Purchasing Division
Finance Department

Room 120
411 West First Street
Duluth, Minnesota 55802

218-730-5340
purchasing@duluthmn.gov

Addendum No. 2
Solicitation #25-AA16
Scope 2: Coal Burner to Natural Gas and Fuel Oil Burner: Burner Contractor

This addendum serves to notify all bidders of the following changes to the solicitation documents:

1. Please insert the attached document labeled 'Exhibit A' into the Bid Package.
2. Please insert the attached document labeled 'Exhibit B' into the Bid Package.

Please acknowledge receipt of this Addendum by checking the acknowledgement box within the www.bidexpress.com solicitation.

Posted: **June 16, 2025**

Exhibit A

DULUTH ENERGY SYSTEMS
COAL SUNSETTING

1 LAKE PLACE DRIVE
DULUTH, MN 55802

SHEET INDEX

NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

TITLE SHEET

DESIGN BY: RJJ DATE: 4/25/25
DRAWN BY: TJW DATE: 4/25/25

HORZ: N.T.S.

Project No. EGE0103

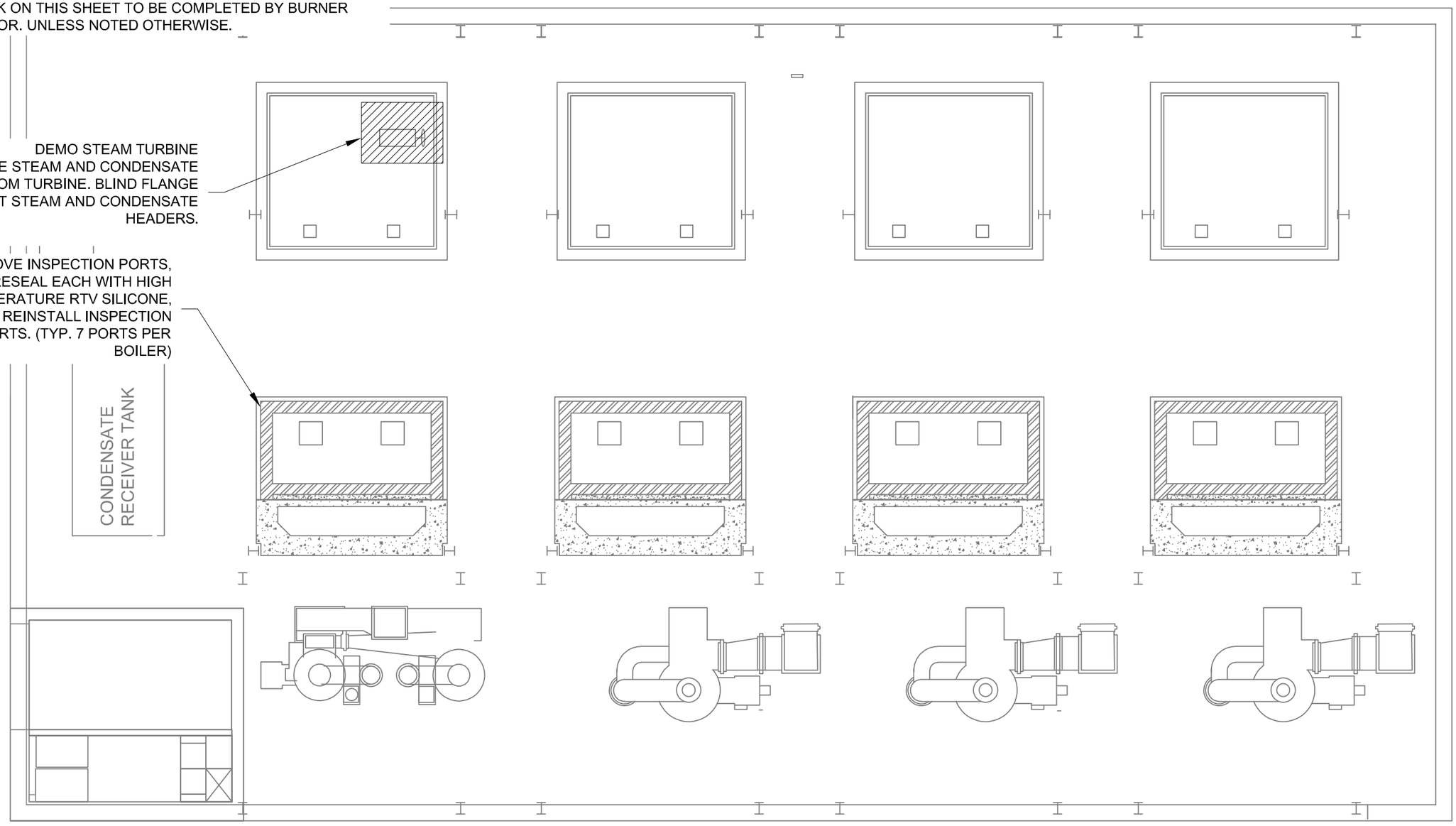
Sheet No. T100

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BURNER CONTRACTOR. UNLESS NOTED OTHERWISE.

DEMO STEAM TURBINE
REMOVE STEAM AND CONDENSATE PIPING FROM TURBINE. BLIND FLANGE AT STEAM AND CONDENSATE HEADERS.

REMOVE INSPECTION PORTS, RESEAL EACH WITH HIGH TEMPERATURE RTV SILICONE, AND REINSTALL INSPECTION PORTS. (TYP. 7 PORTS PER BOILER)

CONDENSATE RECEIVER TANK



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/25	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

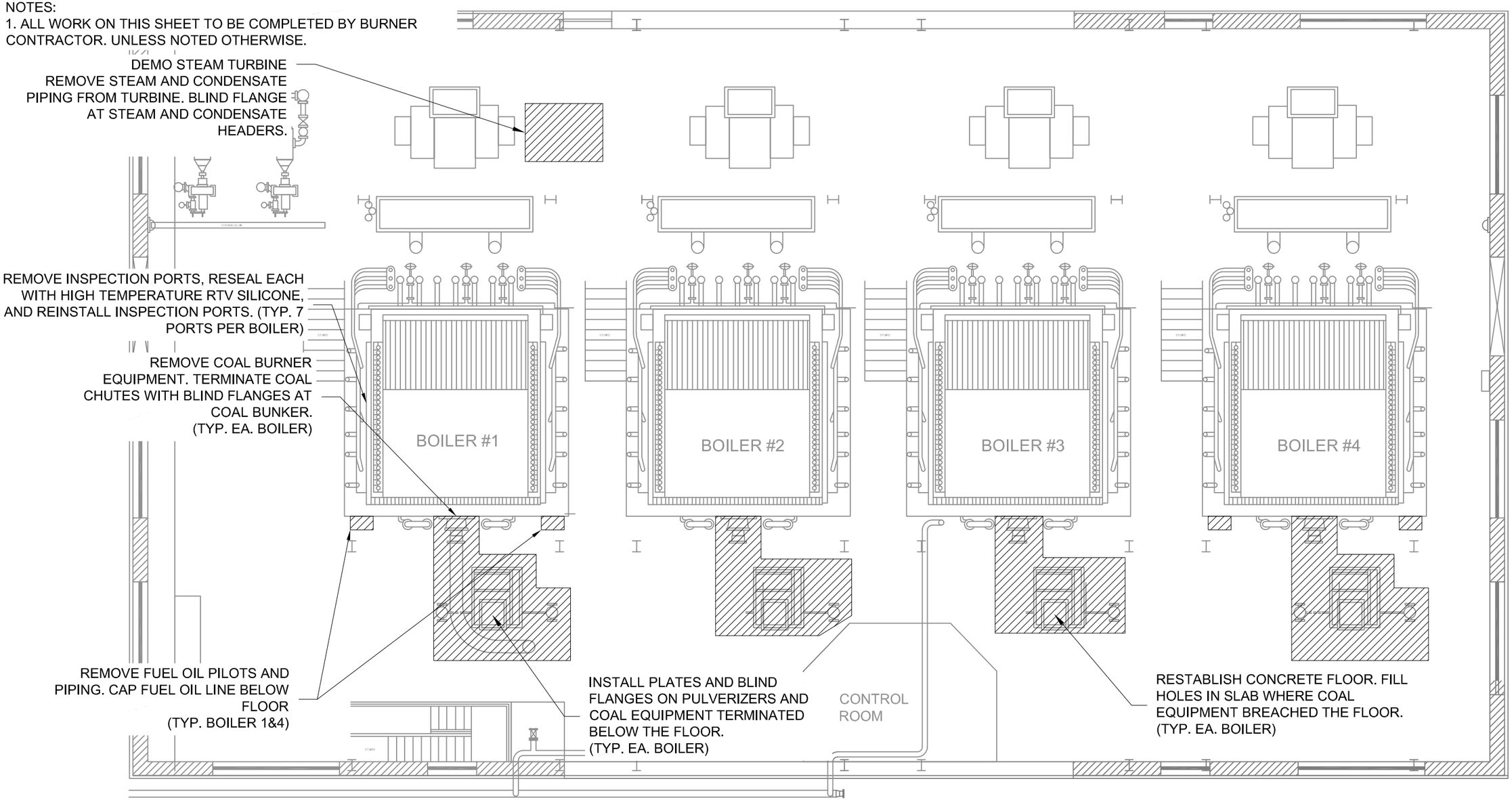
GROUND FLOOR DEMO

DESIGN BY: RJJ DATE: 4/29/25
DRAWN BY: TJW DATE: 4/29/25
HORZ: 1"=10'

Project No. EGE0103

Sheet No. M100

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BURNER CONTRACTOR. UNLESS NOTED OTHERWISE.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

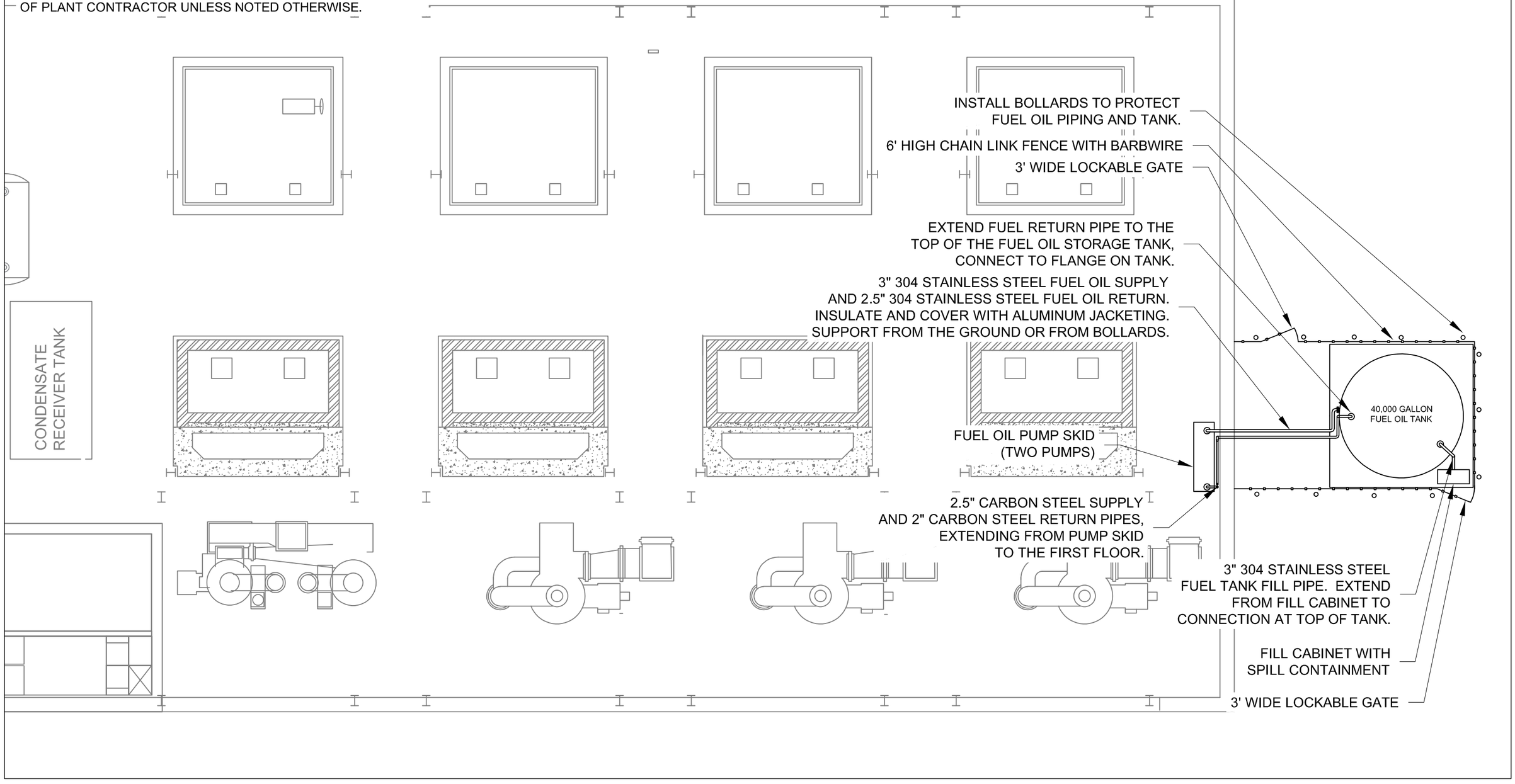
FIRST FLOOR DEMO

DESIGN BY: RJJ DATE: 4/25/25
DRAWN BY: TJW DATE: 4/25/25
HORZ: 1"=10'

Project No.EGE0103

Sheet No. M101

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR UNLESS NOTED OTHERWISE.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

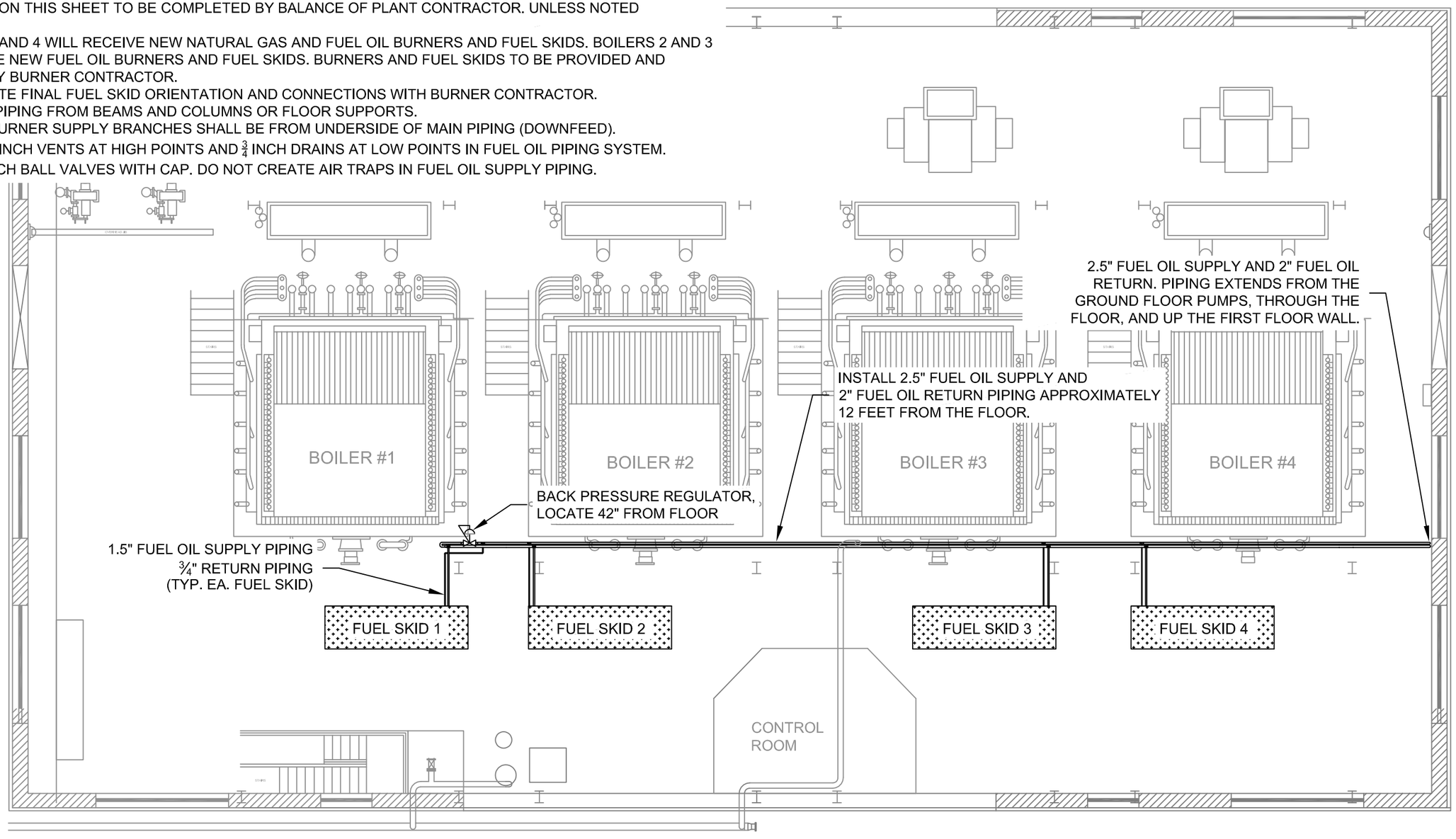
GROUND FLOOR FUEL OIL

DESIGN BY: RJJ DATE: 4/25/25
DRAWN BY: TJW DATE: 4/25/25
HORZ: 1"=10'

Project No. EGE0103

Sheet No. M200

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR. UNLESS NOTED OTHERWISE.
2. BOILERS 1 AND 4 WILL RECEIVE NEW NATURAL GAS AND FUEL OIL BURNERS AND FUEL SKIDS. BOILERS 2 AND 3 WILL RECEIVE NEW FUEL OIL BURNERS AND FUEL SKIDS. BURNERS AND FUEL SKIDS TO BE PROVIDED AND INSTALLED BY BURNER CONTRACTOR.
3. COORDINATE FINAL FUEL SKID ORIENTATION AND CONNECTIONS WITH BURNER CONTRACTOR.
4. SUPPORT PIPING FROM BEAMS AND COLUMNS OR FLOOR SUPPORTS.
5. FUEL OIL BURNER SUPPLY BRANCHES SHALL BE FROM UNDERSIDE OF MAIN PIPING (DOWNFEED).
6. PROVIDE $\frac{3}{4}$ INCH VENTS AT HIGH POINTS AND $\frac{3}{4}$ INCH DRAINS AT LOW POINTS IN FUEL OIL PIPING SYSTEM. PROVIDE $\frac{3}{4}$ INCH BALL VALVES WITH CAP. DO NOT CREATE AIR TRAPS IN FUEL OIL SUPPLY PIPING.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/25	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

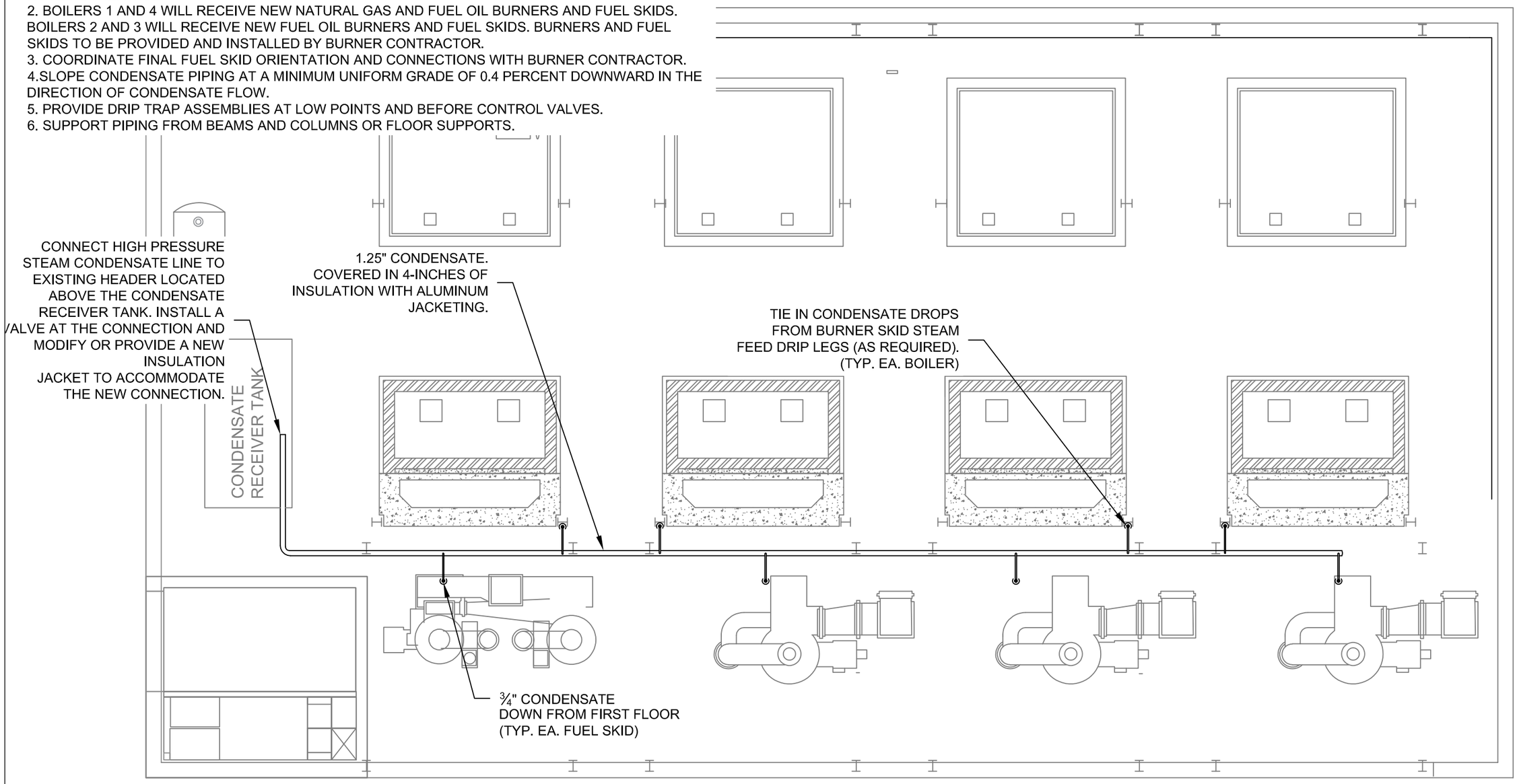
DESIGN BY: RJJ DATE: 4/25/25
DRAWN BY: TJW DATE: 4/25/25
HORZ: 1"=10'

FIRST FLOOR FUEL OIL

Project No. EGE0103

Sheet No. M201

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR. UNLESS NOTED OTHERWISE.
2. BOILERS 1 AND 4 WILL RECEIVE NEW NATURAL GAS AND FUEL OIL BURNERS AND FUEL SKIDS. BOILERS 2 AND 3 WILL RECEIVE NEW FUEL OIL BURNERS AND FUEL SKIDS. BURNERS AND FUEL SKIDS TO BE PROVIDED AND INSTALLED BY BURNER CONTRACTOR.
3. COORDINATE FINAL FUEL SKID ORIENTATION AND CONNECTIONS WITH BURNER CONTRACTOR.
4.SLOPE CONDENSATE PIPING AT A MINIMUM UNIFORM GRADE OF 0.4 PERCENT DOWNWARD IN THE DIRECTION OF CONDENSATE FLOW.
5. PROVIDE DRIP TRAP ASSEMBLIES AT LOW POINTS AND BEFORE CONTROL VALVES.
6. SUPPORT PIPING FROM BEAMS AND COLUMNS OR FLOOR SUPPORTS.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/30/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

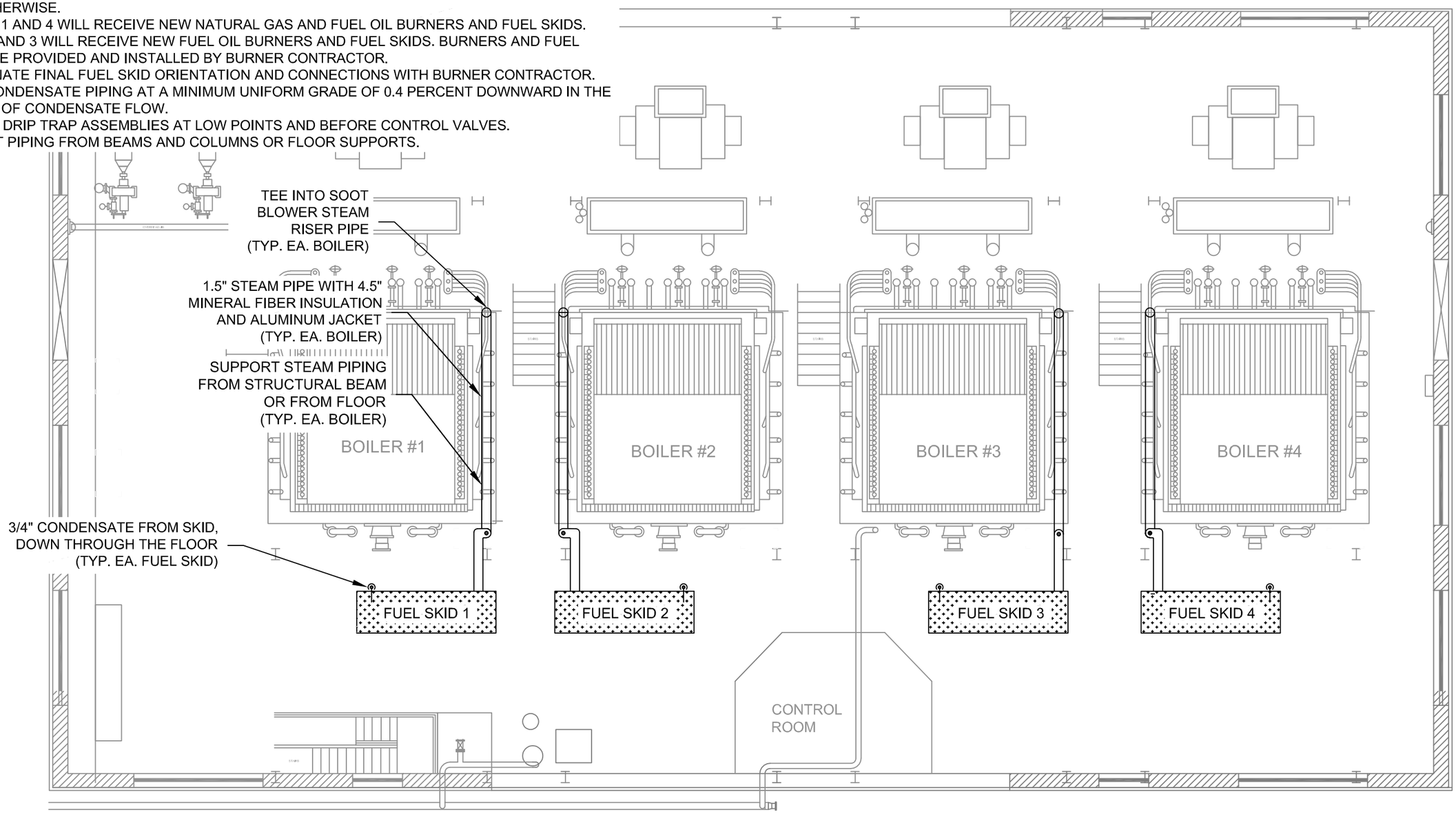
DESIGN BY: RJJ DATE: 4/25/25
DRAWN BY: TJW DATE: 4/25/25
HORZ: 1"=10'

GROUND FLOOR STEAM CONDENSATE

Project No. EGE0103

Sheet No. M202

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR. UNLESS NOTED OTHERWISE.
2. BOILERS 1 AND 4 WILL RECEIVE NEW NATURAL GAS AND FUEL OIL BURNERS AND FUEL SKIDS. BOILERS 2 AND 3 WILL RECEIVE NEW FUEL OIL BURNERS AND FUEL SKIDS. BURNERS AND FUEL SKIDS TO BE PROVIDED AND INSTALLED BY BURNER CONTRACTOR.
3. COORDINATE FINAL FUEL SKID ORIENTATION AND CONNECTIONS WITH BURNER CONTRACTOR.
4.SLOPE CONDENSATE PIPING AT A MINIMUM UNIFORM GRADE OF 0.4 PERCENT DOWNWARD IN THE DIRECTION OF CONDENSATE FLOW.
5. PROVIDE DRIP TRAP ASSEMBLIES AT LOW POINTS AND BEFORE CONTROL VALVES.
6. SUPPORT PIPING FROM BEAMS AND COLUMNS OR FLOOR SUPPORTS.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/25/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

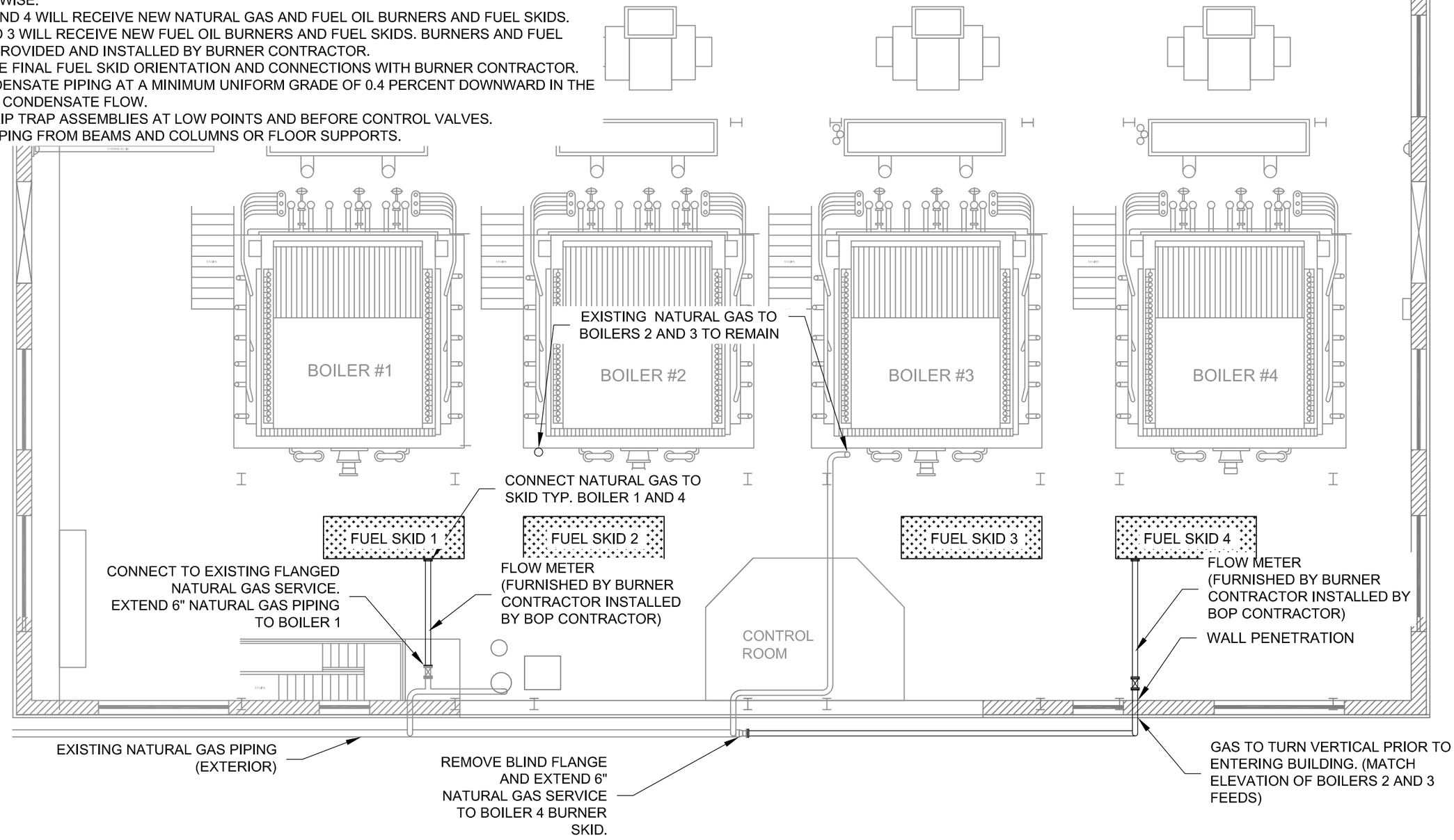
DESIGN BY: RJJ DATE: 4/25/25
DRAWN BY: TJW DATE: 4/25/25
HORZ: 1"=10'

FIRST FLOOR ATOMIZING STEAM

Project No. EGE0103

Sheet No. M203

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR. UNLESS NOTED OTHERWISE.
2. BOILERS 1 AND 4 WILL RECEIVE NEW NATURAL GAS AND FUEL OIL BURNERS AND FUEL SKIDS. BOILERS 2 AND 3 WILL RECEIVE NEW FUEL OIL BURNERS AND FUEL SKIDS. BURNERS AND FUEL SKIDS TO BE PROVIDED AND INSTALLED BY BURNER CONTRACTOR.
3. COORDINATE FINAL FUEL SKID ORIENTATION AND CONNECTIONS WITH BURNER CONTRACTOR.
4.SLOPE CONDENSATE PIPING AT A MINIMUM UNIFORM GRADE OF 0.4 PERCENT DOWNWARD IN THE DIRECTION OF CONDENSATE FLOW.
5. PROVIDE DRIP TRAP ASSEMBLIES AT LOW POINTS AND BEFORE CONTROL VALVES.
6. SUPPORT PIPING FROM BEAMS AND COLUMNS OR FLOOR SUPPORTS.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

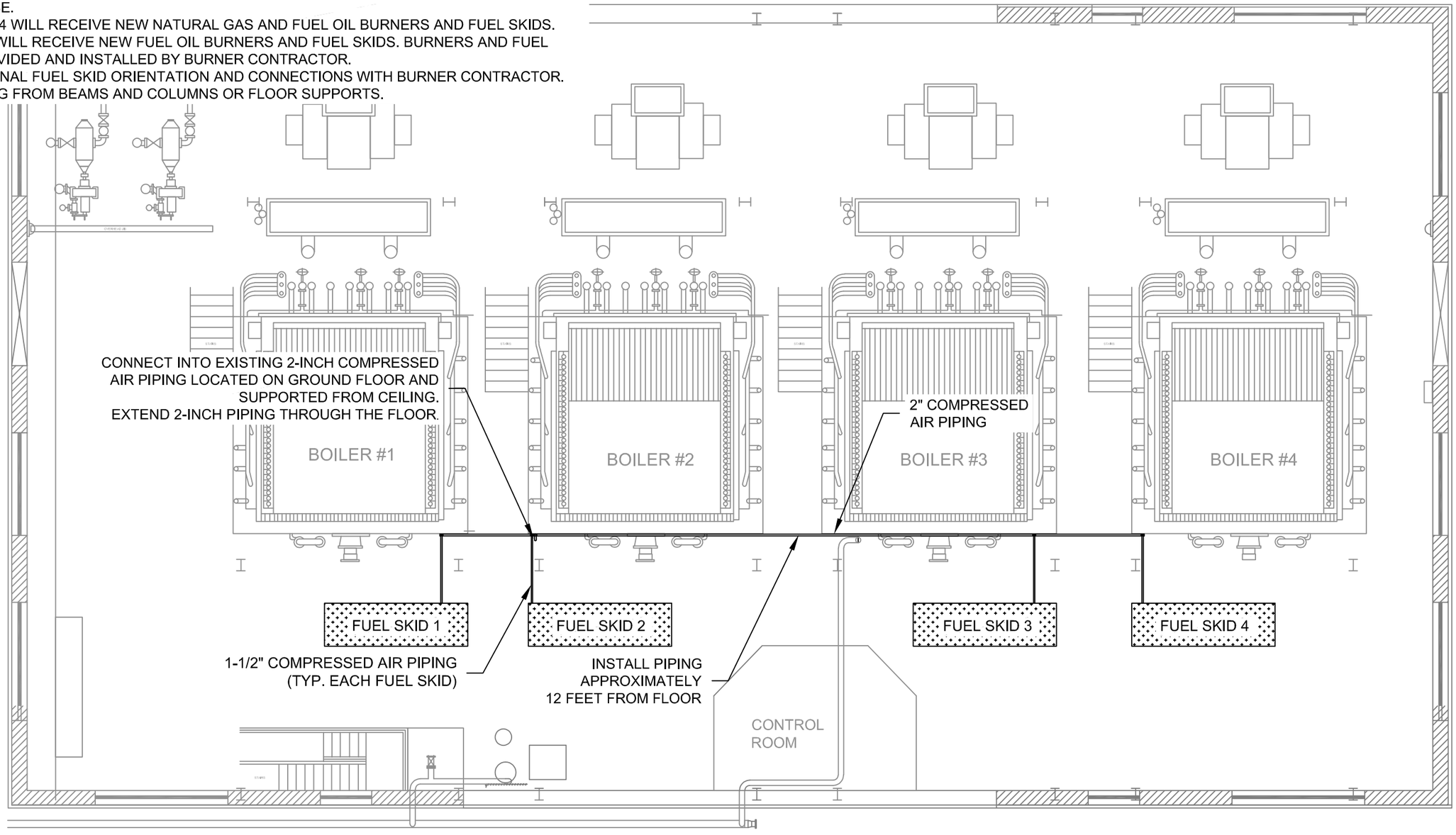
FIRST FLOOR NATURAL GAS

DESIGN BY: RJJ DATE: 4/29/25
DRAWN BY: TJW DATE: 4/29/25
HORZ: 1"=10'

Project No. EGE0103

Sheet No. M204

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR. UNLESS NOTED OTHERWISE.
2. BOILERS 1 AND 4 WILL RECEIVE NEW NATURAL GAS AND FUEL OIL BURNERS AND FUEL SKIDS. BOILERS 2 AND 3 WILL RECEIVE NEW FUEL OIL BURNERS AND FUEL SKIDS. BURNERS AND FUEL SKIDS TO BE PROVIDED AND INSTALLED BY BURNER CONTRACTOR.
3. COORDINATE FINAL FUEL SKID ORIENTATION AND CONNECTIONS WITH BURNER CONTRACTOR.
4. SUPPORT PIPING FROM BEAMS AND COLUMNS OR FLOOR SUPPORTS.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

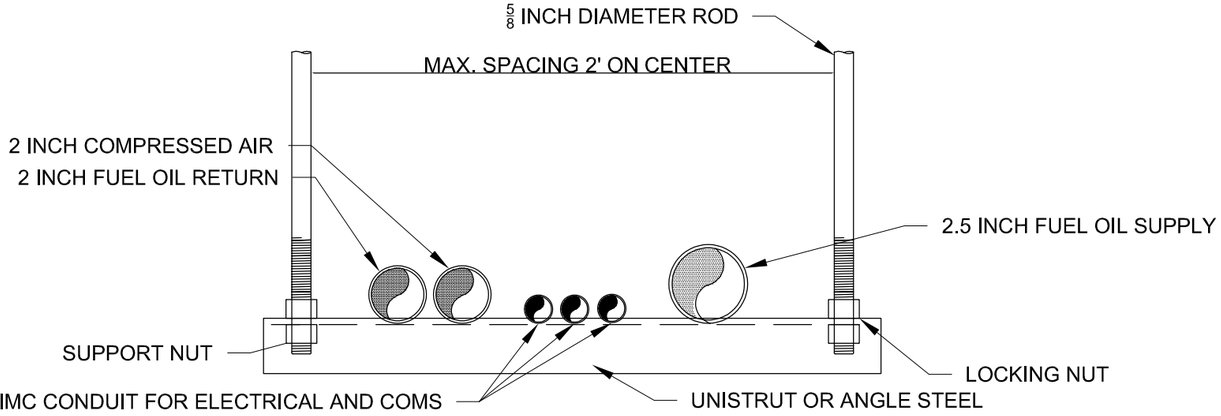
DES COAL SUNSETTING

FIRST FLOOR ATOMIZING AIR

DESIGN BY: RJJ DATE: 4/29/2025
DRAWN BY: TJW DATE: 4/29/2025
HORZ: 1"=10'

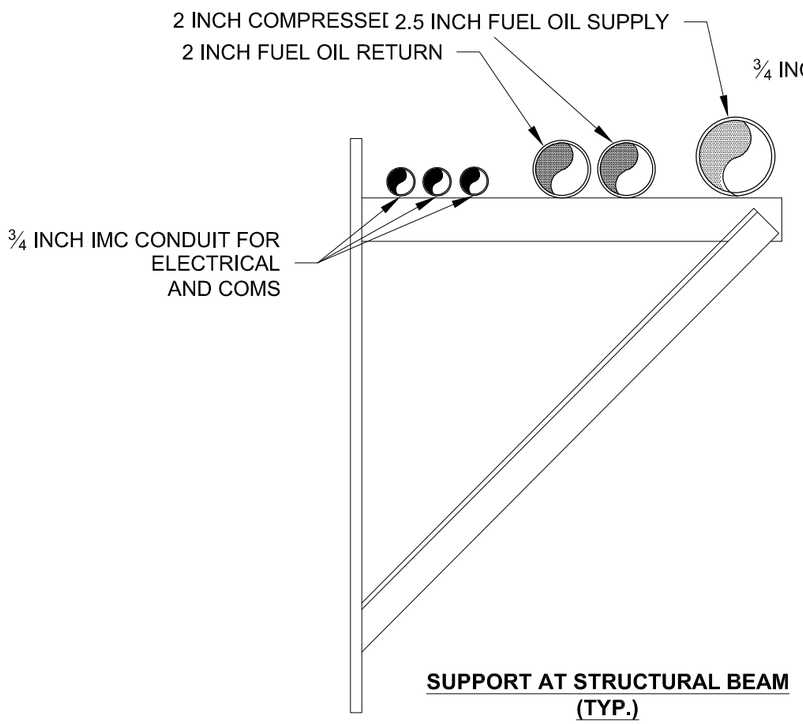
Project No. EGE0103

Sheet No. M205



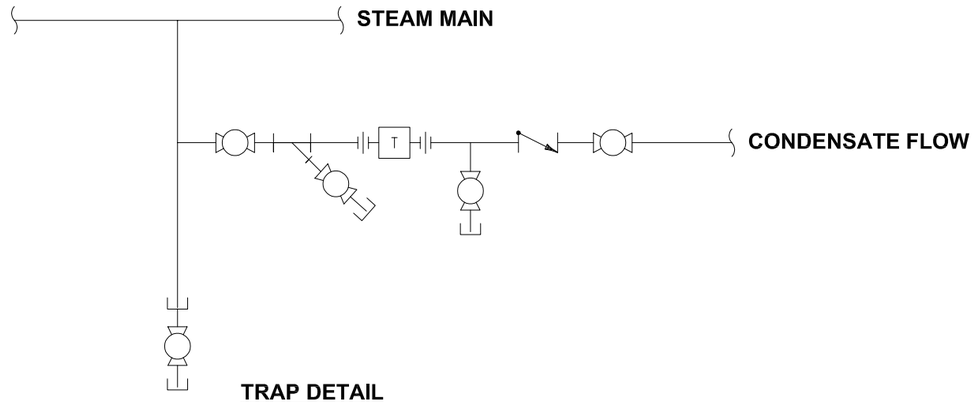
TRAPEZE HANGER DETAIL

NOTES:
1. 10 FOOT MAXIMUM SPACING BETWEEN HANGERS
PIPING U-BOLTED OR STRAPPED TO TRAPEZE



SUPPORT AT STRUCTURAL BEAM (TYP.)

NOTES:
1. ANVIL FIG. 195 OR WELDED STEEL BRACKET (OR APPROVED EQUAL)
2. WELD ATTACHMENT INTO FACE OF BEAM OR WEB.
3. ALTERNATIVE ATTACHMENT METHODS UPON APPROVAL.
4. 10 FOOT MAXIMUM SPACING BETWEEN HANGERS.



TRAP DETAIL

NOTES:
1. FOR STEAM MAINS UP TO 4 INCHES, THE DRIP LEG SHALL BE THE SAME SIZE AS THE STEAM MAIN. FOR STEAM MAINS LARGER THAN 4 INCHES, THE DRIP LEG CAN BE HALF THE DIAMETER OF THE STEAM MAIN, BUT NEVER LESS THAN 4 INCHES.
2. THE LENGTH OF DRIP LEG SHALL BE A MINIMUM OF 28 INCHES.
3. THE TRAP LINE SHALL BE MINIMUM 6 INCHES FROM BOTTOM OF DRIP LEG.
4. INSTALL A DRAIN VALVE AT THE BASE OF THE DRIP LEG.

NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION

EVER-GREEN ENERGY™

DES COAL SUNSETTING

MECHANICAL DETAILS

DESIGN BY: RJJ DRAWN BY: TJW DATE: 4/29/25 DATE: 4/29/25 HORZ: N.T.S.

Project No. EGE0103 Sheet No. M400

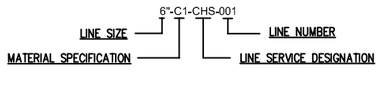
NOTES:

1. FOR BURNER CONTRACTOR. THIS DRAWING PRESENTS DES P&ID STANDARD FOR REFERENCE FOR PRODUCING P&IDS FOR INSTALLED SYSTEMS.

INSTRUMENT FUNCTION TABLE

FIRST LETTER	INITIATING OR MEASURED VARIABLE	CONTROLLER				READOUT DEVICE		SWITCHES & ALARM DEVICE					TRANSMITTER			SOLENOID, RELAY OR COMPUTING DEVICE	PRIMARY ELEMENT	TEST POINT	WELL OR PROBE	VIEWING DEVICE OR GLASS	SAFETY DEVICE
		RECORDING	INDICATING	BLIND	SELF-ACTUATED CONTROL VALVE	RECORDING	INDICATING	HIGH	LOW	OPEN	CLOSED	COMBINATION	RECORDING	INDICATING	BLIND						
A	ANALYSIS	ARC	AIC	AC		AR	AI	ASH	ASL			AS	ART	AIT	AT	AY	AE	AP	AW		
B	BURNER & COMBUSTION	BRC	BIC	BC		BR	BI	BSH	BSL			BS	BRT	BIT	BT	BY	BE		BW	BG	
C	CONDUCTIVITY	CRC	CIC	CC	CCV	CR	CI	CSH	CSL			CS	CRT	CIT	CT	CY	CE		CW		
D	DENSITY	DRC	DIC	DC	DCV	DR	DI	DSH	DSL			DS	DRT	DIT	DT	DY	DE		DW		
E	VOLTAGE	ERC	EIC	EC		ER	EI	ESH	ESL			ES	ERT	EIT	ET	EY	EE				
F	FLOW	FRC	FIC	FC	FCV	FR	FI	FSH	FSL			FS	FRT	FIT	FT	FY	FE	FP		FG	
G																					
H	HAND		HIC	HC								HIS(HS)									
I	CURRENT	IRC	IIC			IR	II	ISH	ISL			IS	IRT	IIT	IT	IY	IE				
J	POWER	JRC	JIC			JR	JI	JSH	JSL	JYO	JYC	JS	JRT	JIT	JT	JY	JE				
K	TIME	KRC	KIC	KC	KCV	KR	KI	KSH	KSL			KS	KRT	KIT	KT	KY	KE				
L	LEVEL	LRC	LIC	LC	LCV	LR	LI	LSH	LSL			LS	LRT	LIT	LT	LY	LE		LW	LG	
M	MOISTURE	MRC	MIC	MC		MR	MI	MSH	MSL			MS	MRT	MIT	MT	MY	ME				
N																					
O																					
P	PRESSURE & VACUUM	PRC	PIC	PC	PCV	PR	PI	PSH	PSL			PS	PRT	PIT	PT	PY	PE	PP			PSV
PD	PRESSURE DIFFERENTIAL	PDRC	PDIC	PDC	PDCV	PDR	PDI	PDSH	PDSL				PDRT	PDIT	PDT	PDY	PE	PP			
PH	PH	PHRC	PHIC	PHC	PHCV	PHR	PHI	PHSH	PHSL				PHRT	PHIT	PHT	PHY	PHE	PHP	PHW		
Q	QUANTITY	QRC	QIC			QR	QI	QSH	QSL			QS	QRT	QIT	QT	QY	QE				
R																					
S	SPEED OR FREQUENCY	SRC	SIC	SC	SCV	SR	SI	SSH	SSL			SS	SRT	SIT	ST	SY	SE				
T	TEMPERATURE	TRC	TIC	TC	TCV	TR	TI	TSH	TSL			TS	TRT	TIT	TT	TY	TE	TP	TW		TSE
TD	TEMPERATURE DIFFERENTIAL	TDRC	TDIC	TDC	TDCV	TDR	TDI	TDSH	TDSL				TDRT	TDIT	TDT	TDY	TE	TP	TW		
U	MULTIVARIABLE					UR	UI									UY					
V	VIBRATION & MACH ANALYSIS					VR	VI	VSH	VSL			VS	VRT	VIT	VT	VY	VE				
W	WEIGHT OR FORCE	WRC	WIC	WC	WCV	WR	WI	WSH	WSL			WS	WRT	WIT	WT	WY	WE				
X																					
Y	EVENT, STATE, PRESENCE		YIC	YC		YR	YI	YSH	YSL						YT	YY	YE				
Z	POSITION OR DIMENSION	ZRC	ZIC	ZC	ZCV	ZR	ZI	ZSH	ZSL	ZSO	ZSC	ZS	ZRT	ZIT	ZT	ZY	ZE				

LINE NUMBERING



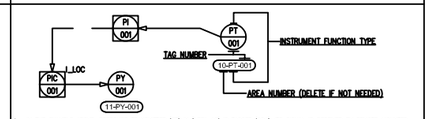
LINE SERVICE DESIGNATION

A	PLANT AIR	LC	LOW PRESSURE CONDENSATE
AD	ASPIRATION DUCT (DUST/FUMES)	LS	LOW PRESSURE STEAM (0–15 PSIG)
BD	BLOWDOWN	MC	MEDIUM PRESSURE CONDENSATE
BF	BOILER FEED WATER	MS	MEDIUM PRESSURE STEAM (15–150 PSIG)
CHR	CHILLED WATER RETURN	N	NITROGEN
CHS	CHILLED WATER SUPPLY	NG	NATURAL GAS
CO	CRUDE OIL	NW	NON-POTABLE WATER
CWR	COOLING WATER RETURN	P	PROCESS FLUID, NON-WATER (ALL)
CWS	COOLING WATER SUPPLY	PC	PUMPED CONDENSATE
CW	CITY WATER	PG	PROPYLENE GLYCOL
DCW	DOMESTIC COLD WATER	PR	PROCESS WATER
DI	DEMINERALIZED WATER	PS	PROCESS SEWER
DWW	DEEP WELL WATER	PW	POTABLE WATER
FO	FUEL OIL	ROW	REVERSE OSMOSIS WATER
FW	FIRE CONTROL WATER	SCW	SOFT COLD WATER
HC	HIGH PRESSURE CONDENSATE	SA	SANITARY WATER SEWER
HS	HIGH PRESSURE STEAM (>150 PSIG)	SW	STORM WATER SEWER
HY	HYDRAULIC OIL	WA	WASH WATER
HWR	HEATING WATER RETURN	WW	WASTE WATER
HWS	HEATING WATER SUPPLY	V	VENT
IA	INSTRUMENT AIR	VA	VAPOR

MATERIAL SPECIFICATION

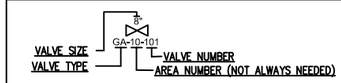
C1	SCH 40 CS
C2	CARBON STEEL 150# (PROCESS)
C3	CARBON STEEL 150# (STEAM & COND.)
C4	CARBON STEEL 300#
C5	CARBON STEEL 1300#
C6	GALVANIZED 150#
C7	CARBON STEEL 150# (LINED)
C8	CARBON STEEL PNUEMATIC LINE
S1	304 STAINLESS STEEL
S2	316 STAINLESS STEEL
S3	STAINLESS STEEL PNUEMATIC LINE
P1	CPVC
P2	PVC SCH. 80
R1	COPPER

INSTRUMENT IDENTIFICATION NUMBERING



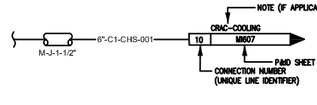
(IN THE EXAMPLE ABOVE: PRESSURE TRANSMITTER "PT" IN "AREA 10" IS TAGGED "001". ITS SIGNAL IS RECEIVED BY REMOTE-MOUNTED PRESSURE INDICATING DISPLAY "PI-001" WHICH SENDS ITS SIGNAL TO A PRESSURE-INDICATING CONTROLLER "PIC-001" WHICH COMMANDS PRESSURE RELIEF SOLENOID "PY-001" LOCATED IN SUB-SYSTEM "AREA 11" TO ACTIVATE (BASED ON "PIC-001" SETPOINT)

VALVE NUMBERING



AV	ANGLE	GL	GLOBE	SV	SOLENOID
BV	BALL	KV	KNIFE	TV	STRAINER
CV	CHECK	MV	METERING	TA	TRAP ASSEMBLY
DV	DIAPHRAM	NV	NEEDLE	TW	THREE WAY
FV	BUTTERFLY	PL	PLUG	VB	VACUUM BREAKER
FW	FOUR WAY	QO	QUICK OPENING		
GA	GATE	RV	RELIEF		

CONTINUATION NOMENCLATURE (OFF PAGE CONNECTIONS)

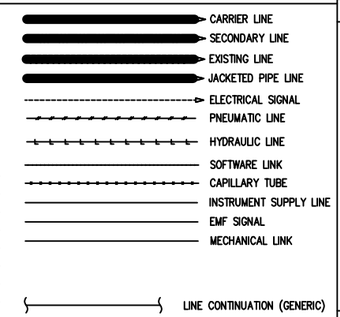


(IN THE EXAMPLE ABOVE: A 6"ø, SCH40 CARBON STEEL, CHILLED WATER SUPPLY PIPE, CLAD IN 1.5" MINERAL WOOL W/ALL-SERVICE JACKET INSULATION, IS TAGGED W/LINE NUMBER "001". THE LINE LEAVES THE PAGE WITH UNIQUE CONNECTION NUMBER OF "10" AND CONTINUES ON SHEET "M607")

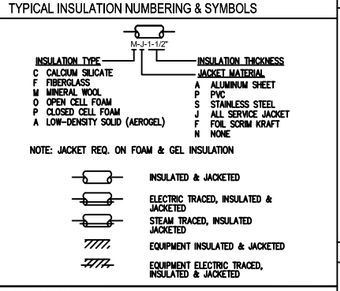
AREA NUMBERING (UNIQUE TO PROJECT, DELETE IF NOT NEEDED)

```
10   PROCESS AREA #1
└─11   SUB-SYSTEM #1 TO PROCESS AREA #1
**   ***
20   PROCESS AREA #2
30   PROCESS AREA #3
40   PROCESS AREA #4
**   ***
**   ***
```

LINE LEGEND (NOTE COLORS OR EDIT AS REQ.)



TYPICAL INSULATION NUMBERING & SYMBOLS

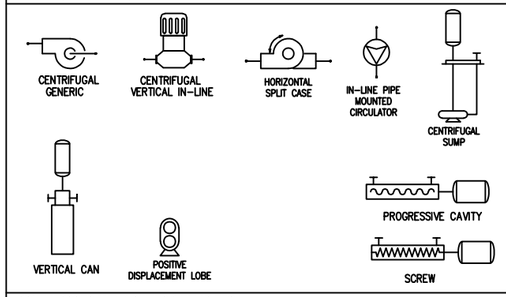


P&ID ABREVIATIONS

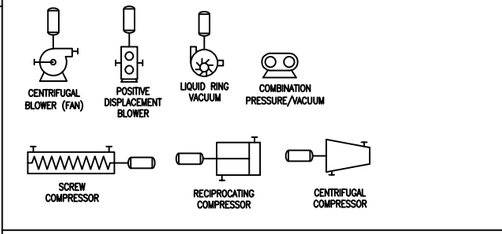
AFV	ACTUATED BUTTERFLY VALVE	LO	LEVER OPERATOR
ABV	ACTUATED BALL VALVE	MW	MANWAY
ABS	ABSOLUTE PRESSURE/VACUUM	NC	NORMALLY CLOSED
AC	AIR TO CLOSE	NO	NORMALLY OPEN
ADV	ACTUATED DIVERTER VALVE	NR	NON-RETURN VALVE
AO	AIR TO OPEN	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
APV	ACTUATED PLUG VALVE	PVC	POLY-VINYL CHLORIDE
ASG	ACTUATED SLIDE GATE	PLS	POLY-PROPYLENE LINED STEEL
BC	BLOW CONNECTION	RD	RUPTURE DISK
BG	BLAST GATE	RO	RESTRICTING ORIFICE
CI	CAST IRON	SC	SAMPLE CONNECTION
CO	CHAIN OPERATOR	SG	SLIDE GATE
CS	CARBON STEEL	SOV	SOLENOID VALVE
CSC	CAR SEAL CLOSED	SS	STAINLESS STEEL
CSO	CAR SEAL OPEN	TLS	TEFLON LINED STEEL
CV	CONSERVATION VENT	UHS	UTILITY HOSE STATION
DC	DRAIN CONNECTION	VC	VENT CONNECTION
DI	DUCTILE IRON	VFD	VARIABLE FREQUENCY DRIVE
FA	FLAME ARRESTOR	VSD	VARIABLE SPEED DRIVE
FC	FAIL CLOSED		
FO	FAIL OPEN		
FRP	FIBERGLASS REINFORCED PLASTIC		
GH	GAUGE HATCH		
GP	GALVANIZED PIPE		
GS	GALVANIZED SHEET		
I/P	CURRENT-TO-PRESSURE TRANSDUCER		
HC	HOSE CONNECTION		
HH	HAND HOLE		
HMS	HAND MOMENTARY SWITCH		
HMV	HAND METERING VALVE		
HOA	HAND/OFF/AUTO SWITCH		

SYMBOLS LEGEND (EDIT AS REQUIRED)

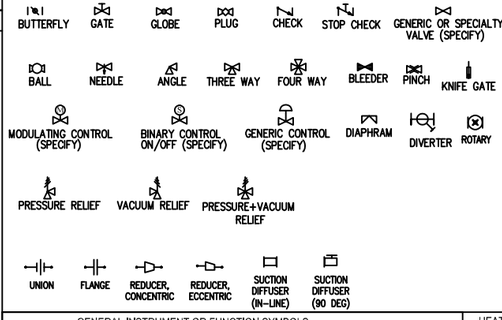
PUMPS (EDIT AS REQ.)



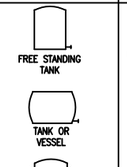
COMPRESSORS AND BLOWERS (EDIT AS REQ.)



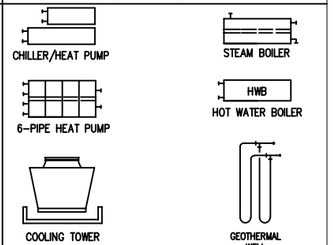
VALVES, FITTINGS



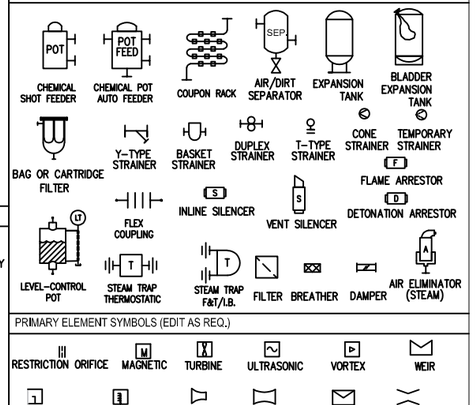
STORAGE (EDIT AS REQ.)



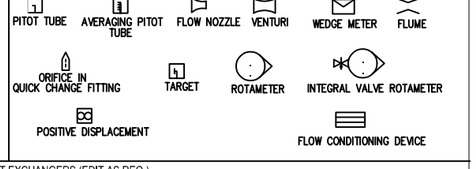
MAJOR EQUIPMENT (EDIT AS REQ.)



SPECIALTY (EDIT AS REQ.)



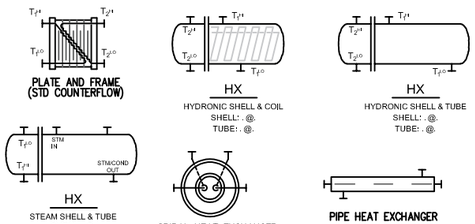
PRIMARY ELEMENT SYMBOLS (EDIT AS REQ.)



GENERAL INSTRUMENT OR FUNCTION SYMBOLS

	PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUX LOCATION NORMALLY ACCESSIBLE TO OPERATOR	AUX LOCATION NOT ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS				
SHARED DISPLAY SHARED CONTROL				
COMPUTER FUNCTION				
PROGRAMMABLE LOGIC CONTROL				

HEAT EXCHANGERS (EDIT AS REQ.)



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/30/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

DESIGN BY: RJJ DATE: 02/06/25
DRAWN BY: TJW DATE: 02/06/25
HORZ: N.T.S.

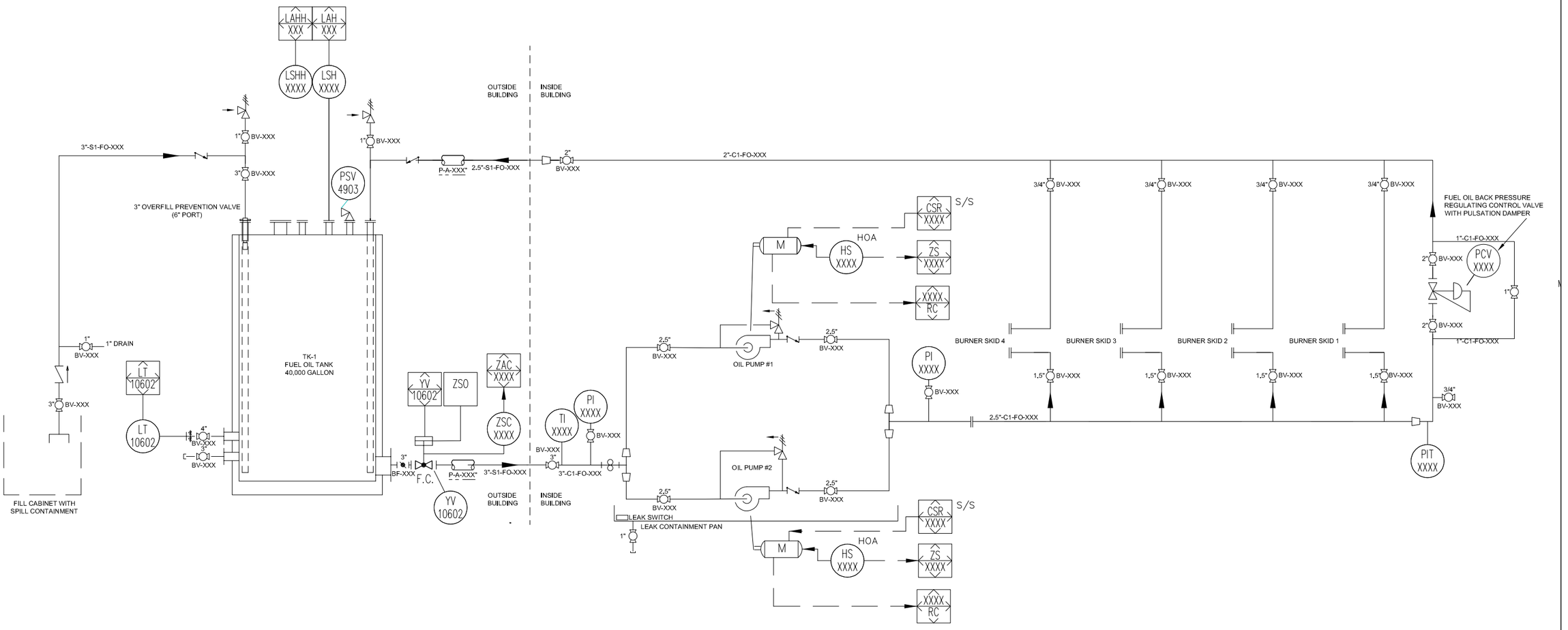
P&ID LEGEND

Project No. EGE0103

Sheet No. M500

NOTES:

1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR. UNLESS NOTED OTHERWISE.
2. PROVIDE ALL FEATURES AND COMPONENTS IN COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS.
3. INSTALL ALL FUEL OIL TANK AND SYSTEM COMPONENTS, CONTROLS, ACCESSORIES AS PER MANUFACTURER'S RECOMMENDATION AND APPLICABLE CODES REGULATIONS.
4. THE CONTRACTOR SHALL COORDINATE WITH TANK MANUFACTURER FOR ALL TANK FITTINGS, SIZING, AND PORT LOCATIONS.
5. PROVIDE A VEEDER-ROOT TLS-450 PLUS FUEL OIL MANAGEMENT SYSTEM, OR APPROVED SUBSTITUTION. AT A MINIMUM, THE SYSTEM SHALL PROVIDE THE FOLLOWING FUNCTIONALITIES: TANK INVENTORY LEVEL INFORMATION, TANK LEAK DETECTION, PIPING LEAK DETECTION, SENSOR CONFIGURATION, COMPLIANCE LEAK TESTING, LOW LEVEL ALARM, HIGH LEVEL ALARM, AND TANK LEVEL ALARM.
6. COORDINATE BURNER SKID FUEL OIL CONNECTION POINTS WITH BURNER INSTALLATION CONTRACTOR.
7. PROVIDE A 3/4" FULL PORT BALL VALVE WITH THREADED NIPPLE AND CAP AT HIGH AND LOW POINTS FOR VENTING AND DRAINING THE PIPING SYSTEM. DO NOT CREATE AIR TRAPS IN FUEL OIL SUPPLY PIPING SYSTEM.
8. PROVIDE VACUUM BREAKER(S) WITH VENT PROTECTORS AT HIGHEST POINT(S) OF RISER LINES.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/30/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

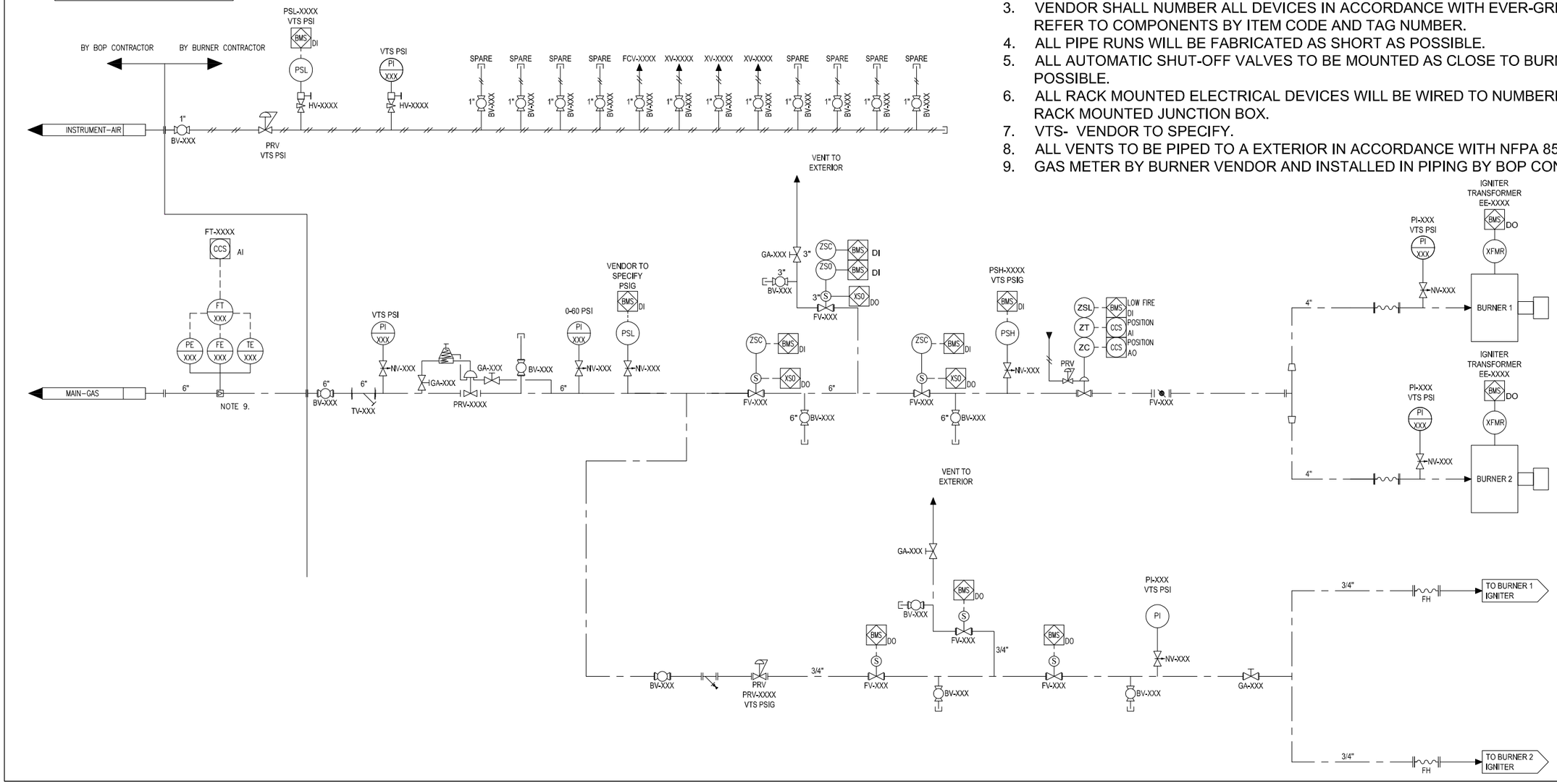
DESIGN BY: RJJ DATE: 02/06/25
DRAWN BY: TJW DATE: 02/06/25
HORZ: N.T.S.

FUEL OIL TANK P&ID

Project No. EGE0103

Sheet No. M501

TAGS: BLR 1– 1XXXX
BLR 2– 2XXXX
BLR 3– 3XXXX
BLR 4– 4XXXX



GENERAL NOTES

1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BURNER CONTRACTOR. UNLESS NOTED OTHERWISE.
2. THIS DRAWING IS FURNISHED FOR REFERENCE ONLY TO PROVIDE TYPICAL FUEL GAS TRAIN AND CONNECTIONS TO BURNER MANAGEMENT SYSTEM AND COMBUSTION CONTROL SYSTEM. VENDOR TO PROVIDE COMPLETE P&ID FOR COMPLETED INSTALLATION FOR BOILER 1 AND 4 AND DESIGN TO BE IN ACCORDANCE WITH NFPA 85. IT IS VENDOR'S RESPONSIBILITY TO SIZE ALL VALVES, PIPE, AND PRESSURE RANGES OF INSTRUMENTS.
3. VENDOR SHALL NUMBER ALL DEVICES IN ACCORDANCE WITH EVER-GREEN STANDARD AND REFER TO COMPONENTS BY ITEM CODE AND TAG NUMBER.
4. ALL PIPE RUNS WILL BE FABRICATED AS SHORT AS POSSIBLE.
5. ALL AUTOMATIC SHUT-OFF VALVES TO BE MOUNTED AS CLOSE TO BURNER INLETS AS POSSIBLE.
6. ALL RACK MOUNTED ELECTRICAL DEVICES WILL BE WIRED TO NUMBERED TERMINALS IN A RACK MOUNTED JUNCTION BOX.
7. VTS- VENDOR TO SPECIFY.
8. ALL VENTS TO BE PIPED TO A EXTERIOR IN ACCORDANCE WITH NFPA 85 GUIDELINES.
9. GAS METER BY BURNER VENDOR AND INSTALLED IN PIPING BY BOP CONTRACTOR.

NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/30/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

FUEL GAS BURNER
P&ID

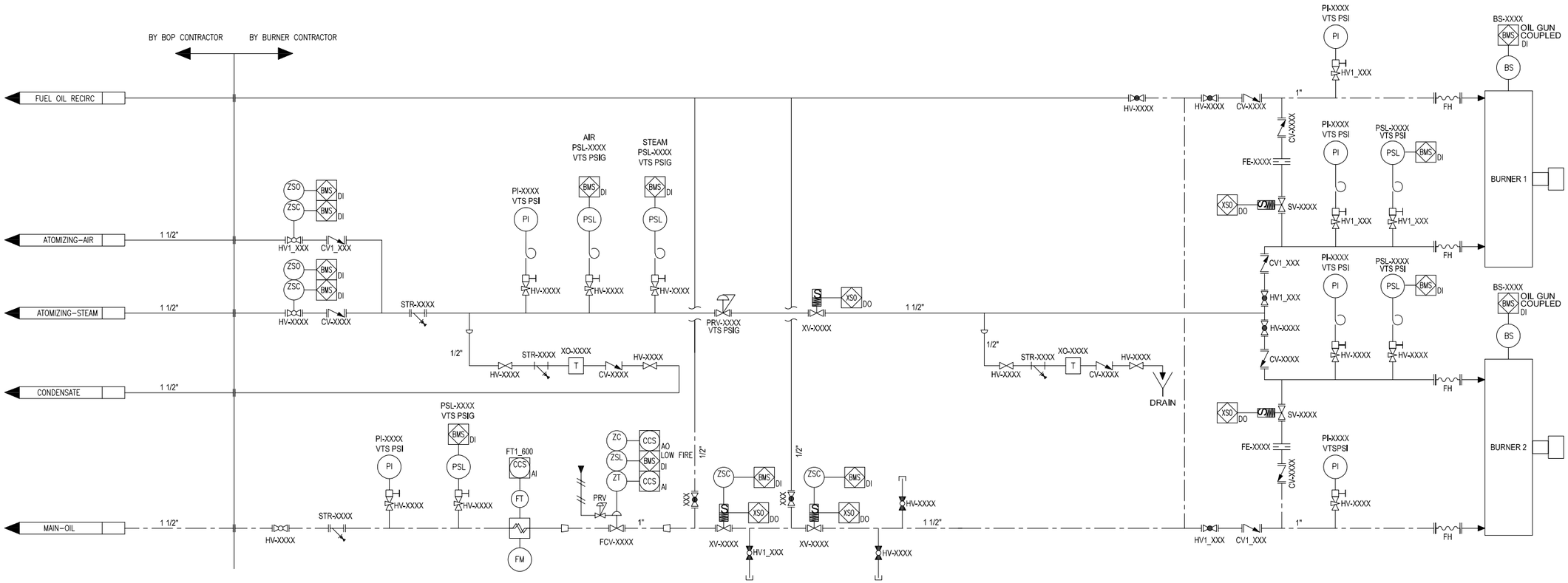
DESIGN BY: PB DATE: 02/06/25
DRAWN BY: TJW DATE: 02/06/25
HORZ: N.T.S.

Project No. EGE0103 Sheet No. M502

TAGS: BLR 1– 100XXX
BLR 2– 200XXX
BLR 3– 300XXX
BLR 4– 400XXX

GENERAL NOTES

1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BURNER CONTRACTOR. UNLESS NOTED OTHERWISE.
2. THIS DRAWING IS FURNISHED FOR REFERENCE ONLY TO PROVIDE TYPICAL FUEL GAS TRAIN AND CONNECTIONS TO BURNER MANAGEMENT SYSTEM AND COMBUSTION CONTROL SYSTEM. VENDOR TO PROVIDE COMPLETE P&ID FOR COMPLETED INSTALLATION FOR BOILER 1 AND 4 AND DESIGN TO BE IN ACCORDANCE WITH NFPA 85. IT IS VENDOR'S RESPONSIBILITY TO SIZE ALL VALVES, PIPE, AND PRESSURE RANGES OF INSTRUMENTS.
3. VENDOR SHALL NUMBER ALL DEVICES IN ACCORDANCE WITH EVER-GREEN STANDARD AND REFER TO COMPONENTS BY ITEM CODE AND TAG NUMBER.
4. ALL PIPE RUNS WILL BE FABRICATED AS SHORT AS POSSIBLE.
5. ALL AUTOMATIC SHUT-OFF VALVES TO BE MOUNTED AS CLOSE TO BURNER INLETS AS POSSIBLE.
6. ALL RACK MOUNTED ELECTRICAL DEVICES WILL BE WIRED TO NUMBERED TERMINALS IN A RACK MOUNTED JUNCTION BOX.
7. VTS- VENDOR TO SPECIFY.
8. ALL VENTS TO BE PIPED TO A EXTERIOR IN ACCORDANCE WITH NFPA 85 GUIDELINES.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

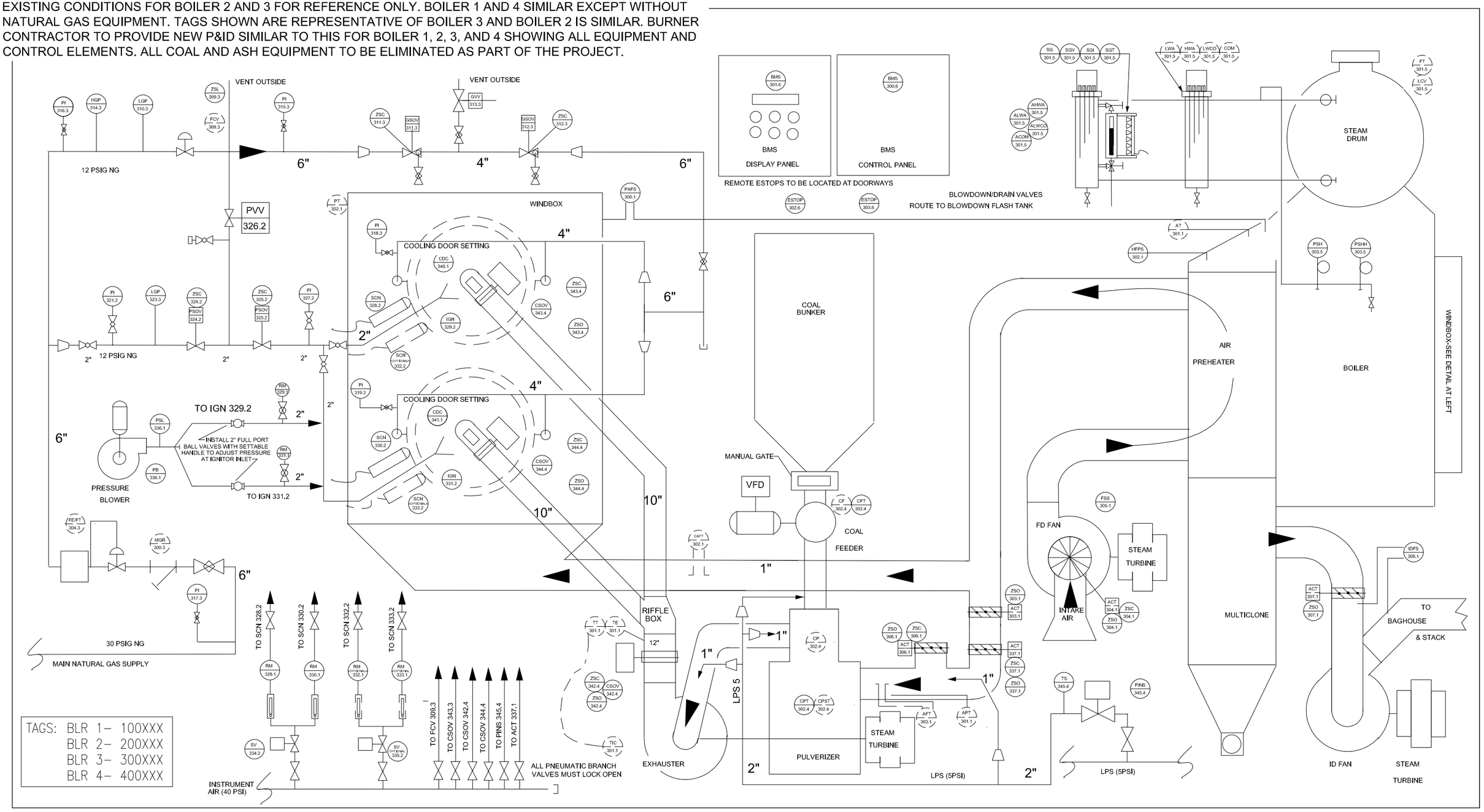
DESIGN BY: PB DATE: 4/29/25
DRAWN BY: TJW DATE: 4/29/25
HORZ: N.T.S.

FUEL OIL BURNER P&ID

Project No. EGE0103

Sheet No. M503

NOTES:
EXISTING CONDITIONS FOR BOILER 2 AND 3 FOR REFERENCE ONLY. BOILER 1 AND 4 SIMILAR EXCEPT WITHOUT NATURAL GAS EQUIPMENT. TAGS SHOWN ARE REPRESENTATIVE OF BOILER 3 AND BOILER 2 IS SIMILAR. BURNER CONTRACTOR TO PROVIDE NEW P&ID SIMILAR TO THIS FOR BOILER 1, 2, 3, AND 4 SHOWING ALL EQUIPMENT AND CONTROL ELEMENTS. ALL COAL AND ASH EQUIPMENT TO BE ELIMINATED AS PART OF THE PROJECT.



TAGS: BLR 1– 100XXX
BLR 2– 200XXX
BLR 3– 300XXX
BLR 4– 400XXX

NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

RYAN JOHNSON

DATE _____ REG. NO. 49918

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

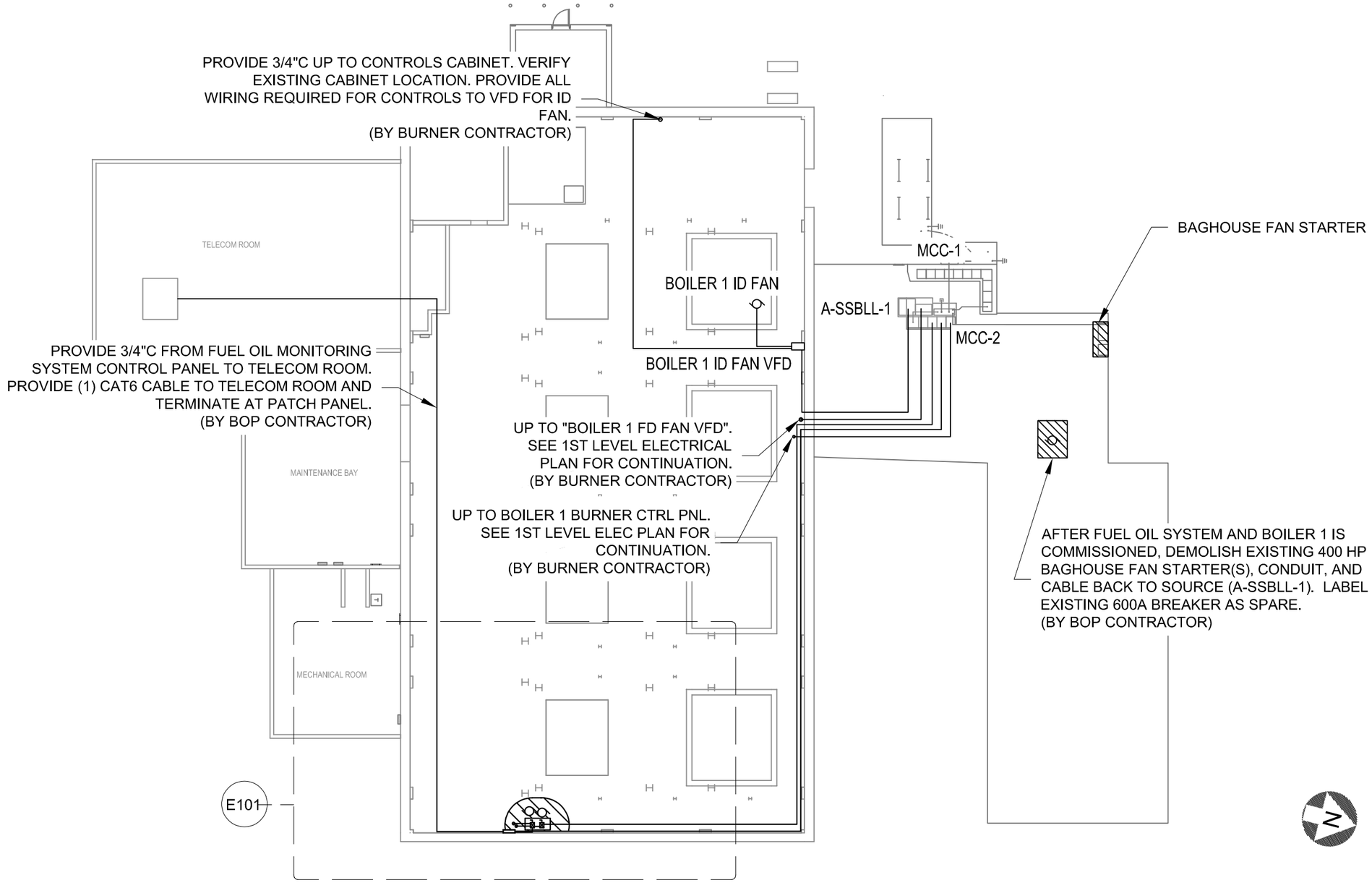
DES COAL SUNSETTING

DESIGN BY: PB DATE: 4/29/25
DRAWN BY: TJW DATE: 4/29/25
HORZ: N.T.S.

EXISITNG BOILER 2 & 3 P&ID

Project No. EGE0103

Sheet No. M504



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

NICHOLAS OELKE

DATE _____ REG. NO. 47135

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/25	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

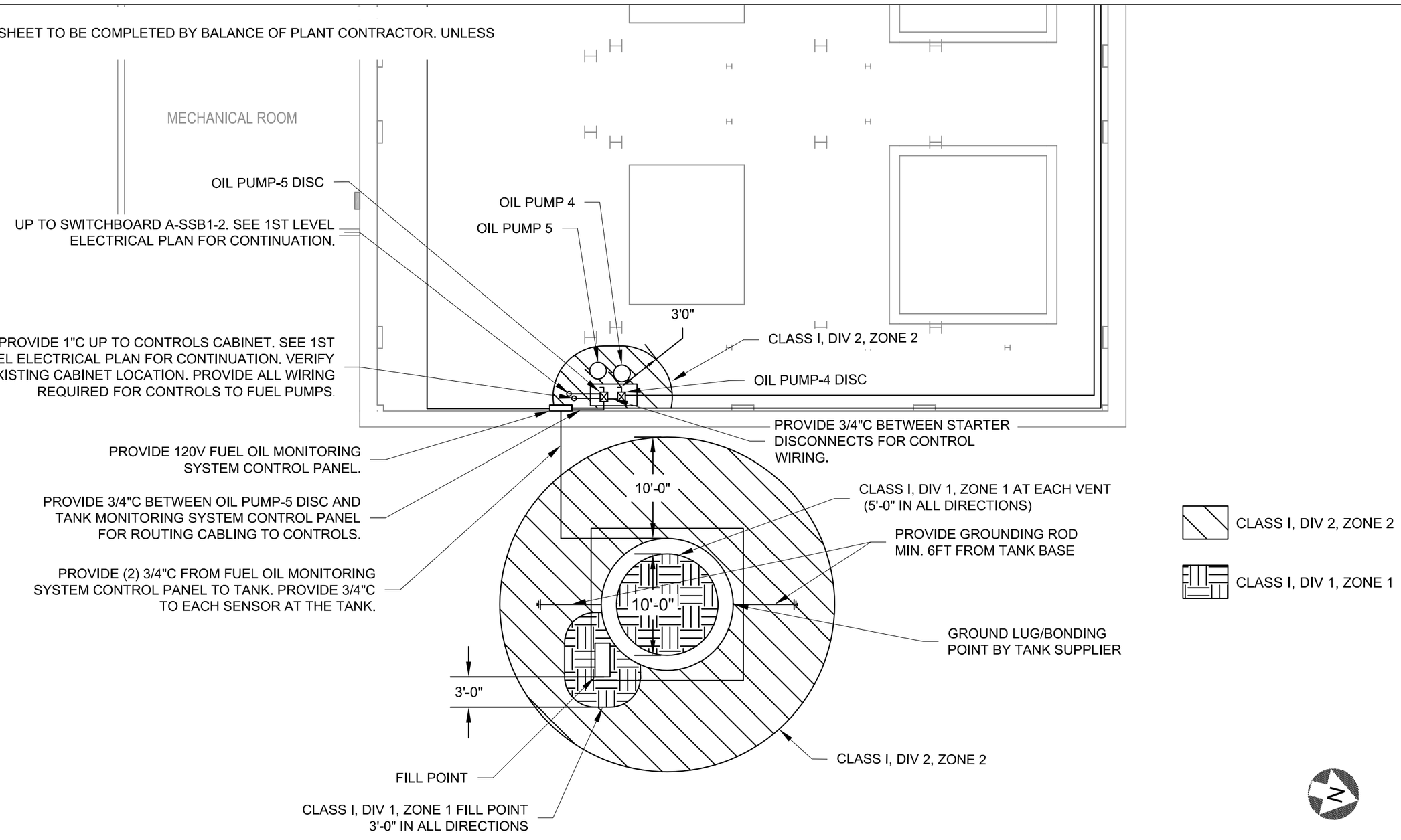
OVERALL GROUND FLOOR ELECTRIC AND COMMUNICATIONS

DESIGN BY: RJJ DATE: 4/25/25
DRAWN BY: TJW DATE: 4/25/25
HORZ: 1"=20'

Project No. EGE0103

Sheet No. E100

NOTES:
1. ALL WORK ON THIS SHEET TO BE COMPLETED BY BALANCE OF PLANT CONTRACTOR. UNLESS NOTED OTHERWISE.



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

NICHOLAS OELKE

DATE _____ REG. NO. 47135

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

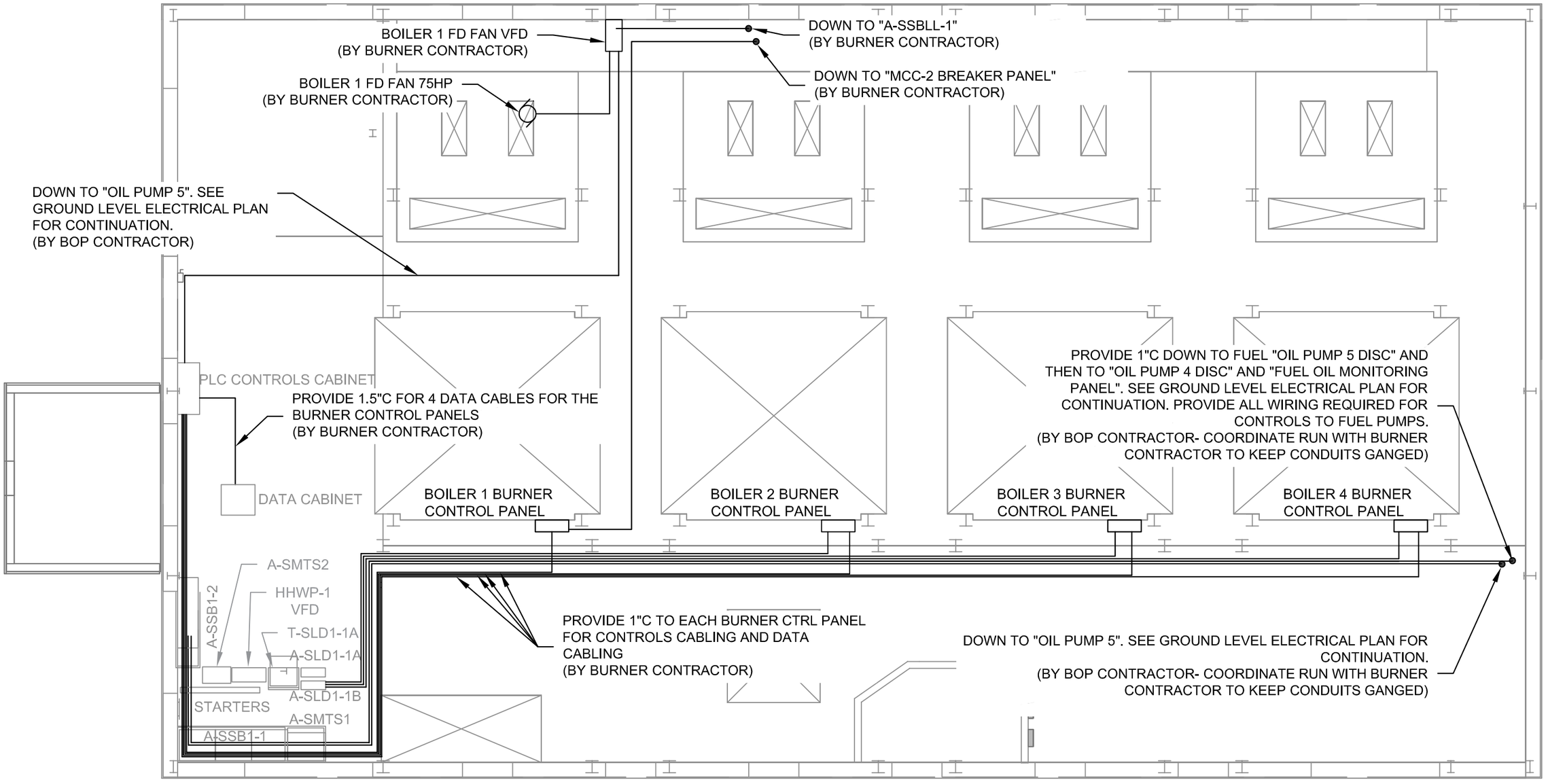
DES COAL SUNSETTING

GROUND FLOOR TANK ELECTRIC AND COMMUNICATIONS

DESIGN BY: RJJ DATE: 4/29/25
DRAWN BY: TJW DATE: 4/29/25
HORZ: 1"=10'

Project No. EGE0103

Sheet No. E101



NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

NICK OELKE

DATE _____ REG. NO. 47135

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

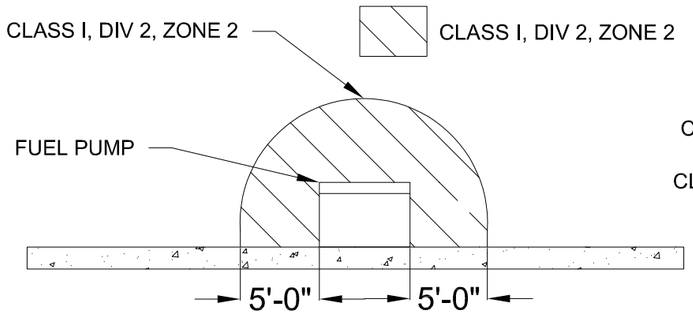
DES COAL SUNSETTING

DESIGN BY: RJJ
DRAWN BY: TJW
DATE: 4/29/25
DATE: 4/29/25
HORZ: 1"=10'

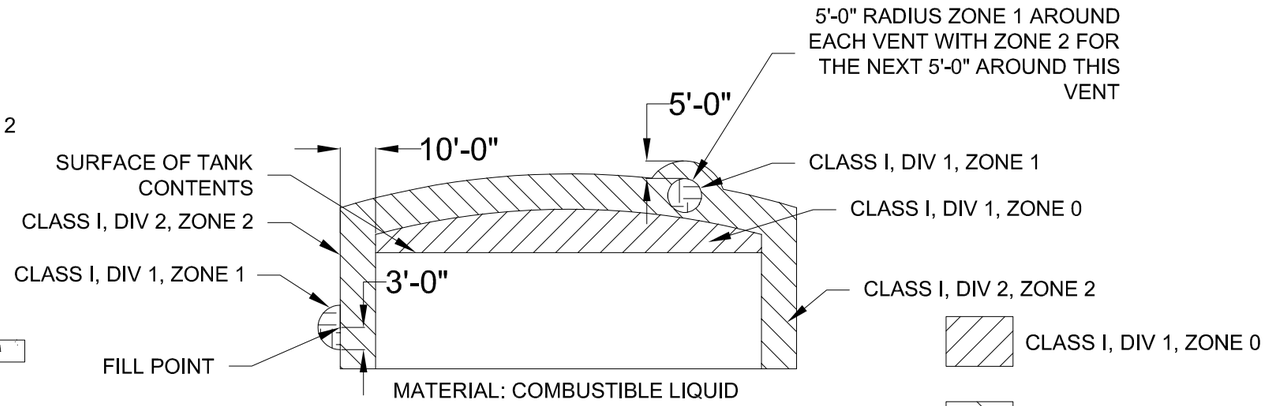
FIRST FLOOR
ELECTRIC AND COMMUNICATIONS

Project No. EGE0103

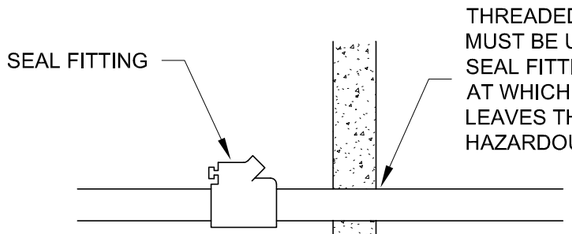
Sheet No. E102



TYPICAL FUEL PUMP CLASSIFICATION AREA



FIXED ROOF STORAGE TANK, OUTDOORS AT GRADE ELECTRICAL CLASSIFICATION



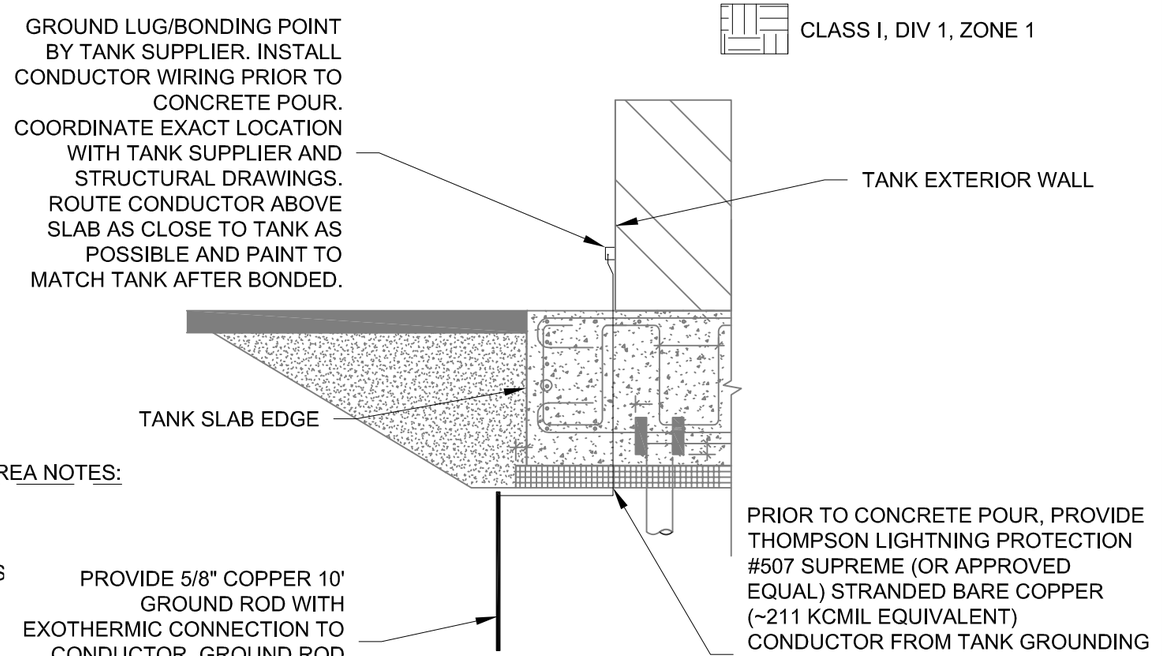
HAZARDOUS AREA NOTES:

A. ELECTRICAL INSTALLATION IN AREA DESIGNATED SHALL FOLLOW ALL RULES AND INTENT OF THE NATIONAL ELECTRICAL CODE FOR AREAS DESIGNATED CLASSIFIED / HAZARDOUS
B. ALL CONDUIT ROUTED WITHIN OR THROUGH A CLASSIFIED AREA SHALL BE THREADED RIGID GALVANIZED CONDUIT.
C. ALL CLASSIFIED / HAZARDOUS SEALS SHALL BE ACCESSIBLE.
D. BOXES, FITTINGS AND JOINTS ARE NOT REQUIRED TO BE EXPLOSION PROOF EXCEPT WHEN EXPLOSION PROOF ENCLOSURES ARE REQUIRED BECAUSE THEY CONTAIN CONTROL DEVICES, CIRCUIT BREAKERS, MOTOR STARTERS, ALARMS OR OTHER SIMILAR DEVICES THAT HAVE MAKE-AND-BREAK CONTACTS
E. WHERE POSSIBLE, THE ELECTRICAL CONTRACTOR SHALL INSTALL ALL DEVICES AND ROUTE ALL CONDUIT OUTSIDE OF THE DEFINED CLASSIFIED / HAZARDOUS SPACE.

NON-CLASSIFIED / NON-HAZARDOUS AREA NOTES:

A. NO UNION, COUPLING, BOX OR FITTING IN CONDUIT PERMITTED BETWEEN SEALING FITTING AND POINT WHERE CONDUIT LEAVES THE HAZARDOUS AREA.

SEAL FITTING DETAIL



GROUND RODS DETAIL

NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

NICHOLAS OELKE

DATE _____ REG. NO. 47135

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

ELECTRIC AND COMMUNICATIONS DETAILS

DESIGN BY: RJJ DATE: 4/29/25
DRAWN BY: TJW DATE: 4/29/25
HORZ: N.T.S.

Project No. EGE0103

Sheet No. E400

VFD Schedule

VFD UNIT #/ TAG	EQUIPMENT SERVED	MOTOR DATA			ENCLOSURE RATING	HARMONIC MITIGATION	INTEGRAL DISCONNECT	BYPASS	MOTOR HEATER	VFD ISOLATION SWITCH	COMMUNICATIONS	VFD MIN. SCCR	BASIS OF DESIGN (SERIES)	NOTES
		QTY	VOLTAGE	HP (EA)										
BOILER 1 FD FAN VFD	BOILER 1 FD FAN	1	460V	75	UL TYPE 12	ACTIVE FRONT END	CIRCUIT BREAKER	RVSS	NO	YES	TBD	**40 KA**	ABB ACH580-3BCR-096A-4+B056+F267+G390	1, 2, 3, **4**, 5, 6, 7, **8**, 9, 10, 11, 12, 13, **14**, 15, 16
BOILER 1 ID FAN VFD	BOILER 1 ID FAN	1	460V	100	UL TYPE 12	ACTIVE FRONT END	CIRCUIT BREAKER	RVSS	NO	YES	TBD	**50 KA**	ABB ACH580-3BCR-124A-4+B056+F267+G390	1, 2, 3, **4**, 5, 6, 7, **8**, 9, 10, 11, 12, 13, **14**, 15, 16

VFD SCHEDULE NOTES:

1. AT MINIMUM, VFD SHALL INCLUDE 5% IMPEDANCE VIA 5% AC LINE REACTOR OR DUAL DC BUS CHOKES SIZED TO 5% EQUIVALENT IMPEDANCE. VFD INPUT AMPS SHALL NOT EXCEED VFD OUTPUT AMPS.
2. PROVIDE UL1449 SURGE PROTECTIVE DEVICE (SPD).
3. PROVIDE WITH ALPHA-NUMERIC KEYPAD INTERFACE. PROVIDE DISPLAY IN PLAIN ENGLISH (NOT CODE & LOOKUP DRIVEN).
4. PROVIDE INTERNAL EMI/RFI FILTER PER IEC 61800-3.
5. VFD SHALL BE BTL LISTED FOR BACNET MS/TP AND SHALL INCLUDE MODBUS RTU. WHERE LISTED COMMUNICATIONS IS TBD, PROVIDE AS REQUIRED FOR CONTROLS ON-SITE.
6. PROVIDE REAL TIME CLOCK WITH BATTERY BACKUP (INCLUDE 10-YEAR BATTERY).
7. PROVIDE PHASE LOSS PROTECTION & BROKEN BELT (LOSS OF LOAD) INDICATION WHILE IN BYPASS.
8. BYPASS CONTACTORS SHALL BE POWERED BY SWITCH MODE POWER SUPPLY, ALLOWING +-30% INPUT VOLTAGE TOLERANCE. (120V CPT NOT ALLOWED).
9. VFD AND BYPASS SHALL BOTH INCLUDE BACNET MS/TP, DAMPER CONTROL AND FIREMAN'S OVERRIDE FUNCTIONALITY.
10. BYPASS OPERATION SHALL AUTO-RESET AFTER A BROWN-OUT CONDITION.
11. INCLUDE FAST ACTING DRIVE ISOLATION FUSES.
12. BYPASS SHALL BE FULLY FUNCTIONAL IN THE EVENT OF A VFD FAILURE. BYPASS SHALL NOT RELY ON THE VFD OR THE VFD'S CONTROL BOARD/RELAYS.
13. VFD SHALL LIMIT THI(D) TO 3% OR LESS AT INPUT LUGS, WHILE AT FULL SPEED/LOAD. VFD SHALL INCLUDE DC BUS CAPACITORS AND LCL FILTER.
14. VFD SHALL PROVIDE AN OUTPUT VOLTAGE EQUAL TO THE MOTOR NAMEPLATE VOLTAGE, WHILE OPERATING AT FULL SPEED/LOAD. POWER FACTOR SHALL BE 1.0.
15. VFD SHALL PROVIDE A PROGRAMMABLE BOOST FUNCTION THAT BOOSTS THE DC BUS VOLTAGE DURING A LOW LINE CONDITION. MINIMUM BOOST AMOUNT: 10%.
16. SYSTEM SHALL MEET IEEE 519 BASED ON THE HARMONIC MITIGATION METHOD(S) IDENTIFIED IN SCHEDULE.

MOTOR AND EQUIPMENT WIRING SCHEDULE

UNIT NO./ TAG	DESCRIPTION	HP	KW	V/PH/HZ	FLA / MCA / MOCP	MIN SCCR	CONTROLLER			DISCONNECT AT MOTOR				CONTROL BY	DUCT SMOKE DETECTORS	CONDUIT/CONDUCTOR SIZE & QUANTITY	PANEL NAME	CIRCUIT NUMBER(S)	OVERCURRENT PROTECTION AMP/POLE	NOTES
							TYPE	SIZE	FURN. BY	NEMA	SIZE	FURN. BY	FUSE SIZE							
BOILER 1 FD FAN	FORCED DRAFT FAN	75	-	480/3/60	96A / 120A / 125A	40 KA	VFD	75HP	DIV 26	12	-	INT W/VFD	PER VFD MFR	DIV 26 & 23	N/A	2"C - 3#1/0, 1#6G	A-SSBLL-1	VERIFY	125A/3P (250AF)	4
BOILER 1 ID FAN	INDUCED DRAFT FAN	100	-	480/3/60	124A / 155A / 200A	50 KA	VFD	100HP	DIV 26	12	-	INT W/VFD	PER VFD MFR	DIV 26 & 23	N/A	2.5"C - 3#3/0, 1#4G	A-SSBLL-1	VERIFY	200A/3P (400AF)	5
OIL PUMP-4	FUEL OIL PUMP	5	-	480/3/60	7.6A / 9.5A / 15A	8 KA	FVNR	0	DIV 26	12 OR 3R	30A	DIV 26	TBD	DIV 26 & 23	N/A	3/4"C - 3#10, 1#10G	MCC-2	VERIFY	20A/3P	2,6
OIL PUMP-5	FUEL OIL PUMP	5	-	480/3/60	7.6A / 9.5A / 15A	8 KA	FVNR	0	DIV 26	12 OR 3R	30A	DIV 26	TBD	DIV 26 & 23	N/A	3/4"C - 3#10, 1#10G	A-SSB1-2	VERIFY	20A/3P	3,6
FUEL OIL MONITOR CTRL PNL	FUEL TANK MONITORING	-	1.5	120/1/60	12.5A / - / 20A	5 KA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	DIV 26 & 23	N/A	3/4"C - 2#10, 1#10G	MCC-2 BREAKER PANEL	20	20A/1P	1
BOILER 1 BURNER CTRL PNL	BOILER BURNER CONTROL	-	1.5	120/1/60	12.5A / - / 20A	5 KA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	DIV 26 & 23	N/A	3/4"C - 2#12, 1#12G	MCC-2 BREAKER PANEL	22	20A/1P	1
BOILER 2 BURNER CTRL PNL	BOILER BURNER CONTROL	-	1.5	120/1/60	12.5A / - / 20A	5 KA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	DIV 26 & 23	N/A	3/4"C - 2#12, 1#12G	A-SLD1-1A	27	20A/1P	7
BOILER 3 BURNER CTRL PNL	BOILER BURNER CONTROL	-	1.5	120/1/60	12.5A / - / 20A	5 KA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	DIV 26 & 23	N/A	3/4"C - 2#10, 1#10G	A-SLD1-1A	29	20A/1P	7
BOILER 4 BURNER CTRL PNL	BOILER BURNER CONTROL	-	1.5	120/1/60	12.5A / - / 20A	5 KA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	DIV 26 & 23	N/A	3/4"C - 2#10, 1#10G	A-SLD1-1A	38	20A/1P	7

GENERAL MOTOR AND EQUIPMENT SCHEDULE NOTES:

A. DIVISION 26 CONTRACTOR TO VERIFY EQUIPMENT SPECIFICATION INFORMATION WITH CORRESPONDING MECHANICAL SCHEDULES AND SHOP DRAWINGS PRIOR TO INSTALLATION.
B. DIVISION 23 CONTRACTOR SHALL BE RESPONSIBLE FOR HANDLING AND INSTALLATION OF ALL MECHANICAL EQUIPMENT LISTED UNLESS NOTED OTHERWISE.
C. DIVISION 26 CONTRACTOR TO SHALL BE RESPONSIBLE FOR PROVIDING REQUIRED ELECTRICAL INTERCONNECTING POWER WIRING BETWEEN STARTER/VFD'S, CONTROLS, DISCONNECTS AND CONNECTIONS TO MECHANICAL EQUIPMENT LISTED UNLESS NOTED OTHERWISE.
D. ALL EQUIPMENT SIZES, LOADS, HP RATINGS, CIRCUIT BREAKER SIZES, STARTER SIZES, CONNECTION TYPE, AND CONDUIT/WIRE SIZES ARE AS PER THE SIZES AND BASIS OF DESIGN EQUIPMENT COORDINATED DURING DESIGN WITH THE VARIOUS DISCIPLINES. ALL REVISIONS AFTER BID (PER EQUIPMENT SUBMITTALS AND ACTUAL SUPPLIED EQUIPMENT) SHALL BE CONSOLIDATED INTO A SINGLE CONFIRMING RFI SUBMITTED BY THE ELECTRICAL CONTRACTOR SHOWING REDLINED PROPOSED REVISIONS TO BE REVIEWED BY EGE.

SPECIFIC MOTOR AND EQUIPMENT SCHEDULE NOTES:

1. WITHIN EXISTING 100A, 208/120V, 10KA EATON PRL1A (WITHIN MCC-2) 'MCC-2 BREAKER PANEL', PROVIDE 20A/1P BREAKER FOR CONTROL PANEL. REPLACE SPARE 20A/2P BREAKER IN CKT 20,22 WITH TWO 20A/1P BREAKERS (SALVAGE BREAKER TO TURN OVER TO OWNER). PROVIDE LABEL AND UPDATED PANEL SCHEDULE.
2. WITHIN EXISTING 600A, 480V, 65KA EATON FREEDOM 2100 MCC (CAT #CGSC-15574-MCC) 'MCC-2', PROVIDE 20A/3P 65KA BREAKER FOR OIL PUMP AND INSTALL IN EXISTING SPACE (OR REPLACE SPARE FUSED SWITCH). PROVIDE ENGRAVED LABEL TO MATCH EXISTING LABELS TO NOTE "OIL PUMP 4".
3. WITHIN EXISTING 1600A, 480/277V SQUARE D QED-2 SWITCHBOARD 'A-SSB1-2' UTILIZE SPARE 20A/3P BREAKER FOR OIL PUMP. PROVIDE ENGRAVED LABEL TO MATCH EXISTING LABELS TO NOTE "OIL PUMP 5".
4. WITHIN EXISTING 2000A, 480/277V SQUARE D QED 2 SWITCHBOARD 'A-SSBLL-1' UTILIZE EXISTING SPARE POWERPACT JJ250 LSI (250A FRAME) BREAKER FOR FD FAN. SET BREAKER AT 125A. PROVIDE ENGRAVED LABEL TO MATCH EXISTING LABELS TO NOTE "BOILER 1 FD FAN". PROVIDE PIN REDUCERS AS REQUIRED FOR TERMINATION AT CIRCUIT BREAKER LUGS.
5. WITHIN EXISTING 2000A SQUARE D QED 2 SWITCHBOARD 'A-SSBLL-1' UTILIZE EXISTING SPARE POWERPACT LJ400 LSI (400A FRAME) BREAKER FOR ID FAN. SET BREAKER AT 200A. PROVIDE ENGRAVED LABEL TO MATCH EXISTING LABELS TO NOTE "BOILER 1 ID FAN".
6. PROVIDE 600V, 30A FUSED STARTER/DISCONNECTS FOR FUEL OIL PUMP. COORDINATE WITH SKID SUPPLIER FOR DIVISION OF WORK. 5HP IS ESTIMATED PUMP SIZE. PROVIDE EXACT FUSE AND MOTOR OVERLOAD SIZE BASED ON EXACT PUMP SELECTION.
7. WITHIN EXISTING 600A, 208/120V, 10KA, SQUARE-D I-LINE HC4286WP PANEL 'A-SLD1-1A', PROVIDE 20A/1P QO BREAKER FOR BOILER BURNER CONTROL PANEL. VERIFY CIRCUIT NUMBERS. PROVIDE LABEL AND UPDATED PANEL SCHEDULE.

NOT FOR CONSTRUCTION - FOR BID ONLY

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF MINNESOTA.

NICHOLAS OELKE

DATE _____ REG. NO. 47135

REV.	DATE	PREP. BY	CHK'D BY	DESCRIPTION
IFB	4/29/2025	TJW	RJJ	ISSUED FOR BID

EVER-GREEN ENERGY™

DES COAL SUNSETTING

ELECTRIC SCHEDULE

DESIGN BY: RJJ DRAWN BY: TJW DATE: 4/29/25 DATE: 4/29/25 HORZ: N.T.S.

Project No. EGE0103 Sheet No. E900

MARKS AND SYMBOLS LEGEND:

MARKS:

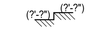
B1001	CONCRETE BEAM MARK NUMBER
B1001-PT	POST TENSIONED CONCRETE BEAM MARK NUMBER
BP1	BEARING / BASE PLATE MARK NUMBER
BRF1	BRACE FRAME MARK NUMBER
BR1	MILD STEEL BOTTOM REINFORCING MARK NUMBER
C1	COLUMN MARK NUMBER
CC1	CONCRETE COLUMN MARK NUMBER
CW1	CONCRETE WALL NUMBER
D1	STEEL DECK MARK NUMBER
DC1	DROP CAPITAL MARK NUMBER
DP1	DRILLED PIER MARK NUMBER
DPC1	DRILLED PIER CAP NUMBER
EP1	EMBEDDED PLATE MARK NUMBER
F1	SPREAD FOOTING MARK NUMBER
GB1	GRADE BEAM MARK NUMBER
H1	HEADER MARK NUMBER
HCP	HOLLOW CORE PLANK
HD1	HOLD DOWN MARK NUMBER
J10	JOIST MARK NUMBER
L1	LINTEL MARK NUMBER
MC1	MASONRY COLUMN MARK NUMBER
MF1	MOMENT FRAME MARK NUMBER
MW1	MASONRY WALL NUMBER
P1	PIER MARK NUMBER
PC1	PILE CAP MARK NUMBER
RD1	ROOF DECK MARK NUMBER
S1	SLAB MARK NUMBER
SC1	STEEL COLUMN MARK NUMBER
SR1	STUD RAIL REINFORCING MARK NUMBER
SW1	SHEAR WALL MARK NUMBER
T1	TRUSS MARK NUMBER
TR1	MILD STEEL TOP REINFORCING MARK NUMBER
W1	WALL MARK NUMBER
WC1	WOOD COLUMN MARK NUMBER
WF1	WALL FOOTING MARK NUMBER
WO1	WEB OPENING

GENERAL SYMBOLS:

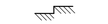
APPROXIMATE LOCATION OF DRAIN TILE

MATCH LINE

LINE OF DEMOLITION



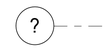
SLAB STEP LOCATION WITH ELEVATIONS


SLAB STEP LOCATION

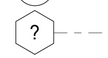

CHANGE IN SLAB SLOPE


CHANGE IN SLAB THICKNESS

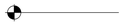
KEYNOTE MARK NUMBER



NEW BUILDING GRID LINE



EXISTING BUILDING GRID LINE


ELEVATION MARKER


SHADED AREA INDICATES CUT THROUGH EXISTING CONSTRUCTION


SHADED AREA INDICATES PROJECTION OF EXISTING CONSTRUCTION

WALL MARK NUMBER OR WALL TYPE


APPROXIMATE LOCATION OF UTILITY PIPE PENETRATION THROUGH FOUNDATION WALL

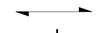
FOOTING STEP LOCATION

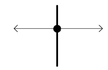
APPROXIMATE LOCATION OF SOIL BORING

COMPRESSION PILE

TENSION / COMPRESSION PILE

TEST PILE


SPAN DIRECTION OF ELEMENT


EXTENT OF ELEMENT

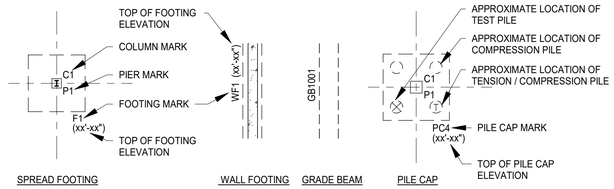
CONTINUOUS EXTENT OF ELEMENT

DETAIL CALLOUT

ELEVATION CALLOUT

PLAN SYMBOLS LEGEND:

FOUNDATION SYSTEM:



SPREAD FOOTING | WALL FOOTING | GRADE BEAM | PILE CAP

SHEET LIST	
SHEET #	SHEET NAME
S001	LEGEND SHEET
S002	GENERAL STRUCTURAL NOTES
S201	FOUNDATION PLAN
S202	FIRST FLOOR FRAMING PLAN
S501	STRUCTURAL DETAILS

STRUCTURAL ABBREVIATIONS:

A

ADDL	ADDITIONAL
ADJ	ADJACENT
ALT	ALTERNATE
ALUM	ALUMINUM
AR	ANCHOR ROD
ARCH	ARCHITECT

B

BDE	BOTTOM OF DECK ELEVATION
BFE	BOTTOM OF FOOTING ELEVATION
BM	BEAM
BOL	BOTTOM OF LINTEL
BOT	BOTTOM
BP	BEARING PLATE / BASE PLATE
BR	BOTTOM REINFORCING
BTWN	BETWEEN

C

CA	COLUMN ABOVE
CANTL	CANTILEVER
CB	COLUMN BELOW
CFS	COLD-FORMED STEEL
CGS	CENTER OF GRAVITY STRAND
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTER LINE
CLR	CLEAR
CLT	CROSS LAMINATED TIMBER
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN(S)	CONNECTION(S)
CONST	CONSTRUCTION
CONT	CONTINUOUS
COSP	CODE OF STANDARD PRACTICE

D

d	NAIL DIAMETER
db	BAR DIAMETER
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DEG	DEGREE
DEMO	DEMOLITION
DF	DOUGLAS FIR-LARCH
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DL	DEAD LOAD
DLT	DOWEL LAMINATED TIMBER

E

EA	EACH
EF	EACH FACE
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EJ	EXPANSION JOINT
EMBED	EMBEDMENT
EQ	EQUAL
EQUIP	EQUIPMENT
ES	EACH SIDE
EW	EACH WAY
E-W	EAST - WEST DIRECTION
(E)	EXISTING
EXP	EXPANSION

F

FDN	FOUNDATION
FD	FLOOR DRAIN
FFE	FINISHED FLOOR ELEVATION
FLR	FLOOR
FS	FOOTING STEP
FT	FEET
FTG	FOOTING
FV	FIELD VERIFY

G

GA	GAGE/GAUGE
GALV	GALVANIZED
GB	GRADE BEAM
GC	GENERAL CONTRACTOR
GLB	GLUE LAMINATED BEAM
GLC	GLUE LAMINATED COLUMN
GLT	GLUE LAMINATED TIMBER
GR	GRADE
GSN	GENERAL STRUCTURAL NOTES
GWB	GYPSUM WALL BOARD

H

HK	HOOK
HORIZ	HORIZONTAL
HSA	HEADED STUD ANCHOR
HSS	HOLLOW STRUCTURAL SHAPE
HT	HEIGHT

I

ID	INSIDE DIAMETER
INCL	INCLUDE
ISF	INSIDE FACE

J

JT	JOINT
JBE	JOIST BEARING ELEVATION

K

K	KIPS
KLF	KIPS PER LINEAL FOOT
KSF	KIPS PER SQUARE FOOT
KSI	KIPS PER SQUARE INCH
KO	KNOCK OUT

L

LB(S)	POUND(S)
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LSL	LAMINATED STRAND LUMBER
LSH	LONG SIDE HORIZONTAL
LSV	LONG SIDE VERTICAL
LWT	LIGHT WEIGHT
LVL	LAMINATED VENEER LUMBER

M

MAX	MAXIMUM
MECH	MECHANICAL
MEP	MECHANICAL, ELECTRICAL & PLUMBING
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MSR	MACHINE STRESS RATED
MTL	METAL

N

NIC	NOT IN CONTRACT
N-S	NORTH - SOUTH DIRECTION
NLT	NAIL LAMINATED TIMBER
NTS	NOT TO SCALE
NWT	NORMAL WEIGHT

O

OC	ON CENTER
OD	OUTSIDE DIAMETER
OSF	OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
O/O	OUT TO OUT

P

PAF	POWER ACTUATED FASTENER
PC	PRECAST CONCRETE
PL	PLATE
PLF	POUNDS PER LINEAL FOOT
PLYWD	PLYWOOD
PRE FAB	PREFABRICATED
PROJ	PROJECTION
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSL	PARALLEL STRAND LUMBER
PT	POST TENSIONED

Q

QTY	QUANTITY

R

R	RADIUS
RD	ROOF DRAIN
REF	REFERENCE
REINF	REINFORCEMENT/REINFORCING
REQD	REQUIRED
REV	REVISION
RO	ROUGH OPENING
RSS	RUGGED STRUCTURAL SCREW
RTU	ROOF TOP UNIT

S

SB	SOIL BORING
SC	SLIP CRITICAL
SCHED	SCHEDULE
SER	STRUCTURAL ENGINEER OF RECORD
SF	SQUARE FOOT
SIM	SIMILAR
SL	SNOW LOAD
SOG	SLAB ON GRADE
SPA	SPACES
SPEC	SPECIFICATION
SPF	SPRUCE PINE FIR
SS	STAINLESS STEEL
SSLT	SHORT-SLOT LOAD TRANSVERSE
STD	STANDARD
STIFF	STIFFENER
STL	STEEL
STRUCT	STRUCTURE / STRUCTURAL
SYM	SYMMETRICAL
SYP	SOUTHERN YELLOW PINE

T

T/G	TONGUE AND GROOVED
TBE	TOP OF BEAM ELEVATION
TDE	TOP OF DECK ELEVATION
TEMP	TEMPORARY
TFE	TOP OF FOOTING ELEVATION
TGBE	TOP OF GRADE BEAM ELEVATION
TPCE	TOP OF PILE CAP ELEVATION
TPCPE	TOP OF PRECAST PLANK ELEVATION
TPE	TOP OF PIER ELEVATION
TR	TOP REINFORCING
TRANS	TRANSVERSE
TSE	TOP OF SHEATHING ELEVATION
TSE	TOP OF SLAB ELEVATION
TSE	TOP OF SUBFLOOR ELEVATION
TWE	TOP OF WALL ELEVATION
TYP	TYPICAL

U

UNO	UNLESS NOTED OTHERWISE
URM	UNREINFORCED MASONRY

V

VERT	VERTICAL

W

W/	WITH
W/O	WITHOUT
WD	WOOD
WF	WIDE FLANGE
WL	WIND LOAD
WP	WORK POINT
WT	WEIGHT
WWR	WELDED WIRE REINFORCING

EVER-GREEN ENERGY™

DULUTH ENERGY SYSTEMS

MBJ
TEL: 218.722.1056
mbjeng.com
501 LAKE AVENUE S
SUITE 200
DULUTH, MN 55802

DULUTH ENERGY SYSTEMS - FUEL OIL TANK FOUNDATION

REVISIONS

#	REV	DATE

NOT FOR CONSTRUCTION - FOR BID ONLY

Issue:	FOR BID
Commission #:	D25.302.0
Date:	04/30/25
Checked By:	BWH
Drawn By:	SJL

Sheet Title:
LEGEND SHEET

Sheet Number:
S001

TYPICAL NOTES:
These notes specify the requirements for the design represented in these documents. The construction and materials shall comply with all the pertinent codes and references, plans, and details, including (but not limited to) those shown in architectural, civil, mechanical and electrical drawings.

The Contractor shall verify all dimensions and existing conditions in the field that affect construction prior to commencing work on the affected element or shop drawing submittals. Resolve any discrepancies with the Architect prior to construction.

The contract structural drawings and specifications represent the completed structure. The Contractor is responsible for bracing and shoring (without overstressing) all structural elements as necessary at any stage of construction until completion of the project. The Structural Engineer of Record is not responsible for the Contractor's means, methods, sequences or procedures of construction. Contractor shall recognize and consider effects of thermal movements of structural elements during construction period.

The Contractor is solely responsible for site safety including all temporary precautionary measures and safety programs. Site observation visits by the Structural Engineer of Record do not include review of the contractor's safety precautions.

Refer to architectural, mechanical and electrical drawings for locations, elevations, dimensions, and details of sleeves, inserts, openings, recesses, curbs, housekeeping pads, etc. that are not shown on the structural drawings and do not damage structural members.

Information shown in the structural drawings regarding existing conditions represents the current and general field conditions related to the new work, to the best of our knowledge. Report all discrepancies (unforeseen conditions) to the Architect for resolution prior to performing related new work.

Requests for information shall be submitted in writing and shall reference the part of the construction documents that is in question.

SPECIAL INSPECTIONS:
Special inspections required by the building code and these documents shall be provided in addition to inspections to be performed by the city in which the project is located.

Contractor shall read and understand their duties in the specification and under the building code for special inspections and coordinate as necessary the Owner's responsibilities.

The Special Inspectors shall be provided by the Owner and shall use current structural drawings incorporating all revisions and approved shop drawings.

Special inspection reports are to be submitted promptly and within 24 hours to the Structural Engineer of Record and Contractor from the time when inspections are performed.

The General Contractor shall provide timely notice (minimum 24 hours) to the Special Inspector and sufficient time for the Inspector to perform their inspection.

For a schedule of Special Structural Inspections required by the building code for this project, see the Special Inspection Schedule.

STRUCTURAL TEST AND SPECIAL INSPECTION SCHEDULE:

	Continuous	Periodic	None
1. STEEL CONSTRUCTION: Section 1705.2.1 and Table 1705.2.3			
1.1 Fabricator Documentation - Note (1)	☐	☐	■
1.2 High Strength Bolting-Bearing Material	☐	☐	■
1.3 High-Strength Bolting-Slip-Critical and Material	☐	☐	■
1.4 Steel Material, Seismic - Section 1705.12.1	☐	☐	■
1.5 Welds: Full and Part Pen and Multi-Pass Fillet	☐	☐	■
1.6 Welds: Single Pass Fillet for All Sections	☐	☐	■
1.7 Frame Joint Detail Compliance	☐	☐	■
1.8 Installation of open-web steel joist and joist girders (Section 1705.2.3 and Table 1705.2.3)			
1.8.1 End Connections - Welding or Bolted	☐	☐	■
1.8.2 Bridging - Horizontal or Diagonal			
1.8.2.1 Standard Bridging	☐	☐	■
1.8.2.2 Bridging that differs from the SJI Specifications listed in Section 2207.1	☐	☐	■
2. CONCRETE CONSTRUCTION: Section 1705.3 and Table 1705.3			
2.1 Member Shape and Size Compliance in Formwork	☐	■	☐
2.2 Reinf Steel and PT Tendons Size, Quantity and Placement	☐	■	☐
2.3 Weldability of Reinforcing and Welds	☐	■	☐
2.4 Anchors in Concrete	■	☐	☐
2.5 Use of Required Mix Design	☐	■	☐
2.6 Sample for Specimens and Tests	■	☐	☐
2.7 Placement of CIP Concrete and Shotcrete	■	☐	☐
2.8 Curing Compliance	☐	■	☐
2.9 Strength for Stressing PT Tendons	☐	☐	■
2.10 Prestressing Force Application	☐	☐	■
2.11 Grouting Bonded Tendons - Seismic	☐	☐	■
2.12 Strength for Formwork Removal	☐	■	☐
2.13 Erection of Precast Members	☐	☐	■
3. MASONRY CONSTRUCTION: Section 1705.4			
3.1 Level 2: TMS 602 Table 4			
3.1.1 Proportions of Site-Prepared Mortar	☐	☐	■
3.1.2 Sample Panel Construction	☐	☐	■
3.1.3 Grout Space	☐	☐	■
3.1.4 Placement of Reinforcement, Connectors and Anchors	☐	☐	■
3.1.5 Proportions of Site Prepared Grout	☐	☐	■
3.1.6 Placement of Masonry Units and Mortar Joint Construction	☐	☐	■
3.1.7 Size and Location of Structural Members	☐	☐	■
3.1.8 Welding of Reinforcement	☐	☐	■
3.1.9 Grout Placement	☐	☐	■
3.1.10 Preparation of Grout Specimens, Mortar Specimens and/or Prisms	☐	☐	■
3.2 Level 3: TMS 602 Table 4			
3.2.1 Proportions of Site-Prepared Mortar	☐	☐	■
3.2.2 Sample Panel Construction	☐	☐	■
3.2.3 Grout Space	☐	☐	■
3.2.4 Placement of Reinforcement, Connectors and Anchors	☐	☐	■
3.2.5 Proportions of Site Prepared Grout	☐	☐	■
3.2.6 Placement of Masonry Units and Mortar Joint Construction	☐	☐	■
3.2.7 Size and Location of Structural Members	☐	☐	■
3.2.8 Welding of Reinforcement	☐	☐	■
3.2.9 Grout Placement	☐	☐	■
3.2.10 Preparation of Grout Specimens, Mortar Specimens and/or Prisms	☐	☐	■
4. WOOD CONSTRUCTION: Section 1705.5			
4.1 High Load Diaphragms			
4.1.1 Grade and Thickness of Panel Sheathing	☐	☐	■
4.1.2 Nominal Framing Member Size at Panel Edge	☐	☐	■
4.1.3 Nail Size and Length	☐	☐	■
4.1.4 Fastener Pattern, Spacing and Edge Margins	☐	☐	■
4.2 Metal-Plated Connected Wood Truss Spanning 60' or Greater			
4.2.1 Temporary Restraint/Bracing	☐	☐	■
4.2.2 Permanent Truss Member Restraint/Bracing	☐	☐	■
5. SOILS: Section 1705.6 and Table 1705.6			
5.1 Bearing Material, Capacity and Depth	☐	■	☐
5.2 Compacted Fill Compliance With Soils Report	■	☐	☐
6. DRIVEN DEEP FOUNDATION ELEMENTS: Section 1705.7 and Table 1705.7			
6.1 Pile Material, Size and Length	■	☐	☐
6.2 Test for Pile Capacity	■	☐	☐
6.3 Observation, Compliance and Records per Pile	■	☐	☐
7. CAST-IN-PLACE DEEP FOUNDATIONS: Section 1705.8 and Table 1705.8			
7.1 Observation, Compliance and Records per Pier	☐	☐	■
7.2 Placement location, plumbness, length, diameter, embedment into bedrock (if applicable) and end-bearing strata capacity	☐	☐	■

Notes:
1. When the fabricator does not meet the requirements of 1704.2.5.1.
2. Empirically designed masonry is excluded.

SHOP DRAWINGS:
Submit shop drawing schedule with construction schedule that includes consideration for review period. See specification for additional information.

General contractor shall submit shop drawings in digital format (.pdf) for structural review. Digital drawings shall meet the following requirements.

1. All pages are rotated, printed to scale with searchable text.
2. All transmittals shall be located as the first page of the submittal or as a separate file within one digital package.
3. Contractor digital review comments and their digital stamp shall be attached. Our review will not occur until the contractor has reviewed, coordinated with other trades and provided shop stamp.
4. MBJ will mark-up the digital set in red and return a digital file via email, ftp site or other means.

Under no circumstances will MBJ review shop drawings that are considered to be scanned/copied construction document submittals. The Detailer shall produce and submit original documents for review.

DESIGN CODES AND STANDARDS:
2018 International Building Code, as amended and adopted by the State of Minnesota.

MATERIAL PROPERTIES:

Reinforcing Steel (Fy):		
Typical	60,000 psi	ASTM A615 Grade 60
Weldable	60,000 psi	ASTM A706 Grade 60
Cast-in-Place Concrete (f'c) at 28 days, UNO:		
Concrete Fill for Pipe Piles	4,000 psi	
Pile Caps	6,000 psi with air entrainment (due to frost exposure)	
Structural Steel (Fy):		
Angles, Channels, Plates, and Bars	36,000 psi	ASTM A36

DESIGN LOADS:
LATERAL LOADS:

Risk Category:	IV
Wind Loads:	
Primary Frame Wind Data:	
Basic Wind Speed:	V ult = 119 mph
Exposure Category:	D
Velocity Pressure Coefficient (Kz):	1.126
Directionality (Kd):	0.95
Force Coefficient (Cf):	0.89
Components and Cladding Wind Loads:	
Exterior Component/Cladding:	Supplier to develop based on code criteria and indicate on shop drawings.
Seismic Loads:	
Primary Seismic Data:	No design required

LATERAL LOAD RESISTING SYSTEM:
The tank is a standalone structure. All connections to concrete pile cap by tank supplier.

GRAVITY LOADS:

Dead Load:	
Fuel Oil Tank:	100,000 lbs (based on preliminary estimate per Ever-Green Energy)
Live Load:	
Fuel Oil:	410,000 lbs (per Ever-Green Energy)
Snow Load:	
Ground Snow Load, Pg:	60 psf
Flat-Roof Snow Load, Pf:	60 psf
Snow Exposure Factor, Ce:	1.0
Snow Load Importance Factor, I:	1.2
Thermal Factor, Ct:	1.2

FOUNDATIONS:
Refer to geotechnical report number 01-20551 by American Engineering Testing, Inc., dated December 17, 2019 (driven pipe pile recommendations are not included in final report, but can be found in draft report dated August 8, 2019).

The Contractor shall verify the location of all existing and new underground utilities and tanks prior to beginning excavation.

For underground utilities adjacent to foundations and through foundations reference drawings for typical detail showing step footings below utilities as required to avoid undermining of structure by utilities.

DRIVEN PILES:
The foundation system shall be supported by driven steel pipe piling based on the preliminary Geotechnical Recommendations.

Piles are designed for a maximum net capacity of 75 tons per pile (working load) with no down drag load. Maximum net capacities shall have a minimum factor of safety of 2.0.

Piles are designed for a maximum uplift load of 4 Tons per pile (working load).

Piles are designed for a maximum lateral load of 1 Ton per pile (working load).

Minimum steel pipe properties shall be: 7" diameter x 0.408" wall thickness; ASTM A252, Grade 3; Fy = 45 ksi.

Pipe piles shall be driven with a closed end consisting of a 1" thick end plate. The pile shall be prepared for full penetration welding to the end plate or with commercially fabricated point reinforcement as require by the Geotechnical Engineer.

All connection splices between pile sections shall be full penetration welds unless noted otherwise on plans.

All pipe piles shall be filled with concrete.

Reference the drawings for estimated pile lengths and/or estimated pile tip elevations.

Provide test piles as directed by the Geotechnical Engineer. Test piles that comply with the project documents may be used in the completed work. Reference drawings for test pile locations.

See project specification for required pile driving criteria, pile test program, coordination meetings, notification requirements, seismic monitoring, and condition surveys of adjacent structures.

Pre-drilling may be necessary to facilitate installation (obstructions) and/or mitigate vibrations during pile driving. Contractor shall include pre-drilling if field conditions dictate this need.

REINFORCED CONCRETE:
The detailing, fabrication and erection of all reinforcing shall be done in accordance with the latest edition of ACI-315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures and ACI-318, "Building Code Requirements for Structural Concrete."

All reinforcing bars are deformed and continuous, unless noted otherwise. Refer to drawings for reinforcing lap length schedule.

Provide suitable wire spacers, chairs, etc. for support of reinforcing steel in proper position while placing concrete. All bars shall be tied to prevent displacement while placing concrete. All chairs and slab bolsters shall be plastic or steel with plastic tips. When reinforcing steel is epoxy coated or p/t tendons are fully encapsulated, all chairs and slab bolsters shall be epoxy coated or plastic and all support bars shall be epoxy coated. Chairs are to be stable and resist tipping.

The fabricator shall submit a complete list of accessories and placing details with the shop drawings.

No horizontal construction joints shall be placed in beams, joists, or slabs, unless shown on drawings.

Locate vertical construction joints in beams and slabs at central one third of span. Refer to drawings for details. Submit proposed construction joint locations to the Structural Engineer of Record for review prior to placement of concrete. Where new concrete is placed against existing concrete, the existing concrete shall be roughened to a minimum 1/4" amplitude.

Refer to drawings for placement guidelines of embedded pipes, sleeves, and conduits. Conduits are not permitted in slabs 3 inches or less in thickness.

Conduit and piping shall be fabricated and installed so that cutting, bending, or displacement of reinforcement from its specified location is not required.

Concrete cover for pipe embedments with their fittings shall be at least 1-1/2 in. For concrete exposed to earth or weather, and at least 3/4 in. For concrete not exposed to weather, or not in contact with ground

Aluminum conduit, aluminum sleeves and aluminum embeds are not permitted in concrete.

All conduits shall be placed within the middle one-third of the slab thickness.

The maximum size of conduits shall be 1 1/4" diameter and shall be spaced no closer (to each other or reinforcing steel) than 4 inches unless prior approval is obtained from the structural engineer.

Sleeves and conduits shall pass perpendicularly through beams in the center third of the beam's depth. Embedded boxes shall not be located on the bottom face of beams and shall meet clearance requirements for beam reinforcing tendons and reinforcing steel.

Embedded boxes, sleeves and conduits shall not be placed within a distance of 2'-6" from the face of any column and shall not be placed within 1'-6" of any anchor without prior approval from the structural engineer.

In areas of high conduit concentration where it is not possible to meet the above requirements, consult the structural engineer prior to placement.

Provide a 3/4 inch chamfer for all exposed concrete corners. See architectural drawings for details and additional requirements.

Formwork and all shoring for flatwork shall be left in place until the concrete reaches at least 75 percent of the 28-day compressive strength. Design of shoring and reshoring is the responsibility of the Contractor and shall conform to ACI 347R and ACI 347.2R.
Concrete compressive strength testing used to determine flatwork stripping times shall be performed using one of the following methods:

CIPPOC and standard cylinders cured and stored in the same conditions as the flatwork.

Maturity testing properly calibrated and conducted by an approved testing agency.

Calcium chloride is not permitted as a concrete additive.

Concrete Cover on Reinforcing:

Topping Slab:	3/4" clear top
Slab on Grade:	upper third of slab
Concrete covers are intended to meet 2 hour rating requirements of IBC Section 721.1 prescriptive fire protection.	
Footings and Caissons:	3" clear bottom and sides
	2" clear top
Walls:	#5 and smaller 1 1/2" clear earth or weather face
	#6 and greater 2" clear earth or weather face
	3/4" interior face
Columns and Beams:	1 1/2" clear to ties or stirrups
Joists:	1" clear top
	3/4" clear bottom and sides
Slabs:	1" clear top
	3/4" clear bottom carbonate aggregate
	1" clear bottom siliceous aggregate

EVER-GREEN ENERGY™

DULUTH ENERGY SYSTEMS

MBJ
TEL: 218.722.1058
mbjeng.com
501 LAKE AVENUE S
SUITE 200
DULUTH, MN 55802

DULUTH ENERGY SYSTEMS - FUEL OIL TANK FOUNDATION

REVISIONS

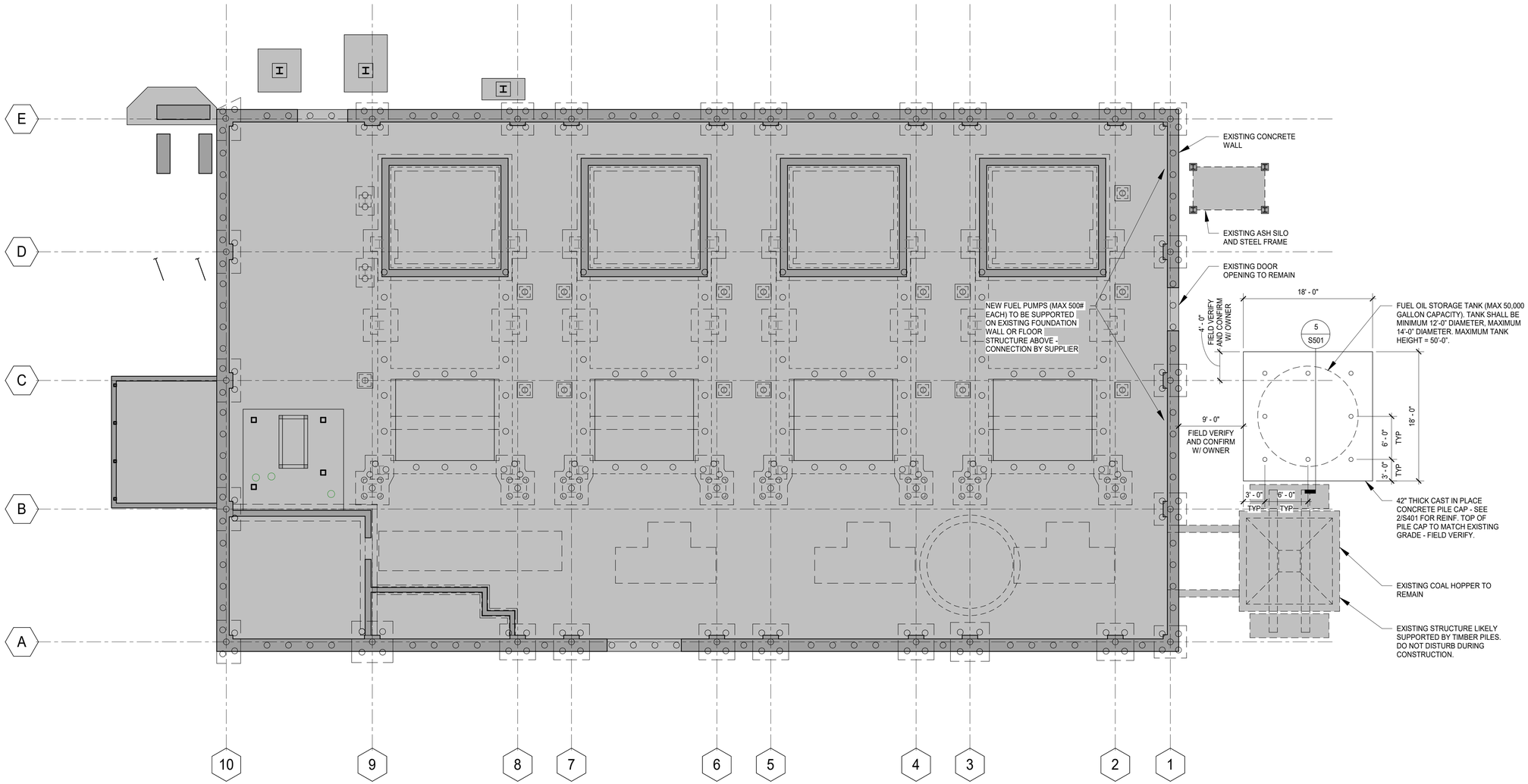
#	REV	DATE

NOT FOR CONSTRUCTION - FOR BID ONLY

Issue:	FOR BID
Commission #:	D25.302.0
Date:	04/30/25
Checked By:	BWH
Drawn By:	SJL

Sheet Title:
GENERAL STRUCTURAL NOTES

Sheet Number:
S002



1 FOUNDATION PLAN

1/8" = 1'-0"

PLAN NOTES (UNLESS NOTED OTHERWISE):

1. EXISTING CONDITIONS DOCUMENTED HEREIN ARE BASED ON ORIGINAL BUILDING DRAWINGS BY SULLIVAN & ORRFALT ARCHITECTS DATED 1932. IT IS LIKELY MODIFICATIONS HAVE BEEN MADE TO EXISTING STRUCTURE. CONTRACTOR SHALL FIELD VERIFY EXISTING STRUCTURE PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF RECORD IF EXISTING CONDITIONS CONFLICT WITH CONSTRUCTION DOCUMENTS.
2. DRIVEN PIPE PILES DESIGN CRITERIA AS FOLLOWS:
   A. MINIMUM 75 TON PER PILE (WORKING LOAD) TO BEDROCK. MINIMUM FACTOR OF SAFETY = 2.0.
   B. REFER TO GENERAL STRUCTURAL NOTES FOR GEOTECHNICAL REPORT, PILE TYPE, UPLIFT AND LATERAL CAPACITY.
   C. ANTICIPATE APPROXIMATELY 50 TO 60 FEET TO TIP ELEVATION.
   D. CONFIRM THE NEED FOR A TEST PILE(S) WITH PROJECT GEOTECHNICAL ENGINEER.
   E. PER THE PRELIMINARY GEOTECHNICAL REPORT, SOILS SHALL BE EXPECTED TO BE MODERATELY CORROSIVE. VERIFY REQUIREMENTS WITH PROJECT GEOTECHNICAL ENGINEER.
   F. PILING CONTRACTOR SHALL PROVIDE FINAL PILE CAPACITY IN COORDINATION WITH SPECIAL INSPECTOR AND GEOTECHNICAL ENGINEER.
   G. PRIOR TO PLACEMENT OF PILE CAP, FINAL PILE CONFIGURATION SHALL BE SURVEYED, AND SURVEY RESULTS SHALL BE SUBMITTED TO STRUCTURAL ENGINEER TO VERIFY PILE CAP DESIGN. STRUCTURAL ENGINEER SHALL REVIEW AND MODIFY PILE CAP (IF REQUIRED) FOR AS-BUILT PILING CONFIGURATION.
3. FOLLOWING EXCAVATION FOR NEW FOUNDATIONS, REPLACE PAVING PER OWNER'S REQUIREMENTS.

EVER-GREEN ENERGY™

DULUTH ENERGY SYSTEMS

MBJ
TEL: 218.722.1056
mbjeng.com
501 LAKE AVENUE S
SUITE 200
DULUTH, MN 55802

DULUTH ENERGY SYSTEMS - FUEL OIL TANK FOUNDATION

REVISIONS

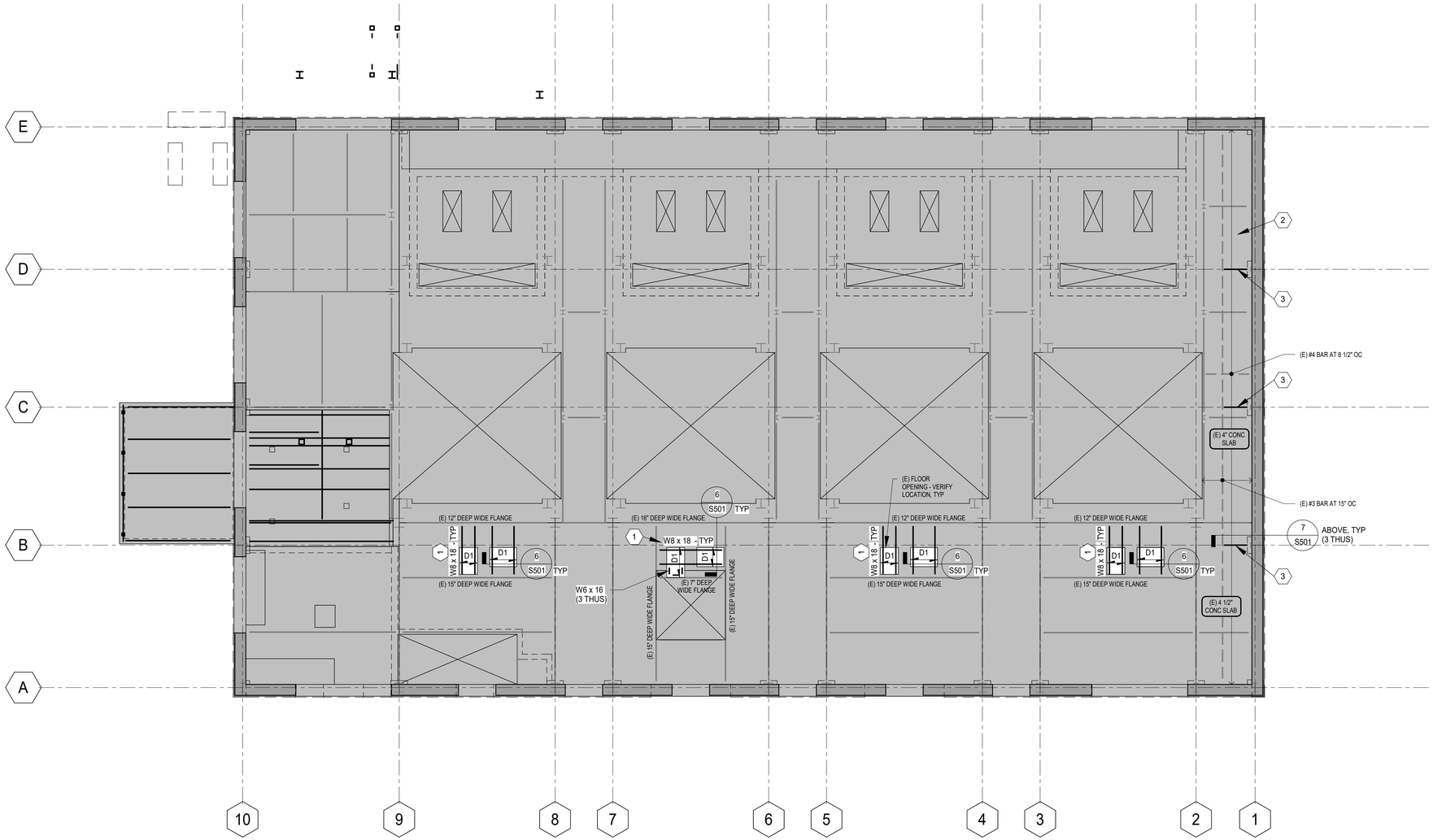
#	REV	DATE

NOT FOR CONSTRUCTION - FOR BID ONLY

Issue:	FOR BID
Commission #:	D25.302.0
Date:	04/30/25
Checked By:	BWH
Drawn By:	SJL

Sheet Title:
FOUNDATION PLAN

Sheet Number:
S201



1 FIRST FLOOR FRAMING PLAN

1/8" = 1'-0"

PLAN NOTES (UNLESS NOTED OTHERWISE):

1. TOP OF SLAB ELEVATION (TSE) = 626'-11" (FIELD VERIFY), UNLESS NOTED OTHERWISE ON PLAN.
2. TOP OF BEAM ELEVATION (TBE) = 626'-6 1/2" (FIELD VERIFY), UNLESS NOTED OTHERWISE ON PLAN AS (XX'-XX").
3. SEE THE GENERAL STRUCTURAL NOTES FOR STEEL BEAM CONNECTION REQUIREMENTS.
4. SEE S501 FOR TYPICAL STEEL CONNECTION SCHEDULES AND DETAILS.
5. D1 = INFILL EXISTING FLOOR OPENING WITH 1 1/2" - 18 GAUGE COMPOSITE FLOOR DECK + 2 1/2" MINIMUM, 4" MAXIMUM NORMAL WEIGHT CONCRETE (MATCH EXISTING SLAB THICKNESS) - MAXIMUM 6'-0" DECK SPAN. NOTIFY ENGINEER OF RECORD IF CONCRETE THICKNESS OR DECK SPAN EXCEED MAXIMUM. ABUT NEW SLAB WITH EXISTING - SEE DETAIL 6/ S501 .

KEYNOTES:

1. SINGLE ANGLE CONNECTION TO EXISTING BEAM WEB (SEE SCHEDULE AND TYPICAL DETAIL). FIELD DRILL HOLES IN EXISTING BEAM WEB. FIELD WELD ALL LEGS (HORIZONTAL AND VERTICAL) OF SINGLE ANGLE CONNECTION (1/4" FILLET WELD) TO NEW STEEL BEAM.
2. NEW 5" DIAMETER (MAXIMUM) OPENINGS MUST BE COORDINATED TO AVOID EXISTING REINFORCING STEEL IN EXISTING SLAB. GPR SCAN OR SIMILAR FLOOR BEFORE DRILLING NEW OPENING. DO NOT DAMAGE EXISTING REINFORCING STEEL.
3. W18x35 CANTILEVER ABOVE FOR PIPE SUPPORT - VERIFY ELEVATION AND FINAL LOCATION WITH PLUMBING.

EVER-GREEN ENERGY™

DULUTH ENERGY SYSTEMS

MBJ
TEL: 218.722.1056
mbjeng.com
501 LAKE AVENUE S
SUITE 200
DULUTH, MN 55802

DULUTH ENERGY SYSTEMS - FUEL OIL TANK FOUNDATION

REVISIONS

#	REV	DATE

NOT FOR CONSTRUCTION - FOR BID ONLY

Issue:	FOR BID
Commission #:	D25.302.0
Date:	04/30/25
Checked By:	BWH
Drawn By:	SJL

Sheet Title:
FIRST FLOOR FRAMING PLAN

Sheet Number:
S202

CONCRETE REINFORCING BAR LAP SPLICE SCHEDULE								
BAR SIZE	f'c = 3,000 PSI		f'c = 4,000 PSI		f'c = 5,000 PSI		f'c ≥ 6,000 PSI	
	CLASS A	CLASS B	CLASS A	CLASS B	CLASS A	CLASS B	CLASS A	CLASS B
#3	18"	22"	16"	20"	14"	18"	12"	16"
#4	22"	30"	20"	26"	18"	22"	16"	20"
#5	28"	36"	24"	32"	22"	28"	20"	26"
#6	34"	44"	30"	38"	26"	34"	24"	32"
#7	48"	64"	42"	54"	38"	50"	34"	44"
#8	56"	72"	48"	62"	44"	56"	40"	52"
#9	62"	82"	54"	70"	48"	64"	44"	58"
#10	70"	92"	62"	80"	54"	70"	50"	64"
#11	78"	102"	68"	88"	60"	78"	56"	72"

NOTES:
1. REINFORCING BAR LAP SPLICE SCHEDULE APPLIES TO UNCOATED, GRADE 60 REINFORCING BARS IN NORMAL WEIGHT CONCRETE.
2. PROVIDE CLASS A LAP UNLESS NOTED OTHERWISE.
3. FOR EPOXY COATED BAR, MULTIPLY THE ABOVE LENGTHS BY 1.5.
4. FOR LIGHT WEIGHT CONCRETE, MULTIPLY THE ABOVE LENGTHS BY 1.3.
5. FOR TOP BARS IN BEAMS AND HORIZONTAL WALL REINFORCING, MULTIPLY THE ABOVE LENGTHS BY 1.3.
6. MAXIMUM SPACING OF BARS BEING LAPPED IS ONE FIFTH THE LAP SPLICE LENGTH, NOT TO EXCEED 6".

1 S501 REINFORCING BAR LAP SPLICE SCHEDULE
NO SCALE

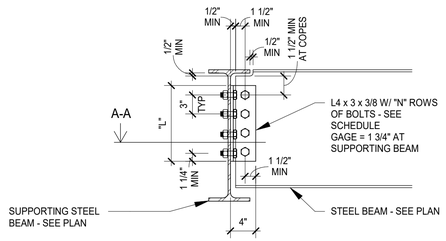
ALL-BOLTED SINGLE ANGLE CONNECTION SCHEDULE			
BEAM SIZE	ROWS OF BOLTS "N"	ANGLE LENGTH (IN) "L"	COMMENTS
W8, W10	2	5 1/2	
W12, W14	3	8 1/2	
W16	4	11 1/2	
W18	5	14 1/2	
W21	6	17 1/2	
W24	7	20 1/2	

NOTES:
1. SEE TYPICAL ALL-BOLTED SINGLE ANGLE CONNECTION DETAIL FOR ADDITIONAL INFORMATION.

2 S501 TYPICAL ALL-BOLTED SINGLE ANGLE CONNECTION SCHEDULE
NO SCALE

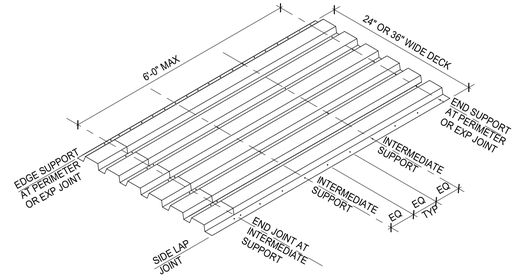
WHEN GIRDER WEB THICKNESS < 3/8" = WHEN GIRDER WEB THICKNESS ≥ 3/8" =

A-A BEAM BOTH SIDES



NOTES:
1. SINGLE ANGLE CONNECTIONS SHALL NOT BE USED AT BEAM TO COLUMN CONNECTIONS, AT THE ENDS OF SUPPORTING BEAMS (GIRDERS) OR AT THE ENDS OF PERIMETER (SPANDREL) BEAMS UNLESS NOTED OTHERWISE.
2. BOLTS SHALL BE 3/4" DIA ASTM A325 (OR F1852) IN STANDARD HOLES UNLESS NOTED OTHERWISE.
3. PROVIDE SHORT SLOT LOAD TRANSVERSE HOLES IN ANGLE LEG AT BEAM WEB.
4. SEE ALL-BOLTED SINGLE ANGLE CONNECTION SCHEDULE FOR ADDITIONAL INFORMATION.

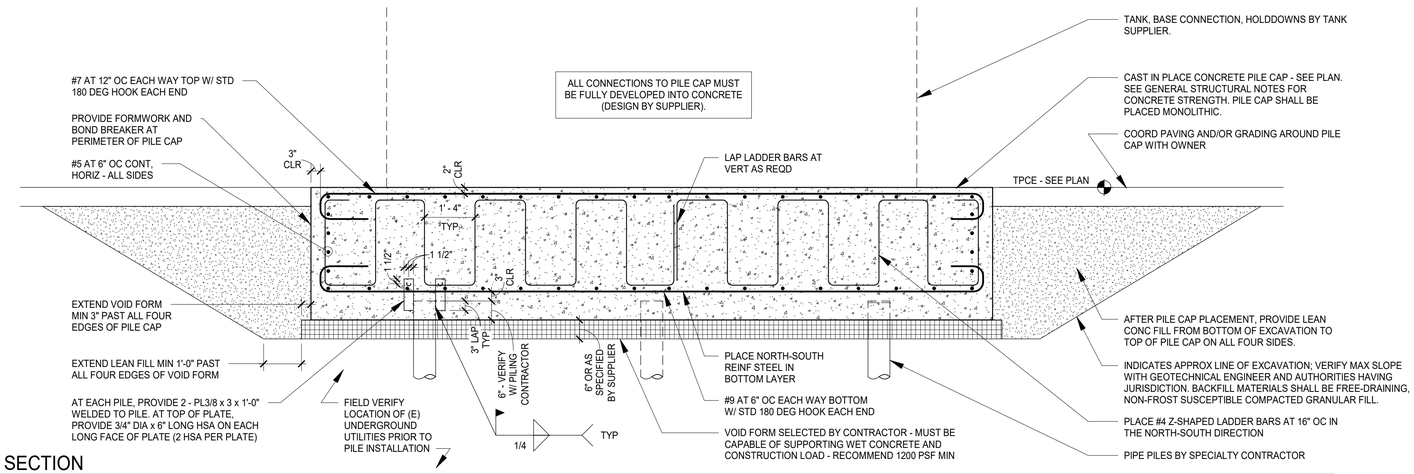
3 S501 TYPICAL ALL-BOLTED SINGLE ANGLE CONNECTION DETAIL
NO SCALE



DECK SUPPORT CONDITION	DECK ATTACHMENT
END SUPPORT	PUDDLE WELDS AT EACH LOW FLUTE
EDGE SUPPORT	PUDDLE WELDS AT 12" OC
INTERMEDIATE SUPPORT	PUDDLE WELDS AT EACH LOW FLUTE
END JOINT AT INT SUPPORT	PUDDLE WELDS AT EACH LOW FLUTE, EACH SIDE
SIDE LAP JOINT	#10 TEK SCREWS OR 1 1/2" SEAM WELD AT 36" OC MAX

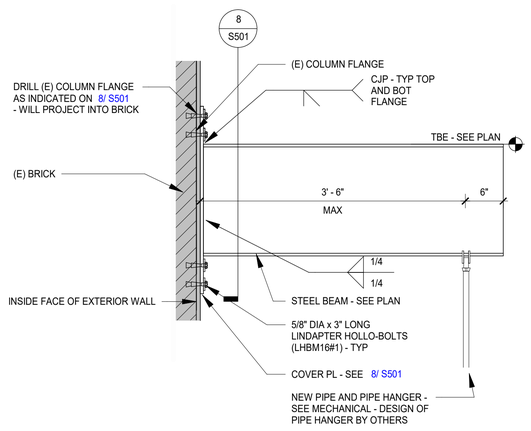
NOTES:
1. ALL PUDDLE (ARC-SPOT) WELDS SHALL BE 5/8" DIAMETER.
2. PROVIDE DECK ATTACHMENTS AT SPACING SHOWN UNLESS NOTED OTHERWISE ON DRAWINGS.
3. DECK SHEETS SHALL BE BUTTED AT END JOINTS. PROVIDE 1 1/2" MINIMUM BEARING.
4. HEADED STUD INSTALLED THROUGH THE DECK MAY BE SUBSTITUTED FOR PUDDLE WELD.

4 S501 TYPICAL COMPOSITE FLOOR DECK ATTACHMENT DETAIL
NO SCALE

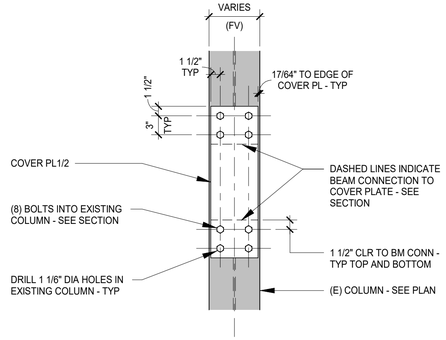


5 S501 SECTION
1/2" = 1'-0"

6 S501 TYPICAL FLOOR INFILL DETAIL
1" = 1'-0"



7 S501 SECTION AT EXISTNG EXTERIOR BUILDING COLUMN
1" = 1'-0"



8 S501 TYPICAL CONNECTION TO EXISTING COLUMN
1" = 1'-0"

EVER-GREEN ENERGY™
DULUTH ENERGY SYSTEMS
MBJ
TEL: 218.722.1058
mbjeng.com
501 LAKE AVENUE S
SUITE 200
DULUTH, MN 55802

DULUTH ENERGY SYSTEMS - FUEL OIL TANK FOUNDATION

REVISIONS

#	REV	DATE

NOT FOR CONSTRUCTION - FOR BID ONLY

Issue:	FOR BID
Commission #:	D25.302.0
Date:	04/30/25
Checked By:	BWH
Drawn By:	SJL

Sheet Title:
STRUCTURAL DETAILS

Sheet Number:
S501

Exhibit B

SPIDER 8TX ETHERNET SWITCH
MOUNTED ABOVE BAGHOUSE CP
24VDC FROM MASTER CP

BOILER # 1 COMBUSTION CONTROL

SIEMENS 353 CONTROLLER	BOILER # 1 SUB-MASTER B1SM	BOILER # 1 PULVERIZER B1P	BOILER # 1 AIR-FLOW / FD B1FD	BOILER # 1 OXYGEN B1O2	BOILER # 1 INDUCED DRAFT (ID) B1ID	BOILER # 1 DRUM LEVEL B1DL
I.P. ADDRESS	192.168.0.3.	192.168.0.4.	192.168.0.5.	192.168.0.6.	192.168.0.7.	192.168.0.8.
MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
GATE	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1

SPIDER 8TX ETHERNET SWITCH
MOUNTED ON BLR # 1 CP
24VDC FROM MASTER CP

BOILER # 3 COMBUSTION CONTROL

SIEMENS 353 CONTROLLER	BOILER # 3 SUB-MASTER B3SM	BOILER # 3 PULVERIZER B3P	BOILER # 3 AIR-FLOW / FD B3FD	BOILER # 3 OXYGEN B3O2	BOILER # 3 INDUCED DRAFT (ID) B3ID	BOILER # 3 DRUM LEVEL B3DL	BOILER # 3 GAS FLOW B3GF
I.P. ADDRESS	192.168.0.16.	192.168.0.17.	192.168.0.18.	192.168.0.19.	192.168.0.20.	192.168.0.21.	192.168.0.22.
MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
GATE	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1

SPIDER 8TX ETHERNET SWITCH
MOUNTED ON BLR # 3 CP
24VDC FROM MASTER CP

BOILER # 2 COMBUSTION CONTROL

SIEMENS 353 CONTROLLER	BOILER # 2 SUB-MASTER B2SM	BOILER # 2 PULVERIZER B2P	BOILER # 2 AIR-FLOW / FD B2FD	BOILER # 2 OXYGEN B2O2	BOILER # 2 INDUCED DRAFT (ID) B2ID	BOILER # 2 DRUM LEVEL B2DL	BOILER # 2 GAS FLOW B2GF
I.P. ADDRESS	192.168.0.9.	192.168.0.10.	192.168.0.11.	192.168.0.12.	192.168.0.13.	192.168.0.14.	192.168.0.15.
MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
GATE	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1

SPIDER 8TX ETHERNET SWITCH
MOUNTED ON BLR # 2 CP
24VDC FROM MASTER CP

SEE NOTES 2,3,4

MASTER PANEL
AB PLC
I.P. ADDRESS 192.168.0.30.
MASK 255.255.255.0
GATE 192.168.0.1

BOILER # 4 COMBUSTION CONTROL

SIEMENS 353 CONTROLLER	BOILER # 4 SUB-MASTER B4SM	BOILER # 4 PULVERIZER B4P	BOILER # 4 AIR-FLOW / FD B4FD	BOILER # 4 OXYGEN B4O2	BOILER # 4 INDUCED DRAFT (ID) B4ID	BOILER # 4 DRUM LEVEL B4DL
I.P. ADDRESS	192.168.0.23.	192.168.0.24.	192.168.0.25.	192.168.0.26.	192.168.0.27.	192.168.0.28.
MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
GATE	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1

SPIDER 8TX ETHERNET SWITCH
MOUNTED ON BLR # 4 CP
24VDC FROM MASTER CP

I.P. ADDRESS 192.168.0.31.
MASK 255.255.255.0

OPERATOR'S HMI PC

120 VAC FROM MASTER CP

MOUNTED ON MASTER CP
SPIDER 8TX ETHERNET SWITCH

SIEMENS 353 CONTROLLER	BAGHOUSE REMOTE IO	ACROMAG ETHERNET MODBUS TCP/IP 972EN-4006	ACROMAG ETHERNET MODBUS TCP/IP 962EN-4006	SIEMENS 353 CONTROLLER	SIEMENS 353 CONTROLLER	SIEMENS 353 CONTROLLER	SIEMENS 353 CONTROLLER
		AO MODULE	AI MODULE	10-INCH STEAM VALVE CONTROLLER	LOW PRESURE HEADER VENT CONTROLLER	PLANT MASTER PM	Plant 20" Line Pressure Controller PLPR
I.P. ADDRESS	192.168.0.36	192.168.0.34.	192.168.0.35.	192.168.0.33	192.168.0.32.	192.168.0.2	192.168.0.29.
MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
GATE	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1	192.168.0.1

NOTES
1) BURNER CONTRACTOR TO DEMO HATCHED CONTROLLERS AS BOILERS ARE CONVERTED.
2) BURNER CONTRACTOR TO MOVE EXISTING EXHAUST TEMP TRANSMITTERS FROM EXISTING MASTER PANEL PLC OVER TO RESPECTIVE BOILER (3 PER BOILER). SEE IO LIST FOR SLOT AND CHANNEL.
3) BURNER CONTRACTOR TO DEMO 4 COAL FEEDER INPUTS FROM RESPECTIVE BOILER COAL FEEDER TO MASTER PANEL PLC SEE IO LIST FOR SLOT AND CHANNEL.
4) BURNER CONTRACTOR TO MOVE ONE MAKEUP WATER METER FROM MASTER PLC TO BALANCE OF PLANT CONTROLLER. SEE IO LIST FOR SLOT AND CHANNEL.

DATE	DESC	BY	DATE	DESC	BY
REV 8			REV 4		
REV 7			REV 3		
REV 6			REV 2		
REV 5			REV 1	2/04/07 ADDED CONTROLLER AND PLC WILL A	

DULUTH STEAM, DULUTH, MN.

SCALE: NONE | APPROVED BY | DRAWN BY
DATE: 11/03/06 | CHK'D

POWER PROCESS EQUIPMENT, INC.
CHANHASSEN, MINNESOTA

Ethernet Communications Detail

DRAWING NUMBER 281195 Page20 Rev 1

Boiler 2 Gas

PROJECT ACTION	*IO TAG*	*Type*	*Controller*	*Loop*	*Controller IP*	*Channel*	*Type*	*0% (4mA)*	*100% (20mA)*	*Eng Units*	*Description*	*Operating Type*
Move to BOP CONTROLLER	QT001	Discrete Output	B2 GAS	Plant gas	192.168.0.15	DIN3	1 pulse = 0.1MCF			MCF	Total Plant Gas	For Information
Move to BOP CONTROLLER	RH	Analog Input	B2 GAS	RH-OAT	192.168.0.15	AINU1	4/20 mA	0	100	%	Relative Humidity	For Information
Move to BOP CONTROLLER	OAT	Analog Input	B2 GAS	RH-OAT	192.168.0.15	AINU2	4/20 mA	-40	140	degf	Outside Air Temp	For Information and Drives Baghouse steam valve.
Move to BOP CONTROLLER	Steam Valve to Baghouse	Discrete Output	B2 GAS	RH-OAT	192.168.0.15	ROUT	4/20 mA	0	1	open/closed	Steam Valve to Baghouse	Opens @ 40degf/ Closes at 45 dF. Fail Open 0= OPEN, 1= CLOSED

Master PLC

Project Action	*Controller*	*IO TYPE*	*DI*	*Description*
Demo	MicroLogix 1500	DI	I:0/0	PULSE INPUT- COAL FEEDER 1
	MicroLogix 1500	DI	I:0/1	PULSE INPUT- COAL FEEDER 2
	MicroLogix 1500	DI	I:0/2	PULSE INPUT- COAL FEEDER 3
	MicroLogix 1500	DI	I:0/3	PULSE INPUT- COAL FEEDER 4
Move to BOP Controller	MicroLogix 1500	DI	I:0/4	MAKEUP WATER METER PULSE- 74.80 GAL/PULSE
	MicroLogix 1500	DI	I:0/5	
	MicroLogix 1500	DI	I:0/6	
Move to respective Boiler Controller	MicroLogix 1500	AI	I:1.0	AI- SLOT 1 CH 0- BOILER 1 AIR HTR GAS INLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:1.1	AI- SLOT 1 CH 1- BOILER 1 AIR HTR GAS OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:1.2	AI- SLOT 1 CH 2- BOILER 1 AIR HTR AIR OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:1.3	
Move to respective Boiler Controller	MicroLogix 1500	AI	I:1.4	AI- SLOT 1 CH 4- BOILER 2 AIR HTR GAS INLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:1.5	AI- SLOT 1 CH 5- BOILER 2 AIR HTR GAS OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:1.6	AI- SLOT 1 CH 6- BOILER 2 AIR HTR AIR OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
Move to respective Boiler Controller	MicroLogix 1500	AI	I:2.0	AI- SLOT 2 CH 0- BOILER 3 AIR HTR GAS INLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:2.1	AI- SLOT 2 CH 1- BOILER 3 AIR HTR GAS OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:2.2	AI- SLOT 2 CH 2- BOILER 3 AIR HTR AIR OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:2.3	
Move to respective Boiler Controller	MicroLogix 1500	AI	I:2.4	AI- SLOT 2 CH 4- BOILER 4 AIR HTR GAS INLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:2.5	AI- SLOT 2 CH 5- BOILER 4 AIR HTR GAS OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)
	MicroLogix 1500	AI	I:2.6	AI- SLOT 2 CH 6- BOILER 4 AIR HTR AIR OUTLET TEMP (4mA=4000=0 DEG F 20mA=20000=1000 F)