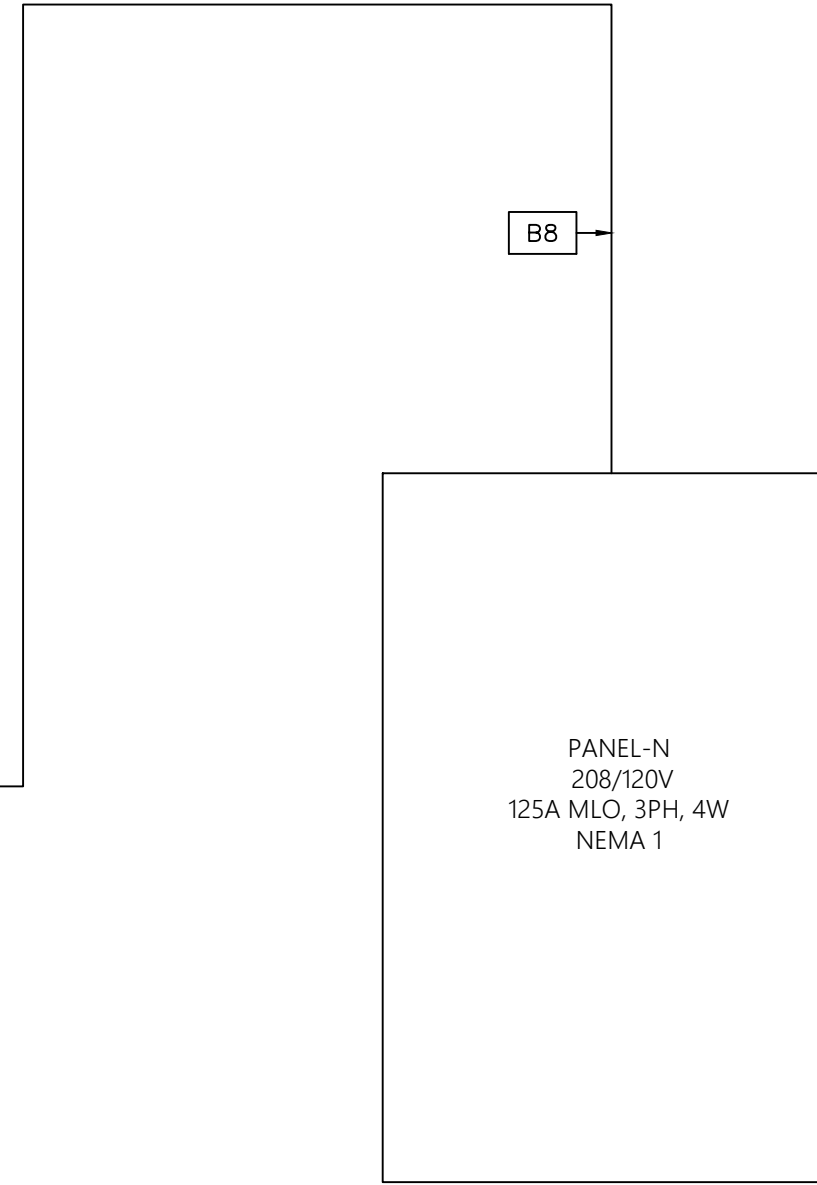
ELECTRICAL PLAN

E02

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GENERAL ELECTRICAL NOTES

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (N.E.C.) AND GOVERNING MUNICIPAL, STATE AND LOCAL CODES. ALL MATERIAL SHALL BE NEW AND SHALL BEAR THE U.L. LABEL WHERE APPLICABLE.
- CONTRACTOR SHALL MAKE ALL NECESSARY CUTTING AND DO ALL THE REPATCHING AS NECESSARY FOR THE PROPER EXECUTION OF THIS WORK.
- AFTER COMPLETION OF THE INSTALLATION, THE SYSTEM SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS.
- WHERE ELECTRICAL CONDUCTORS ARE INSTALLED IN CONDUIT, THE CONDUIT SHALL COMPLY WITH THE N.E.C. REQUIREMENTS.
- ALL CONDUCTOR SHALL BE COPPER. NO CONDUCTOR SHALL BE SMALLER THAN #12 AWG AND SHALL BE RATED FOR 600VOLTS THWN OR THHN INSULATION. INSTALL A GROUNDING CONDUCTOR WITH ALL CIRCUITS, UNLESS NOTED OTHERWISE, SIZED PER N.E.C.250-122.
- VERIFY BREAKER AND CORRESPONDING WIRE SIZES FOR ALL ELECTRICAL EQUIPMENT. DONOT ORDER MATERIAL BEFORE VERIFYING BREAKER & WIRE SIZE. REPORT ANY DISCREPANCY IMMEDIATELY TO THE ENGINEER OF RECORD.
- VERIFY AVAILABLE INTERRUPTING CURRENT(AIC) WITH POWER COMPANY. EQUIPMENT AIC RATING MUST BE LARGER THAN THE POWER COMPANY AIC OR MUST BE PROTECTED ON THE LINE SIDE WITH A CURRENT LIMITING DEVICE.
- SAFETY SWITCHES SHALL BE SQUARE 'D', GENERAL ELECTRIC, OR WESTINGHOUSE, FUSED OR NON-FUSED AND SIZED AS INDICATED. NEMA 3R WHEN EXPOSED TO WEATHER
- PANELS SHALL BE SQUARE 'D', GENERAL ELECTRIC OR EQUAL, TYPE AND NUMBER OF BREAKERS AS INDICATED ON PANEL SCHEDULE. STENCIL PANEL DESIGNATION ON INSIDE OF PANEL. ALL TWO-POLE BREAKERS SHALL BE COMMON TRIP. PROVIDE TYPE WRITTEN SCHEDULE IN EACH LOAD CENTERS. CONNECTION TO MAIN BUS SHALL BE WITH BURNDY ANNULAR COMPRESSION LUGS.
- ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE ANCHORED TO COMPLY WITH LOCAL CODE FOR WIND RESISTANCE.
- IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM AND PROVIDE ALL REQUIREMENTS NECESSARY FOR EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER.
- ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR IN A FIRST CLASS WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULLY OPERATIVE AND ACCEPTED BY THE OWNER.
- LOAD DATA IS BASED ON INFORMATION GIVEN ENGINEER AT TIME OF DESIGN. VERIFY ALL EQUIPMENT AND PANEL SIZES BEFORE ORDERING AND BEFORE INSTALLATION.
- ALL BRANCH CIRCUITS SHALL HAVE GROUND CONDUCTORS.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE, IF REQUIRED, ADJUSTMENTS (±) 6"-0" IN THE LOCATION OF ALL SYSTEM DEVICES, FIXTURES, OUTLETS, PANELS, ETC. IN ORDER TO EXPEDITE THE ELECTRICAL WORK. THE POSITION OF ALL WORK AS SHOWN IS INTENDED TO BE FIXED AND IN THE PROPER LOCATION. SUCH REQUIRED ADJUSTMENT SHALL BE DETERMINED BY THE A/E.
- PROVIDE SEPARATE NEUTRAL FOR EACH BRANCH CIRCUIT PHASE CONDUCTOR.



ELECTRICAL ONE-LINE FEEDER SCHEDULE													
FEEDER AMPACITY	NO. OF SETS	FEEDER CONDUCTOR SIZE (75°C)						CONDUIT SIZE (EMT)					
		COPPER CONDUCTORS (THWN)		ALUMINUM CONDUCTORS (XHHW-2)		3 PHASE CONDUCTORS AND GROUND			3 PHASE CONDUCTORS, NEUTRAL, AND GROUND				
		PHASE & NEUTRAL	GROUND	PHASE & NEUTRAL	GROUND	NO.	COPPER FEEDERS	ALUMINUM FEEDERS	NO.	COPPER FEEDERS	ALUMINUM FEEDERS		
30	1	10	10	-	-	A1	1/2"	-	B1	1/2"	-		
50	1	8	10	6	6	A2	3/4"	3/4"	B2	3/4"	1"		
60	1	6	10	4	6	A3	3/4"	1"	B3	1"	1"		
65	1	6	8	4	6	A4	3/4"	1"	B4	1"	1"		
85	1	4	8	2	6	A5	1"	1-1/4"	B5	1-1/4"	1-1/4"		
100	1	3	8	1	6	A6	1"	1-1/4"	B6	1-1/4"	1-1/4"		
115	1	2	6	1/0	4	A7	1-1/4"	1-1/4"	B7	1-1/4"	1-1/2"		
130	1	1	6	2/0	4	A8	1-1/4"	1-1/2"	B8	1-1/2"	2"		
150	1	1/0	6	3/0	4	A9	1-1/2"	1-1/2"	B9	1-1/2"	2"		
175	1	2/0	6	4/0	4	A10	1-1/2"	2"	B10	2"	2"		
200	1	3/0	6	250kcmil	4	A11	2"	2"	B11	2"	2-1/2"		
230	1	4/0	4	300kcmil	2	A12	2"	2"	B12	2-1/2"	2-1/2"		
250	1	250kcmil	4	350kcmil	2	A13	2"	2-1/2"	B13	2-1/2"	2-1/2"		
300	2	1/0	4	3/0	2	A14	1-1/2"	1-1/2"	B14	2"	2"		
350	2	2/0	3	4/0	1	A15	1-1/2"	2"	B15	2"	2"		
380	1	500kcmil	3	750kcmil	1	A16	2-1/2"	3"	B16	3"	3-1/2"		
400	2	3/0	3	250kcmil	1	A17	2"	2"	B17	2"	2-1/2"		
460	2	4/0	2	300kcmil	1/0	A18	2"	2-1/2"	B18	2-1/2"	2-1/2"		
500	2	250kcmil	2	350kcmil	1/0	A19	2"	2-1/2"	B19	2-1/2"	2-1/2"		
600	2	350kcmil	1	500kcmil	2/0	A20	2-1/2"	2-1/2"	B20	2-1/2"	3"		
760	2	500kcmil	1/0	750kcmil	3/0	A21	2-1/2"	3"	B21	3"	3-1/2"		
800	3	300kcmil	1/0	400kcmil	3/0	A22	2-1/2"	2-1/2"	B22	2-1/2"	2-1/2"		

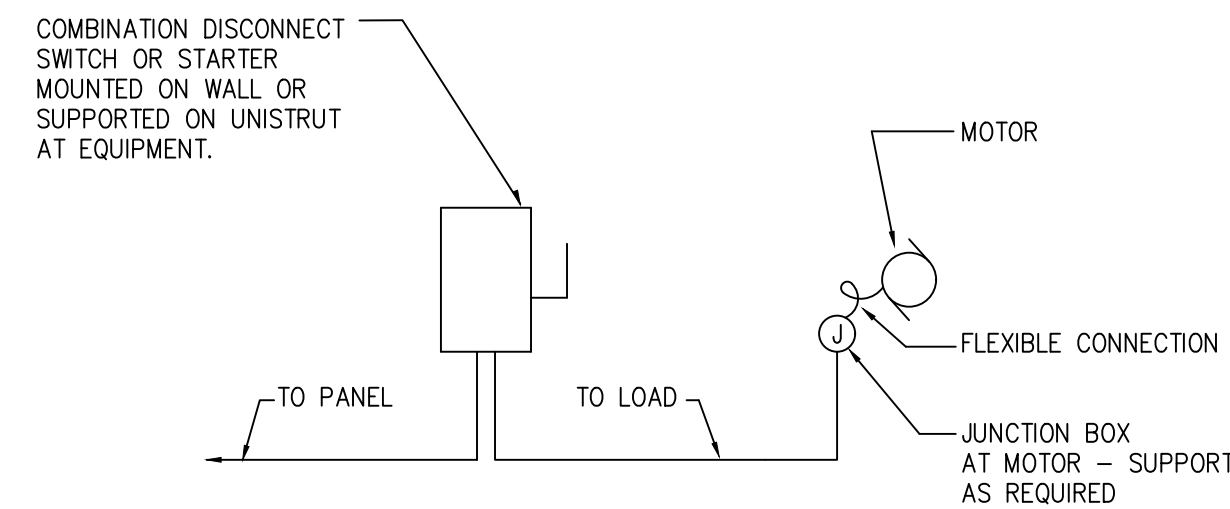
NOTES: 1. CONDUIT SIZE BASED ON CONDUCTOR PROPERTIES LISTED IN THE CURRENT NEC EDITION, CHAPTER 9, TABLES 5 AND 5A, AND CONDUIT AREAS LISTED CHAPTER 9, TABLE 4 FOR EMT WITH 40% FILL. OTHER CONDITIONS MAY REQUIRE A LARGER CONDUIT, SIZED PER NEC.
2. COORDINATE SIZE, TYPE, AND QUANTITY OF LUGS WITH EQUIPMENT VENDOR

B E301 ELECTRICAL ONE-LINE
SCALE = NTS

DISCONNECT SWITCH AND STARTER SCHEDULE														
MARK	LOAD	DISC SW	STARTER	VOLTS	PHASE	HP	VA	AMPS	SW	FUSE	NEMA SIZE	STR TYPE	NEMA ENCL.	CONDUIT & WIRE
BLR-1	BOILER-1	UNIT		208	3	-	4,318	12.0	30.0	20.0	-	-	1	4#10,1#10 GND, 3/4"
BLR-2	BOILER-2	UNIT		208	3	-	4,318	12.0	30.0	25.0	-	-	1	4#10,1#10 GND, 3/4"
P-1	SYSTEM PUMP	X	X	208	3	3.0	3,958	11.0	**	**	**	VFD	1	HOA 3#12,1#12 GND, 3/4"
P-2	SYSTEM PUMP	X	X	208	3	3.0	3,958	11.0	**	**	**	VFD	1	HOA 3#12,1#12 GND, 3/4"
P-3	BOILER PUMP	X	X	208	3	3.0	3,958	11.0	**	**	**	VFD	1	HOA 3#12,1#12 GND, 3/4"
P-4	BOILER PUMP	X	X	208	3	3.0	3,958	11.0	**	**	**	VFD	1	HOA 3#12,1#12 GND, 3/4"

*ELECTRICAL CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH CONTRACTOR SUPPLYING EQUIPMENT PRIOR TO ALL TRADES ORDERING EQUIPMENT TO ENSURE THE PROPER SELECTION AND COST IMPLICATIONS OF EQUIPMENT SELECTION. COSTS INCURRED DUE TO CHANGES SHALL BE DEFERRED TO THE TRADE SUPPLYING THE EQUIPMENT.
**CONSULT VFD SUPPLIER FOR PROPER SWITCH/FUSE SIZING.
FBO=FEEDER BREAKER ONLY, VFD=VARIABLE SPEED DRIVE BY EC, ALT=ALTERATION REQUIRED
UNIT=INTEGRAL WITH UNIT

POWER SYSTEMS	
SYMBOL	DESCRIPTION
SWBD 1	LARGE ELECTRICAL EQUIPMENT WITH DESIGNATION
▨	DISTRIBUTION PANEL WITH DESIGNATION
▭	BRANCH PANEL WITH DESIGNATION
EF 3	MECHANICAL EQUIPMENT CONNECTION WITH DESIGNATION
⊖	MOTOR WITH DESIGNATION
⊖	DISCONNECT SWITCH
⊖	MOTOR STARTER
⊖	COMBINATION MOTOR STARTER / DISCONNECT SWITCH
VFD	VARIABLE FREQUENCY DRIVE
⊙	JUNCTION BOX
F1	FIXTURE TYPE
23-1	CIRCUIT-RELAY
a	CONTROL DEVICE
⊖	DUPLEX RECEPTACLE
⊖ G	GROUND FAULT CIRCUIT INTERRUPTER
⊖	CEILING MOUNTED DUPLEX RECEPTACLE
⊖	SIMPLEX SPECIAL RECEPTACLE
∇	DATA/TELEPHONE ROUGH-IN, WALL MOUNTED



B E301 EQUIPMENT WIRING - TYPICAL
SCALE = NTS

BRANCH PANEL NAME	VOLTAGE	PHASE	WIRE	BUS SIZE	MAIN OCP	AIC RATING						
PANEL N	120/208	3	4	125	MLO	22,000						
100% NEUTRAL	CODE: L=LIGHTING, R=RECEPTACLES, M=MOTORS, K=KITCHEN					FLUSH MOUNTING						
NEMA 1	COPPER GROUND BAR, ISOLATED GROUND BAR					DOUBLE MAIN LUGS						
LOAD	ROE	BKR	CTR	A	B	C	CTR	BKR	POLE	CODE	LOAD	
BOILER-1	M 3	20	1	1,440				2	30	3	M	LP VAPORIZER LPV-1
	M 3	3		1,440				4	3	M		
	M 3	5		2,800				6	3	M		
BOILER-2	M 3	20	7	1,440				8	30	3	M	LP VAPORIZERS LPV-2
	M 3	9		2,800				10	3	M		
	M 3	11		1,440				12	3	M		
SYSTEM PUMP P-1	M 3	20	13	1,320				14	2	M	SPARE	
	M 3	15		1,320				16	20	1	M	SPARE
	M 3	17		1,320				18	20	1	M	SPARE
SYSTEM PUMP P-2	M 3	20	19	1,320				20	20	1	M	SPARE
	M 3	21		1,320				22	20	1	M	SPARE
	M 3	23		1,320				24	20	1	M	SPARE
BOILER PUMP P-3	M 3	20	25	1,320				26	30	2	M	SPARE
	M 3	27		1,320				28	2	M	SPARE	
	M 3	29		1,320				30	20	2	M	SPARE
BOILER PUMP P-4	M 3	20	31	132				32				SPARE
	M 3	33		1,320				34				SPARE
	M 3	35		1,320				36				
		37						38				
		39						40				
		41						42				
12,572	PHASE A	RECEP-V@	per NEC	-	101 VA						40,092	
13,760	PHASE B	LIGHTS-V@	100%	-	DEMAND VA						38,087	
13,760	PHASE C	MOTOR-V@	95%	38,087	HI-PH CONN. A						114	
40,092	TCL	KITCHEN-V@	80%	-	DEMAND A						106	

EVERYTHING OUTSIDE OF BID PACKAGE II IS CONSIDERED BID PACKAGE I.

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ELECTRICAL ONE-LINE & DETAILS

E03