

PIPING LEGEND

	BUTTERFLY VALVE
	BALL VALVE
	CHECK VALVE
	HOSE END DRAIN VALVE
	GAUGE COCK
	Y-STRAINER
	AUTOMATIC AIR VENT
	FLEXIBLE CONNECTOR
	FLANGED JOINT
	UNION
	ELBOW TURNED UP
	ELBOW TURNED DOWN
	PIPING CONNECTION (TEE)
	PIPING REDUCER
	DIRECTION OF FLOW

INSTRUMENT/CONTROL LEGEND

	PRESSURE GAUGE
	ANALOG THERMOMETER
	DIGITAL THERMOMETER
	TEMPERATURE TRANSMITTER
	PRESSURE TRANSMITTER
	DIFFERENTIAL PRES GAUGE
	FLOW METER
	FLOAT SWITCH
	LOW COOLANT SWITCH
	TANK LEVEL MONITOR
	LEVEL SENSOR PROBE
	GLYCOL LEVEL SENSOR

NOTE: SEE ELECTRICAL FOR ADDITIONAL DETAIL ON CONTROL & INSTRUMENTATION DEVICES

ABBREVIATIONS

Ø	DIAMETER (PHASE)
A	AMPS
AFF	ABOVE FINISHED FLOOR
BTU	BRITISH THERMAL UNIT
DFR	DIESEL FUEL RETURN
DFS	DIESEL FUEL SUPPLY
ECR	ENGINE COOLANT RETURN
ECS	ENGINE COOLANT SUPPLY
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING
FPT	FEMALE PIPE THREAD
GA	GAUGE
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GRC	GALVANIZED RIGID CONDUIT
HP	HORSEPOWER
HYR	HYDRONIC RETURN
HYS	HYDRONIC SUPPLY
ID	INSIDE DIAMETER
KW	KILOWATT
LT	LIQUID TIGHT
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MIN	MINIMUM
MPT	MALE PIPE THREAD
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OC	ON CENTER
OD	OUTSIDE DIAMETER
PRV	PRESSURE RELIEF VALVE
PSI	POUNDS/PER SQUARE INCH
PSID	PSI DIFFERENTIAL
PSIG	PSI GAUGE
SCH	SCHEDULE
TDH	TOTAL DEVELOPED HEAD
TYP	TYPICAL
UOR	USED OIL RETURN
V	VOLTS
W	WATTS
WG	WATER GAUGE

ENGINE COOLING SYSTEM EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
R-1 R-2	GLYCOL RADIATOR	SINGLE PASS, 5 ROW, VERTICAL CORE, 3" FLANGED CONNECTIONS, GALVANIZED OR EPOXY COATING, EXPANDED METAL GUARD. 10,000 BTU/MIN AT 80°F AMBIENT, 70 GPM 50% ETHYLENE GLYCOL AT 200F IN, 0.5 PSI MAX GLYCOL PRESSURE DROP. 5 HP, 460 V, 3 PH MOTOR SUITABLE FOR VFD OPERATION AT 10:1 TURNDOWN RATIO.	DIESEL RADIATOR PART NO. DR3734
TV-1	COOLANT THERMOSTATIC VALVE	3" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 175F NOMINAL TEMPERATURE	FPE PART NO. A3010-175
TV-2	HEAT RECOV. THERMOSTATIC VALVE	2-1/2" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 185F NOMINAL TEMPERATURE,	FPE PART NO. A2510-185
ET-1	GEN COOLANT EXPANSION TANK	24 GALLON CAPACITY TANK, 12.75" O.D x 48" LONG FABRICATED STEEL TANK, SEE FABRICATION DETAIL	CUSTOM FABRICATION
HP-EC	ENGINE COOLANT FILL HAND PUMP	DOUBLE ACTION PISTON HAND PUMP, ALUM HOUSING, SS PISTON SHAFT & LINER, BUNA-N SEALS, ANTI-SIPHONING VALVE.	GPI MODEL HP-100
G-EC	ENGINE COOLANT GLYCOL TANK LEVEL GAUGE	MAGNETIC OPERATED SPIRAL GAUGE FOR #1 DIESEL, 25 PSIG MAX OPERATING PRESSURE, 35" LIQUID COLUMN PLUS 4" RISER.	ROCHESTER MODEL 8660

HEAT RECOVERY & PLANT HEATING EQUIPMENT SCHEDULE:

HX-1	POWER PLANT HEAT EXCHANGER	316 SS PLATES, BRAZED CONST. 2" SOLDER CUP PORTS, 300 MBH MIN CAPACITY. PRIMARY: 35 GPM 195F EWT (50% ETHYLENE) 3.0 PSI MAX WPD, SECONDARY: 35 GPM 185F LWT (50% PROPYLENE) 3.0 PSI MAX WPD	AMERIDEX SLB-120-50
HX-2	SCHOOL HEAT EXCHANGER	316 SS PLATES, BRAZED CONST. 2" SOLDER CUP PORTS, 200 MBH MIN CAPACITY. PRIMARY: 20 GPM 185F EWT (50% PROPYLENE) 1.5 PSI MAX WPD, SECONDARY: 25 GPM 175F LWT (50% PROPYLENE) 1.5 PSI MAX WPD	AMERIDEX SLB-120-40
P-CUH1	CONTROL ROOM HEAT	1 GPM AT 18' TDH, 1/25HP, 115V, 1Ø. PROVIDE WITH 3/4" SOLDER COMPANION SHUT OFF FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 15-58FC, SPEED 3
P-HR1A	HEAT RECOV. PRIMARY	35 GPM AT 8' TDH, 1/6HP, 115V, 1Ø. PROVIDE WITH 2" NPT COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 50-44F
P-HR1B	HEAT RECOV. SECONDARY	30 GPM AT 17' TDH, 1/2HP, 115V, 1Ø. PROVIDE WITH 1-1/2" SOLDER COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 40-80/2 SPEED 1
P-HR2	SCHOOL HEAT RECOVERY PUMP	25 GPM AT 6' TDH, 1/6HP, 115V, 1Ø. PROVIDE WITH 1-1/2" SOLDER SHUT OFF COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 26-99FC SPEED 2
CUH-1	CONTROL ROOM HEAT	WALL MOUNTED HOT WATER CABINET UNIT HEATER, 18 MBH AT 1 GPM 180F EWT & 60F EAT.	TOYOTOMI HC-20 WITH WALL MOUNT BRACKET
ET-2	HEAT RECOV. EXP. TANK	BLADDER TYPE EXPANSION TANK, 44 GALLON TANK, 22 GALLON ACCEPTANCE VOL, 125 PSIG WORKING PRESSURE, 12 PSIG PRE-CHARGE.	AMTRON AX-80

VENTILATION EQUIPMENT SCHEDULE:

EF-1 EF-2	GENERATION ROOM EXHAUST FANS	DIRECT DRIVE 14"Ø PROPELLER SIDEWALL EXHAUST FAN, 2,100 CFM AT 0.375" SP, 1,750 RPM. FURNISH WITH SPECIAL 1/2 HP, 115 V, 1 PH VARIGREEN MOTOR WITH OPTIONAL 0-10V LEADS AND OPTIONAL TRANSFORMER	GREENHECK SE1-14-436-VG (1/2 HP)
EF-1 EF-2 COMB.	FAN & INTAKE DAMPERS	OPPOSED BLADE LOW-LEAKAGE CONTROL DAMPER, AIRFOIL BLADES, GALVANIZED STEEL CONSTRUCTION, ACETAL BEARINGS, STAINLESS STEEL JAMB SEALS, TPE BLADE SEALS.	GREENHECK VCD-33
MD	MOTORIZED DAMPER ACTUATOR	MULTI-VOLTAGE SPRING RETURN ACTUATOR	BELIMO AF-BUP

PIPE/TUBING STRUT CLAMP SCHEDULE

PIPE/TUBE	CLAMP #	PIPE/TUBE	CLAMP #	NOTES:
1/2" COPPER	BVT062	1/2" STEEL	B2008	1) ALL CLAMP NUMBERS ARE B-LINE. EQUIVALENT EQUALS ACCEPTABLE. 2) ALL COPPER TUBE CLAMPS TO BE CUSHIONED, VIBRA-CLAMP. 3) ALL STEEL PIPE CLAMPS NOT CUSHIONED. USE FOR ALL STEEL PIPE AND RIGID CONDUIT. 4) SEE PLANS, ELEVATIONS, ISOMETRICS, AND DETAILS FOR ACTUAL PIPE SIZES.
3/4" COPPER	BVT087	3/4" STEEL	B2009	
1" COPPER	BVT112	1" STEEL	B2010	
1-1/4" COPPER	BVT125	1-1/4" STEEL	B2011	
1-1/2" COPPER	BVT162	1-1/2" STEEL	B2012	
2" COPPER	BVT212	2" STEEL	B2013	
2-1/2" COPPER	BVT262	2-1/2" STEEL	B2014	
3" COPPER	BVT312	3" STEEL	B2015	

FUEL SYSTEM EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
P-DF1	DAY TANK FILL PUMP	ROTARY GEAR PUMP, 5 GPM @ 25 PSID, C-FRAME MOUNT, 1" FPT INLET AND OUTLET, IRON CONSTRUCTION, STEEL SHAFT, CARBON GRAPHITE BUSHINGS, BUNA-N LIP SEAL, WITH 75 PSID INTERNAL PRV. DIRECT MOUNT TO FOOT MOUNT 56C FRAME MOTOR, 1,200 RPM, 1/2 HP, 115VAC.	GORMAN RUPP GMC1DC3-B-40C PUMP AND CENTURY #C827 MOTOR FOR FIELD ASSEMBLY
P-DF2	DIESEL CIRC. PUMP		
P-U01	USED OIL DRAIN PUMP		
P-U02	USED OIL INJECTION PUMP	ROTARY GEAR PUMP GEAR PUMP - 1.2 GPH @ 15 PSID, 1/8" FPT INLET AND OUTLET, PEEK GEARS, PTFE SEALS, MAGNETICALLY COUPLED TO FOOT MOUNT 56C FRAME MOTOR, 1,725 RPM, 1/2 HP, 115VAC.	MICROPUMP GA-V21.J8FS.A PUMP WITH #81518 ADAPTER & CENTURY #C826V1 MOTOR
P-DF3	INTERMEDIATE TANK FILL PUMP	SELF-PRIMING CENTRIFUGAL PUMP FOR PETROLEUM SERVICE, 50 GPM @ 30' TDH. 1-1/2" FPT, GRAY IRON NO. 30 CASING, BRONZE IMPELLER, OPTIONAL BUNA-N SELF-LUBRICATED MECHANICAL SEAL RATED TO -40F, 34 PSIG MAX WORKING PRESSURE. CLOSE COUPLED TO 3450 RPM TOTALLY ENCLOSED FAN-COOLED EXPLOSION PROOF CAPACITOR START MOTOR, 3/4HP, 230V, 1 PH, 60HZ.	GORMAN-RUPP 81-1/2D3X.75
HP-DT	DAY TANK FILL HAND PUMP	DOUBLE ACTION PISTON HAND PUMP, ALUM HOUSING, SS PISTON SHAFT & LINER, BUNA-N SEALS, ANTI-SIPHONING VALVE.	GPI MODEL HP-100
G-DI	DAY TANK LEVEL GAUGE	MAGNETIC OPERATED SPIRAL GAUGE FOR #1 DIESEL, 25 PSIG MAX OPERATING PRESSURE, 35" LIQUID COLUMN PLUS 4" RISER.	ROCHESTER MODEL 8660
M-DI	DAY TANK METER	STEEL BODY, 1" ANSI 150# FLANGED ENDS, 20-800 GPH FLOW RANGE, O-RINGS AND SEALS COMPATIBLE WITH #1 DIESEL, DIRECT READ 6-DIGIT REGISTER TO 0.1 GAL, DRY CONTACT PULSER.	ISTEC CONTOIL 9226-F
F-DI	DAY TANK FILTER	THREE FILTER BANK WITH INDIVIDUAL FILTER ISOLATION VALVES, IMPACT RESISTANT "SEE-THRU" BOWLS, 15 PSIG WORKING PRESSURE. WITH 1/2" WATER PROBE PORT & 3" EACH WATER-IN-FUEL DETECTION KITS. INSTALL 3 EACH 10 MICRON AQUABLOC FILTER ELEMENTS & FURNISH 3 SPARES.	RACOR TURBINE 79/1000FGV-P WATER-IN-FUEL RR30880E ELEMENTS 2020TM-OR
F-GEN	GENSET FILTER	SINGLE FILTER, IMPACT RESISTANT "SEE-THRU" BOWL, 15 PSIG WORKING PRESSURE. INSTALL 10 MICRON AQUABLOC FILTER ELEMENTS & FURNISH 1 SPARE.	RACOR TURBINE 1000FG ELEMENT 2020TM-OR
F-UOB	USED OIL BLENDER FILTER	CUSTOM FABRICATED FILTER BANK. FURNISH WITH TWO STAGE ELEMENTS: 10 MICRON HYDROSORB II FILTER 2 MICRON PARTICULATE FILTER PROVIDE 3 OF EACH ELEMENT TYPE	CIM-TEK #30034 (HYDROSORB) CIM-TEK #30066 (2 MICRON)
ABV-1 1" AT INTERM. TANK ABV-2 2" AT TANK FARM	ACTUATED BALL VALVE	ACTUATED BALL VALVE ASSEMBLY RATED TO -50F. TYPE 304 STAINLESS STEEL FABRICATED COUPLING BRACKET, SHAFT, AND FASTENERS CONFIGURED TO ALLOW WRENCH ACCESS FOR MANUAL OPERATION OF VALVE WITHOUT REMOVING ACTUATOR. LOW TEMP BALL VALVE, 150# RF FLANGED ENDS. ELECTRIC ACTUATOR WITH OPERATING VOLTAGE, NEMA RATING, AND TORQUE AS INDICATED. CONFIGURE WITHOUT MANUAL OVERRIDE SHAFT EXTENSION. FURNISH WITH PTC SELF REGULATING HEATER, AUXILIARY SWITCH SET (AUXILIARY SWITCHES 3 & 4), AND EXXON BEACON 325 SEVERE COLD LUBRICANT.	VALVE ASSEMBLY: DG VALVE (780) 413-1760 1" BALL VALVE - 151 IN-LB OPERATING TORQUE @ -50F NUTRON MODEL T3-R10R01LZ 2" BALL VALVE - 360 IN-LB OPERATING TORQUE @ -50F NUTRON MODEL T3-R20R01LZ-05 NEMA 7 ACTUATOR - 600 IN-LBS TORQUE, 10 SECOND STROKE TIME, 0.50 LOCKED ROTOR AMPS. RCS MODEL SXR-1023
PF AT TANK FARM	PIPELINE FILTER	SINGLE ELEMENT FILTER, EPOXY COATED CARBON STEEL HOUSING, BOLT-ON COVER WITH BUNA-N GASKET, 2" ANSI 150# FLANGED INLET/OUTLET. PROVIDE 3 EACH 10 MICRON HYDROSORB II FILTER ELEMENTS.	FILTER HOUSING: CIM-TEK VIKING 1F FILTER ELEMENT: CIM-TEK #30034

INSTRUMENTATION SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
TT	TEMPERATURE TRANSMITTER	RTD, 20-240°F RANGE, 4-20mA OUTPUT, 1/2" NPT PIPING CONNECTION, 6mm DIAMETER BY 2.5" LONG STEM, HIRSCHMANN ELECTRICAL CONNECTION	NOSHOK 800-20/240-1-1-8-8-025-6
PT	PRESSURE TRANSMITTER	0-60 PSIG RANGE, 4-20mA OUTPUT, 1/4" NPT PIPING CONNECTION, HIRSCHMANN ELECTRICAL CONNECTION	NOSHOK 100-60-1-1-2-7
FM	HEAT RECOVERY FLOW METER	150# ANSI FLANGED CONNECTION, SIZE AS INDICATED, PTFE LINER, HASTELLOY C ELECTRODES, RATED FOR 210F OPERATION. FURNISH WITH TRANSMITTER FOR DIRECT AND REMOTE MOUNTING, 115/230 VAC, 50/60 HZ, AND NEMA 4X BODY.	SIEMENS SITRANS METER: FM MAGFLO MAG 3100 TRANSMITTER: F M MAGFLO MAG 5000, CODE NO. FDK: 7ME6910, OPTION 1AA10-1AA0
LCA	GLYCOL TANK LOW COOLANT ALARM	LOW COOLANT LEVEL ALARM FLOAT SWITCH, SEE MECHANICAL FOR INSTALLATION DETAILS	MURPHY EL-150-K1
GLS	GLYCOL TANK LEVEL SENSOR PROBE	12" PROBE, 2" NPT TANK CONNECTION, SS FLOAT, 1/4" RESOLUTION, NEMA 4 ENCLOSURE WITH SIGNAL CONDITIONER AND 1/2" NPT CONDUIT CONNECTION	INNOVATIVE COMPONENTS CLM-2012-SS
FS	DAY TANK/HOPPER FLOAT SWITCH	VERTICAL ACTION FLOAT SWITCH, REVERSIBLE 70VSPST NC/NO SWITCH, 1/8" NPT, 1" MAX Ø BUNA-N FLOAT FOR S.G.=.47, MINIMUM 60" LONG PVC COATED #20 AWG LEAD WIRES	INNOVATIVE COMPONENTS LS-12-111/2
LS	INTERMEDIATE TANK TWO POINT FLOAT TYPE LEVEL SWITCH	TWO POINT MAGNETIC FLOAT SWITCH - 2-1/2" ANSI 150# FLAT FACE FLANGE MOUNT, 3/4" NPT CONDUIT ENTRY, 8MM DIAMETER FIXED LENGTH STAINLESS STEEL STEM, 2 EACH 1.2" MAX. DIAMETER STAINLESS STEEL FLOATS FOR MINIMUM S.G.=0.65, 50VA FORM A CONTACTS. 19.25" STEM LGNTH. ACTUATION LENGTHS 13"(N.O.) & 1 8"(N.O.).	APG MODEL FLE-0A2-B3-B-A2-E-19.25in.-13in.NO-18in.NO
TLM	TANK LEVEL MONITOR PANEL	TANK LEVEL MONITOR CONSOLE FOR UP TO SIX TANKS, COLOR LCD SCREEN, ETHERNET CONNECTION WITH WEB INTERFACE, PROGRAMMABLE VOLUME CALCULATIONS WITH TEMPERATURE COMPENSATION	FRANKLIN/INCON EVO 200
LSP	FUEL/OIL TANK LEVEL SENSOR PROBE	TOP-MOUNT TANK PROBE WITH INSTALLATION KIT FOR 2" NPT RISER, WATER TIGHT COMPRESSION GLAND FITTING FOR CABLE ENTRANCE. FRANKLIN FUEL SYSTEMS, NO SUBSTITUTES. PROBE AND RISER LENGTH AS INDICATED ON INSTALLATION DETAILS.	4" TANK PROBE: FMP-LL3-53-1 2" TANK PROBE: FMP-LL3-29-1 FLOAT: TSP-IDF2 2" FOR DIESEL INSTALLATION KIT: TSP-C2A

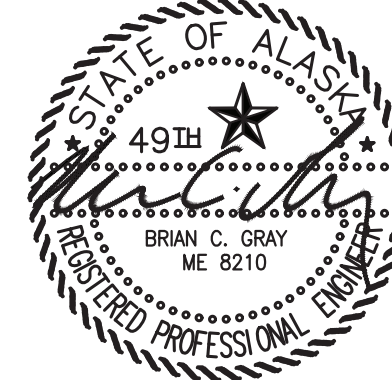
END USER HEAT RECOVERY ENERGY MEASUREMENT SYSTEM SCHEDULE

PROVIDE A COMPLETE THERMAL ENERGY MEASUREMENT SYSTEM INCLUDING ENERGY (BTU) METER, MAGNETIC FLOW METER AND TWO IMPEDANCE MATCHED RTD'S WITH PIPING WELLS. ALL SYSTEM COMPONENTS TO BE SUPPLIED AND CALIBRATED BY A SINGLE MANUFACTURER AND PROVIDED WITH A CERTIFICATE OF NIST TRACEABLE CALIBRATION FOR UTILITY GRADE METERING. CENTRAL STATION STEAM OR APPROVED EQUAL.

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
EM	END USER ENERGY METER	BTU METER FOR USE WITH FLOW METER AND RTD'S SPECIFIED BELOW. WALL MOUNT, 120VAC, PROGRAMMABLE FOR WATER AND GLYCOL. DISPLAY TO INCLUDE TOTAL ENERGY, PERIODIC ENERGY (RESET), POSITIVE ENERGY (CHARGE), NEGATIVE ENERGY (DISCHARGE), VOLUME FLOW RATE, ENERGY RATE, SUPPLY TEMPERATURE AND RETURN TEMPERATURE.	CENTRAL STATION STEAM HEATX-W-0-AC-3.5-S
EFM	END USER ENERGY FLOW METER	FLOW METER FOR USE WITH ENERGY METER ABOVE. 2" ANSI 150# FLANGED CONNECTION, 120VAC, PFA LINER, HASTELLOY C ELECTRODES, 316 SS GROUND RINGS, INTEGRAL MOUNTED TRANSMITTER, RATED FOR 210F OPERATION.	CENTRAL STATION STEAM CADILLAC METER CMAG D-II-F-150-H-C-S-FM
RT	END USER ENERGY RTD	RESISTANCE TEMPERATURE DEVICE (RTD'S) FOR USE WITH ENERGY METER ABOVE. PROVIDE TWO PRECISION IMPEDANCE MATCHED 4-WIRE RTD'S WITH 3/4" NPT THERMAL WELLS.	CENTRAL STATION STEAM CADILLAC

EQUIPMENT REQUIREMENTS FOR APPROVED EQUALS (APPLIES TO ALL SCHEDULES): SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

REV #1
ISSUED
NOVEMBER
2021



1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
<p>ALASKA ENERGY AUTHORITY</p>			
<p>PROJECT:</p> <p>NIKOLAI POWER SYSTEM UPGRADE</p>			
<p>TITLE:</p> <p>MECHANICAL LEGENDS & SCHEDULES</p>			
<p>Gray Stassel Engineering, Inc.</p>		DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: NIKO M1 PROJECT NUMBER:	SCALE: AS NOTED DATE: 9/1/21 SHEET: <p style="font-size: 24pt; font-weight: bold;">M1.1</p> OF 9
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	#2 or #3	100	90	---
Level 2	#1	150	135	80
Level 3	#1 & #2 or #3	250	225	120
Level 4	All	350	---	200

Note : Gen #2 & #3 are equal capacity. Manually select lead unit.

Engine-Generator Alarm Settings (Genset Controller - GC)			
Function	Normal Range	Pre-Alarm	Shut Down
Oil Pressure	30-50 PSI	14.5 PSI	10 PSI
Air Filter Vacuum	1-10" H2O	15" H2O	20" H2O
Coolant Temp.	180-200°F	210°F	215°F
Exhaust Temp.	500-850°F	900°F	----
Under Frequency	59.5-60.5 Hz	----	58.2 Hz
Over Frequency	59.5-60.5 Hz	----	61.8 Hz
Under Voltage	470-490 V	----	432 V
Over Voltage	470-490 V	----	528 V
Reverse Power	0	----	10%

Generator Breaker Settings (Genset Controller - GC)	
Function	Setting
Gen #1 Breaker Rated Current	250 A
Gen #2 Breaker Rated Current	160 A
Gen #3 Breaker Rated Current	160 A
Gen Breaker Level 1 (100%) Time Over Current	3 sec.
Gen Breaker Level 2 (120%) Time Over Current	1 sec.
Gen Breaker Level 3 (250%) Time Over Current	0.4 sec.

Feeder Breaker Settings (Feeder Protection Relay - FPR)	
Function (Note: Element 1 is the only active element)	Setting
T.O.C. Trip Pickup (amps) Note: 5A = 100% of CT rating	4.2
T.O.C. Curve Selection	U4
T.O.C. Time Dial	5.00
E.M Reset delay (Y/N)	N
Constant Time Adder (seconds)	0.00
Minimum Response Time (seconds)	0.00
Maximum Phase T.O.C. Torque Control	1

Radiator VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	1
PID Reference Temperature	175°F
Proportional Gain	0.93
Integral Gain	0.3
Derivative	0
Minimum Speed	10 Hz.
Low Speed Timeout	10 sec.
Loss of Phase	Ignore

POWER PLANT GENERATION SWITCHGEAR OPERATION

THIS POWER PLANT IS DESIGNED TO OPERATE IN FULLY AUTOMATIC MODE UNDER CONTROL OF THE PROGRAMMABLE LOGIC CONTROLLER (PLC). MONITORING AND CONTROL IS PRIMARILY DONE THROUGH THE OPERATOR INTERFACE UNIT (OIU). IN AN EMERGENCY SUCH AS A FAILURE OF THE PLC IT CAN ALSO BE OPERATED IN MANUAL MODE. EACH ENGINE IS CONTROLLED BY AN INDIVIDUAL EASYGEN (EZGN) GENSET CONTROLLER (GC) LOCATED IN EACH GENERATOR SECTION. FOLLOWING ARE INSTRUCTIONS FOR OPERATING THE SYSTEM. SEE SECTION 3.1 OF THE O&M MANUAL FOR DETAILED SEQUENCES.

AUTOMATIC OPERATION:

- 1) VERIFY THAT THE "SYSTEM MODE" SWITCH ON THE MASTER SECTION IS SET TO AUTO.
- 2) CHECK THE MASTER SECTION FOR ANY FAULTS AS INDICATED BY THE ALARM LAMPS. CORRECT THE CAUSE OF THE FAULT (EMERGENCY STOP, LOW COOLANT LEVEL, FEEDER BREAKER TRIPPED, ETC.) PRESS THE ALARM RESET BUTTON ON THE MASTER SECTION AND VERIFY THAT THE ALARMS CLEAR.
- 3) CHECK EACH GENERATOR SECTION FOR ANY FAULTS. FOR ENGINE-GENERATOR RELATED FAULTS CORRECT THE CAUSE OF THE FAULT (LOW OIL LEVEL, HIGH TEMPERATURE, CIRCUIT BREAKER TRIPPED, ETC.). TO CLEAR ANY ALARMS PRESS THE "ALARM RESET" BUTTON ON THE GENERATOR SECTION.
- 4) PLACE EACH AVAILABLE GENERATOR IN SERVICE BY PRESSING THE "AUTO" BUTTON. IF A GENERATOR IS OUT OF SERVICE FOR REPAIR, VERIFY THE STOP BUTTON IS ILLUMINATED.
- 5) THE PLC WILL AUTOMATICALLY START ALL AVAILABLE GENERATORS AND PARALLEL THEM TO THE BUS. AS SOON AS THE BUS IS ENERGIZED THE STATION SERVICE POWER WILL TURN ON.
- 6) AFTER THE AVAILABLE GENERATORS ARE ON LINE, THE PLC WILL WAIT FOR A BRIEF INTERVAL (USUALLY 15 SECONDS) AND CLOSE THE FEEDER BREAKER TO ENERGIZE THE COMMUNITY FEEDER. THE RED BREAKER CLOSED LAMP WILL ILLUMINATE.

DEMAND CONTROL OPERATION (AUTO MODE):

- 1) GENERATORS ARE CONSIDERED AVAILABLE FOR DEMAND CONTROL ONLY WHEN THEIR GC IS IN THE AUTO MODE AND THERE ARE NO ALARMS. SEE GC AND ALARM SECTIONS BELOW FOR ADDITIONAL DESCRIPTIONS. THE DEMAND CONTROL SYSTEM WILL UTILIZE ALL AVAILABLE GENERATORS AS REQUIRED TO MEET THE LOAD ON THE SYSTEM.
- 2) ON INITIAL STARTUP THE DEMAND CONTROL IS ACTIVATED AFTER THE FEEDER BREAKER HAS BEEN CLOSED FOR ONE MINUTE. THIS ALLOWS THE PLC TIME TO DETERMINE THE POWER DEMAND ON THE SYSTEM. THE PLC MONITORS THE LOAD ON THE SYSTEM AND COMPARES IT TO THE CONNECTED GENERATING CAPACITY.
- 3) THE DEMAND CONTROL PROVIDES TWO TYPES OF CONTROL FOR INCREASING LOAD – INCREASE AND OVERLOAD. THE OVERLOAD SETPOINT IS TYPICALLY THE PRIME RATING OF THE GENSET AND THE INCREASE SETPOINT IS TYPICALLY 90% OF THE OVERLOAD SETPOINT. WHEN THE LOAD EXCEEDS THE INCREASE SETPOINT FOR A PRE-SET TIME DELAY (USUALLY 30 SECONDS) THE DEMAND CONTROL WILL SWITCH TO THE NEXT HIGHER LEVEL OF GENERATING CAPACITY. WHEN THE LOAD EXCEEDS THE OVERLOAD SETPOINT THE DEMAND CONTROL WILL IMMEDIATELY SWITCH TO THE NEXT HIGHER LEVEL OF GENERATING CAPACITY (NO TIME DELAY).
- 4) THE DEMAND CONTROL PROVIDES ONE TYPE OF CONTROL FOR DECREASING LOAD. THE DECREASE SETPOINT IS TYPICALLY 80% OF THE OVERLOAD SETPOINT. WHEN THE LOAD DROPS BELOW THE DECREASE SETPOINT FOR A PRE-SET TIME DELAY (USUALLY 2 MINUTES) THE DEMAND CONTROL WILL SWITCH TO THE NEXT LOWER LEVEL OF GENERATING CAPACITY.
- 5) SEE THE DEMAND CONTROL TABLE THIS SHEET FOR DEMAND LEVEL SETPOINTS AT THE TIME OF COMMISSIONING. ON THE SCADA SYSTEM GO TO THE DEMAND TAB TO VERIFY THE PRESENT SETPOINTS.

MANUAL OPERATION:

- 1) PLACE THE MASTER CONTROL "SYSTEM MODE" SWITCH IN THE MANUAL POSITION.
- 2) CHECK THE MASTER AND GENERATOR SECTIONS FOR ANY FAULTS AND CLEAR AS DESCRIBED UNDER AUTOMATIC OPERATION STEPS 2 AND 3.
- 3) TO PLACE A GENERATOR IN SERVICE, PRESS THE GC MAN BUTTON, THEN PRESS THE "I" (START) BUTTON. AFTER THE ENGINE STARTS AND STABILIZES, PRESS THE CONTACTOR CLOSE BUTTON ON THE GC. THE RED BREAKER CLOSED LAMP WILL ILLUMINATE.
- 4) REPEAT THIS PROCESS FOR AT LEAST ONE MORE GENERATOR.
- 5) WITH TWO GENERATORS ON LINE ROTATE THE FEEDER BREAKER CONTROL KNOB FOR THE MAIN FEEDER BREAKER TO THE CLOSE POSITION TO ENERGIZE THE COMMUNITY. MONITOR THE LOAD ON THE SYSTEM FOR ONE MINUTE THEN SELECT THE APPROPRIATE GENERATOR(S) TO MATCH THE LOAD.
- 6) TAKE ANY GENERATOR(S) NOT NEEDED OFF LINE BY PRESSING THE RED GC STOP BUTTON. THE ENGINE WILL COOL DOWN FOR THREE MINUTES THEN SHUT OFF. NOTE THAT PRESSING THE RED STOP BUTTON TWICE WILL IMMEDIATELY SHUTDOWN THE GENERATOR.
- 7) TO MANUALLY SWITCH TO A DIFFERENT GENERATOR AS THE LOAD CHANGES REPEAT STEPS 3 AND 6.

SERVICE DUE / OIL CHANGE PROCEDURE:

NOTE THAT UNDER AUTOMATIC OPERATION, WHENEVER THE SERVICE TIME HAS BEEN EXCEEDED THE GENERATOR WILL AUTOMATICALLY BE TAKEN OFF LINE AS LONG AS ANOTHER GENERATOR IS AVAILABLE IN AUTO. AN "ENGINE SERVICE" MESSAGE WILL DISPLAY ON THE GC AND THE RED "ENGINE ALARM" LAMP WILL ILLUMINATE.

- 1) IF THE SWITCHGEAR IS IN MANUAL MODE, PERFORM MANUAL OPERATION STEPS 3 AND 6 ABOVE THEN CONTINUE AT STEP 3 BELOW (LOCK OUT).
- 2) IF THE SWITCHGEAR IS IN AUTOMATIC MODE, PRESS THE GC MAN BUTTON ON THE GENERATOR TO BE SERVICED. THE PLC WILL START ANOTHER GENERATOR. ONCE THE OTHER GENERATOR IS ON LINE, PRESS THE GC STOP BUTTON ON THE GENERATOR TO BE SERVICED. NOTE THAT IF THE STOP BUTTON IS PRESSED BEFORE ANOTHER UNIT IS ONLINE, AN OUTAGE WILL OCCUR.
- 3) LOCK THE UNIT OUT USING THE KEY SWITCH AND TAG OUT OF SERVICE.
- 4) SERVICE ENGINE (OIL CHANGE, FUEL FILTER, AIR FILTER, ETC.).
- 5) REMOVE TAG AND TURN THE GENERATOR LOCKOUT SWITCH TO RUN.

- 6) PRESS THE "SERVICE HOURS RESET" BUTTON AND HOLD FOR 10 SECONDS.
- 7) PRESS THE "ALARM RESET" BUTTON.
- 8) AFTER ALL ALARMS HAVE BEEN CLEARED PRESS THE "HOME" BUTTON.
- 9) START THE ENGINE BY PRESSING THE MAN BUTTON AND THEN THE "I" (START) BUTTON.
 - a) AFTER THE ENGINE COMES UP TO SPEED VERIFY THAT THE ENGINE OIL PRESSURE IS IN THE NORMAL RANGE.
 - b) CHECK THE OIL FILTER FOR LEAKS.
- 10) AFTER THE ENGINE RUNS FOR ONE MINUTE PRESS THE STOP BUTTON.
- 11) CHECK THE OIL LEVEL USING THE DIPSTICK AND ADD OIL AS REQUIRED.
- 12) PLACE THE GENERATOR BACK IN SERVICE BY PRESSING THE AUTO BUTTON ON THE GC.

ENGINE-GENERATOR PROTECTION ALARMS:

SEE THE TABLES THIS SHEET FOR ALARM LEVEL SETPOINTS AND BREAKER TRIP SETTINGS AT THE TIME OF COMMISSIONING. SEE SECTION 3.1 OF THE O&M MANUAL FOR DETAILED DESCRIPTIONS OF WARNING ALARM AND PROTECTION SEQUENCES.

FUEL/OIL SYSTEM

AUTOMATIC DAY TANK FILL – THE 200 GALLON DAY TANK IS FILLED FROM THE 4,000 GALLON INTERMEDIATE TANK. IT HAS AUTOMATIC FILL CONTROLS WITH REDUNDANT HIGH AND LOW LEVEL ALARMS AND TIMERS. SEE DAY TANK CONTROL PANEL DRAWING SHEET E7.3 FOR DETAILED SEQUENCE OF OPERATION.

MANUAL INTERMEDIATE TANK FILL – THE INTERMEDIATE TANK IS LOCATED ADJACENT TO THE POWER PLANT. A BURIED FUEL PIPELINE FROM THE POWER PLANT AREA TO THE TANK FARM IS PROVIDED FOR FILLING THE INTERMEDIATE TANK. THE INTERMEDIATE TANK FILL CONTROL PANEL IS LOCATED IN THE POWER PLANT AND PROVIDES MANUAL CONTROL FOR THE FILLING OPERATION. SEE INTERMEDIATE TANK FILL CONTROL PANEL DRAWINGS SHEET E7.4 AND E7.5 FOR DETAILED SEQUENCE OF OPERATION. THE INTERMEDIATE TANK NEEDS TO BE FILLED WHENEVER IT DROPS BELOW THE 50% FULL LEVEL.

MANUAL USED ENGINE OIL DRAIN – USED OIL PUMP P-U01 IS USED TO PUMP USED ENGINE OIL FROM THE ENGINE OIL PANS TO THE USED OIL HOPPER. P-U01 RUNS THROUGH A MANUAL 0-5 MINUTE TIMER SWITCH

AUTOMATIC USED ENGINE OIL BLENDING SYSTEM – THE USED ENGINE OIL BLENDING SYSTEM FILTERS USED OIL AND MIXES IT WITH DIESEL FUEL IN THE DAY TANK TO BE BURNED BY THE ENGINES. THE PUMPING RATES ARE SET TO BLEND APPROXIMATELY 0.5% USED OIL TO 99.5% DIESEL FUEL. SEE DAY TANK CONTROL PANEL DRAWING SHEET E7.3 FOR DETAILED SEQUENCE OF OPERATION.

ENGINE COOLING SYSTEM

RADIATORS – RADIATOR FAN MOTORS WILL OPERATE UNDER VARIABLE FREQUENCY DRIVE (VFD) CONTROL. WHEN THE COOLANT RETURN TEMP REACHES THE PID REFERENCE SETPOINT THE MOTOR WILL START AT MINIMUM SPEED AND RAMP UP TO THE REQUIRED SPEED. USING PID CONTROL THE VFD WILL MODULATE THE FAN SPEED AS REQUIRED TO MAINTAIN COOLANT RETURN TEMP AT THE PID REFERENCE SETPOINT. AS THE COOLANT RETURN TEMP RISES, THE VFD WILL INCREASE THE SPEED OF THE FAN MOTOR UP TO 100%. ONCE THE FAN REACHES THE MINIMUM SPEED, THE VFD WILL MAINTAIN THAT SPEED UNTIL THE LOW SPEED TIME OUT EXPIRES. WHEN THE LOW SPEED TIME OUT EXPIRES THE MOTOR WILL STOP. THE MOTOR WILL REMAIN OFF UNTIL THE COOLANT RETURN TEMP RISES TO THE PID REFERENCE SETPOINT. SEE THE RADIATOR VFD SETTINGS TABLE THIS SHEET FOR SETPOINTS AT THE TIME OF COMMISSIONING.

THERMOSTATIC VALVE TV-1 WILL MIX HOT COOLANT FROM THE ENGINE DISCHARGE PIPE WITH COLD COOLANT FROM THE RADIATOR RETURN PIPE TO MAINTAIN 175°F +/- TEMPERATURE COOLANT RETURN TO THE ENGINES.

ENGINE COOLANT RETURN HIGH TEMPERATURE ALARM. WHEN THE ENGINE COOLANT RETURN TEMPERATURE RISES ABOVE 190°F FOR A MINIMUM OF 2 MINUTES, THE "HIGH COOLANT RETURN TEMPERATURE" LAMP SHALL ILLUMINATE. LAMP SHALL REMAIN ON UNTIL MASTER RESET BUTTON IS PRESSED.

POWER PLANT HEATING AND VENTILATION SYSTEM

GENERATION ROOM – THE OPERATING AND OFF LINE GENERATORS REJECT MORE HEAT TO THE GENERATION ROOM THAN IS REQUIRED SO EXHAUST FANS WITH INTAKE AIR DUCTS ARE INSTALLED TO PROVIDE COOLING.

GENERATION ROOM VENTILATION – THERE ARE FOUR AIR INTAKES IN THE GENERATION ROOM CEILING. ONE OF THE AIR INTAKES IS USED FOR COMBUSTION AIR AND THE DAMPER IS OPEN ANY TIME THE STATION SERVICE POWER IS ON. THE OTHER THREE AIR INTAKES ARE LABELED "EF-1" AND "EF-2". THESE DAMPERS OPEN WHENEVER THE ASSOCIATED EXHAUST FAN RUNS. THE INTAKES ARE EQUIPPED WITH A MOTORIZED DAMPER THAT OPENS EACH TIME THE ASSOCIATED EXHAUST FAN RUNS.

EXHAUST FANS – THERE ARE TWO EXHAUST FANS ON THE WALL ABOVE THE FRONT OF THE GENERATORS, EF-1 & EF-2. EACH FAN IS EQUIPPED WITH A MOTORIZED DAMPER THAT OPENS WHENEVER THE FAN RUNS ON A CALL FOR COOLING THROUGH A 24VAC DIGITAL MODULATING THERMOSTAT. THE THERMOSTAT WILL PROVIDE A 0-10V SIGNAL TO MODULATE THE FAN SPEED AS REQUIRED TO MAINTAIN GENERATING ROOM TEMP, 75F, ADJUSTABLE.

MOTOR OPERATED DAMPERS – ALL DAMPER MOTORS WILL BE NORMALLY CLOSED SPRING RETURN AND WILL CLOSE ON LOSS OF POWER (FIRE ALARM) IN LESS THAN 30 SECONDS. VENTILATION AIR INTAKE AND EXHAUST MOTORIZED DAMPERS WILL OPEN ANY TIME THE ASSOCIATED EXHAUST FAN OPERATES. THE COMBUSTION AIR INTAKE MOTORIZED DAMPER WILL BE OPEN ANY TIME PLANT OPERATES (STATION SERVICE POWER ON).

CONTROL ROOM VENTILATION – COOLING AND VENTILATION FOR THE CONTROL ROOM IS PROVIDED BY AN OPERABLE WINDOW.

CONTROL ROOM HEATING – THE CONTROL ROOM IS HEATED BY A CABINET UNIT HEATER. PUMP P-CUH1 CIRCULATES ENGINE COOLANT FROM THE PIPING MAINS THROUGH THE CABINET UNIT HEATER IN THE CONTROL ROOM. THE ONBOARD TEMPERATURE CONTROLLER CYCLES THE PUMP AND THE HEATER FAN ON AND OFF AS REQUIRED TO MAINTAIN TEMPERATURE IN THE CONTROL ROOM, USUALLY 65F.

HEAT RECOVERY SYSTEM

THE POWER PLANT HEAT EXCHANGER (HX-1), THE PRIMARY (HOT SIDE) ENGINE COOLANT CIRCULATING PUMP (P-HR1A), AND THE SECONDARY (COLD SIDE) HEAT RECOVERY FLUID MAIN CIRCULATING PUMP (P-HR1B) ARE LOCATED IN THE POWER PLANT. BOTH PUMPS OPERATE CONTINUOUSLY UNDER MANUAL CONTROL.

PEX ARCTIC PIPE TEMPERING SYSTEM – THE HEAT RECOVERY ARCTIC PIPE IS PEX (PLASTIC) PIPE WHICH HAS A LIMITED LIFE AT ELEVATED TEMPERATURES. THE HEAT RECOVERY SUPPLY TEMPERATURE IS TEMPERED BY A THREE-WAY THERMOSTATIC VALVE "TV-2" THAT IS INSTALLED BETWEEN THE HEAT EXCHANGER AND THE ARCTIC PIPE. THE VALVE MIXES COLD RETURN FLUID WITH HOT FLUID FROM THE HEAT EXCHANGER TO LIMIT THE SUPPLY TEMPERATURE TO APPROXIMATELY 185F.

HEAT RECOVERY LOSS OF PRESSURE – WHEN THE SYSTEM PRESSURE IN THE HEAT RECOVERY PIPING DROPS BELOW 15 PSIG FOR 15 MINUTES, A RED LAMP "HEAT RECOVERY LOSS OF PRESSURE" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE.

NO LOAD ON HEAT RECOVERY SYSTEM – WHEN THE HEAT RECOVERY RETURN TEMP. IS EQUAL TO OR GREATER THAN THE HEAT RECOVERY SUPPLY TEMP. FOR 60 MINUTES, AN AMBER LAMP "NO LOAD ON HEAT RECOVERY" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE. WHEN THE HEAT RECOVERY SUPPLY TEMP. IS A MIN. OF 1°F GREATER THAN THE HEAT RECOVERY RETURN TEMP. THE LAMP WILL TURN OFF.

HEAT RECOVERY LOSS OF FLOW – WHEN THE FLOW RATE IN THE HEAT RECOVERY PIPING FALLS BELOW 10 GPM FOR 15 MINUTES, A RED LAMP "HEAT RECOVERY LOSS OF FLOW" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE.

THE HEAT RECOVERY SYSTEM PROVIDES INTERRUPTIBLE HEAT TO SCHOOL BUILDING WITH A FUTURE CONNECTION PROVIDED IN THE CRAWL SPACE OF THE COMMUNITY BUILDING. THE LOCATION OF THE END USERS ARE SHOWN ON SHEET M8.1.

SCHOOL HEAT RECOVERY NORMAL OPERATION – THE SCHOOL SECONDARY LOOP PUMP P-HR2 CIRCULATES THE BUILDING HEATING FLUID THROUGH THE COLD SIDE OF THE HEAT EXCHANGER, CAPTURING HEAT FROM THE HEAT RECOVERY SYSTEM AND TRANSFERRING IT TO THE BOILER RETURN. WHEN AVAILABLE RECOVERED HEAT EQUALS OR EXCEEDS HEAT LOAD AT SCHOOL THE BOILERS WILL NOT FIRE. AS HEAT LOAD INCREASES THE SCHOOL HEATING GLYCOL TEMPERATURE WILL DROP UNTIL BOILERS FIRE. BOILERS SHALL BE SET AT 160F-180F OPERATING TEMPERATURE.

SCHOOL HEAT RECOVERY PANEL AND PUMP CONTROL – THE PUMP IS CONTROLLED BY THE HEAT RECOVERY CONTROL PANEL LOCATED NEAR THE HEAT EXCHANGER. WHEN THE PIPING TEMPERATURES ARE WITHIN THE NORMAL RANGE PUMP P-HR2 RUNS CONTINUOUSLY. THE PUMP IS LOCKED OUT AND THE END USER BUILDING IS ISOLATED FROM THE HEAT RECOVERY SYSTEM WHEN EITHER OF TWO CONDITIONS OCCUR:

- 1) THE HEAT RECOVERY SYSTEM TEMPERATURE IS DEPRESSED BELOW THE SET POINT (LOW TEMP LOCKOUT).
- 2) THE TEMPERATURE OF THE BUILDING HEATING RETURN FLUID IS GREATER THAN THE TEMPERATURE OF THE HEAT RECOVER SUPPLY FLUID (DISCHARGE LOCKOUT).

SEE SHEET E8.2 FOR DETAILED SEQUENCE OF OPERATIONS

SYSTEM STARTUP

PRIOR TO STARTING FUEL AND OIL PUMPS, PRIME CAVITIES WITH LUBE OIL AND RUN MOMENTARILY TO VERIFY CORRECT ROTATION.

FUEL OIL PIPING – AFTER PRESSURE TESTING, PRIME ALL PIPING AND BLEED OFF AIR.

VERIFY OPERATION OF ALL FUEL PUMP CONTROLS IN ACCORDANCE WITH SEQUENCES OF OPERATION ON THE CONTROL PANEL DRAWINGS.

ENGINE COOLANT PIPING – AFTER PRESSURE TESTING, FLUSHING, AND BLEEDING, FILL SYSTEM WITH ETHYLENE GLYCOL SOLUTION. SEE HYDRONIC PIPING SPECIFICATION 23 21 13.

HEAT RECOVERY PIPING – AFTER PRESSURE TESTING, FLUSHING AND BLEEDING, FILL SYSTEM WITH A PROPYLENE SOLUTION. SEE HYDRONIC PIPING SPECIFICATION 23 21 13.

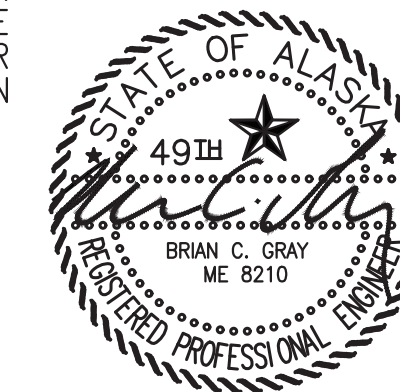
VERIFY OPERATION AND CALIBRATION OF DIGITAL THERMOMETERS AND PRESSURE GAUGES. SEE INSTRUMENTATION AND CONTROL DEVICES SPECIFICATION 23 09 00.

VERIFY OPERATION AND CALIBRATION OF ENGINE COOLANT SYSTEM AND HEAT RECOVERY SYSTEM THERMOSTATIC VALVES.


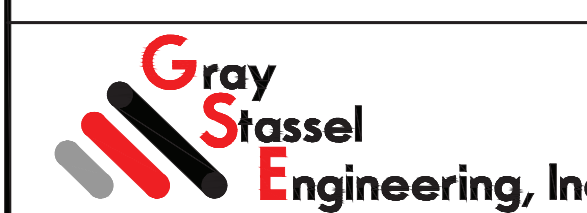
VERIFY CALIBRATION OF ALL ELECTRICAL INSTRUMENTATION DEVICES INCLUDING TEMPERATURE TRANSMITTERS, PRESSURE TRANSMITTERS, DIFFERENTIAL PRESSURE SWITCHES, FLOW METERS, ENERGY METERS, LEVEL GAUGES, ETC.

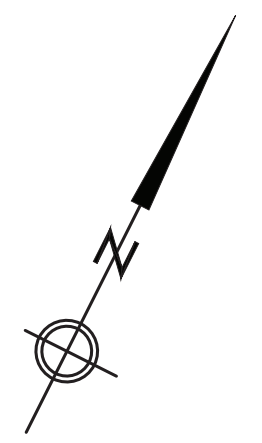
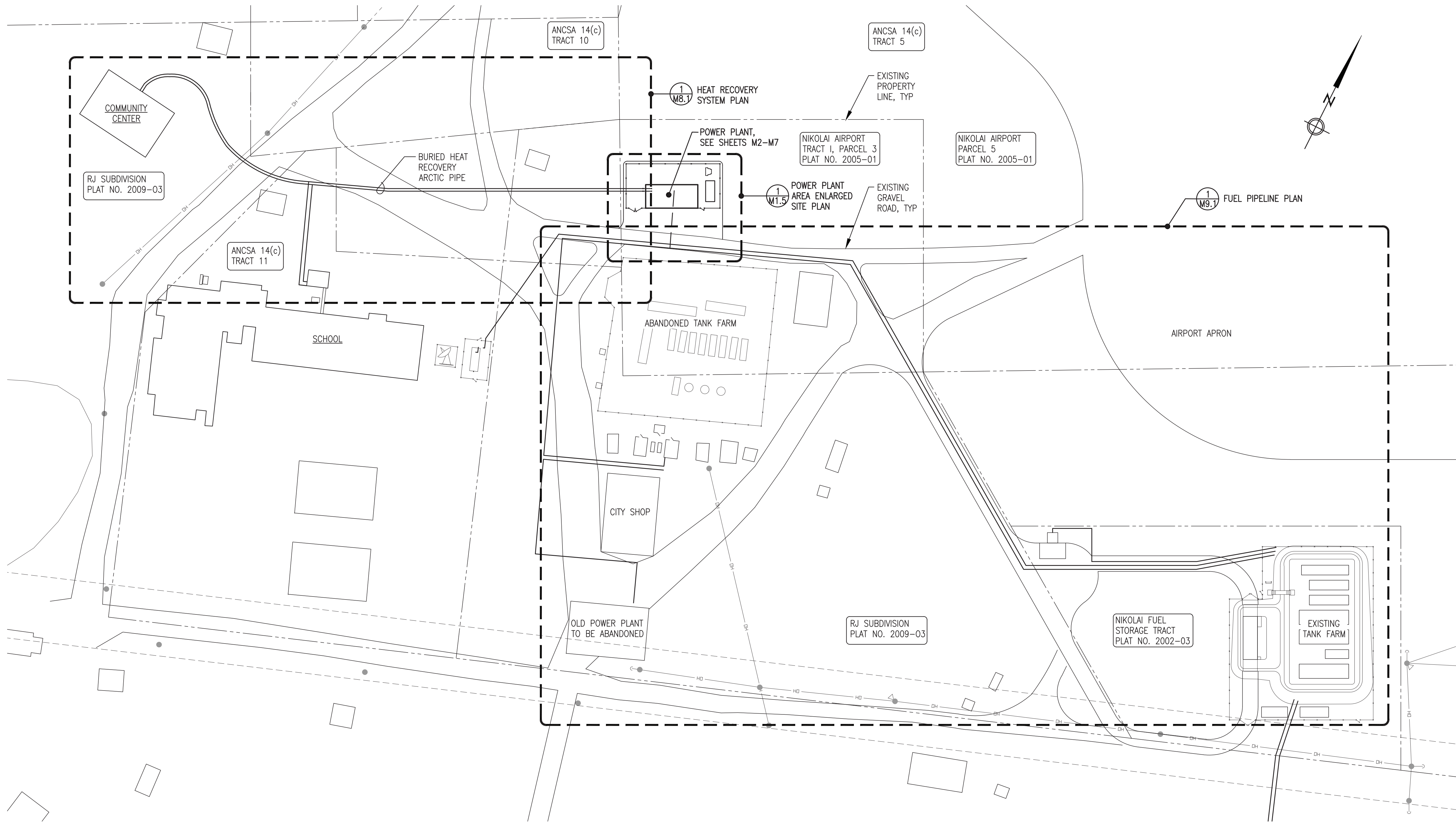
CLEAN ALL SYSTEM STRAINERS AFTER FIRST 48 HOURS OR MORE OF OPERATION. MONITOR SYSTEM OPERATION FOR ONE WEEK MINIMUM BEFORE LEAVING SITE. CHANGE GLYCOL FILTER ELEMENTS AT TIME OF FIRST OIL CHANGE ON EACH ENGINE.

REV #1
ISSUED
NOVEMBER
2021



ALASKA ENERGY AUTHORITY

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: SYSTEM START UP & SEQUENCE OF OPERATIONS			
		DRAWN BY:	SCALE: AS NOTED
P.O. 111405, Anchorage, AK 99511 (907)349-0100		DESIGNED BY:	DATE: 9/1/21
		FILE NAME: NIKO M1	SHEET:
		PROJECT NUMBER:	M1.3 OF 9



1 OVERALL PROJECT AREA PLAN
M1.4 1"=40'

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY



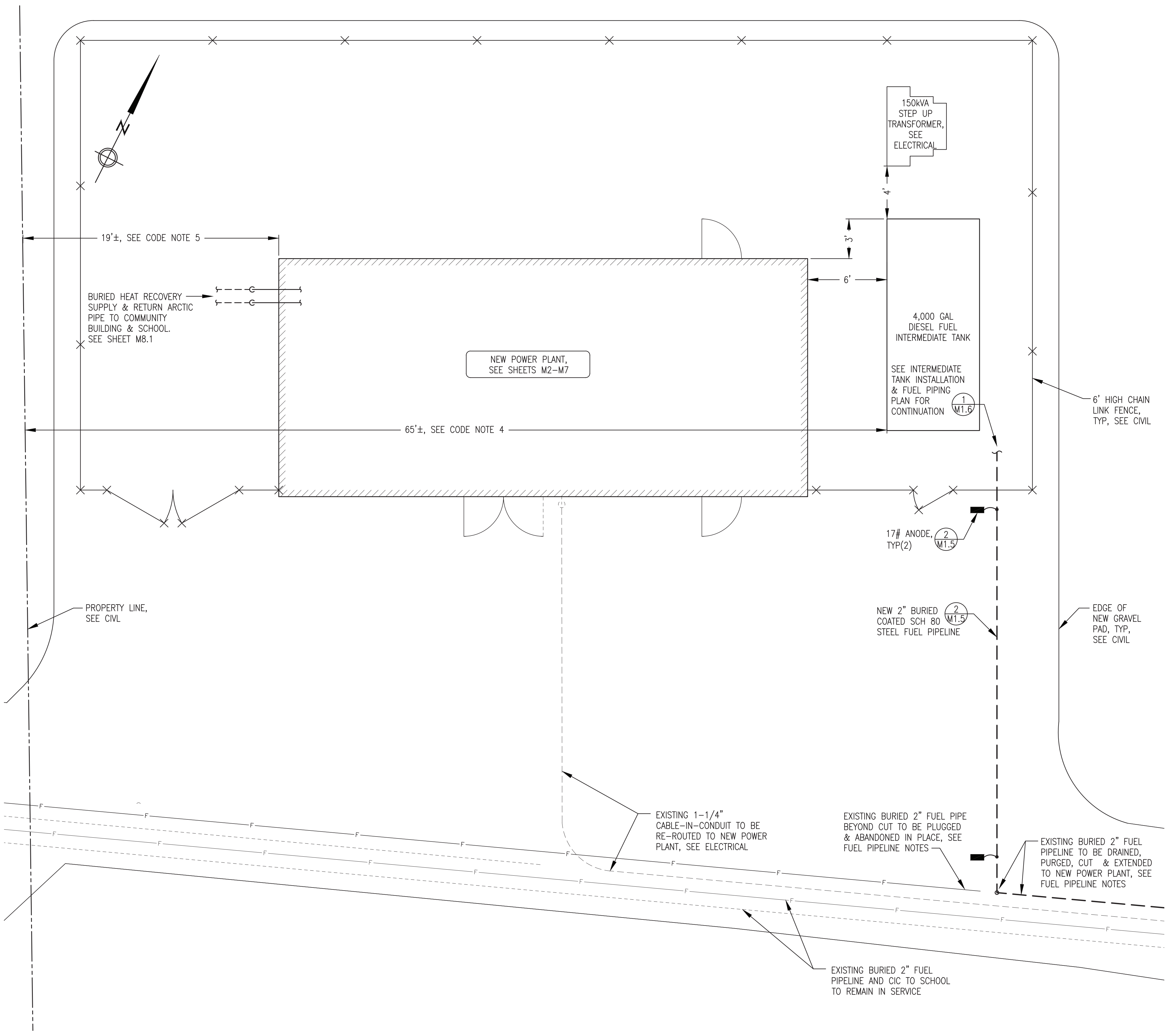
ALASKA ENERGY AUTHORITY

PROJECT: NIKOLAI POWER SYSTEM UPGRADE

TITLE: OVERALL PROJECT AREA PLAN

<p>Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100</p>	DRAWN BY:	SCALE: AS NOTED
	DESIGNED BY:	DATE: 9/1/21
	FILE NAME: NIKO M1	SHEET: M1.4 OF 9
PROJECT NUMBER:		

REV #1
ISSUED
NOVEMBER
2021

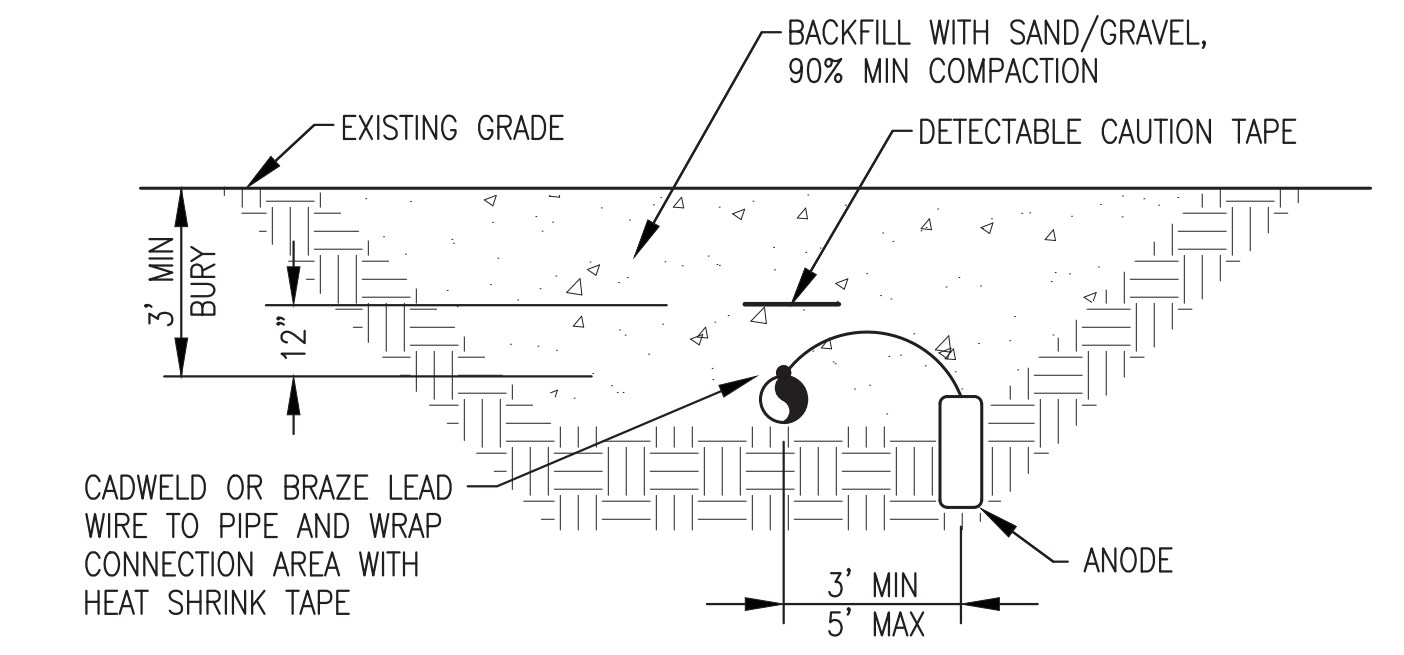


CODE NOTES:

- 1) SEE CIVIL FOR SITE LAYOUT AND POWER PLANT LOCATION ON SITE.
- 2) SEE STRUCTURAL FOR FOUNDATION DETAILS.
- 3) SEE ARCHITECTURAL AND STRUCTURAL FOR POWER PLANT BUILDING CONSTRUCTION.
- 4) THE INTERNATIONAL FIRE CODE AND STATE OF ALASKA REGULATIONS REQUIRE 30' OF CLEARANCE FROM 751-12,000 GALLON BULK STORAGE TANKS TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON. THE LOCATION OF THE NEW 10,000 GALLON DOUBLE WALL FUEL TANK HAS A CLEARANCE OF APPROXIMATELY 65' FROM THE NEAREST PROPERTY BOUNDARY AS INDICATED.
- 5) THE INTERNATIONAL BUILDING CODE REQUIRES 10' MINIMUM CLEARANCE FROM THE NEW POWER PLANT TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON. THE LOCATION OF THE NEW POWER PLANT HAS A CLEARANCE OF APPROXIMATELY 19' FROM THE NEAREST PROPERTY BOUNDARY AS INDICATED.
- 6) THE INTERNATIONAL FIRE CODE REQUIRES FIRE APPARATUS ROADWAY TO PROVIDE ACCESS TO WITHIN 150' OF EVERY PORTION OF THE FACILITY. THE EXISTING GRAVEL ROAD AND THE NEW GRAVEL PAD PROVIDES ACCESS TO WITHIN 25' OF ALL PORTIONS OF THE NEW POWER PLANT.

FUEL PIPELINE MODIFICATION NOTES:

- 1) PRIOR TO EXCAVATING AND CUTTING EXISTING FUEL PIPELINE INSTALL TEMPORARY INTERMEDIATE TANK AT EXISTING POWER PLANT AND DRAIN PIPELINE AS INDICATED ON SHEET M9.1.
- 2) TWO EACH EXISTING FUEL PIPES AND TWO EACH EXISTING HDPE CONDUIT ARE ROUTED TOGETHER AS SHOWN. LOCATE EXISTING PIPES AND HAND EXCAVATE AS REQUIRED TO EXPOSE PIPE BEING CAREFUL NOT TO DAMAGE ADJACENT CONDUIT AND FUEL PIPE.
- 3) PERFORM ALL CUTTING IN ACCORDANCE WITH APPROPRIATE HOT WORK PROCEDURES PER NFPA 51B. PRIOR TO WELDING INERT OR VAPOR FREE EXISTING PIPE AND COVER ADJACENT PIPE AND CONDUIT.
- 4) WELD NEW 2" 90° ELBOW AND 2" SCH 80 COATED PIPE EXTENSION TO NEW POWER PLANT INTERMEDIATE TANK AS INDICATED. COPE ELBOW AS REQUIRED FOR PIPELINE ALIGNMENT.
- 5) AFTER WELDING, PRESSURE TESTING, AND ANODE INSTALLATION, WRAP ALL BELOW GRADE JOINTS AND FITTINGS WITH HDPE HEAT-SHRINK TAPE TO FORM A CONTINUOUS WATER PROOF SEAL. EXTEND HEAT SHRINK 6" MINIMUM ONTO UNDAMAGED COATING ON EXISTING PIPE AND 6" MINIMUM ABOVE GRADE.
- 6) PLUG CUT END OF EXISTING PIPELINE WITH NON-SHRINK GROUT AND DECOMMISSION PRIOR TO PLACING FILL IN EXCAVATION AREA.



2 BURIED FUEL PIPE & CONDUIT INSTALLATION
NO SCALE

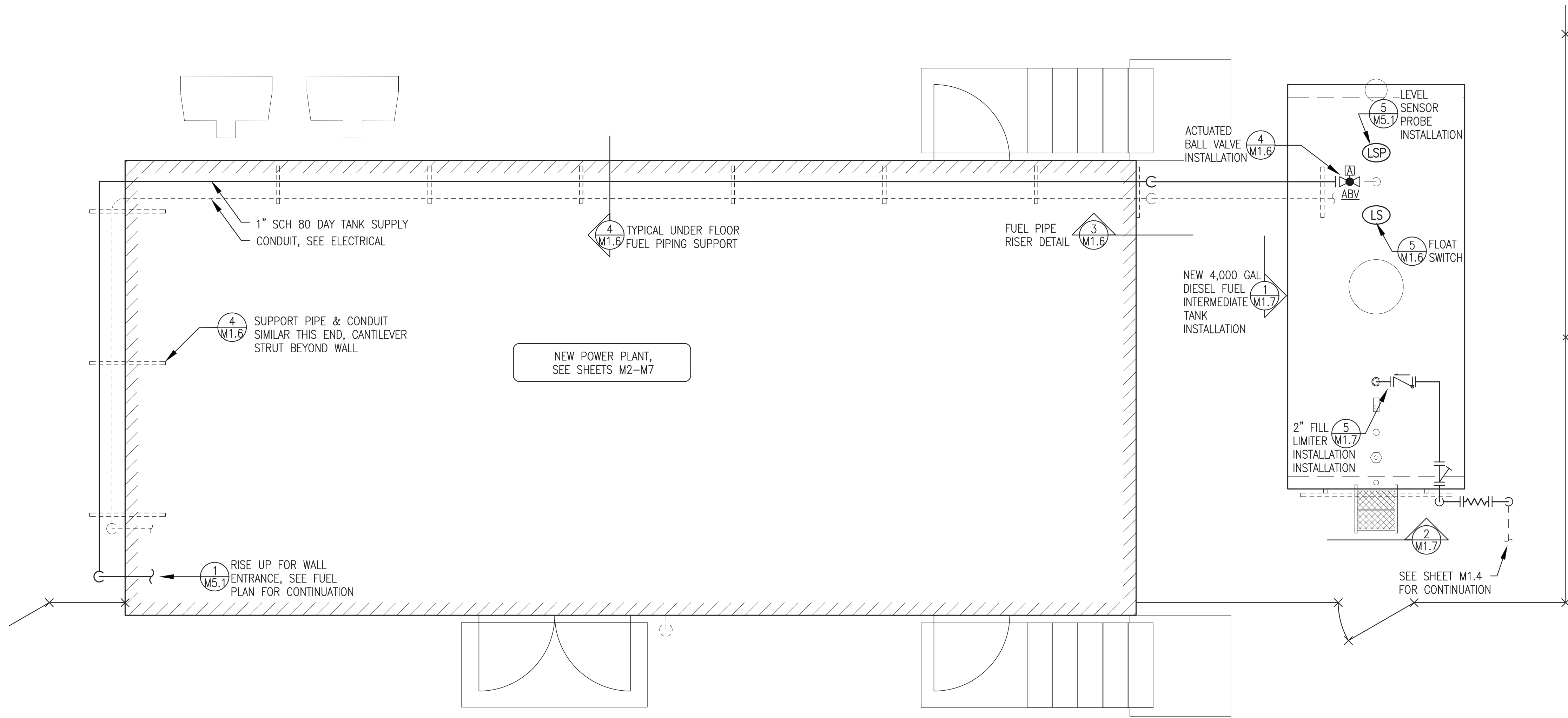
1 POWER PLANT MECHANICAL SITE PLAN
1"=4'

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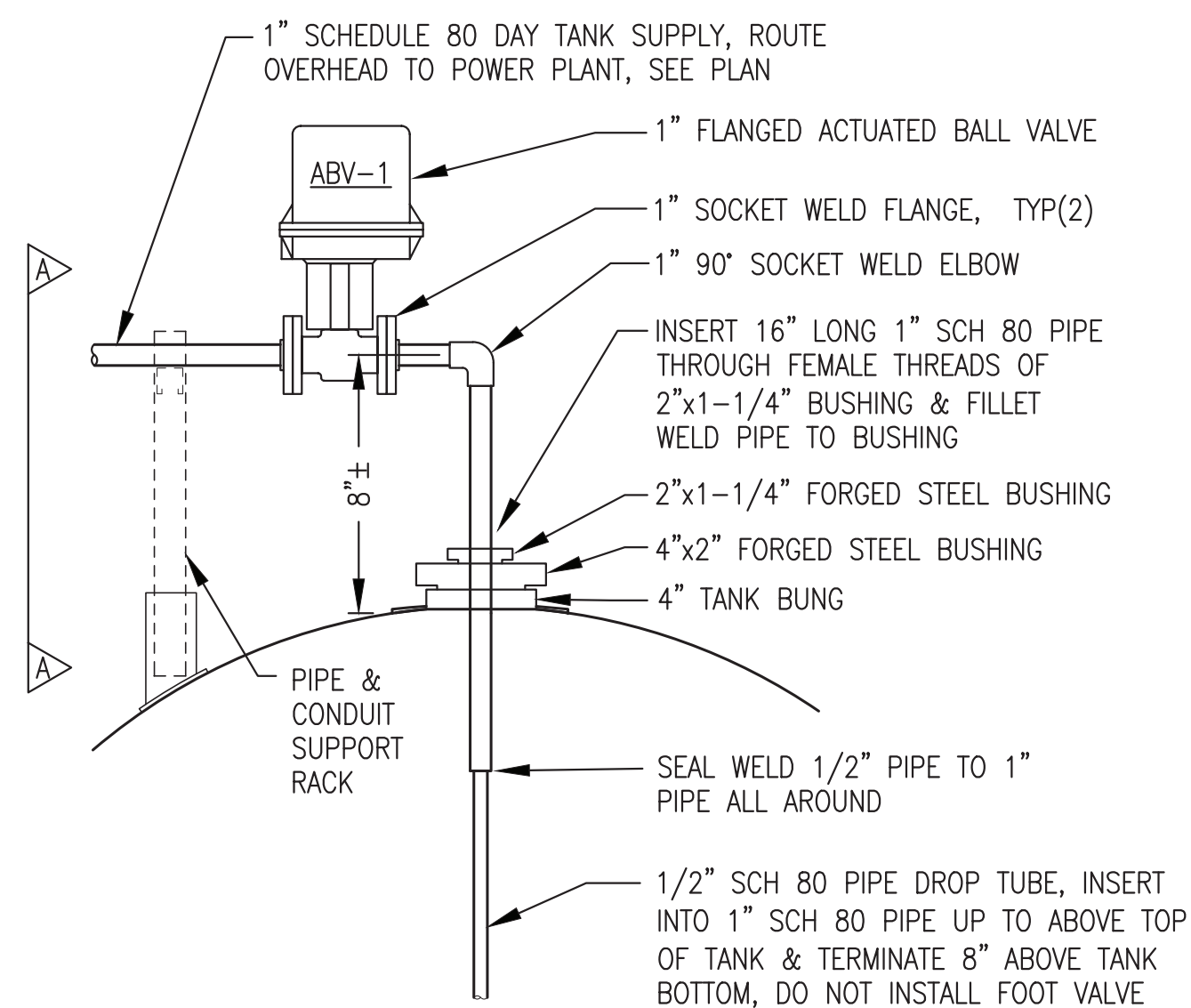


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: POWER PLANT MECHANICAL SITE PLAN & DETAILS			
DRAWN BY:		SCALE: AS NOTED	
DESIGNED BY:		DATE: 9/1/21	
FILE NAME: NIKO M1		SHEET: M1.5 OF 9	
PROJECT NUMBER:		P.O. 111405, Anchorage, AK 99511 (907)349-0100	

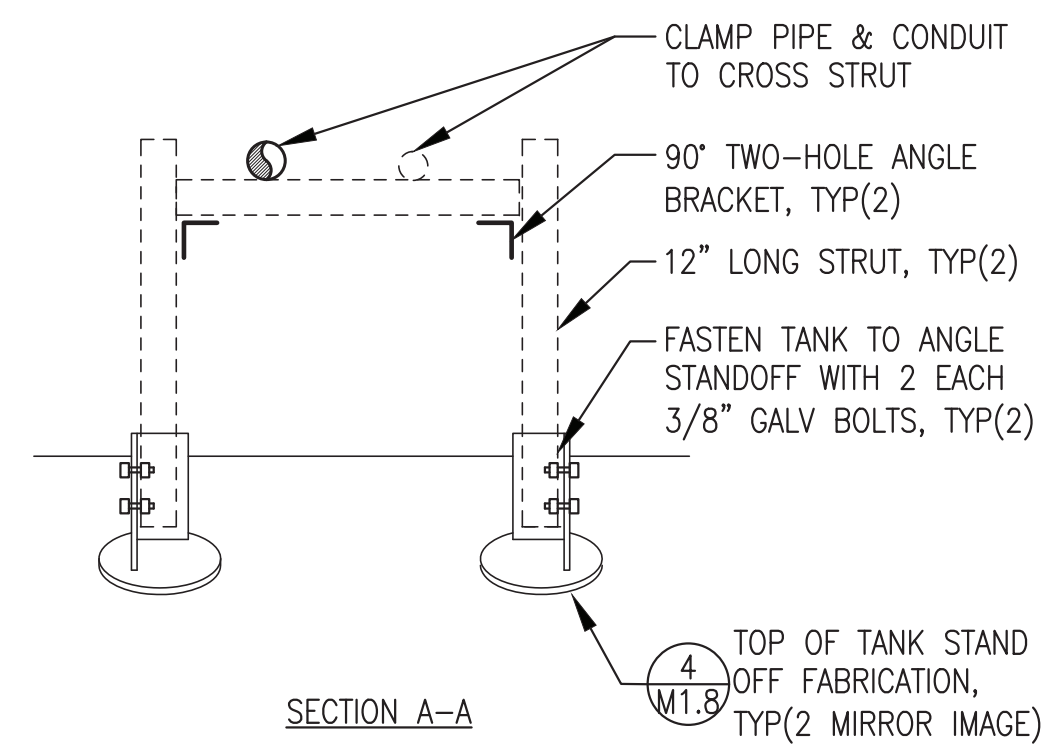




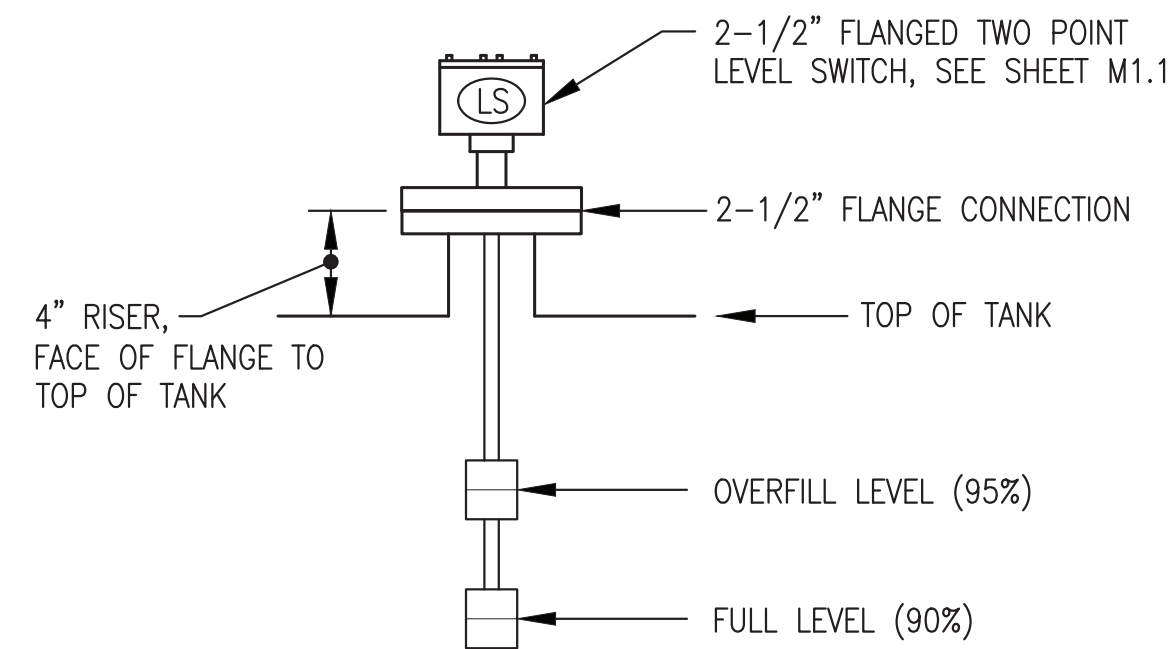
1 ENLARGED INTERMEDIATE TANK PIPING PLAN
M1.6 3/8"=1'-0"



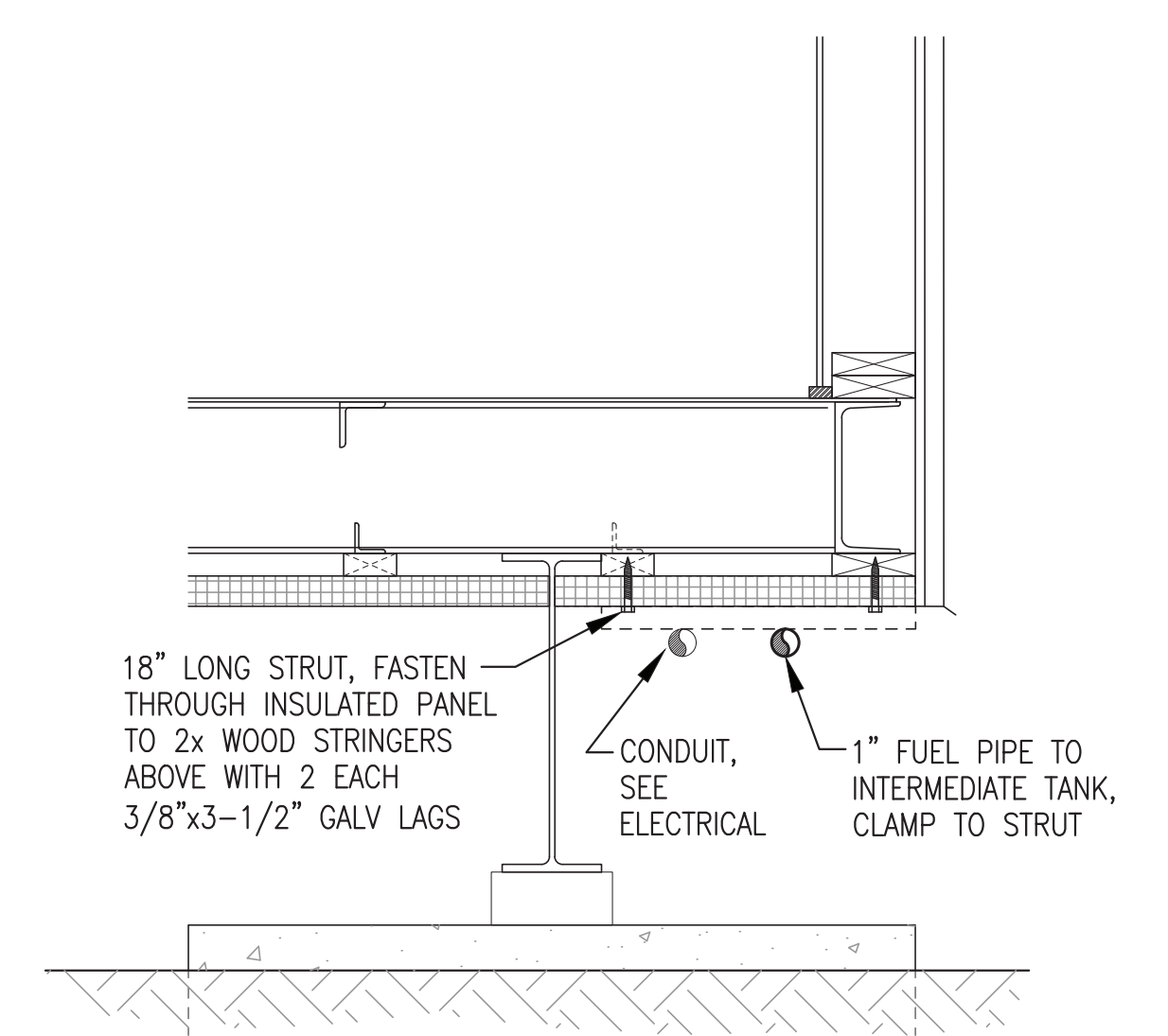
4 ACTUATED BALL VALVE & DROP TUBE INSTALLATION
M1.6 NO SCALE



5 FLOAT SWITCH INSTALLATION
M1.6 NO SCALE

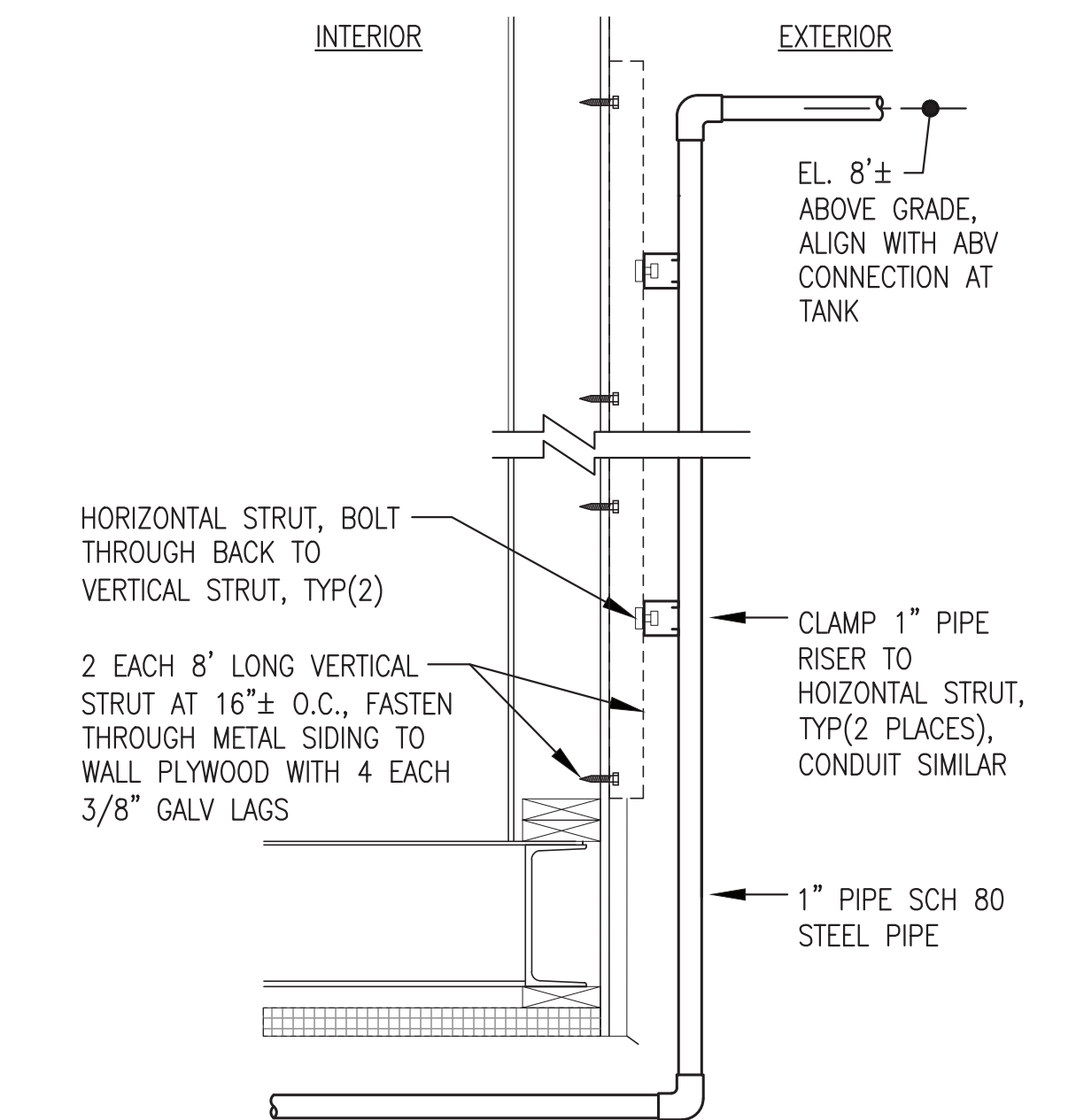


NOTE: FLOATS POSITIONED TO PROVIDE SHUT OFF WHEN FUEL LEVEL IS AT 5'-10" ABOVE TANK BOTTOM (90% CAPACITY) AND ALARM WHEN FUEL LEVEL IS AT 6'-3" ABOVE TANK BOTTOM (95% CAPACITY). FIELD VERIFY SHUT OFF HEIGHT.



NOTE: ONE UNDER FLOOR PIPE SUPPORT SHOWN. PROVIDE UNDER FLOOR PIPE SUPPORTS AT 6' O.C. MIN.

2 FUEL PIPE RISER DETAIL
M1.6 NO SCALE



3 FUEL PIPE RISER DETAIL
M1.6 NO SCALE

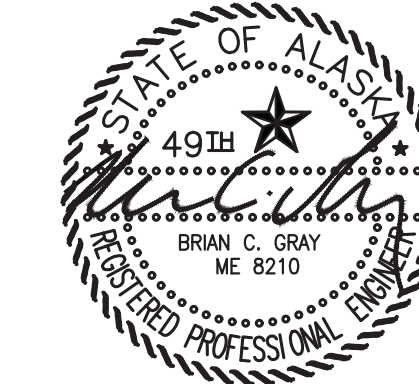
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY



PROJECT:	NIKOLAI POWER SYSTEM UPGRADE		
TITLE:	ENLARGED INTERMEDIATE TANK PIPING PLAN & DETAILS		

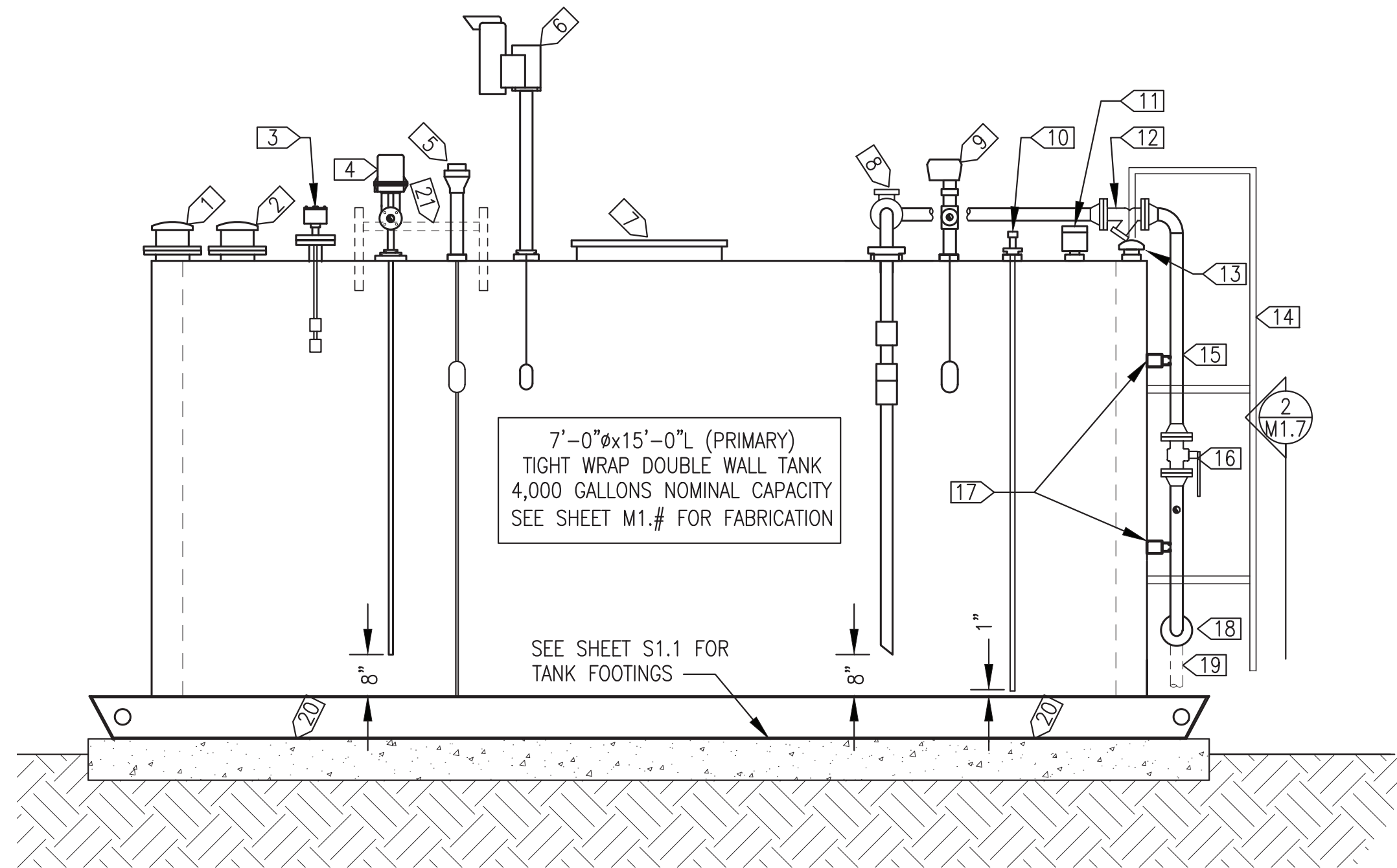
<p>Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100</p>	DRAWN BY:	SCALE: AS NOTED
	DESIGNED BY:	DATE: 9/1/21
	FILE NAME: NIKO M1	SHEET: M1.6 OF 9
	PROJECT NUMBER:	

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2021

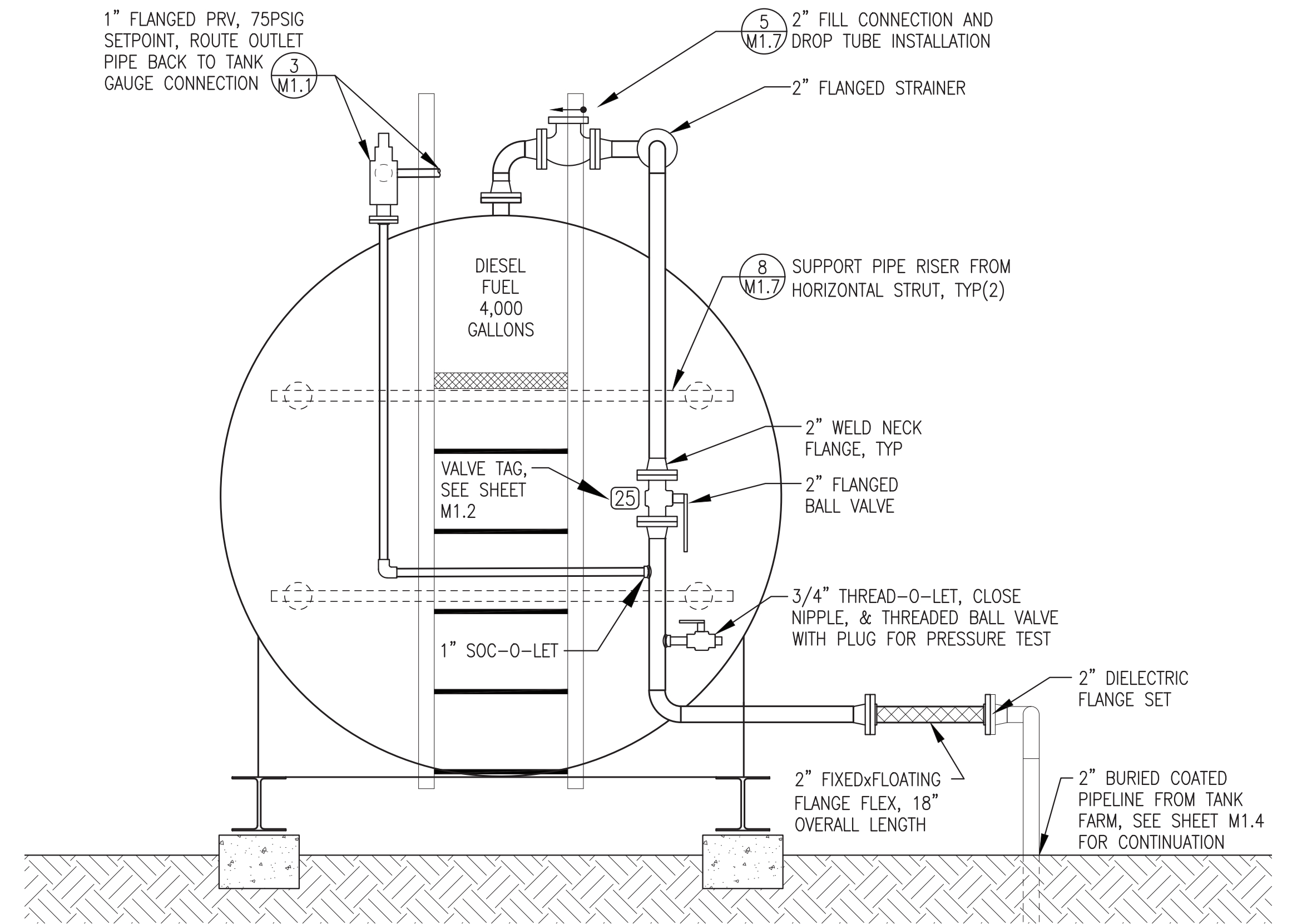


SPECIFIC NOTES:

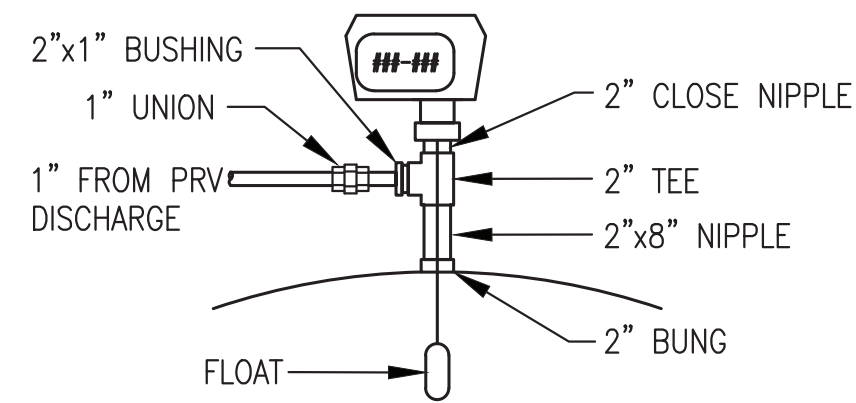
- 1 8" FLANGED SECONDARY EMERGENCY VENT.
- 2 8" FLANGED PRIMARY EMERGENCY VENT.
- 3 INSTALL TWO POINT FLOAT TYPE FULL/OVERFILL LEVEL SWITCH LS, SEE DETAIL 5/M1.6.
- 4 INSTALL 1" FLANGED ACTUATOR VALVE & DROP TUBE IN 4" BUNG. SEE DETAIL 4/M1.6.
- 5 INSTALL 89" LONG SENSOR PROBE FOR TANK LEVEL MONITORING IN 2" BUNG, SEE DETAIL 5/M5.1.
- 6 INSTALL 2" PRESSURE/VACUUM VENT WITH WHISTLE ALARM ON 3" BUNG, SEE INSTALLATION DETAIL 6/M1.7.
- 7 24" MANHOLE.
- 8 2" FILL LIMITER & FLANGED CHECK VALVE, SEE INSTALLATION DETAIL 5/M1.7.
- 9 2" MECHANICAL FUEL LEVEL GAUGE ON 2" BUNG, SEE INSTALLATION DETAIL 3/M1.7.
- 10 1" WATER DRAW ON 2" BUNG. SEE INSTALLATION DETAIL 4/M1.7.
- 11 2" FPT GAUGE HATCH ON 2"x4" NIPPLE.
- 12 2" FLANGED STRAINER ON FUEL TRANSFER PIPELINE
- 13 2" SECONDARY TANK MONITOR PORT WITH VENT CAP.
- 14 SHOP FABRICATED BOLT-ON LADDER.
- 15 2" FUEL TRANSFER PIPELINE RISER ON FACE OF TANK.
- 16 2" FLANGED BALL VALVE WITH 1" FLANGED PRV BYPASS.
- 17 SUPPORT 2" FILL RISER PIPE FROM TANK HEAD, SEE DETAIL 8/M1.7.
- 18 2" FLANGED FLEX BEHIND.
- 19 TRANSITION TO BURIED, SEE TANK END ELEVATION 2/M1.7.
- 20 ANCHOR TANK TO CONCRETE FOOTING, TYP(4 LOCATIONS TOTAL), SEE DETAIL 7/M1.7 AND SHEET S1.1.
- 21 SUPPORT OVERHEAD PIPING & CONDUIT WITH FIELD-MOUNTED STRUT RACK.



1 4,000 GALLON INTERMEDIATE TANK INSTALLATION
M1.7 1/2"=1'-0"



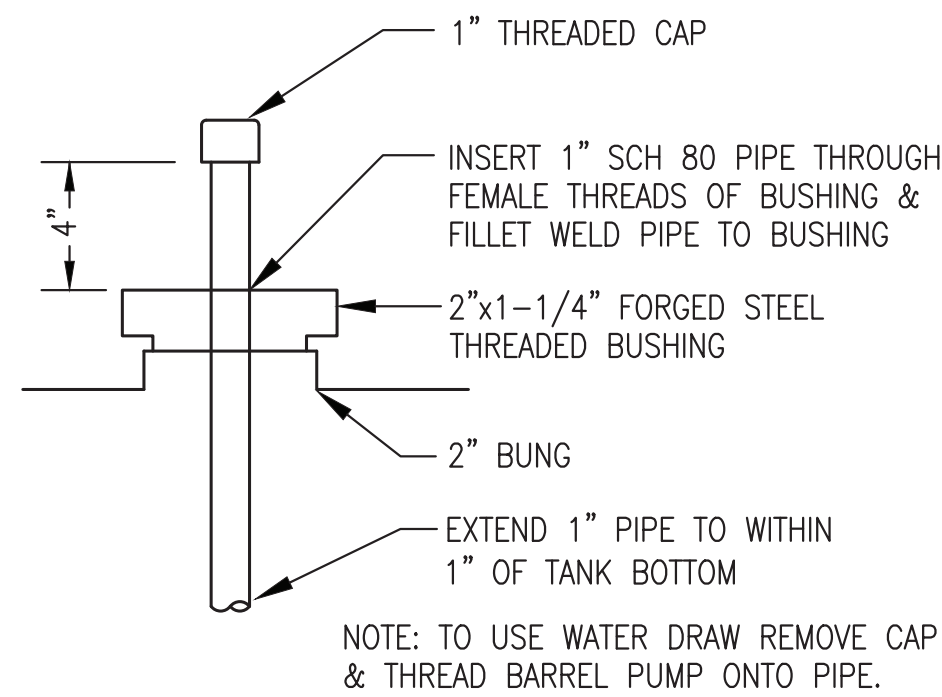
2 4,000 GALLON INTERMEDIATE TANK END ELEVATION
M1.7 3/4"=1'-0"



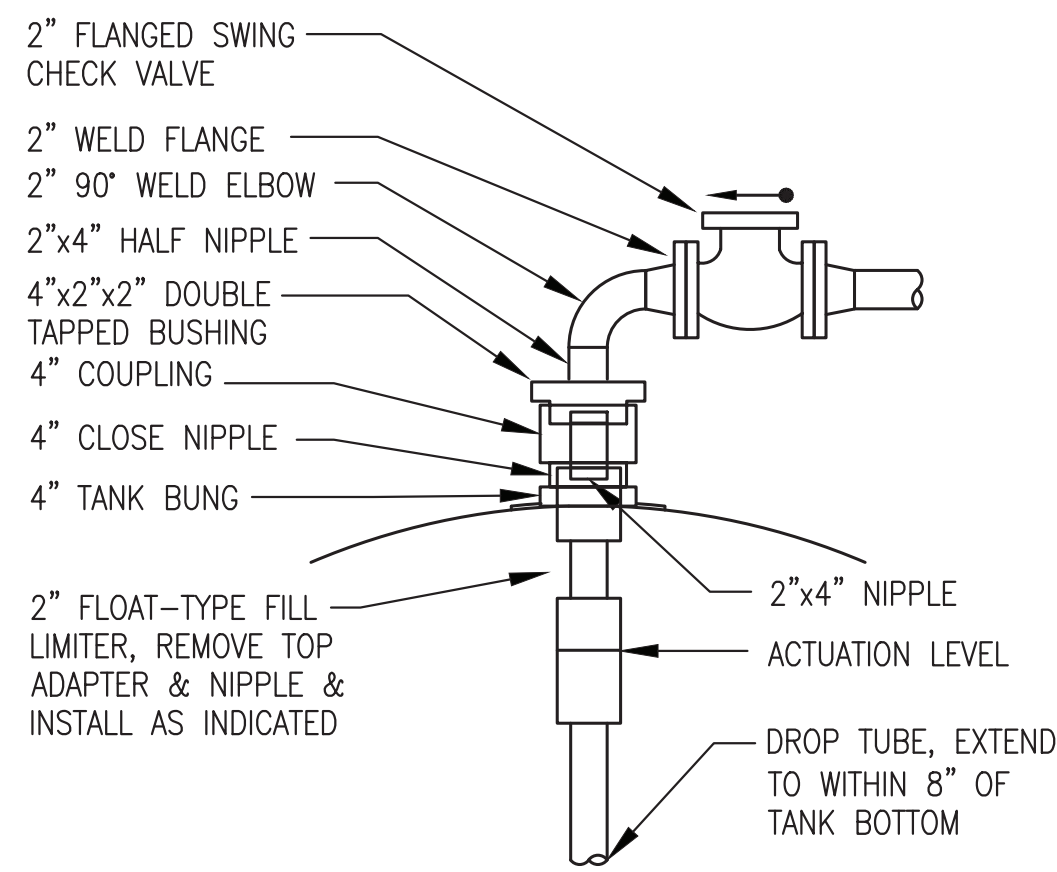
NOTES:

- 1) FEED FLOAT CABLE THROUGH NIPPLE PRIOR TO CONNECTING TO TANK.
- 2) GREASE FLOAT PRIOR TO INSTALLING IN TANK TO PREVENT FREEZING TO BOTTOM.
- 3) CALIBRATE GAUGE AFTER FILLING TANK AND VERIFY WITH MANUAL GAUGING ROD OR TAPE.

3 MECHANICAL LEVEL GAUGE INSTALLATION
M1.7 NO SCALE

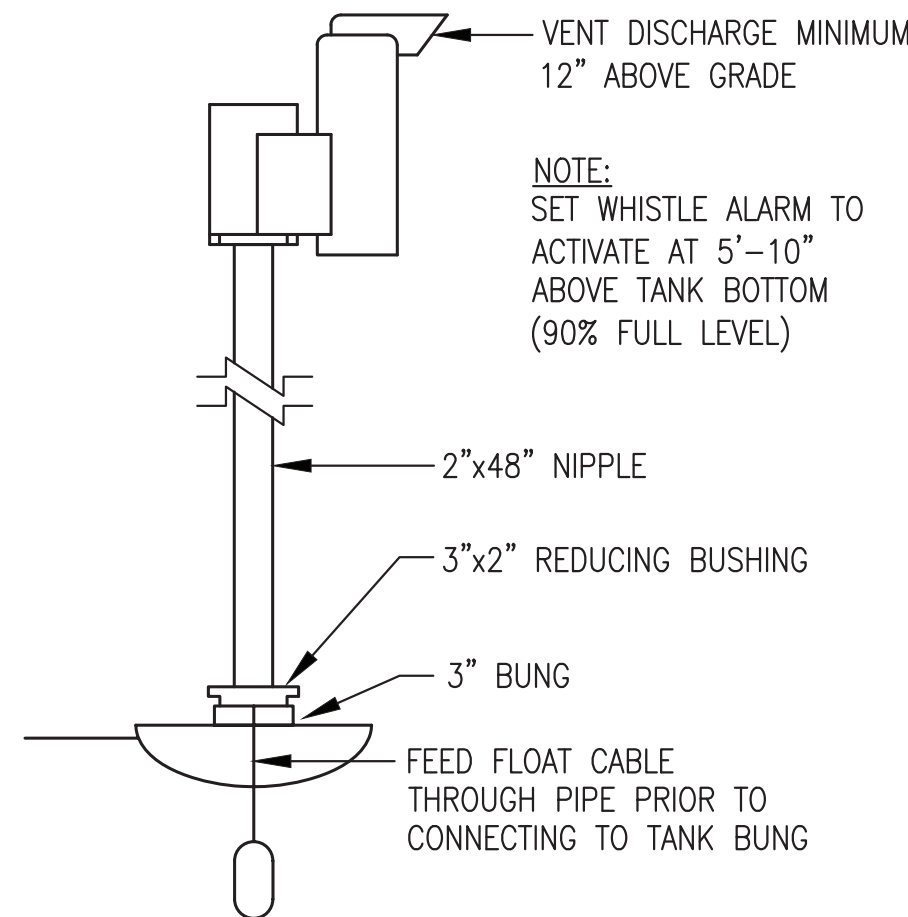


4 WATER DRAW INSTALLATION
M1.7 NO SCALE

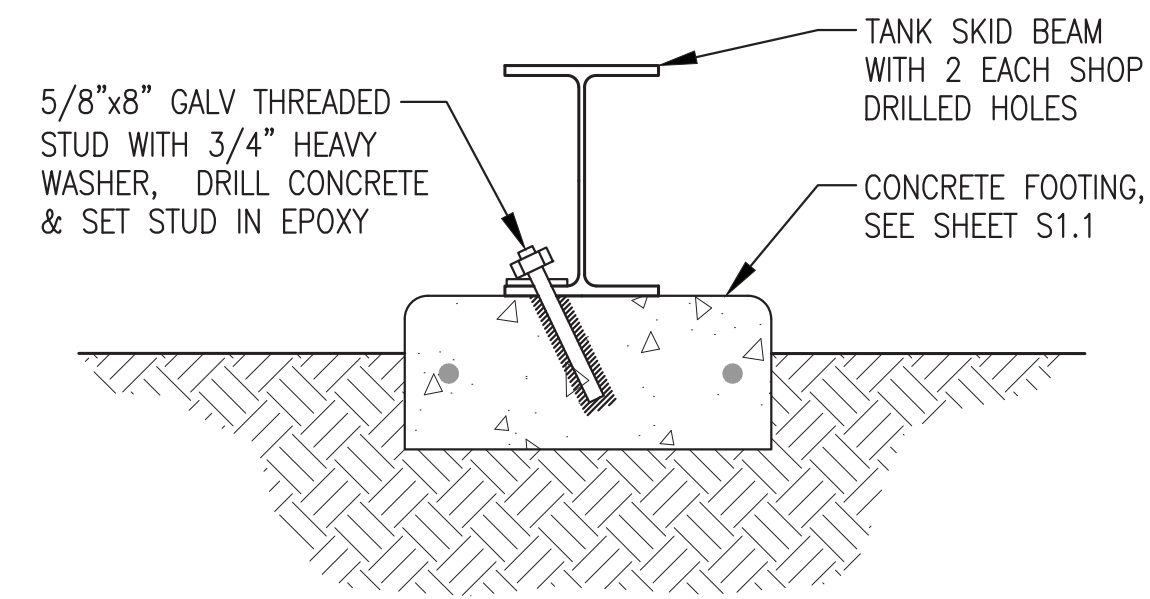


NOTE: PIPING SIZED TO PROVIDE SHUT OFF WHEN ACTUATION LEVEL IS AT 6'-3" ABOVE TANK BOTTOM (95% CAPACITY). FIELD VERIFY SHUT OFF HEIGHT & ADJUST LINKAGE AS REQUIRED.

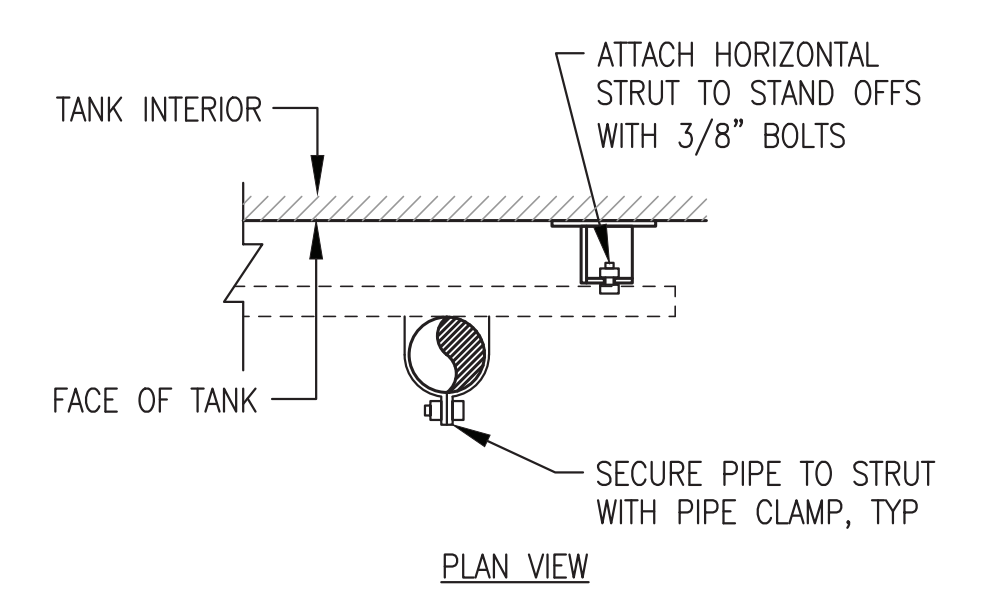
5 FILL LIMITER INSTALLATION
M1.7 NO SCALE



6 P/V WHISTLE VENT INSTALLATION
M1.7 NO SCALE

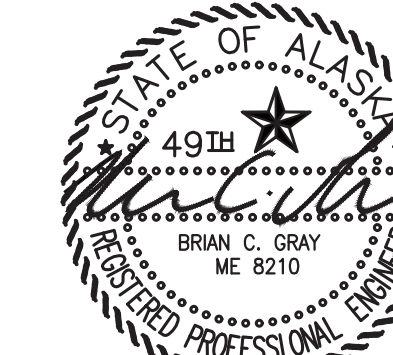


7 TYPICAL TANK ANCHOR
M1.7 NO SCALE



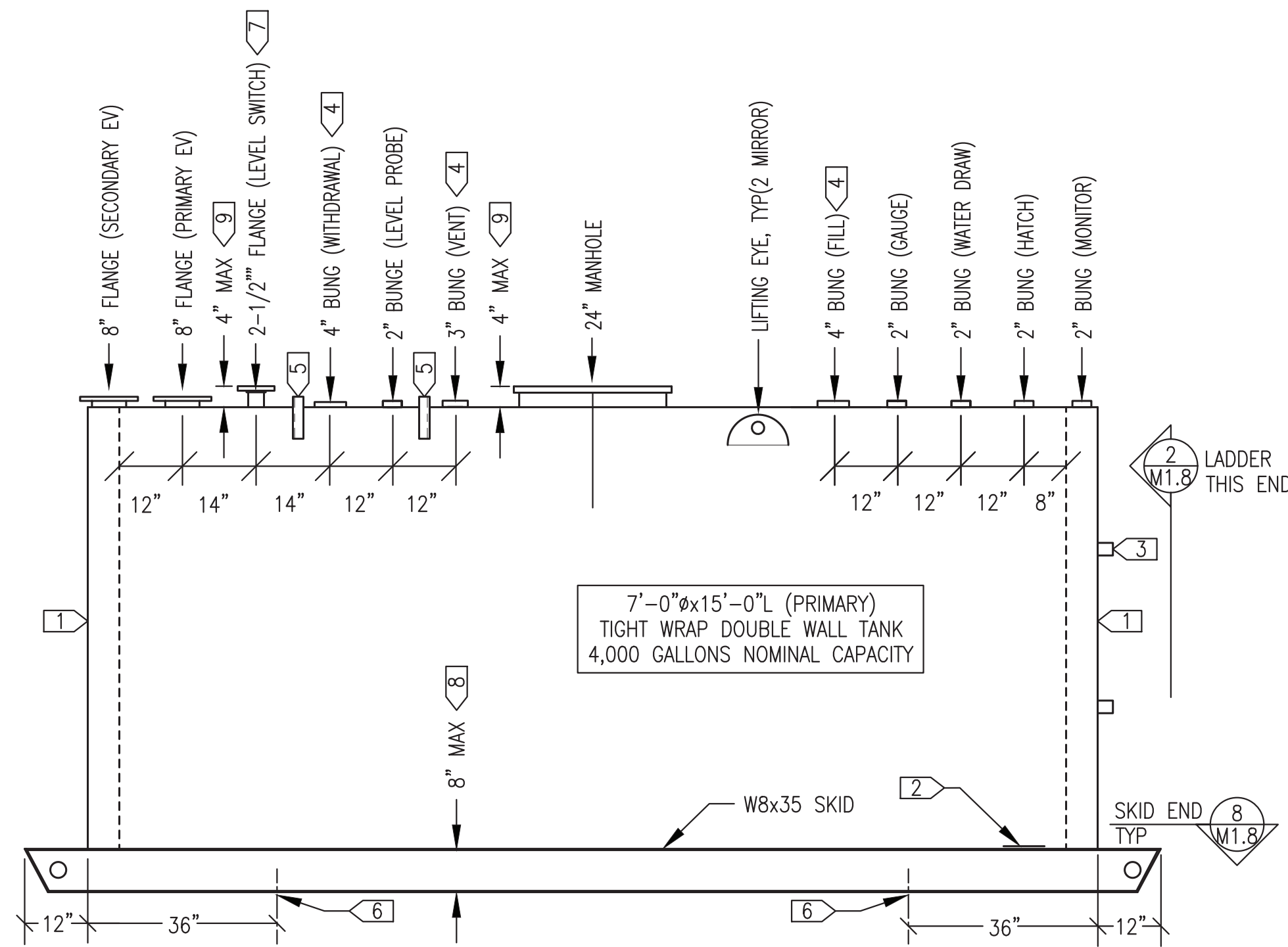
8 TANK HEAD PIPE SUPPORT
M1.7 NO SCALE

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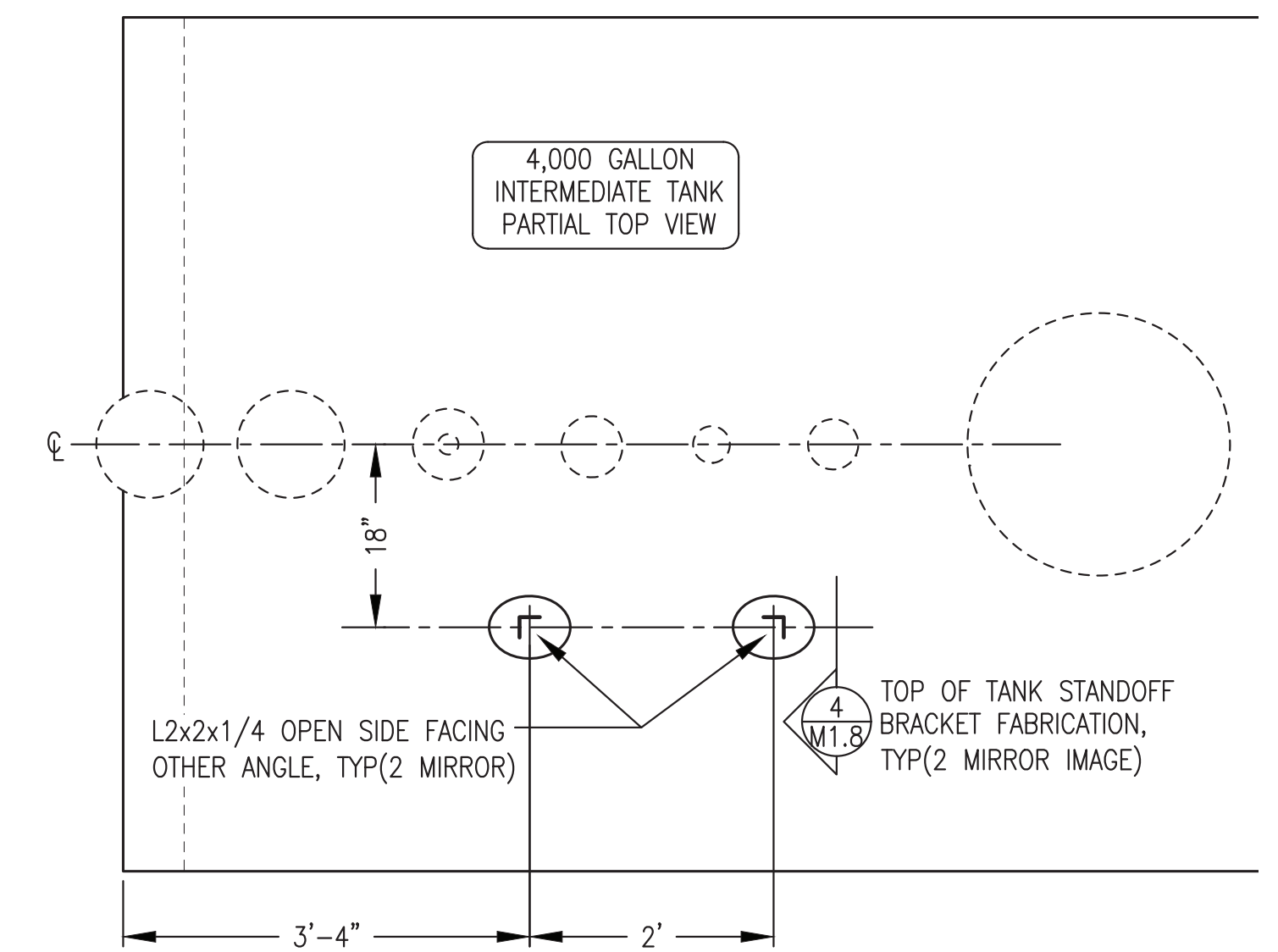
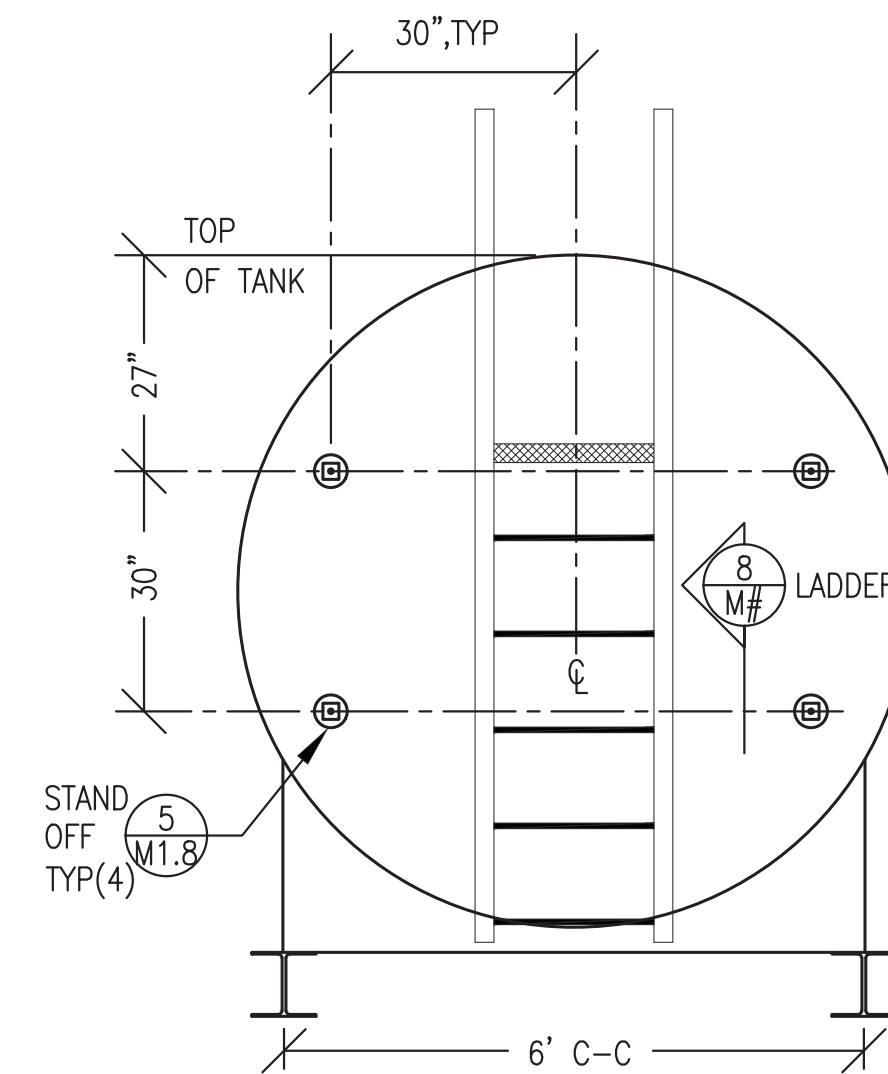


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: INTERMEDIATE TANK INSTALLATION ELEVATION & DETAILS			
DRAWN BY:		SCALE: AS NOTED	
DESIGNED BY:		DATE: 9/1/21	
FILE NAME: NIKO M1		SHEET:	
PROJECT NUMBER:		M1.7 OF 9	

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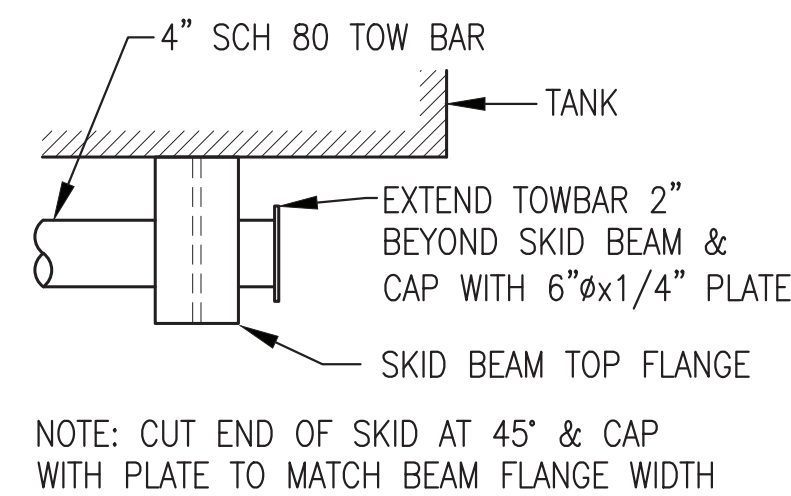
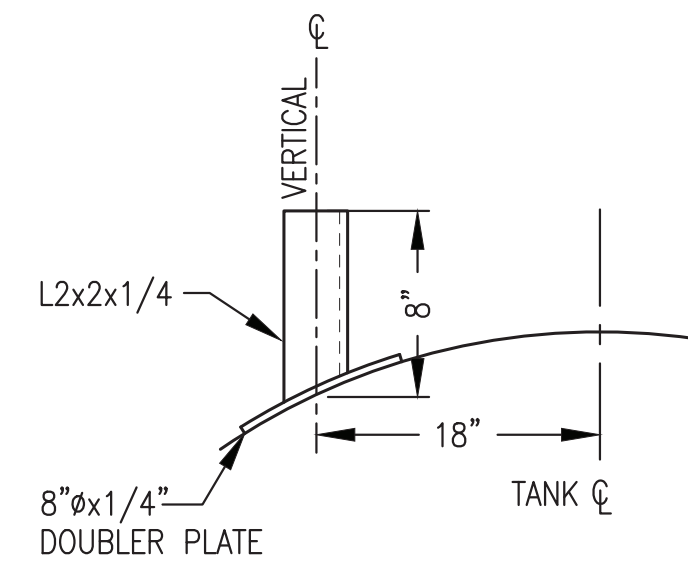
- TANK FABRICATION SPECIFIC DETAILS**
- 1 4" HIGH BLACK LETTERING x1/2" STROKE: "DIESEL FUEL 4,000 GALLONS"
 - 2 SEAL WELD 1/4"x10"Ø STRIKER PLATE TO TANK BOTTOM DIRECTLY BELOW GAUGE HATCH TOP BUNG. PLATE TO BE ROLLED TO MATCH DIAMETER OF TANK.
 - 3 PIPE SUPPORT STAND OFF, 4 THIS END OF TANK.
 - 4 PROVIDE 1/4"x8" DIAMETER DOUBLER PLATE.
 - 5 PIPE SUPPORT STANDOFF, SEE TOP OF TANK SUPPORT BRACKET LAYOUT 3/M1.8.
 - 6 1-1/8"Ø HOLE, 2 PLACES EACH SKID, SEE DETAIL 7/M1.8.
 - 7 2-1/2" FLAT FACED FLANGE. FACE OF FLANGE 4" ABOVE TOP OF TANK.
 - 8 PROVIDE SADDLE/SKID ASSEMBLY WITH 8" MAX RISE FROM BOTTOM OF SKID TO BOTTOM OF TANK.
 - 9 4" MAX FROM TOP OF TANK TO FURTHEST EXTENT OF WELDED TANK ATTACHMENT, TYP.



1 SECTION THROUGH TANK
M1.8 1/2"=1'-0"

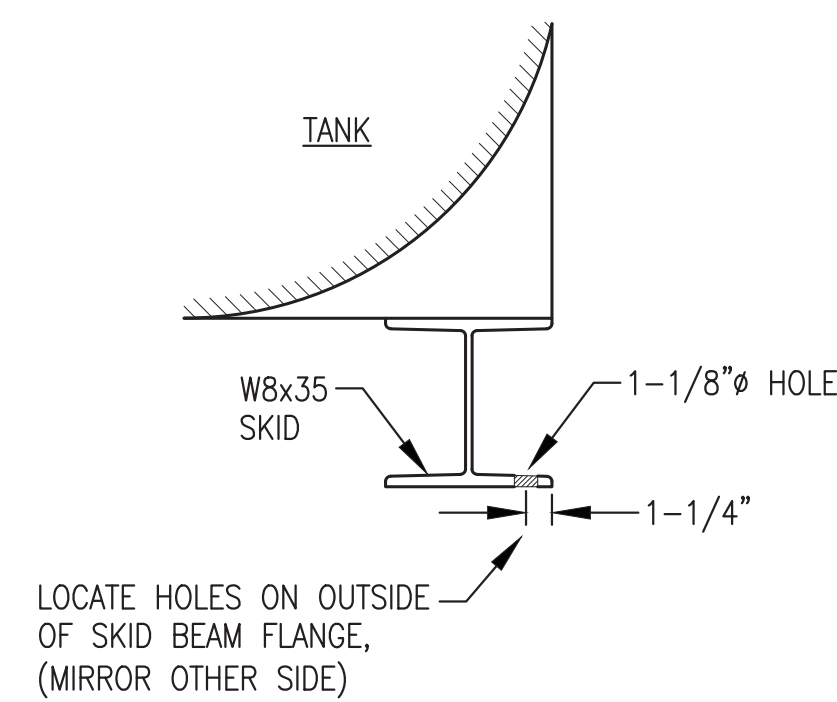
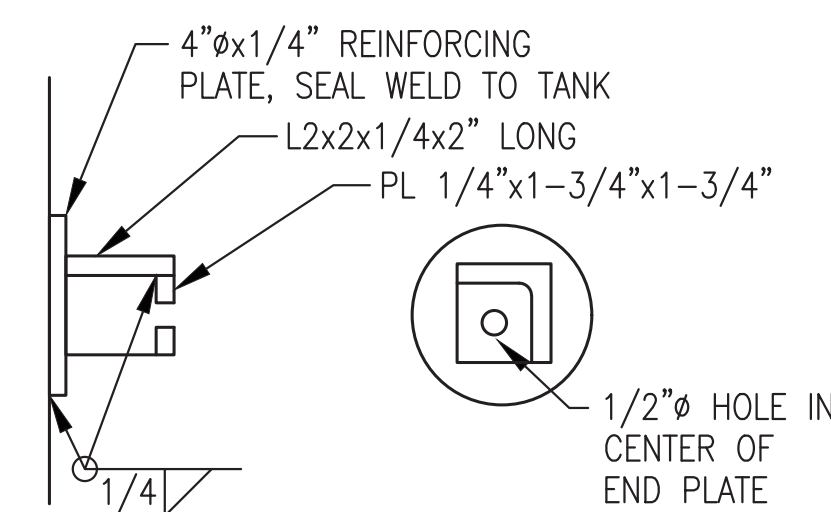
2 TANK END ELEVATION
M1.8 NO SCALE

3 TOP OF TANK STANDOFF BRACKET LAYOUT
M1.8 NO SCALE



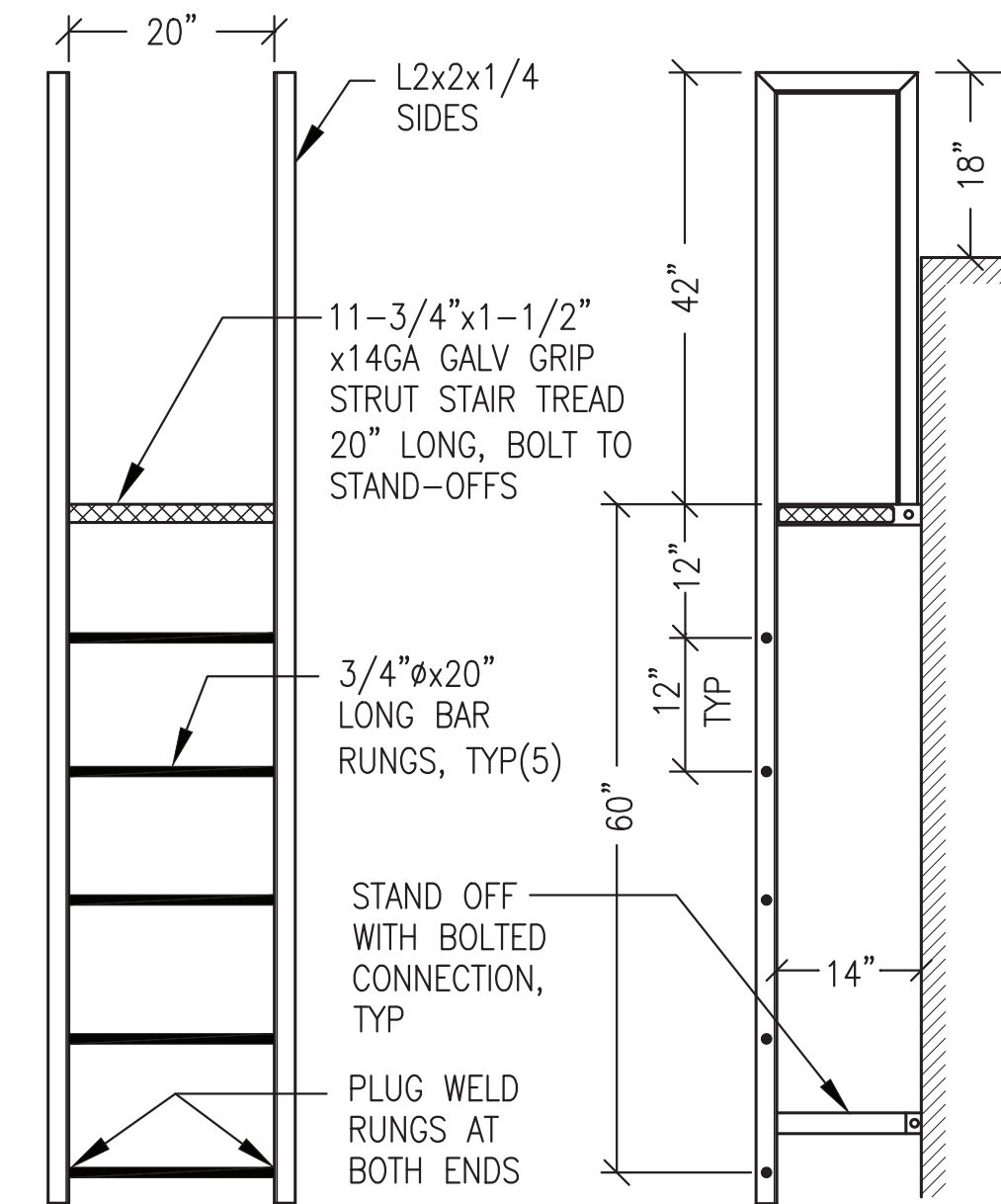
4 TOP OF TANK STANDOFF BRACKET FABRICATION
M1.8 NO SCALE

6 END OF SKID (TOP VIEW)
M1.8 NO SCALE

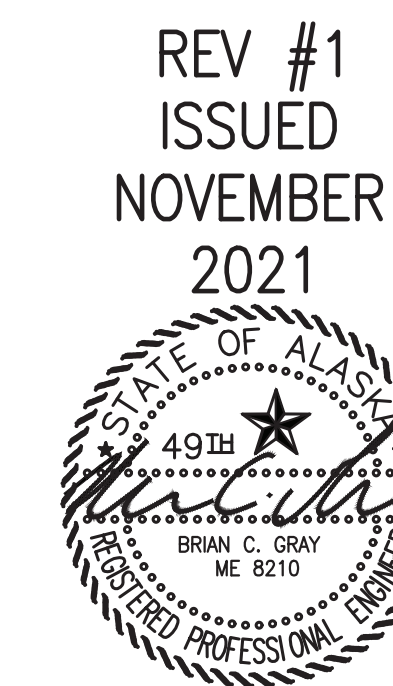


5 TYP. PIPE SUPPORT STAND OFF
M1.7 NO SCALE

7 TYPICAL TANK SKID HOLE
M1.8 NO SCALE



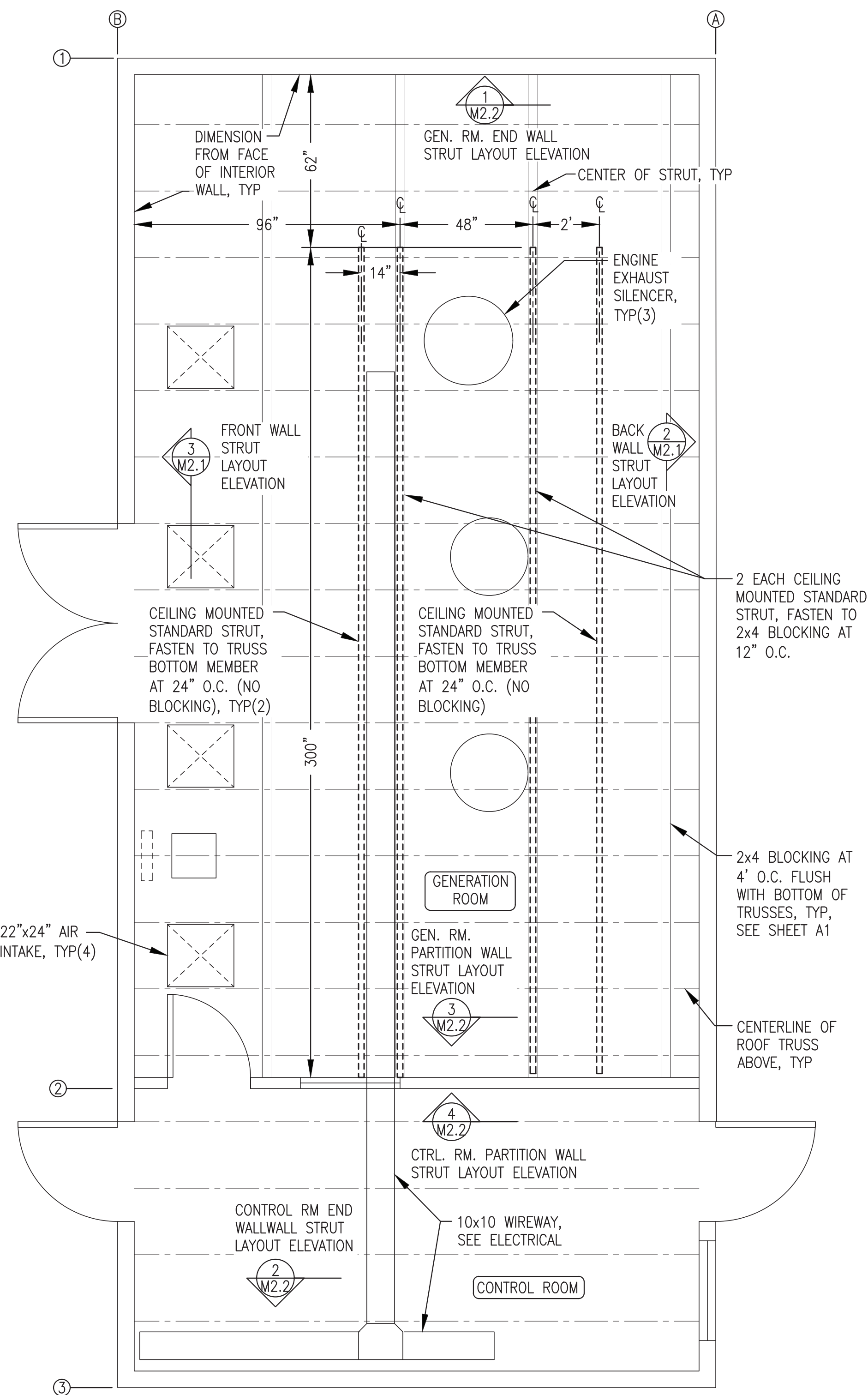
8 LADDER FABRICATION
M1.8 NO SCALE



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2021

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: 4,000 GALLON INTERMEDIATE TANK FABRICATION			
DRAWN BY:		SCALE: AS NOTED	
DESIGNED BY:		DATE: 9/1/21	
FILE NAME: NIKO M1		SHEET: M1.8 OF 9	
PROJECT NUMBER:			

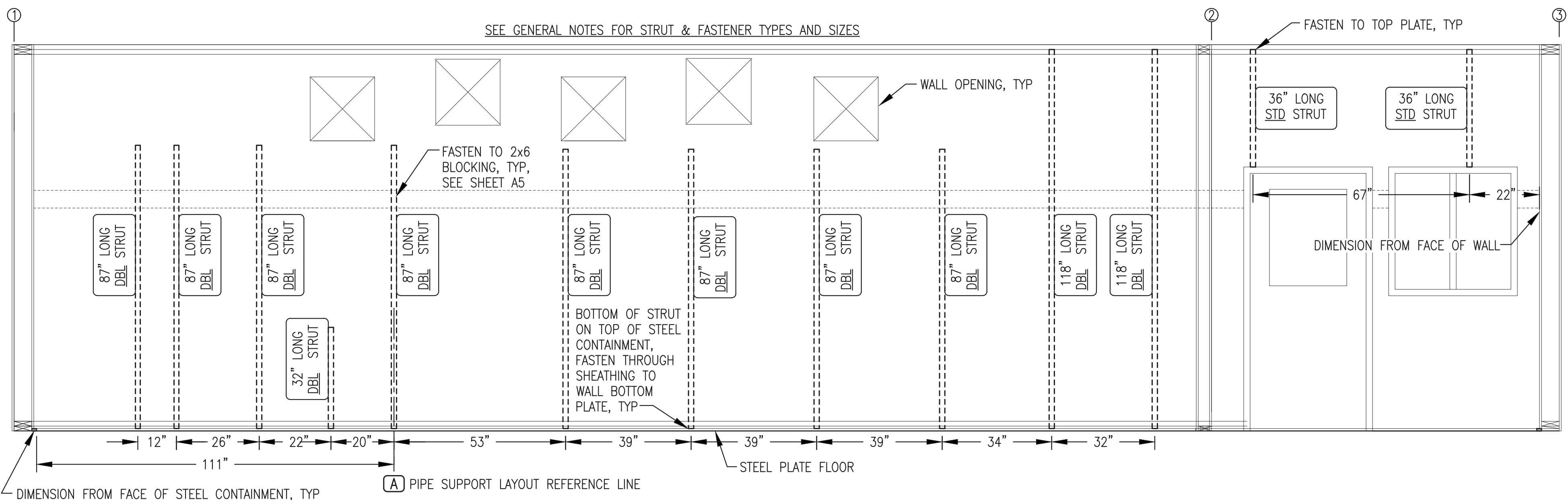




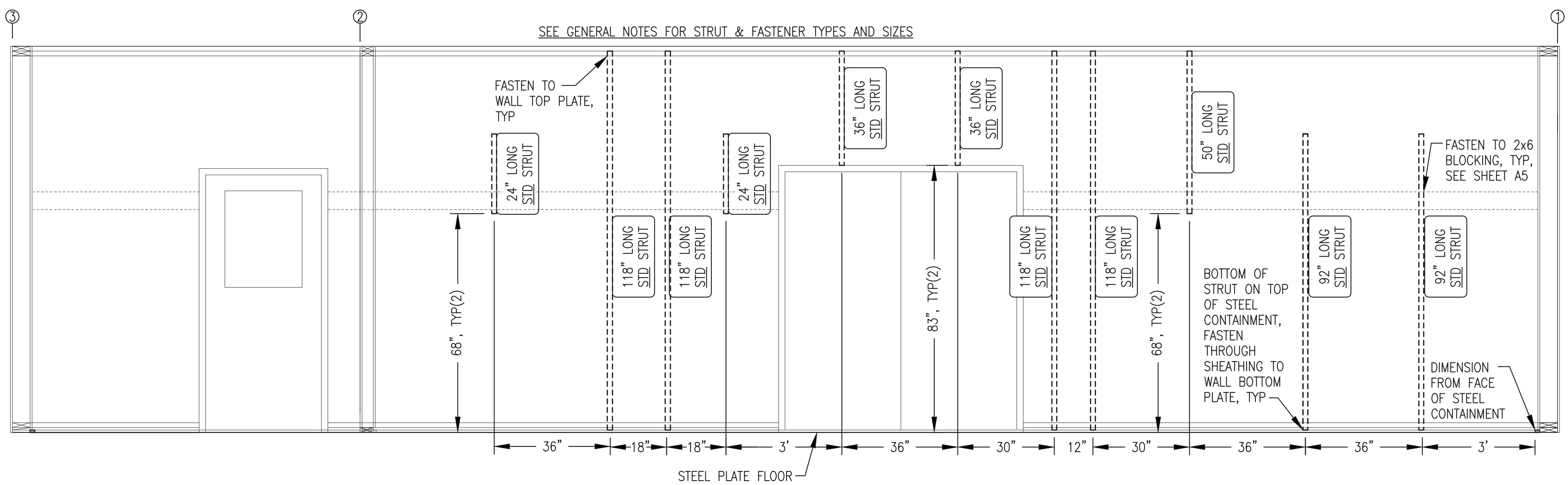
1 REFLECTED CEILING STRUT LAYOUT PLAN
M2.1 3/8"=1'-0"

MECHANICAL SUPPORT GENERAL NOTES:

1. MAJOR WALL AND CEILING MOUNTED SUPPORT STRUT SHOWN THIS SHEET IS REQUIRED PRIOR TO INITIAL PIPE, WIREWAY, AND EQUIPMENT INSTALLATION. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL SPECIFIC EQUIPMENT, PIPING, AND WIREWAY STRUT SUPPORTS' LOCATIONS AND DETAILS.
2. ALL STRUT LAYOUT DIMENSIONS ON CEILING PLAN AND WALL ELEVATIONS ARE APPROXIMATE. IF STRUT LANDS ON MAJOR RIB OF CORRUGATED CEILING PANEL, MOVE TO CLOSEST FLAT SECTION IF POSSIBLE. IF CORRUGATION CAN NOT BE AVOIDED, CUT OUT CORRUGATION AND SEAL TO STRUT ALL AROUND.
3. "STD" DESIGNATES STANDARD 1-5/8"x1-5/8" SINGLE STRUT.
 "DBL" DESIGNATES 1-5/8"x3-1/4" DOUBLE (BACK-TO-BACK) STRUT.
4. USE 3/8"x2" HEX HEAD LAG BOLTS TO FASTEN 1-5/8" "STD" STRUT TO WALL OR CEILING STRUCTURE.
 USE 3/8"x4" HEX HEAD LAG BOLTS TO FASTEN 3-1/4" "DBL" STRUT TO WALL STRUCTURE.
5. ON WALLS FASTEN STRUT TO 5/8" SHEATHING WITH 3/8" LAGS AT 20" O.C. BETWEEN PLATES AND/OR BLOCKING.



2 BACK WALL LAYOUT ELEVATION
M2.1 1/2"=1'-0"

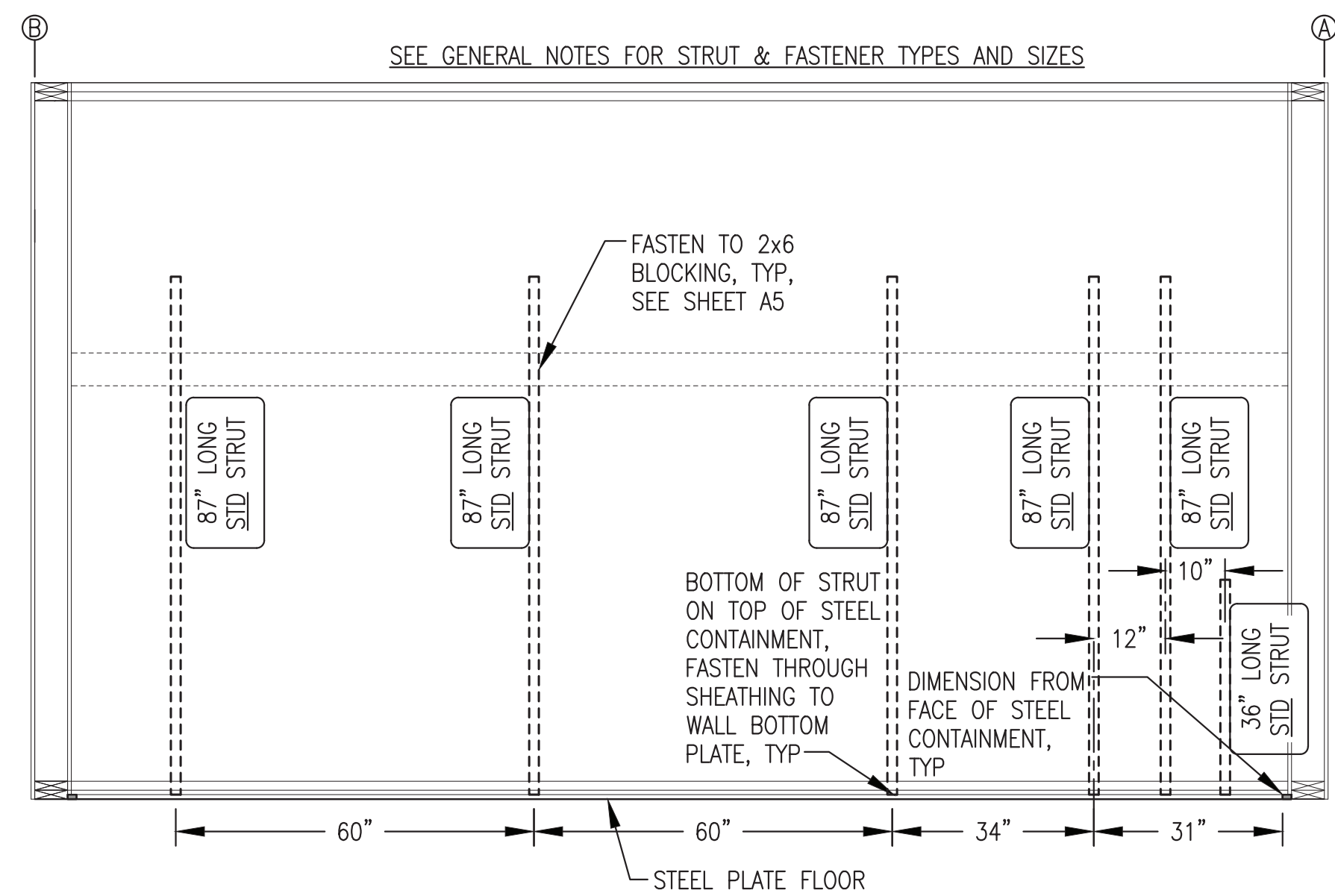


3 FRONT WALL LAYOUT ELEVATION
M2.1 1/2"=1'-0"

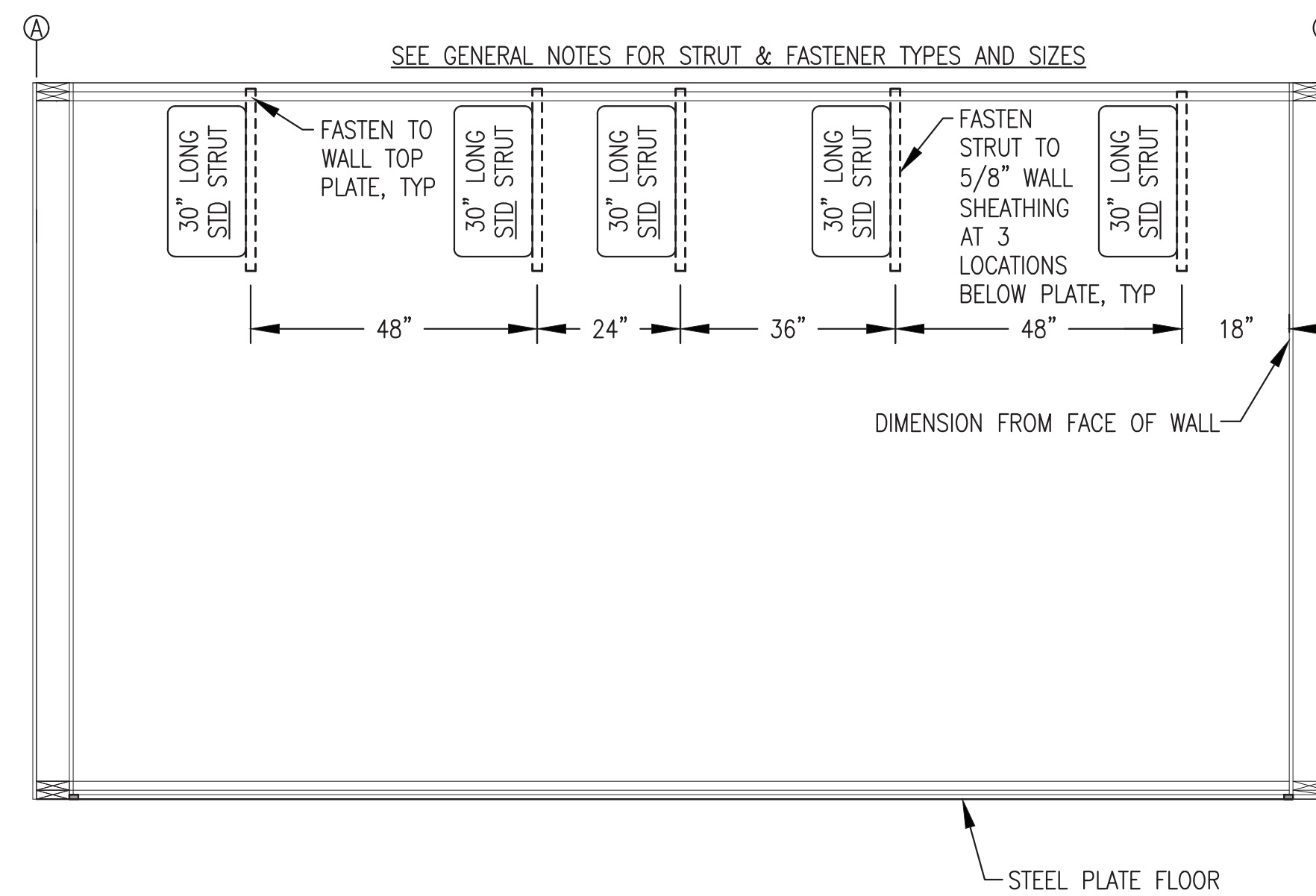
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 NOVEMBER
 2021



1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: WALL & CEILING MECHANICAL SUPPORT LAYOUT			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M2.1 OF 9	
PROJECT NUMBER: P.O. 111405, Anchorage, AK 99511 (907)349-0100			

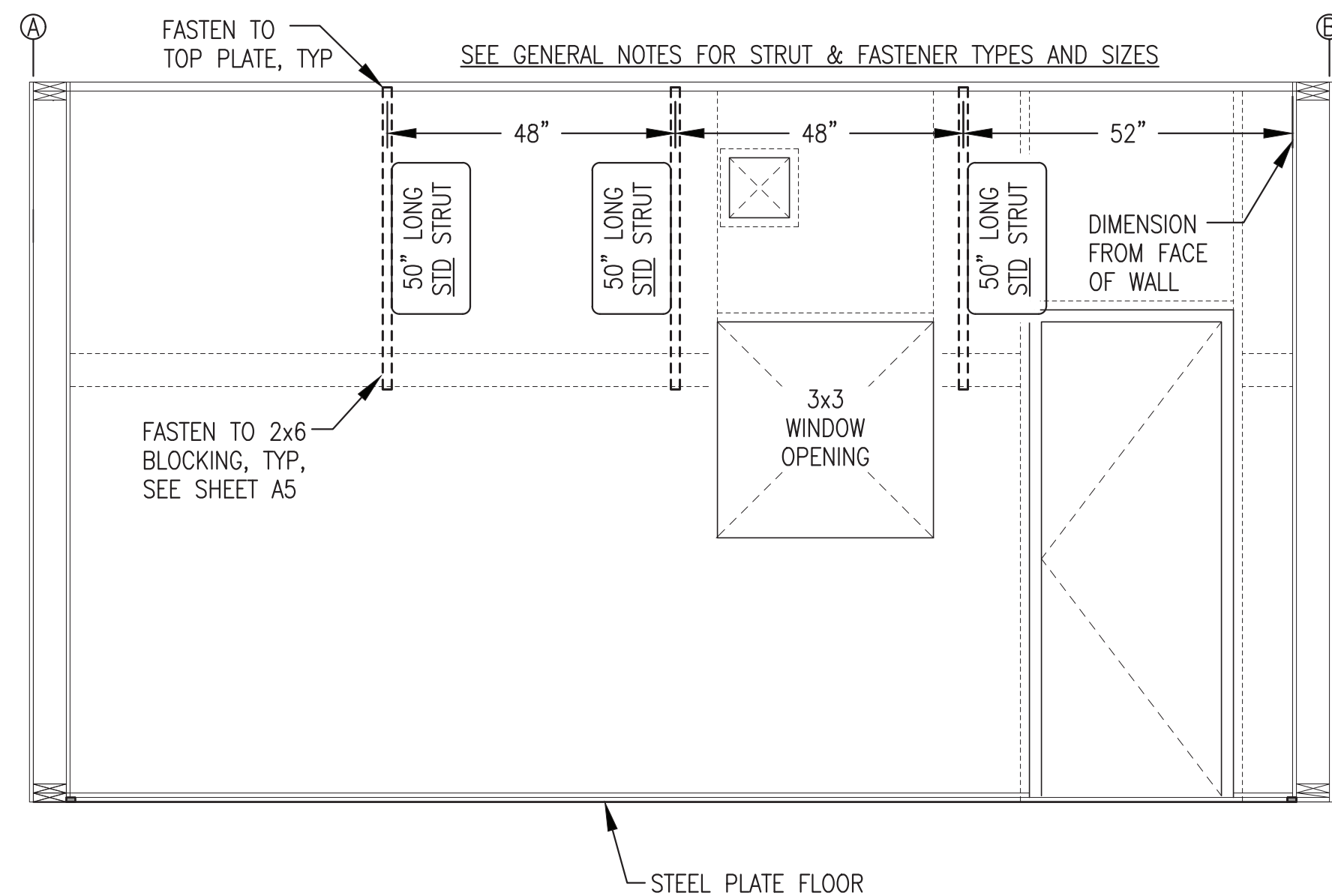


1 GENERATION ROOM END WALL LAYOUT ELEVATION
M2.2 1/2"=1'-0"

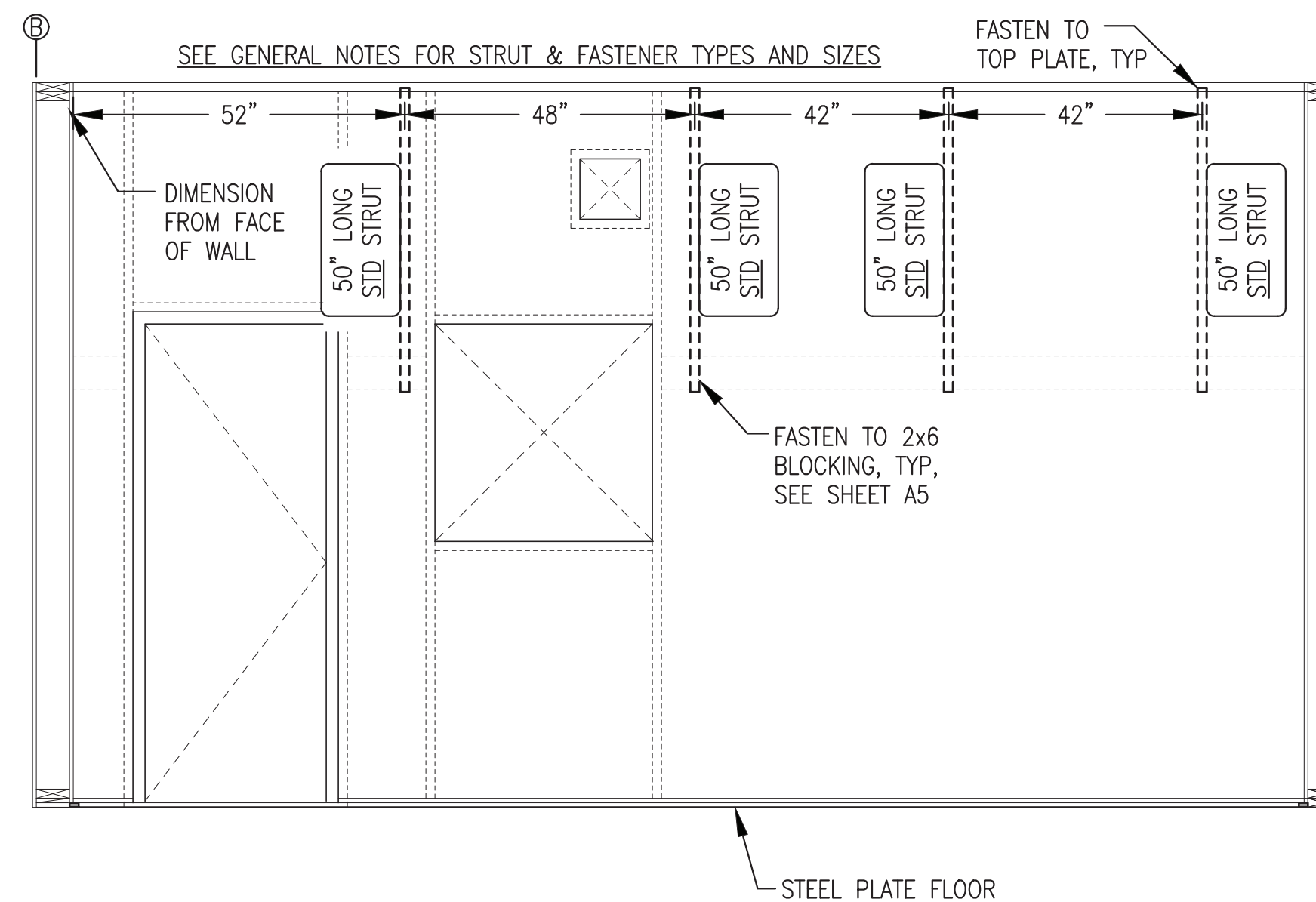


2 CONTROL ROOM END WALL LAYOUT ELEVATION
M2.2 1/2"=1'-0"

- MECHANICAL SUPPORT GENERAL NOTES:**
1. MAJOR WALL AND CEILING MOUNTED SUPPORT STRUT SHOWN THIS SHEET IS REQUIRED PRIOR TO INITIAL PIPE, WIREWAY, AND EQUIPMENT INSTALLATION. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL SPECIFIC EQUIPMENT, PIPING, AND WIREWAY STRUT SUPPORTS LOCATIONS AND DETAILS.
 2. ALL STRUT LAYOUT DIMENSIONS ON CEILING PLAN AND WALL ELEVATIONS ARE APPROXIMATE. IF STRUT LANDS ON MAJOR RIB OF CORRUGATED CEILING PANEL, MOVE TO CLOSEST FLAT SECTION IF POSSIBLE. IF CORRUGATION CAN NOT BE AVOIDED, CUT OUT CORRUGATION AND SEAL TO STRUT ALL AROUND.
 3. "STD" DESIGNATES STANDARD 1-5/8"x1-5/8" SINGLE STRUT.
"DBL" DESIGNATES 1-5/8"x3-1/4" DOUBLE (BACK-TO-BACK) STRUT.
 4. USE 3/8"x2" HEX HEAD LAG BOLTS TO FASTEN 1-5/8" "STD" STRUT TO WALL OR CEILING STRUCTURE.
USE 3/8"x4" HEX HEAD LAG BOLTS TO FASTEN 3-1/4" "DBL" STRUT TO WALL STRUCTURE.
 5. ON WALLS FASTEN STRUT TO 5/8" SHEATHING WITH 3/8" LAGS AT 20" O.C. BETWEEN PLATES AND/OR BLOCKING.

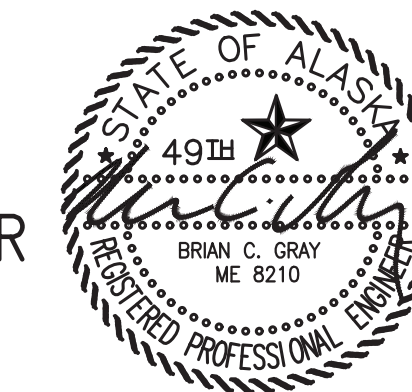



3 GENERATION ROOM PARTITION WALL LAYOUT ELEVATION
M2.2 1/2"=1'-0"



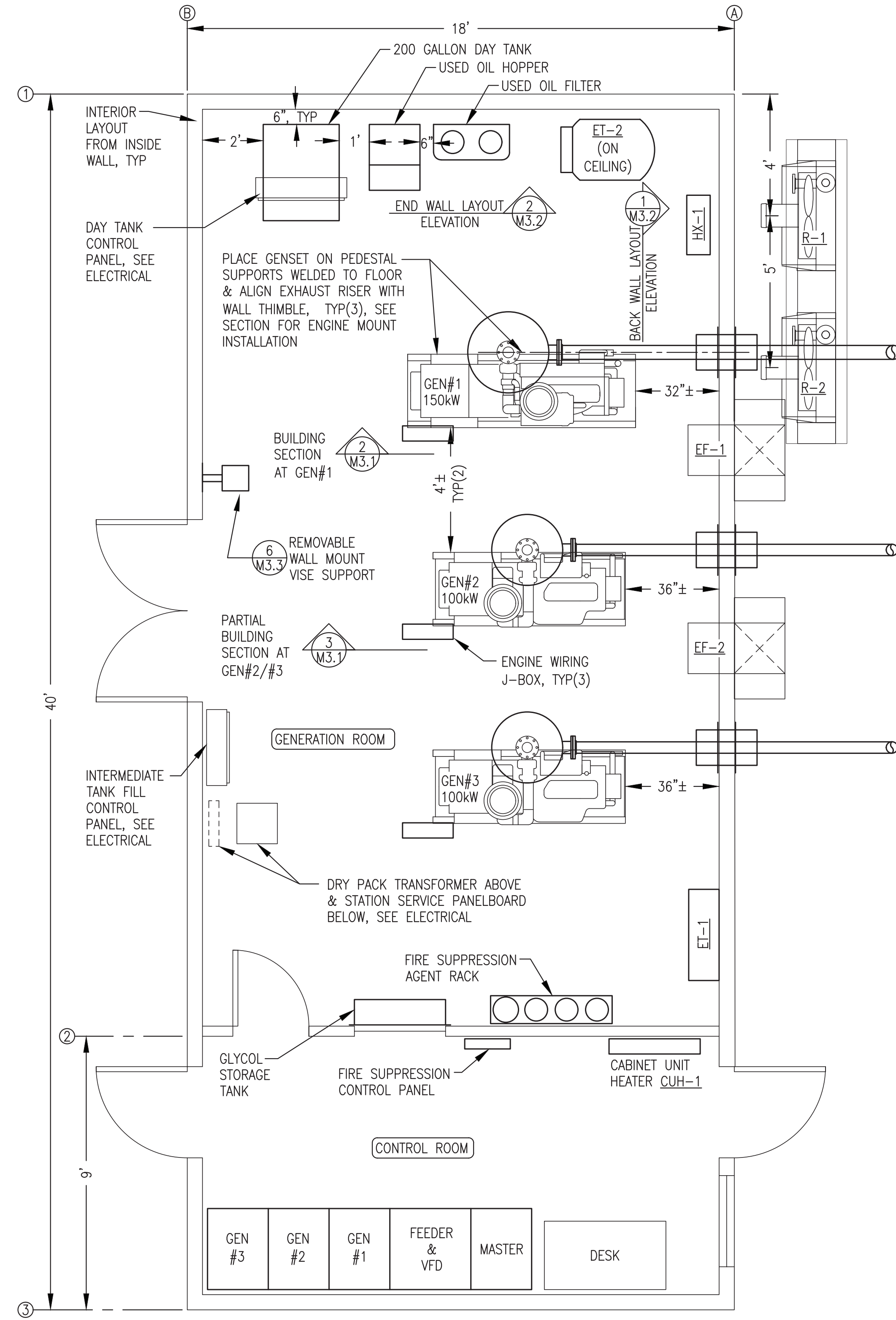
4 GENERATION ROOM PARTITION WALL LAYOUT ELEVATION
M2.2 1/2"=1'-0"

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NOVEMBER
2021

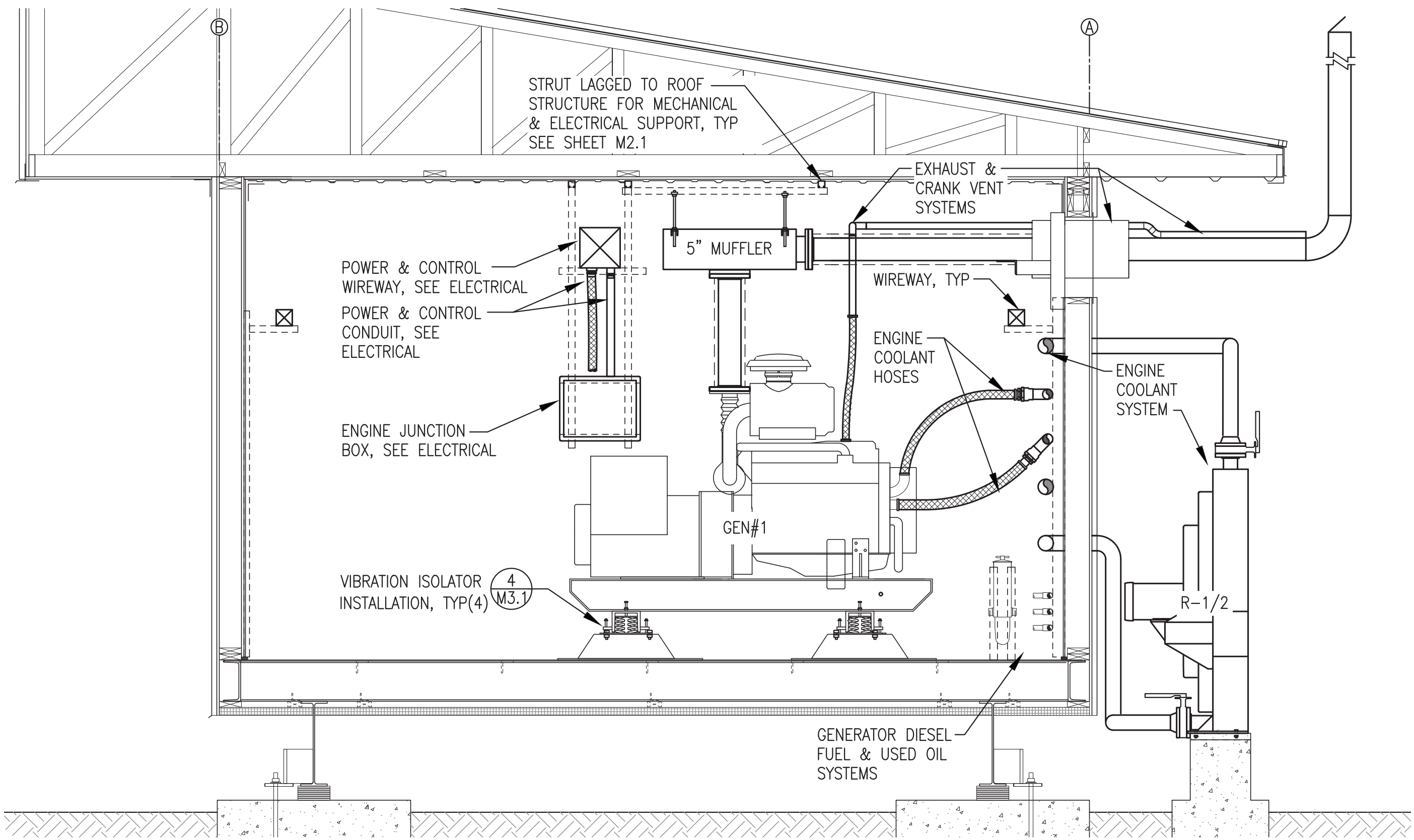


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: END WALLS MECHANICAL SUPPORT LAYOUT			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M2.2 OF 9	
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

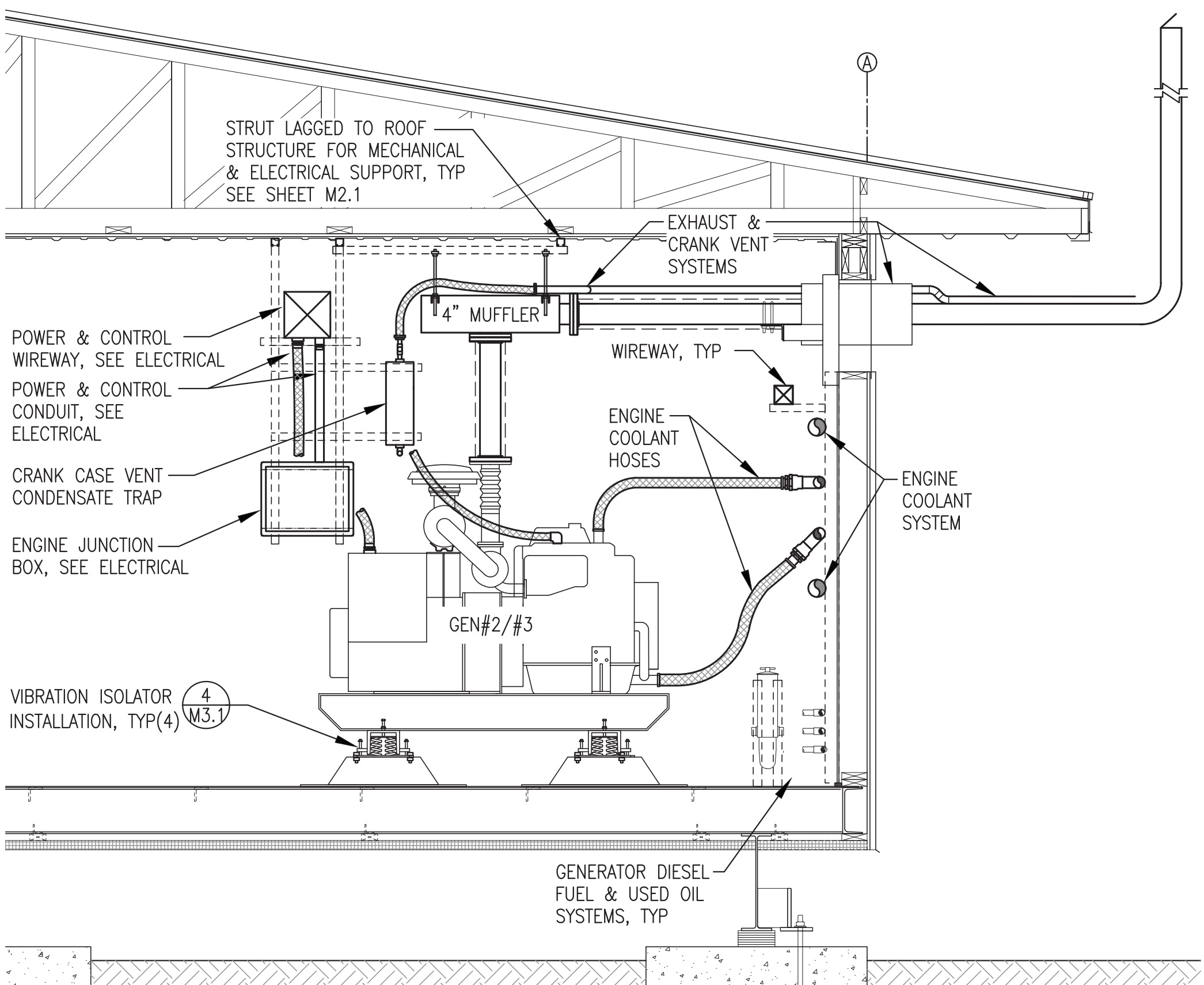
NIKOLAI ENGINE GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1	ENGINE - 223 HP, 150 EKW PRIME, JOHN DEERE 6068AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 170 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274G.
GEN #2	ENGINE - 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274E.
GEN #3	ENGINE - 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274E.



1 EQUIPMENT LAYOUT PLAN
M3.1 3/8"=1'-0"



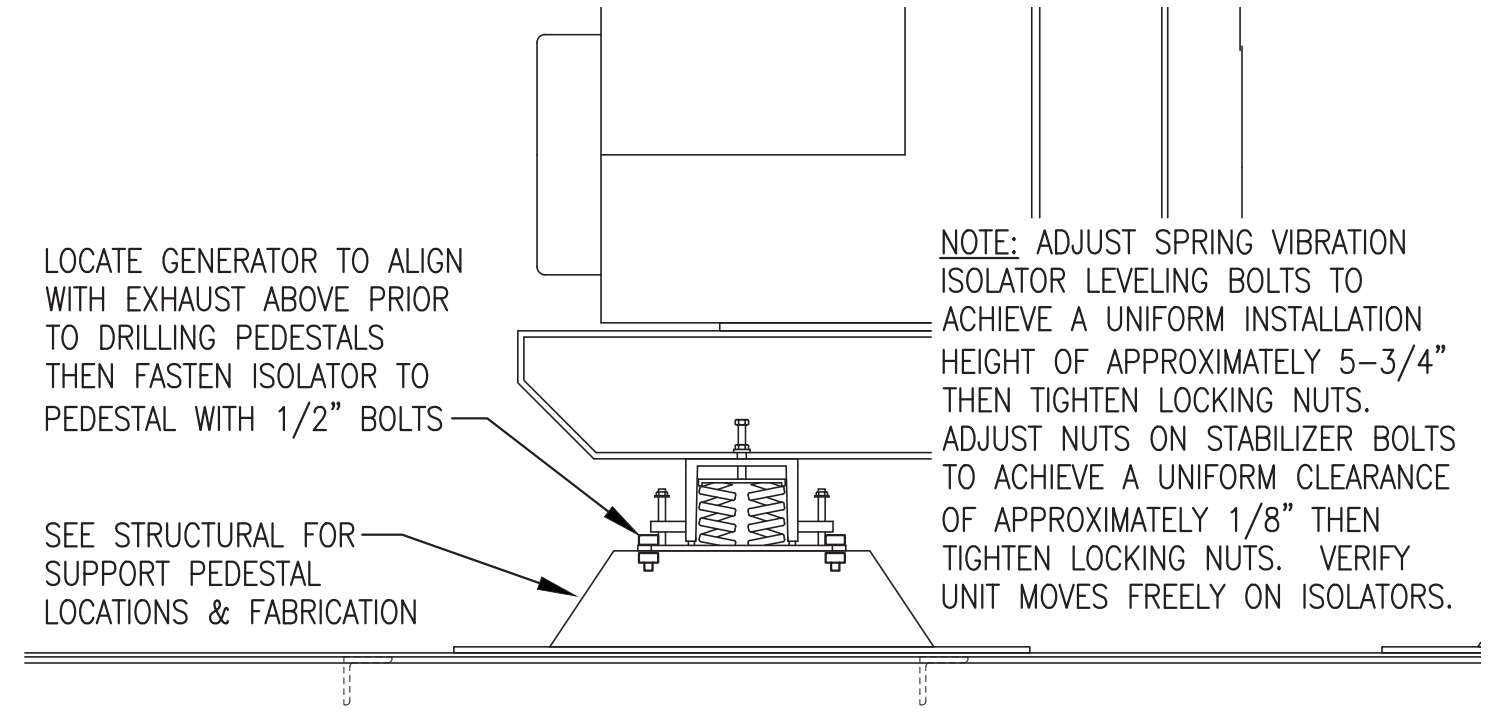
2 BUILDING SECTION AT GEN#1
M3.1 1/2"=1'-0"



3 TYPICAL PARTIAL BUILDING SECTION AT GEN#2/#3
M3.1 1/2"=1'-0"

EQUIPMENT LAYOUT GENERAL NOTES:

- SEE SHEETS M2.1 AND M2.2 FOR WALL AND CEILING EQUIPMENT MECHANICAL SUPPORT PLANS AND DETAILS
- SEE SHEETS M3.1-M3.4 FOR GENERAL EQUIPMENT LAYOUT, BASE SUPPORT, FABRICATIONS, AND GENERATOR ASSEMBLY PLANS AND DETAILS.
- SEE SHEETS M4.1-M4.4 FOR ENGINE COOLANT AND HEAT RECOVERY PLANS, ISOMETRICS AND DETAILS.
- SEE SHEETS M5.1-M5.7 FOR DIESEL FUEL AND USED OIL SYSTEM PLANS AND DETAILS.
- SEE SHEET M6 FOR EXHAUST AND CRANK CASE VENTILATION PLANS AND DETAILS.
- SEE SHEETS M7.1 AND M7.2 FOR VENTILATION SYSTEM PLANS AND DETAILS.



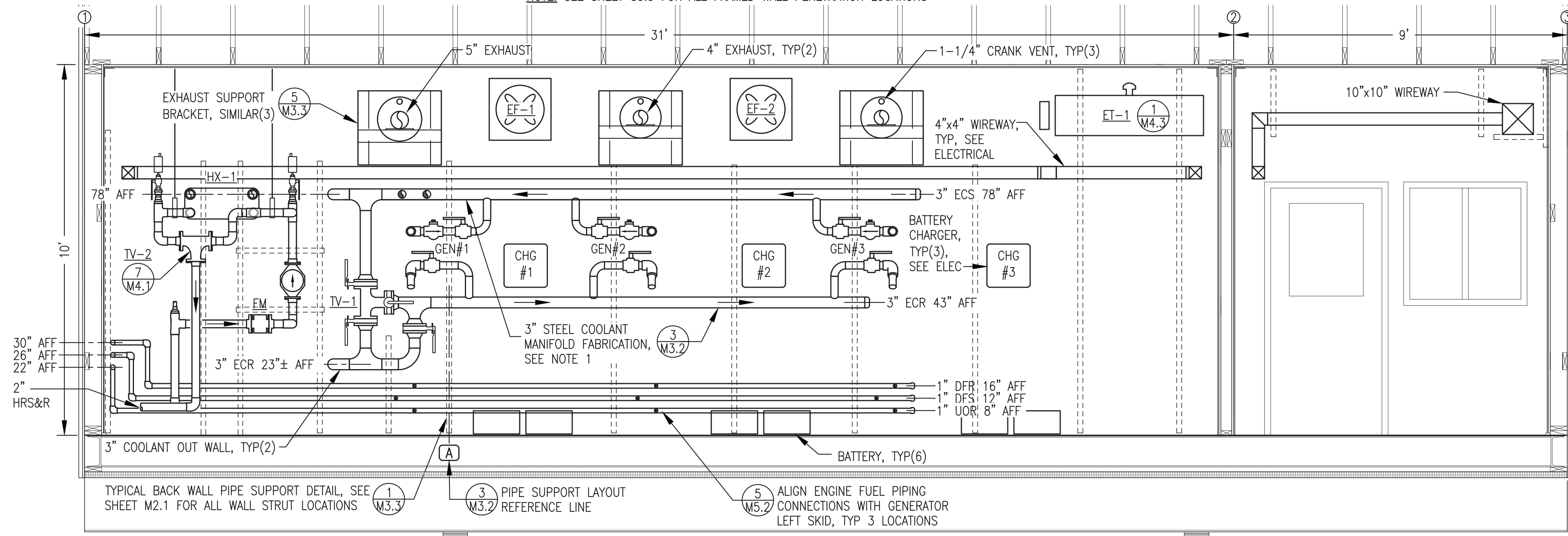
4 VIBRATION ISOLATOR INSTALLATION
M3.1 1"=1'-0"

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2021

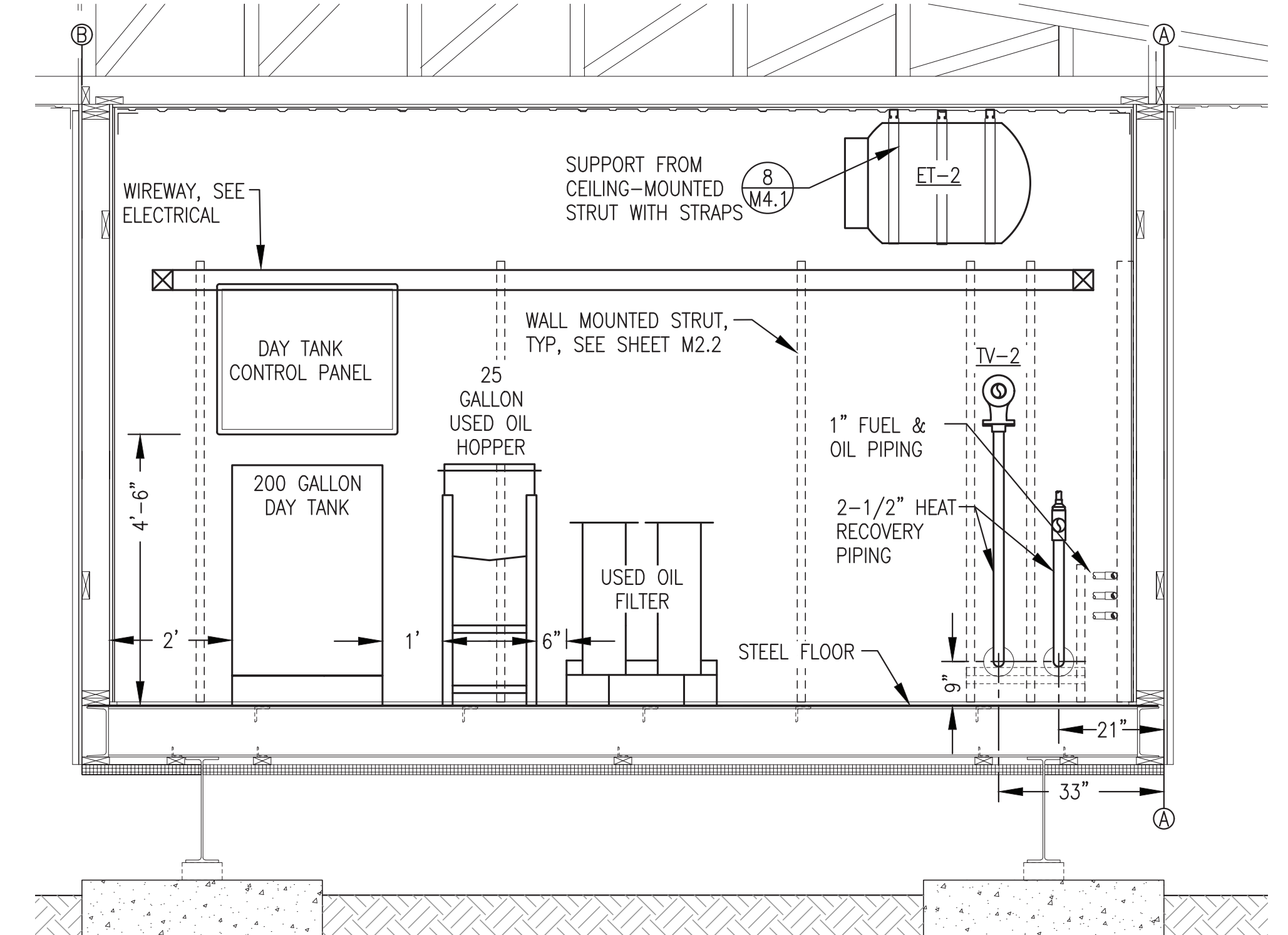


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: EQUIPMENT LAYOUT PLAN & SECTIONS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M3.1 OF 9	
PROJECT NUMBER:			
 Gray Stassel Engineering, Inc.			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

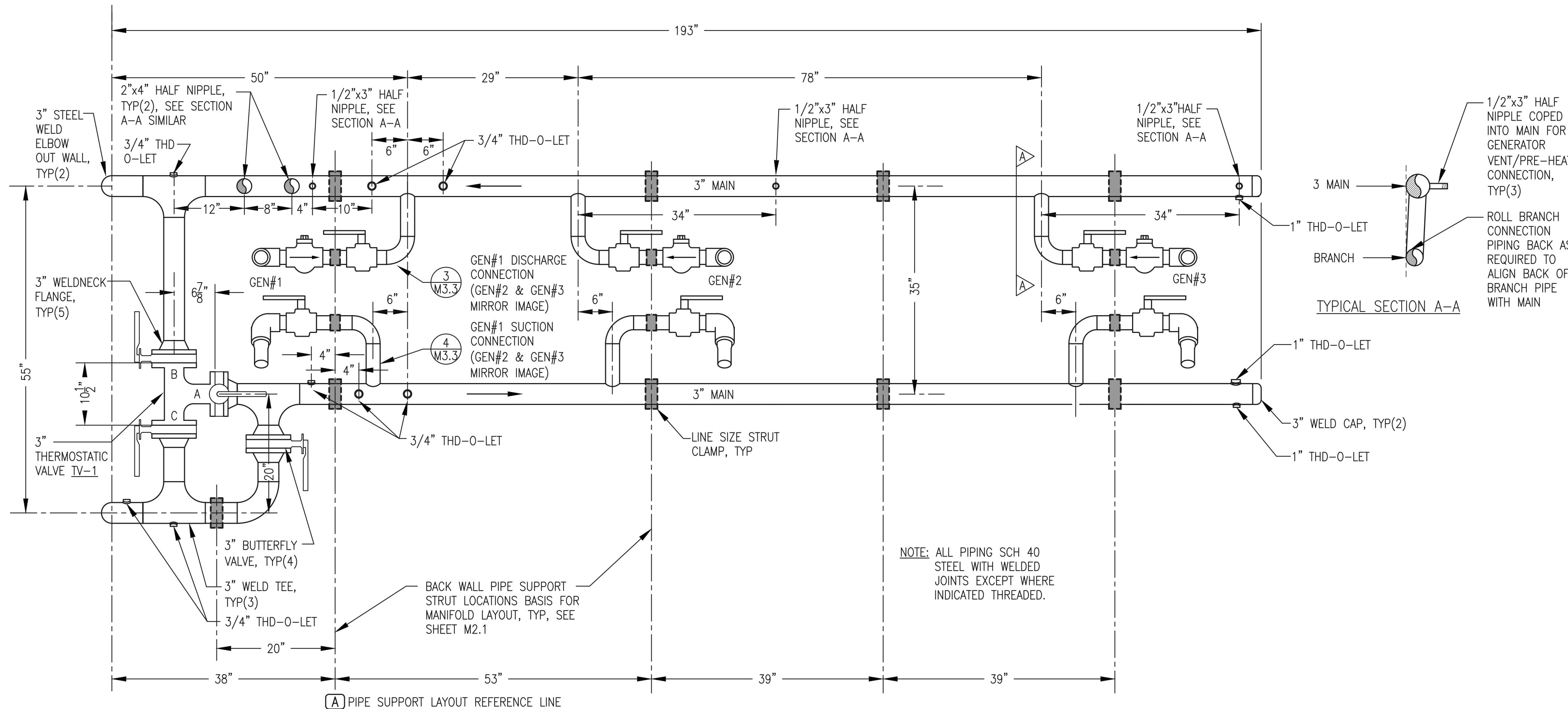
NOTE: SEE SHEET S3.3 FOR ALL FRAMED WALL PENETRATION LOCATIONS



1 BACK WALL LAYOUT ELEVATION
M3.2 1/2"=1'-0"




2 END WALL LAYOUT ELEVATION
M3.2 1/2"=1'-0"



3 COOLANT MANIFOLD ENLARGED FABRICATION DETAIL
M3.2 1"=1'-0"

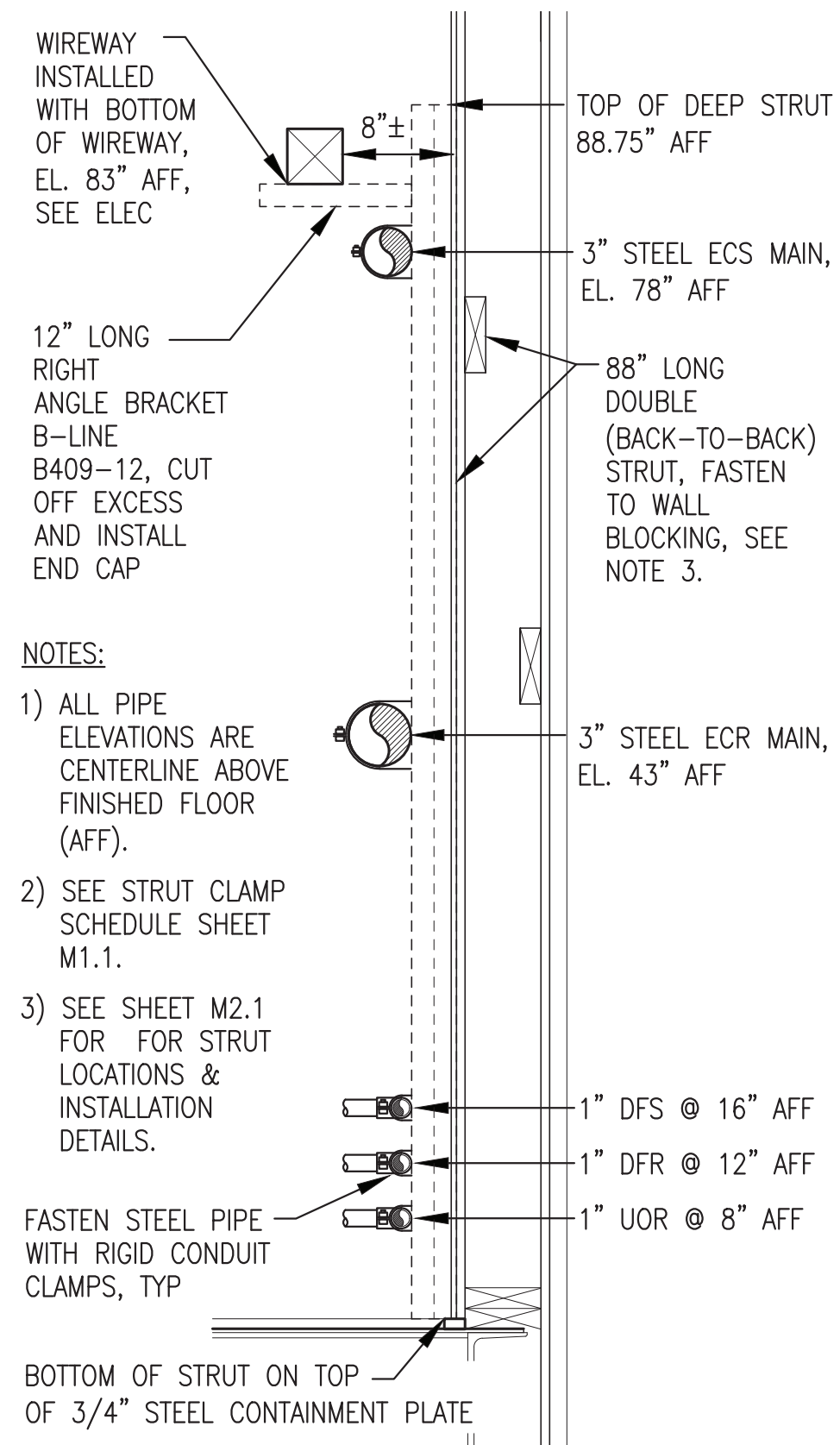
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ISSUED
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2021



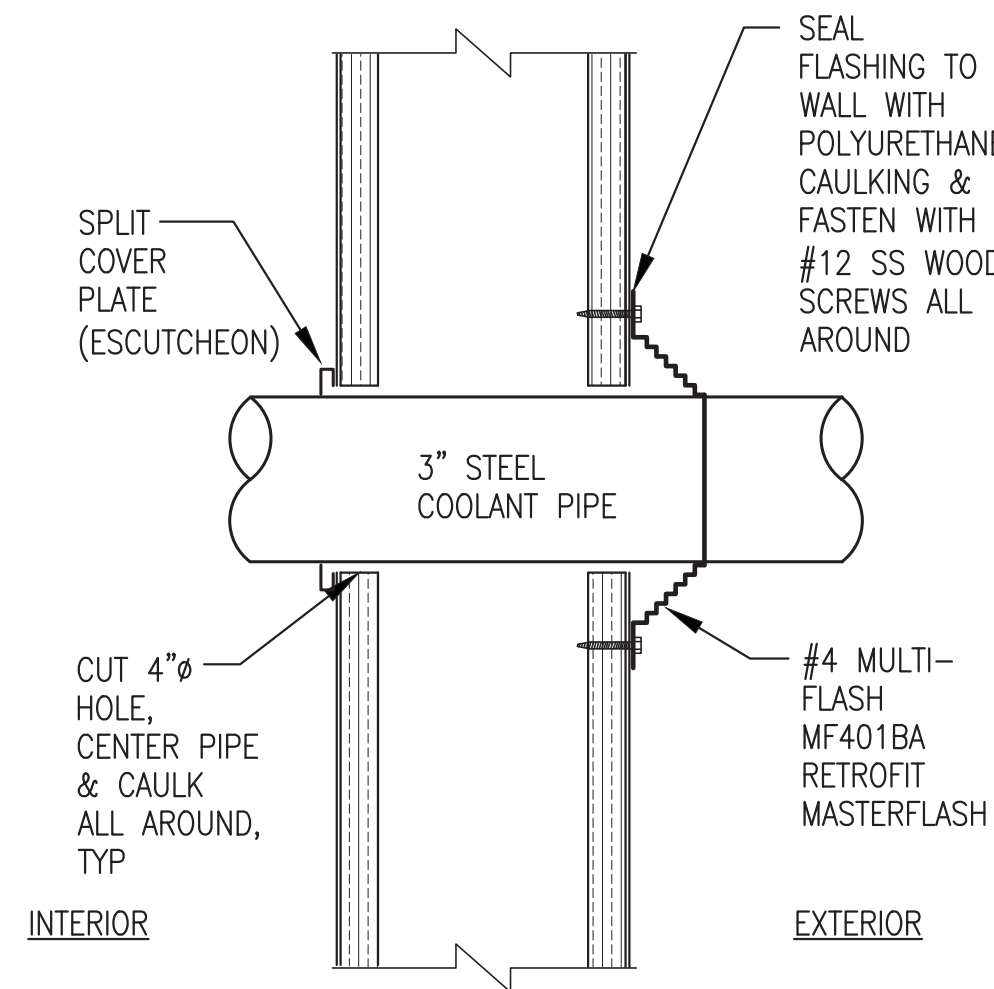
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: WALL LAYOUT ELEVATIONS & COOLANT MANIFOLD FABRICATION DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M3.2 OF 9	
PROJECT NUMBER:			



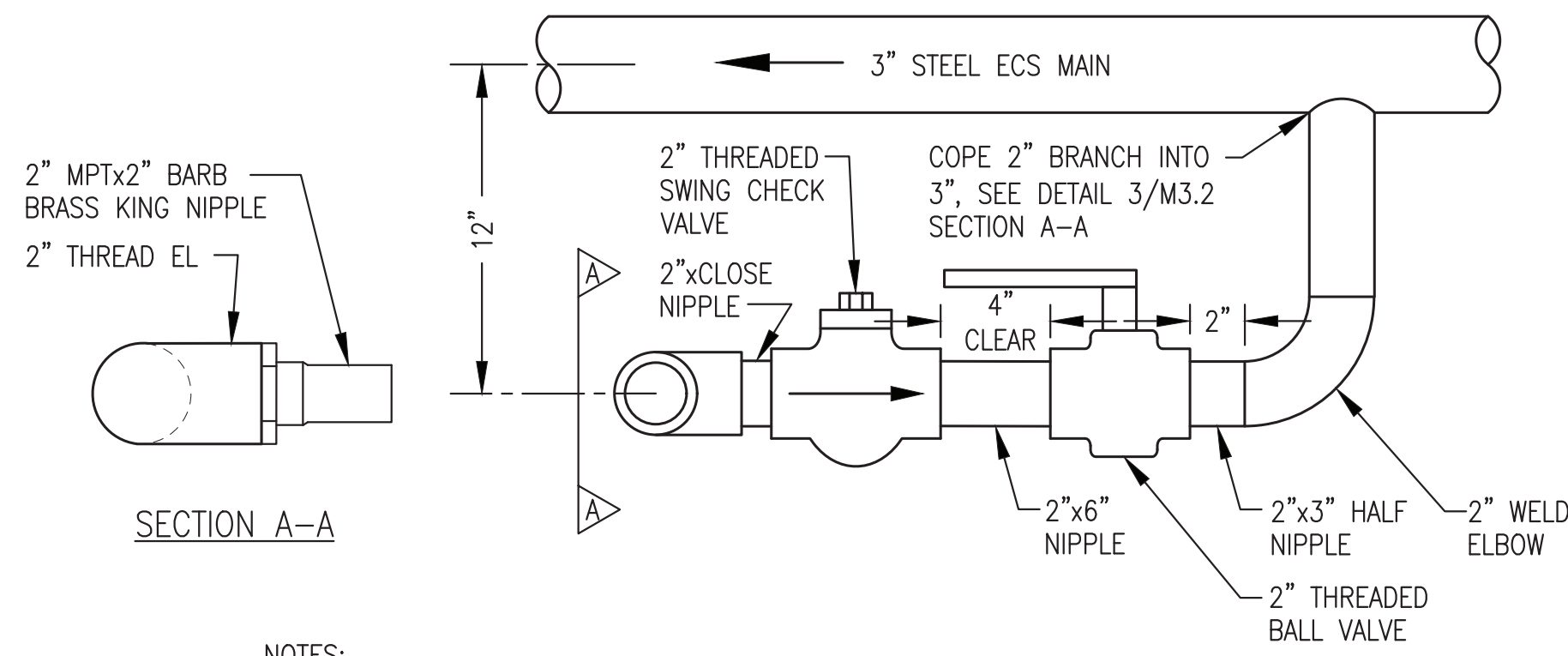
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1 BACK WALL PIPING SUPPORT
M3.3 NO SCALE

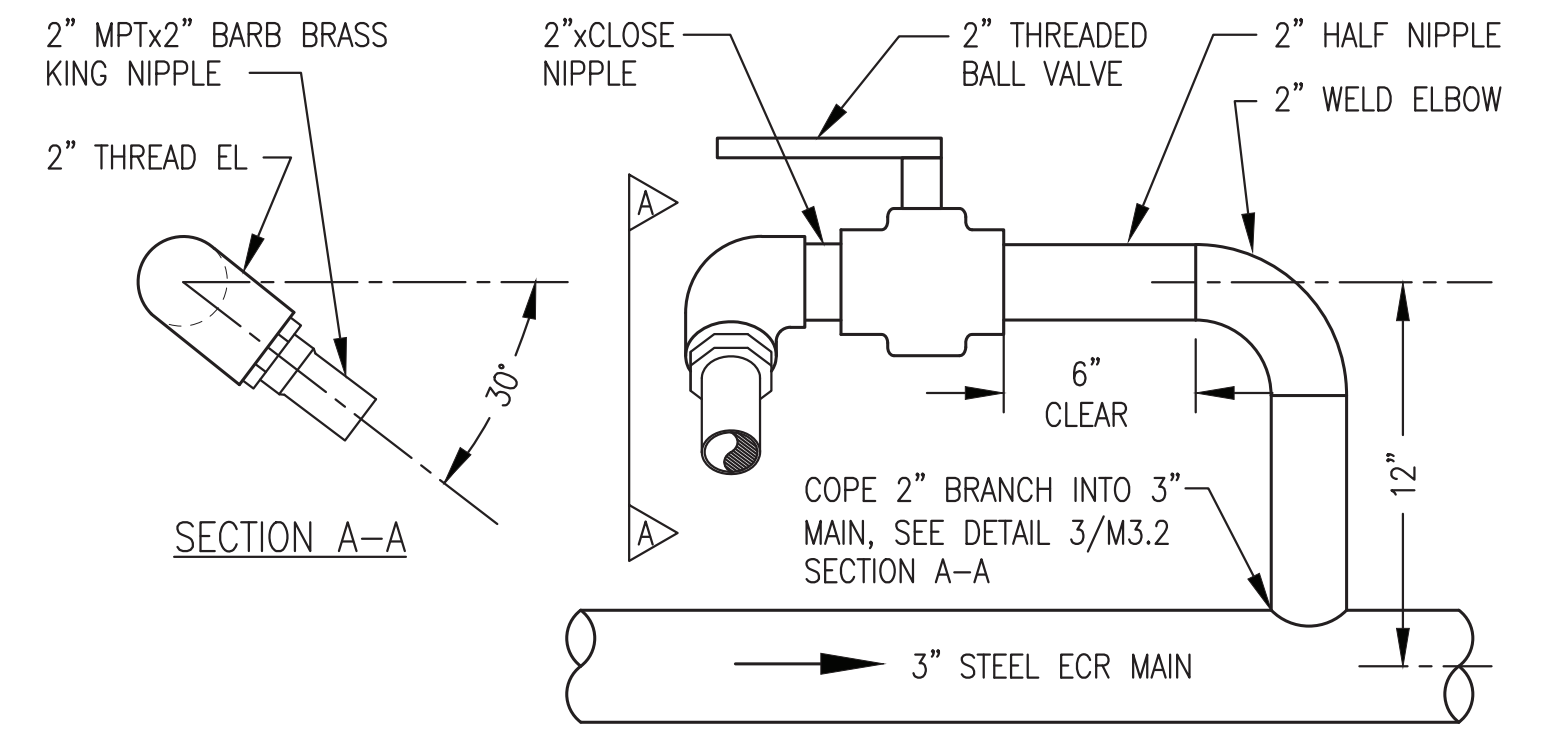


2 COOLANT PIPE WALL PENETRATION
M3.3 NO SCALE



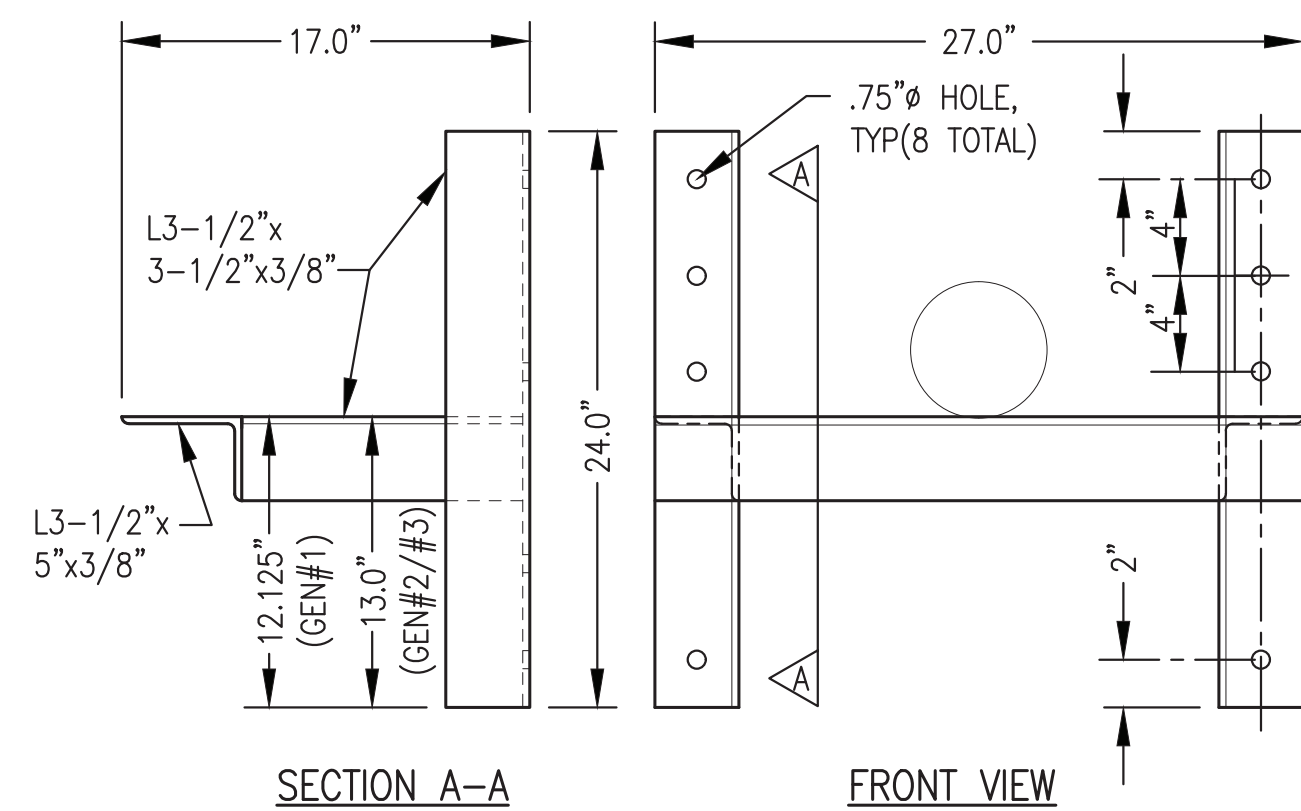
NOTES:
1) MAIN PIPING 3" STEEL WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
2) ALL PIPING SCHEDULE 40 STEEL. ALL LINE SIZE VALVES THREADED.

3 GEN#1 DISCHARGE CONNECTION (GEN#2 & GEN#3 MIRROR IMAGE)
M3.3 NO SCALE

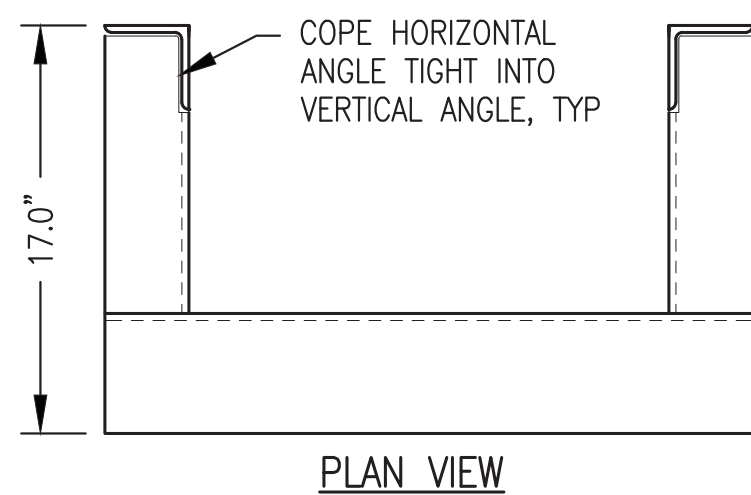


NOTES:
1) MAIN PIPING 3" STEEL WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
2) ALL PIPING SCHEDULE 40 STEEL. ALL LINE SIZE VALVES THREADED.

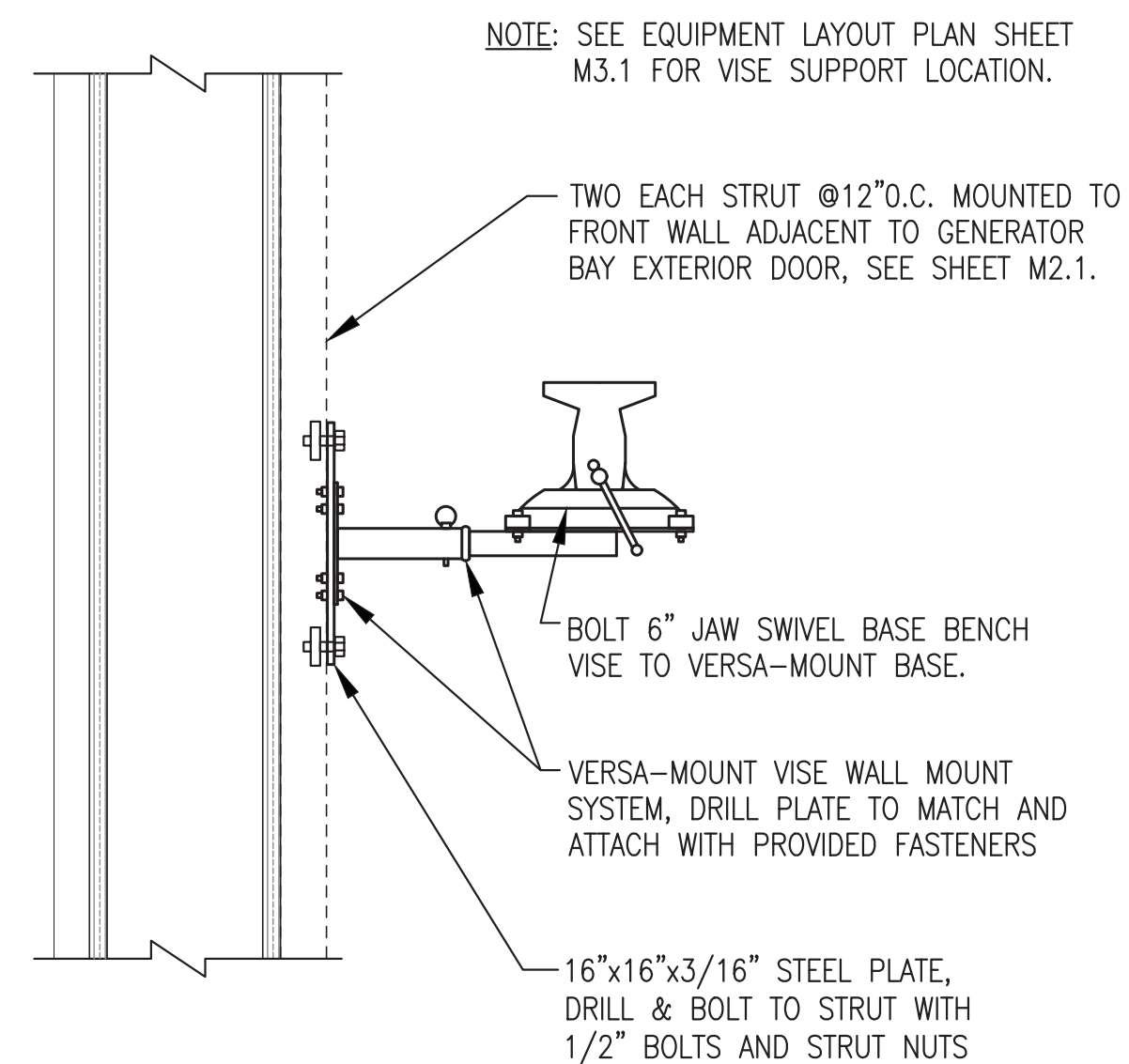
4 GEN#1 SUCTION CONNECTION (GEN #2 & GEN#3 MIRROR IMAGE)
M3.3 NO SCALE



NOTES:
1. FABRICATE 1 EACH BRACKET WITH 13.0" RISE FOR GEN #1 AND 2 EACH BRACKETS WITH 12.125" RISE FOR GEN#2 & #3.
2. MAKE ALL JOINTS WITH CONTINUOUS FULL PENETRATION WELDS.
3. AFTER COMPLETION GRIND EDGES AND ROUND SHARP CORNERS, SANDBLAST ENTIRE ASSEMBLY, AND FINISH WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.



5 EXHAUST SUPPORT BRACKET FABRICATION
M3.3 NO SCALE



NOTE: SEE EQUIPMENT LAYOUT PLAN SHEET M3.1 FOR VISE SUPPORT LOCATION.

TWO EACH STRUT @12"O.C. MOUNTED TO FRONT WALL ADJACENT TO GENERATOR BAY EXTERIOR DOOR, SEE SHEET M2.1.

BOLT 6" JAW SWIVEL BASE BENCH VISE TO VERSA-MOUNT BASE.

VERSA-MOUNT VISE WALL MOUNT SYSTEM, DRILL PLATE TO MATCH AND ATTACH WITH PROVIDED FASTENERS

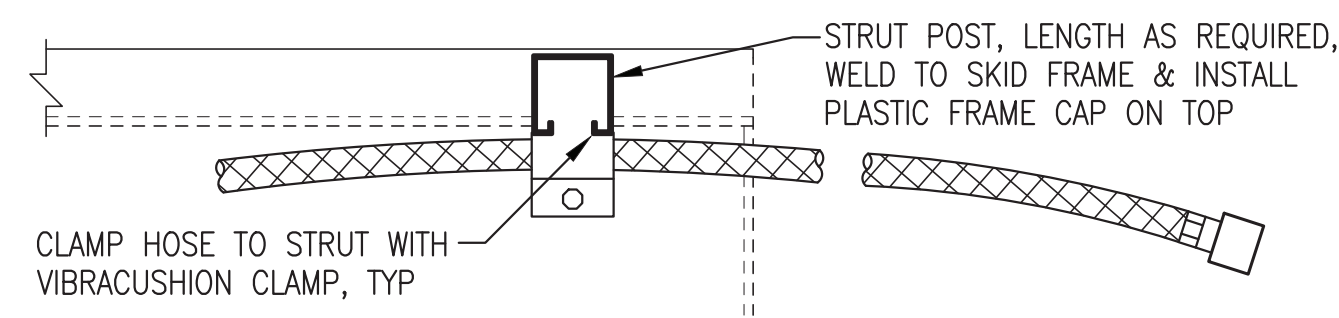
16"x16"x3/16" STEEL PLATE, DRILL & BOLT TO STRUT WITH 1/2" BOLTS AND STRUT NUTS

6 REMOVABLE BENCH VISE INSTALLATION
M3.3 NO SCALE

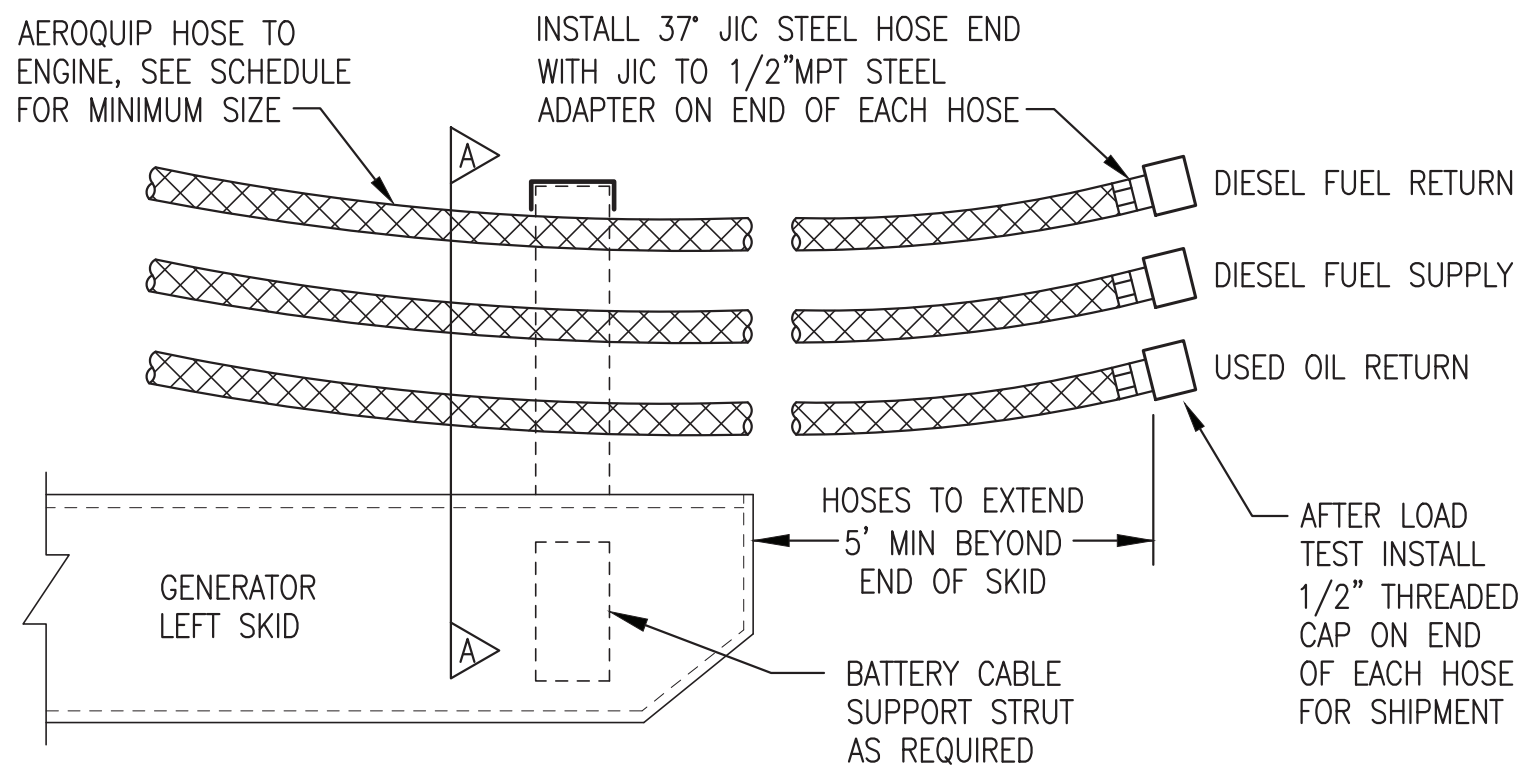


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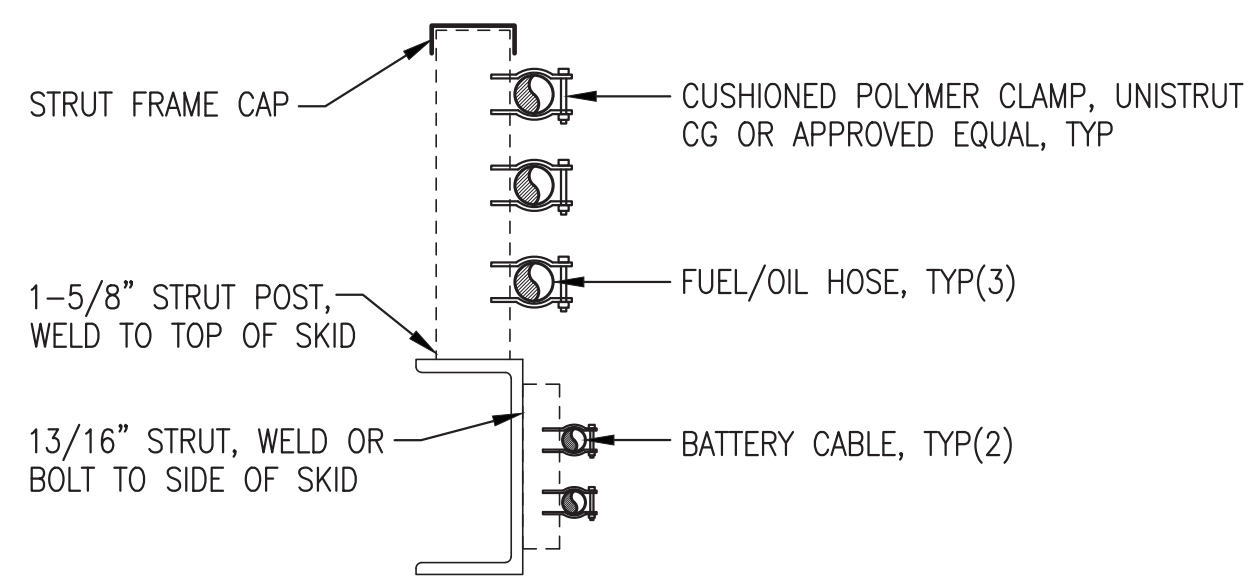
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: MECHANICAL DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M3.3 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



LEFT SKID PLAN (TOP) VIEW



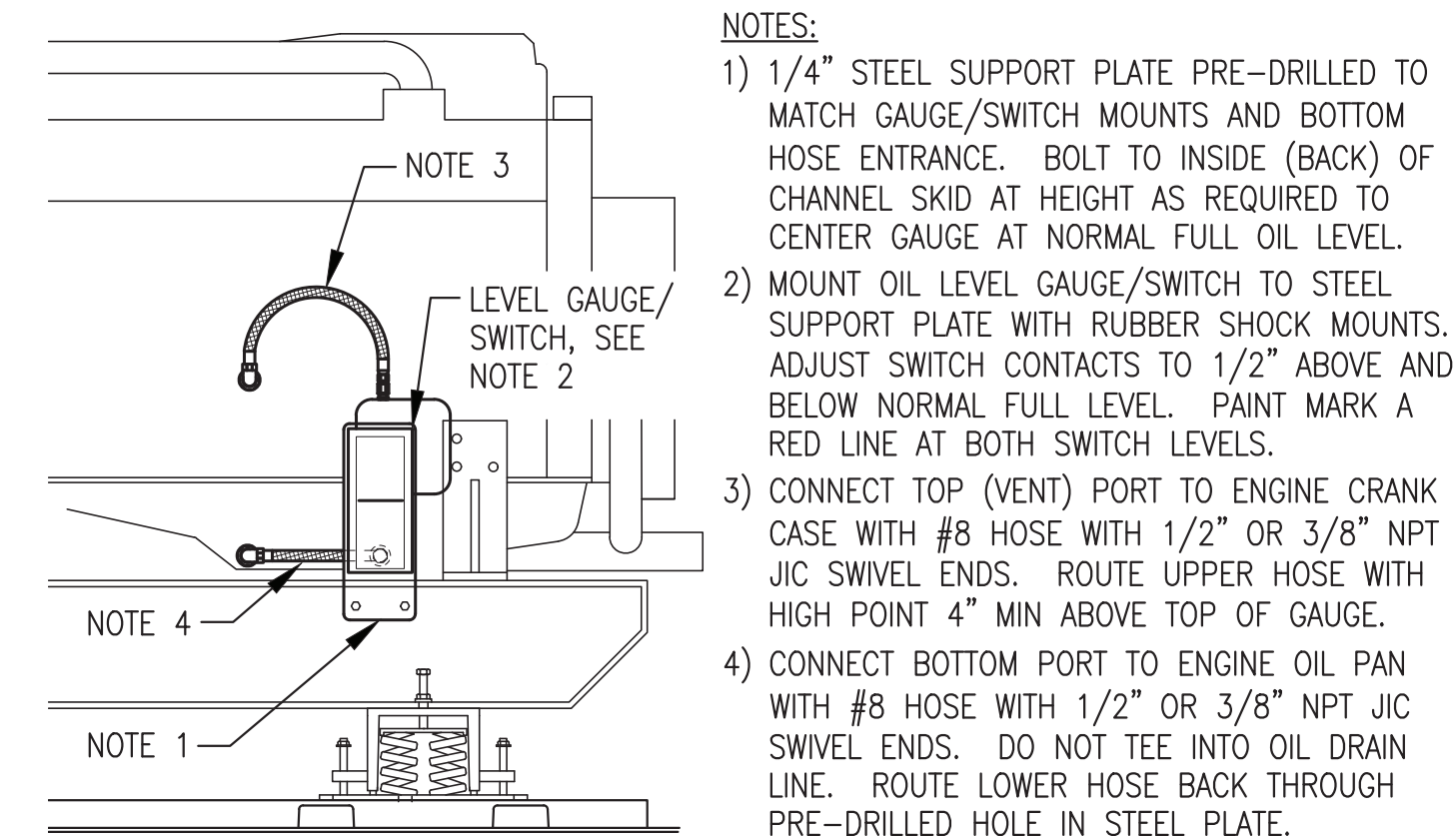
LEFT SKID ELEVATION (SIDE) VIEW



SECTION A-A

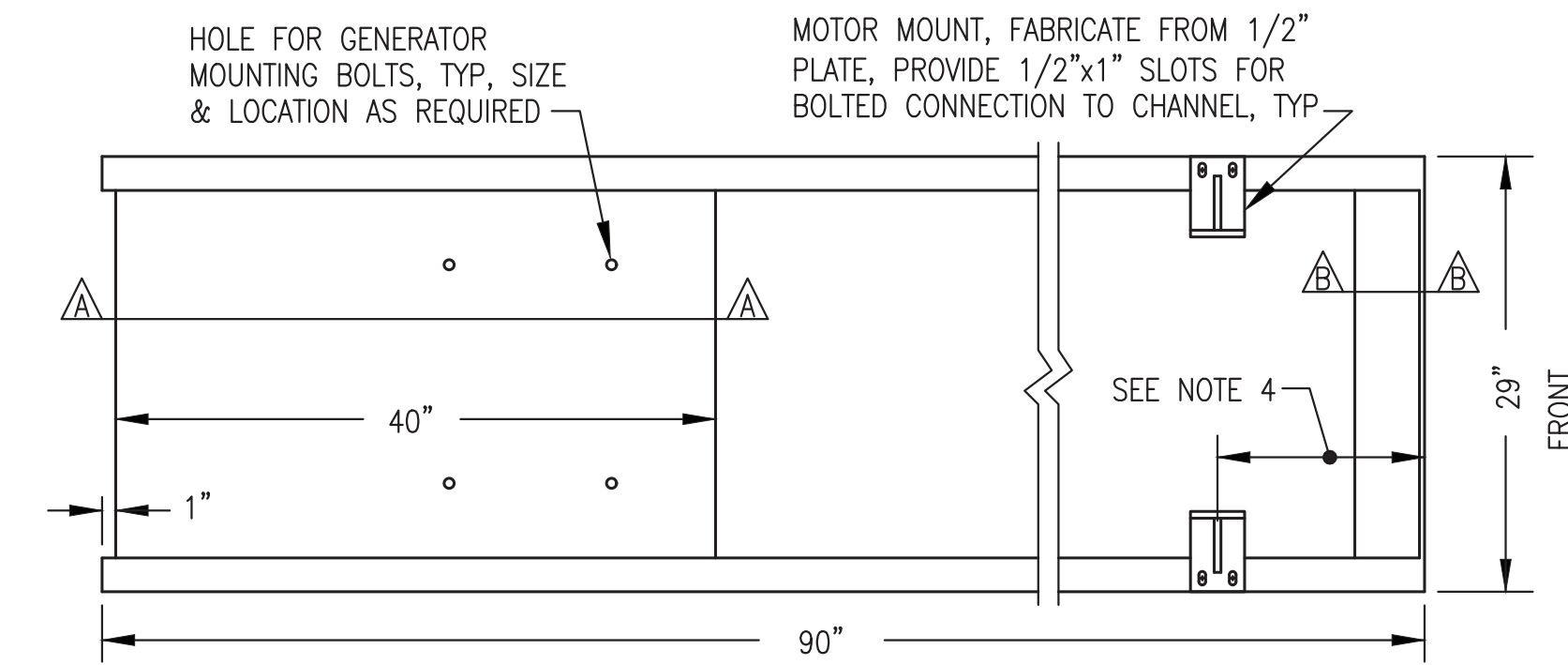
NOTE:
GROUP HOSES ON LEFT SKID AS SHOWN TO COORDINATE WITH COOLANT HOSE/CABLE SUPPORTS MOUNTED TO RIGHT SKID BEAM.

1 FUEL & OIL HOSE TERMINATIONS
M3.4 NO SCALE

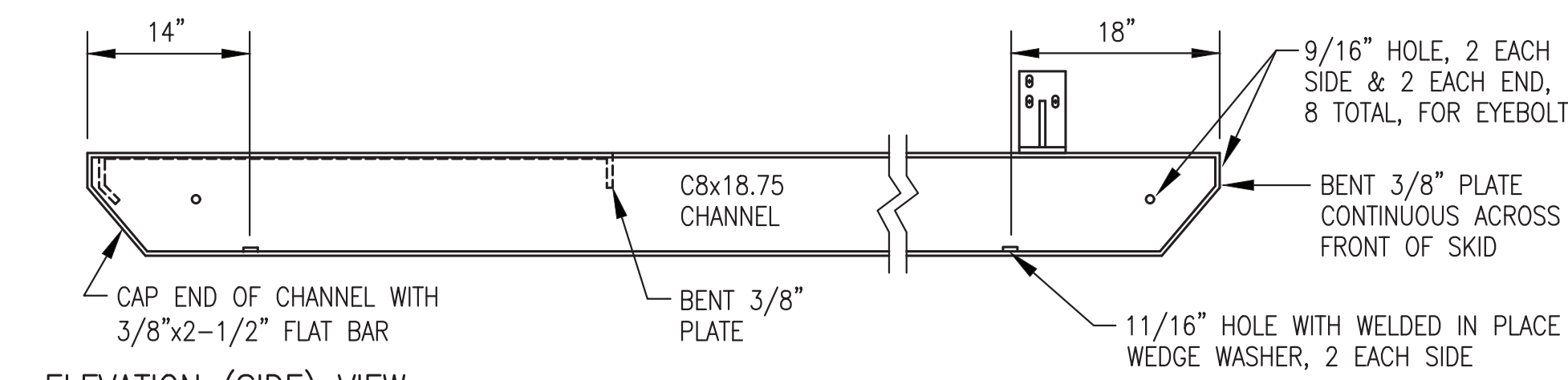


- NOTES:
- 1) 1/4" STEEL SUPPORT PLATE PRE-DRILLED TO MATCH GAUGE/SWITCH MOUNTS AND BOTTOM HOSE ENTRANCE. BOLT TO INSIDE (BACK) OF CHANNEL SKID AT HEIGHT AS REQUIRED TO CENTER GAUGE AT NORMAL FULL OIL LEVEL.
 - 2) MOUNT OIL LEVEL GAUGE/SWITCH TO STEEL SUPPORT PLATE WITH RUBBER SHOCK MOUNTS. ADJUST SWITCH CONTACTS TO 1/2" ABOVE AND BELOW NORMAL FULL LEVEL. PAINT MARK A RED LINE AT BOTH SWITCH LEVELS.
 - 3) CONNECT TOP (VENT) PORT TO ENGINE CRANK CASE WITH #8 HOSE WITH 1/2" OR 3/8" NPT JIC SWIVEL ENDS. ROUTE UPPER HOSE WITH HIGH POINT 4" MIN ABOVE TOP OF GAUGE.
 - 4) CONNECT BOTTOM PORT TO ENGINE OIL PAN WITH #8 HOSE WITH 1/2" OR 3/8" NPT JIC SWIVEL ENDS. DO NOT TEE INTO OIL DRAIN LINE. ROUTE LOWER HOSE BACK THROUGH PRE-DRILLED HOLE IN STEEL PLATE.

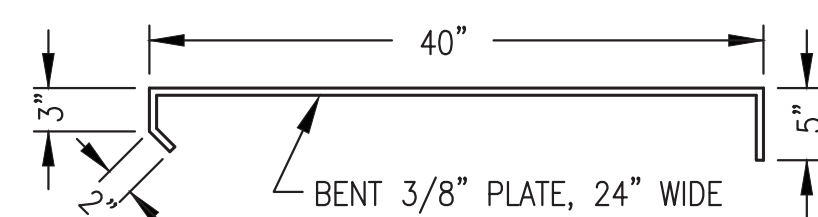
4 TYPICAL OIL LEVEL GAUGE/SWITCH INSTALLATION
M3.4 NO SCALE



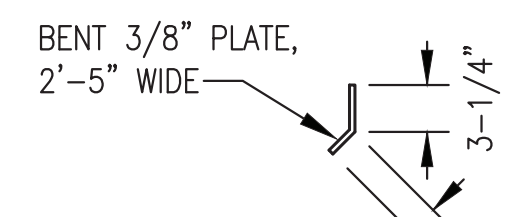
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



SECTION A-A

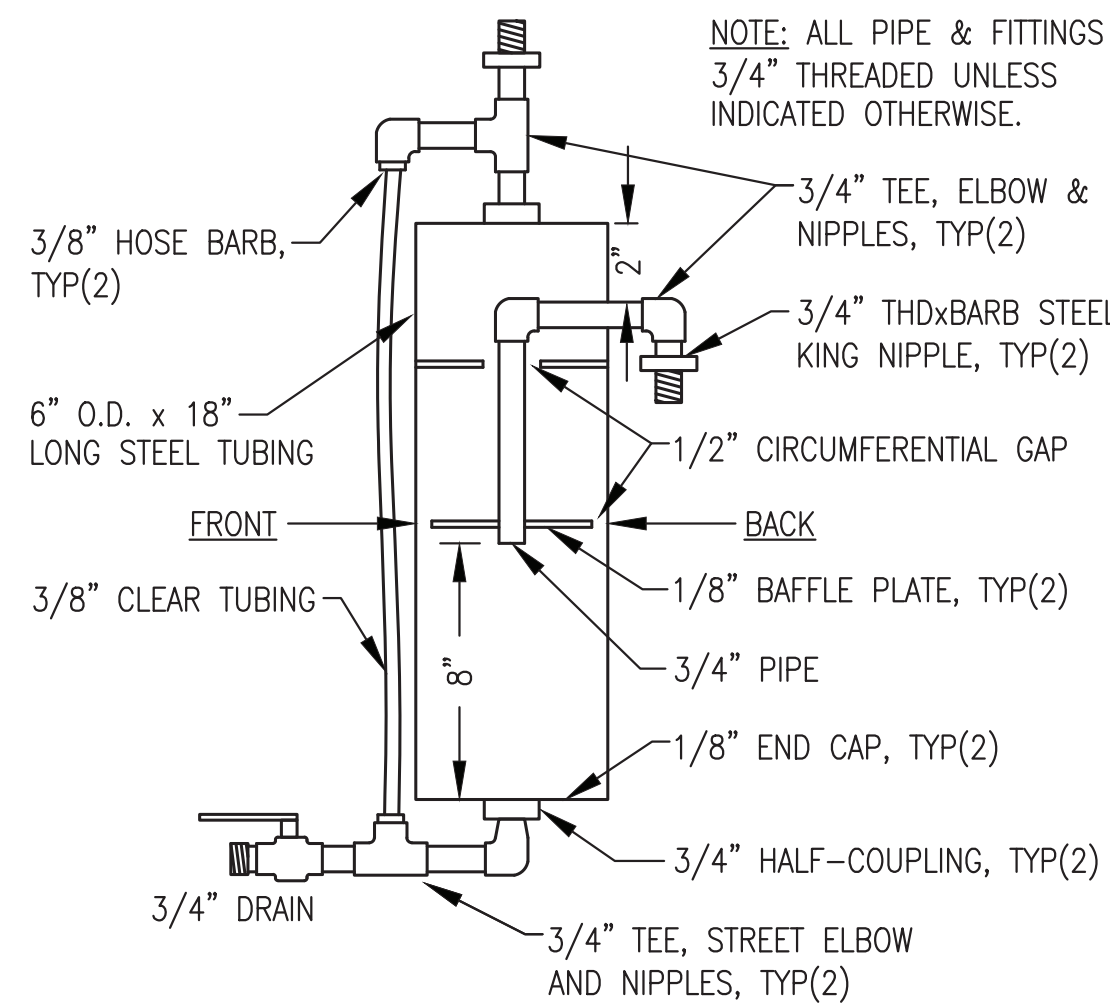


SECTION B-B

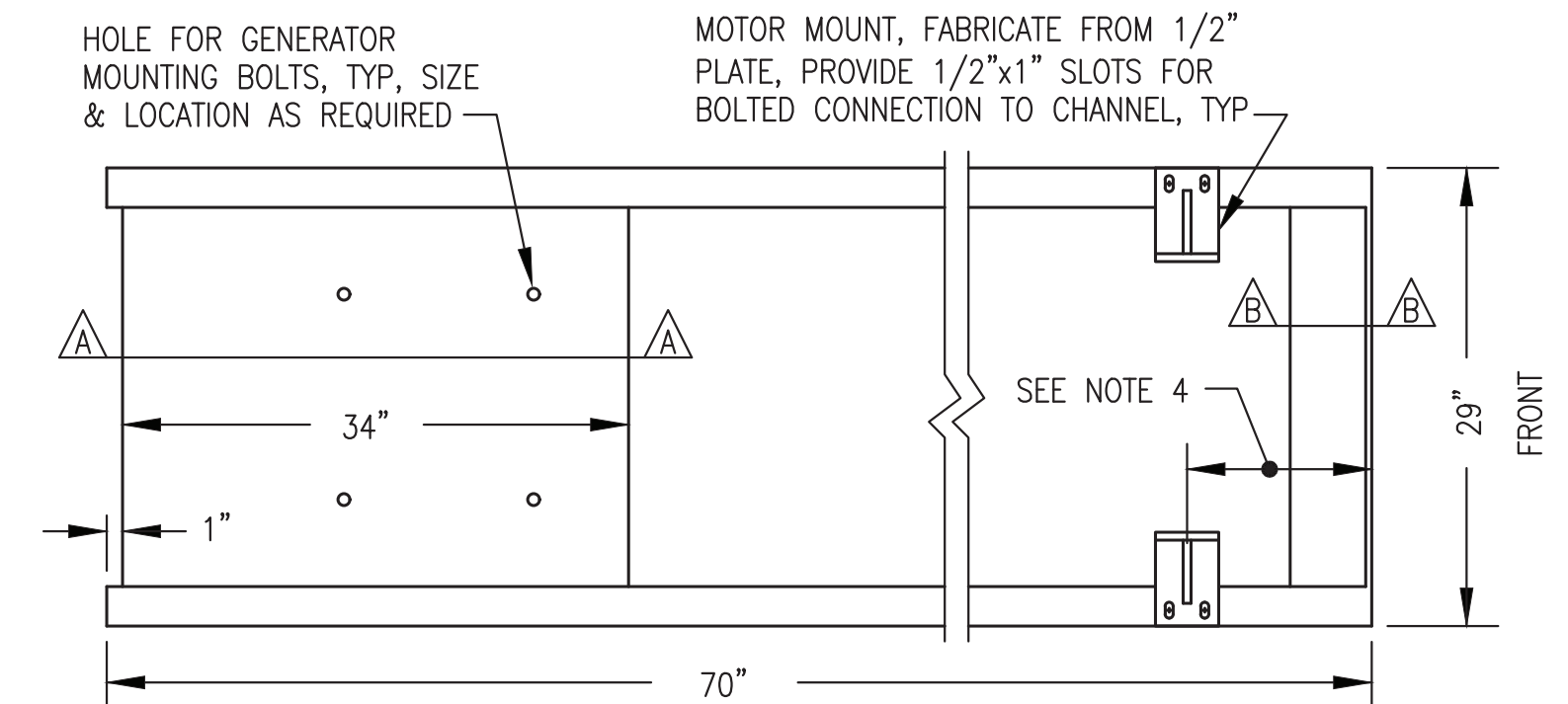
NOTES:

- 1) FABRICATE FROM ASTM A-36 STEEL. BEND PLATES & CUT ENDS OF CHANNELS AT 90° & 45° AS SHOWN.
- 2) EXCEPT WHERE INDICATED AS BOLTED MAKE ALL CONNECTIONS WITH CONTINUOUS WELDS (FILLET OR FULL-PENETRATION GROOVE AS REQUIRED) IN ACCORDANCE WITH CURRENT AWS STANDARD CODE.
- 3) ROUND ALL CORNERS & GRIND WELDS SMOOTH AFTER FABRICATION. PAINT TO MATCH ENGINE-GENERATOR.
- 4) PLACE UNIT ON SKID SO THAT THE CENTERLINE OF THE EXHAUST RISER IS 50" FROM THE FRONT OF THE SKID.

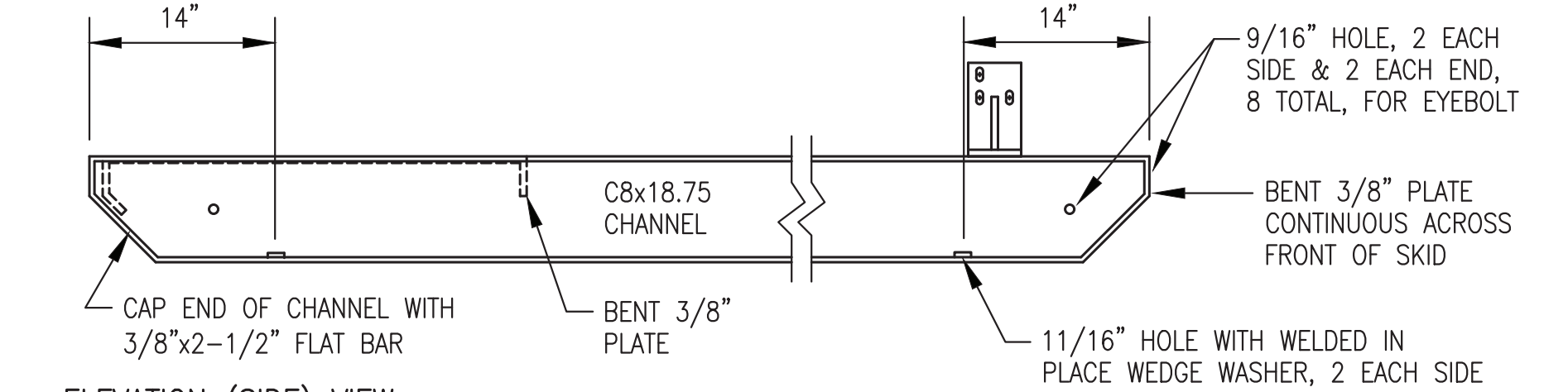
2 GEN#1 (JOHN DEERE 6068) SKID DESIGN
M3.4 NO SCALE



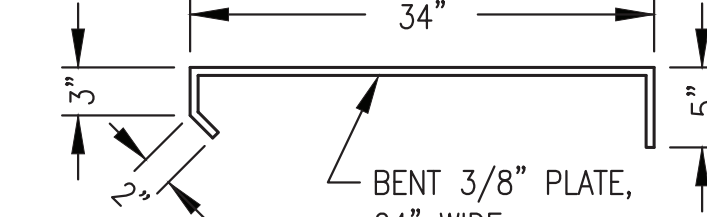
5 GEN#2/#3 CONDENSATE TRAP FABRICATION
M3.4 NO SCALE



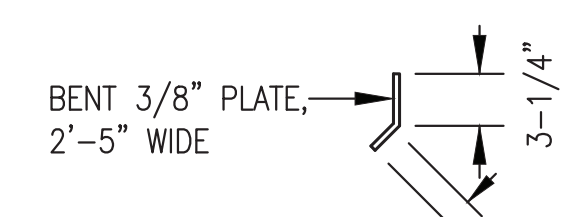
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



SECTION A-A



SECTION B-B

NOTES:

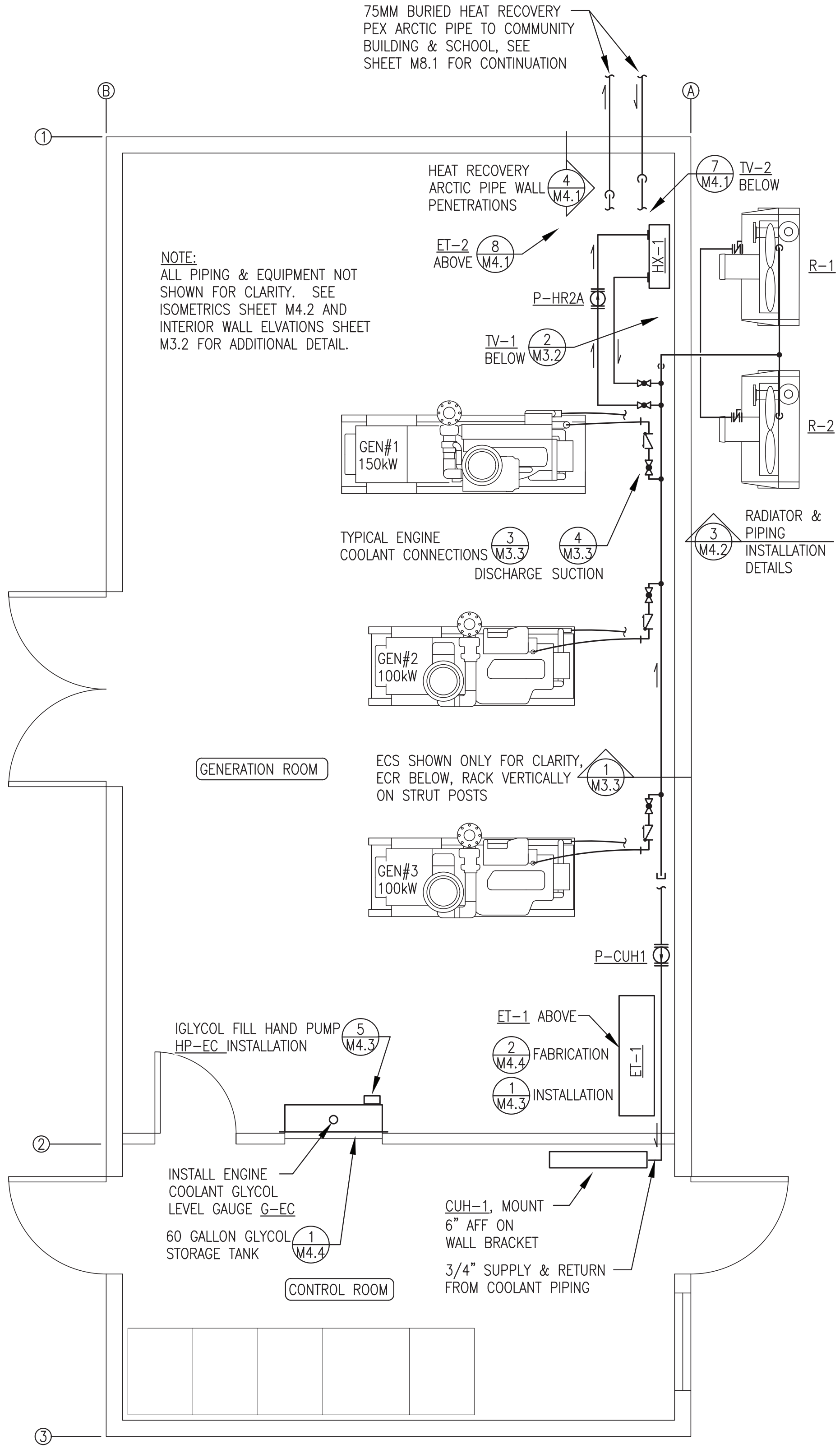
- 1) FABRICATE FROM ASTM A-36 STEEL. BEND PLATES & CUT ENDS OF CHANNELS AT 90° & 45° AS SHOWN.
- 2) EXCEPT WHERE INDICATED AS BOLTED MAKE ALL CONNECTIONS WITH CONTINUOUS WELDS (FILLET OR FULL-PENETRATION GROOVE AS REQUIRED) IN ACCORDANCE WITH CURRENT AWS STANDARD CODE.
- 3) ROUND ALL CORNERS & GRIND WELDS SMOOTH AFTER FABRICATION. PAINT TO MATCH ENGINE-GENERATOR.
- 4) PLACE ENGINE ON SKID SO THAT THE CENTERLINE OF THE EXHAUST RISER IS 39" FROM THE FRONT OF THE SKID.

3 GEN#2 & GEN#3 (JOHN DEERE 4045) SKID DESIGN
M3.4 NO SCALE

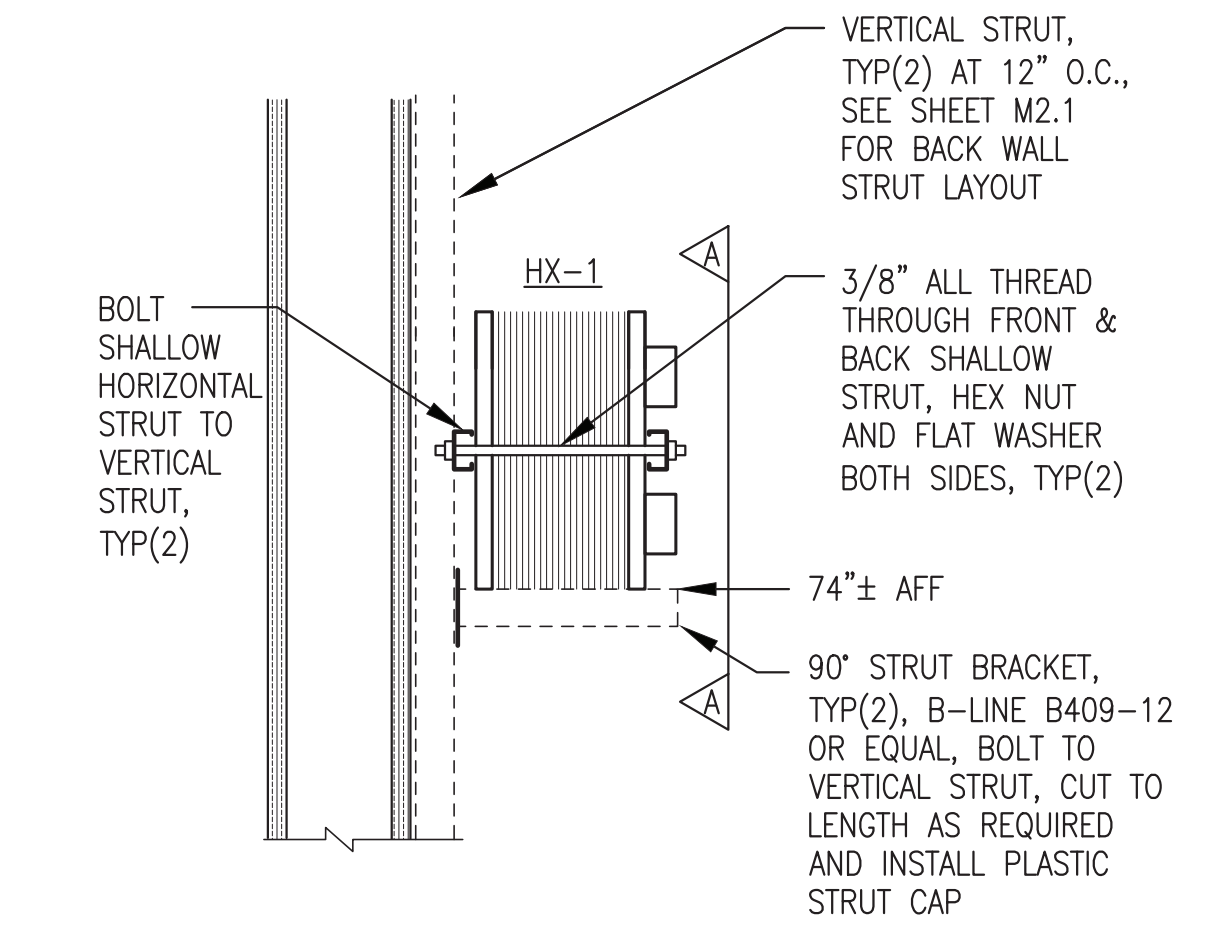
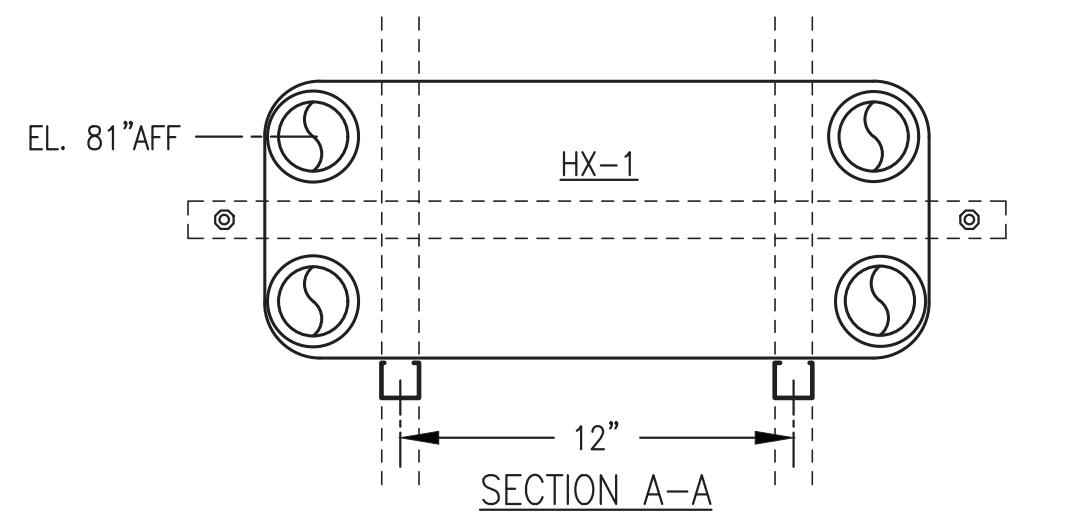
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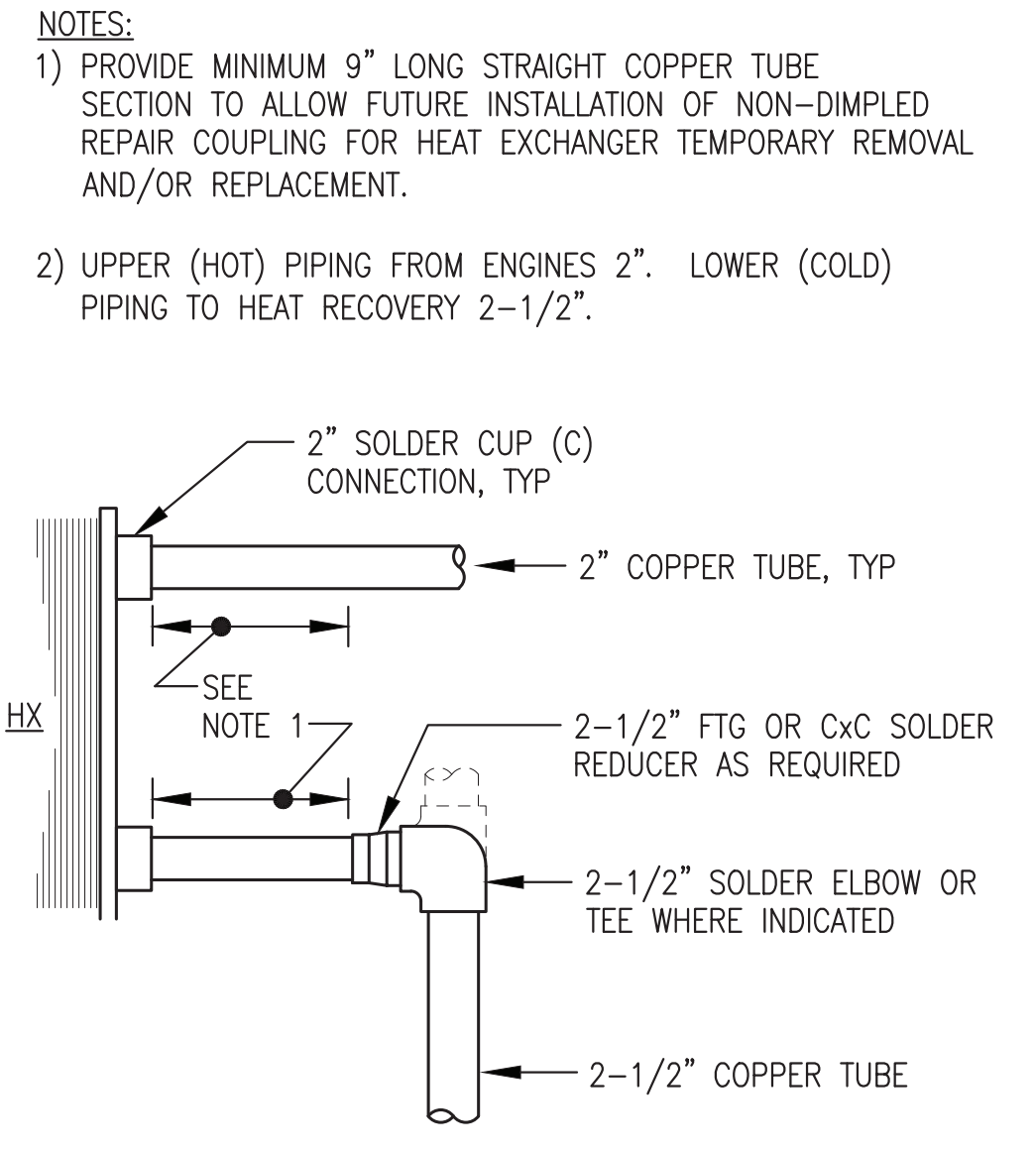
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: GENERATOR FABRICATION DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M3.4 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



1 ENGINE COOLANT & HEAT RECOVERY PIPING PLAN
 M4.1 3/8"=1'-0"

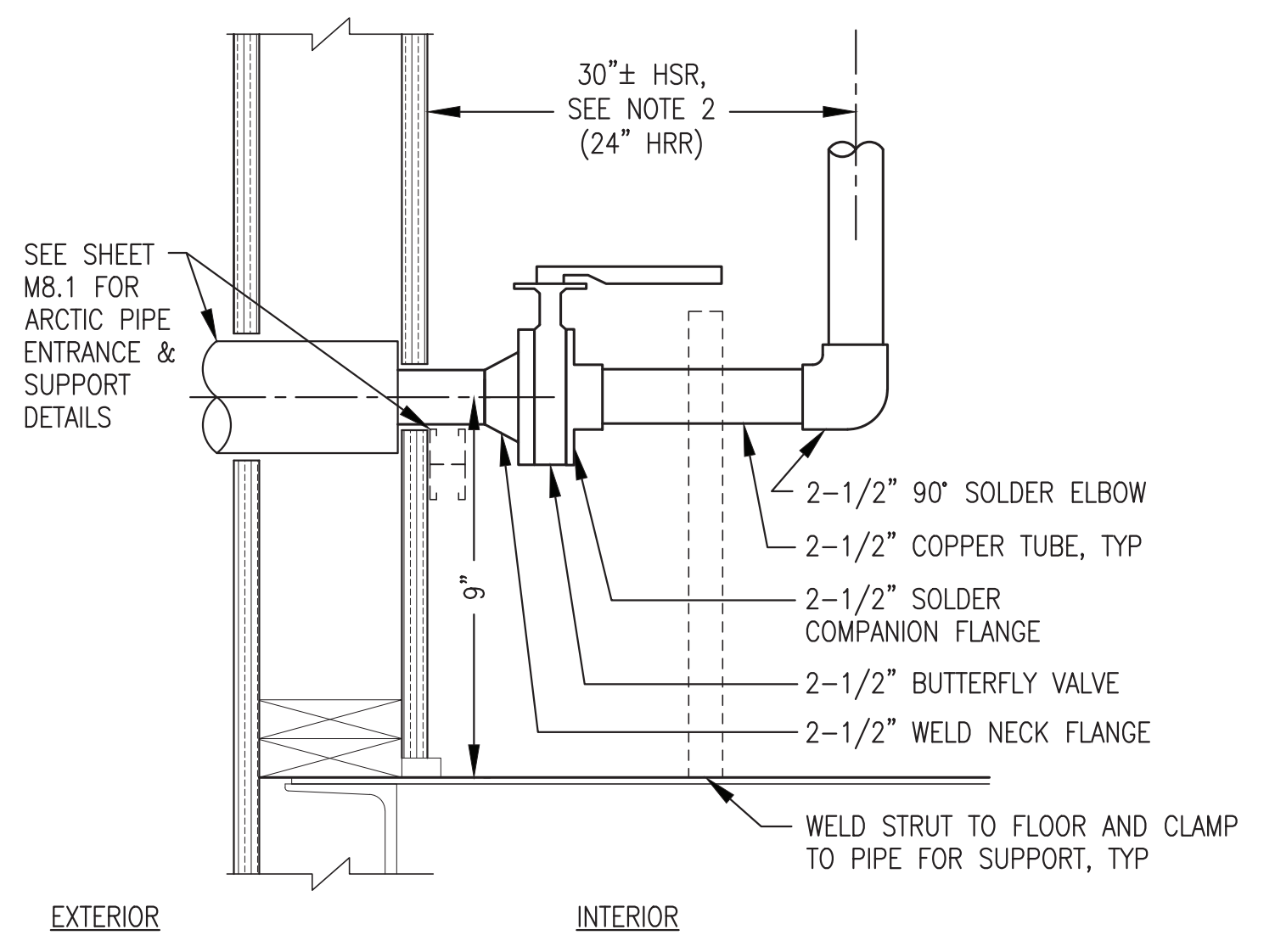


2 HEAT EXCHANGER HX-1 SUPPORT FROM WALL
 M4.1 NO SCALE

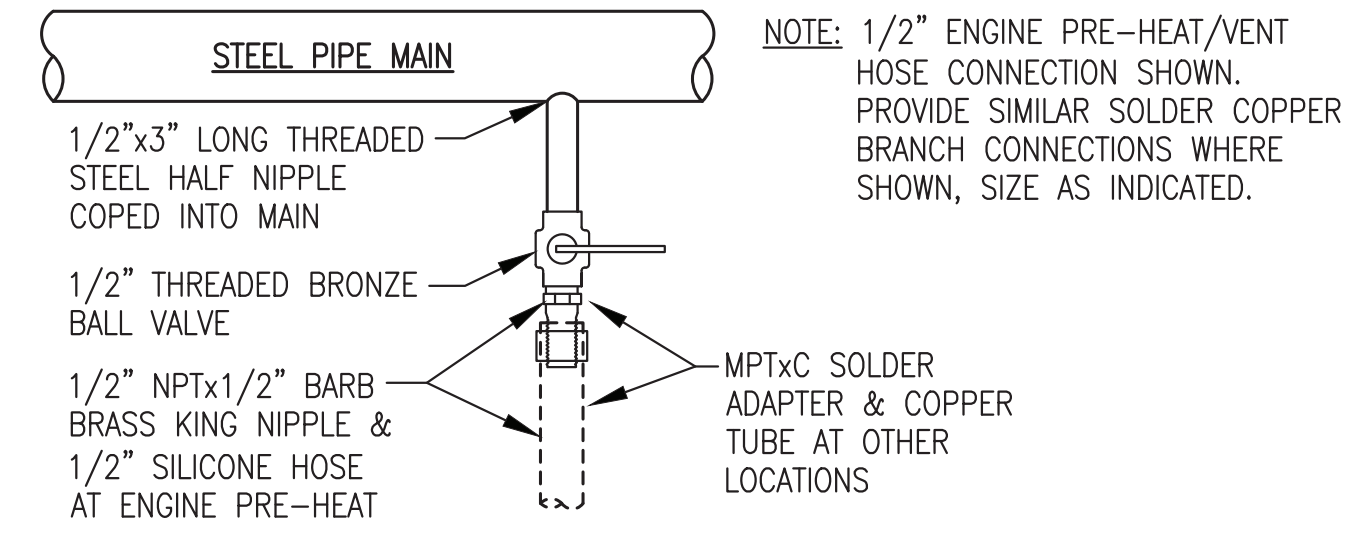


3 HX PIPING CONNECTION
 M4.1 NO SCALE

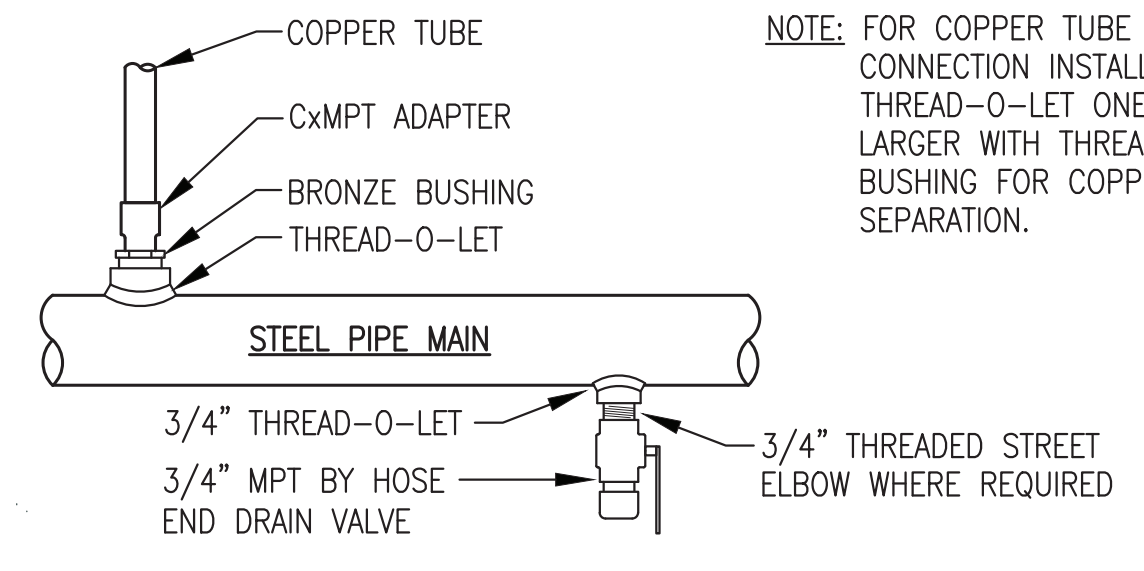
NOTES:
 1) SEE ELEVATION 2/M3.2 FOR PENETRATION LOCATIONS.
 2) 2-1/2" HEAT RECOVERY SUPPLY TO RISE UP DIRECTLY INTO TV-2 "A" PORT, SEE BACK WALL ELEVATION 1/M3.2 FOR PIPING LAYOUT.
 3) ONE PIPE SHOWN. PROVIDE TWO SIMILAR.



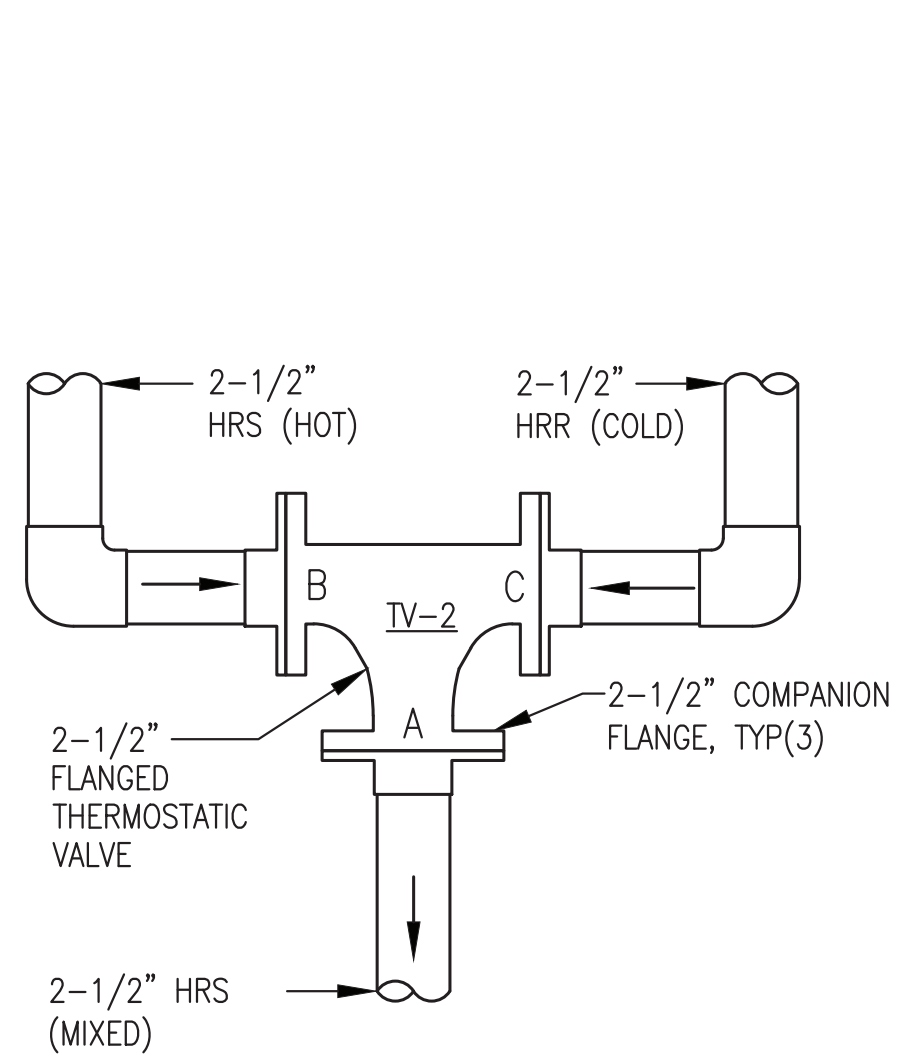
4 2-1/2" ARCTIC PIPE CONNECTION
 M4.1 NO SCALE



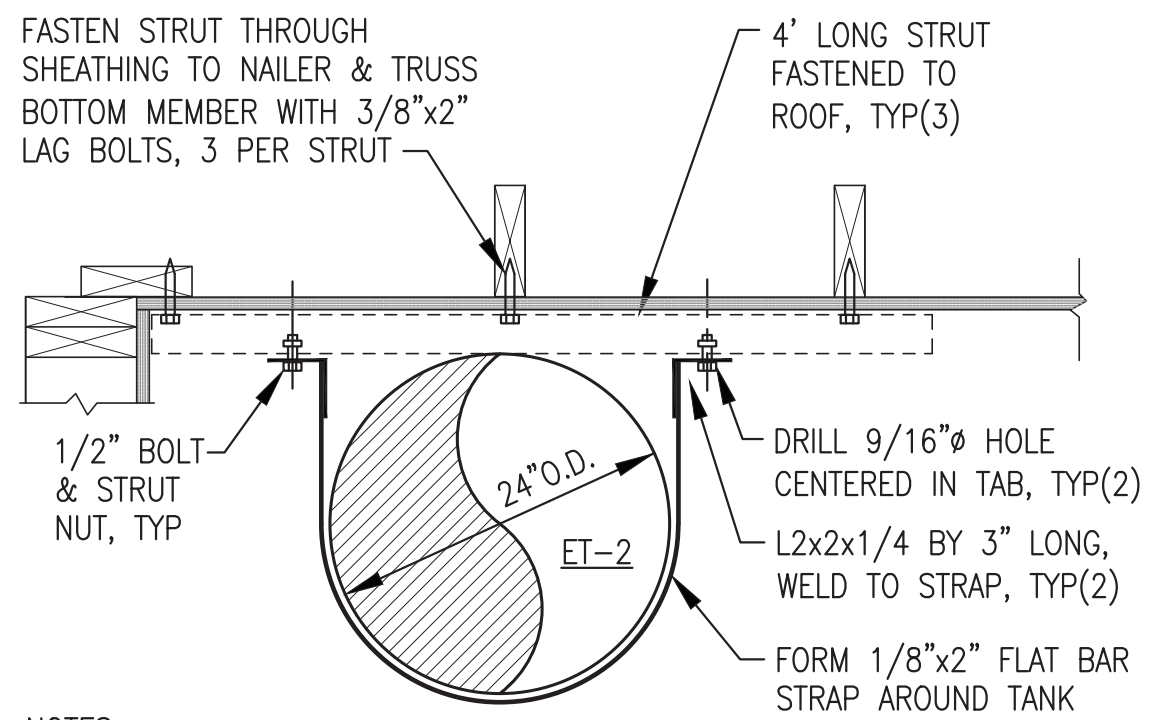
5 TYP VALVED BRANCH CONNECTION TO STEEL MAIN
 M4.1 NO SCALE



6 TYP DIRECT CONNECTION TO STEEL MAIN
 M4.1 NO SCALE



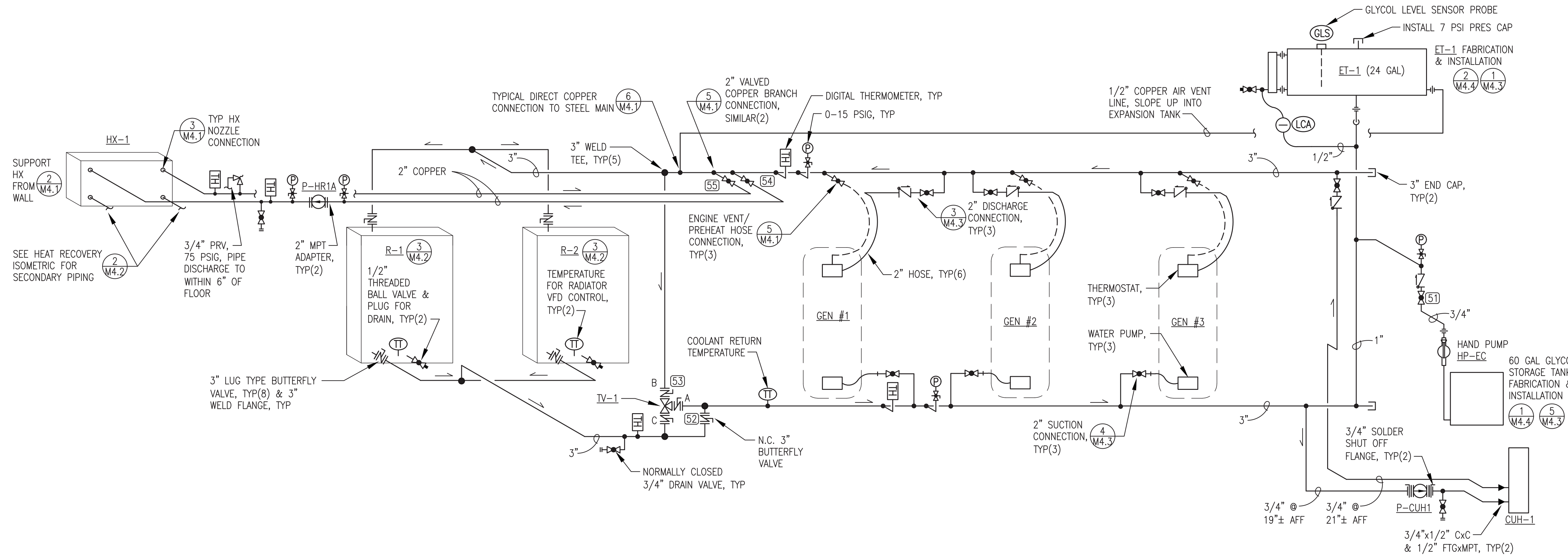
7 TV-2 INSTALLATION
 M4.1 NO SCALE



8 HEAT RECOVERY EXP TANK ET-2 SUPPORT
 M4.1 NO SCALE

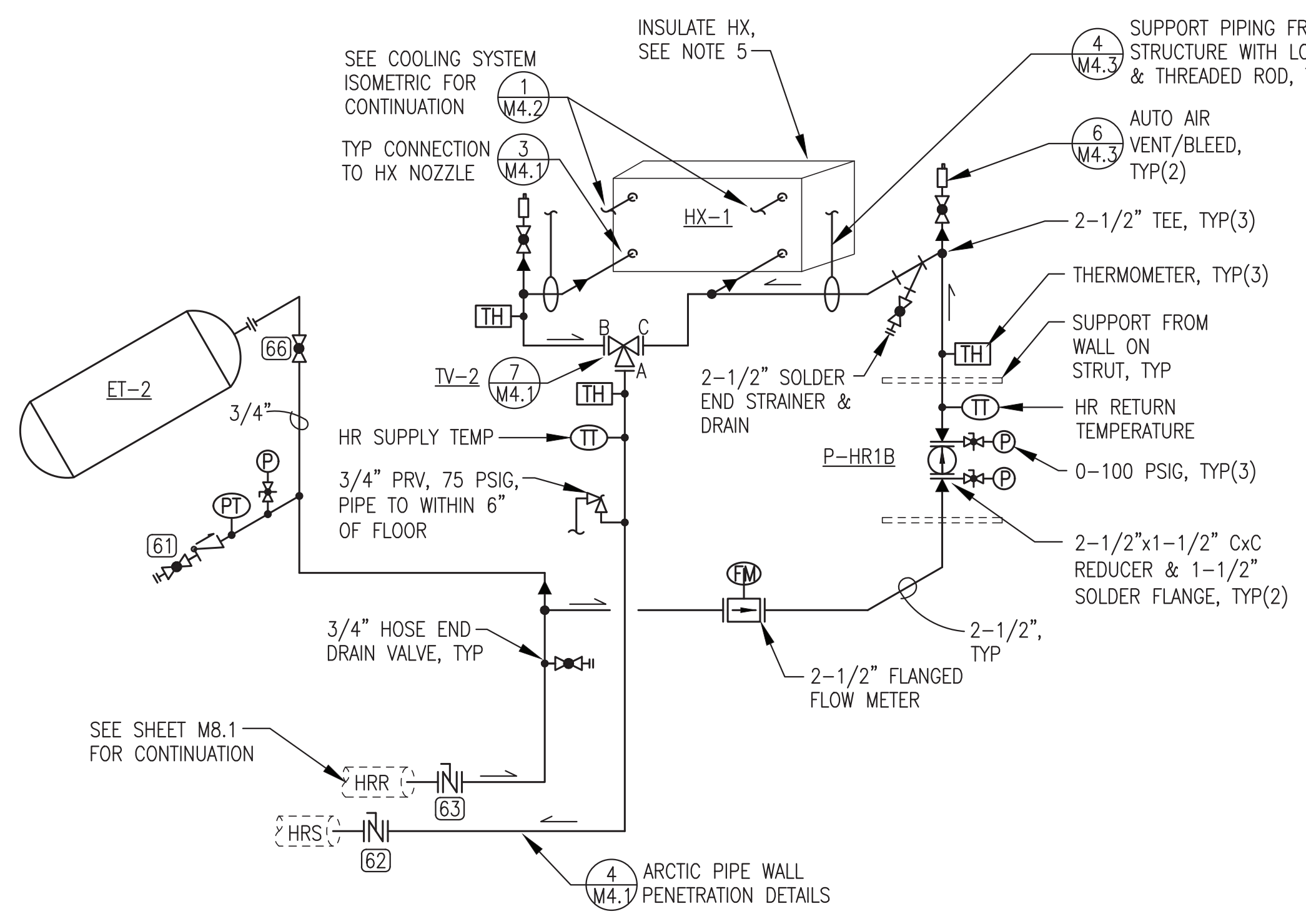
REV #1
 ISSUED
 NOVEMBER
 2021

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: ENGINE COOLANT & HEAT RECOVERY PIPING PLAN & DETAILS			
Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100		DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: NIKO M2-M7 PROJECT NUMBER:	SCALE: AS NOTED DATE: 9/1/21 SHEET: M4.1 OF 9



- NOTES:**
- ALL 3" PIPING SHOWN THIS ISOMETRIC SCH 40 STEEL WITH WELDED JOINTS UNLESS SPECIFICALLY INDICATED OTHERWISE. ALL ENGINE BRANCH CONNECTIONS SCH 40 STEEL WITH WELDED AND THREADED JOINTS. ALL OTHER PIPE SHOWN THIS ISOMETRIC TYPE "L" HARD DRAWN COPPER WITH SOLDER JOINTS UNLESS SPECIFICALLY INDICATED OTHERWISE.
 - SEE COOLANT MANIFOLD FABRICATION DETAIL 3/M3.2 FOR CONNECTIONS TO STEEL MAINS. SEE DETAILS 5&6/M4.1 FOR BRANCH PIPING CONNECTIONS. SEE DETAILS 2&3/M4.3 FOR INSTRUMENTATION CONNECTIONS.
 - ALL PRESSURE GAUGES IN ENGINE COOLANT PIPING 0-15 PSIG. SEE INSTRUMENTATION SCHEDULE FOR ALL ELECTRONIC INSTRUMENTS.
 - UPON COMPLETION OF FABRICATION FLUSH INTERIOR OF PIPING TO REMOVE ALL DEBRIS AND RESIDUE, SEE SPECIFICATIONS.
 - INSULATE COOLANT PIPING MAINS FROM GENERATOR VALVES TO WALL PENETRATIONS. ALL OTHER PIPING NOT INSULATED.
 - SET P-HR1A TO OPERATE ON SPEED 3. SET P-CUH1 TO OPERATE ON SPEED 3.

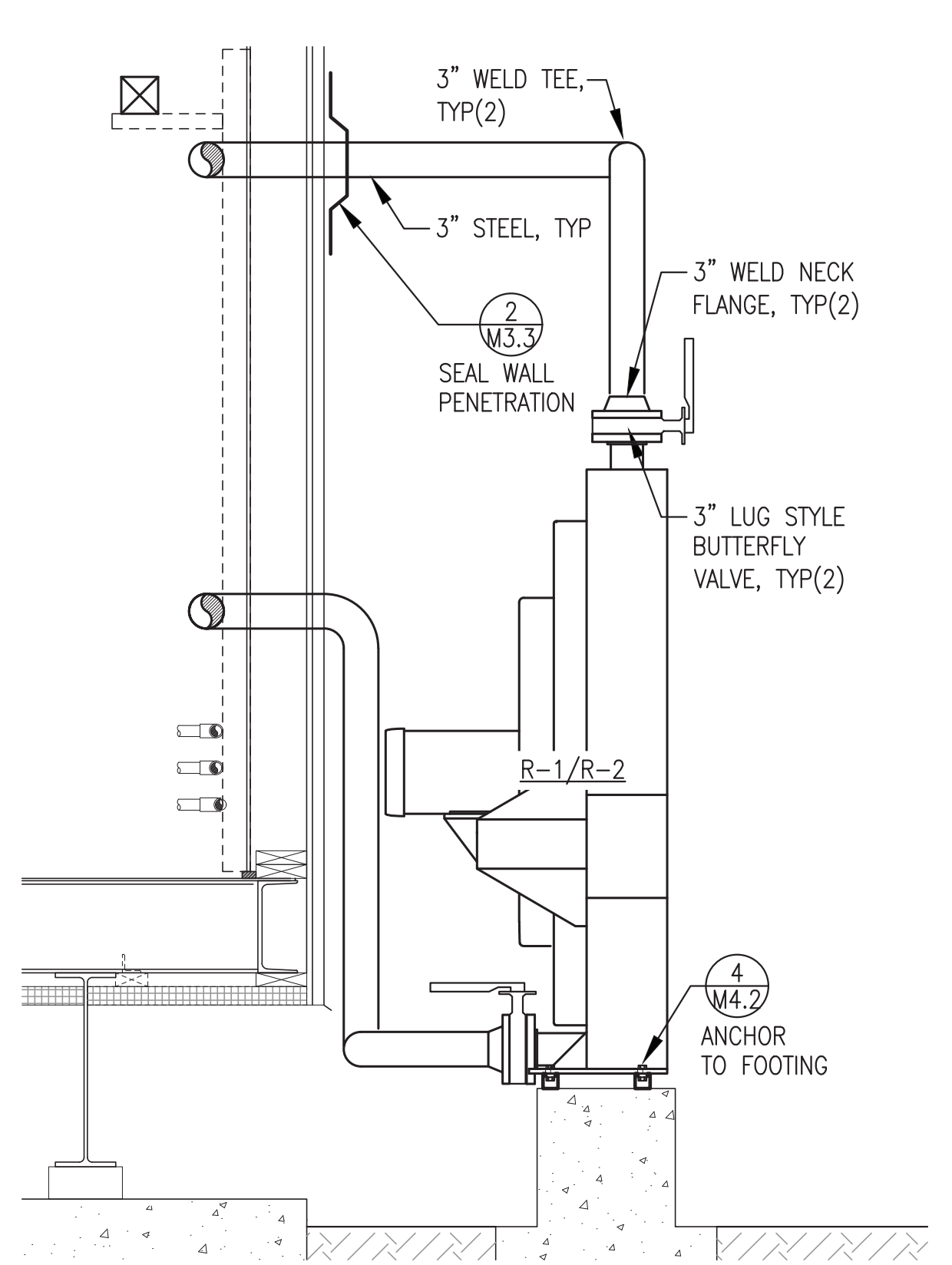
1 COOLING SYSTEM PIPING ISOMETRIC
M4.2 NO SCALE



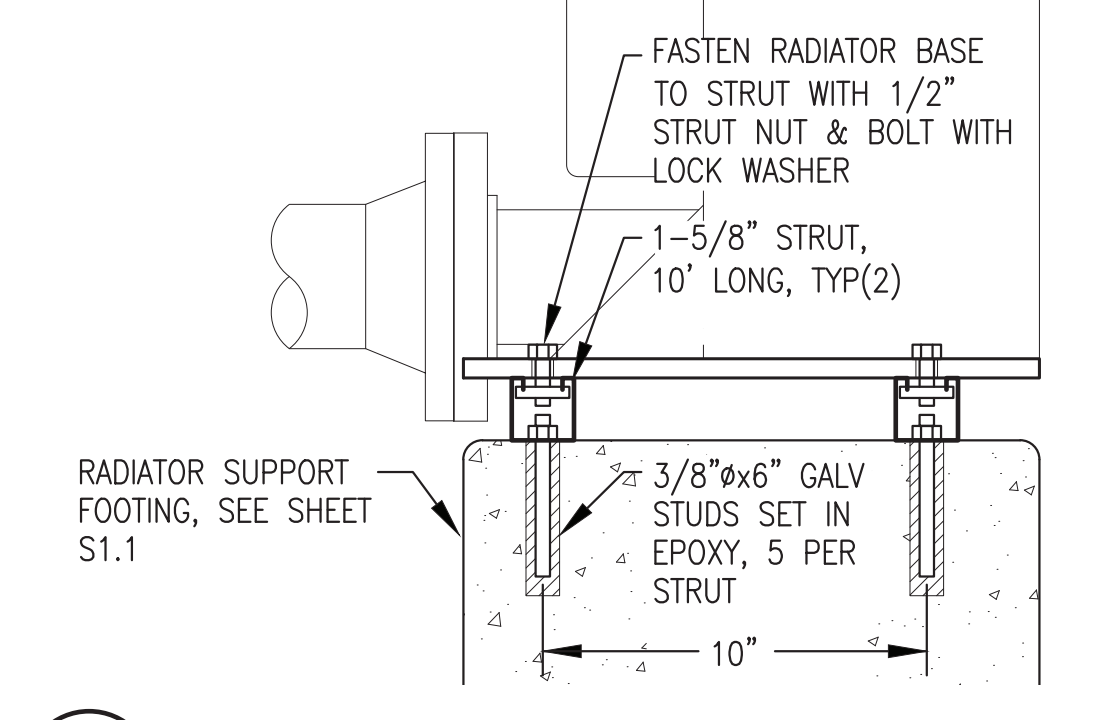
HEAT RECOVERY ISOMETRIC NOTES:

- ALL PIPING SHOWN THIS ISOMETRIC TYPE "L" COPPER WITH SOLDER JOINTS. 2-1/2" EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. ALL FLANGES ANSI 150# PATTERN TWO-PIECE WITH POWDER COATED STEEL FLANGE AND SOLDER COPPER TUBE ADAPTER. FOR ALL JOINTS EXCEPT BUTTERFLY VALVES INSTALL SPIRAL WOUND METALLIC GASKETS AND COAT GASKETS WITH ANTI-SEIZE COMPOUND PRIOR TO ASSEMBLING.
- MAKE ALL CONNECTIONS FOR INSTRUMENTATION WITH T-DRILL TAP OR REDUCING TEE AS SHOWN ON DETAIL 3/M4.3.
- ALL HEAT RECOVERY PRESSURE GAUGES 0-100 PSIG. SEE INSTRUMENTATION SCHEDULE FOR ALL ELECTRONIC INSTRUMENTS
- UPON COMPLETION OF FABRICATION FLUSH PIPING TO REMOVE ALL DEBRIS, SEE SPECIFICATIONS.
- INSULATE HEAT RECOVERY PIPING MAINS. WRAP HEAT EXCHANGER WITH 1" RIGID FOIL-BACK FIBERGLASS INSULATION ALL AROUND AND TAPE ALL SEAMS.
- SET P-HR1B TO OPERATE ON SPEED 1 FOR PRESENT SERVICE TO SCHOOL ONLY. INCREASE TO SPEED 2 WHEN COMMUNITY CENTER IS FULLY CONNECTED.

2 HEAT RECOVERY SYSTEM PIPING ISOMETRIC
M4.2 NO SCALE



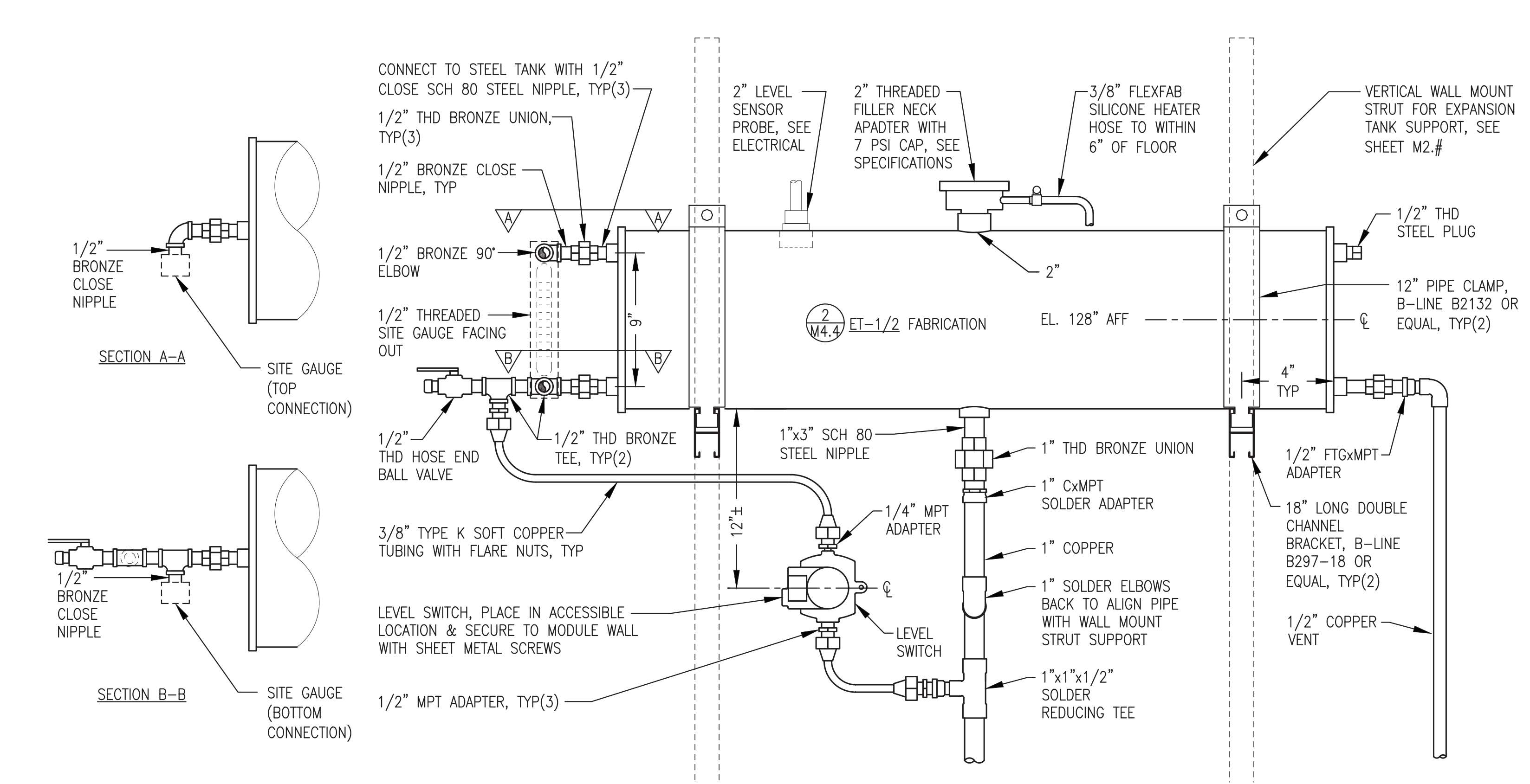
3 TYPICAL RADIATOR INSTALLATION
M4.2 3/4"=1'-0"



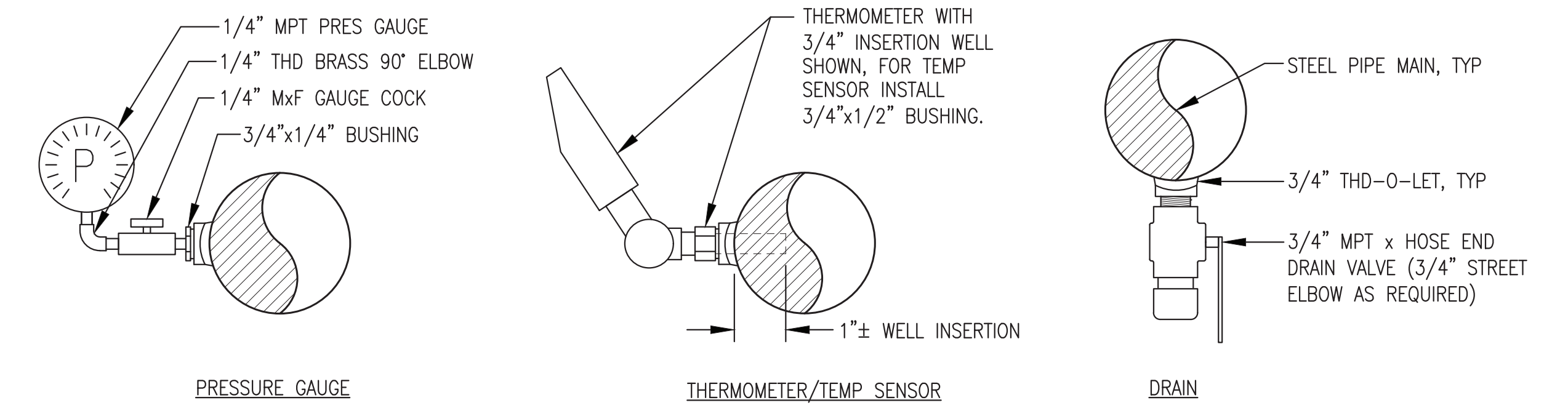
4 RADIATOR BASE MOUNT DETAIL
M4.2 NO SCALE

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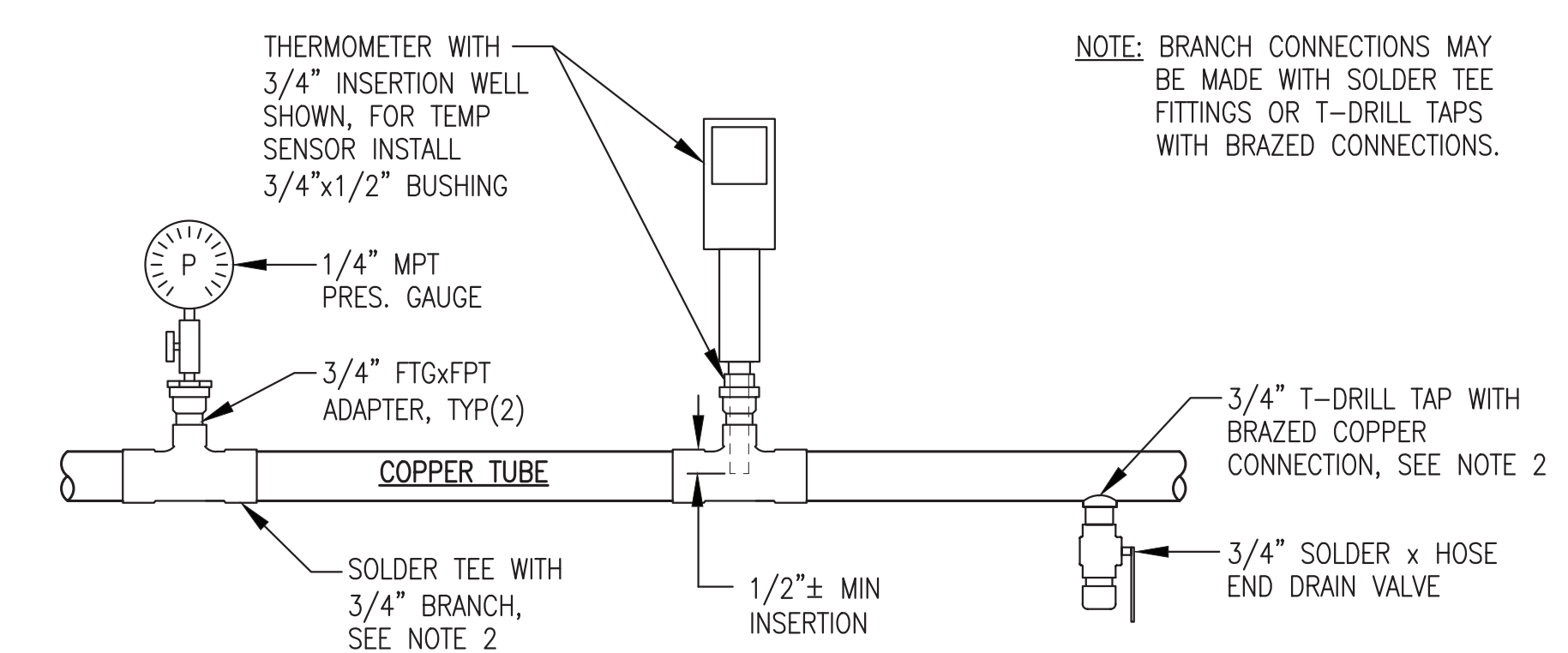
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: ENGINE COOLANT & HEAT RECOVERY PIPING ISOMETRICS & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M4.2 OF 9	
PROJECT NUMBER:			
 Gray Stassel Engineering, Inc.			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



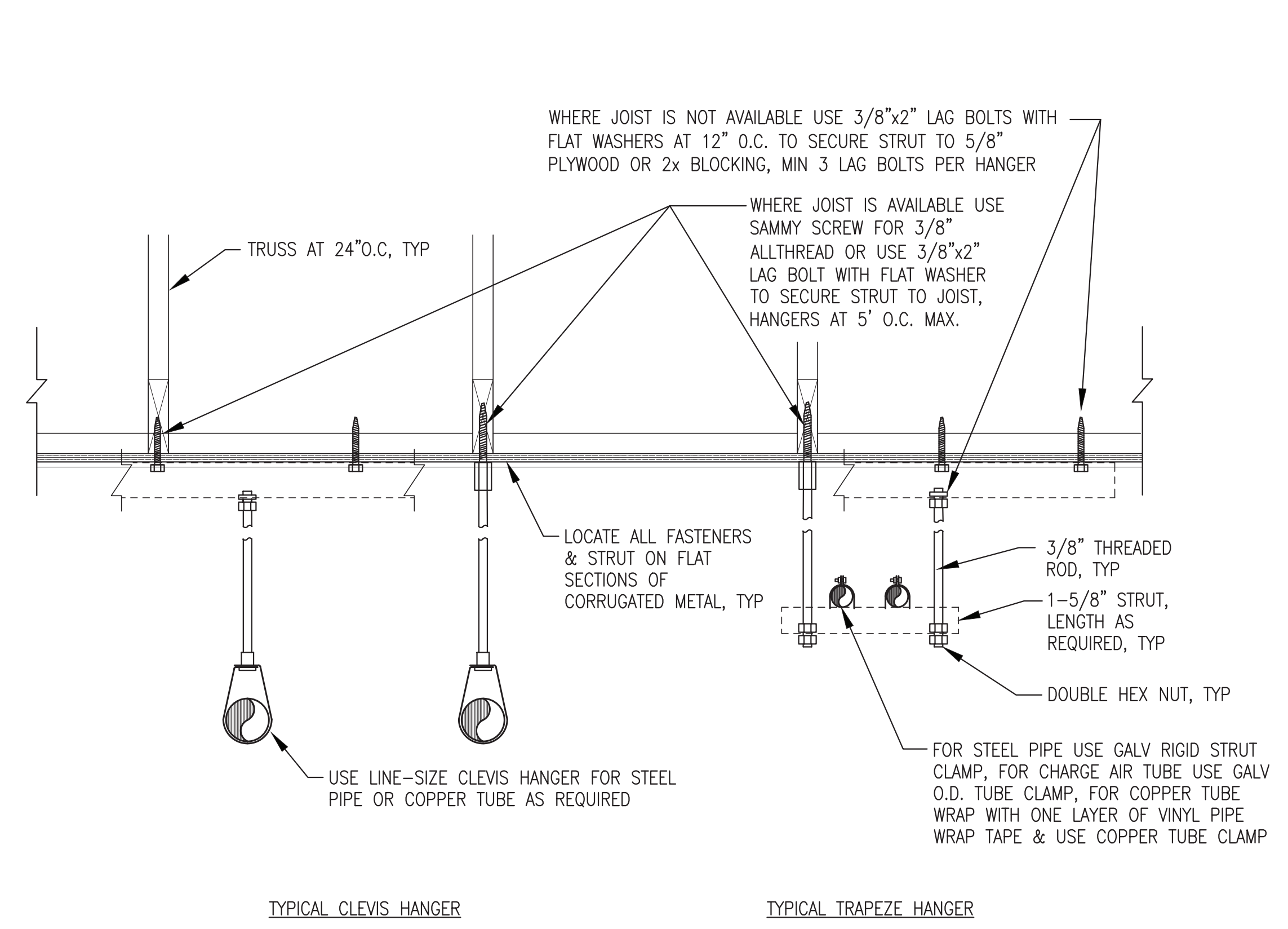
1 24 GALLON EXPANSION TANK ET-1 INSTALLATION (30 GALLON EXPANSION TANK ET-2 SIMILAR, MIRROR IMAGE)
M4.3 NO SCALE



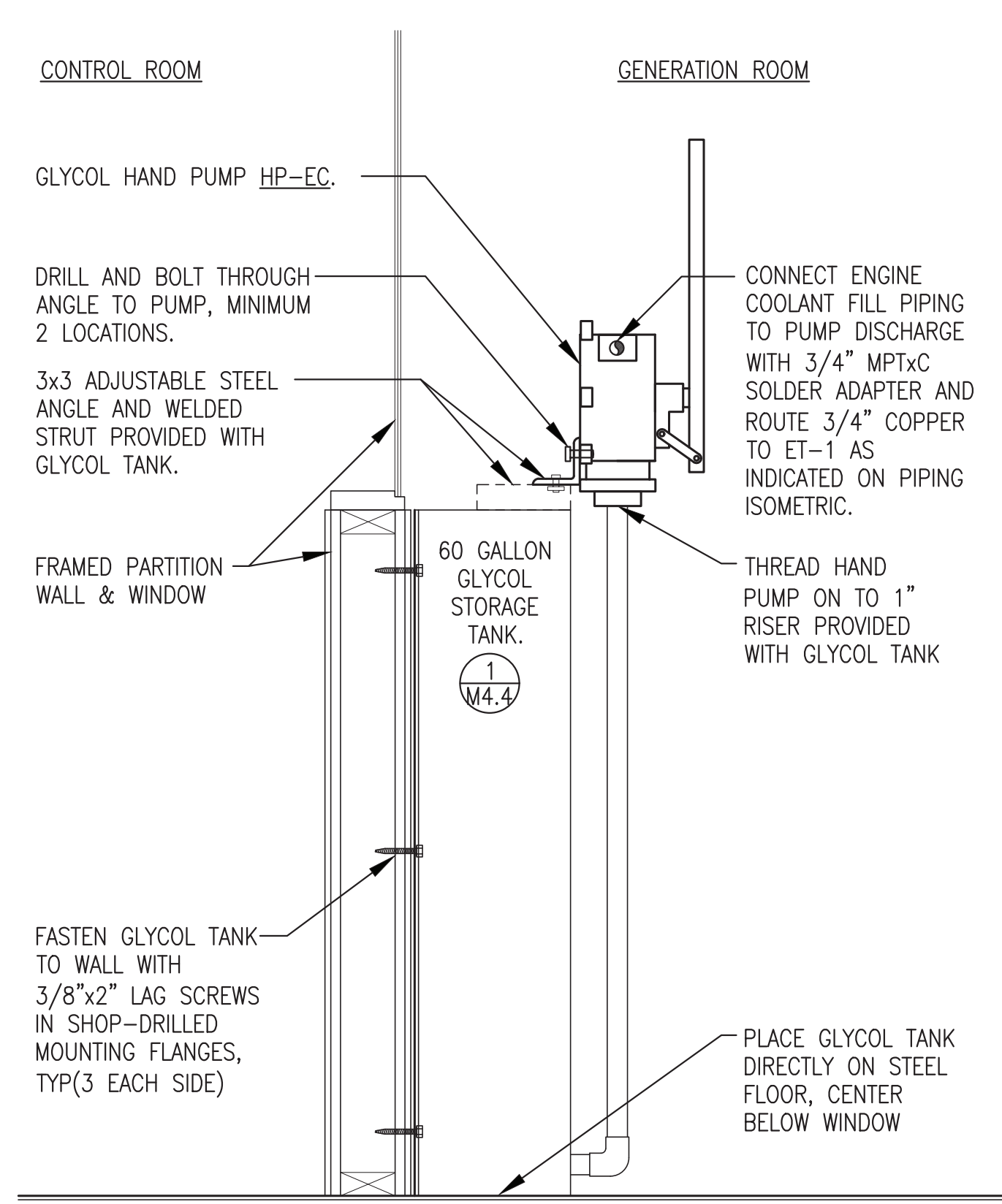
2 TYP INSTRUMENT/DRAIN INSTALLATION IN STEEL PIPE
M4.3 NO SCALE



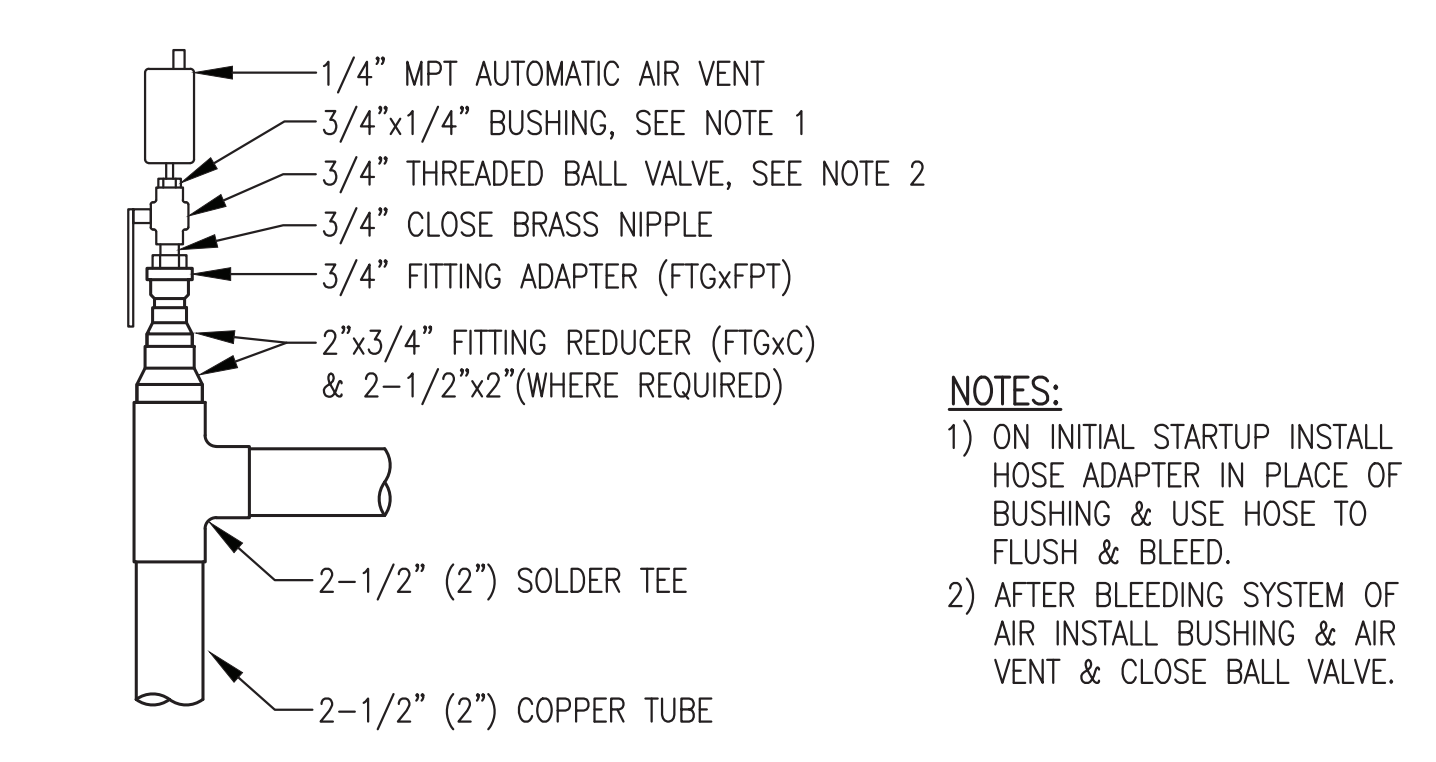
3 TYP INSTRUMENT/DRAIN INSTALLATION IN COPPER TUBE
M4.3 NO SCALE



4 TYPICAL OVERHEAD PIPING SUPPORT DETAIL (3"Ø PIPE & SMALLER)
M4.3 NO SCALE

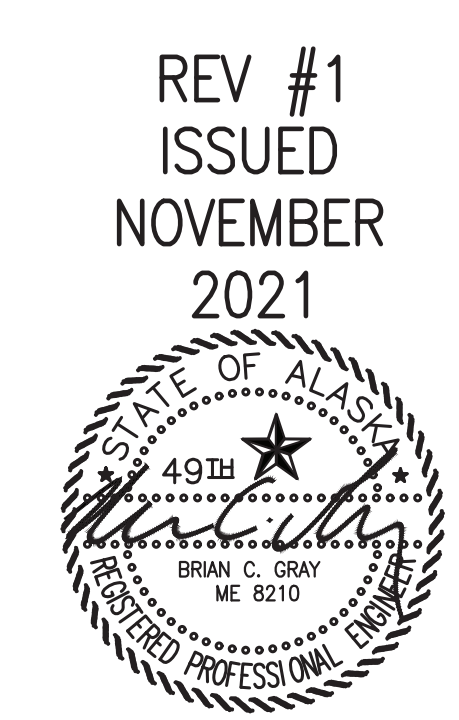


5 GLYCOL STORAGE TANK & HAND PUMP HP-EC INSTALLATION DETAIL
M4.3 NO SCALE



6 TYPICAL AIR VENT INSTALLATION IN COPPER TUBE
M4.3 NO SCALE

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: ENGINE COOLANT & HEAT RECOVERY PIPING DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M4.3 OF 9	
PROJECT NUMBER: P.O. 111405, Anchorage, AK 99511 (907)349-0100			



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 ISSUED
 NOVEMBER
 2021

GLYCOL TANK GENERAL NOTES:

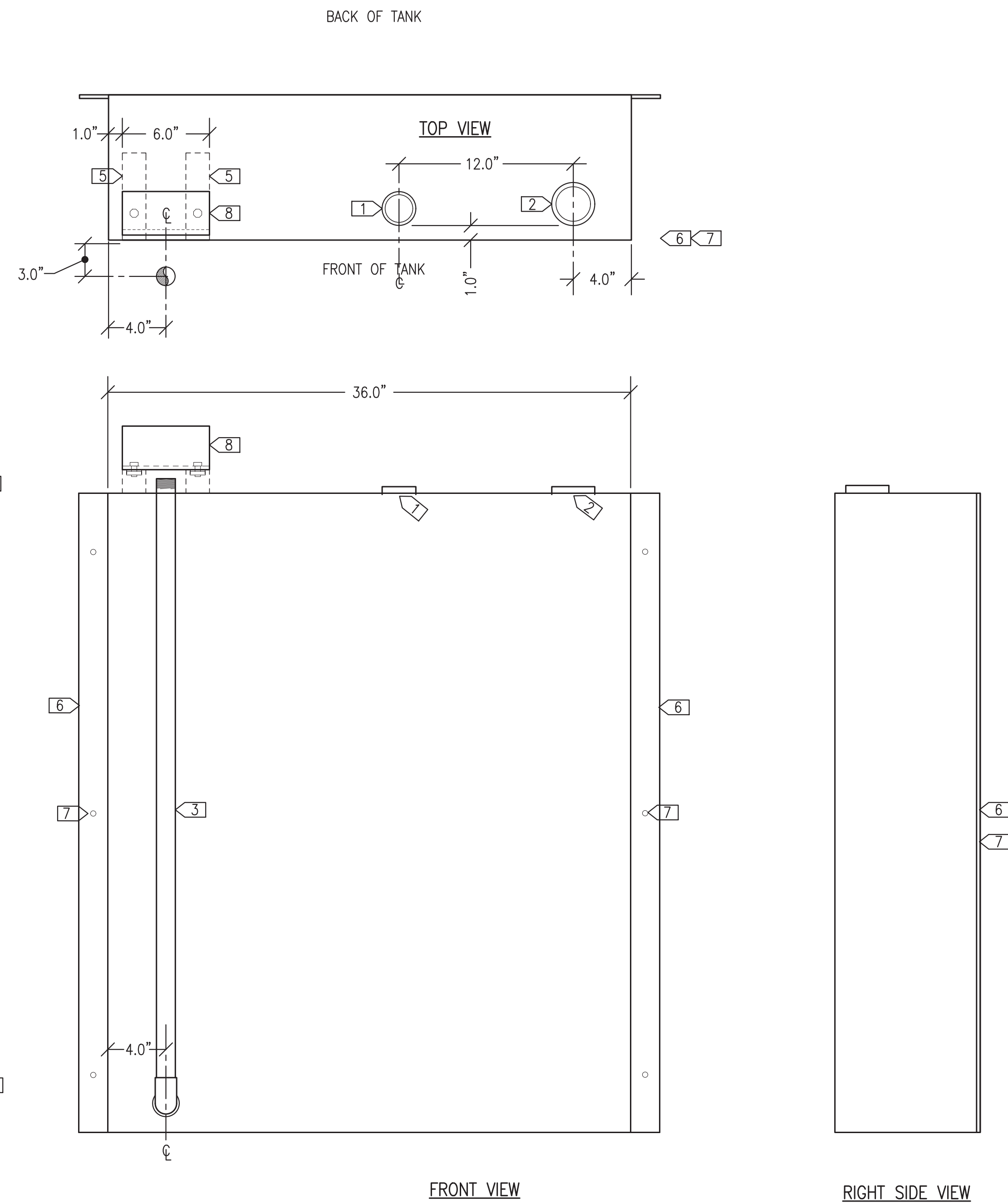
- FABRICATE SINGLE WALL 60 GALLON NOMINAL CAPACITY GLYCOL TANK.
- FABRICATE FROM ASTM A-36 STEEL PLATE, 10 GAUGE MINIMUM EXCEPT FOR TOP 3/16" MINIMUM. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS.
- PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. SEAL WELD ALL TANK ATTACHMENTS.
- ALL FPT OPENINGS TO BE FORGED STEEL HALF COUPLINGS.
- PRESSURE TEST COMPLETED ASSEMBLY TO 5 PSIG MAXIMUM USING SOAPY WATER SOLUTION ON ALL WELD JOINTS.
- UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PRIME AND TOP COAT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
- UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS AND AIR DRY INTERIOR. INSTALL 2" SCREENED VENT ON 2" FPT FILL CONNECTION WITH 2" CLOSE NIPPLE FOR SHIPPING. SEAL ALL OTHER OPENINGS WITH PLASTIC OR STEEL PLUGS..

GLYCOL TANK SPECIFIC NOTES:

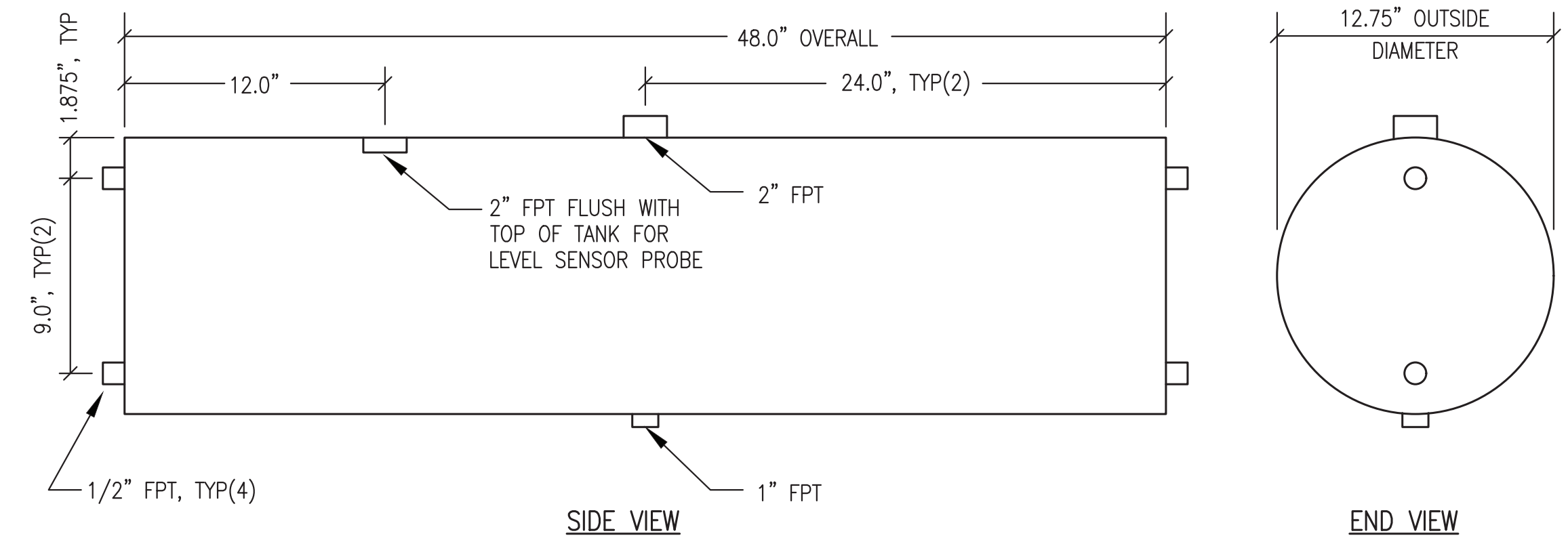
- 1-1/2" FPT (TANK GAUGE)
- 2" FPT (VENT) - INSTALL 2" THREADED MUSHROOM VENT CAP
- 1" SCHEDULE 80 PIPE WITH THREADED TOP CONNECTION (WITHDRAWAL)
- 1" SOCKETWELD 90° ELBOW
- 6" LONG STRUT, END FLUSH WITH FRONT OF TANK
- 2x1/4" FLAT BAR CONTINUOUS TWO SIDES
- 7/16" HOLE AT 18" O.C. TWO SIDES
- L3x3x1/4"x6" LONG FOR FUTURE CONNECTION TO HAND PUMP BY OTHERS. PAINT TO MATCH TANK AND FASTEN TO STRUTS WITH 1/2" BOLTS & STRUT NUTS.

EXPANSION TANK GENERAL NOTES:

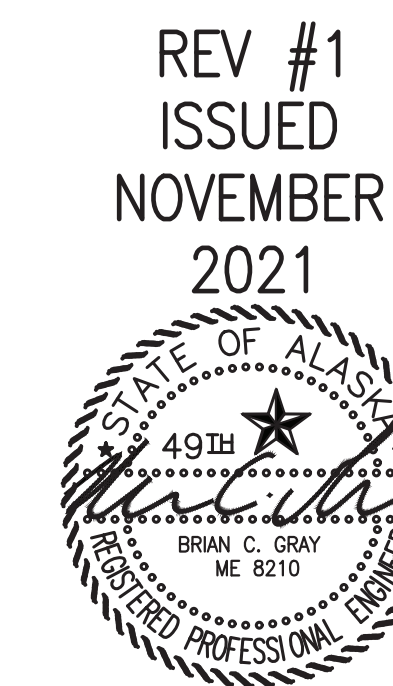
- FABRICATE SINGLE WALL 24 GALLON NOMINAL CAPACITY GLYCOL EXPANSION TANK.
- FABRICATE SHELL FROM MINIMUM 10 GAUGE ASTM A-36 PLATE STEEL ROLLED AND WELDED OR SCHEDULE 5 LIGHTWALL ASTM A53 STEEL PIPE. FABRICATE HEADS FROM 3/16" THICK ASTM A-36 PLATE STEEL. MAKE ALL JOINTS WITH CONTINUOUS FULL-PENETRATION WELDS.
- PROVIDE WITH ALL OPENINGS INDICATED USING MINIMUM 3000# FORGED STEEL PIPE HALF COUPLINGS IN ACCORDANCE WITH U.L 142 FIGURE 7.1 #2.
- PRESSURE TEST COMPLETED ASSEMBLY TO 15 PSIG MINIMUM.
- UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PRIME AND TOP COAT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
- UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS, AIR DRY INTERIOR, AND SEAL ALL TANK OPENINGS WITH PLASTIC PLUGS.




1 60 GALLON GLYCOL STORAGE TANK
M4.4 1"=6"

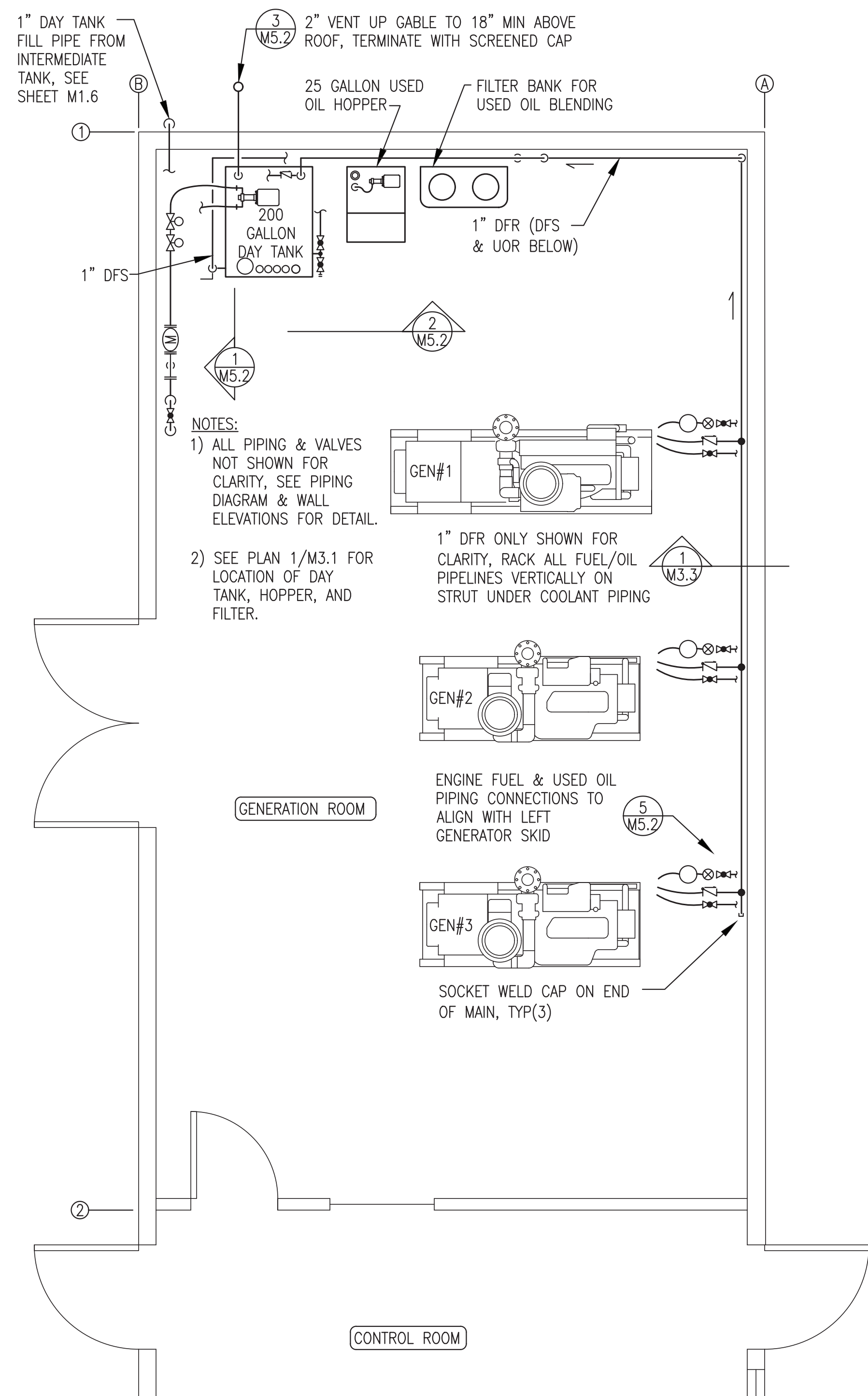


2 24 GALLON GLYCOL EXPANSION TANK
M4.4 1"=6"

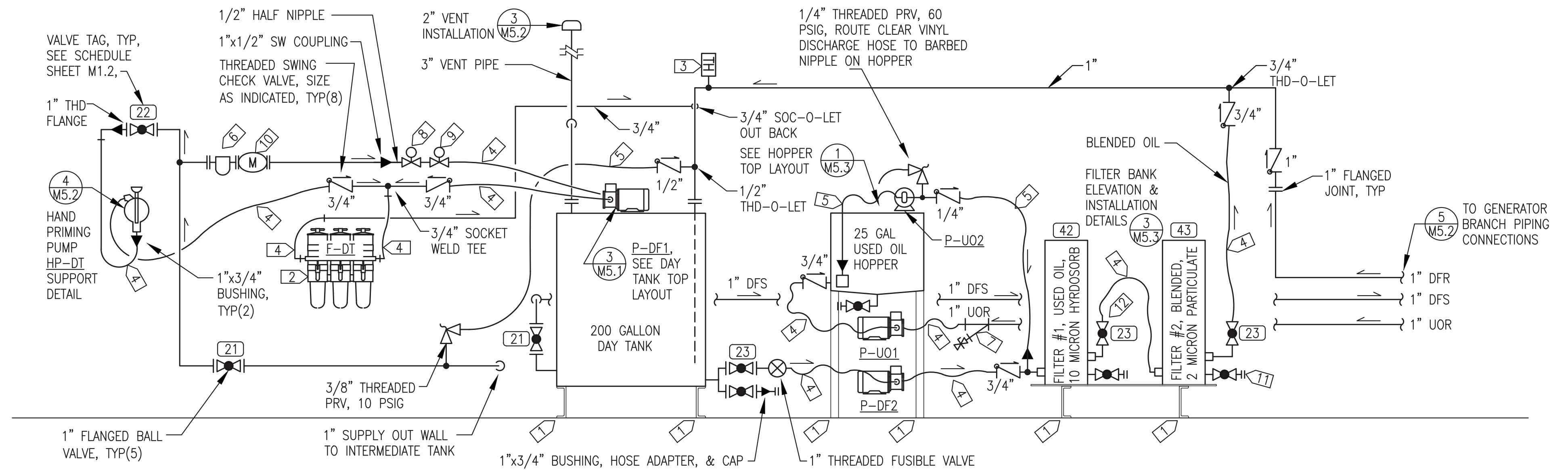


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: GLYCOL STORAGE & EXPANSION TANKS FABRICATION			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M4.4 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			





1 DIESEL FUEL SYSTEM & USED OIL PIPING PLAN
M5.1 3/8"=1'



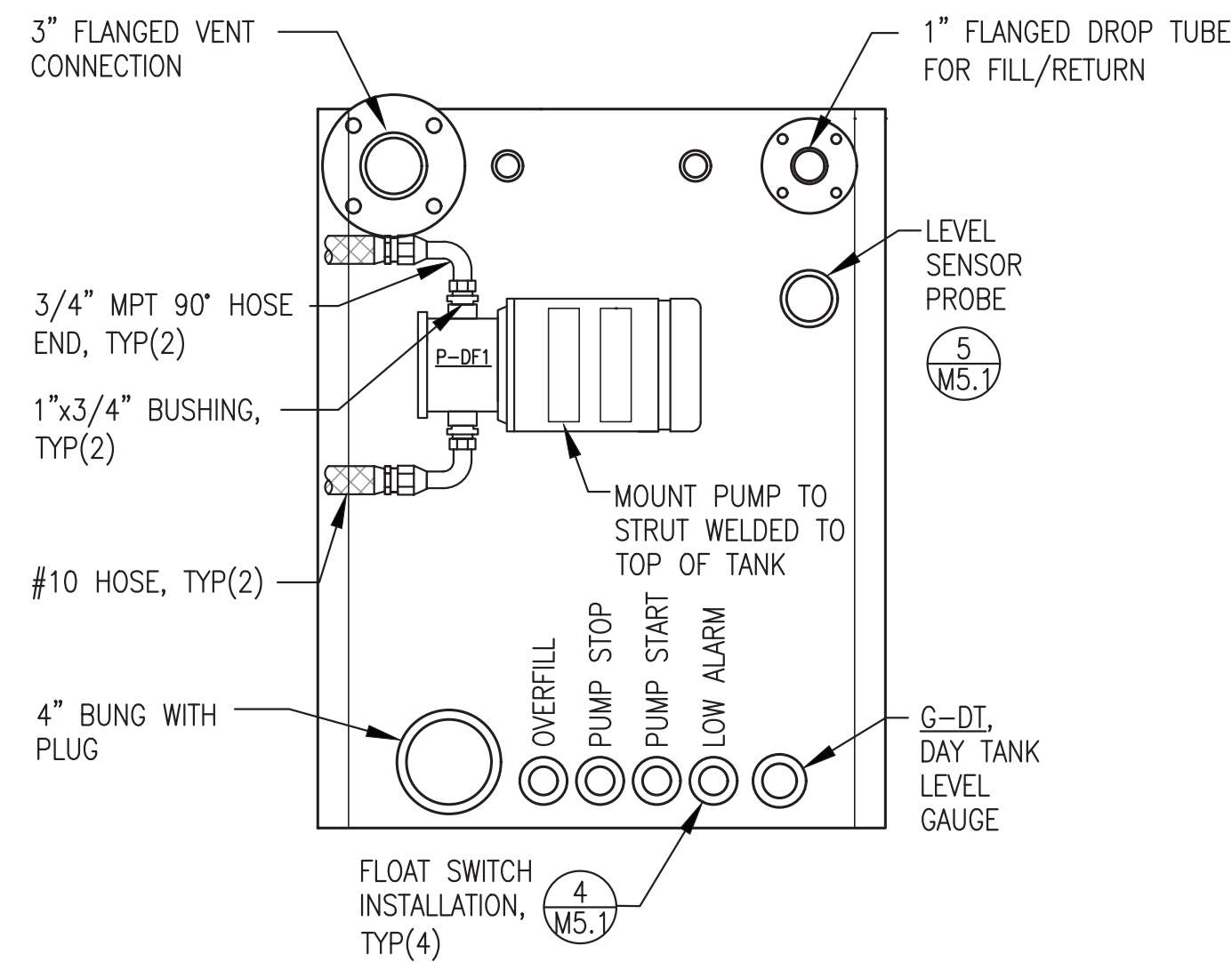
PIPING DIAGRAM SPECIFIC NOTES:

- 1) FASTEN DEVICE TO FLOOR WITH MIN 1"x3/16" FILLET WELD ALL 4 CORNERS, WIRE BRUSH AND RE-PAINT WELD AREA TO MATCH EXISTING.
- 2) 3/4" THREADED DUAL FILTER BANK E-DT.
- 3) DIGITAL THERMOMETER, INSTALL WELL IN 3/4" THREAD-O-LET.
- 4) #10 HOSE WITH 1/2" OR 3/4" NPT ENDS TO MATCH EQUIPMENT.
- 5) #6 HOSE WITH 1/8", 1/4", OR 3/8" NPT ENDS.
- 6) 1" FLANGED BASKET STRAINER IN 1" DAY TANK SUPPLY WITH BLOW DOWN.
- 7) 1" THREADED "N" STRAINER IN 1" UOR WITH BLOW DOWN VALVE.
- 8) 1/2" NO SOLENOID VALVE.
- 9) 1/2" NC SOLENOID VALVE.
- 10) METER M-DT EQUIPPED WITH 1" ANSI 150# FLANGED ENDS.
- 11) 3/4" THREADED BALL VALVE WITH HOSE ADAPTER & CAP, TYP(3).
- 12) 3/4" THREADED BALL VALVE, TYP(2).

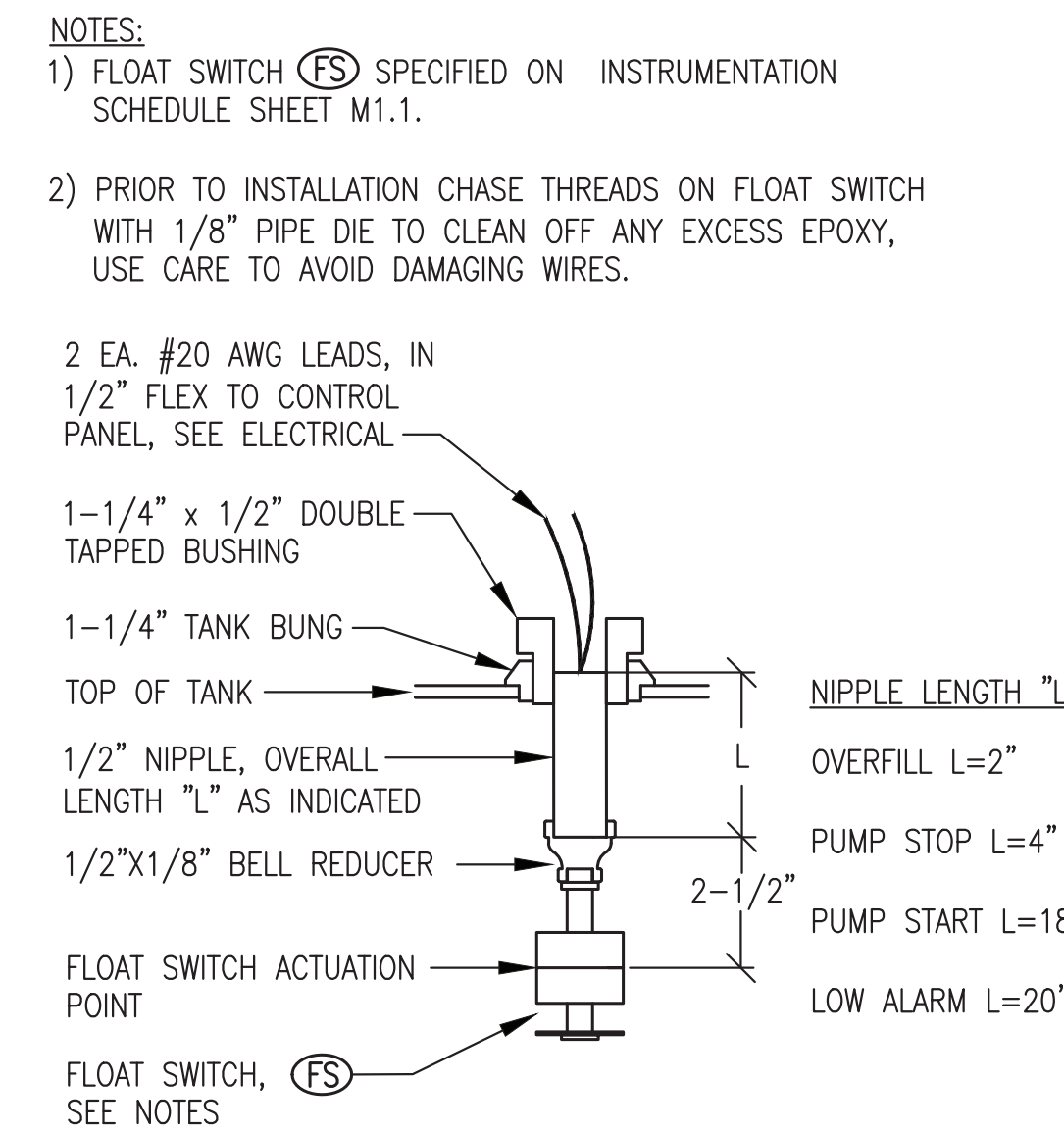
PIPING DIAGRAM GENERAL NOTES:

- 1) FABRICATE DAY TANK, FILTER BANK, & HOPPER IN ACCORDANCE WITH FABRICATION PLANS, LAYOUT ELEVATIONS & DETAILS.
- 2) ALL DAY TANK SUPPLY & RETURN PIPING 1" SCH 80 EXCEPT WHERE INDICATED AS 3/4". ALL VENT PIPING 3" SCH 40.
- 3) ALL PIPING JOINTS SOCKET OR BUTT WELD EXCEPT FOR THREADED VENT & CONNECTIONS TO EQUIPMENT & VALVES.
- 4) ON ALL HOSES FIELD INSTALL JIC/NPT SWIVEL ENDS, SIZE REQUIRED TO MATCH PIPING, PUMPS OR EQUIPMENT.

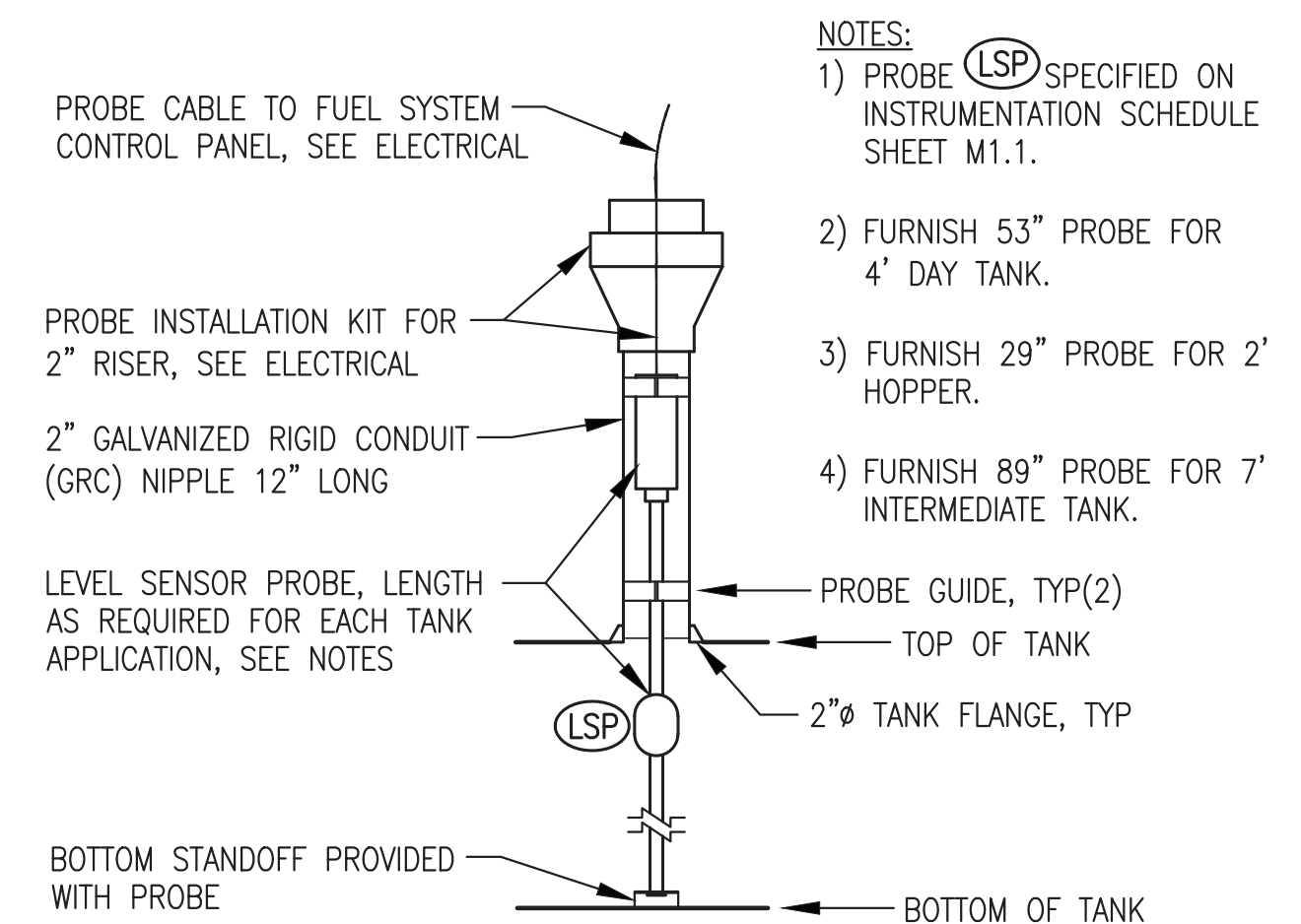
2 DIESEL FUEL & USED OIL PIPING DIAGRAM
M5.1 NO SCALE



3 TOP OF DAY TANK - PLAN VIEW
M5.1 NO SCALE



4 DAY TANK FLOAT SWITCH INSTALLATION
M5.1 NO SCALE



5 TYPICAL LEVEL SENSOR PROBE INSTALLATION
M5.1 NO SCALE

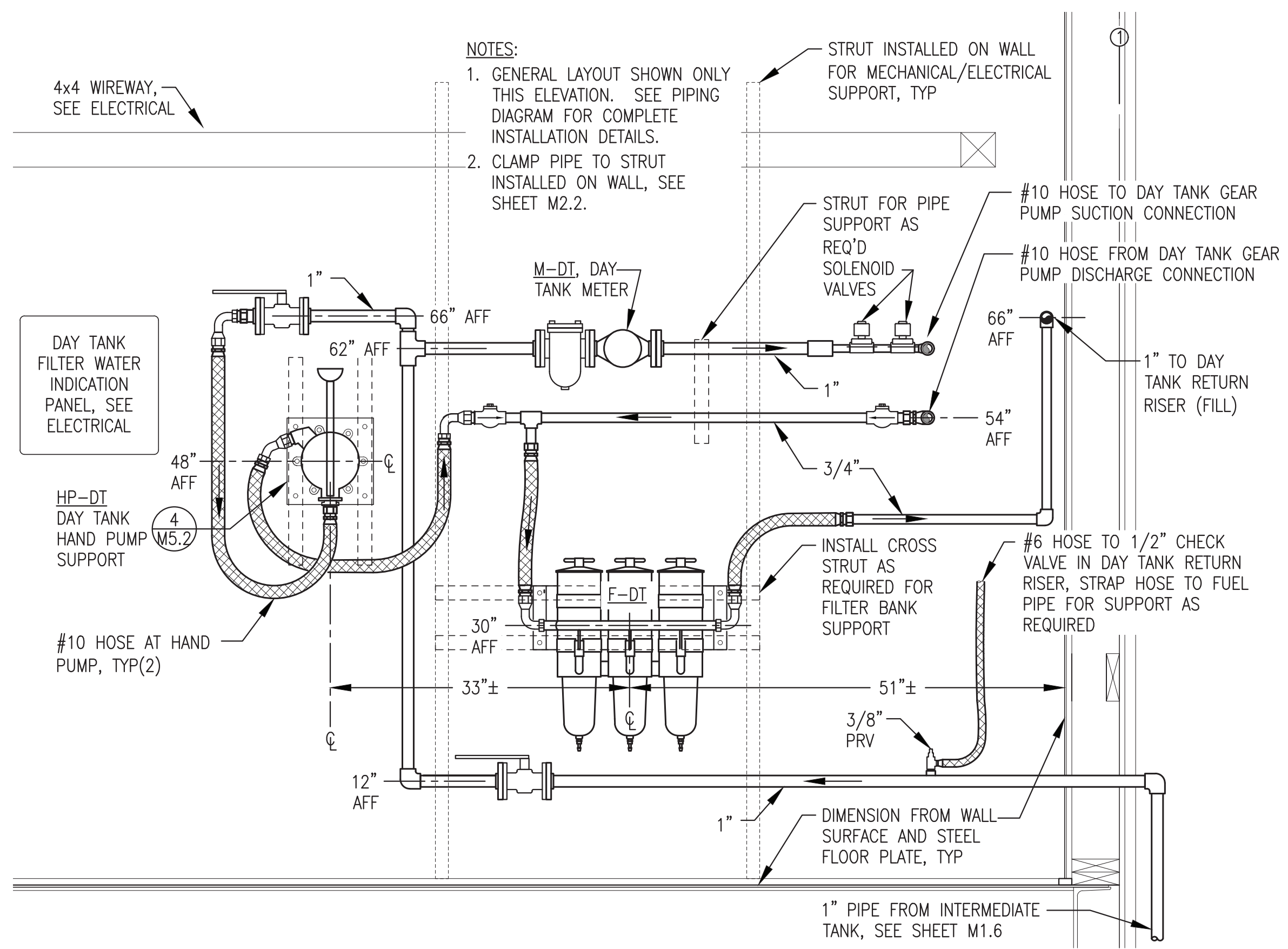
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NOVEMBER
2021



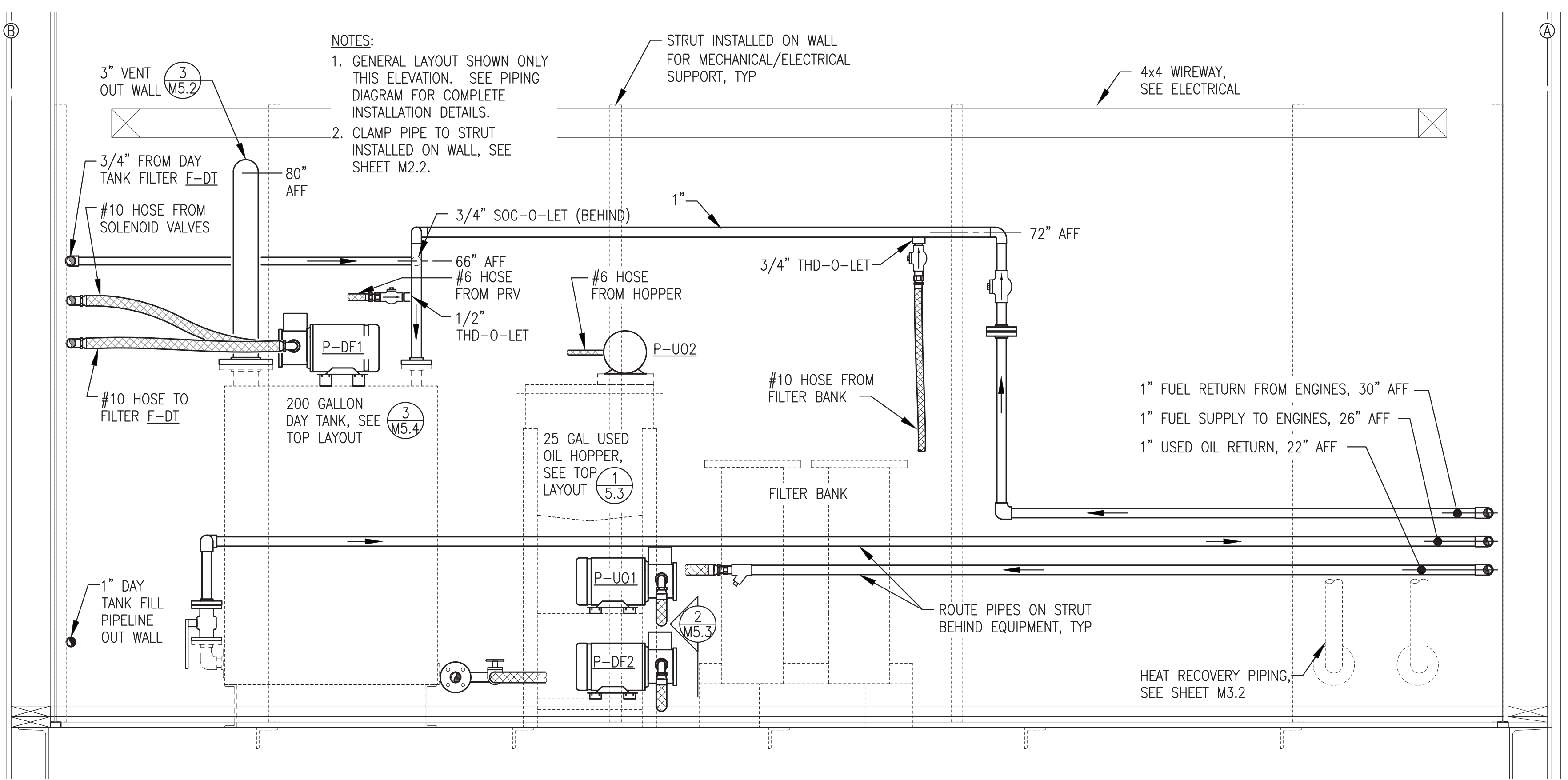
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: DIESEL FUEL & USED OIL PIPING PLAN, DIAGRAM & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M5.1 OF 9	
PROJECT NUMBER:			



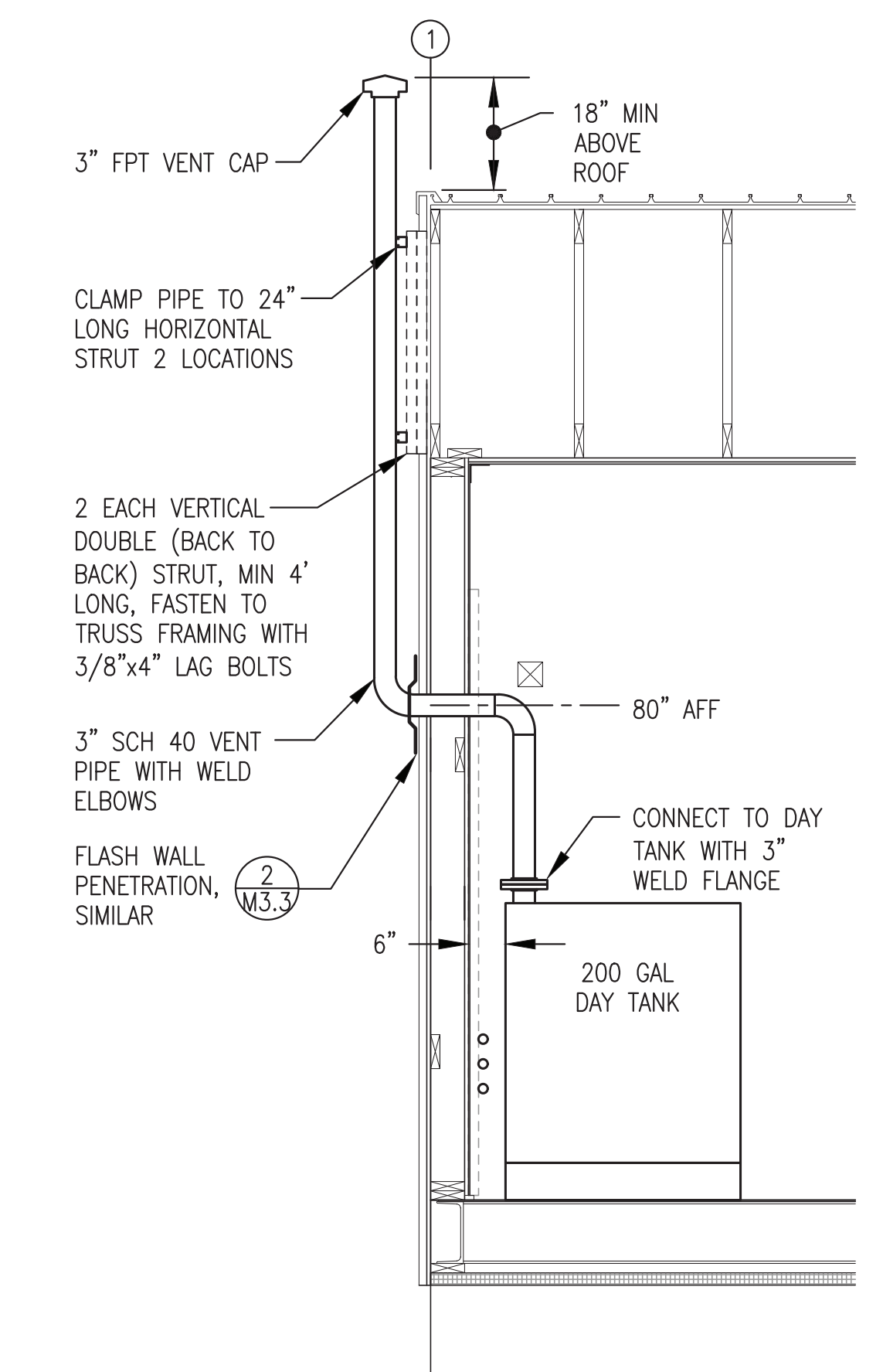
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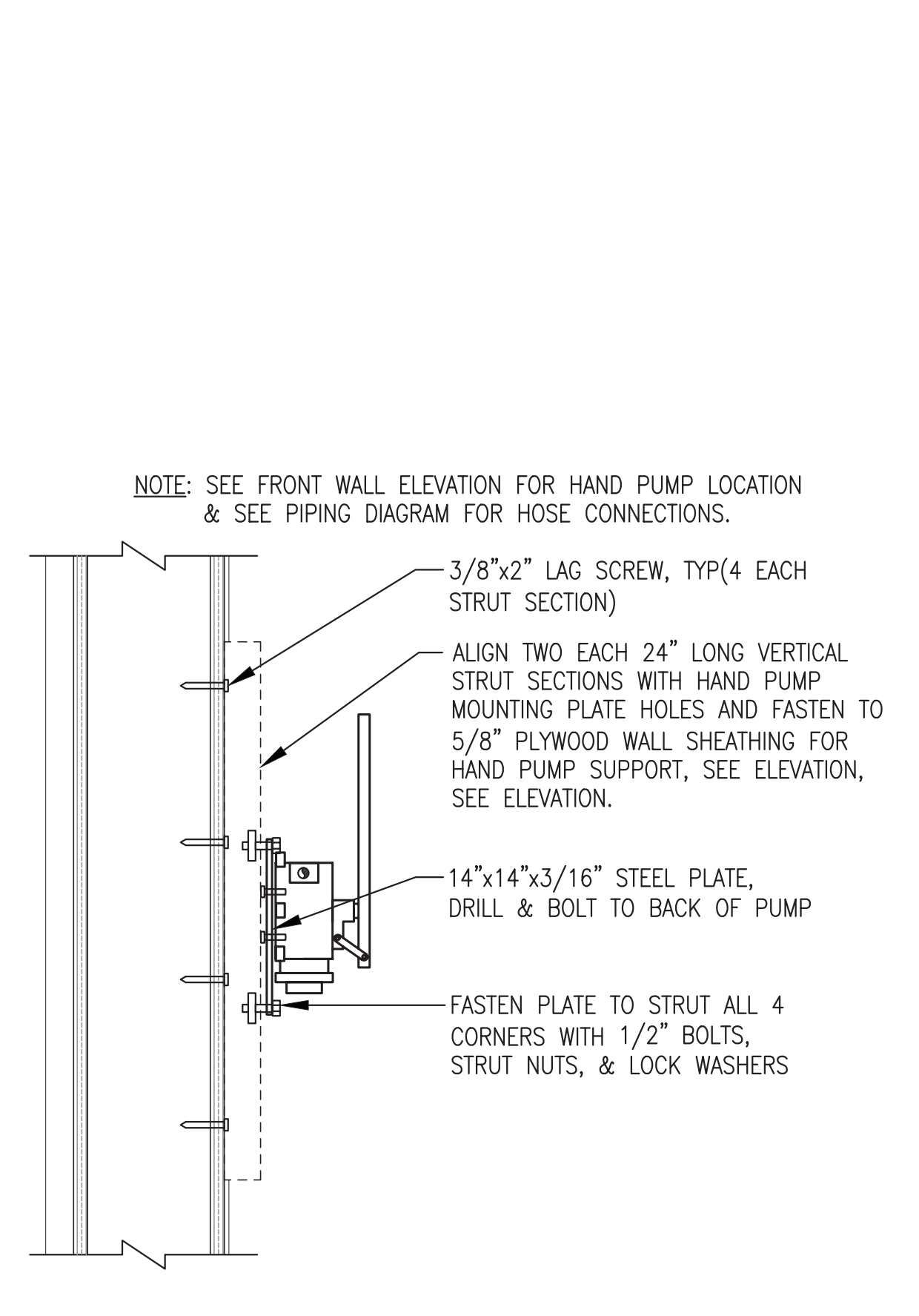
1 DIESEL FUEL FRONT WALL ELEVATION
 M5.2 1"=1"



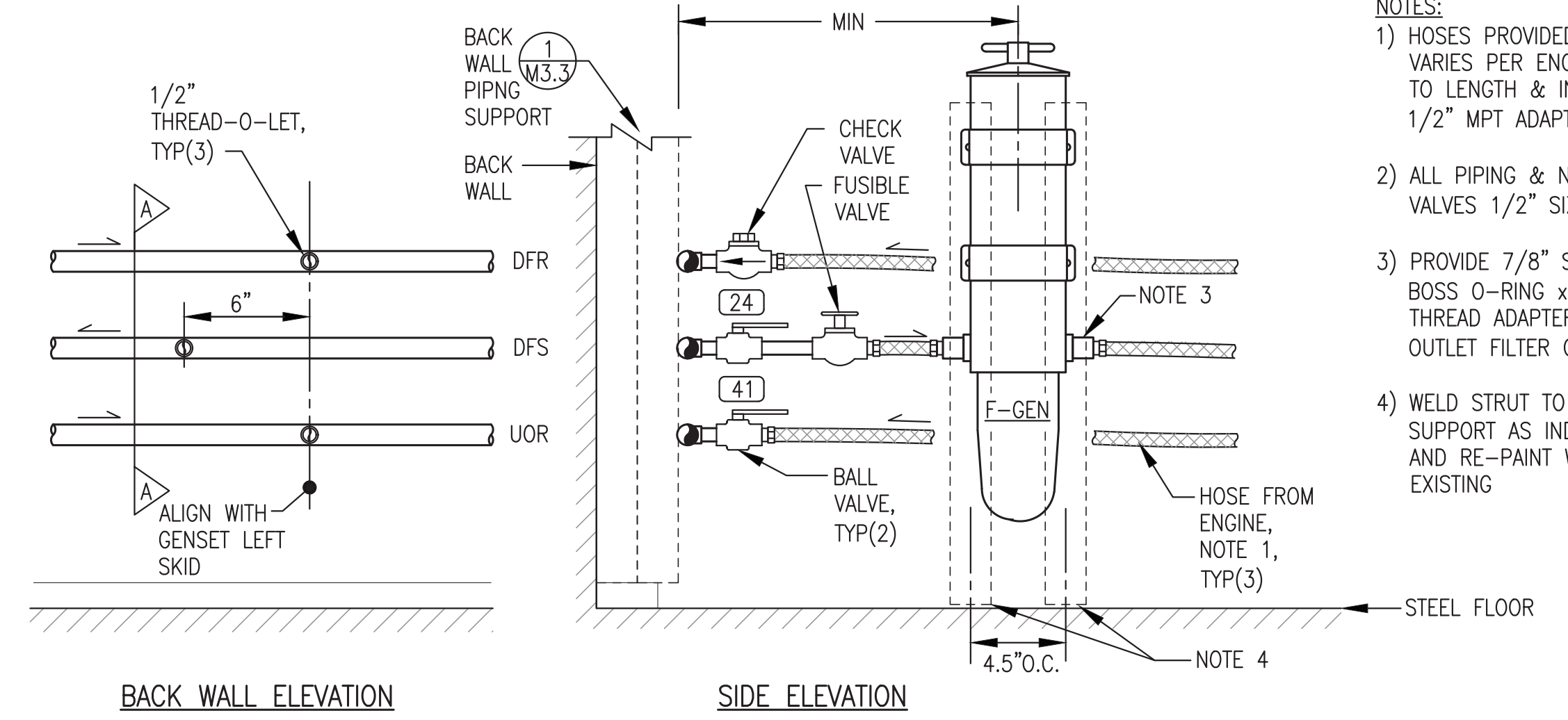
2 DIESEL FUEL & USED OIL END WALL ELEVATION
 M5.2 1"=1"



3 DAY TANK VENT INSTALLATION
 M5.2 3/8"=1'-0"



4 DAY TANK HAND PUMP HP-DT WALL SUPPORT DETAIL
 M5.2 NO SCALE



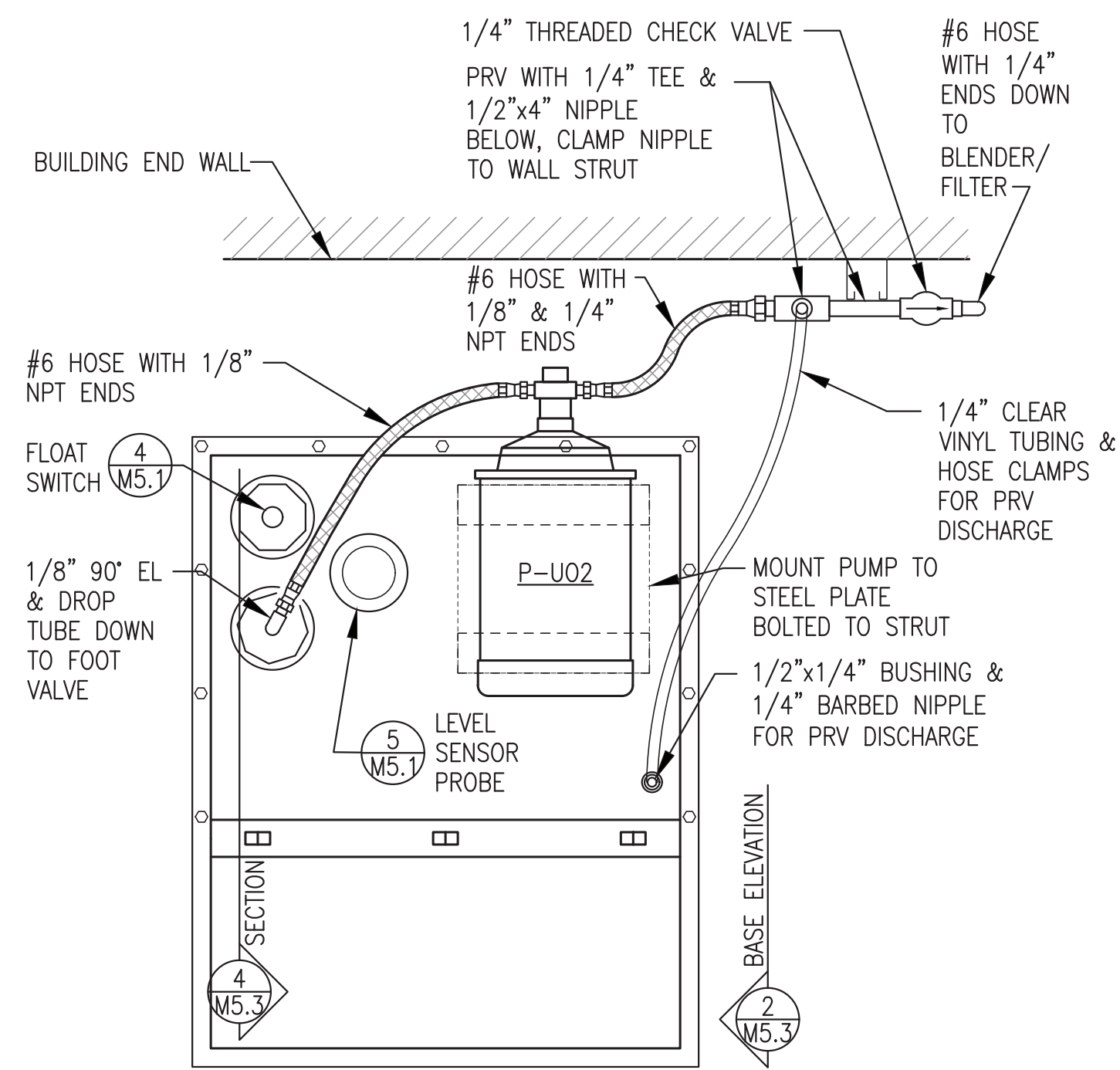
5 ENGINE FUEL PIPING CONNECTION
 M5.2 NO SCALE

- NOTES:**
- HOSES PROVIDED WITH ENGINE, SIZE VARIES PER ENGINE & PRODUCT. CUT TO LENGTH & INSTALL JIC SWIVELS & 1/2" MPT ADAPTERS.
 - ALL PIPING & NIPPLES SCH 80. ALL VALVES 1/2" SIZE, THREADED BODY.
 - PROVIDE 7/8" SAE J1926 MALE NFS BOSS O-RING x 1/2" FEMALE PIPE THREAD ADAPTER FOR HOSE INLET & OUTLET FILTER CONNECTIONS, TYP(2)
 - WELD STRUT TO FLOOR FOR FILTER SUPPORT AS INDICATED, WIRE BRUSH AND RE-PAINT WELD AREA TO MATCH EXISTING

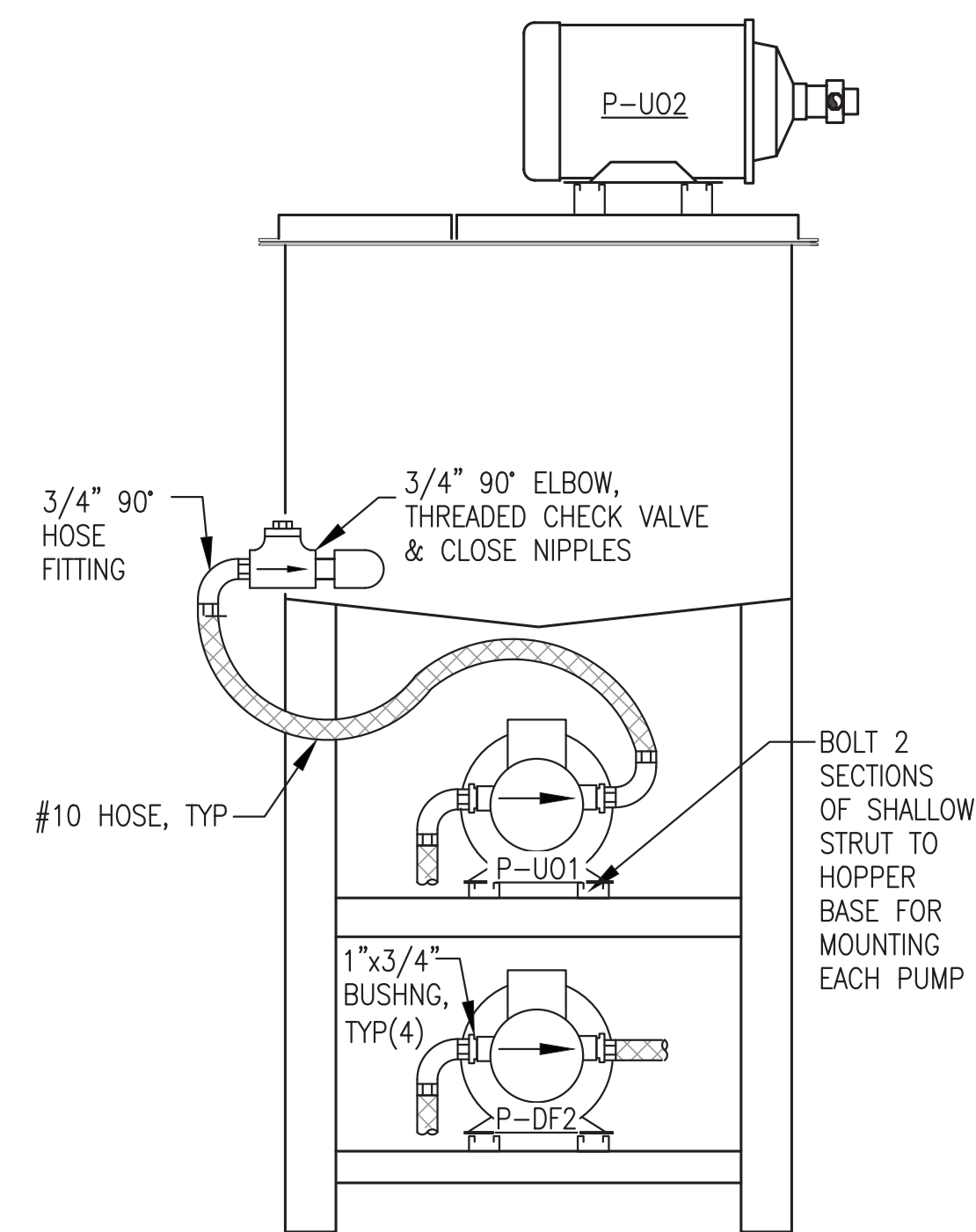
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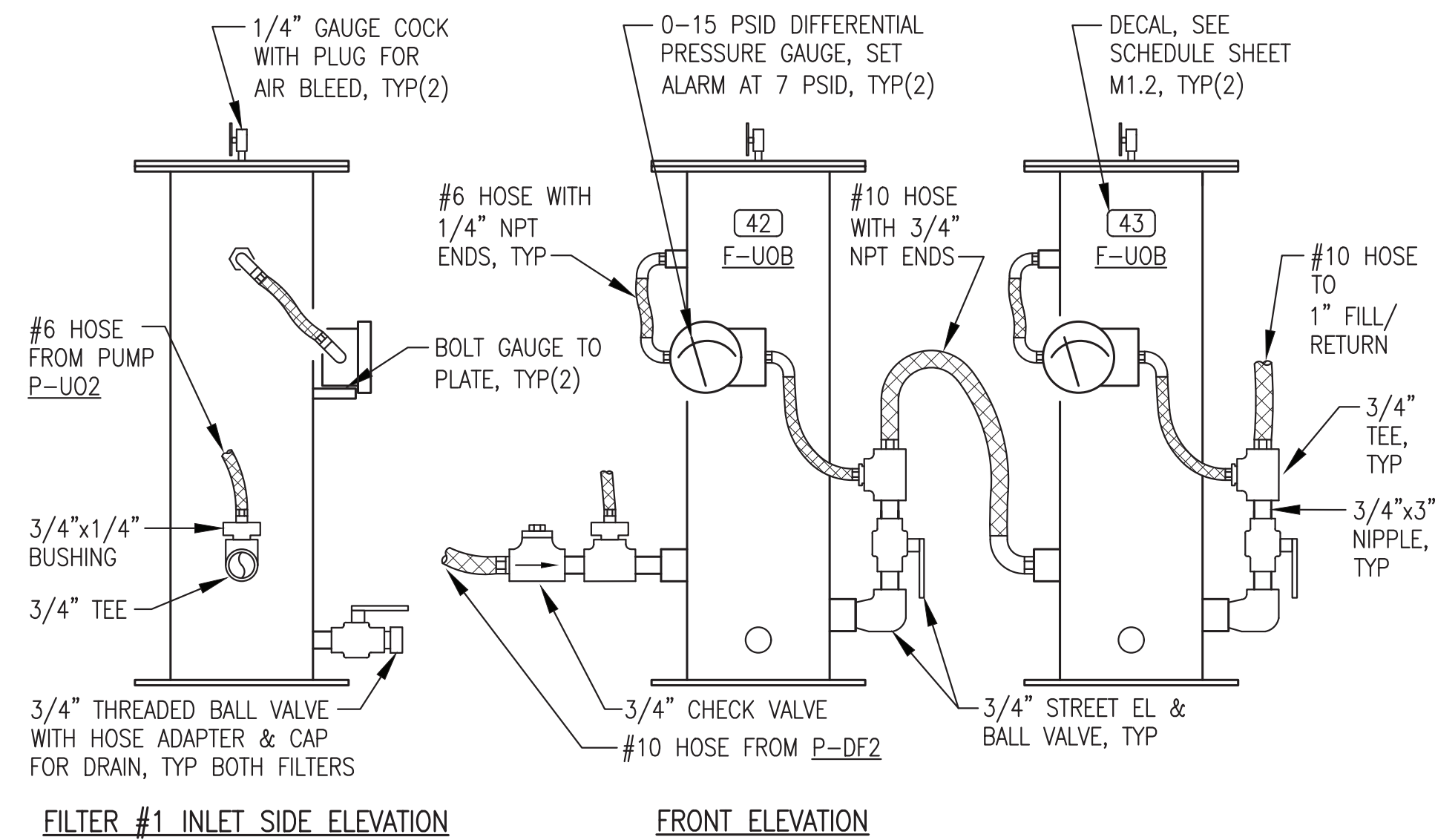
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: DIESEL FUEL & USED OIL PIPING ELEVATIONS & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M5.2 OF 9	
PROJECT NUMBER:			
 Gray Stassel Engineering, Inc.			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



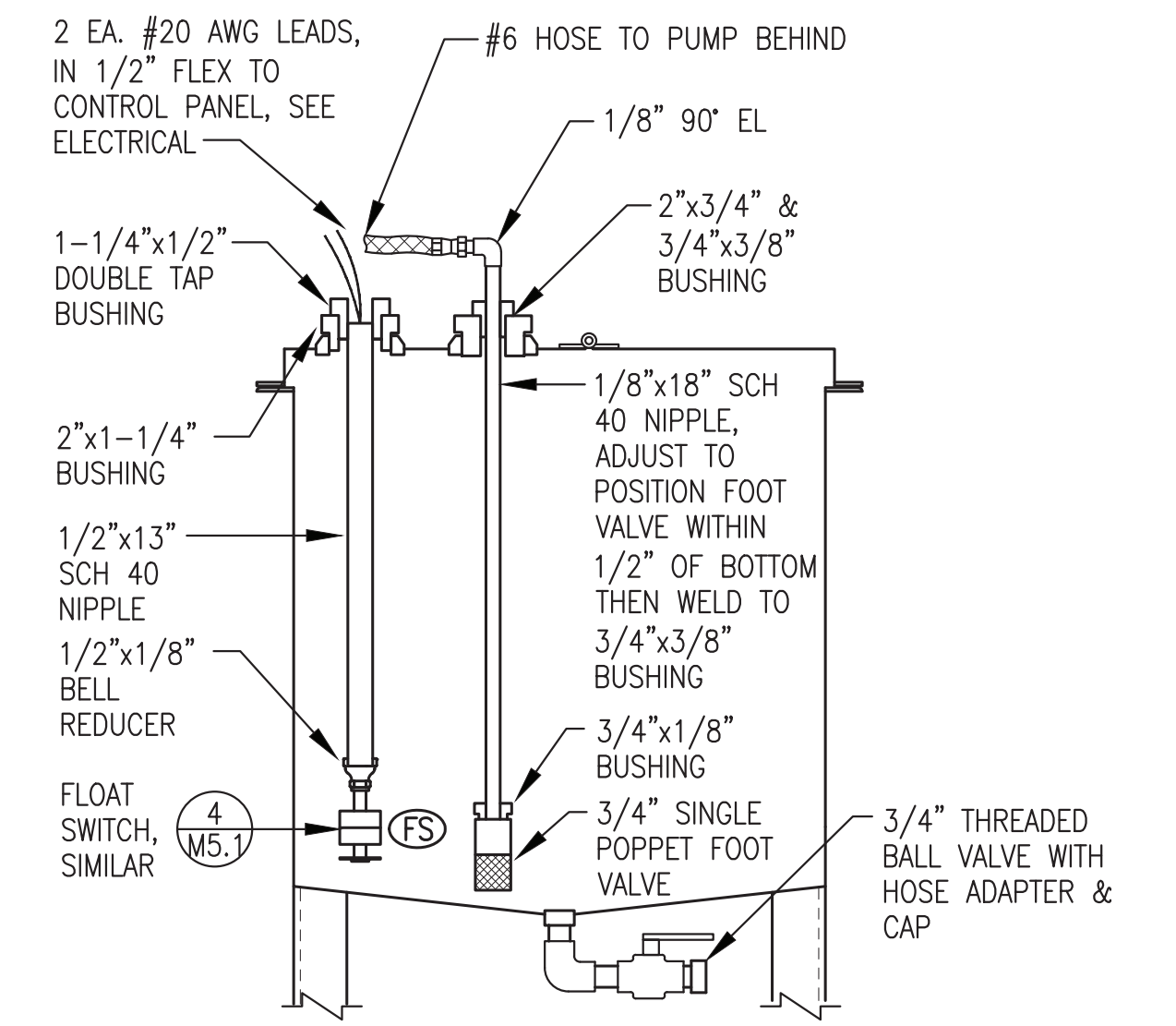
1 TOP OF HOPPER - PLAN VIEW
M5.3 NO SCALE



2 HOPPER BASE ELEVATION
M5.3 NO SCALE




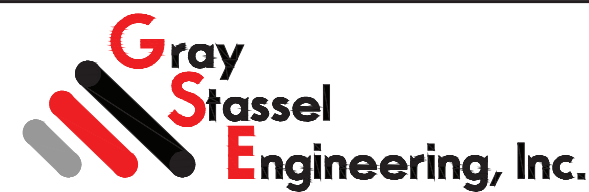
3 FILTER BANK ELEVATIONS & INSTALLATION DETAILS
M5.3 NO SCALE

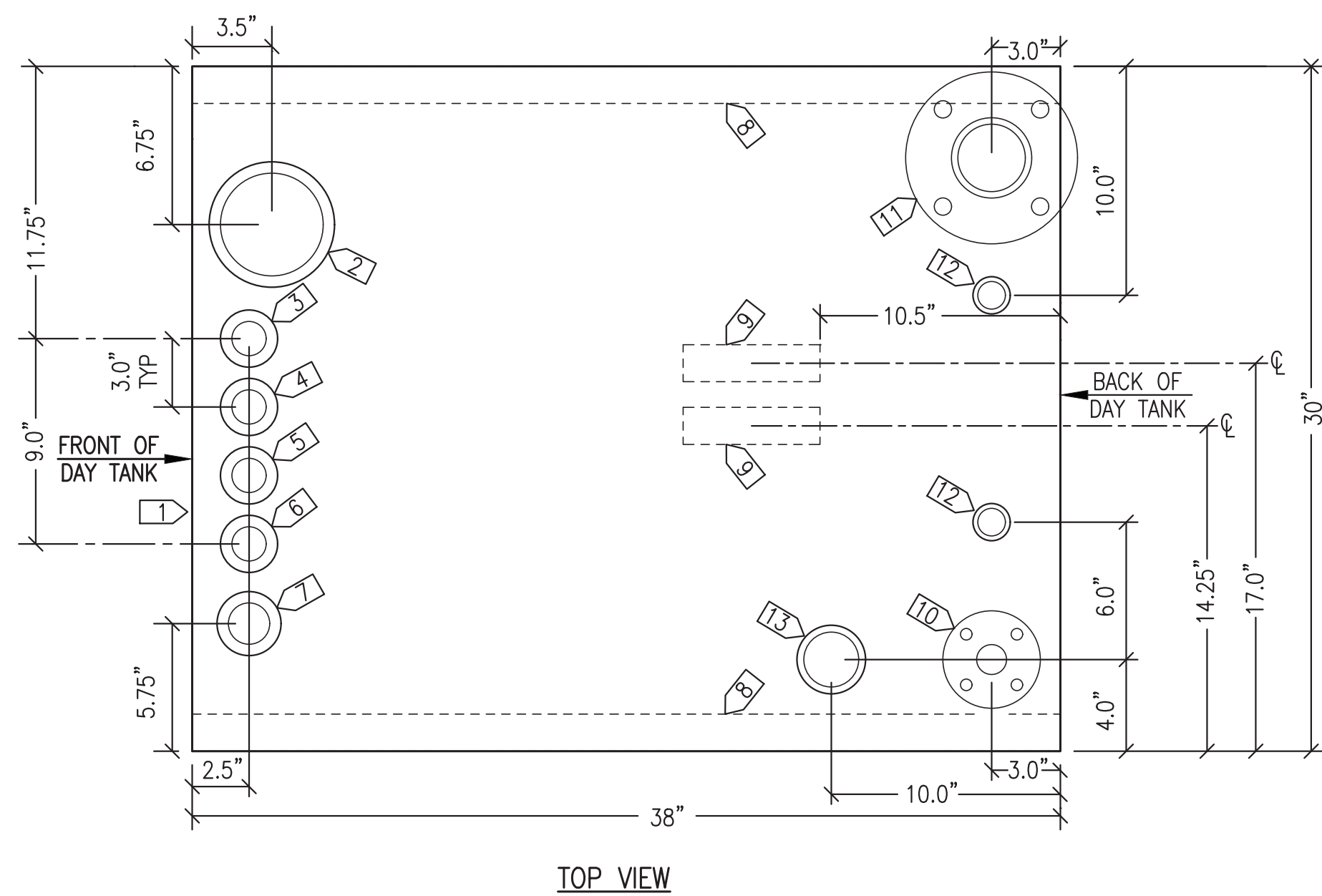


4 SECTION THROUGH HOPPER
M5.3 NO SCALE

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NOVEMBER
2021



1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: USED OIL HOPPER & BLENDER INSTALLATION DETAILS			
 Gray Stassel Engineering, Inc.		DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: NIKO M2-M7 PROJECT NUMBER:	SCALE: AS NOTED DATE: 9/1/21 SHEET: M5.3 OF 9
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



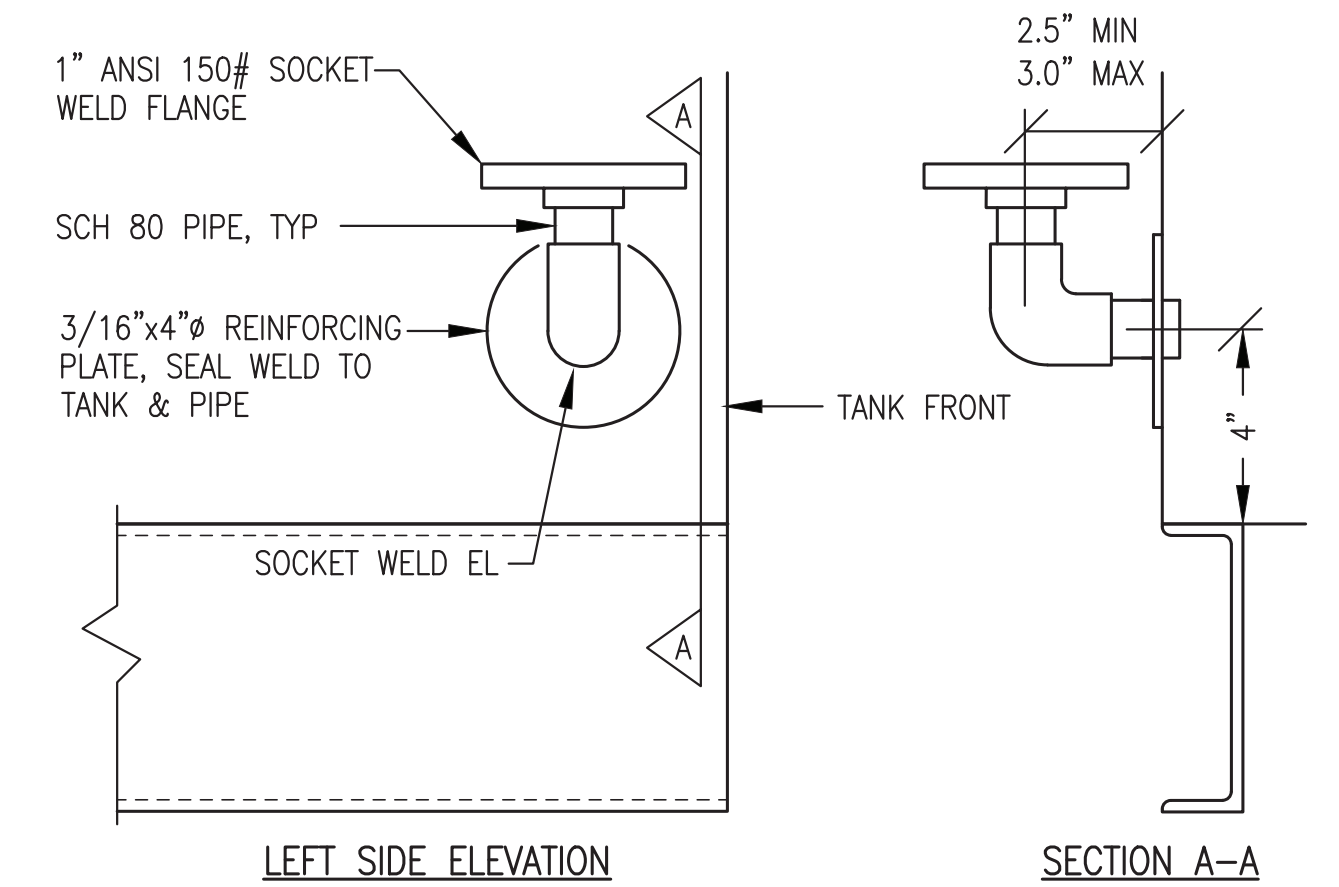
TOP VIEW

DAY TANK SPECIFICATIONS:

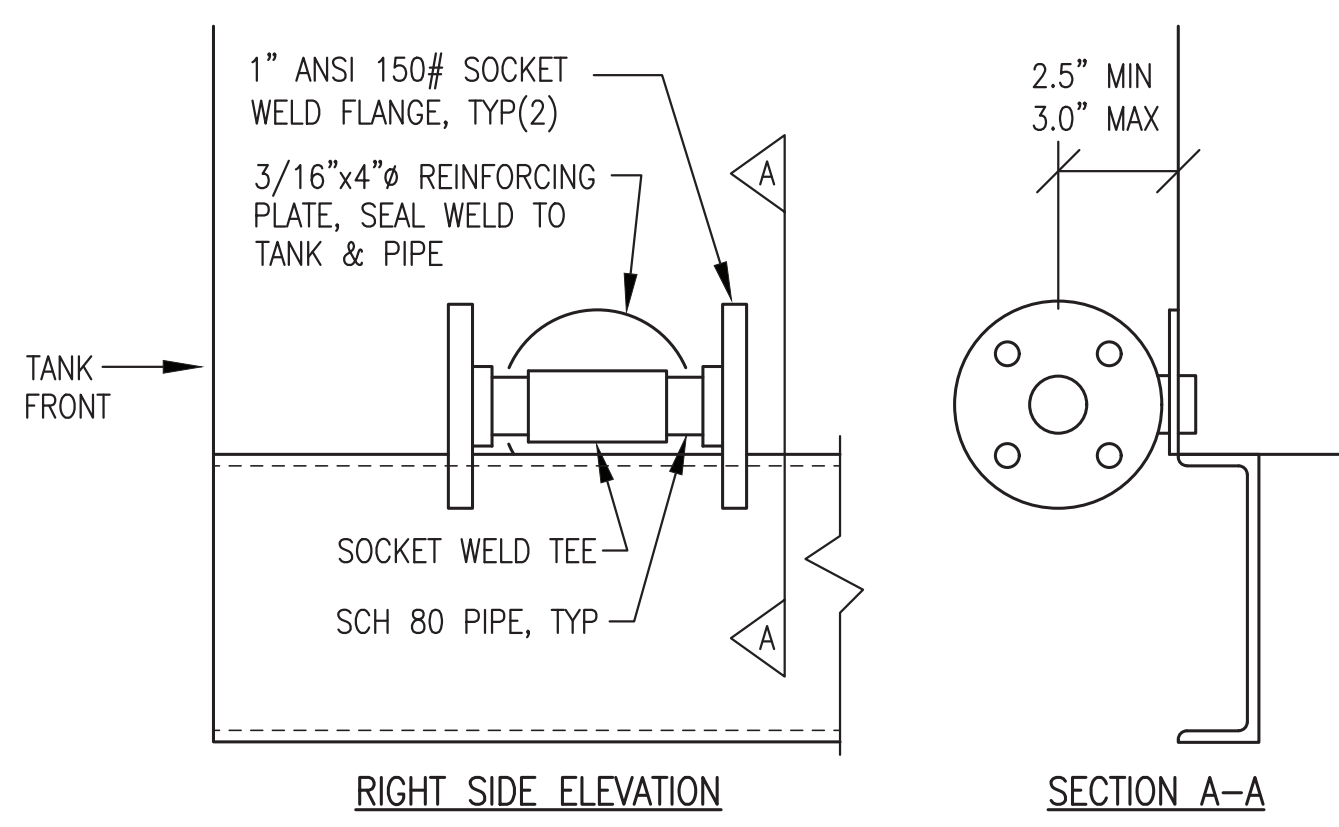
- 1) FABRICATE SINGLE WALL 200 GALLON NOMINAL CAPACITY DAY TANK. FABRICATE IN ACCORDANCE WITH UL 142.
- 2) FABRICATE FROM ASTM A-36 STEEL PLATE, 10 GAUGE MINIMUM EXCEPT FOR TOP 3/16" MINIMUM. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS IN ACCORDANCE WITH UL 142 FIGURE 6.5 - #1, #6, #7, OR #8.
- 3) PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. ALL STRUT TO BE 1-5/8"x1-5/8"x12 GA SOLID BACK PLAIN (BLACK), B-LINE B22 PLN OR EQUAL. SEAL WELD ALL TANK ATTACHMENTS.
- 4) INSTALL ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 - #4 UNLESS INDICATED OTHERWISE. ALL DROP TUBES SCH 40 ASTM A53 STEEL PIPE WITH MPT OR FLANGED END AS INDICATED.
- 5) PRESSURE TEST COMPLETED ASSEMBLY TO 5 PSIG MAXIMUM USING SOAPY WATER SOLUTION ON ALL WELD JOINTS.
- 6) UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
- 7) LABEL ALL OPENINGS WITH 1/4" BLACK LETTERS INDICATING FUNCTION AS LISTED IN PARENTHESES IN SPECIFIC NOTES.
- 8) UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS AND AIR DRY INTERIOR. SEAL ALL MPT OPENINGS WITH THREADED STEEL CAPS. SEAL FPT TANK OPENINGS WITH THREADED STEEL PIPE PLUGS WHERE INDICATED. INSTALL 1-1/4" VENT CAP WHERE INDICATED. SEAL ALL OTHER FPT OPENINGS WITH PLASTIC OR STEEL PLUGS.

DAY TANK SPECIFIC NOTES:

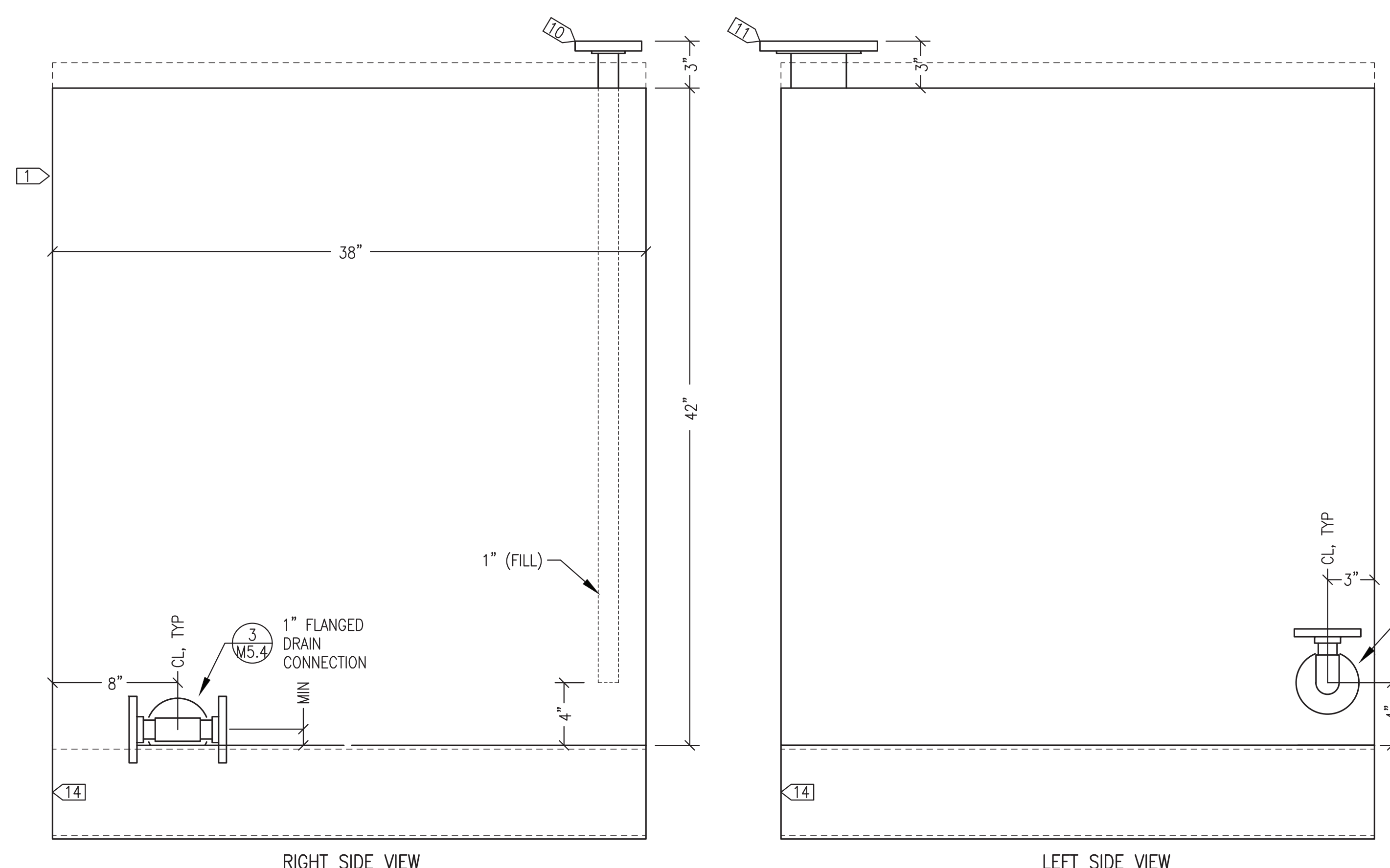
- 1) PROVIDE 2" HIGH LETTERING: "DIESEL FUEL 200 GALLONS"
- 2) 4" FPT (MANUAL FILL) - INSTALL THREADED STEEL PLUG
- 3) 1-1/4" FPT (OVERFILL) - INSTALL VENT CAP FOR SHIPPING
- 4) 1-1/4" FPT (PUMP STOP)
- 5) 1-1/4" FPT (PUMP START)
- 6) 1-1/4" FPT (LOW ALARM)
- 7) 1-1/2" FPT (TANK GAUGE)
- 8) 38"L STRUT, ENDS FLUSH WITH TANK
- 9) 6"L STRUT
- 10) 1" SCH 40 DROP TUBE (FILL) WITH 1" 150# FLANGE
- 11) 3" 150# FLANGED VENT CONNECTION
- 12) 1" FPT (SPARE) - INSTALL THREADED STEEL PLUG
- 13) 2" FPT (TANK LEVEL PROBE)
- 14) C6x8.2, 38" LONG



2 1" FLANGED SUPPLY CONNECTION
M5.4 NO SCALE



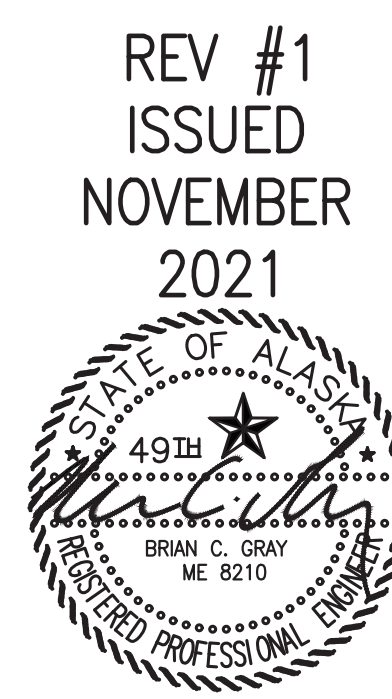
3 1" FLANGED DRAIN CONNECTION
M5.4 NO SCALE



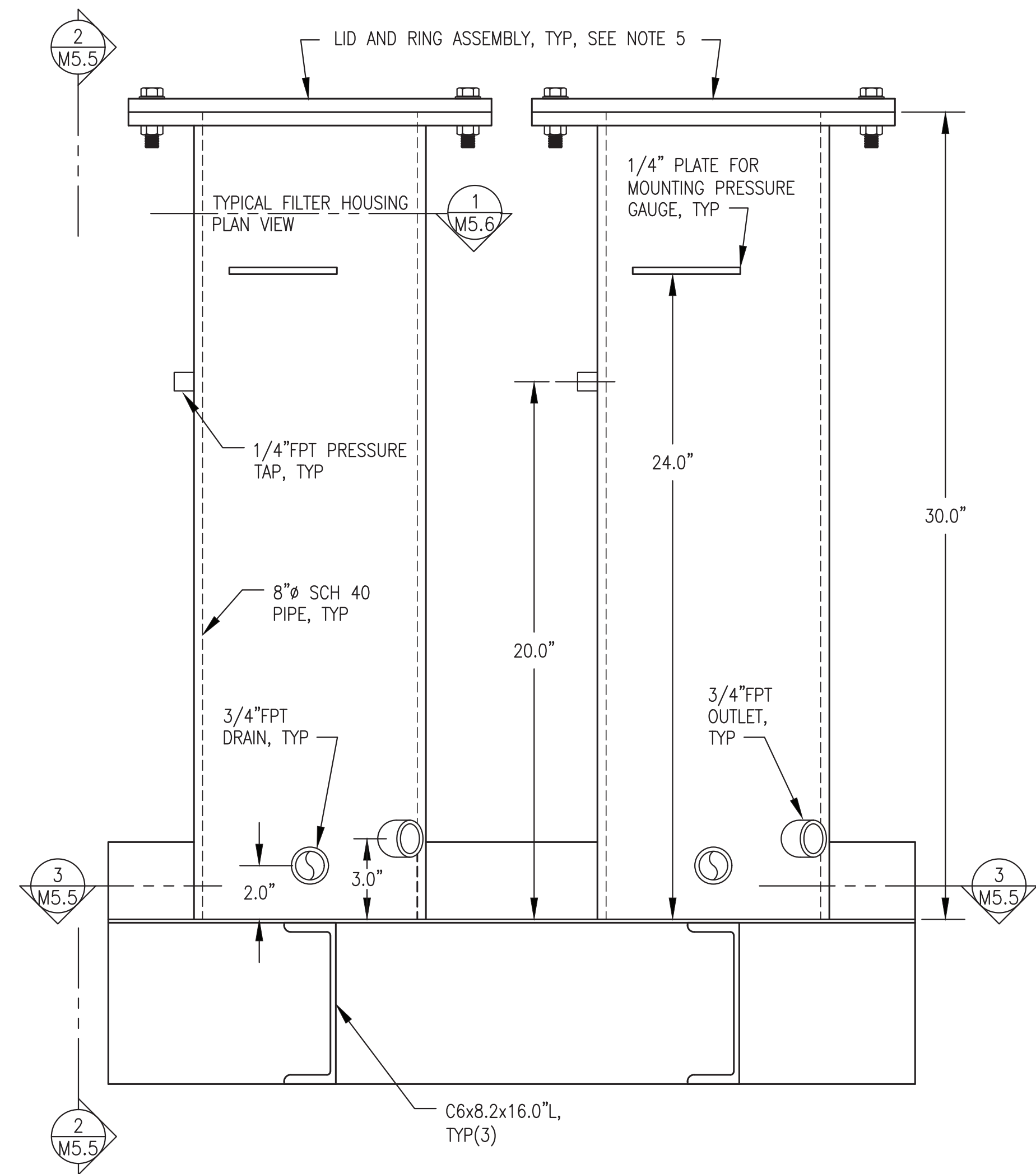
RIGHT SIDE VIEW

LEFT SIDE VIEW

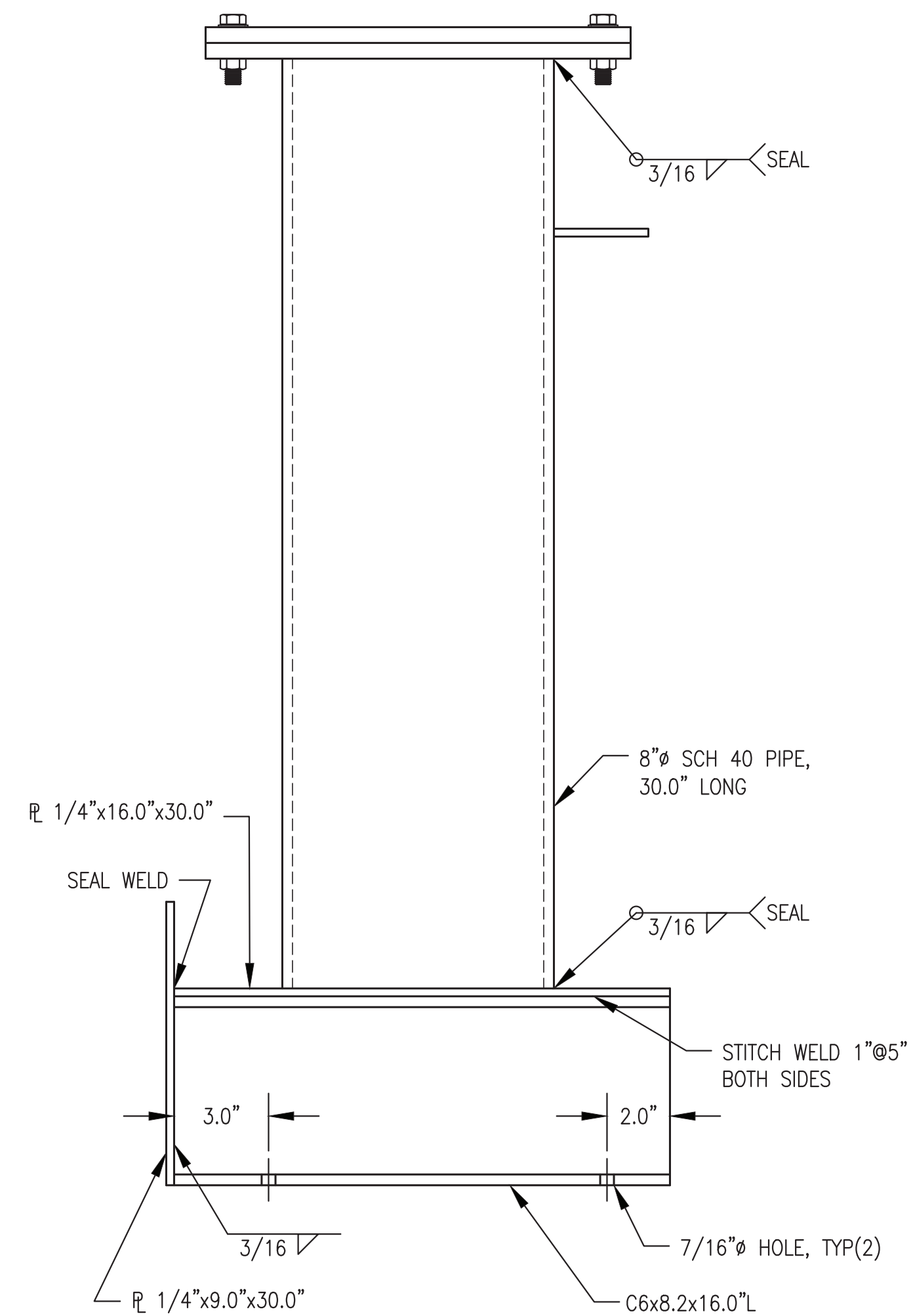
1 200 GALLON SINGLE WALL DAY TANK
M5.4 1/2"=1'-0"



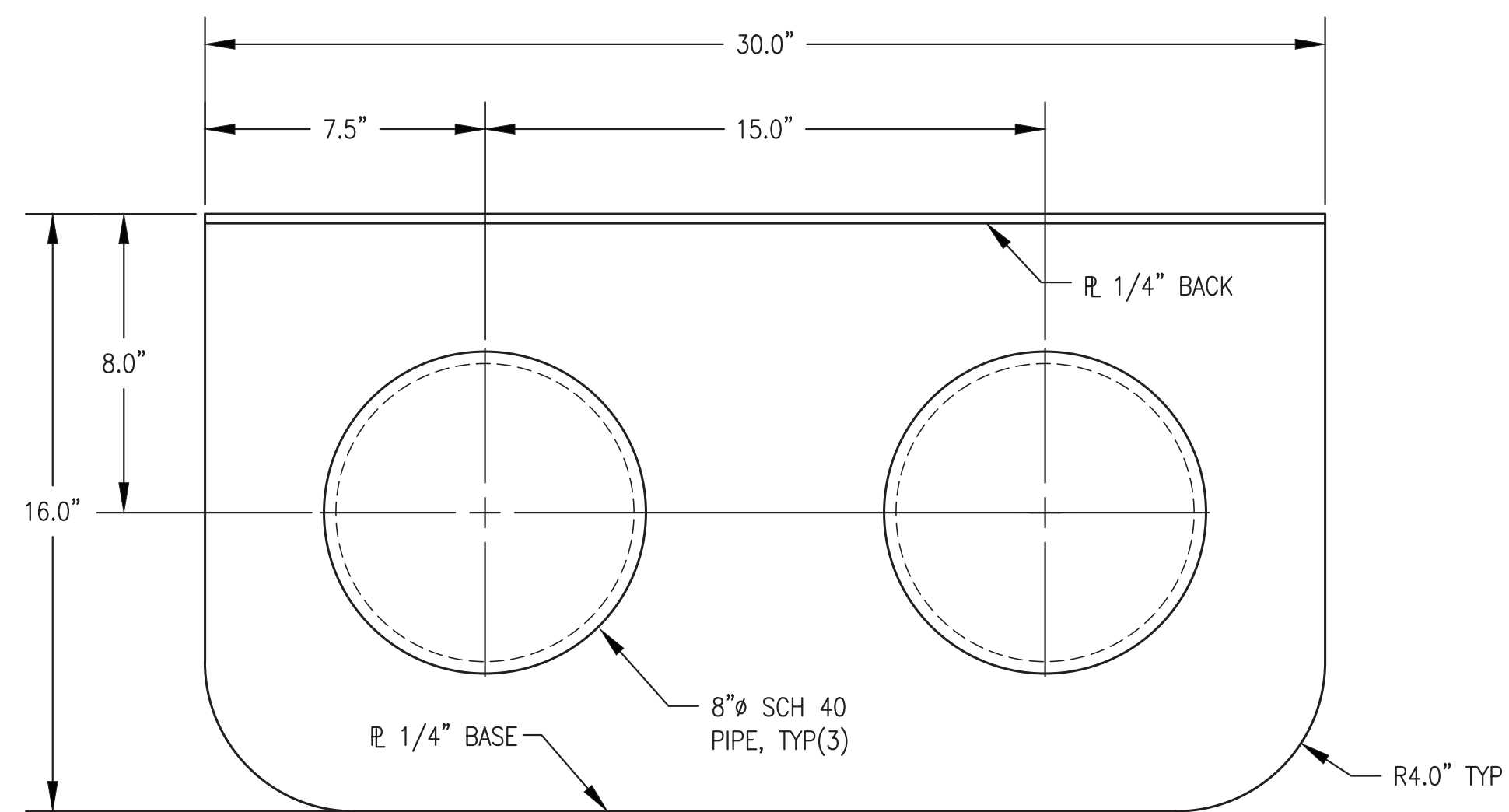
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: 200 GALLON DAY TANK FABRICATION			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M5.4 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



1 OIL FILTER BANK FRONT ELEVATION
M5.5 1/4" = 1"




2 SECTION THROUGH FILTER & BASE
M5.5 1/4" = 1"



3 OIL FILTER BANK BASE PLAN
M5.5 1/4" = 1"

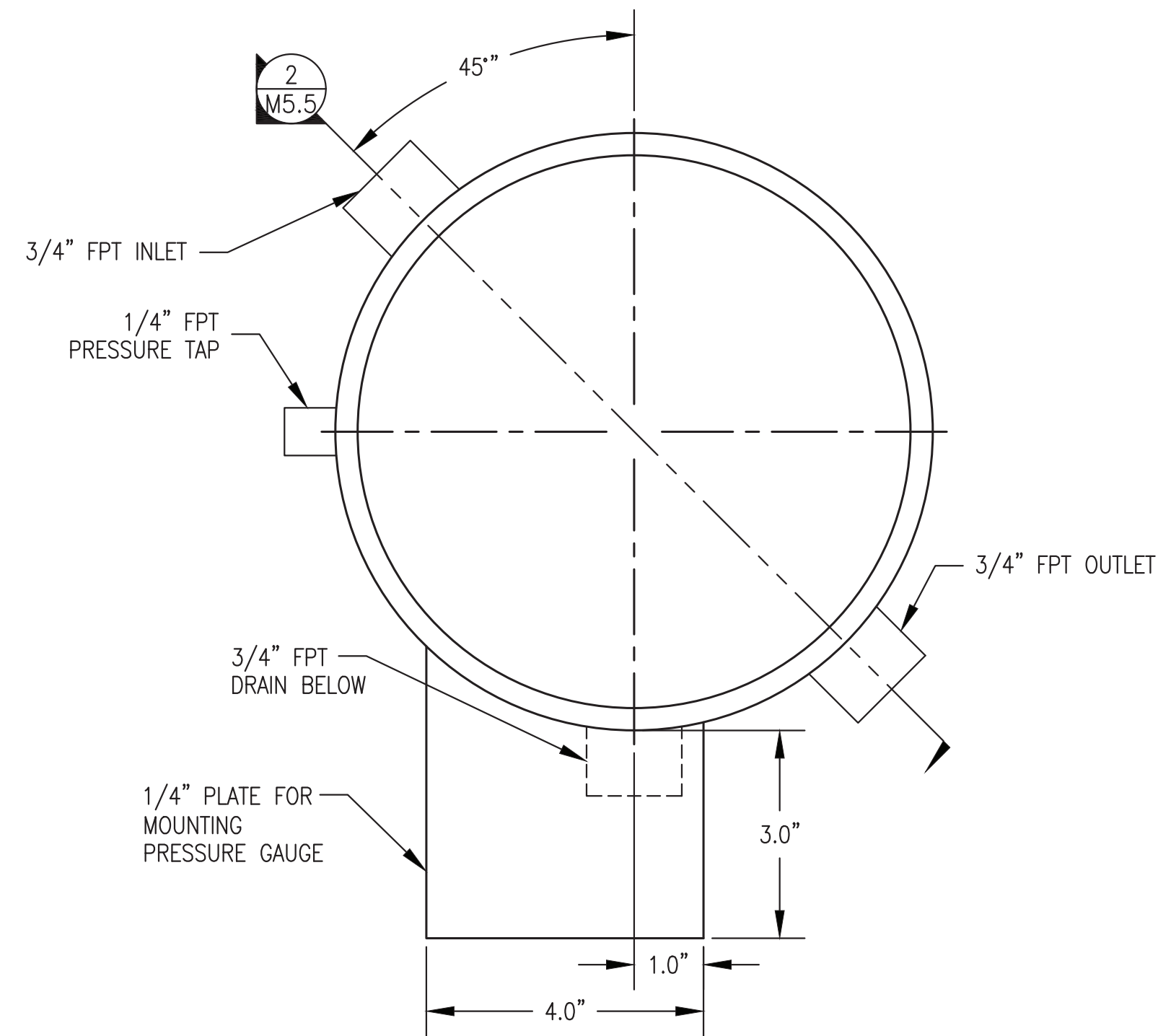
FILTER BANK GENERAL NOTES:

1. FABRICATE TWO CHAMBER FILTER BANK AS INDICATED. SEE SHEET M5.5 FOR INTERNAL DETAILS.
2. FABRICATE FROM ASTM A-36 STEEL PLATE AND SHAPES AND ASTM A-53 PIPE. ALL JOINTS TO BE FULL CONTINUOUS SEAL WELDS EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.
3. PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. INSTALL MINIMUM 3,000# FORGED STEEL HALF COUPLINGS FOR ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 - #2.
4. PRESSURE TEST COMPLETED ASSEMBLY TO MINIMUM 50 PSIG USING SOAPY WATER SOLUTION ON ALL WELD JOINTS.
5. UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
6. AFTER PAINTING REMOVE LID, WIRE BRUSH MATING SURFACES OF LID AND RING TO REMOVE ALL PAINT AND POLISH SURFACES SMOOTH. APPLY A LIGHT COAT OF GREASE OR ANTI-SIEZE PASTE TO BOTH FACES PRIOR TO INSTALLING GASKET. INSTALL 13.5" O.D. FULL-FACED 1/4" BUNA-N RUBBER GASKET (ALASKA RUBBER OR EQUAL) ON FILTER LIDS.
7. FURNISH FASTENERS AS INDICATED AND COAT WITH ANTI-SIEZE.
8. PRESSURE TEST EACH FILTER HOUSING ASSEMBLY TO 50 PSIG MINIMUM.
9. UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS, AIR DRY INTERIOR, AND SEAL ALL TANK OPENINGS WITH PLASTIC PLUGS.

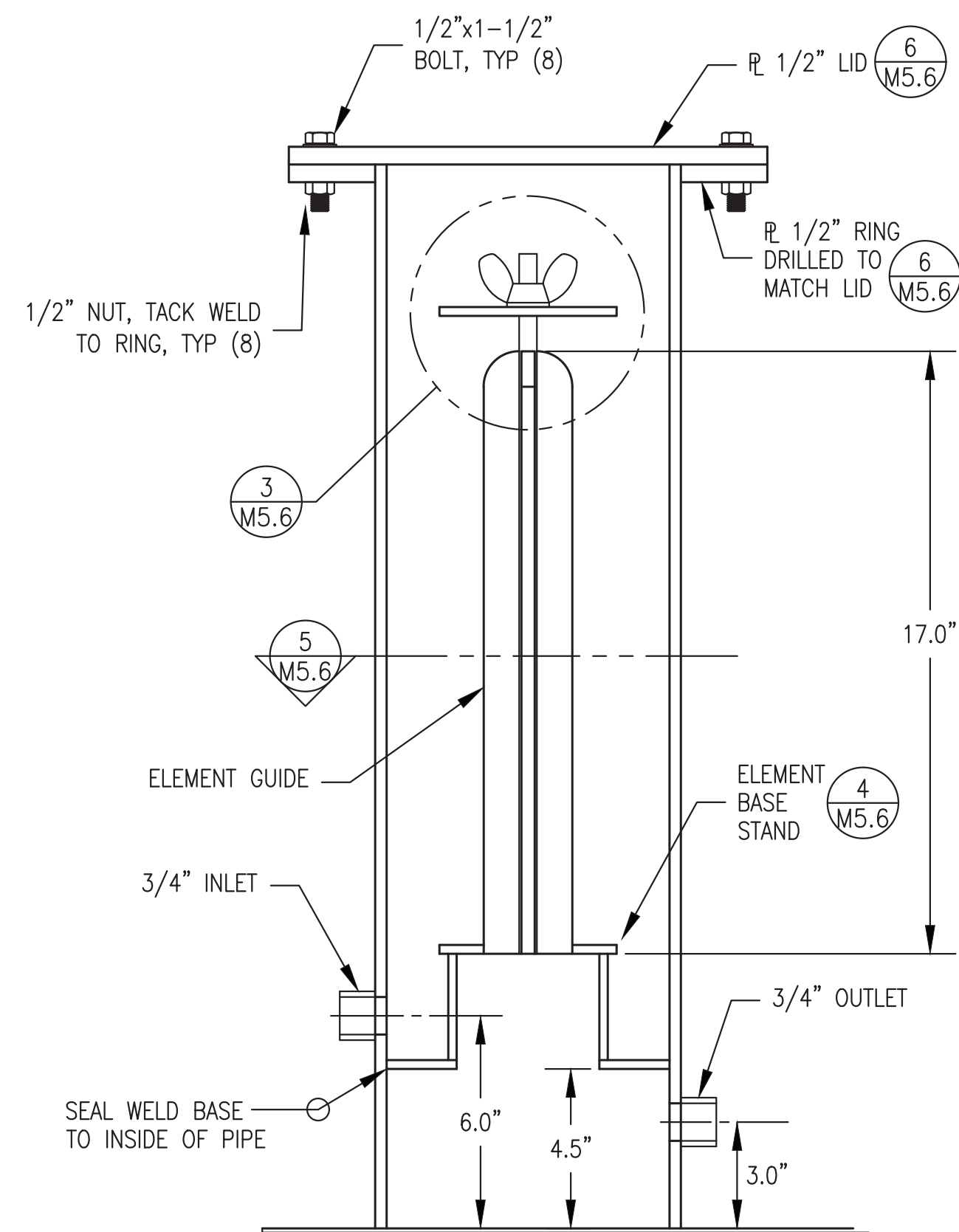
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: USED OIL BLENDER FILTER BANK LAYOUT & CONFIGURATION			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M5.5 OF 9	
PROJECT NUMBER:			



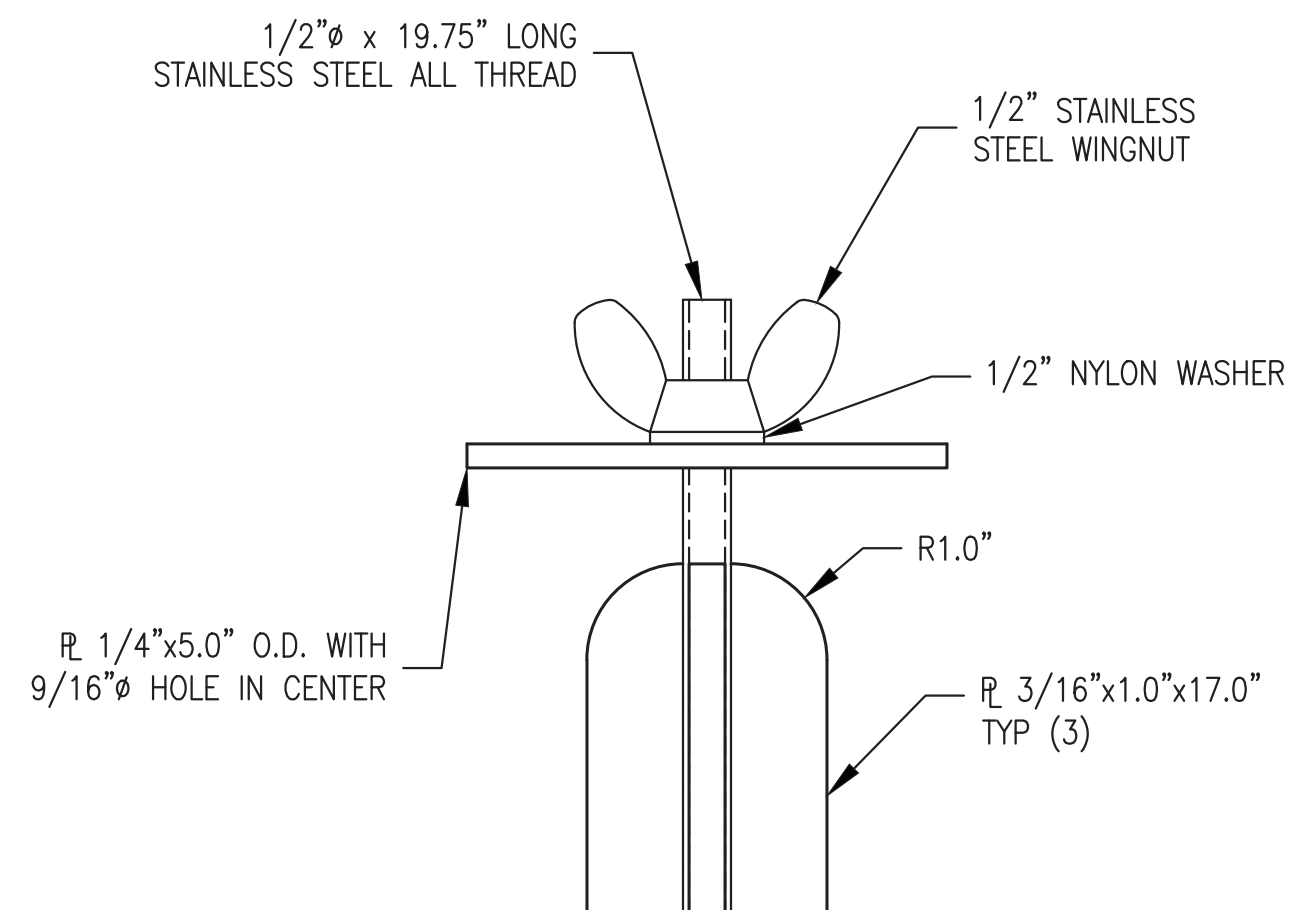
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NOVEMBER
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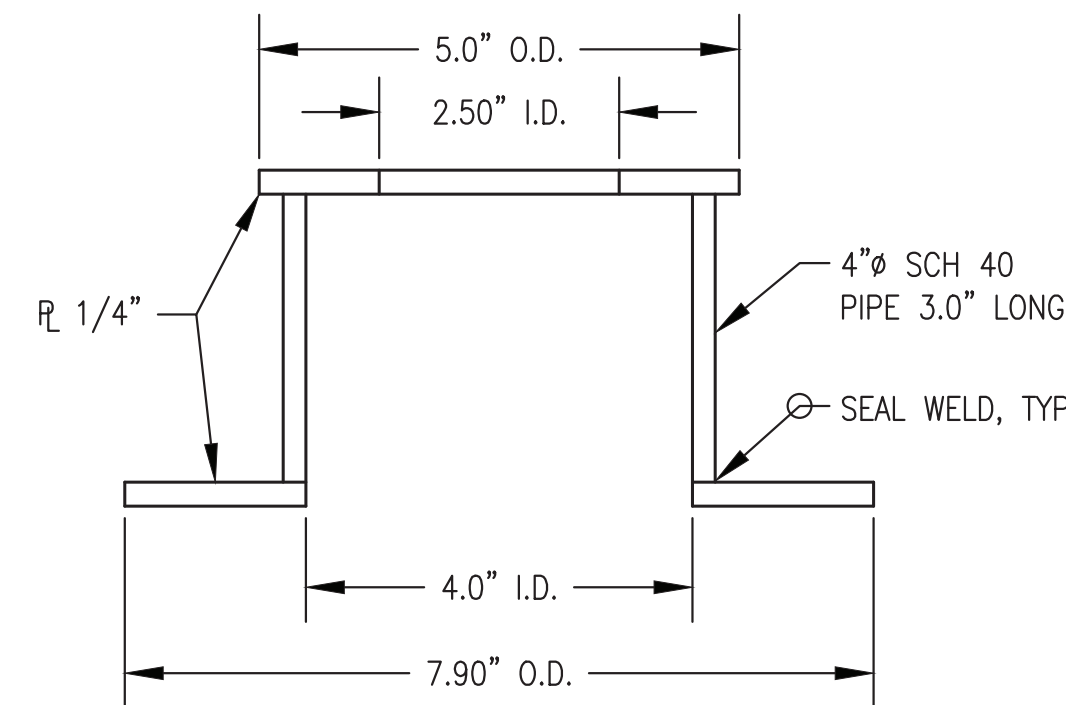
1 TYPICAL FILTER HOUSING – PLAN VIEW
M5.6 1/2" = 1"



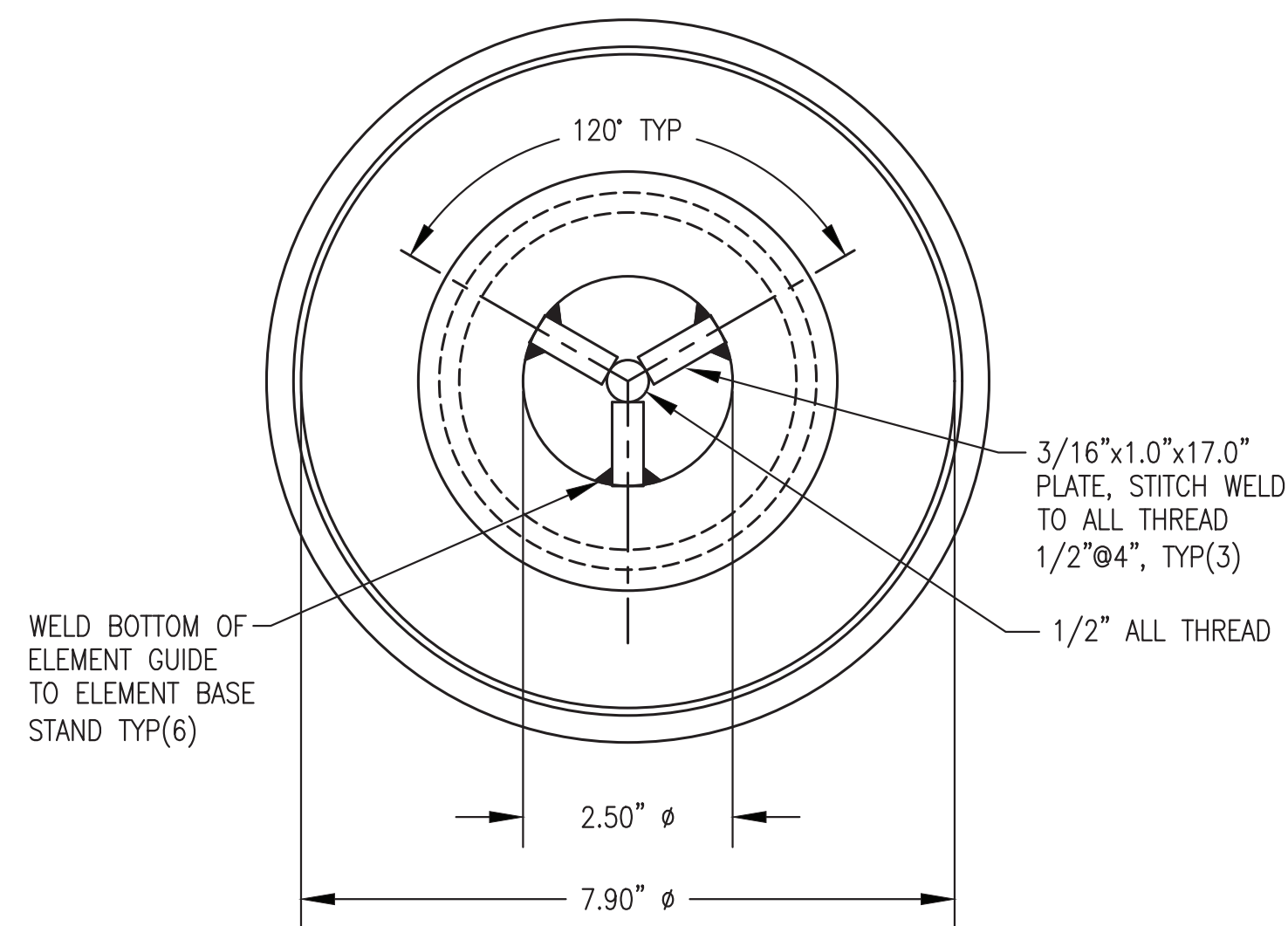
2 TYPICAL SECTION THROUGH FILTER HOUSING
M5.6 1/4" = 1"



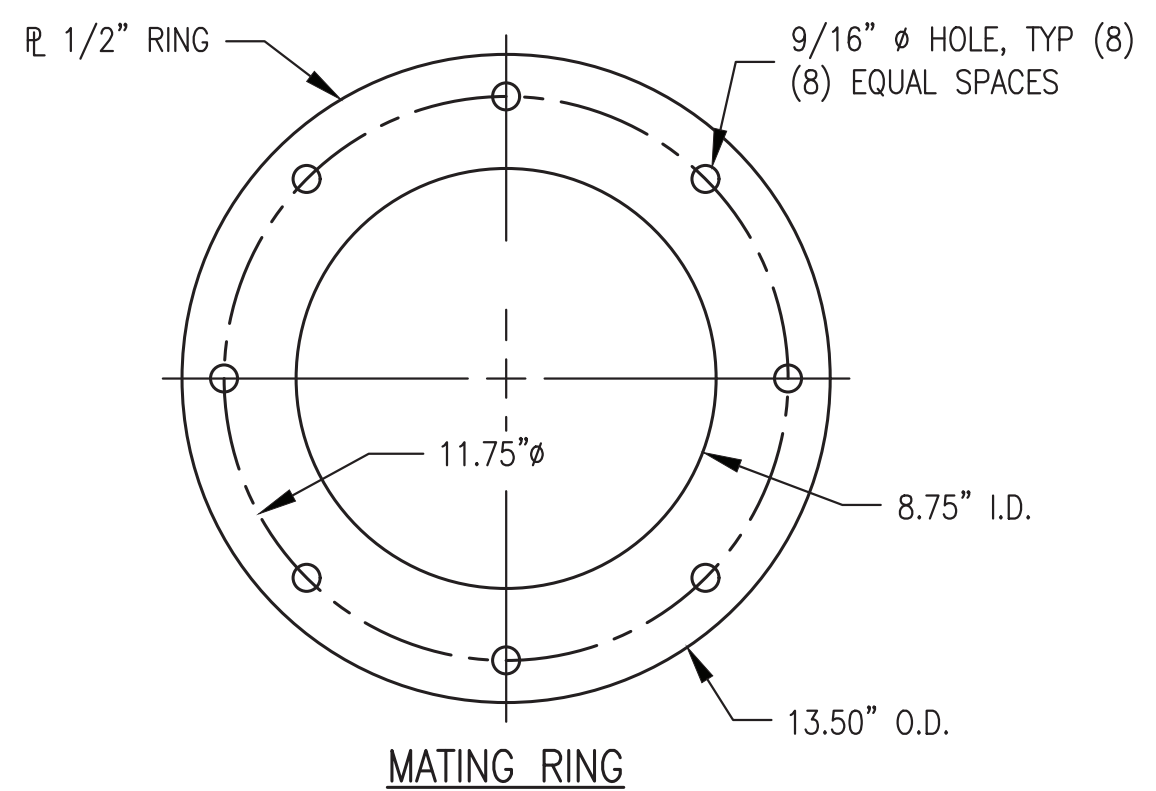
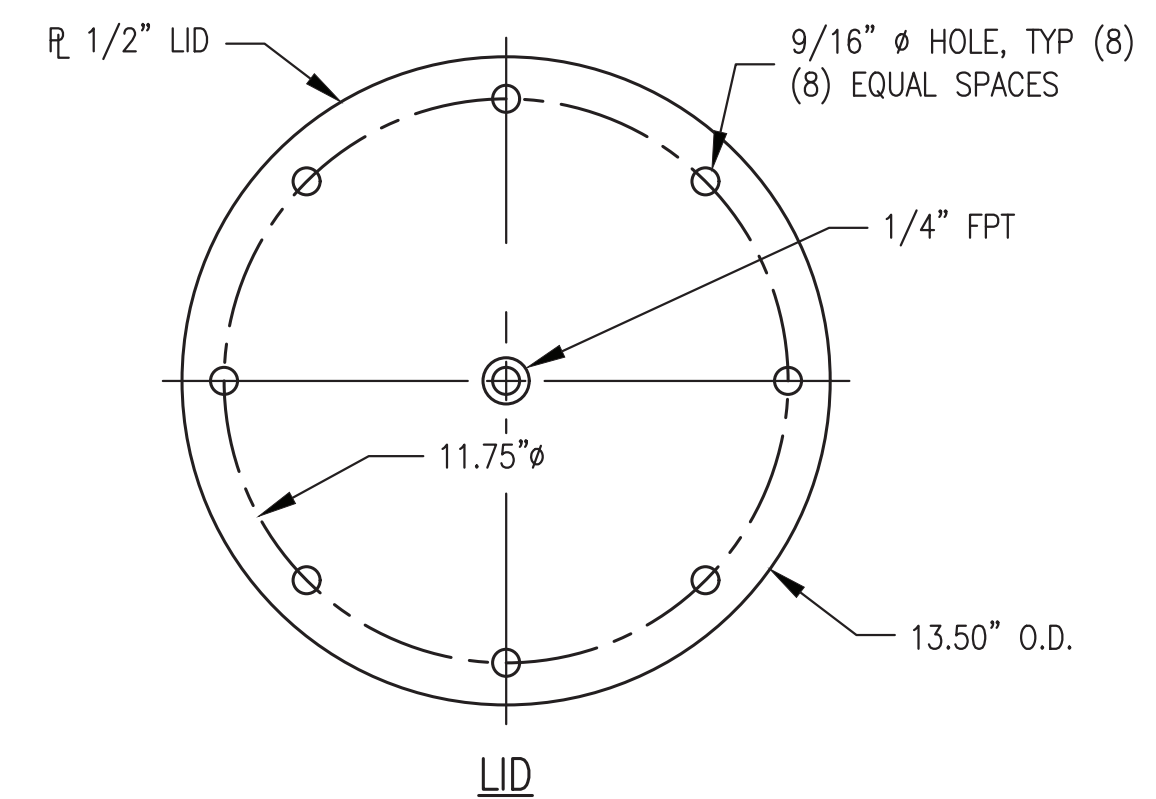
3 ELEMENT RETAINER CAP
M5.6 1/2" = 1"



4 ELEMENT BASE STAND
M5.6 1/2" = 1"



5 SECTION THROUGH ELEMENT GUIDE
M5.6 1/2" = 1"



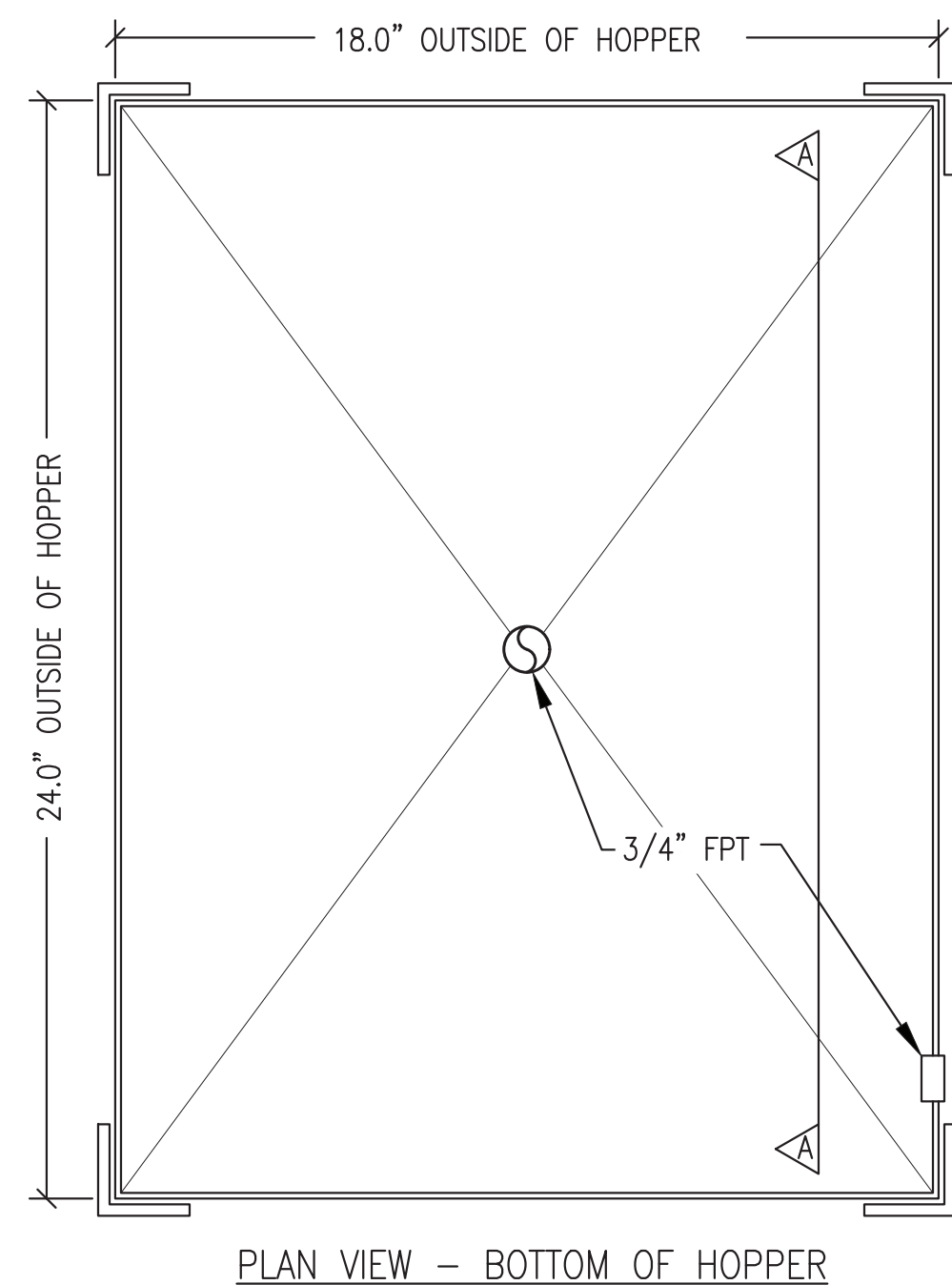
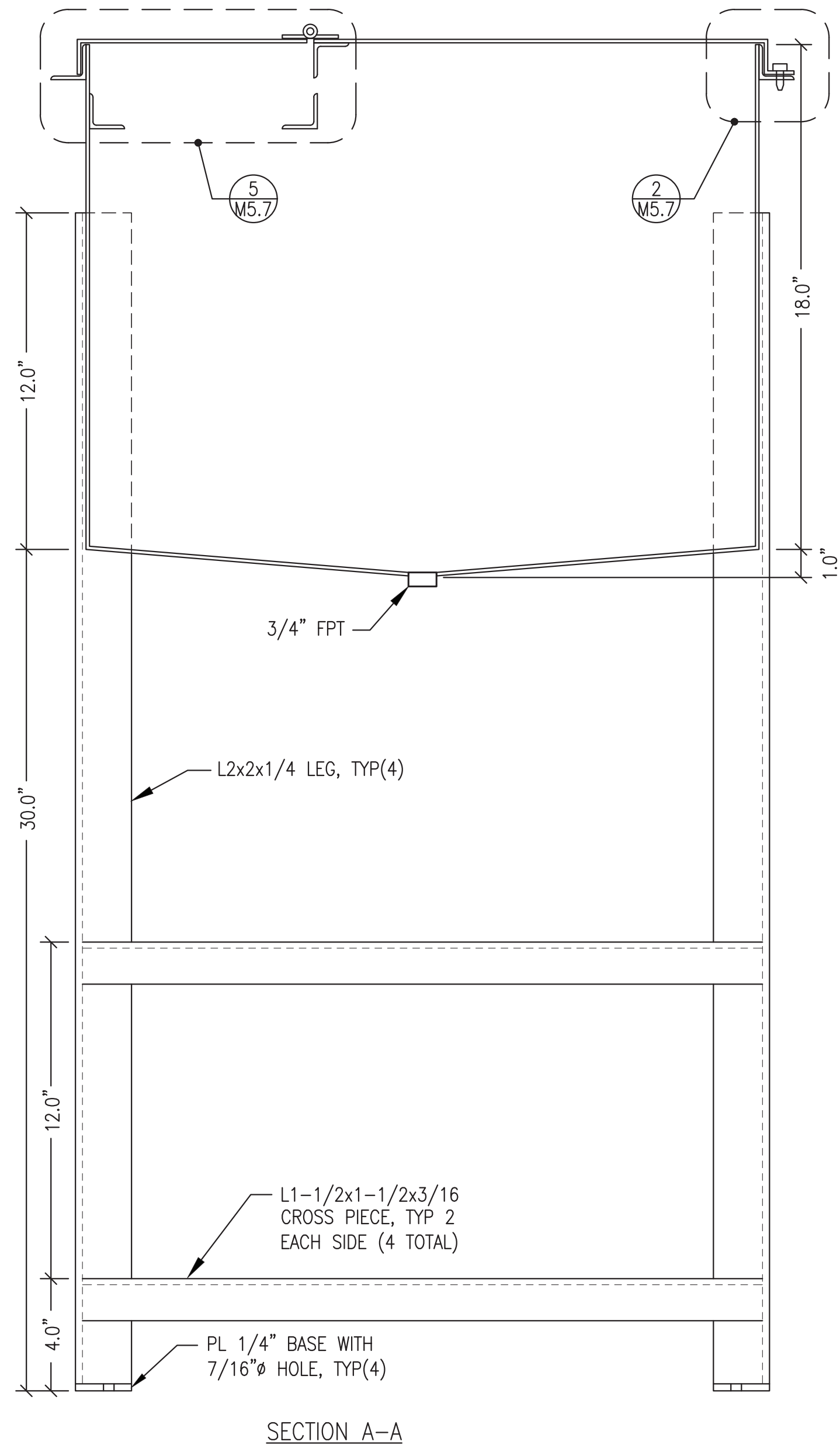
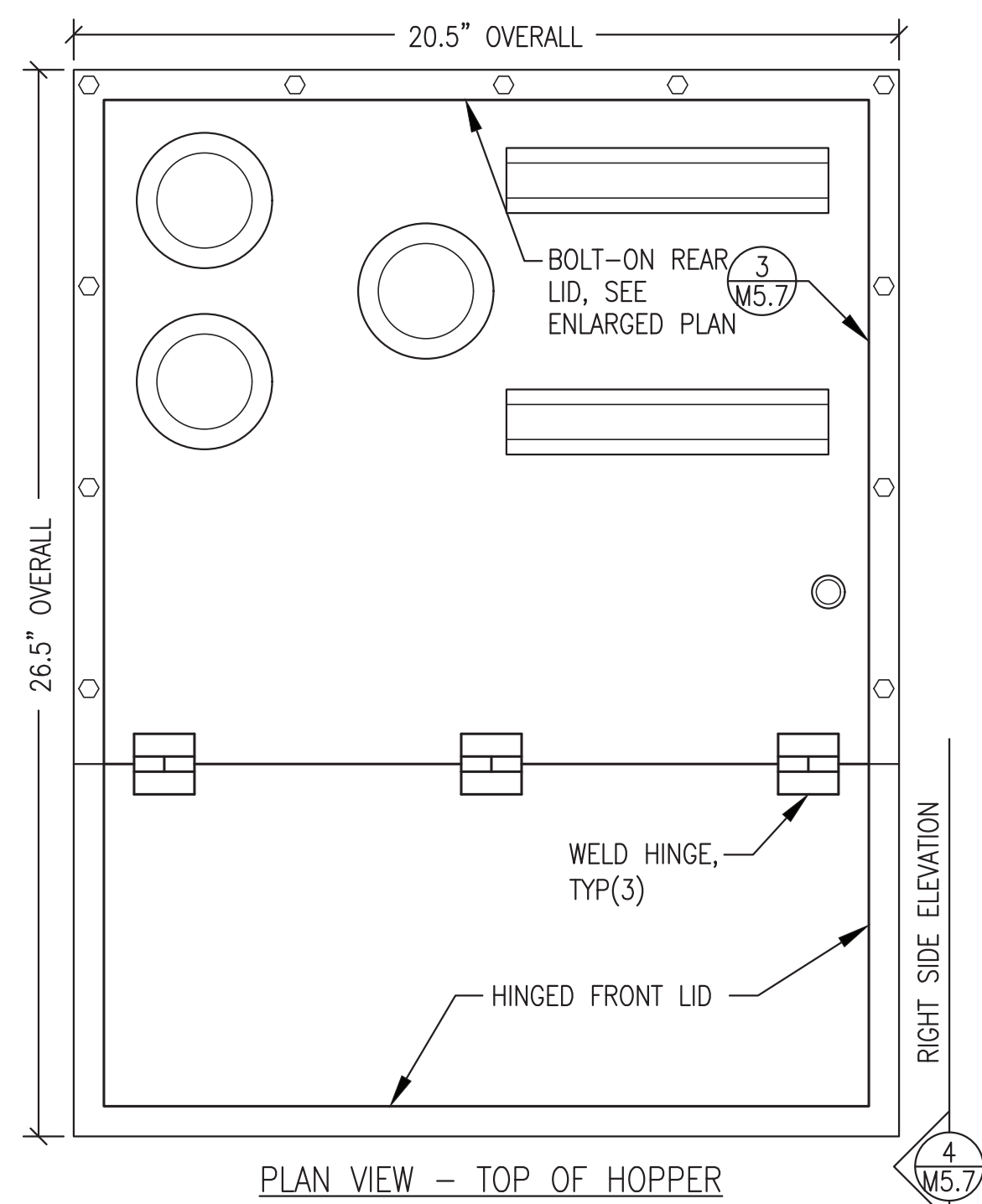
6 LID & MATING RING – PLAN VIEW
M5.6 1/4" = 1"

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 2021



1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: USED OIL BLENDER TYPICAL FILTER HOUSING DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M5.6 OF 9	
PROJECT NUMBER:			

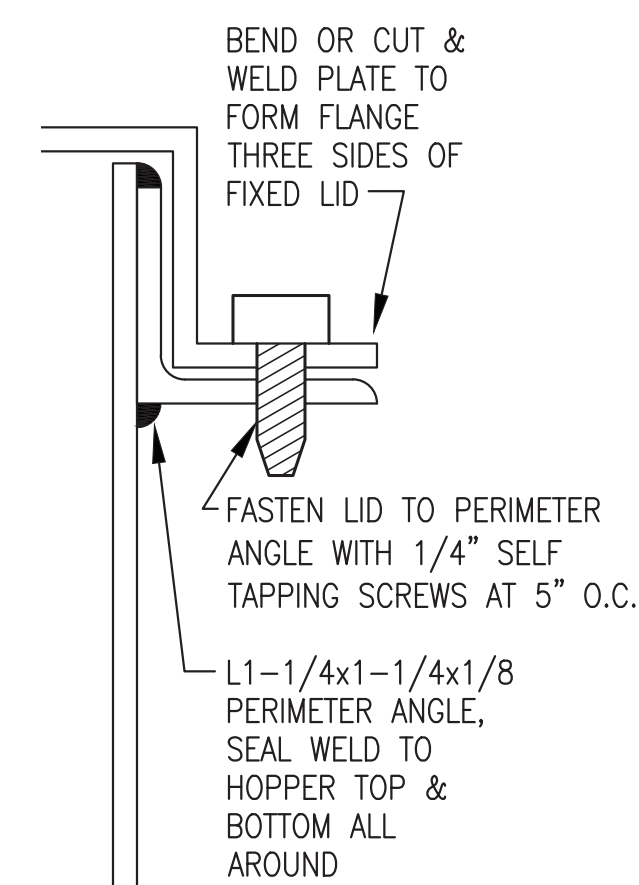




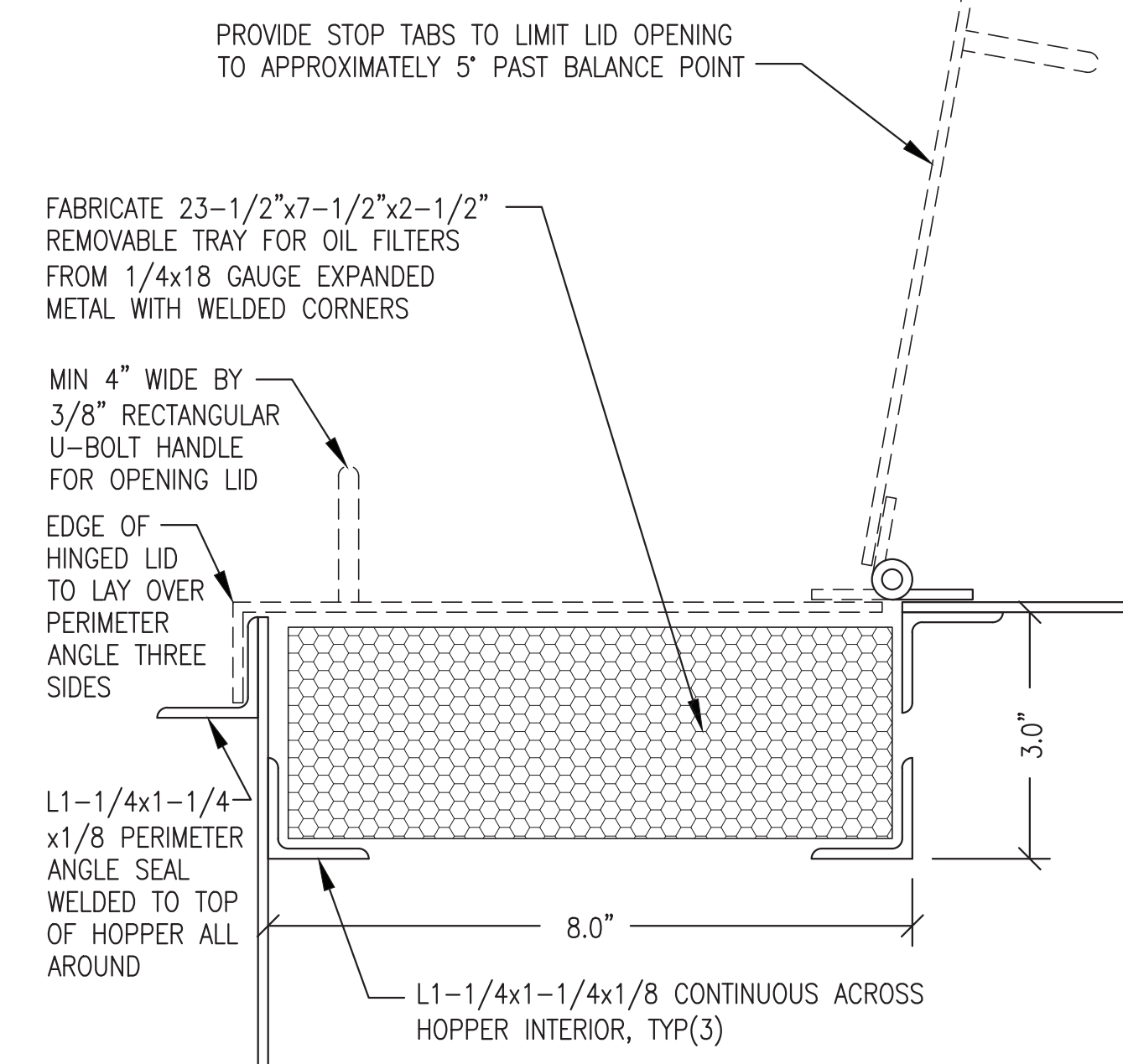
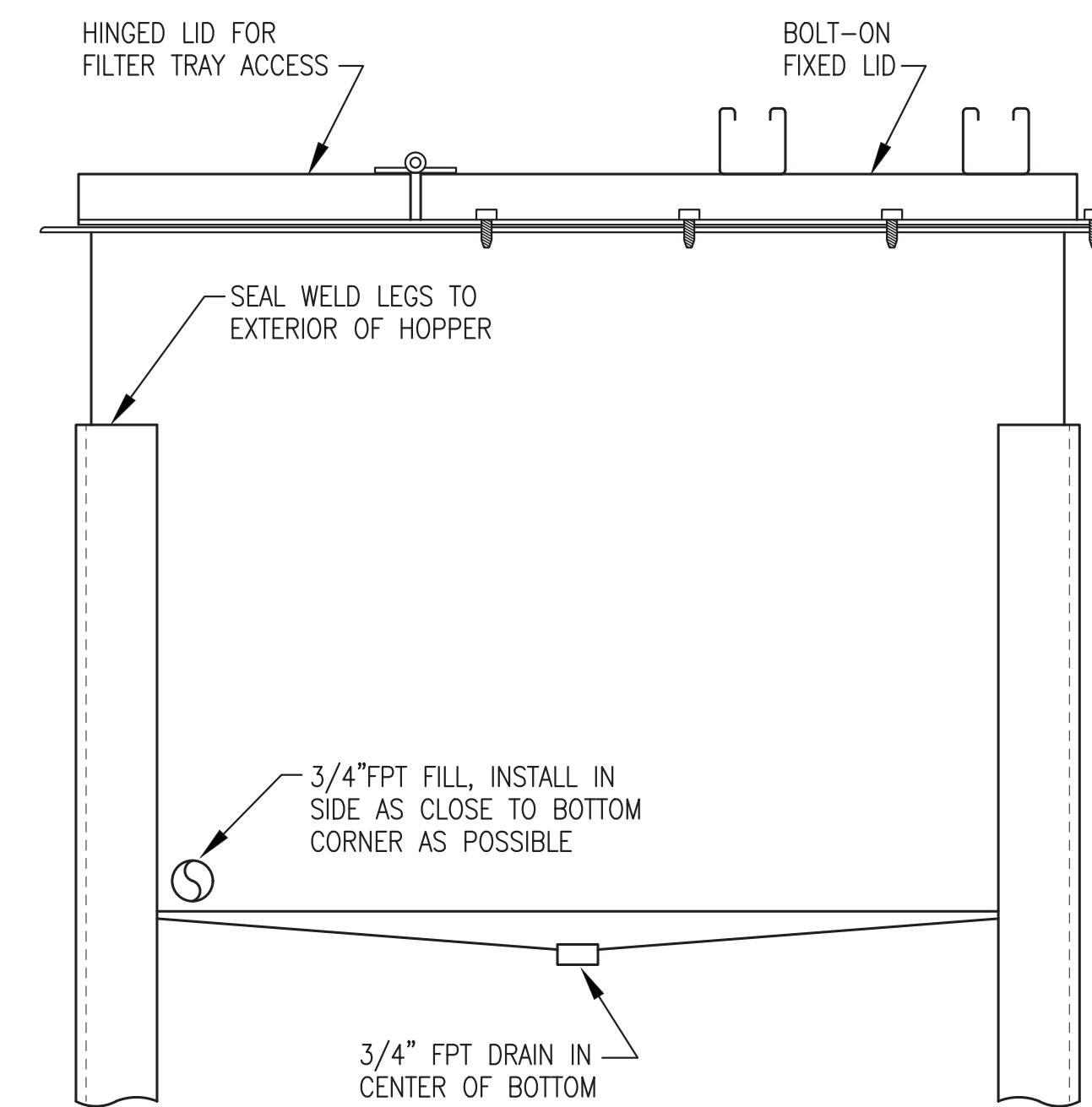
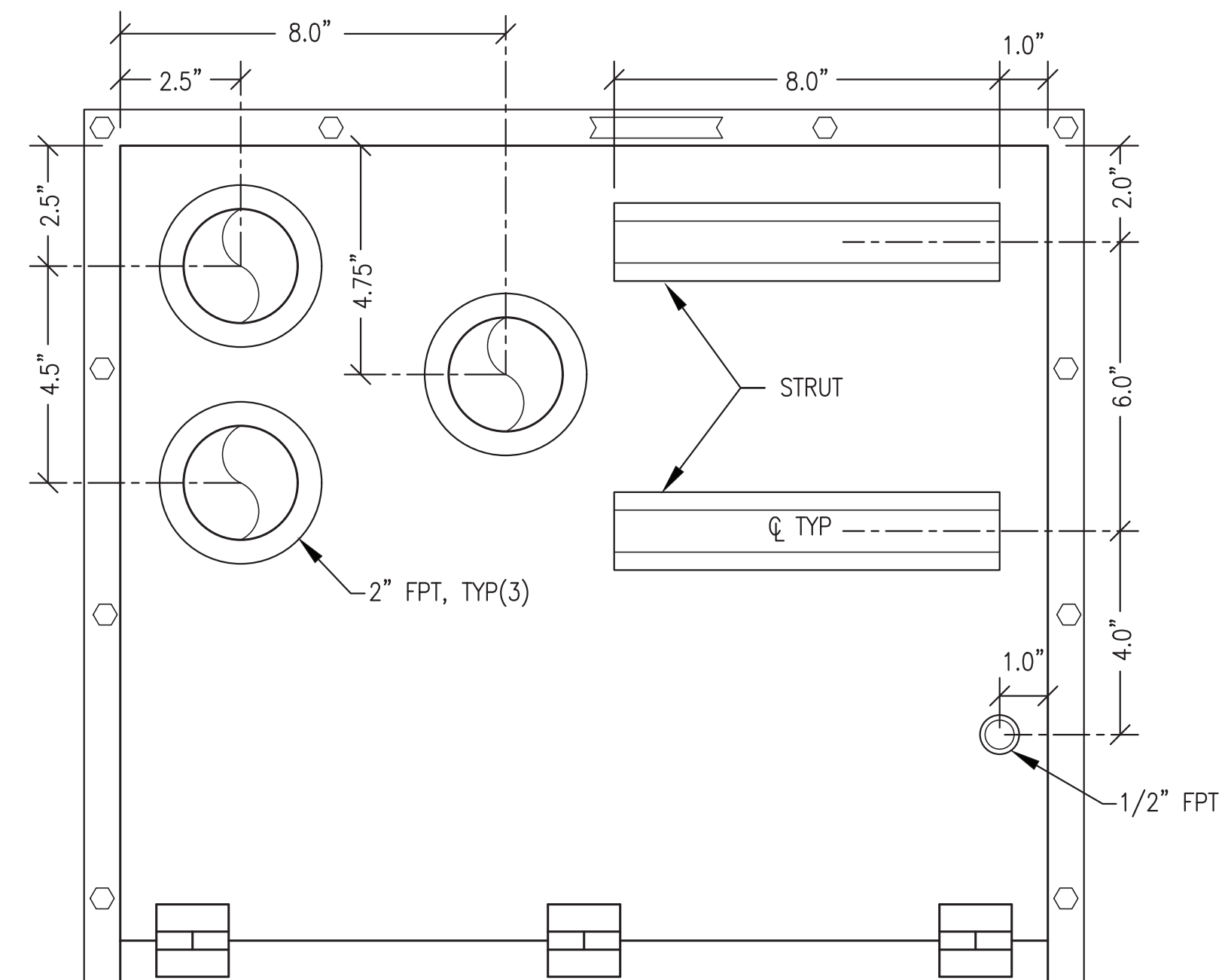
1 HOPPER PLAN & SECTION
M5.7 1/4"=1'-0"

FABRICATION NOTES:

- FABRICATE SINGLE WALL 25 GALLON USABLE CAPACITY HOPPER.
- FABRICATE FROM MINIMUM 10 GAUGE ASTM A-36 STEEL PLATE. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS. SEAL WELD ALL TANK ATTACHMENTS.
- PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. INSTALL ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 - #1, #2, #4, OR #6. ALL STRUT TO BE 1-5/8"x1-5/8"x12 GA SOLID BACK PLAIN (BLACK), B-LINE B22 PLN OR EQUAL. FURNISH ALL FASTENERS AS INDICATED.
- UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
- PRIOR TO SHIPPING, SEAL ALL FPT OPENINGS WITH PLASTIC OR STEEL PLUGS.



2 FIXED LID PERIMETER ATTACHMENT
M5.7 1"=1"



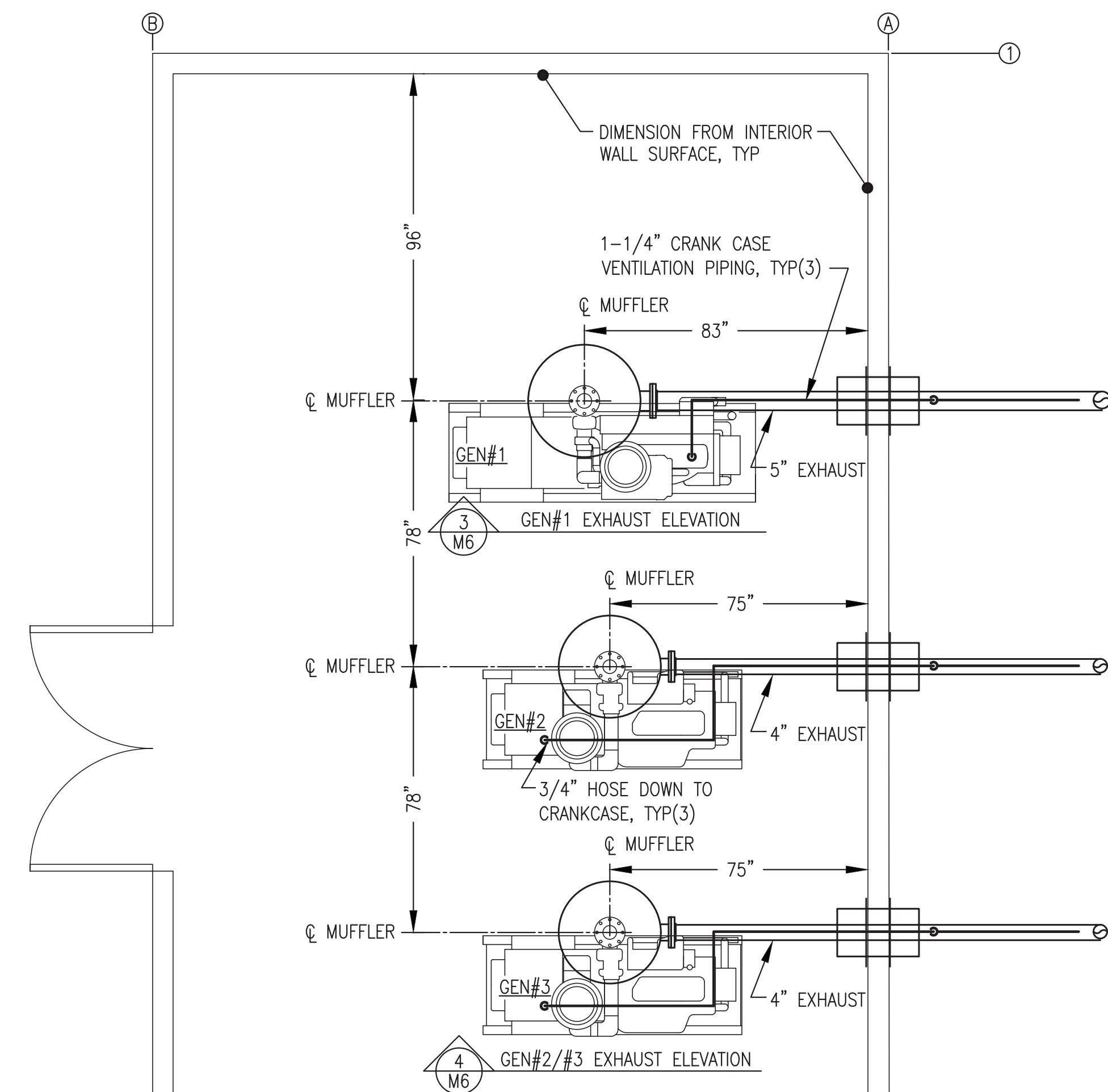
5 HINGED LID & FILTER TRAY DETAIL
M5.7 1"=2"

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2021

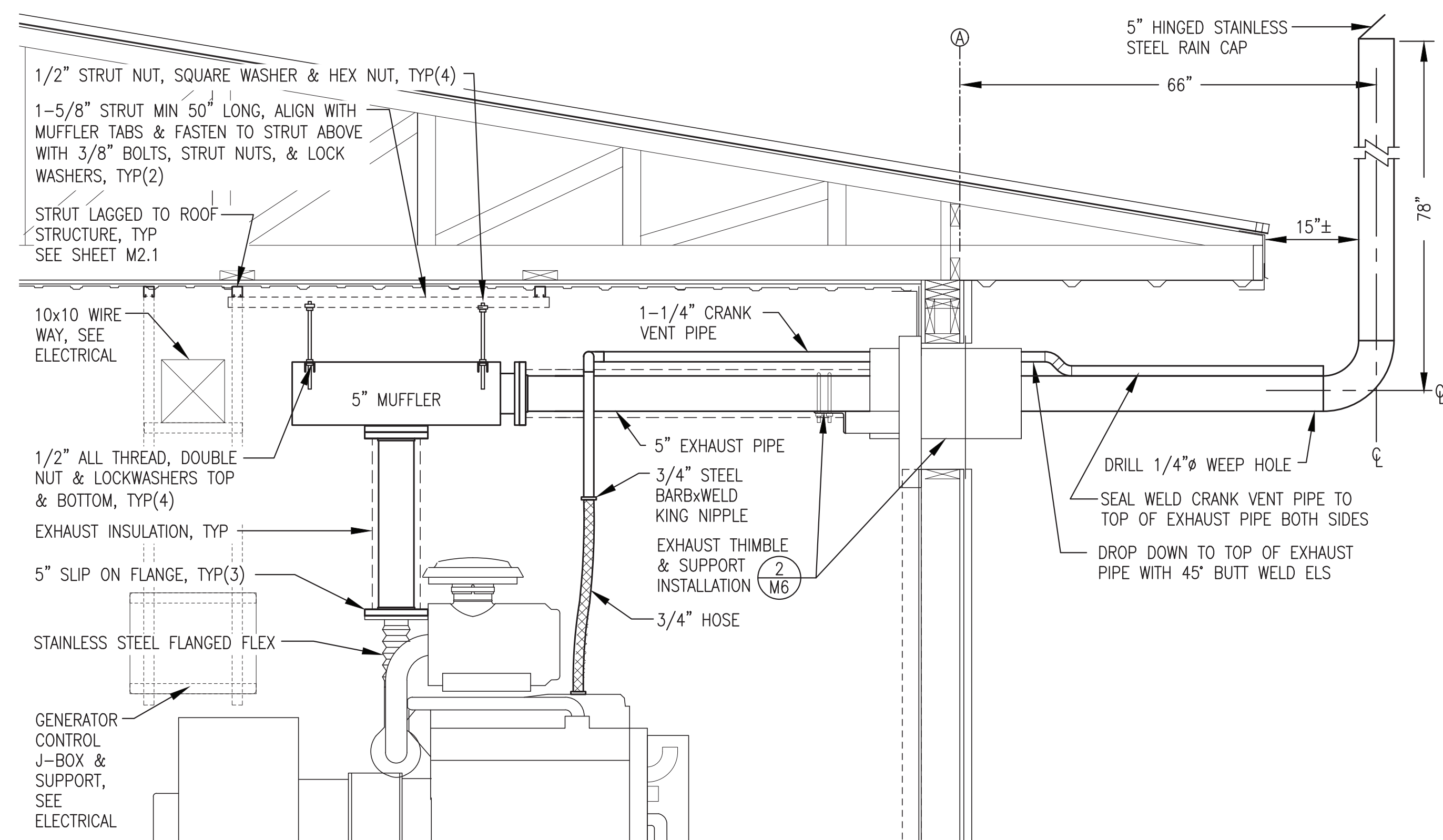


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
<p>ALASKA ENERGY AUTHORITY</p>			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: USED OIL BLENDER 25 GALLON HOPPER FABRICATION DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M5.7 OF 9	
PROJECT NUMBER:			



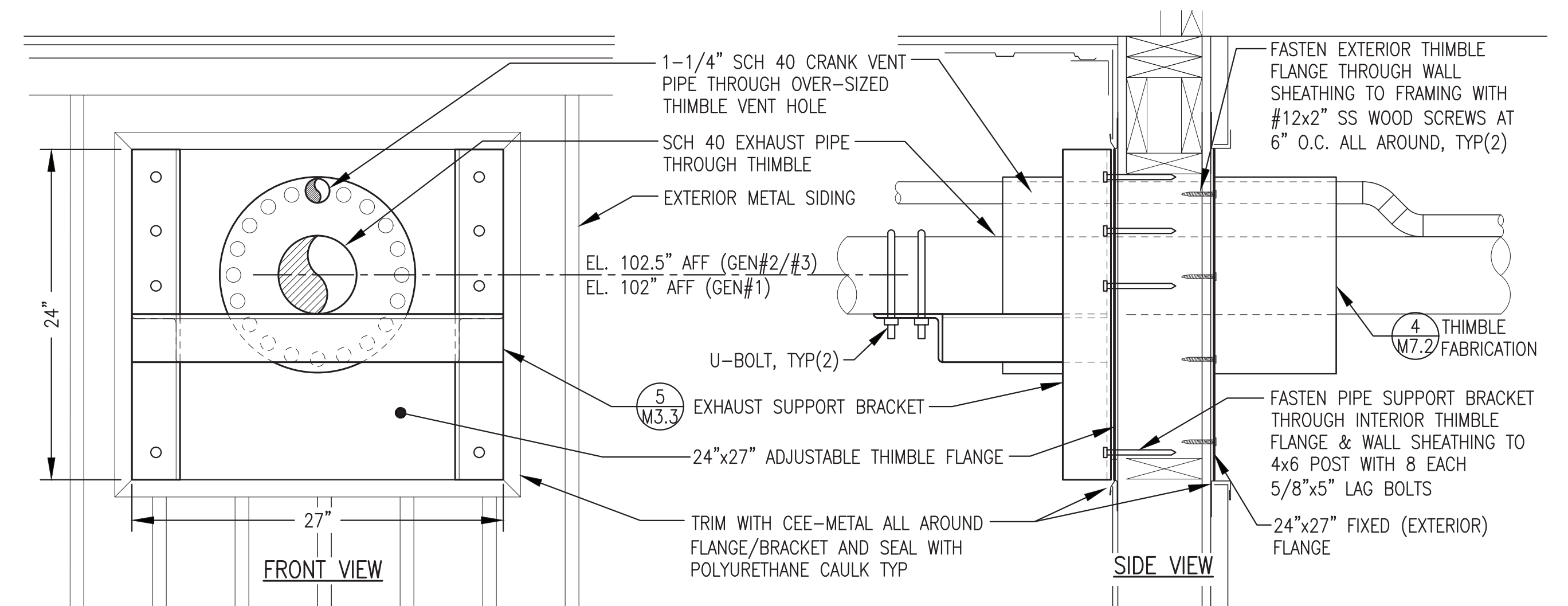


1 MUFFLER, EXHAUST & CRANK VENT PIPE PLAN
3/8"=1'-0"

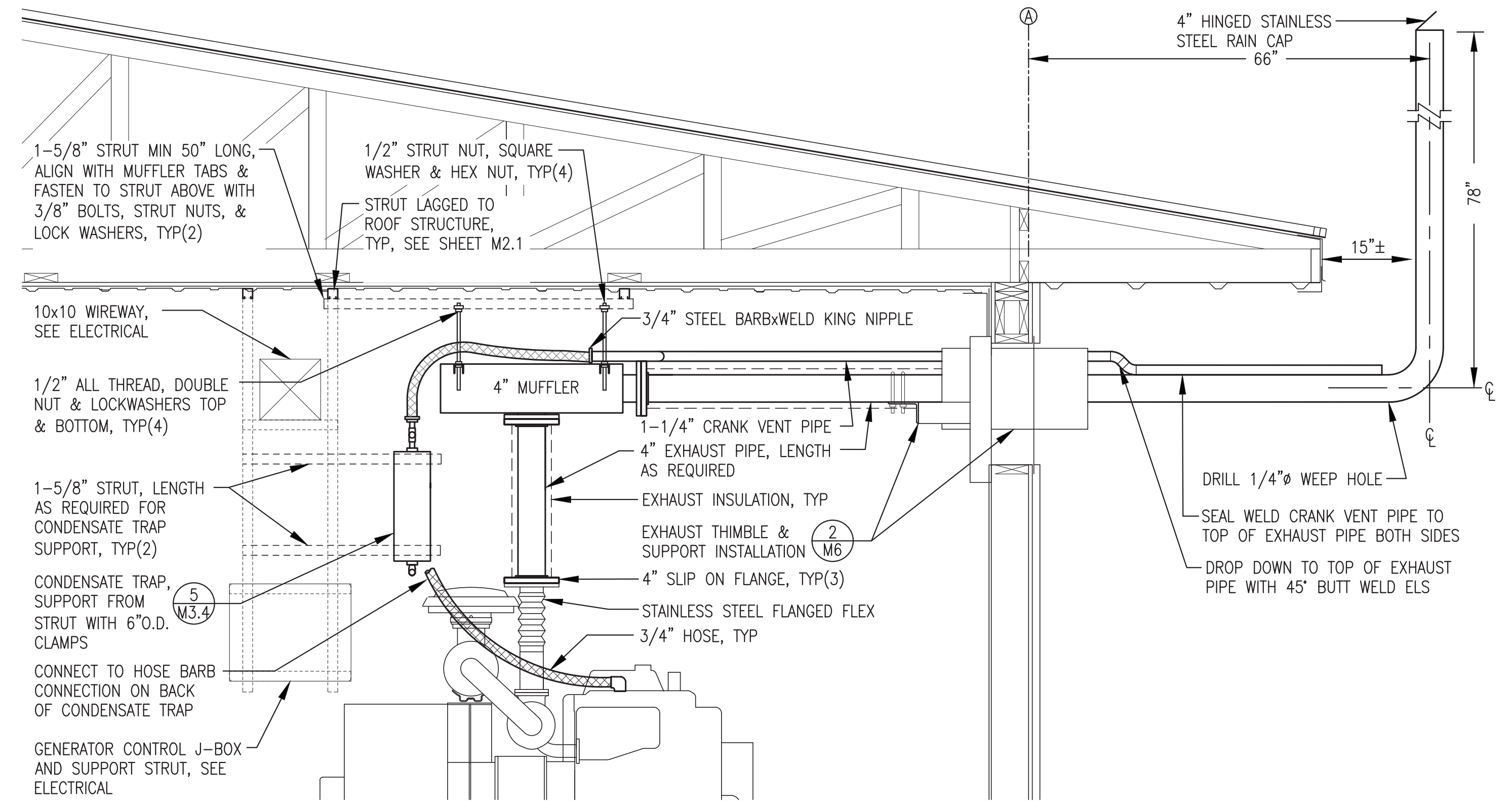


3 GEN#1 MUFFLER, EXHAUST & CRANK VENT PIPE INSTALLATION
3/4"=1'-0"

- EXHAUST & CRANK VENT SYSTEM NOTES:**
- 1) THE MAXIMUM EXHAUST TEMPERATURE FOR THE ENGINES IS LESS THAN 1400°F. THE EXHAUST SYSTEM LAYOUT PROVIDES MORE THAN 9" CLEARANCE TO COMBUSTIBLES IN ACCORDANCE WITH NFPA 37 8.3. PARAGRAPH 8.3.1.
 - 2) TRIPLE WALL INSULATED/VENTILATED WALL THIMBLES SHALL BE FABRICATED AS INDICATED AND LISTED FOR ZERO CLEARANCE TO COMBUSTIBLES.
 - 3) MUFFLERS SHALL BE PACKED DISC STYLE, BOTTOM CENTER IN AND SIDE OUT, SIZE AS INDICATED, ASA 125# FLANGED CONNECTIONS, 2" INTERNAL ACOUSTICAL/ THERMAL WRAP, FOUR MOUNTING TABS, HIGH TEMPERATURE SATIN BLACK FINISH, CRITICAL GRADE.
 - 4) EXTERIOR EXHAUST PIPE SCH 40 TYPE 304L STAINLESS STEEL WITH TYPE 304L BUTT WELD 90° EL. RISER PIPE MAY BE CARBON STEEL. ALL FLANGES STAINLESS OR CARBON STEEL ANSI 150# FLAT FACED SLIP ON WITH HIGH TEMPERATURE FULL FACE GASKETS.
 - 5) EXTERIOR CRANK VENT PIPE SCH 40 TYPE 304L STAINLESS STEEL WITH TYPE 304L BUTT WELD ELS. INTERIOR PIPE MAY BE CARBON STEEL WITH BUTT WELD OR SOCKET WELD ELS.
 - 6) INSULATE INTERIOR EXHAUST PIPE WITH 1-1/2" MEDIUM TEMPERATURE RIGID INSULATION WITH ALUMINUM JACKET WHERE INDICATED.
 - 7) INSULATE EXHAUST FLEX INCLUDING FLANGES WITH HIGH TEMPERATURE BLANKET SYSTEM.

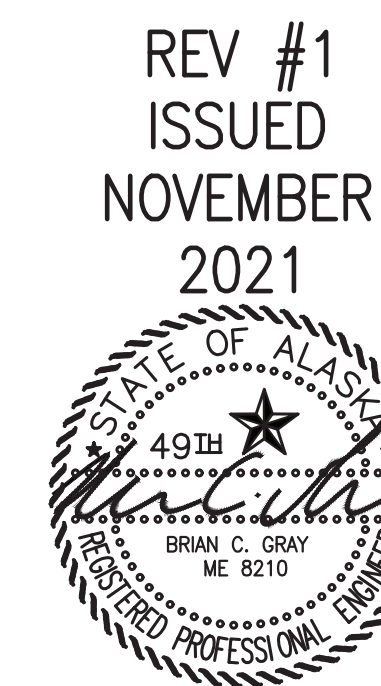


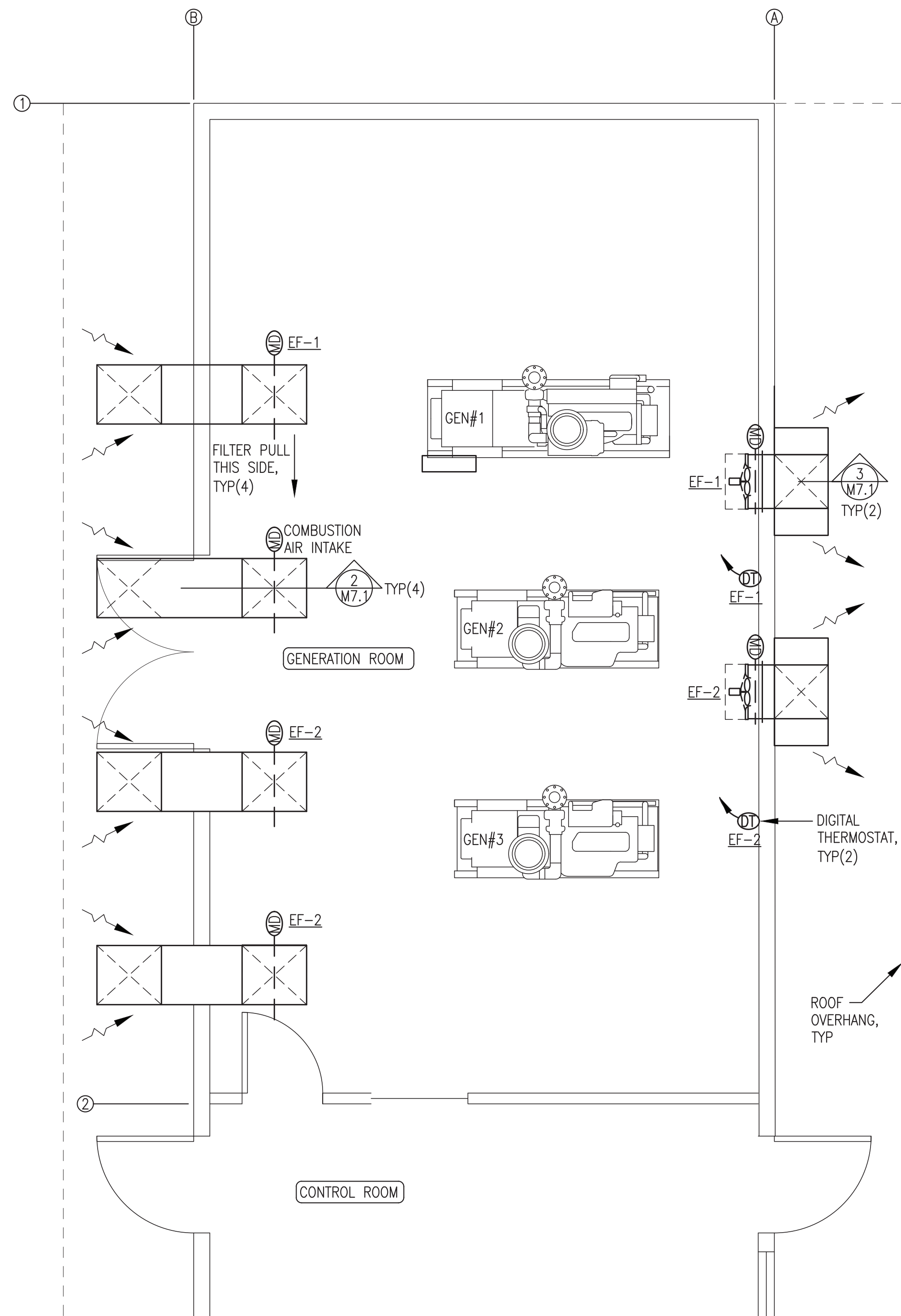
2 EXHAUST THIMBLE & PIPE SUPPORT INSTALLATION
1-1/2"=1'-0"



4 GEN#2/GEN#3 MUFFLER, EXHAUST & CRANK VENT PIPE INSTALLATION
3/4"=1'-0"

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
<p>ALASKA ENERGY AUTHORITY</p>			
<p>PROJECT: NIKOLAI POWER SYSTEM UPGRADE</p>			
<p>TITLE: EXHAUST & CRANK VENT PLAN & DETAILS</p>			
<p>Gray Stassel Engineering, Inc.</p>		<p>DRAWN BY: JTD</p> <p>DESIGNED BY: BCG</p> <p>FILE NAME: NIKO M2-M7</p> <p>PROJECT NUMBER:</p>	<p>SCALE: AS NOTED</p> <p>DATE: 9/1/21</p> <p>SHEET: M6 OF 9</p>





1
M7.1
3/8"=1'-0"

VENTILATION PLAN

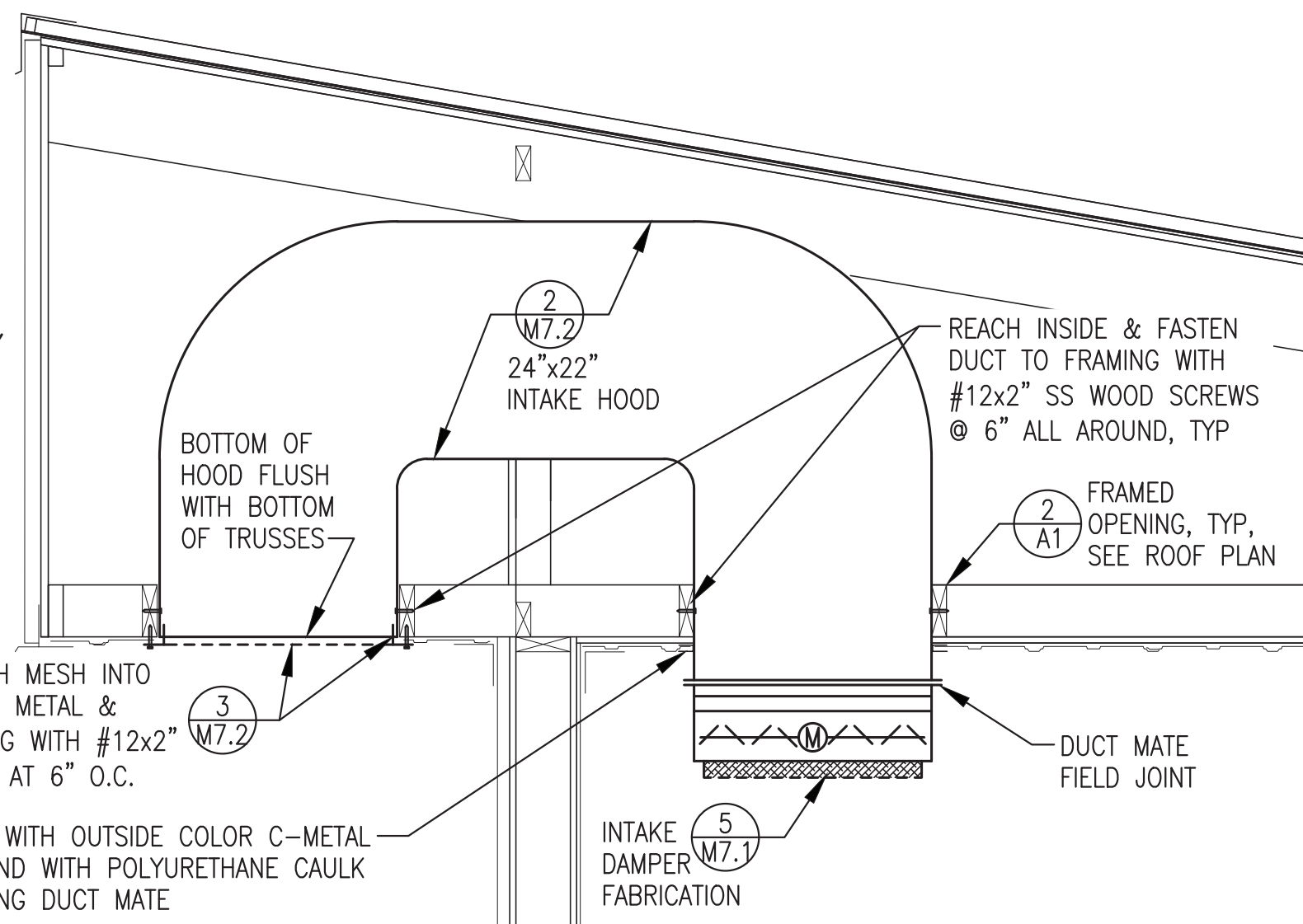
NOTE: INTAKE HOODS MUST BE INSTALLED SIMULTANEOUSLY WITH TRUSSES PRIOR TO ROOF BLOCKING & SHEATHING

INSERT FRAME WITH MESH INTO DUCT OVER SOFFIT METAL & FASTEN TO FRAMING WITH #12x2" SS WOOD SCREWS AT 6" O.C.

TRIM ALL AROUND WITH OUTSIDE COLOR C-METAL & SEAL ALL AROUND WITH POLYURETHANE CAULK PRIOR TO INSTALLING DUCT MATE

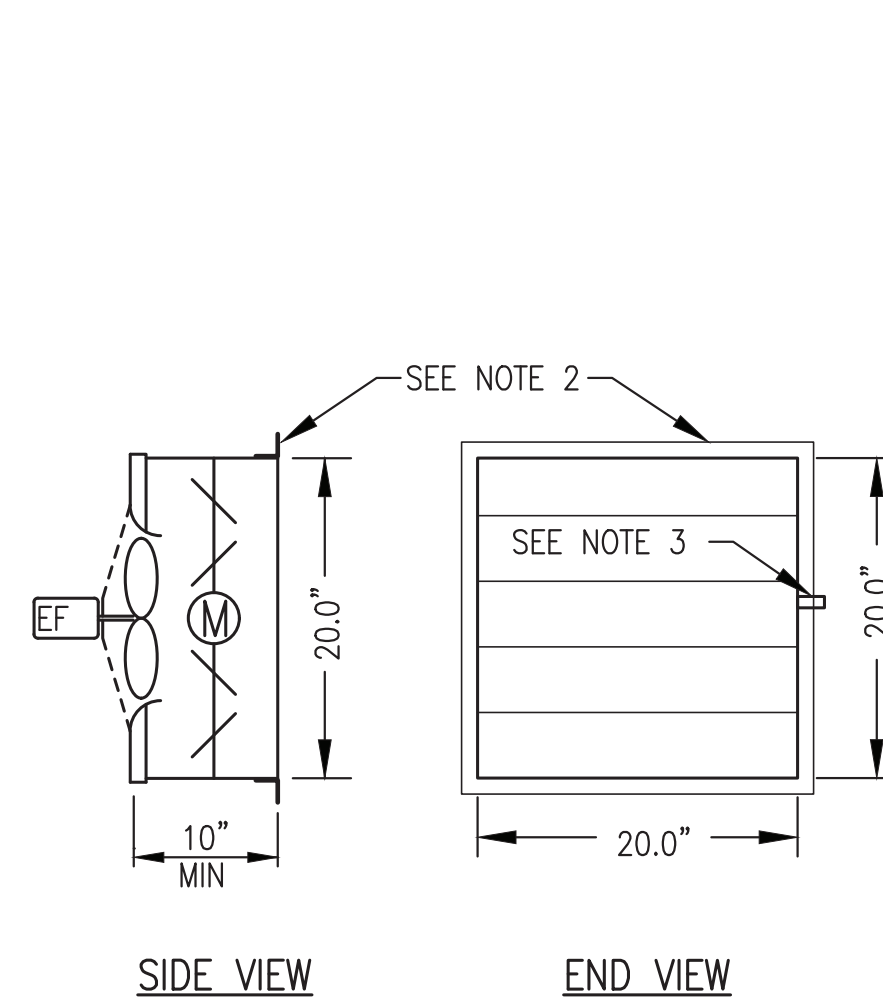
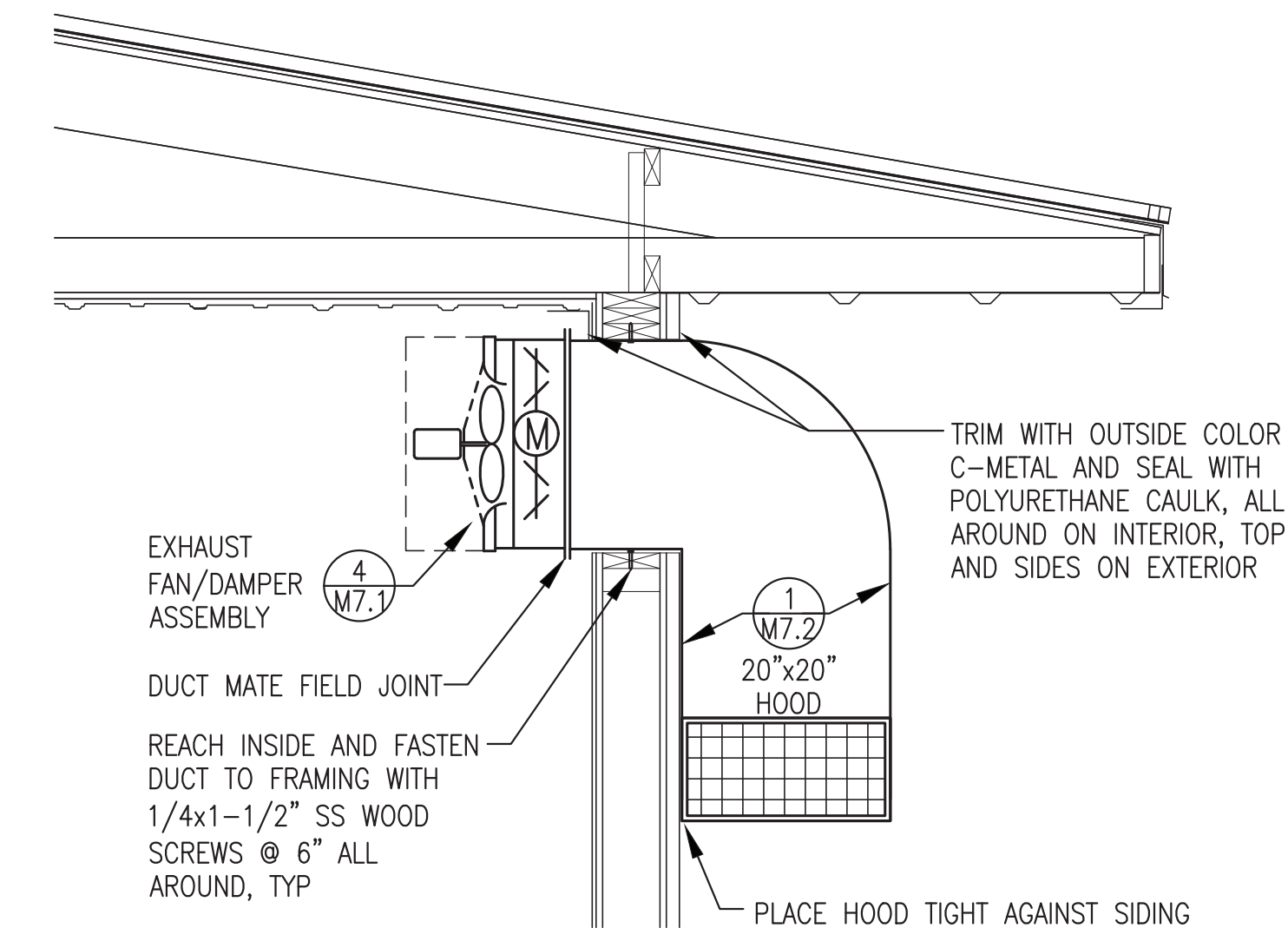
2
M7.1
3/4"=1'-0"

INTAKE HOOD INSTALLATION



3
M7.1
3/4"=1'-0"

EXHAUST FAN & HOOD INSTALLATION

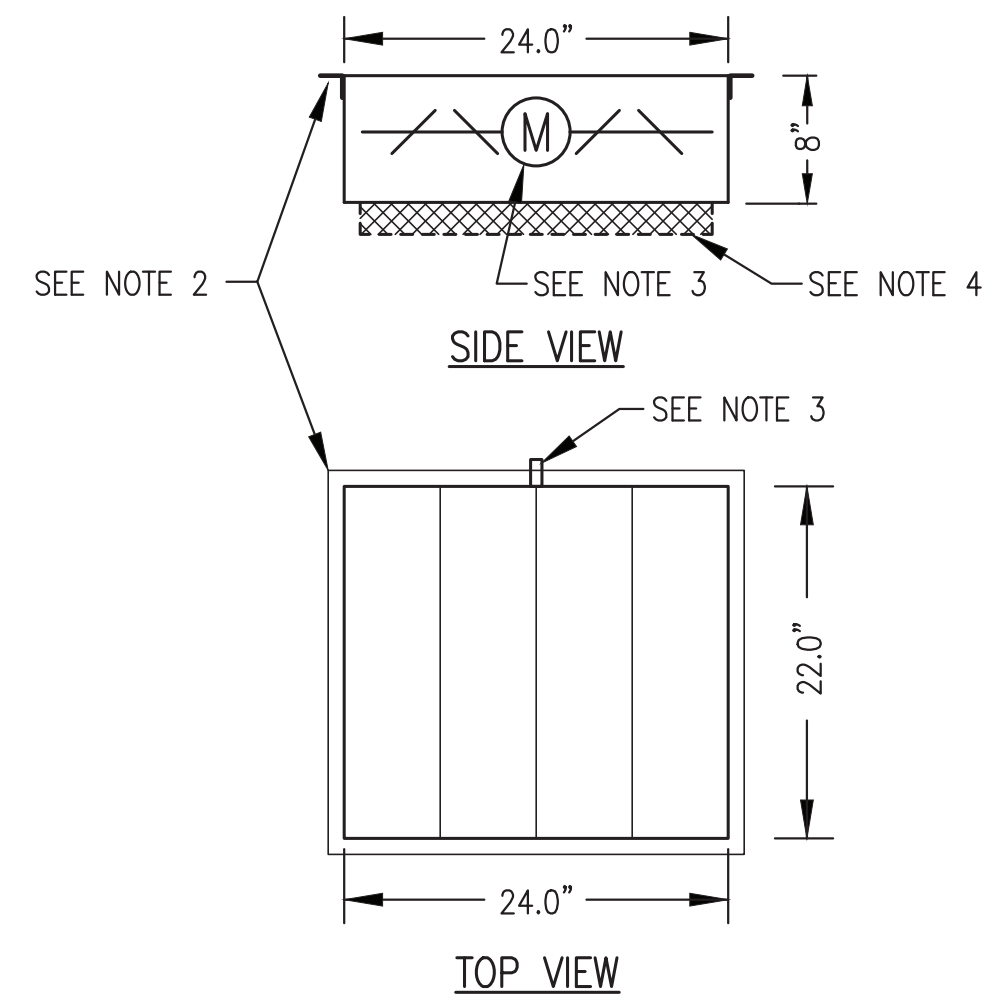


NOTES:

- 1) FABRICATE 2 IDENTICAL ASSEMBLIES COMPLETE WITH FAN AND DAMPER MOUNTED AND SEALED TO DUCT.
- 2) SHOP MOUNT DUCTMATE FLANGE.
- 3) PROVIDE MIN 3" DAMPER ROD EXTENSION ON THE LEFT SIDE AND FABRICATE SHEET METAL STAND-OFF BRACKET TO FULLY SUPPORT THE ACTUATOR FROM THE DAMPER FRAME.

4
M7.1
1"=1'-0"

EXHAUST FAN ASSEMBLY FABRICATION



NOTES:

1. FABRICATE FOUR IDENTICAL VENTILATION INTAKE ASSEMBLIES.
2. SHOP MOUNT DUCTMATE FLANGE.
3. PROVIDE MIN 3" DAMPER ROD EXTENSION ON SIDE INDICATED AND FABRICATE SHEET METAL STAND-OFF BRACKET TO FULLY SUPPORT THE ACTUATOR FROM THE DAMPER FRAME.
4. INSTALL FRAME FOR REMOVABLE 20"x20"x2" MERV 8 FILTERS. FABRICATE FROM "C" CHANNEL THREE SIDES WITH LATCHING HINGED COVER ON FOURTH SIDE TO ALLOW FILTERS TO SLIDE OUT. SEE PLAN VIEW FOR DAMPER ACTUATOR AND FILTER PULL ORIENTATION. PROVIDE 3 FILTERS FOR EACH ASSEMBLY.

5
M7.1
1"=1'-0"

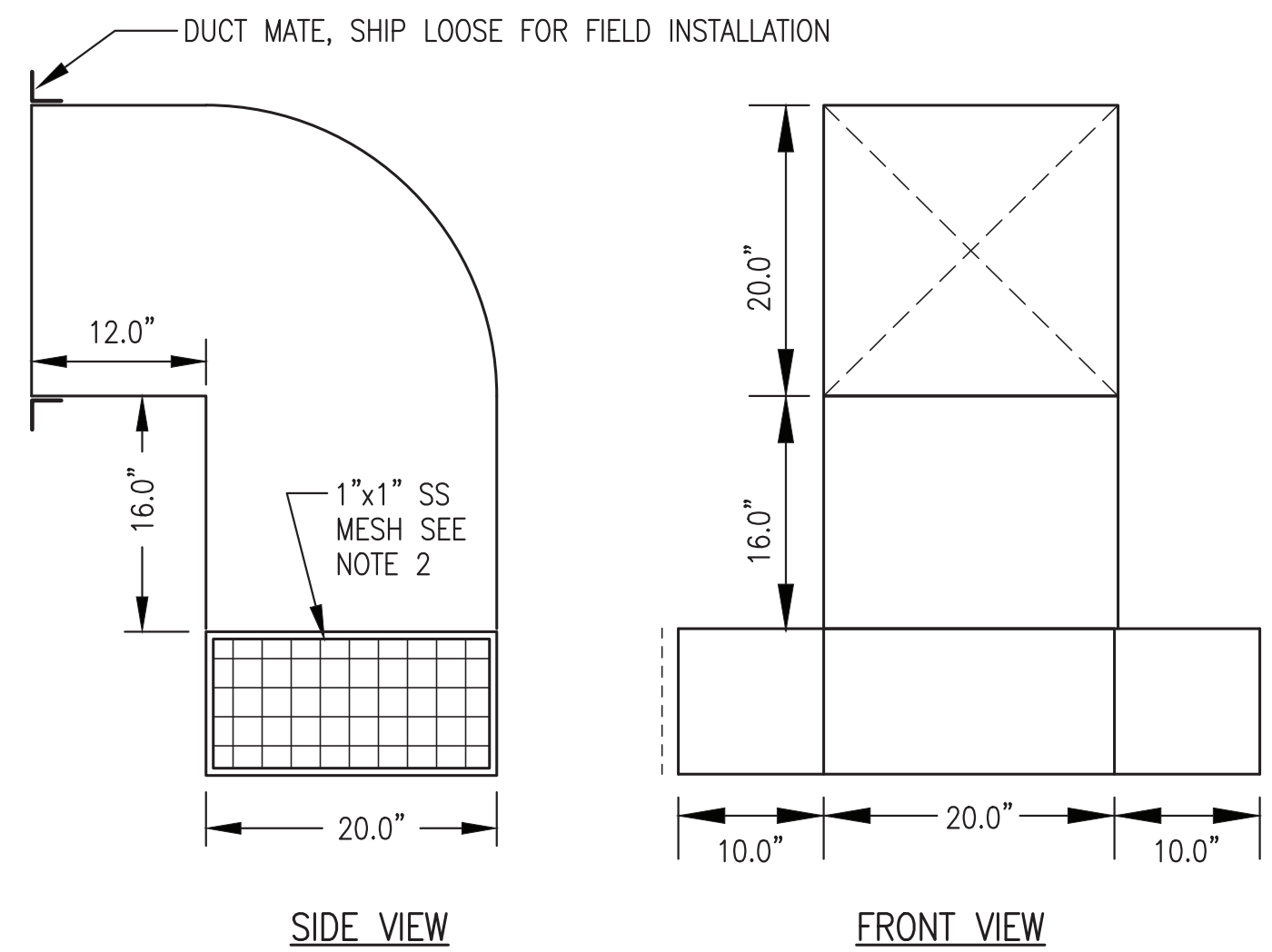
INTAKE AIR DAMPER ASSEMBLY FABRICATION

REV #1
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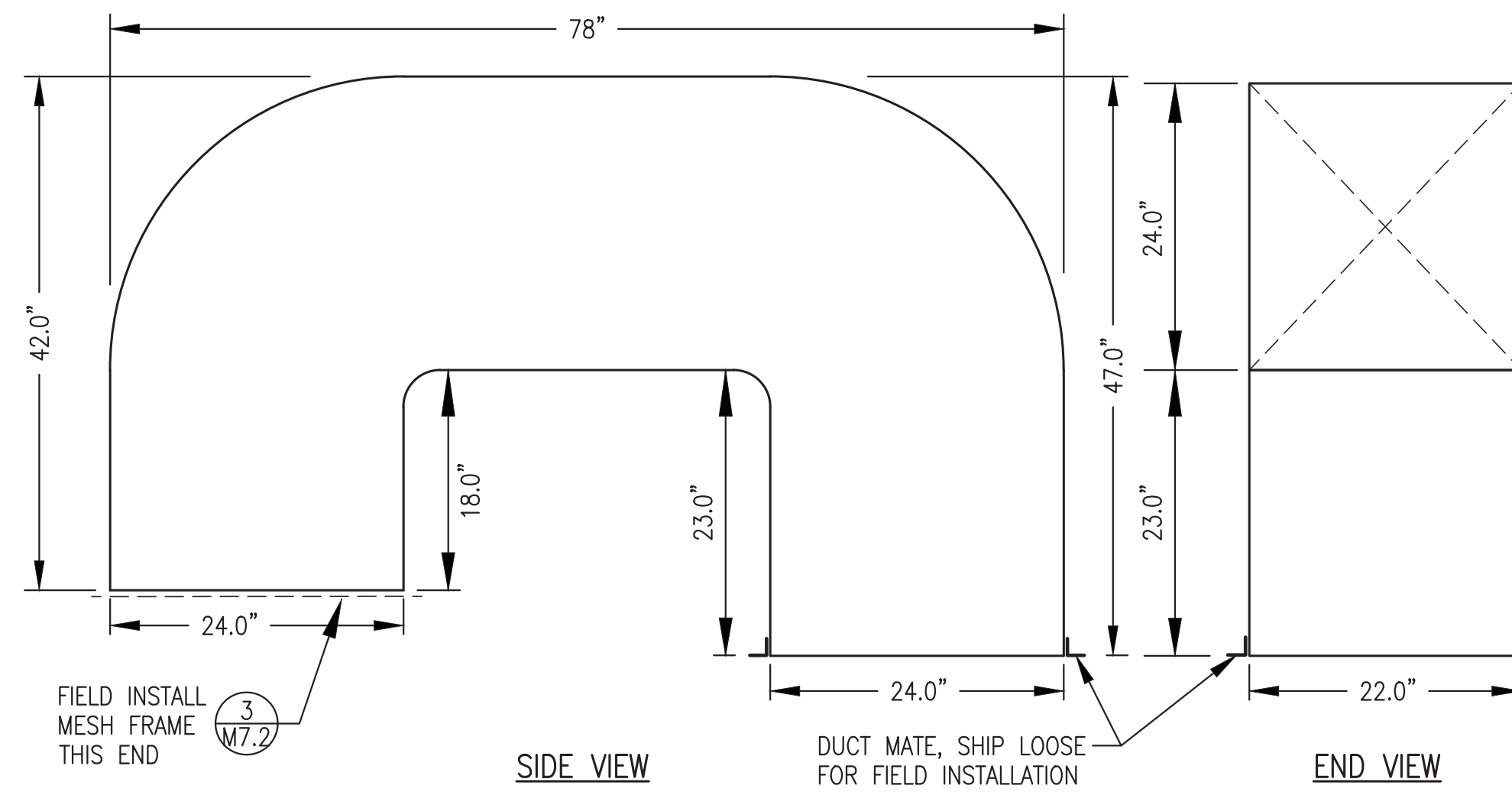


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
<p>ALASKA ENERGY AUTHORITY</p>			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: VENTILATION PLAN & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M2-M7		SHEET: M7.1 OF 9	
PROJECT NUMBER:			

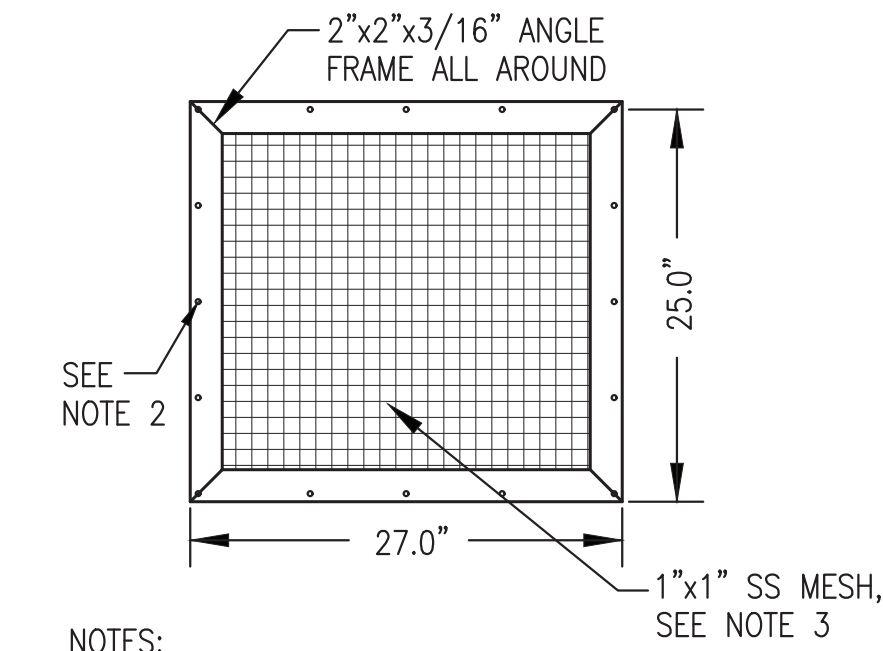




- NOTES:**
- FABRICATE TWO IDENTICAL HOODS FROM 0.090" THICK TYPE 5052 ALUMINUM WITH ALL WELDED SEAMS.
 - PROVIDE 1" FRAME ALL AROUND BOTTOM OF HOOD. INSTALL 1"x1" STAINLESS STEEL WIRE MESH IN HEMMED STAINLESS STEEL FRAME AND FASTEN TO HOOD WITH STAINLESS STEEL SCREWS ALL AROUND.



- NOTE:** FABRICATE FOUR IDENTICAL HOODS FROM MIN 18 GAUGE GALV SHEET METAL WITH SEALED MECHANICAL JOINTS OR AT CONTRACTORS OPTION 0.090" THICK TYPE 5052 ALUMINUM WITH ALL WELDED SEAMS.

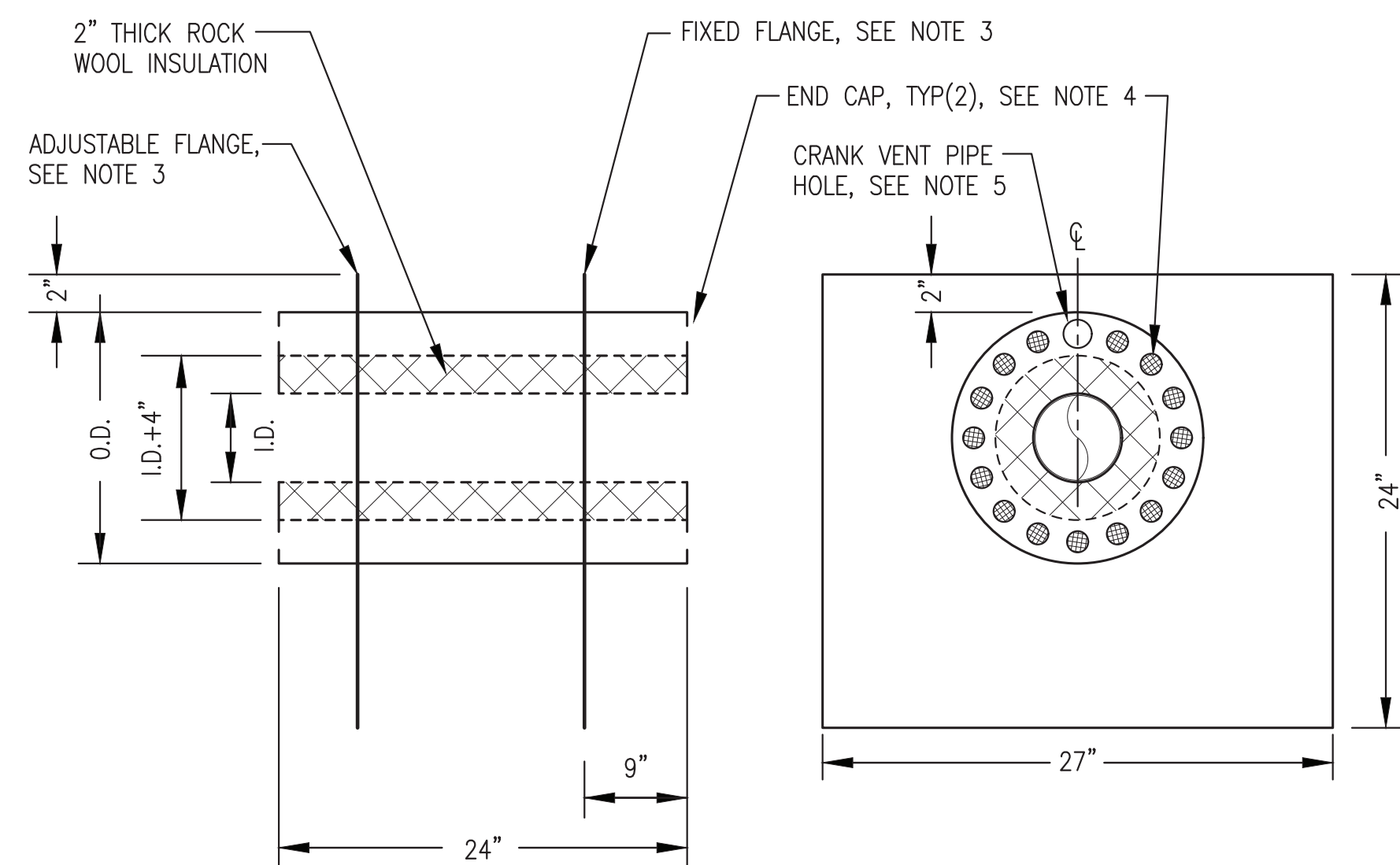


- NOTES:**
- FABRICATE FOUR IDENTICAL AIR INTAKE MESH FRAMES.
 - FABRICATE FRAME FROM 2"x2"x3/16" ALUMINUM ANGLE WITH MITERED AND WELDED CORNERS AND 1/4" HOLES AT 6" O.C. ALL AROUND, 1/2" FROM OUTSIDE EDGE OF FRAME.
 - INSTALL 1"x1" STAINLESS STEEL WIRE MESH IN HEMMED STAINLESS STEEL FRAME AND FASTEN TO ANGLE FRAME WITH STAINLESS STEEL SCREWS ALL AROUND.

1 EXHAUST HOOD FABRICATION
1"=1'-0"

2 INTAKE HOOD FABRICATION
1"=1'-0"

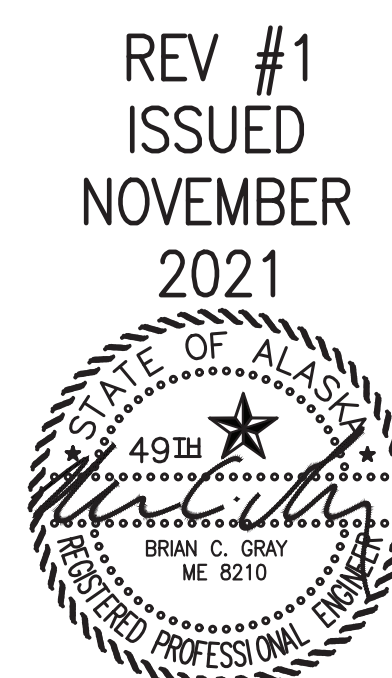
3 INTAKE HOOD MESH FRAME
1"=1'-0"



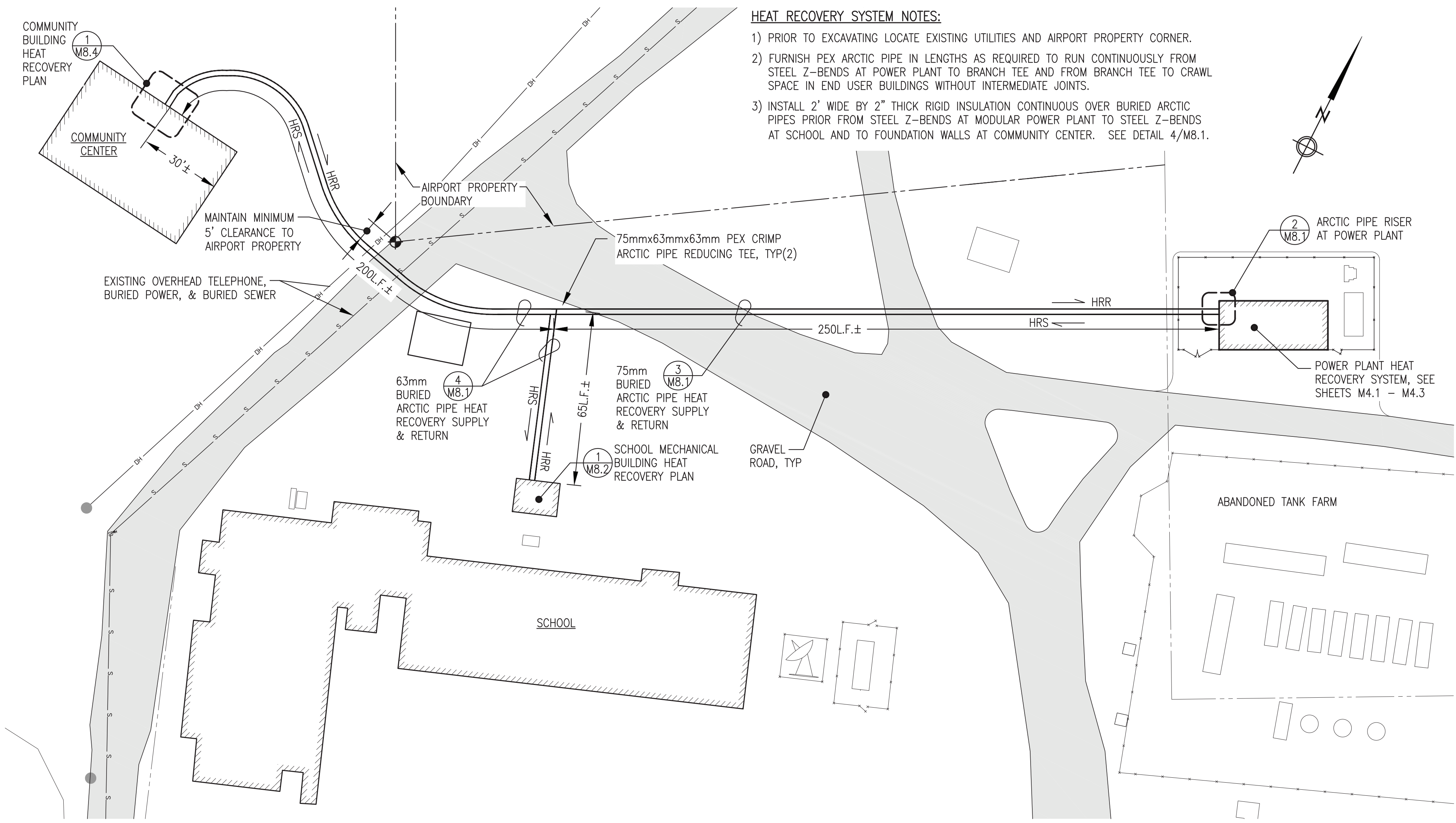
- NOTES:**
- FABRICATE 1 EACH THIMBLE FOR 5" NOMINAL PIPE SIZE AND 2 EACH THIMBLES FOR 4" NOMINAL PIPE SIZE. SEE CHART FOR DIMENSIONS.
 - FABRICATE ENTIRE ASSEMBLY FROM MINIMUM 16 GAUGE TYPE 304 STAINLESS STEEL WITH ALL JOINTS SEAL WELDED.
 - FABRICATE TWO IDENTICAL SQUARE FLANGES. SEAL WELD FIXED FLANGE TO OUTER SHELL. ADJUSTABLE FLANGE TO SHIP LOOSE FOR FIELD INSTALLATION.
 - SEAL WELD END CAPS TO INNER AND OUTER SHELLS. PROVIDE 1" VENT HOLES INTO UNINSULATED SPACE BOTH ENDS, QUANTITY AS INDICATED, EQUALLY SPACED. ON EXTERIOR (FIXED FLANGE) END INSTALL 1/8" STAINLESS STEEL BUG SCREEN.
 - AT TOP-CENTER LOCATION EACH END PROVIDE 1.7" HOLE WITHOUT SCREEN FOR CRANK VENT PIPE INSTALLATION.

NOMINAL EXHAUST PIPE SIZE	I.D.	O.D.	VENT HOLE QUANTITY
4"	4.7"	13.3"	16
5"	5.7"	14.3"	16

4 EXHAUST PIPE THIMBLE FABRICATION
NO SCALE

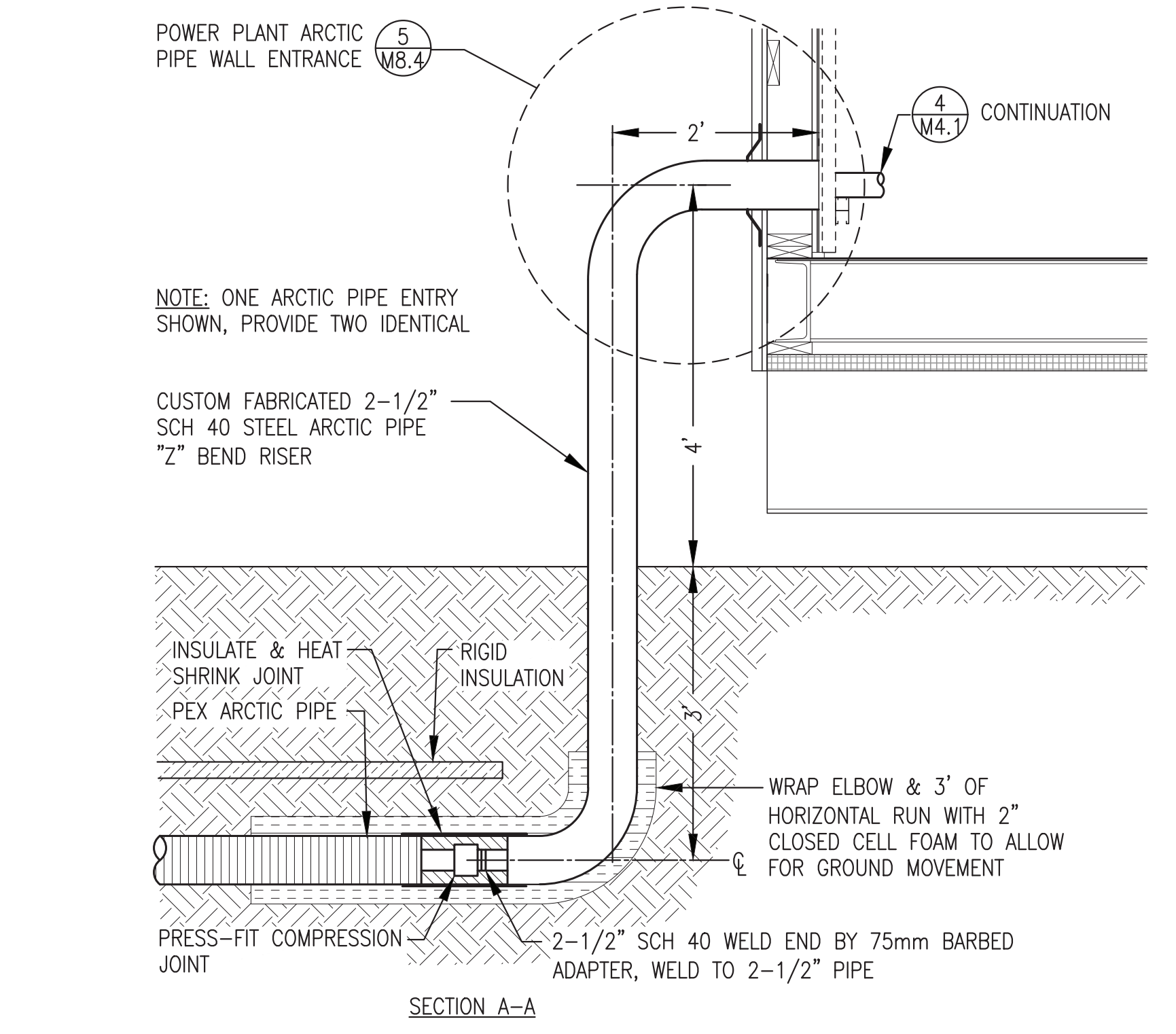
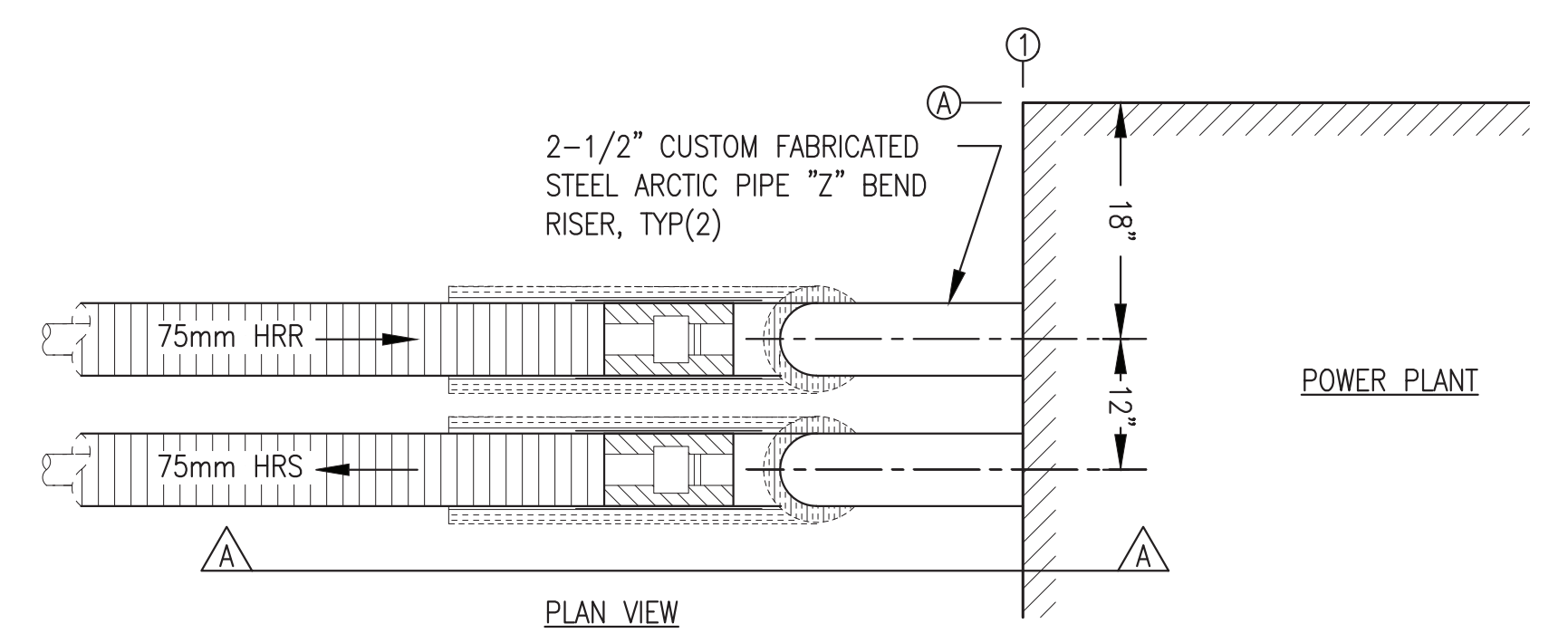


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: SHEET METAL FABRICATION DETAILS			
 Gray Stassel Engineering, Inc.		DRAWN BY: JTD	SCALE: AS NOTED
P.O. 111405, Anchorage, AK 99511 (907)349-0100		DESIGNED BY: BCG	DATE: 9/1/21
FILE NAME: NIKO M2-M7		SHEET:	M7.2 OF 9
PROJECT NUMBER:			

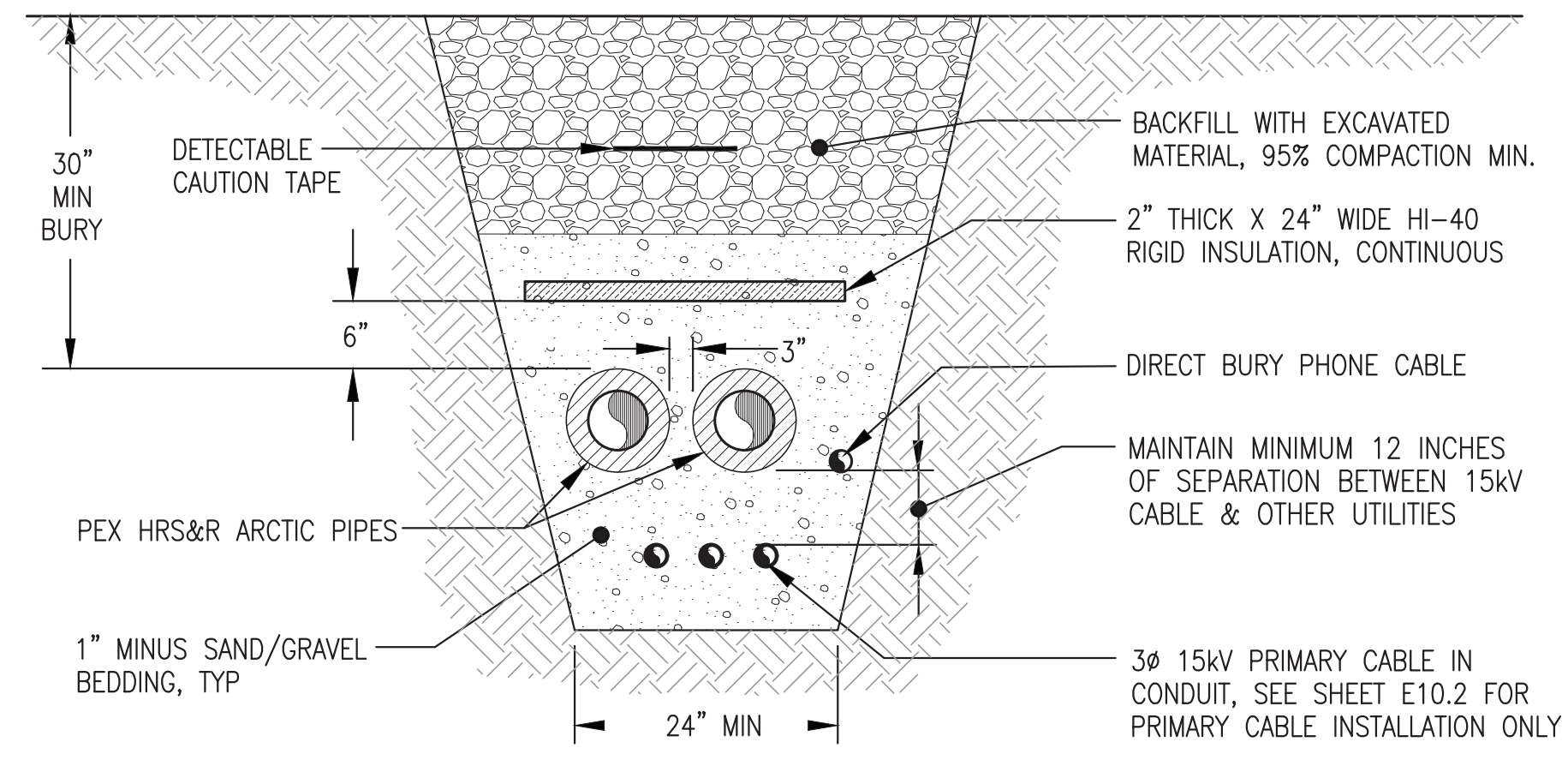


1 OVERALL HEAT RECOVERY SYSTEM PLAN
 M8.1 1"=25'

- HEAT RECOVERY SYSTEM NOTES:**
- 1) PRIOR TO EXCAVATING LOCATE EXISTING UTILITIES AND AIRPORT PROPERTY CORNER.
 - 2) FURNISH PEX ARCTIC PIPE IN LENGTHS AS REQUIRED TO RUN CONTINUOUSLY FROM STEEL Z-BENDS AT POWER PLANT TO BRANCH TEE AND FROM BRANCH TEE TO CRAWL SPACE IN END USER BUILDINGS WITHOUT INTERMEDIATE JOINTS.
 - 3) INSTALL 2" WIDE BY 2" THICK RIGID INSULATION CONTINUOUS OVER BURIED ARCTIC PIPES PRIOR FROM STEEL Z-BENDS AT MODULAR POWER PLANT TO STEEL Z-BENDS AT SCHOOL AND TO FOUNDATION WALLS AT COMMUNITY CENTER. SEE DETAIL 4/M8.1.



2 ARCTIC PIPE RISER AT POWER PLANT
 M8.1 3/4"=1'-0"

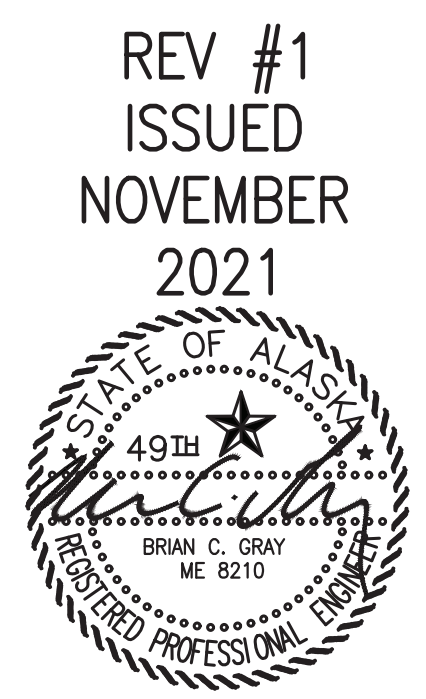


3 TYPICAL BURIED ARCTIC PIPE INSTALLATION
 M8.1 NO SCALE

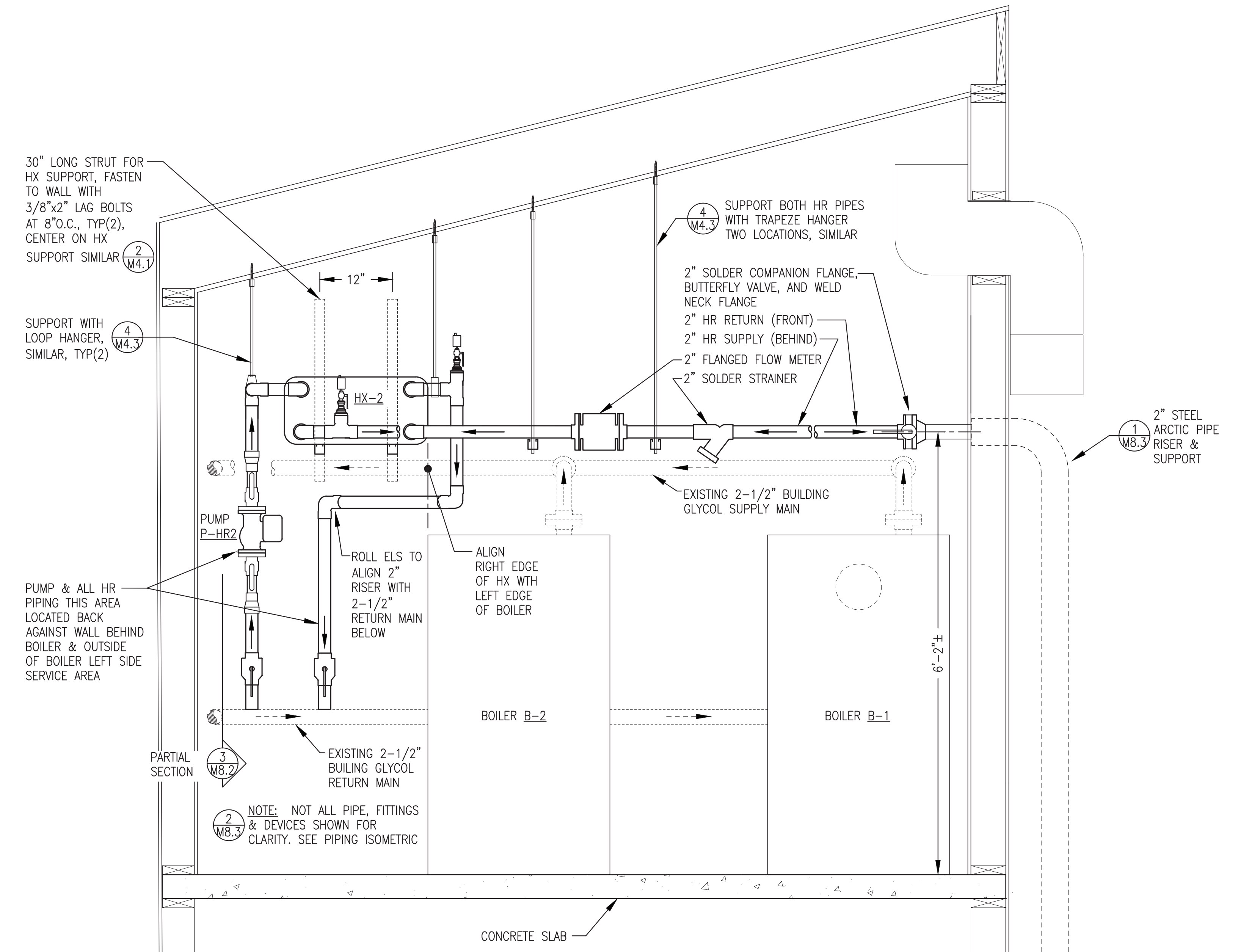
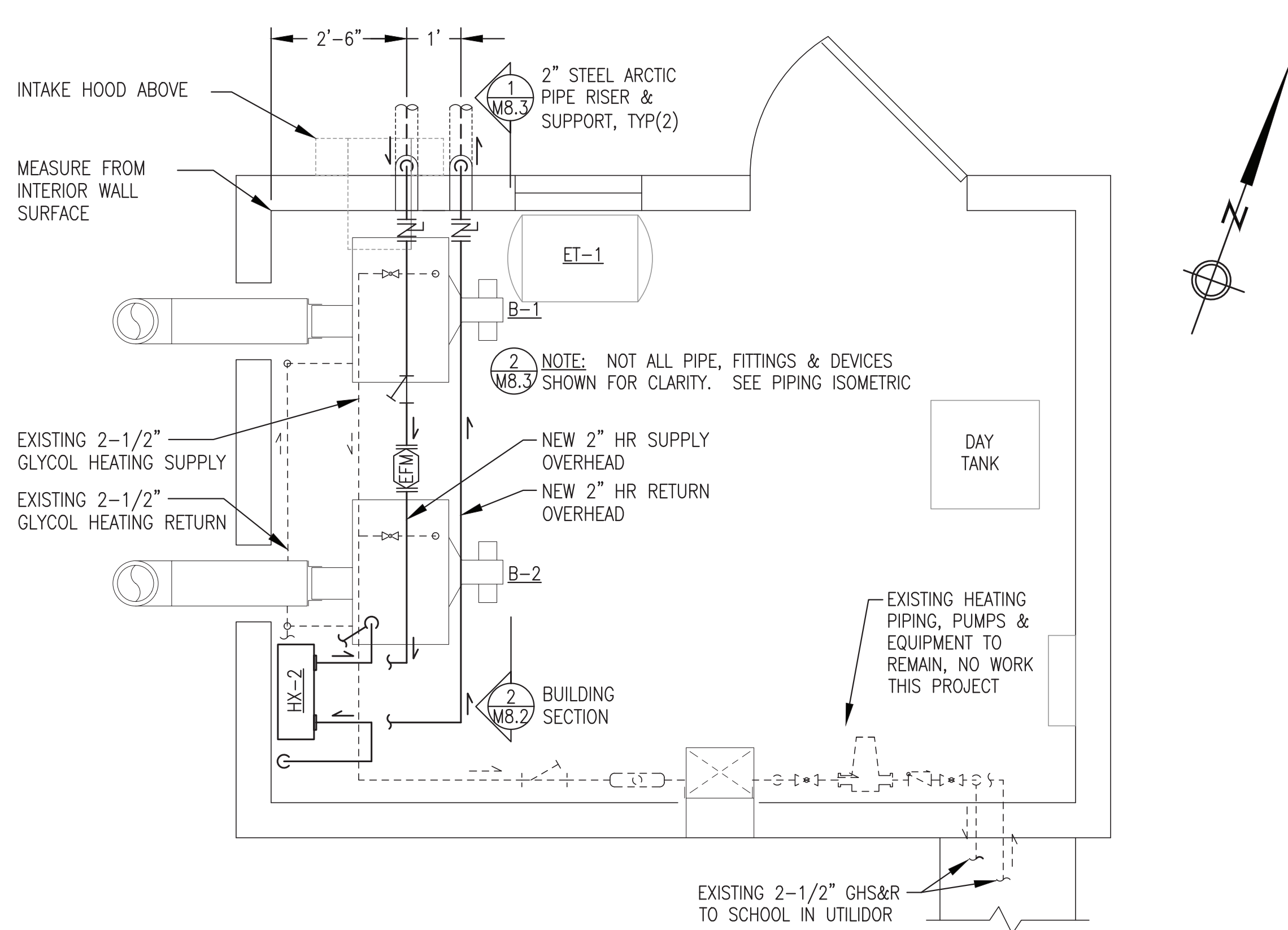
ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #1

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG

 ALASKA ENERGY AUTHORITY	
PROJECT: NIKOLAI POWER SYSTEM UPGRADE	
TITLE: HEAT RECOVERY SYSTEM PLAN & DETAILS	
DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: NIKO M8 PROJECT NUMBER:	SCALE: AS NOTED DATE: 9/1/21 SHEET: M8.1 OF 9

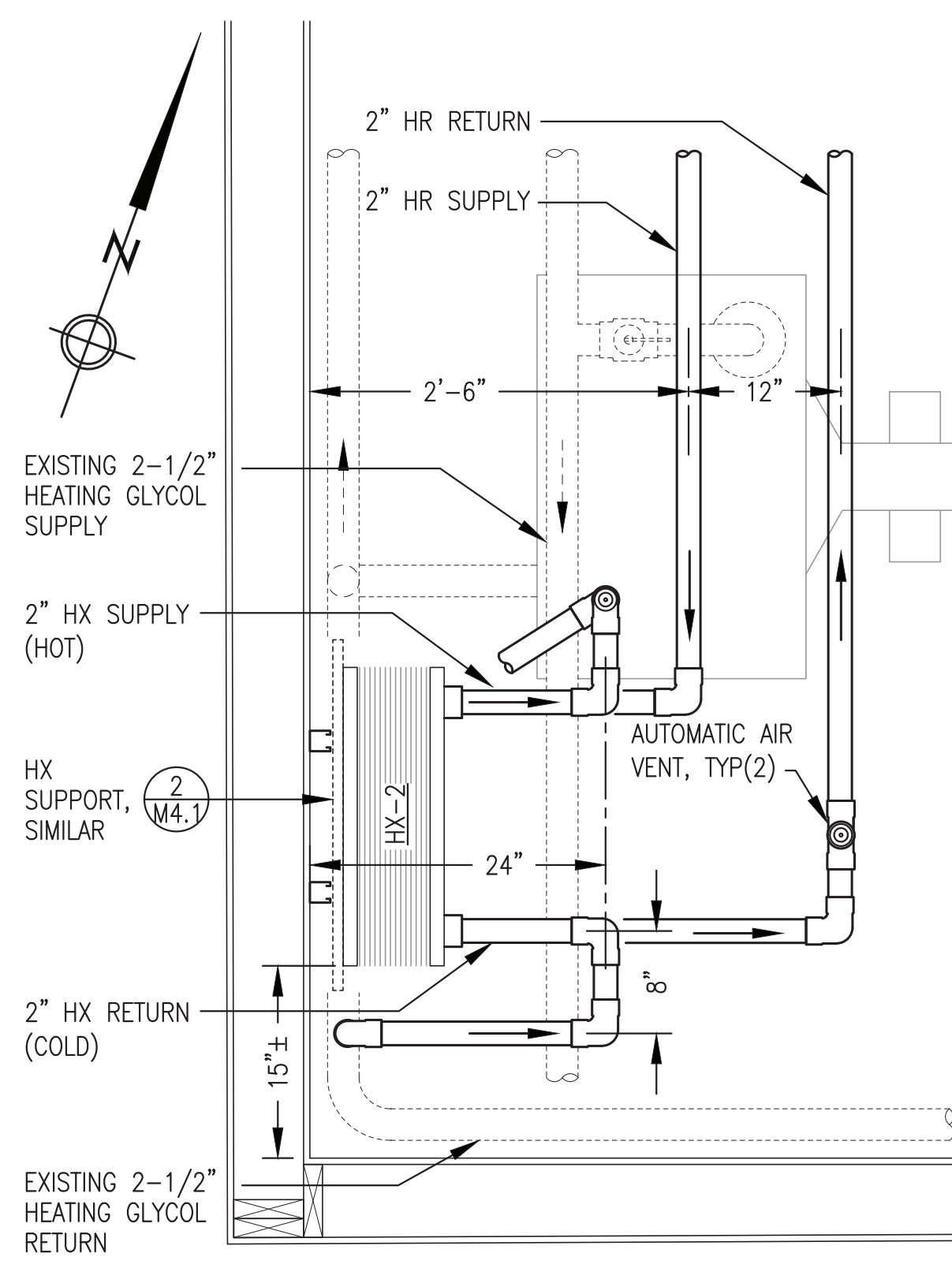
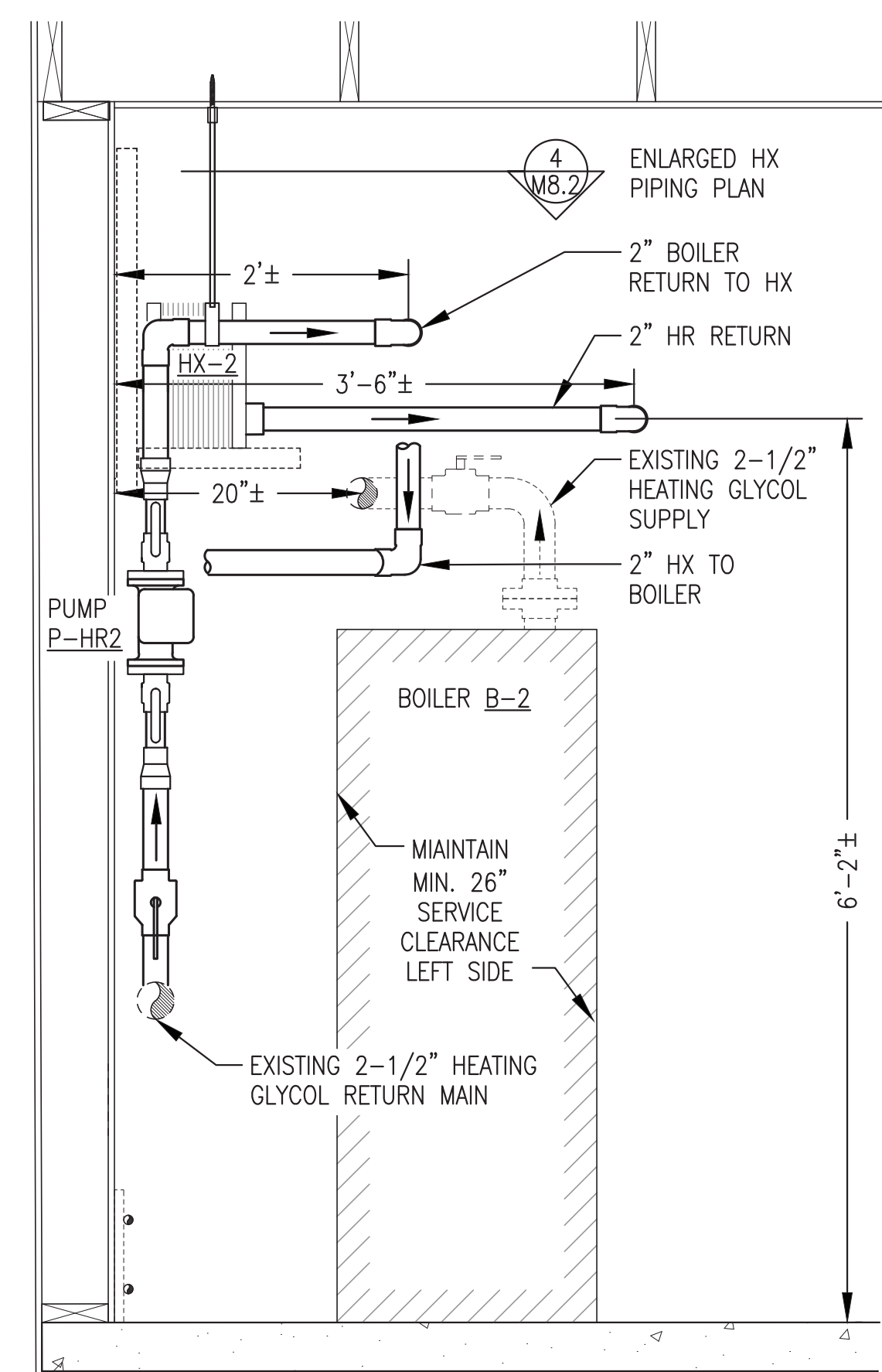


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1 SCHOOL MECHANICAL BUILDING HEAT RECOVERY PLAN
M8.2 1/2"=1'-0"


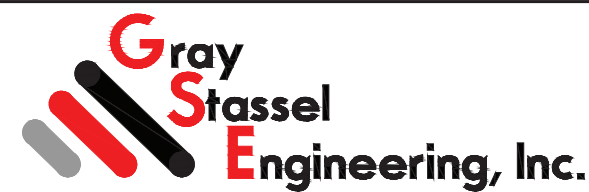
2 SCHOOL MECHANICAL BUILDING SECTION
M8.2 1"=1'-0"



3 PARTIAL SECTION
M8.2 1"=1'-0"

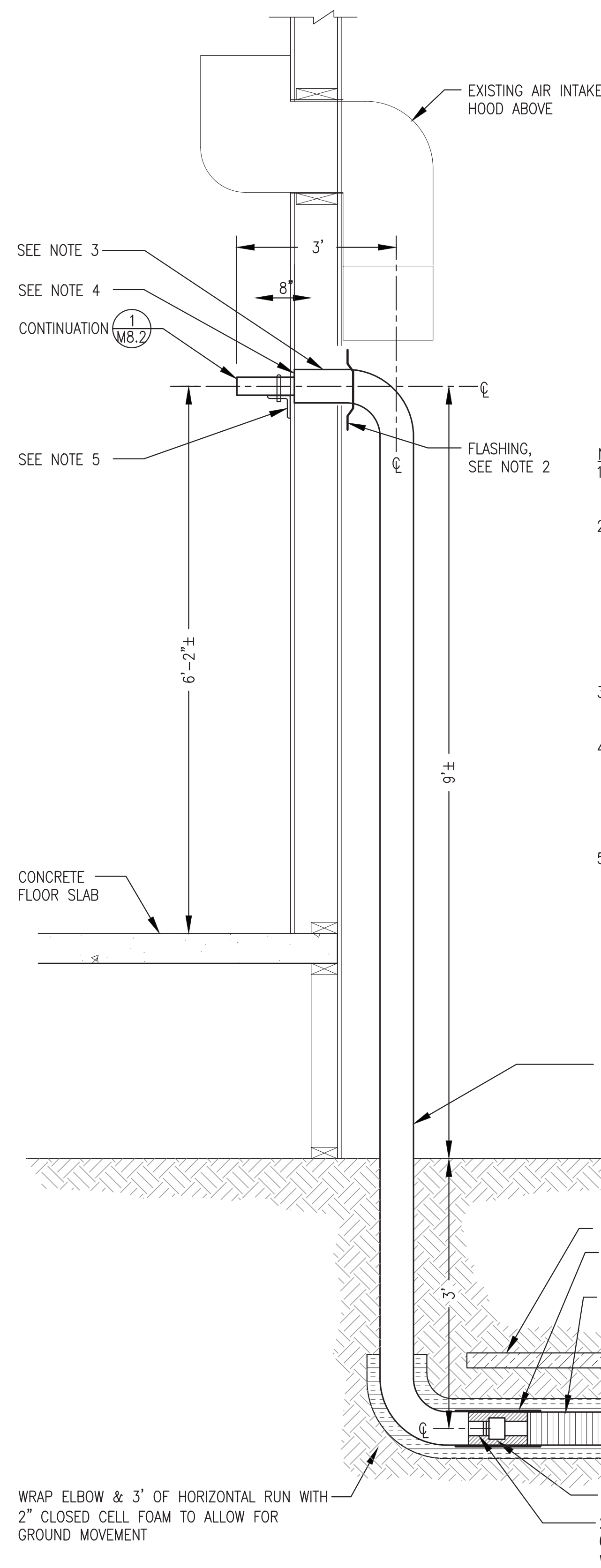
4 ENLARGED HX PIPING PLAN
M8.2 1"=1'-0"

ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #1

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: HEAT RECOVERY SYSTEM SCHOOL MECHANICAL BUILDING PLAN & DETAILS			
 Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100		DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: NIKO M8 PROJECT NUMBER:	SCALE: AS NOTED DATE: 9/1/21 SHEET: M8.2 OF 9



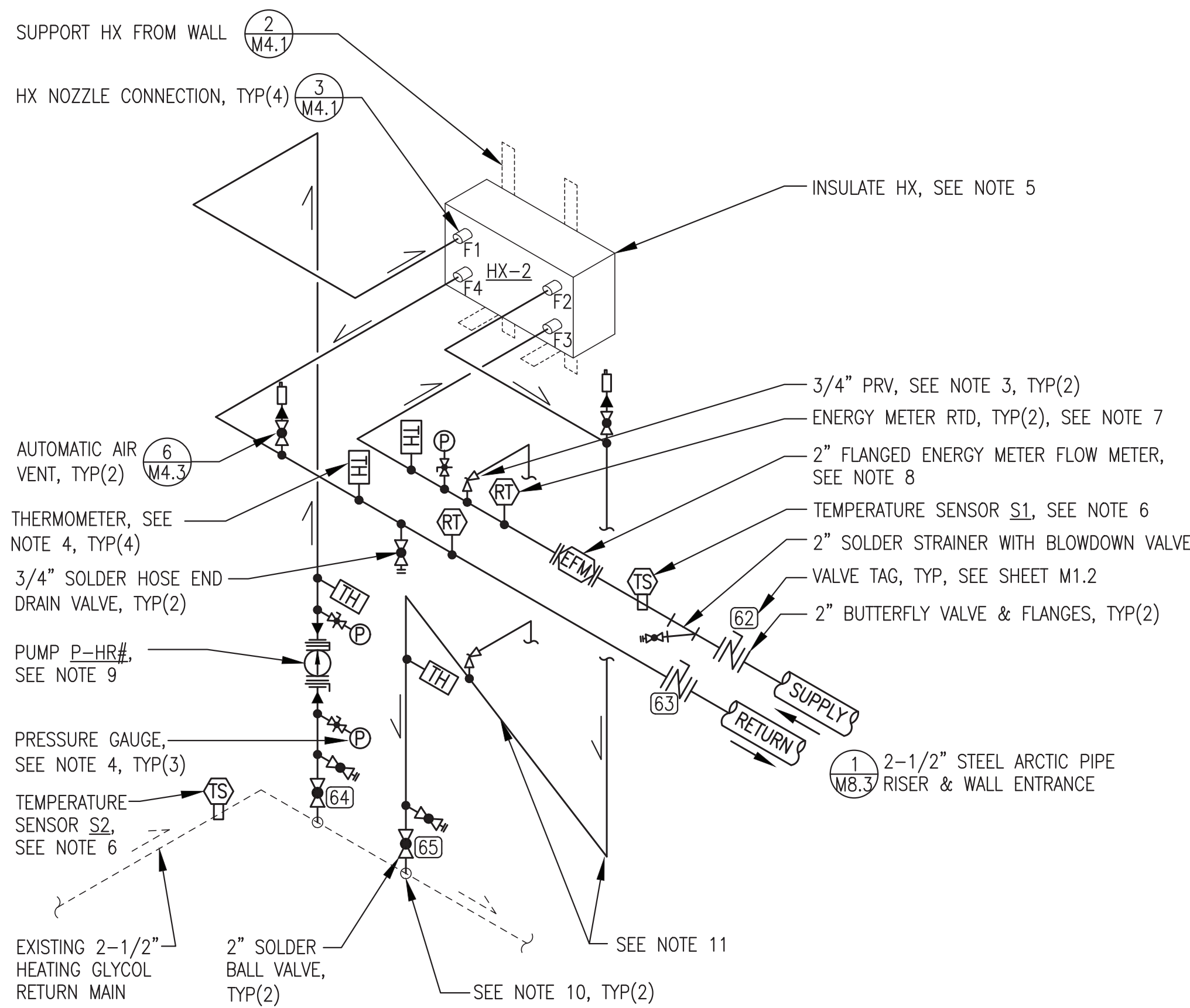
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NOTES:

- ONE ARCTIC PIPE ENTRY SHOWN, PROVIDE TWO IDENTICAL.
- AFTER WELDING, PRESSURE TESTING, AND INSULATING JOINT, INSTALL MULTI-FLASH #6 RETROFIT HF601BA WALL FLASHING OVER ARCTIC PIPE, SEAL TO WALL SURFACE WITH POLYURETHANE CAULKING, & FASTEN TO WALL WITH STAINLESS STEEL SHEET METAL SCREWS ALL AROUND.
- CUT OUTSIDE HOLE 1/2" LARGER THAN ARCTIC PIPE JACKET.
- CUT INSIDE HOLE 1/2" LARGER THAN CARRIER PIPE, CENTER PIPE, INSERT ARCTIC PIPE UNTIL JACKET TOUCHES INTERIOR WALL SHEATHING, & CAULK ALL AROUND.
- INSTALL 4' LONG SECTION L3"x3"x3/16" STEEL ANGLE AT ELEVATION OF BOTTOM OF STEEL CARRIER PIPE. SECURE ANGLE TO WALL WITH 3/8"x3" LAG SCREW AT MINIMUM 3 EACH WALL STUDS. SECURE 2" STEEL PIPES TO ANGLE WITH U-BOLTS.

1 SCHOOL MECHANICAL BUILDING ARCTIC PIPE RISER & WALL ENTRANCE
M8.3 NO SCALE




2 SCHOOL HEAT RECOVERY PIPING ISOMETRIC
M8.3 NO SCALE

NOTES:

- ALL NEW PIPING & EQUIPMENT SHOWN IN DARK SOLID LINES. ALL EXISTING PIPING SHOWN IN LIGHT DASHED LINES.
- ALL NEW PIPING 2" TYPE "L" COPPER TUBE UNLESS SPECIFICALLY INDICATED OTHERWISE. SUPPORT PIPING & EQUIPMENT FROM BUILDING STRUCTURE WITH STRUT AND FITTINGS AS REQUIRED.
- 3/4" PRV, 100 PSIG SETPOINT, PIPE DISCHARGE TO WITHIN 6" OF FLOOR.
- SEE DETAIL 3/M4.3 FOR INSTRUMENTATION INSTALLATION.
- WRAP HEAT EXCHANGER WITH 1" RIGID FOIL-BACK FIBERGLAS INSULATION ALL AROUND & TAPE ALL SEAMS. INSULATE ALL NEW PIPING WITH 1/8"x2" SELF-ADHESIVE FOIL BACKED FOAM INSULATION SPIRAL WRAPPED. EXISTING SCHOOL HYDRONIC PIPING TO REMAIN PARTIALLY INSULATED AS EXISTING.
- TEMPERATURE SENSOR PROVIDED WITH HEAT RECOVERY PANEL, SEE ELECTRICAL. INSTALL ON SURFACE OF PIPING WHERE INDICATED. CAREFULLY REMOVE SHORT SECTION OF EXISTING PIPING INSULATION AND SAVE FOR REUSE. WIRE BRUSH AREA ON PIPE TO REMOVE ALL SURFACE RESIDUE. PLACE SENSOR DIRECTLY ON CLEANED AREA AND SECURE TO PIPE WITH MINIMUM 2 WRAPS OF HIGH TEMPERATURE FOIL BACKED TAPE. ROUTE LEAD TO INSULATION SURFACE AND CAREFULLY REPLACE INSULATION. TAPE/SEAL REPLACED INSULATION TO MATCH EXISTING.
- RTD PROVIDED WITH ENERGY METER FOR HEAT RECOVERY FEED (SUPPLY) & RETURN, SEE ENERGY MEASUREMENT SCHEDULE SHEET M1.1. INSTALL IN 3/4" THERMAL WELL.
- FLANGED FLOW METER PROVIDED WITH ENERGY METER, SEE ENERGY MEASUREMENT SCHEDULE SHEET M1.1. INSTALL WITH 2" COMPANION FLANGES WITH MINIMUM 6" LONG STRAIGHT (NO FITTINGS) LENGTH OF PIPE UPSTREAM AND DOWNSTREAM OF METER.
- REDUCE TO 1-1/2" COPPER AND CONNECT TO 1-1/2" SOLDER SHUT-OFF FLANGE TO MATCH PUMP, TYP(2).
- CONNECT TO EXISTING 2-1/2" COPPER MAIN WITH 2-1/2"x2-1/2"x2" SOLDER REDUCING TEE OR WITH 2" T-DRILL TAP.
- ROLL 90° SOLDER ELBOW AS REQUIRED TO ALIGN WITH RISER AND ROUTE PIPING TO AVOID BOILER B-2 LEFT SIDE SERVICE AREA.

ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #1

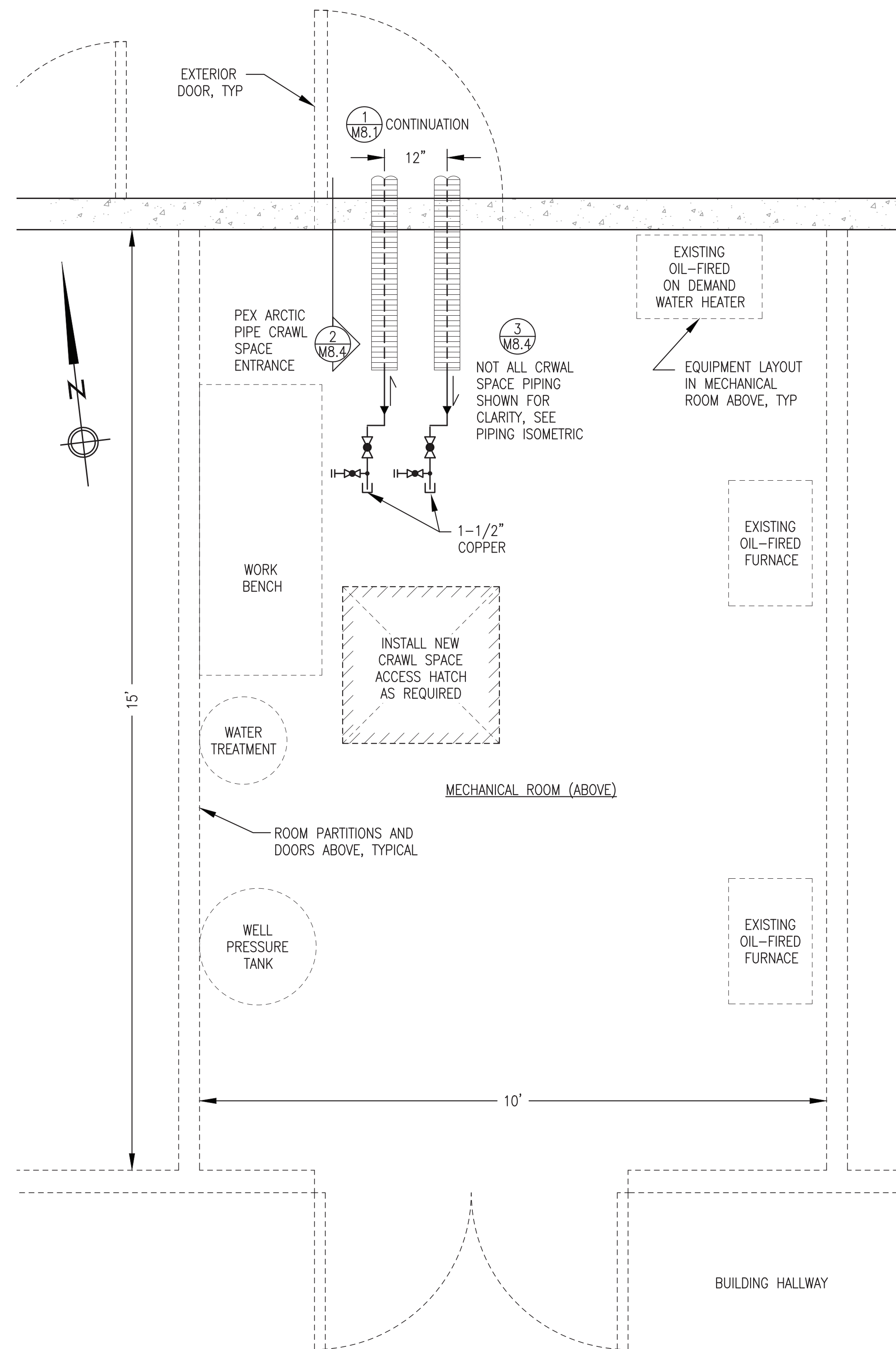
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: HEAT RECOVERY SYSTEM SCHOOL MECHANICAL BUILDING PIPING ISOMETRIC & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M8		SHEET: M8.3 OF 9	
PROJECT NUMBER:			



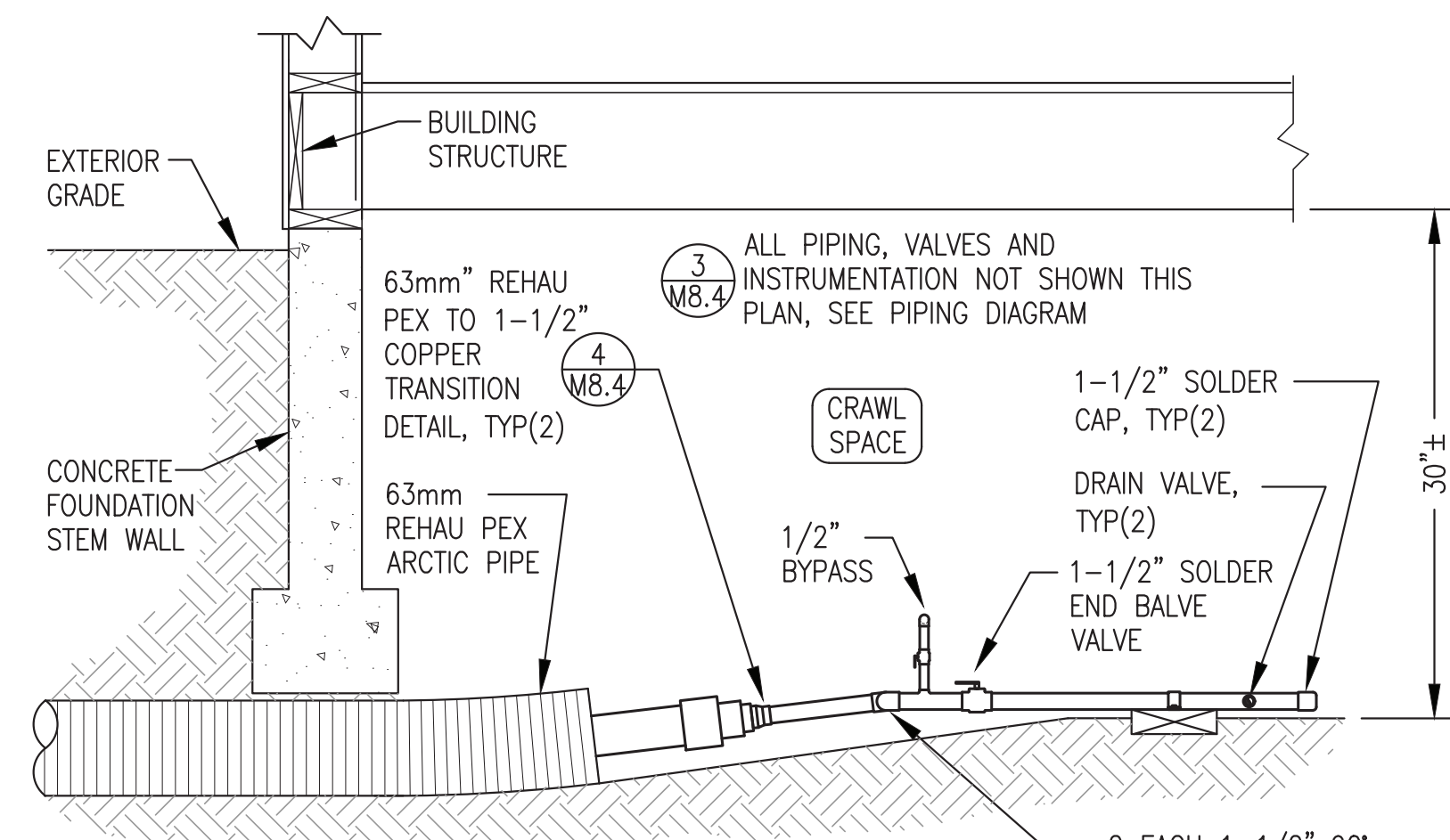
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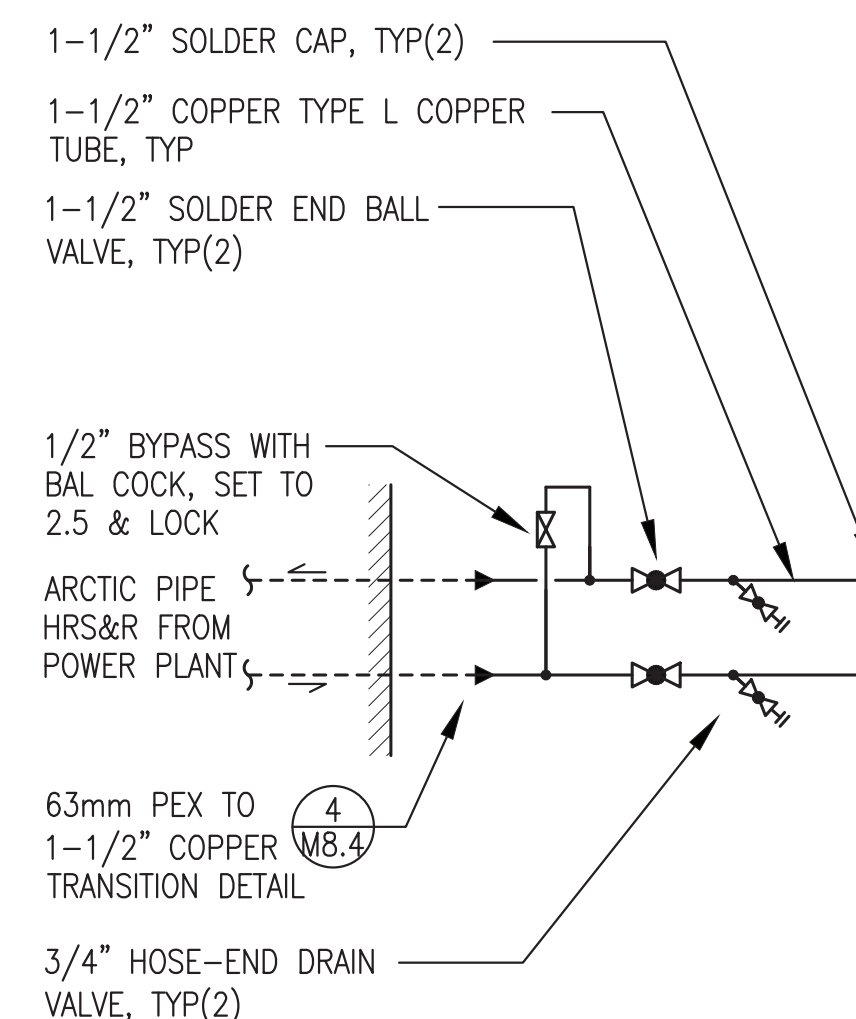
Gray
Stassel
Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100



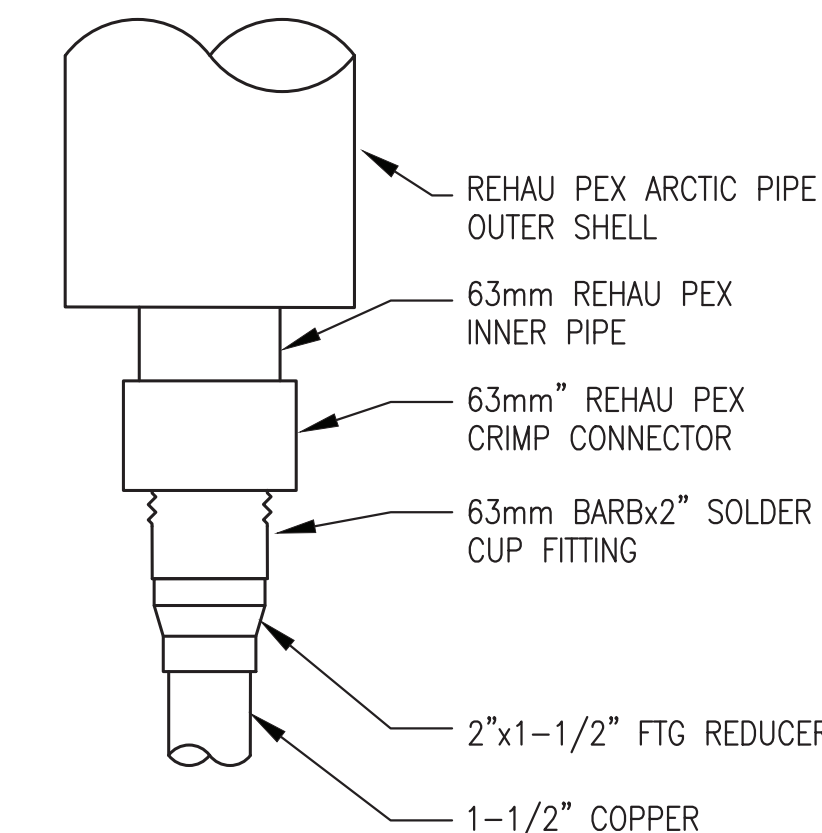
1 COMMUNITY BUILDING HEAT RECOVERY PARTIAL CRAWL SPACE PLAN
 M8.4 3/4"=1'-0"



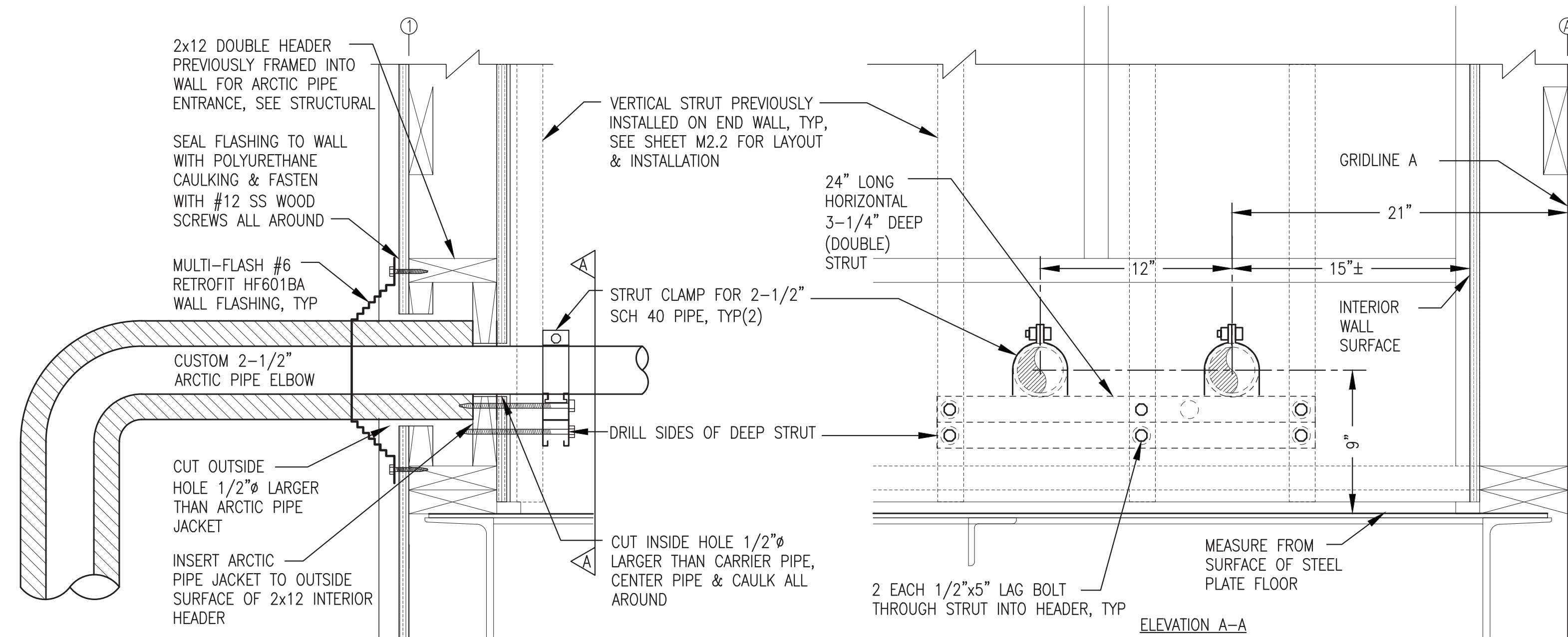
2 COMMUNITY BUILDING PEX ARCTIC PIPE ENTRANCE
 M8.4 NO SCALE



3 ARCTIC PIPE ENTRANCE PIPING DIAGRAM
 M8.4 NO SCALE




4 63mm REHAU PEX ARCTIC PIPE TO 1-1/2\"/>
 M8.4 NO SCALE



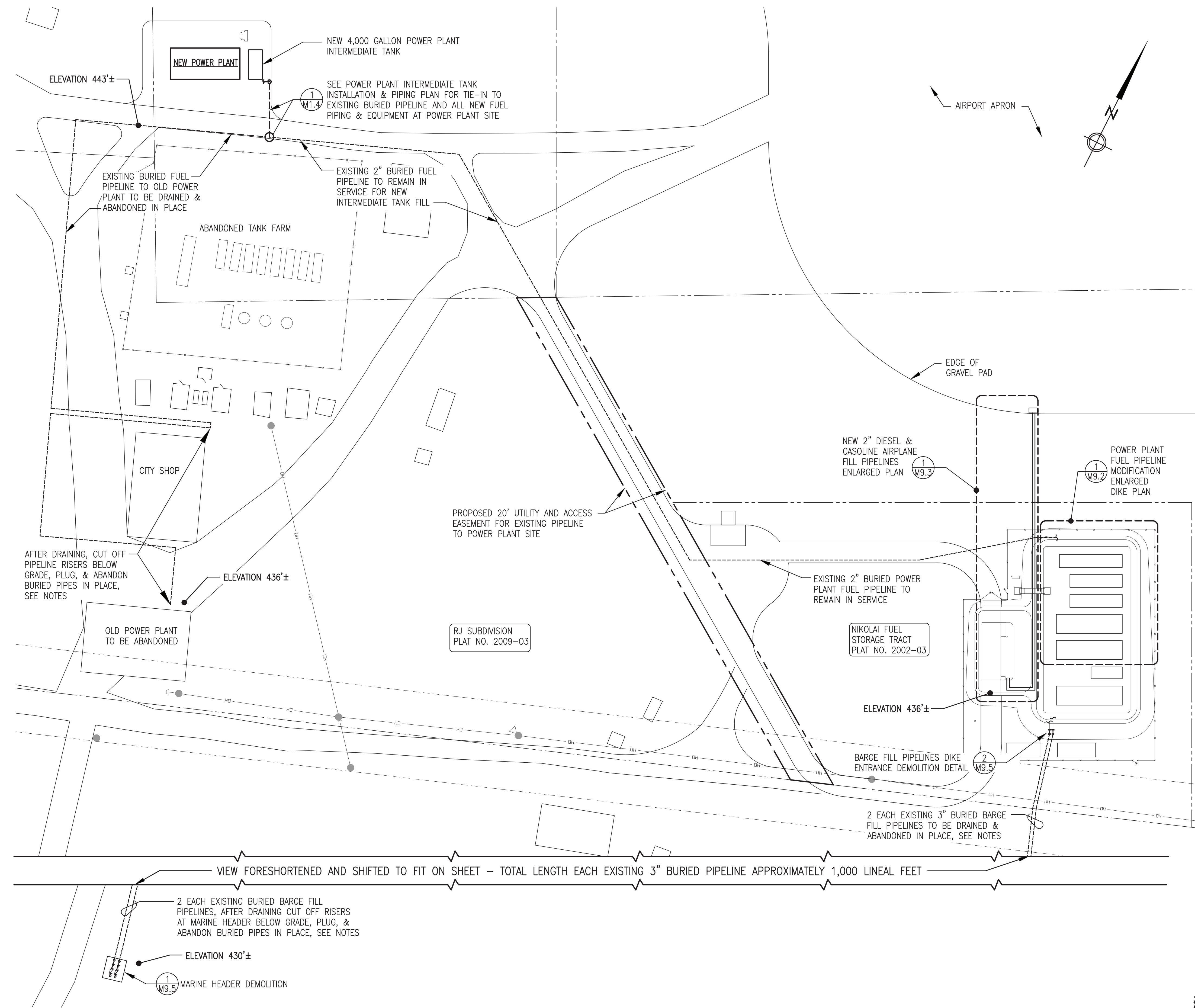
5 ARCTIC PIPE ENTRANCE AT POWER PLANT
 M8.4 2"=1'-0"

ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #1

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: HEAT RECOVERY SYSTEM COMMUNITY BUILDING & POWER PLANT ENTRANCES			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M8		SHEET: M8.4 OF 9	
PROJECT NUMBER:			




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- TEMPORARY FUEL TRANSFER SYSTEM GENERAL NOTES:**
- 1) THE EXISTING DAY TANK AUTOMATICALLY FILLS FROM THE TANK FARM USING THE BURIED FUEL TRANSFER PIPELINE. IN ORDER TO MAINTAIN POWER IN THE COMMUNITY, A TEMPORARY FUEL SOURCE MUST BE PROVIDED AT THE OLD POWER PLANT FROM THE TIME THE TRANSFER PIPELINE IS CUT UNTIL THE TIME THE NEW POWER PLANT IS COMMISSIONED. PLAN OUT WORK TO MINIMIZE THE TIME REQUIRED TO OPERATE ON THE TEMPORARY FUEL SYSTEM AND COORDINATE THE CHANGEOVER WITH THE UTILITY.
 - 2) FURNISH A MINIMUM 1,000 GALLON CAPACITY TEMPORARY FUEL STORAGE TANK AND PLACE IT IN THE VICINITY OF THE EXISTING POWER PLANT.
 - 3) PRIOR TO PLACING IN SERVICE, INSPECT THE TANK TO ENSURE IT IS STRUCTURALLY SOUND AND LIQUID TIGHT. VERIFY THAT THE INTERIOR IS CLEAN AND FREE OF WATER, RUST, SLUDGE, OR DEBRIS. NOTE THAT THERE ARE SEVERAL ABANDONED EXISTING TANKS OF UNKNOWN CONDITION IN THE COMMUNITY.
 - 4) PLACE THE TANK WITHIN A TEMPORARY LINED IMPOUND TO PROVIDE SECONDARY CONTAINMENT. ALTERNATELY, A DOUBLE WALL TANK WITH SUITABLE OVERFILL PROTECTION IN ACCORDANCE WITH EPA ALTERNATIVE SECONDARY CONTAINMENT REQUIREMENTS MAY BE USED.
 - 5) INSTALL A LEVEL GAUGE AND A GAUGE HATCH ON THE TANK TO ALLOW FOR MONITORING. CONNECT THE TEMPORARY TANK TO THE EXISTING DAY TANK WITH NEW PIPING TO ALLOW THE DAY TANK AUTO FILL FUNCTION TO CONTINUE.
 - 6) DURING THE ENTIRE TIME THE TEMPORARY FUEL SYSTEM IS IN SERVICE, MONITOR THE TANK LEVEL DAILY AND FILL AS REQUIRED TO MAINTAIN A MINIMUM OF 300 GALLONS OF FUEL AT ALL TIMES. NOTE THAT THE POWER PLANT IS ESTIMATED TO USE AN AVERAGE OF 125 GALLONS PER DAY. LOAD FUEL IN THE TRUCK FILL CONTAINMENT AREA AT THE EXISTING TANK FARM AND TRANSFER IN A SAFE AND ENVIRONMENTALLY SOUND MANNER. PROVIDE A RECORD OF THE QUANTITY OF EACH TRANSFER TO THE UTILITY. ALL FUEL REQUIRED FOR POWER GENERATION WILL BE PROVIDED BY THE UTILITY AT NO COST TO THE CONTRACTOR.

- EXISTING PIPELINE DRAINING AND DECOMMISSIONING GENERAL NOTES:**
- 1) THE FOLLOWING NOTES APPLY TO THE EXISTING POWER PLANT FUEL TRANSFER PIPE AND THE EXISTING BARGE FILL PIPELINES. NOTE THAT WORK ON THE POWER PLANT FUEL TRANSFER PIPE MUST BE COORDINATED WITH THE PRECEDING TEMPORARY FUEL SYSTEM NOTES.
 - 2) APPROXIMATE GROUND SURFACE ELEVATIONS ARE INDICATED ON THE PLAN TO ASSIST IN DEVELOPING A PLAN FOR DRAINING.
 - 3) IDENTIFY ALL REQUIRED TANK FARM MANIFOLD AND BULK TANK CONNECTION ISOLATION VALVES, CLOSE VALVES AND LOCKOUT PRIOR TO COMMENCING DRAINING AND DECOMMISSIONING OF PIPELINE(S).
 - 4) DRAIN ALL RESIDUAL FUEL FROM EACH PIPE INDICATED TO BE DRAINED. CAPTURE DIESEL FUEL AND GASOLINE IN SEPARATE CONTAINERS AND TURN OVER ALL CAPTURED FUEL TO THE CITY.
 - 5) TWO EACH EXISTING HDPE CONDUIT ARE ROUTED ADJACENT TO THE EXISTING POWER PLANT FUEL TRANSFER PIPE, SEE ELECTRICAL. LOCATE CONDUIT AND CAREFULLY EXCAVATE TO AVOID DAMAGE.
 - 6) PERFORM ALL CUTTING IN ACCORDANCE WITH APPROPRIATE HOT WORK PROCEDURES PER NFPA 51B.
 - 7) WHERE INDICATED ON PLAN FOR PIPES TO BE CUT OFF BELOW GRADE, CUT THE PIPE 2' MINIMUM BELOW GRADE AND PLUG OPEN END WITH NON-SHRINK GROUT.
 - 8) SEE SHEETS M1.4 AND M9.5 FOR ADDITIONAL PIPELINE DEMOLITION & DECOMMISSIONING DETAILS.

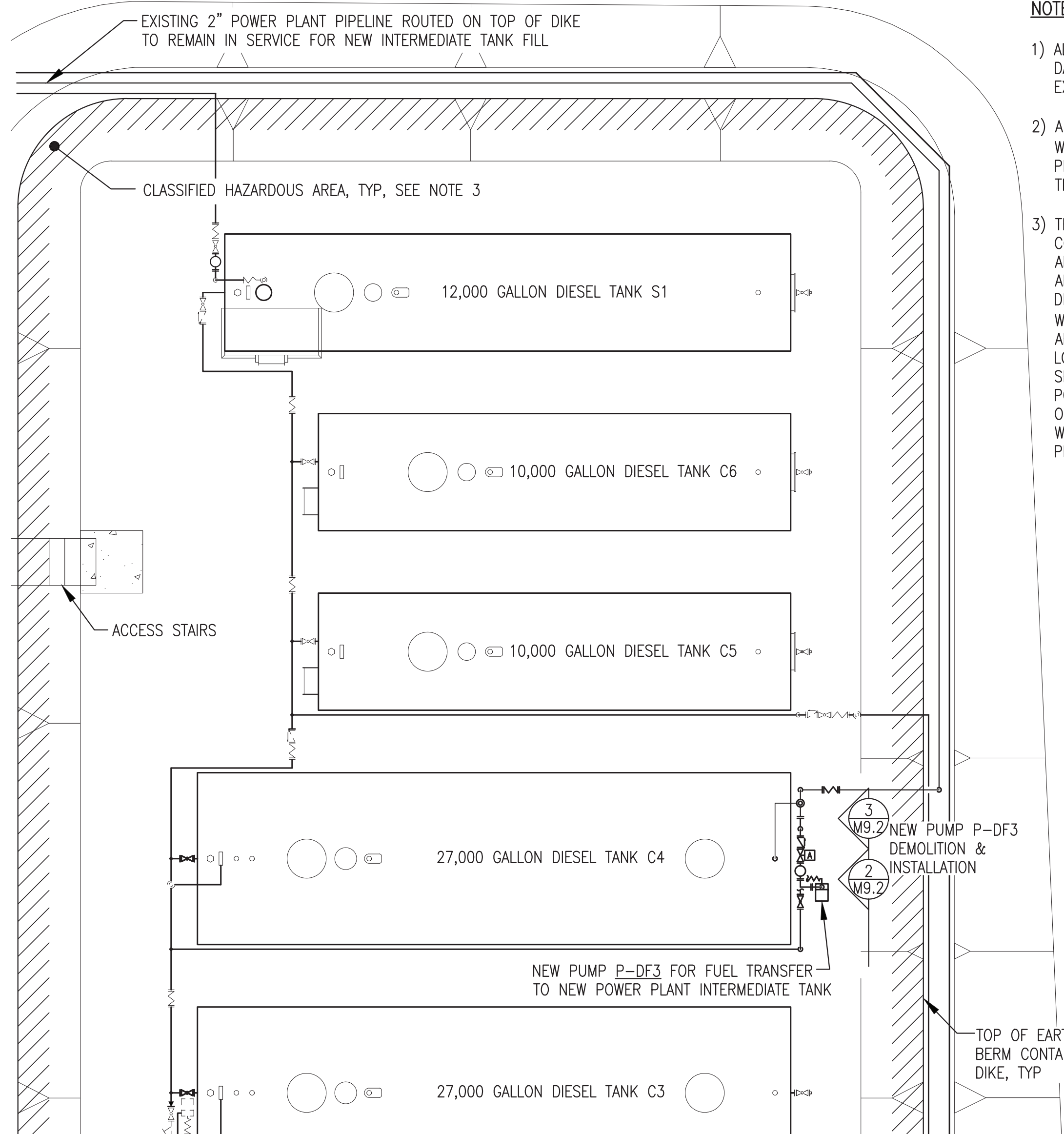
**ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER THE BASE BID EXCEPT AS FOLLOWS:
 THE AIRPLANE FILL PIPELINES SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #3.
 THE DRAINING AND DEMOLITION OF THE BARGE FILL PIPELINES SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #4.**

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: OVERALL COMMUNITY FUEL PIPELINE PLAN			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M9		SHEET: M9.1 OF 9	
PROJECT NUMBER:			

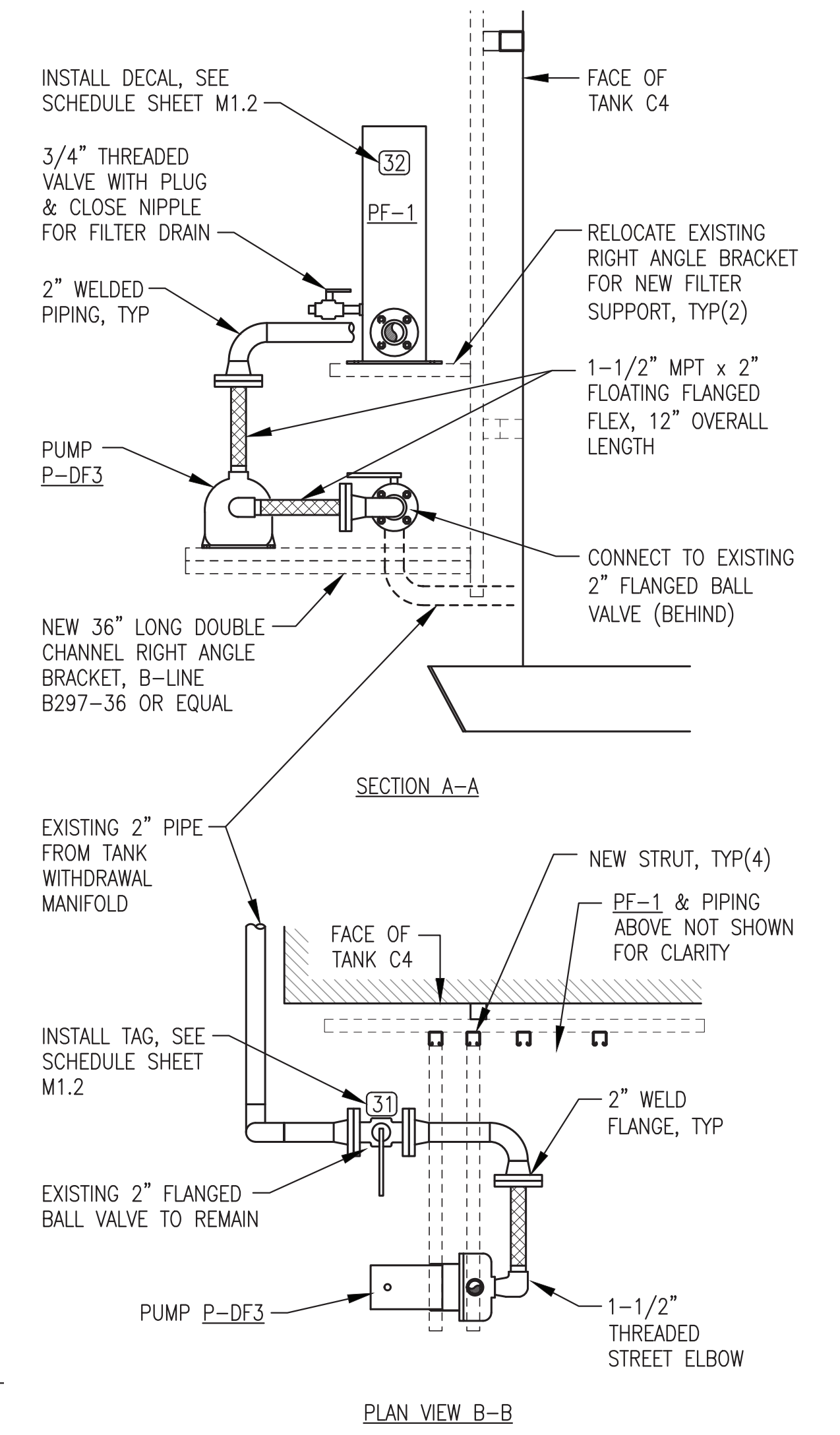
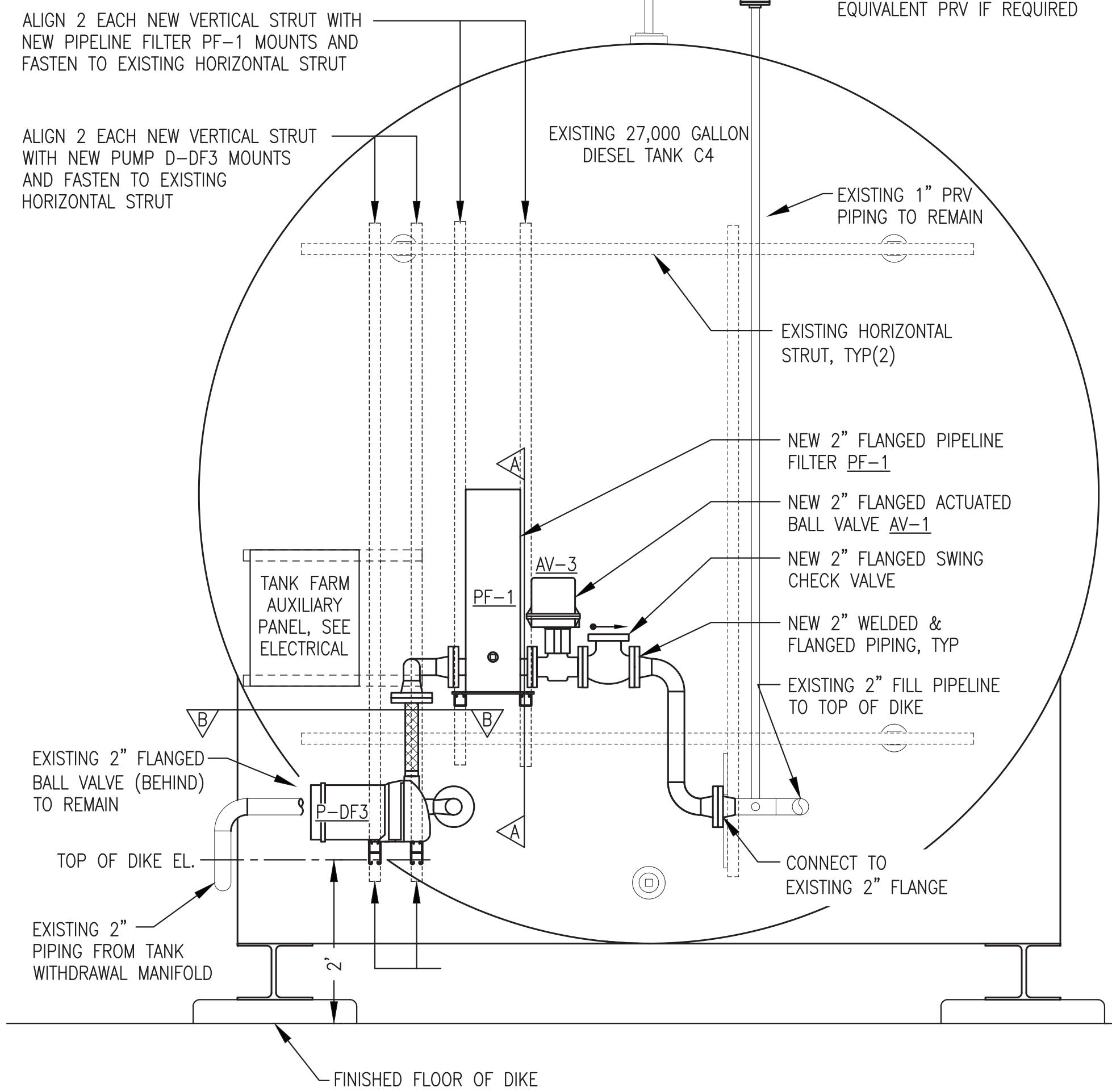
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1
M9.1 OVERALL COMMUNITY FUEL PIPELINE PLAN
 1"=30'

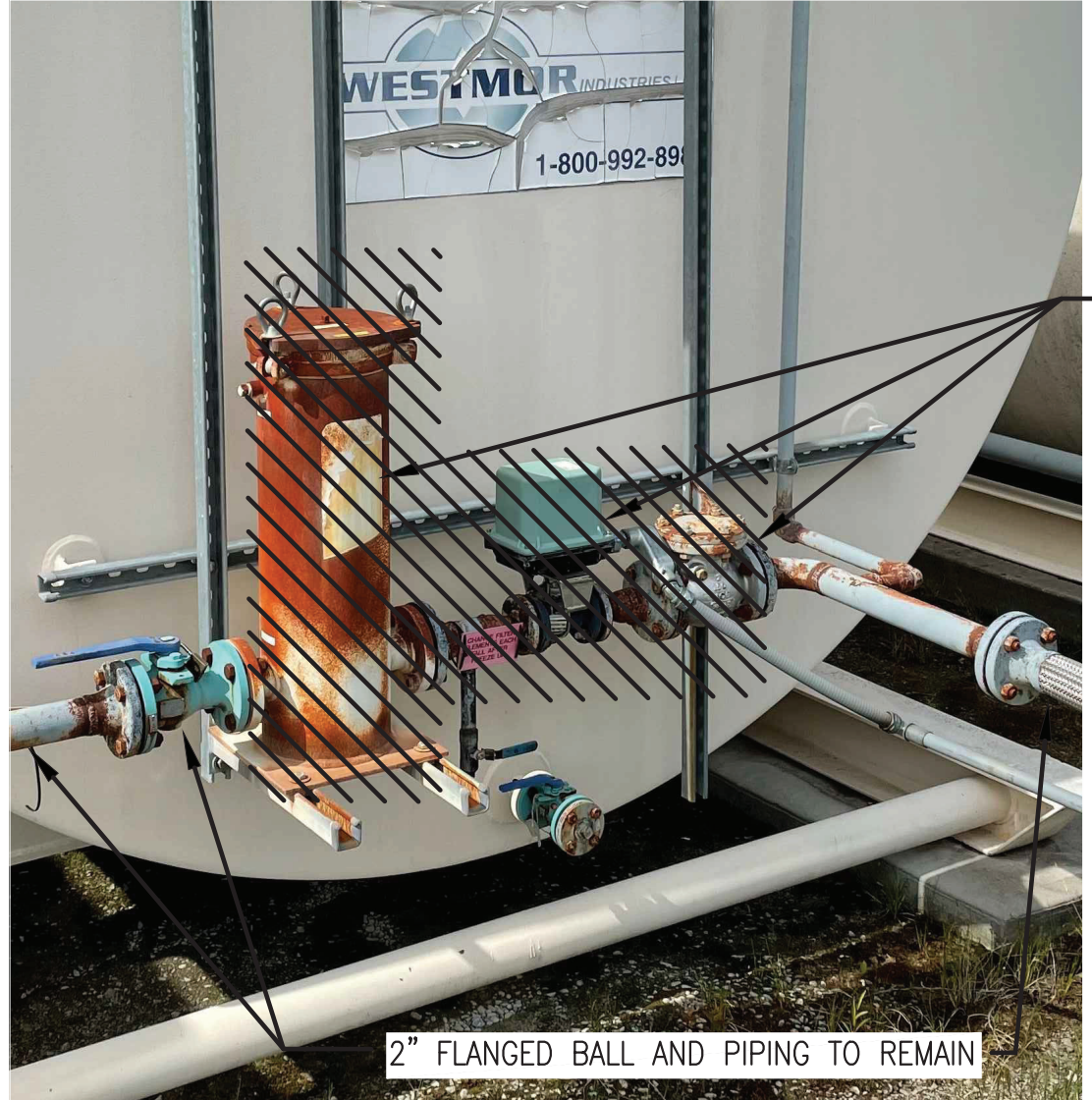


- NOTES:**
- 1) ALL PIPING SHOWN WITH LIGHT/DASHED LINES THIS PLAN EXISTING TO REMAIN IN SERVICE.
 - 2) ALL PIPING & DEVICES SHOWN WITH DARK/SOLID LINES THIS PLAN NEW TO BE INSTALLED THIS PROJECT.
 - 3) THE EXISTING TANK FARM DIKE CONTAINS BOTH DIESEL FUEL AND GASOLINE TANKS. ALL AREAS BELOW THE TOP OF ALL DIKED CONTAINMENT AREAS AND WITHIN 10' OF GASOLINE TANKS ARE CLASSIFIED HAZARDOUS LOCATIONS. PREFABRICATE PIPE SPOOLS OFFSITE WHEN POSSIBLE AND PERFORM ALL ONSITE WELDING IN ACCORDANCE WITH APPROPRIATE HOT WORK PROCEDURES PER NFPA 51B.



1 ENLARGED TANK FARM PIPING MODIFICATION PLAN
M9.2 1"=6'

2 PUMP P-DF3 INSTALLATION NEW WORK AT TANK C4
M9.2 3/4"=1'-0"

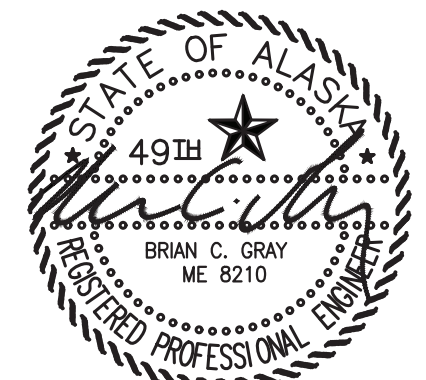


DRAIN PIPELINE THEN REMOVE FLANGED FILTER, ACTUATED BALL VALVE, & CHECK VALVE

2" FLANGED BALL AND PIPING TO REMAIN

3 PIPING DEMOLITION AT TANK C4
M9.2 NO SCALE

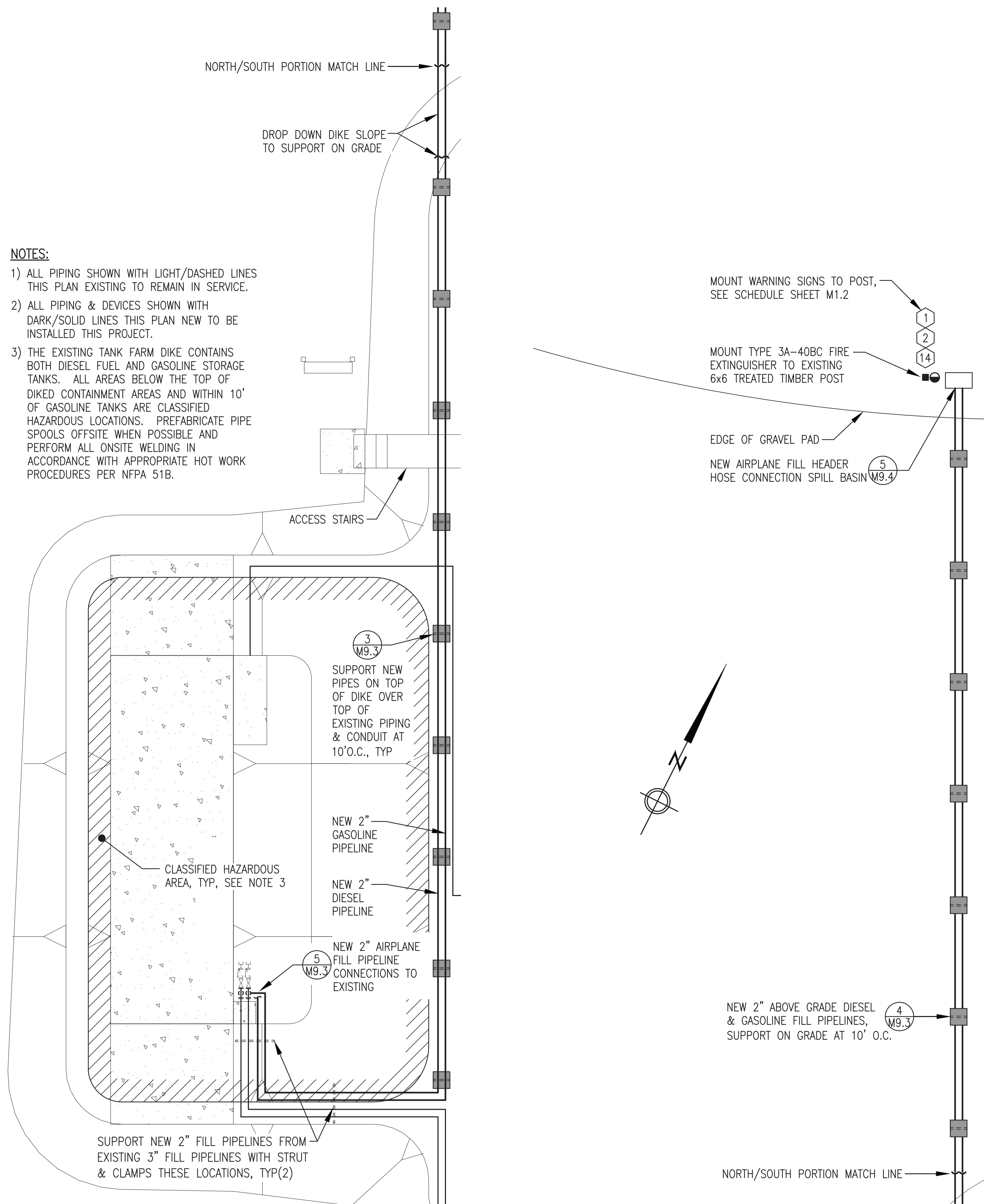
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REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: POWER PLANT INTERMEDIATE TANK FILL SYSTEM TANK FARM PIPING PLAN & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M9		SHEET: M9.2 OF 9	
PROJECT NUMBER:			
 Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100			

NOTES:

- 1) ALL PIPING SHOWN WITH LIGHT/DASHED LINES THIS PLAN EXISTING TO REMAIN IN SERVICE.
- 2) ALL PIPING & DEVICES SHOWN WITH DARK/SOLID LINES THIS PLAN NEW TO BE INSTALLED THIS PROJECT.
- 3) THE EXISTING TANK FARM DIKE CONTAINS BOTH DIESEL FUEL AND GASOLINE STORAGE TANKS. ALL AREAS BELOW THE TOP OF DIKED CONTAINMENT AREAS AND WITHIN 10' OF GASOLINE TANKS ARE CLASSIFIED HAZARDOUS LOCATIONS. PREFABRICATE PIPE SPOOLS OFFSITE WHEN POSSIBLE AND PERFORM ALL ONSITE WELDING IN ACCORDANCE WITH APPROPRIATE HOT WORK PROCEDURES PER NFPA 51B.

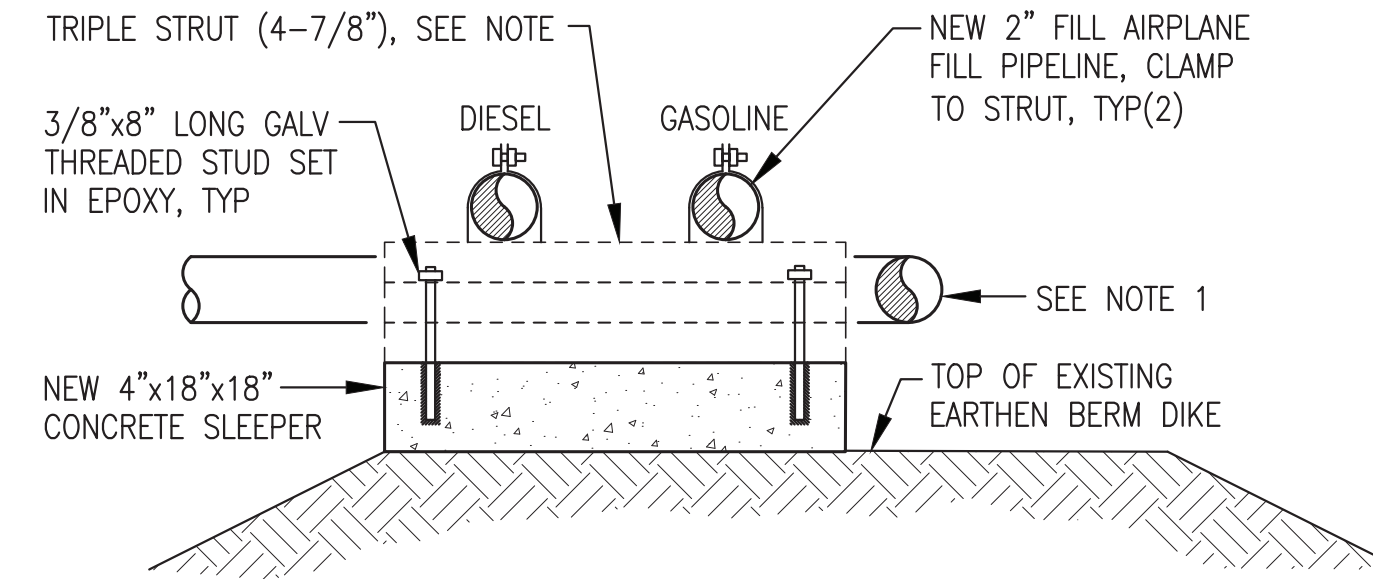


1 NEW AIRPLANE FILL PIPELINE PLAN – SOUTH PORTION
M9.3 1"=6'

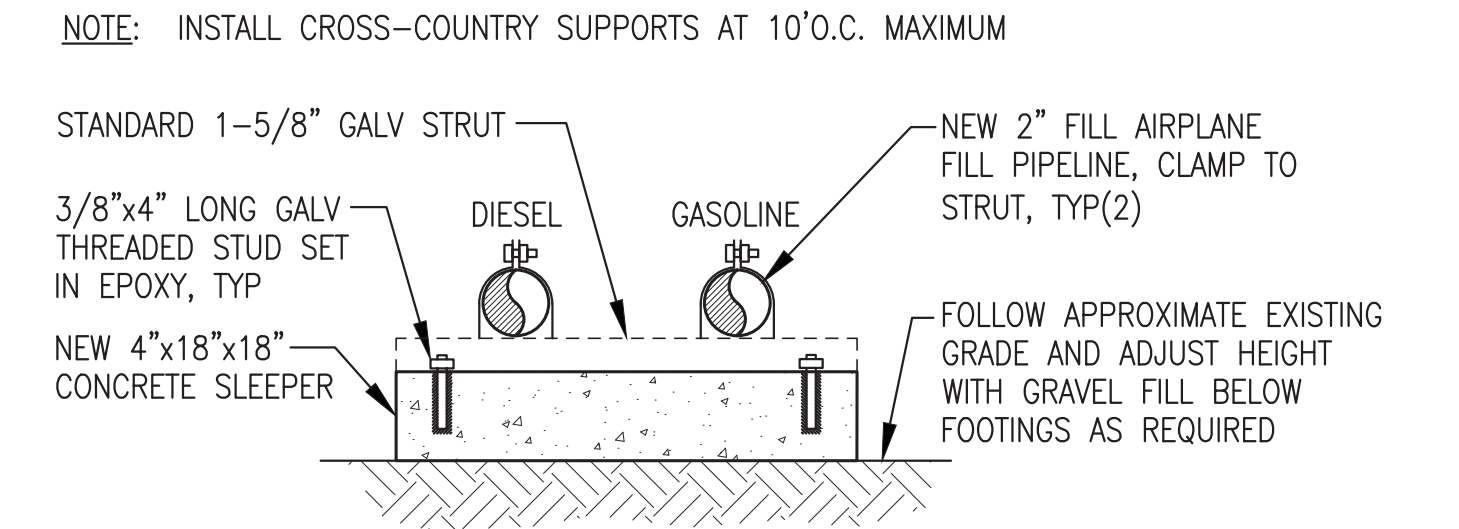
2 NEW AIRPLANE FILL PIPELINE PLAN – NORTH PORTION
M9.3 1"=6'

NOTES:

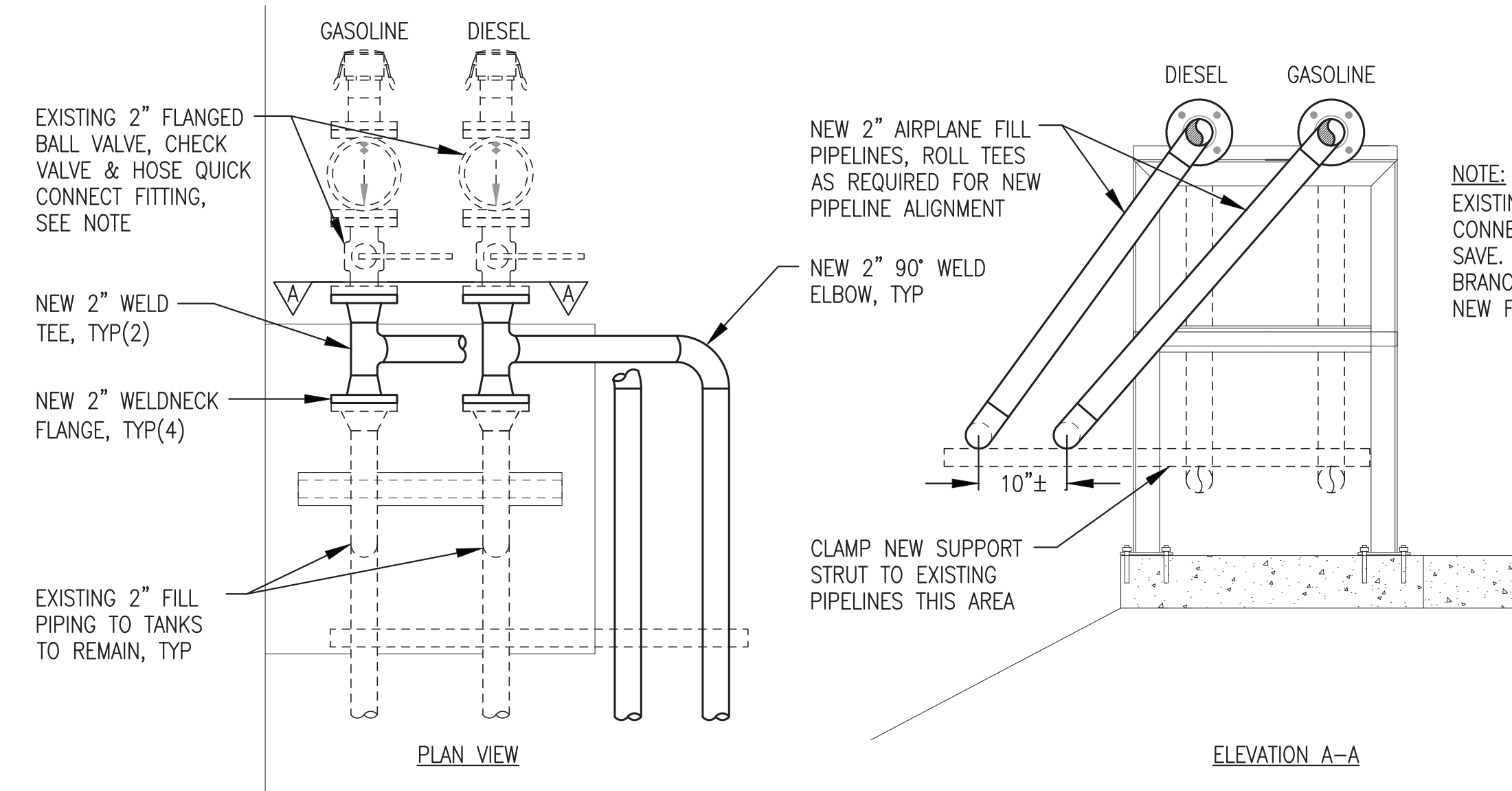
- 1) TOP OF SUPPORT TO BE AT SUFFICIENT ELEVATION TO ALLOW NEW 2" AIRPLANE FILL PIPELINES TO PASS ABOVE ALL OTHER EXISTING DIKE-MOUNTED PIPING & CONDUIT. ADD ADDITIONAL STRUT AS REQUIRED EXCEPT MAX HEIGHT TO BE BELOW ACCESS STAIRS.
- 2) SEE PLAN 1/M9.3 FOR APPROXIMATE SUPPORT LOCATIONS ON TOP OF DIKE. ADJUST SUPPORT LOCATIONS AS REQUIRED TO CLEAR EXISTING PIPING AND SUPPORTS



3 TYPICAL NEW PIPELINE SUPPORT ON TOP OF DIKE
M9.3 NO SCALE




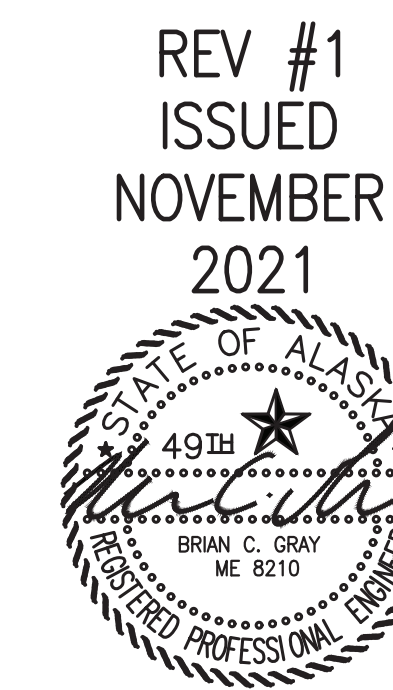
4 TYPICAL ABOVE GRADE PIPELINE SUPPORT
M9.3 NO SCALE



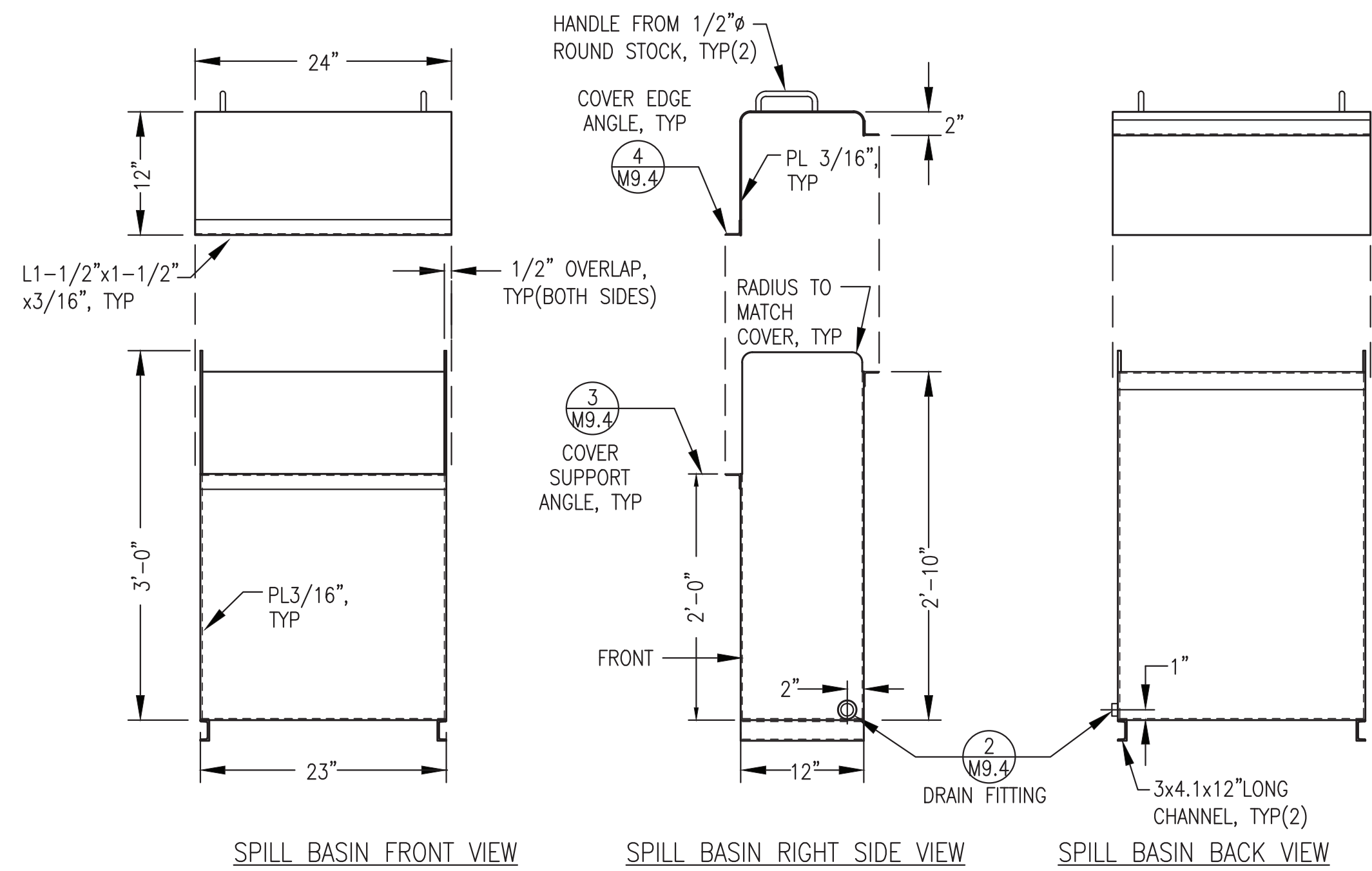
5 NEW 2" AIRPLANE FILL PIPELINE CONNECTION TO EXISTING
M9.3 NO SCALE

ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #3

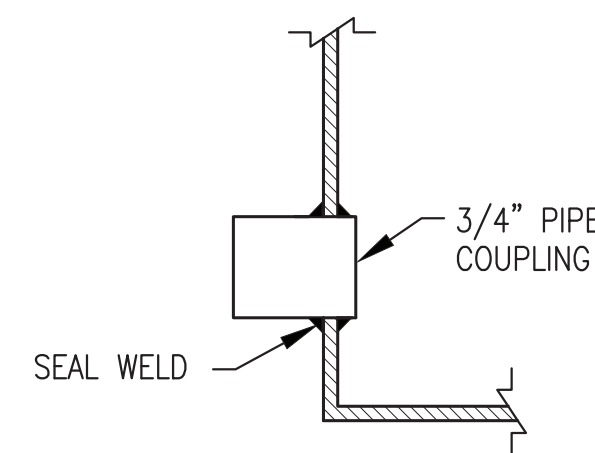
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: NEW AIRPLANE FUEL FILL PIPELINES PLANS & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO M9		SHEET: M9.3 OF 9	
PROJECT NUMBER:			



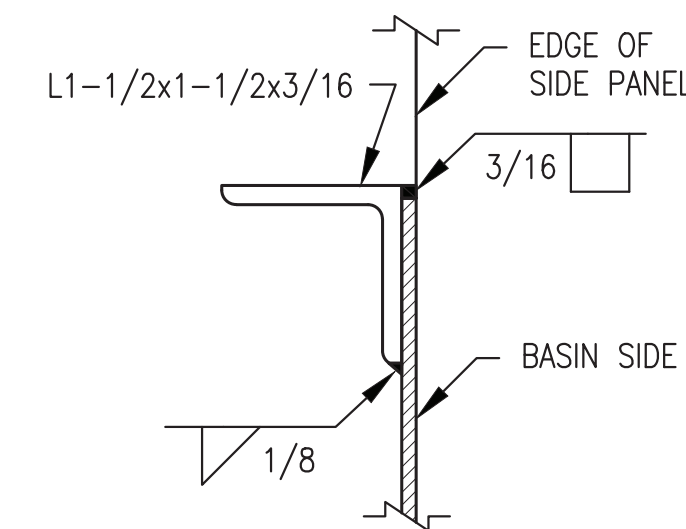
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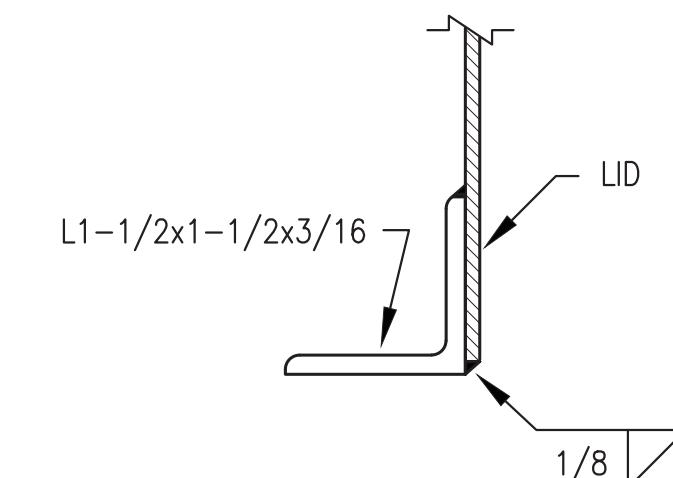
1 ALUMINUM SPILL BASIN FABRICATION DETAILS
M9.4 NO SCALE



2 DRAIN FITTING
M9.4 NO SCALE

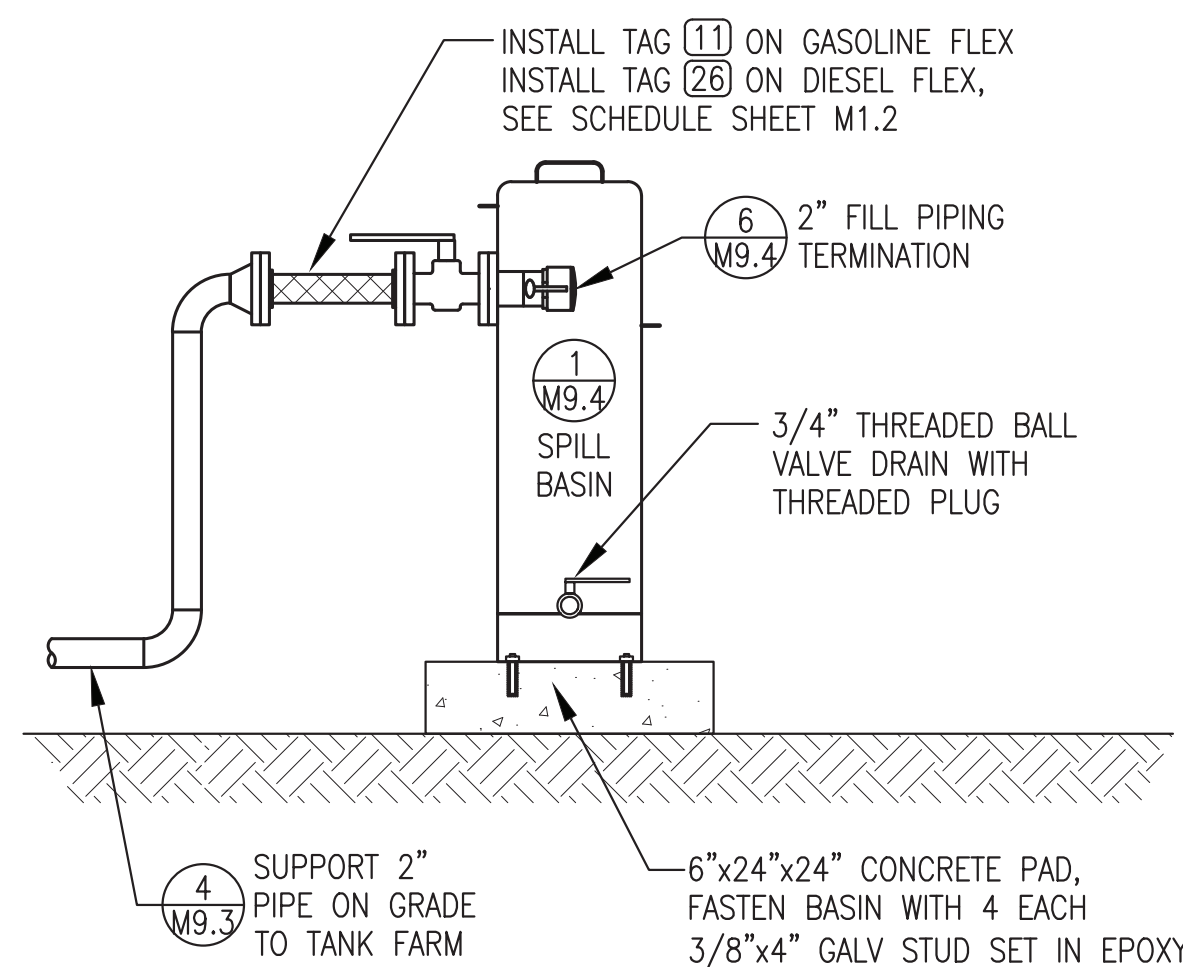


3 COVER SUPPORT ANGLE
M9.4 NO SCALE

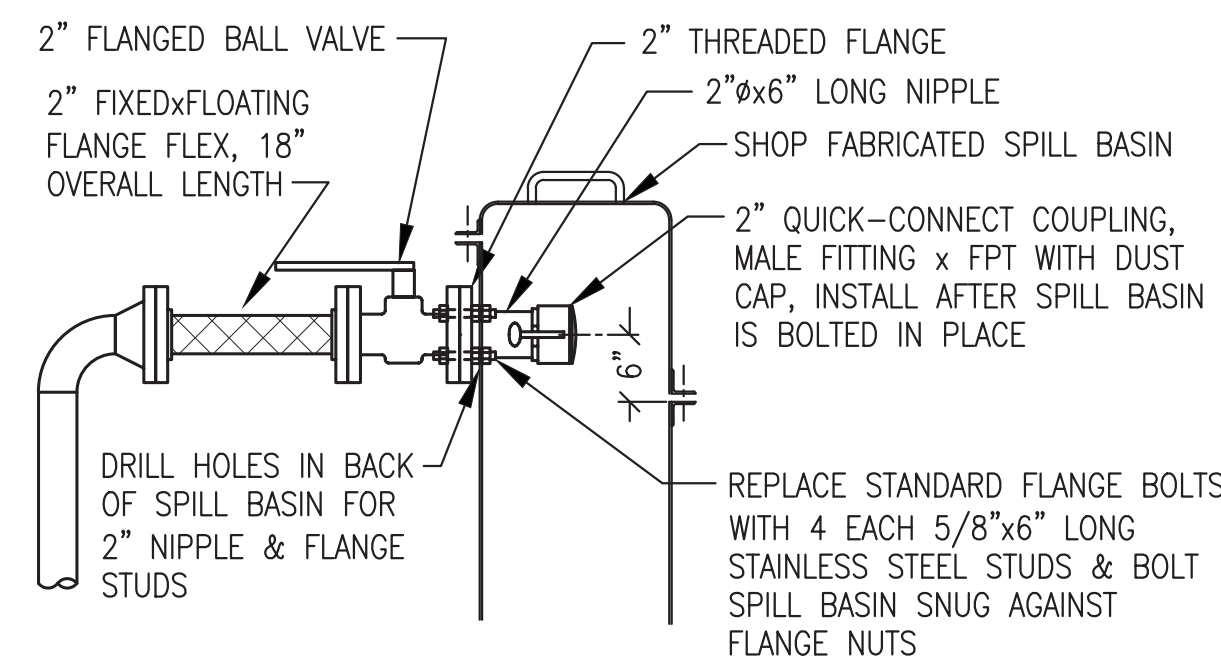


4 COVER EDGE ANGLE
M9.4 NO SCALE

NOTE: ONE PIPELINE SHOWN, PROVIDE TWO IDENTICAL.



5 AIRPLANE/TRUCK HEADER SPILL BASIN INSTALLATION
M9.4 NO SCALE



6 3\"/> M9.4 NO SCALE

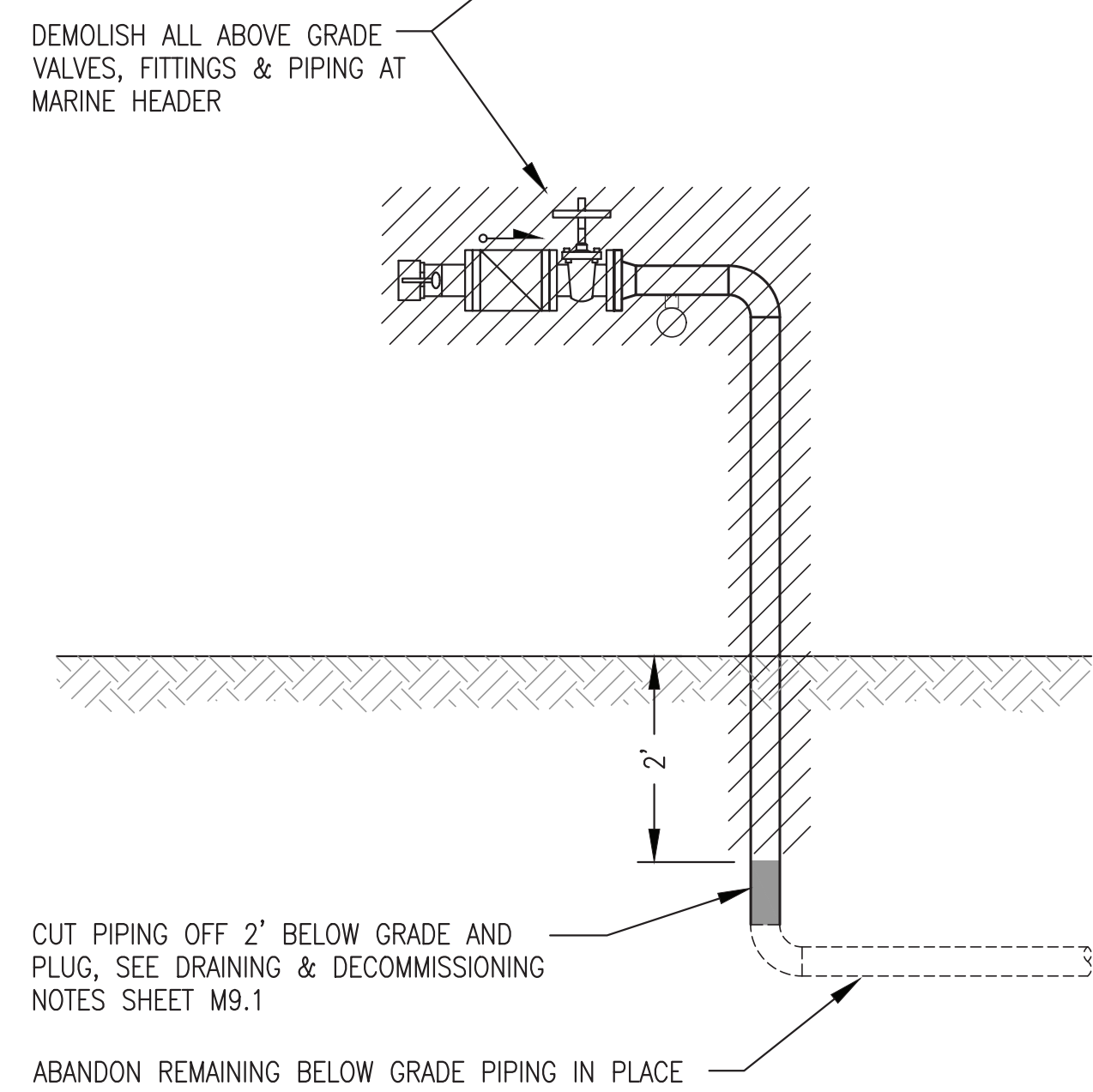
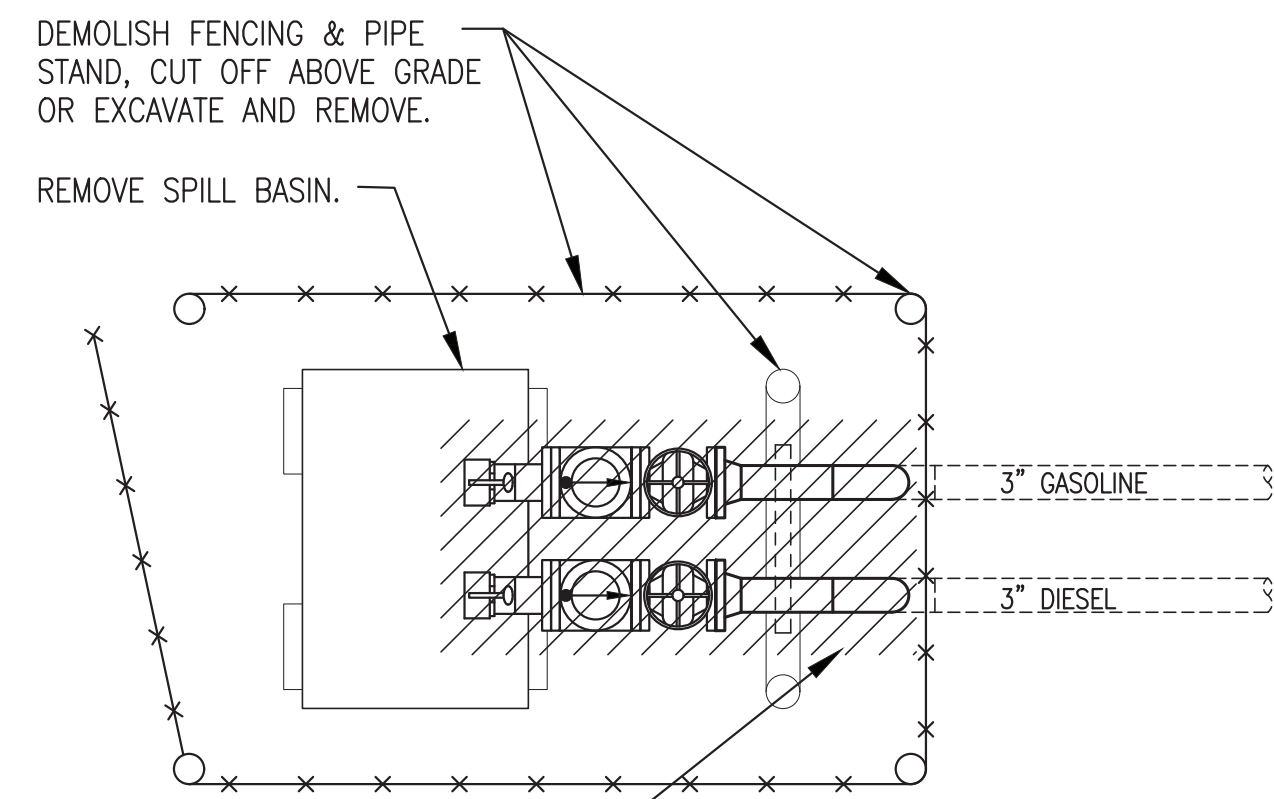
ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #3.

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2021

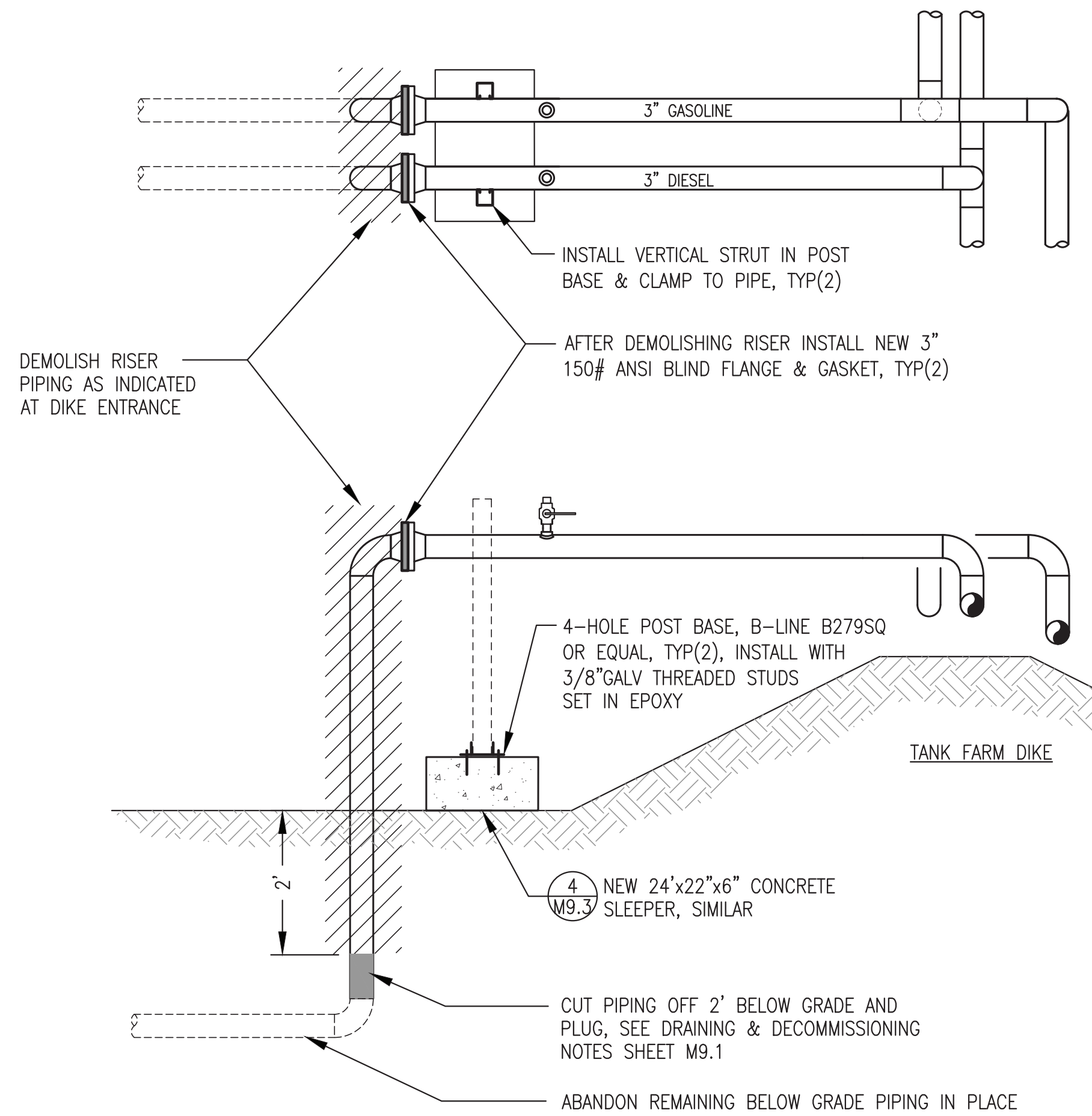
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: NEW AIRPLANE FILL PIPELINE HOSE CONNECTION SPILL BASIN DETAILS			
 Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100		DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: NIKO M9 PROJECT NUMBER:	
		SCALE: AS NOTED DATE: 9/1/21 SHEET: M9.4 OF 9	

DEMOLITION NOTES:

- 1) SEE SHEET M9.1 PLAN AND NOTES FOR PIPELINE DRAINING AND DECOMMISSIONING PRIOR TO COMMENCING WITH PIPING DEMOLITION INDICATED ON THIS SHEET.
- 2) EXISTING PIPING TO BE DEMOLISHED SHOWN HATCHED.
- 3) PRESSURE TEST EXISTING PIPING TO REMAIN IN SERVICE AFTER INSTALLING BLIND FLANGES.

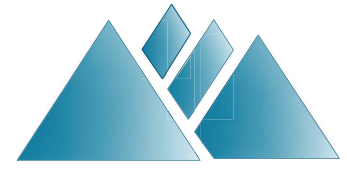
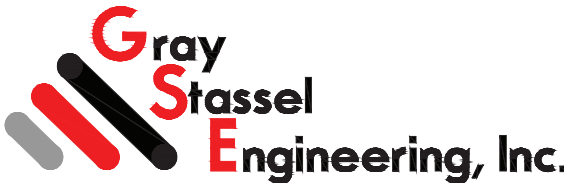


1 BARGE FILL PIPELINES MARINE HEADER DEMOLITION
M9.5 NO SCALE



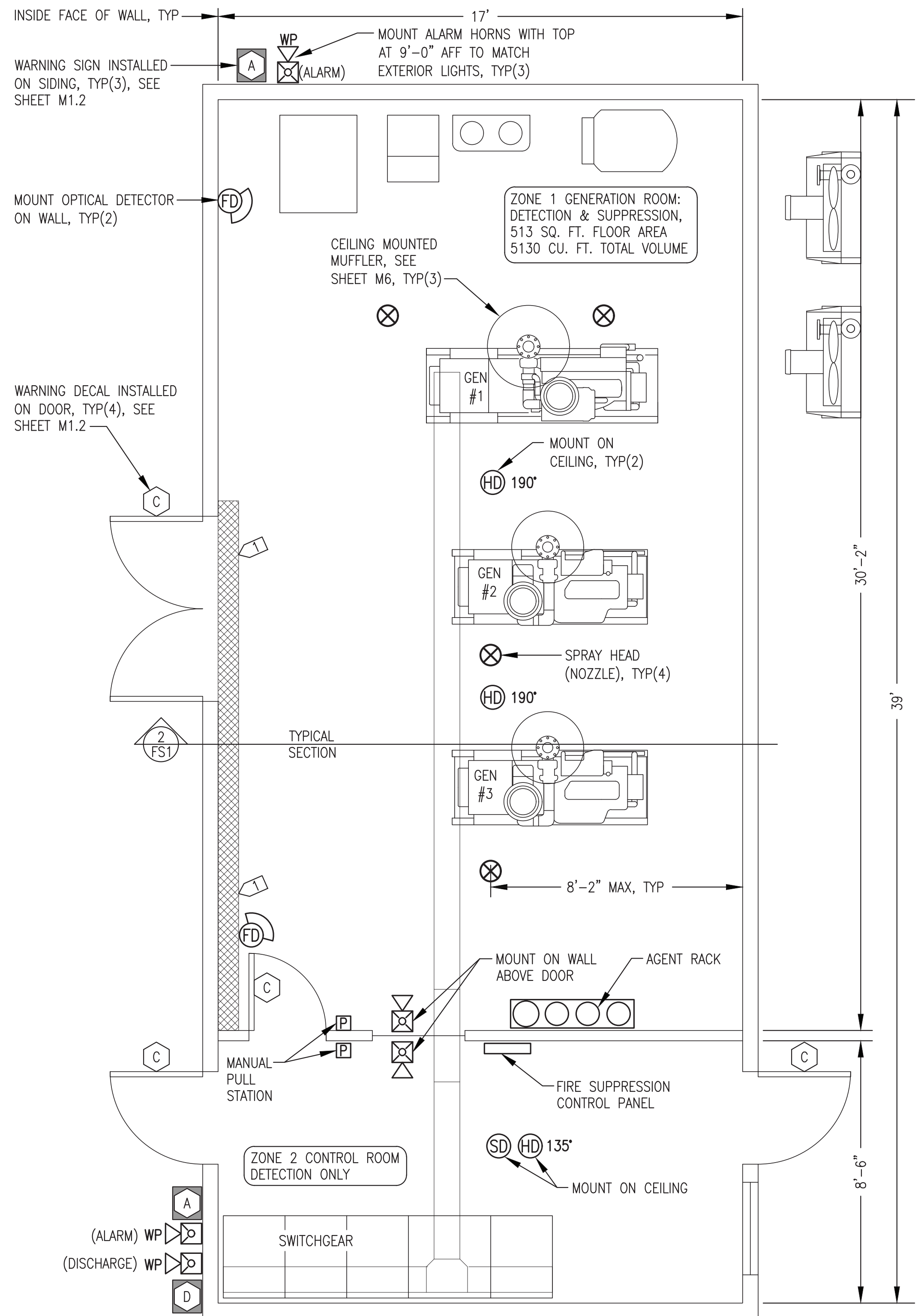
2 BARGE FILL PIPELINES DIKE ENTRANCE DEMOLITION
M9.5 NO SCALE

ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #4

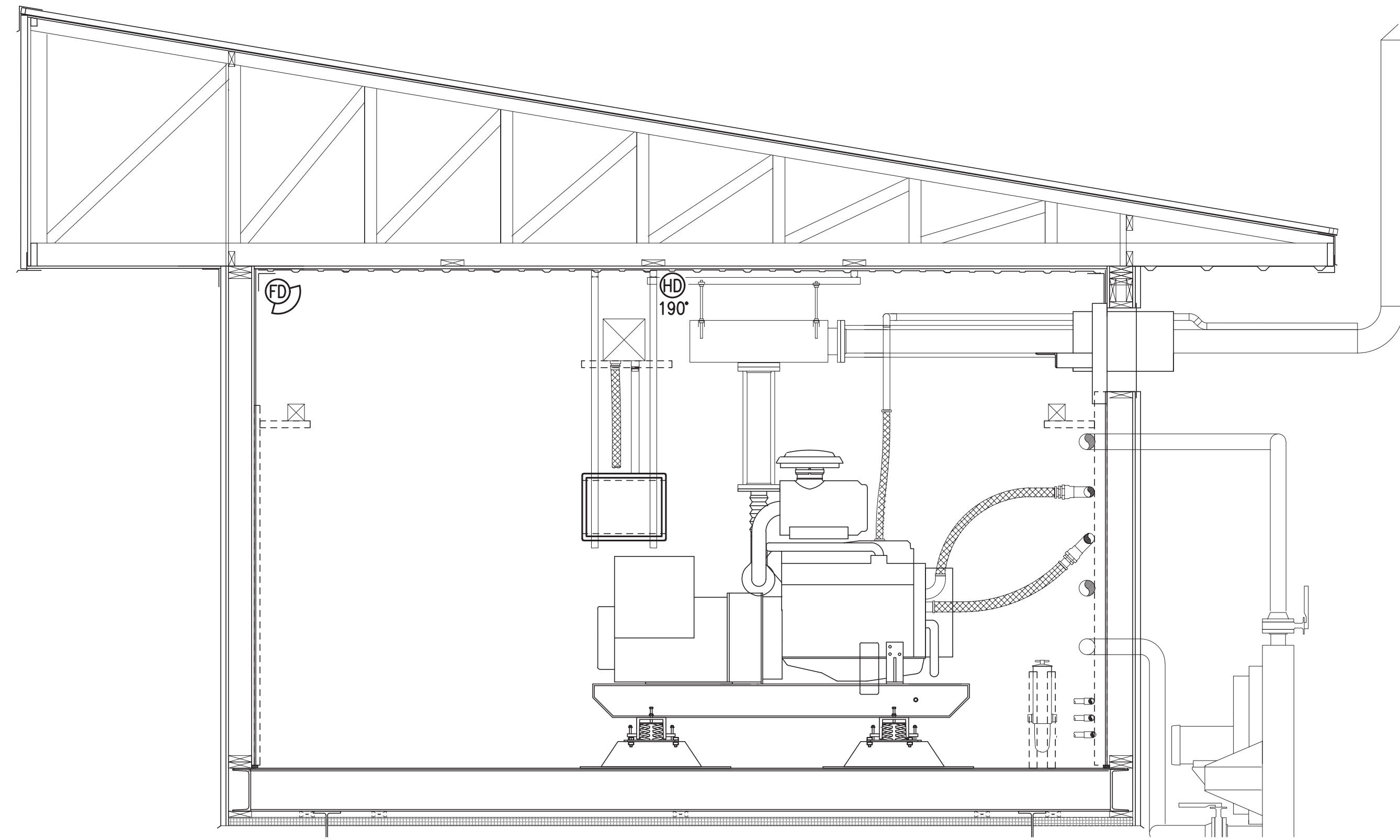
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: BARGE FILL PIPELINES DEMOLITION DETAILS			
 Gray Stassel Engineering, Inc.		DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: NIKO M9 PROJECT NUMBER:	SCALE: AS NOTED DATE: 9/1/21 SHEET: M9.5 OF 9
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

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1 FIRE SUPPRESSION SYSTEM PLAN
FS1 3/8"=1'-0"



2 TYPICAL SECTION THROUGH BUILDING
FS1 3/8"=1'-0"

FIRE SUPPRESSION SYMBOL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
HD135°	NORMAL TEMP. (135°F) DETECTOR	P	MANUAL PULL STATION
HD190°	HIGH TEMP. (190°F) DETECTOR	⊗	INTERIOR ALARM HORN/STROBE
FD	FLAME (OPTICAL) DETECTOR	⊗ WP	EXTERIOR ALARM HORN/STROBE
SD	SMOKE (IONIZATION) DETECTOR		

FIRE SUPPRESSION PLACARD SCHEDULE (SEE SHEET M1.2)	
SYMBOL	DESCRIPTION
A	"FIRE ALARM"
C	"CAUTION, ROOM PROTECTED BY WATER MIST FIRE PROTECTION SYSTEM, IN CASE OF FIRE KEEP DOOR CLOSED AND DO NOT ENTER"
D	"FLASHING LIGHT MEANS FIRE SUPPRESSION AGENT HAS DISCHARGED"


FIRE SUPPRESSION WIRE SCHEDULE			
SYMBOL	CIRCUIT DESCRIPTION	WIRE TYPE	WIRE COLOR
A	24V DC POWER	#14 AWG SOLID	RED & BLACK
B	DETECTION CIRCUITS	#14 AWG SOLID	BLUE & YELLOW
C	ANNUNCIATION ALARM	#14 AWG SOLID	BROWN & ORANGE
D	ANNUNCIATION DISCHARGE	#14 AWG SOLID	WHITE, & GRAY
E	24V DC AUX POWER	#14 AWG SOLID	RED & BLACK WITH GRAY STRIPE

GENERAL NOTES:


- 1) INTERIOR FINISH OF ALL WALLS AND CEILING METAL SIDING. INTERIOR FINISH OF FLOOR WELDED STEEL PLATE. CEILING HEIGHT IN ALL ROOMS 10'-0" ABOVE FINISHED FLOOR.
- 2) ALL DOORS SELF-CLOSING WITH GASKETS. ALL BUILDING PIPING AND CONDUIT PENETRATIONS SEALED LIQUID TIGHT. ALL BUILDING DUCT PENETRATIONS EQUIPPED WITH MOTORIZED DAMPERS THAT CLOSE ON GENERATOR SHUT DOWN.

SPECIFIC NOTES:

- 1) THE HATCHED AREA INDICATES THE PORTION OF THE ZONE WHERE THE SPRAY HEAD TO WALL DISTANCE EXCEEDS 8'-2". THIS AREA DOES NOT CONTAIN ANY COMBUSTIBLE MATERIAL OR SOURCES OF IGNITION. THE HEAD LAYOUT IS DESIGNED TO PROVIDE THE REQUIRED SUPPRESSION FOR THIS ZONE. THE ROOM VOLUME IS WITHIN THE MAXIMUM VOLUME LIMITATION OF THE SYSTEM.

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: FIRE SUPPRESSION SYSTEM PLAN, SECTION, LEGEND, & NOTES			
DRAWN BY: BCG		SCALE: AS NOTED	
DESIGNED BY: BCG		DATE: 9/1/21	
FILE NAME: NIKO FS1		SHEET: FS1 OF 1	
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

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EQUIPMENT REQUIREMENTS FOR APPROVED EQUALS (APPLIES TO ALL SCHEDULES):
 SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO
 COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED
 ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM
 MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL
 AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

ELECTRICAL EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
1	DAY TANK ALARM HORN/STROBE	MULTI-TONE ALARM WITH STROBE, 115V, NEMA 3R, WEATHER RESISTANT SURFACE MOUNT BELL BOX	WHEELLOCK MT4-115-WH-VNS
2	DIGITAL THERMOSTAT	MULTIPLE OUTPUT MODULATING DIGITAL THERMOSTAT	HONEYWELL TB7980B
3	NOT USED	NOT USED	NOT USED
4	EXTERIOR LIGHT	AREA LIGHT, WIDE DISPERSION WALL PACK WITH PHOTO CONTROL. LED, 17.7W, 120-277V DRIVER	HUBBELL NRG-356L-5K-U-PC
5	EMERGENCY LIGHT	WHITE PLASTIC ENCLOSURE, 120-347V INPUT, DUAL 5.3W LED LAMPS, LITHIUM IRON PHOSPHATE BATTERY	LITHONIA EML6L UVOLT LTP SRDT
6	EMERGENCY/EXIT LIGHT COMBO	WHITE PLASTIC ENCLOSURE, RED EXIT SIGN, 277/120V INPUT, DUAL 1.5W 9.6V LED LAMPS. OPTIONAL HIGH OUTPUT NI-CAD BATTERY	LITHONIA LHQM LED R HO
7	EMERGENCY EXIT REMOTE LIGHT	REMOTE LAMP FIXTURE, DUAL HEAD, RATED FOR EXTERIOR INSTALLATION IN DAMP/WET LOCATIONS, 1.5W 9.6V LED LAMPS.	LITHONIA ELA T QWP L0309
8	INTERIOR LIGHT	SURFACE MOUNTED LED STRIPLIGHT FIXTURE, 48" LONG, 34W, 5000K WITH SNAP ON FROSTED DIFFUSER	LITHONIA L1N-L48-5000LM-FST
9	TIMER SWITCH	0-5 MINUTE, 120V, 20A, 1HP RATED, INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER.	INTERMATIC FF5M
10	LIGHT SWITCH	SINGLE POLE SNAP SWITCH, 120V, 20A, METAL, 1-1/2HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER, IVORY.	HUBBELL 1221-1
11	1Ø SMALL MOTOR DISCONNECT	SINGLE POLE SNAP SWITCH WITH RED PILOT LIGHT, 120V, 20A, 1HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	HUBBELL 1221-PL
12	NOT USED	NOT USED	
13	STATION SERVICE TRANSFORMER	DRY TYPE, ENERGY STAR, ENCLOSURE TYPE 1 WITH INTEGRAL WALL MOUNT BRACKETS, 15 kVA, HV 480 DELTA, LV 208Y/120	HAMMOND HPS SENTINEL CAT. NO. SG3A0015KB
14	STATION SERVICE PANELBOARD	COPPER BUS, 3 PHASE, 4 WIRE, 120/208V, 125A MAIN BREAKER, 30 CIRCUITS, BOLT-IN BREAKERS, SURFACE MOUNT, NEMA 1	SIEMENS OR SQUARE D
15	STANDARD RECEPTACLE	SURFACE MOUNT 125V NEMA 5-20R RECEPTACLE. INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	PASS & SEYMOUR 5362W
16	EXTERIOR GFCI RECEPTACLE	125V NEMA 5-20R GFCI RECEPTACLE. MOUNT IN CAST FDA BOX WITH WEATHERPROOF COVER	PASS & SEYMOUR 2095-W
17	BATTERY CHARGER	12/24-VOLT SOLID STATE 20-AMP AUTO-EQUALIZING BATTERY CHARGER FOR 120 VAC INPUT, WITH OPTIONAL HIGH/LOW VOLTAGE, AC POWER FAILURE, & REMOTE SUMMARY ALARM RELAYS	SENS NRG22-20-RCLS OR LEMARCHE ECSR-40/20-12/24V-AV1
18	WELDER/COMPR. RECEPTACLE	NEMA 6-30R, BLACK, 250V, 30A, 2 POLE, WITH GROUND. INSTALL IN DEEP 4"x4" STEEL BOX WITH 2.15"Ø HOLE METAL COVER	PASS & SEYMOUR 3801
19	NOT USED	NOT USED	NOT USED
20	RADIATOR MOTOR DISCONNECT	NON-FUSED LOCKABLE SAFETY SWITCH, NEMA 3R ENCLOSURE, 3PST, 600V, 30A, MIN 5HP RATED	SIEMENS HNF361R OR SQUARE D HU361R
21	24VAC CONTROL TRANSFORMER	120V PRIMARY, 24V SECONDARY, 75VA OUTPUT, PLATE MOUNT, INSTALL ON 4"x4" PRESSED STEEL BOX	HONEYWELL AT175A1008
22	ENCLOSED POWER RELAY (RIB)	20A, 1HP RATED CONTACT, SPDT, 24VAC COIL, NEMA 1 ENCLOSURE, RED LED PILOT LIGHT	FUNCTIONAL DEVICES RIB2401B
23	SNAP SWITCH WITH THERMAL UNIT	600VAC, 1HP, 16A MANUAL MOTOR STARTER WITH TYPE S, TYPE A, MELTING ALLOY, CLASS 20 THERMAL UNIT	SQUARE D 2510F01 MOTOR STARTER WITH A14.8 THERMAL UNIT
24	ROUTER - HIGH SPEED INTERNET	4-PORT GIGABIT ROUTER, DUAL 2.4 AND 5 GHz WIFI WITH ADJUSTABLE ANTENNAS, 4 GIGABIT LAN, 1 GIGABIT WAN, USB 2.0 AND USB 4.0, MINIMUM 256 MB RAM	ASUS RT-ACI-900P

ELECTRICAL CONDUCTOR SCHEDULE

SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
GENERATOR LEADS & FEEDERS (480V) (ENGINE STARTER CABLES SIMILAR)	HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE, TIN COATED COPPER CONDUCTOR. THERMOSET EPDM INSULATION, UL 3340/3374, MINIMUM 600V, LISTED 150°C FOR NON-FLEXING	COBRA CABLE, BELDEN, OR OMNI	TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT 150°C.
GENERAL USE CONDUCTORS	CLASS B CONCENTRIC STRANDED, SOFT DRAWN COPPER. TYPE XHHW2 INSULATION, 600V AND 90C RATED.		
SHIELDED/TWISTED INSTRUMENT & CONTROL & CANBUS CONDUCTORS	#18 AWG STRANDED TINNED COPPER CONDUCTORS, 600V POLYETHYLENE INSULATION, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE & PVC OUTER JACKET	BELDEN PART #'S SINGLE PAIR: #1120A FOUR PAIR: #1049A SINGLE TRIAD: #1121A	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY.
EHTERNET (CAT5e) COMMUNICATION CONDUCTORS	SOLID BARE COPPER CONDUCTORS, 300V FEP INSULATION & JACKET, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE	FOUR PAIR #24 BELDEN 1585LC	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY. ROUTE ALL DEVICENET & CAT5e CABLES IN SEPARATE DEDICATED RACEWAY.
DIRECT BURY TELEPHONE CABLE	RUS APPROVED PE-39 DIRECT BURY EXCHANGE CABLE. HDPE INSULATION, ETPR FILLED POLYETHYLENE JACKET	SIX PAIR #24 GENERAL 7525058	

COLOR CODING - UNLESS SPECIFICALLY INDICATED OTHERWISE COLOR CODE CONDUCTORS AS FOLLOWS:
 480-VOLT POWER CONDUCTORS
 PHASE A - BROWN
 PHASE B - ORANGE
 PHASE C - YELLOW
 NEUTRAL - WHITE WITH YELLOW STRIPE
 120/208-VOLT POWER CONDUCTORS
 PHASE A - BLACK
 PHASE B - RED
 PHASE C - BLUE
 NEUTRAL - WHITE
 24 VOLT DC CONDUCTORS
 +24VDC - RED or RED WITH GRAY STRIPE
 -24VDC - BLACK or BLACK WITH GRAY STRIPE
 CONTROL & INSTRUMENT CONDUCTORS
 COLOR CODED PER MANUFACTURER'S STANDARD

NOTES:
 1) FOR NO. 6 AWG AND SMALLER CONDUCTORS COLOR CODING SHALL BE PROVIDED BY USING CONDUCTORS WITH CONTINUOUS COLOR EMBEDDED IN THE INSULATION. FOR ALL CONDUCTORS LARGER THAN NO. 6 SCOTCH 35 MARKING TAPE OR EQUIVALENT MAY BE USED TO COLOR CODE THE CABLE. WHERE MARKING TAPE IS USED THE CABLE SHALL BE IDENTIFIED AT EVERY ACCESSIBLE LOCATION. PROVIDE A MINIMUM OF 2 INCHES OF TAPE AT EACH LOCATION.
 2) GROUNDING - PROVIDE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN EACH RACEWAY. DO NOT USE THE CONDUIT AS AN EQUIPMENT GROUNDING CONDUCTOR. EQUIPMENT GROUNDING CONDUCTORS SHALL BE OF THE SAME TYPE AS THE PHASE CONDUCTORS AND SHALL BE SIZED AS INDICATED ON THE DRAWINGS. CONDUCTORS NOT INDICATED SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

WIRING & DEVICE SYMBOL LEGEND

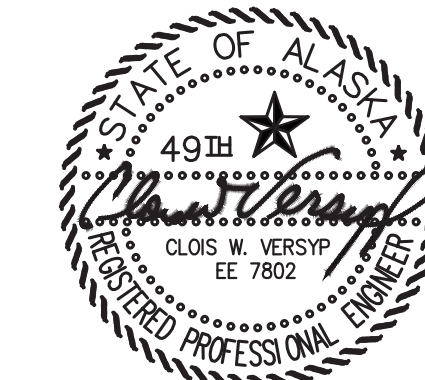
SYMBOL	DESCRIPTION
SS-##	HOME RUN TO PANEL & BREAKER(S) INDICATED. SHORT DASH INDICATES HOT CONDUCTOR, LONG DASH INDICATES NEUTRAL CONDUCTOR, CURVED DASH INDICATES GROUND CONDUCTOR. IF NOT SPECIFICALLY INDICATED, PROVIDE 2#12 AWG & 1#12 AWG GROUND.
⚡	ELECTRICAL ITEM - SEE EQUIPMENT SCHEDULE
1/4	MOTOR (HORESPOWER INDICATED)
MD	MOTORIZED DAMPER - SEE MECHANICAL
⊖	125V, 20A, DUPLEX RECEPTACLE
T	LINE VOLTAGE THERMOSTAT
DT	DIGITAL THERMOSTAT, MODULATING
\$	SNAP SWITCH / SMALL MOTOR DISCONNECT
T\$	TIMER SWITCH
⏚	GROUND


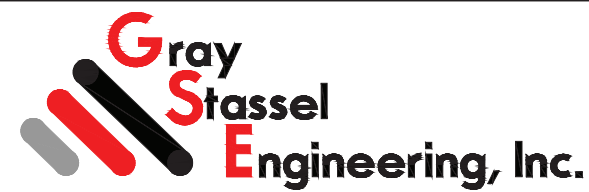
INSTRUMENTATION & ENERGY MEASUREMENT LEGEND

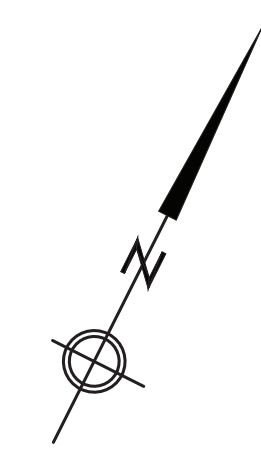
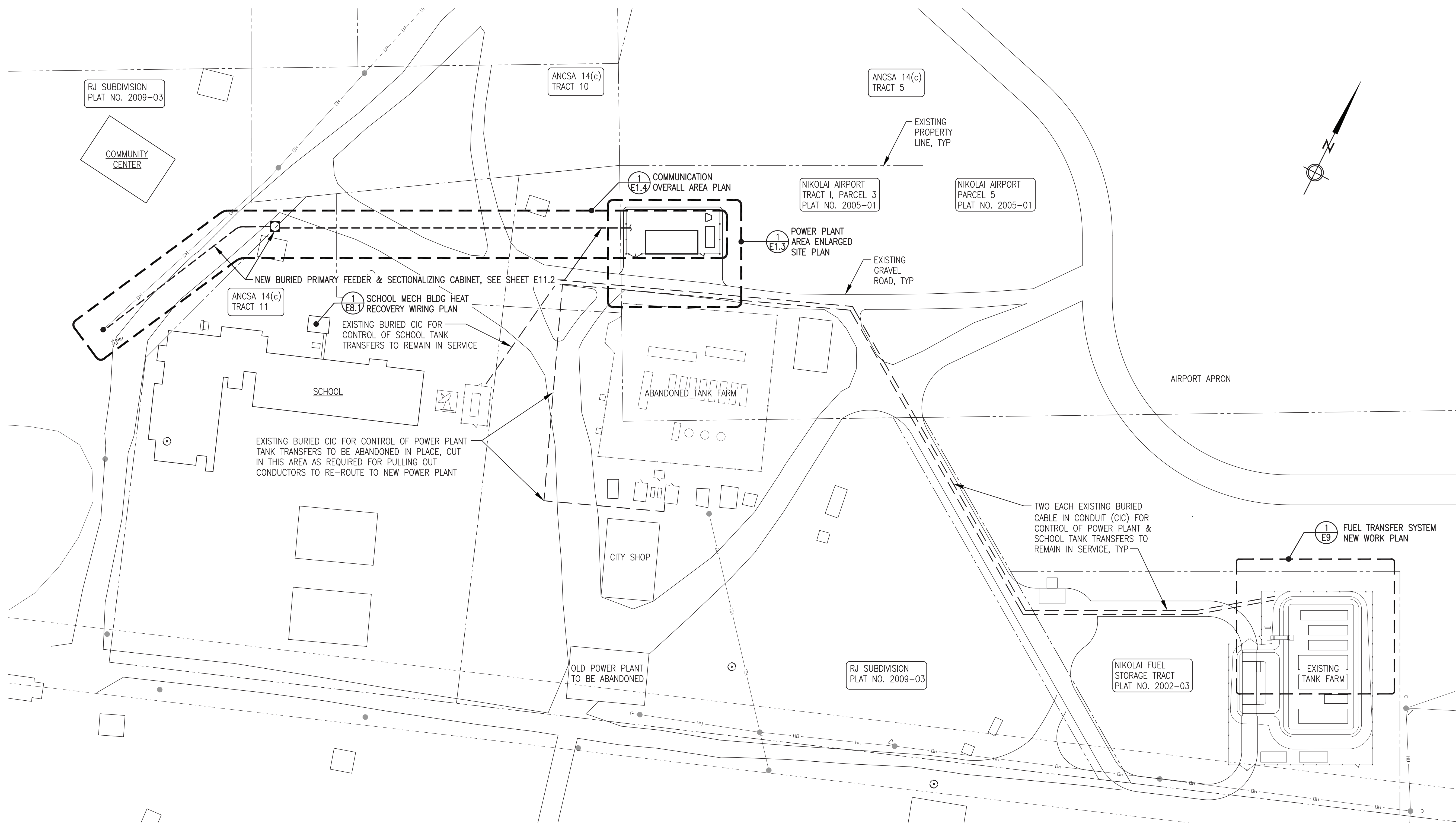
NOTE: SEE SCHEDULES SHEET M1.1 FOR EQUIPMENT SPECIFICATIONS.

SYMBOL	SERVICE/FUNCTION	SYMBOL	SERVICE/FUNCTION
Ⓣ	TEMPERATURE TRANSMITTER	Ⓛs	INTERMEDIATE TANK TWO POINT FLOAT SWITCH
Ⓟ	PRESSURE TRANSMITTER	Ⓛm	TANK LEVEL MONITOR PANEL
Ⓜ	HEAT RECOVERY FLOW METER	Ⓛsp	FUEL/OIL TANK LEVEL SENSOR PROBE
Ⓛca	GLYCOL TANK LOW COOLANT ALARM	Ⓛem	END USER ENERGY METER
Ⓛsl	GLYCOL TANK LEVEL SENSOR PROBE	Ⓛefm	END USER ENERGY FLOW METER
Ⓛfs	DAY TANK/HOPPER FLOAT SWITCH	Ⓛrt	END USER ENERGY RTD


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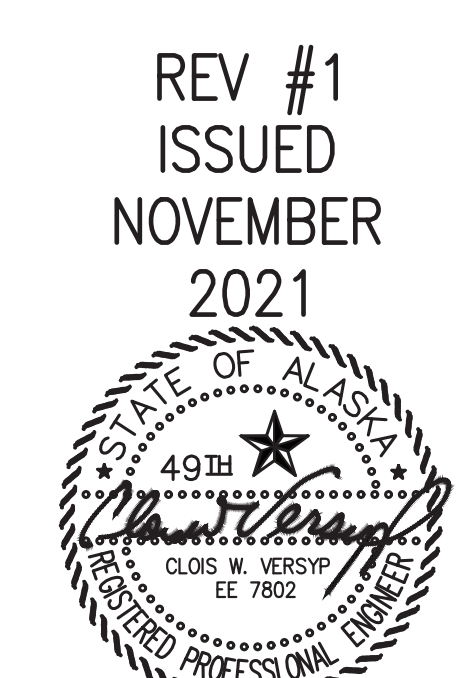


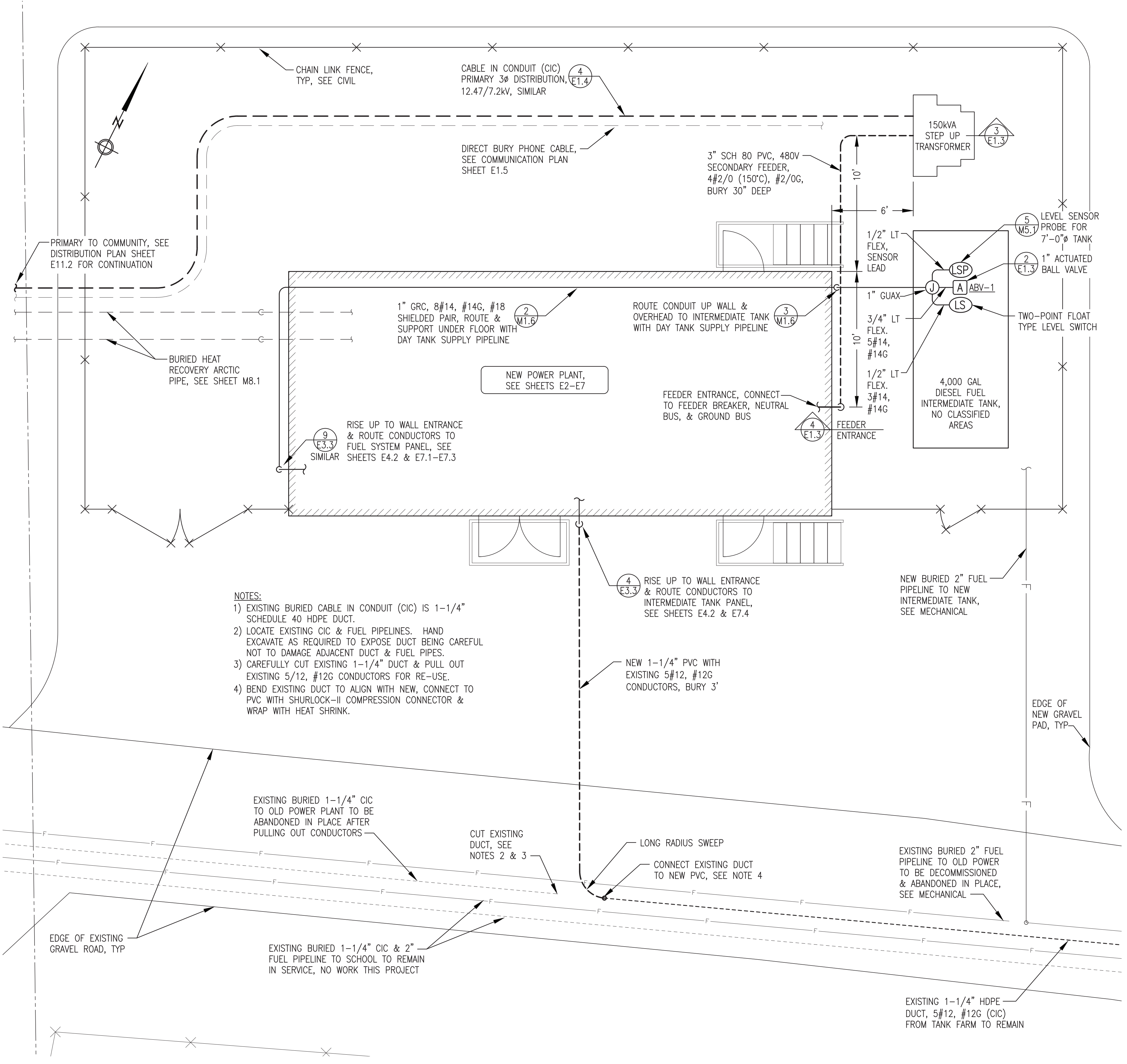
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: ELECTRICAL LEGENDS & SCHEDULES			
 Gray Stassel Engineering, Inc.		DRAWN BY: JTD SCALE: NO SCALE	
P.O. 111405, Anchorage, AK 99511 (907)349-0100		DESIGNED BY: CWV/BCG DATE: 9/1/21	
PROJECT NUMBER:		SHEET: E1.1 OF 9	



1 OVERALL PROJECT AREA PLAN
E1.2 1"=40'

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: OVERALL PROJECT AREA PLAN			
DRAWN BY: JTD		SCALE: NO SCALE	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E1		SHEET: E1.2 OF 9	
PROJECT NUMBER: P.O. 111405, Anchorage, AK 99511 (907)349-0100			

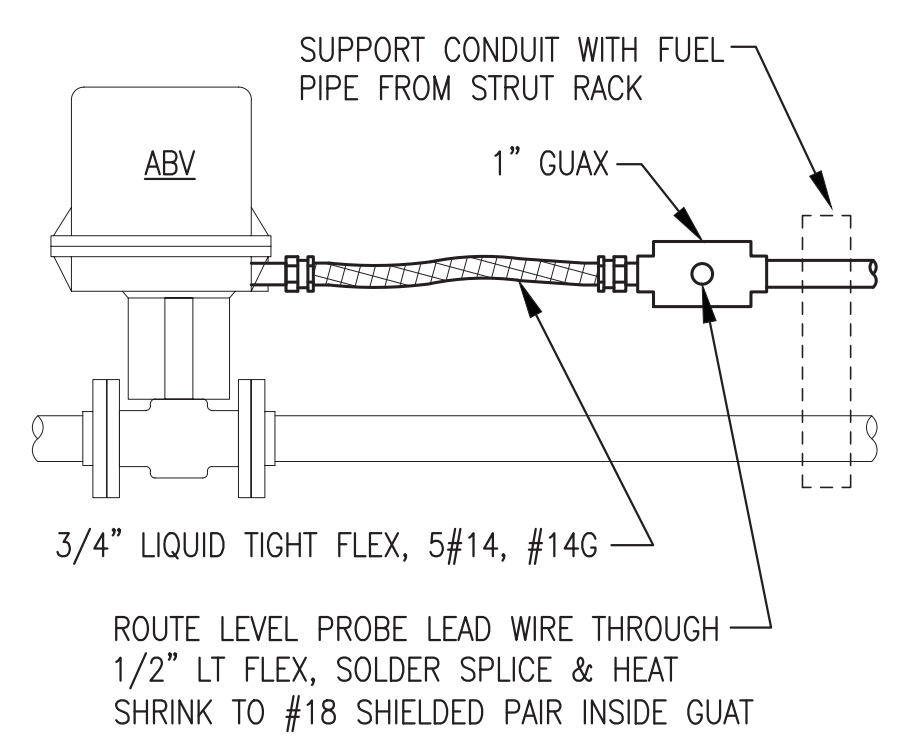




- NOTES:**
- 1) EXISTING BURIED CABLE IN CONDUIT (CIC) IS 1-1/4" SCHEDULE 40 HDPE DUCT.
 - 2) LOCATE EXISTING CIC & FUEL PIPELINES. HAND EXCAVATE AS REQUIRED TO EXPOSE DUCT BEING CAREFUL NOT TO DAMAGE ADJACENT DUCT & FUEL PIPES.
 - 3) CAREFULLY CUT EXISTING 1-1/4" DUCT & PULL OUT EXISTING 5/12, #12G CONDUCTORS FOR RE-USE.
 - 4) BEND EXISTING DUCT TO ALIGN WITH NEW, CONNECT TO PVC WITH SHURLOCK-II COMPRESSION CONNECTOR & WRAP WITH HEAT SHRINK.

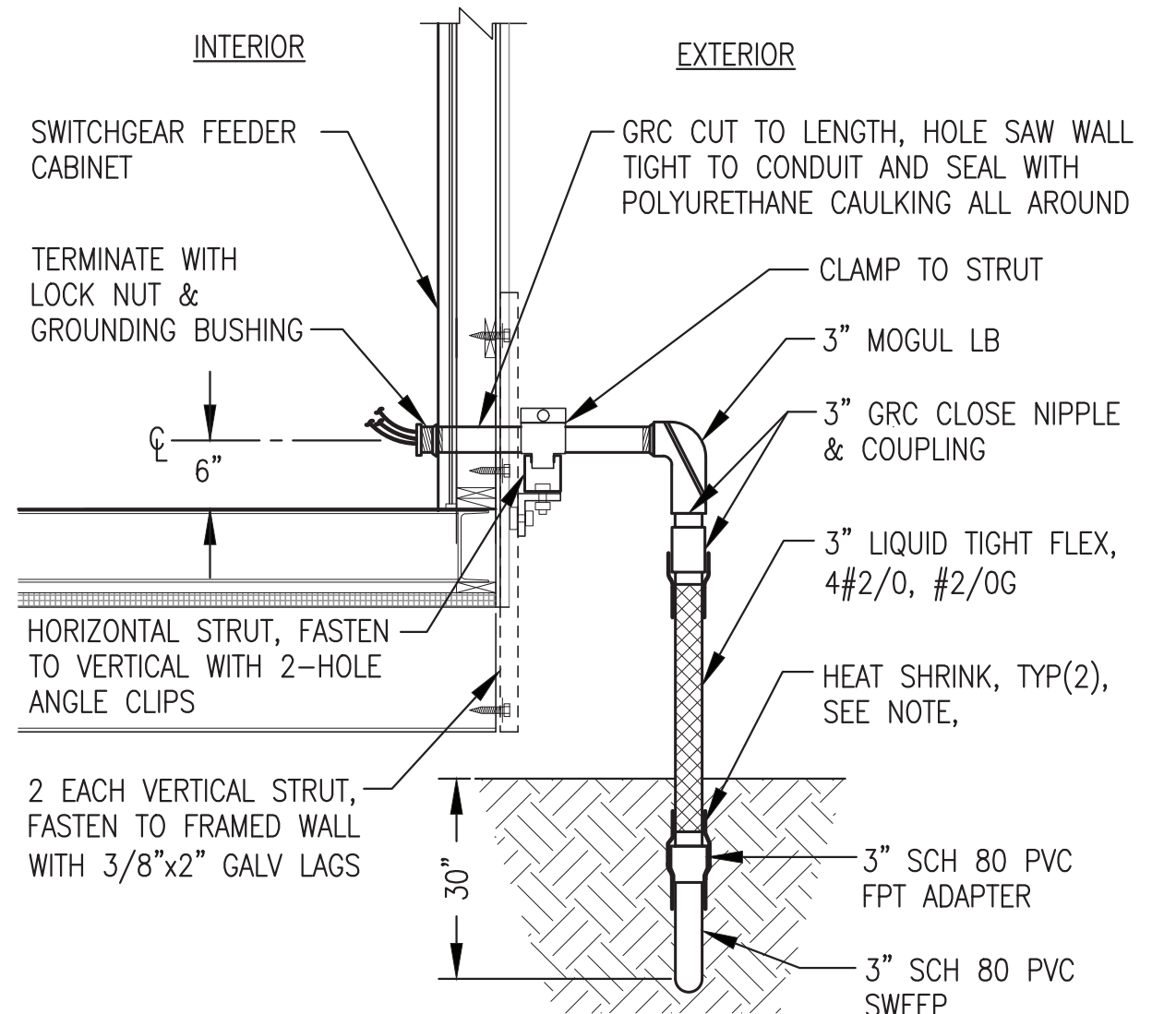
1 POWER PLANT AREA ENLARGED SITE PLAN
E1.3 1"=4'

- NOTES:**
- 1) ACTUATED BALL VALVE CONTROLLED FROM FUEL SYSTEM CONTROL PANEL IN POWER PLANT, SEE LOGIC DIAGRAM SHEET E7.1 FOR CONDUCTOR TERMINATIONS.
 - 2) SEE MECHANICAL FOR ACTUATED BALL VALVE SPECIFICATIONS & INSTALLATION.



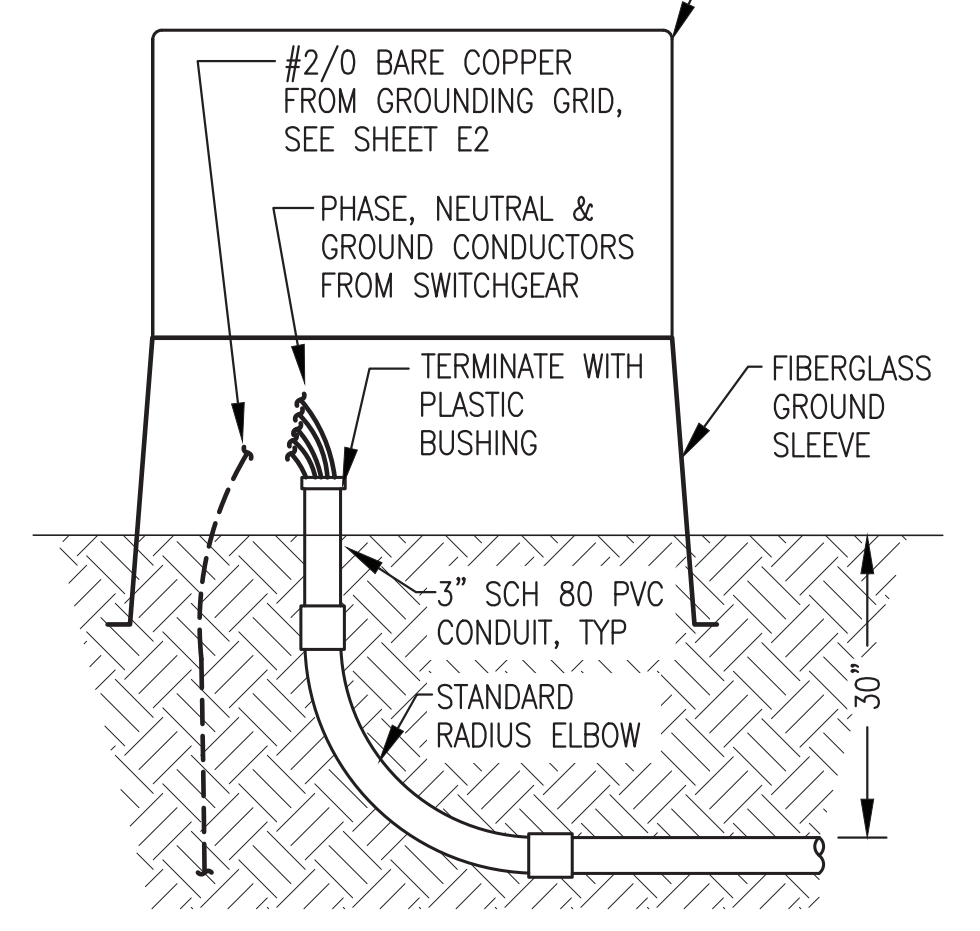
2 ACTUATOR VALVE CONNECTION
E1.3 NO SCALE

NOTE: INSTALL HEAT SHRINK TO FORM WATERTIGHT SEAL FROM FLEX ON TO GRC & FROM FLEX ON TO PVC CONDUIT.



4 MAIN FEEDER BUILDING ENTRANCE
E1.3 NO SCALE

PAD MOUNT 300kVA STEP-UP TRANSFORMER, 277/480V WYE TO 7200/12470 WYE, PROVIDE TRANSFORMER GROUNDING IN ACCORDANCE WITH RUS CONSTRUCTION UNIT UM48-2

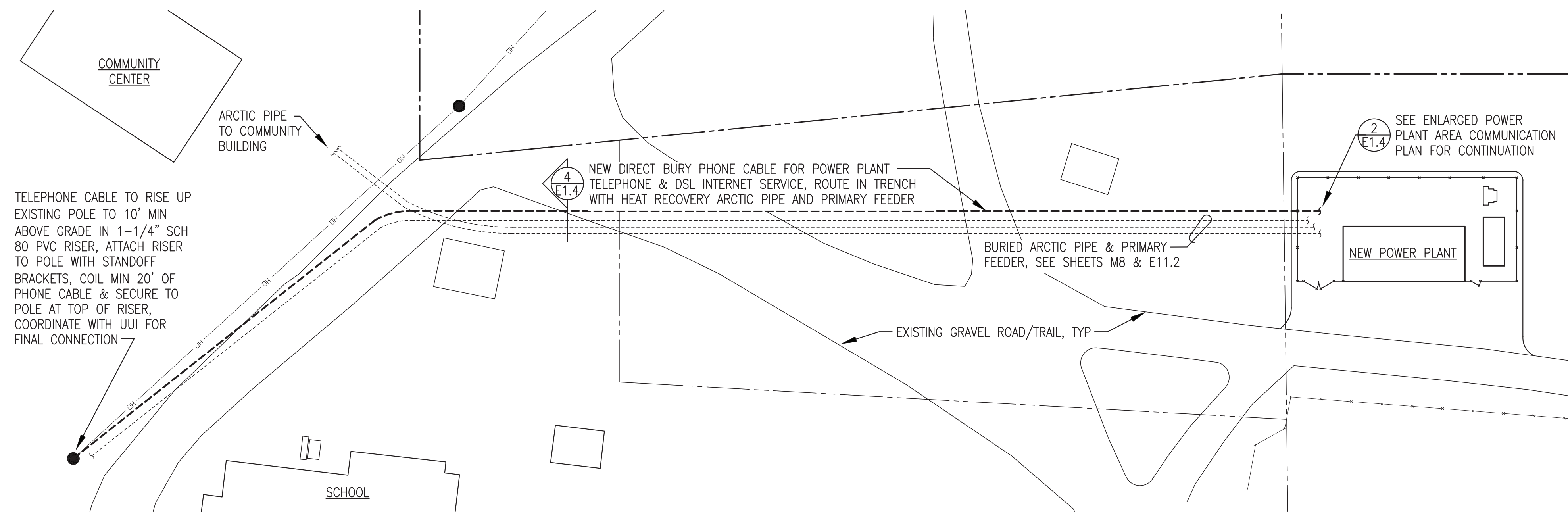


3 TRANSFORMER INSTALLATION
E1.3 NO SCALE

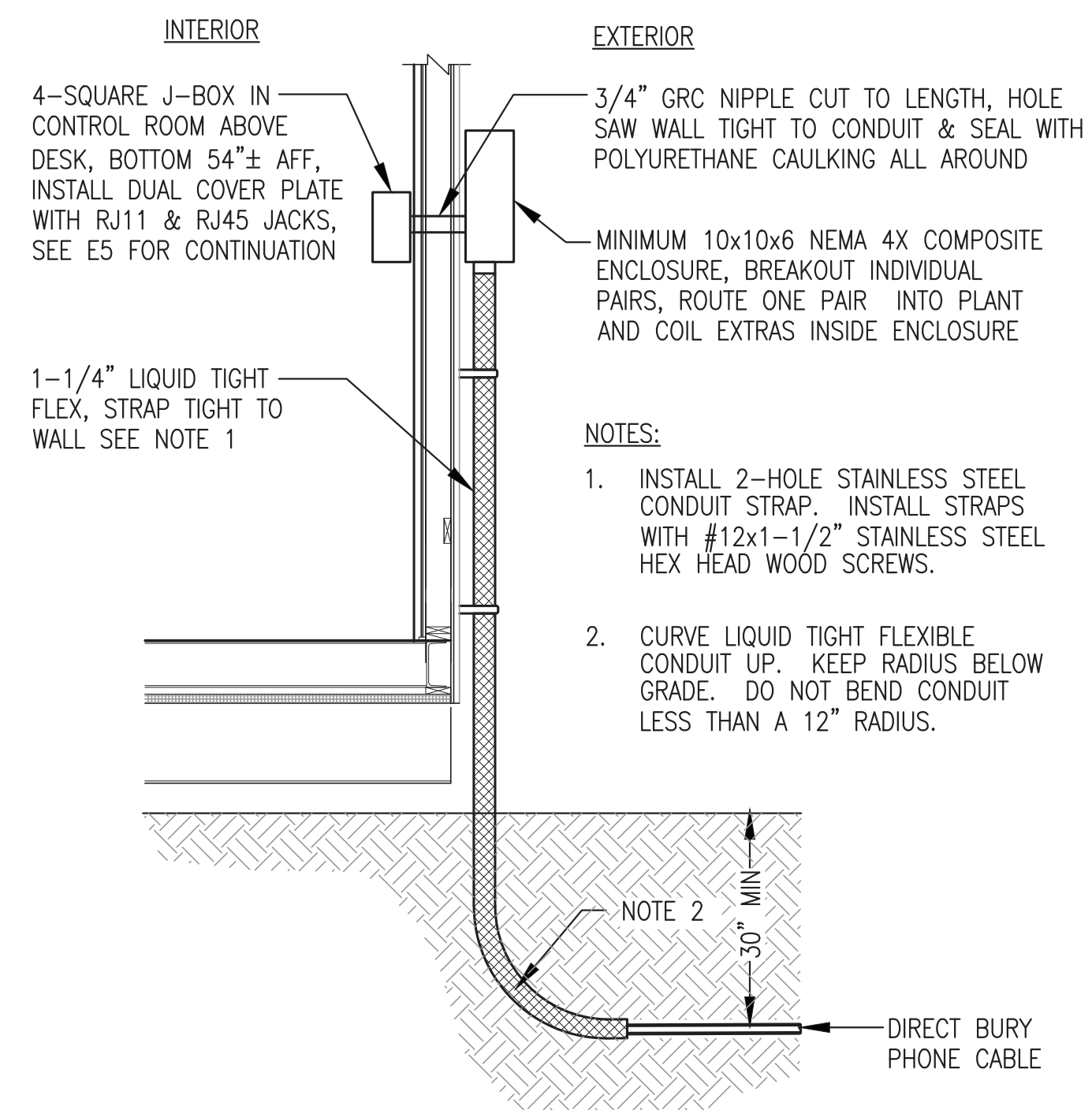
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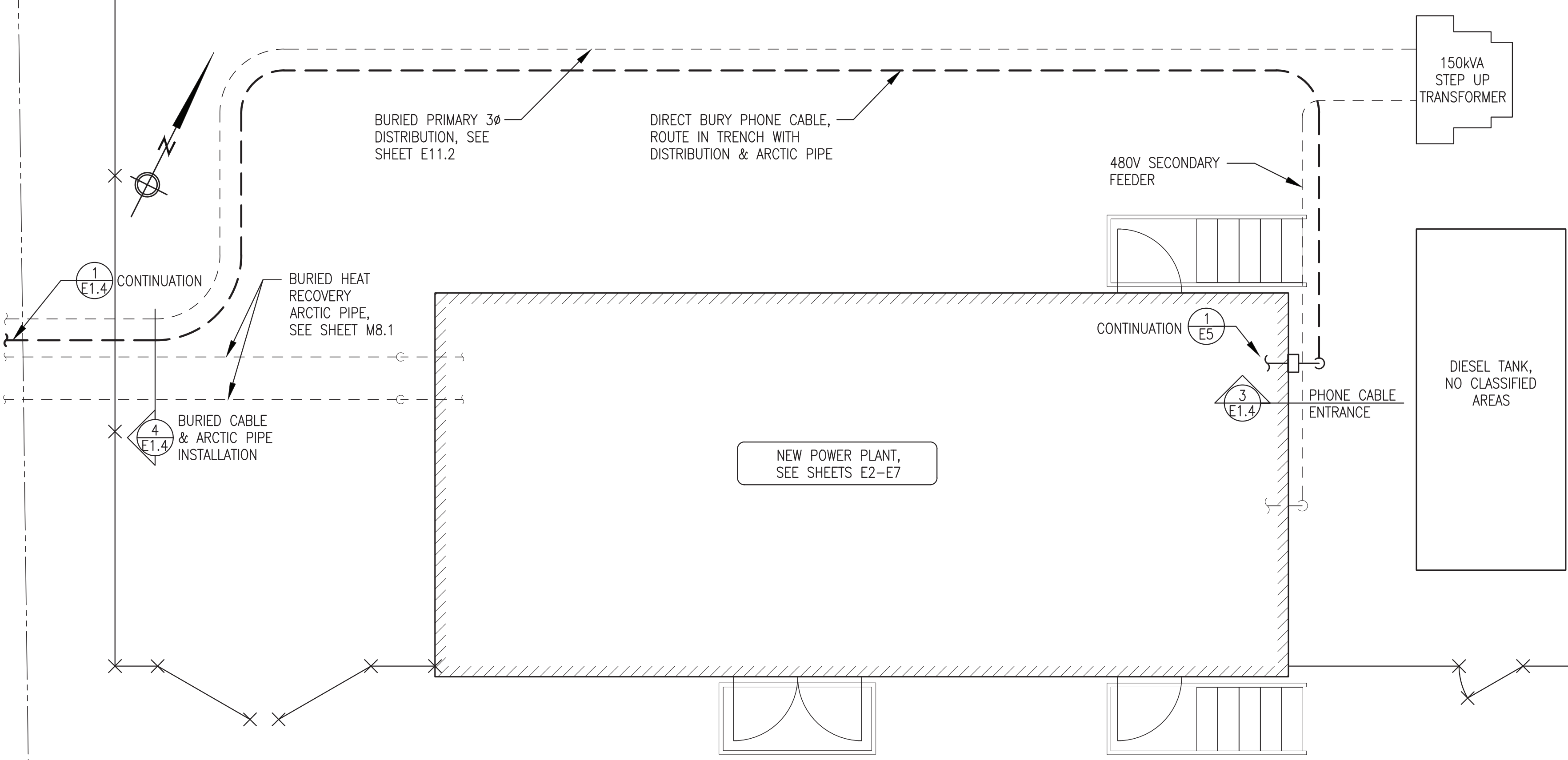
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: POWER PLANT AREA ENLARGED SITE PLAN & DETAILS			
DRAWN BY: JTD		SCALE: NO SCALE	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E1		SHEET: E1.3 OF 9	
PROJECT NUMBER:			
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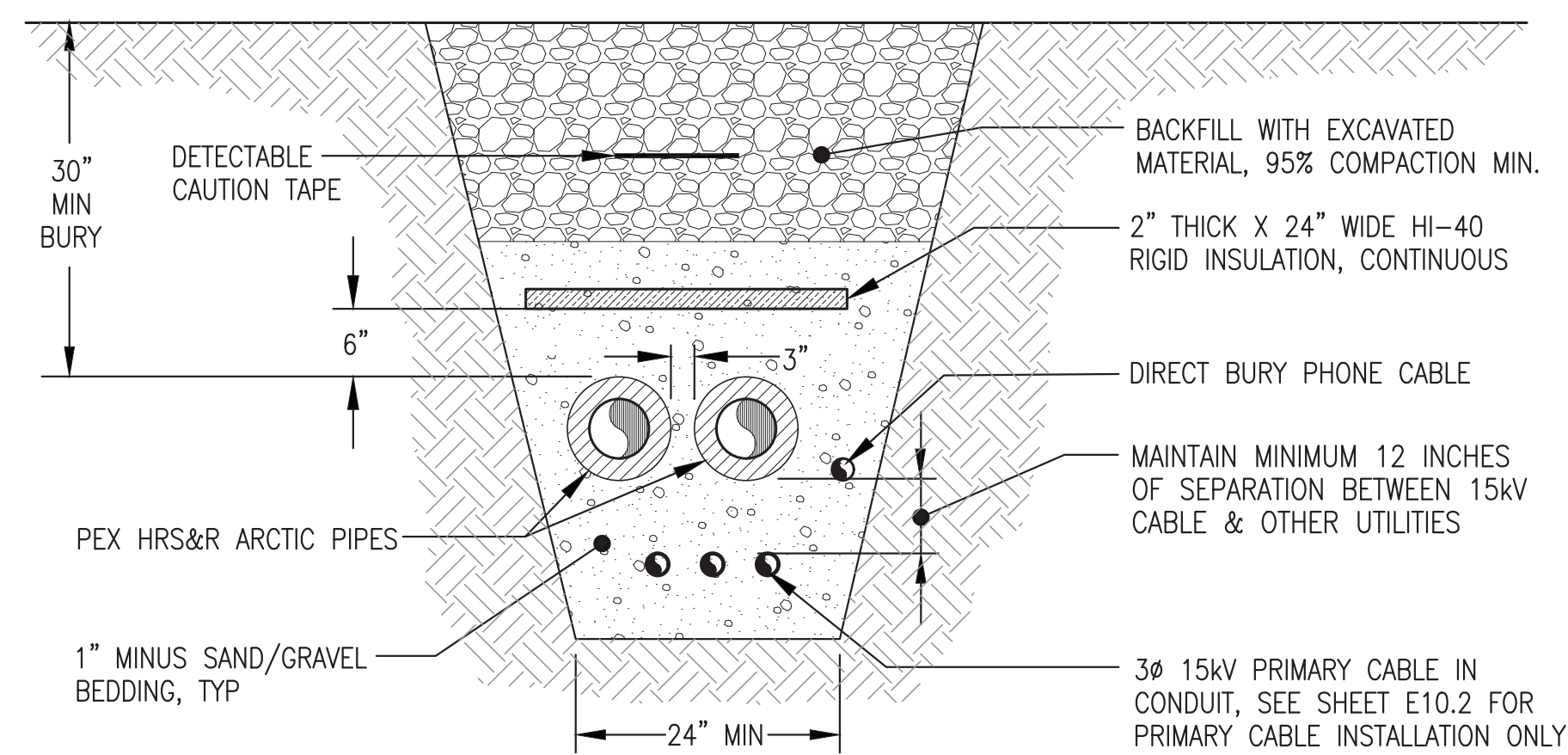
1 COMMUNICATION OVERALL AREA PLAN
E1.4 1"=25'



3 PHONE CABLE BUILDING ENTRANCE
E1.4 NO SCALE



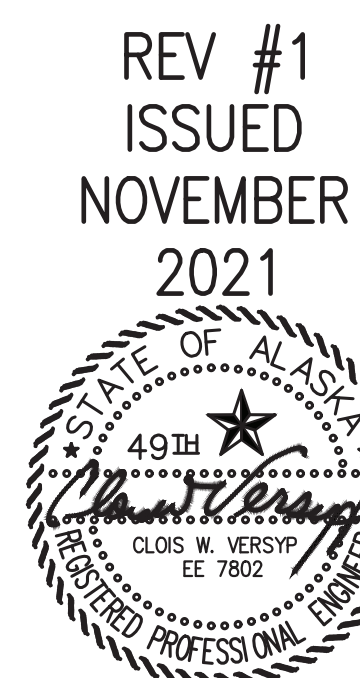
2 ENLARGED POWER PLANT AREA COMMUNICATION PLAN
E1.4 1"=4'



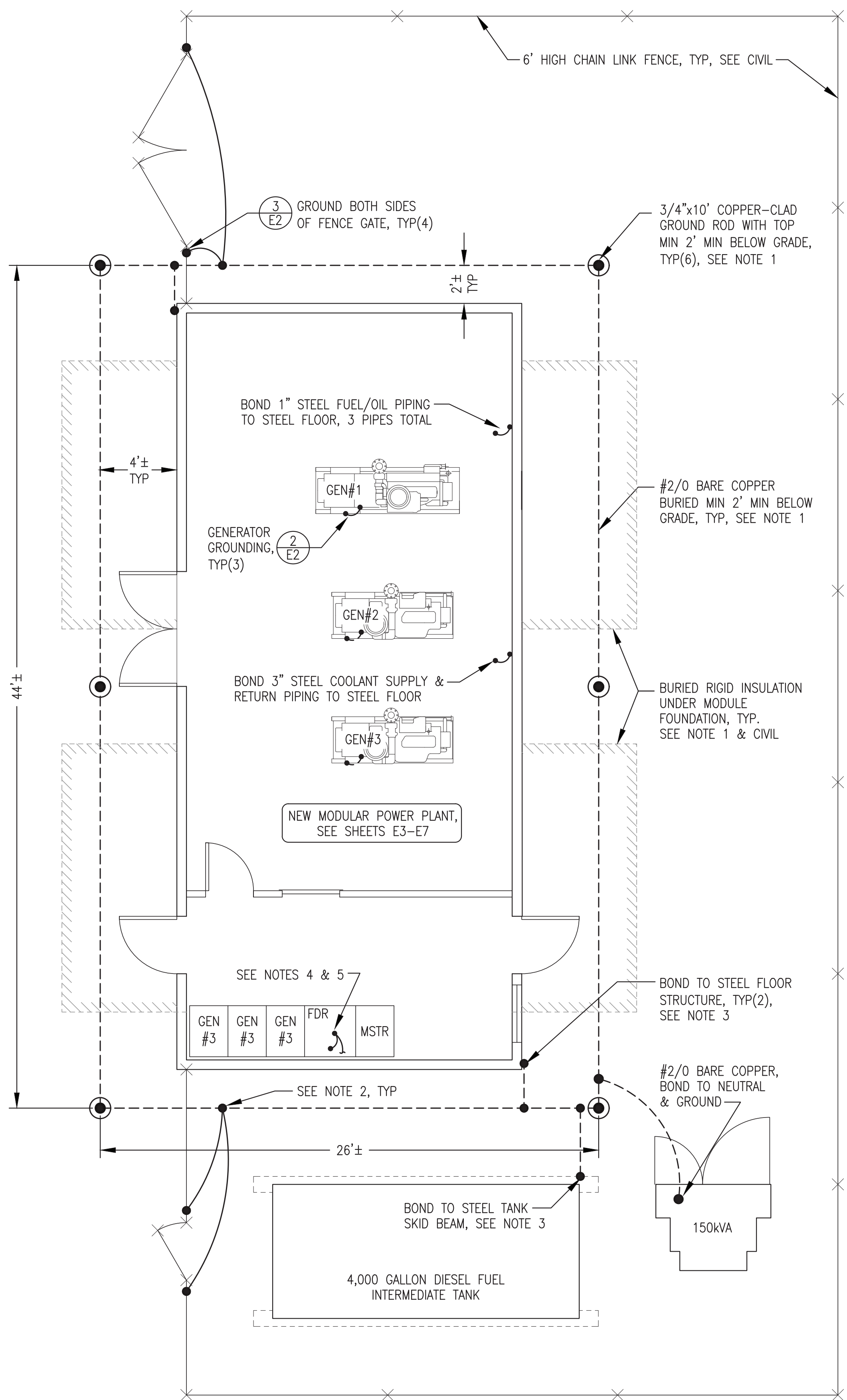
4 TYPICAL BURIED ARCTIC PIPE INSTALLATION
E1.4 NO SCALE

TELEPHONE LAND LINE & DSL INTERNET SERVICE GENERAL NOTES:

1) FURNISH AND INSTALL COMPLETE SYSTEM WITH TELEPHONE, EQUIPMENT, MODEM, JACKS, CABLES, AND ACCESSORIES REQUIRED TO PROVIDE DEDICATED TELEPHONE AND DSL INTERNET SERVICE.	3) THE LAND LINE TELEPHONE SERVICE SHALL HAVE UNLIMITED LOCAL SERVICE. LONG DISTANCE SERVICE SHALL BE AVAILABLE UNDER A SEPARATE PLAN.
2) THE INTERNET SERVICE SHALL HAVE THE FOLLOWING MINIMUM PERFORMANCE CHARACTERISTICS: 1.0 MBPS DOWNLOAD 256 KBPS UPLOAD 10 GB MONTHLY DATA LIMIT UNITED UTILITIES INC 1MBPS/256KBPS PLAN OR APPROVED EQUAL.	4) UPON COMPLETION OF INSTALLATION THE TELEPHONE AND INTERNET SYSTEM SHALL BE COMMISSIONED IN ACCORDANCE WITH THE SERVICE PROVIDER'S REQUIREMENTS.
	5) IN ADDITION TO FURNISHING AND INSTALLING SYSTEMS, THE CONTRACTOR SHALL PRE-PAY FOR A 1 YEAR SERVICE CONTRACT FOR LOCAL TELEPHONE AND INTERNET.

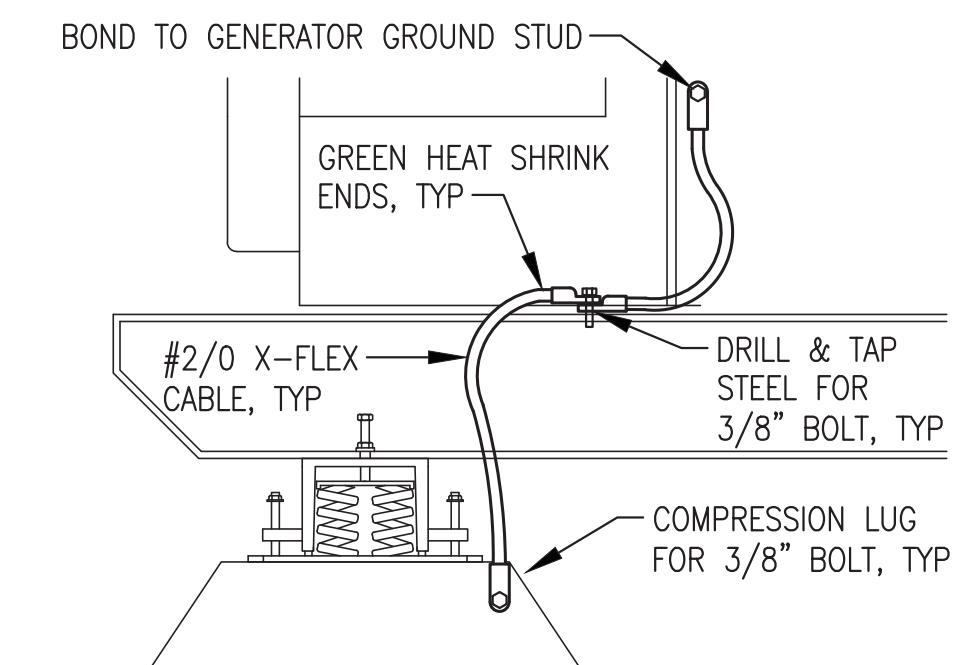


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: COMMUNICATION PLANS & DETAILS			
DRAWN BY: JTD		SCALE: NO SCALE	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E1		SHEET: E1.4 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

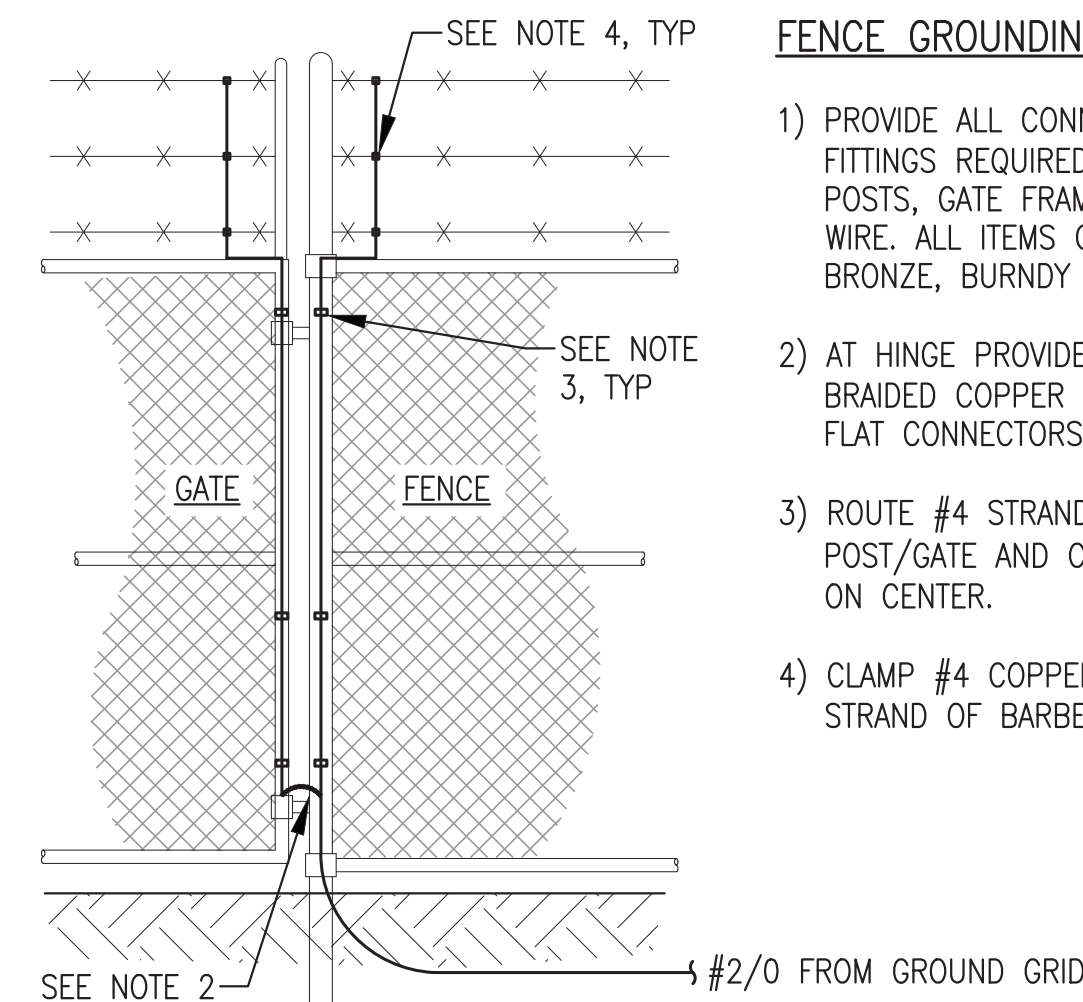


GROUNDING NOTES:

- 1) GRAVEL PAD INCLUDES LAYER OF RIGID INSULATION BELOW GRADE. COORDINATE WITH PAD CONSTRUCTION TO INSTALL GROUND GRID PRIOR TO AND BELOW INSULATION LAYER.
- 2) CAD-WELD ALL GROUNDING GRID CABLE AND GROUND ROD CONNECTIONS.
- 3) MAKE ALL CONNECTIONS TO STRUCTURES AND SKID BEAMS WITH COPPER COMPRESSION LUGS AND STAINLESS STEEL BOLTS. DRILL AND TAP STRUCTURAL MEMBERS AND GRIND OFF PAINT AS REQUIRED TO ENSURE FULL CONTACT.
- 4) TEMPORARILY BOND SWITCHGEAR NEUTRAL BUS TO GROUND BUS FOR LOAD BANK TESTING AS REQUIRED. REMOVE JUMPER AFTER TESTING AND PRIOR TO COMMISSIONING.
- 5) IN FEEDER SECTION TERMINATE #2/0G FROM TRANSFORMER ON GROUND BUS, SEE FEEDER DETAILS SHEET E1.3. IN ADDITION, PROVIDE #2/0 JUMPER FROM GROUND BUS TO STEEL FLOOR.



2 GENERATOR GROUNDING
NO SCALE



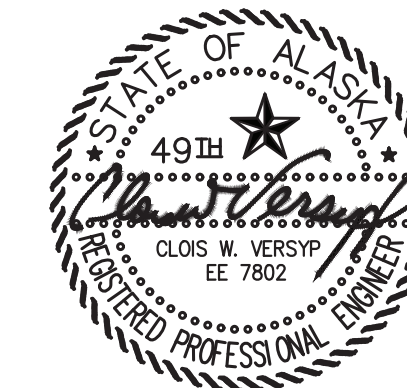
3 TYPICAL FENCE GROUNDING DETAIL
NO SCALE



FENCE GROUNDING NOTES:

- 1) PROVIDE ALL CONNECTORS AND FITTINGS REQUIRED TO BOND POSTS, GATE FRAME, AND BARBED WIRE. ALL ITEMS COPPER OR BRONZE, BURNDY OR EQUAL.
- 2) AT HINGE PROVIDE 24" TYPE "B" BRAIDED COPPER STRAP WITH FLAT CONNECTORS.
- 3) ROUTE #4 STRANDED COPPER UP POST/GATE AND CLAMP AT 2± ON CENTER.
- 4) CLAMP #4 COPPER TO EACH STRAND OF BARBED WIRE.

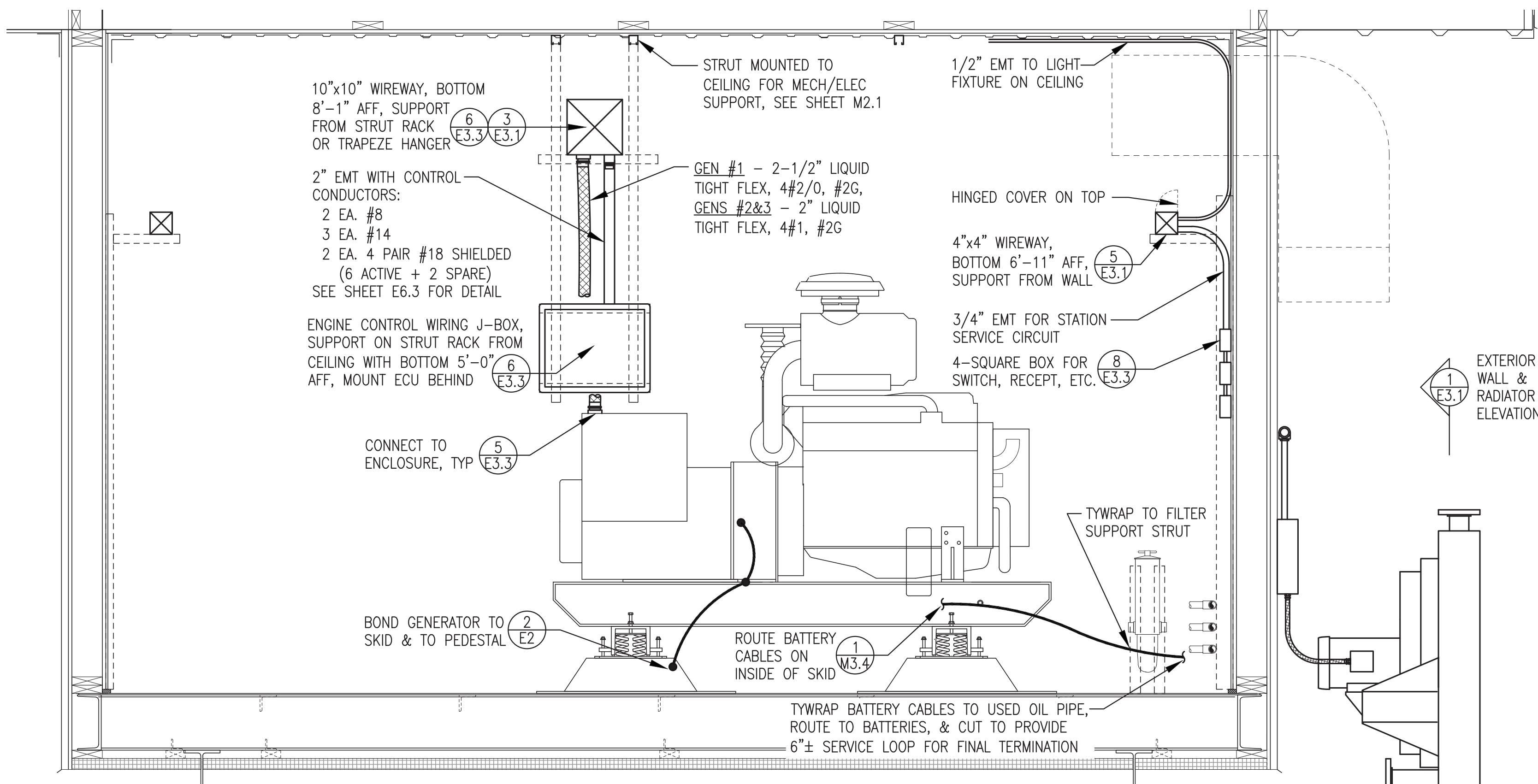
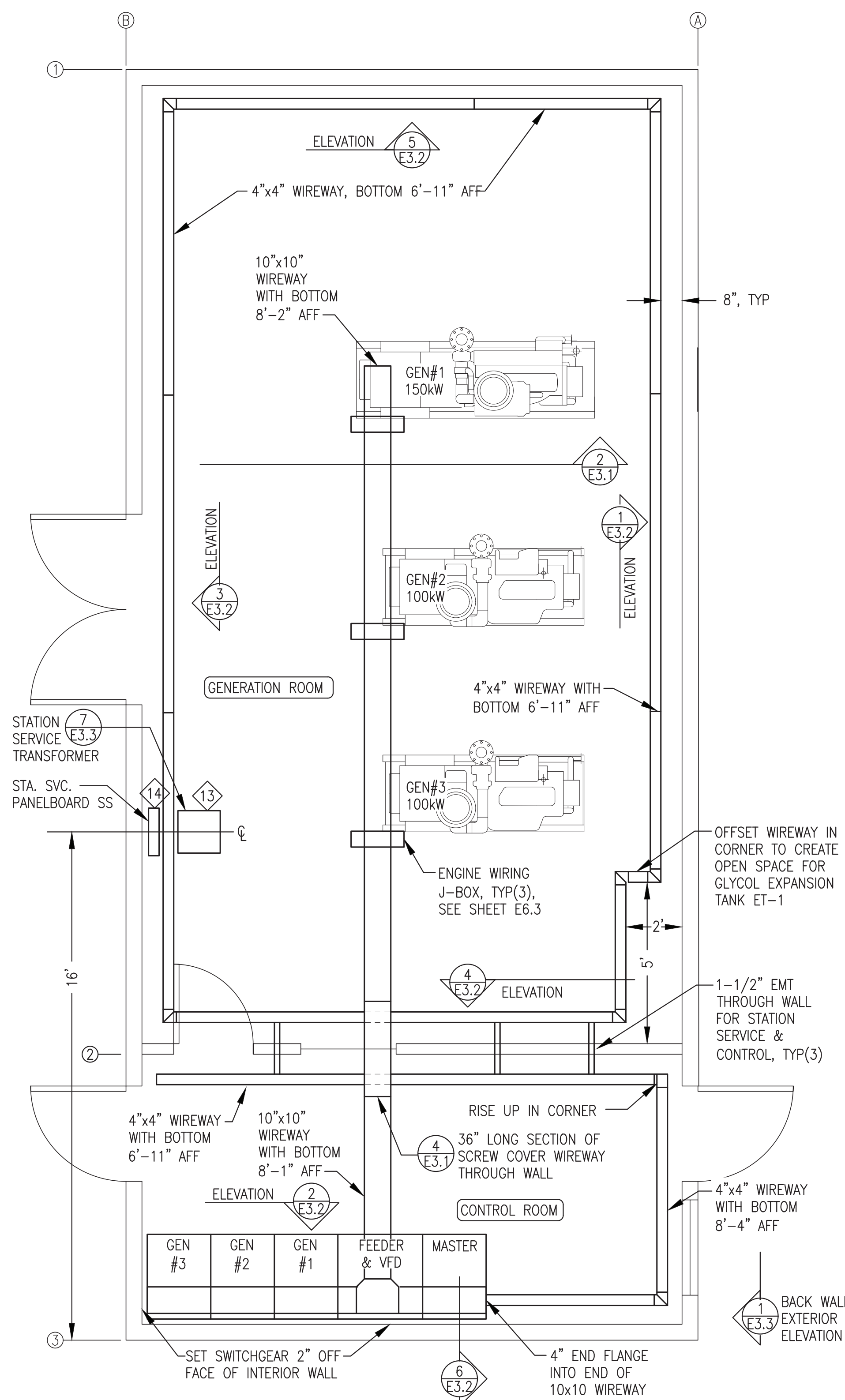
1 POWER PLANT GROUNDING PLAN
1/4"=1'-0"

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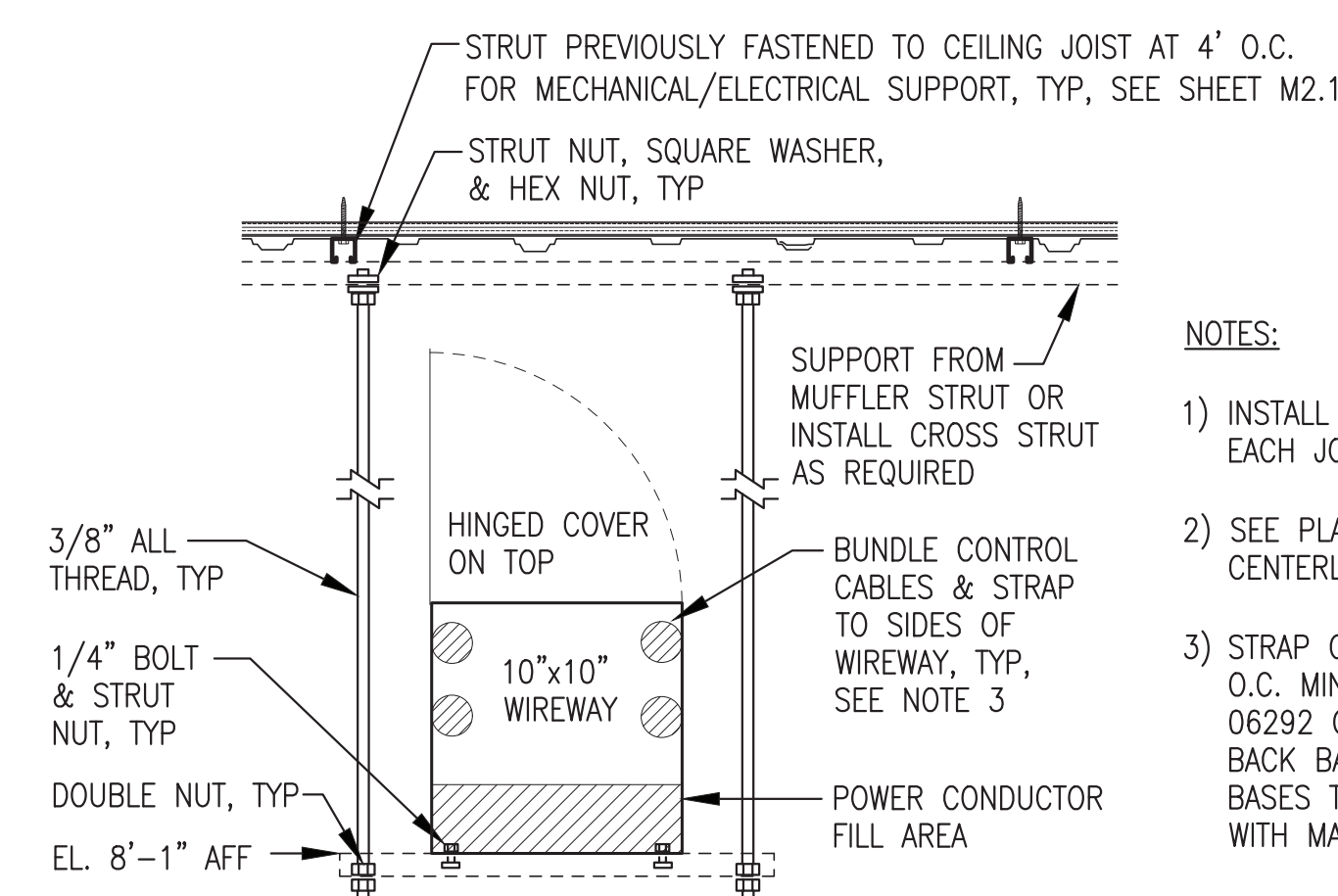


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: GROUNDING PLAN & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E2-E5		SHEET: E2 OF 9	
PROJECT NUMBER:			
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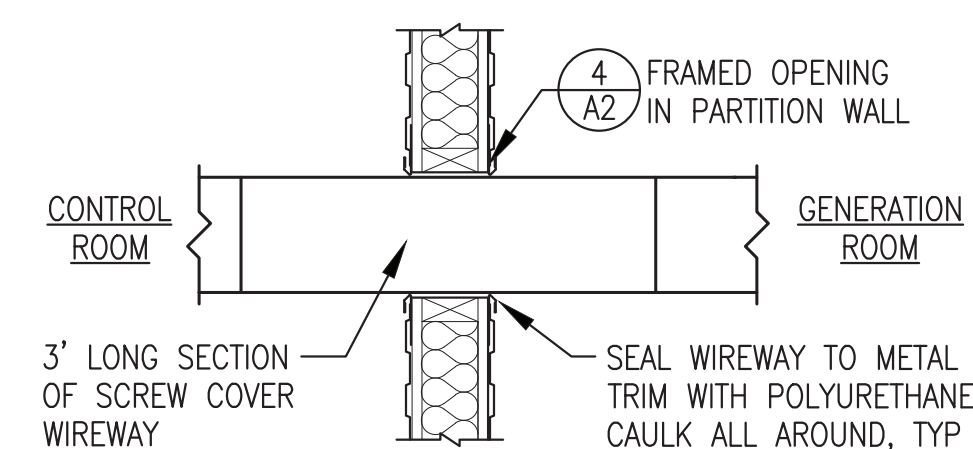
NIKOLAI ENGINE GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1	ENGINE - 223 HP, 150 EKW PRIME, JOHN DEERE 6068AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 170 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274G.
GEN #2	ENGINE - 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274E.
GEN #3	ENGINE - 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274E.



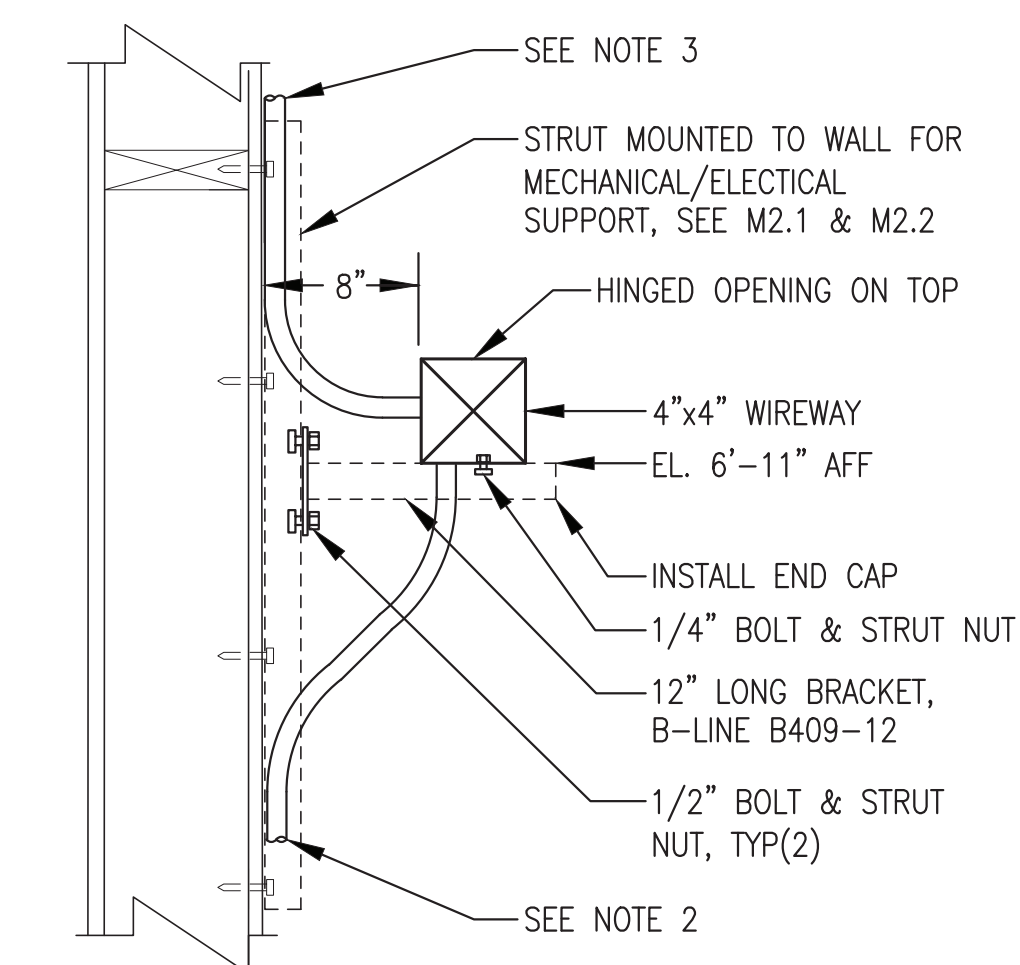
2 TYPICAL BUILDING SECTION
3/4"=1'-0"



3 10" WIREWAY INSTALLATION
NO SCALE



4 WIREWAY WALL PENETRATION
NO SCALE



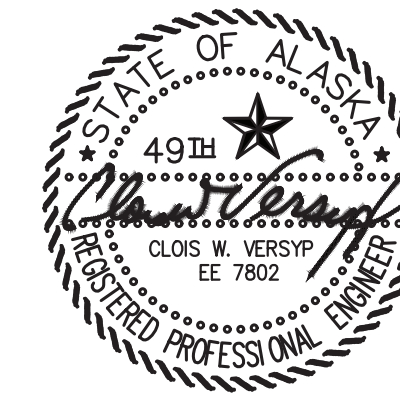
5 TYPICAL 4"x4" WIREWAY SUPPORT
NO SCALE

NOTES:

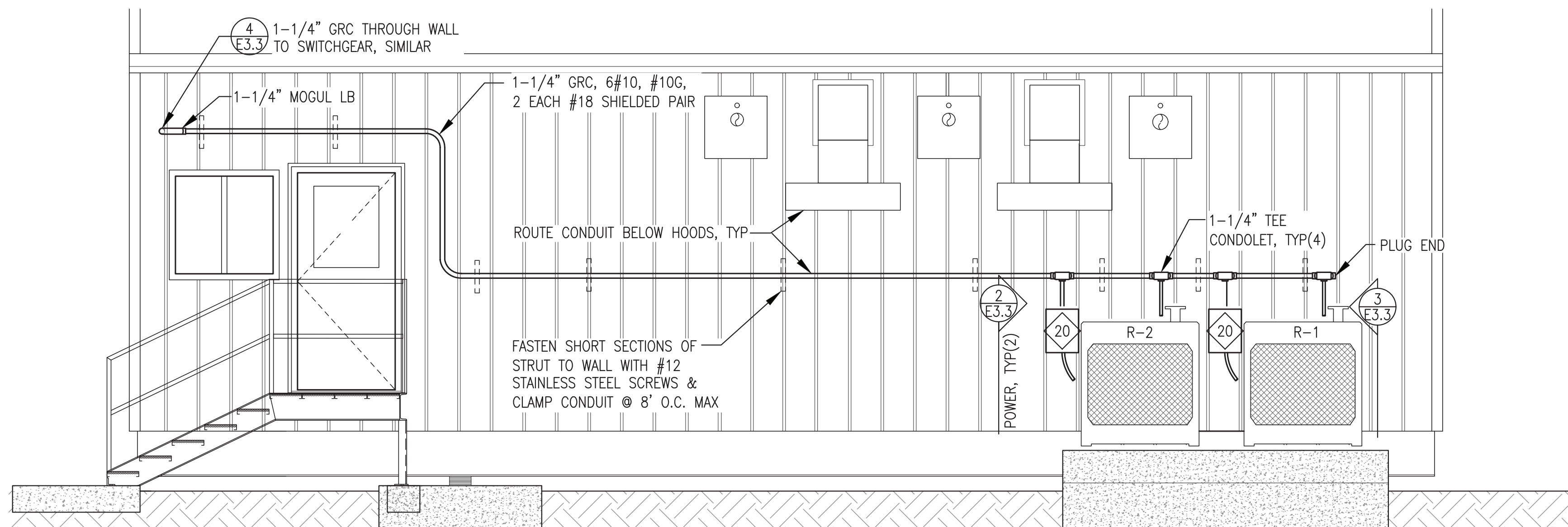
- 1) THIS DETAIL IS FOR ALL WALL MOUNTED WIREWAY SUPPORT EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE ON WIREWAY PLAN.
- 2) FOR ALL CONDUIT ROUTED DOWN, ENTER THROUGH BOTTOM OF WIREWAY AS SHOWN.
- 3) FOR ALL CONDUIT ROUTED UP, ENTER THROUGH BACK OF WIREWAY WITH BENT CONDUIT, SWEEP FITTING, OR "L" CONDUIT BODY (LL OR LR) AS REQUIRED.

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: WIREWAY PLAN, BUILDING SECTION, & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E2-E5		SHEET: E3.1 OF 9	
PROJECT NUMBER:			

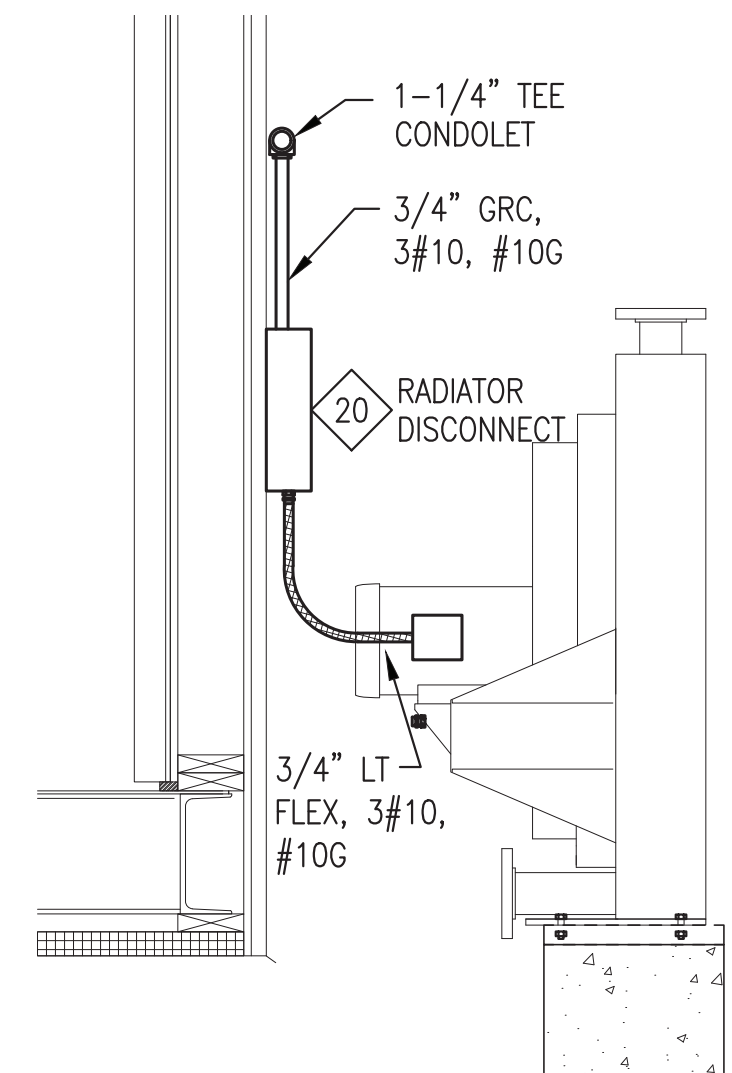
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NOVEMBER
2021



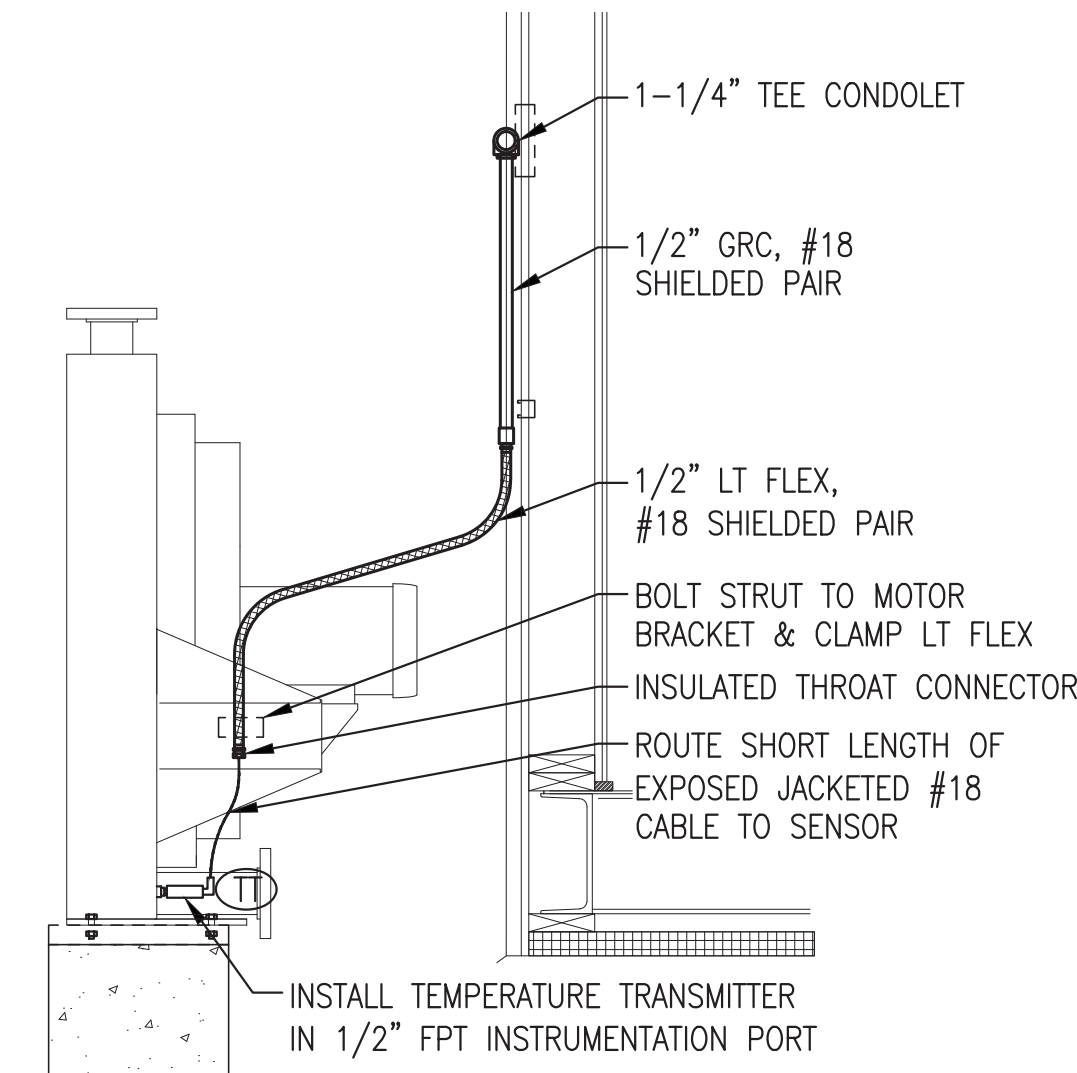
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P.O. 111405, Anchorage, AK 99511 (907)349-0100



1 BACK WALL EXTERIOR ELEVATION
E3.3 3/8"=1'-0"



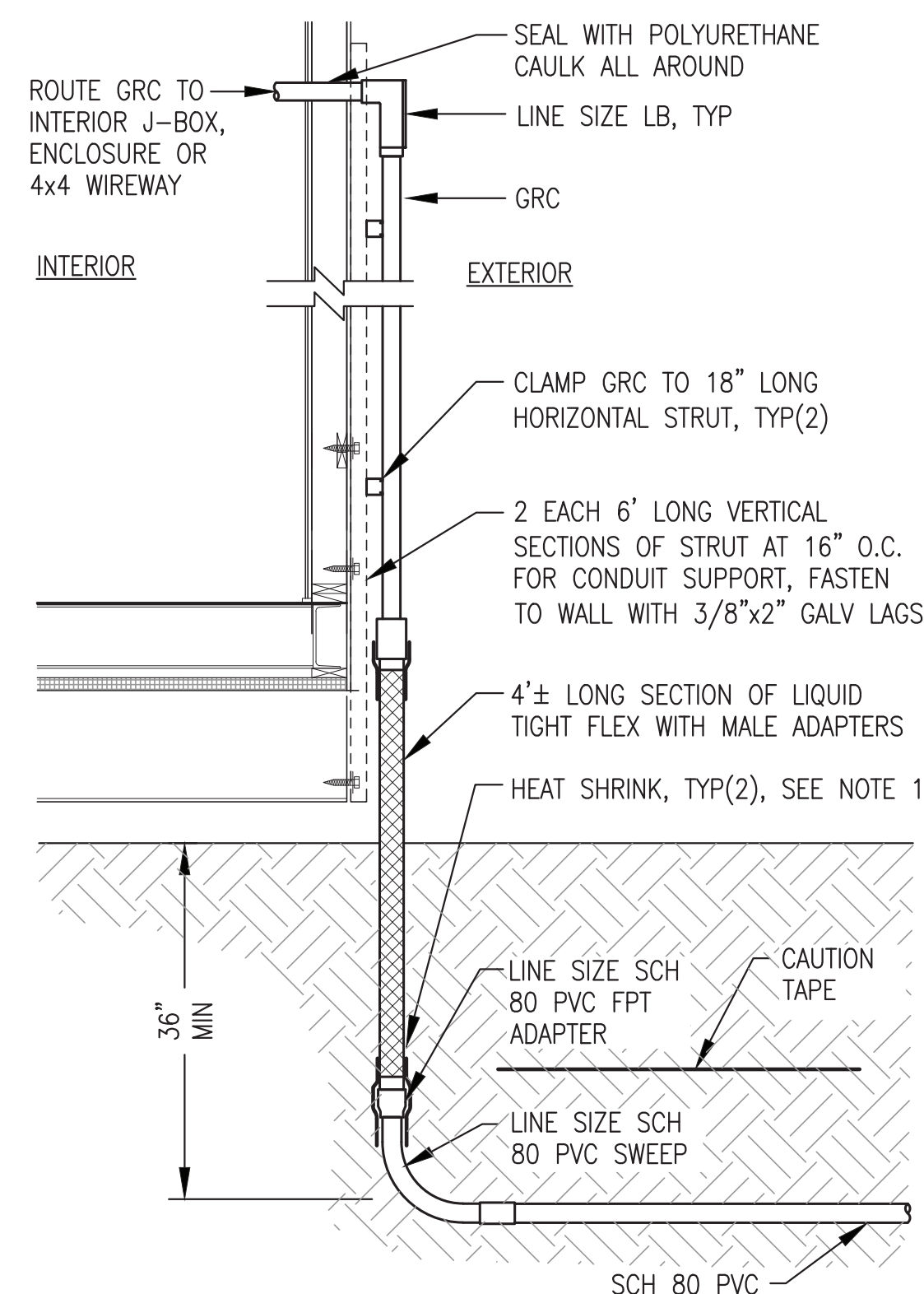
2 RADIATOR POWER CONNECTION
E3.3 3/4"=1'-0"



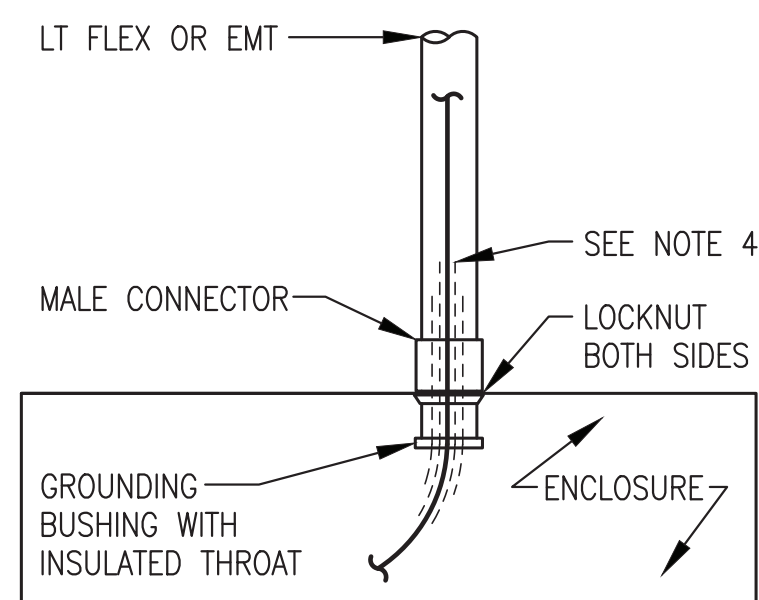
3 RADIATOR TEMPERATURE TRANSMITTER
E3.3 3/4"=1'-0"

NOTES:

- 1) INSTALL HEAT SHRINK TO FORM WATERTIGHT SEAL FROM FLEX ON TO GRC & FROM FLEX ON TO PVC CONDUIT.
- 2) SEE SHEET E1.3 FOR CONDUIT & CONDUCTOR SIZES, QUANTITIES AND LOCATIONS.
- 3) BURIED CONDUIT RISER SHOWN, ABOVE GRADE CONDUIT ENTRANCE SIMILAR.



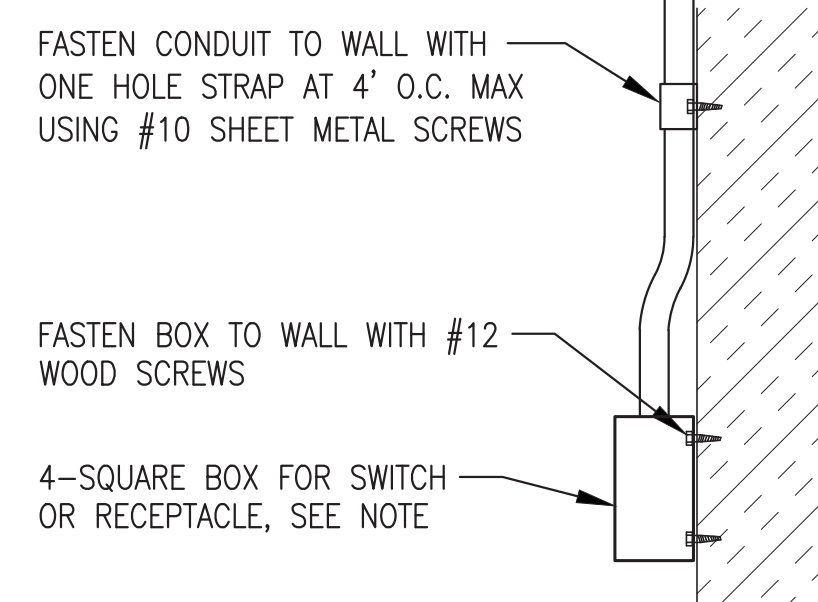
4 CONDUIT RISER AT POWER PLANT
E3.3 NO SCALE



5 TYP ENCLOSURE CONNECTION
E3.3 NO SCALE

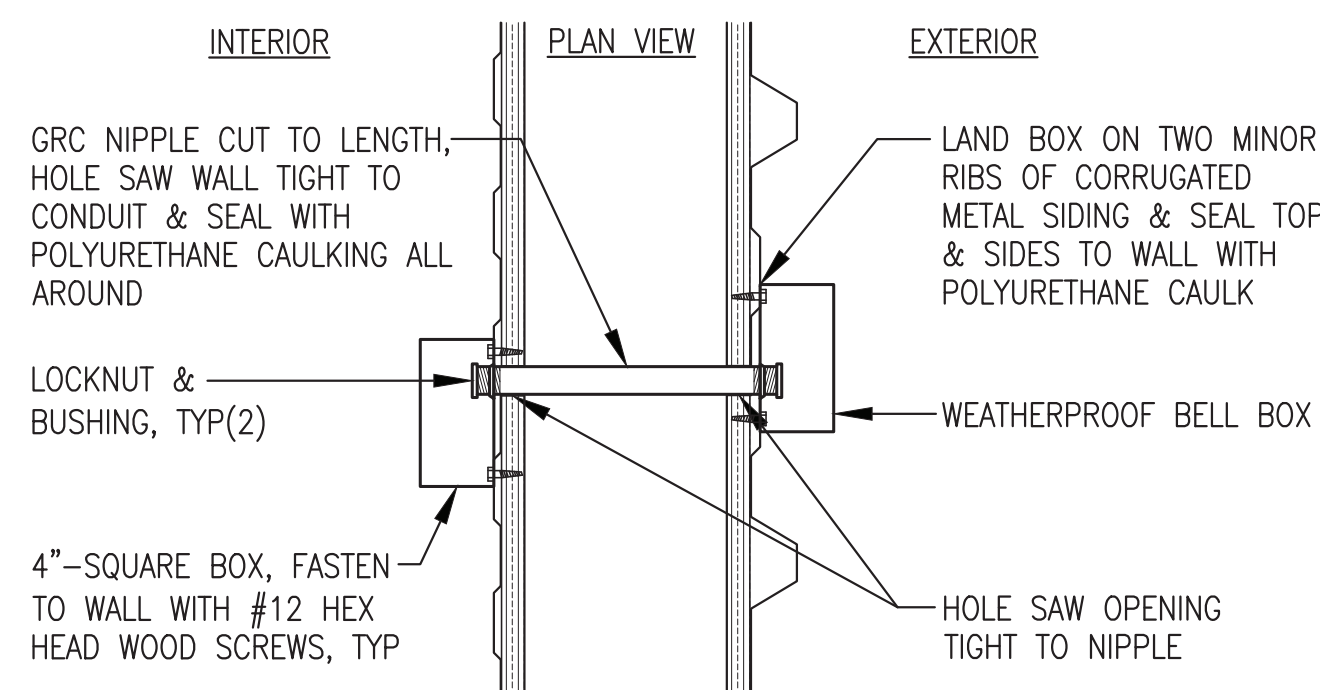
NOTES:

- 1) THIS DETAIL APPLIES TO CONNECTIONS TO WIREWAY, GENERATOR ENCLOSURES, SWITCHGEAR, AND PANELS.
- 2) AT A MINIMUM INSTALL GROUNDING BUSHING ON ALL GENERATOR POWER CONDUIT, COMMUNITY FEEDER CONDUIT, STATION SERVICE FEEDERS, AND WHERE OTHERWISE INDICATED OR REQUIRED. BOND GROUNDING BUSHING TO EQUIPMENT GROUNDING CONDUCTOR.
- 3) INSTALL PLASTIC BUSHING WHERE GROUNDING BUSHING IS NOT REQUIRED.
- 4) ON GENERATOR ENCLOSURES PROTECT CABLES FROM WEAR BY INSTALLING 2 LAYERS OF HEAVY WALL HEAT SHRINK. BASE LAYER 12" LONG & SECOND LAYER 8" LONG, CENTERED IN CONNECTOR.

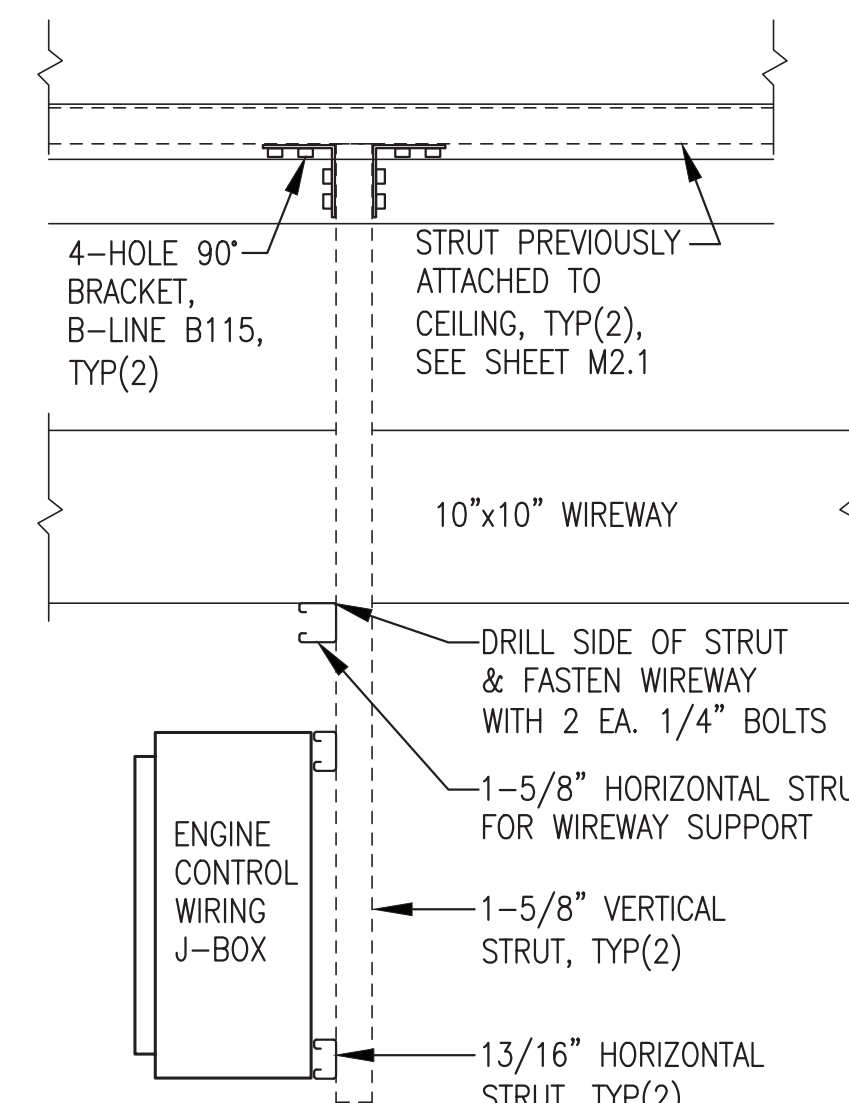


8 TYPICAL INTERIOR DEVICE MOUNTING
E3.3 NO SCALE

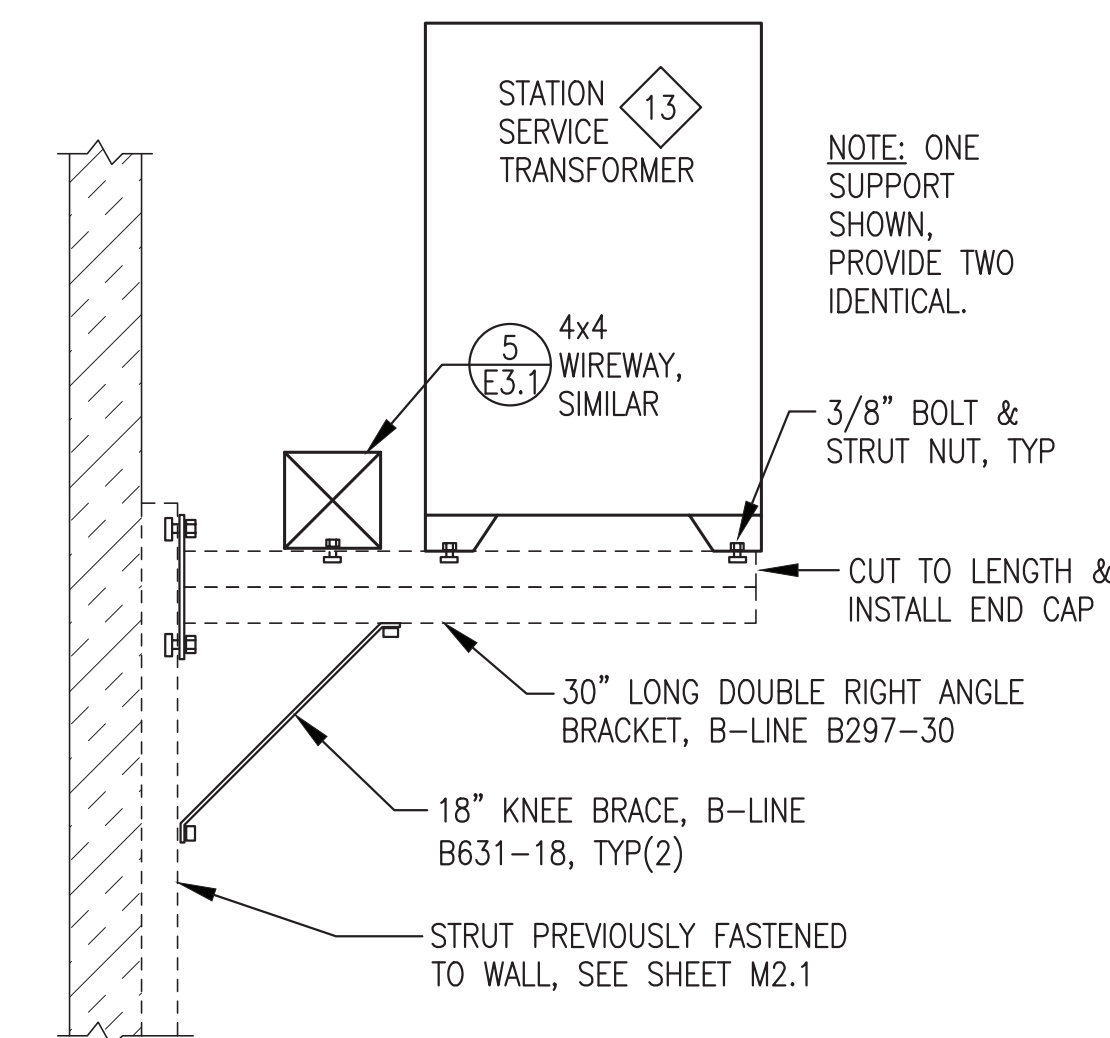
NOTE: FOR CONDUIT WALL PENETRATIONS WITHOUT BELL BOX, INSTALL CONDUIT BODY & SEAL ALL AROUND CONDUIT WITH POLYURETHANE CAULK.



9 TYP EXTERIOR WALL-MOUNT DEVICE
E3.3 NO SCALE

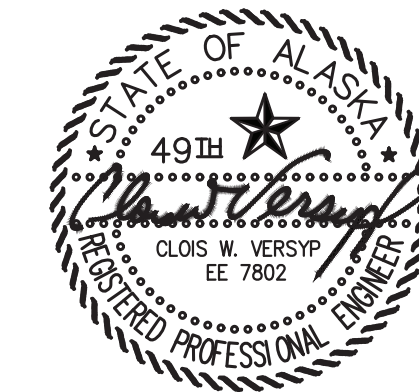


6 ENGINE WIRING J-BOX SUPPORT
E3.3 NO SCALE

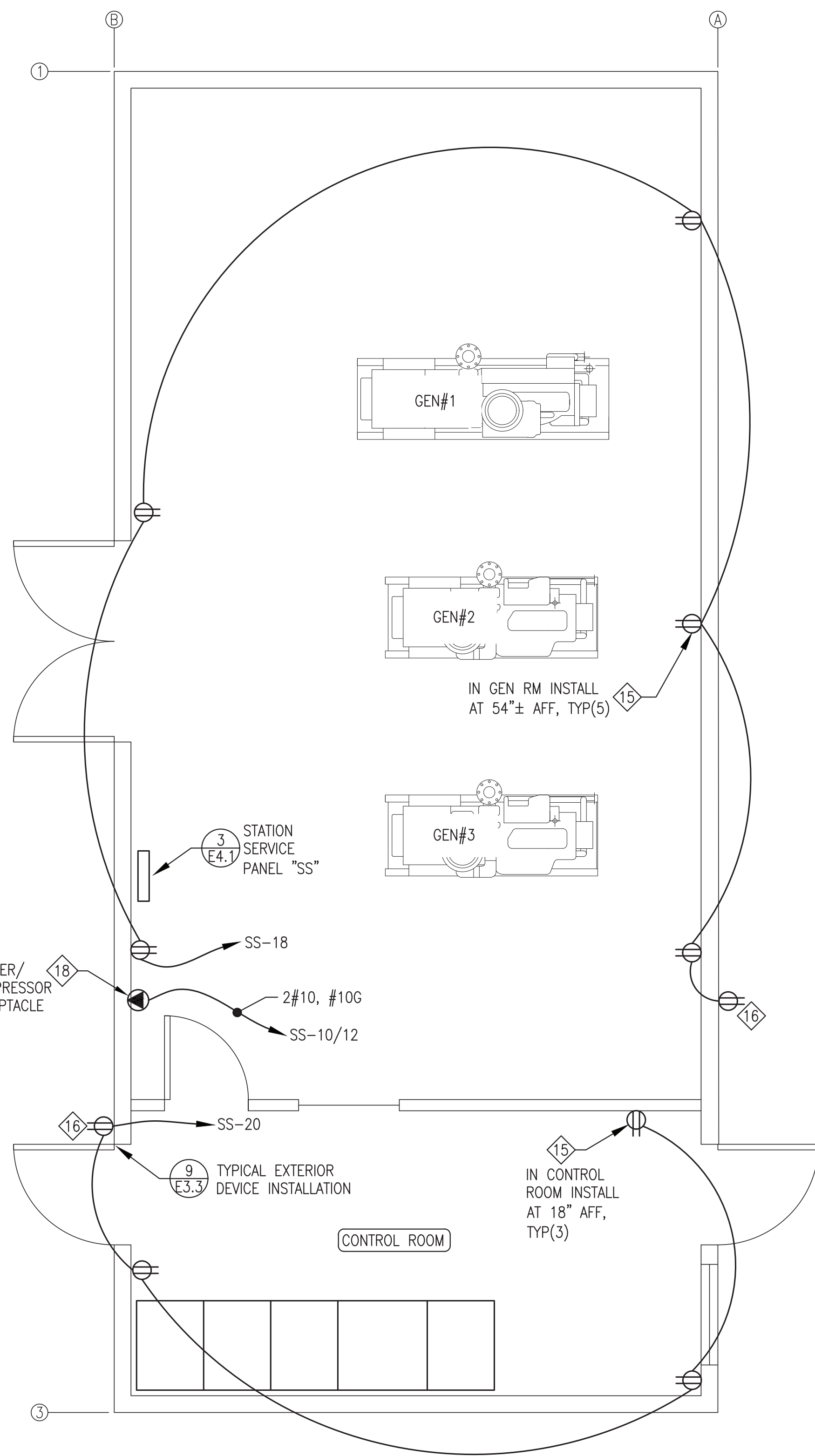


7 STATION SERVICE TRANSFORMER SUPPORT
E3.3 NO SCALE

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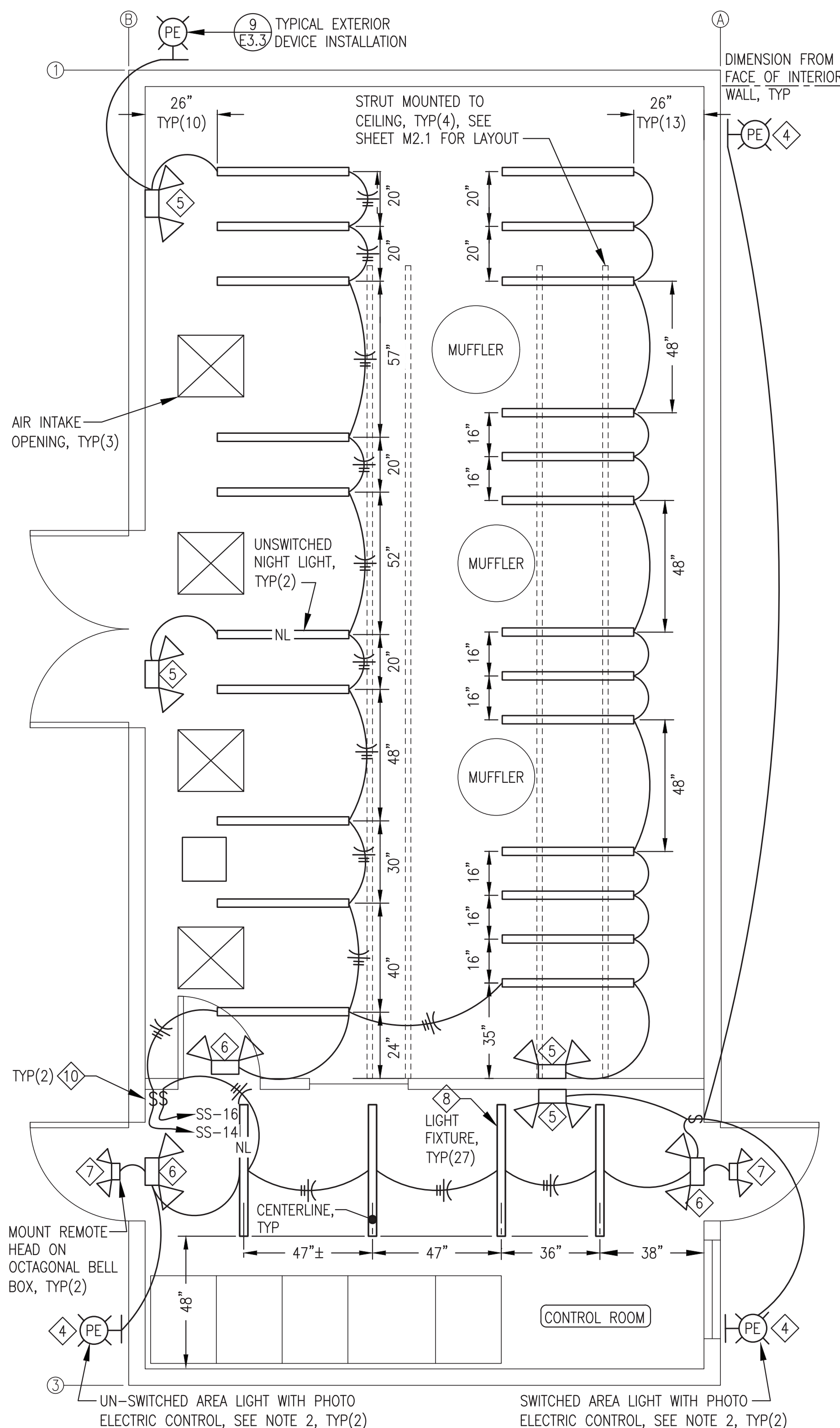


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
<p>ALASKA ENERGY AUTHORITY</p>			
<p>PROJECT: NIKOLAI POWER SYSTEM UPGRADE</p>			
<p>TITLE: ELEVATIONS & DETAILS</p>			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E2-E5		SHEET: E3.3 OF 9	
PROJECT NUMBER:			
<p>Gray Stassel Engineering, Inc.</p>			
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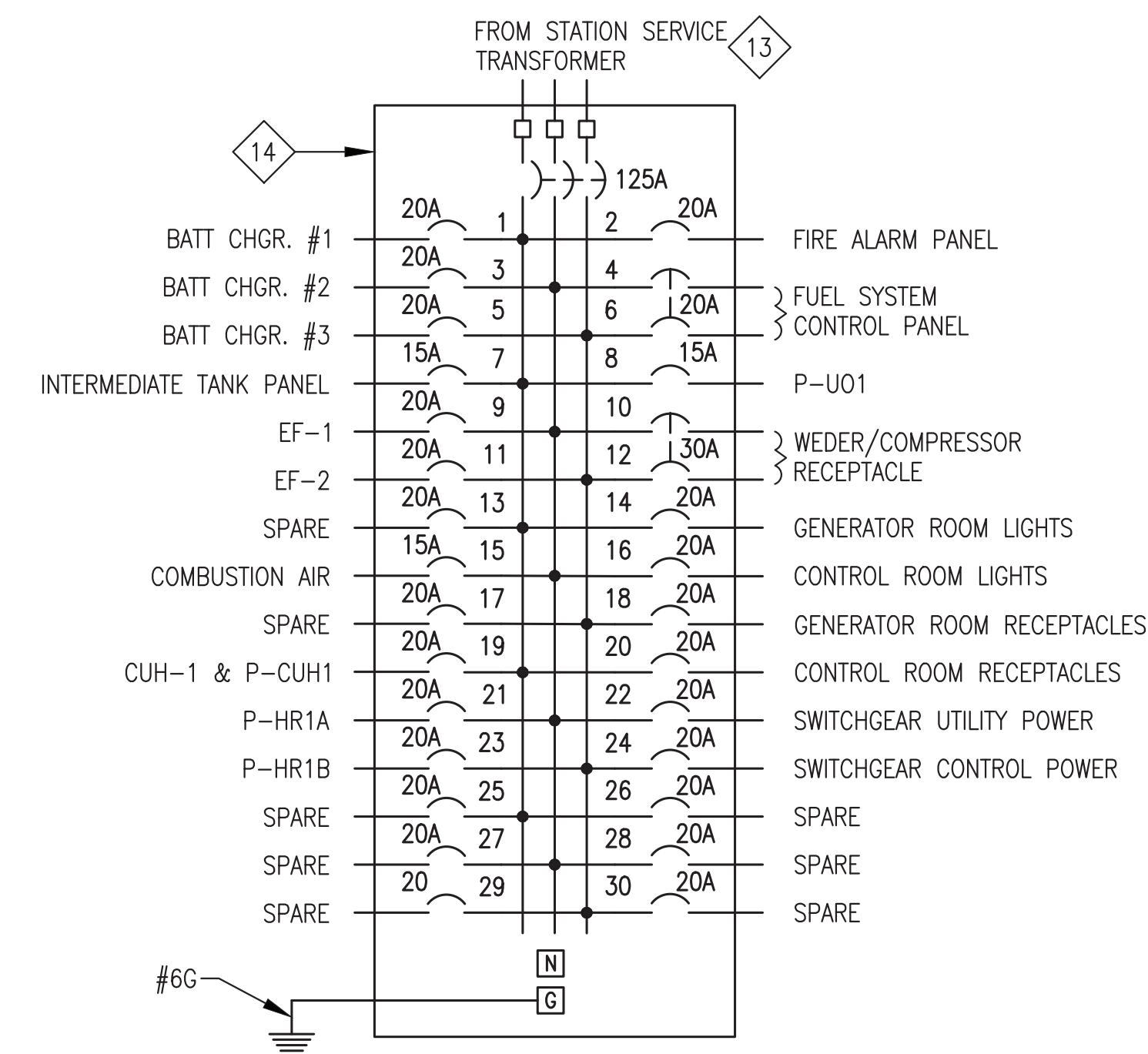
NOTES:
 1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.

1
E4.1 RECEPTACLE PLAN
 3/8"=1'-0"



NOTES:
 1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.
 2) MOUNT EXTERIOR AREA LIGHTS WITH TOP 9'-0" AFF.
 3) FASTEN INTERIOR LIGHTS TO CEILING WITH #12 SHEET METAL SCREWS EXCEPT WHERE LIGHTS CROSS STRUT USE 1/4" BOLTS & STRUT NUTS, TYP

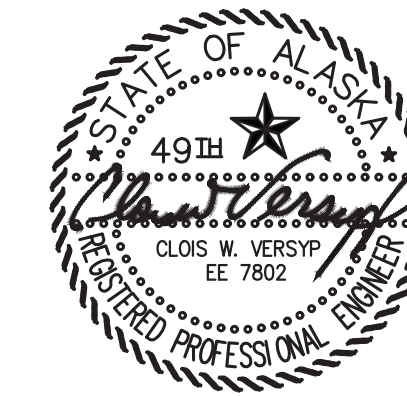
2
E4.1 LIGHTING PLAN
 3/8"=1'-0"



3
E4.1 STATION SERVICE PANEL "SS"
 NO SCALE

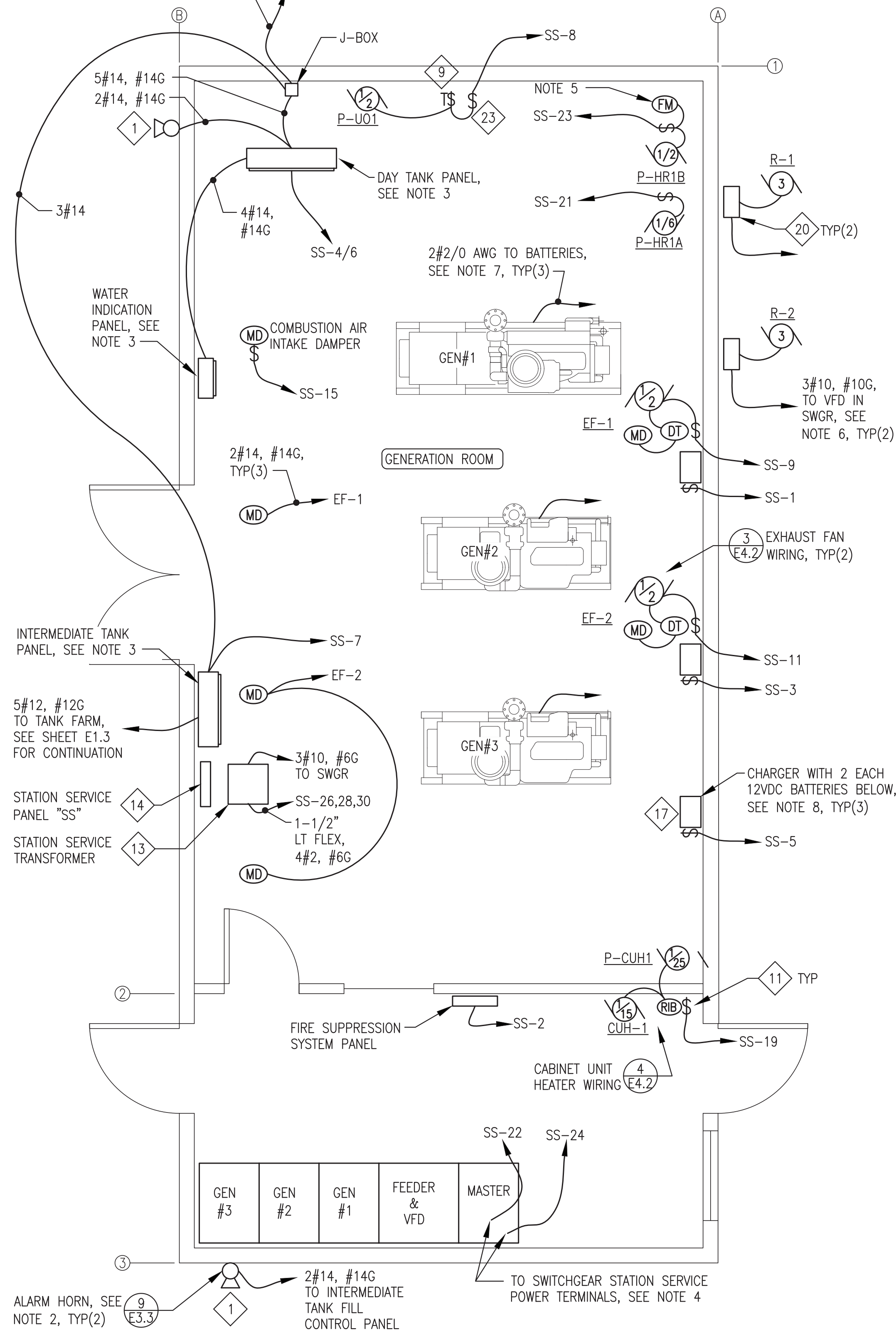
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: RECEPTACLE & LIGHTING PLANS & PANELBOARD			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E2-E5		SHEET: E4.1 OF 9	
PROJECT NUMBER:			

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1"=3/8", 8#14, #14G, #18 SHIELDED PAIR TO INTERMEDIATE TANK, SEE SHEET E1.3 FOR CONTINUATION

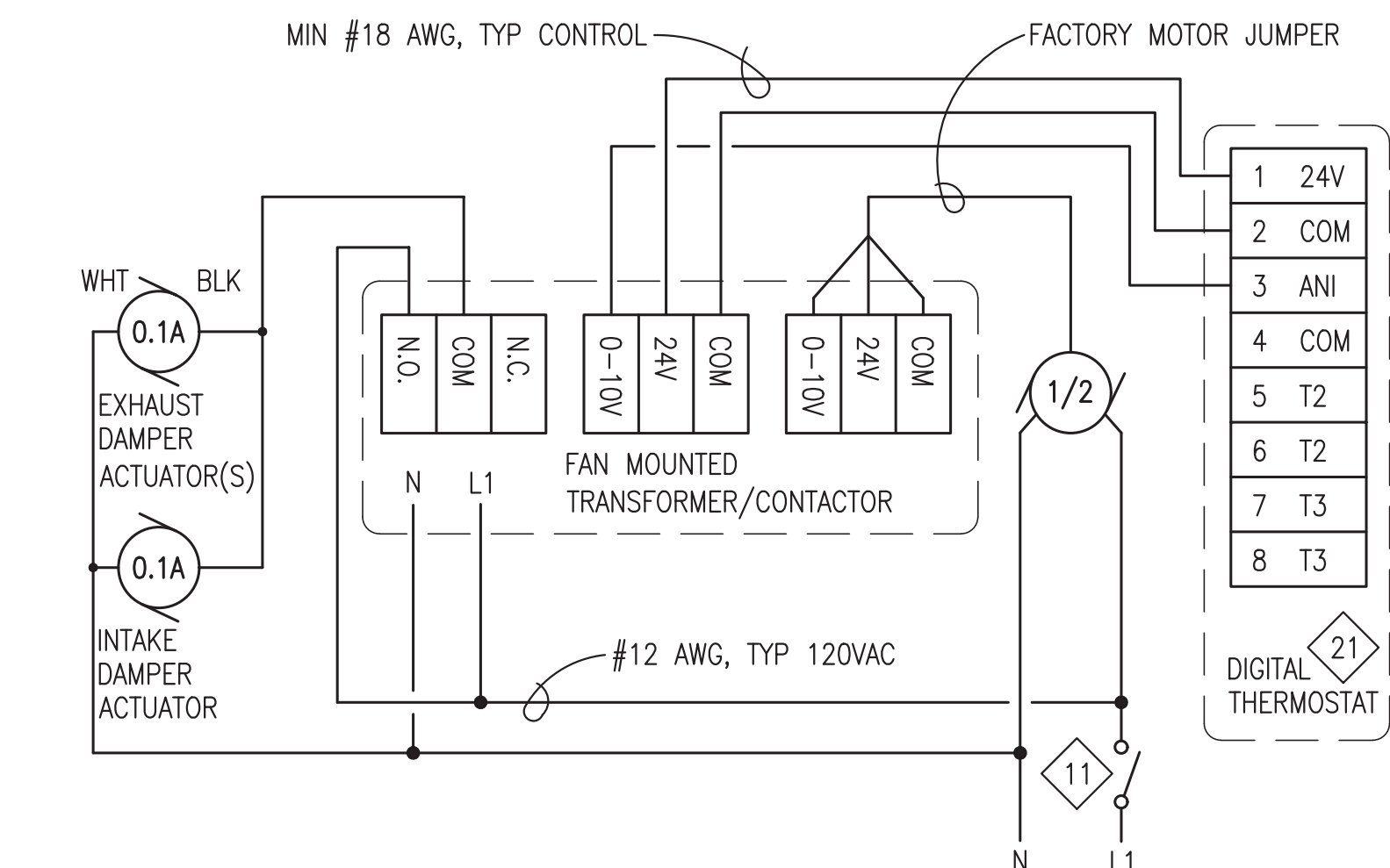


1 STATION SERVICE PLAN
E4.2 3/8"=1'-0"

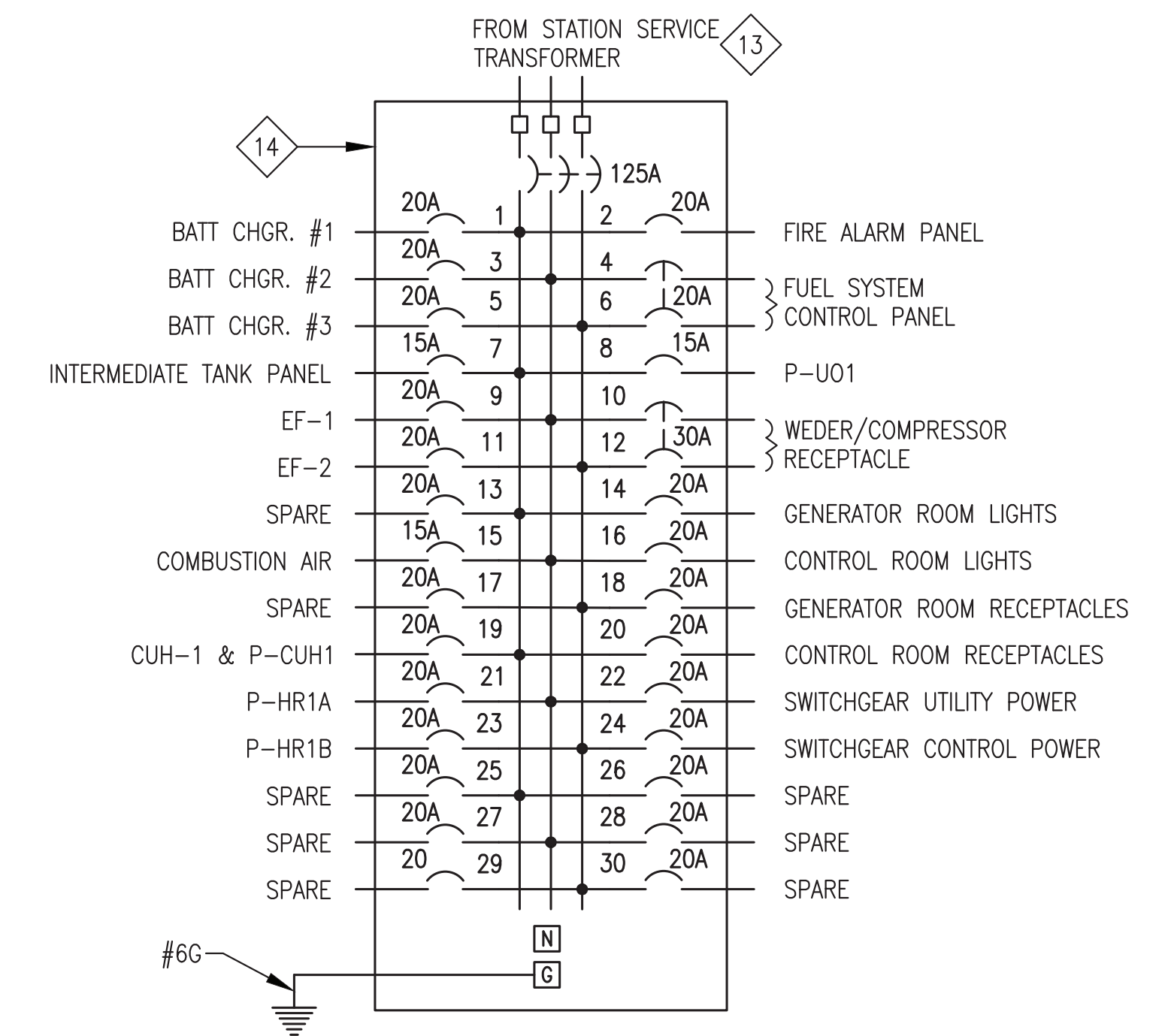
STATION SERVICE GENERAL NOTES:

- 1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.
- 2) MOUNT ALARMS HORNS WITH TOP AT 9'-0" AFF TO MATCH EXTERIOR LIGHTS, SEE SHEET E4.1
- 3) SEE SHEETS E7.1-E7.5 FOR DAY TANK, WATER INDICATION, AND INTERMEDIATE TANK CONTROL PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
- 4) SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL POWER AND CONTROL WIRING.
- 5) INSTALL FLOW METER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. PROVIDE POWER FROM P-HR1B DISCONNECT.
- 6) ROUTE RADIATOR VFD POWER CONDUCTORS IN SEPARATE EXTERIOR CONDUIT, SEE ELEVATION 1/E3.3. DO NOT ROUTE IN WIREWAY. NOTE THAT CONDUCTORS ARE OVERSIZED FOR 80% DE-RATE AND PROVIDED WITH 15A BREAKER IN SWITCHGEAR.
- 7) ROUTE BATTERY CABLES TO FRONT OF SKID SUPPORTED WITH CUSHIONED CLAMPS, SEE SHEET M3.4. ROUTE FROM SKID DIRECTLY UNDER FUEL HOSES TO WALL AND TYWRAP CABLES TO USED OIL PIPE ALONG WALL. CUT TO PROVIDE 6"± SERVICE LOOP FOR FINAL TERMINATION ON BATTERIES.
- 8) MOUNT BATTERY CHARGER TO WALL ON SHALLOW STRUT AND INSTALL BATTERIES IN RACK ON FLOOR BELOW, SEE ELEVATION 1/E3.2.

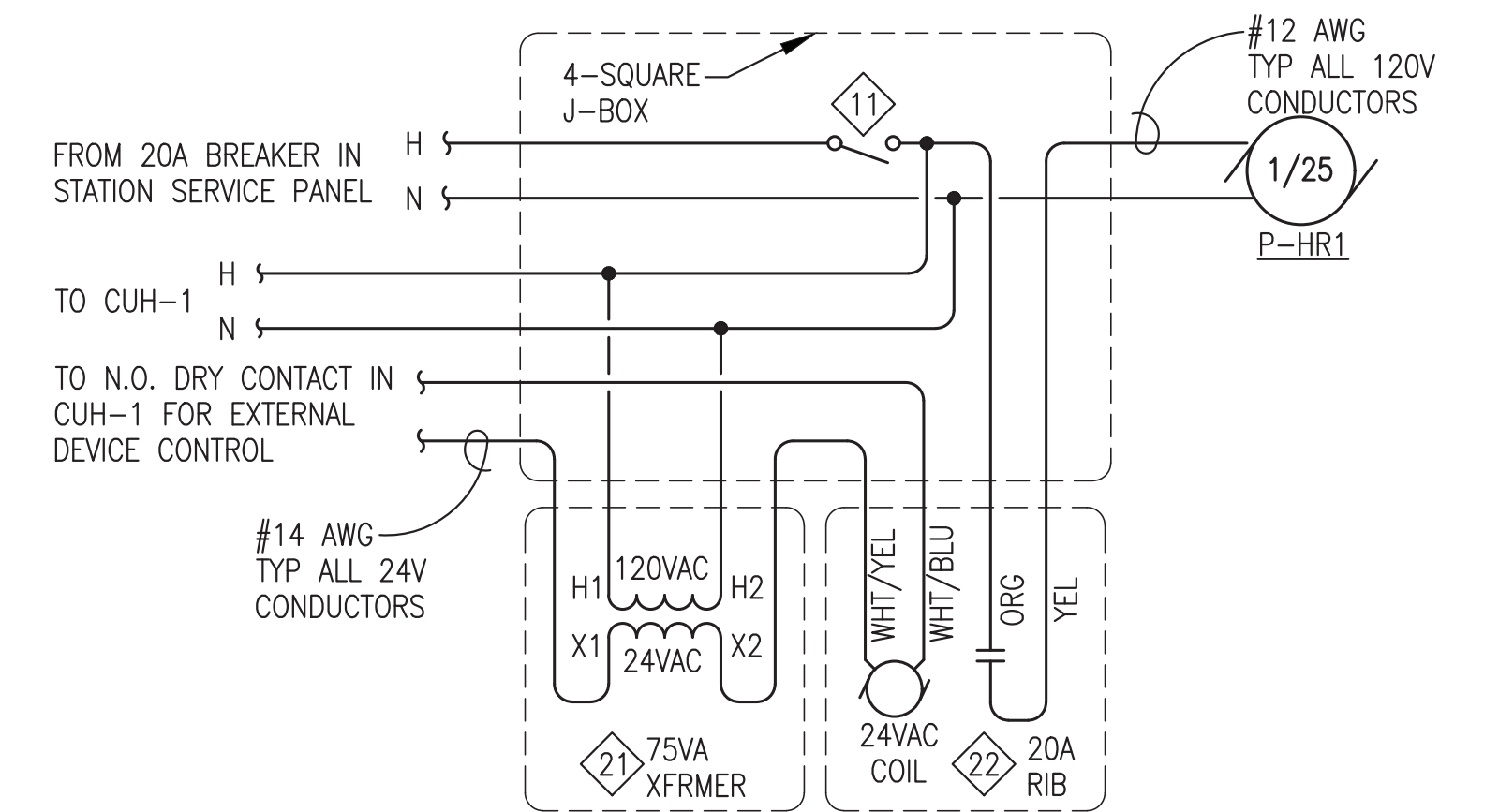
MAKE THE FOLLOWING SETTINGS ON DIGITAL THERMOSTAT:
 APPLICATION = 0 (INTERNAL SENSOR)
 OUTPUT 1 = 0 (COOL/0-10V)
 OUTPUT 2 = 0 (NOT USED)
 OUTPUT 3 = 0 (NOT USED)
 OUTPUT 3 ACTIVATION = 0 (100%)
 NSB VALUE = 3 (6°F)
 OUTPUT 1 MIN = 0 (0%)
 MAX SETPOINT = 90°F
 MIN SETPOINT = 50°F



3 EXHAUST FAN WIRING DIAGRAM
E4.2 NO SCALE



2 STATION SERVICE PANELBOARD "SS"
E4.2 NO SCALE



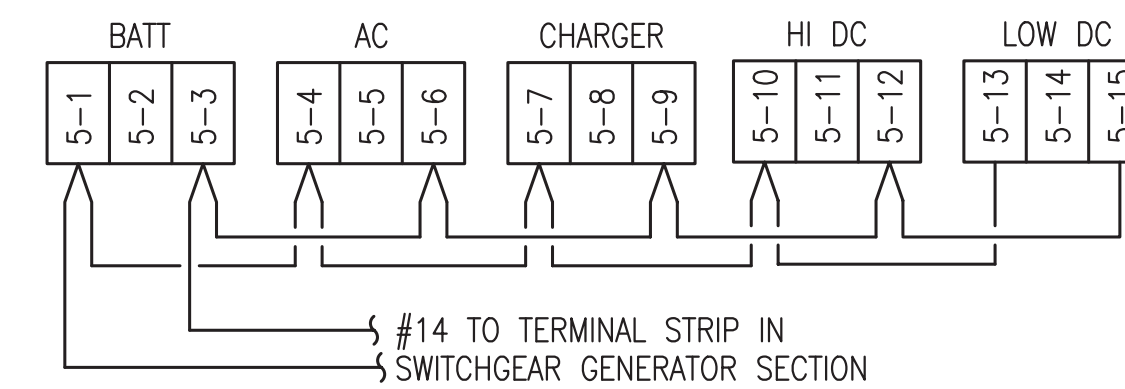
4 CUH-1 WIRING DIAGRAM
E4.2 NO SCALE

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NOVEMBER
2021

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: STATION SERVICE PLAN, DETAILS, & PANELBOARD			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E2-E5		SHEET: E4.2 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

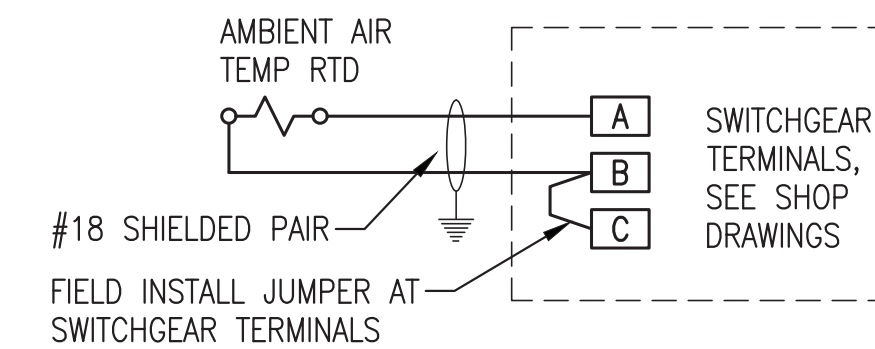
INSTRUMENTATION & DATA PLAN NOTES:

- RTD TEMPERATURE SENSOR PROVIDED WITH SWITCHGEAR. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION. SEE DETAIL 3/E5 AND NOTE 10.
- INSTALL DSL MODEM AND INTERNET ROUTER ON TOP OF MASTER SECTION IN RACK OR CABINET. CONNECT MODEM TO ROUTER AND TO TELEPHONE LINE. CONNECT ROUTER TO ETHERNET SWITCH INSIDE MASTER SECTION. CONNECT BOTH TO 120VAC UPS, SEE NOTE 10.
- LOW COOLANT LEVEL ALARM SWITCH INSTALLED AT EXPANSION TANK, SEE MECHANICAL. CONNECT TO N.C. SWITCH (WHITE & RED) AND ROUTE 2#14 TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
- GLYCOL LEVEL SENSOR PROBE INSTALLED IN EXPANSION TANK, SEE MECHANICAL. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR. SEE NOTE 10.
- INSTALL TEMP TRANSMITTER IN EACH RADIATOR, SEE DETAIL 3/E3.3. ROUTE #18 SHIELDED PAIR FROM EACH TO SWITCHGEAR VFD SECTION, SEE NOTE 10.
- INSTALL COOLANT RETURN TEMP TRANSMITTER IN PIPING MAIN WHERE SHOWN ON COOLING PIPING ISOMETRIC 1/M4.2. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION, SEE NOTE 10.
- INSTALL TWO TEMP TRANSMITTERS AND ONE PRESSURE TRANSMITTER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. ROUTE #18 SHIELDED PAIR FROM EACH TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
- INSTALL FLOW METER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
- ROUTE 2#14 FROM BATTERY CHARGER ALARM CONTACTS TO ASSOCIATED SWITCHGEAR GENERATOR SECTION, SEE NOTE 10 AND WIRING DIAGRAM 2/E5.
- SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL INSTRUMENTATION AND DATA WIRING INCLUDING CONTROL POWER.
- ROUTE GENERATOR CONTROL CONDUCTORS TO SWITCHGEAR IN 10x10 WIREWAY WITH POWER CONDUCTORS. SEE DETAIL 2/E3.1, SHEET E6.3, AND NOTE 10.
- SEE SHEETS E7.1-E7.5 FOR DAY TANK, WATER INDICATION, AND INTERMEDIATE TANK CONTROL PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
- ROUTE CAT5e CONDUCTORS FROM DAY TANK PANEL REMOTE I/O AND TANK LEVEL MONITOR TO ETHERNET SWITCH IN SWITCHGEAR MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
- ROUTE CAT5e FOR DATA AND 2#14 FOR GENERATOR SHUT DOWN FROM FIRE PANEL TO SWITCHGEAR MASTER SECTION, SEE SHEET FS1 AND NOTE 10. INSTALL IN SEPARATE DEDICATED RACEWAY, COLOR RED. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
- ROUTE CAT5e FROM RJ-45 JACK TO ETHERNET SWITCH IN MASTER SECTION. ROUTE TELEPHONE CABLE FROM RJ-11 JACK TO MODEM ON TOP OF MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.

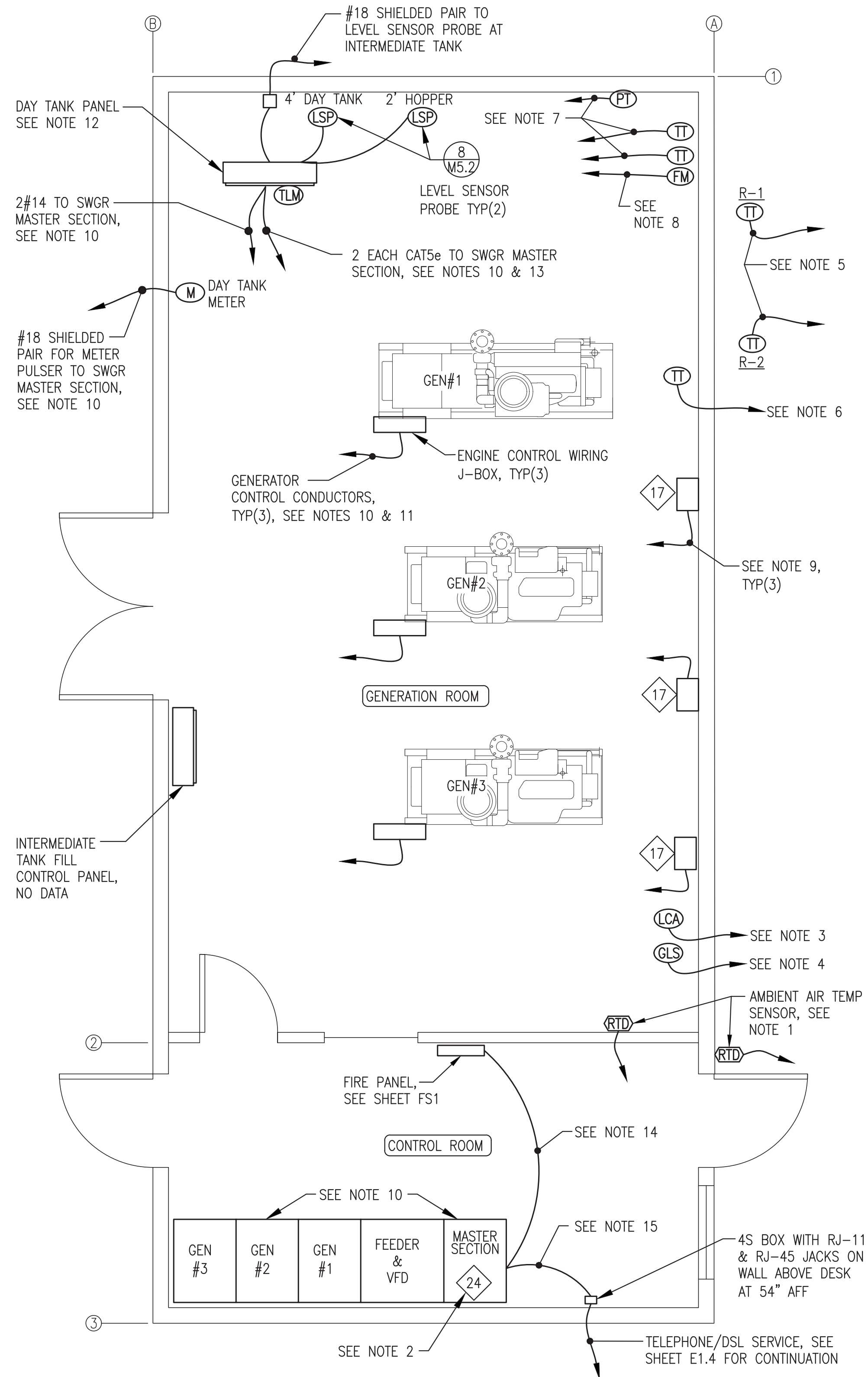


NOTE: PRIOR TO ENERGIZING MAKE THE FOLLOWING SETTINGS ON CHARGER:
 1) AC LINE VOLTAGE SWITCH TO "115V".
 2) AUTO BOOST JUMPER TO "NORM".
 3) FLOAT VOLTAGE JUMPER TO "13.50/27.00" (FOR GEL CELL).
 4) BATTERY RANGE JUMPER TO "24V".

2 BATTERY CHARGER ALARM WIRING DIAGRAM
NO SCALE



3 AMBIENT AIR TEMP RTD TERMINATION
NO SCALE

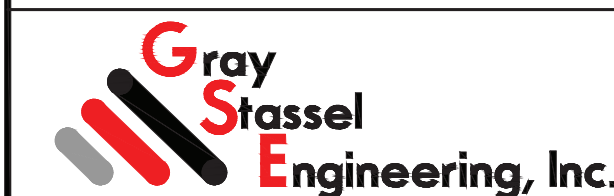


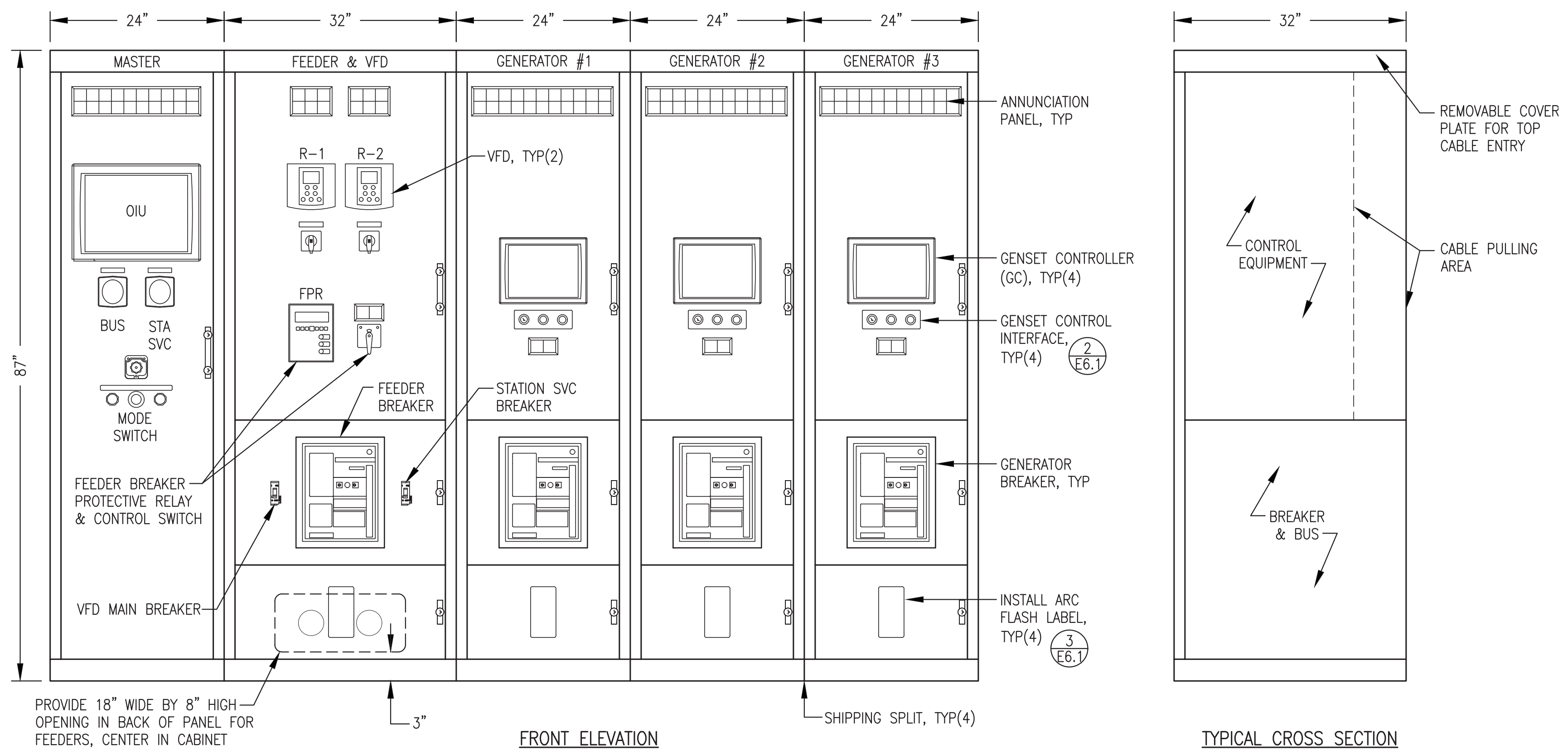
1 INSTRUMENTATION & DATA PLAN
3/8"=1'-0"

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2021



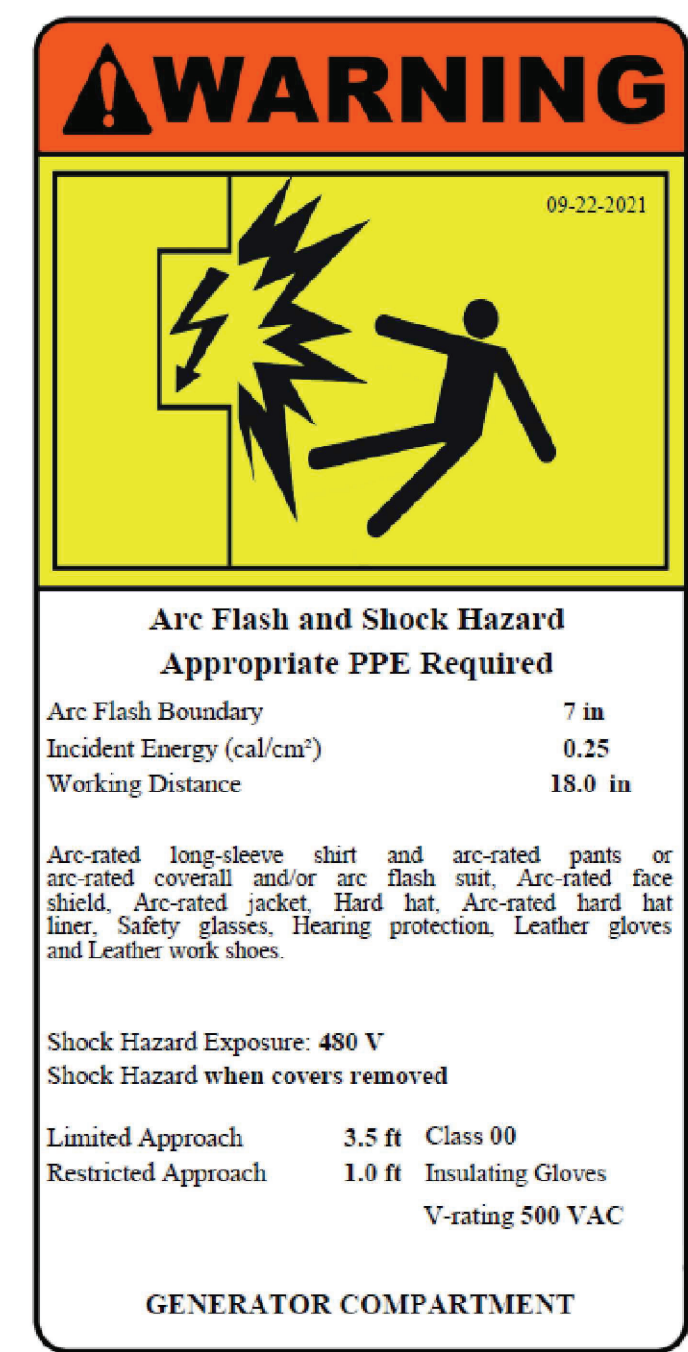
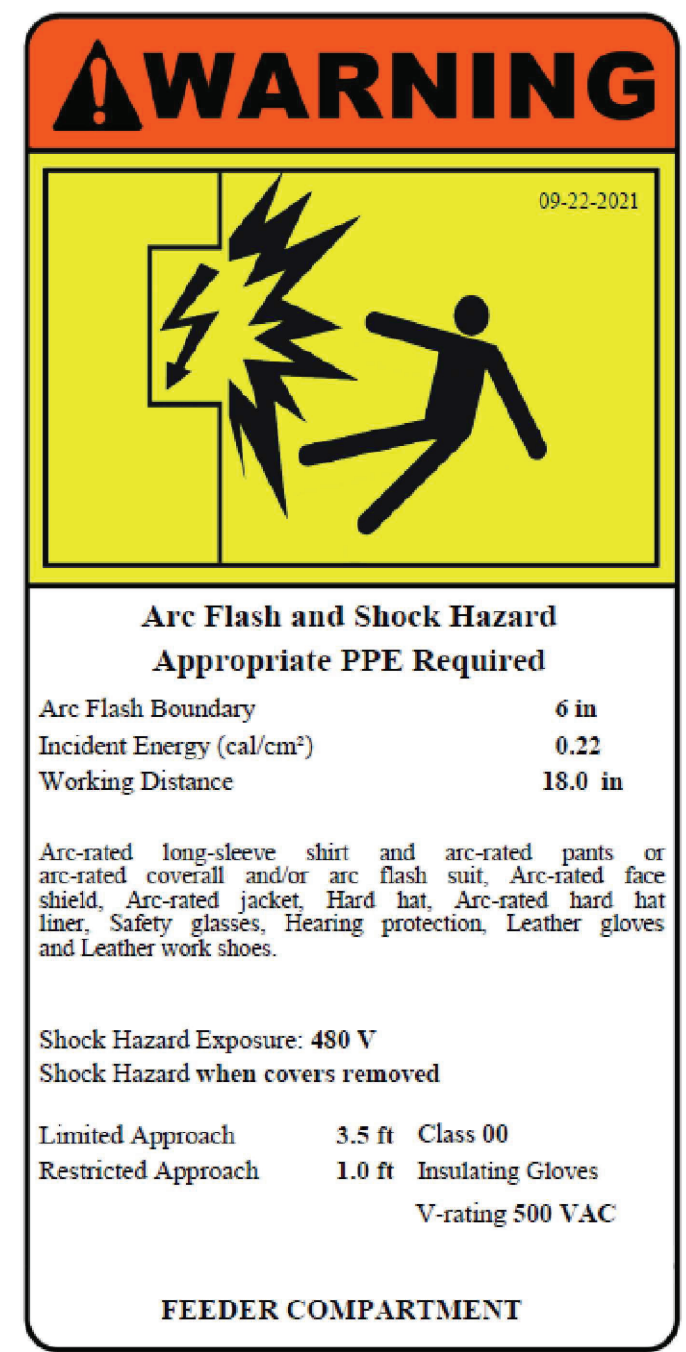
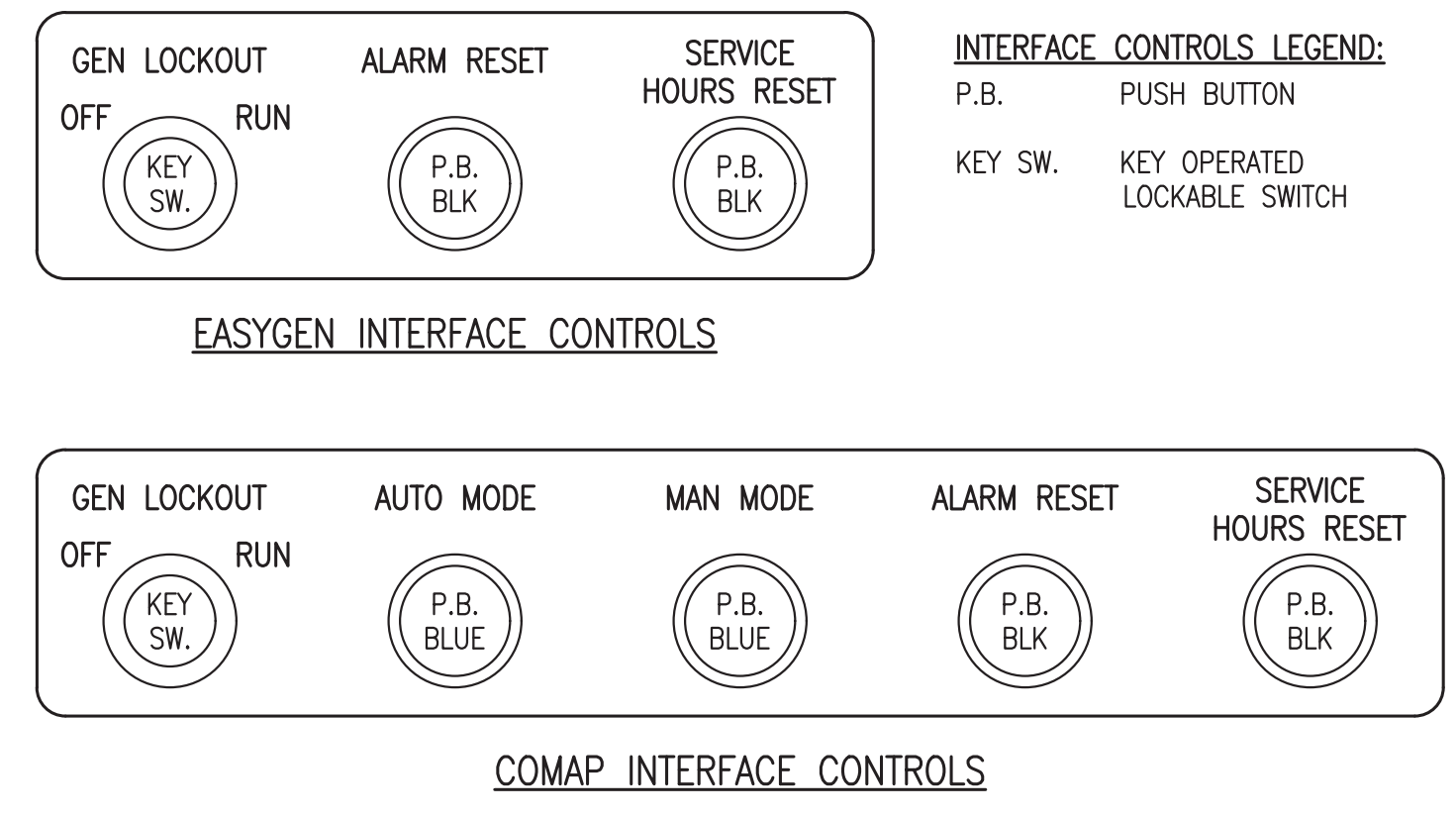
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: INSTRUMENTATION & DATA PLAN & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E2-E5		SHEET: E5 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			





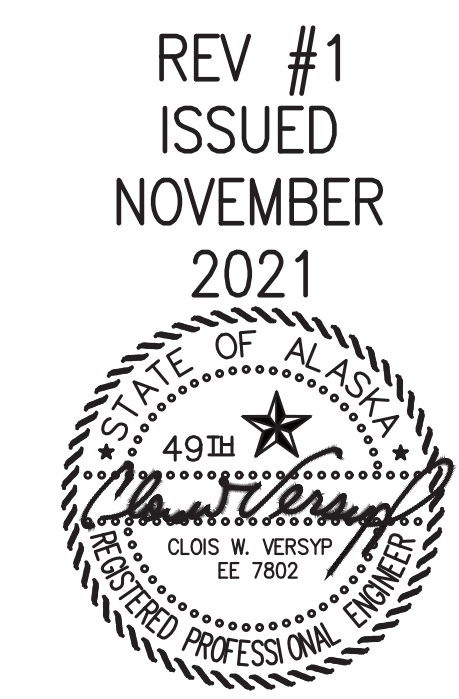
1 SWITCHGEAR ENCLOSURE LAYOUT
E6.1 NO SCALE

2 GENSET CONTROL (GC) INTERFACE CONTROLS
E6.1 NO SCALE



- ARC FLASH NOTES:
- 1) PERMANENTLY AFFIX ARC FLASH LABELS TO EACH SECTION WITH 480V POWER AS INDICATED.
 - 2) SCALED PDF IMAGES OF THESE LABELS WILL BE FURNISHED TO THE FABRICATOR UPON REQUEST.

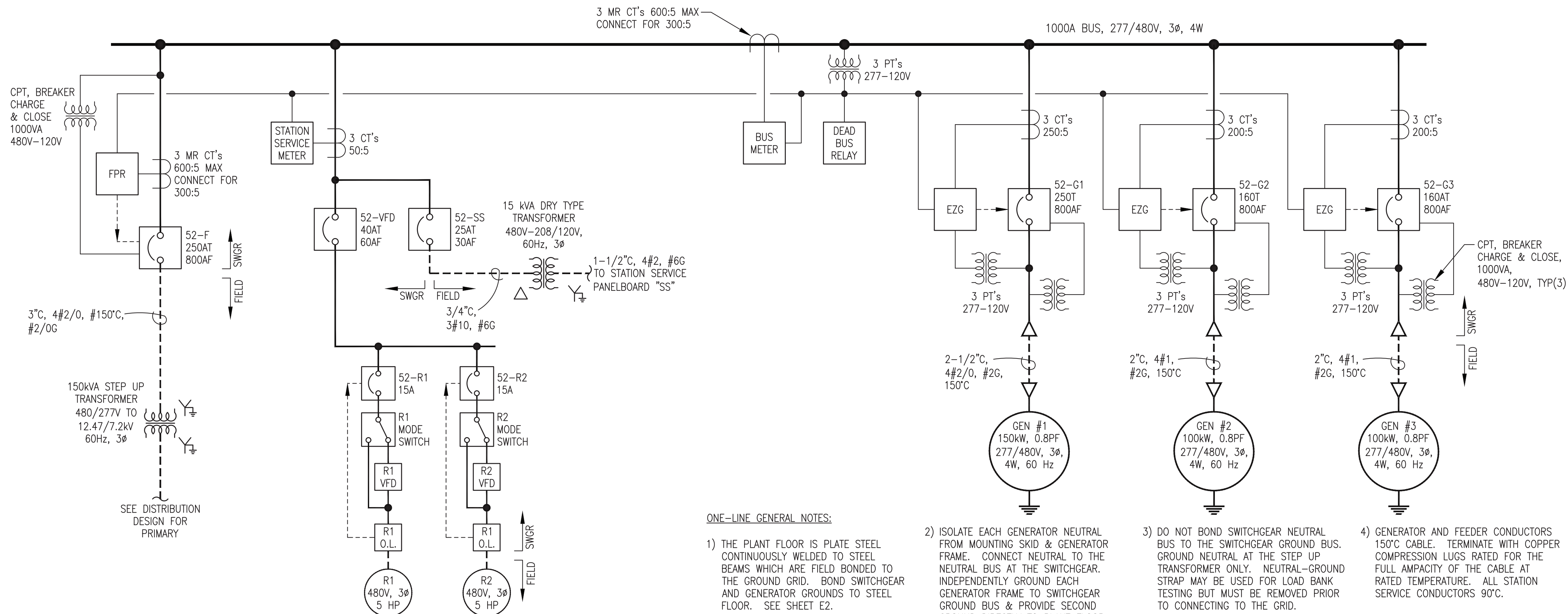
3 ARC FLASH LABELS
E6.1 NO SCALE



REV #1
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NOVEMBER
2021

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: SWITCHGEAR ENCLOSURE LAYOUT			
DRAWN BY: JTD		SCALE: NO SCALE	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E6		SHEET: E6.1 OF 9	
PROJECT NUMBER:			



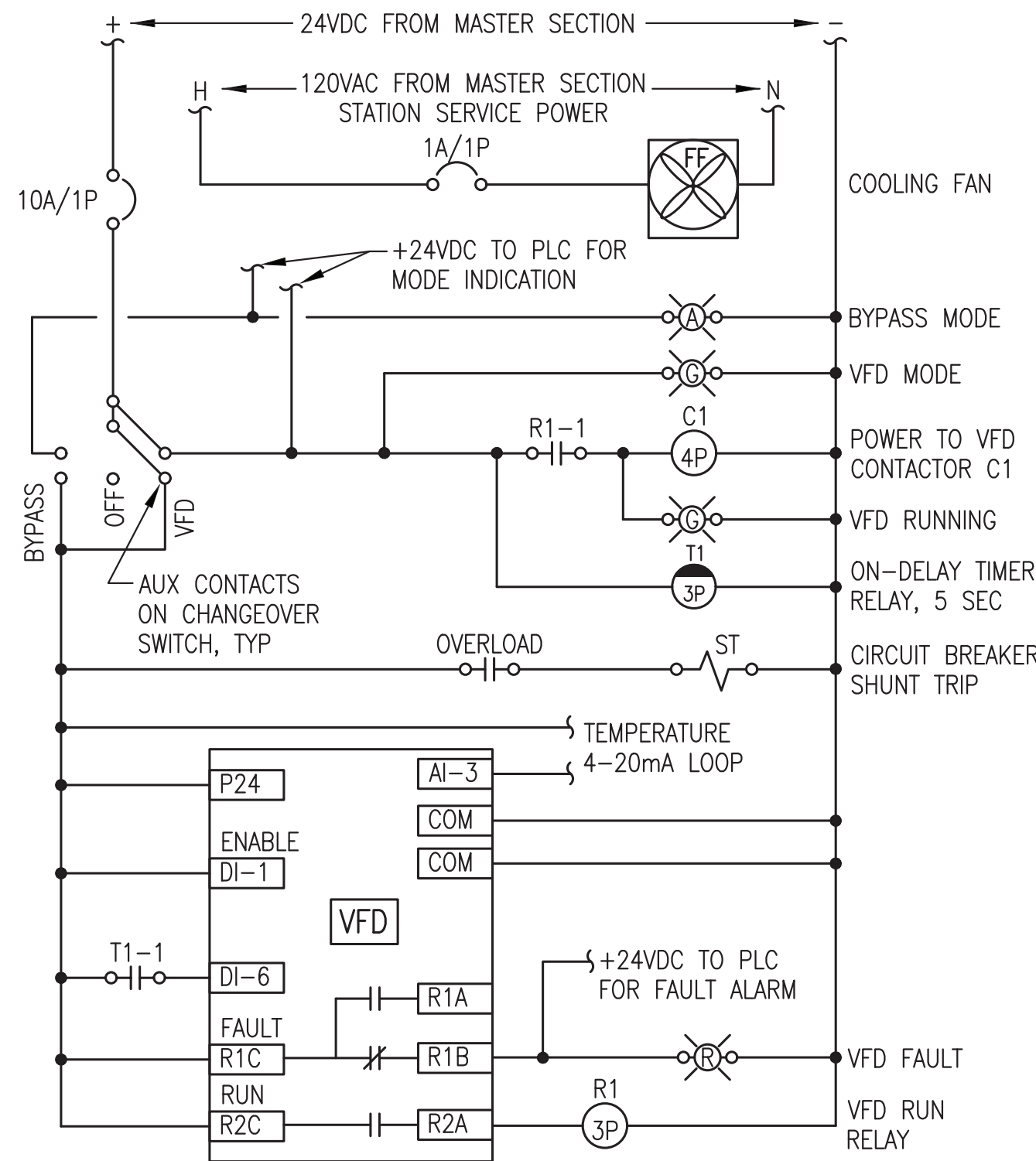
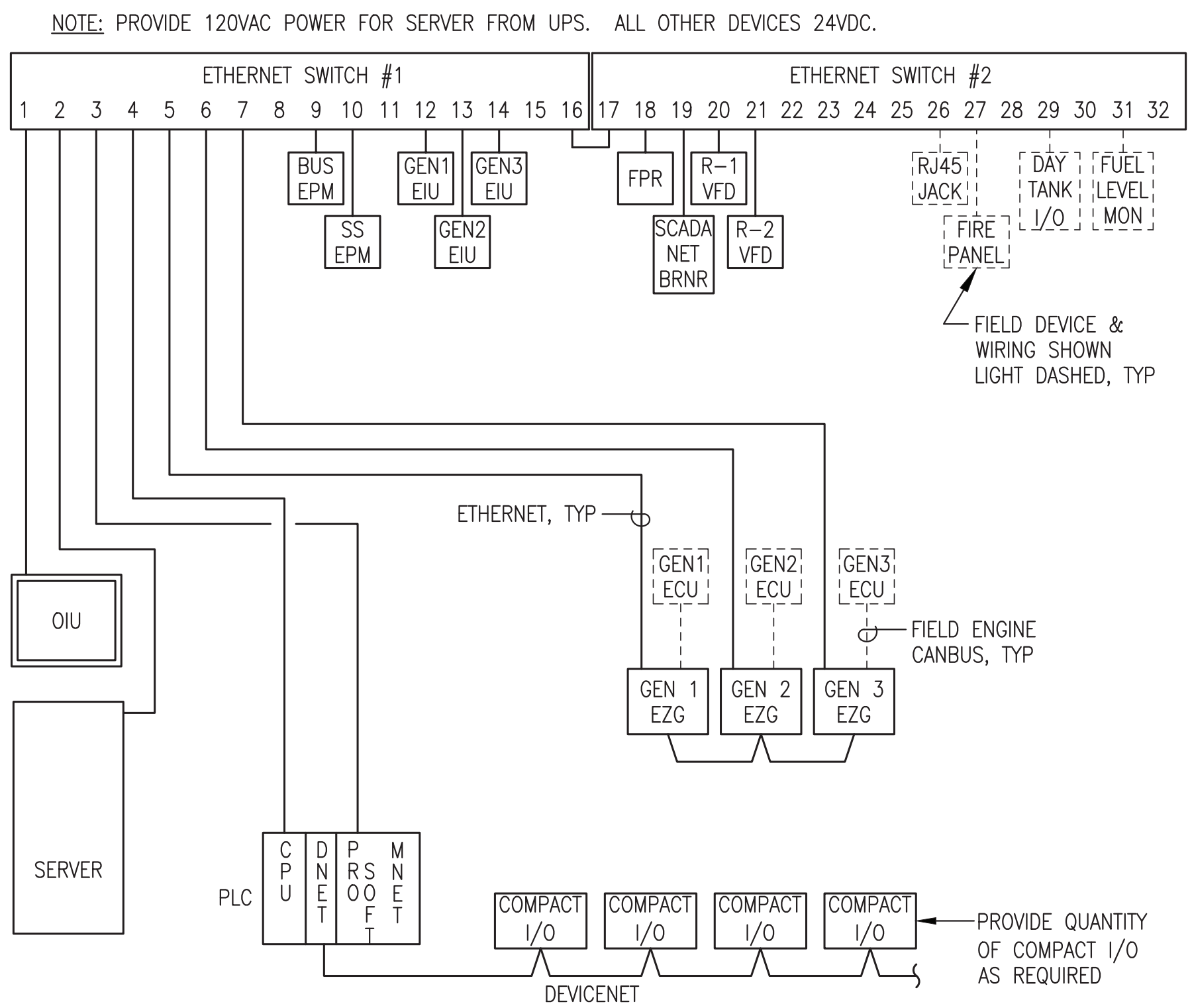


SWITCHGEAR SYMBOL LEGEND	
	TRANSFORMER PT=POTENTIAL XFRMR CPT=CONTROL POWER XFRMR
	CURRENT TRANSFORMER M.R. - INDICATES MULTIRATIO CT'S RATING FACTOR RF=2.0
	CIRCUIT BREAKER AT=AMP TRIP RATING AF=AMP FRAME RATING
	WOODWARD EASYPEN GENSET CONTROLLER
	FEEDER PROTECTION RELAY
	SHOP INSTALLED POWER WIRING/BUS
	FIELD INSTALLED POWER WIRING
	SHOP INSTALLED CONTROL WIRING

ONE-LINE GENERAL NOTES:

- 1) THE PLANT FLOOR IS PLATE STEEL CONTINUOUSLY WELDED TO STEEL BEAMS WHICH ARE FIELD BONDED TO THE GROUND GRID. BOND SWITCHGEAR AND GENERATOR GROUNDS TO STEEL FLOOR. SEE SHEET E2.
- 2) ISOLATE EACH GENERATOR NEUTRAL FROM MOUNTING SKID & GENERATOR FRAME. CONNECT NEUTRAL TO THE NEUTRAL BUS AT THE SWITCHGEAR. INDEPENDENTLY GROUND EACH GENERATOR FRAME TO SWITCHGEAR GROUND BUS & PROVIDE SECOND GROUND DIRECTLY TO PLANT FLOOR.
- 3) DO NOT BOND SWITCHGEAR NEUTRAL BUS TO THE SWITCHGEAR GROUND BUS. GROUND NEUTRAL AT THE STEP UP TRANSFORMER ONLY. NEUTRAL-GROUND STRAP MAY BE USED FOR LOAD BANK TESTING BUT MUST BE REMOVED PRIOR TO CONNECTING TO THE GRID.
- 4) GENERATOR AND FEEDER CONDUCTORS 150°C CABLE. TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT RATED TEMPERATURE. ALL STATION SERVICE CONDUCTORS 90°C.

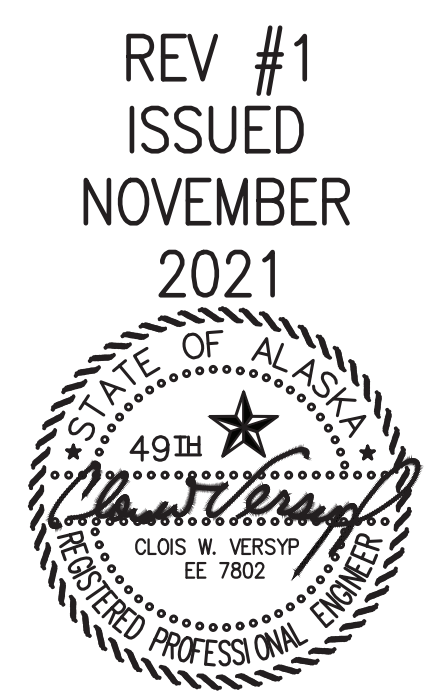
1 SWITCHGEAR ONE-LINE DIAGRAM
E6.2 NO SCALE



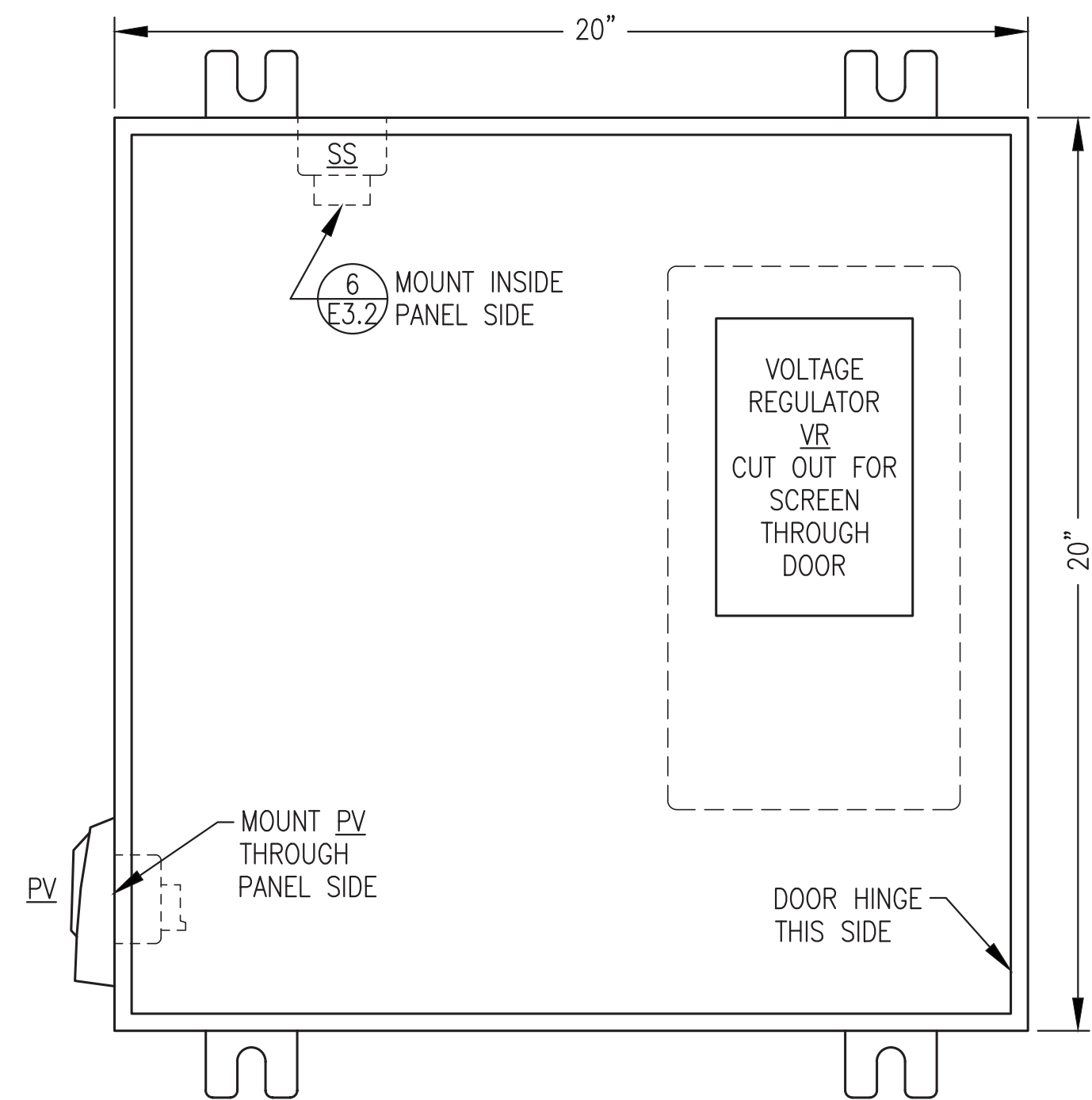
3 TYPICAL RADIATOR VFD LOGIC DIAGRAM
E6.2 NO SCALE

2 COMMUNICATION SCHEMATIC
E6.2 NO SCALE

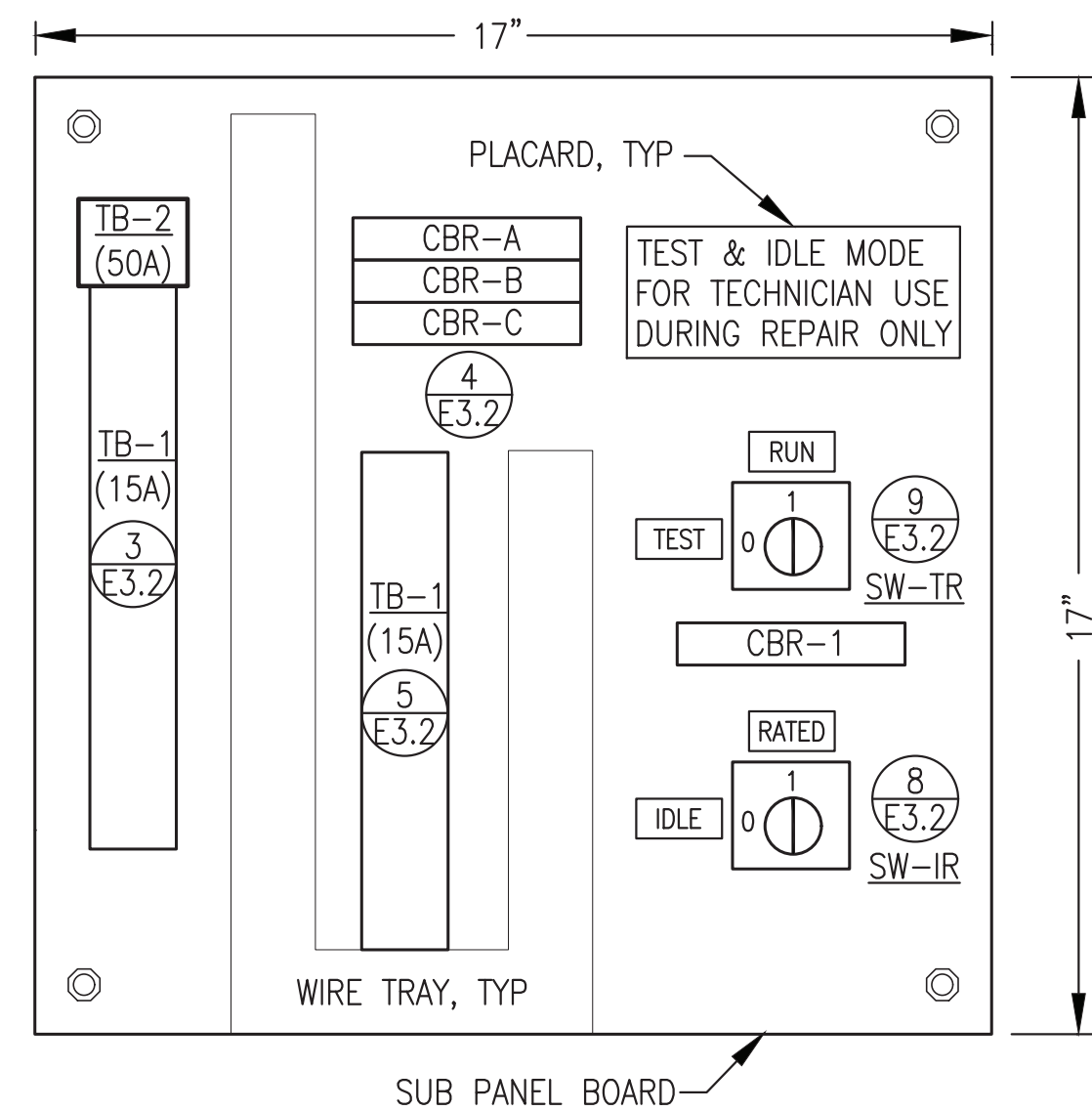
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: SWITCHGEAR ONE-LINE & SCHEMATICS			
DRAWN BY: JTD		SCALE: NO SCALE	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E6		SHEET: E6.2 OF 9	
PROJECT NUMBER: P.O. 111405, Anchorage, AK 99511 (907)349-0100			



REV #1
ISSUED
NOVEMBER
2021



1 JUNCTION BOX FRONT PANEL LAYOUT
E6.3 NO SCALE



2 JUNCTION BOX SUB PANEL LAYOUT
E6.3 NO SCALE

TAG	MANUFACTURER	MODEL	DESCRIPTION
CBR-A/B/C	ALLEN-BRADLEY	1489-M1-C010	RAIL MOUNT CIRCUIT BREAKER, 1P, 1A
CBR-1	ALLEN-BRADLEY	1489-M1-C050	RAIL MOUNT CIRCUIT BREAKER, 1P, 5A
ENCL.	HOFFMAN	A20H20ALP	20x20x8" NEMA 12
PV	HOFFMAN	A20P20	BACK PANEL
SS	MURPHY	PV101-C-MSTD	POWER VIEW W/HARNESS
SW-IR/SW-TR	CATERPILLAR	9X-8124	STARTER AUXILIARY SOLENOID, 24V
TB-1	ALLEN-BRADLEY	194L-A12-225-2	CHANGEOVER SWITCH, 12A, 2P
TB-2	ALLEN-BRADLEY	194L-HE-4A-175	90 DEGREE I-O HANDLE
VR	IDEC	BNH15LW	15A DIN RAIL-MOUNT TERMINAL BLOCK
	IDEC	BNH50W	50A DIN RAIL-MOUNT TERMINAL BLOCK
	BASLER	DECS-150 5NS1V1N1S	DIGITAL VOLTAGE REGULATOR

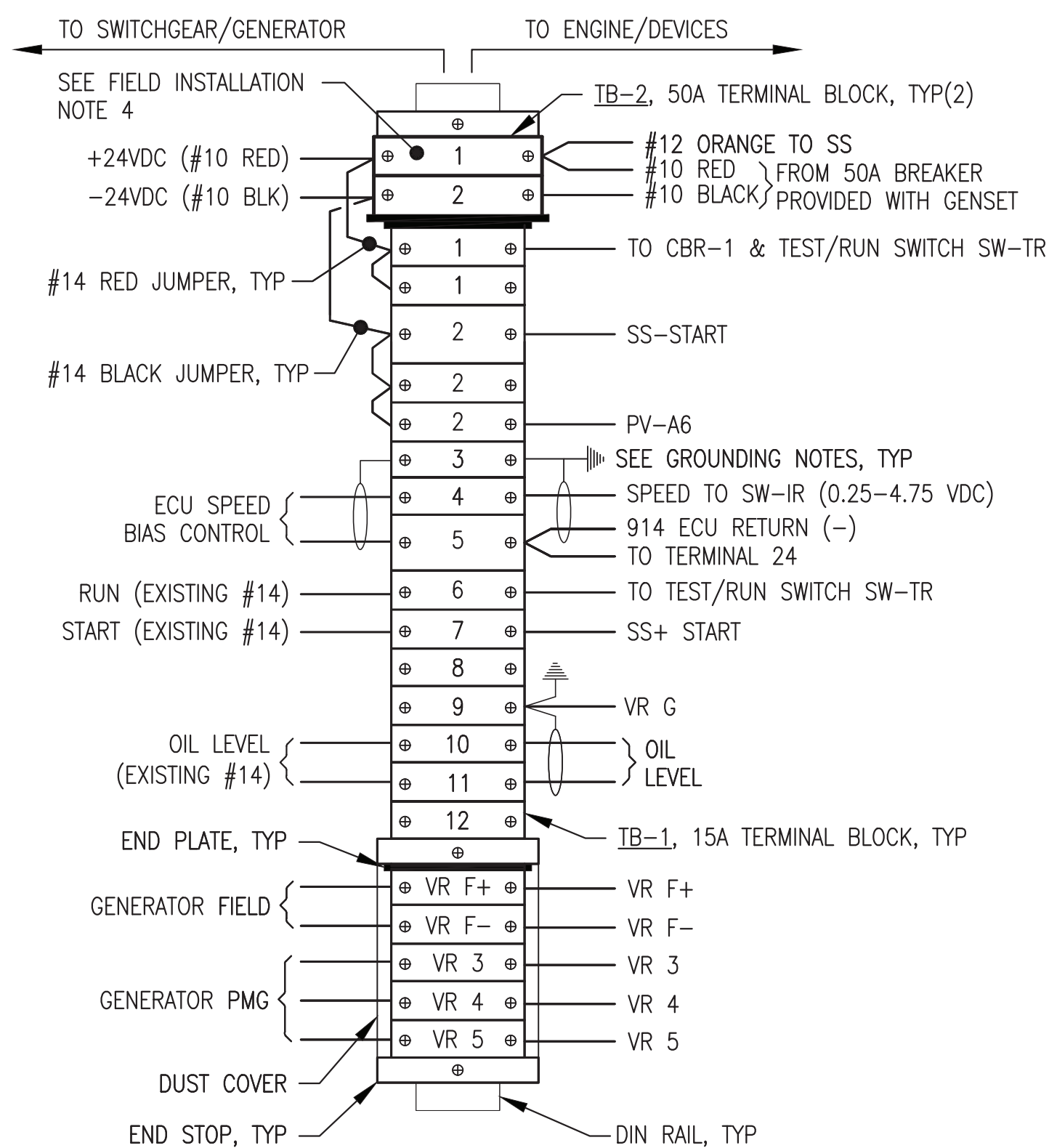
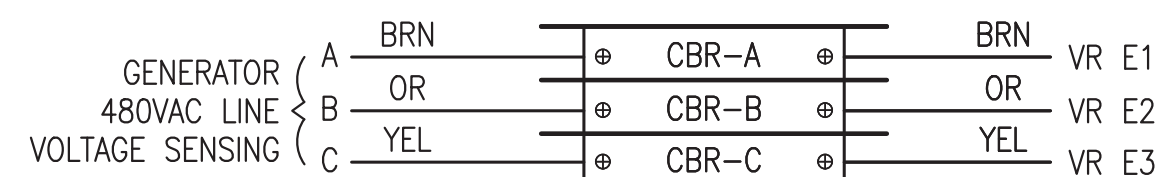
NOTE: SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

SHOP FABRICATION NOTES:

- PROVIDE ASSEMBLY WITH ALL DEVICES AND WIRING INDICATED.
- INSTALL IN A NEMA 12 ENCLOSURE WITH MOUNTING FLANGES AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL AND HINGED LOCKABLE DOOR. SIZE AS INDICATED.
- PROVIDE DIN RAIL, TERMINAL END PLATES, TERMINAL END STOPS, TERMINAL DUST COVERS AND OTHER MISCELLANEOUS HARDWARE AS REQUIRED TO MATCH TERMINALS. LABEL ALL TERMINALS EXACTLY AS INDICATED ON THE DETAILS.
- ALL WIRE #14AWG EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. LABEL BOTH ENDS OF ALL JUMPERS WITH THE ENGINE PANEL TERMINAL NUMBER.
- PROVIDE MECHANICAL GROUND LUGS FASTENED TO BACK PANEL AND GROUNDED TO ENGINE-GENERATOR. GROUND ALL SHIELD DRAIN WIRES TO LUGS AT PANEL END ONLY.
- PROVIDE WIRING HARNESSSES FOR CONNECTION TO GENERATOR AND TO ENGINE. INSTALL WIRES IN LIQUID TIGHT FLEX OR FLEXIBLE PLASTIC WIRE LOOM AND PROVIDE SERVICE LOOPS IN ACCORDANCE WITH SPECIFICATIONS.
- SHOP TEST EACH NEW ENGINE-GENERATOR WITH ASSOCIATED JUNCTION BOX PERMANENTLY CONNECTED. UPON COMPLETION OF TESTING, COIL WIRING HARNESSSES AND SECURE JUNCTION BOX TO GENERATOR FOR SHIPPING.

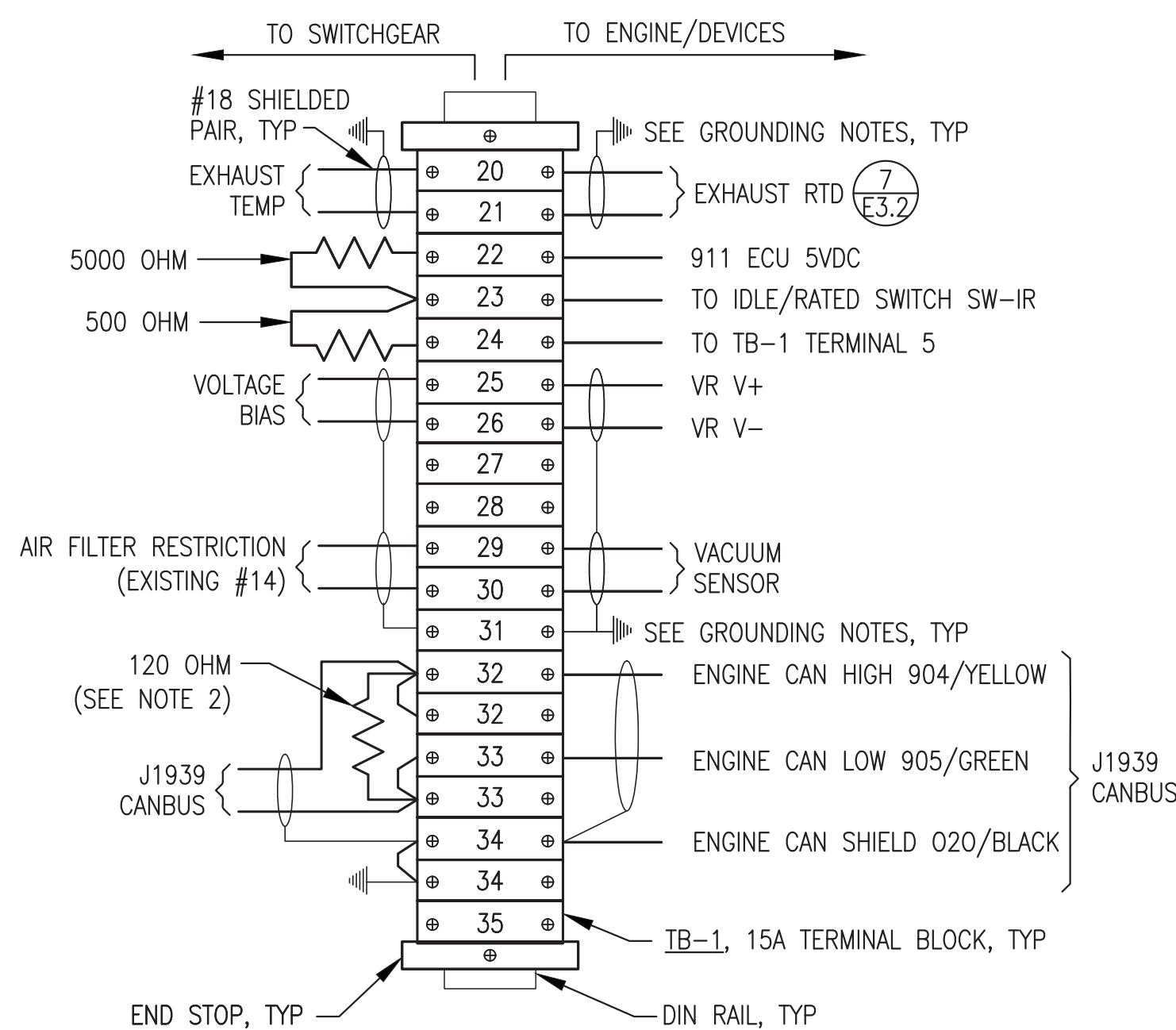
FIELD INSTALLATION NOTES:

- PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE ENGINE PANEL TERMINAL NUMBER.
- ON SHIELDED CONDUCTORS GROUND ALL SHIELD DRAIN WIRES TO LUGS AT PANEL END ONLY.



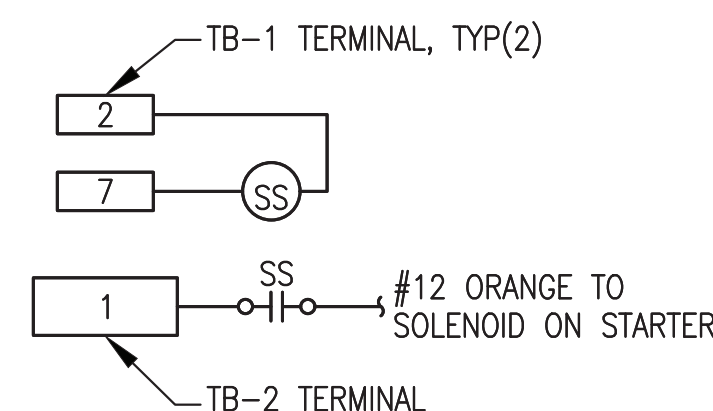
3 TERMINAL STRIP CONNECTIONS
E6.3 NO SCALE

4 CIRCUIT BREAKER CONNECTIONS
E6.3 NO SCALE

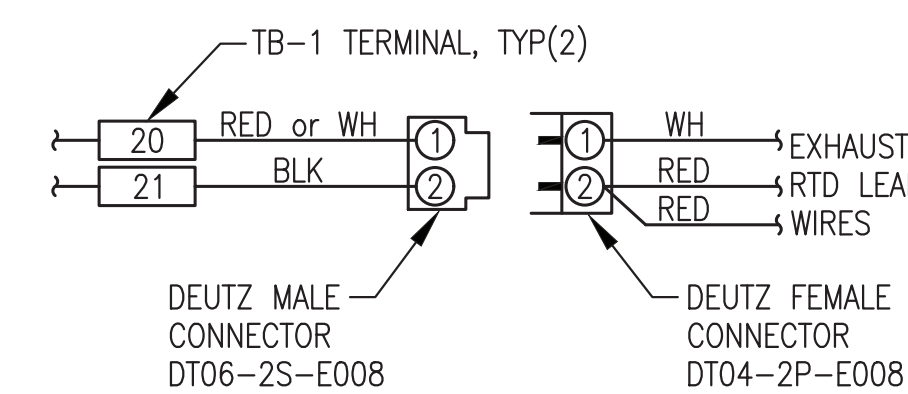


- NOTES: 1) ALL RESISTORS 0.25W.
2) REMOVE RESISTOR IF ENGINE WIRING HARNESS HAS 120 OHM END OF LINE RESISTOR.

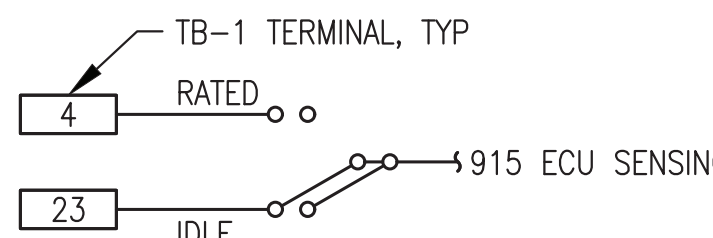
5 TERMINAL STRIP CONNECTIONS
E6.3 NO SCALE



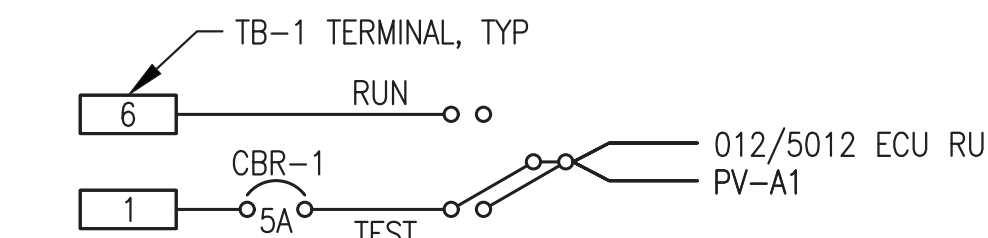
6 STARTER AUX SOLENOID SS WIRING
E6.3 NO SCALE



7 EXHAUST RTD CONNECTOR
E6.3 NO SCALE



8 IDLE/RATED SWITCH SW-IR WIRING
E6.3 NO SCALE

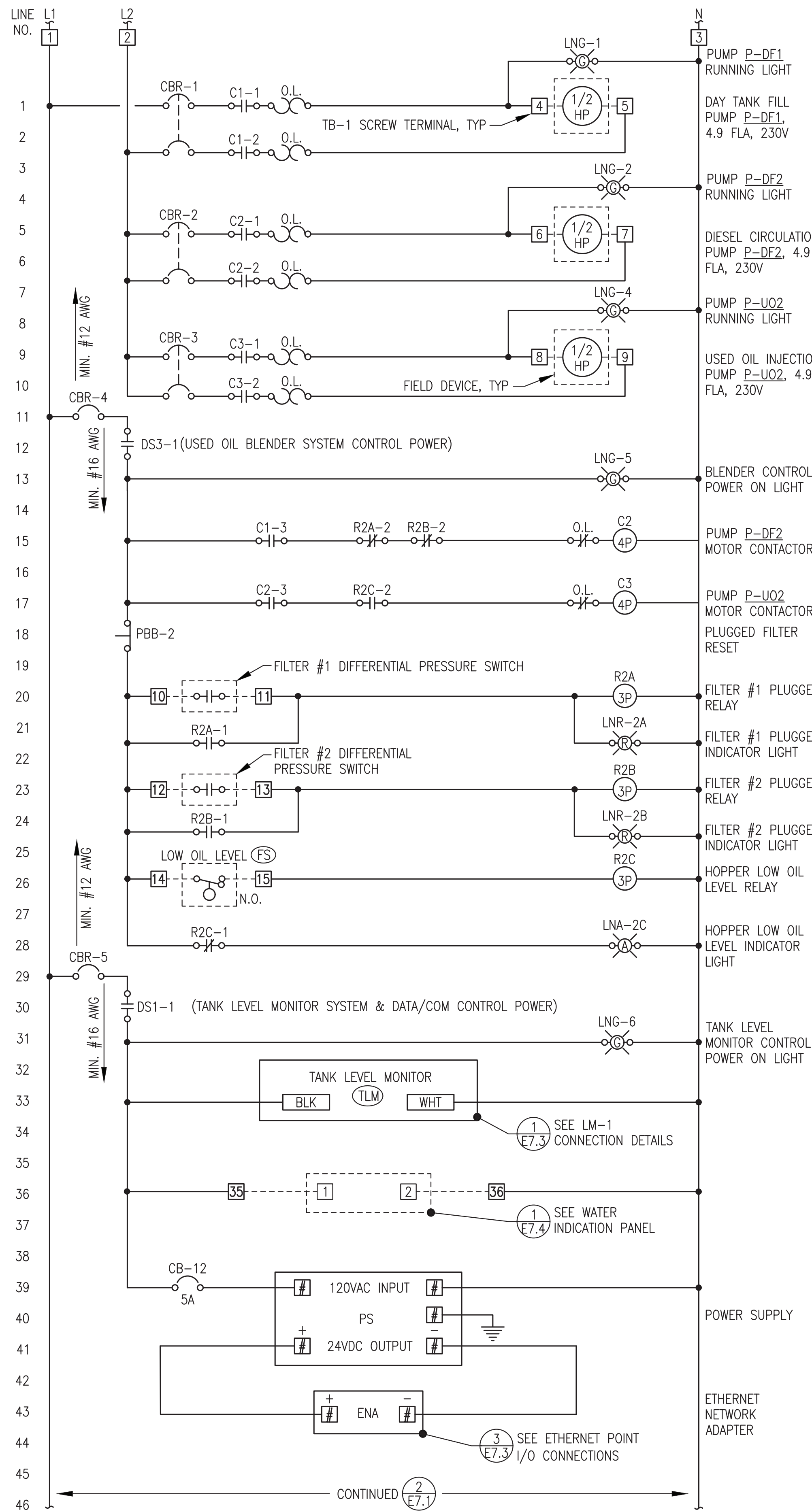


9 TEST/RUN SWITCH SW-TR WIRING
E6.3 NO SCALE

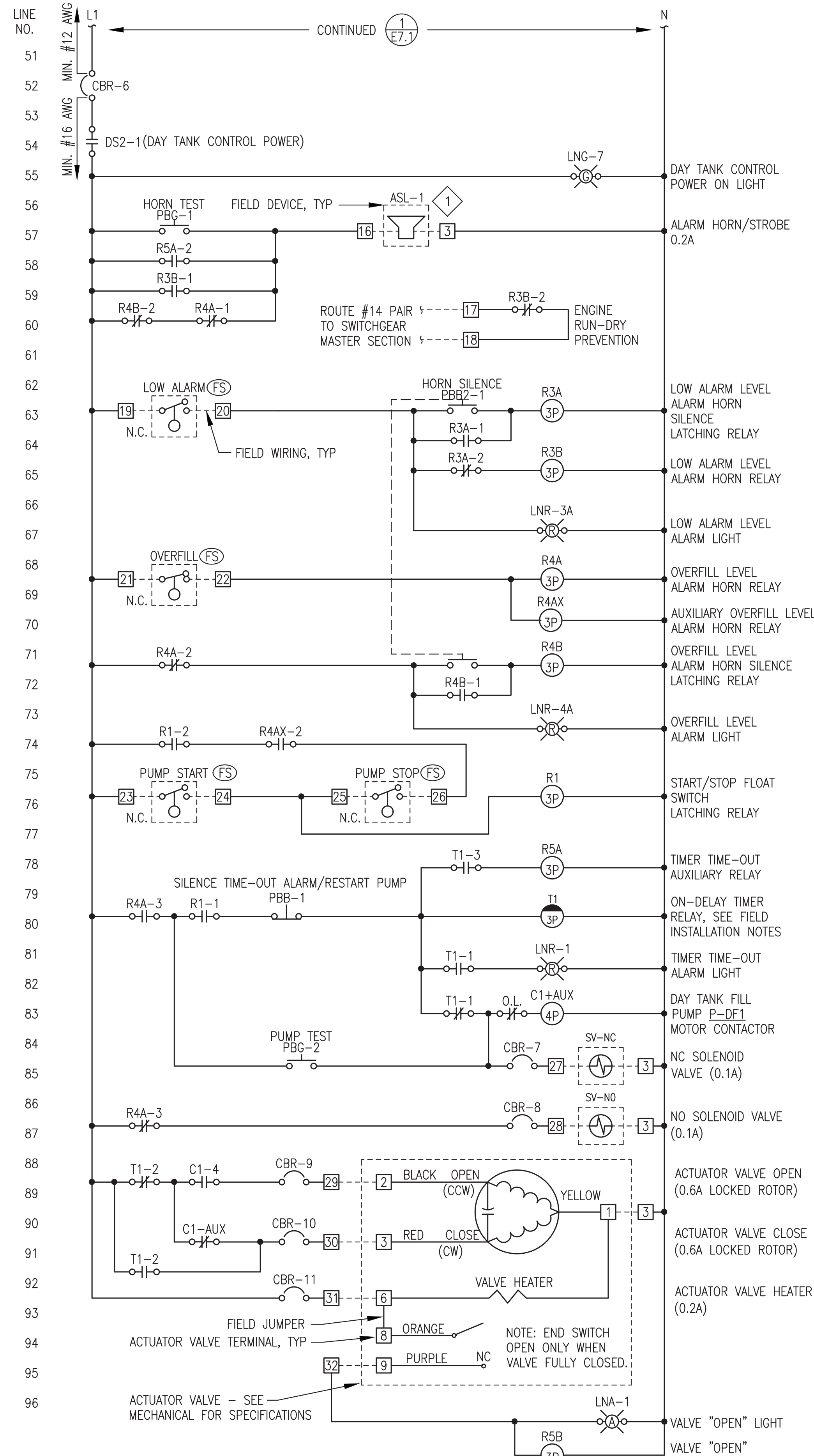
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: 24VDC ENGINE WIRING JUNCTION BOX			
DRAWN BY: JTD		SCALE: NO SCALE	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E6		SHEET: E6.3 OF 9	
PROJECT NUMBER: P.O. 111405, Anchorage, AK 99511 (907)349-0100			



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NOVEMBER
2021



1 USED OIL BLENDER SYSTEM LOGIC DIAGRAM
E7.1 NO SCALE



2 DAY TANK LOGIC DIAGRAM
E7.1 NO SCALE

BILL OF MATERIALS

NOTE: ON THIS SHEET AND THE PANEL DRAWINGS THAT FOLLOW SPECIFIC PARTS MANUFACTURER AND MODEL ARE SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

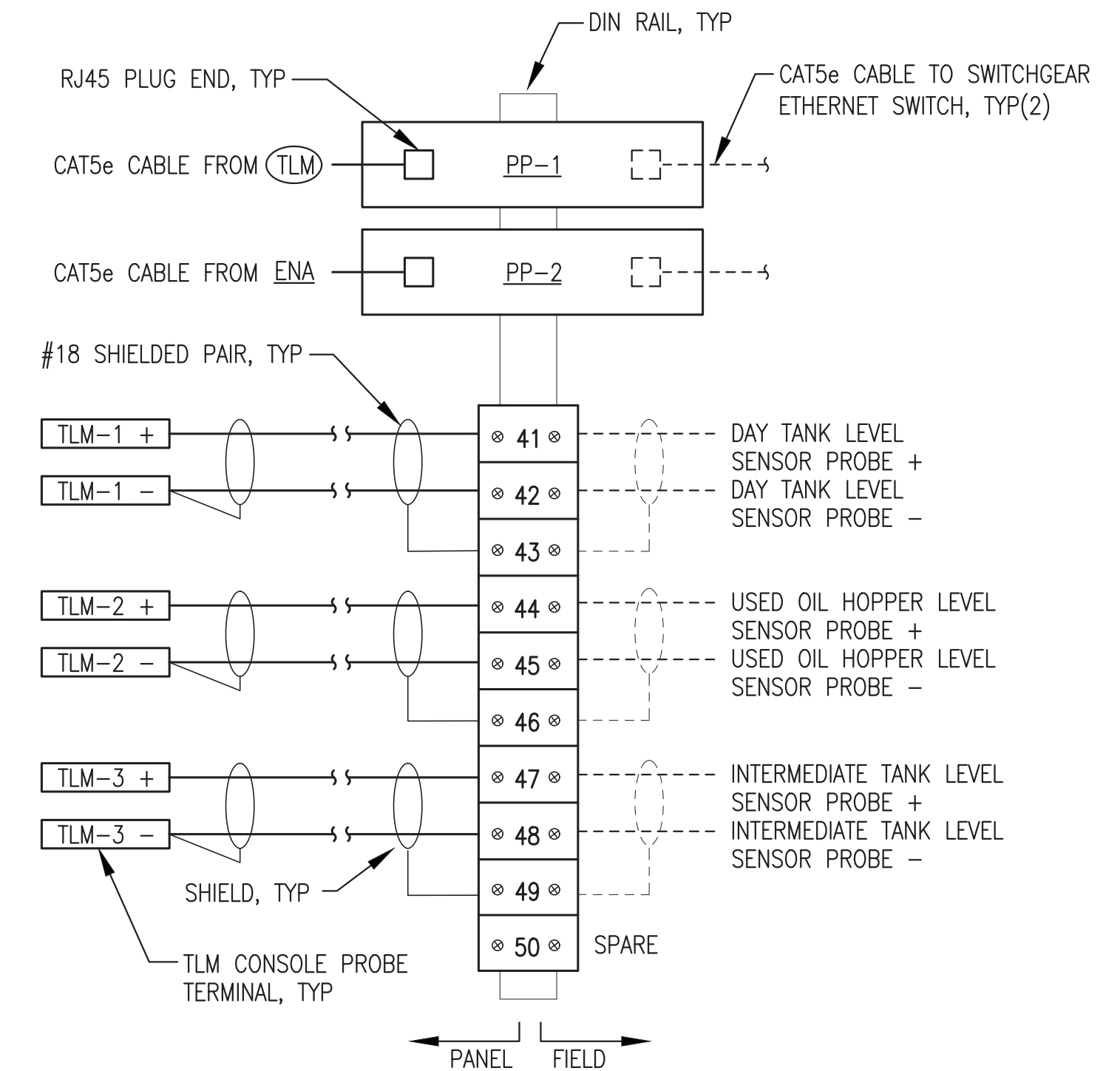
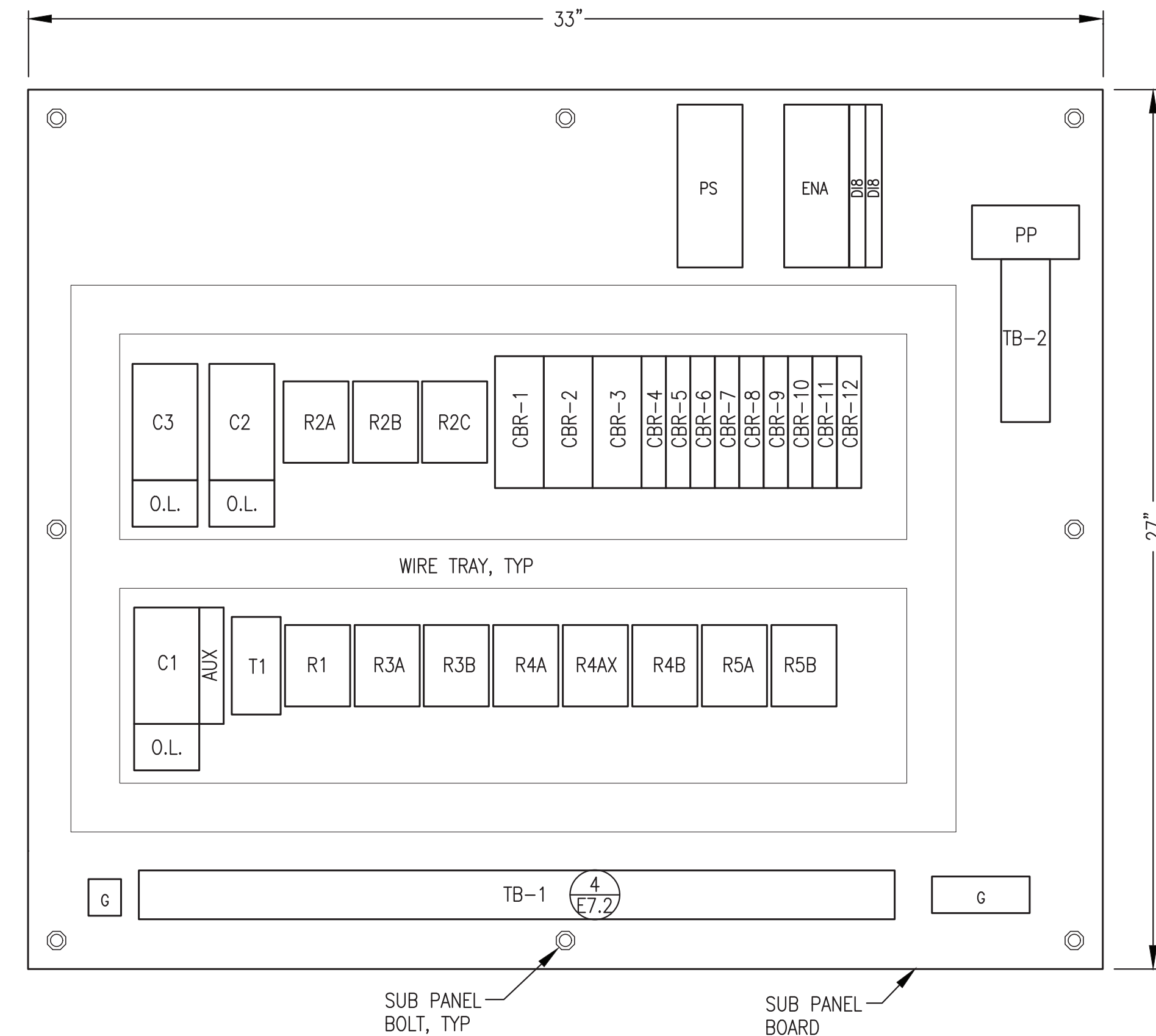
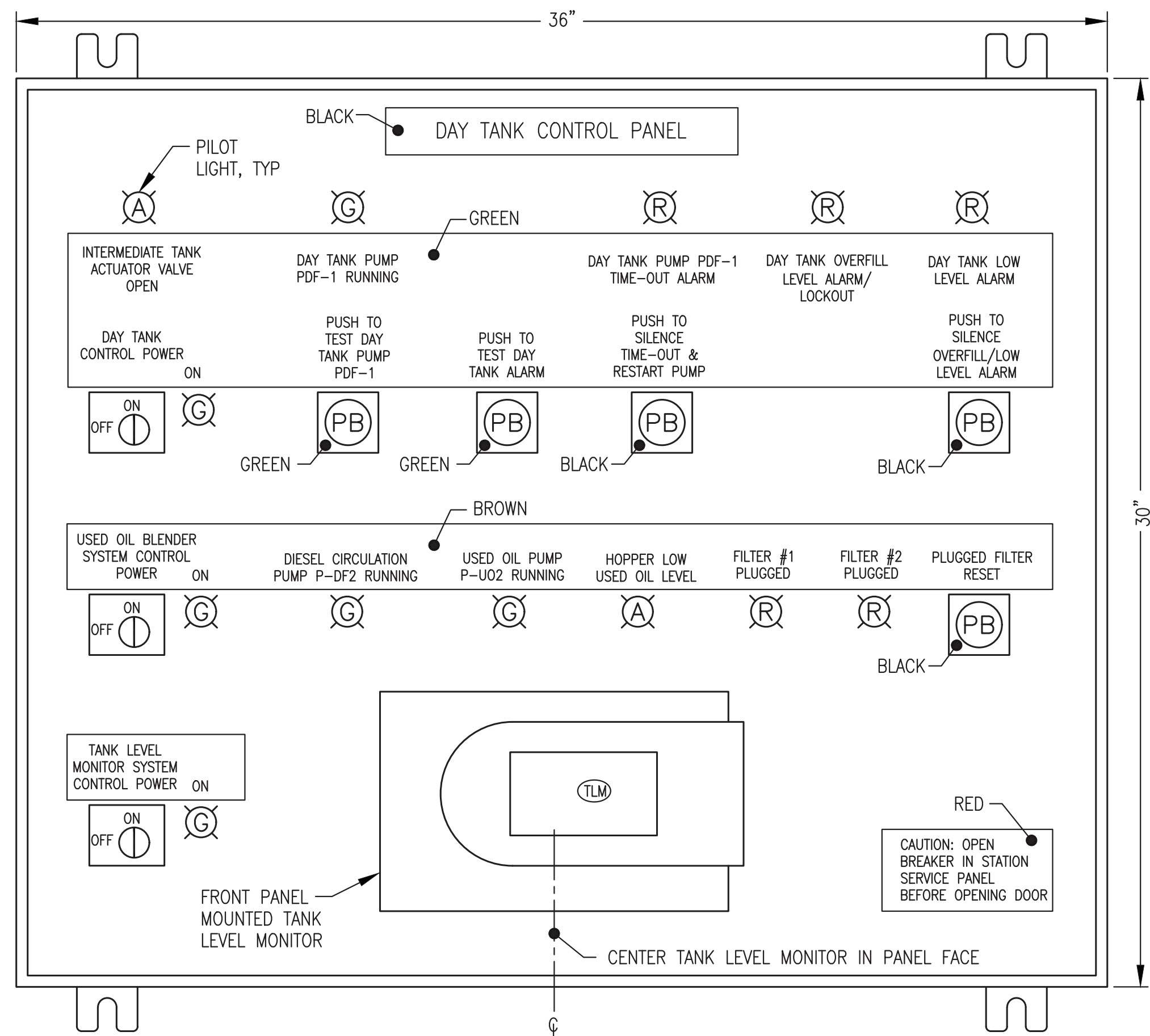
TAG	MANUFACTURER	MODEL	DESCRIPTION
AUX C	ALLEN-BRADLEY	100SA11	AUXILIARY CONTACT FOR CONTACTOR, 2 POLE, NO, NC CONTACTOR, 120V COIL, 9A, 4 POLE
CBR-1,2,3	ALLEN-BRADLEY	1489-M2-C150	RAIL-MOUNT CIRCUIT BREAKER, 2 POLE, 15A
CBR-4,5,6,12	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CBR-7,8,9,10,11	ALLEN-BRADLEY	1489-M1-C010	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 1A
DS	ALLEN-BRADLEY	194LE201753	DISCONNECT, 2 POSITION, 3 N.O., 20A, FACE MOUNT
ENA	ALLEN-BRADLEY	194LHC4E1751	KNOB ACTUATOR FOR LOAD SWITCH, ON/OFF, LOCKABLE
Di8	ALLEN-BRADLEY	1734-AENTR	I/O DUAL PORT ETHERNET NETWORK ADAPTER
LNG	ALLEN-BRADLEY	1734-IB8	DIGITAL INPUT MODULE, 24VDC, 8 POINT, SINKING
LNR	ALLEN-BRADLEY	800HQRH2G	GREEN LED PILOT LIGHT, 12-130V, NEMA 4X
LNA	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-130V, NEMA 4X
OL	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-130V, NEMA 4X
PBB	ALLEN-BRADLEY	193-1EEDB	OVERLOAD, 230V, 1#, ADJUSTABLE 3.2A-16.0A RANGE
PBB2	ALLEN-BRADLEY	800HAR2D2	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, BLACK
PBG	ALLEN-BRADLEY	800HAR2A2	MOMENTARY PUSH BUTTON, 2 NO, NEMA 4X, BLACK
PP	ALLEN-BRADLEY	800HAR1D1	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, GREEN
R	PHOENIX CONTACTS	FLPPRJ45/RJ45	ETHERNET PATCH PANEL, RJ45xRJ45, DIN RAIL MOUNT
	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
T	ALLEN-BRADLEY	700HN101	11 PIN SOCKET BASE
	ALLEN-BRADLEY	700HT3	SERIES B TIMING MODULE
	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN205	11 PIN RELAY SOCKET BASE FOR TIMER
TB-1,2	ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS
(TLM)			TANK LEVEL MONITOR, SEE INSTRUMENTATION SCHEDULE ON SHEET M1.1

LEGEND

—	PANEL WIRING	---	FIELD WIRING	O.L.	OVERLOADS
R#	CONTROL RELAY	R#-#	NORMALLY OPEN CONTACT	PB-#	NORMALLY OPEN MOMENTARY PUSH BUTTON
T#	TIME DELAY RELAY	SS-#	2-POSITION SELECTOR SWITCH	PB-#	NORMALLY CLOSED MOMENTARY PUSH BUTTON
C#	CONTACTOR	R#-#	NORMALLY CLOSED CONTACT	SV#	SOLENOID VALVE
#	TERMINAL BLOCK	SW-#	NORMALLY OPEN FLOAT SWITCH	ASL-#	ALARM & STROBE LIGHT
CB-#	CIRCUIT BREAKER	SW-#	NORMALLY CLOSED FLOAT SWITCH		

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
<p>ALASKA ENERGY AUTHORITY</p>			
<p>PROJECT: NIKOLAI POWER SYSTEM UPGRADE</p>			
<p>TITLE: DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS</p>			
DRAWN BY: BCG/JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E7		SHEET: E7.1 OF 9	
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

REV #1
ISSUED
NOVEMBER
2021



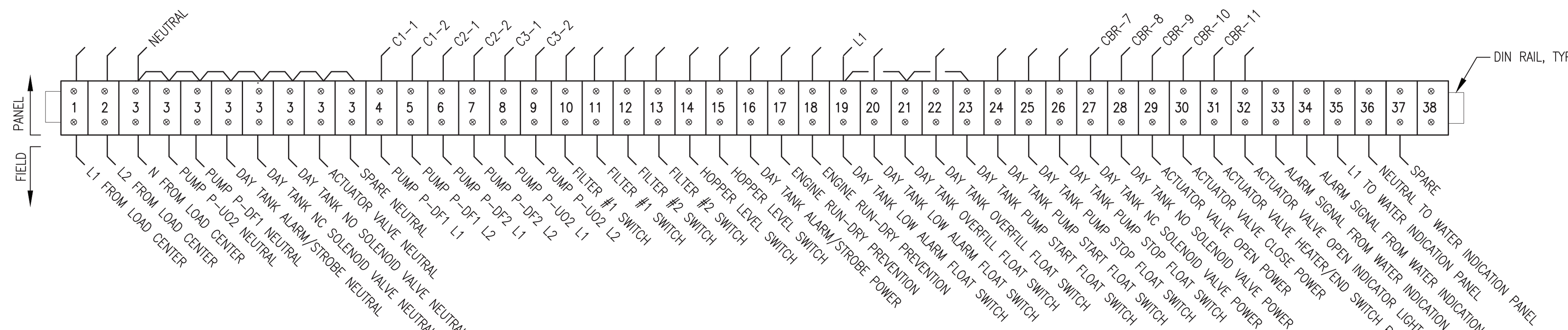
NOTES:

- INSTALL TERMINAL STRIP TB-2 AND ETHERNET PATCH PANEL PP-1 ON VERTICAL DIN RAIL AS SHOWN. LOCATE TERMINAL STRIP IN THE UPPER RIGHT CORNER OF PANEL TO ACCOMMODATE CONDUCTOR ENTRY THROUGH RIGHT SIDE OF PANEL, SEE SUB-PANEL LAYOUT.

1 FRONT PANEL LAYOUT
E7.2 NO SCALE

2 SUB PANEL LAYOUT
E7.2 NO SCALE

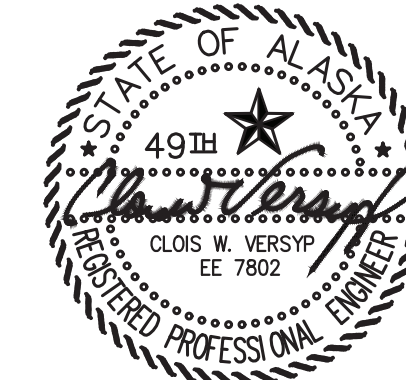
3 TB-2 TERM STRIP LAYOUT
E7.2 NO SCALE



- NOTES:
- INSTALL TERMINAL STRIP TB-1 ON HORIZONTAL DIN RAIL AS SHOWN. LOCATE TERMINAL STRIP BELOW PANEL DEVICES TO ACCOMMODATE CONDUCTOR ROUTING FROM CONDUITS CONNECTING TO BOTTOM OF PANEL, SEE SUB-PANEL LAYOUT.
 - IN ADDITION TO THE TERMINAL STRIPS SHOWN, PROVIDE 6 EACH 35A SCREW TERMINAL GROUNDING BUS.

4 TB-1 TERMINAL STRIP LAYOUT
E7.2 NO SCALE

REV #1
ISSUED
NOVEMBER
2021



1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
<p>ALASKA ENERGY AUTHORITY</p>			
<p>PROJECT: NIKOLAI POWER SYSTEM UPGRADE</p>			
<p>TITLE: DAY TANK CONTROL PANEL LAYOUT & TERMINAL STRIPS</p>			
DRAWN BY: BCG/JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E7		SHEET: E7.2 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



PANEL NOTES:

- 1) PROVIDE COMPLETE LISTED PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM EXCEPT FOR FIELD DEVICES. INSTALL IN A NEMA 12 ENCLOSURE WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK. SEE SHEET E7.2 FOR PANEL LAYOUT DETAILS.
- 2) USE MIN #12 WIRE FOR ALL CIRCUITS UP TO FIRST IN-LINE PANEL BREAKERS (FOR 20A FEED). USE MIN #16 AWG ON ALL 5 AMP CIRCUITS AND MIN #14 AWG WIRE ON ALL 15A CIRCUITS. TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).
- 3) LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING. PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES AS SHOWN ON THE PANEL FACE LAYOUT AND SECURE TO PANEL FACE WITH A MINIMUM OF TWO STAINLESS STEEL MOUNTING SCREWS, COLOR AS INDICATED.
- 4) BENCH TEST COMPLETED UNIT. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES.
- 5) DEVICES AND WIRING NOTED AS "FIELD" AND SHOWN WITH DASHED LINES WILL BE FIELD INSTALLED AND ARE NOT PART OF THE PANEL SHOP FABRICATION. FOR BENCH TEST, PROVIDE TEMPORARY DEVICES AND WIRING AS REQUIRED TO SIMULATE FIELD DEVICES.
- 6) POWER TO PANEL PROVIDED FROM DEDICATED 20A 2-POLE CIRCUIT BREAKER IN LISTED LOAD CENTER. SEE FIELD INSTALLATION NOTE #3.

FIELD INSTALLATION NOTES:

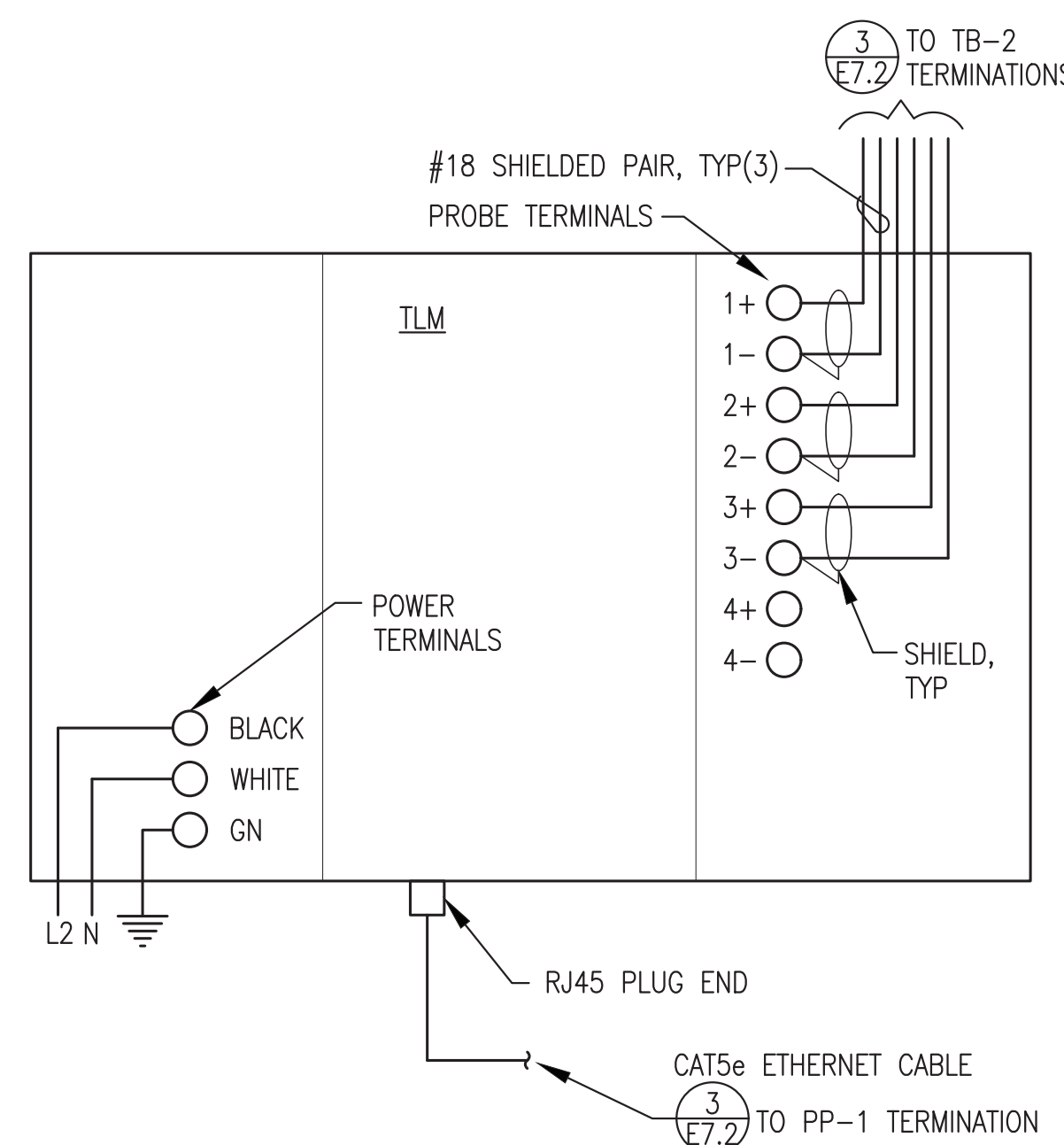
- 1) SEE MECHANICAL FOR DAY TANK INSTALLATION & PIPING. INSTALL CONTROL PANEL & FIELD DEVICES AS INDICATED TO PROVIDE REDUNDANT HIGH & LOW LIMIT CONTROLS & OVERFILL PROTECTION.
- 2) FIELD WIRING TO FLOAT SWITCHES, SOLENOID VALVES, ACTUATOR VALVE, & ALARM HORN #14 AWG. ALL OTHER FIELD WIRING #12 AWG. LABEL BOTH ENDS OF ALL CONDUCTORS WITH CONTROL PANEL TERMINAL BLOCK TERMINATION NUMBERS. WHEN NOT IN CONDUIT, MAKE JACKETED COM CABLE ENCLOSURE ENTRIES WITH CABLE GLAND CONNECTORS.
- 3) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS ON SHEET E2. PROVIDE POWER TO DAY TANK PANEL FROM DEDICATED 20A 2-POLE CIRCUIT BREAKER IN STATION SERVICE PANELBOARD.
- 4) VERIFY THAT ALL DAY TANK FLOAT SWITCHES ARE ORIENTED FOR N.C. (OPEN ON RISE) OPERATION PRIOR TO INSTALLATION. ALL FLOATS SHOWN ON LOGIC DIAGRAM WITH TANK AT FULL (PUMP STOP) LEVEL. VERIFY THAT THE HOPPER FLOAT SWITCH IS ORIENTED FOR N.O. (CLOSE ON RISE) OPERATION.
- 5) FILL PUMP CAVITIES WITH LUBE OIL PRIOR TO INITIAL OPERATION. VERIFY PROPER ROTATION OF PUMPS. PRIME SYSTEM WITH HAND PRIMING PUMP PRIOR TO BEGINNING DAY TANK FILL.
- 6) FIELD TEST COMPLETED UNIT TO VERIFY ALL CONTROL AND ALARM FUNCTIONS. MANIPULATE FLOAT SWITCHES BY REACHING IN THROUGH ADJACENT 4" BUNG. TEMPORARILY SET TIMING RELAY TO 30 SECONDS TO VERIFY TIME-OUT AND RESET FUNCTIONS.
- 7) SET TIMING RELAY TIME DELAY TO 30 MINUTES (APPROX. 55 GALS. REQUIRED FROM PUMP START TO PUMP STOP LEVEL @ APPROX. 4 GPM). ON THE INITIAL TANK FILL, THE PUMP TEST/RESET BUTTON MAY HAVE TO BE MANUALLY RESET IN ORDER TO GET THE FUEL LEVEL TO WITHIN THE NORMAL OPERATING RANGE. SEE SEQUENCE OF OPERATIONS.

DAY TANK FILL SEQUENCE OF OPERATIONS:

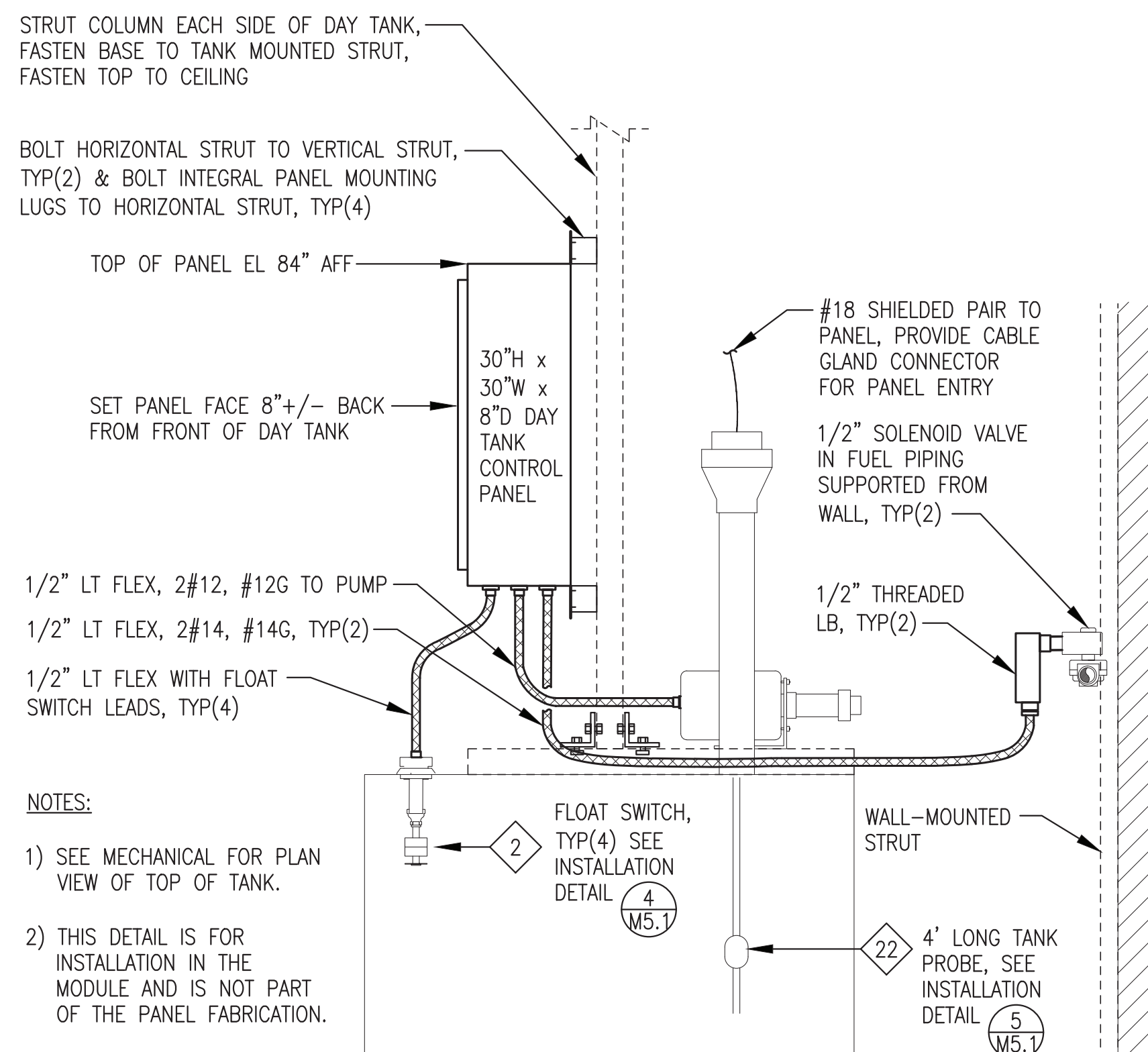
- 1) WHEN THE DAY TANK CIRCUIT BREAKER AND CONTROL POWER SWITCH ARE CLOSED, THE POWER LIGHT IS ON AND POWER IS PROVIDED TO THE REMOTE ACTUATOR VALVE HEATER/OPEN LIGHT CIRCUIT.
- 2) WHEN THE DAY TANK IS NOT CALLING FOR FUEL, POWER IS PROVIDED TO THE REMOTE ACTUATOR VALVE CLOSE CIRCUIT. WHEN THE ACTUATOR IS IN THE FULLY CLOSED POSITION, THE CLOSING CIRCUIT IS BROKEN BY INTERNAL ACTUATOR LIMIT SWITCH #2 AND THE REMOTE ACTUATOR VALVE "OPEN" LIGHT IS OFF.
- 3) NORMAL FILL OPERATION - WHEN THE FUEL LEVEL DROPS TO THE "PUMP START" SWITCH, THE TIMER IS STARTED, THE N.C. DAY TANK SOLENOID VALVE OPENS, THE REMOTE ACTUATOR VALVE OPENS & THE VALVE "OPEN" LIGHT TURNS ON, THE DAY TANK PUMP IS ENERGIZED, THE PUMP "ON" LIGHT TURNS ON, AND THE USED OIL BLENDER RUN SIGNAL DRY CONTACT CLOSURES. WHEN THE ACTUATOR IS IN THE FULLY OPEN POSITION, THE OPENING CIRCUIT IS BROKEN BY INTERNAL ACTUATOR LIMIT SWITCH #7 AND THE REMOTE ACTUATOR VALVE "OPEN" LIGHT REMAINS ON. WHEN FUEL REACHES THE "PUMP STOP" FLOAT SWITCH BEFORE THE TIMER TIMES-OUT, THE TIMER IS RESET, THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE REMOTE ACTUATOR VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, AND THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS.
- 4) TIMER OPERATION - IF THE TIMER TIMES-OUT THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE REMOTE ACTUATOR VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS, THE "TIME-OUT" ALARM LIGHT TURNS ON, AND THE TIME-OUT ALARM HORN SOUNDS. PRESSING THE "TIME-OUT ALARM SILENCE / PUMP RESTART" BUTTON RESETS THE TIMER, SILENCES THE ALARM HORN, AND STARTS THE NORMAL FILL OPERATION. SEE FIELD INSTALLATION NOTES FOR TIMER SETTING.
- 5) OVERFILL FUEL LEVEL - IF THE TANK OVERFILLS AND THE FUEL LEVEL REACHES THE "OVERFILL" FLOAT SWITCH, THE N.O. DAY TANK SOLENOID VALVE CLOSURES, THE "OVERFILL LEVEL" ALARM LIGHT TURNS ON, THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS, THE "OVERFILL LEVEL" ALARM LIGHT TURNS ON, AND THE ALARM HORN SOUNDS. PRESSING THE LEVEL ALARM HORN "SILENCE" BUTTON SILENCES THE ALARM HORN WHILE LEAVING THE "OVERFILL LEVEL" ALARM LIGHT ON. WHEN THE FUEL LEVEL FALLS BELOW THE "OVERFILL" FLOAT SWITCH, THE "OVERFILL LEVEL" ALARM LIGHT TURNS OFF, THE N.O. DAY TANK SOLENOID VALVE OPENS AND THE ALARM HORN TURNS OFF (IF NOT PREVIOUSLY SILENCED). WHEN THE FUEL LEVEL REACHES THE "PUMP START" FLOAT SWITCH, THE NORMAL FILL OPERATION IS REPEATED.
- 6) LOW FUEL LEVEL - IF THE FUEL LEVEL FALLS BELOW THE "LOW ALARM" FLOAT SWITCH, THE "LOW FUEL LEVEL" ALARM LIGHT TURNS ON, THE ENGINE RUN-DRY PREVENTION DRY CONTACT OPENS, AND THE ALARM HORN SOUNDS. THE LEVEL ALARM HORN "SILENCE" BUTTON SILENCES THE ALARM HORN WHILE LEAVING THE "LOW FUEL LEVEL" ALARM LIGHT ON. WHEN THE FUEL LEVEL RISES ABOVE THE "LOW ALARM" FLOAT SWITCH THE "LOW FUEL LEVEL" ALARM LIGHT TURNS OFF, THE ENGINE RUN-DRY PREVENTION DRY CONTACT CLOSURES, AND THE ALARM HORN TURNS OFF (IF NOT PREVIOUSLY SILENCED).
- 7) PUMP & HORN TEST - MOMENTARY CONTACT BUTTONS ARE PROVIDED TO TEST FUNCTION OF THE DAY TANK PUMP AND ALARM HORN. PRESSING THE "PUSH TO TEST DAY TANK PUMP" BUTTON STARTS THE TIMER, MOMENTARILY OPENS THE N.C. DAY TANK SOLENOID VALVE & ACTUATED BALL VALVE, ENERGIZES THE DAY TANK PUMP, TURNS ON THE DAY TANK PUMP "RUNNING" LIGHT AND CLOSURES THE USED OIL BLENDER RUN SIGNAL DRY CONTACT. THE "PUSH TO TEST DAY TANK PUMP" BUTTON IS LOCKED OUT IF THE DAY TANK IS AT THE OVERFILL LEVEL. PRESSING THE "PUSH TO TEST DAY TANK ALARM" BUTTON MOMENTARILY ENERGIZES THE ALARM HORN/STROBE.

USED OIL BLENDER SYSTEM SEQUENCE OF OPERATIONS:

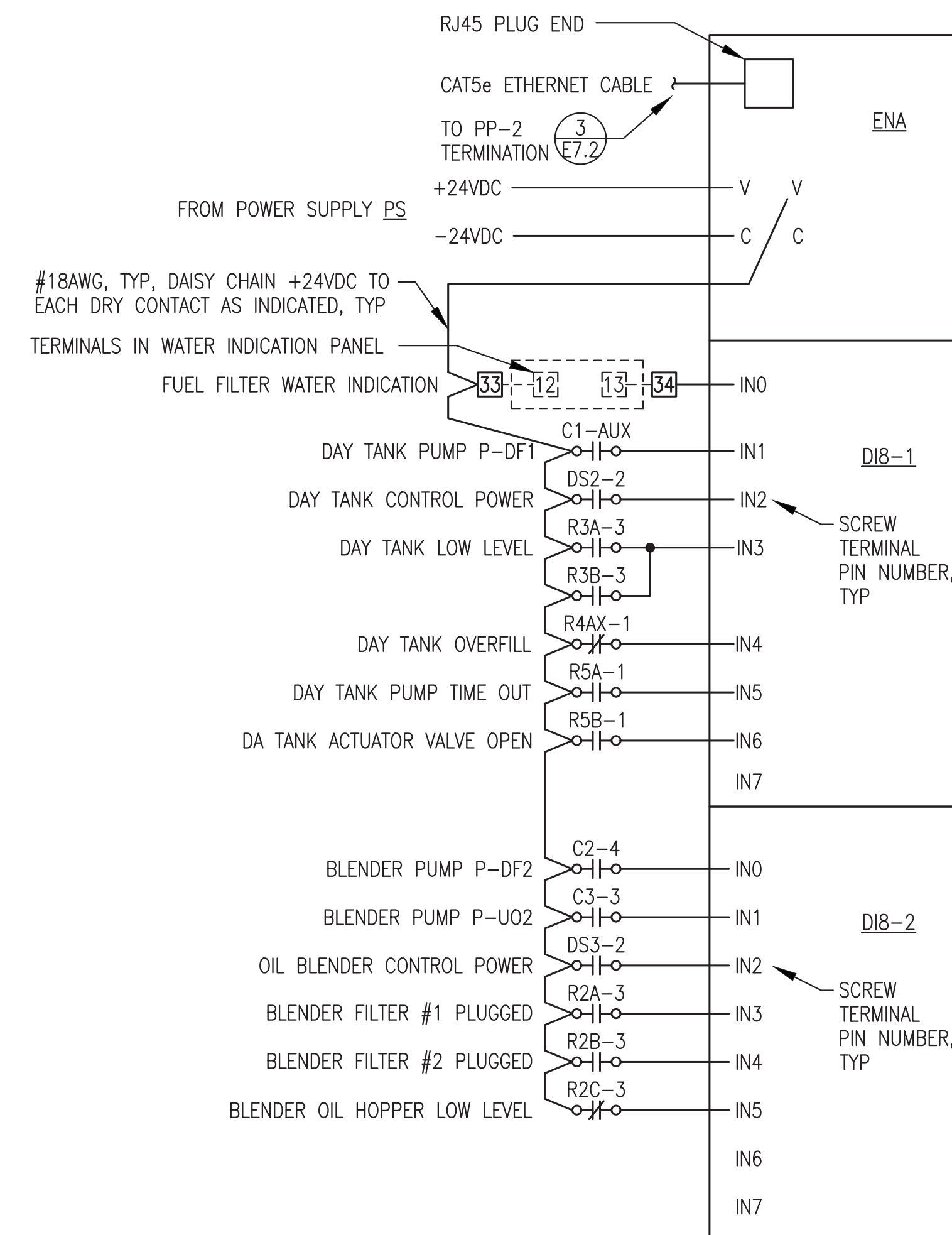
- 1) WHEN THE BLENDER CIRCUIT BREAKER AND CONTROL POWER SWITCH ARE CLOSED; THE GREEN POWER LIGHT IS ON AND POWER IS PROVIDED TO ALL CONTROL DEVICES.
- 2) NORMAL OPERATION - WHENEVER THE DAY TANK FILL SEQUENCE IS INITIATED, BOTH THE DIESEL CIRCULATING PUMP P-DF2 AND THE USED OIL INJECTION PUMP P-U02 RUN AND THE ASSOCIATED GREEN PUMP RUNNING LIGHTS ARE ON.
- 3) PLUGGED FILTER - IF THE DIFFERENTIAL PRESSURE ACROSS A FILTER REACHES THE ALARM SETPOINT, BOTH PUMPS STOP RUNNING AND THE RED FILTER PLUGGED LIGHT FOR THE ASSOCIATED FILTER TURNS ON. THE ALARM LATCHES AND THE SYSTEM WILL NOT OPERATE UNTIL THE PROBLEM IS CORRECTED. AFTER THE FILTER ELEMENT HAS BEEN CHANGED THE BLACK RESET BUTTON MUST BE PRESSED TO RESUME NORMAL OPERATION.
- 4) HOPPER LOW OIL LEVEL - WHEN THE OIL LEVEL FALLS BELOW THE LOW LEVEL FLOAT SWITCH, USED OIL INJECTION PUMP P-U02 STOPS RUNNING AND THE AMBER HOPPER LOW OIL LEVEL LIGHT TURNS ON. PUMP P-U02 WILL NOT OPERATE UNTIL THE USED OIL LEVEL IN THE HOPPER RISES ABOVE THE LOW LEVEL. RESET IS NOT REQUIRED.



1 TANK LEVEL MONITOR (TLM) CONSOLE CONNECTIONS
E7.3 NO SCALE



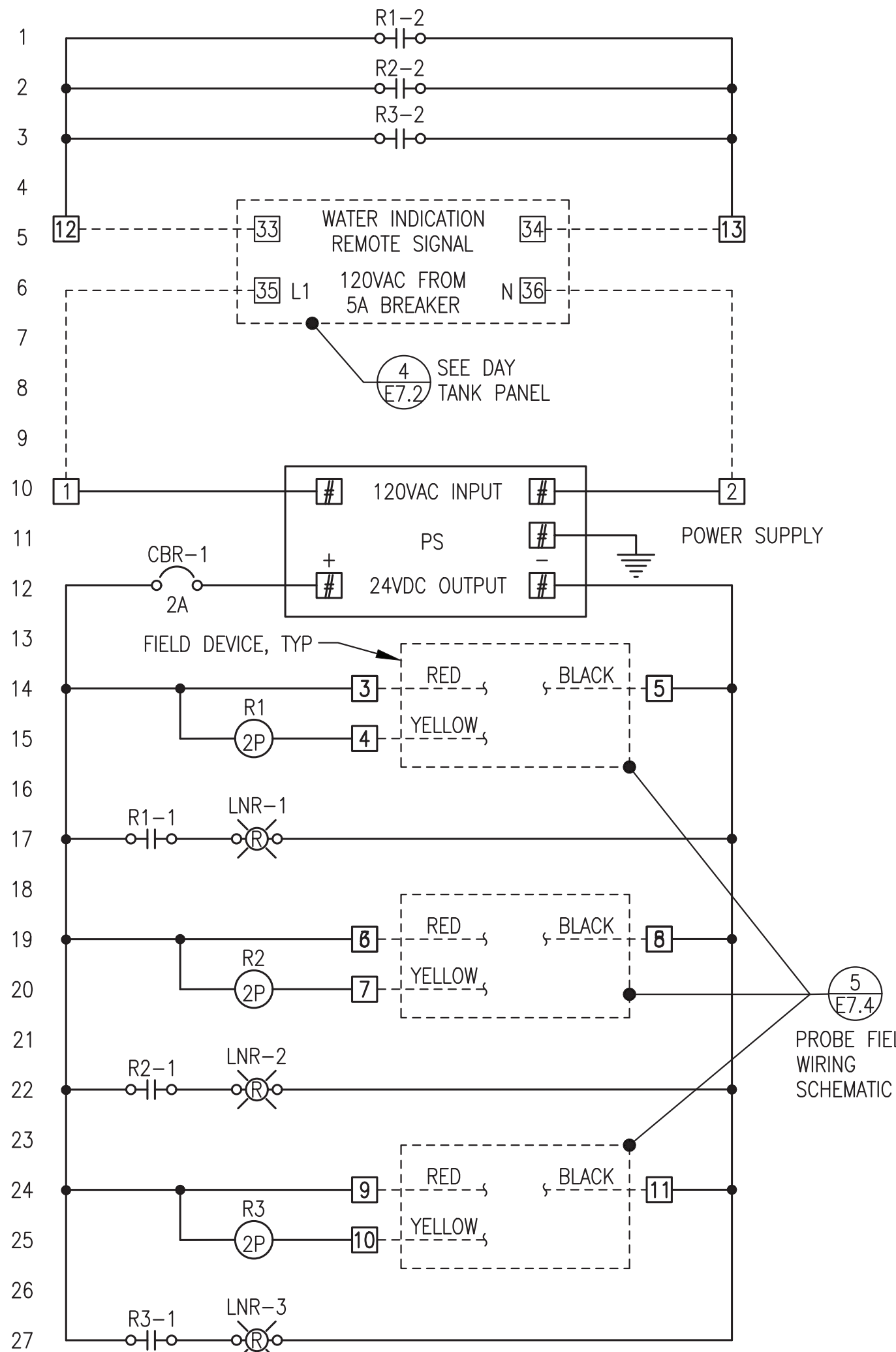
2 DAY TANK CONTROL PANEL & DEVICE INSTALLATION
E7.3 NO SCALE



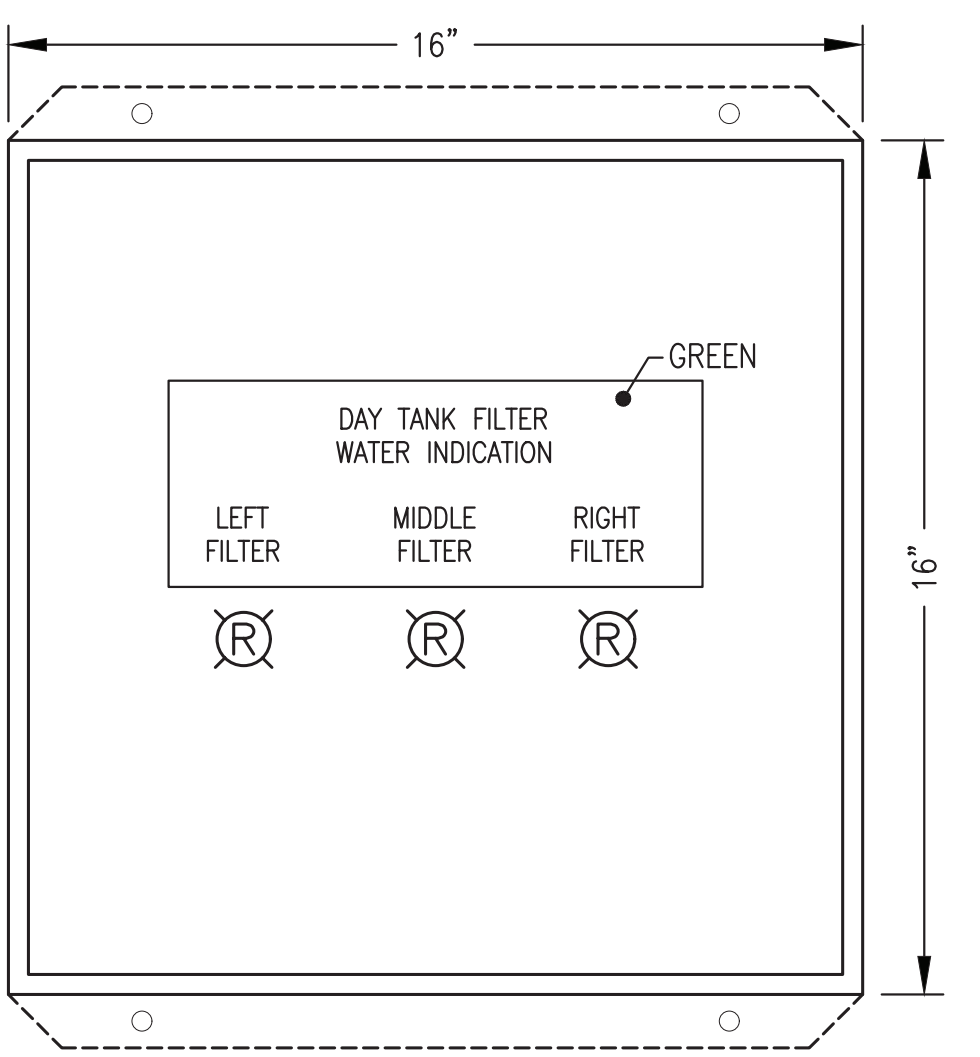
3 ETHERNET POINT I/O CONNECTIONS
E7.3 NO SCALE

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: DAY TANK CONTROL PANEL NOTES, SEQUENCE OF OPERATION & INSTALLATION DETAILS			
DRAWN BY: BCG/JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E7		SHEET: E7.3 OF 9	
PROJECT NUMBER:			

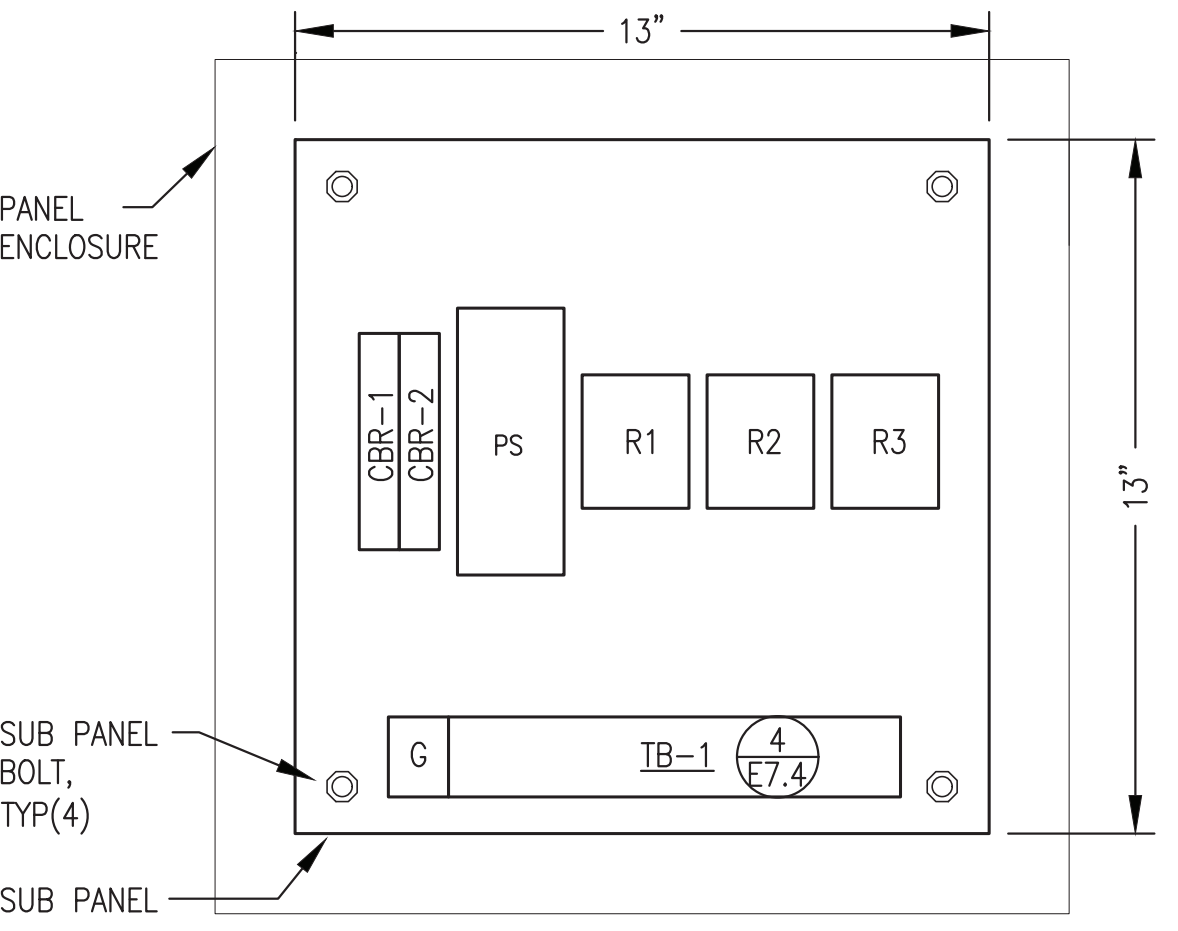




1 PANEL WIRING DIAGRAM
E7.4 NO SCALE



2 FRONT PANEL LAYOUT
E7.4 NO SCALE

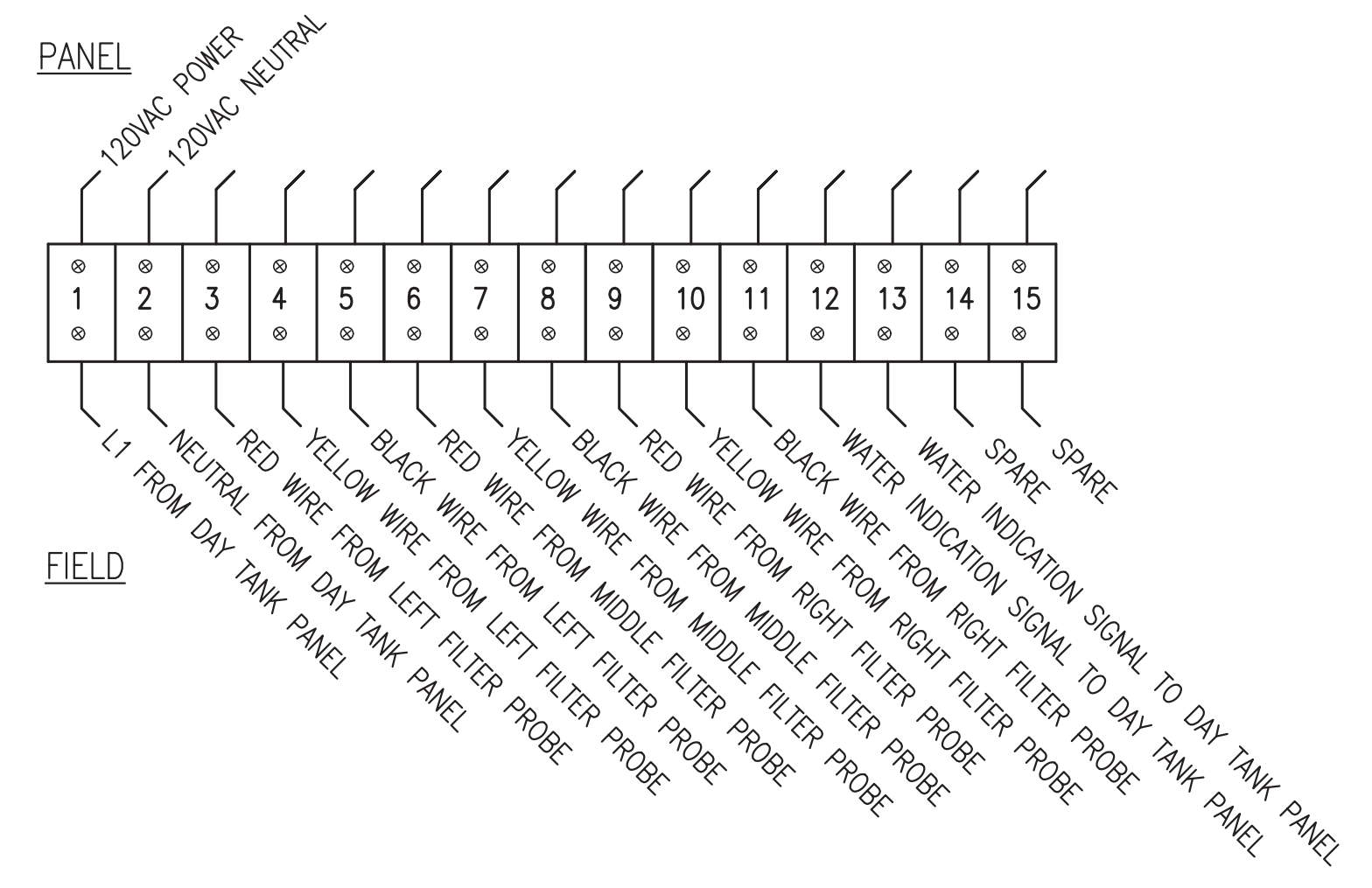


3 SUB PANEL LAYOUT
E7.4 NO SCALE

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
CBR-1	1	ALLEN-BRADLEY	1489-M1-C020	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 2A
LNR	3	ALLEN-BRADLEY	800HQH2R	RED LED PILOT LIGHT, 12-130V, NEMA 4X
PS	1	PULS	CP.241-S1	5A, 120VAC/24VDC POWER SUPPLY
R	3	ALLEN-BRADLEY	700HA32A1	2PDT RELAY
	3	ALLEN-BRADLEY	700HN100	8 PIN SOCKET BASE
TB	15	ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS

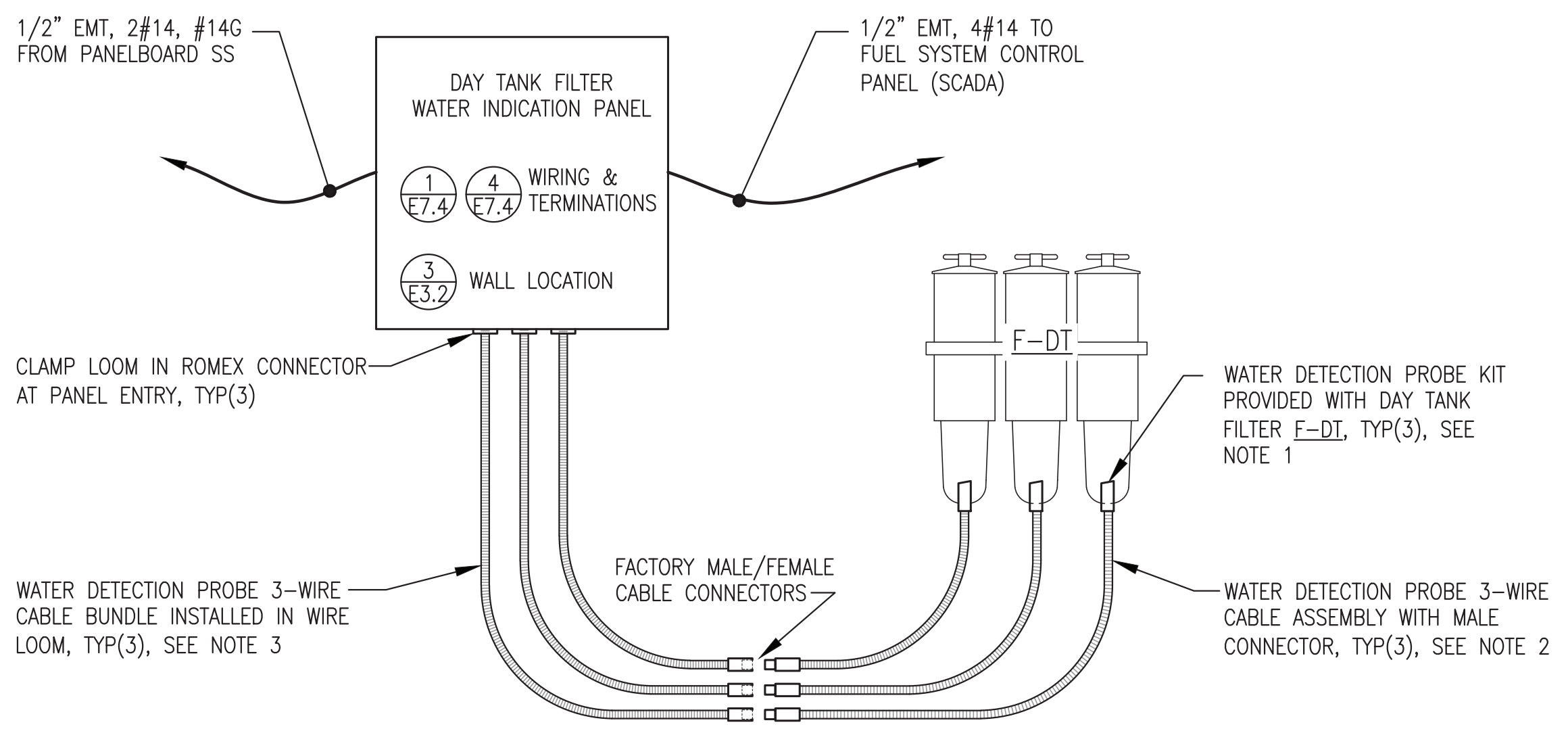
PANEL SHOP FABRICATION NOTES:

- FURNISH COMPLETE PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN WIRING DIAGRAM AND BILL OF MATERIALS ALONG WITH ALL PANEL DEVICE ACCESSORIES, DIN RAIL, & HARDWARE REQUIRED FOR COMPLETE INSTALLATION.
- INSTALL IN A 16"x16"x8" NEMA 12 STEEL ENCLOSURE WITH INTEGRAL MOUNTING FLANGES AT BACK, A MIN 16 GAUGE INTERIOR BACK PANEL, AND HINGED DOOR. ENCLOSURE COLOR ANSI 61 GRAY AND BACK PANEL COLOR WHITE.
- PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED. SECURE TO PANEL FACE WITH A MINIMUM OF TWO MOUNTING SCREWS.
- CONNECT DEVICES WITH MANUFACTURER PROVIDED CABLES IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS.



- NOTES:
- INSTALL TERMINAL STRIP TB-1 HORIZONTALLY AS SHOWN. LOCATE TERMINAL STRIP BELOW WIRE TRAY TO ACCOMMODATE FIELD CONDUCTORS ENTERING BOTTOM OF PANEL, SEE SUB-PANEL LAYOUT.
 - IN ADDITION TO THE TERMINAL STRIPS SHOWN, PROVIDE 2 EACH 60A SCREW TERMINAL GROUNDING BUS.

4 TERMINAL STRIP TB-1 LAYOUT
E7.4 NO SCALE



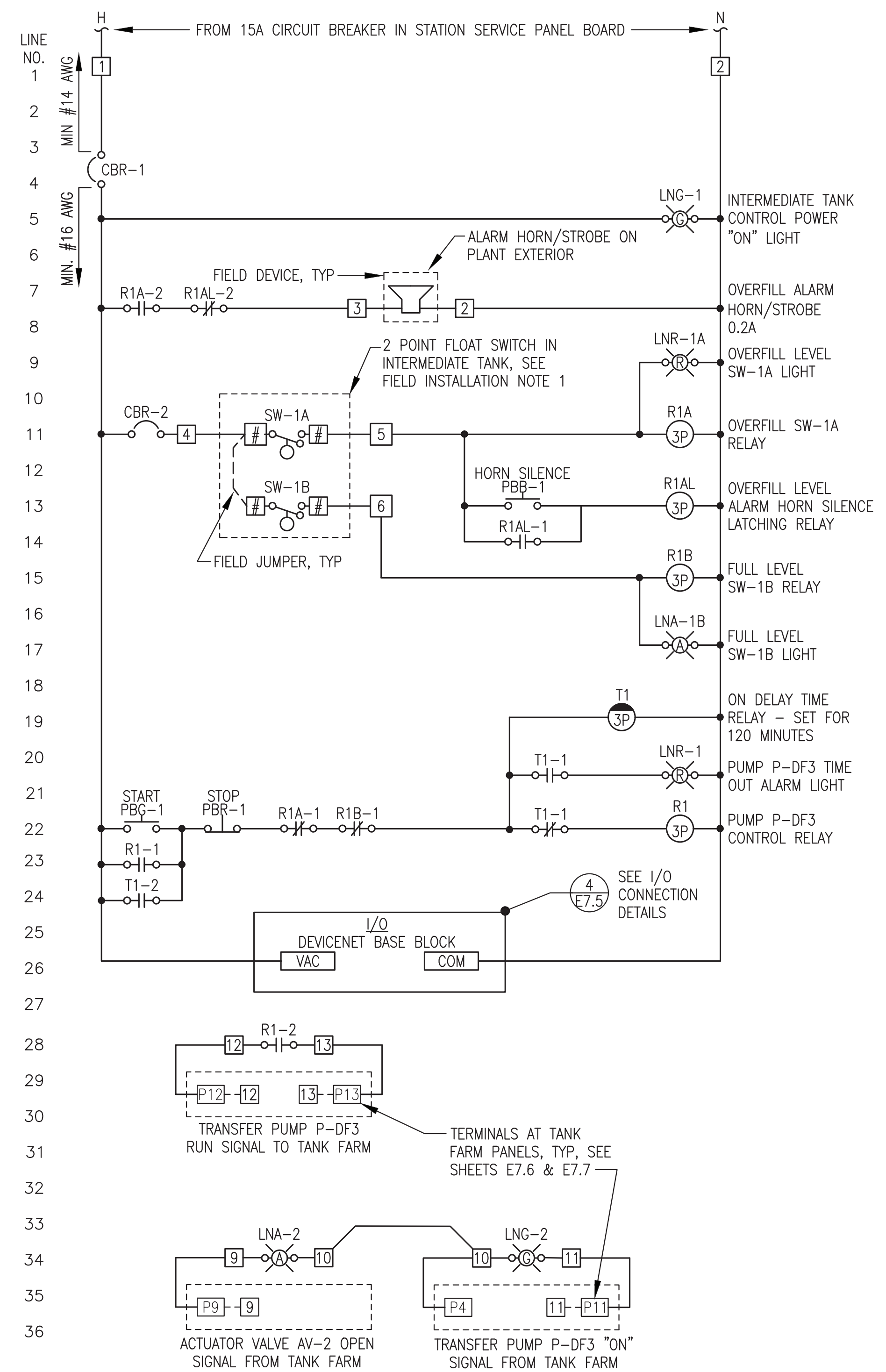
5 FIELD WIRING SCHEMATIC
E7.4 NO SCALE

- NOTES:
- THREE EACH RACOR WATER DETECTION PROBE KITS, MODEL RK30880E, SHIPPED LOOSE WITH 3-FILTER BANK. NOT ALL KIT COMPONENTS USED THIS INSTALLATION. KEEP THREE EACH WATER DETECTION PROBE CABLES WITH MOLDED MALE CONNECTORS AND KEEP THREE EACH 3-WIRE CABLE BUNDLES WITH MOLDED FEMALE CONNECTORS. DISCARD THREE EACH PILOT LIGHTS AND DISCARD THREE EACH MOUNTING PANELS.
 - PRIOR TO FLOODING SYSTEM WITH FUEL INSTALL WATER DETECTION PROBES IN EACH FILTER ACCORDING TO MANUFACTURER'S INSTRUCTIONS. ROUTE FACTORY LOOMED CABLES WITH MOLDED FEMALE CONNECTORS BACK TO WALL IN NEAT AND ORGANIZED FASHION FOR CONNECTION TO WIRE EXTENSION CONNECTORS. TYWRAP LOOM TO CONDUIT OR PIPING.
 - FACTORY 3-WIRE CABLE BUNDLES FURNISHED WITH MOLDED MALE CONNECTORS. FIELD INSTALL IN 3/8" PLASTIC WIRE LOOM FROM CONNECTOR TO PANEL ENTRY AND ROUTE TO PANEL IN NEAT AND ORGANIZED FASHION. TYWRAP LOOM TO ADJACENT CONDUIT, PIPING, OR STRUT.

REV #1
ISSUED
NOVEMBER
2021



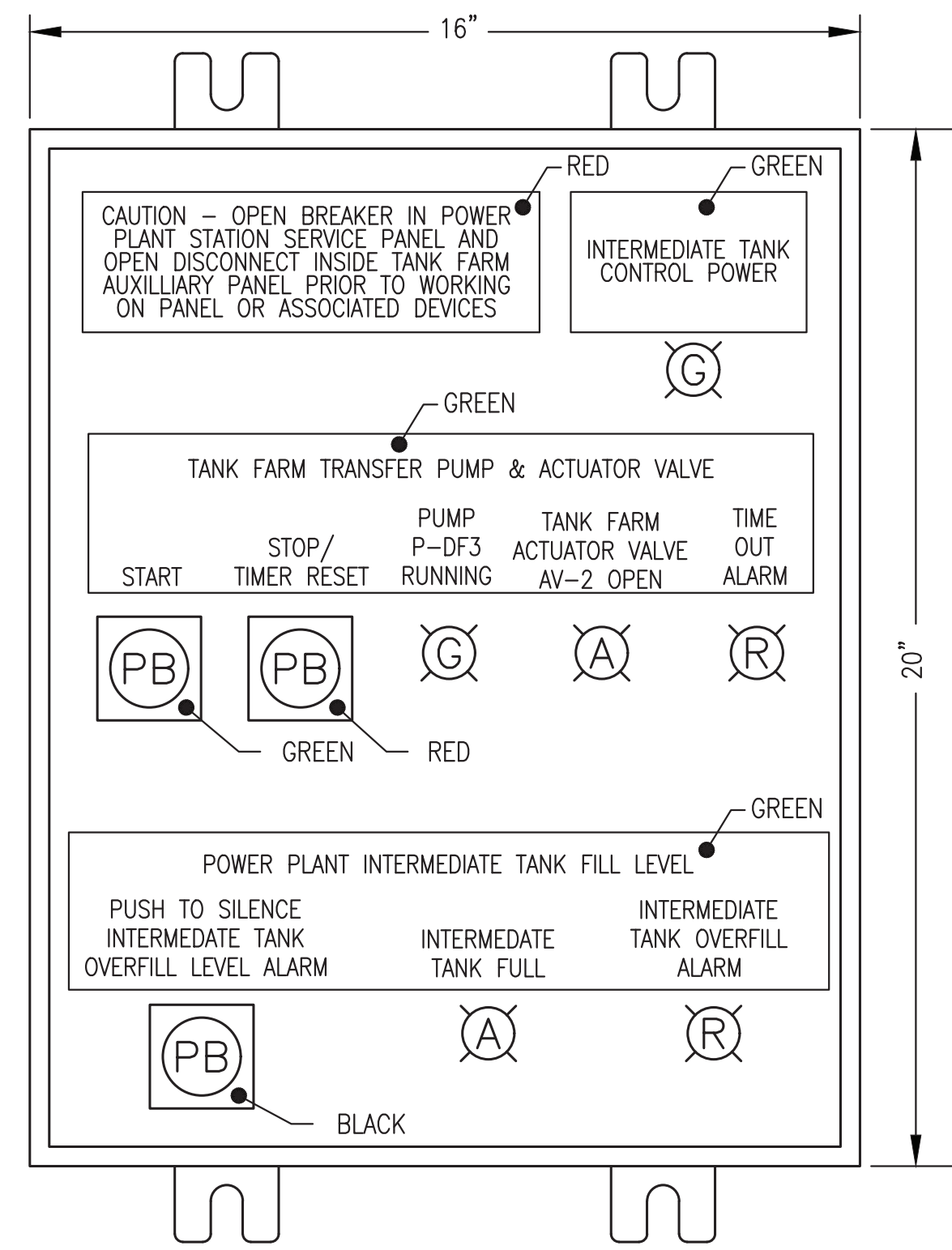
1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: DAY TANK FILTER WATER INDICATION PANEL			
DRAWN BY: BCG/JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E7		SHEET: E7.4 OF 9	
PROJECT NUMBER: P.O. 111405, Anchorage, AK 99511 (907)349-0100			
 Gray Stassel Engineering, Inc.			



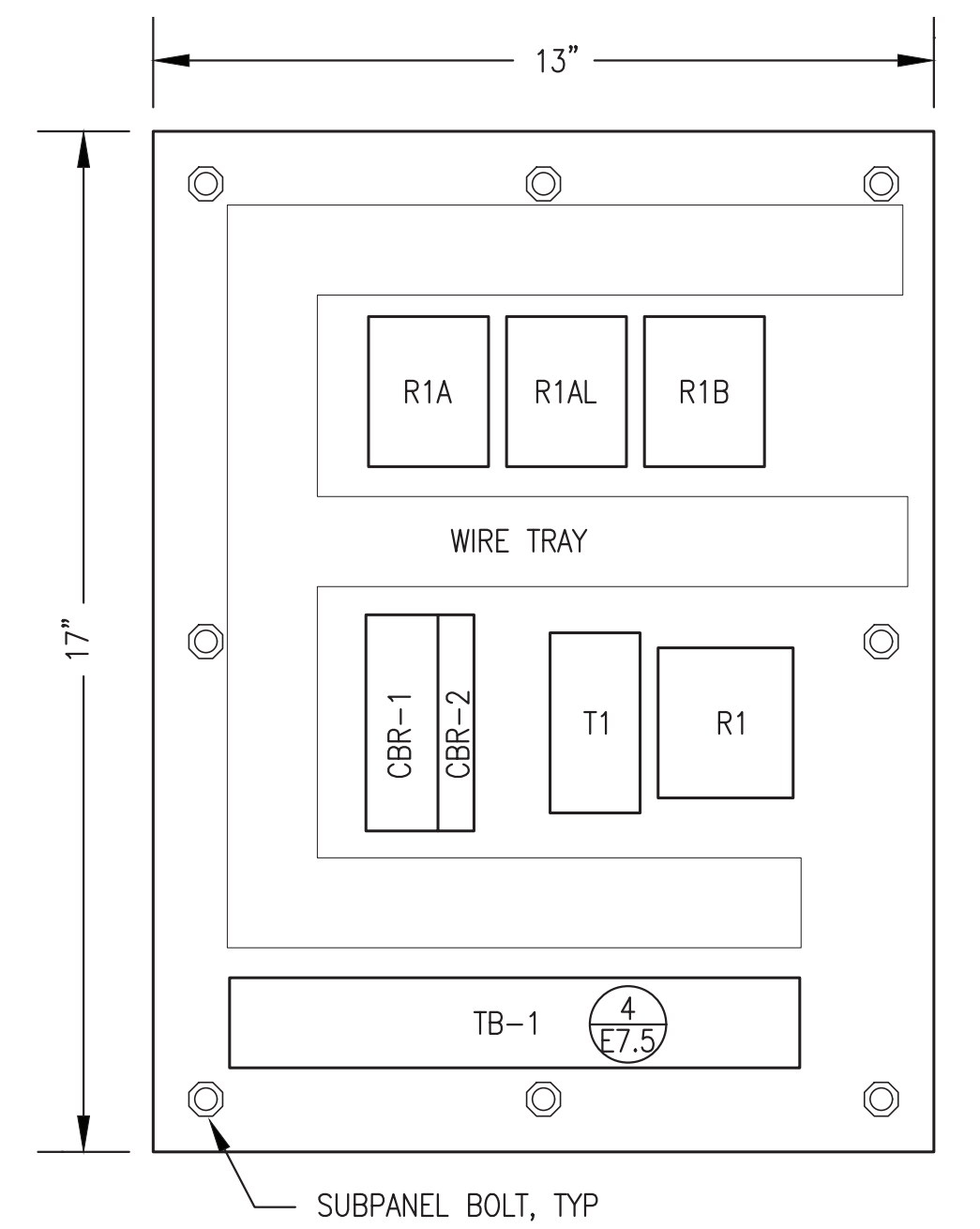
1
E7.5 NO SCALE
LOGIC DIAGRAM

SEQUENCE OF OPERATIONS:

- WHEN THE CIRCUIT BREAKER IN THE STATION SERVICE PANELBOARD AND THE DISCONNECT SWITCH ON THE PANEL FACE ARE CLOSED: POWER IS PROVIDED TO THE CONTROL PANEL.
- NORMAL FILL OPERATION – WHEN THE "START" BUTTON IS PRESSED: THE TIMING RELAY IS STARTED AND THE "PUMP RUN" SIGNAL IS SENT TO THE TANK FARM AUXILIARY PANEL. UPON RECEIPT OF SIGNALS FROM THE TANK FARM AUXILIARY PANEL: THE PUMP "ON" LIGHT TURNS ON AND THE "TANK FARM ACTUATOR VALVE OPEN" LIGHT TURNS ON. WHEN THE FUEL LEVEL REACHES THE FULL FLOAT SWITCH: THE "TANK FULL" LIGHT TURNS ON, THE TIMING RELAY IS RESET, THE "PUMP RUN" SIGNAL TO THE TANK FARM IS TERMINATED, THE PUMP "ON" LIGHT TURNS OFF, AND AFTER APPROXIMATELY 10 SECONDS THE "ACTUATOR VALVE OPEN" LIGHT TURNS OFF. PRESSING THE "STOP" BUTTON AT ANY TIME DURING A NORMAL FILL CYCLE WILL PERFORM THE SAME FUNCTION AS THE FUEL LEVEL REACHING THE FULL FLOAT SWITCH EXCEPT THE "TANK FULL" LIGHT WILL NOT BE TURNED ON.
- TIMER OPERATION – IF THE TIMING RELAY TIMES OUT BEFORE THE TANK IS FULL OR THE FILL CYCLE IS STOPPED: THE "PUMP RUN" SIGNAL TO THE TANK FARM IS DE-ENERGIZED, THE PUMP "ON" LIGHT TURNS OFF, THE ACTUATOR VALVES CLOSES, AFTER APPROXIMATELY 10 SECONDS THE "ACTUATOR VALVE OPEN" LIGHTS TURN OFF, AND THE "TIME OUT" ALARM LIGHT TURNS ON. THE TIMER CAN BE RE-SET BY PRESSING THE "STOP" BUTTON.
- OVERFILL ALARM – IF THE INTERMEDIATE TANK OVERFILLS AND THE FUEL LEVEL REACHES THE OVERFILL FLOAT SWITCH: THE "OVERFILL ALARM" LIGHT TURNS ON, THE ALARM HORN SOUNDS, THE "PUMP RUN" SIGNAL TO THE TANK FARM IS TERMINATED, THE TIMING RELAY IS RESET, AND AFTER APPROXIMATELY 10 SECONDS THE "ACTUATOR VALVE OPEN" LIGHT TURNS OFF. PRESSING THE "SILENCE OVERFILL ALARM" BUTTON SILENCES THE ALARM HORN BUT THE "OVERFILL ALARM" LIGHT WILL STAY ON UNTIL THE FUEL LEVEL FALLS BELOW THE OVERFILL FLOAT SWITCH. A NEW FILL CYCLE CANNOT BE STARTED UNTIL THE FUEL LEVEL DROPS BELOW THE FULL LEVEL.
- LOSS OF PUMP P-DF3 "ON" SIGNAL – IF THE "ON" LIGHT TURNS OFF BEFORE THE TANK REACHES THE FULL LEVEL, BEFORE THE TIMER TIMES OUT, OR BEFORE THE STOP BUTTON IS PRESSED, IT IS LIKELY THAT THE TANK FARM AUXILIARY PANEL CONTROL POWER HAS BEEN TURNED OFF, THE AUXILIARY PANEL TIMER RELAY HAS TIMED OUT, OR THE TANK FARM "E-STOP" HAS BEEN ACTIVATED. SEE SHEET E7.6 "AUXILIARY TANK FARM PANEL".



2
E7.5 NO SCALE
FRONT PANEL LAYOUT



3
E7.5 NO SCALE
SUBPANEL LAYOUT

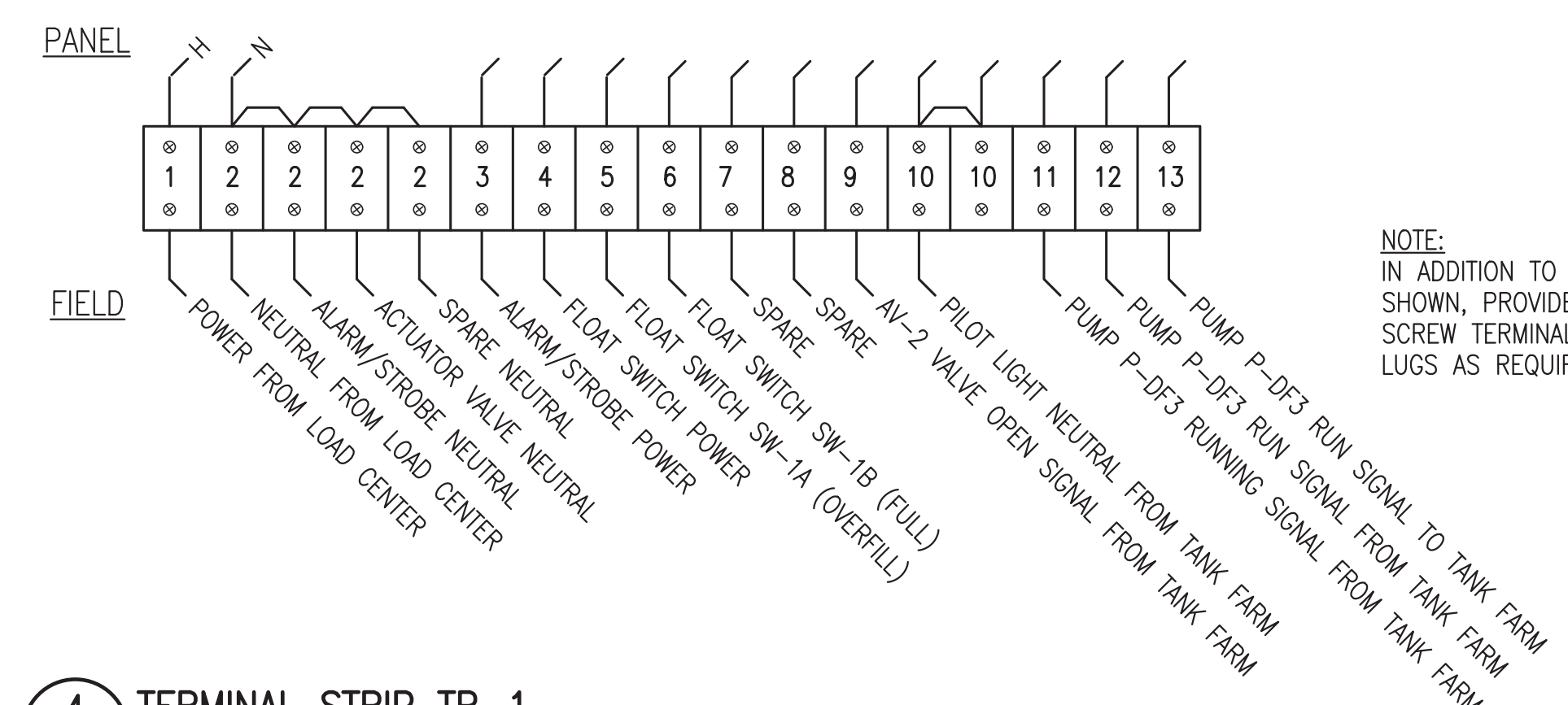
TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
CBR-1	1	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CBR-2	1	ALLEN-BRADLEY	1489-M1-C010	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 1A
LNA	2	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-120V, NEMA 4X
LNG	2	ALLEN-BRADLEY	800HQRH2G	GREEN LED PILOT LIGHT, 12-120V, NEMA 4X
LNR	2	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-120V, NEMA 4X
PBB	1	ALLEN-BRADLEY	800HAR2	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, BLACK
PBG	1	ALLEN-BRADLEY	800HAR1	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, GREEN
PBR	1	ALLEN-BRADLEY	800HAR6D2	MOMENTARY PUSH BUTTON, 1 NC, NEMA 4X, RED
R	4	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
T	5	ALLEN-BRADLEY	700HN101	11 PIN SOCKET BASE
	1	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	1	ALLEN-BRADLEY	700HN205	11 PIN RELAY SOCKET BASE FOR TIMER
	1	ALLEN-BRADLEY	700HT3	SERIES B TIMING MODULE
TB	17	ALLEN-BRADLEY	1492CAM1L	LARGE-HEAD SCREW TERMINALS, 35A, 600V

PANEL FABRICATION NOTES:

- PROVIDE COMPLETE LISTED PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM EXCEPT FOR FIELD DEVICES. FIELD DEVICES ARE INDICATED BY DASHED OUTLINES. FIELD WIRING AND FIELD INSTALLED DEVICES PROVIDED BY OTHERS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT PART OF THE PANEL SCOPE.
- INSTALL IN A 16"x20"x8" NEMA 12 STEEL ENCLOSURE WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL, AND HINGED LOCKABLE DOOR.
- USE MINIMUM #16AWG FOR ALL WIRING UNLESS SPECIFICALLY NOTED OTHERWISE. TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF ENDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).
- LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING.
- PROVIDE LISTED DIN RAIL, END PLATES, HARDWARE AND ACCESSORIES AS REQUIRED FOR MOUNTING ALL DIN RAIL DEVICES AND TERMINAL BLOCKS.
- PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED, AND SECURE TO PANEL FACE WITH A MINIMUM OF TWO STAINLESS STEEL MOUNTING SCREWS.
- BENCH TEST THE COMPLETED ASSEMBLY PRIOR TO SHIPPING. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES. TEST IN CONJUNCTION WITH TANK FARM AUXILIARY PANEL TO VERIFY FUNCTION.

FIELD INSTALLATION NOTES:

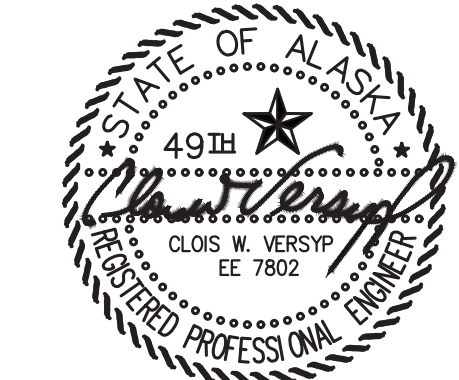
- PRIOR TO PLACING IN THE TANK, VERIFY PROPER OPERATION OF FLOAT SWITCH (ACTUATION LENGTH AND NO/NC FUNCTION). LABEL FLOAT SWITCH TERMINALS WITH THE NUMBER OF THE ASSOCIATED HOME RUN LANDING ON TB-1 IN THE CONTROL PANEL.
- PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE NUMBER OF THE ASSOCIATED HOME RUN LANDING ON TB-1 IN THE CONTROL PANEL. INSTALL JUMPERS ON FIELD DEVICES AS SHOWN. USE MIN #14AWG FOR CONNECTION TO ALL FIELD DEVICES UNLESS INDICATED OTHERWISE.
- TEST ALL CONTROL AND ALARM FUNCTIONS UPON COMPLETION AND PRIOR TO PLACING INTO SERVICE. SET TIMERS TO 10 SECONDS TO VERIFY TIME OUT FUNCTION, THEN RE-SET TO VALUES SHOWN.



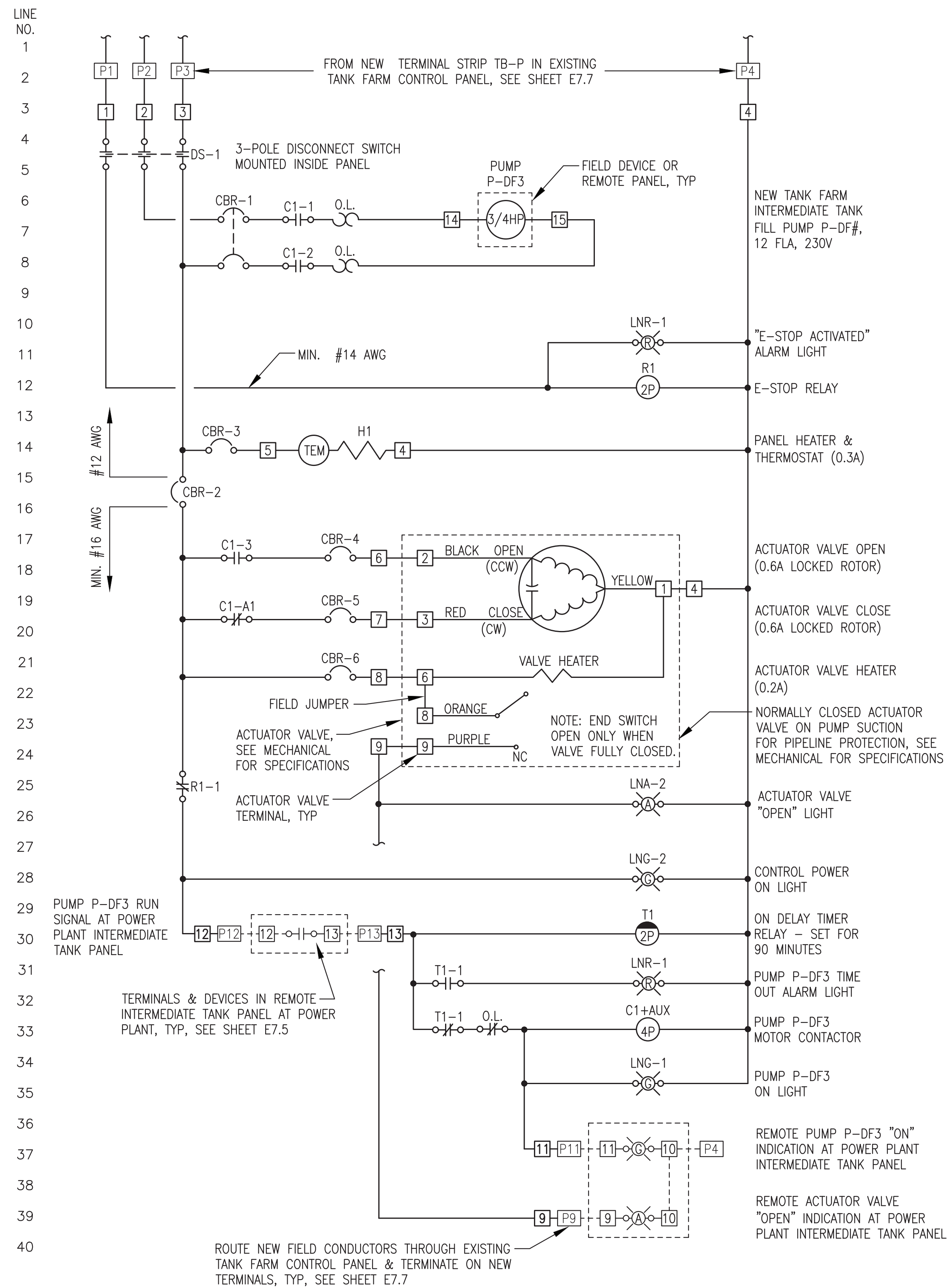
4
E7.5 NO SCALE
TERMINAL STRIP TB-1

NOTE:
IN ADDITION TO TERMINALS SHOWN, PROVIDE 30A RATED SCREW TERMINAL GROUNDING LUGS AS REQUIRED.

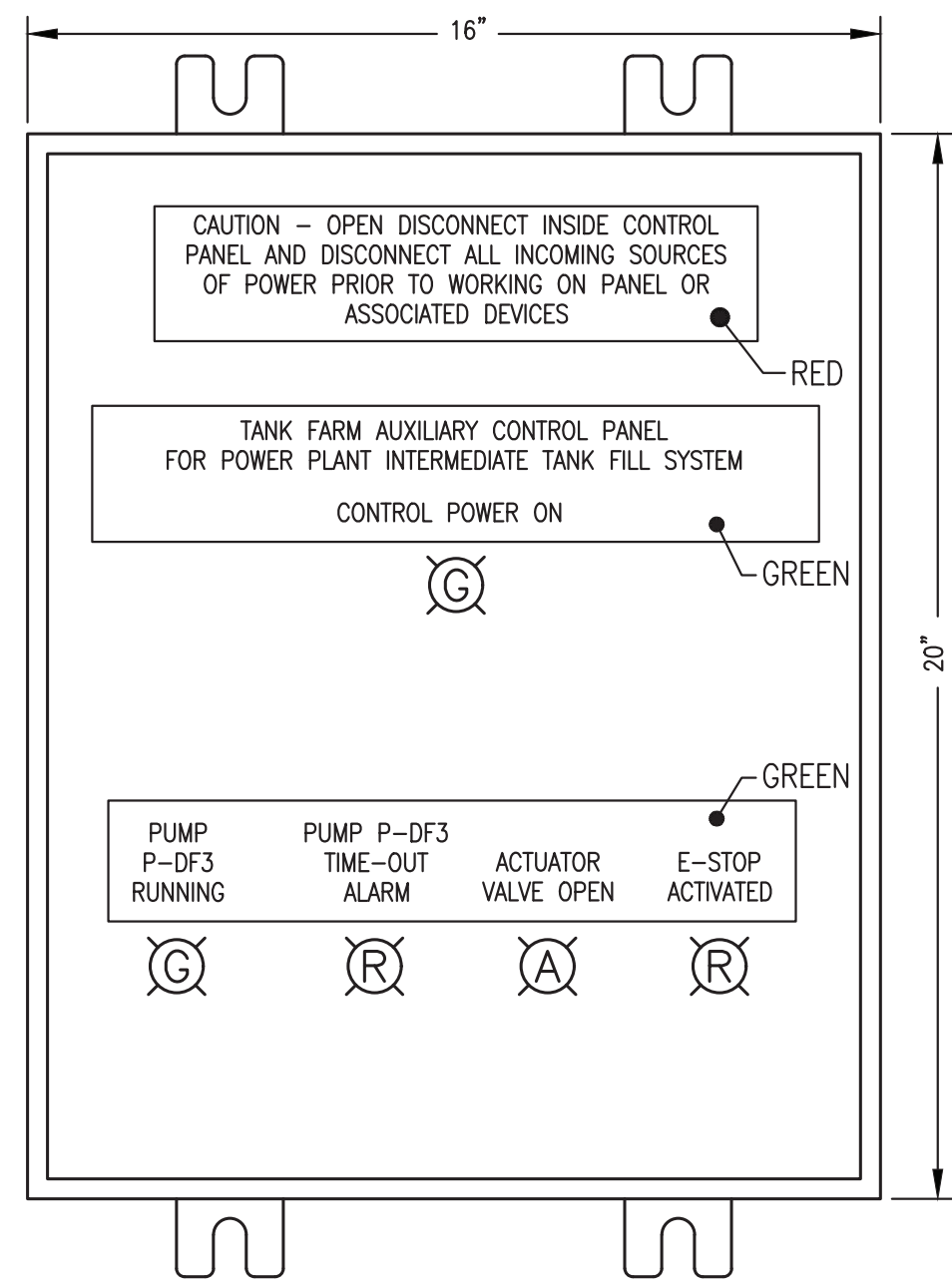
REV #1
ISSUED
NOVEMBER
2021



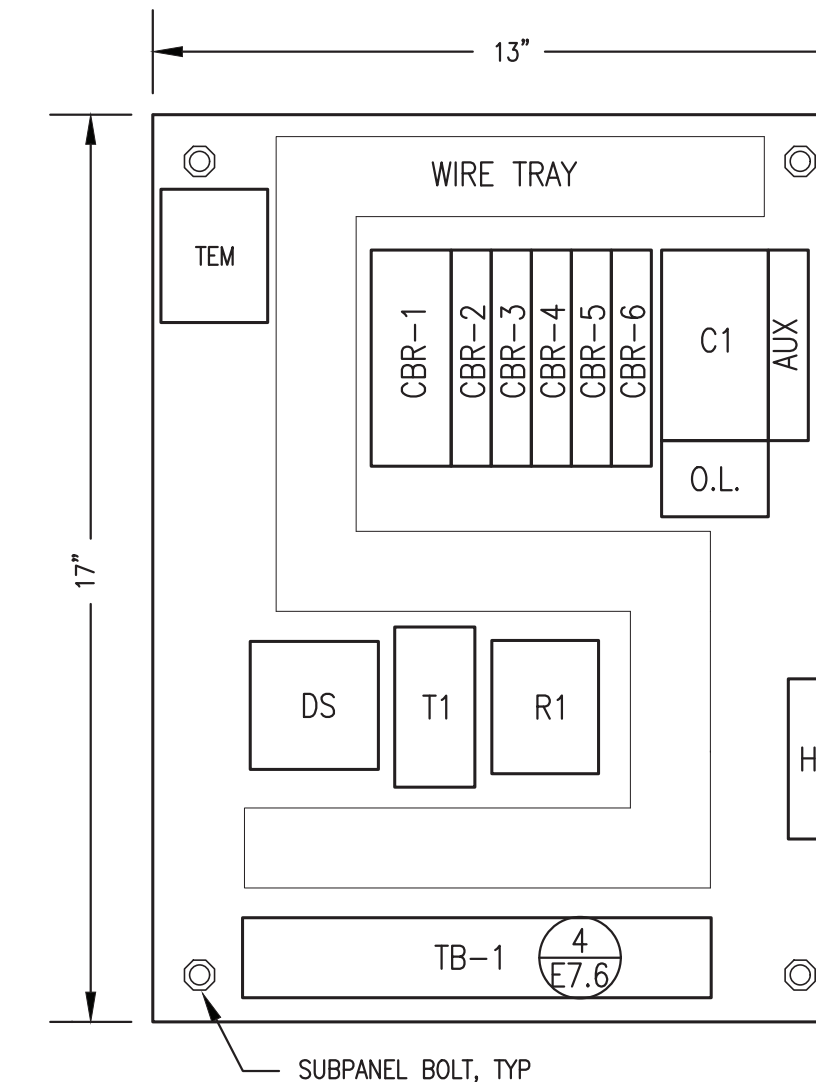
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REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: INTERMEDIATE TANK FILL CONTROL PANEL			
DRAWN BY: BCG/JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E7		SHEET: E7.5 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			



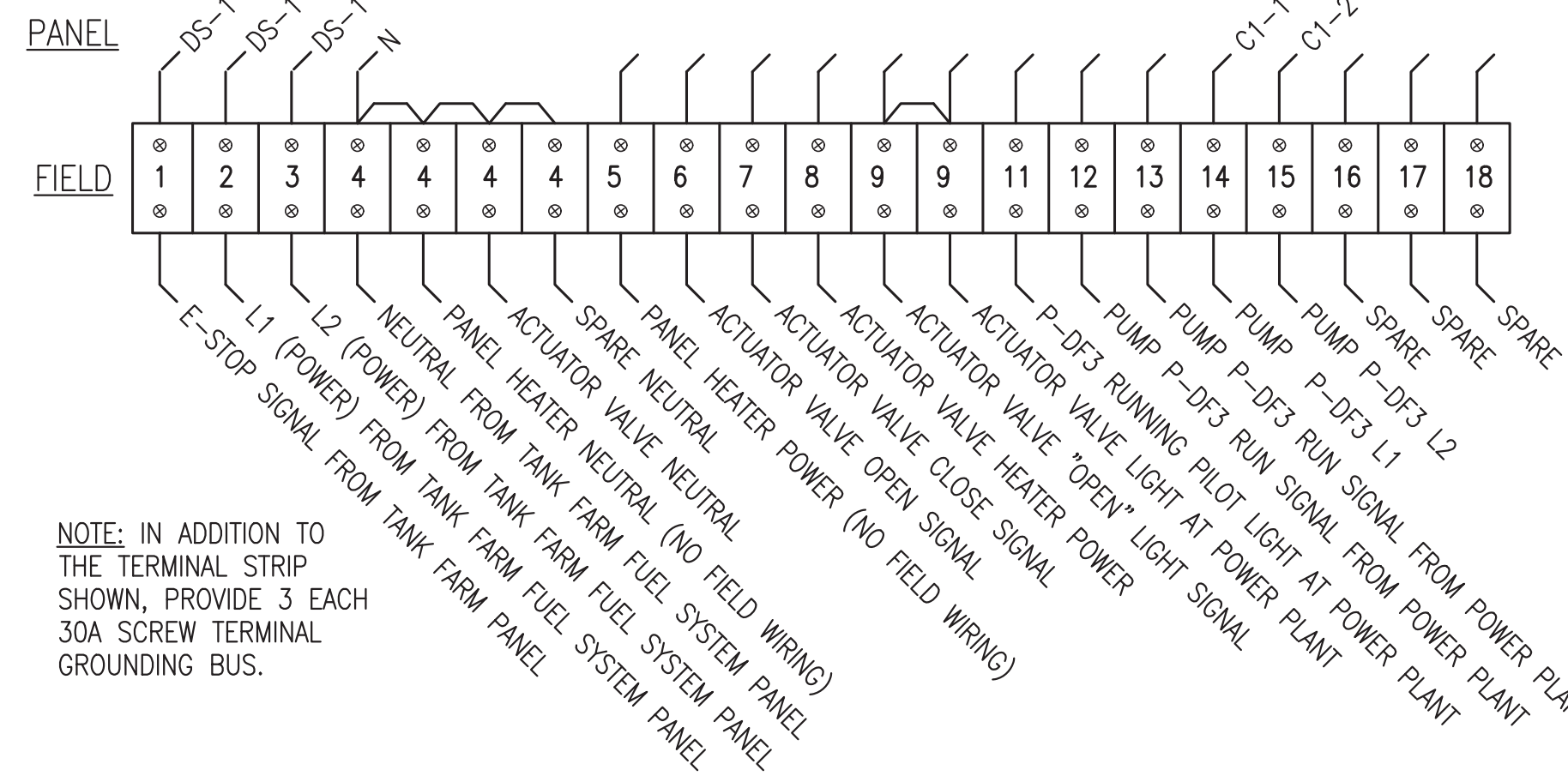
1 TANK FARM AUXILIARY PANEL LOGIC DIAGRAM
E7.6 NO SCALE



2 FRONT PANEL LAYOUT
E7.6 NO SCALE



3 SUBPANEL LAYOUT
E7.6 NO SCALE



4 TERMINAL STRIP TB-1
E7.6 NO SCALE

SEQUENCE OF OPERATIONS:

- WHEN THE CIRCUIT BREAKER IN THE TANK FARM FUEL SYSTEM CONTROL PANEL PANELBOARD AND THE DISCONNECT SWITCH LOCATED INSIDE THE PANEL FACE ARE CLOSED: POWER IS PROVIDED TO THE CONTROL PANEL, THE ACTUATOR VALVE HEATER, AND TO THE FIRST AUXILIARY END SWITCH ON THE ACTUATOR VALVE. IN NORMAL INACTIVE STATUS (NO RUN SIGNAL FROM POWER PLANT) POWER IS PROVIDED TO THE ACTUATOR VALVE CLOSE CIRCUIT. WHEN THE ACTUATOR IS IN THE FULLY CLOSED POSITION: THE ACTUATOR CLOSE CIRCUIT IS BROKEN BY AN INTERNAL LIMIT SWITCH IN THE ACTUATOR AND THE ACTUATOR VALVE "OPEN" LIGHT IS OFF.
- NORMAL FILL OPERATION - WHEN THE "PUMP START" BUTTON ON THE POWER PLANT INTERMEDIATE TANK PANEL IS DEPRESSED AND THE PUMP "RUN" SIGNAL IS RECEIVED: THE TIMING RELAY IS STARTED, THE PUMP STARTS, THE PUMP "ON" LIGHT TURNS ON, THE ACTUATOR VALVE BEGINS TO OPEN, THE "ACTUATOR VALVE OPEN" LIGHT IS ENERGIZED, AND THE PUMP "ON" & "TANK FARM ACTUATOR VALVE OPEN" SIGNALS ARE SENT TO THE INTERMEDIATE TANK PANEL. WHEN THE ACTUATOR VALVE REACHES THE FULLY OPEN POSITION: THE ACTUATOR OPEN CIRCUIT IS BROKEN BY AN INTERNAL LIMIT SWITCH IN THE ACTUATOR AND THE "ACTUATOR VALVE OPEN" LIGHT REMAINS ON. WHEN THE THE PUMP "RUN" SIGNAL FROM THE INTERMEDIATE TANK PANEL IS TERMINATED (STOP OR FULL LEVEL): THE TIMING RELAY IS RESET, THE PUMP STOPS, THE PUMP "ON" LIGHT TURNS OFF, THE PUMP "ON" SIGNAL TO THE POWER PLANT INTERMEDIATE TANK PANEL IS DE-ENERGIZED, AND THE ACTUATOR VALVE BEGINS TO CLOSE. WHEN THE ACTUATOR VALVE REACHES THE FULLY CLOSED POSITION: THE "ACTUATOR VALVE OPEN" LIGHT TURNS OFF, THE ACTUATOR CLOSE CIRCUIT IS BROKEN BY AN INTERNAL LIMIT SWITCH IN THE ACTUATOR AND THE "TANK FARM ACTUATOR VALVE OPEN" SIGNAL TO THE POWER PLANT INTERMEDIATE TANK IS DE-ENERGIZED.
- TIMER OPERATION - IF THE TIMING RELAY TIMES OUT BEFORE THE FILL CYCLE IS STOPPED THE SEQUENCE IS IDENTICAL TO THE NORMAL PUMP STOP SEQUENCE EXCEPT: THE "TIME OUT" ALARM LIGHT ON THE FACE OF THE PANEL IS TURNED ON. THE "TIME OUT" ALARM LIGHT REMAINS ON AND PUMP P-DF3 CANNOT BE STARTED UNTIL THE TIMER IS RESET BY PRESSING THE STOP BUTTON AT THE POWER PLANT INTERMEDIATE TANK PANEL.
- E-STOP ACTIVATION - IF THE REMOTE EMERGENCY SHUTOFF SWITCH LOCATED AT THE TANK FARM VEHICLE DISPENSER IS PRESSED DURING A NORMAL FILL OPERATION: THE PUMP IS DE-ENERGIZED, THE ACTUATOR VALVE BEGINS TO CLOSE, AND THE "E-STOP ACTIVATED" LIGHT LOCATED ON THE FACE OF THE PANEL TURNS ON. WHEN THE ACTUATOR VALVE REACHES THE FULLY CLOSED POSITION: THE "ACTUATOR VALVE OPEN" LIGHT TURNS OFF, THE ACTUATOR CLOSE CIRCUIT IS BROKEN BY AN INTERNAL LIMIT SWITCH IN THE ACTUATOR AND THE "TANK FARM ACTUATOR VALVE OPEN" SIGNAL TO THE POWER PLANT INTERMEDIATE TANK PANEL IS DE-ENERGIZED. THE MAINTAINED CONTACT EMERGENCY SHUTOFF SWITCH MUST BE PULLED OUT TO ENABLE CONTROL FUNCTIONS.

BILL OF MATERIALS

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
AUX	1	ALLEN-BRADLEY	100SA02	AUXILIARY CONTACT FOR CONTACTOR, 2 POLE NC
C	1	ALLEN-BRADLEY	100C23D10	CONTACTOR, 120V COIL, 23A, 4 POLE
CBR-1	1	ALLEN-BRADLEY	1489-M2-C150	RAIL-MOUNT CIRCUIT BREAKER, 2 POLE, 15A
CBR-2,3	2	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CBR-4,5,6	3	ALLEN-BRADLEY	1489-M1-C010	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 1A
DS	1	ALLEN-BRADLEY	194L-A161753	DISCONNECT, 2 POSITION, 3 N.O., 16A, BASE MOUNT
H	1	ALLEN-BRADLEY	194L-HE4A175I	CONTROL KNOB FOR DISCONNECT, ON-OFF
LNA	1	ALLEN-BRADLEY	DAH301	PANEL HEATER, 30W
LNG	2	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-120V, NEMA 4X
LNR	2	ALLEN-BRADLEY	800HQRH2R	GREEN LED PILOT LIGHT, 12-120V, NEMA 4X
OL	1	ALLEN-BRADLEY	800HQRH2G	RED LED PILOT LIGHT, 12-120V, NEMA 4X
R	1	ALLEN-BRADLEY	193-1EEDB	OVERLOAD, 230V, 1Ø, ADJUSTABLE 3.2A-16.0A RANGE
T	1	ALLEN-BRADLEY	700HA32A1	2PDT RELAY
T	1	ALLEN-BRADLEY	700HA32A1	8 PIN SOCKET BASE
T	1	ALLEN-BRADLEY	700HA32A1	2PDT RELAY
T	1	ALLEN-BRADLEY	700HA32A1	8 PIN RELAY SOCKET BASE FOR TIMER
T	1	ALLEN-BRADLEY	700HN204	8 PIN SOCKET BASE
T	1	ALLEN-BRADLEY	700HT3	SERIES B TIMING MODULE
TB	21	ALLEN-BRADLEY	1492CAM1L	LARGE-HEAD SCREW TERMINALS, 35A, 600V
TEM	1	HOFFMAN	ATEMNC	THERMOSTAT FOR PANEL HEATERS

PANEL FABRICATION NOTES:

- PROVIDE COMPLETE UL LISTED PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM EXCEPT FOR FIELD DEVICES. FIELD DEVICES ARE INDICATED BY DASHED OUTLINES. FIELD WIRING AND FIELD INSTALLED DEVICES PROVIDED BY OTHERS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT PART OF THE PANEL SCOPE.
- INSTALL IN A 16"x20"x8" NEMA 4X STEEL ENCLOSURE WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL, AND HINGED LOCKABLE DOOR.
- USE MINIMUM #16AWG FOR ALL WIRING SERVED BY 5A CONTROL POWER CIRCUIT BREAKER UNLESS SPECIFICALLY NOTED OTHERWISE. TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).
- LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING.
- PROVIDE LISTED DIN RAIL, END PLATES, HARDWARE AND ACCESSORIES AS REQUIRED FOR MOUNTING ALL DIN RAIL DEVICES AND TERMINAL BLOCKS.
- PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED, AND SECURE TO PANEL FACE WITH A MINIMUM OF TWO STAINLESS STEEL MOUNTING SCREWS.
- BENCH TEST THE COMPLETED ASSEMBLY PRIOR TO SHIPPING. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES. TEST IN CONJUNCTION WITH INTERMEDIATE TANK PANEL TO VERIFY FUNCTION.

FIELD INSTALLATION NOTES:

- SEE SHEET E9 FOR PANEL SUPPORT AND FIELD WIRING DETAILS.
- PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE NUMBER OF THE ASSOCIATED HOME RUN LANDING ON TB-1 IN THE CONTROL PANEL. INSTALL JUMPERS ON FIELD DEVICES AS SHOWN. USE MIN #14AWG FOR CONNECTION TO ALL FIELD DEVICES UNLESS INDICATED OTHERWISE.
- TEST ALL CONTROL AND ALARM FUNCTIONS UPON COMPLETION AND PRIOR TO PLACING INTO SERVICE. SET TIMERS TO 10 SECONDS TO VERIFY TIME OUT FUNCTION, THEN RE-SET TO VALUES SHOWN.

REV #1
ISSUED
NOVEMBER
2021

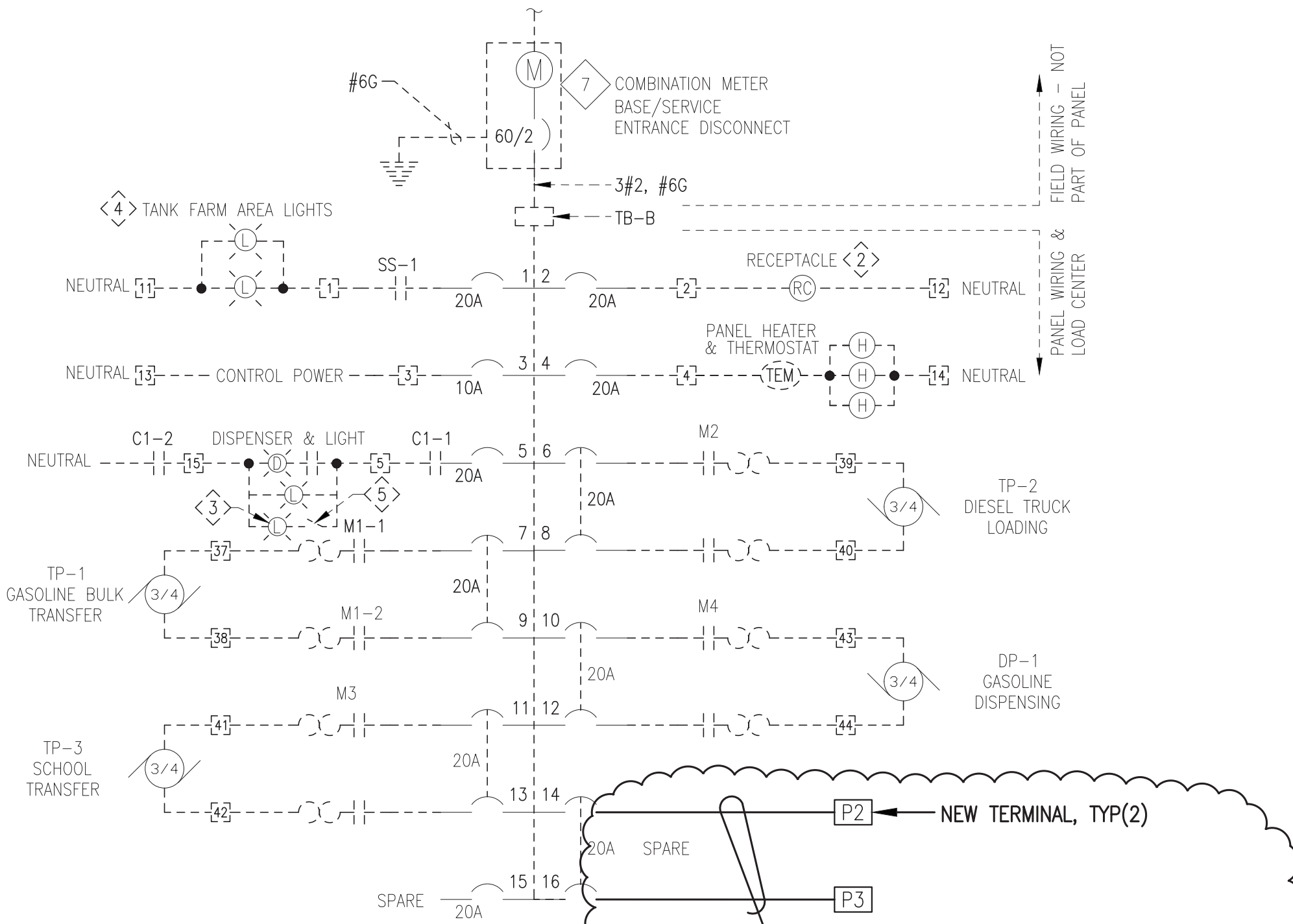


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY

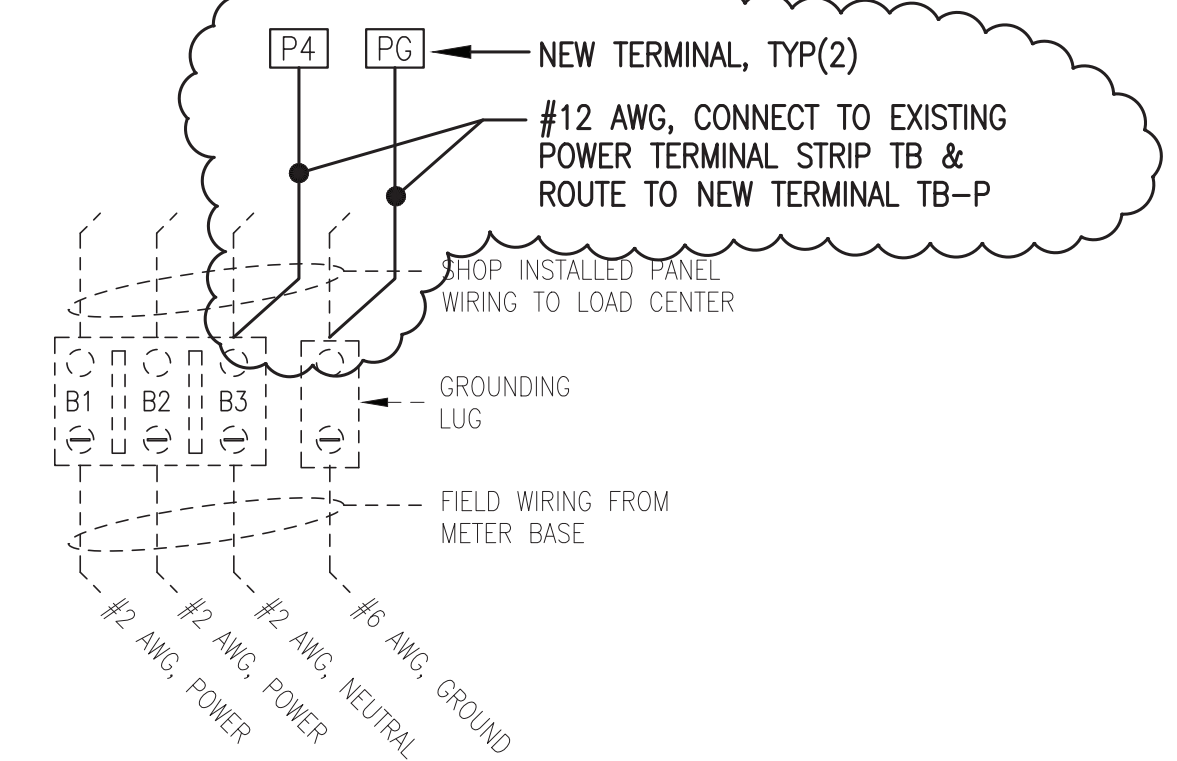


PROJECT:		ALASKA ENERGY AUTHORITY	
PROJECT:		NIKOLAI POWER SYSTEM UPGRADE	
TITLE:		TANK FARM AUXILIARY PANEL	
	DRAWN BY: BCG/JTD	SCALE: AS NOTED	
	DESIGNED BY: CWB/BCG	DATE: 9/1/21	
FILE NAME: NIKO E7	SHEET:	E7.6 OF 9	
P.O. 111405, Anchorage, AK 99511 (907)349-0100	PROJECT NUMBER:		

PANEL	TB-1	FIELD
CB-1 / SS-2	1	AREA LIGHTING POWER
CB-2	2	TANK FARM RECEPTACLE POWER
CB-3	3	CONTROL POWER (NO FIELD WIRING)
CB-4	4	PANEL HEATER POWER (NO FIELD WIRING)
CB-5 / C1-1	5	GASOLINE DISPENSER POWER
R1C-3	6	ALARM HORN/STROBE POWER
	7	SPARE POWER
	8	SPARE
	9	SPARE
	10	SPARE
NEUTRAL	11	AREA LIGHTING NEUTRAL
NEUTRAL	12	TANK FARM RECEPTACLE NEUTRAL
NEUTRAL	13	CONTROL NEUTRAL (NO FIELD WIRING)
NEUTRAL	14	PANEL HEATER NEUTRAL (NO FIELD WIRING)
NEUTRAL / C1-2	15	GASOLINE DISPENSER NEUTRAL
NEUTRAL	16	ALARM HORN/STROBE NEUTRAL
SPARE NEUTRAL	17	SPARE NEUTRAL
SPARE NEUTRAL	18	SPARE NEUTRAL
SPARE NEUTRAL	19	SPARE NEUTRAL
	20	GASOLINE DISPENSER PUMP RUN SIGNAL
	21	EMERGENCY SWITCH L1
	22	EMERGENCY SWITCH L2
	23	SPARE
	24	SPARE
	25	FLOAT SWITCH (SW-1) POWER
	26	FLOAT SWITCH (SW-1A) LOW LEVEL
	27	FLOAT SWITCH (SW-1B) FULL LEVEL
	28	FLOAT SWITCH (SW-1C) OVERFILL
	29	DIESEL TRUCK LOADING (TP-2) SWITCH L1
	30	DIESEL TRUCK LOADING (TP-2) SWITCH L2
	31	SCHOOL TRANSFER PUMP (TP-3) "RUN" SIGNAL
	32	SCHOOL TRANSFER PUMP (TP-3) "ON" SIGNAL
	33	SCHOOL TRANSFER PUMP (TP-3) "ON" SIGNAL
	34	SCHOOL TRANSFER PUMP (TP-3) "ON" SIGNAL
	35	SCHOOL TRANSFER PUMP (TP-3) "TIME OUT" SIGNAL
	36	SCHOOL TRANSFER PUMP (TP-3) "TIME OUT" SIGNAL
CB-7 / M1-T1	37	GASOLINE TRANSFER PUMP TP-1
CB-9 / M1-T2	38	GASOLINE TRANSFER PUMP TP-1
CB-6 / M2-T1	39	DIESEL TRUCK LOADING PUMP TP-2
CB-8 / M2-T2	40	DIESEL TRUCK LOADING PUMP TP-2
CB-11 / M3-T1	41	SCHOOL TRANSFER PUMP TP-3
CB-13 / M3-T2	42	SCHOOL TRANSFER PUMP TP-3
CB-10 / M4-T1	43	GASOLINE DISPENSING PUMP DP-1
CB-12 / M4-T2	44	GASOLINE DISPENSING PUMP DP-1
	45	GROUND
	46	GROUND
	47	GROUND
	48	GROUND
	49	GROUND
	50	GROUND

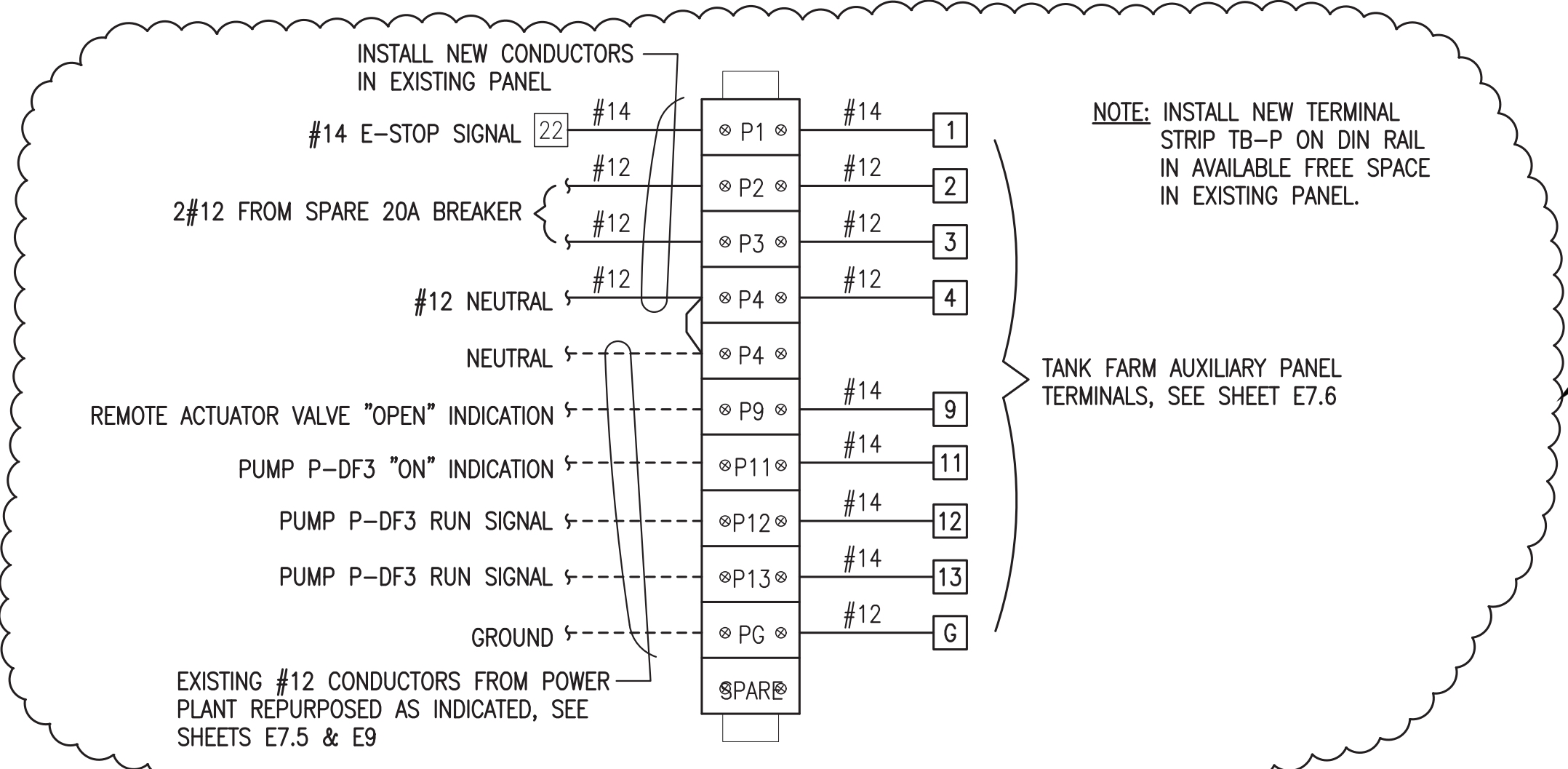


2 EXISTING TANK FARM CONTROL PANEL ONE-LINE MODIFICATIONS
E7.7 NO SCALE



3 EXISTING TANK FARM CONTROL PANEL TERMINAL STRIP TB-B MODIFICATIONS
E7.7 NO SCALE

1 EXISTING TANK FARM CONTROL PANEL TERMINAL STRIP TB-1 MODIFICATIONS
E7.7 NO SCALE



4 NEW TERMINAL STRIP TB-P IN EXISTING TANK FARM CONTROL PANEL
E7.7 NO SCALE

EXISTING TANK FARM PANEL BILL OF MATERIALS:

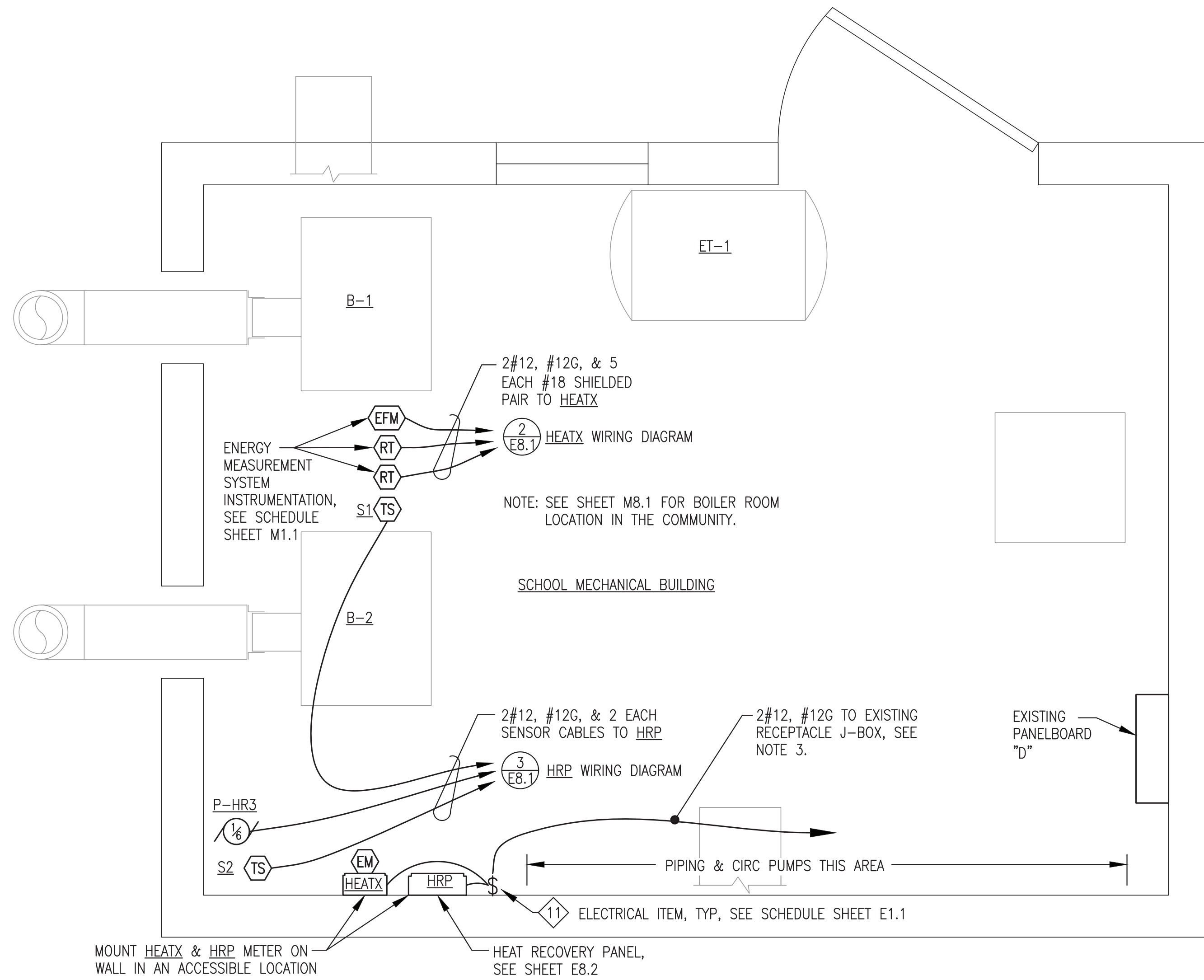
Tag Name	Tag Qty	Part Number	Description
C	1	100LA20ND4	Allen-Bradley-Contactor, 4 pole, 120 Voc, 20A
CB	1	Q110	Siemens-Q-Circuit breaker, 1 pole 10A
CB	5	Q120	Siemens-Q-Circuit breaker, 1 pole 20A
CB	5	Q220	Siemens-Q-Circuit Breaker, 2 pole 20A
	1	G1616L1125	Siemens-Load Center, single phase, main lug, 100A, 16 space
LNA	2	800HQRH10A	Allen-Bradley-Amber LED pilot light, 120V, NEMA 4X
LNG	5	800HQRH10G	Allen-Bradley-Green LED pilot light, 120V, NEMA 4X
LNR	2	800HQRH10R	Allen-Bradley-Red LED pilot light, 120V, NEMA 4X
M	4	100C23D10	Allen-Bradley-Contactor, 3 pole, 120 Voc, 20A
	4	193ES1BB	Allen-Bradley-Overload relay
	3	100SA11	Allen-Bradley-Auxiliary contact, NO, NC
PBB	1	800HAR2D2	Allen-Bradley-Momentary push-button, 1 N.C. NEMA 4X black
	1	800HN101B	Allen-Bradley-Silicone boot push button
PBB2	1	800HAR2A4	Allen-Bradley-Momentary push-button, 2 N.C. NEMA 4X black
	1	800HN101B	Allen-Bradley-Silicone boot push button
PBG	1	800HAR1D1	Allen-Bradley-Momentary push-button, 1 N.O. NEMA 4X green
	1	800HN101G	Allen-Bradley-Silicone boot push button
PBR	1	800HAR6D2	Allen-Bradley-Momentary push-button, 1 N.C. NEMA 4X red
	1	800HN101R	Allen-Bradley-Silicone boot push button
R	4	700HA32A1	Allen-Bradley-Relay DPDT
	4	700HN125	Allen-Bradley-8-pin relay socket
R	1	700HA33A1	Allen-Bradley-Relay 3PDT
	1	700HN126	Allen-Bradley-11-pin relay socket
SS	3	800HHR2D1	Allen-Bradley-Selector Switch, 2 pos. 1 N.O.
	3	800HNR101	Allen-Bradley-Silicone switch cover
T	4	700HA32A1	Allen-Bradley-Relay DPDT
	4	700HN202	Allen-Bradley-8-pin relay socket
	4	700HT1	Allen-Bradley-Series-B timing module
TB-1	50	1492CAM1	Allen-Bradley-Screw terminals blocks, 35Amp, 600V
TB-B	1	1492PDM3111	Allen-Bradley-Screw terminals blocks, 100Amp, 600V
H1,2,3	3	D-AH301	Hoffman Panel Heater, 30W
TEM	1	A-TEMNC	Hoffman Panel Thermostat
TB-P	10	1492CAM1L	ALLEN-BRADLEY LARGE-HEAD SCREW TERMINALS, 35A, 600V

- GENERAL NOTES:**
- 1) ALL WIRING & DEVICES SHOWN WITH LIGHT/DASHED LINES EXISTING TO REMAIN IN SERVICE.
 - 2) ALL WIRING & DEVICES SHOWN WITH DARK/SOLID LINES NEW TO BE INSTALLED THIS PROJECT.

REV #1
ISSUED
NOVEMBER
2021



1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: EXISTING TANK FARM CONTROL PANEL MODIFICATIONS			
DRAWN BY: BCG/JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E7		SHEET: E7.7 OF 9	
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

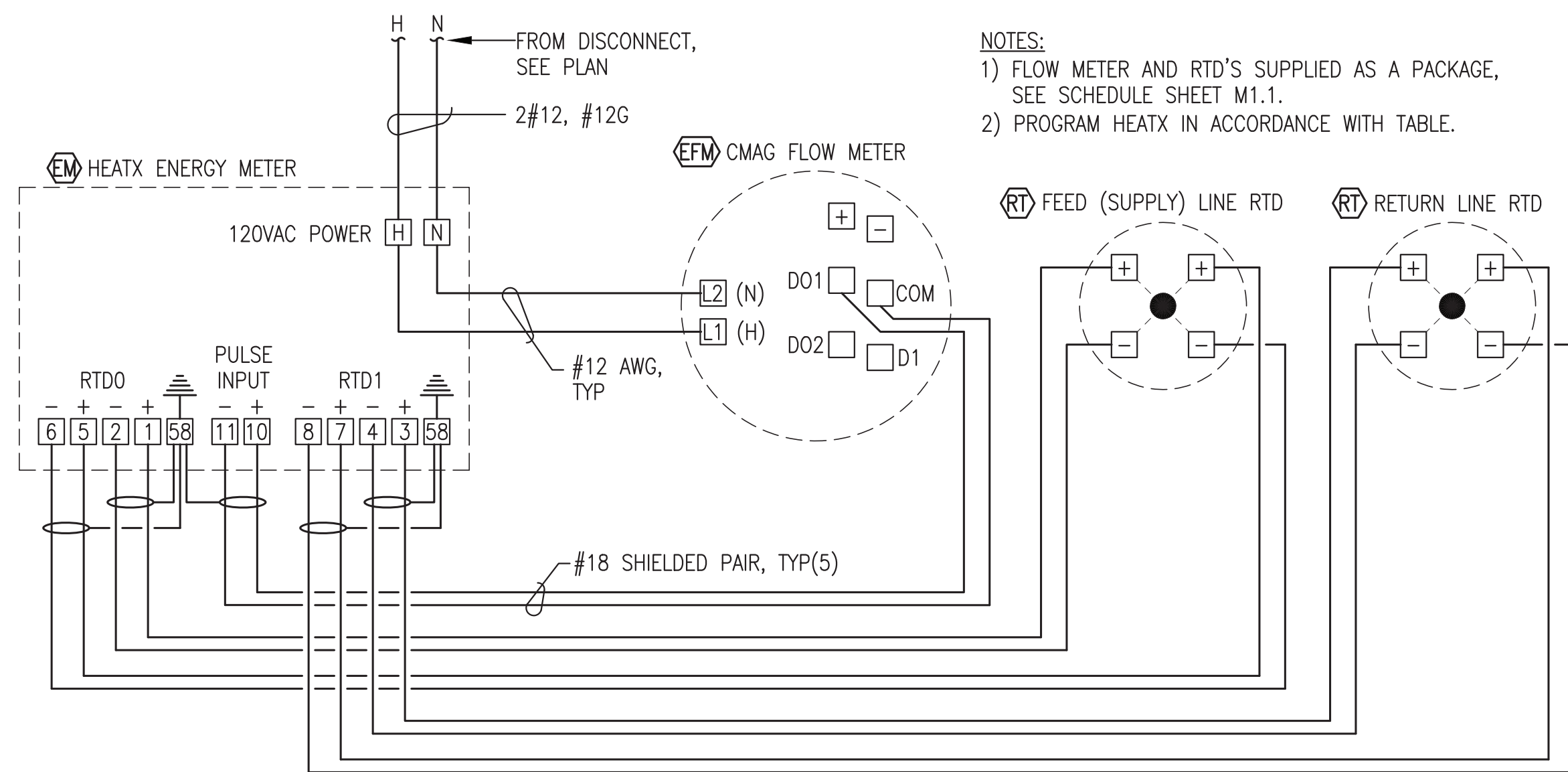


- NOTES:
- SEE MECHANICAL PIPING DIAGRAMS FOR SENSOR LOCATIONS & INSTALLATION INSTRUCTIONS.
 - SEE SCHEDULES SHEET M1.1 FOR ALL INSTRUMENTATION AND HEAT RECOVERY SYSTEM ENERGY MEASUREMENT DEVICES.
 - EXISTING 12 CIRCUIT PANELBOARD "D" (SQUARE D TYPE NQOB) IS FULL POWER HEAT RECOVERY SYSTEM EQUIPMENT FROM EXISTING RECEPTACLE CIRCUIT. EXISTING RECEPTACLE CIRCUIT IS POWERED FROM 20A SINGLE POLE BREAKER 3 IN PANELBOARD. USE LABEL MAKER TO RE-LABEL CIRCUIT 3 TO READ: "RECEPTACLES AND HEAT RECOVERY".

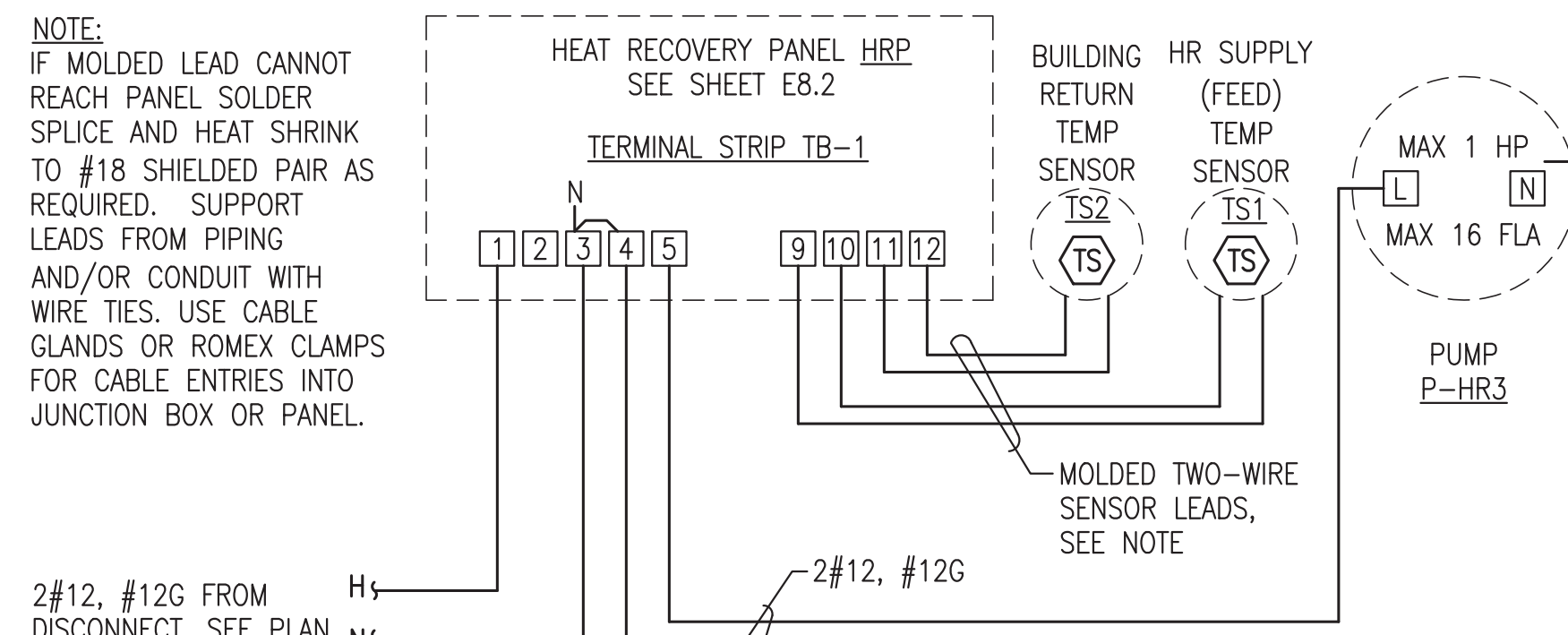
SCHOOL HEAT RECOVERY ENERGY METER EM & HEATX PROGRAMMING TABLE

Parameter Number	Parameter	Selection	Description
1	LANG	ENGL	Select Language
2	MODE	CHAR	Selects mode of operation (CHAR = Charge / Discharge)
3	RESET	NO	Resets totals upon exiting the set-up mode (Note: Will default to "NO" after exiting)
4	UNITS	US	Metric or US units
5	ENERGY	KBTU	Set energy units for display
6	VOLUME	GAL	Set volume units for display
7	POWER	KBTU/HR	Set power units for display
8	FLOW	Gal/m	Set flow rate units for display
9	FACTOR	10.70	The K-factor of the flow meter for pulse input (Water=10.0, 50% Propylene=10.7)
10	CUTOFF	0.15 Hz	Low frequency cut-off of the flow meter expressed in Hz.
11	OFFSET	NO	The offset between temperature sensors
12	FM LOC	feed	Location of the flow meter as being either feed or return.
13	RELO	Flw L.	Defines parameter for Relay 0.
14	RELO	0.00	Set point for parameters set in above step 13
15	REL1	Flw H.	Defines parameter for Relay 1.
16	REL2	0.00	Set point for parameters set in above step 15.
13	4-20 Ma		Defines the parameter to be output as a 4-20 mA signal
14	4 Ma		Defines the 4 mA setting
15	20 Ma		Defines the 20 mA setting
17	PULSE	ENERGY	Defines whether the pulse output is for the energy or volume total
18	PULSE	1.00 KBTU	Defines how often a pulse is output
19	PULSE	500 ms	Defines the Pulse width
20	CLOCK	HR	Set time in hours and minutes (Field verify during commissioning)
21	DATE	Year	Set date in year, month and day (Field verify during commissioning)
22	COMMS	RS485	Comms setting if present
23	BAUD	9600	Communications baud rate
24	PARITY	NONE	Communications parity
25	BUS	002	Bus Address
26	Df DIS	YES	Display will either revert to energy total if "YES" or stay where left if "NO"
27	Fr RES	NO	Enables REST key on front panel if "YES", disables if "NO"
28	PK/OPK	OFF	Selects whether Energy will be totalized in separate Peak or Off-Peak registers
29	PK ON		Set the hour at which energy totalization will commence in PEAK register.
30	PK OFF		Set the hour at which energy totalization will commence in OFF PEAK register.
31	LOG	OFF	Selects interval at which logging will occur.
31	RESOL	NORM	Display energy, volume and temp with normal resolution "NORM"
33	QUIT	YES	YES = Return to normal operation. NO = Continue in programming.

1 SCHOOL MECH BUILDING HEAT RECOVERY WIRING PLAN
E8.1 3/4"=1'-0"



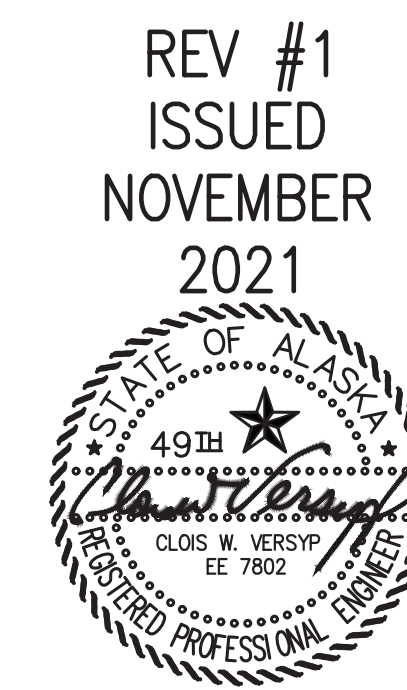
2 SCHOOL HEAT RECOVERY ENERGY METER EM & HEATX WIRING DIAGRAM
E8.1 NO SCALE

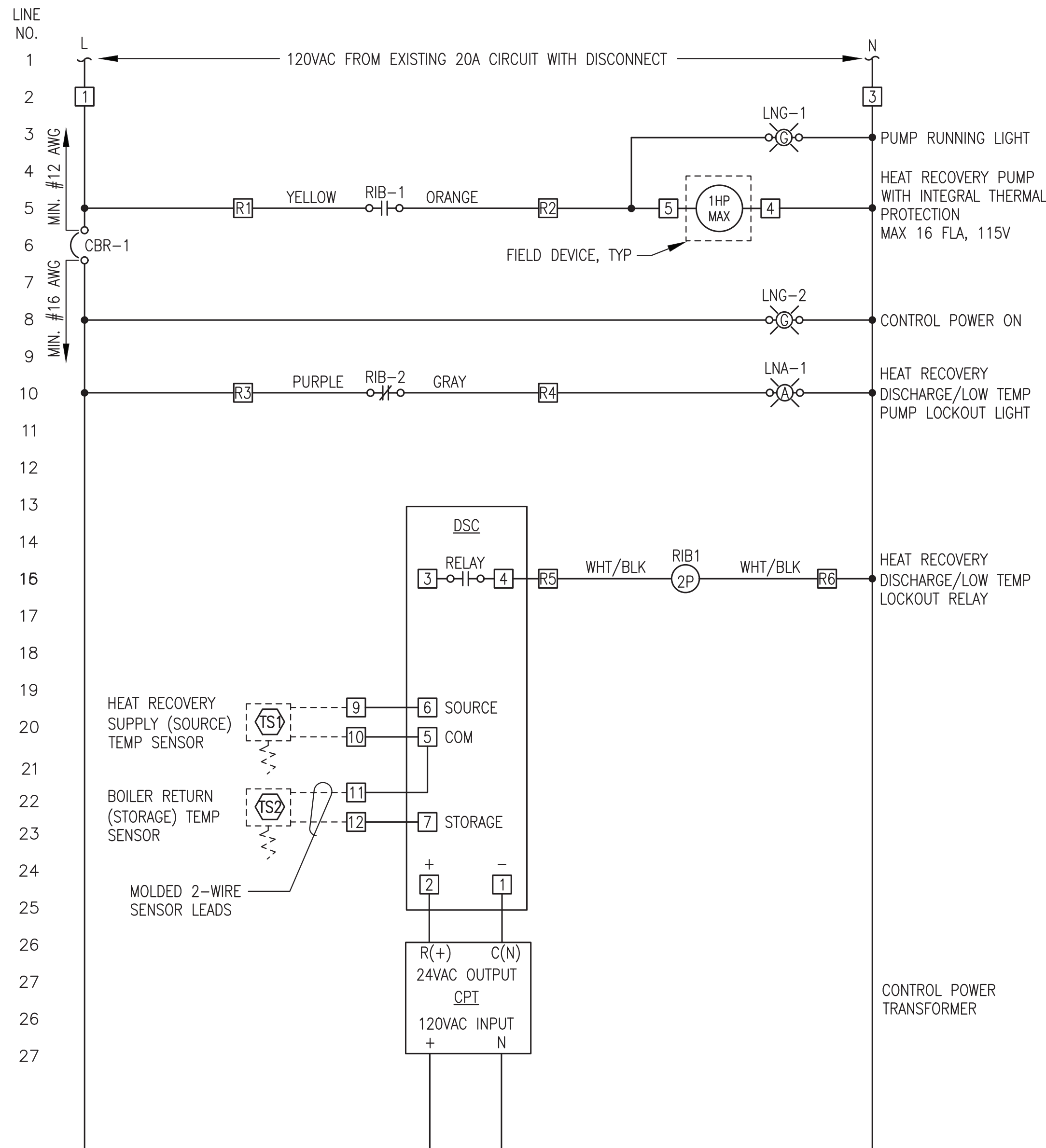


3 SCHOOL HEAT RECOVERY PANEL HRP WIRING DIAGRAM
E8.1 NO SCALE

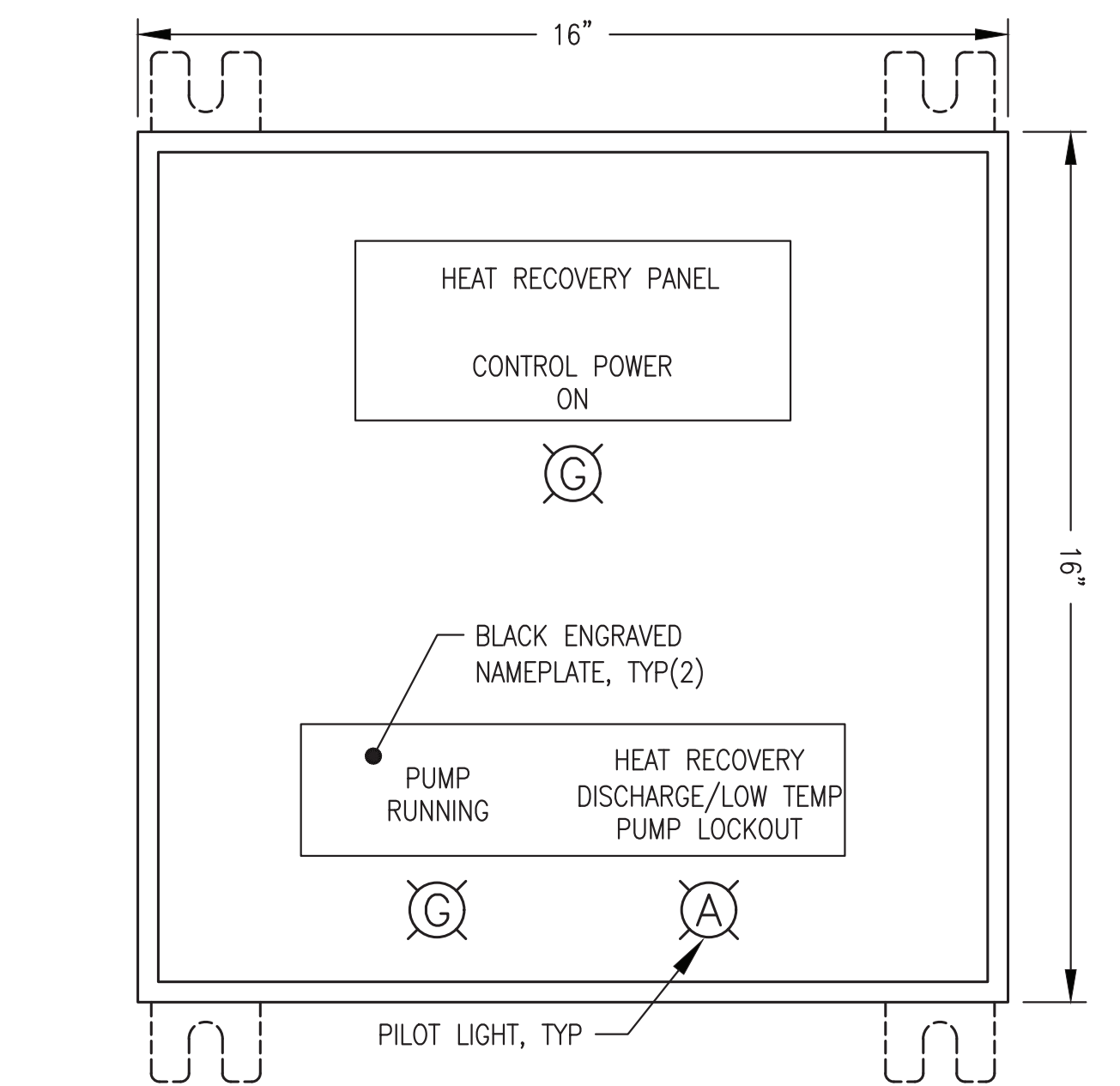
ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #1

1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: HEAT RECOVERY SYSTEM SCHOOL MECH BLDG WIRING PLAN & DIAGRAMS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E8		SHEET: E8.1 OF 9	
PROJECT NUMBER:			

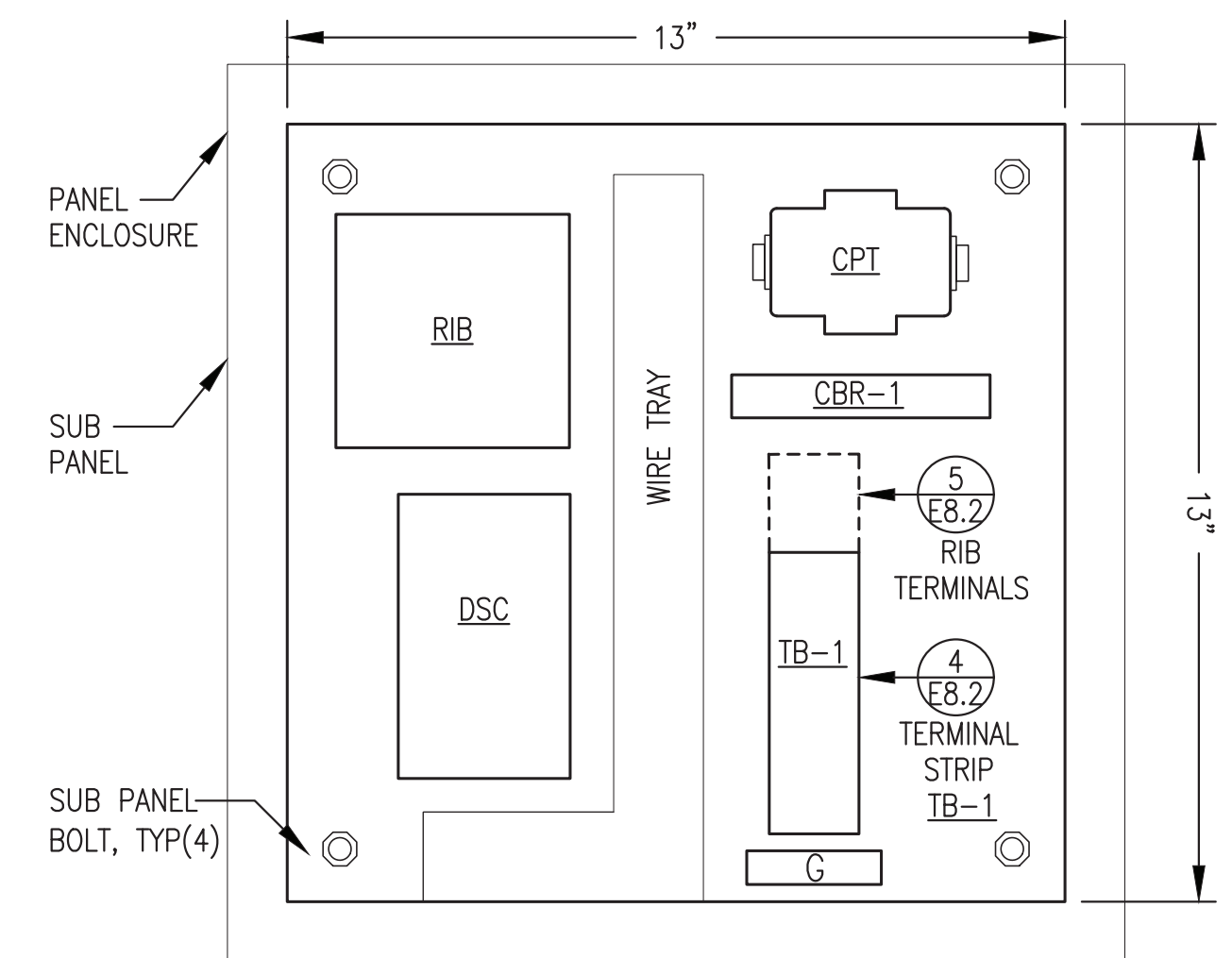




1 HEAT RECOVERY PANEL LOGIC DIAGRAM
E8.2 NO SCALE



2 FRONT PANEL LAYOUT
E8.2 NO SCALE



3 SUB PANEL LAYOUT
E8.2 NO SCALE

PANEL	FIELD
L1	1 POWER FROM DISCONNECT
	2 SPARE
N	3 NEUTRAL FROM DISCONNECT
	4 PUMP NEUTRAL
	5 PUMP POWER
	6 SPARE
	7 SPARE
	8 SPARE
	9 SENSOR S1 SIGNAL
	10 SENSOR S1 SIGNAL
	11 SENSOR S2 SIGNAL
	12 SENSOR S2 SIGNAL

R-1	YELLOW
R-2	ORANGE
R-3	PURPLE
R-4	GREY
R-5	WHITE/BLACK
R-6	WHITE/BLACK
R-7	BROWN
R-8	BLUE

4 TERMINAL STRIP TB-1
E8.2 NO SCALE

5 RIB TERMINAL STRIP
E8.2 NO SCALE

LEGEND			
R#	CONTROL RELAY	R#-#	NORMALLY OPEN CONTACT
#	TERMINAL BLOCK	R#-#	NORMALLY CLOSED CONTACT
CB-#	CIRCUIT BREAKER	---	FIELD WIRING
		---	PANEL WIRING

BILL OF MATERIALS

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
CBR	1	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CPT	1	FUNCTIONAL DEVICES	TR40VA002	40VA, 24VAC CONTROL POWER TRANSFORMER
DSC	1	TEKMAR	MODEL 156	DIFFERENCE SETPOINT CONTROLLER WITH MINIMUM AND MAXIMUM TEMPERATURE FUNCTIONS, 24VAC, 1 EACH N.O. RELAY RATED 240V, 10A, 1/3HP
LNG	2	ALLEN-BRADLEY	800HQRH10G	GREEN LED PILOT LIGHT, 120V, NEMA 4X
LNA	1	ALLEN-BRADLEY	800HQRH10A	AMBER LED PILOT LIGHT, 120V, NEMA 4X
RIB	1	FUNCTIONAL DEVICES	RIB01P	DPDT RELAY, 120VAC COIL, 20A, 1HP N.C. RATED
TS1,2	2	TEKMAR	MODEL 085	SOLAR SENSOR, 10K THERMISTOR, 6mm DIA x 45mm LONG, 5' LEAD WIRE
TB		ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS

HEAT RECOVERY PANEL SEQUENCE OF OPERATION:

CONTROL POWER: WHEN THE CIRCUIT BREAKER IN THE LOAD CENTER IS CLOSED, THE WALL-MOUNT DISCONNECT IS CLOSED, AND THE INTERNAL CIRCUIT BREAKER CBR-1 IS CLOSED, POWER IS PROVIDED TO CONTROL DEVICES AND THE "CONTROL POWER ON" LIGHT IS ON.

NORMAL OPERATION: WHEN THE DIFFERENCE BETWEEN SENSOR S1 (HEAT RECOVERY SUPPLY TEMPERATURE OR "SOURCE") AND SENSOR S2 (BOILER RETURN TEMPERATURE OR "STORAGE") IS GREATER THAN THE DELTA-T SETPOINT (7 DEG F) AND THE HEAT RECOVERY SUPPLY SENSOR S1 TEMPERATURE IS GREATER THAN THE MINIMUM SOURCE SETPOINT (160 DEG F): THE PUMP WILL RUN AND THE "PUMP RUNNING" LIGHT WILL BE ON.

DISCHARGE LOCKOUT OPERATION: WHEN THE DIFFERENCE BETWEEN SENSOR S1 AND SENSOR S2 BECOMES LESS THAN THE DELTA-T SETPOINT (7 DEG F) MINUS THE DELTA-T DIFFERENTIAL (5 DEG F): THE DSC RELAY WILL OPEN, THE RIB1 COIL WILL BE DE-ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN ON, AND THE PUMP WILL STOP. WHEN THE DIFFERENCE BETWEEN S1 AND S2 BECOMES GREATER THAN THE DELTA-T SETPOINT: THE DSC RELAY WILL CLOSE, THE RIB1 COIL WILL BE ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN OFF, AND THE PUMP WILL RUN.

DISTRICT HEAT LOW TEMPERATURE LOCKOUT OPERATION: IF THE HEAT RECOVERY SUPPLY TEMPERATURE (SENSOR S1 "SOURCE") FALLS TO LESS THAN THE MINIMUM SOURCE SETPOINT (160 DEG F): THE DSC RELAY WILL OPEN, THE RIB2 COIL WILL BE DE-ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN ON AND THE PUMP WILL STOP. WHEN THE HEAT RECOVERY SUPPLY TEMPERATURE (S1) RECOVERS AND BECOMES EQUAL TO THE MINIMUM SOURCE SETPOINT (160 DEG F) PLUS THE MINIMUM SOURCE DIFFERENTIAL (5 DEG F): THE DSC RELAY WILL CLOSE, THE RIB2 COIL WILL BE ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN OFF, AND THE PUMP WILL RUN.

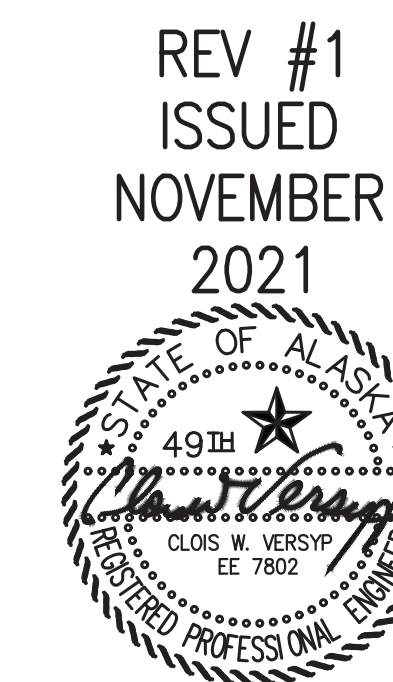
SHOP FABRICATION NOTES:

- FURNISH COMPLETE PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM AND BILL OF MATERIALS ALONG WITH ALL PANEL DEVICE ACCESSORIES REQUIRED FOR COMPLETE INSTALLATION. FURNISH TEMPERATURE SENSORS LOOSE SHIP WITH PANEL FOR FIELD INSTALLATION.
- INSTALL IN A NEMA 12 ENCLOSURE, MIN 14 GAUGE STEEL CONSTRUCTION WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL, AND HINGED LOCKABLE DOOR. PAINT ENCLOSURE ANSI 61 GRAY AND PAINT BACK PANEL WHITE.
- TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).
- LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING.
- PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED. SECURE TO PANEL FACE WITH A MINIMUM OF TWO MOUNTING SCREWS.
- PROGRAM THE DIFFERENTIAL SETPOINT CONTROLLER (DSC) WITH THE FOLLOWING SETTINGS:
SET THE DRAINDOWN/DRAINBACK DIP SWITCH TO DRAINDOWN.
 ΔT SETPOINT=7; ΔT DIFFERENTIAL=5; MINIMUM SOURCE SETPOINT=160; MINIMUM SOURCE DIFFERENTIAL=5;
MAXIMUM STORAGE SETPOINT=200; MAXIMUM STORAGE DIFFERENTIAL=10. SET DISPLAY TO 'F'.
- BENCH TEST COMPLETED UNIT. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES.

FIELD INSTALLATION NOTES:

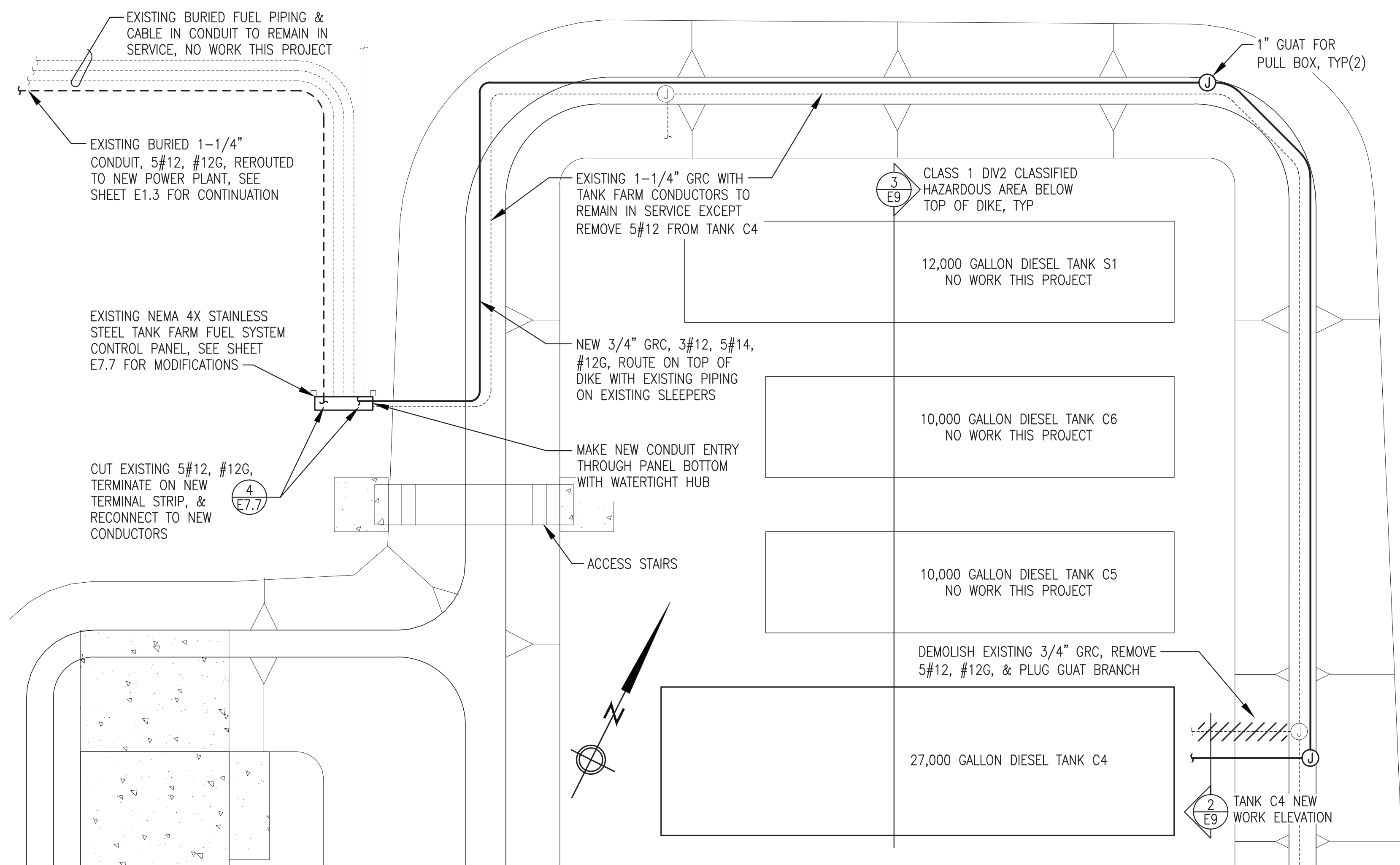
- SEE FIELD WIRING DIAGRAM 3/E8.1. PERFORM ALL FIELD WIRING IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS. FIELD WIRING TO MOTORS MIN #12 AWG. LABEL BOTH ENDS OF ALL CONDUCTORS WITH PANEL TERMINAL BLOCK TERMINATION NUMBERS.

ALL WORK ON THIS SHEET SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #1

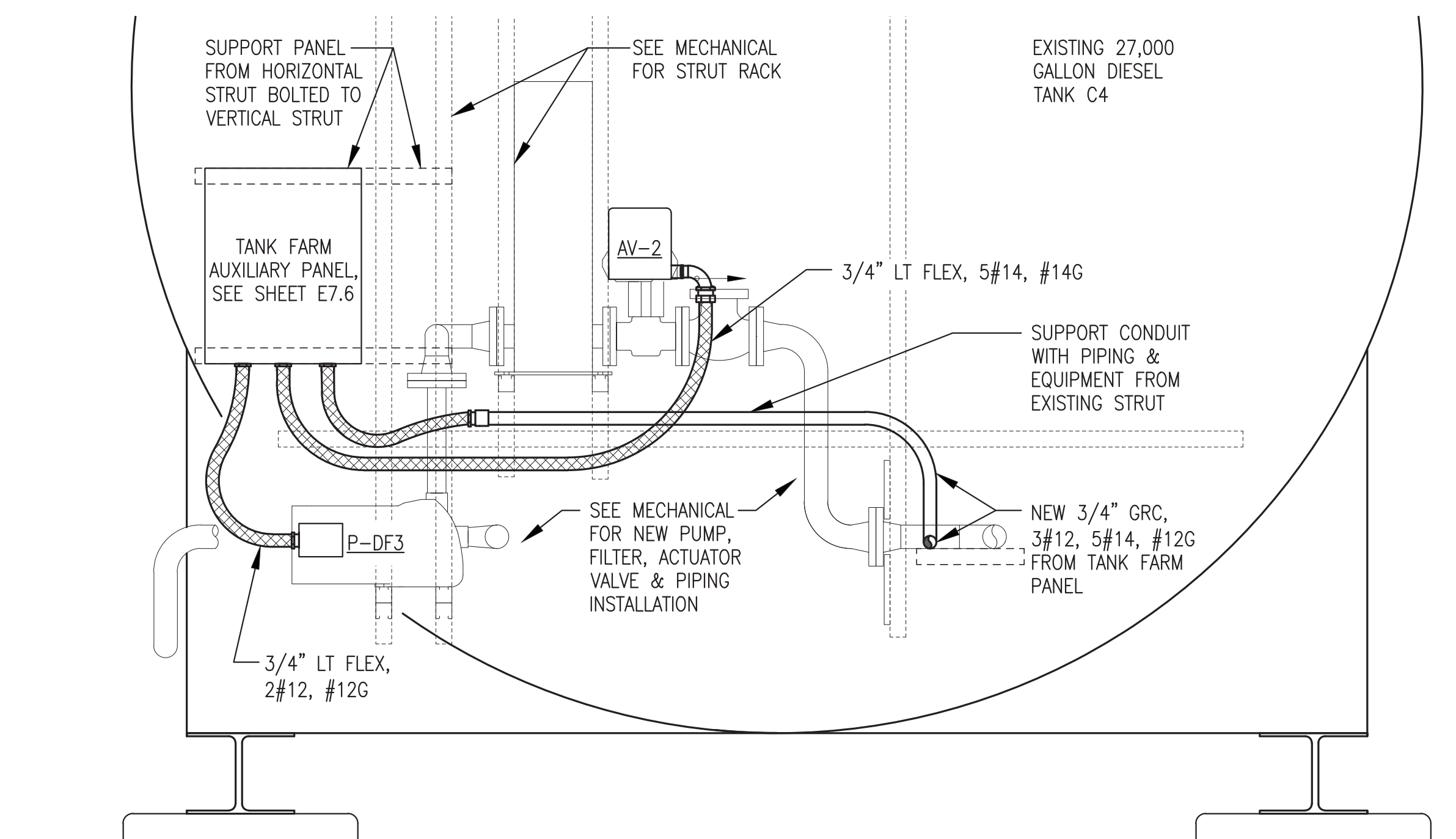


1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: HEAT RECOVERY SYSTEM SCHOOL MECH BLDG HEAT RECOVERY PANEL HRP			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E8		SHEET: E8.2 OF 9	
PROJECT NUMBER:			

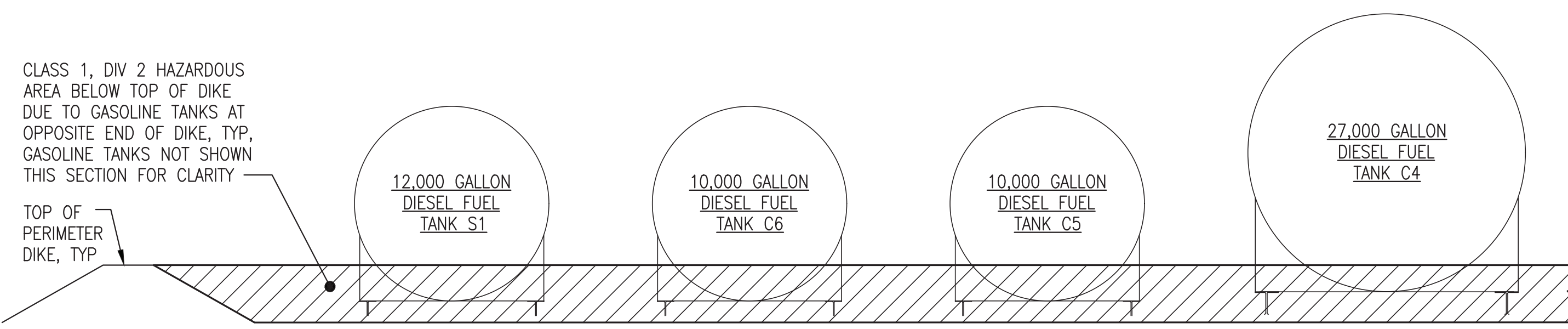




1 ENLARGED TANK FARM PIPING MODIFICATION PLAN
E9 1"=6"

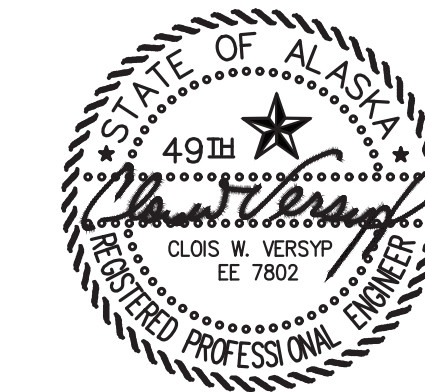



2 TANK C4 NEW WORK ELEVATION
E9 1"=1'-0"



3 HAZARDOUS AREA CLASSIFICATION SECTION
E9 NO SCALE

REV #1
ISSUED
NOVEMBER
2021



1	UPDATED TO COORDINATE WITH VENETIE POWER PLANT PROJECT	11/1/21	BCG
REV.	DESCRIPTION	DATE	BY
 ALASKA ENERGY AUTHORITY			
PROJECT: NIKOLAI POWER SYSTEM UPGRADE			
TITLE: TANK FARM WIRING MODIFICATION PLAN, HAZARDOUS AREA CLASSIFICATION, & DETAILS			
DRAWN BY: JTD		SCALE: AS NOTED	
DESIGNED BY: CWV/BCG		DATE: 9/1/21	
FILE NAME: NIKO E9		SHEET: E9 OF 9	
PROJECT NUMBER:			
P.O. 111405, Anchorage, AK 99511 (907)349-0100			

GENERAL NOTES

- ALL CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE CONSTRUCTION DRAWINGS.
- THE 2007 EDITION OF ANSI C2 – NATIONAL ELECTRICAL SAFETY CODE (NESC), RUS BULLETIN 1728F–804, SPECIFICATIONS AND DRAWINGS FOR 12.47/7.2 kV LINE CONSTRUCTION, AND RUS BULLETIN 1728F–806, SPECIFICATIONS AND DRAWINGS FOR UNDERGROUND ELECTRICAL DISTRIBUTION, UNLESS MODIFIED BY THESE DRAWINGS OR SPECIFICATIONS, SHALL BE FOLLOWED, INCLUDING ANY STATE OF ALASKA AMENDMENTS. OBTAIN COPIES OF THE RUS BULLETINS AND MAINTAIN COPIES ON THE JOB SITE. ADDITIONALLY, CONSTRUCTION SPECIFICATIONS ARE INCLUDED IN DIVISIONS 26 AND 33 OF THE CONSTRUCTION DOCUMENTS. CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH THE CONTRACT DOCUMENTS, RUS CONSTRUCTION UNITS, AND ANSI C2.
- THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM CURRENTLY SERVES CUSTOMERS. SERVICE SHALL BE MAINTAINED AT ALL TIMES TO THE CUSTOMERS EXCEPT WHEN OUTAGES ARE REQUIRED FOR SERVICE CONVERSION OR OTHER CONSTRUCTION RELATED ACTIVITIES. ALL OUTAGES SHALL BE COORDINATED IN ADVANCE WITH THE NIKOLAI LIGHT & POWER (NL&P) (OWNER). PRIOR TO COMMENCING WORK ON THE UPGRADE, MEET WITH THE NL&P TO DEVELOP AN OUTAGE SCHEDULE THAT WILL KEEP DISRUPTIONS OF POWER TO THE CUSTOMERS TO A MINIMUM. NL&P SHALL HAVE FINAL AUTHORITY ON WHEN OUTAGES CAN OCCUR.
- THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM POLES ARE SHARED WITH THE TELEPHONE SYSTEM, UNITED UTILITY, INC. CONTRACTOR SHALL NOT DISRUPT THE EXISTING TELEPHONE SYSTEM WITHOUT THE CONSENT OF THE TELEPHONE COMPANY. ANY PART OF THE EXISTING TELEPHONE SYSTEM DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE TELEPHONE COMPANY.
- ALL EXISTING UTILITIES MAY NOT BE SHOWN. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATING (INCLUDING TRENCHING FOR NEW UNDERGROUND). COORDINATE WITH THE CITY OF NIKOLAI AND NL&P TO LOCATE UNDERGROUND UTILITIES.
- THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY SHOW ALL FEATURES OF THE REQUIRED WORK. PROVIDE ALL EQUIPMENT AND MATERIALS REQUIRED FOR A COMPLETE SYSTEM. VERIFY EXISTING FIELD CONDITIONS PRIOR TO STARTING CONSTRUCTION. IMMEDIATELY CONTACT THE ENGINEER FOR CLARIFICATION OF QUESTIONABLE ITEMS OR APPARENT CONFLICTS.
- ENSURE THAT APPROPRIATE SAFETY MEASURES ARE IMPLEMENTED AND THAT ALL WORKERS ARE AWARE OF THE POTENTIAL HAZARDS FROM ELECTRICAL SHOCK ASSOCIATED WITH WORKING ON OR NEAR AN ENERGIZED MEDIUM VOLTAGE DISTRIBUTION SYSTEM.
- THE SITE DRAWINGS USED WERE DEVELOPED USING A COMBINATION OF AERIAL PHOTOGRAPHY AND SURVEY DATA PROVIDED BY OTHERS. ANY VARIATIONS BETWEEN WHAT IS SHOWN AND THE ACTUAL FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
- SEE CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COORDINATING HIS WORK WITH EXISTING FACILITY OPERATORS, OTHER CONTRACTORS AND/OR SUBCONTRACTORS WORKING IN THE COMMUNITY, LOCAL UTILITY AND GOVERNMENT ORGANIZATIONS, AND STATE AND FEDERAL AUTHORITIES.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROVIDING CONSTRUCTION ACCESS FOR EQUIPMENT AND PERSONNEL AS REQUIRED TO COMPLETE POLE INSTALLATION, POLE HARDWARE AND CONDUCTOR INSTALLATION, AND ALL OTHER PROJECT TASKS. CONTRACTOR SHALL COORDINATION WITH LOCAL ENTITIES AND RESIDENTS, ERECT TEMPORARY STRUCTURES, AND PERFORM TEMPORARY REMOVAL/RELOCATION AND REPLACEMENT OF ALL STRUCTURES, STEAM HOUSES, ETC. AS NECESSARY TO COMPLETE THE WORK. ALL EXISTING STRUCTURES AFFECTED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL OR BETTER CONDITION BY THE CONTRACTOR IMMEDIATELY AFTER THE CONTRACTOR'S WORK IN THAT AREA IS COMPLETED. CONTRACTOR SHALL COORDINATE ALL NECESSARY PUBLIC SAFETY ACTIVITIES INCLUDING SIGNAGE, BARRIERS, TRAFFIC CONTROL PLANS, LIGHTING, PUBLIC NOTIFICATIONS, AND OTHER ITEMS DEEMED NECESSARY TO PROTECT THE PUBLIC DURING CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR SHALL BALANCE THE PHASES OF THE NEW DISTRIBUTION SYSTEM. DURING CONSTRUCTION LOAD IMBALANCE SHOULD BE KEPT TO A MINIMUM AND SHALL NOT EXCEED 20%.

GENERAL DEMOLITION NOTES

- COORDINATE ALL DEMOLITION WITH NEW WORK TO MINIMIZE OUTAGES, SEE SPECIFICATIONS.
- ALL EXISTING PRIMARY AND SECONDARY OVERHEAD TO REMAIN IN SERVICE UNLESS OTHERWISE NOTED ON THE DRAWINGS. UNDERGROUND CONDUCTORS ARE TO BE TAKEN OUT OF SERVICE WHERE NOTED ON THE DRAWINGS.
- EXISTING BURIED CONDUCTORS TAKEN OUT OF SERVICE AS A RESULT OF THIS PROJECT SHALL BE DEMOLISHED (WHEN ENCOUNTERED) AND DISPOSED OF OFF SITE.

GENERAL NEW WORK NOTES

- SEE PLAN SHEETS FOR CABLE SIZES.
- REPAIR ALL ROADS AND DRIVEWAYS AFFECTED BY THE INSTALLATION OF THE NEW BURIED CABLE. PLACE 2" MINUS NFS FILL IN MAX. 8" LIFTS AND COMPACT TO 95% OF MAXIMUM DENSITY. TOP 6" OF ROAD/DRIVEWAY FILL TO BE 1" MINUS NFS SUITABLE FOR ROAD CONSTRUCTION. BLEND TOP OF FILL WITH EXISTING ROAD/DRIVEWAY SURFACE AND SLOPE FOR PROPER DRAINAGE.
- ALL DISTRIBUTION EQUIPMENT TO BE LOCATED WITHIN EXISTING ROAD RIGHT-OF-WAY, CITY PROPERTY OR UTILITY EASEMENT AND AS SHOWN IN DETAILS.
- CONTRACTOR SHALL CLEARLY LABEL EACH CIRCUIT COMING INTO EACH SECTIONALIZING CABINET TO ENSURE THAT THE CIRCUITS OR PHASES WILL NOT BE CROSSED. SEE SPECIFICATIONS.
- WHERE IT IS NECESSARY TO CROSS IN-SERVICE POWER CABLES, IF EXISTING CABLE IS BURIED A MINIMUM 5' DEEP. CROSS THE NEW POWER CABLES ABOVE (4' MINIMUM BURIAL DEPTH PLUS 1' CLEAR). IF EXISTING BURIED CABLE IS LESS THAN 5' BELOW GRADE, TRENCH AND INSTALL NEW CABLES BELOW EXISTING.
- PRIMARY UNDERGROUND CONDUCTOR ROUTINGS SHOWN DIAGRAMMATIC AND DO NOT INDICATE ACTUAL BURIED ROUTING. FIELD ROUTE AS REQUIRED TO MINIMIZE TRENCHING AND AVOID OTHER UTILITIES AND OBSTACLES.
- LEANING POLES THAT ARE NOTED TO BE RESET SHALL BE MADE PLUMB AND RE-GUYED. ADDITIONAL GUY WIRE SHALL BE ADDED WHERE REQUIRED.

PLAN SYMBOL LEGEND

-----	EXISTING SINGLE PHASE OVERHEAD PRIMARY	-----	NEW UNDERGROUND
- - - - -	EXISTING 3-PHASE OVERHEAD PRIMARY	-----	NEW SECONDARY
-----	EXISTING UNDERGROUND	-----	NEW SECONDARY
-----	EXISTING SECONDARY	-----	NEW SECONDARY
●	EXISTING ELECTRICAL POLE	●	NEW ELECTRICAL POLE
⌋	EXISTING TRANSFORMER POLE MOUNTED	⌋	NEW TRANSFORMER POLE MOUNTED
→	EXISTING GUY	→	NEW GUY
☀	EXISTING LIGHT		
		⏚	NEW PADMOUNT TRANSFORMER ID AND KVA INDICATED
		⏚	NEW PRIMARY SECTIONALIZING CABINET
		Ⓜ	NEW METER MAIN

ABBREVIATIONS

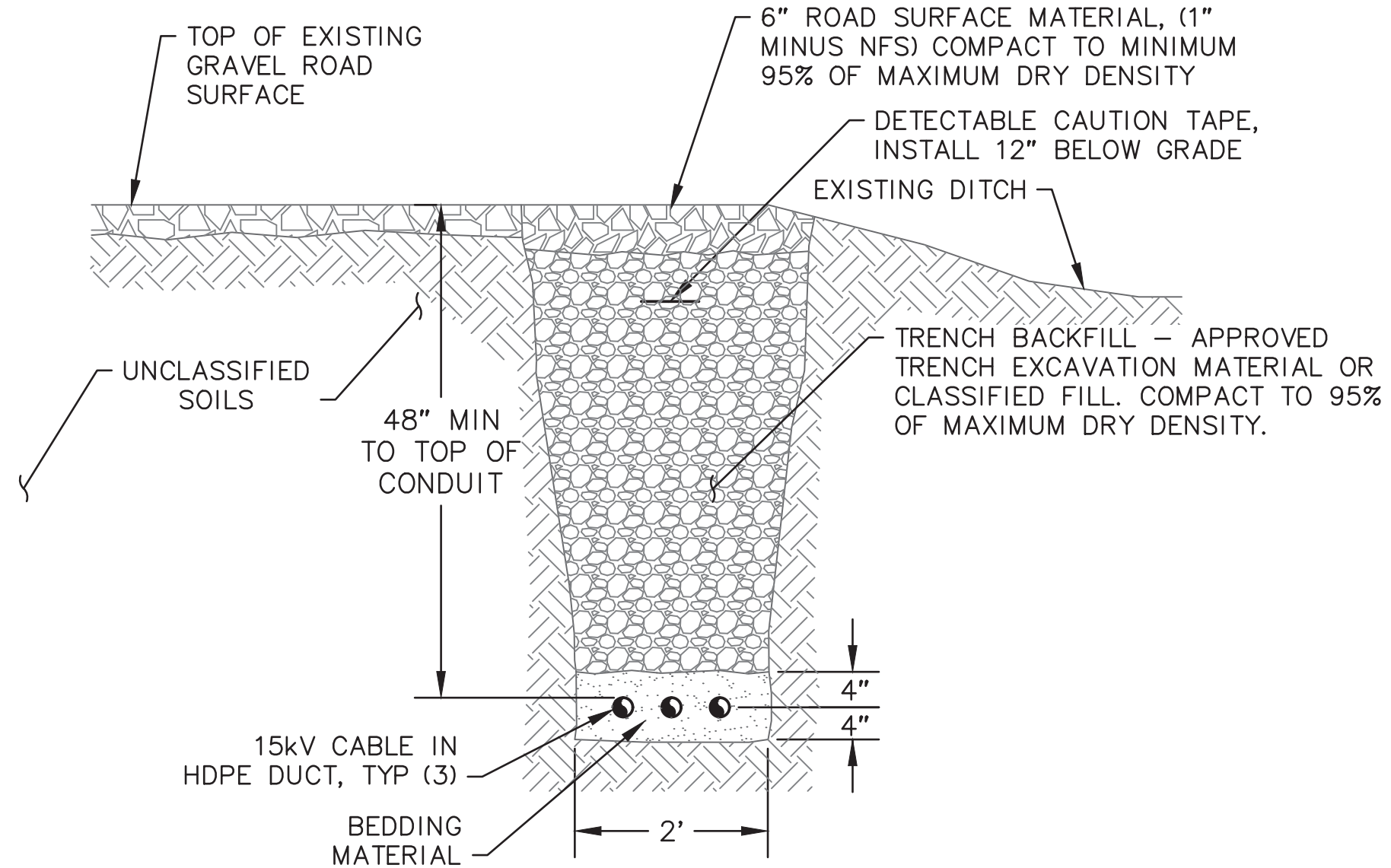
(E)	EXISTING
A	AMPERE
AC	ALTERNATING CURRENT
AIC	AMPERES INTERRUPTING CAPACITY
AWG	AMERICA WIRE GAGE
BCu	BARE COPPER
C	CONDUCTOR
CB	CIRCUIT BREAKER
CIC	CABLE IN CONDUIT
CT	CURRENT TRANSFORMER
DIA	DIAMETER
DISC	DISCONNECT
DWG	DRAWING
EA	EACH
EL	ELEVATION
F	FAHRENHEIT
FT	FEET
FU	FUSE
G,GND	GROUND
H	HOT CONDUCTOR
HDPE	HIGH DENSITY POLYETHYLENE
HPS	HIGH PRESSURE SODIUM
HZ	HERTZ
JCN	JACKETED CONCENTRIC NEUTRAL
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LFMC	LIQUID-TIGHT FLEXIBLE METAL CONDUIT
LFNC	LIQUID-TIGHT FLEXIBLE NON-METALLIC CONDUIT
LTG	LIGHTING
M	METER
MAX	MAXIMUM
MCM	THOUSAND CIRCULAR MILLS
MFR	MANUFACTURER
MIN	MINIMUM
N	NEUTRAL CONDUCTOR
NTS	NOT TO SCALE
P	POLE
PED	SECONDARY SERVICE PEDESTAL
PDS	PRIMARY DISTRIBUTION SWITCHGEAR
PH	PHASE
PVC	POLYVINYL CHLORIDE
R	SHUNT REACTOR
RMC	RIGID METAL CONDUIT, GALVANIZED
TR	TRANSFORMER
TYP	TYPICAL
UD	UNDERGROUND DISTRIBUTION
U/G	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VOLTS
VA	VOLT-AMPERES
VAC	VOLTS-ALTERNATING CURRENT
W	WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
XLP	CROSS LINKED POLYETHYLENE



NIKOLAI POWER SYSTEM UPGRADE
 ELECTRICAL DISTRIBUTION LEGEND,
 ABBREVIATIONS & NOTES
 NIKOLAI, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	9/1/21

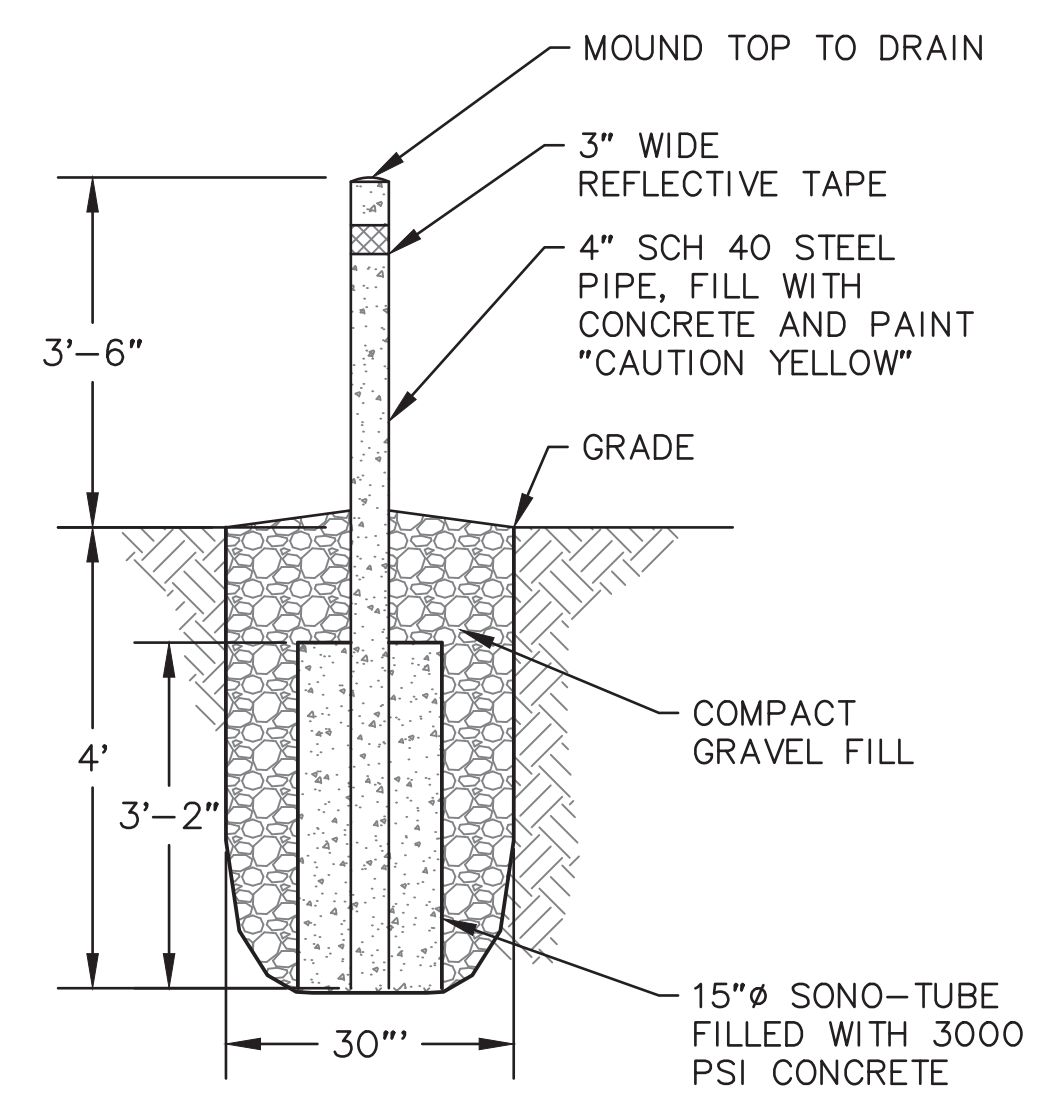
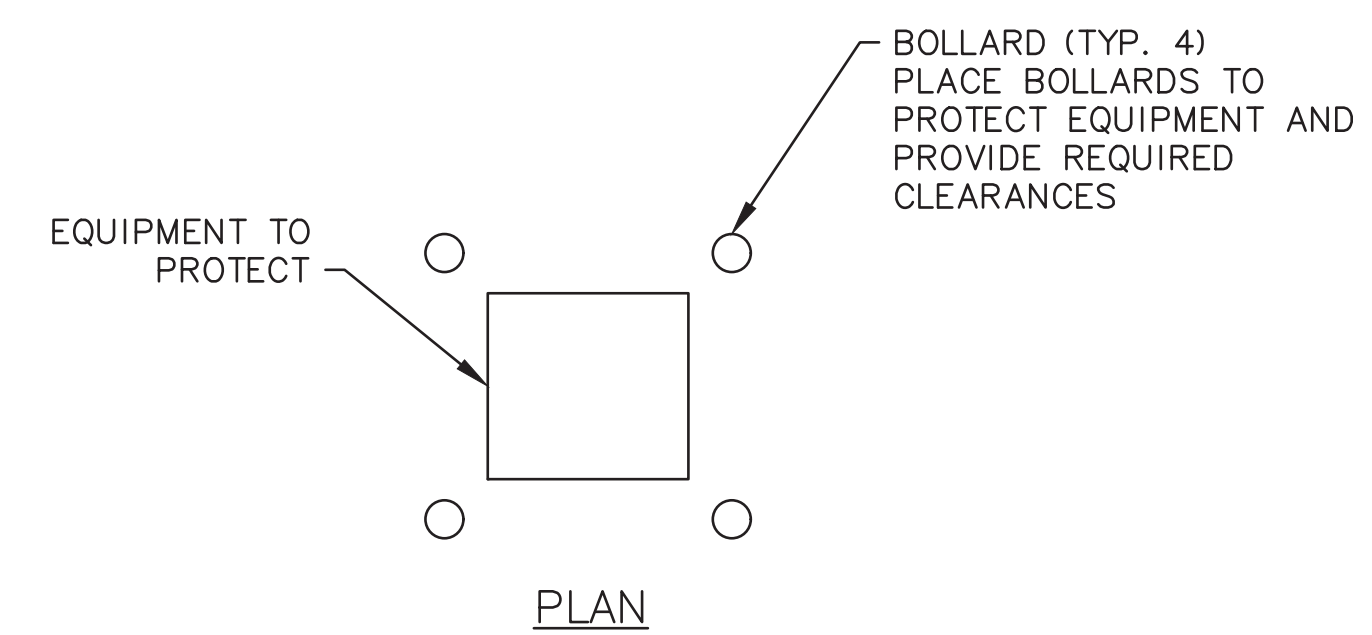
Plot Date	9/1/21
Designed	TRK
Drawn	TRK
Approved	KH



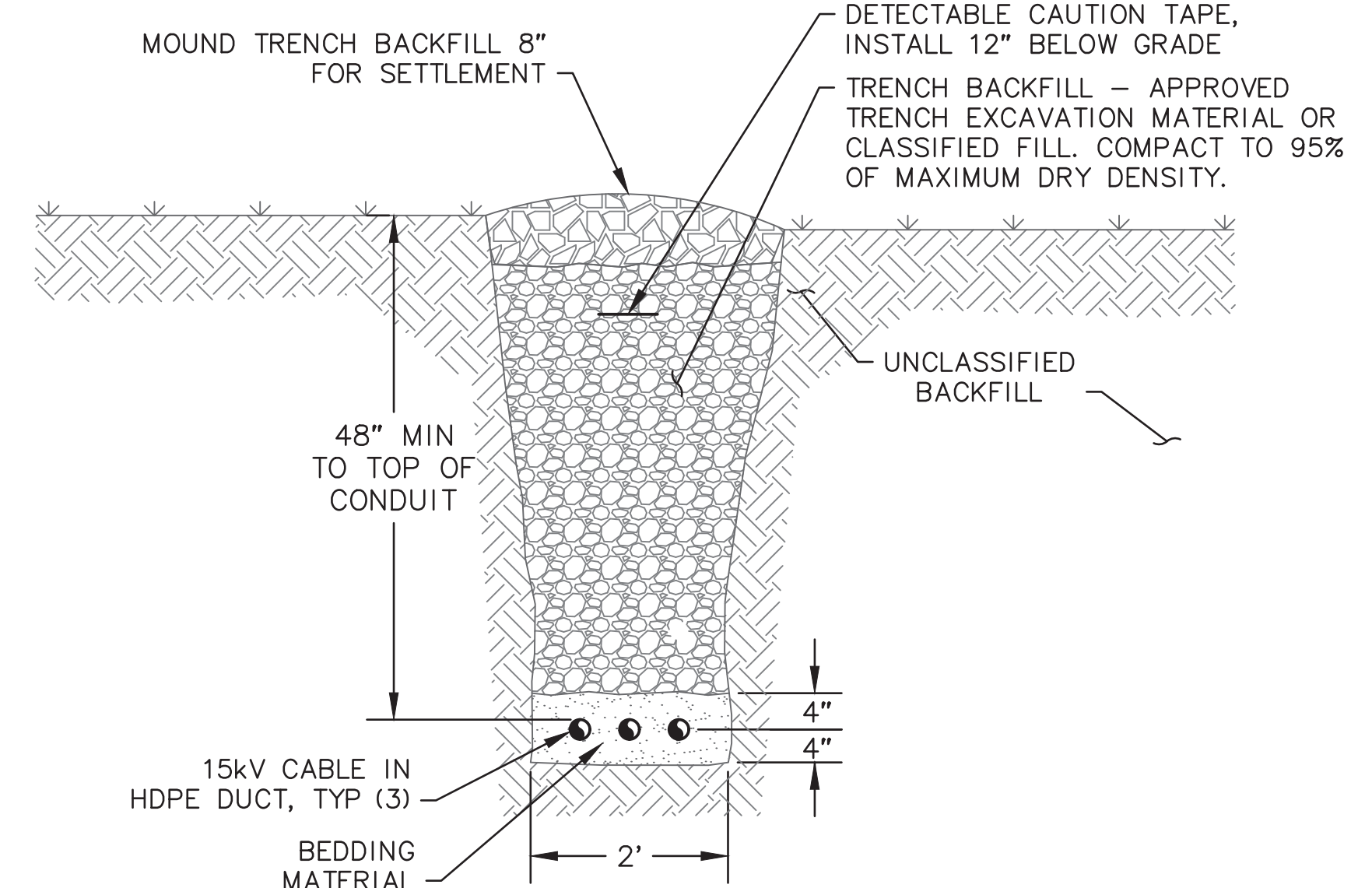
NOTES

1. MAINTAIN MINIMUM 12 INCHES OF SEPARATION BETWEEN 600V AND 15KV CABLE AT ALL TIMES. SEPARATION CAN BE VERTICAL OR HORIZONTAL.
2. 600V CABLE SHALL HAVE A MINIMUM OF 36" COVER AT ALL LOCATION.
3. ALL TRENCHING AND OTHER EXCAVATIONS SHALL BE SLOPED OR SHORED IN ACCORDANCE WITH OSHA STANDARDS.

1 CABLE INSTALLATION IN ROAD
E10.2 Scale: NTS



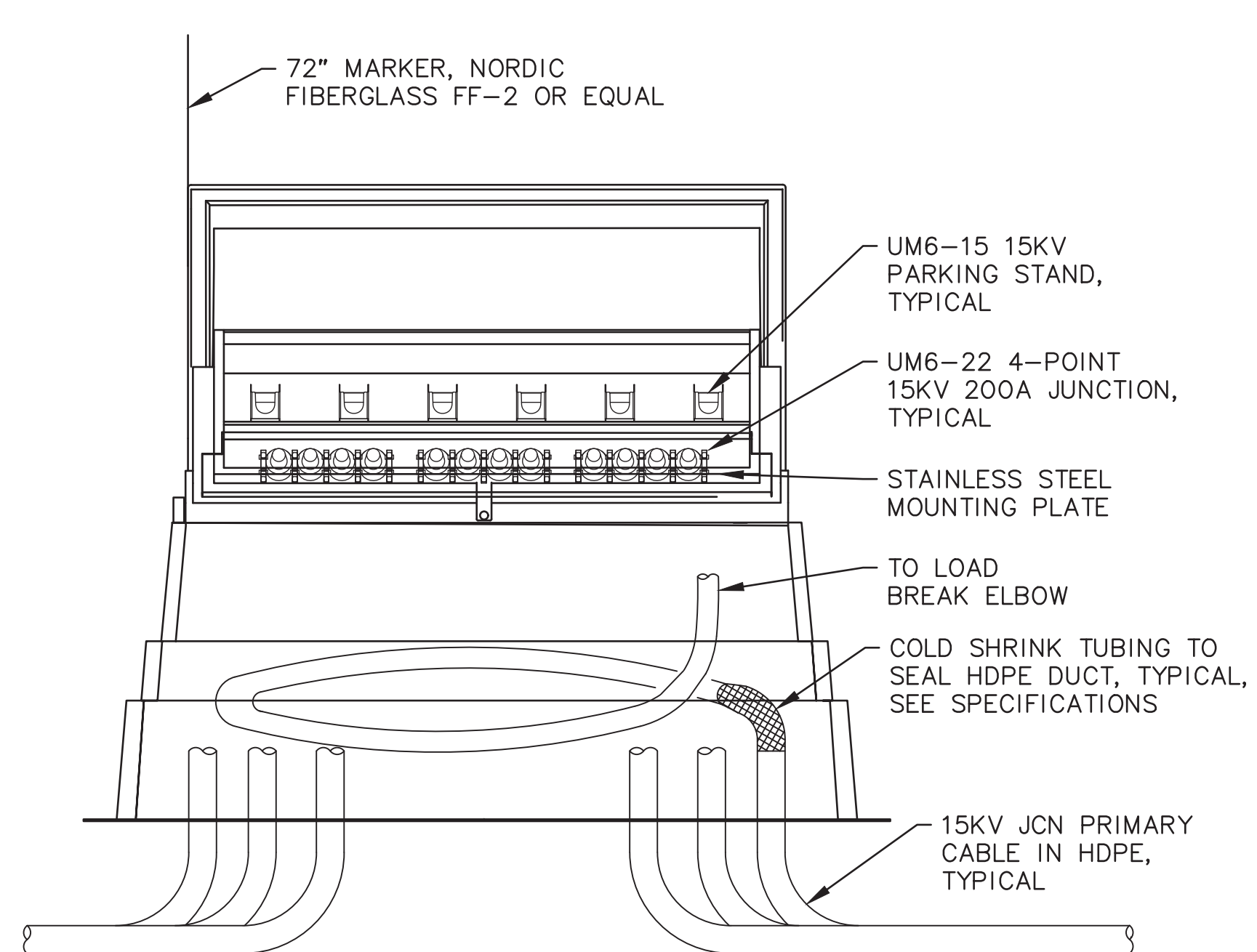
3 BOLLARD DETAIL
E10.2 Scale: NTS



NOTES

1. MAINTAIN MINIMUM 12 INCHES OF SEPARATION BETWEEN 600V AND 15KV CABLE AT ALL TIMES. SEPARATION CAN BE VERTICAL OR HORIZONTAL.
2. 600V CABLE SHALL HAVE A MINIMUM OF 36" COVER AT ALL LOCATION.
3. ALL TRENCHING AND OTHER EXCAVATIONS SHALL BE SLOPED OR SHORED IN ACCORDANCE WITH OSHA STANDARDS.

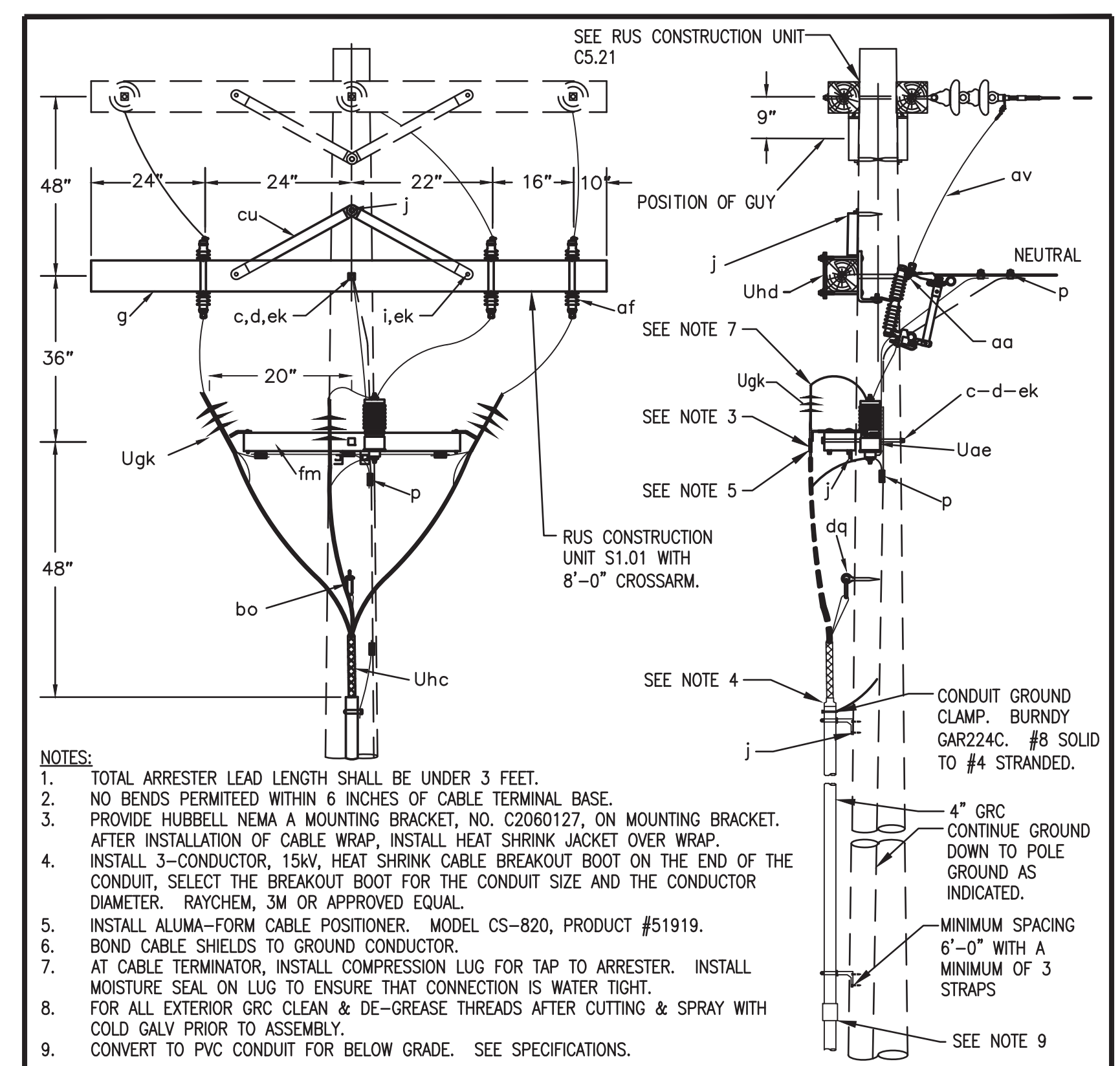
2 CABLE INSTALLATION OFF ROAD
E10.3 Scale: NTS



NOTES

1. INSTALL GROUNDING LUG, HUBBELL/FARGO CC-207P ON MOUNTING BOARD AND CONNECT TO GROUND.
2. SEE UM33 FOR ADDITIONAL GROUNDING NOTES.
3. INSTALL DRAIN WIRE ON EACH UM6-10.
4. ENSURE THAT ALL METAL COMPONENTS ARE GROUND.
5. PROVIDE SLACK IN THE CABLE TO THE MAXIMUM EXTENT PRACTICABLE. IF POSSIBLE, PROVIDE ONE FULL LOOP AROUND THE BASE OF THE GROUND SLEEVE OR SECTIONALIZING CABINET FOR EACH CABLE.

4 SECTIONALIZING CABINET SPECIFIC REQUIREMENTS
E10.2 Scale: NTS



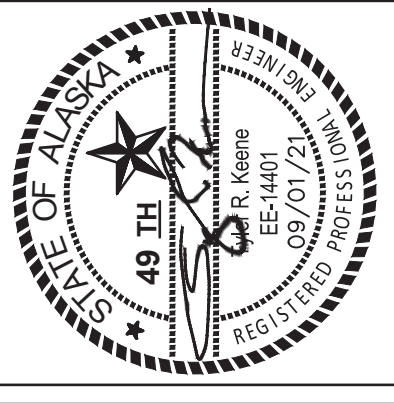
NOTES:

1. TOTAL ARRESTER LEAD LENGTH SHALL BE UNDER 3 FEET.
2. NO BENDS PERMITTED WITHIN 6 INCHES OF CABLE TERMINAL BASE.
3. PROVIDE HUBBELL NEMA A MOUNTING BRACKET, NO. C2060127, ON MOUNTING BRACKET. AFTER INSTALLATION OF CABLE WRAP, INSTALL HEAT SHRINK JACKET OVER WRAP.
4. INSTALL 3-CONDUCTOR, 15KV, HEAT SHRINK CABLE BREAKOUT BOOT ON THE END OF THE CONDUIT. SELECT THE BREAKOUT BOOT FOR THE CONDUIT SIZE AND THE CONDUCTOR DIAMETER. RAYCHEM, 3M OR APPROVED EQUAL.
5. INSTALL ALUMA-FORM CABLE POSITIONER, MODEL CS-820, PRODUCT #51919.
6. BOND CABLE SHIELDS TO GROUND CONDUCTOR.
7. AT CABLE TERMINATOR, INSTALL COMPRESSION LUG FOR TAP TO ARRESTER. INSTALL MOISTURE SEAL ON LUG TO ENSURE THAT CONNECTION IS WATER TIGHT.
8. FOR ALL EXTERIOR GRC CLEAN & DE-GREASE THREADS AFTER CUTTING & SPRAY WITH COLD GALV PRIOR TO ASSEMBLY.
9. CONVERT TO PVC CONDUIT FOR BELOW GRADE. SEE SPECIFICATIONS.

ITEM	QTY.	MATERIAL
c	2	Bolt, machine, 5/8" x required length.
d	2	Washer, square 2 1/4".
g	1	Crossarm, 3 5/8" x 4 5/8" x 8'-0"
i	2	Bolt, carriage, 3/8" x 4 1/2"
j		Screw, lag 1/2" x 4" as required.
p		Connectors, as required.
aa	1	Eyenuit, 5/8"
af	3	100 amp open cutout, Chance C7.
av		Jumpers, as required.
bo	1	Anchor, shackle.
cu	2	Brace, wood, 28"
dq	1	Eye screw, elliptical or drive hook.
ek	4	Locknuts, as required.
fm	1	Three-Phase Mounting bracket, ALUMA-FORM TB-EMB-1-6PA-35 Product 51064, or Approved Equal.
Uae	3	Surge arrester, 7.65 kV MCOV (9kV Dist. Class)

ITEM	QTY.	MATERIAL
Ugc	1	4" GRC CONDUIT.
Ugk	3	Cable termination. (IEEE Class 1, Molded Outdoor), with Compression Lug.
Uhc	3	Cable support. HUBBELL 1"-1.24", Catalog NO. 02402017.
Uhd	3	Crossarm mounting bracket.

THREE PHASE CABLE TERMINAL POLE WITH CUTOUTS AND BRACKET MOUNTING ARRESTERS		
NO.	REVISION	DATE
0	ISSUED FOR CONSTRUCTION	9/1/21

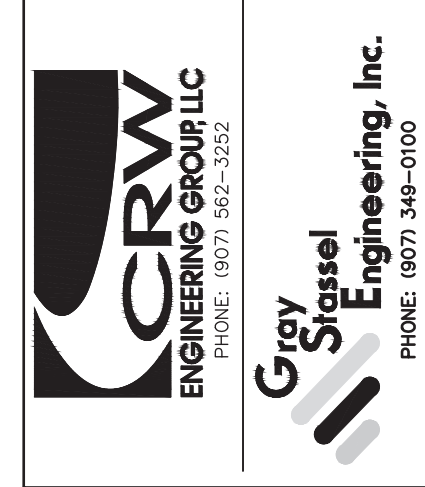
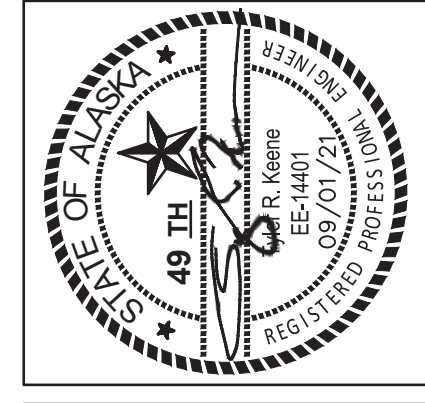
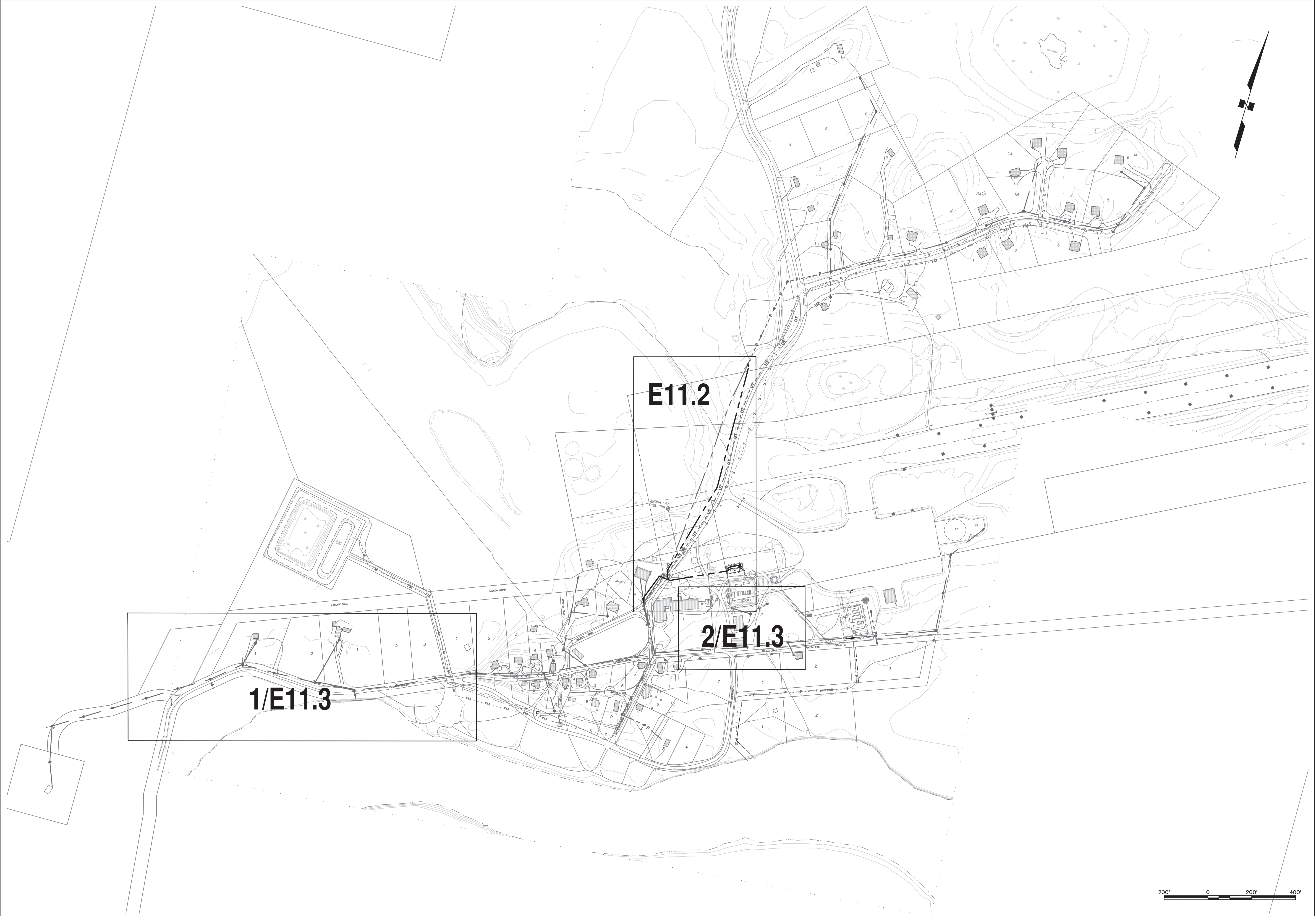


NIKOLAI POWER SYSTEM UPGRADE
ELECTRICAL DISTRIBUTION DETAILS
NIKOLAI, ALASKA

NO.	REVISION	DATE
0	ISSUED FOR CONSTRUCTION	9/1/21

Plot Date: 9/1/21
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E10.2



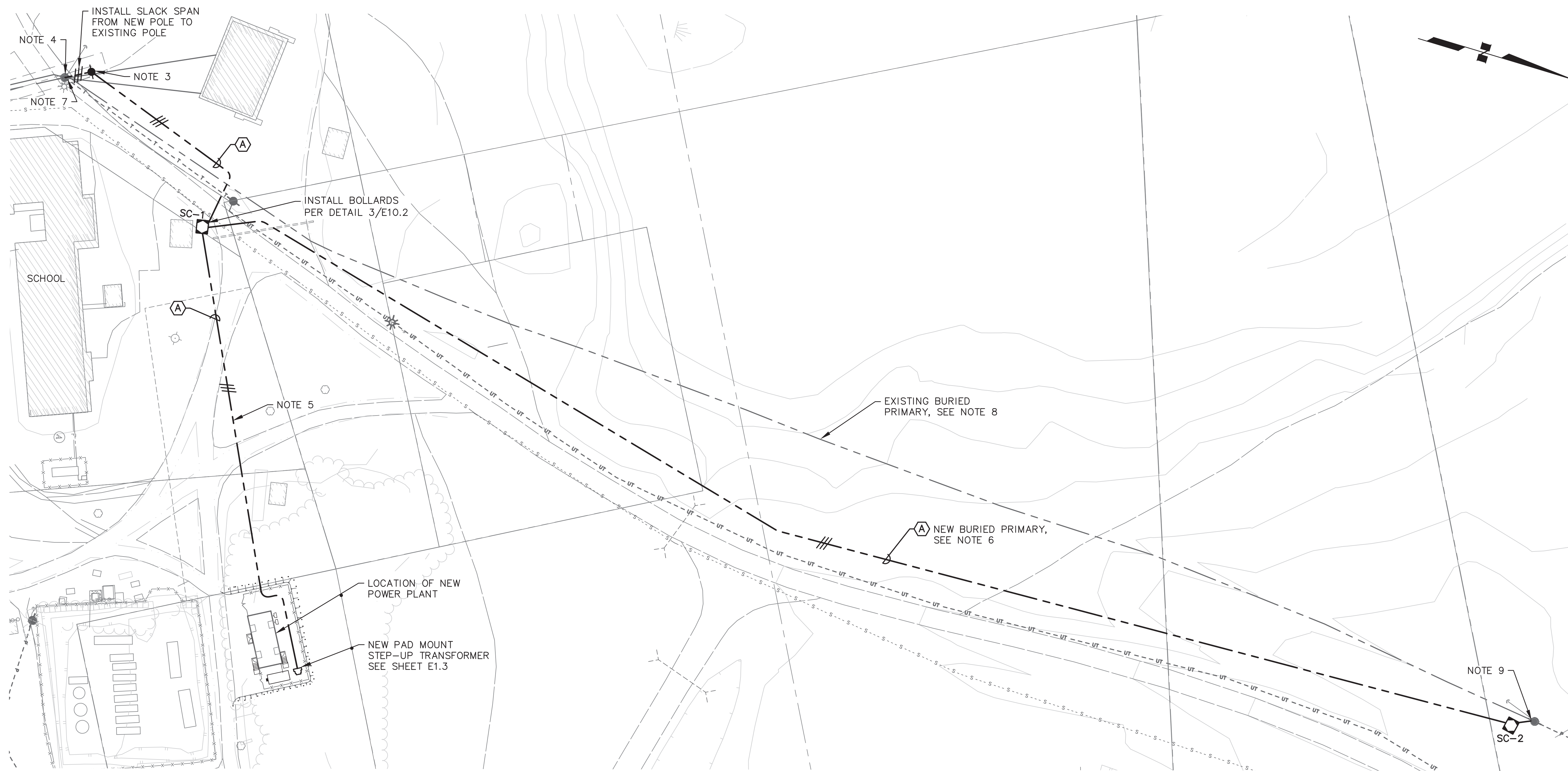
NIKOLAI POWER SYSTEM UPGRADE
ELECTRICAL DISTRIBUTION SITE PLAN
NIKOLAI, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	9/1/21

Plot Date	9/1/21
Designed	TRK
Drawn	TRK
Approved	KH

Sheet No. **E11.1**

File: J:\JobsData\72307.00 Nikolai RPSU\00 CADD 2019\01 Working Set\03 Electrical\NIKOLAI RPSU.dwg Plot Date: 8/31/2021 2:04 PM



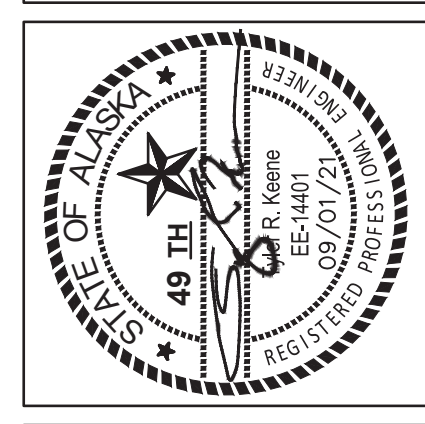
CABLE SCHEDULE	
TYPE	DESCRIPTION
A	NEW (3) #1/0 AWG, ALUMINUM, 15KV JACKETED CONCENTRIC NEUTRAL, STRAND-FILLED, EACH FACTORY INSTALLED IN 1-1/2" HDPE CONDUIT, 2500' SPOOL LENGTH.

CAUTION - BURIED UTILITIES
 EXISTING UTILITIES SHOWN IN THESE PLANS ARE BASED ON INCOMPLETE RECORDS. CONTRACTOR SHALL COORDINATE WITH LOCAL UTILITIES AND HAVE APPROPRIATE MATERIALS ON HAND TO REPAIR WATER, SEWER, COMMUNICATION, AND ELECTRICAL UTILITY DAMAGE THAT MAY OCCUR AS A RESULT OF CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL REPAIR DAMAGED UTILITIES AT NO ADDITIONAL COST TO THE PROJECT.

NOTES

- SEE SHEET E10.1 FOR GENERAL REQUIREMENTS.
- SEE SHEETS E10.2 FOR EQUIPMENT DETAILS AND TRENCH SECTIONS.
- INSTALL NEW 40', CLASS 4 POLE. BURY MINIMUM 6'. INSTALL SINGLE DEADEND RUS UNITS C5.21 AND N5.1 AND RISER PER MODIFIED RUS DETAIL UC2a ON SHEET E10.2.
- INSTALL ADDITIONAL HARDWARE AS REQUIRED TO CONVERT SINGLE DEADEND TO DOUBLE DEADEND (C6.21) AND CONNECT SLACK SPAN TO NEW POLE.
- WHERE PRACTICAL, ROUTE WITH HEAT RECOVERY ARCTIC PIPES, SEE DETAIL 3/M8.1. MAINTAIN 12" SEPARATION.
- INSTALL NEW BURIED 3φ PRIMARY TO SERVE NORTH SIDE OF TOWN.
- REMOVE EXISTING RISER WHEN NEW UNDERGROUND TO NORTH SIDE OF TOWN IS CONSTRUCTED.
- REMOVE UNDERGROUND CONDUCTORS TAKEN OUT OF SERVICE AND ABANDONED CONDUIT BELOW GRADE THAT DOES NOT INTERFERE WITH NEW WORK. REMOVE CONDUIT THAT INTERFERES WITH NEW WORK. IF DIRECT BURIED CABLE, CUT BELOW GRADE AND ABANDON IN PLACE.
- REMOVE EXISTING RISER AND INSTALL NEW RISER PER MODIFIED RUS DETAIL UC2A ON SHEET E10.2 WHEN NEW UNDERGROUND TO NORTH SIDE OF TOWN IS CONSTRUCTED.

ALL WORK DESCRIBED BY NOTES 6, 7, 8, AND 9 SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #2. ALL OTHER WORK SHALL BE INCLUDED UNDER THE BASE BID.



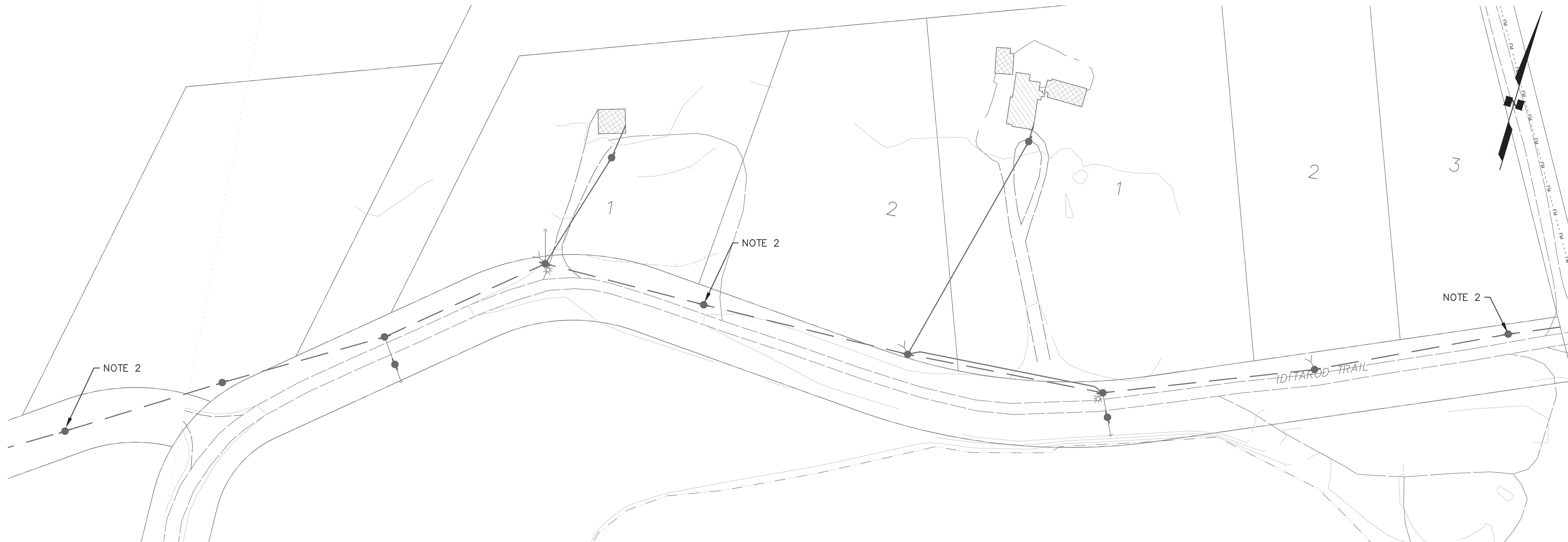
NIKOLAI POWER SYSTEM UPGRADE
ELECTRICAL UNDERGROUND DISTRIBUTION PLAN
 NIKOLAI, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	9/1/21

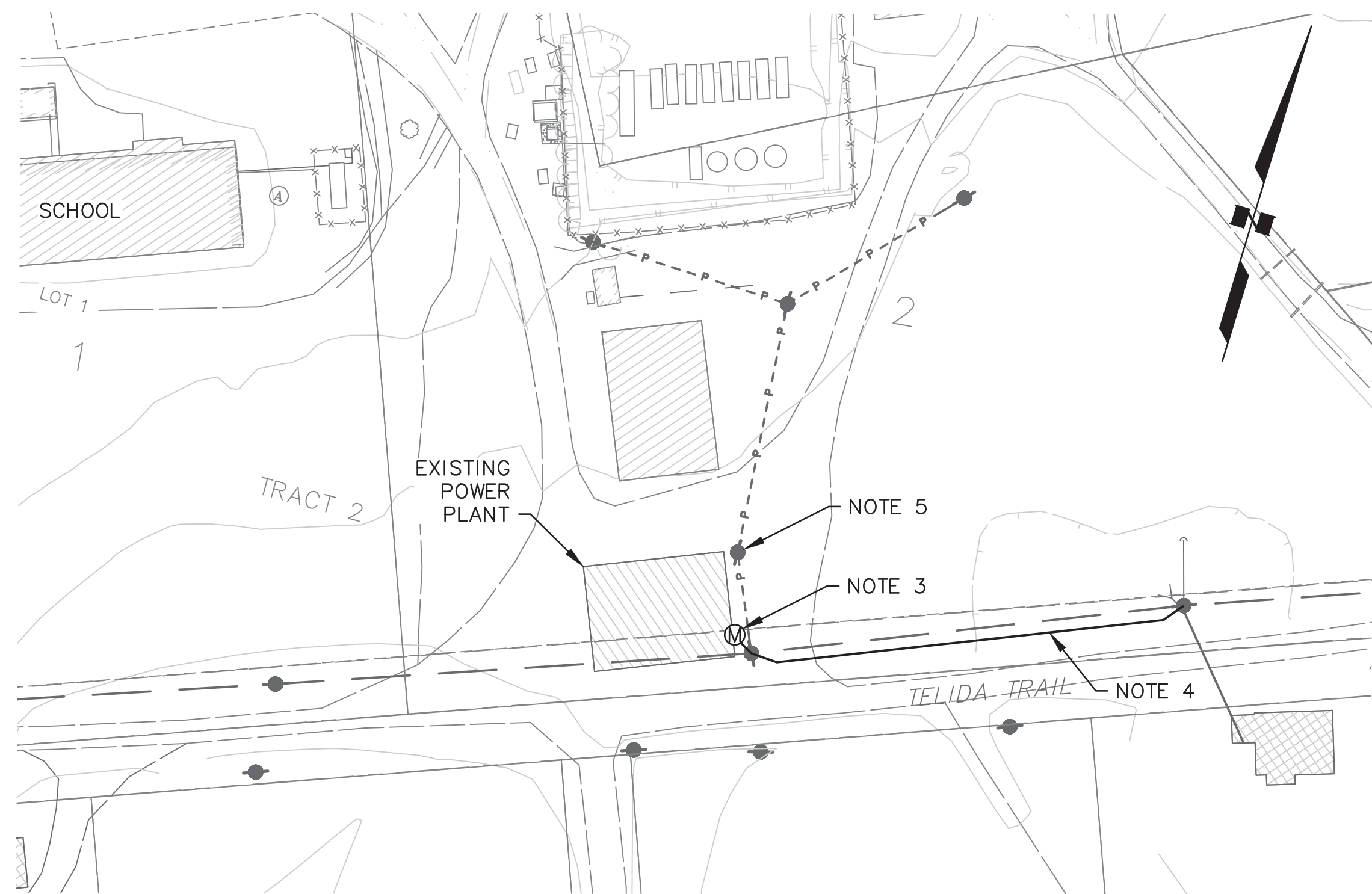
Plot Date: 9/1/21
 Designed: TRK
 Drawn: TRK
 Approved: KH

Sheet No. **E11.2**

File: J:\JobsData\72307.00 Nikolai RPSU\00 CADD 2019\01 Working Set\03 Electrical\NIKOLAI RPSU.dwg Plot Date: 8/31/2021 2:04 PM



1
E11.3 OVERHEAD DISTRIBUTION PARTIAL PLAN
GRAPHIC SCALE

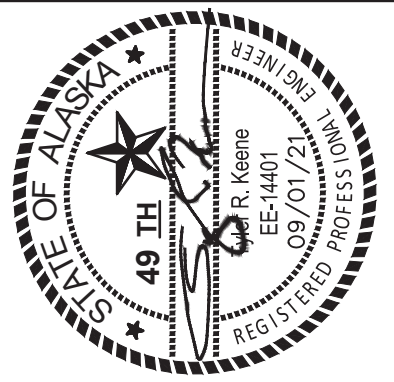


2
E11.3 OVERHEAD DISTRIBUTION PARTIAL PLAN
GRAPHIC SCALE

NOTES

1. SEE SHEET E10.1 FOR GENERAL REQUIREMENTS.
2. INSTALL NEW ANCHOR AND GUY AND RESET LEANING POLE PLUMB.
3. INSTALL NEW 100A METER MAIN AND OVERHEAD RISER FOR EXISTING POWER PLANT. WORK TO CONNECT METER MAIN TO EXISTING BUILDING ELECTRICAL SYSTEM TO BE DONE BY OTHERS.
4. INSTALL #2 TRIPLEX. CONNECT TO NEW METER MAIN AND EXISTING POLE MOUNTED TRANSFORMER TO THE EAST.
5. WHEN NEW POWER PLANT IS READY TO COME ONLINE, OPEN CUTOUTS ON RISER POLE FOR EXISTING PAD MOUNT STEP-UP TRANSFORMER TO DISCONNECT EXISTING POWER PLANT FROM THE ELECTRICAL DISTRIBUTION SYSTEM.

ALL WORK SHOWN ON PARTIAL PLAN 1/E11.3 SHALL BE INCLUDED UNDER ADDITIVE ALTERNATE #2. ALL OTHER WORK SHALL BE INCLUDED UNDER THE BASE BID.



NIKOLAI POWER SYSTEM UPGRADE
ELECTRICAL OVERHEAD DISTRIBUTION PLAN
NIKOLAI, ALASKA

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Designed	TRK
Drawn	TRK
Approved	KH

Sheet No. **E11.3**