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

- (P) PRESSURE GAUGE
- (T) ANALOG THERMOMETER
- (TH) DIGITAL THERMOMETER
- (TT) TEMPERATURE TRANSMITTER
- (PT) PRESSURE TRANSMITTER
- (DP) DIFFERENTIAL PRES GAUGE
- (FM) FLOW METER
- (FS) FLOAT SWITCH
- (LCA) LOW COOLANT SWITCH
- (TLM) TANK LEVEL MONITOR
- (LSP) LEVEL SENSOR PROBE
- (GLS) 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
CAC-2 CAC-3	CHARGE AIR COOLERS	SINGLE PASS, 4 ROW, VERTICAL ALUMINUM CORE, 4" FLANGED CONNECTIONS, EPOXY COATING, EXPANDED METAL GUARD. 1,300 SCFM CHARGE AIR AT 395F IN AND 110F OUT AT 75F AMBIENT, 34" H20 MAX CHARGE AIR PRESSURE DROP. 5 HP, 460 V, 3 PH MOTOR SUITABLE FOR VFD OPERATION AT 10:1 TURNDOWN RATIO.	DIESEL RADIATOR PART NO. DR3376A
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" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 185F NOMINAL TEMPERATURE,	FPE PART NO. AF2012-185
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, 400 MBH MIN CAPACITY. PRIMARY: 50 GPM 195F EWT (50% ETHYLENE) 2.0 PSI MAX WPD, SECONDARY: 40 GPM 185F LWT (50% PROPYLENE) 1.5 PSI MAX WPD	AMERIDEX SLB-120-92
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	50 GPM AT 10' TDH, 1/6HP, 115V, 1ø. PROVIDE WITH 2" NPT COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 50-40/4 SPEED 3
P-HR1B	HEAT RECOV. SECONDARY	40 GPM AT 8' TDH, 1/6HP, 115V, 1ø. PROVIDE WITH 2" NPT COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 50-40/4 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

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, GALVANIZED STEEL CONSTRUCTION, 304 STAINLESS STEEL BEARINGS AND JAMB SEALS, EPDM BLADE SEALS.	GREENHECK VCD-23
(MD)	MOTORIZED DAMPER ACTUATOR	MULTI-VOLTAGE SPRING RETURN ACTUATOR	BELIMO AF-BUP

PIPE/TUBING STRUT CLAMP SCHEDULE

PIPE/TUBE	CLAMP #	PIPE/TUBE	CLAMP #
1/2" COPPER	BVT062	1/2" STEEL	B2008
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

NOTES:
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.

FUEL SYSTEM EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
P-DF1 P-DF2 P-UO1	DAY TANK FILL PUMP DIESEL CIRC. PUMP USED OIL DRAIN 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-UO2	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 1725 RPM TEFC THERMALLY PROTECTED AUTO RESET MOTOR, 1/2 HP, 115 V, 1 PH, 60 HZ. FURNISH WITH BASE MOUNT S56C FRAME INDUSTRIAL MOTOR.	MICROPUMP GA-V21.J8FS.A PUMP WITH #81518 ADAPTER & BALDOR CFDL3504M MOTOR
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-DT	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-DT	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-DT	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	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 NEMA 7 ACTUATOR – 600 IN-LBS TORQUE, 10 SECOND STROKE TIME, 0.50 LOCKED ROTOR AMPS. RCS MODEL SXR-1023

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 70VASPST 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 LNGTH. ACTUATION LENGTHS 13"(N.O.) &1 8"(N.O.).	APG MODEL FLE-0A2-B3-B-A2-E-19.25in.-13in.N0-18in.N0
(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-I 2' TANK PROBE: FMP-LL3-29-I FLOAT: TSP-IDF2 2" FOR DIESEL INSTALLATION KIT: TSP-C2A

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.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

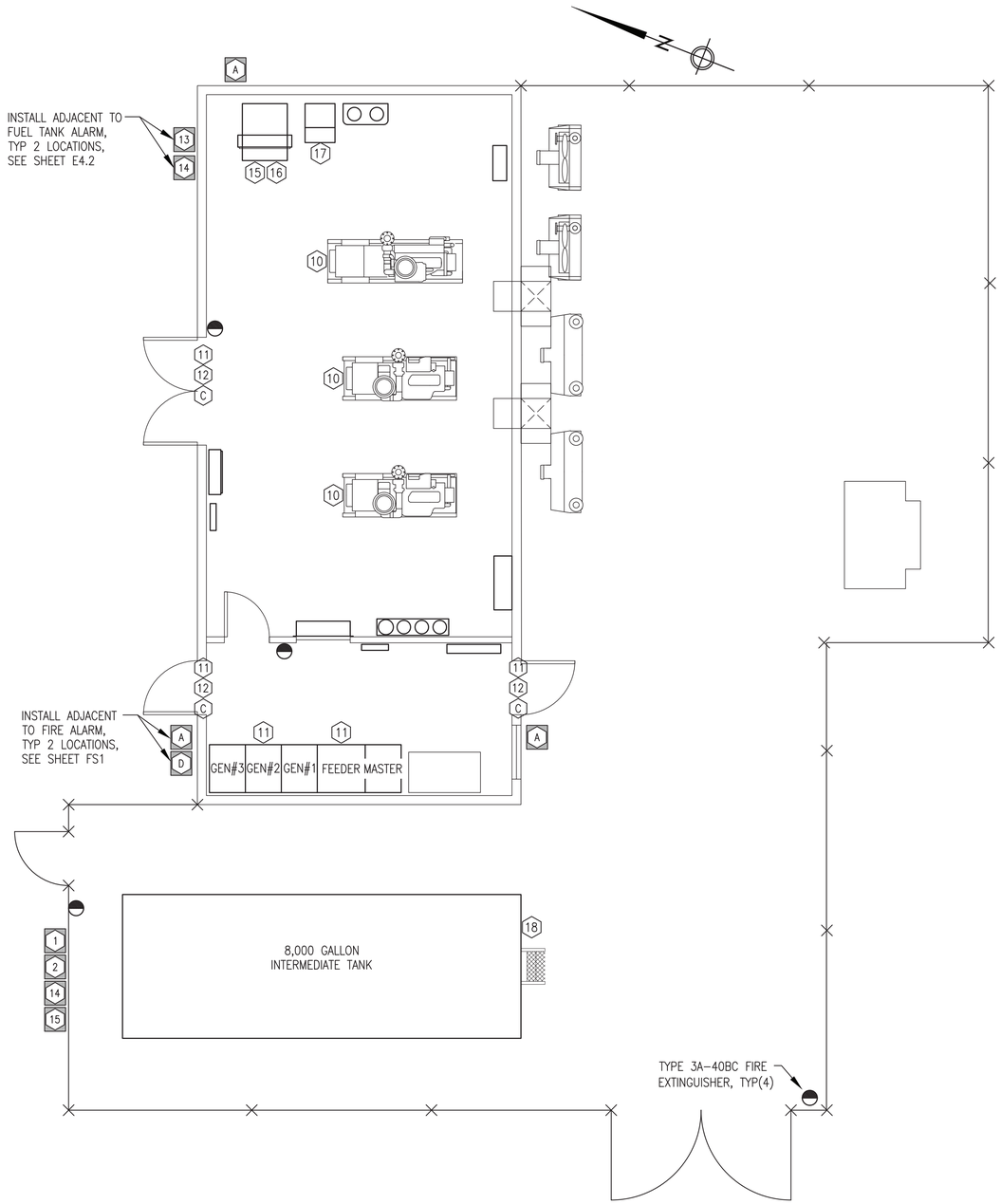
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: MECHANICAL LEGENDS & SCHEDULES

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M1	SHEET: M1.1
PROJECT NUMBER:	



1 / M1.2 POWER PLANT WARNING SIGN & FIRE EXTINGUISHER PLAN
1"=4'

VALVE TAG SCHEDULE:

GREEN (DIESEL FUEL)

21 "NORMALLY OPEN, CLOSE ONLY FOR EMERGENCIES & TEMPORARY MAINTENANCE OF DAY TANK & DEVICES"
22 "NORMALLY CLOSED, OPEN ONLY FOR HAND PRIMING DAY TANK"
23 "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF BLENDER"
24 "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF ENGINE"
25 not used
26 "NORMALLY CLOSED, OPEN ONLY FOR FUEL DELIVERY"

BROWN (USED OIL)

41 "NORMALLY CLOSED, OPEN ONLY FOR ENGINE OIL CHANGE"
42 "BLENDER FILTER #1, 10 MICRON HYDROSORB" (DECAL)
43 "BLENDER FILTER #2, 2 MICRON PARTICULATE" (DECAL)

PINK (COOLING/ETHYLENE GLYCOL)

51 "NORMALLY CLOSED, OPEN ONLY FOR ADDING COOLANT – ETHYLENE GLYCOL ONLY"
52 "NORMALLY CLOSED, OPEN ONLY ON HIGH COOLANT TEMPERATURE ALARM"
53 "NORMALLY OPEN, CLOSE ONLY ON HIGH COOLANT TEMPERATURE ALARM"
54 "NORMALLY OPEN, HEAT RECOVERY SUPPLY"
55 "NORMALLY OPEN, HEAT RECOVERY RETURN"

YELLOW (HEAT RECOVERY/PROPYLENE GLYCOL)

61 NOT USED
62 "NORMALLY OPEN, HEAT RECOVERY SUPPLY"
63 "NORMALLY OPEN, HEAT RECOVERY RETURN"

SPECIFICATIONS:
VALVE TAGS – 3"x5"x.08" ALUMINUM, 3/16" HOLES IN ALL FOUR CORNERS, BLACK GERBER THERMAL TRANSFER FILM PRINTED LETTERS ON GERBER 220 HIGH PERFORMANCE VINYL BACKGROUND, COLOR AS INDICATED, ONE SIDE ONLY. WARNING LITES OR APPROVED EQUAL.

DECALS – WHERE NOTED AS DECALS PROVIDE WITHOUT ALUMINUM BACKING PLATE.

INSTALLATION NOTES:
1) SEE DRAWINGS THAT FOLLOW FOR LOCATIONS OF ALL SPECIFIC FUNCTION TAGS.
2) SECURE EACH METAL TAG TIGHT TO VALVE, PIPE, OR DEVICE WITH STAINLESS STEEL SAFETY WIRE THROUGH ALL FOUR CORNERS OR FASTEN TO ADJACENT WALL OR SECTION OF STRUT WITH SCREWS.
3) APPLY DECALS TO CLEAN SMOOTH SURFACES OF EQUIPMENT OR ON ADJACENT WALL.
4) FOR ALL VALVES NOT INDICATED WITH A SPECIFIC FUNCTION TAG PROVIDE 1-1/2"ø BRASS TAG LABELED "N.O." FOR NORMALLY OPEN VALVES AND 1"ø BRASS TAG LABELED "N.C." FOR NORMALLY CLOSED VALVES. SECURE TAGS TO VALVE OR ADJACENT PIPE WITH BEADED BRASS CHAIN.

WARNING SIGN & INFORMATIONAL PLACARD SCHEDULE:

PROVIDE DECALS AND SIGN BOARDS AS SPECIFIED BELOW IN ACCORDANCE WITH THE SCHEDULE. INSTALL WHERE SHOWN ON THE WARNING SIGN/PLACARD PLAN THIS SHEET AND OTHER REFERENCED SHEETS.

(#) DECALS – DECALS TO BE WHITE NON-REFLECTIVE VINYL BACKGROUND, 3M 3650-10, WITH 3M SERIES 225 HIGH PERFORMANCE VINYL LETTERS, ONE SIDE ONLY, SELF ADHESIVE BACK. NOMINAL 10"x14" SIZE UNLESS INDICATED OTHERWISE OR REQUIRED TO BE LARGER FOR SPECIFIED LETTER SIZE. WARNING LITES OR EQUAL. INSTALL ON FACE OF DOORS OR ELECTRICAL ENCLOSURES WHERE INDICATED. CLEAN SURFACES AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

(#) BOARDS – SIGN BOARDS TO BE EQUAL TO DECALS EXCEPT MOUNTED ON 0.08" ALUMINUM PLATE. PROVIDE 3/16" HOLES IN ALL FOUR CORNERS. ATTACH TO CHAIN LINK FENCING WITH HOG RINGS OR STAINLESS STEEL TIES. ATTACH TO WALLS OR STRUCTURES WITH STAINLESS STEEL SCREWS OR BOLTS.

WARNING SIGNS – RED LETTERING ON WHITE BACKGROUND.

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"

1 "DANGER FLAMMABLE, NO SMOKING OR OPEN FLAMES"

2 "ATTACH STATIC WIRE, & VERIFY TANK CAPACITY PRIOR TO FILLING TANKS"

10 "CAUTION: THIS UNIT STARTS AUTOMATICALLY, LOCK & TAG OUT PRIOR TO SERVICE"

11 "DANGER HIGH VOLTAGE, AUTHORIZED PERSONNEL ONLY"

12 "CAUTION HEARING & EYE PROTECTION REQUIRED"

13 "FUEL OIL DAY TANK ALARM"

14 "IN CASE OF SPILL CALL DEC 1-800-478-9300"

INFORMATIONAL PLACARDS – BLACK LETTERING ON WHITE BACKGROUND.

15 15 "CHECK INTERMEDIATE TANK LEVEL DAILY, FILL WHEN BELOW 4'-0"

16 "TO MANUALLY FILL DAY TANK IN CASE OF EMERGENCY:
1) TURN OFF POWER TO THE DAY TANK CONTROL PANEL
2) MANUALLY OPEN ACTUATOR VALVE AT INTERMEDIATE TANK USING A WRENCH
3) OPEN NORMALLY CLOSED VALVE BY HAND PUMP
4) OPERATE HAND PUMP WHILE MONITORING LEVEL GAUGE"

17 "TO CHANGE ENGINE OIL:
1) LOCK & TAG GENERATOR OUT OF SERVICE
2) OPEN NORMALLY CLOSED DRAIN VALVE AT GEN
3) TURN ON PUMP TIMER & PUMP OUT ENGINE OIL
4) CHANGE FILTER & PLACE OLD ONE IN HOPPER
5) CLOSE DRAIN VALVE & REFILL ENGINE
6) RUN ENGINE, SHUT OFF, & CHECK DIPSTICK
7) TOP OFF & PLACE ENGINE BACK IN SERVICE"

18 "INTERMEDIATE TANK MAX FILL LEVEL 6'-9" (90% TANK CAPACITY)

NOTE: SEE SHEET M9.1 FOR LOCATION OF SIGNS NOT SHOWN ON THIS SHEET.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: WARNING SIGN & FIRE EXTINGUISHER PLAN, SIGN SCHEDULE, & VALVE TAG SCHEDULE

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M1	SHEET: M1.2
PROJECT NUMBER:	

Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	#1	100	90	---
Level 2	#2 or #3	220	198	80
Level 3	#1 & #2 or #3	320	288	176
Level 4	All	540	---	256

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	180 A
Gen #2 Breaker Rated Current	350 A
Gen #3 Breaker Rated Current	350 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

Charge Air Cooler VFD Settings	
Function	Setting
rSL (Wake UP Threshold)	Not Used
PID Reference Temperature	100
Proportional Gain	.2
Integral Gain	.1
Derivative	0
Minimum Speed	10 Hz.
Low Speed Timeout	Not Used
Loss of Phase	Ignore

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 8,000 GALLON INTERMEDATE 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 AND IS MANUALLY FILLED BY TRUCK. 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

CHARGE AIR COOLERS (CAC) – CAC FANS WILL OPERATE CONTINUOUSLY ANY TIME ASSOCIATED ENGINE RUNS AND STOP WHEN THE ENGINE STOPS. VARIABLE FREQUENCY DRIVES WILL OPERATE AT FULL SPEED FOR 30 SECONDS UPON STARTUP AND THEN WILL MODULATE FAN SPEED TO MAINTAIN ENGINE INTAKE MANIFOLD AIR TEMPERATURE AT THE PID REFERENCE SETPOINT. SEE THE CHARGE AIR COOLER VFD SETTINGS TABLE THIS SHEET FOR SETPOINTS AT THE TIME OF COMMISSIONING.

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

THE HEAT RECOVERY SYSTEM PROVIDES INTERRUPTIBLE HEAT TO THE CENTRAL SANITIATION FACILITY AND CLINIC. A FUTURE CONNECTION IS ALSO PROVIDED TO ALLOW HEAT TO BE PROVIDED TO THE OLD WASHETERIA BUILDING. THE LOCATION OF THE END USERS ARE SHOWN ON SHEET M8.2. SEE 2021 ANTHC CENTRAL SANITATION FACILITY MECHANICAL DESIGN AND 2015 ANTHC CLINIC HEAT RECOVERY MECHANICAL DESIGN FOR HEAT RECOVERY SYSTEM SEQUENCE OF OPERATIONS AT END USER BUILDINGS.

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 CAUGES. 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.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

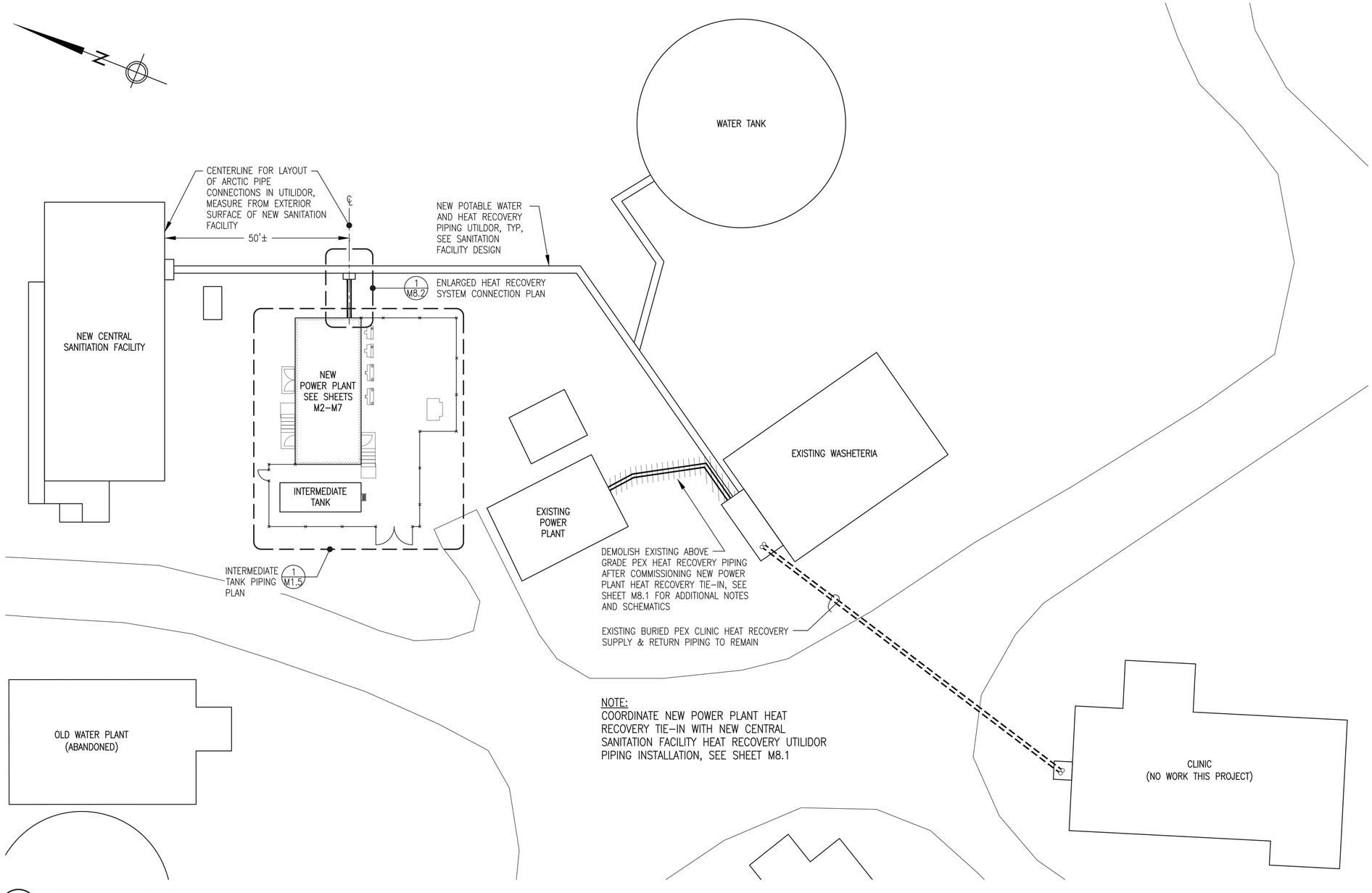
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: SYSTEM START UP AND SEQUENCE OF OPERATIONS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M1	SHEET: M1.3
PROJECT NUMBER:	



1 M1.4 OVERALL PROJECT AREA PLAN
1"=15'

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: OVERALL PROJECT AREA PLAN

Gray Stassel Engineering, Inc.
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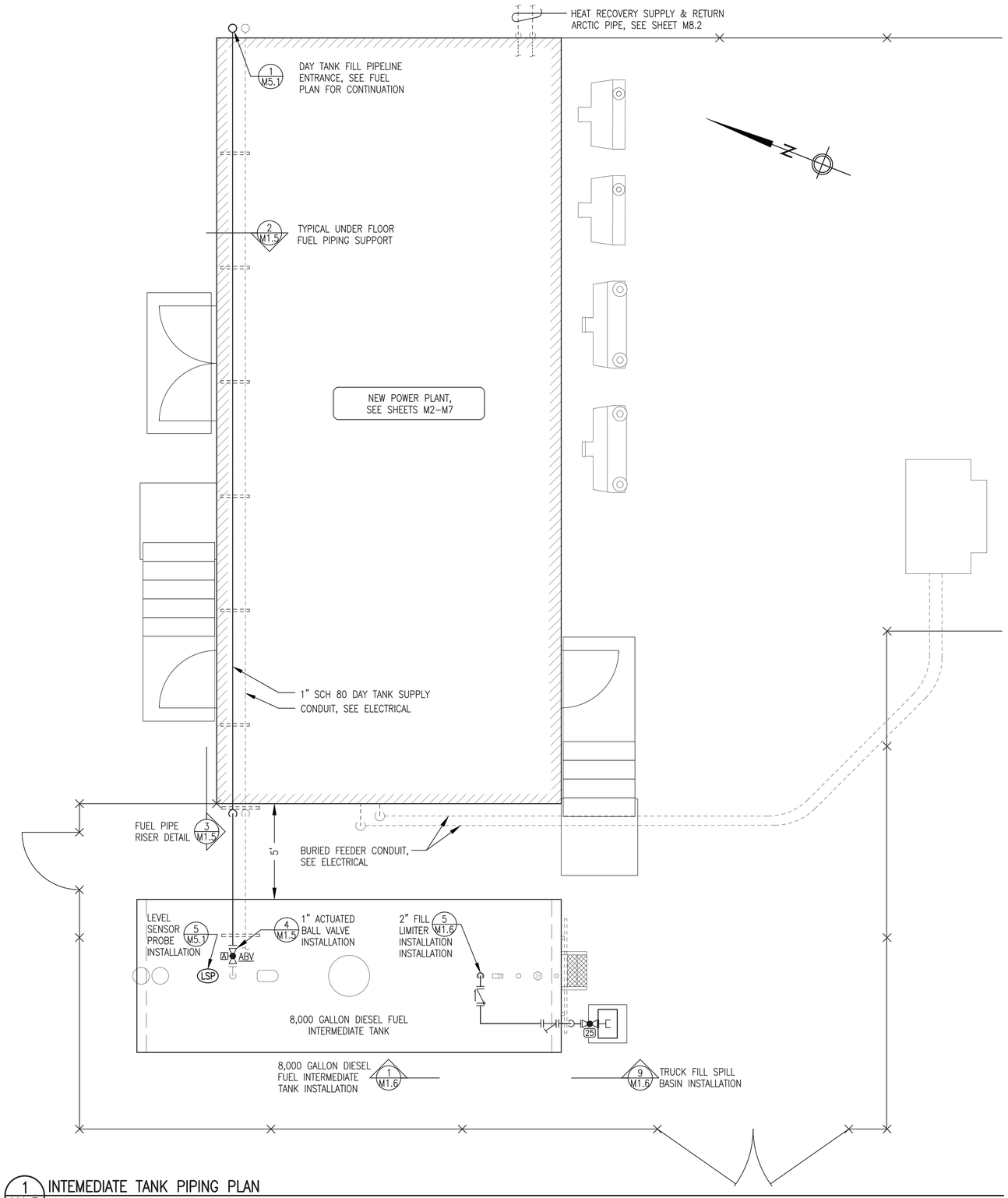
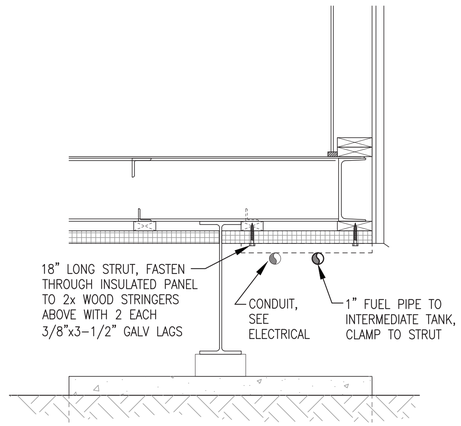
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M1	SHEET: M1.4
PROJECT NUMBER:	

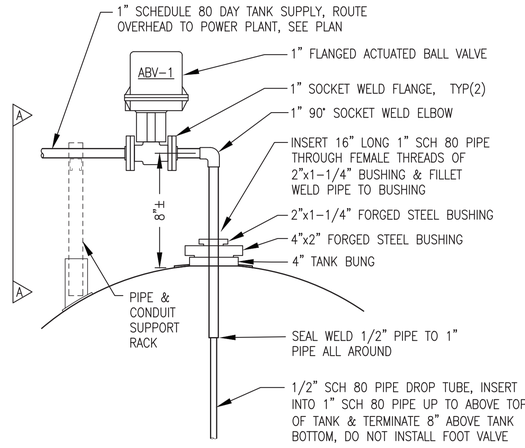


1 M1.5 INTEMEDIATE TANK PIPING PLAN
1"=3'-0"

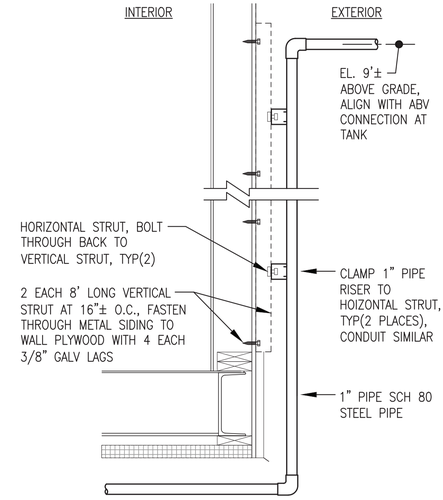


NOTE: ONE UNDER FLOOR PIPE SUPPORT SHOWN.
PROVIDE UNDER FLOOR PIPE SUPPORTS AT 6' O.C. MIN.

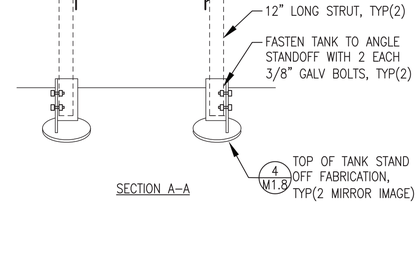
2 M1.5 FUEL PIPE RISER DETAIL
NO SCALE



4 M1.5 ACTUATED BALL VALVE & DROP TUBE INSTALLATION
NO SCALE



3 M1.5 FUEL PIPE RISER DETAIL
NO SCALE



ISSUED FOR CONSTRUCTION
NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

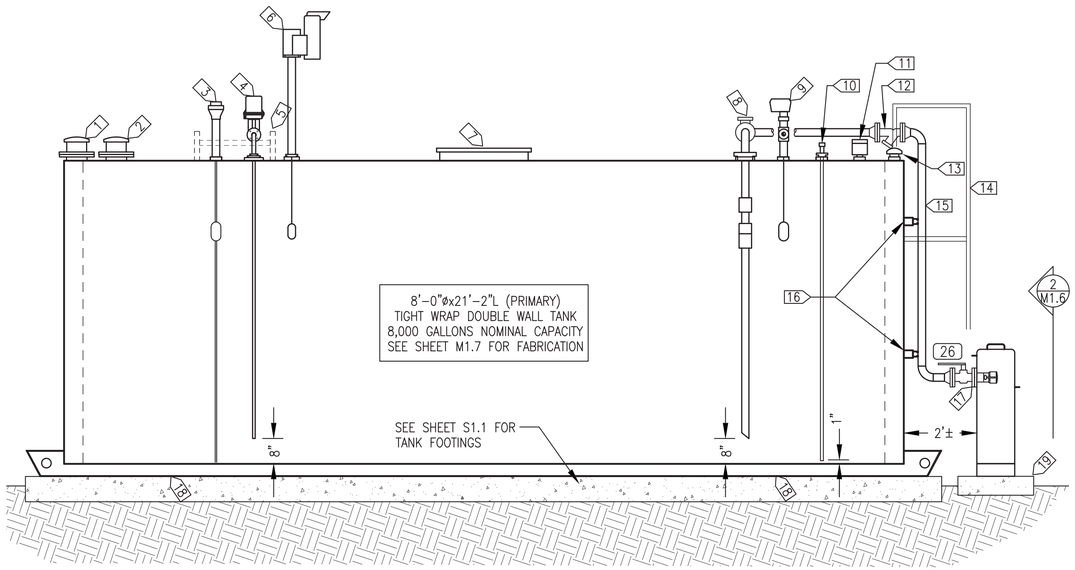
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: ENLARGED INTEMEDIATE TANK PIPING PLAN & DETAILS

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

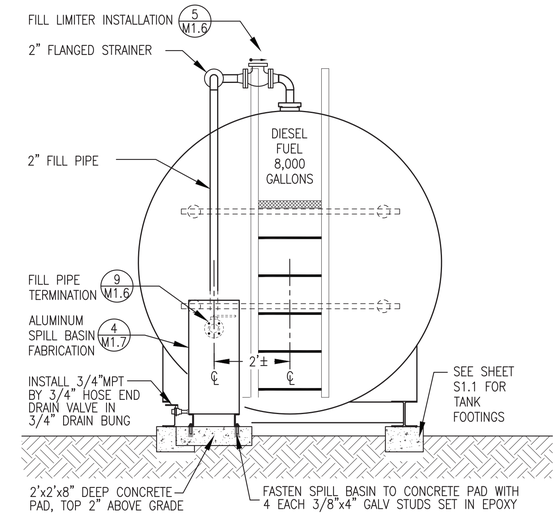
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M1	SHEET: M1.5
PROJECT NUMBER:	



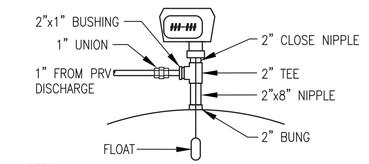
SPECIFIC NOTES:

1. 8" FLANGED SECONDARY EMERGENCY VENT.
2. 8" FLANGED PRIMARY EMERGENCY VENT.
3. INSTALL 101" LONG SENSOR PROBE FOR TANK LEVEL MONITORING IN 2" BUNG, SEE DETAIL 5/M5.1.
4. INSTALL 1" FLANGED ACTUATOR VALVE & DROP TUBE IN 4" BUNG. SEE DETAIL 4/M1.5.
5. SUPPORT OVERHEAD PIPING & CONDUIT WITH FIELD-MOUNTED STRUT RACK.
6. INSTALL 2" PRESSURE/VACUUM VENT WITH WHISTLE ALARM ON 3" BUNG, SEE INSTALLATION DETAIL 6/M1.6.
7. 24" MANHOLE.
8. 2" FILL LIMITER & FLANGED CHECK VALVE, SEE INSTALLATION DETAIL 5/M1.6.
9. 2" MECHANICAL FUEL LEVEL GAUGE ON 2" BUNG, SEE INSTALLATION DETAIL 3/M1.6.
10. 1" WATER DRAW ON 2" BUNG. SEE INSTALLATION DETAIL 4/M1.6.
11. 2" FPT GAUGE HATCH ON 2"x4" NIPPLE.
12. 2" FLANGED STRAINER ON 2" FILL PIPE.
13. 2" SECONDARY TANK MONITOR PORT WITH VENT CAP.
14. SHOP FABRICATED BOLT-ON LADDER.
15. 2" FILL PIPE RISER ON FACE OF TANK.
16. SUPPORT 2" FILL RISER PIPE FROM TANK HEAD, SEE DETAIL 8/M1.6.
17. TERMINATE FILL PIPE IN ALUMINUM SPILL BASIN, SEE DETAIL 9/M1.6.
18. ANCHOR TANK TO CONCRETE FOOTING, TYP 2 EACH SKID, SEE DETAIL 7/M1.6 AND SHEET S1.1.
19. CENTER 2'x2"x6" DEEP CONCRETE FOOTING UNDER SPILL BASIN, SEE END VIEW FOR INSTALLATION DETAILS.

1 M1.6 8,000 GALLON INTERMEDIATE TANK INSTALLATION
1/2"=1'-0"



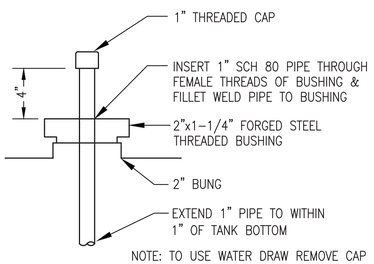
2 M1.6 8,000 GALLON INTERMEDIATE TANK END ELEVATION
1/2"=1'-0"



NOTES:

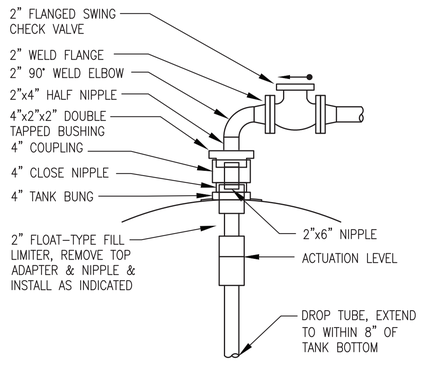
1) FEED FLOAT CABLE THROUGH NIPPLE PRIOR TO CONNECTING TO TANK.
2) GREASE FLOAT PRIOR TO INSTALLING IN TANK TO PREVENT FREEZING TO BOTTOM.
3) CALIBRATE GAUGE AFTER FILLING TANK AND VERIFY WITH MANUAL GAUGING ROD OR TAPE.

3 M1.6 MECHANICAL LEVEL GAUGE INSTALLATION
NO SCALE



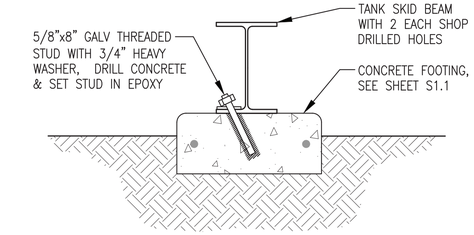
NOTE: TO USE WATER DRAW REMOVE CAP & THREAD BARREL PUMP ONTO PIPE.

4 M1.6 WATER DRAW INSTALLATION
NO SCALE

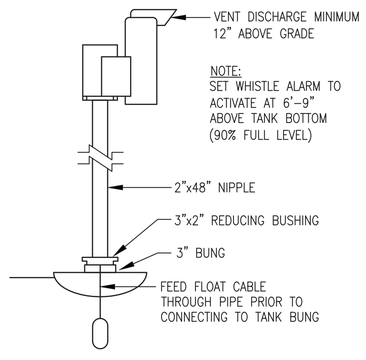


NOTE: PIPING SIZED TO PROVIDE SHUT OFF WHEN ACTUATION LEVEL IS AT 7'-2" ABOVE TANK BOTTOM (95% CAPACITY). FIELD VERIFY SHUT OFF HEIGHT & ADJUST LINKAGE AS REQUIRED.

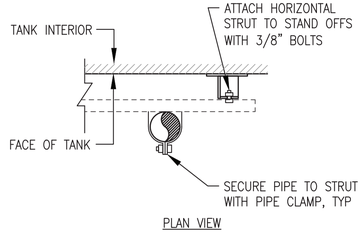
5 M1.6 FILL LIMITER INSTALLATION
NO SCALE



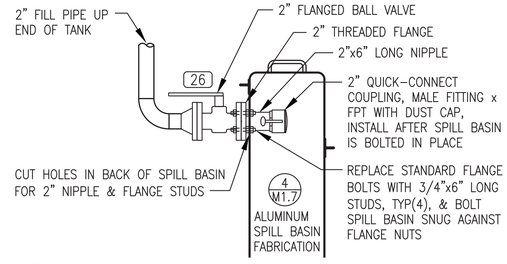
7 M1.6 TYPICAL TANK ANCHOR
NO SCALE



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



8 M1.6 TANK HEAD PIPE SUPPORT
NO SCALE



9 M1.6 FILL PIPE TERMINATION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

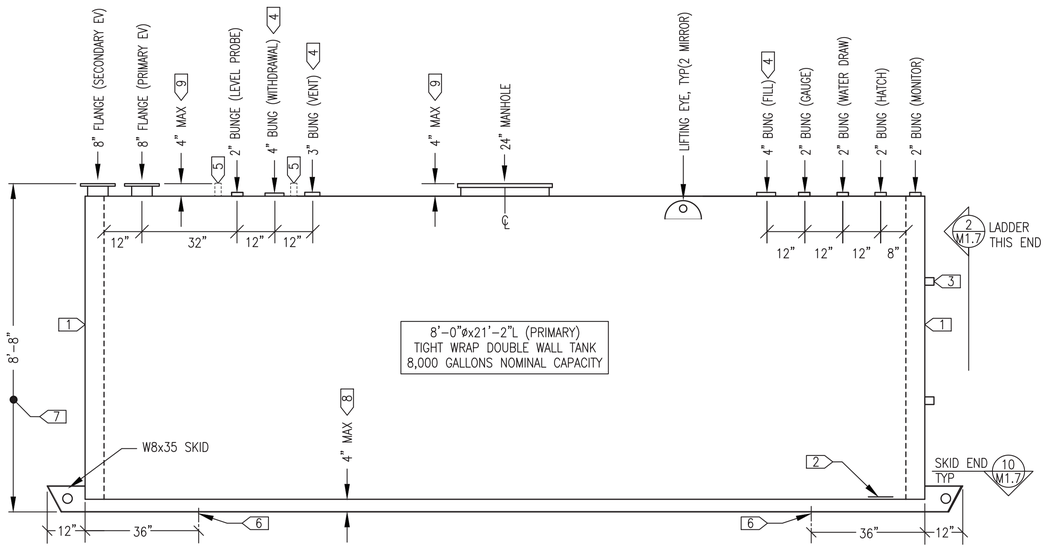
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: INTEMEDIATE TANK INSTALLATION ELEVATION & DETAILS

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

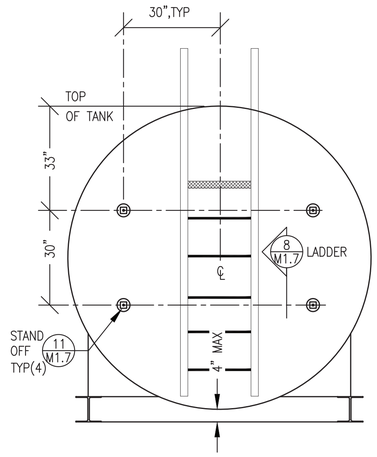
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M1	SHEET: M1.6
PROJECT NUMBER:	



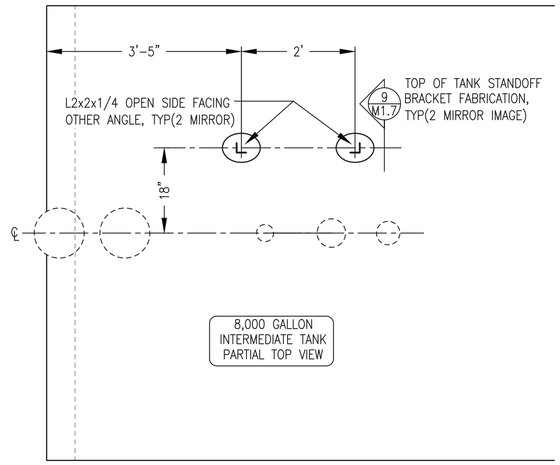
TANK FABRICATION SPECIFIC DETAILS

1. 4" HIGH BLACK LETTERING x1/2" STROKE: "DIESEL FUEL 8,000 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 9/M1.7.
6. 1-1/8"ø HOLE, 2 PLACES EACH SKID, SEE DETAIL 12/M1.7.
7. MAX 8'-8" OVERALL HEIGHT OF SKID/ TANK ASSEMBLY.
8. PROVIDE SADDLE/SKID ASSEMBLY WITH 4" MAX RISE FROM BOTTOM OF SKID TO BOTTOM OF TANK.
9. 4" MAX FROM TOP OF TANK TO FURTHEST EXTEND OF WELDED TANK ATTACHMENT, TYP.

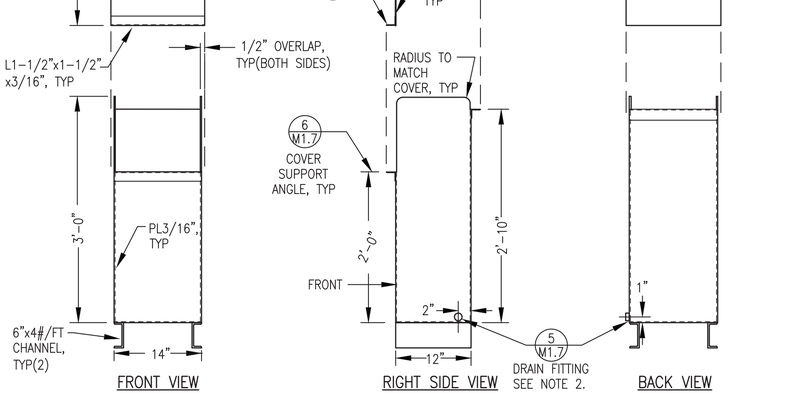
1/M1.7 SECTION THROUGH TANK
1/2"=1'-0"



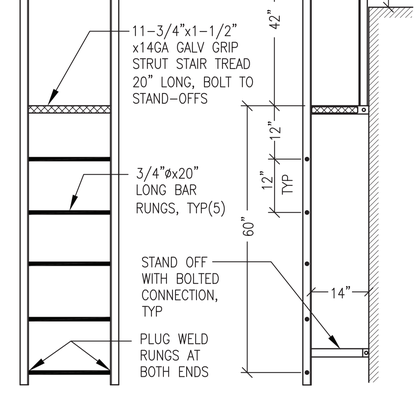
2/M1.7 TANK END ELEVATION
NO SCALE



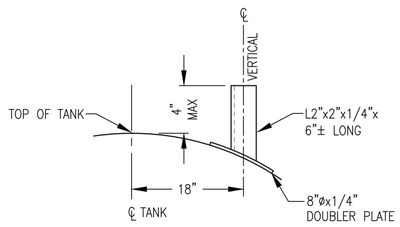
3/M1.7 TOP OF TANK STANDOFF BRACKET LAYOUT
NO SCALE



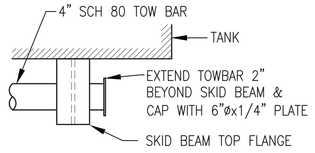
4/M1.7 ALUMINUM SPILL BASIN FABRICATION DETAILS
1"=1'-0"



8/M1.7 TANK LADDER FABRICATION
NO SCALE

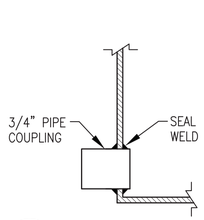


9/M1.7 TOP OF TANK STANDOFF FABRICATION
NO SCALE

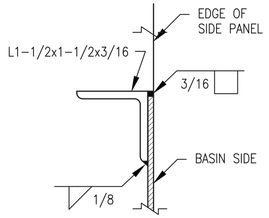


NOTE: CUT END OF SKID AT 45° & CAP WITH PLATE TO MATCH BEAM FLANGE WIDTH

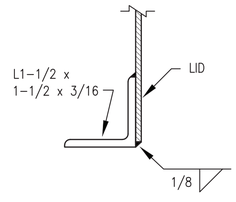
10/M1.7 END OF SKID (TOP VIEW)
NO SCALE



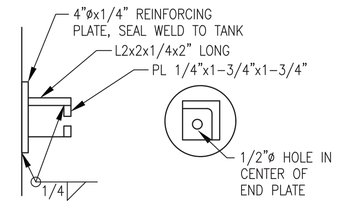
5/M1.7 DRAIN FITTING
NO SCALE



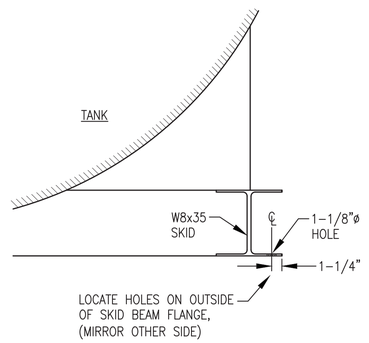
6/M1.7 COVER SUPPORT ANGLE
NO SCALE



7/M1.7 COVER EDGE ANGLE
NO SCALE



11/M1.7 TYP. PIPE SUPPORT STAND OFF
NO SCALE



12/M1.7 TYPICAL TANK SKID HOLE
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH — BRIAN C. GRAY ME 8210 — REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

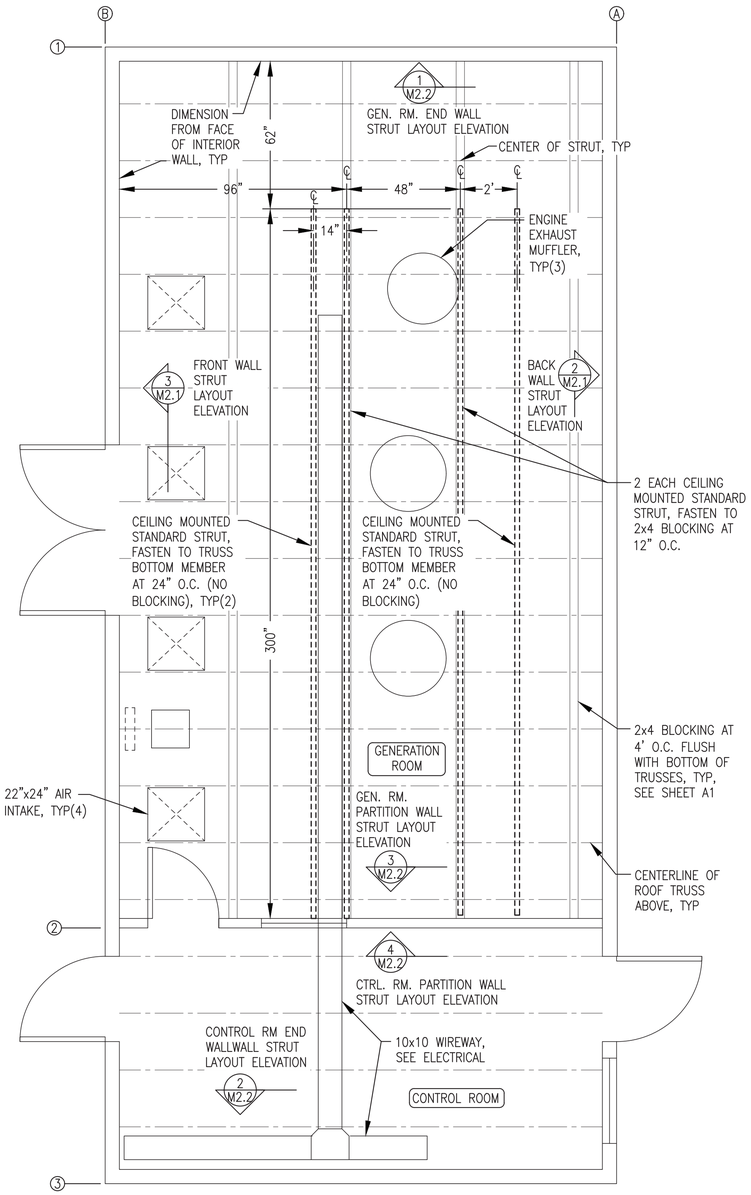
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: 8,000 GALLON INTERMEDIATE TANK & SPILL BASIN FABRICATION DETAILS

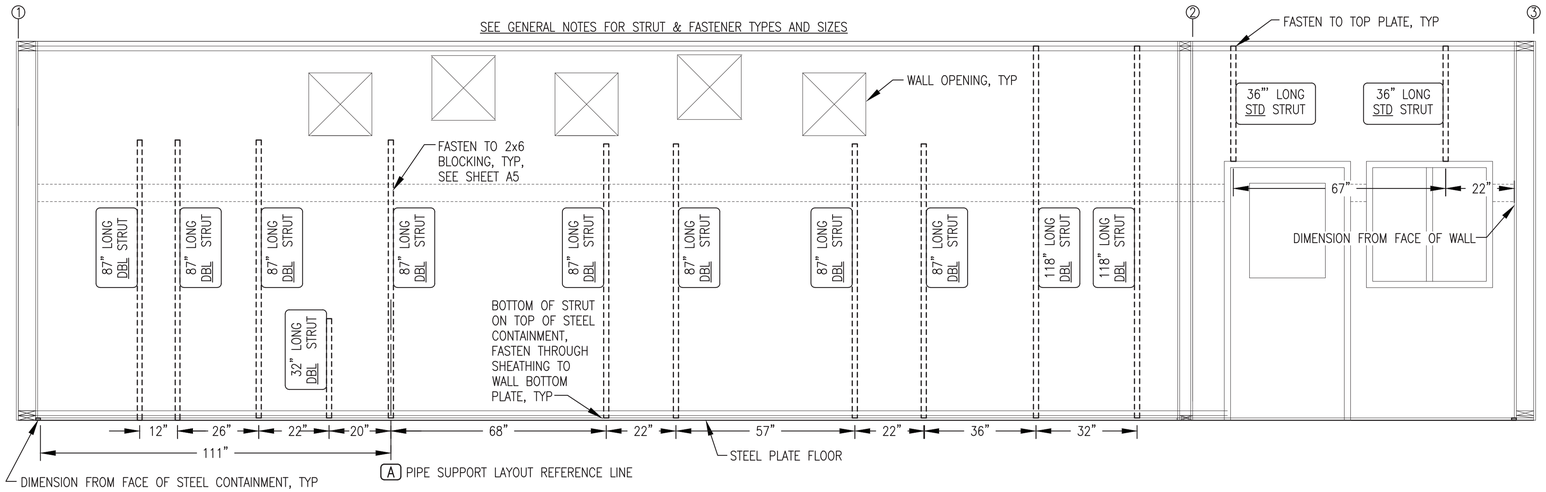
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M1	SHEET: M1.7
PROJECT NUMBER:	



1 M2.1 REFLECTED CEILING STRUT LAYOUT PLAN

3/8"=1'-0"



2 M2.1 BACK WALL LAYOUT ELEVATION

1/2"=1'-0"

3 M2.1 FRONT WALL LAYOUT ELEVATION

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.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

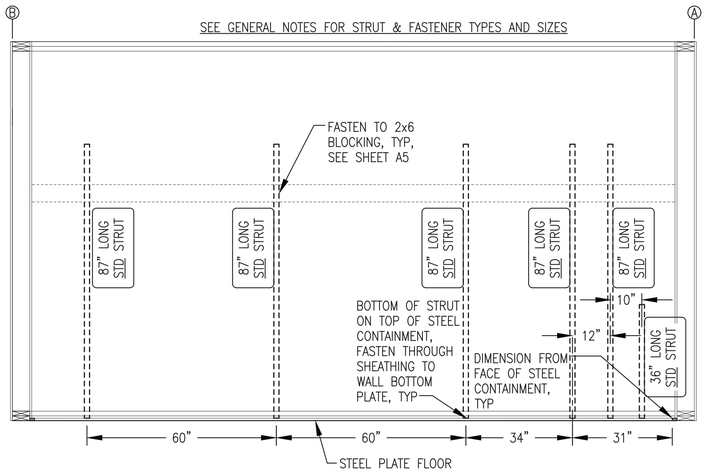
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

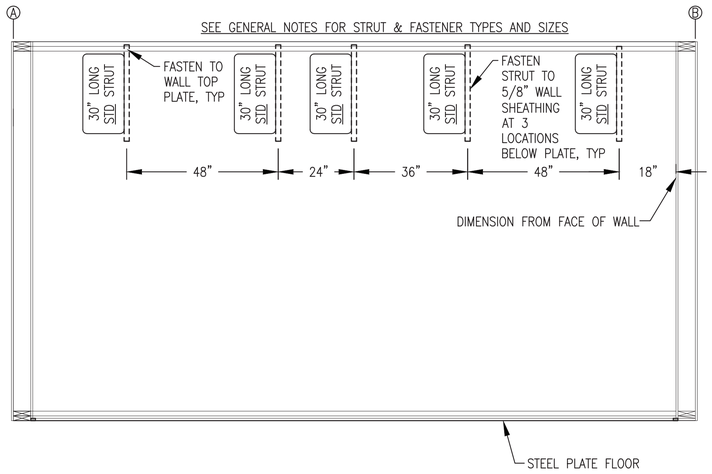
TITLE: WALL & CEILING MECHANICAL SUPPORT LAYOUT

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M2.1
PROJECT NUMBER:	



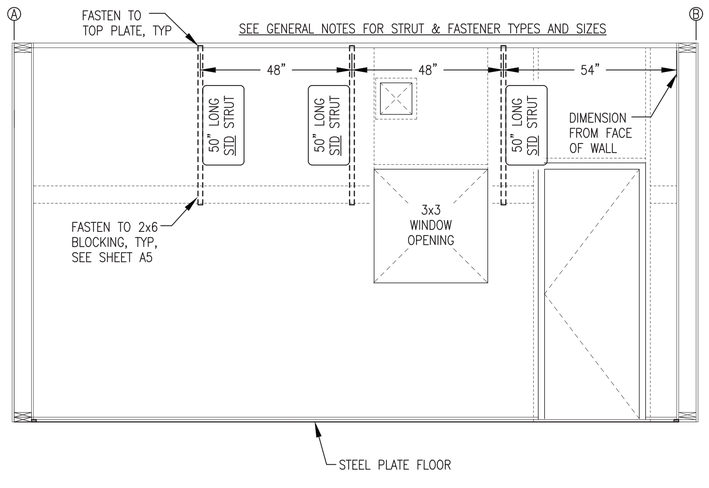
1 M2.2 GENERATION ROOM END WALL LAYOUT ELEVATION
1/2"=1'-0"



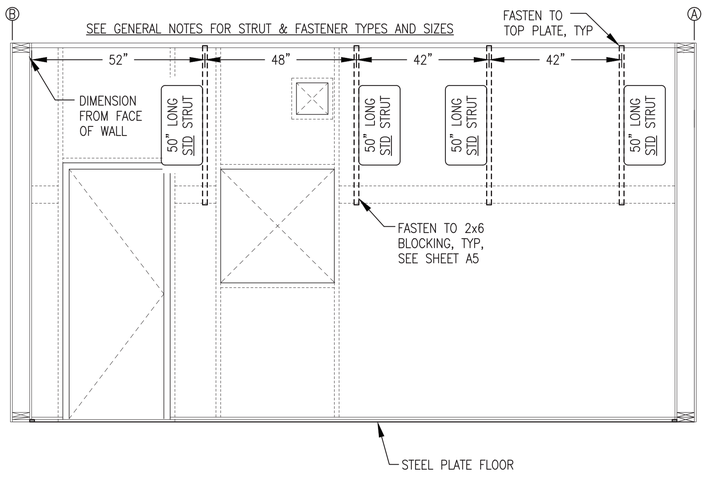
2 M2.2 CONTROL ROOM END WALL LAYOUT ELEVATION
1/2"=1'-0"

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



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

ISSUED FOR CONSTRUCTION
NOVEMBER
2021

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

ALASKA ENERGY AUTHORITY

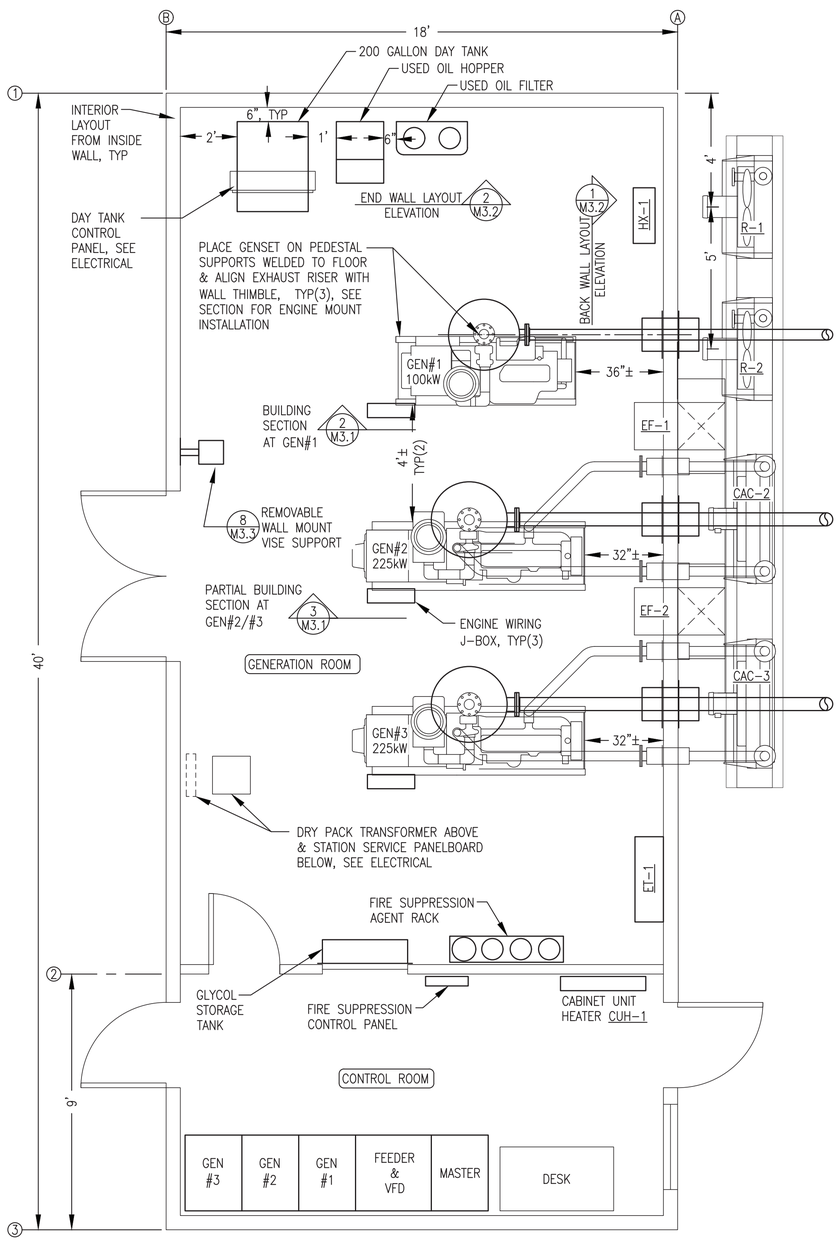
PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: END WALLS MECHANICAL SUPPORT LAYOUT

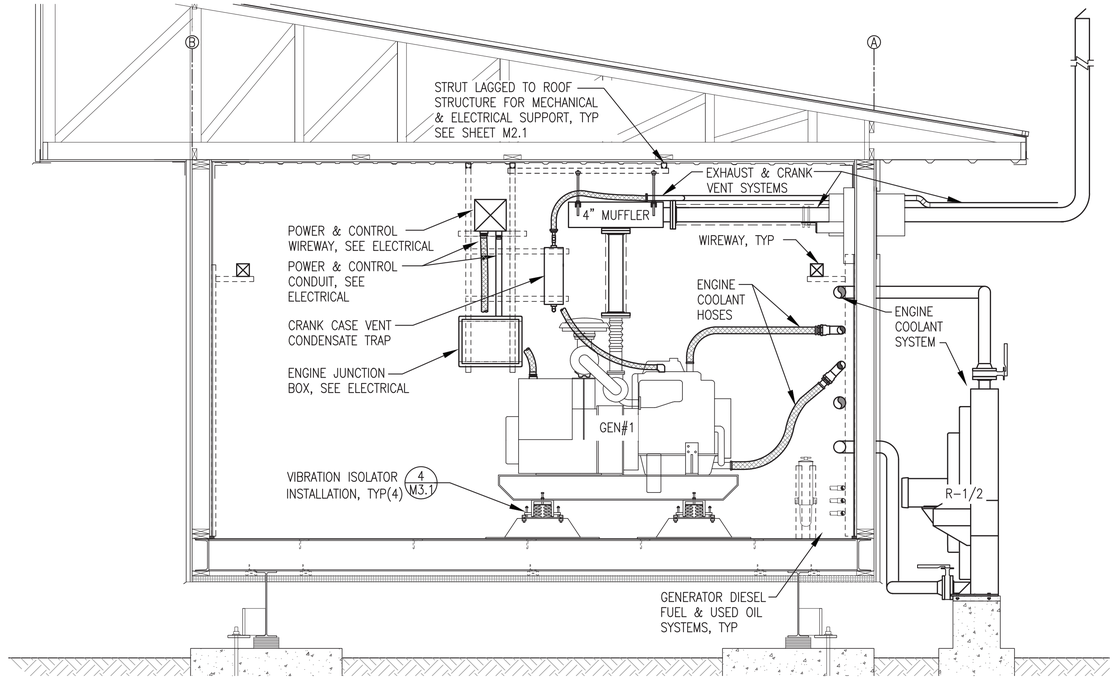
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M2.2
PROJECT NUMBER:	

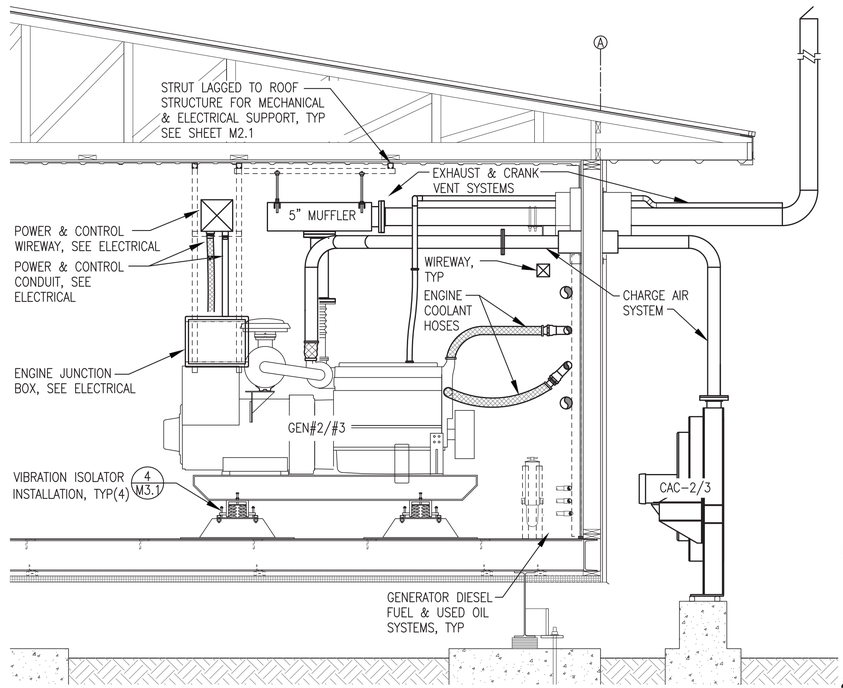
VENETIE ENGINE GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1	ENGINE – 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274E.
GEN #2	ENGINE – 319 HP, 225 EKW PRIME, JOHN DEERE 6090HFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 270 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD S4L1D–D41.
GEN #3	ENGINE – 319 HP, 225 EKW PRIME, JOHN DEERE 6090HFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 270 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD S4L1D–D41.



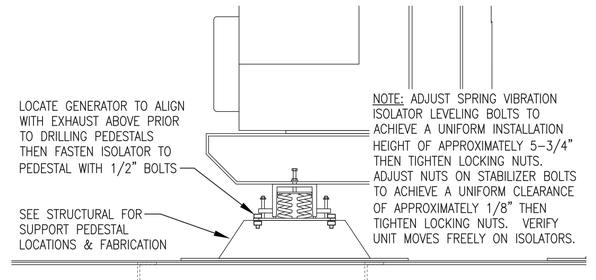
1 M3.1 EQUIPMENT LAYOUT PLAN
3/8"=1'-0"



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



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



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

EQUIPMENT LAYOUT GENERAL NOTES:

1. SEE SHEETS M2.1 & M2.2 FOR WALL AND CEILING EQUIPMENT MECHANICAL SUPPORT PLANS AND DETAILS
2. SEE SHEETS M3.1–M3.5 FOR GENERAL EQUIPMENT LAYOUT, BASE SUPPORT, FABRICATIONS, AND GENERATOR ASSEMBLY PLANS AND DETAILS.
3. SEE SHEETS M4.1–M4.3 FOR ENGINE COOLANT AND HEAT RECOVERY PLANS, ISOMETRICS AND DETAILS.
4. SEE SHEETS M5.1–M5.7 FOR DIESEL FUEL AND USED OIL SYSTEM PLANS AND DETAILS.
5. SEE SHEETS M6.1 & M6.2 FOR ENGINE EXHAUST, CRANK CASE VENTILATION, AND CHARGE AIR SYSTEM PLANS AND DETAILS.
6. SEE SHEETS M7.1 & M7.2 FOR VENTILATION SYSTEM PLANS AND DETAILS.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

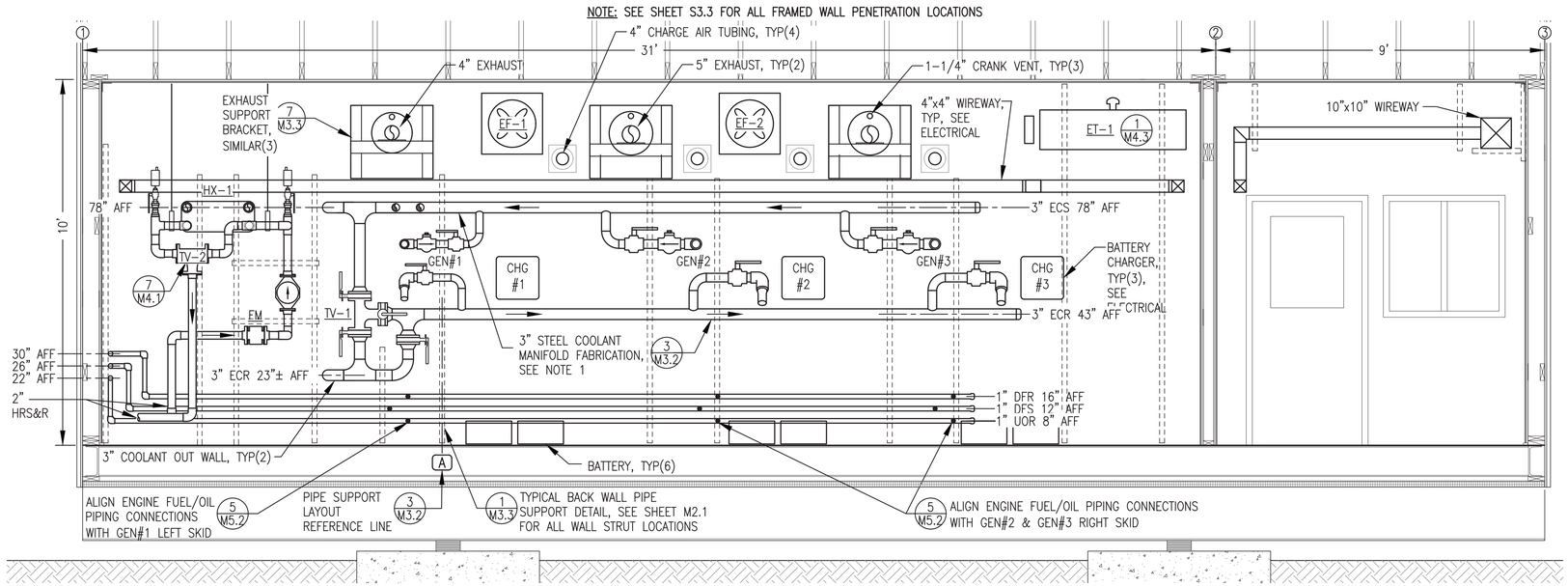
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

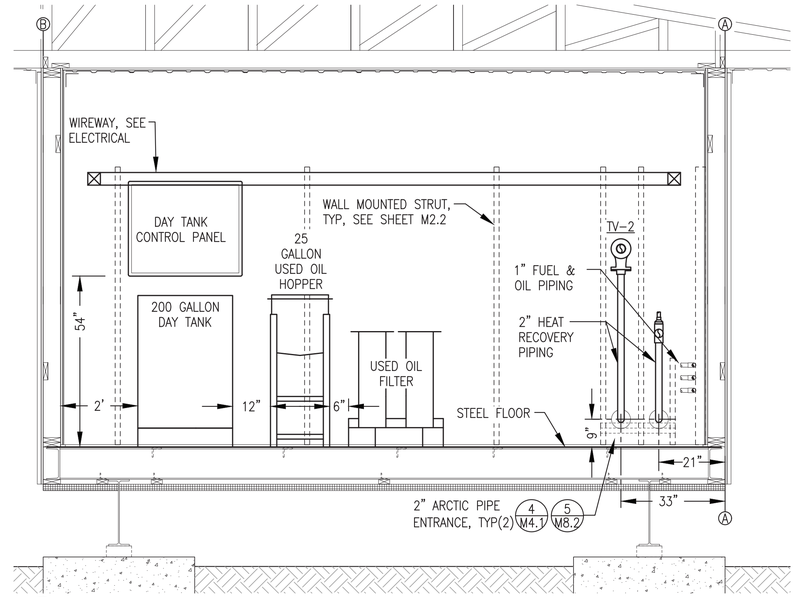
TITLE: EQUIPMENT LAYOUT PLAN & SECTIONS

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

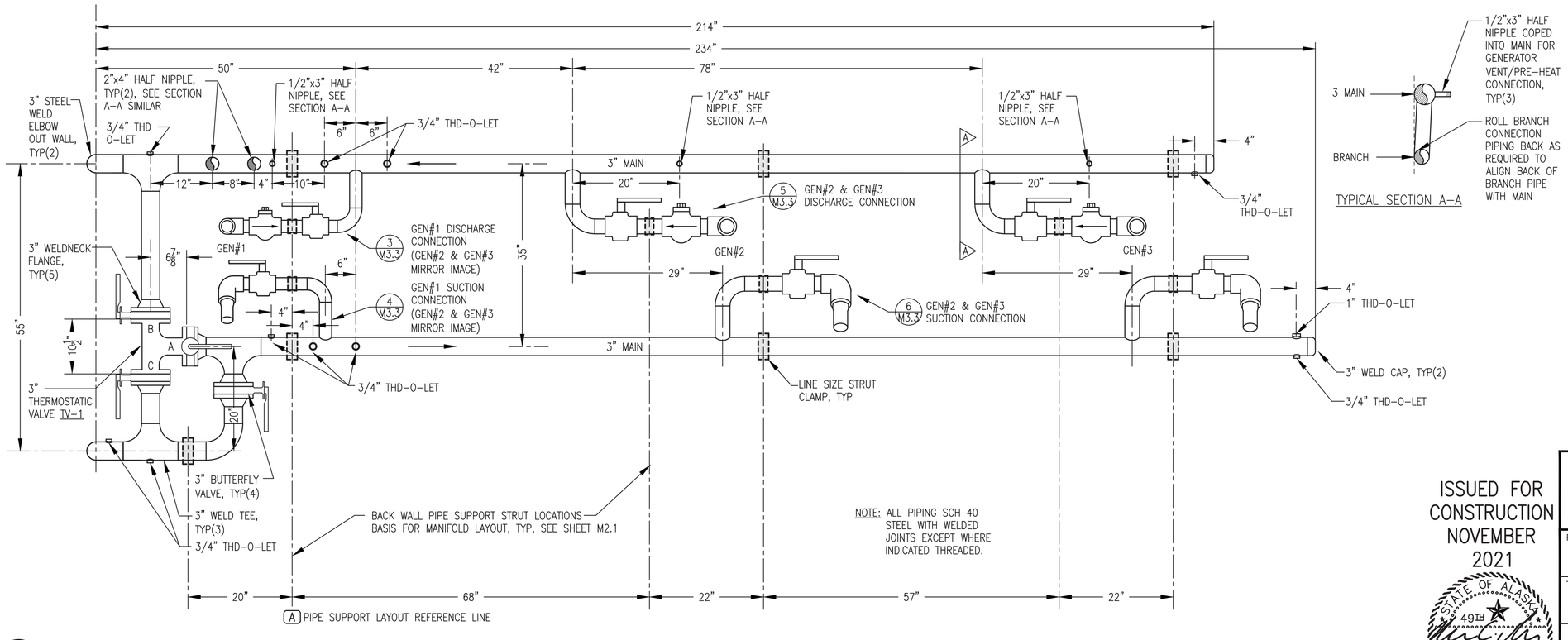
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2–M7	SHEET: M3.1
PROJECT NUMBER:	



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



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



TYPICAL SECTION A-A

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

NOTE: ALL PIPING SCH 40 STEEL WITH WELDED JOINTS EXCEPT WHERE INDICATED THREADED.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC PHONE: (907) 562-3252

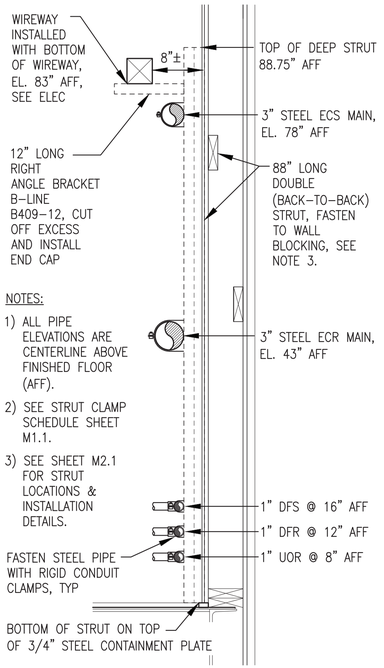
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

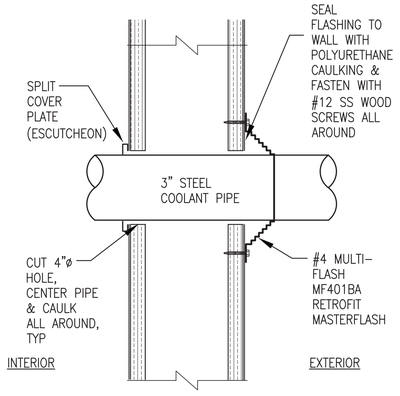
TITLE: WALL LAYOUT ELEVATIONS & COOLANT MANIFOLD FABRICATION DETAILS

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

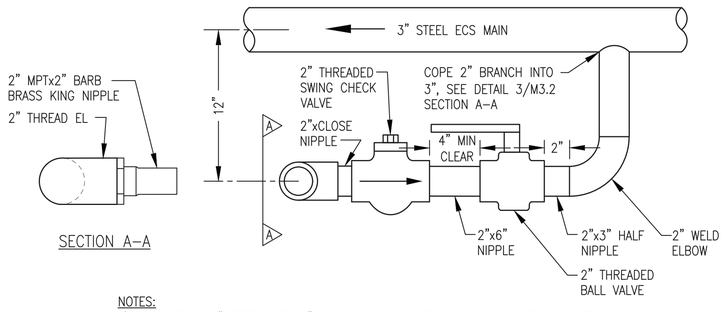
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 11/1/21
FILE NAME: VEN PP M2-M7 | SHEET: M3.2
PROJECT NUMBER:



1 M3.3 BACK WALL PIPING SUPPORT
NO SCALE



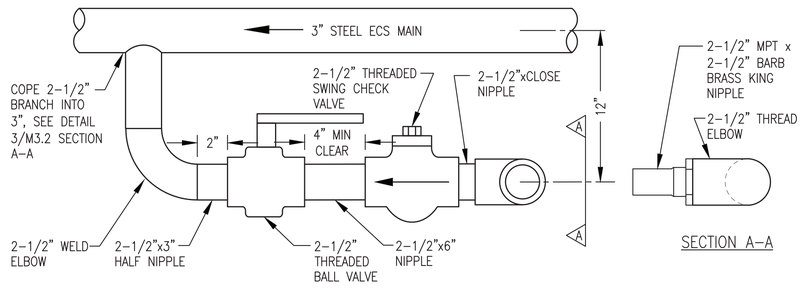
2 M3.3 COOLANT PIPE WALL PENETRATION
NO SCALE



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.

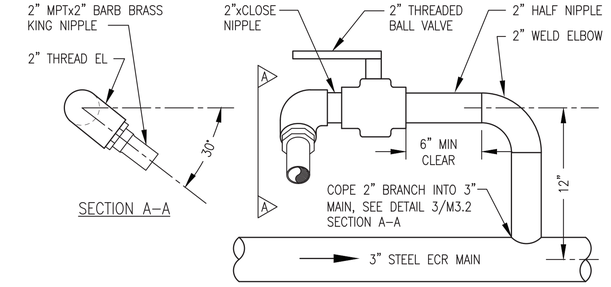
3 M3.3 GEN#1 DISCHARGE CONNECTION
NO SCALE



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.

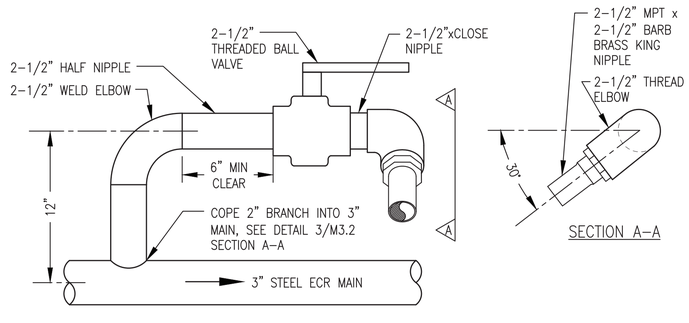
5 M3.3 GEN#2 & GEN#3 DISCHARGE CONNECTION
NO SCALE



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.

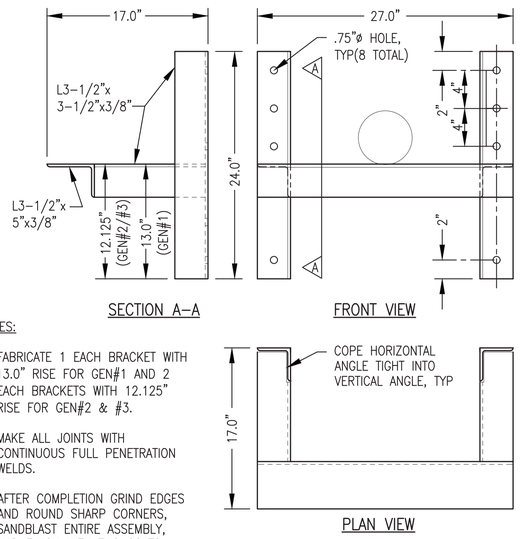
4 M3.3 GEN#1 SUCTION CONNECTION
NO SCALE



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.

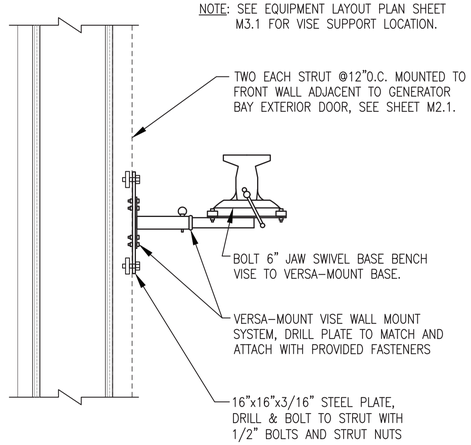
6 M3.3 GEN#2 & GEN#3 SUCTION CONNECTION
NO SCALE



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.

7 M3.3 EXHAUST SUPPORT BRACKET FABRICATION
NO SCALE



8 M3.3 REMOVABLE BENCH VISE INSTALLATION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

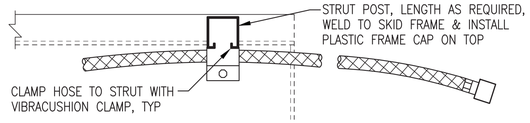
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

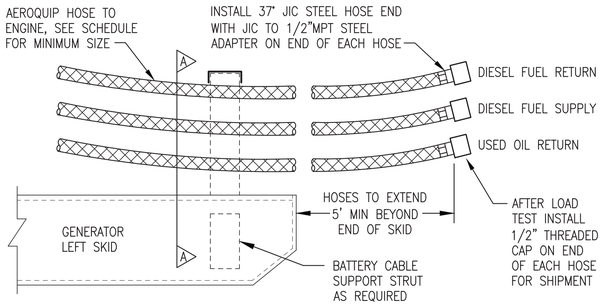
TITLE: MECHANICAL DETAILS

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

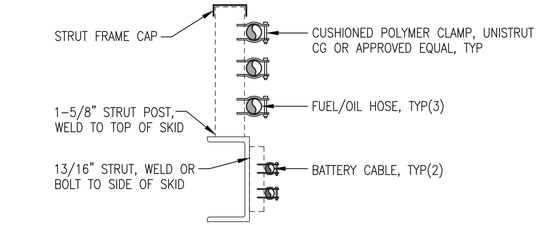
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M3.3
PROJECT NUMBER:	



GEN#1 LEFT SKID PLAN (GEN#2/#3 ON RIGHT SKID, MIRROR IMAGE)

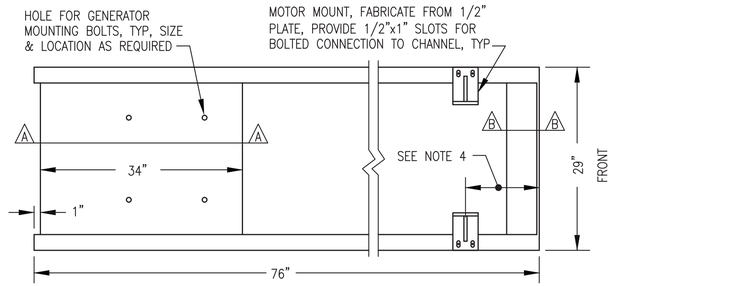


GEN#1 LEFT SKID ELEVATION (GEN#2/#3 ON RIGHT SKID, SIMILAR)

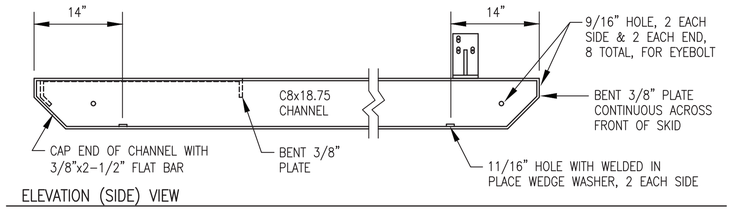


GEN#1 LEFT SKID SECTION A-A (GEN#2/#3 ON RIGHT SKID, MIRROR IMAGE)

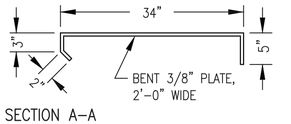
NOTE:
JOHN DEERE 4045 GEN#1 TO HAVE FUEL HOSE AND BATTERY CABLE SUPPORTS MOUNTED TO THE LEFT SKID BEAM. JOHN DEERE 6090 GEN#2 & GEN#3 TO HAVE FUEL HOSE AND BATTERY CABLE SUPPORTS MOUNTED TO RIGHT SKID BEAM.



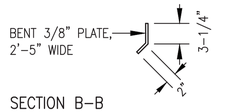
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



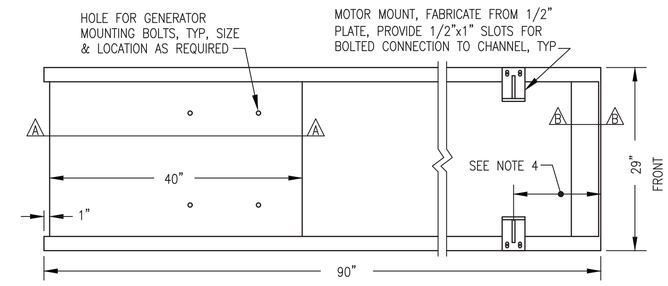
SECTION A-A



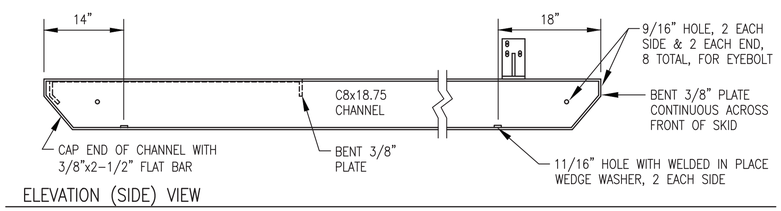
SECTION B-B

NOTES:

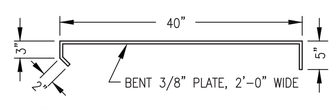
1) FABRICATE FROM ASTM A-36 STEEL. BEND PLATES & CUT ENDS OF CHANNELS AT 90° & 45° AS SHOWN.
2) EXCEPT WHERE INDICATED AS BOLTED MAKE ALL CONNECTIONS WITH CONTINUOUS WELDS (FILLET OR FULL-PENETRATION GROOVE AS REQUIRED) IN ACCORDANCE WITH CURRENT AWS STANDARD CODE.
3) ROUND ALL CORNERS & GRIND WELDS 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.



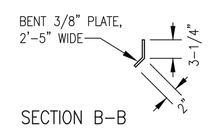
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



SECTION A-A



SECTION B-B

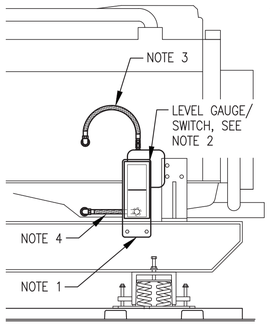
NOTES:

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.

1 M3.4 FUEL & OIL HOSE TERMINATIONS
NO SCALE

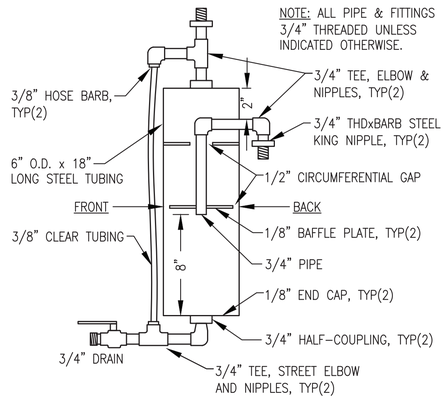
2 M3.4 GEN#1 (JOHN DEERE 4045) SKID DESIGN
NO SCALE

3 M3.4 GEN#2 & GEN#3 (JOHN DEERE 6090) SKID DESIGN
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 M3.4 TYPICAL OIL LEVEL GAUGE/SWITCH INSTALLATION
NO SCALE



5 M3.4 GEN#1 CONDENSATE TRAP FABRICATION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

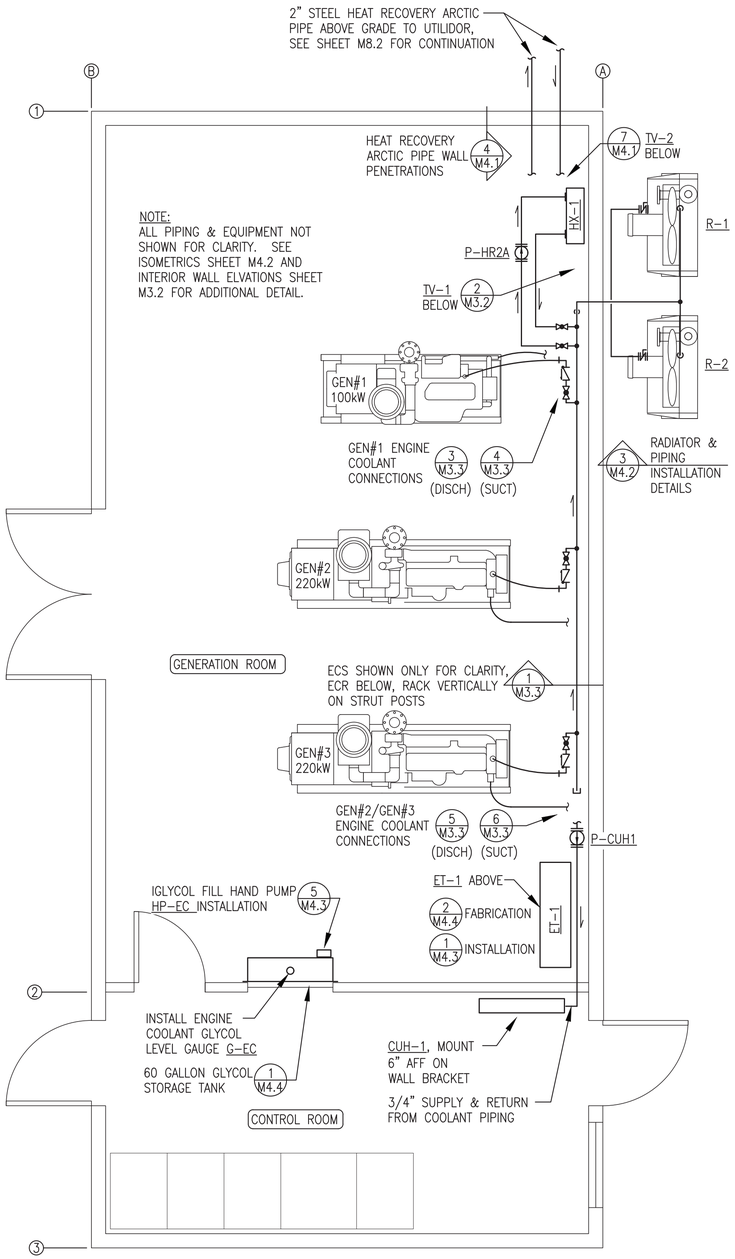
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

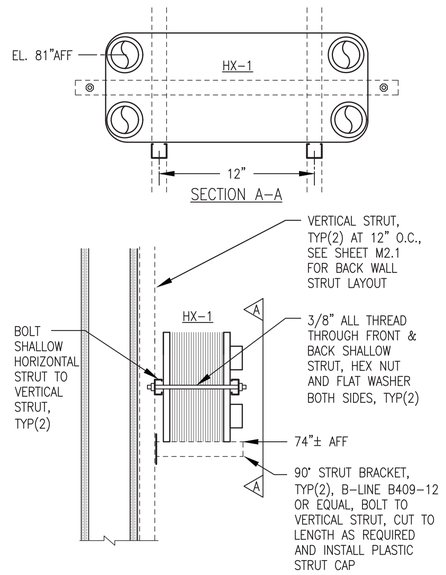
TITLE: GENERATOR FABRICATION DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 11/1/21
FILE NAME: VEN PP M2-M7 | SHEET: M3.4
PROJECT NUMBER:

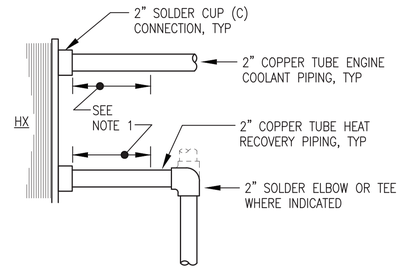


1 M4.1 ENGINE COOLANT & HEAT RECOVERY PIPING PLAN
3/8"=1'-0"



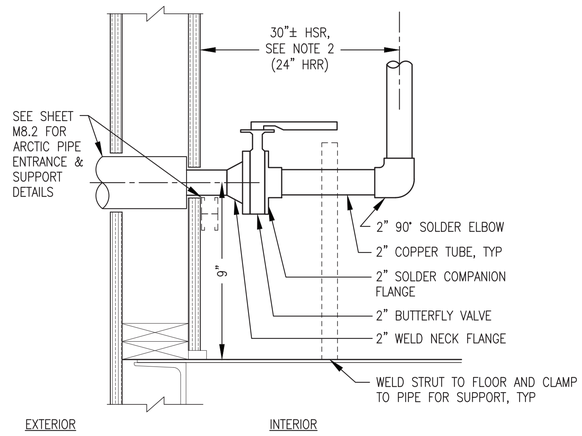
2 M4.1 HEAT EXCHANGER HX-1 SUPPORT FROM WALL
NO SCALE

NOTES:
1) PROVIDE MINIMUM 9" LONG STRAIGHT COPPER TUBE SECTION TO ALLOW FUTURE INSTALLATION OF NON-DIMPLED REPAIR COUPLING FOR HEAT EXCHANGER TEMPORARY REMOVAL AND/OR REPLACEMENT.

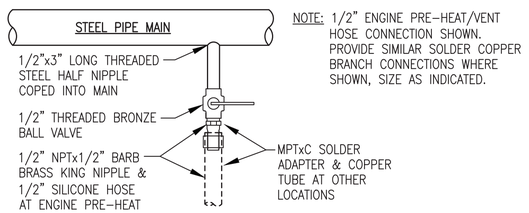


3 M4.1 HX PIPING CONNECTION
NO SCALE

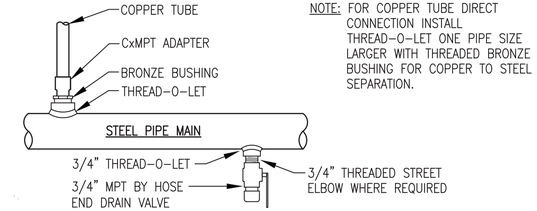
NOTES:
1) SEE ELEVATION 2/M3.2 FOR PENETRATION LOCATIONS.
2) 2" HEAT RECOVERY SUPPLY ALIGNED WITH TV-2 "A" PORT ABOVE, SEE BACK WALL ELEVATION 1/M3.2 FOR PIPING LAYOUT.
3) ONE PIPE SHOWN. PROVIDE TWO SIMILAR.



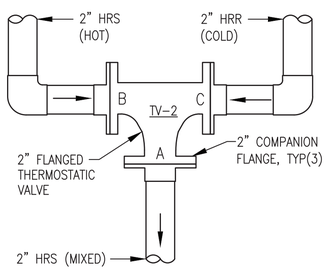
4 M4.1 2" ARCTIC PIPE CONNECTION
NO SCALE



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



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



7 M4.1 TV-2 INSTALLATION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

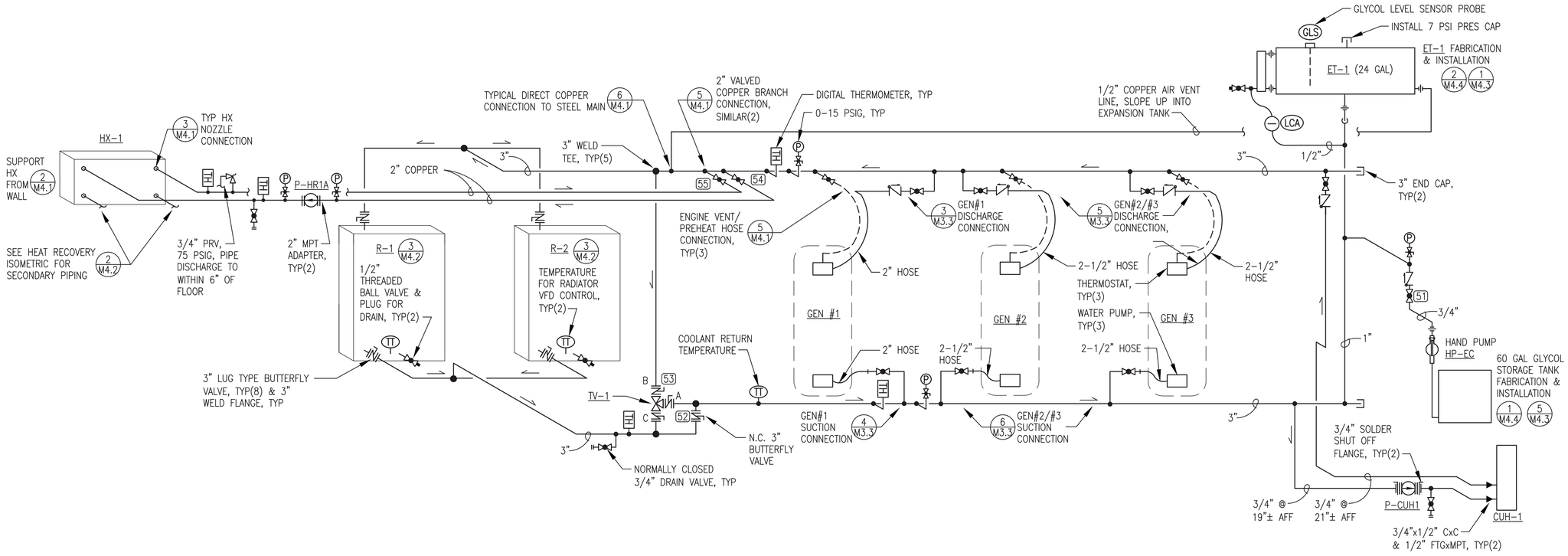
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: ENGINE COOLANT & HEAT RECOVERY PIPING PLAN & DETAILS

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

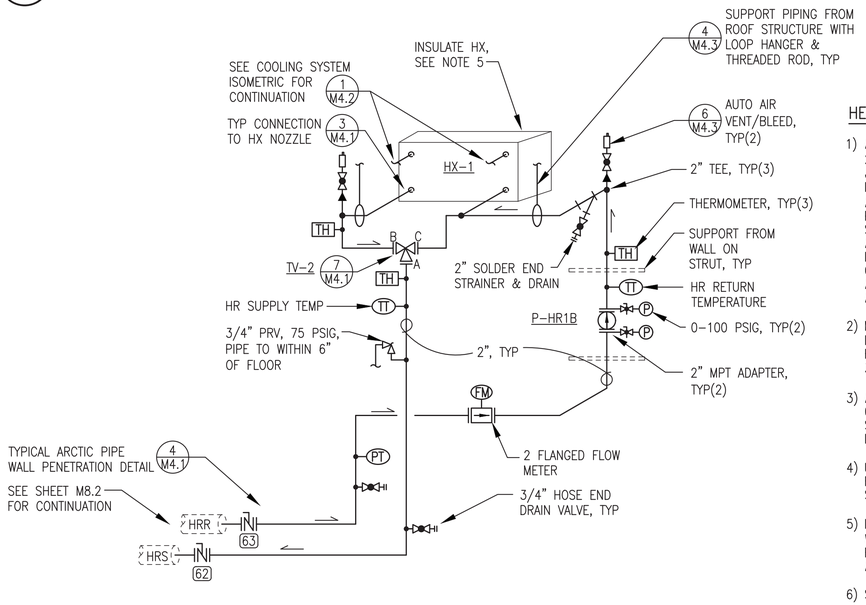
DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: VEN PP M2-M7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 11/1/21
SHEET: M4.1



NOTES:

1. 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.
2. 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.
3. ALL PRESSURE GAUGES IN ENGINE COOLANT PIPING 0-15 PSIG. SEE INSTRUMENTATION SCHEDULE FOR ALL ELECTRONIC INSTRUMENTS.
4. UPON COMPLETION OF FABRICATION FLUSH INTERIOR OF PIPING TO REMOVE ALL DEBRIS AND RESIDUE, SEE SPECIFICATIONS.
5. INSULATE COOLANT PIPING MAINS FROM GENERATOR VALVES TO WALL PENETRATIONS. ALL OTHER PIPING NOT INSULATED.
6. SET P-HR1A TO OPERATE ON SPEED 3. SET P-CUH1 TO OPERATE ON SPEED 3.

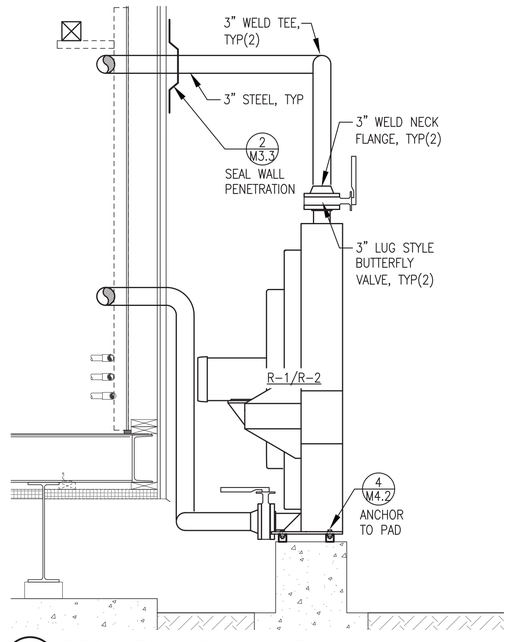
1 M4.2 COOLING SYSTEM PIPING ISOMETRIC
NO SCALE



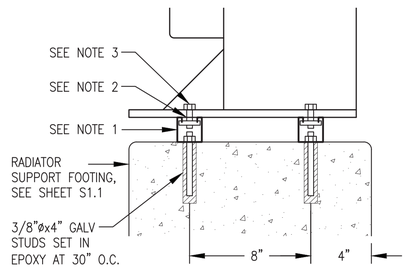
HEAT RECOVERY ISOMETRIC NOTES:

1) ALL PIPING SHOWN THIS ISOMETRIC 2"ø TYPE "L" COPPER WITH SOLDER JOINTS 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.
2) MAKE ALL CONNECTIONS FOR INSTRUMENTATION WITH T-DRILL TAP OR REDUCING TEE AS SHOWN ON DETAIL 3/M4.3.
3) ALL HEAT RECOVERY PRESSURE GAUGES 0-100 PSIG. SEE INSTRUMENTATION SCHEDULE FOR ALL ELECTRONIC INSTRUMENTS
4) UPON COMPLETION OF FABRICATION FLUSH PIPING TO REMOVE ALL DEBRIS, SEE SPECIFICATIONS.
5) INSULATE HEAT RECOVERY PIPING MAINS. WRAP HEAT EXCHANGER WITH 1" RIGID FOIL-BACK FIBERGLASS INSULATION ALL AROUND AND TAPE ALL SEAMS.
6) SET P-HR1B TO OPERATE ON SPEED 3.

2 M4.2 HEAT RECOVERY SYSTEM PIPING ISOMETRIC
NO SCALE



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



NOTES:

1. PROVIDE 2 PARALLEL RUNS OF 1-5/8" STRUT LOCATED AS INDICATED ALONG ENTIRE LENGTH OF COOLER SUPPORT FOOTING.
2. RADIATOR BASE MOUNTING HOLES ARE AT 10" O.C. FROM FACTORY. PRIOR TO PLACING RADIATORS DRILL NEW REAR MOUNTING HOLES 8" FROM FRONT HOLES TO ALIGN WITH CHARGE AIR COOLER SUPPORTS.
3. FASTEN BASE WITH 4 EACH 1/2" STRUT NUT, BOLT, & WITH LOCK WASHER.

4 M4.2 RADIATOR BASE MOUNT DETAIL
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

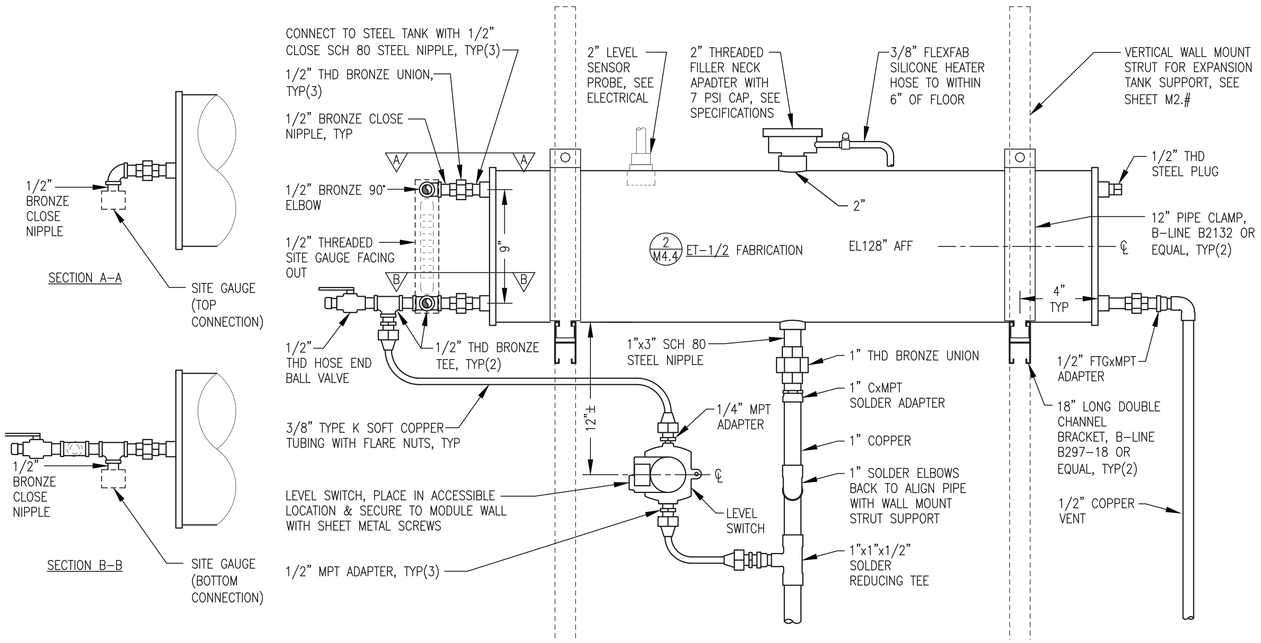
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

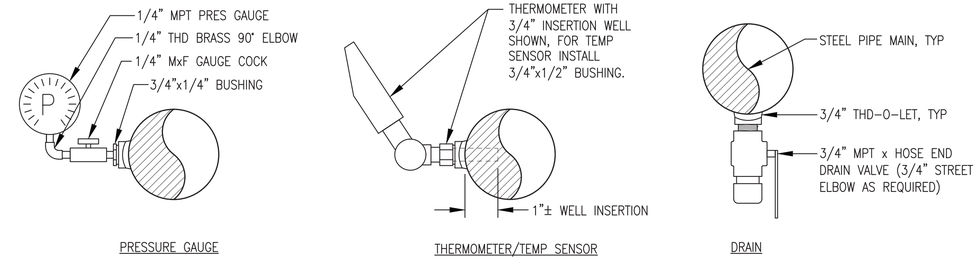
TITLE: ENGINE COOLANT & HEAT RECOVERY PIPING ISOMETRICS & DETAILS

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

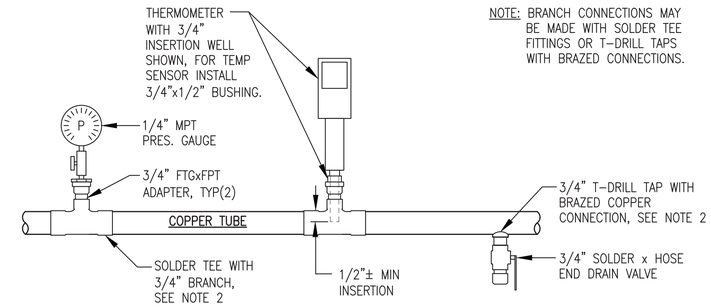
DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: VEN PP M2-M7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 11/1/21
SHEET: M4.2



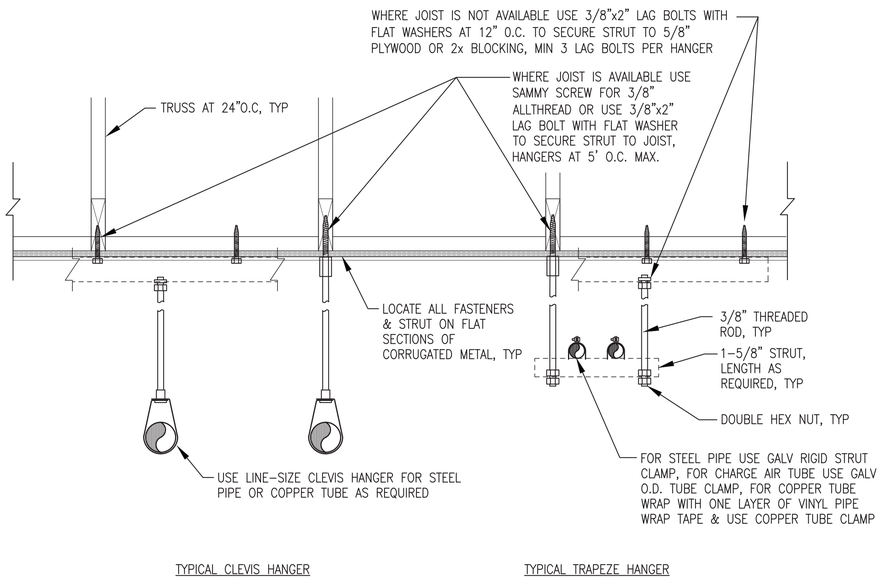
1 M4.3 24 GALLON EXPANSION TANK ET-1 INSTALLATION (30 GALLON EXPANSION TANK ET-2 SIMILAR, MIRROR IMAGE)
NO SCALE



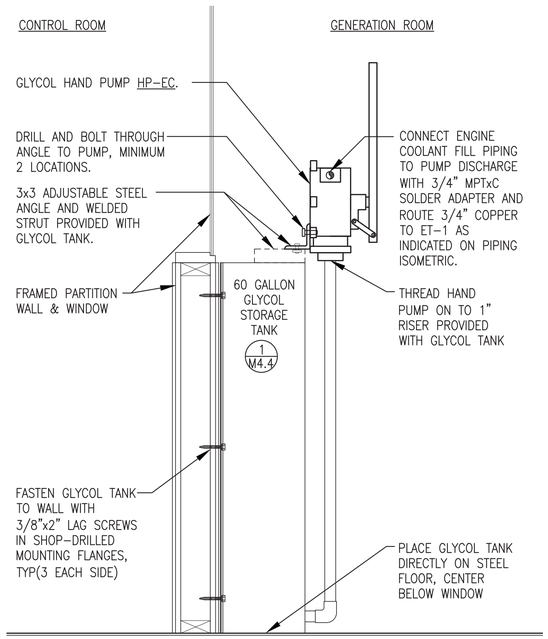
2 M4.3 TYP INSTRUMENT/DRAIN INSTALLATION IN STEEL PIPE
NO SCALE



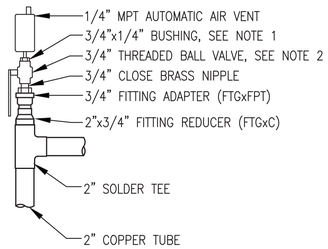
3 M4.3 TYP INSTRUMENT/DRAIN INSTALLATION IN COPPER TUBE
NO SCALE



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



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



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

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY ME 8210
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ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: ENGINE COOLANT & HEAT RECOVERY PIPING DETAILS

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

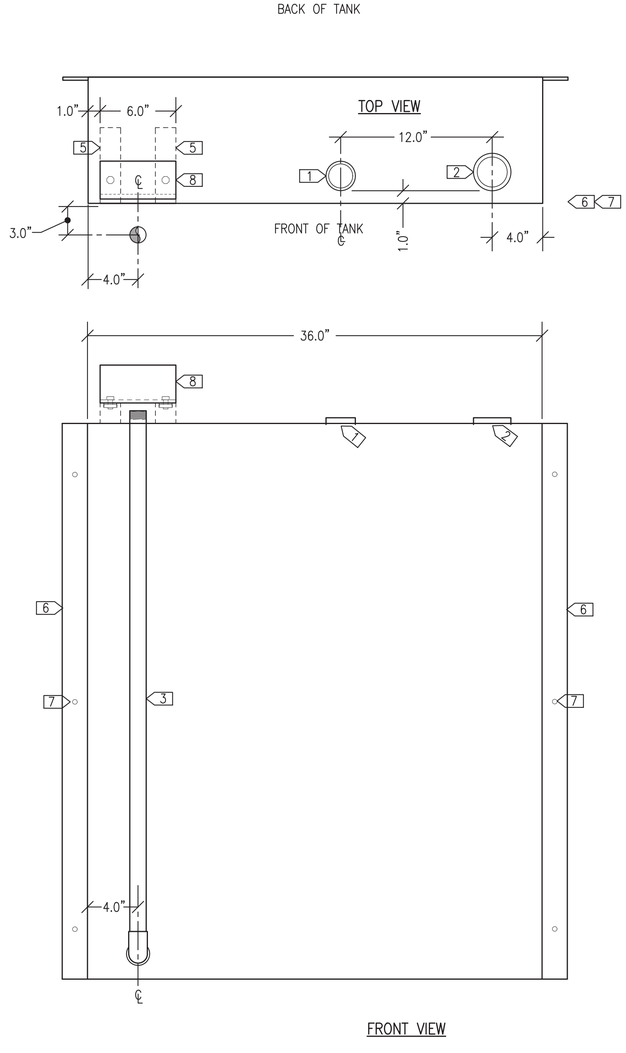
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M4.3
PROJECT NUMBER:	

GLYCOL TANK GENERAL NOTES:

1. FABRICATE SINGLE WALL 60 GALLON NOMINAL CAPACITY GLYCOL TANK.
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.
3. PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. SEAL WELD ALL TANK ATTACHMENTS.
4. ALL FPT OPENINGS TO BE FORGED STEEL HALF COUPLINGS.
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. PRIME AND TOP COAT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
7. 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:

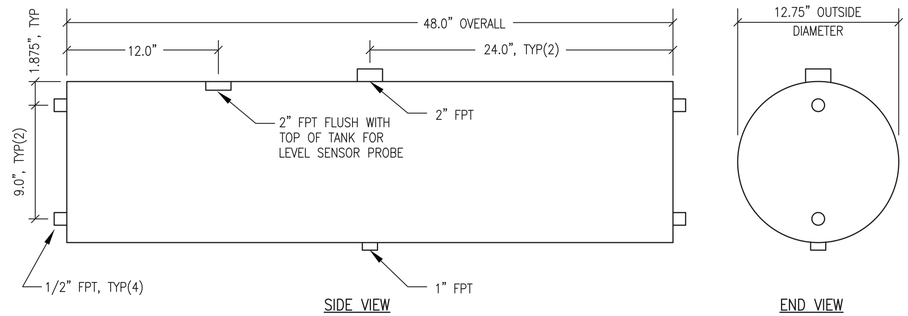
1. 1-1/2" FPT (TANK GAUGE)
2. 2" FPT (VENT) - INSTALL 2" THREADED MUSHROOM VENT CAP
3. 1" SCHEDULE 80 PIPE WITH THREADED TOP CONNECTION (WITHDRAWAL)
4. 1" SOCKETWELD 90° ELBOW
5. 6" LONG STRUT, END FLUSH WITH FRONT OF TANK
6. 2x1/4" FLAT BAR CONTINUOUS TWO SIDES
7. 7/16" HOLE AT 18" O.C. TWO SIDES
8. 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.



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

EXPANSION TANK GENERAL NOTES:

1) FABRICATE SINGLE WALL 24 GALLON NOMINAL CAPACITY GLYCOL EXPANSION TANK.
2) 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.
3) PROVIDE WITH ALL OPENINGS INDICATED USING MINIMUM 3000# FORGED STEEL PIPE HALF COUPLINGS IN ACCORDANCE WITH U.L 142 FIGURE 7.1 #2.
4) PRESSURE TEST COMPLETED ASSEMBLY TO 15 PSIG MINIMUM.
5) 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.
6) UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS, AIR DRY INTERIOR, AND SEAL ALL TANK OPENINGS WITH PLASTIC PLUGS.



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

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

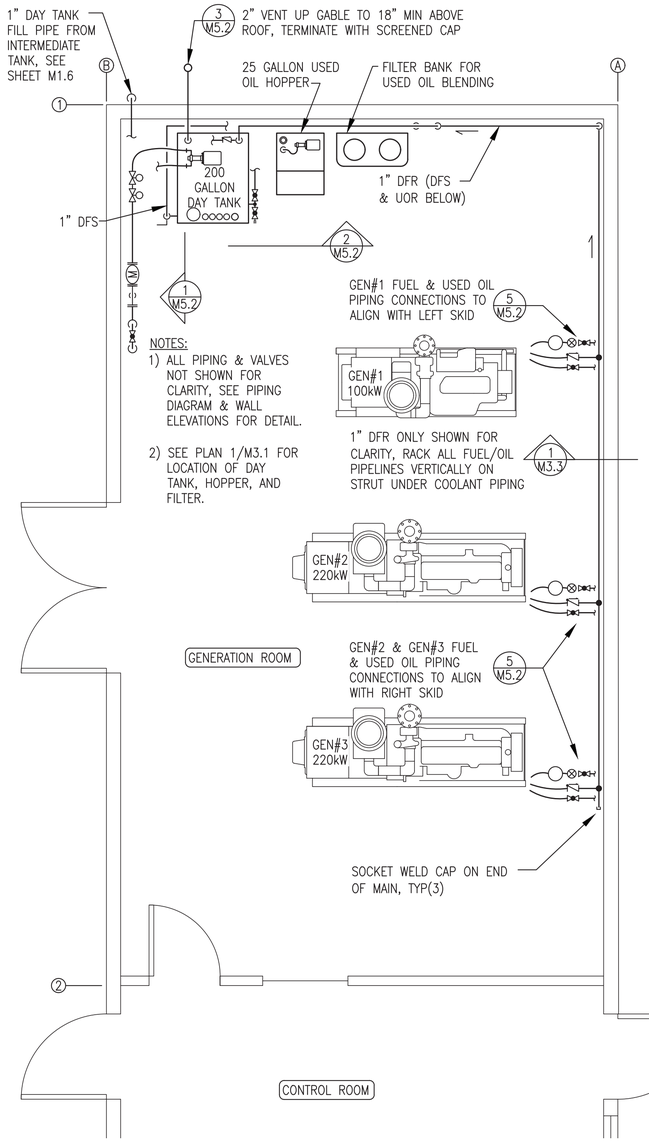
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: GLYCOL STORAGE & EXPANSION TANKS FABRICATION

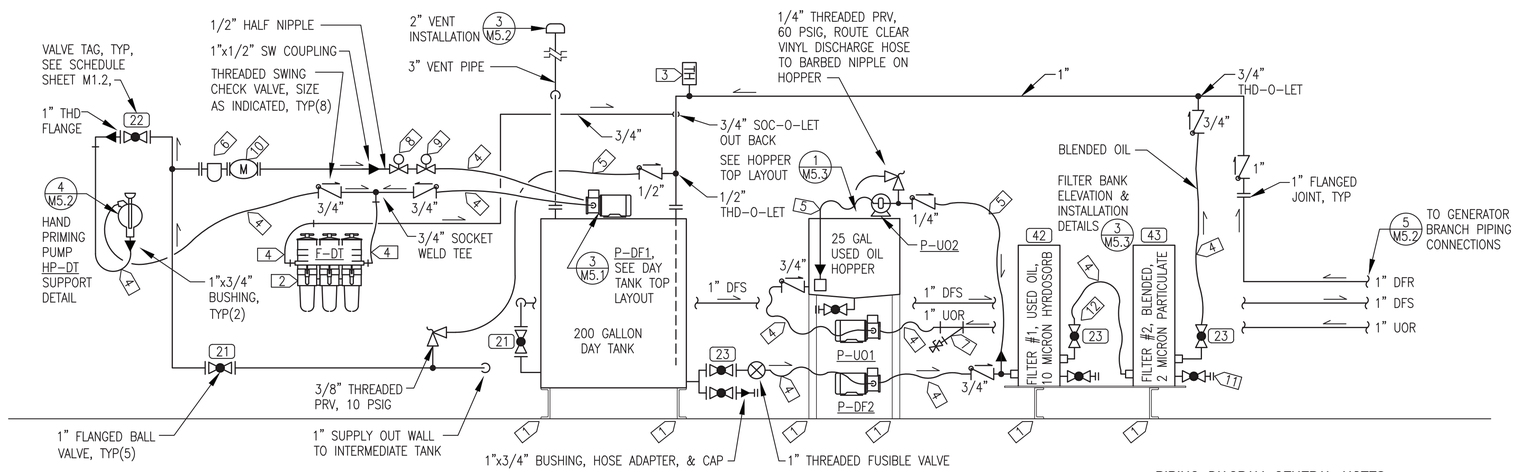
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M4.4
PROJECT NUMBER:	



1 M5.1 DIESEL FUEL SYSTEM & USED OIL PIPING PLAN

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 TRIPLE FILTER BANK F-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 "Y" 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:

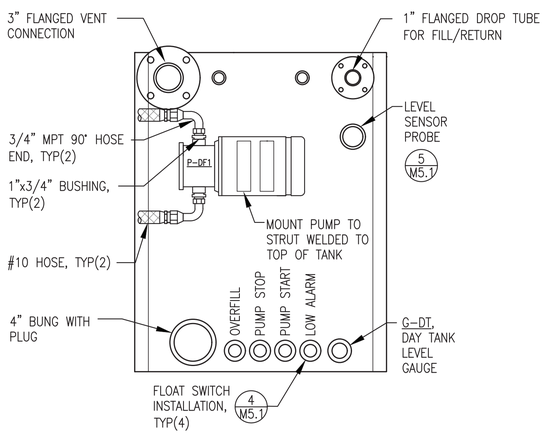
1) FABRICATE DAY TANK, FILTER BANK, & HOPPER IN ACCORDANCE WITH FABRICATION PLANS, LAYOUT ELEVATIONS & DETAILS.
2) ALL DAY TANK SUPPLY & RETURN PIPING 1" SCH 80 EXCEPT WHERE INDICATED AS 3/4". ALL VENT PIPING 3" SCH 40.
3) ALL PIPING JOINTS SOCKET OR BUTT WELD EXCEPT FOR THREADED VENT & CONNECTIONS TO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

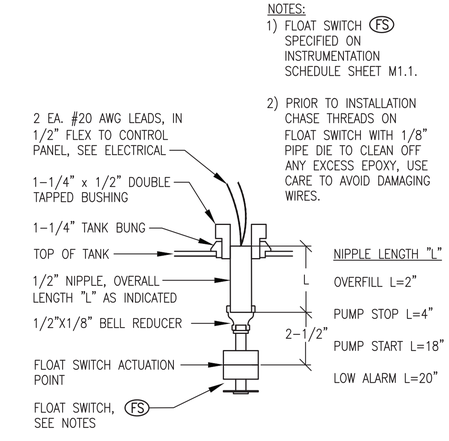
2 M5.1 DIESEL FUEL & USED OIL PIPING DIAGRAM

NO SCALE

3 M5.1 TOP OF DAY TANK – PLAN VIEW

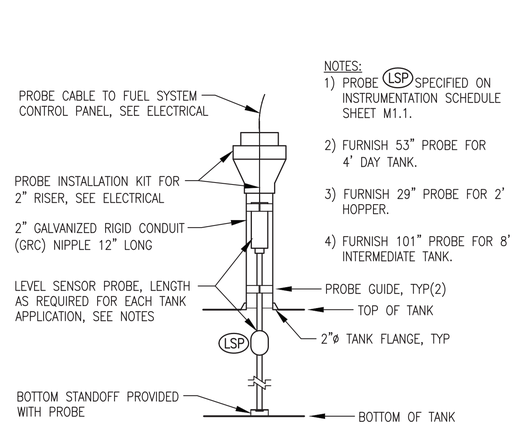
NO SCALE





4 M5.1 DAY TANK FLOAT SWITCH INSTALLATION

NO SCALE



5 M5.1 TYPICAL LEVEL SENSOR PROBE INSTALLATION

NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

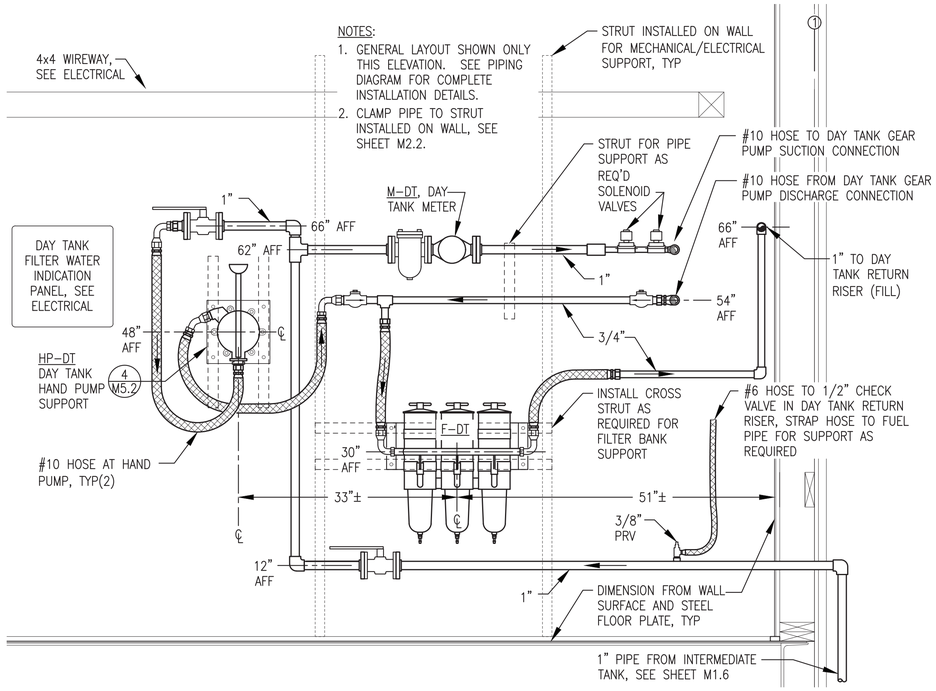
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

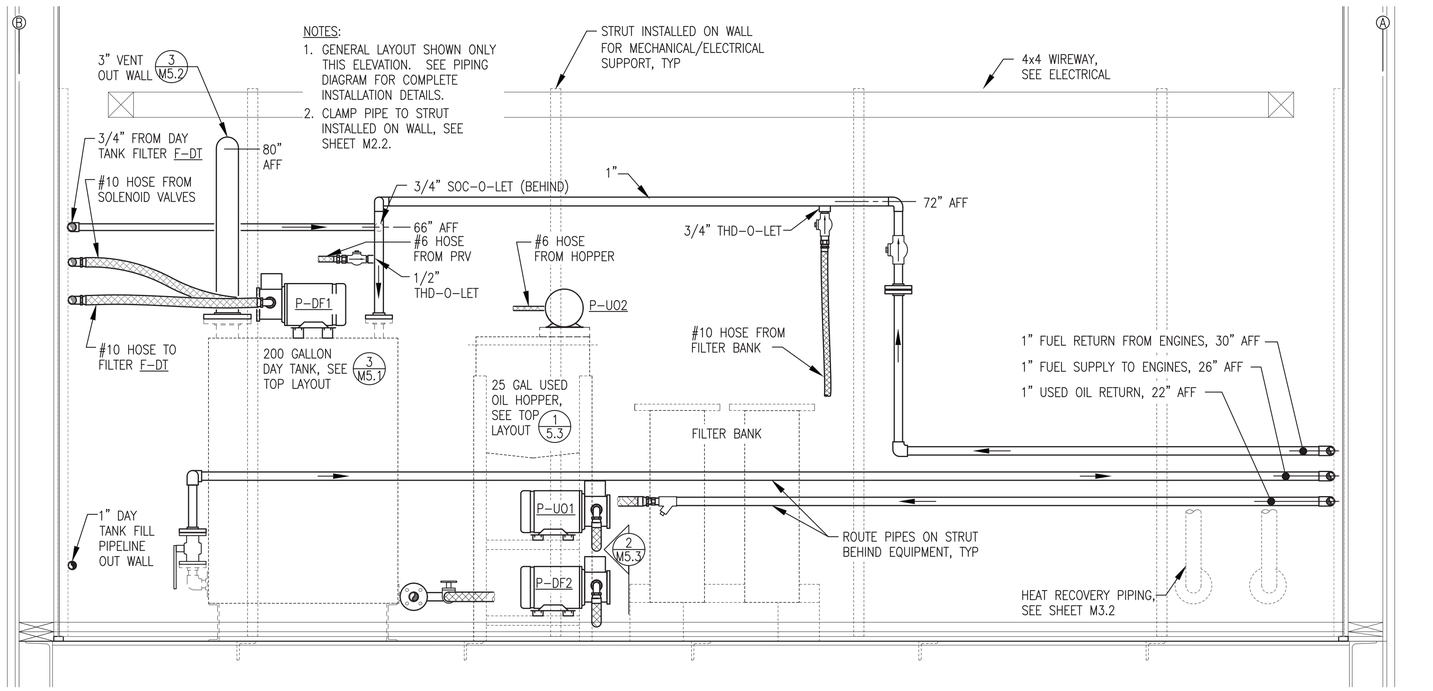
TITLE: DIESEL FUEL & USED OIL PIPING PLAN, DIAGRAM & DETAILS

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

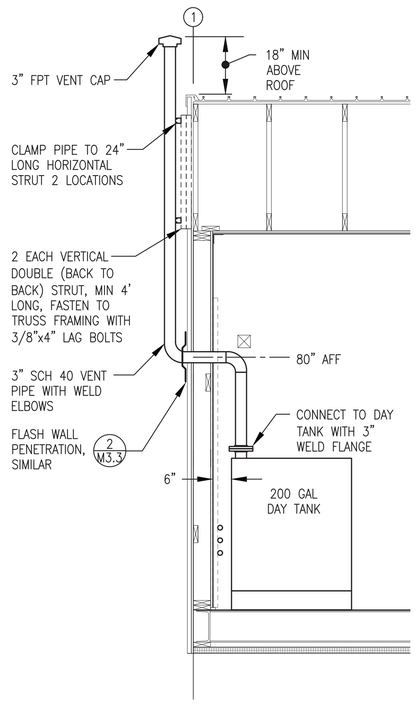
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M5.1
PROJECT NUMBER:	



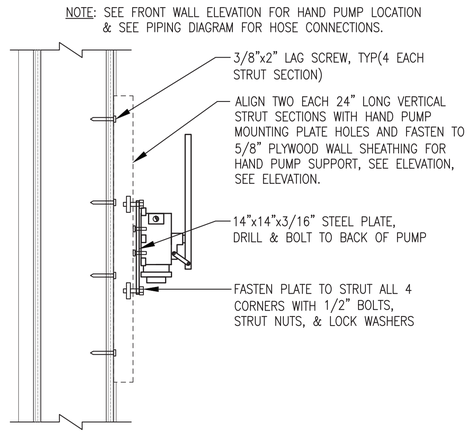
1 M5.2 DIESEL FUEL FRONT WALL ELEVATION
1"=1'



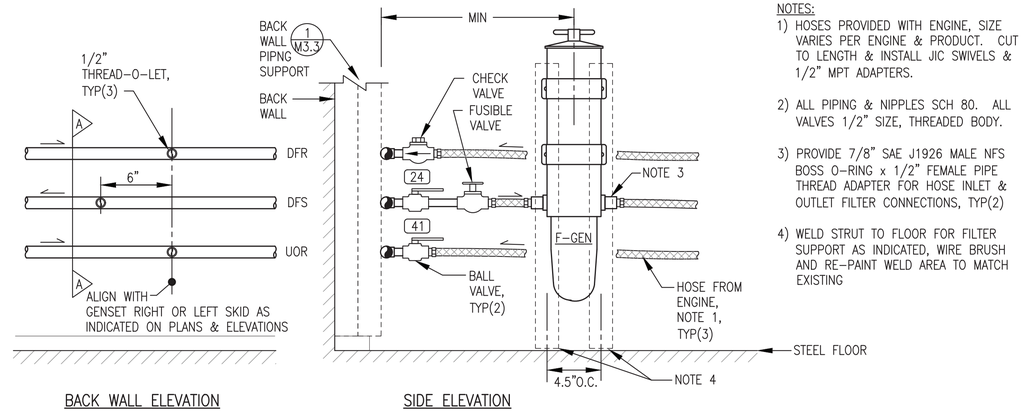
2 M5.2 DIESEL FUEL & USED OIL END WALL ELEVATION
1"=1'



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



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



NOTES:
1) HOSES PROVIDED WITH ENGINE, SIZE VARIES PER ENGINE & PRODUCT. CUT TO LENGTH & INSTALL JIC SWIVELS & 1/2" MPT ADAPTERS.
2) ALL PIPING & NIPPLES SCH 80. ALL VALVES 1/2" SIZE, THREADED BODY.
3) 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)
4) WELD STRUT TO FLOOR FOR FILTER SUPPORT AS INDICATED, WIRE BRUSH AND RE-PAINT WELD AREA TO MATCH EXISTING

5 M5.2 ENGINE FUEL PIPING CONNECTION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

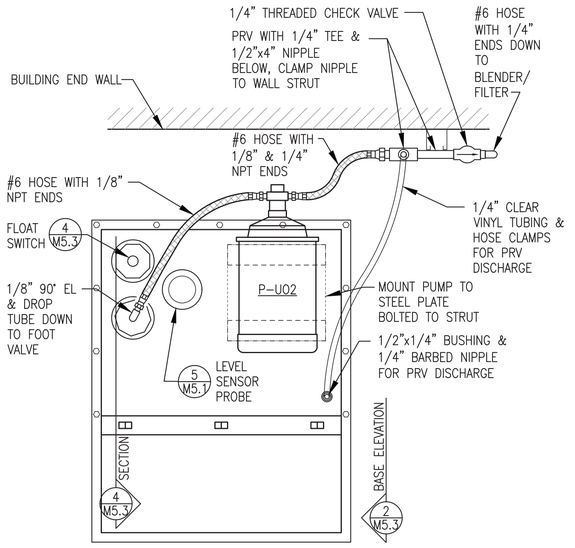
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

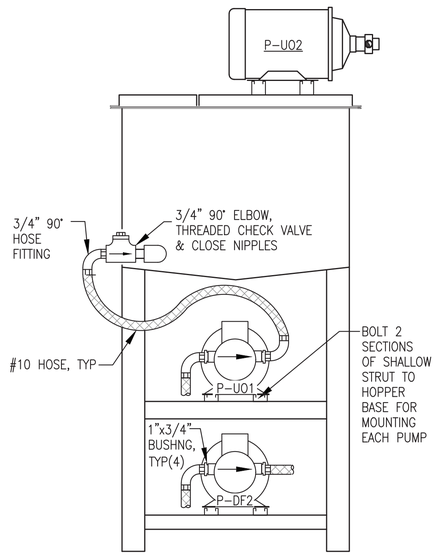
TITLE: DIESEL FUEL & USED OIL PIPING ELEVATIONS & DETAILS

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

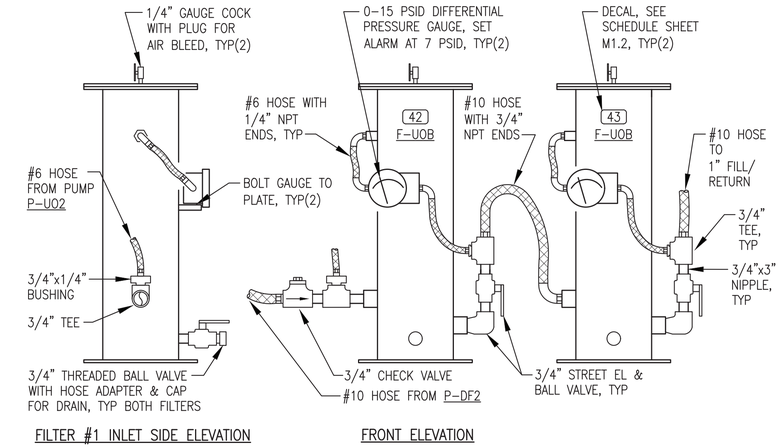
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M5.2
PROJECT NUMBER:	



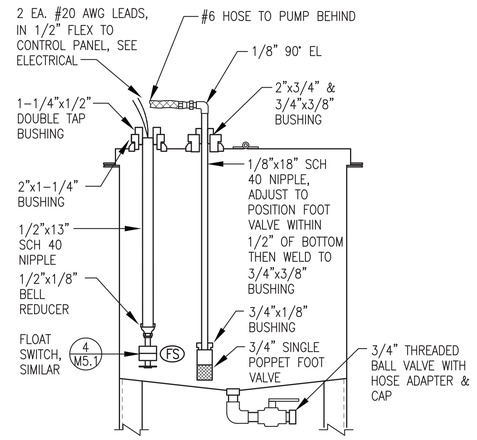
1 M5.3 TOP OF HOPPER – PLAN VIEW
NO SCALE



2 M5.3 HOPPER BASE ELEVATION
NO SCALE



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



4 M5.3 SECTION THROUGH HOPPER
NO SCALE

ISSUED FOR CONSTRUCTION
NOVEMBER
2021

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

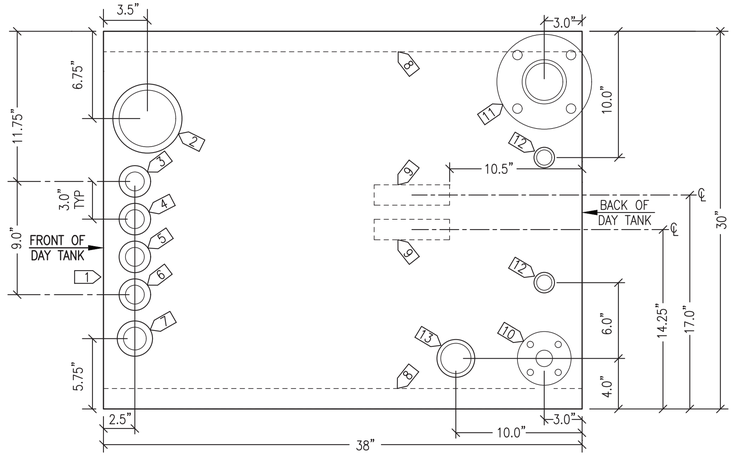
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

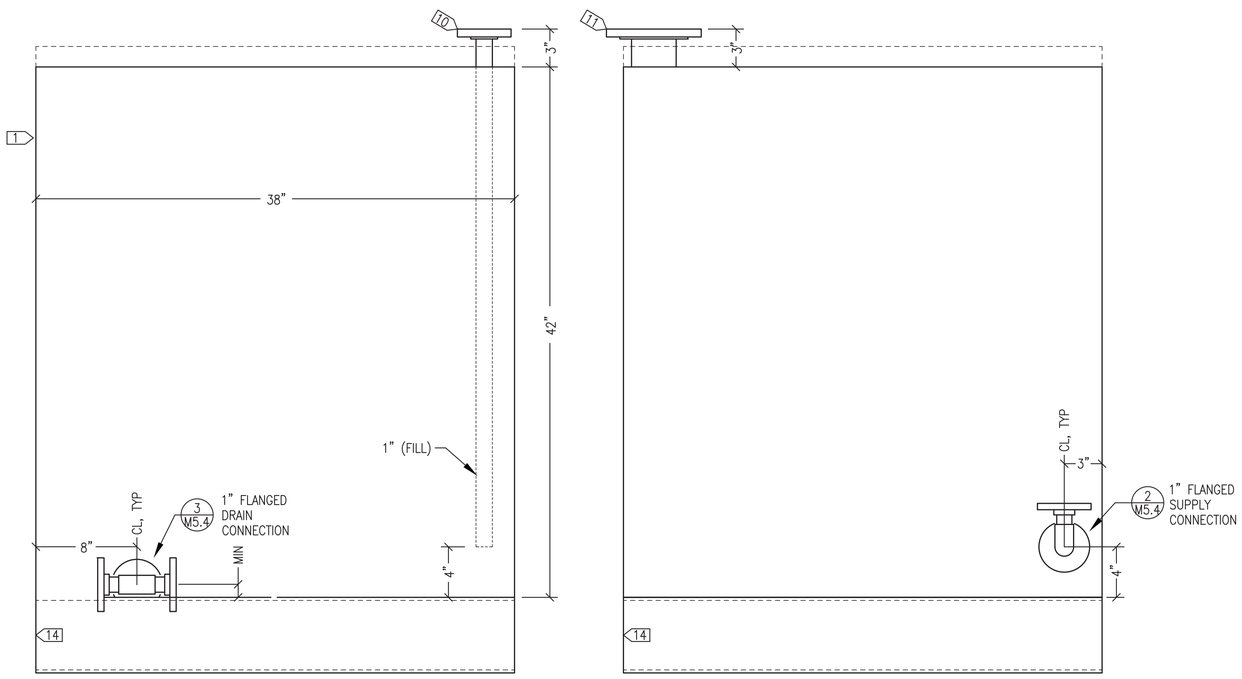
TITLE: USED OIL HOPPER & BLENDER INSTALLATION DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M5.3
PROJECT NUMBER:	



TOP VIEW



RIGHT SIDE VIEW

LEFT SIDE VIEW

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

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.

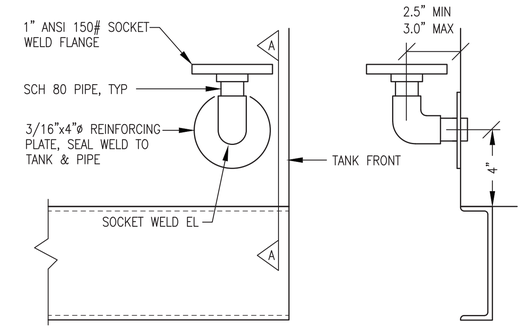
6) UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.

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:

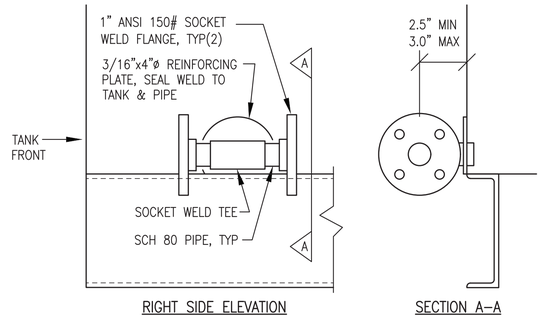
1. PROVIDE 2" HIGH LETTERING: "DIESEL FUEL 200 GALLONS"
2. 4" FPT (MANUAL FILL) - INSTALL THREADED STEEL PLUG
3. 1-1/4" FPT (OVERFILL) - INSTALL VENT CAP FOR SHIPPING
4. 1-1/4" FPT (PUMP STOP)
5. 1-1/4" FPT (PUMP START)
6. 1-1/4" FPT (LOW ALARM)
7. 1-1/2" FPT (TANK GAUGE)
8. 38"L STRUT, ENDS FLUSH WITH 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



LEFT SIDE ELEVATION

SECTION A-A

2 M5.4 1" FLANGED SUPPLY CONNECTION
NO SCALE



RIGHT SIDE ELEVATION

SECTION A-A

3 M5.4 1" FLANGED DRAIN CONNECTION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC PHONE: (907) 562-3252

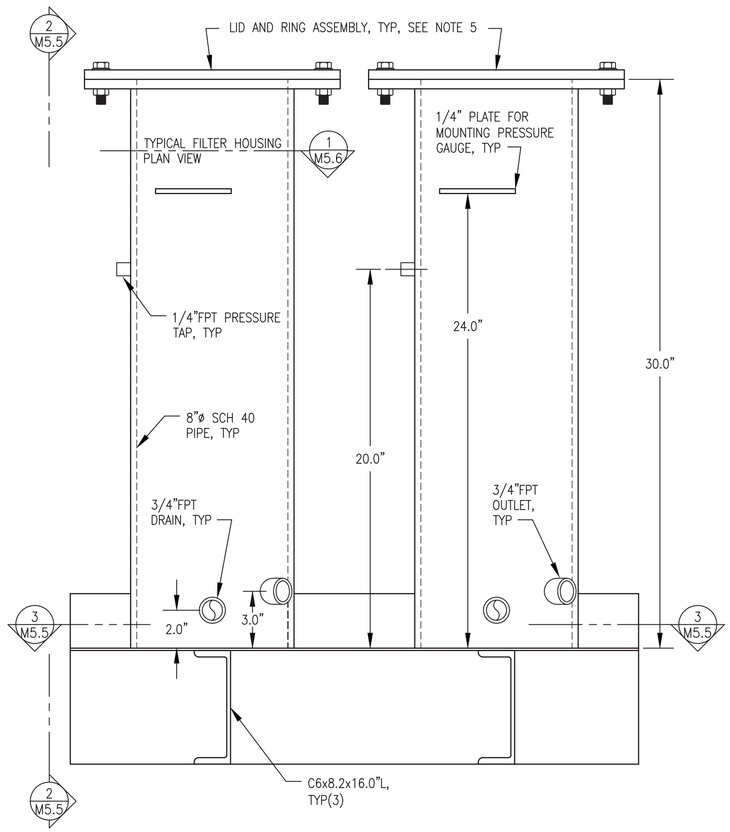
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

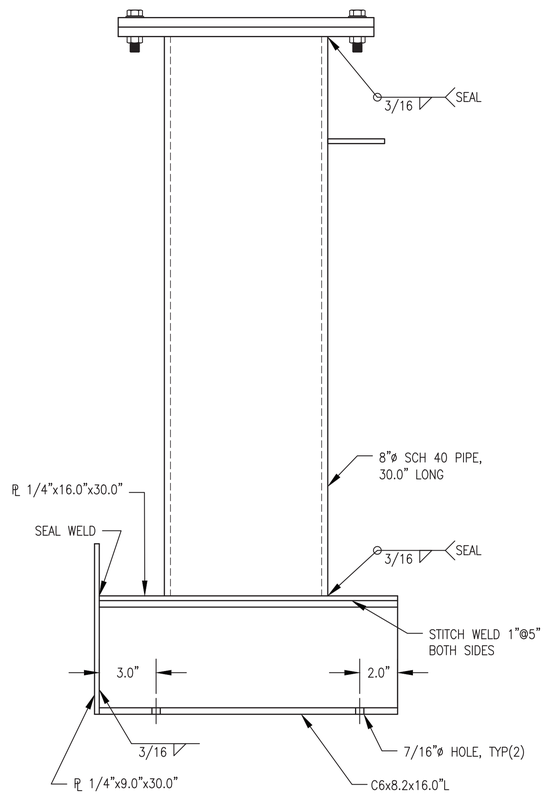
TITLE: 200 GALLON DAY TANK FABRICATION

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

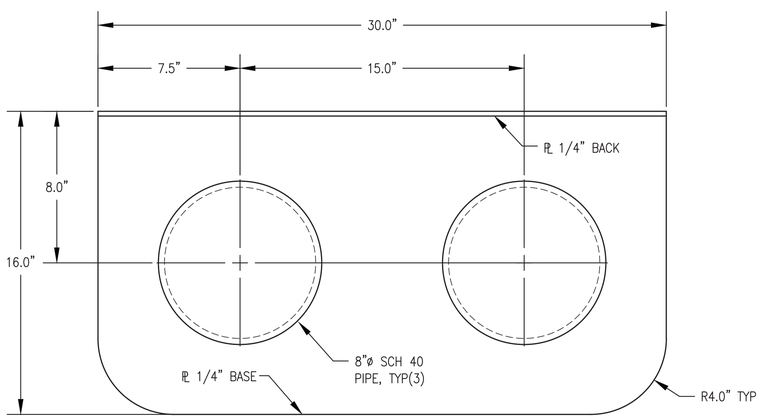
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M5.4
PROJECT NUMBER:	



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



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



3 M5.5 OIL FILTER BANK BASE PLAN
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.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

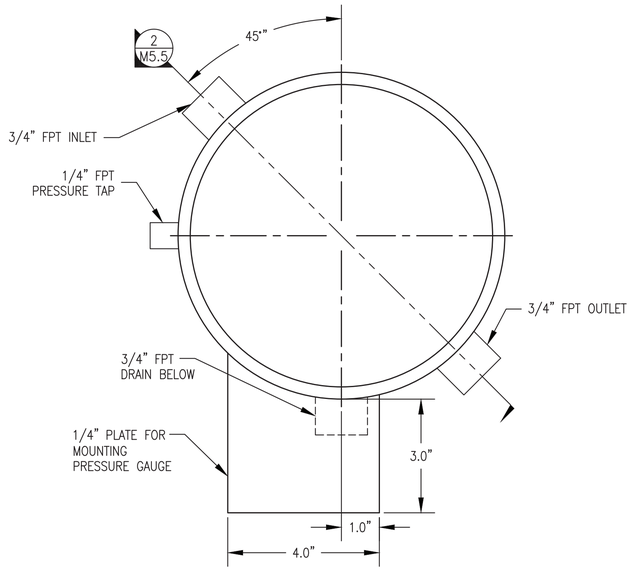
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

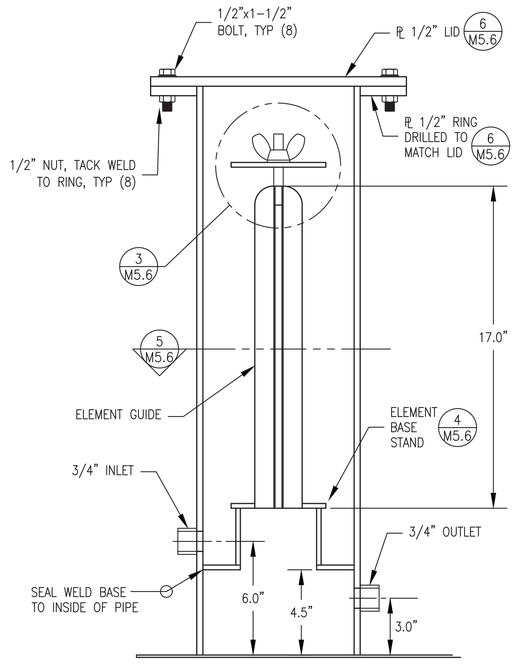
TITLE: USED OIL BLENDER
FILTER BANK LAYOUT & CONFIGURATION

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

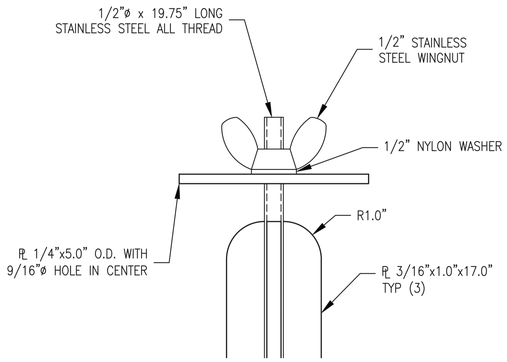
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 9/30/21
FILE NAME: VEN PP M2-M7	SHEET: M5.5
PROJECT NUMBER:	



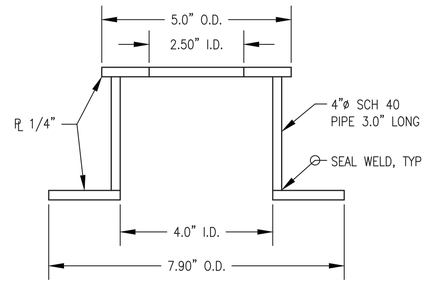
1 M5.6 TYPICAL FILTER HOUSING – PLAN VIEW
1/2" = 1"



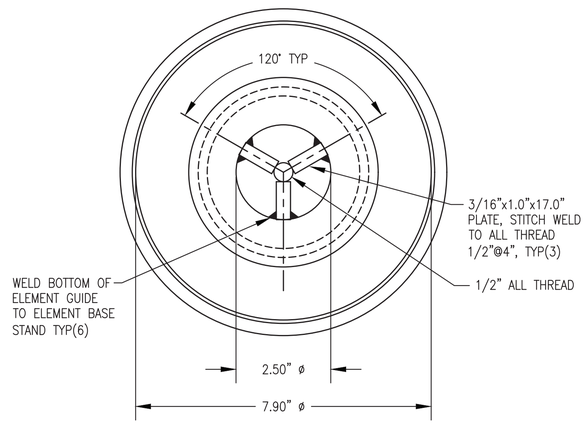
2 M5.6 TYPICAL SECTION THROUGH FILTER HOUSING
1/4" = 1"



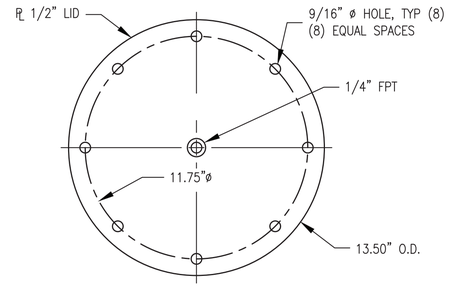
3 M5.6 ELEMENT RETAINER CAP
1/2" = 1"



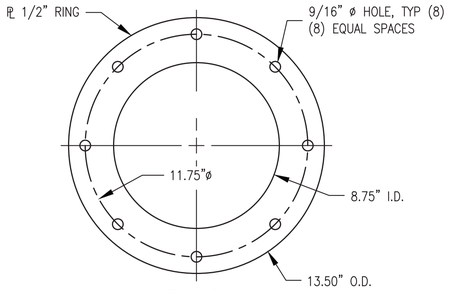
4 M5.6 ELEMENT BASE STAND
1/2" = 1"



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



LID



MATING RING

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

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

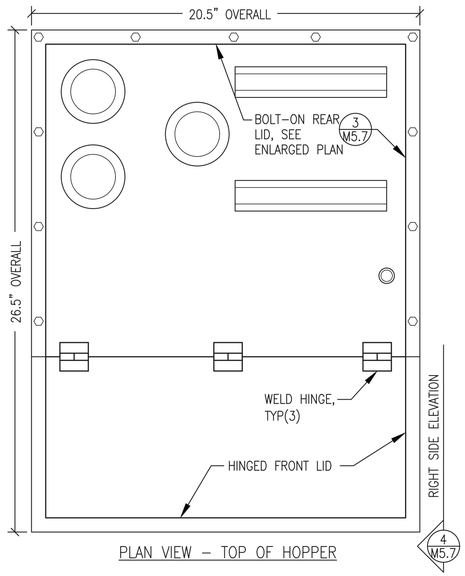
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

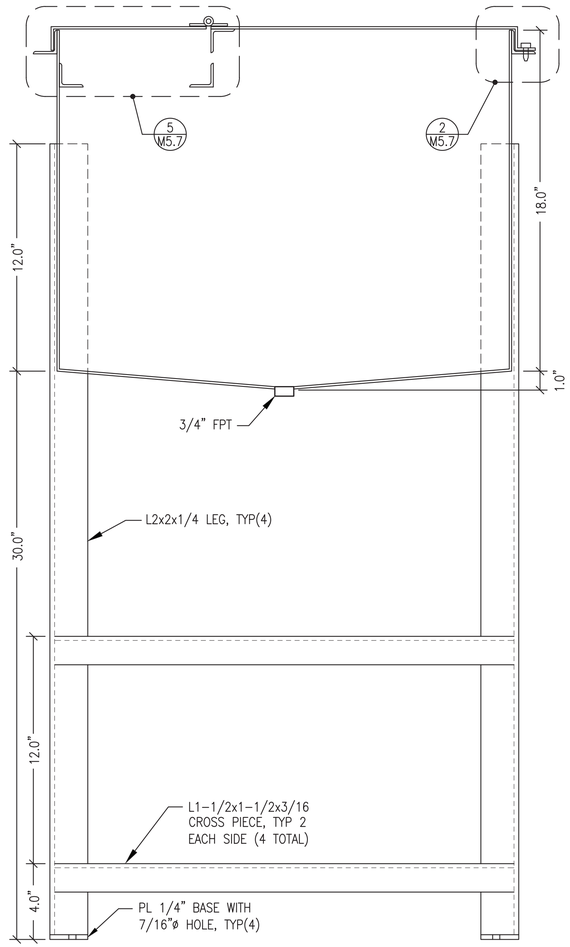
TITLE: USED OIL BLENDER
TYPICAL FILTER HOUSING DETAILS

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

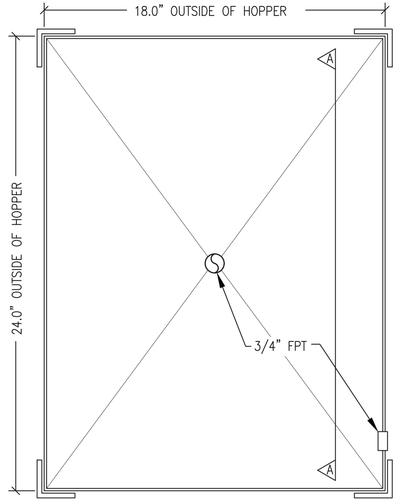
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M5.6
PROJECT NUMBER:	



PLAN VIEW – TOP OF HOPPER

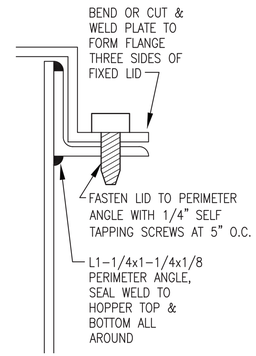


SECTION A–A

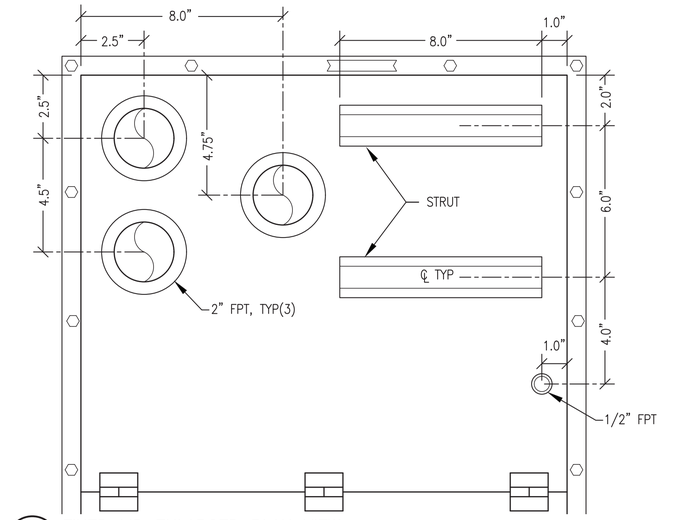


PLAN VIEW – BOTTOM OF HOPPER

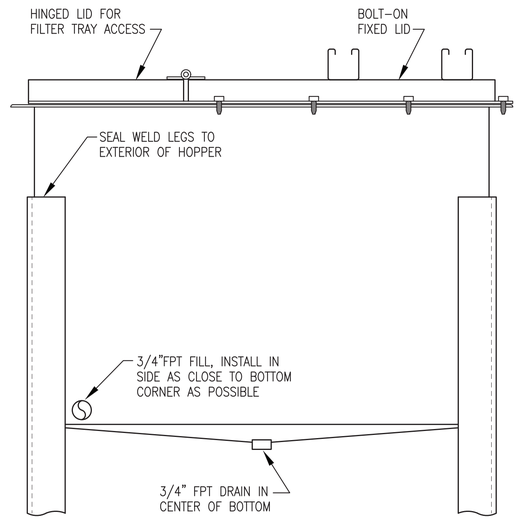
1 M5.7 HOPPER PLAN & SECTION
1/4"=1-0"



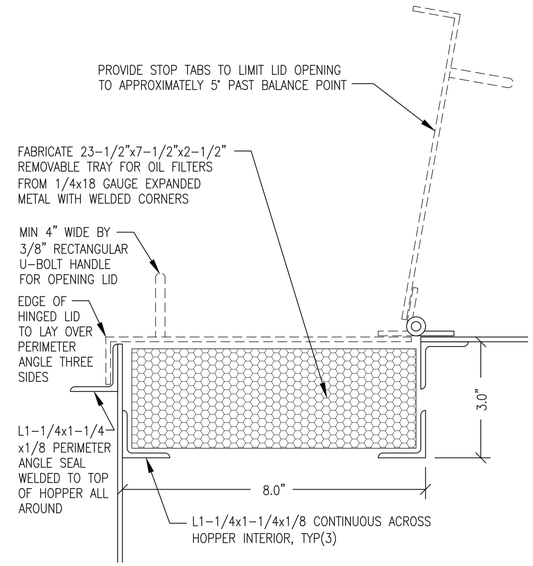
2 M5.7 FIXED LID PERIMETER ATTACHMENT
1"=1"



3 M5.7 FIXED LID ENLARGED PLAN VIEW
4"=1'-0"



4 M5.7 HOPPER RIGHT SIDE ELEVATION
1/4"=1-0"



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

FABRICATION NOTES:

1) FABRICATE SINGLE WALL 25 GALLON USABLE CAPACITY HOPPER.
2) FABRICATE FROM MINIMUM 10 GAUGE ASTM A-36 STEEL PLATE. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS. SEAL WELD ALL TANK ATTACHMENTS.
3) 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.
4) 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.
5) PRIOR TO SHIPPING, SEAL ALL FPT OPENINGS WITH PLASTIC OR STEEL PLUGS.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC PHONE: (907) 562-3252

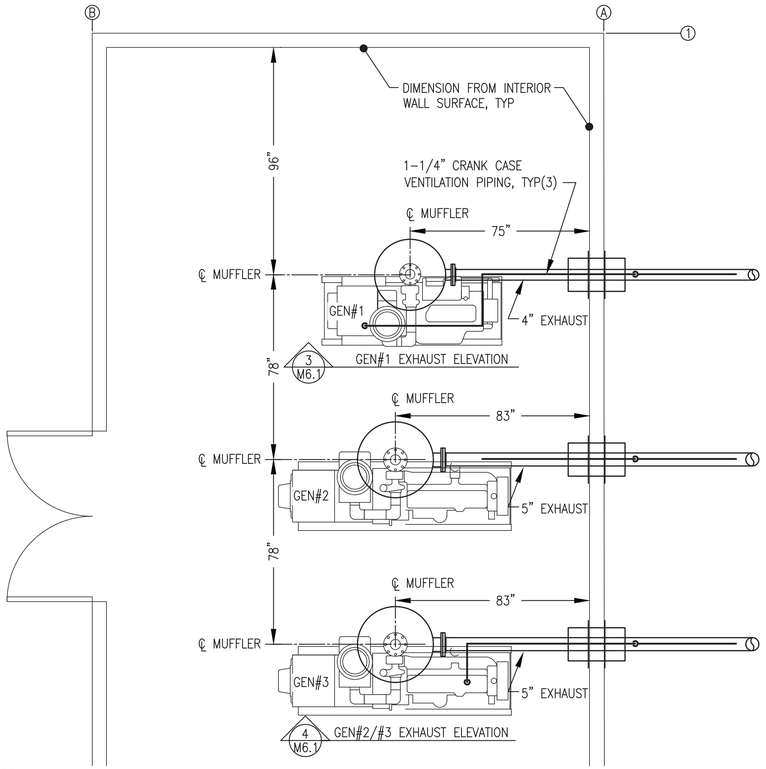
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: USED OIL BLENDER 25 GALLON HOPPER FABRICATION DETAILS

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

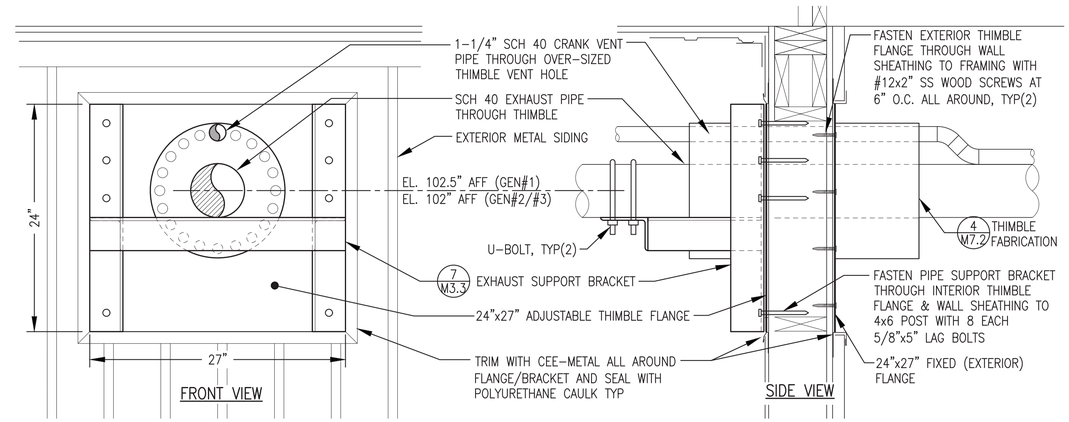
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M5.7
PROJECT NUMBER:	



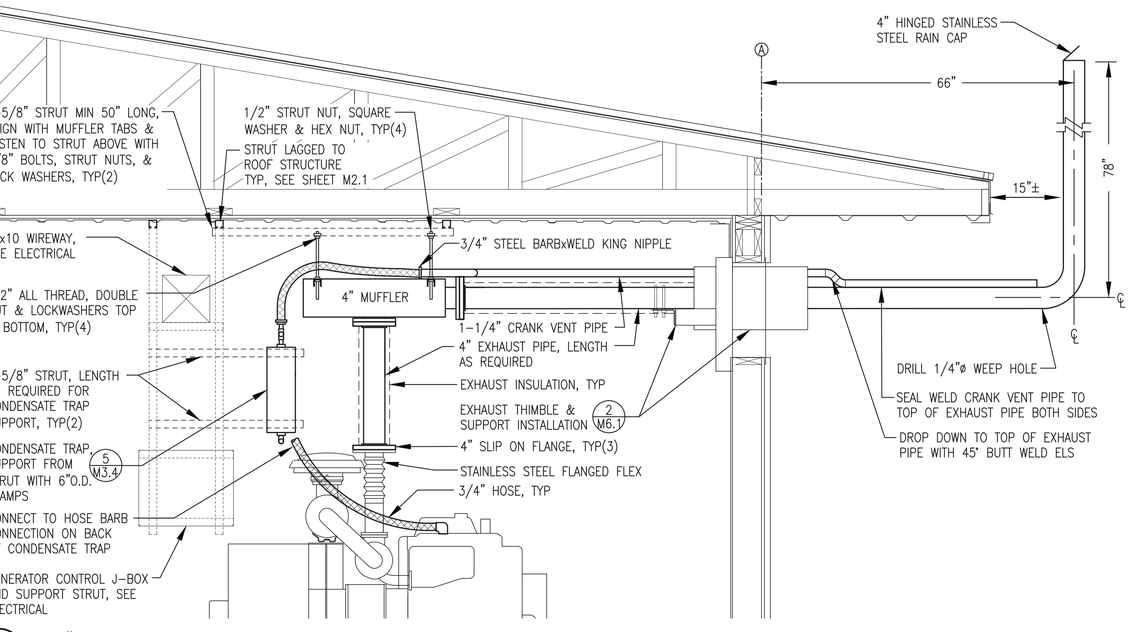
1 M6.1 MUFFLER, EXHAUST & CRANK VENT PIPE PLAN
3/8"=1'-0"

EXHAUST & CRANK VENT SYSTEM NOTES:

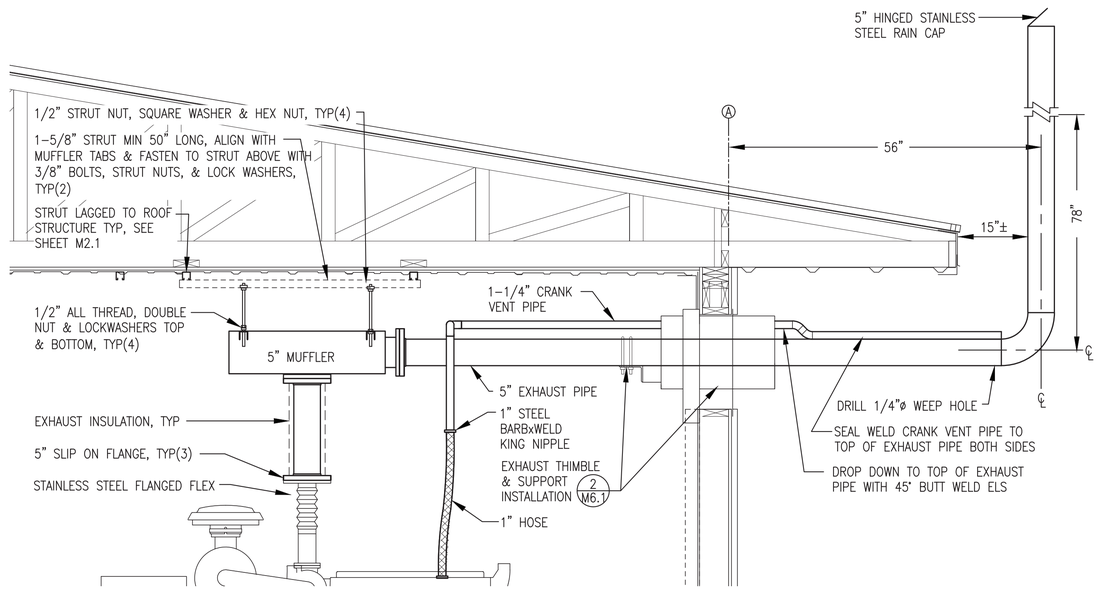
1) THE MAXIMUM EXHAUST TEMPERATURE FOR THE ENGINES IS LESS THAN 1400°F. THE EXHAUST SYSTEM LAYOUT PROVIDES MORE THAN 9" CLEARANCE TO COMBUSTIBLES IN ACCORDANCE WITH NFPA 37 8.3. PARAGRAPH 8.3.1.
2) TRIPLE WALL INSULATED/VENTILATED WALL THIMBLES SHALL BE FABRICATED AS INDICATED AND LISTED FOR ZERO CLEARANCE 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 M6.1 EXHAUST THIMBLE & PIPE SUPPORT INSTALLATION
1-1/2"=1'-0"



3 M6.1 GEN#1 MUFFLER, EXHAUST & CRANK VENT PIPE INSTALLATION
3/4"=1'-0"



4 M6.1 GEN#2/#3 MUFFLER, EXHAUST & CRANK VENT PIPE INSTALLATION
3/4"=1'-0"

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STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

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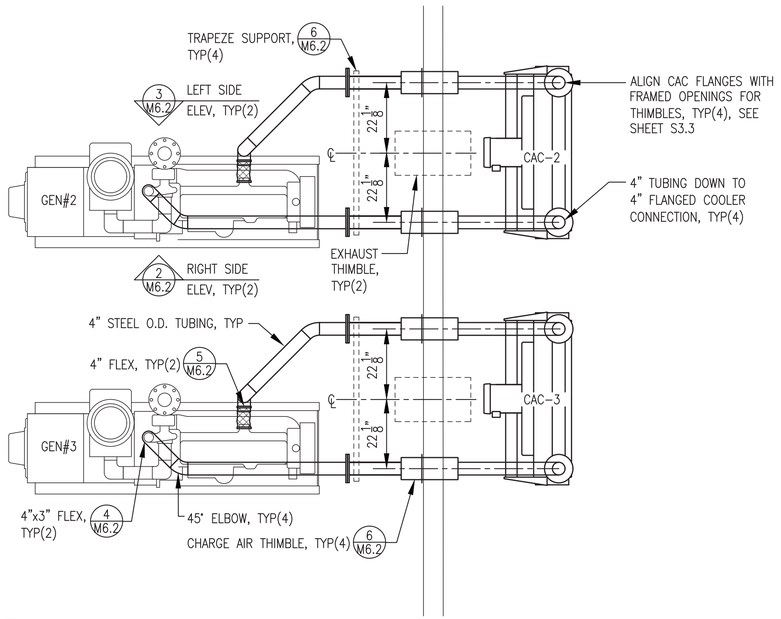
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

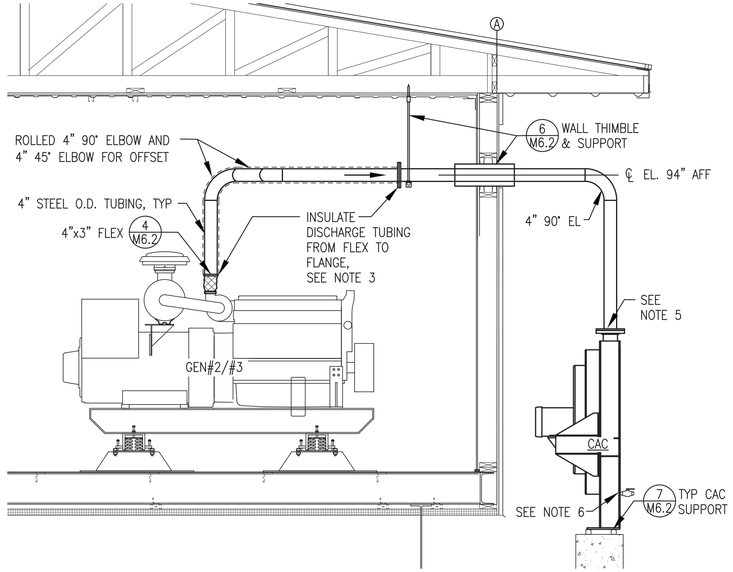
TITLE: EXHAUST & CRANK VENT PLAN & DETAILS

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

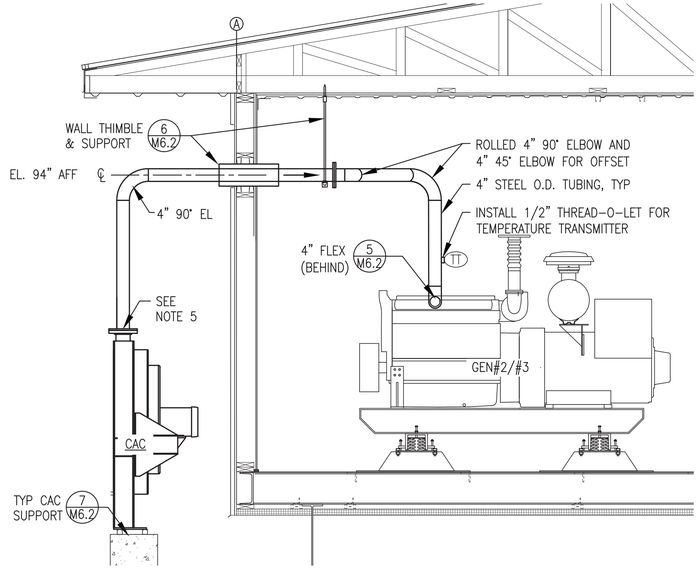
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M6.1
PROJECT NUMBER:	



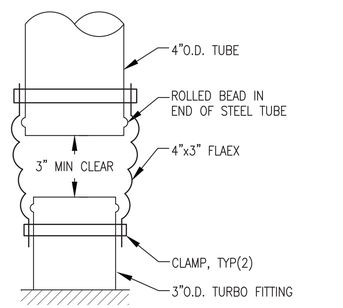
1 M6.2 CHARGE AIR PLAN
1/2"=1'-0"



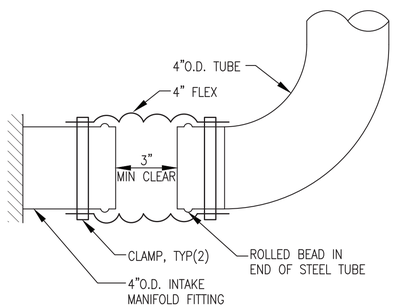
2 M6.2 TYPICAL CHARGE AIR RIGHT SIDE (DISCHARGE) ELEVATION
1/2"=1'-0"



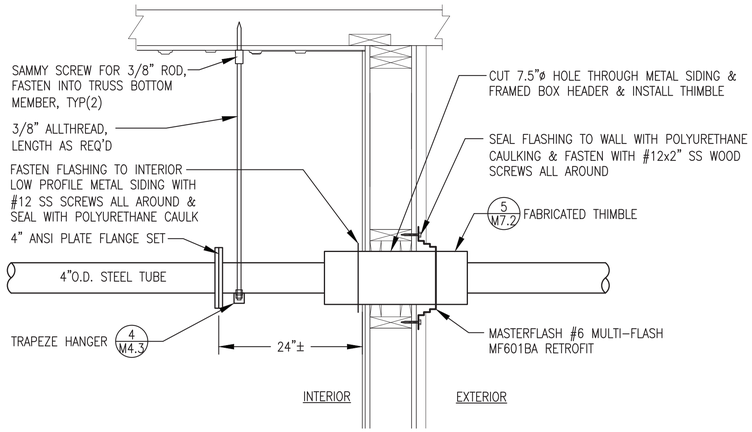
3 M6.2 TYPICAL CHARGE AIR LEFT SIDE (RETURN) ELEVATION
1/2"=1'-0"



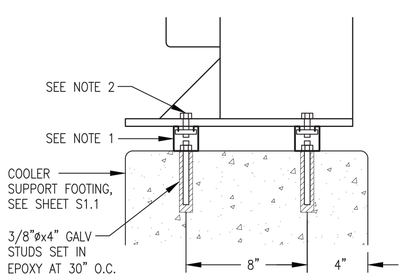
4 M6.2 TYPICAL CHARGE AIR DISCHARGE FLEX
NO SCALE



5 M6.2 TYPICAL CHARGE AIR RETURN FLEX
NO SCALE



6 M6.2 CHARGE AIR TUBING WALL ENTRANCE & TRAPEZE SUPPORT
NO SCALE



7 M4.2 COOLER BASE MOUNT DETAIL
NO SCALE

NOTES:
1. PROVIDE 2 PARALLEL RUNS OF 1-5/8" STRUT LOCATED AS INDICATED ALONG ENTIRE LENGTH OF COOLER SUPPORT FOOTING.
2. FASTEN BASE WITH 4 EACH 1/2" STRUT NUT, BOLT, & WITH LOCK WASHER.

CHARGE AIR SYSTEM GENERAL NOTES:

1) ALL TUBING TO BE LIGHT WALL CARBON STEEL O.D. TUBING. ALL ELBOWS TO BE LONG RADIUS FITTINGS TO MATCH TUBING. ALL JOINTS TO BE WELDED EXCEPT AS INDICATED.
2) INSULATE INTERIOR CHARGE AIR DISCHARGE TUBING FROM FLEX TO FLANGE WITH 3" WIDE FIBERGLASS PAD TAPE. SECURE ENDS WITH HOSE CLAMPS.
3) PAINT ALL EXPOSED TUBING AND FLANGES WITH COLD GALVANIZING COMPOUND.
4) ALL FLEX CONNECTIONS HIGH TEMPERATURE DOUBLE HUMP SILICONE TURBO SLEEVES WITH RINGS. ON RETURN CONNECTIONS USE 4"I.D. x 6" LONG, FLEXFAB 7723 OR EQUAL. ON DISCHARGE CONNECTIONS USE 4"I.D. x 3"I.D x 6" LONG, FLEXFAB 7766 OR EQUAL. FASTEN WITH LINED STAINLESS STEEL T-BOLT CLAMPS, IDEAL 30051 OR EQUAL.
5) MAKE COOLER CONNECTIONS WITH O.D. TUBE BY ANSI 125# STEEL PLATE FLANGES, G.T. EXHAUST PART #41 OR EQUAL. INSTALL HIGH TEMPERATURE FULL FACE GASKETS.
6) INSTALL 3/4" THREADED BALL VALVE AND PLUG FOR TANK DRAIN, 2 PER COOLER.

ISSUED FOR CONSTRUCTION
NOVEMBER 2021

STATE OF ALASKA 49TH
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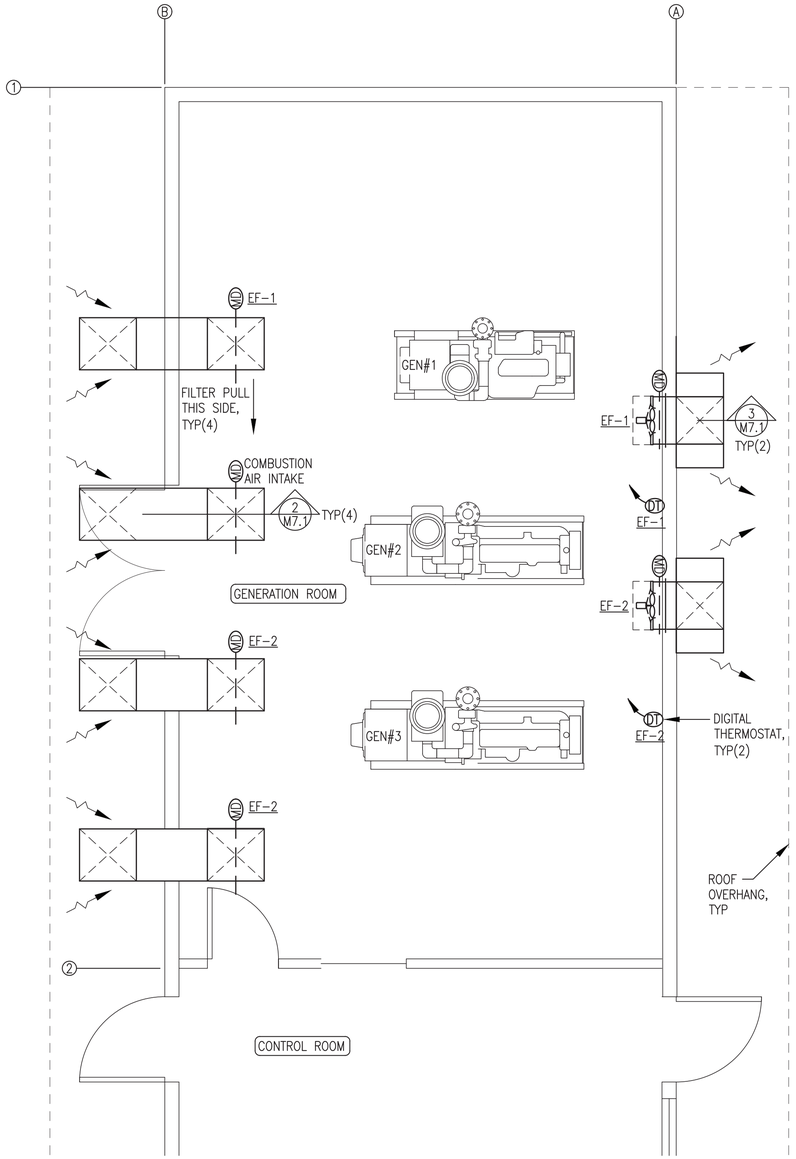
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

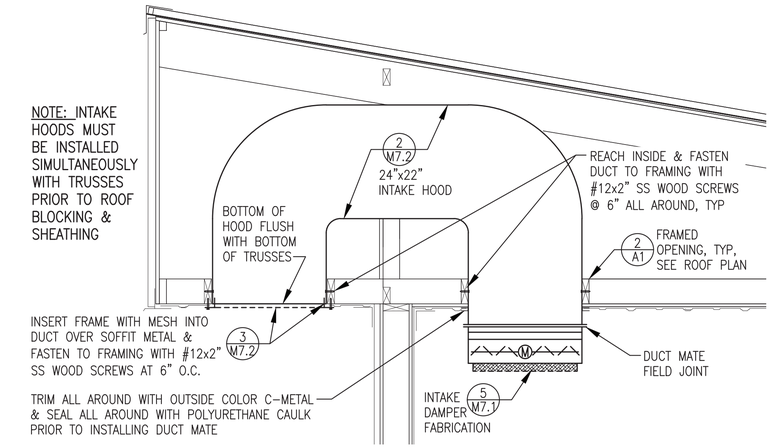
TITLE: CHARGE AIR PLAN & DETAILS

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

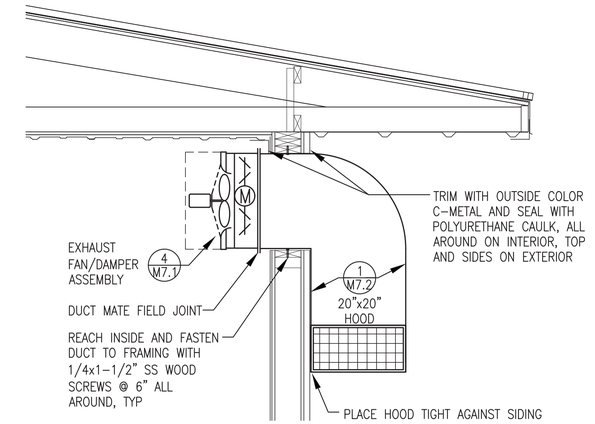
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M2-M7	SHEET: M6.2
PROJECT NUMBER:	



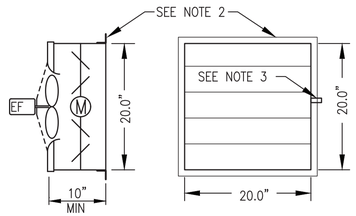
1 M7.1 VENTILATION PLAN
3/8"=1'-0"



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



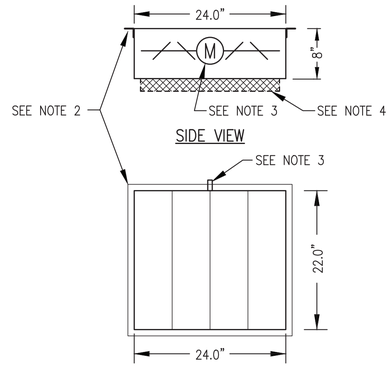
3 M7.1 EXHAUST FAN & HOOD INSTALLATION
3/4"=1'-0"



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 EXHAUST FAN ASSEMBLY FABRICATION
1"=1'-0"



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 INTAKE AIR DAMPER ASSEMBLY FABRICATION
1"=1'-0"

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ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: VENTILATION PLAN & DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
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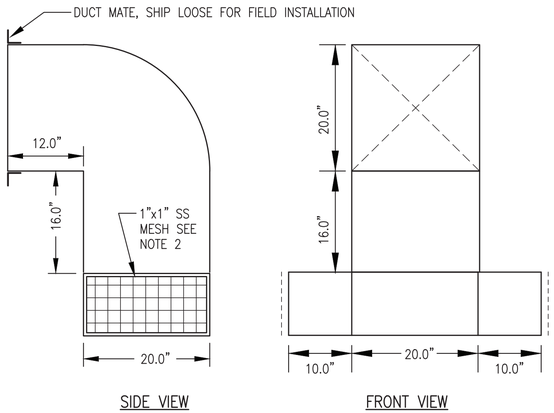
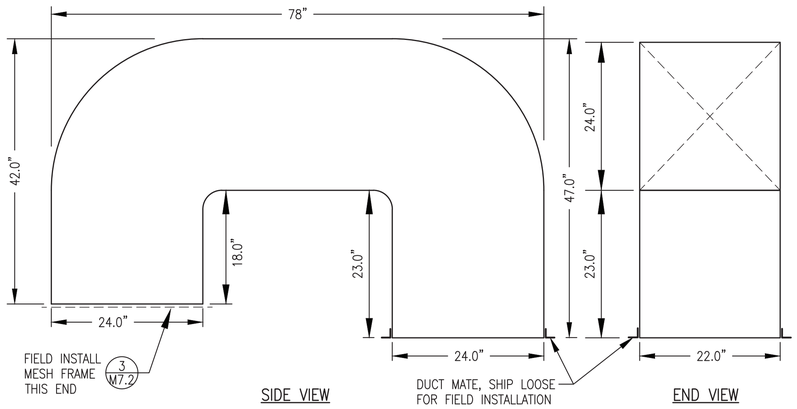


NOTES:

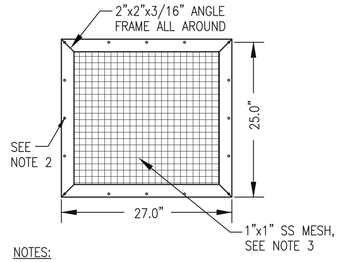
1. FABRICATE TWO IDENTICAL HOODS FROM 0.090" THICK TYPE 5052 ALUMINUM WITH ALL WELDED SEAMS.
2. PROVIDE 1" FRAME ALL AROUND BOTTOM OF HOOD. INSTALL 1"x1" STAINLESS STEEL WIRE MESH IN HEMMED STAINLESS STEEL FRAME AND FASTEN TO HOOD WITH STAINLESS STEEL SCREWS ALL AROUND.

1 M7.2 EXHAUST HOOD FABRICATION
1"=1'-0"



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.

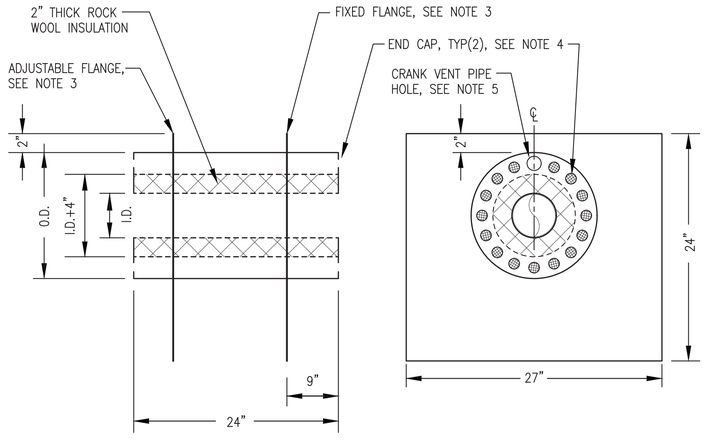
2 M7.2 INTAKE HOOD FABRICATION
1"=1'-0"



NOTES:

1. FABRICATE FOUR IDENTICAL AIR INTAKE MESH FRAMES.
2. 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.
3. INSTALL 1"x1" STAINLESS STEEL WIRE MESH IN HEMMED STAINLESS STEEL FRAME AND FASTEN TO ANGLE FRAME WITH STAINLESS STEEL SCREWS ALL AROUND.

3 M7.2 INTAKE HOOD MESH FRAME
1"=1'-0"



NOTES:

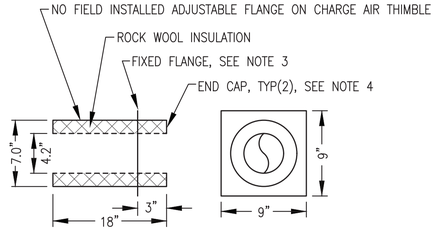
1. FABRICATE 1 EACH THIMBLE FOR 4" NOMINAL PIPE SIZE AND 2 EACH THIMBLES FOR 5" NOMINAL PIPE SIZE. SEE CHART FOR DIMENSIONS.
2. FABRICATE ENTIRE ASSEMBLY FROM MINIMUM 16 GAUGE TYPE 304 STAINLESS STEEL WITH ALL JOINTS SEAL WELDED.
3. FABRICATE TWO IDENTICAL SQUARE FLANGES. SEAL WELD FIXED FLANGE TO OUTER SHELL. ADJUSTABLE FLANGE TO SHIP LOOSE FOR FIELD INSTALLATION.
4. SEAL WELD END CAPS TO INNER AND OUTER SHELLS. PROVIDE 1"ø VENT HOLES INTO UNINSULATED SPACE BOTH ENDS, QUANTITY AS INDICATED, EQUALLY SPACED. ON EXTERIOR (FIXED FLANGE) END INSTALL 1/8" STAINLESS STEEL BUG SCREEN.
5. AT TOP-CENTER LOCATION EACH END PROVIDE 1.7"ø 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 M7.2 EXHAUST PIPE THIMBLE FABRICATION
NO SCALE

NOTES:

1) FABRICATE 4 IDENTICAL CHARGE AIR THIMBLES.
2) FABRICATE ENTIRE ASSEMBLY FROM MINIMUM 16 GAUGE TYPE 304 STAINLESS STEEL WITH ALL JOINTS SEAL WELDED.
3) FABRICATE ONE SQUARE FLANGE & SEAL WELD TO OUTER SHELL.
4) SEAL WELD END CAPS TO INNER AND OUTER SHELLS.



5 M7.2 CHARGE AIR TUBING THIMBLE FABRICATION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

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ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: SHEET METAL FABRICATION DETAILS

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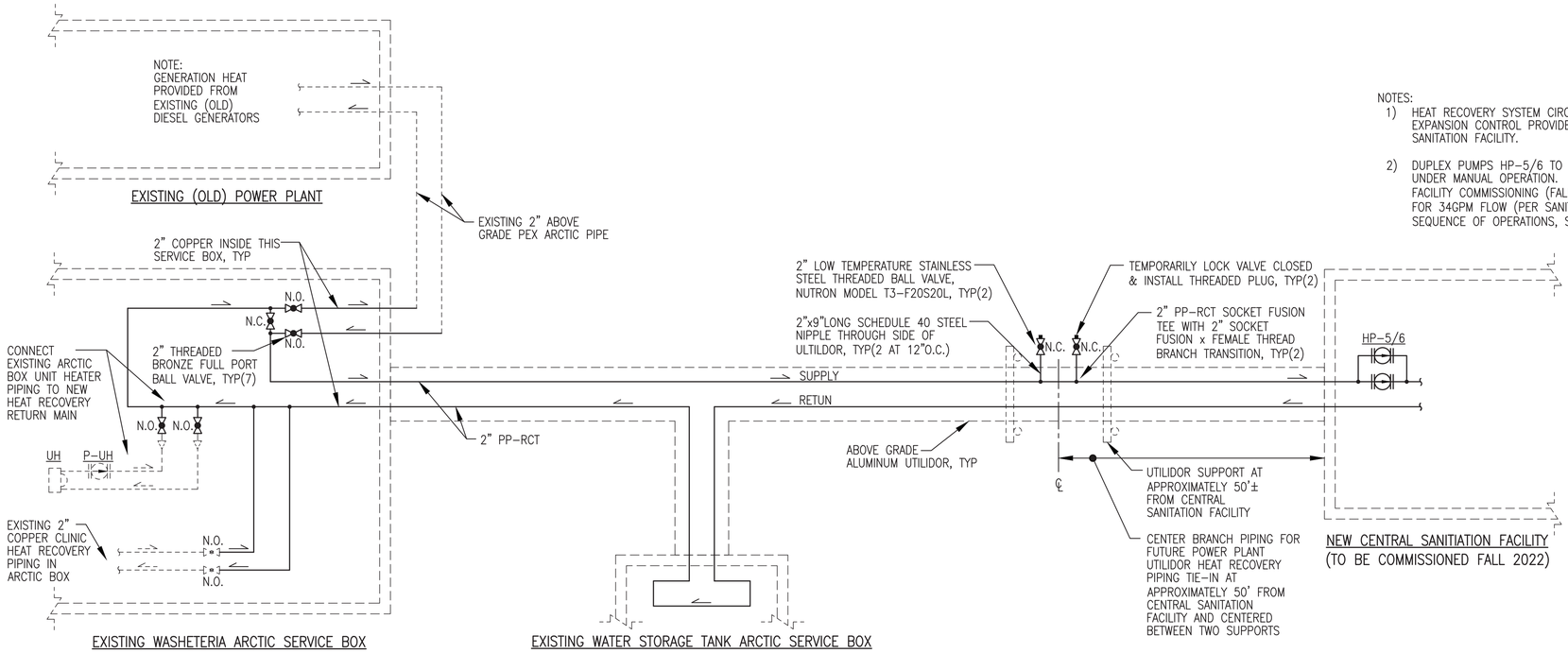
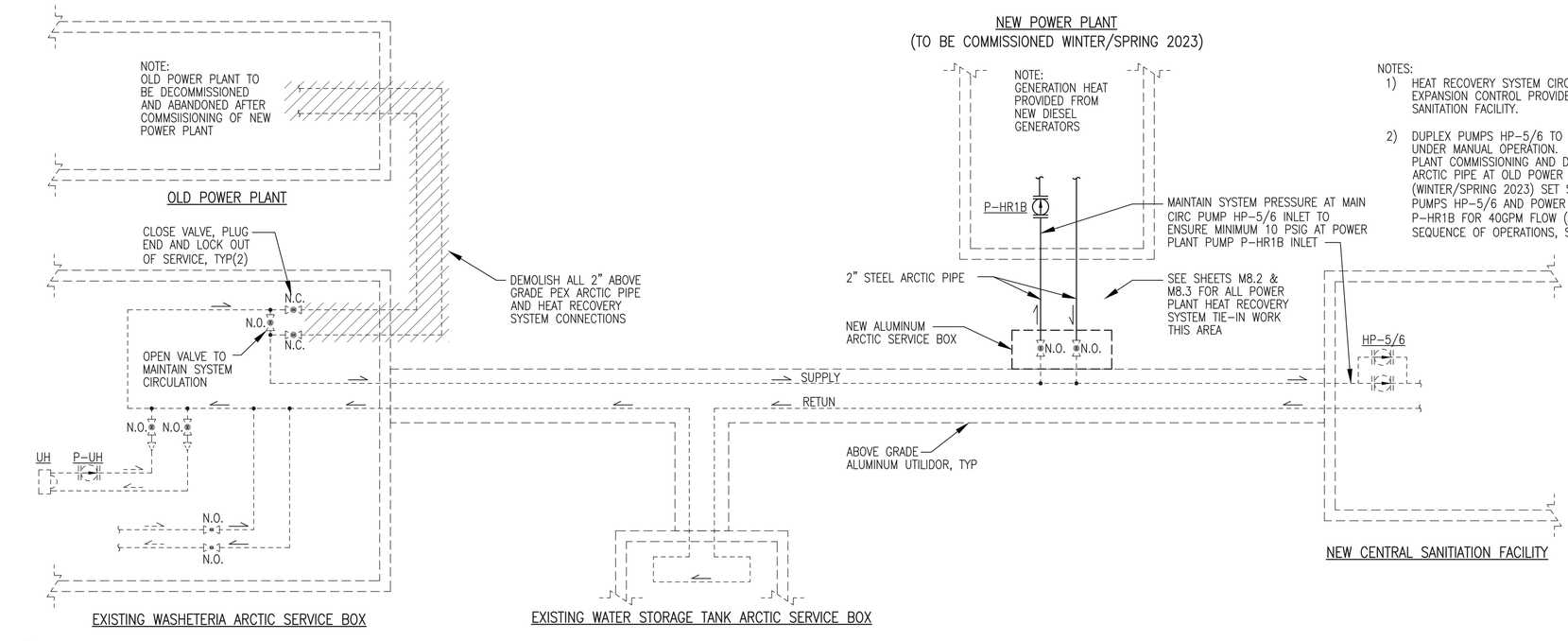
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 11/1/21
FILE NAME: VEN PP M2-M7 | SHEET: M7.2
PROJECT NUMBER:



1 M8.1 FALL 2022 HEAT RECOVERY SYSTEM SCHEMATIC
2"=1'-0"



2 M8.1 WINTER/SPRING 2023 HEAT RECOVERY SYSTEM SCHEMATIC
2"=1'-0"

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STATE OF ALASKA 49TH
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ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: FALL 2022 & WINTER/SPRING 2023 HEAT RECOVERY SYSTEM SCHEMATICS

Gray Stassel Engineering, Inc.
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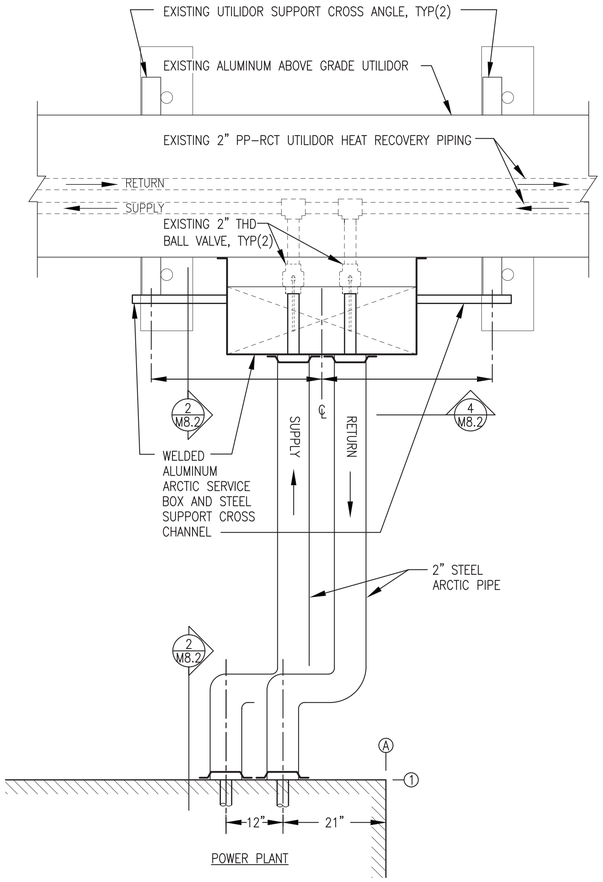
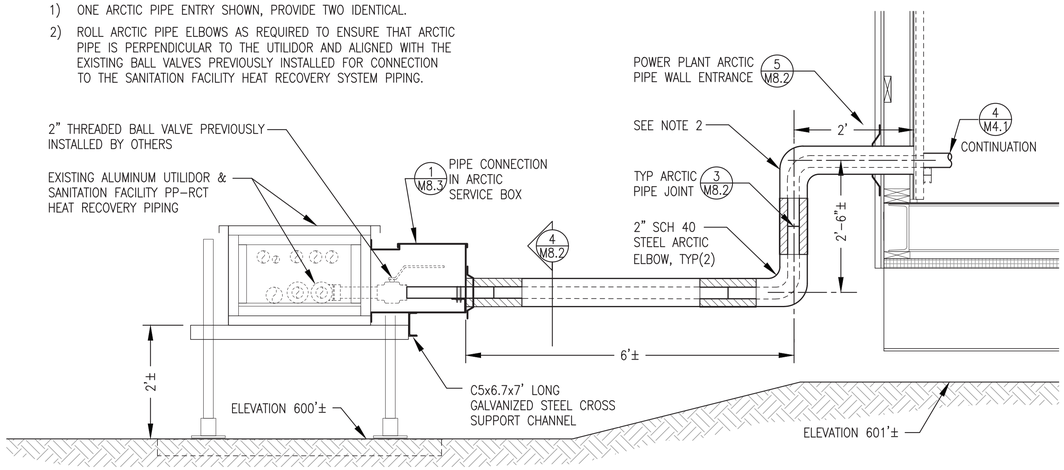
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M8	SHEET: M8.1
PROJECT NUMBER:	



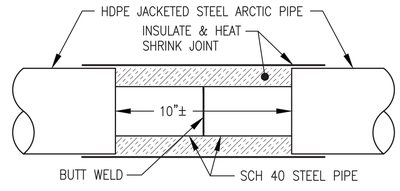
1 M8.2 HEAT RECOVERY SYSTEM PIPING CONNECTION PLAN
3/4"=1'-0"

NOTES:

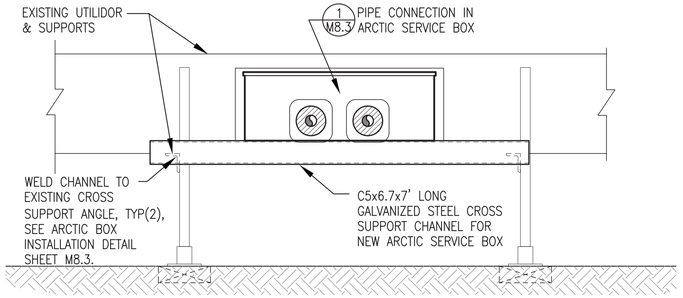
1) ONE ARCTIC PIPE ENTRY SHOWN, PROVIDE TWO IDENTICAL.
2) ROLL ARCTIC PIPE ELBOWS AS REQUIRED TO ENSURE THAT ARCTIC PIPE IS PERPENDICULAR TO THE UTILIDOR AND ALIGNED WITH THE EXISTING BALL VALVES PREVIOUSLY INSTALLED FOR CONNECTION TO THE SANITATION FACILITY HEAT RECOVERY SYSTEM PIPING.



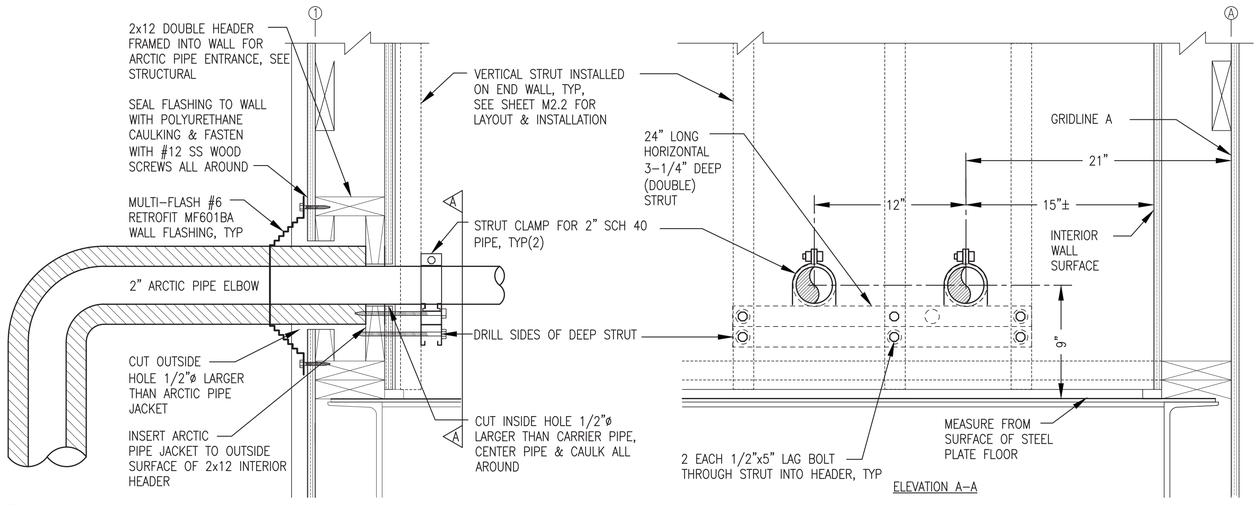
2 M8.2 HEAT RECOVERY SYSTEM PIPING CONNECTION SECTION
3/4"=1'-0"



3 M8.2 TYPICAL ARCTIC PIPE JOINT
NO SCALE



4 M8.2 HEAT RECOVERY SYSTEM PIPING CONNECTION FRONT ELEVATION
3/4"=1'-0"



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

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
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ALASKA ENERGY AUTHORITY

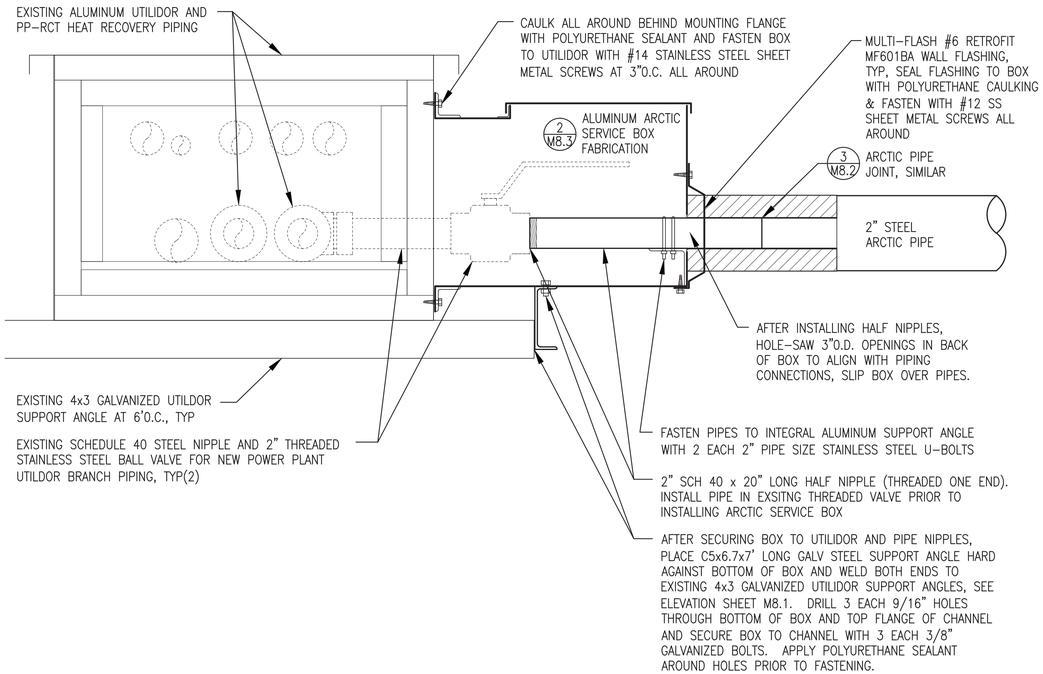
PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: POWER PLANT HEAT RECOVERY SYSTEM PLAN & DETAILS

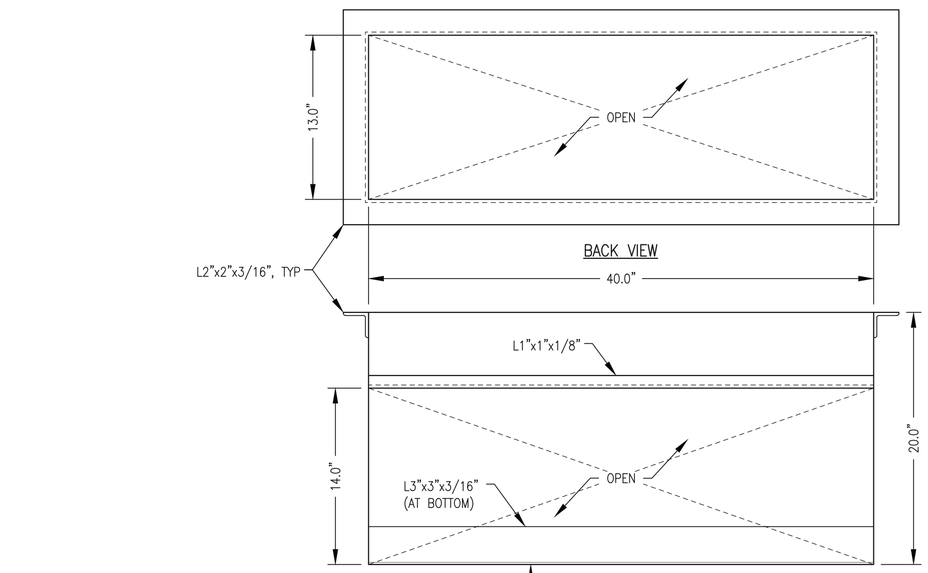
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M8	SHEET: M8.2
PROJECT NUMBER:	

NOTES:
1. ONE ARCTIC PIPE ENTRY SHOWN, PROVIDE TWO IDENTICAL.
2. FILL ARCTIC ENTRY BOX WITH FIBERGLASS BATT INSULATION AFTER COMPLETION OF INSTALLATION, PRESSURE TESTING AND COMMISSIONING SYSTEM.



1 M8.3 TYPICAL HEAT RECOVERY CONNECTION AND ARCTIC SERVICE BOX INSTALLATION
2"=1'–0"



NOTES:
1. FABRICATE FROM 3/16" 5086–H116 ALUMINUM PLATE & 6061–T6 ALUMINUM SHAPES AS INDICATED.

2 M8.3 ALUMINUM ARCTIC SERVICE BOX FABRICATION
2"=1'–0"

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562–3252

ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: POWER PLANT HEAT RECOVERY SYSTEM CONNECTION DETAILS

Gray Stassel Engineering, Inc.
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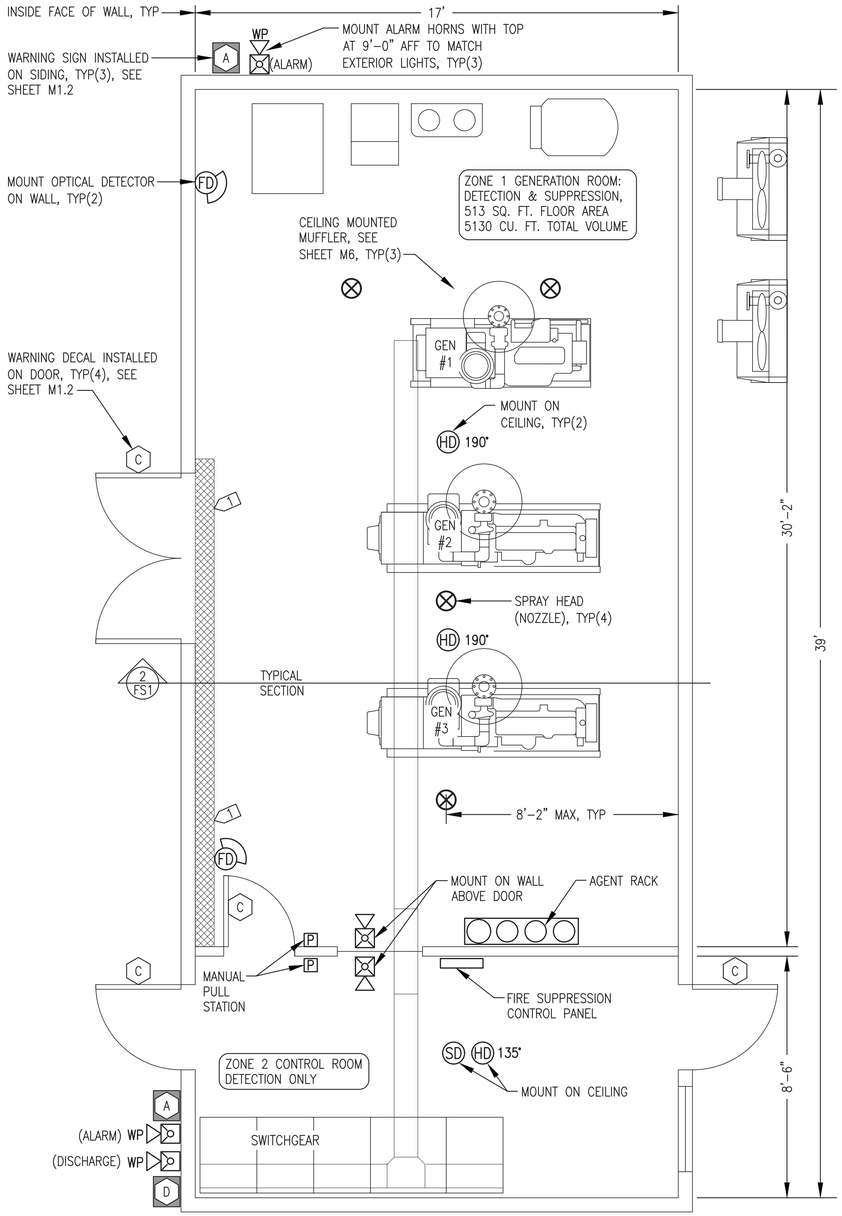
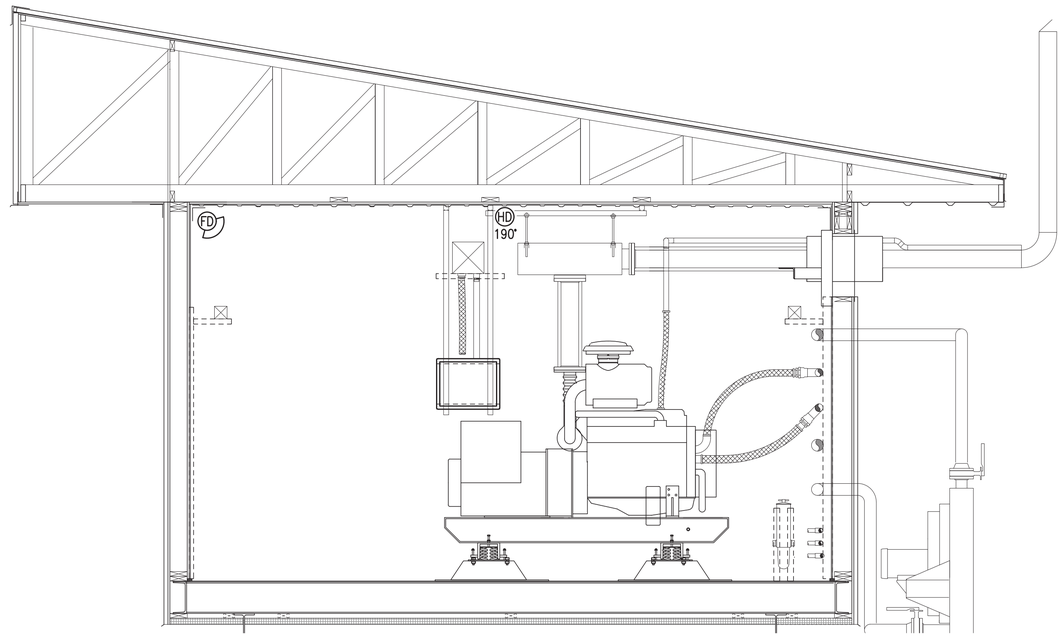
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 11/1/21
FILE NAME: VEN PP M8	SHEET: M8.3
PROJECT NUMBER:	



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



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

FIRE SUPPRESSION SYMBOL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
HD 135°	NORMAL TEMP. (135°F) DETECTOR	P	MANUAL PULL STATION
HD 190°	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.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
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ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: FIRE SUPPRESSION SYSTEM PLAN, SECTION, LEGEND, & NOTES

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

DRAWN BY: BCG | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 11/1/21
FILE NAME: VEN FS1 | SHEET: FS1 OF
PROJECT NUMBER:

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	WHEELOCK 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, 5000'K 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-I
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 GIGBIT 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 (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 OMINI	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
TT	TEMPERATURE TRANSMITTER	FS	DAY TANK/HOPPER FLOAT SWITCH
PT	PRESSURE TRANSMITTER	GLS	GLYCOL TANK LEVEL SENSOR PROBE
FM	HEAT RECOVERY FLOW METER	TLM	TANK LEVEL MONITOR PANEL
LCA	GLYCOL TANK LOW COOLANT ALARM	LSP	FUEL/OIL TANK LEVEL SENSOR PROBE

ISSUED FOR CONSTRUCTION
NOVEMBER 2021

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

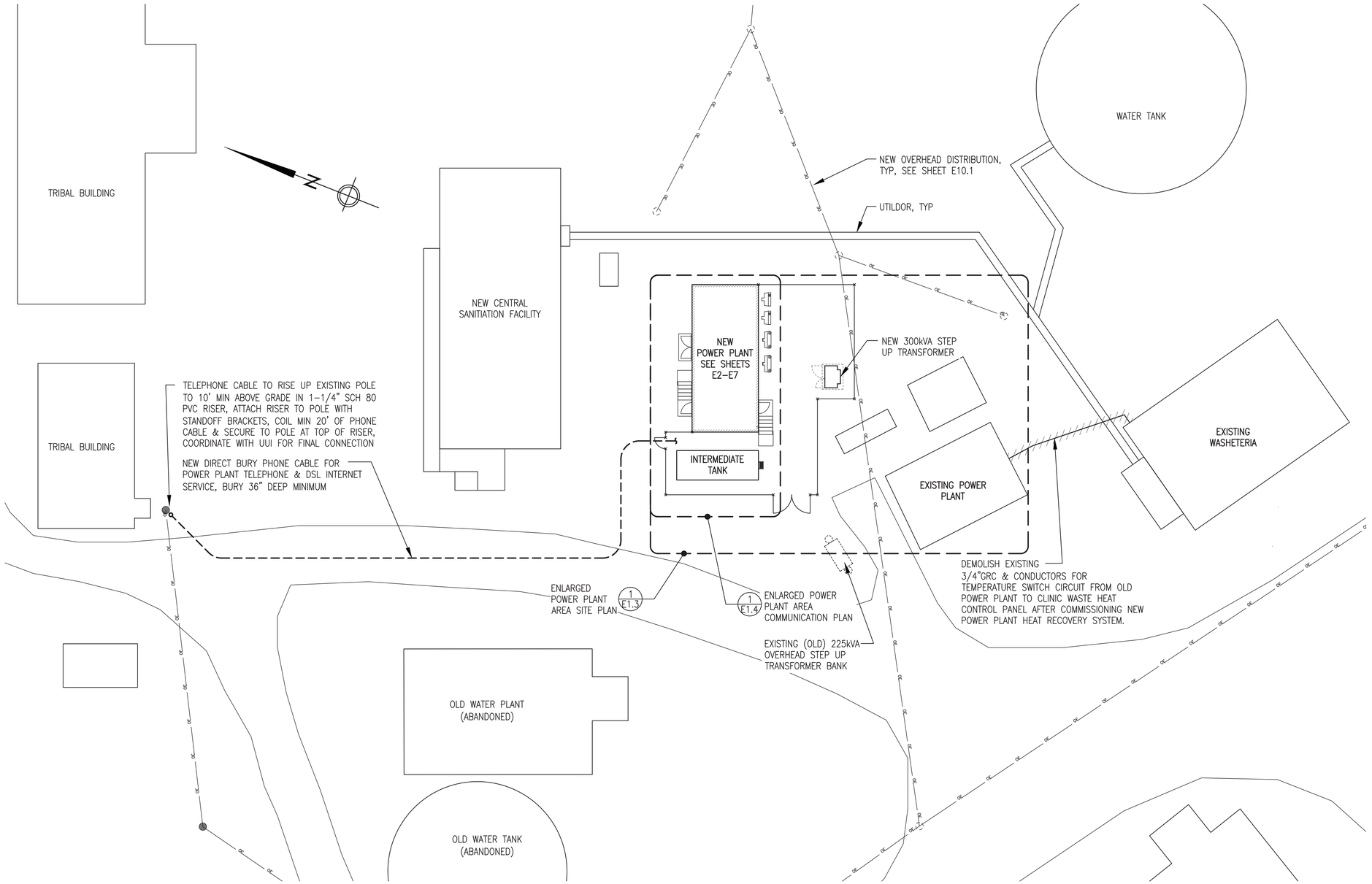
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: ELECTRICAL LEGENDS & SCHEDULES

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

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: VEN PP E1
PROJECT NUMBER:
SCALE: NO SCALE
DATE: 11/1/21
SHEET: E1.1



1 E1.2 OVERALL PROJECT AREA PLAN
1"=15'

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
CLOIS W. VERSYP EE 7802
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
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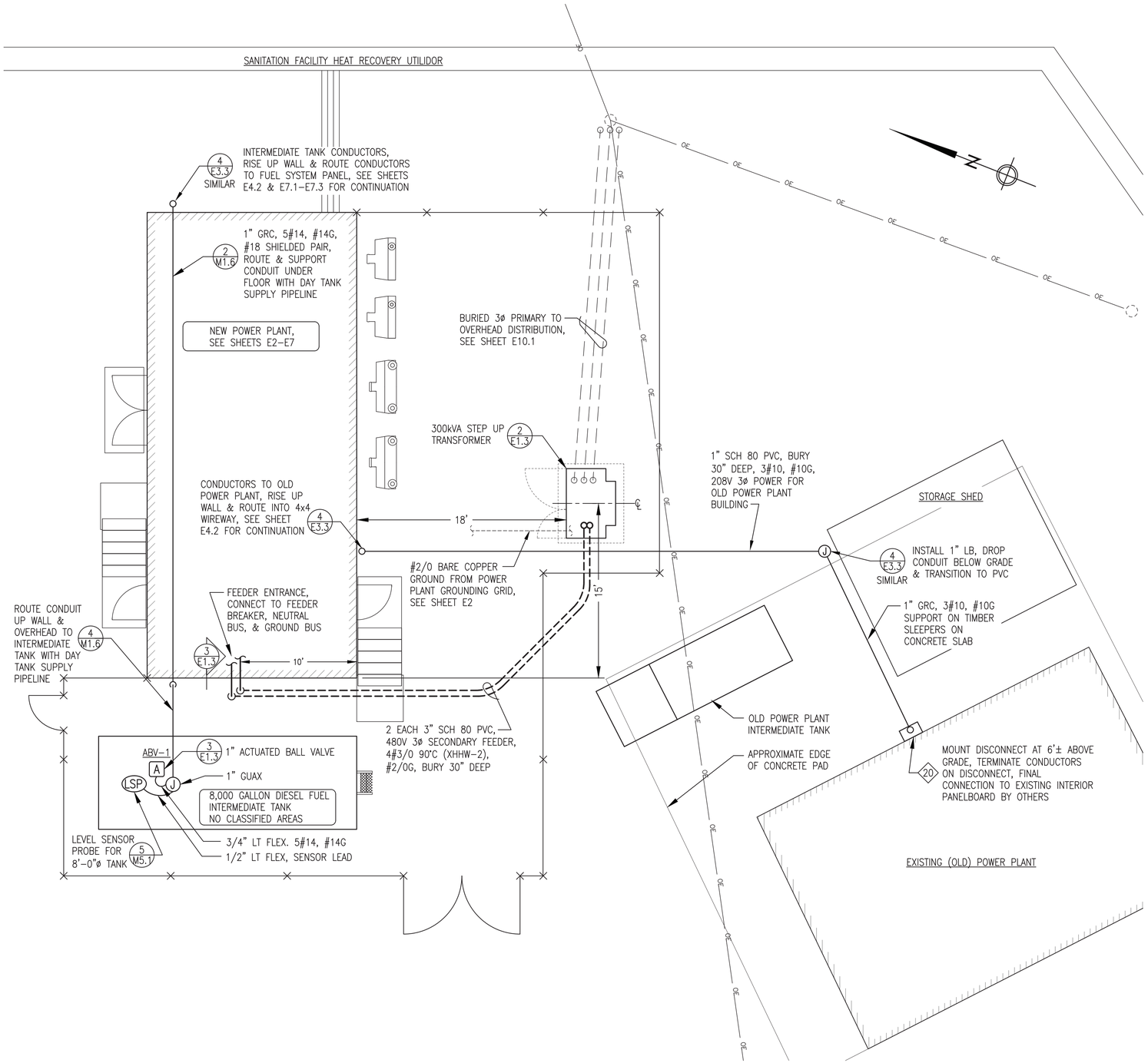
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

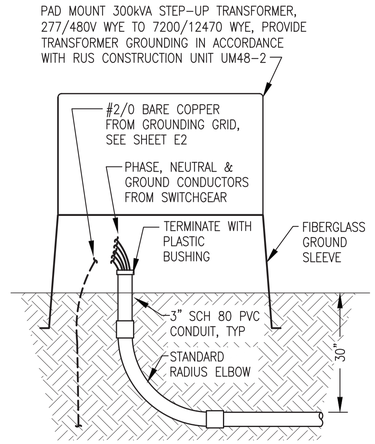
TITLE: OVERALL PROJECT AREA PLAN

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

DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E1	SHEET: E1.2
PROJECT NUMBER:	



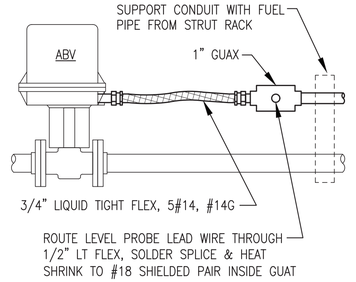
1 E1.3 POWER PLANT AREA ENLARGED SITE PLAN
1"=5'



2 E1.3 TRANSFORMER INSTALLATION
NO SCALE

NOTES:
1) ACTUATED BALL VALVE CONTROLLED FROM FUEL SYSTEM CONTROL PANEL IN POWER PLANT, SEE LOGIC DIAGRAM SHEET E7.1 FOR CONDUCTOR TERMINATIONS.

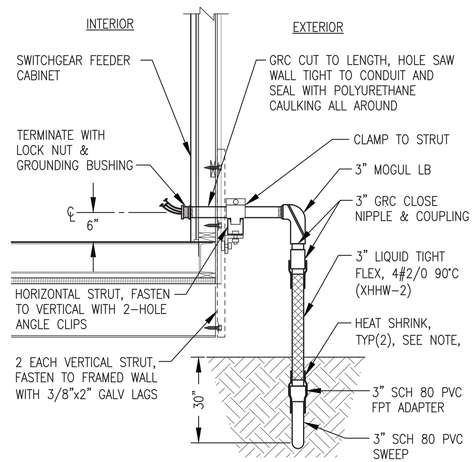
2) SEE MECHANICAL FOR ACTUATED BALL VALVE SPECIFICATIONS & INSTALLATION.



3 E1.3 ACTUATOR VALVE CONNECTION
NO SCALE

NOTES:
1) ONE CONDUIT ENTRANCE SHOWN. PROVIDE TWO IDENTICAL

2) INSTALL HEAT SHRINK TO FORM WATERTIGHT SEAL FROM FLEX ON TO GRC & FROM FLEX ON TO PVC CONDUIT.



4 E1.3 MAIN FEEDER BUILDING ENTRANCE
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE. 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562–3252

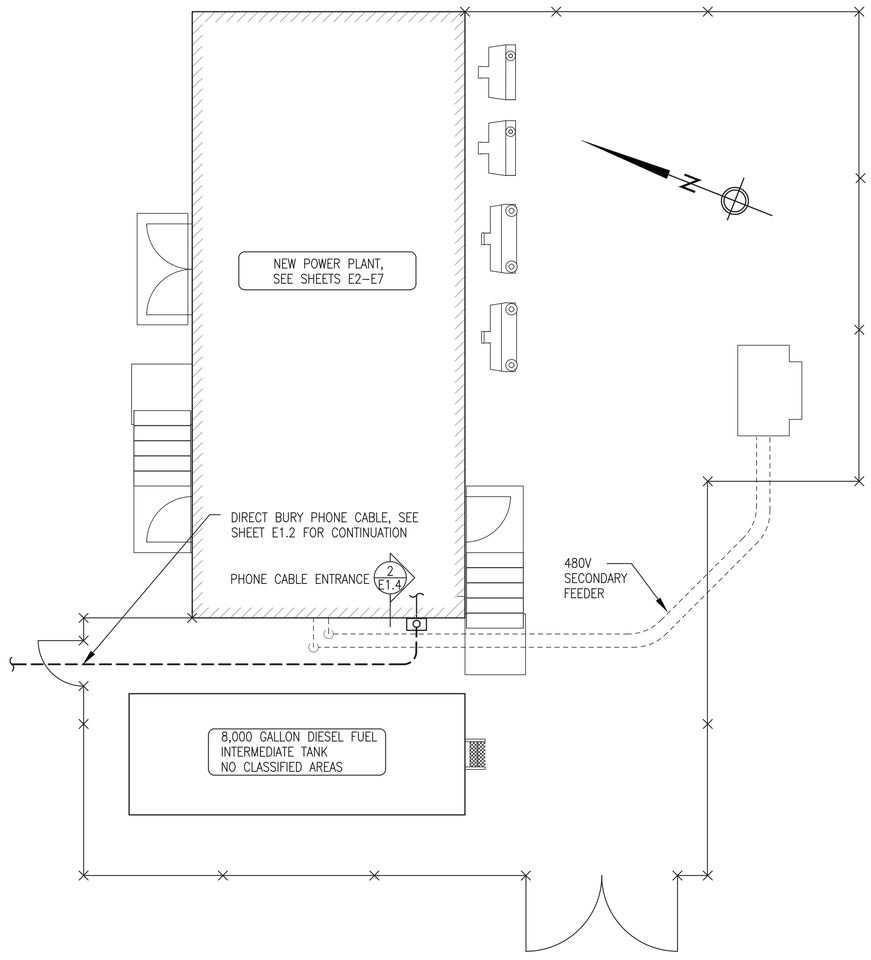
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

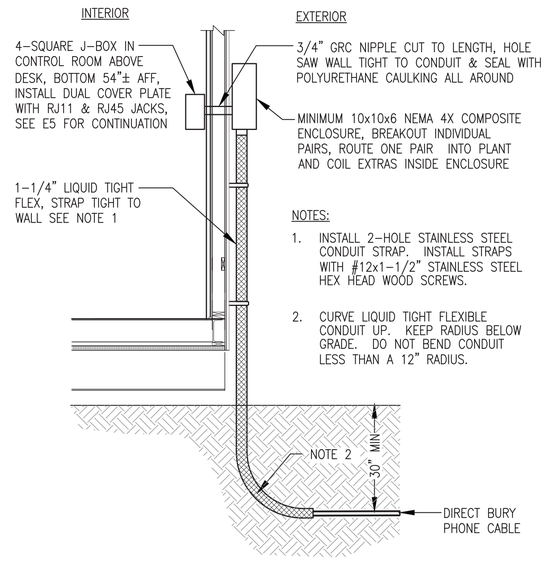
TITLE: POWER PLANT AREA ENLARGED SITE PLAN & DETAILS

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

DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E1	SHEET: E1.3
PROJECT NUMBER:	



1 E1.4 POWER PLANT ENLARGED AREA COMMUNICATION PLAN
1"=5'



2 E1.4 PHONE CABLE BUILDING ENTRANCE
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. 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.	3) THE LAND LINE TELEPHONE SERVICE SHALL HAVE UNLIMITED LOCAL SERVICE. LONG DISTANCE SERVICE SHALL BE AVAILABLE UNDER A SEPARATE PLAN. 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.

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562–3252

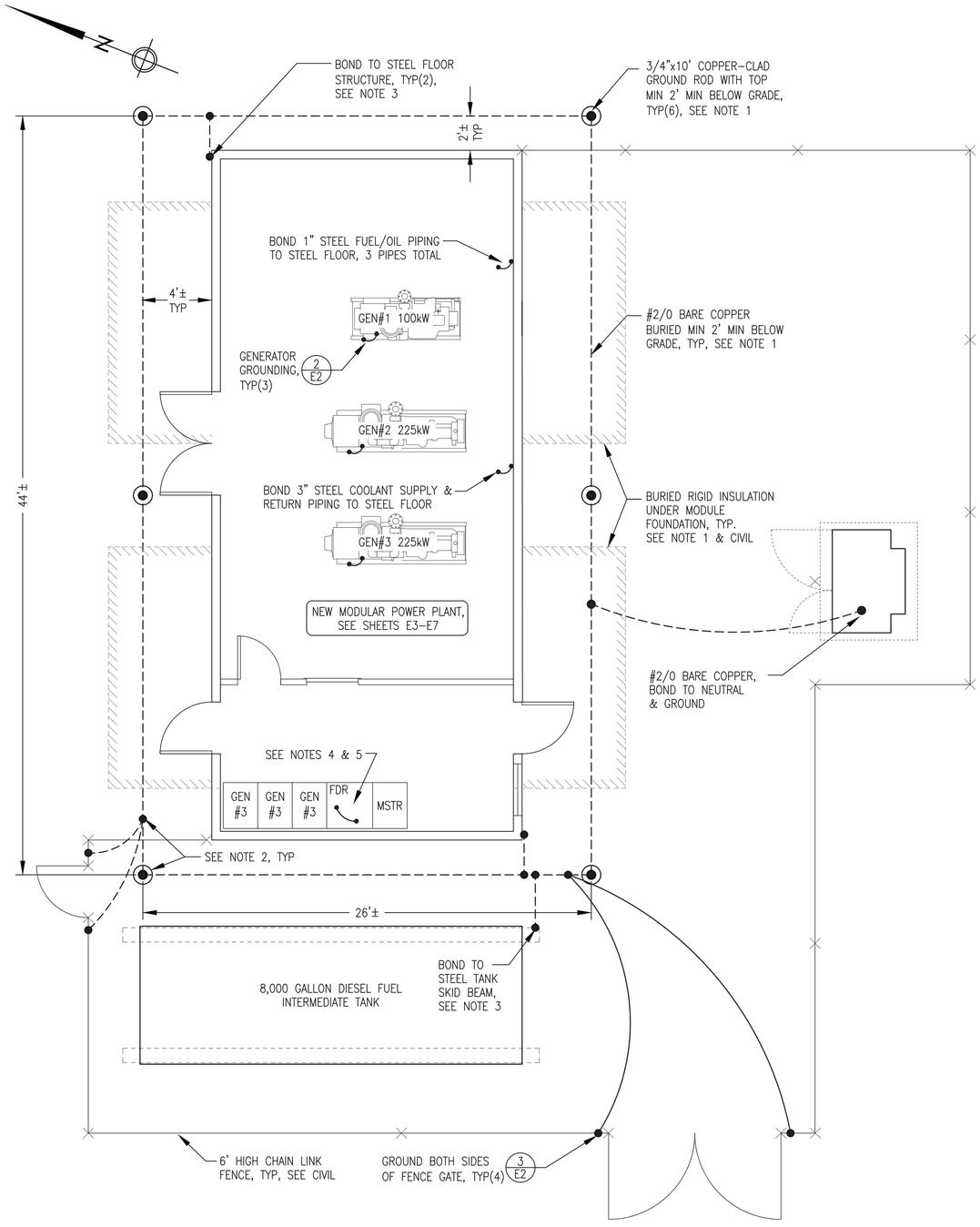
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: COMMUNICATION PLANS & DETAILS

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

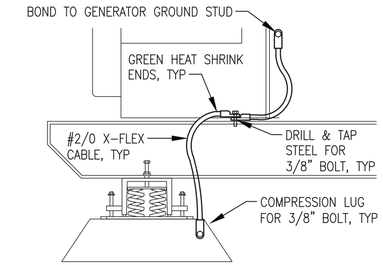
DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 11/1/21
FILE NAME: VEN PP E1 | SHEET: E1.4
PROJECT NUMBER:



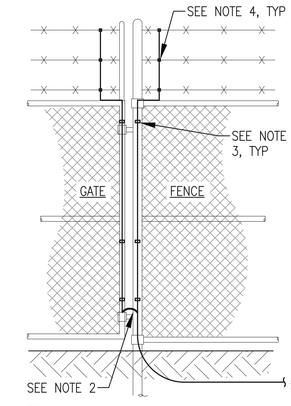
1/E2 POWER PLANT GROUNDING PLAN
1/4"=1'-0"

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) 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 PROVIDE #2/0 JUMPER FROM GROUND BUS TO STEEL FLOOR.



2/E2 GENERATOR GROUNDING
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.

3/E2 TYPICAL FENCE GROUNDING DETAIL
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

ALASKA ENERGY AUTHORITY

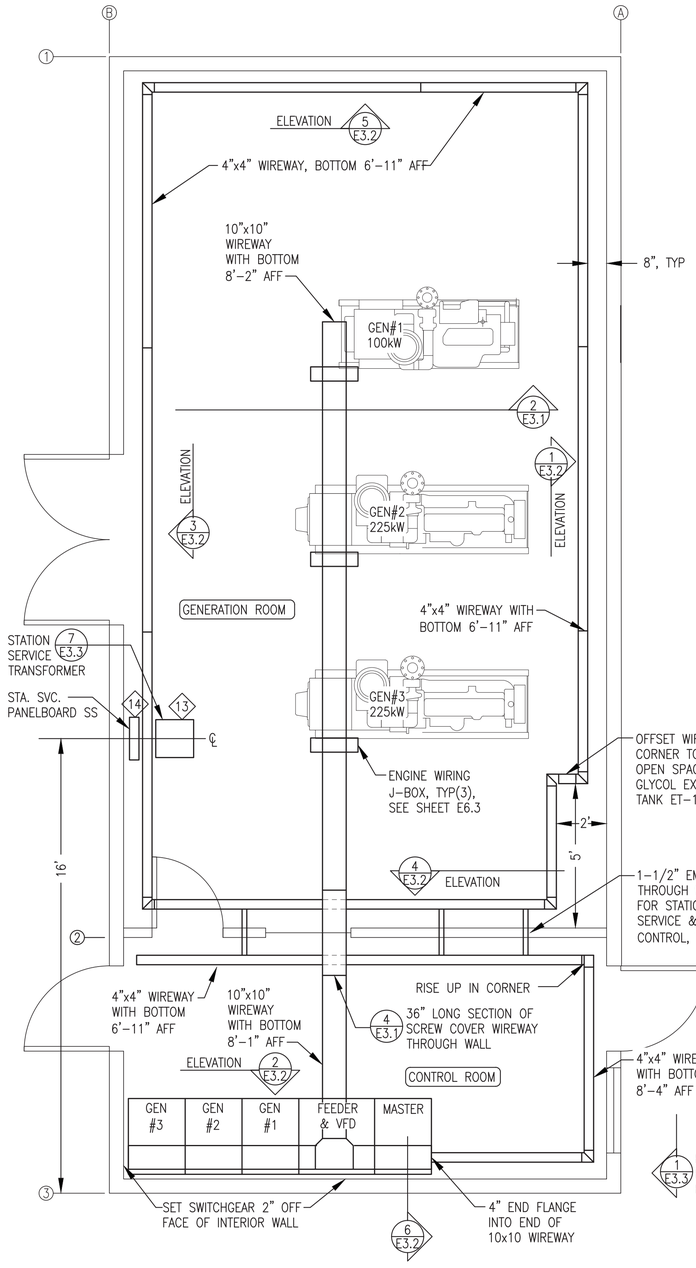
PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: GROUNDING PLAN AND DETAILS

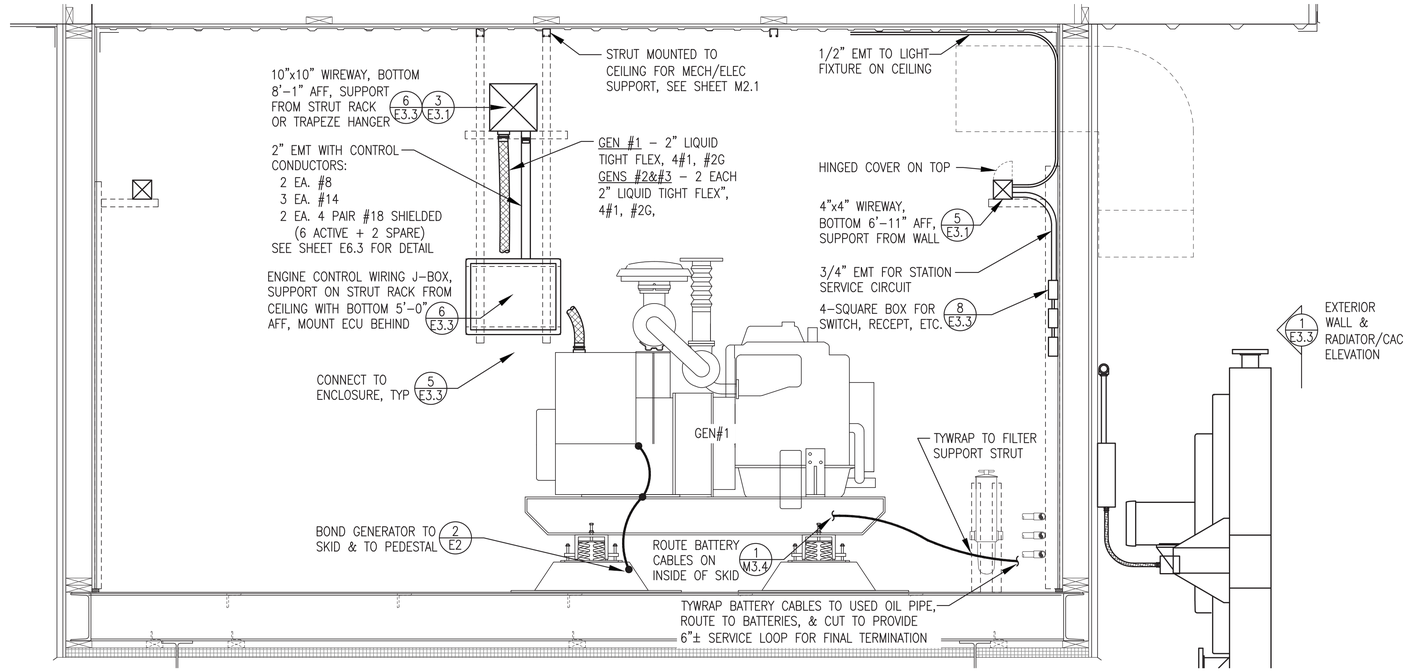
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E2-E5	SHEET: E2
PROJECT NUMBER:	

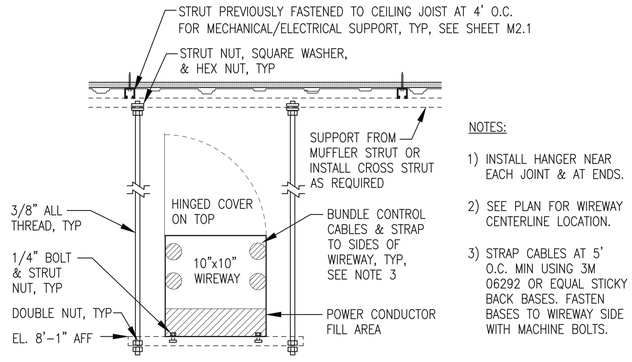
VENETIE ENGINE GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1	ENGINE – 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274E.
GEN #2	ENGINE – 319 HP, 225 EKW PRIME, JOHN DEERE 6090HFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 270 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD S4L1D–D41.
GEN #3	ENGINE – 319 HP, 225 EKW PRIME, JOHN DEERE 6090HFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 270 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD S4L1D–D41.



1 E3.1 EQUIPMENT LAYOUT & WIREWAY PLAN
3/8"=1'–0"



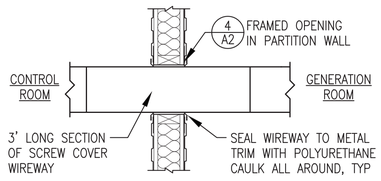
2 E3.1 TYPICAL BUILDING SECTION
3/4"=1'–0"



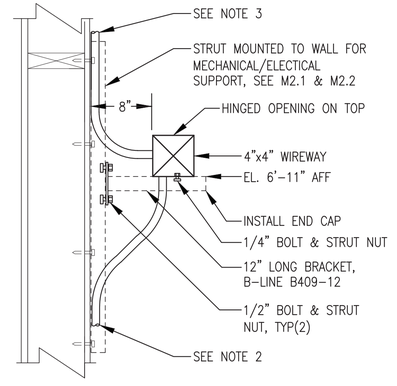
NOTES:

1) INSTALL HANGER NEAR EACH JOINT & AT ENDS.
2) SEE PLAN FOR WIREWAY CENTERLINE LOCATION.
3) STRAP CABLES AT 5' O.C. MIN USING 3M 06292 OR EQUAL STICKY BACK BASES. FASTEN BASES TO WIREWAY SIDE WITH MACHINE BOLTS.

3 E3.1 10" WIREWAY INSTALLATION
NO SCALE



4 E3.1 WIREWAY WALL PENETRATION
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.

5 E3.1 TYPICAL 4"x4" WIREWAY SUPPORT
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562–3252

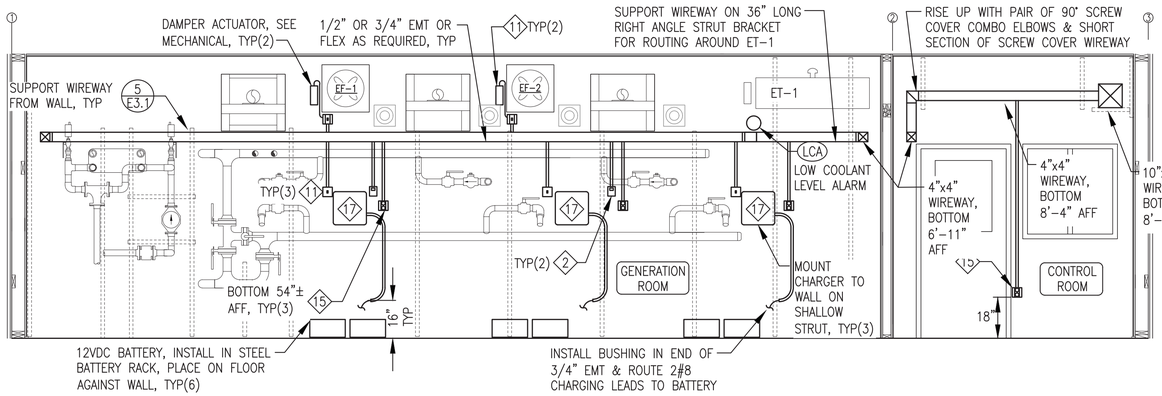
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: WIREWAY PLAN, BUILDING SECTION, & DETAILS

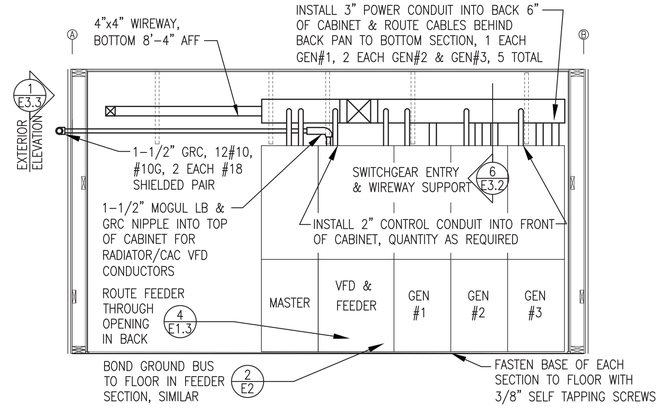
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E2–E5	SHEET: E3.1
PROJECT NUMBER:	



1 E3.2 WALL ELEVATION AT GRID A (BACK WALL)

3/8"=1'-0"

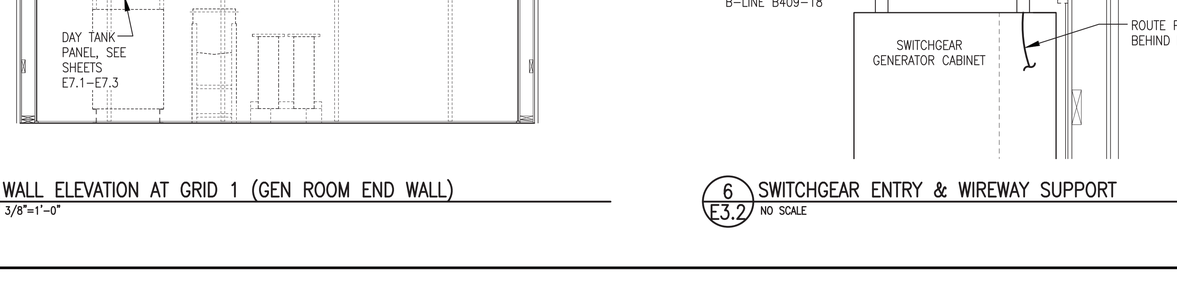


2 E3.2 WALL ELEVATION AT GRID 2 (CONTROL ROOM END WALL)

3/8"=1'-0"

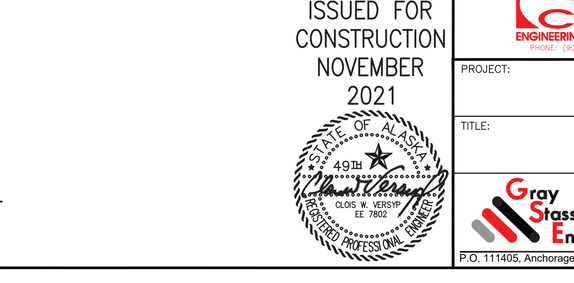
GENERAL NOTE:

WALL ELEVATIONS SHOWN PRIMARILY FOR GENERAL LAYOUT OF MAJOR RACEWAY, EQUIPMENT, AND DEVICES REQUIRING REGULAR ACCESS FOR NORMAL PLANT OPERATIONS. ALL EQUIPMENT, DEVICES & INSTRUMENTATION CIRCUITS NOT SHOWN FOR CLARITY. SEE PLANS & DETAILS FOR COMPLETE ELECTRICAL INSTALLATIONS.



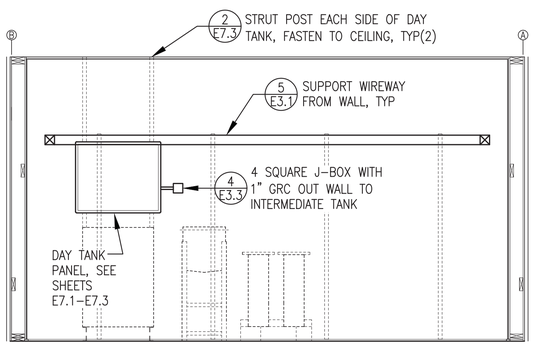
3 E3.2 WALL ELEVATION AT GRID B (FRONT WALL)

3/8"=1'-0"



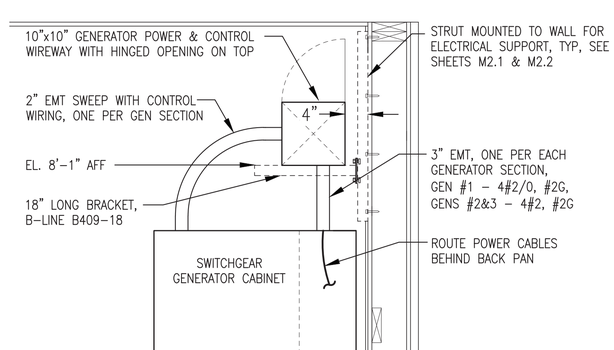
4 E3.2 INTERIOR WALL ELEVATION

3/8"=1'-0"



5 E3.2 WALL ELEVATION AT GRID 1 (GEN ROOM END WALL)

3/8"=1'-0"



6 E3.2 SWITCHGEAR ENTRY & WIREWAY SUPPORT

NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC PHONE: (907) 562-3252

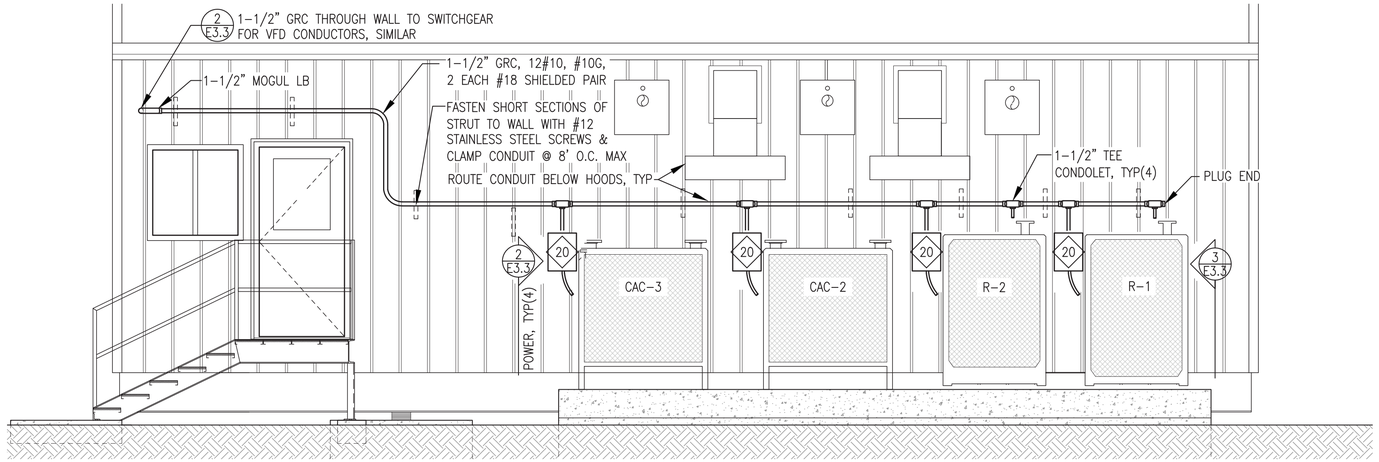
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

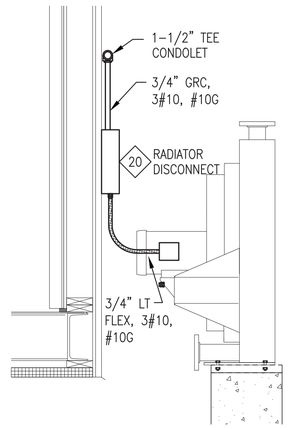
TITLE: ELEVATIONS & DETAILS

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

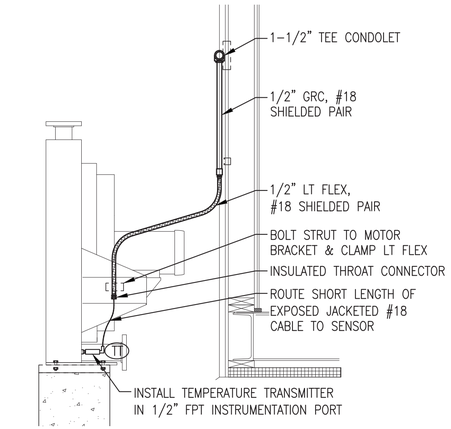
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E2-E5	SHEET: E3.2
PROJECT NUMBER:	



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



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



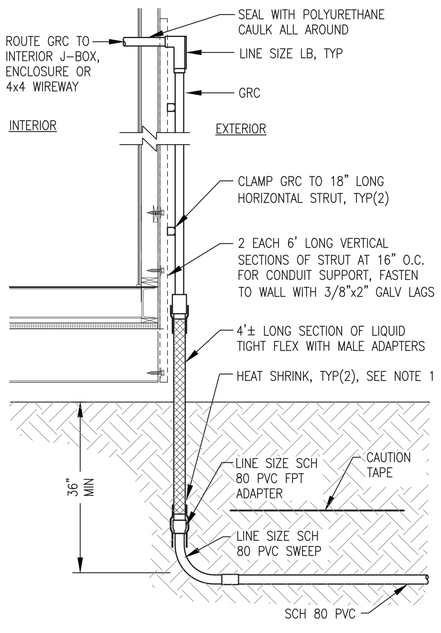
3 E3.3 RADIATOR TEMPERATURE TRANSMITTER
3/4"=1'-0"

NOTES:

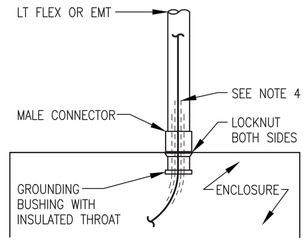
1) INSTALL HEAT SHRINK TO FORM WATERTIGHT SEAL FROM FLEX ON TO GRC & FROM FLEX ON TO PVC CONDUIT.

2) SEE SHEET E1.3 FOR CONDUIT & CONDUCTOR SIZES, QUANTITIES AND LOCATIONS.

3) BURIED CONDUIT RISER SHOWN, ABOVE GRADE CONDUIT ENTRANCE SIMILAR.

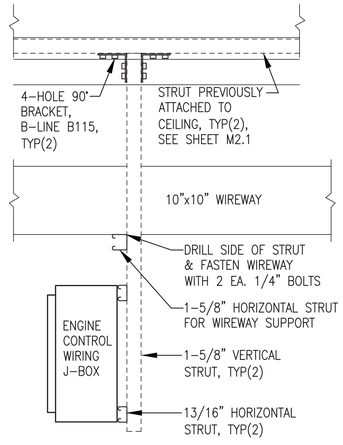


4 E3.3 CONDUIT RISER AT POWER PLANT
NO SCALE

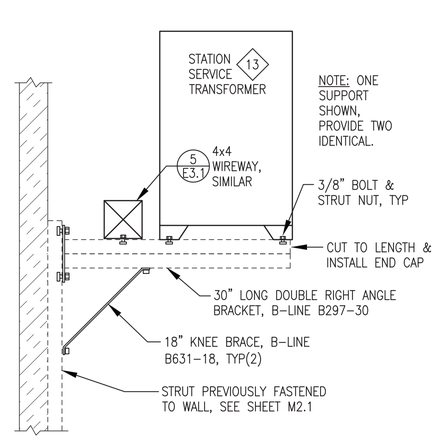


NOTES:
1) THIS DETAIL APPLIES TO CONNECTIONS TO WIREWAY, GENERATOR ENCLOSURES, SWITCHGEAR, AND PANELS.
2) AT A MINIMUM INSTALL GROUNDING BUSHING ON ALL GENERATOR POWER CONDUIT, COMMUNITY FEEDER CONDUIT, STATION SERVICE FEEDERS, AND WHERE OTHERWISE INDICATED OR REQUIRED. BOND GROUNDING BUSHING TO EQUIPMENT 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.

5 E3.3 TYP ENCLOSURE CONNECTION
NO SCALE

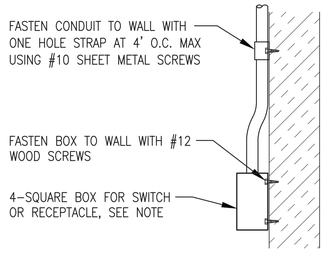


6 E3.3 ENGINE WIRING J-BOX SUPPORT
NO SCALE



NOTE: ONE SUPPORT SHOWN, PROVIDE TWO IDENTICAL.

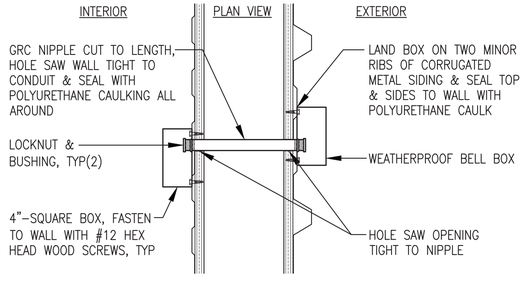
7 E3.3 STATION SERVICE TRANSFORMER SUPPORT
NO SCALE



NOTE: INSTALL THERMOSTATS & TIMER SWITCHES IN DEEP SINGLE GANG BELL BOX INSTEAD OF 4-SQUARE BOX.

8 E3.3 TYPICAL INTERIOR DEVICE MOUNTING
NO SCALE

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



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

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

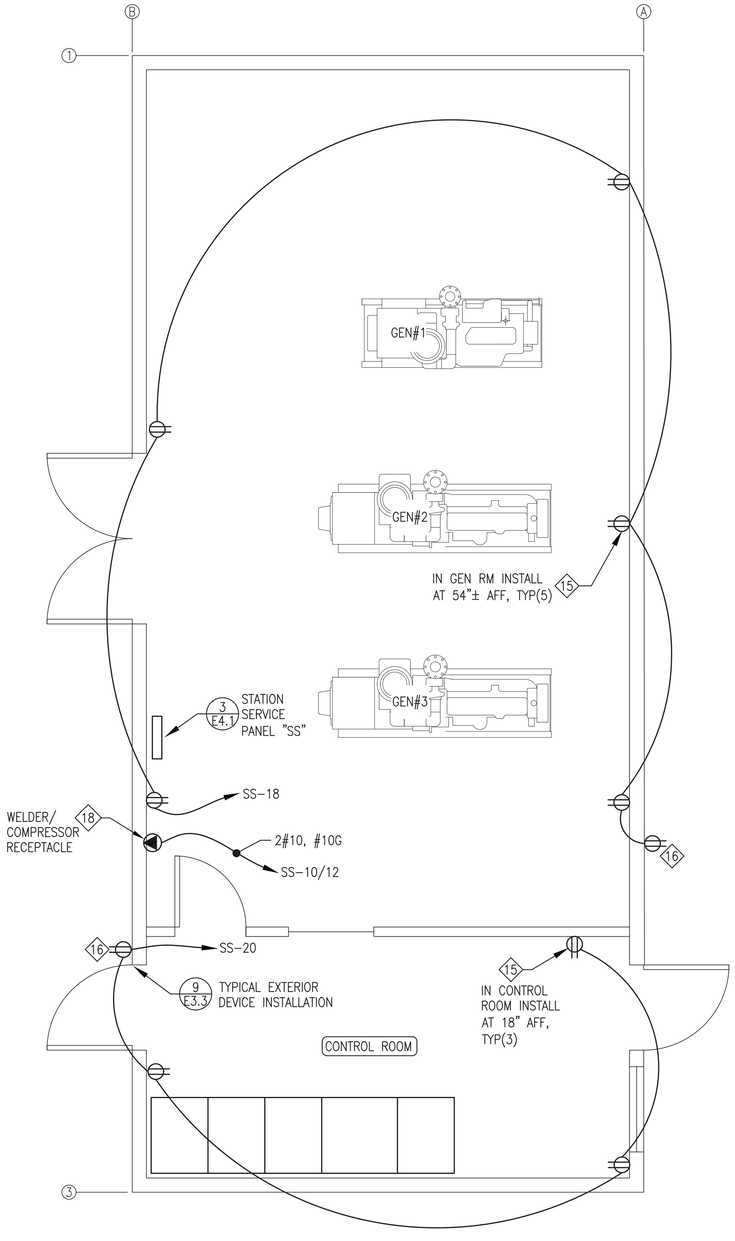
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: ELEVATIONS & DETAILS

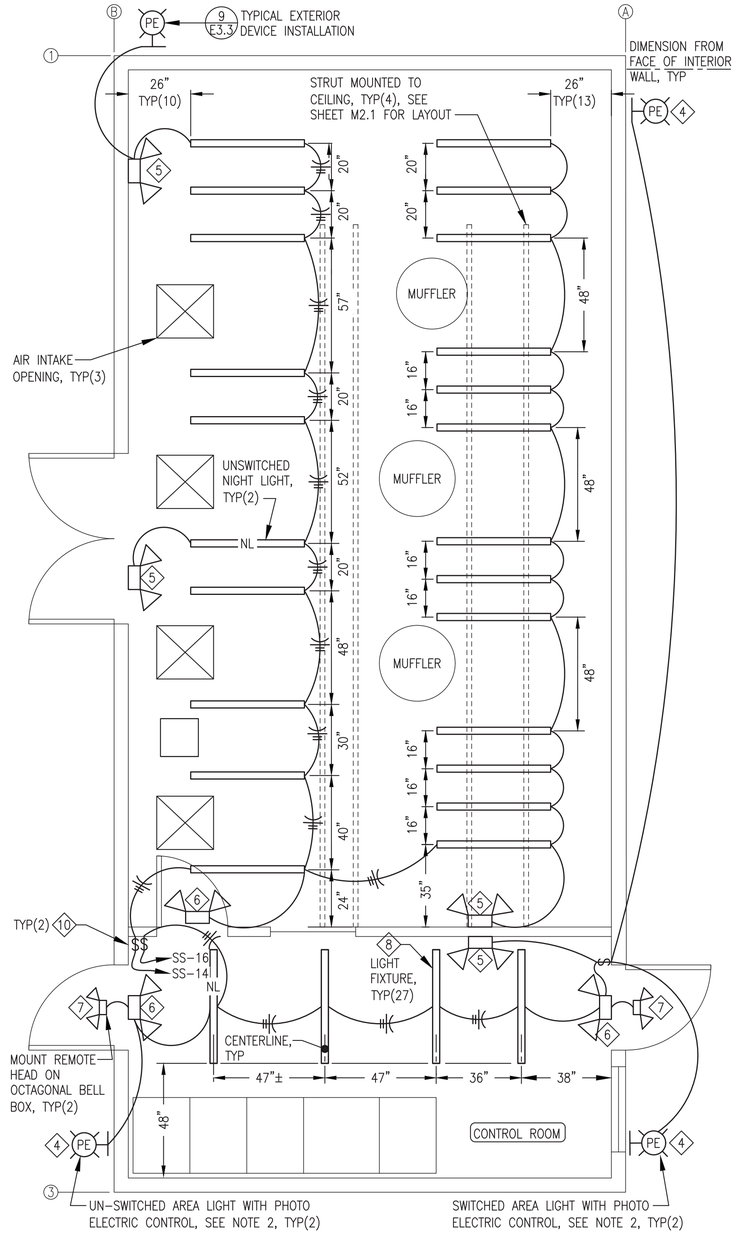
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E2-E5	SHEET: E3.3
PROJECT NUMBER:	



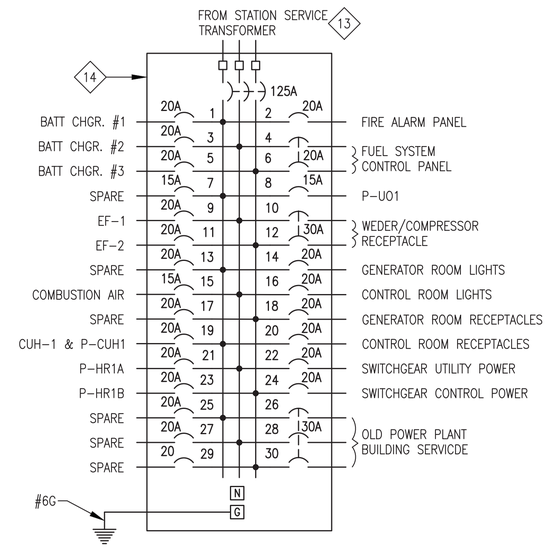
NOTES:
1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.

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

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

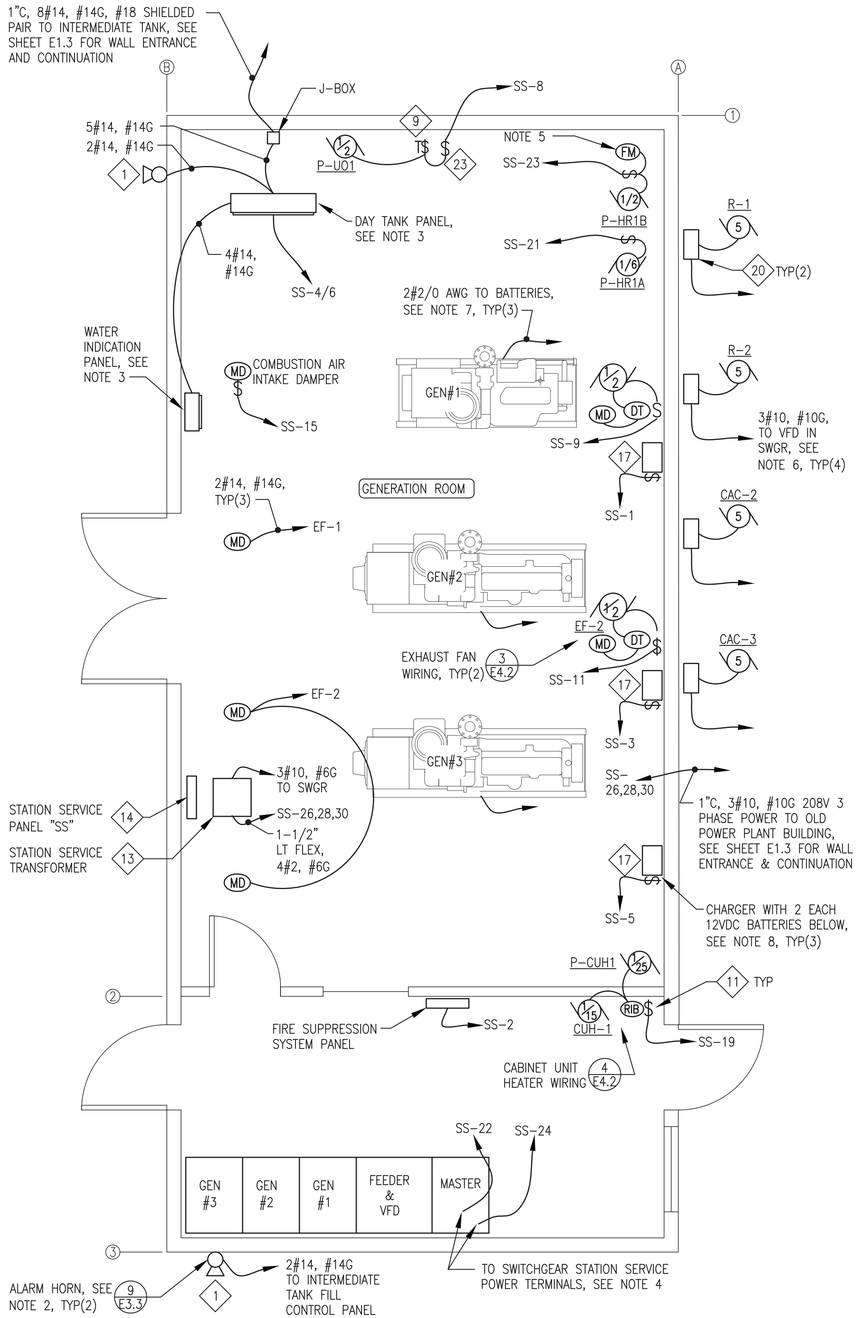
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: RECEPTACLE & LIGHTING PLANS & PANELBOARD

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E2-E5	SHEET: E4.1
PROJECT NUMBER:	



1 E4.2 STATION SERVICE PLAN
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 AND WATER INDICATION CONTROL PANEL DESIGNS 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.

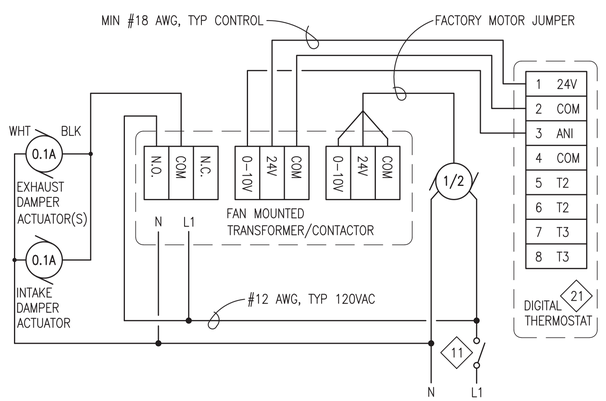
5) INSTALL FLOW METER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. PROVIDE POWER FROM P-HR1B DISCONNECT.

6) ROUTE RADIATOR/CAC VFD POWER CONDUCTORS IN SEPARATE EXTERIOR CONDUIT, SEE ELEVATION 1/E3.3. DO NOT ROUTE IN WIREWAY. NOTE THAT VFD CONDUCTORS ARE OVERSIZED FOR 50% DE-RATE AND PROVIDED WITH 15A BREAKER IN SWITCHGEAR.

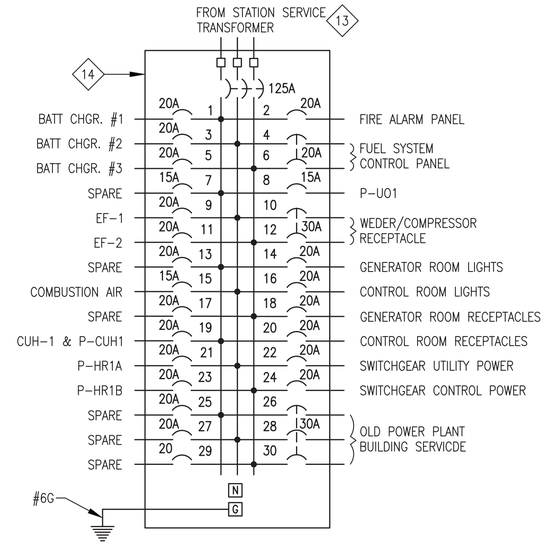
7) ROUTE BATTERY CABLES TO FRONT OF SKID SUPPORTED WITH CUSHIONED CLAMPS, SEE SHEET M3.4. ROUTE FROM SKID DIRECTLY UNDER FUEL HOSES TO WALL AND TYWRAP CABLES TO USED OIL PIPE ALONG WALL. CUT TO PROVIDE 6"± SERVICE LOOP FOR FINAL TERMINATION ON BATTERIES.

8) MOUNT BATTERY CHARGER TO WALL ON SHALLOW STRUT AND INSTALL BATTERIES IN RACK ON FLOOR BELOW, SEE ELEVATION 1/E3.2.

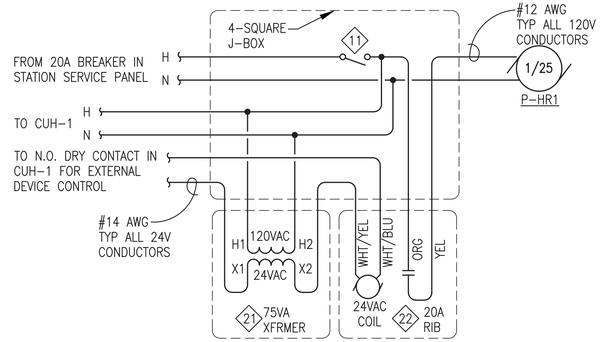
MAKE THE FOLLOWING SETTINGS ON DIGITAL THERMOSTAT:
APPLICATION = 0 (INTERNAL SENSOR)
OUTPUT 1 = 0 (COOL/0-10V)
OUTPUT 2 = 0 (NOT USED)
OUTPUT 3 = 0 (NOT USED)
OUTPUT 3 ACTIVATION = 0 (100%)
NSB VALUE = 3 (6°F)
OUTPUT 1 MIN = 0 (0%)
MAX SETPOINT = 90°F
MIN SETPOINT = 50°F



3 E4.2 EXHAUST FAN WIRING DIAGRAM
NO SCALE



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



4 E4.2 CUH-1 WIRING DIAGRAM
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

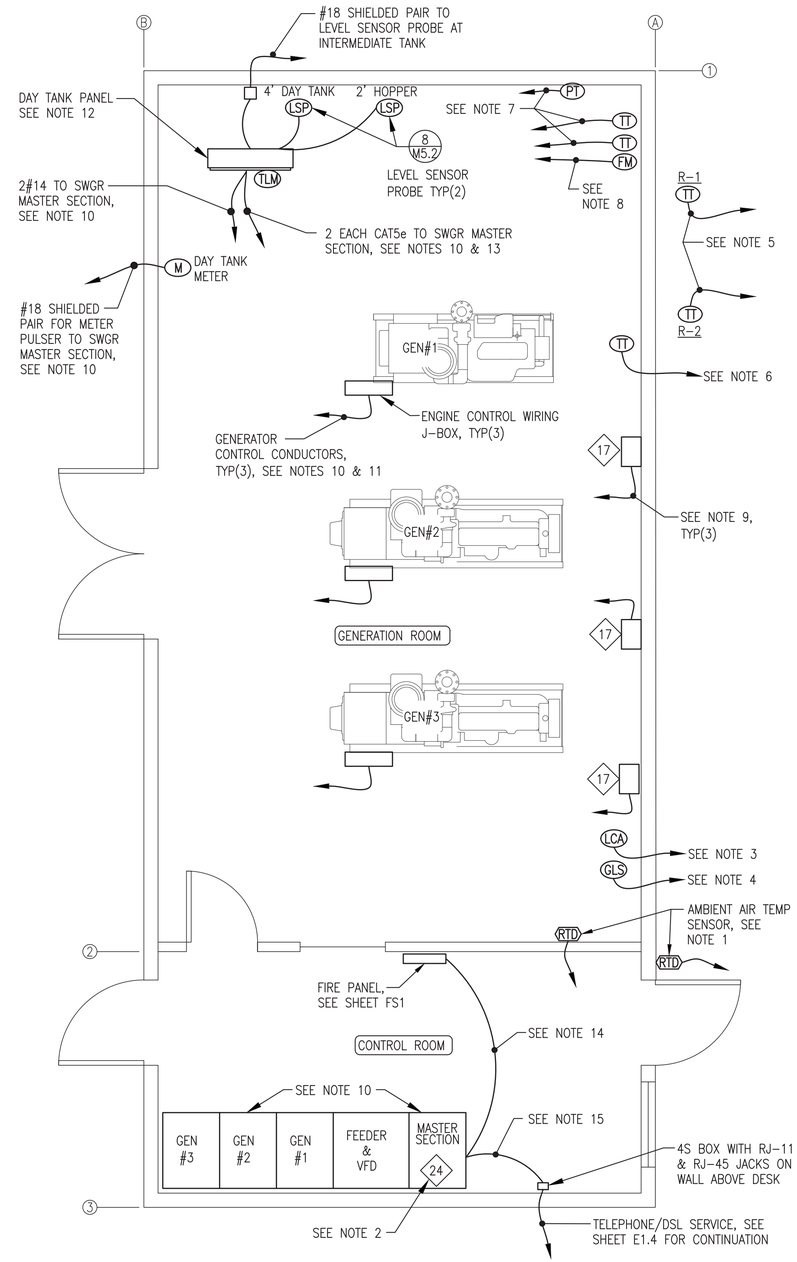
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: STATION SERVICE PLAN, DETAILS, & PANELBOARD

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

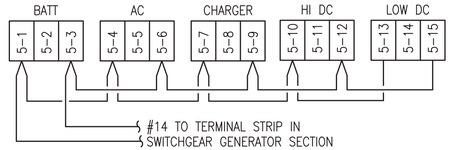
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E2-E5	SHEET: E4.2
PROJECT NUMBER:	



1 E5 INSTRUMENTATION & DATA PLAN
3/8"=1'-0"

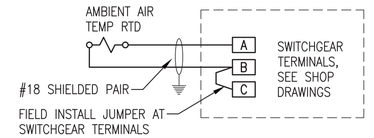
INSTRUMENTATION & DATA PLAN NOTES:

1. RTD TEMPERATURE SENSOR PROVIDED WITH SWITCHGEAR. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION. SEE DETAIL 3/E5 AND NOTE 10.
2. 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.
3. 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.
4. GLYCOL LEVEL SENSOR PROBE INSTALLED IN EXPANSION TANK, SEE MECHANICAL. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR. SEE NOTE 10.
5. INSTALL TEMP TRANSMITTER IN EACH RADIATOR, SEE DETAIL 3/E3.3. ROUTE #18 SHIELDED PAIR FROM EACH TO SWITCHGEAR VFD SECTION, SEE NOTE 10.
6. 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.
7. 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.
8. 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.
9. ROUTE 2#14 FROM BATTERY CHARGER ALARM CONTACTS TO ASSOCIATED SWITCHGEAR GENERATOR SECTION, SEE NOTE 10 AND WIRING DIAGRAM 2/E5.
10. SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL INSTRUMENTATION AND DATA WIRING INCLUDING CONTROL POWER.
11. ROUTE GENERATOR CONTROL CONDUCTORS TO SWITCHGEAR IN 10x10 WIREWAY WITH POWER CONDUCTORS. SEE DETAIL 2/E3.1, SHEET E6.3, AND NOTE 10.
12. SEE SHEETS E7.1–E7.4 FOR DAY TANK AND WATER INDICATION CONTROL PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
13. 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.
14. 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.
15. 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 E5 BATTERY CHARGER ALARM WIRING DIAGRAM
NO SCALE



3 E5 AMBIENT AIR TEMP RTD TERMINATION
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

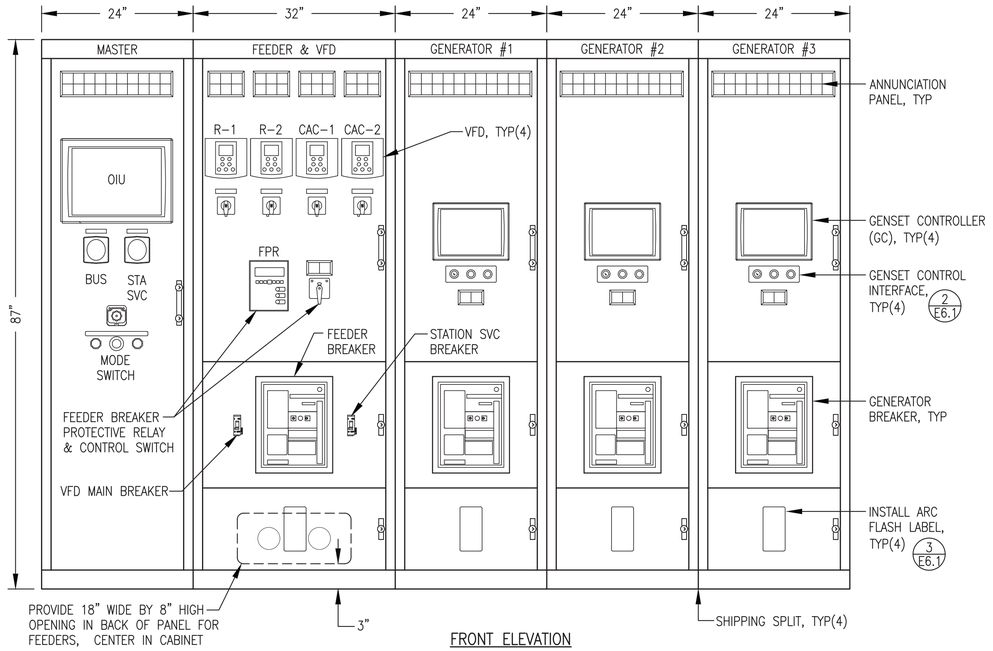
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

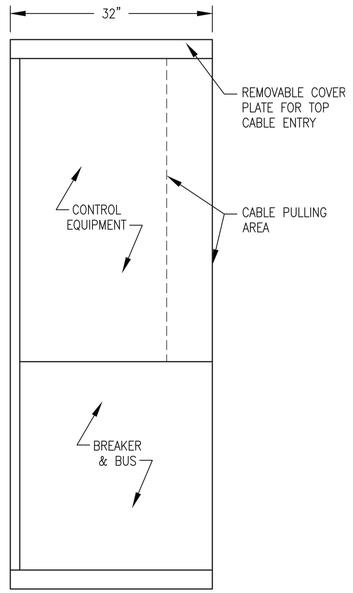
TITLE: INSTRUMENTATION & DATA PLAN & DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E2-E5	SHEET: E5
PROJECT NUMBER:	



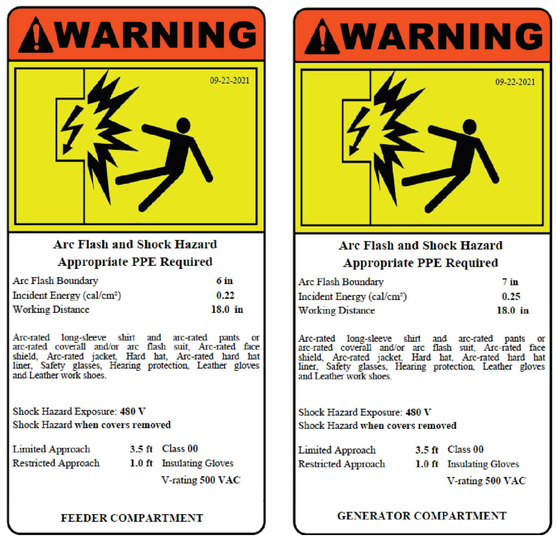
FRONT ELEVATION



TYPICAL CROSS SECTION

1 E6.1 SWITCHGEAR ENCLOSURE LAYOUT

NO SCALE

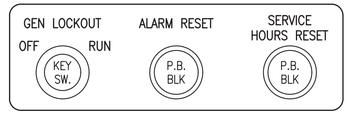


ARC FLASH NOTES:

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 E6.1 ARC FLASH LABELS

NO SCALE

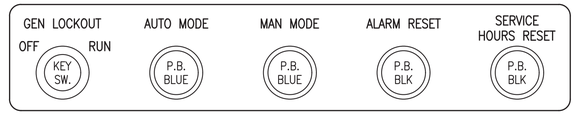


EASYGEN INTERFACE CONTROLS

INTERFACE CONTROLS LEGEND:

P.B. PUSH BUTTON

KEY SW. KEY OPERATED LOCKABLE SWITCH



COMAP INTERFACE CONTROLS

2 E6.1 GENSET CONTROL (GC) INTERFACE CONTROLS

NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

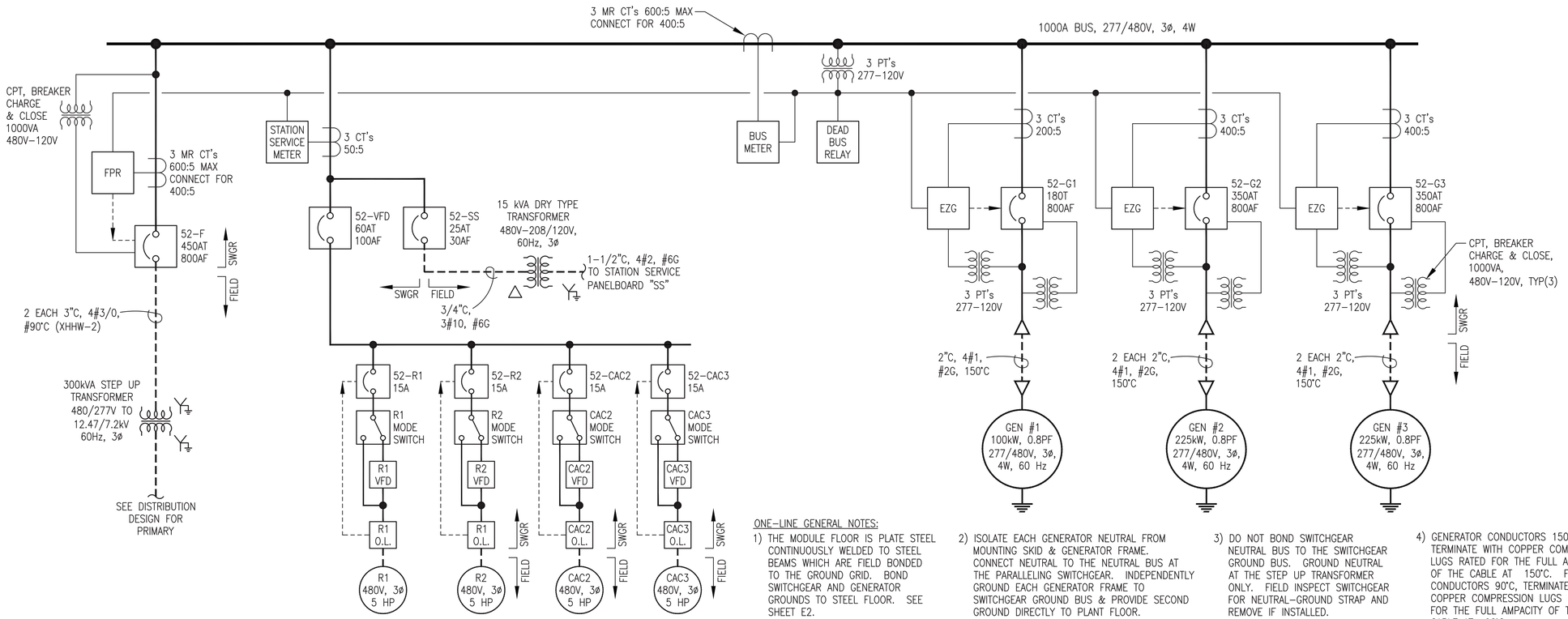
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: SWITCHGEAR ENCLOSURE LAYOUT

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

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: VEN PP E6
PROJECT NUMBER:
SCALE: NO SCALE
DATE: 11/1/21
SHEET: E6.1



SWITCHGEAR SYMBOL LEGEND

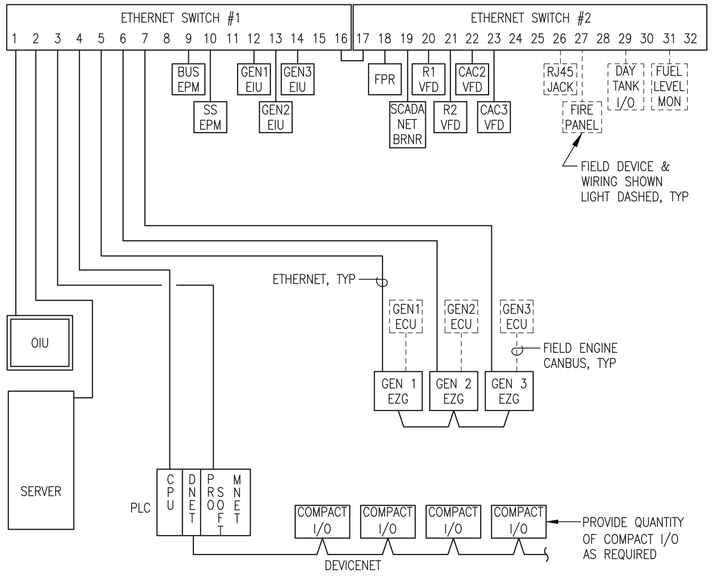
- TRANSFORMER PT=POTENTIAL XFRMR CPT=CONTROL POWER XFRMR
- CURRENT TRANSFORMER M.R. – INDICATES MULTIRATIO CT'S RATING FACTOR RF=2.0
- CIRCUIT BREAKER AT=AMP TRIP RATING AF=AMP FRAME RATING
- EZG — WOODWARD EASYGEN GENSET CONTROLLER
- FPR — FEEDER PROTECTION RELAY
- SHOP INSTALLED POWER WIRING/BUS
-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

ONE–LINE GENERAL NOTES:

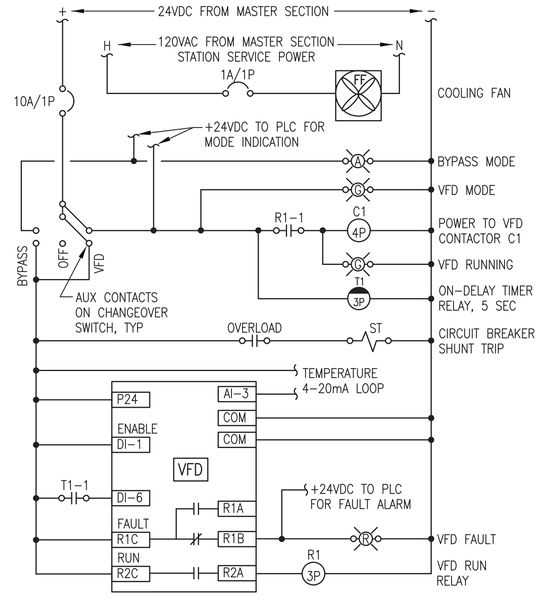
1) THE MODULE FLOOR IS PLATE STEEL CONTINUOUSLY WELDED TO STEEL BEAMS WHICH ARE FIELD BONDED TO THE GROUND GRID. BOND SWITCHGEAR AND GENERATOR GROUNDS TO STEEL FLOOR. SEE SHEET E2.
2) ISOLATE EACH GENERATOR NEUTRAL FROM MOUNTING SKID & GENERATOR FRAME. CONNECT NEUTRAL TO THE NEUTRAL BUS AT THE PARALLELING 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. FIELD INSPECT SWITCHGEAR FOR NEUTRAL–GROUND STRAP AND REMOVE IF INSTALLED.
4) GENERATOR CONDUCTORS 150°C CABLE, TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT 150°C. FEEDER CONDUCTORS 90°C, TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT 90°C.

1 E6.2 SWITCHGEAR ONE–LINE DIAGRAM
NO SCALE

NOTE: PROVIDE 120VAC POWER FOR SERVER FROM UPS. ALL OTHER DEVICES 24VDC.



2 E6.2 COMMUNICATION SCHEMATIC
NO SCALE



3 E6.2 TYPICAL RADIATOR VFD LOGIC DIAGRAM
NO SCALE

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC PHONE: (907) 562-3252

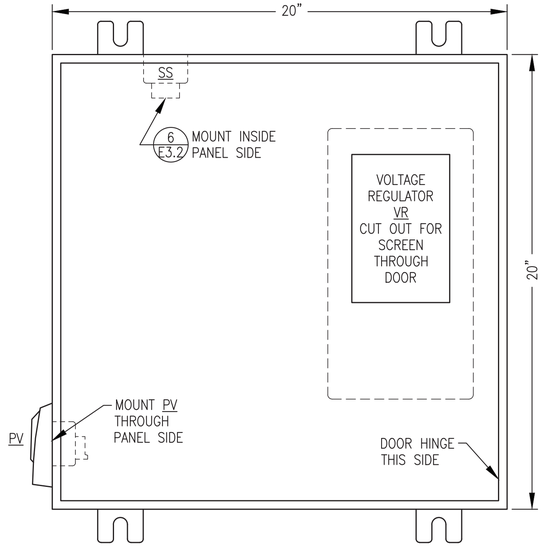
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

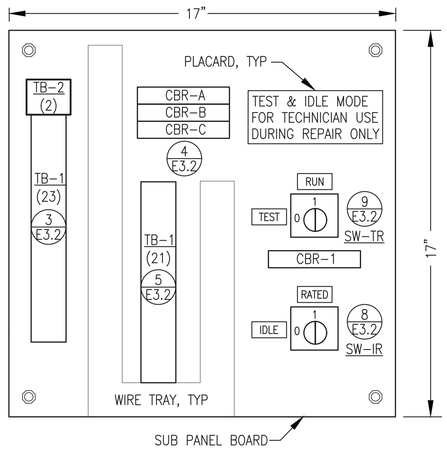
TITLE: SWITCHGEAR ONE–LINE & SCHEMATICS

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

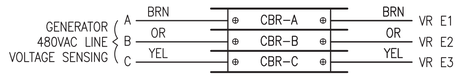
DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E6	SHEET: E6.2
PROJECT NUMBER:	



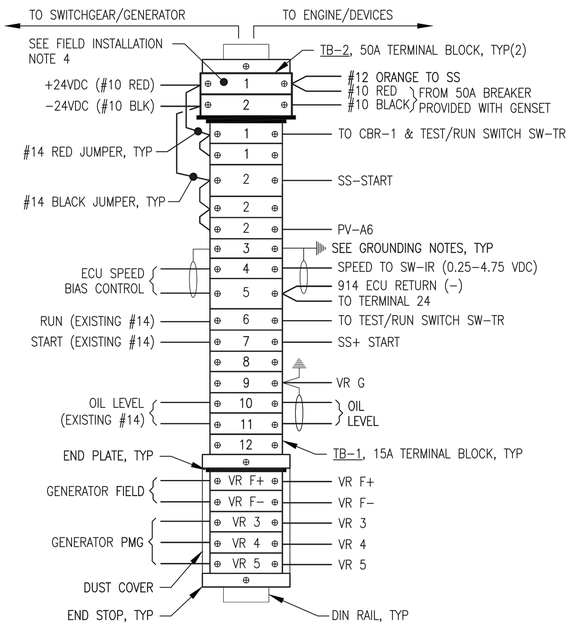
1 E6.3 JUNCTION BOX FRONT PANEL LAYOUT
NO SCALE



2 E6.3 JUNCTION BOX SUB PANEL LAYOUT
NO SCALE

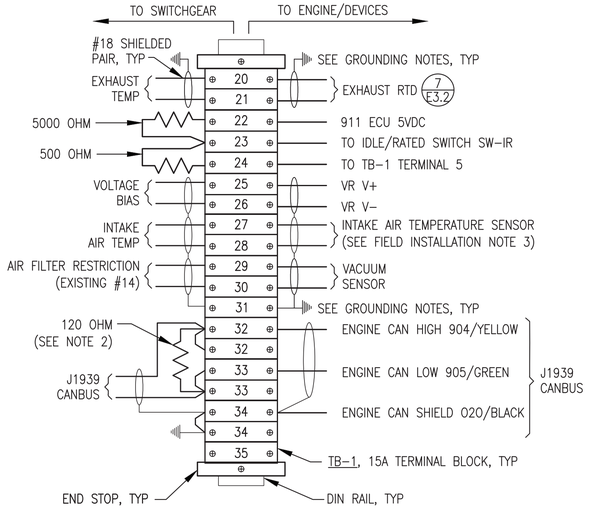


4 E6.3 CIRCUIT BREAKER CONNECTIONS
NO SCALE



NOTE: TYPICAL JOHN DEERE ECU CONNECTION NUMBERS SHOWN. SEE WIRING HARNESS FOR EACH ENGINE FOR ACTUAL ECU CONNECTIONS.

3 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE



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

5 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE

BILL OF MATERIALS

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
	HOFFMAN	A20P20	BACK PANEL
PV	MURPHY	PV101-C-MSTD	POWER VIEW W/HARNESS
SS	CATERPILLAR	9X-8124	STARTER AUXILIARY SOLENOID, 24V
SW-IR/SW-TR	ALLEN-BRADLEY	194L-A12-225-2	CHANGEOVER SWITCH, 12A, 2P
	ALLEN-BRADLEY	194L-HE-4A-175	90 DEGREE I-O HANDLE
TB-1	IDEC	BNH15LW	15A DIN RAIL-MOUNT TERMINAL BLOCK
TB-2	IDEC	BNH50W	50A DIN RAIL-MOUNT TERMINAL BLOCK
VR	BASLER	DECS-150 5NS1V1N1S	DIGITAL VOLTAGE REGULATOR

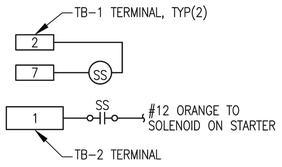
NOTE: SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE 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:

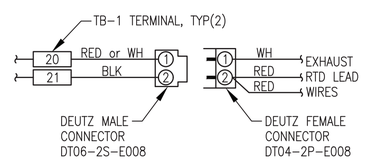
1) PROVIDE ASSEMBLY WITH ALL DEVICES AND WIRING INDICATED.
2) INSTALL IN A NEMA 12 ENCLOSURE WITH MOUNTING FLANGES AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL AND HINGED LOCKABLE DOOR. SIZE AS INDICATED.
3) PROVIDE DIN RAIL, TERMINAL END PLATES, TERMINAL END STOPS, TERMINAL DUST COVERS AND OTHER MISCELLANEOUS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

FIELD INSTALLATION NOTES:

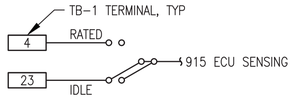
1) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE ENGINE PANEL TERMINAL NUMBER.
2) ON SHIELDED CONDUCTORS GROUND ALL SHIELD DRAIN WIRES TO LUGS AT PANEL END ONLY.
3) INTAKE AIR TEMPERATURE ONLY ON ENGINES WITH CHARGE AIR COOLER. SENSOR PROVIDED WITH ENGINE-GENERATOR. FIELD INSTALL SENSOR IN CHARGE AIR RETURN TUBING 1/2" PORT, SEE MECHANICAL. ROUTE SHIELDED WIRE IN LOOM TO J-BOX AND TERMINATE AS INDICATED.



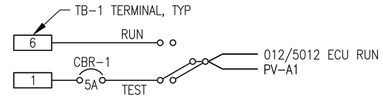
6 E6.3 STARTER AUX SOLENOID SS WIRING
NO SCALE



7 E6.3 EXHAUST RTD CONNECTOR
NO SCALE



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



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

ISSUED FOR CONSTRUCTION
NOVEMBER 2021

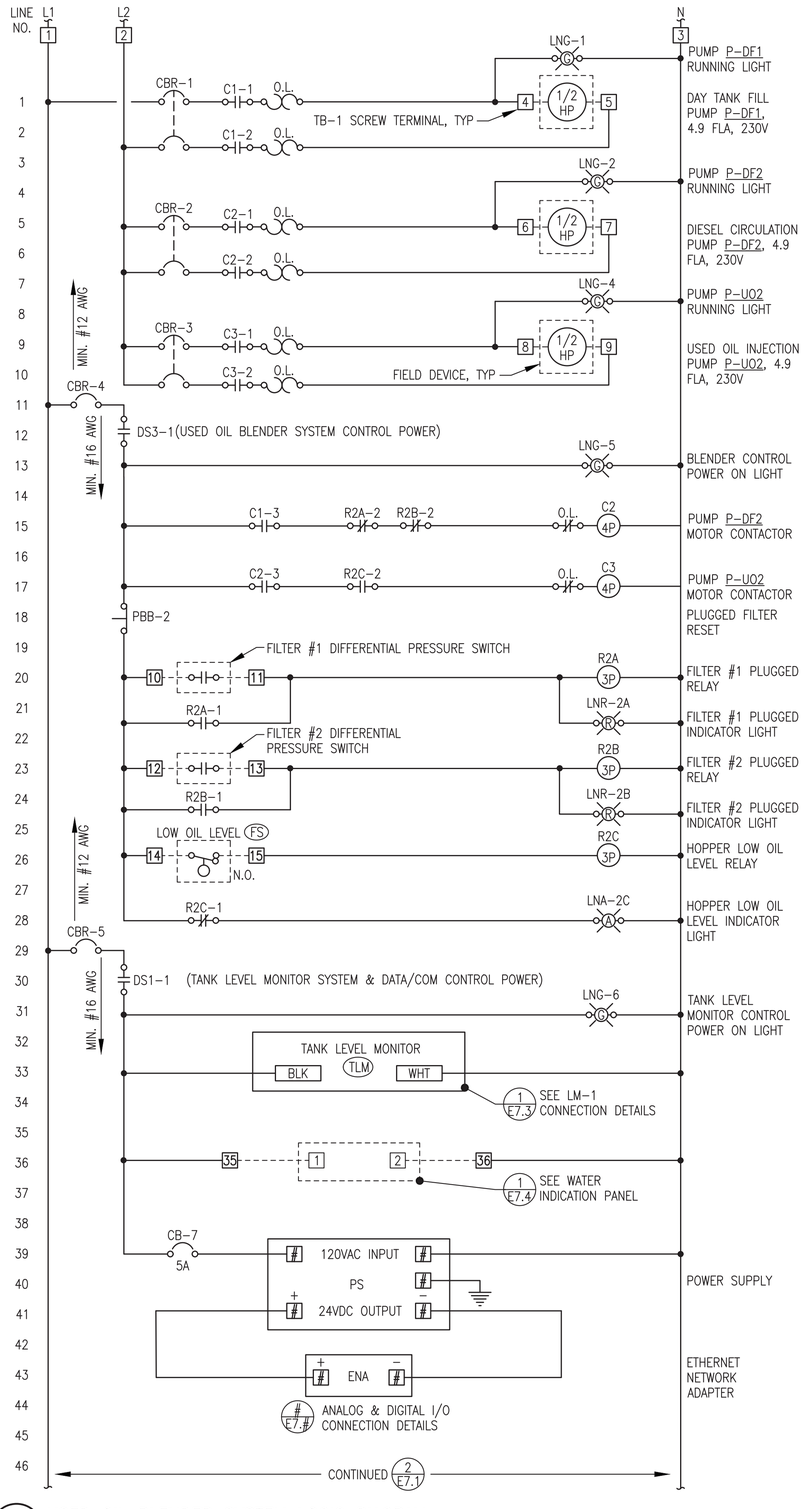
CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252
ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

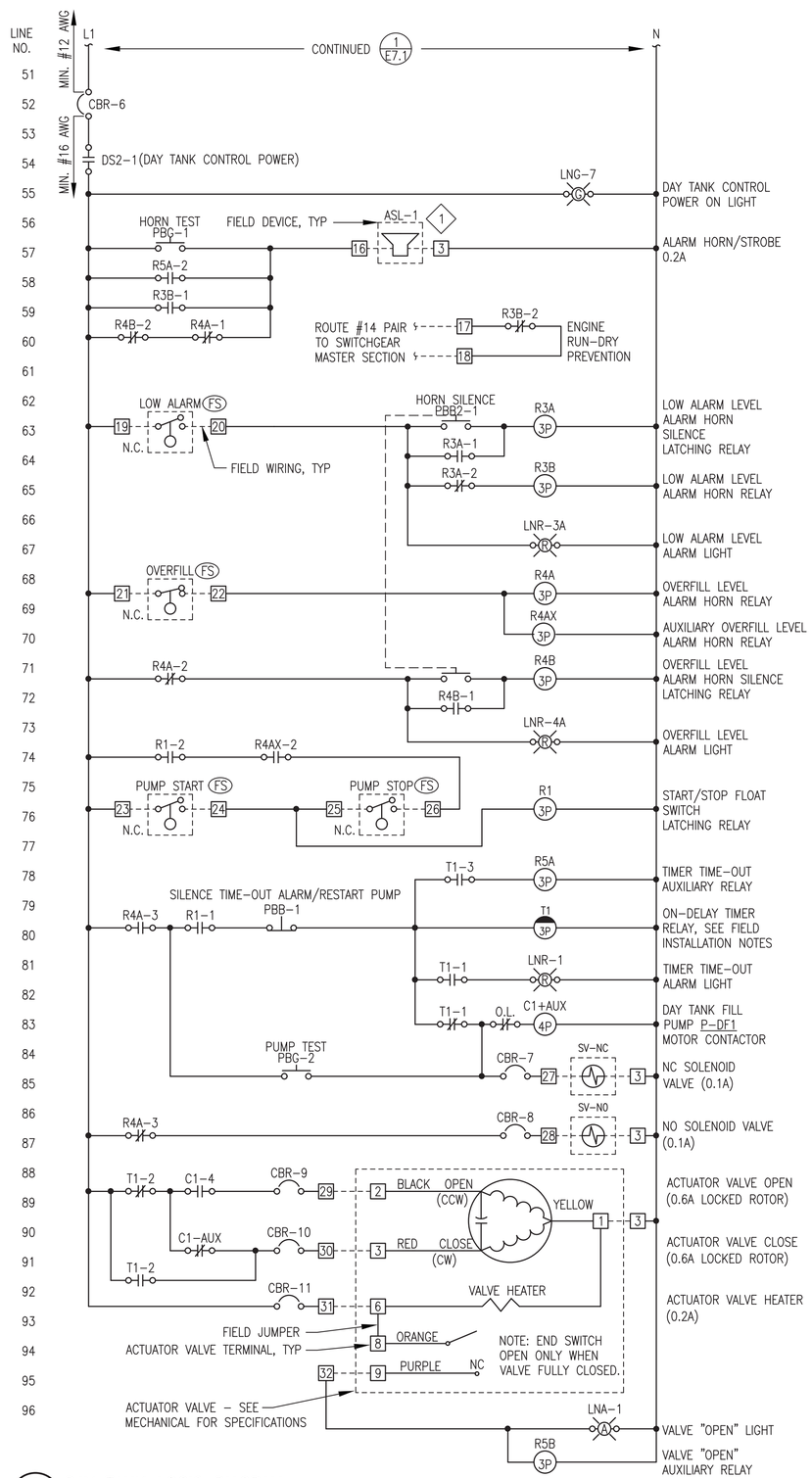
TITLE: 24VDC ENGINE WIRING JUNCTION BOX

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

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: VEN PP E6
PROJECT NUMBER:
SCALE: NO SCALE
DATE: 11/1/21
SHEET: E6.3



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



2 E7.1 DAY TANK LOGIC DIAGRAM
NO SCALE

BILL OF MATERIALS

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.

TAG	MANUFACTURER	MODEL	DESCRIPTION
AUX	ALLEN-BRADLEY	100SA11	AUXILIARY CONTACT FOR CONTACTOR, 2 POLE, NO, NC
C	ALLEN-BRADLEY	100C09D10	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	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
	ALLEN-BRADLEY	194LHC4E1751	KNOB ACTUATOR FOR LOAD SWITCH, ON/OFF, LOCKABLE
ENA	ALLAN-BRADLEY	1734-AENTR	I/O DUAL PORT ETHERNET NETWORK ADAPTER WITH 2 EA. MODULES:
	ALLAN-BRADLEY	1734-IB8	24VDC DISCRETE SINK INPUT MODULE, 8 POINT
LNG	ALLEN-BRADLEY	800HQRH2G	GREEN LED PILOT LIGHT, 12-130V, NEMA 4X
LNR	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-130V, NEMA 4X
LNA	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-130V, NEMA 4X
OL	ALLEN-BRADLEY	193-1EEDB	OVERLOAD, 230V, 1ø, ADJUSTABLE 3.2A-16.0A RANGE
PBB	ALLEN-BRADLEY	800HAR2D2	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, BLACK
PBB2	ALLEN-BRADLEY	800HAR2A2	MOMENTARY PUSH BUTTON, 2 NO, NEMA 4X, BLACK
PBG	ALLEN-BRADLEY	800HAR1D1	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, GREEN
PP	PHOENIX CONTACTS	FLPPRJ45/RJ45	ETHERNET PATCH PANEL, RJ45xRJ45, DIN RAIL MOUNT
R	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN101	11 PIN SOCKET BASE
T	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 E1.1		

LEGEND

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

ISSUED FOR CONSTRUCTION
NOVEMBER 2021

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

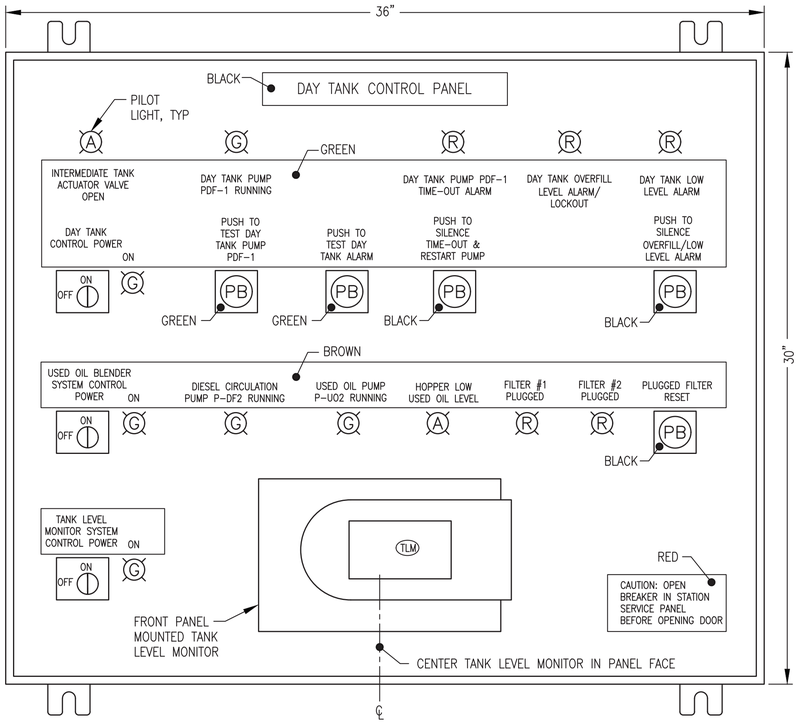
ALASKA ENERGY AUTHORITY

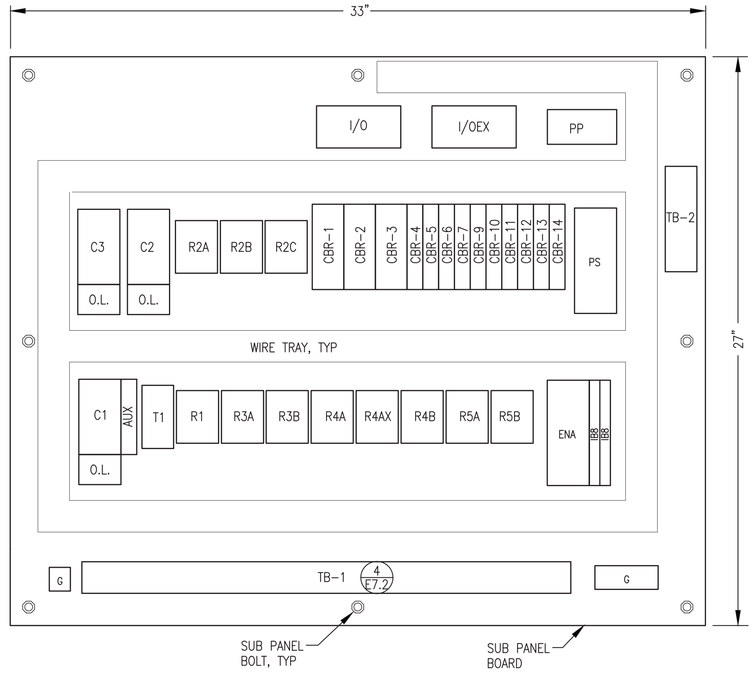
PROJECT: VENETIE POWER SYSTEM UPGRADE

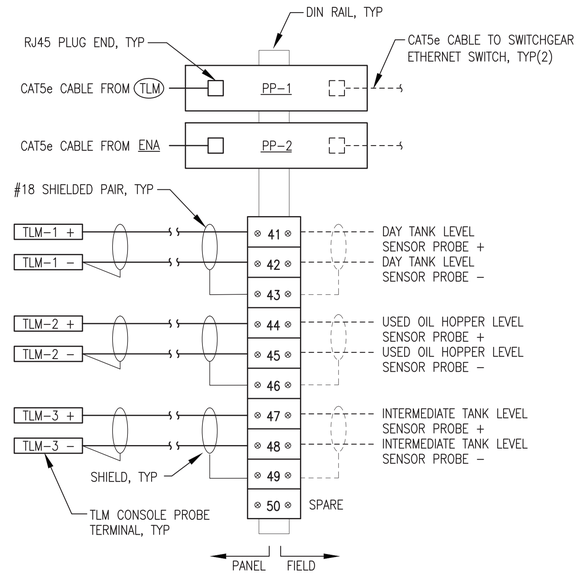
TITLE: DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS

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

DRAWN BY: BCG/JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 11/1/21
FILE NAME: VEN PP E7 | SHEET: E7.1
PROJECT NUMBER:







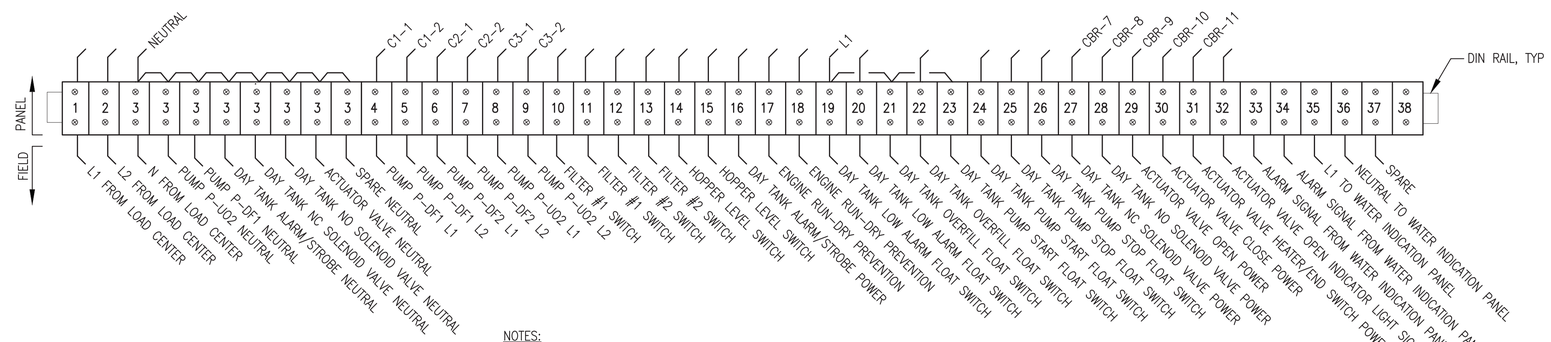
NOTES:

1. 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 E7.2 FRONT PANEL LAYOUT
NO SCALE

2 E7.2 SUB PANEL LAYOUT
NO SCALE

3 E7.2 TB-2 TERM STRIP & PP-1 ETHERNET PANEL LAYOUT
NO SCALE



NOTES:

1) 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.
2) IN ADDITION TO THE TERMINAL STRIPS SHOWN, PROVIDE 6 EACH 35A SCREW TERMINAL GROUNDING BUS.

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

ISSUED FOR CONSTRUCTION NOVEMBER 2021

STATE OF ALASKA 49TH CLOS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: DAY TANK CONTROL PANEL LAYOUT & TERMINAL STRIPS

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

DRAWN BY: BCG/JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E7	SHEET: E7.2
PROJECT NUMBER:	

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 CLOSES. 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 CLOSES, 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 CLOSES, 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 CLOSES 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.

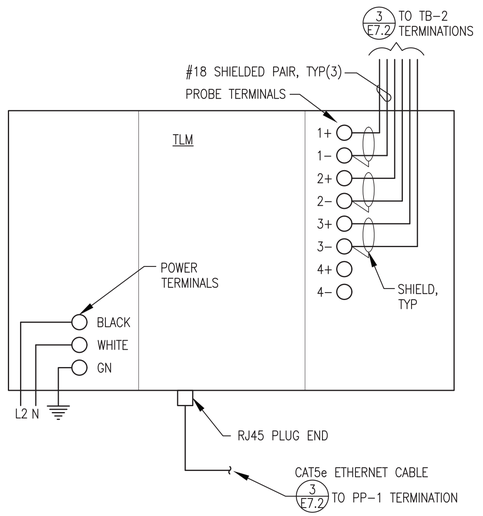
USED OIL BLENDER SYSTEM SEQUENCE OF OPERATIONS:

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.

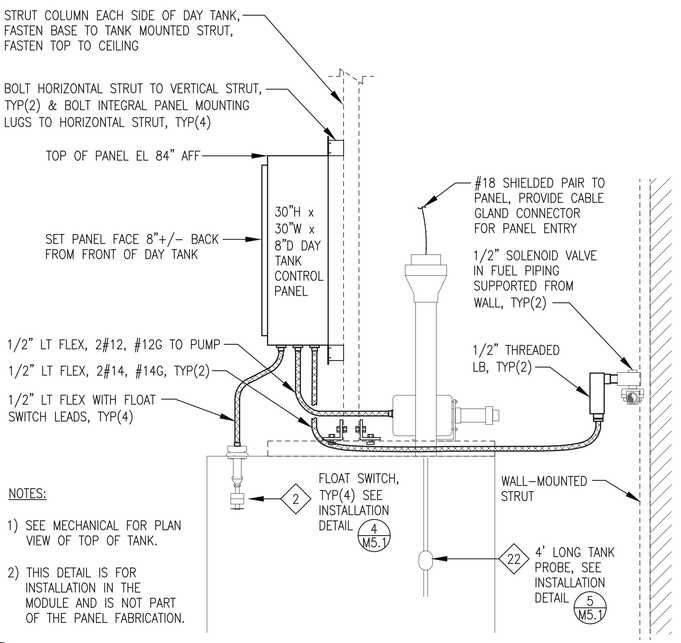
2) NORMAL OPERATION – WHENEVER THE DAY TANK FILL SEQUENCE IS INITIATED, BOTH THE DIESEL CIRCULATING PUMP P-DF2 AND THE USED OIL INJECTION PUMP P-UO2 RUN AND THE ASSOCIATED GREEN PUMP RUNNING LIGHTS ARE ON.

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-UO2 STOPS RUNNING AND THE AMBER HOPPER LOW OIL LEVEL LIGHT TURNS ON. PUMP P-UO2 WILL NOT OPERATE UNTIL THE USED OIL LEVEL IN THE HOPPER RISES ABOVE THE LOW LEVEL. RESET IS NOT REQUIRED.



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



2 E7.3 DAY TANK CONTROL PANEL & DEVICE INSTALLATION
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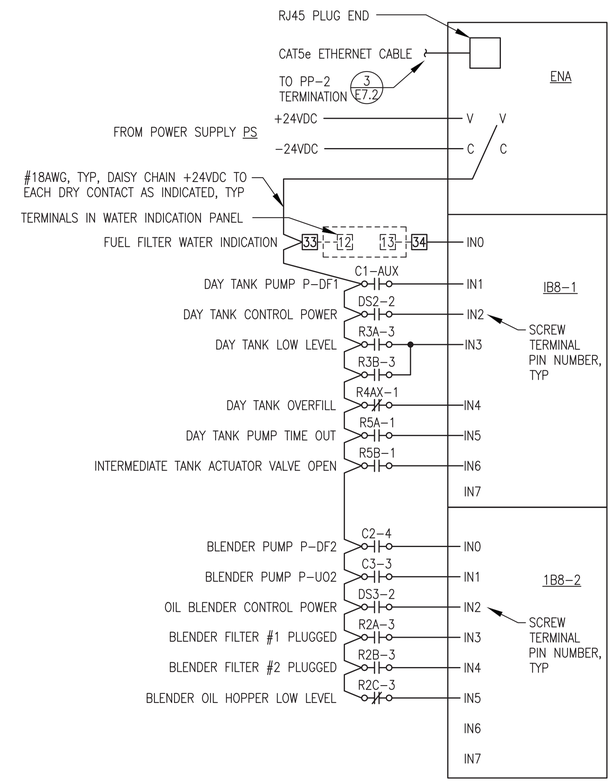

3 E7.3 ETHERNET POINT I/O CONNECTIONS
NO SCALE

ISSUED FOR CONSTRUCTION
NOVEMBER 2021

STATE OF ALASKA 49TH
CLOIS W. VERSYP
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PHONE: (907) 562-3252

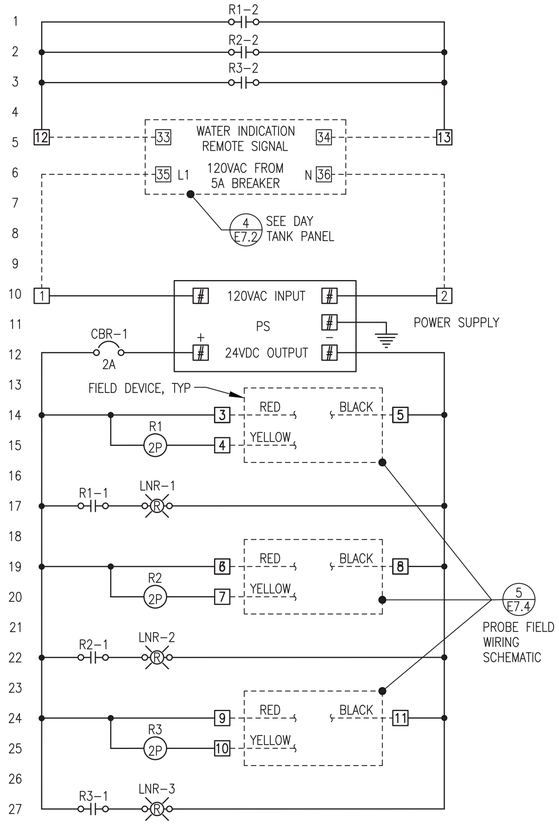
ALASKA ENERGY AUTHORITY

PROJECT: VENEIE POWER SYSTEM UPGRADE

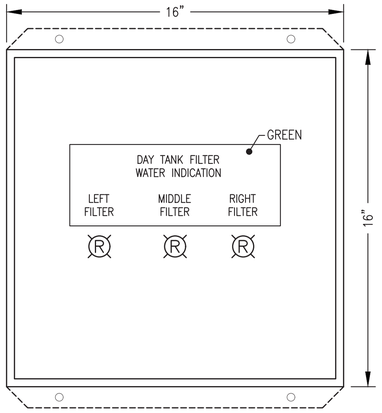
TITLE: DAY TANK CONTROL PANEL NOTES, SEQUENCE OF OPERATIONS & INTERCONNECT DETAILS

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

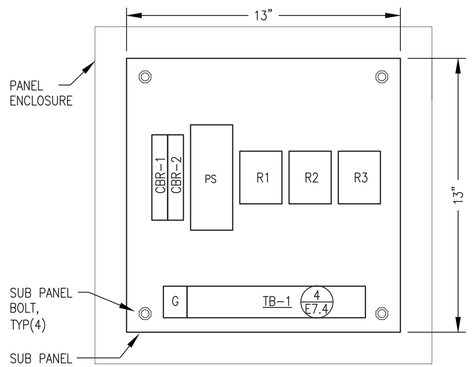
DRAWN BY: BCG/JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E7	SHEET: E7.3
PROJECT NUMBER:	



1 E7.4 PANEL WIRING DIAGRAM
NO SCALE



2 E7.4 FRONT PANEL LAYOUT
NO SCALE



3 E7.4 SUB PANEL LAYOUT
NO SCALE

PANEL BILL OF MATERIALS

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
CBR-1	1	ALLEN-BRADLEY	1489-M1-C020	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 2A
LNR	3	ALLEN-BRADLEY	800HQRH2R	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

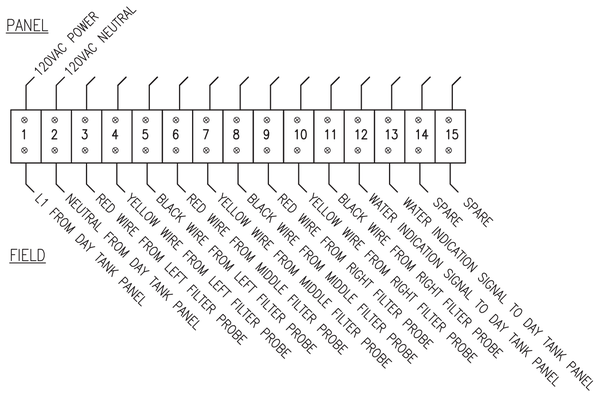
PANEL SHOP FABRICATION NOTES:

1) 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.

2) 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.

3) PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED. SECURE TO PANEL FACE WITH A MINIMUM OF TWO MOUNTING SCREWS.

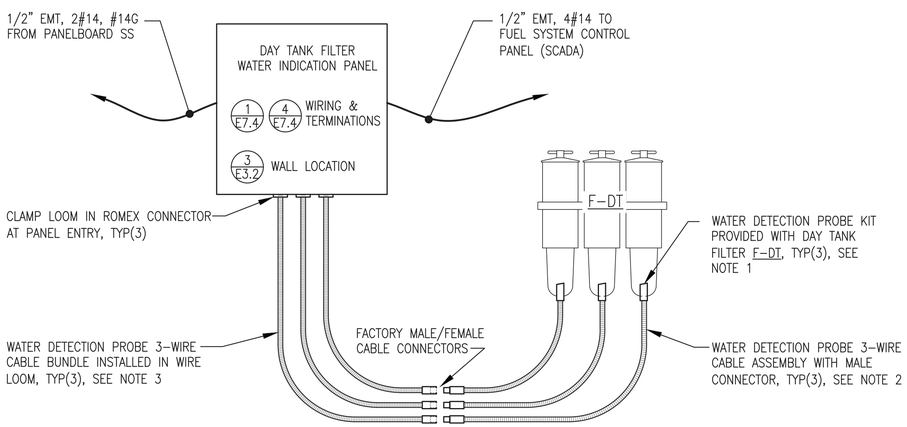
4) CONNECT DEVICES WITH MANUFACTURER PROVIDED CABLES IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS.



NOTES:

1. 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.
2. IN ADDITION TO THE TERMINAL STRIPS SHOWN, PROVIDE 2 EACH 60A SCREW TERMINAL GROUNDING BUS.

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

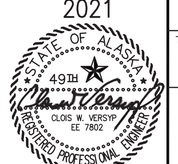


NOTES:

1. 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.
2. 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.
3. 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.

5 E7.4 FIELD WIRING SCHEMATIC
NO SCALE

ISSUED FOR CONSTRUCTION
NOVEMBER 2021



CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

ALASKA ENERGY AUTHORITY

PROJECT: VENETIE POWER SYSTEM UPGRADE

TITLE: DAY TANK FILTER WATER INDICATION PANEL

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

DRAWN BY: BCG/JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 11/1/21
FILE NAME: VEN PP E7	SHEET: E7.4
PROJECT NUMBER:	

GENERAL NOTES

1. ALL CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH THE STAKING SHEETS, NOTES TO STAKING SHEETS, SPECIFICATIONS, AND THE CONSTRUCTION DRAWINGS.

2. 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.

3. 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 VENETIE VILLAGE ELECTRIC (OWNER). PRIOR TO COMMENCING WORK ON THE UPGRADE, MEET WITH VENETIE VILLAGE ELECTRIC TO DEVELOP AN OUTAGE SCHEDULE THAT WILL KEEP DISRUPTIONS OF POWER TO THE CUSTOMERS TO A MINIMUM. VENETIE VILLAGE ELECTRIC SHALL HAVE FINAL AUTHORITY ON WHEN OUTAGES CAN OCCUR.

4. 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.

5. UNLESS OTHERWISE INDICATED, THE EXISTING PRIMARY AND SECONDARY DISTRIBUTION SYSTEM, INCLUDING HARDWARE, CONDUCTORS (BOTH PRIMARY AND SECONDARY), TRANSFORMERS, CROSSARMS, INSULATORS, LIGHTS, ANCHOR RODS, GUYS, AND ALL OTHER MATERIAL DIRECTLY RELATED TO THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM SHALL BE REMOVED AFTER COMPLETION OF THE INSTALLATION, ENERGIZATION, AND SERVICE CONVERSIONS TO THE NEW ELECTRICAL DISTRIBUTION SYSTEM. POLES THAT HAVE TELEPHONE SYSTEM CONDUCTORS OR EQUIPMENT ATTACHED SHALL NOT BE REMOVED.

6. ALL EXISTING UTILITIES MAY NOT BE SHOWN. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO DIGGING HOLES FOR POLES AND ANCHORS. COORDINATE WITH THE VILLAGE OF VENETIE AND VENETIE VILLAGE ELECTRIC TO LOCATE UNDERGROUND UTILITIES.

7. 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.

8. 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.

9. 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.

10. SEE CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL INFORMATION.

11. 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.

12. 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.

13. 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 10%. .

SCOPE OF WORK

1. THE PURPOSE OF THIS PROJECT IS TO REPLACE THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM IN VENETIE, ALASKA, AS INDICATED ON THE DRAWINGS.

2. THE LIMIT OF CONSTRUCTION FOR THE NEW ELECTRICAL DISTRIBUTION SYSTEM IS THE CONNECTION TO THE EXISTING SERVICE MASTS AT THE VARIOUS SERVICES. THE CONTRACTOR SHALL REMOVE THE EXISTING SECONDARY SERVICE DROP CONDUCTORS, UNLESS OTHERWISE INDICATED ON THE DRAWINGS, AND INSTALL NEW SERVICE CONDUCTORS TO EACH SERVICE. THE EXISTING METER BASE OR SERVICE MAST WILL NOT BE THE RESPONSIBILITY OF THE CONTRACTOR EXCEPT FOR PROVIDING DEADEND ASSEMBLIES AND MAKING THE CONNECTION TO THE EXISTING SERVICE ENTRANCE CONDUCTORS AT THE SERVICE MAST. IF THE EXISTING SERVICE MAST IS NOT IN SATISFACTORY CONDITION TO SUPPORT THE NEW SERVICE, THE CONTRACTOR SHALL NOTIFY VENETIE VILLAGE ELECTRIC FOR RESOLUTION. THE CONTRACTOR SHALL NOTIFY VENETIE VILLAGE ELECTRIC FAR ENOUGH IN ADVANCE TO ALLOW VENETIE VILLAGE ELECTRIC TIME TO REPAIR OR REPLACE THE SERVICE MAST.

COORDINATION BETWEEN NEW AND EXISTING DISTRIBUTION SYSTEMS

1. THE NEW ELECTRICAL DISTRIBUTION SYSTEM WILL CROSS THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM AT MULITIPLE LOCATIONS AS INDICATED ON THE DRAWINGS, BUT NOT LIMITED TO THE LOCATIONS SHOWN. AT ALL CROSSINGS THE CONTRACTOR SHALL MAKE PROVISIONS IN THE EXISTING AND/OR NEW ELECTRICAL DISTRIBUTION SYSTEMS TO MAINTAIN POWER TO THE CUSTOMERS DURING THE CONSTRUCTION OF THE NEW SYSTEM. AS INDICATED, ALL OUTAGES SHALL BE COORDINATED WITH AND APPROVED BY VENETIE VILLAGE ELECTRIC. ACCEPTABLE METHODS WILL BE AS FOLLOWS:

   a) WHERE THE NEW OVERHEAD DISTRIBUTION SYSTEM IS HIGHER THAN THE EXISTING SYSTEM, CONTRACTOR MAY LOWER THE NEUTRAL OF THE NEW SYSTEM SUCH THAT THE PRIMARY CONDUCTORS OF THE NEW SYSTEM CROSS OVER THE EXISTING SYSTEM AND THE NEUTRAL CROSSES UNDER.

   b) CONTRACTOR MAY INSTALL TEMPORARY INSULATED MEDIUM VOLTAGE CONDUCTORS AND ROUTE THE CONDUCTORS ON THE GROUND. IF THIS METHOD IS CHOSEN, THE AT–GRADE CONDUCTORS SHALL BE PROTECTED FROM VANDALISM AND DAMAGE AND PROVISIONS SHALL BE MADE FOR THE SUPPORT OF THE EXISTING POLES DURING THE INSTALLATION OF THE NEW SYSTEM.

   c) OTHER METHODS MAY BE PROPOSED BY THE CONTRACTOR AS APPLICABLE TO ALLOW INSTALLATION OF THE NEW SYSTEM WHILE THE EXISTING SYSTEM REMAINS IN SERVICE.

2. IN ALL CASES, THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE BEST METHOD OF CROSSING THE EXISTING DISTRIBUTION SYSTEM. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL REQUIRED TO ACCOMPLISH ALL CROSSINGS.

3. AT ALL TIMES AND IN ALL LOCATIONS, TEMPORARY INSTALLATIONS SHALL MEET THE NESC SAFETY REQUIREMENTS. ANY TEMPORARY INSTALLATION THAT IS ROUTED ON THE GROUND SHALL BE CLEARLY IDENTIFIED AND, IF REQUIRED, PROVISIONS SHALL BE INSTALLED FOR PERSONNEL AND VEHICLE CROSSING.

ELECTRICAL EQUIPMENT SCHEDULE

ITEM NO.	DESCRIPTION	MANUFACTURER
◇1	STREET LIGHT, LED TYPE, POLE MOUNTED WITH ARM AND ATTACHMENTS. TYPE II LIGHT DISTRIBUTION. 4000K CCT, GRAY. PROVIDE 2–1/2' LONG GALVANIZED, 2" PIPE TENON CANTILEVER ARM SUITABLE FOR WOOD POLES. 120 VOLTS. PHOTO ELECTRIC CONTROL.	AMERICAN ELECTRIC LIGHTING CAT. No. ATBO 20LEDE70 MVOLT R2 PCSS LITHONIA SMAW–T20–US2–5–GALV TENON ARM
◇2	STREET LIGHT, LED TYPE, POLE MOUNTED WITH ARM AND ATTACHMENTS. TYPE IV LIGHT DISTRIBUTION. 4000K CCT, GRAY. PROVIDE 2–1/2' LONG GALVANIZED, 2" PIPE TENON CANTILEVER ARM SUITABLE FOR WOOD POLES. 120 VOLTS. PHOTO ELECTRIC CONTROL.	AMERICAN ELECTRIC LIGHTING CAT. No. ATBO 20LEDE70 MVOLT R2 PCSS LITHONIA SMAW–T20–US2–5–GALV TENON ARM
◇3	120/240 VOLT, SINGLE–PHASE, THREE–WIRE, 100 AMP, OVERHEAD BASE FORM 2S WITH 304 STAINLESS STEEL ENCLOSURE. PROVIDE AW HUB.	B–LINE CAT. No. 011–SS

ABBREVIATIONS

(E)	EXISTING
A	AMPERE
AC	ALTERNATING CURRENT
AIC	AMPERES INTERRUPTING CAPACITY
AWG	AMERICA WIRE GAGE
BCu	BARE COPPER
C	CONDUCTOR
C	CONDUIT
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

LEGEND

EXISTING SINGLE PHASE OVERHEAD PRIMARY	NEW SINGLE PHASE OVERHEAD PRIMARY
EXISTING 3–PHASE OVERHEAD PRIMARY	NEW 3–PHASE OVERHEAD PRIMARY
EXISTING UNDERGROUND	NEW UNDERGROUND
EXISTING SECONDARY*	NEW SECONDARY*
EXISTING ELECTRICAL POLE	NEW ELECTRICAL POLE
EXISTING STUB POLE	NEW STUB POLE
EXISTING TRANSFORMER XX=SIZE	NEW TRANSFORMER XX=SIZE
EXISTING GUY	NEW GUY
EXISTING LIGHT	NEW LIGHT

*SINGLE PHASE UNLESS NOTED ON THE DRAWINGS

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION LEGEND, ABBREVATIONS, SPECIFICATIONS & NOTES

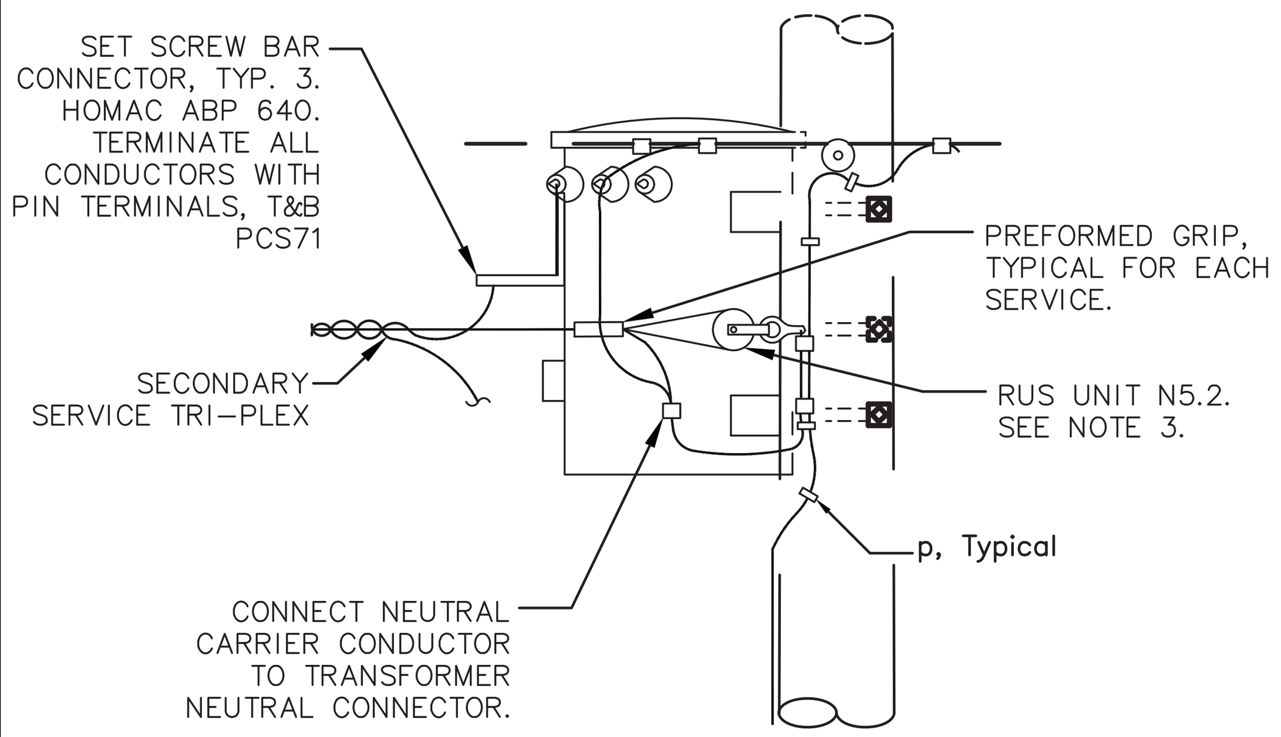
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date: NOV 2021
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E10.0

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:07 AM

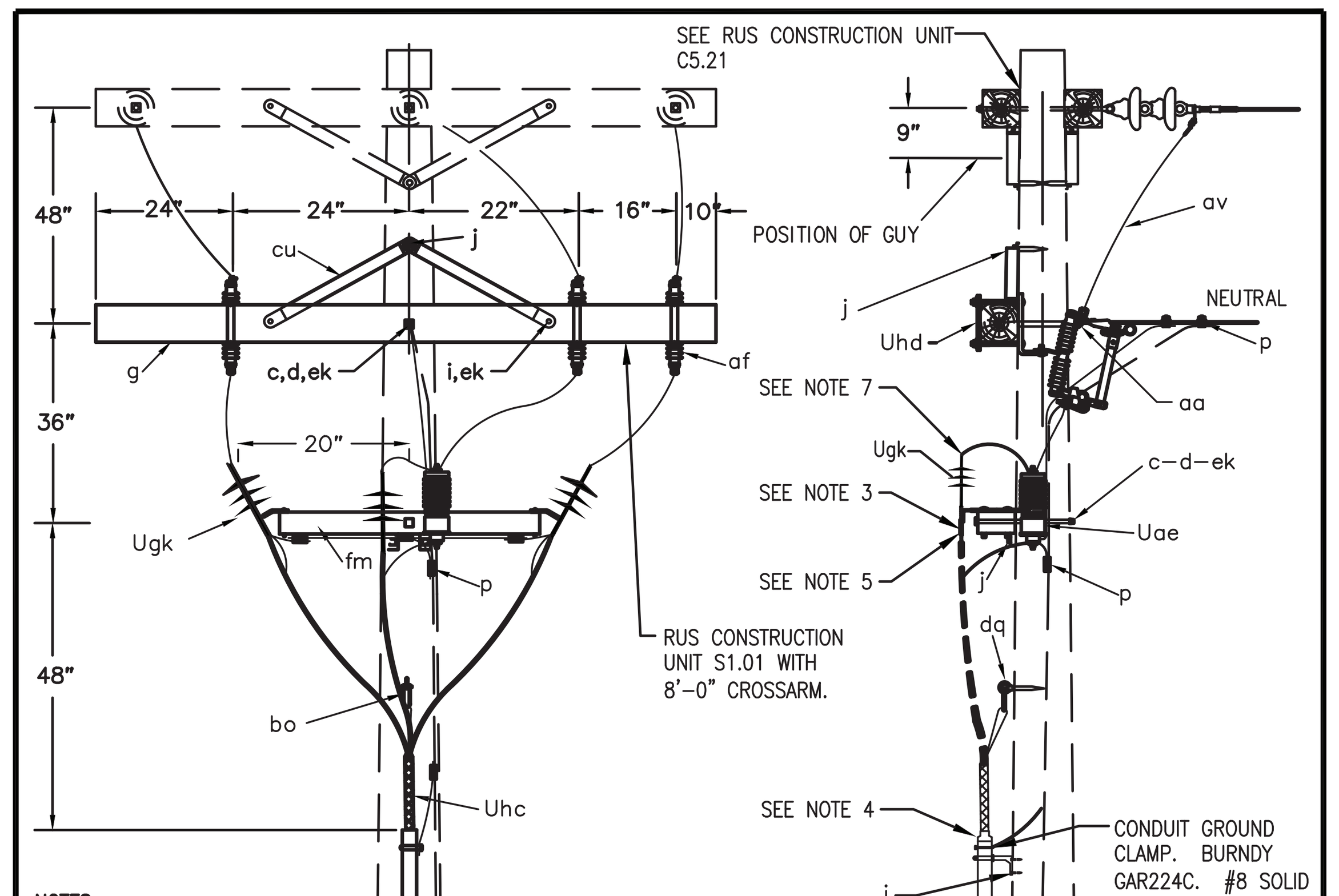


NOTES:
1) THIS CONSTRUCTION UNIT APPLIES ONLY TO SINGLE-PHASE SECONDARY CONNECTIONS AT SINGLE-PHASE TRANSFORMERS. FOR CONNECTIONS THREE-PHASE TRANSFORMERS SEE APPROPRIATE RUS CONSTRUCTION UNIT.
2) FOR POLE GROUNDING, TRANSFORMER GROUNDING, NEUTRAL CONNECTIONS, ETC. SEE THE APPROPRIATE RUS CONSTRUCTION UNIT.
3) FOR SERVICES ON OPPOSITE SIDES OF POLE PROVIDE TWO UNITS. AN EYE NUT MAY BE USED FOR THE SECOND UNIT IF DESIRED BY THE CONTRACTOR.

ITEM	QTY	MATERIAL
p		Connectors, as req'd
–	–	–
av		Jumpers, as req'd

SINGLE–PHASE SECONDARY SERVICE ASSEMBLY

DEC 2017 | N7.6



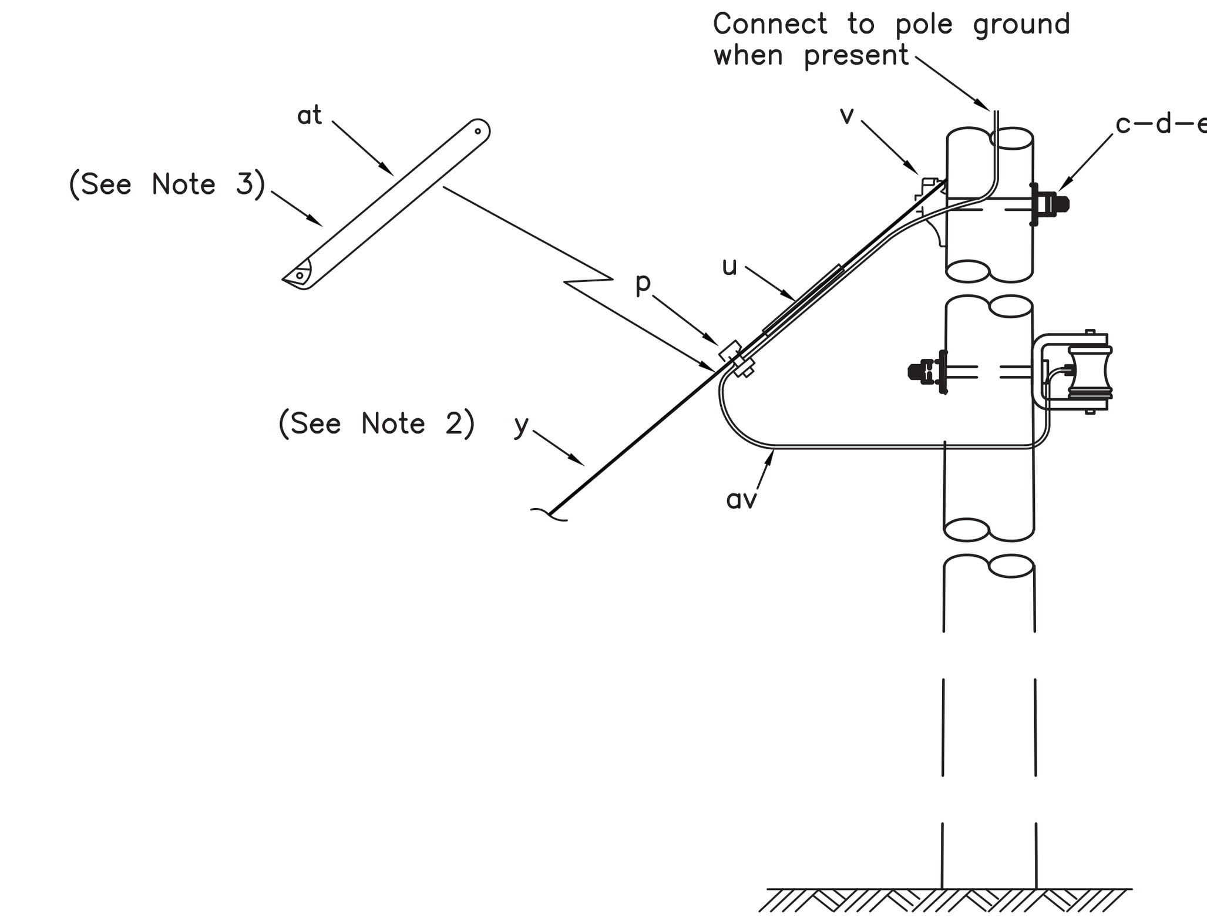
NOTES:
1. TOTAL ARRESTER LEAD LENGTH SHALL BE UNDER 3 FEET.
2. NO BENDS PERMITEED WITHIN 6 INCHES OF CABLE TERMINAL BASE.
3. PROVIDE HUBBELL NEMA A MOUNTING BRACKET, NO. C2060127, ON MOUNTING BRACKET. AFTER INSTALLATION OF CABLE WRAP, INSTALL HEAT SHRINK JACKET OVER WRAP.
4. INSTALL 3-CONDUCTOR, 15kV, 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	Eyenut, 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

AUG 2021 | 12.47/7.2 kV | UC2a



NOTES:
1. PROVIDE PRE-FORMED GUY DEADEND (u.) OTHER DEADEND MATERIAL SHALL NOT BE SUBSTITUTED.
2. GUY WIRE SHALL BE 3/8" EHS UNLESS OTHERWISE NOTED. SEE SPECIFICATION.
3. INSTALL RED STRIPED REFLECTIVE TAPE ON BOTH SIDES OF GUY GUARD. INSTALL TAPE IN WARM ENVIRONMENT, ABOVE MANUFACTURE RECOMMENDED TEMPERATURE.

ITEM	QTY	MATERIAL
c	1	Bolt, machine, 3/4" x req'd length
d	1	Washer, square, 4", curved
p		Connectors, guy bond and as req'd
j	1	Screw, lag, 1/2" x 4"
u	2	Deadend for guy strand, heavy duty
v	1	Guy attachment, guy hook type
y		Guy wire, as req'd
at	1	Guy marker, Yellow
av		Jumpers, as req'd
ck	1	Clamp, anchor bonding
ek	1	Locknuts

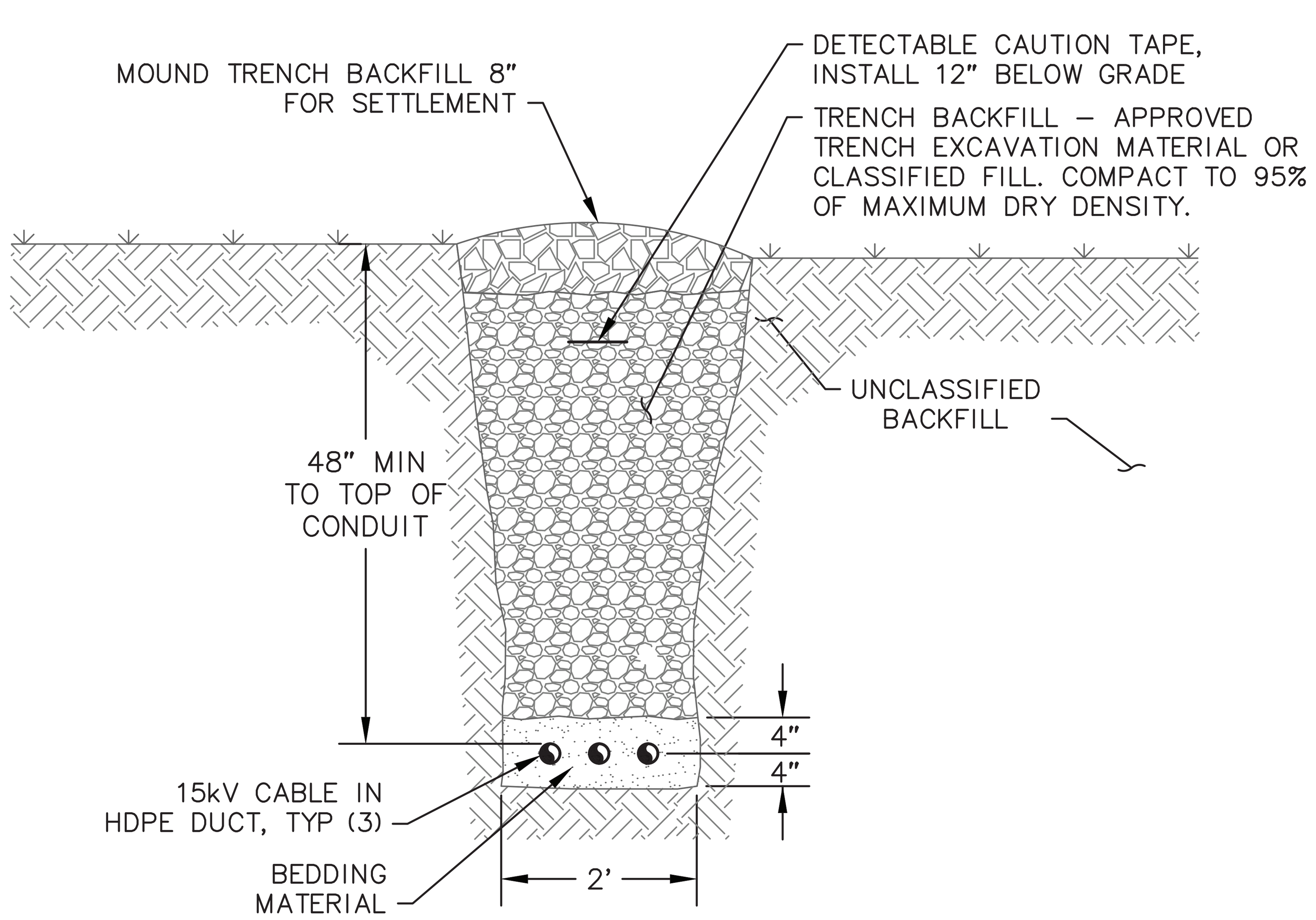
DESIGN PARAMETERS:

PERMITTED LOAD IS LEAST OF: 8,500 LBS (IN ANY DIRECTION) or 90% of RATED BREAKING STRENGTH OF GUY WIRE

SINGLE DOWN GUY (THROUGH BOLT TYPE)

DEC 2017 | E1.1La

TRANSFORMER FUSE LINK SCHEDULE	
TRANSFORMER SIZE	FUSE LINK SIZE AND TYPE
10KVA	1.4 Amp, SloFast
15KVA	2.1 Amp, SloFast
25 KVA	3.5 Amp, SloFast
37.5 KVA	5.2 Amp, SloFast
75 KVA	10.4 Amp, SloFast
100 KVA	14 Amp, SloFast

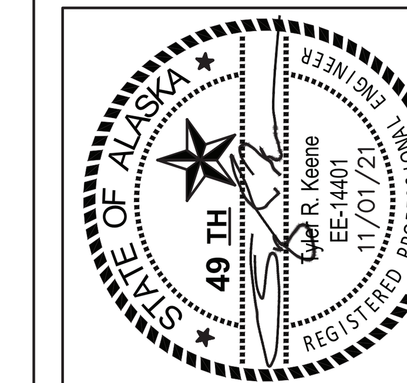


NOTES
1. MAINTAIN MINIMUM 12 INCHES OF SEPARATION BETWEEN 600V AND 15kV CABLE AT ALL TIMES. SEPARATION CAN BE VERTICAL OR HORIZONTAL.
2. 600V CABLE SHALL HAVE A MINIMUM OF 36" COVER AT ALL LOCATION.
3. ALL TRENCHING AND OTHER EXCAVATIONS SHALL BE SLOPED OR SHORED IN ACCORDANCE WITH OSHA STANDARDS.

1 / E10.1 **CABLE INSTALLATION OFF ROAD**

Scale: NTS

ALASKA ENERGY AUTHORITY



CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE
DISTRIBUTION DETAILS
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E10.1

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ALASKA ENERGY AUTHORITY

STATE OF ALASKA
49 TH
KEITH HAMM
EE-11401
11/01/21
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
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VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION SITE PLAN

VENETIE, ALASKA

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Designed TRK
Drawn TRK
Approved KH

Sheet No.
E11.0

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:07 AM

NOTES

1. DEMOLISH ALL EXISTING DISTRIBUTION CONDUCTORS, CROSSARMS, HARDWARE, ETC. TAKEN OUT OF SERVICE AS A RESULT OF WORK AWARDED EXCEPT WHERE SPECIFICALLY INDICATED TO REMAIN. COORDINATE DEMO WORK TO MINIMIZE OUTAGES.
2. EXISTING POLES WITH TELEPHONE TO REMAIN. EXISTING POLES WITHOUT TELEPHONE TO BE REMOVED UNLESS SPECIFICALLY NOTED.
3. EXISTING TELEPHONE TO REMAIN IN SERVICE ON EXISTING POLES.
4. EXISTING POLE, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN. SEE STAKING SHEETS FOR MODIFICATIONS TO POLE AND CONDUCTORS IF REQUIRED. CONNECT TO NEW SYSTEM AS SHOWN ON THE DISTRIBUTION PLANS.

MATCH LINE E11.6

MATCH LINE E11.2

MATCH LINE E11.7

NOTE 4

SEE SHEET E11.10 FOR ENLARGED POWER PLANT DEMOLITION PLAN

ABANDON UNDERGROUND. REMOVE CONDUCTORS AND RISERS. ABANDON UNDERGROUND CONDUIT. IF CONDUCTORS ARE DIRECT BURIED, CUT CONDUCTORS BELOW GRADE AND ABANDON.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KEMPF EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

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VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN (1 of 9)

VENETIE, ALASKA

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MATCH LINE E11.4

MATCH LINE E11.3

MATCH LINE E11.1

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

POST OFFICE LIGHT POLES

ABANDON UNDERGROUND. REMOVE CONDUCTORS AND RISERS. ABANDON UNDERGROUND CONDUIT. IF CONDUCTORS ARE DIRECT BURIED, CUT CONDUCTORS BELOW GRADE AND ABANDON.

NOTES

1. DEMOLISH ALL EXISTING DISTRIBUTION CONDUCTORS, CROSSARMS, HARDWARE, ETC. TAKEN OUT OF SERVICE AS A RESULT OF WORK AWARDED EXCEPT WHERE SPECIFICALLY INDICATED TO REMAIN. COORDINATE DEMO WORK TO MINIMIZE OUTAGES.
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4. EXISTING POLE, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN. SEE STAKING SHEETS FOR MODIFICATIONS TO POLE AND CONDUCTORS IF REQUIRED. CONNECT TO NEW SYSTEM AS SHOWN ON THE DISTRIBUTION PLANS.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. K. KEMPF EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN (2 of 9)

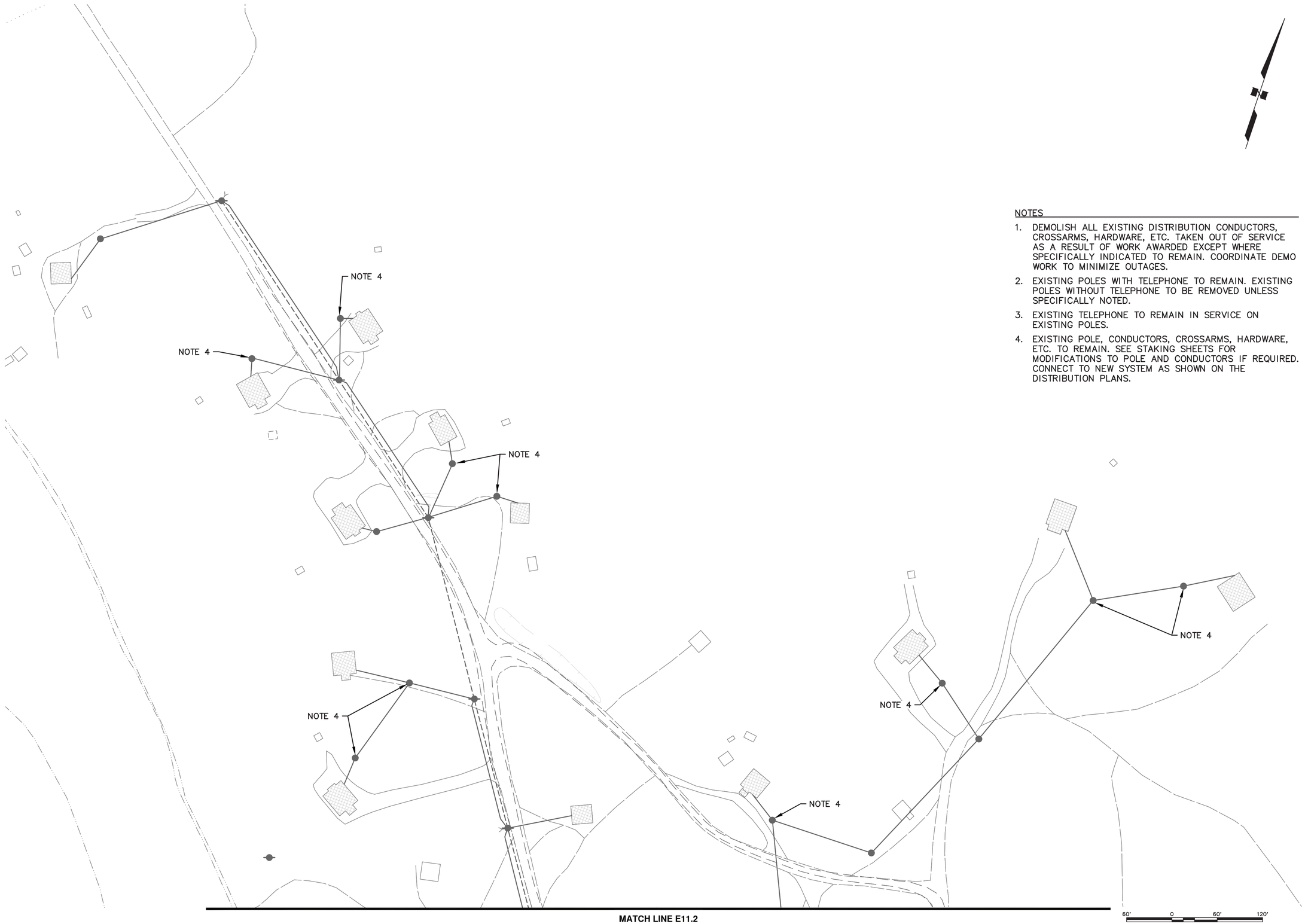
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.2

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:07 AM



NOTES

1. DEMOLISH ALL EXISTING DISTRIBUTION CONDUCTORS, CROSSARMS, HARDWARE, ETC. TAKEN OUT OF SERVICE AS A RESULT OF WORK AWARDED EXCEPT WHERE SPECIFICALLY INDICATED TO REMAIN. COORDINATE DEMO WORK TO MINIMIZE OUTAGES.
2. EXISTING POLES WITH TELEPHONE TO REMAIN. EXISTING POLES WITHOUT TELEPHONE TO BE REMOVED UNLESS SPECIFICALLY NOTED.
3. EXISTING TELEPHONE TO REMAIN IN SERVICE ON EXISTING POLES.
4. EXISTING POLE, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN. SEE STAKING SHEETS FOR MODIFICATIONS TO POLE AND CONDUCTORS IF REQUIRED. CONNECT TO NEW SYSTEM AS SHOWN ON THE DISTRIBUTION PLANS.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN (3 of 9)

VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.3

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:07 AM

NOTES

1. DEMOLISH ALL EXISTING DISTRIBUTION CONDUCTORS, CROSSARMS, HARDWARE, ETC. TAKEN OUT OF SERVICE AS A RESULT OF WORK AWARDED EXCEPT WHERE SPECIFICALLY INDICATED TO REMAIN. COORDINATE DEMO WORK TO MINIMIZE OUTAGES.
2. EXISTING POLES WITH TELEPHONE TO REMAIN. EXISTING POLES WITHOUT TELEPHONE TO BE REMOVED UNLESS SPECIFICALLY NOTED.
3. EXISTING TELEPHONE TO REMAIN IN SERVICE ON EXISTING POLES.
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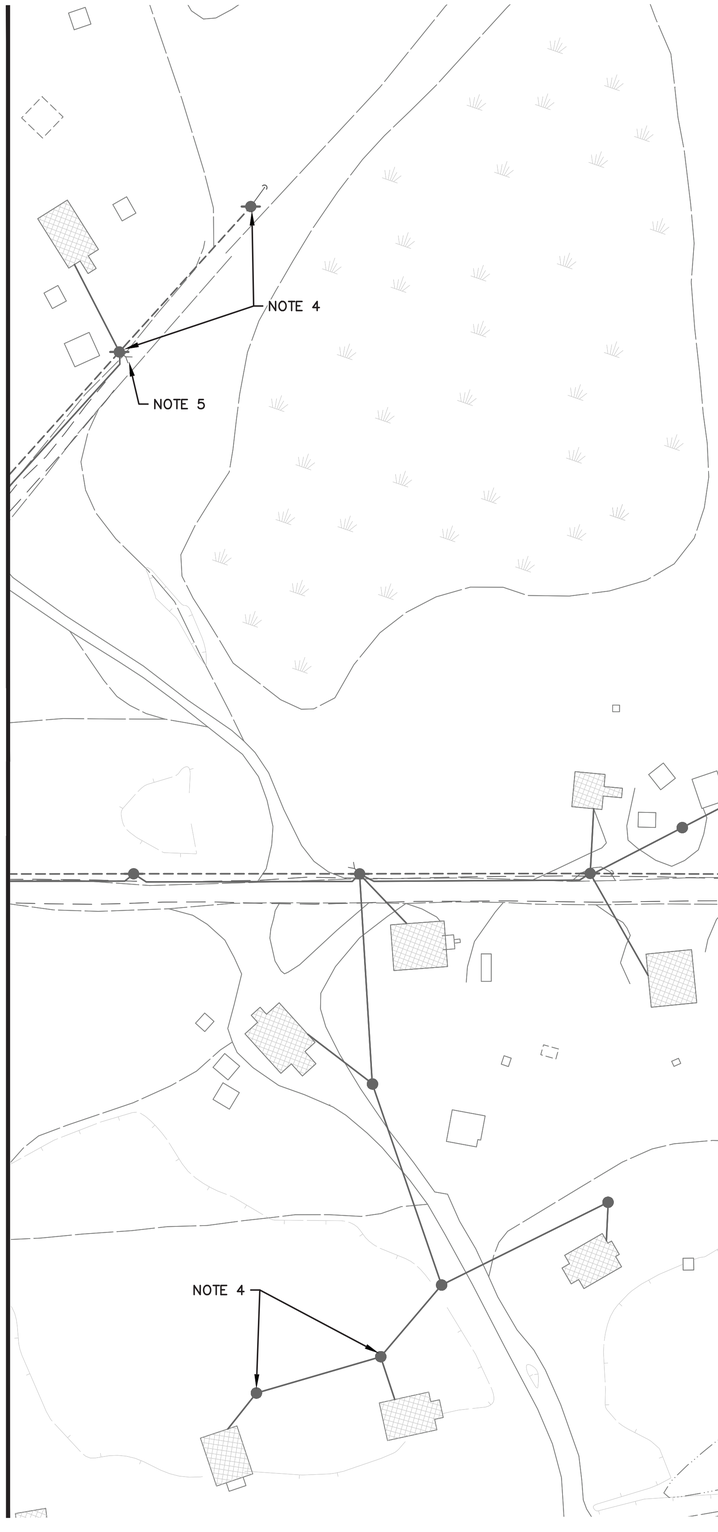
5. REMOVE TRANSFORMER AND REPLACE WITH NEW TRANSFORMER. WORK SHALL BE INCLUDED IN ADDITIVE ALTERNATE #2.



ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. K. Kelley EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN (4 of 9)

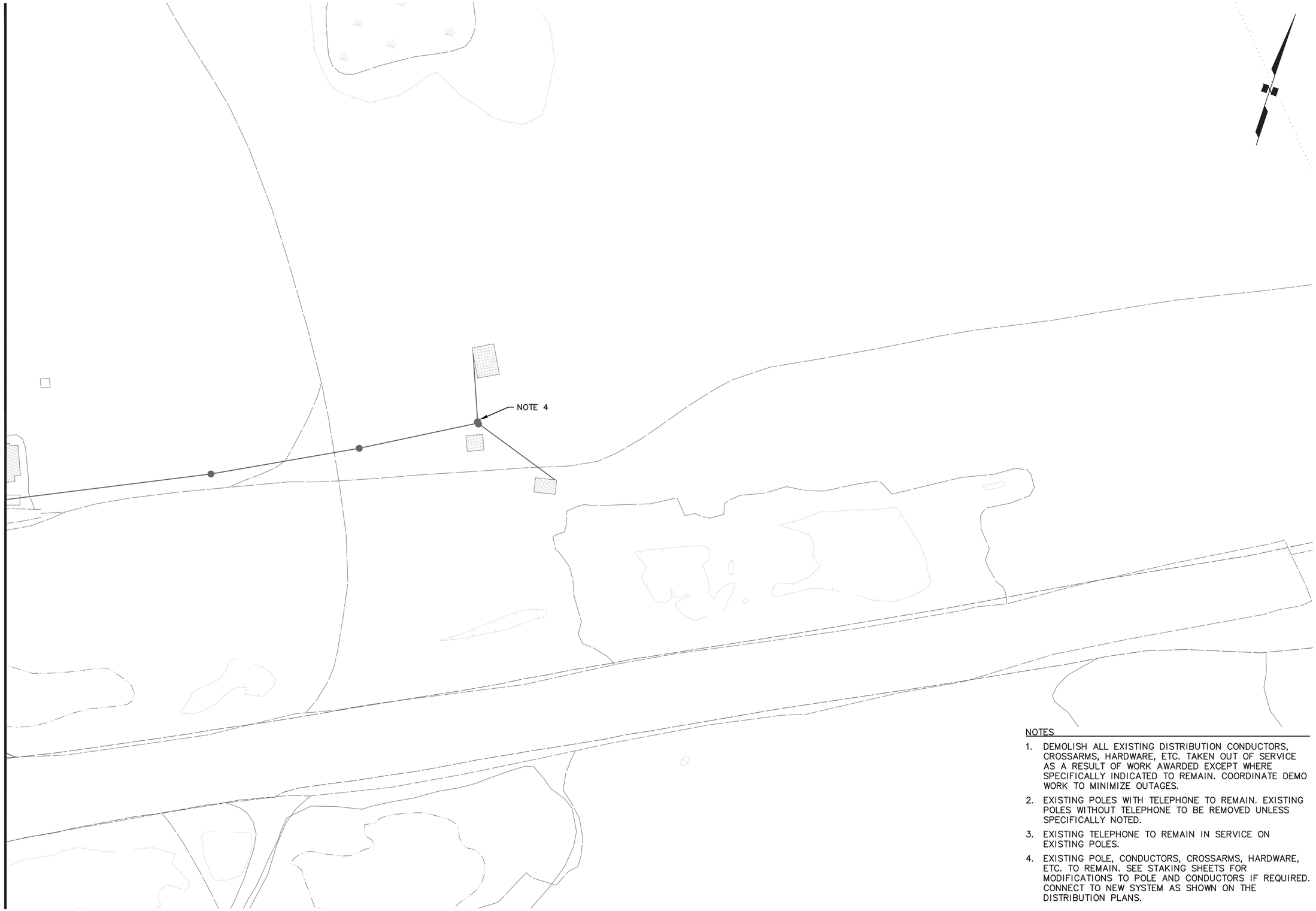
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.4

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:07 AM



NOTES

1. DEMOLISH ALL EXISTING DISTRIBUTION CONDUCTORS, CROSSARMS, HARDWARE, ETC. TAKEN OUT OF SERVICE AS A RESULT OF WORK AWARDED EXCEPT WHERE SPECIFICALLY INDICATED TO REMAIN. COORDINATE DEMO WORK TO MINIMIZE OUTAGES.
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3. EXISTING TELEPHONE TO REMAIN IN SERVICE ON EXISTING POLES.
4. EXISTING POLE, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN. SEE STAKING SHEETS FOR MODIFICATIONS TO POLE AND CONDUCTORS IF REQUIRED. CONNECT TO NEW SYSTEM AS SHOWN ON THE DISTRIBUTION PLANS.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. Kelley EE-11401 11/01/21

CRW ENGINEERING GROUP LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN
(5 of 9)

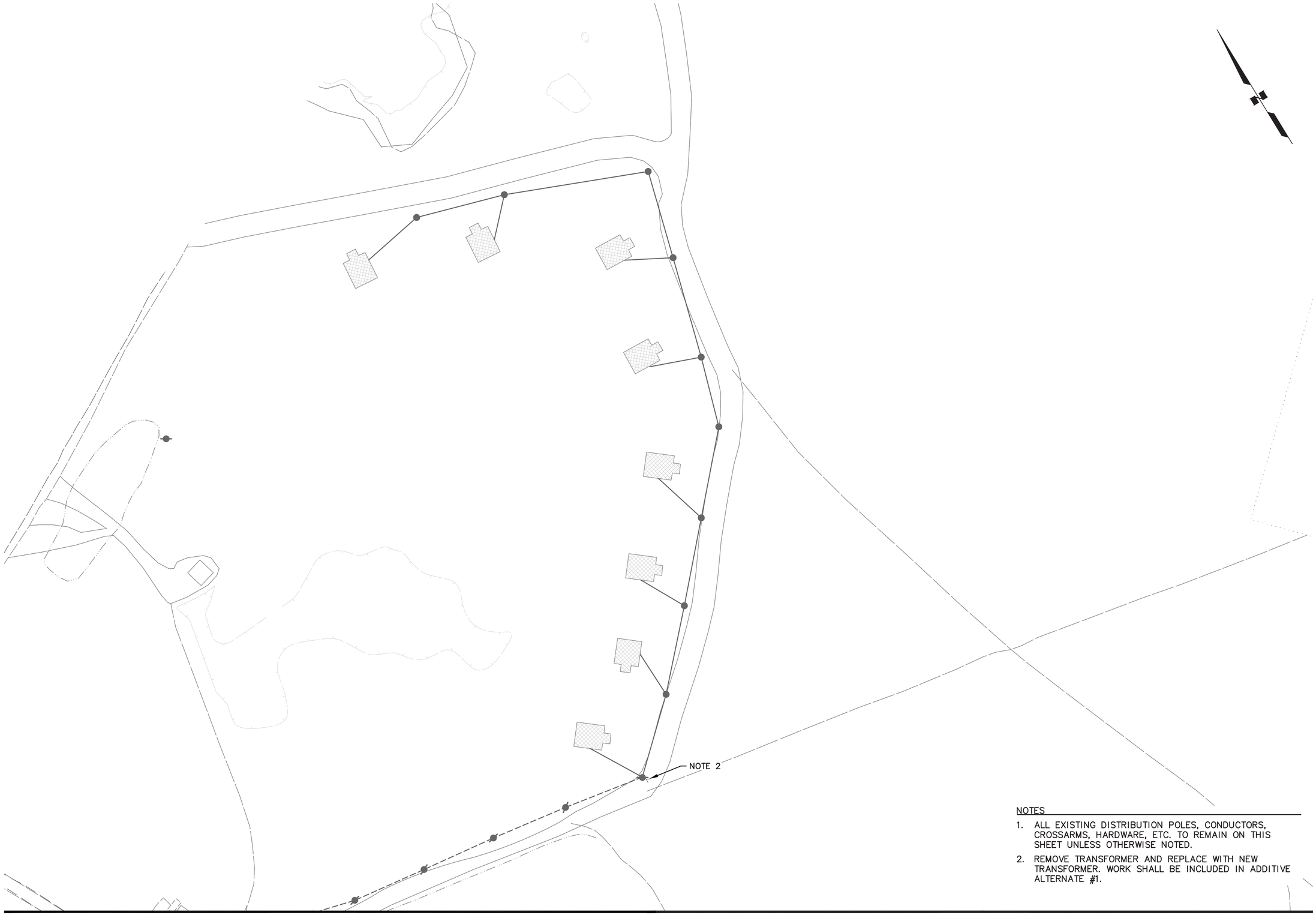
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No.
E11.5

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:07 AM



NOTES

1. ALL EXISTING DISTRIBUTION POLES, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN ON THIS SHEET UNLESS OTHERWISE NOTED.
2. REMOVE TRANSFORMER AND REPLACE WITH NEW TRANSFORMER. WORK SHALL BE INCLUDED IN ADDITIVE ALTERNATE #1.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49 TH REGISTERED PROFESSIONAL ENGINEER K. Kemp EE-11401 11/01/21

CRW ENGINEERING GROUP LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN
(6 of 9)

VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No.
E11.6

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:07 AM

MATCH LINE E11.6

MATCH LINE E11.1

MATCH LINE E11.8

NOTE 4

NOTE 5

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTE 4

NOTES

1. DEMOLISH ALL EXISTING DISTRIBUTION CONDUCTORS, CROSSARMS, HARDWARE, ETC. TAKEN OUT OF SERVICE AS A RESULT OF WORK AWARDED EXCEPT WHERE SPECIFICALLY INDICATED TO REMAIN. COORDINATE DEMO WORK TO MINIMIZE OUTAGES.
2. EXISTING POLES WITH TELEPHONE TO REMAIN. EXISTING POLES WITHOUT TELEPHONE TO BE REMOVED UNLESS SPECIFICALLY NOTED.
3. EXISTING TELEPHONE TO REMAIN IN SERVICE ON EXISTING POLES.
4. EXISTING POLE, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN. SEE STAKING SHEETS FOR MODIFICATIONS TO POLE AND CONDUCTORS IF REQUIRED. CONNECT TO NEW SYSTEM AS SHOWN ON THE DISTRIBUTION PLANS.
5. REMOVE TRANSFORMER AND REPLACE WITH NEW TRANSFORMER. WORK SHALL BE INCLUDED IN ADDITIVE ALTERNATE #1.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. K. Kohler EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN (7 of 9)

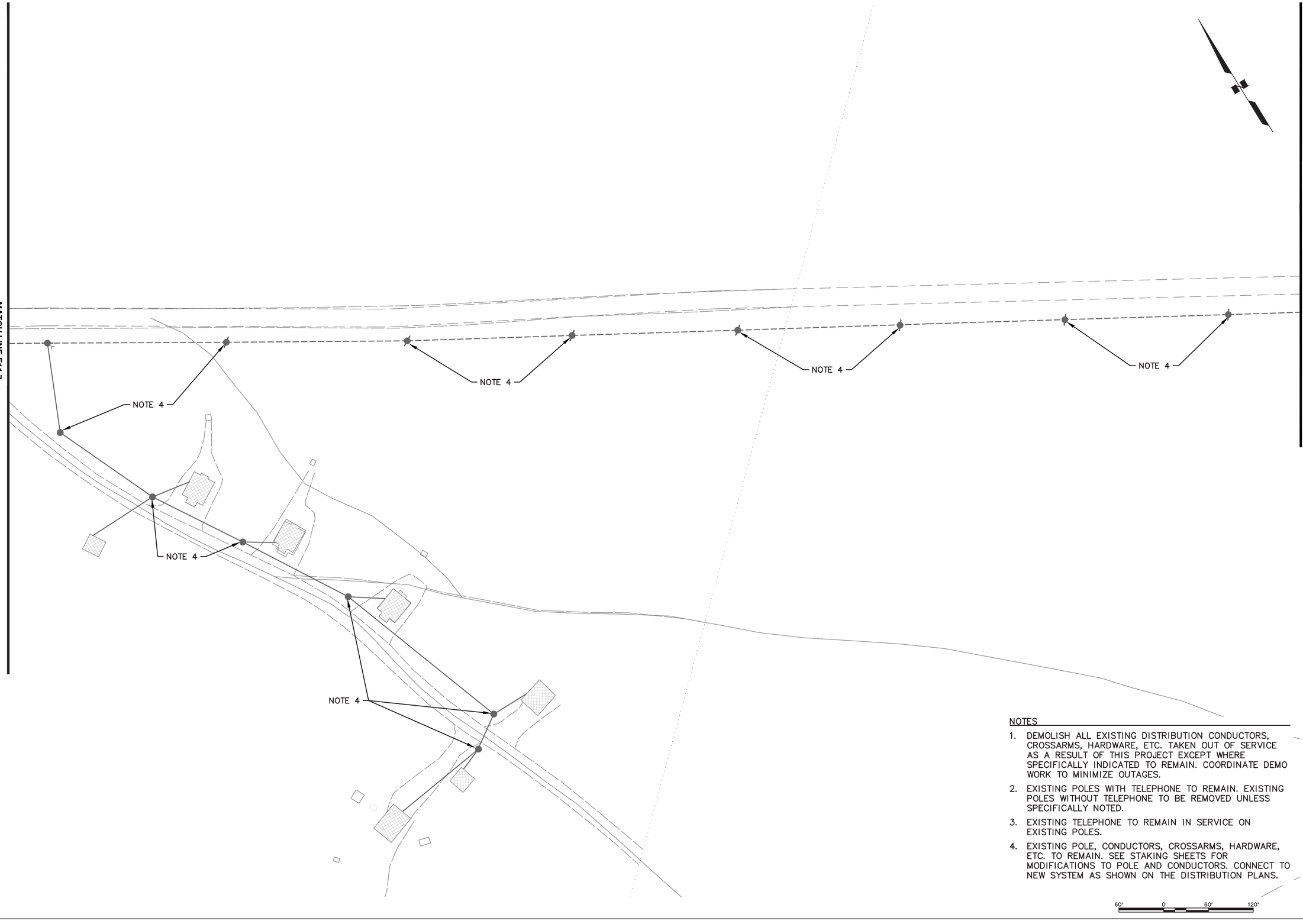
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E11.7

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:08 AM



NOTES

1. DEMOLISH ALL EXISTING DISTRIBUTION CONDUCTORS, CROSSARMS, HARDWARE, ETC. TAKEN OUT OF SERVICE AS A RESULT OF THIS PROJECT EXCEPT WHERE SPECIFICALLY INDICATED TO REMAIN. COORDINATE DEMO WORK TO MINIMIZE OUTAGES.
2. EXISTING POLES WITH TELEPHONE TO REMAIN. EXISTING POLES WITHOUT TELEPHONE TO BE REMOVED UNLESS SPECIFICALLY NOTED.
3. EXISTING TELEPHONE TO REMAIN IN SERVICE ON EXISTING POLES.
4. EXISTING POLE, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN. SEE STAKING SHEETS FOR MODIFICATIONS TO POLE AND CONDUCTORS. CONNECT TO NEW SYSTEM AS SHOWN ON THE DISTRIBUTION PLANS.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DEMOLITION PLAN
(8 of 9)

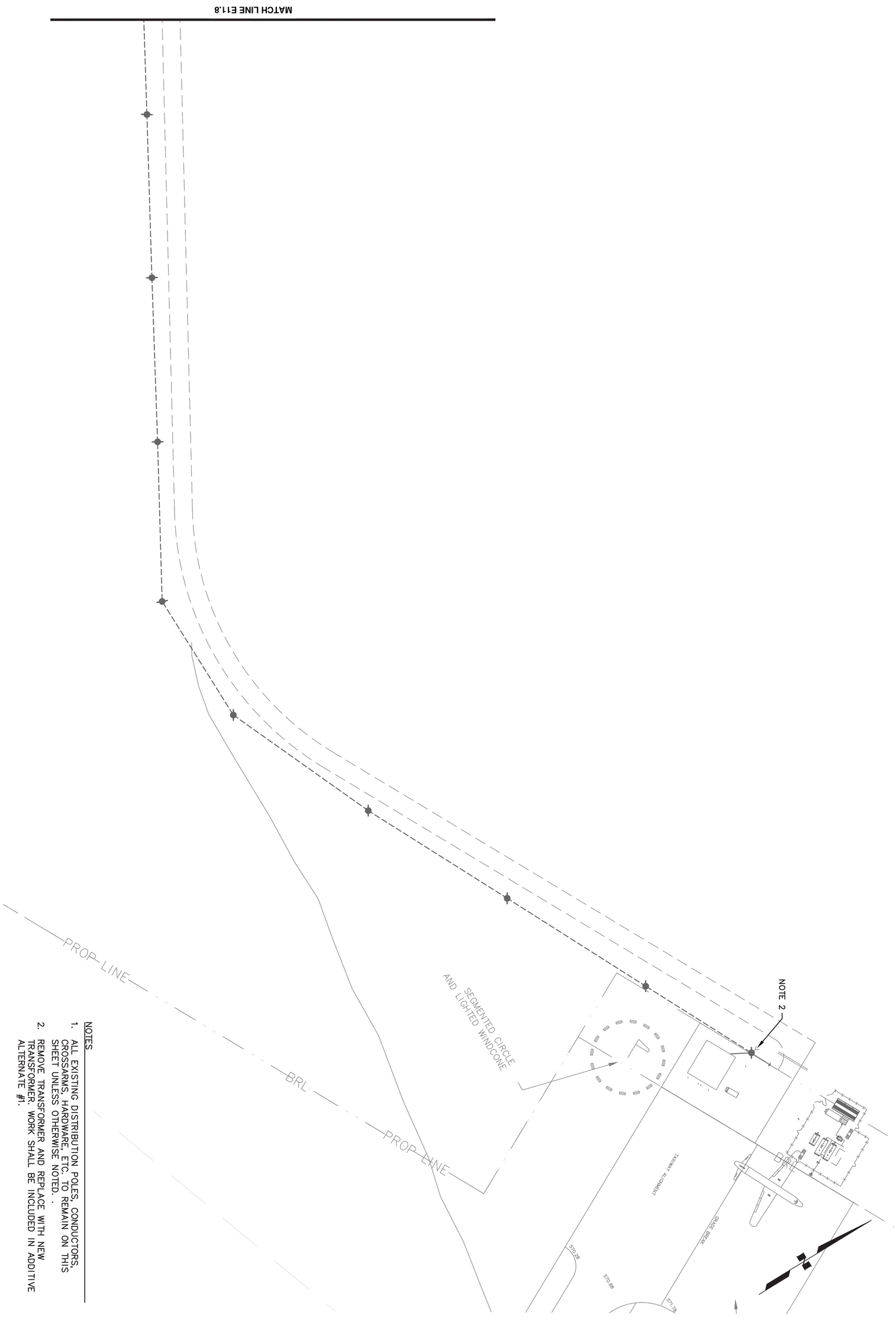
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.8

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:08 AM



NOTES

1. ALL EXISTING DISTRIBUTION POLES, CONDUCTORS, CROSSARMS, HARDWARE, ETC. TO REMAIN ON THIS SHEET UNLESS OTHERWISE NOTED. .
2. REMOVE TRANSFORMER AND REPLACE WITH NEW TRANSFORMER. WORK SHALL BE INCLUDED IN ADDITIVE ALTERNATE #1.

Sheet No. E11.9

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

VENETIE ENERGY SYSTEM UPGRADE

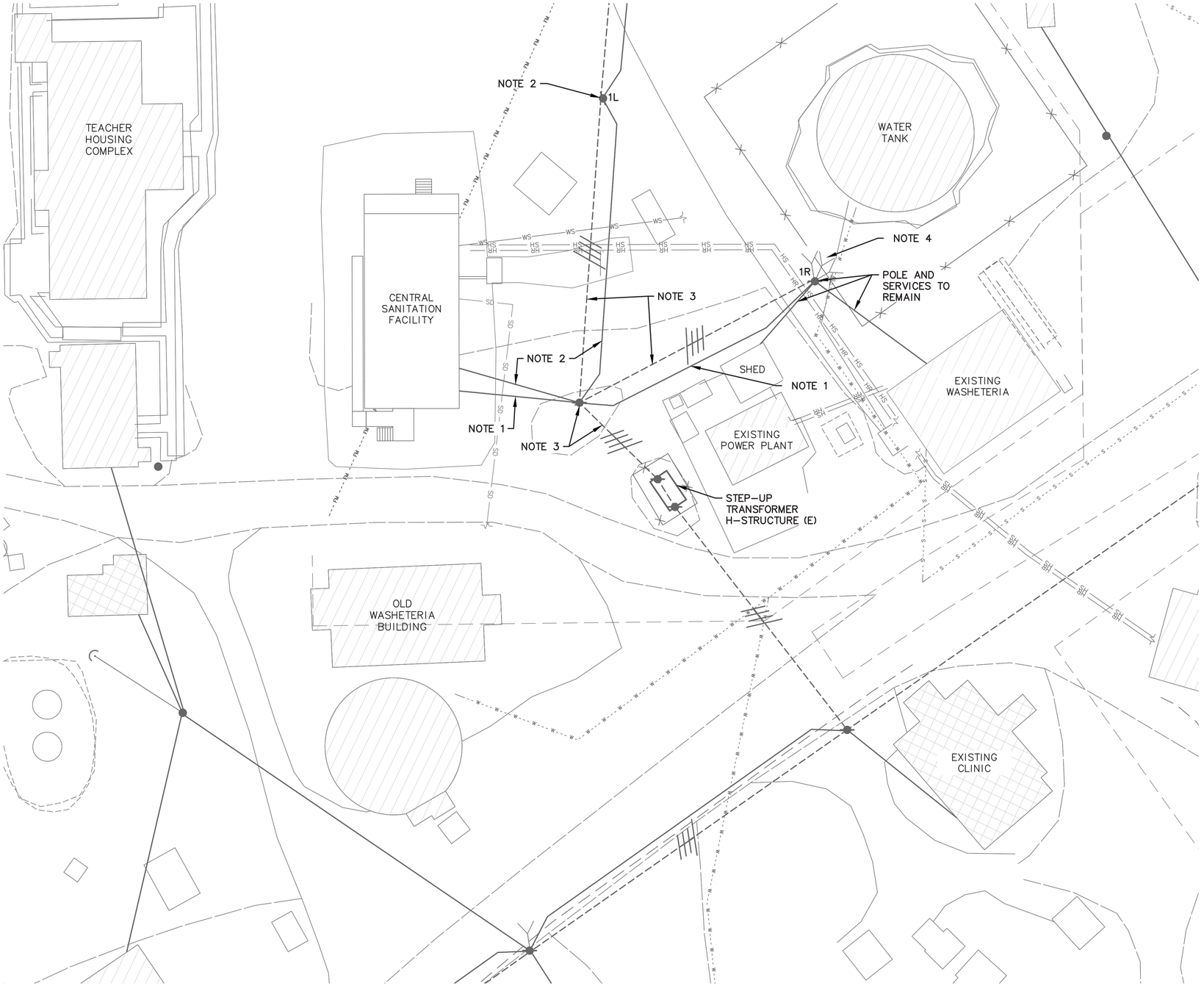
DEMOLITION PLAN
(9 of 9)

VENETIE, ALASKA

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252
Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

STATE OF ALASKA
49 TH
R. Keene
EE-14401
11/01/21
REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY



1 E11.10 **ENLARGED POWER PLANT DEMOLITION PLAN**
Scale: NTS

20' 0 20' 40'

NOTES

PRIOR TO SITE CLEARING

1. DISCONNECT AND REMOVE EXISTING UTILITY SERVICE BACK TO TRANSFORMER. SALVAGE CONDUCTORS FOR POSSIBLE RE-USE. REROUTE SERVICE PER SHEET E12.10.
2. DISCONNECT AND REMOVE EXISTING SCHOOL BACKUP SERVICE BACK TO EXISTING POLE 1L TO THE EAST. POLE TO REMAIN. SEE STAKING SHEETS FOR POLE MODIFICATIONS. SALVAGE CONDUCTORS FOR RE-USE. REROUTE SERVICE PER SHEET E12.10.
3. DEMOLISH EXISTING POLE AND TURN OVER TO UTILITY. REROUTE PRIMARY DISTRIBUTION AS SHOWN ON SHEET E12.10. SALVAGE PRIMARY CONDUCTORS FOR POSSIBLE RE-USE.
4. REMOVE EXISTING (3) 25KVA TRANSFORMERS AND SALVAGE FOR INSTALLATION ON NEW POLE. SEE SHEET E12.10.

AFTER COMMISSIONING OF NEW PLANT

5. DEMOLISH OVERHEAD STEP-UP TRANSFORMERS AND ALL SECONDARY CONDUCTORS AND TURN OVER TO THE UTILITY. EXISTING H-STRUCTURE AND OVERHEAD PRIMARY TO THE SOUTH TO REMAIN.

UPON COMPLETION OF ADDITIVE ALTERNATIVE #1

6. DEMOLISH H-STRUCTURE AND ALL OVERHEAD DISTRIBUTION TAKEN OUT OF SERVICE BY THE COMPLETION OF ADDITIVE ALTERNATIVE #1 UNLESS OTHERWISE NOTED ON SHEET E11.1.

UPON COMPLETION OF ADDITIVE ALTERNATIVE #2

7. DEMOLISH ALL OVERHEAD DISTRIBUTION TAKEN OUT OF SERVICE BY THE COMPLETION OF ADDITIVE ALTERNATIVE #2 UNLESS OTHERWISE NOTED ON SHEET E11.1.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. K. KEMPF EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252
Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE
ENLARGED POWER PLANT DEMOLITION PLAN
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.10

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:08 AM

NOTES

1. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.
2. NEW DISTRIBUTION CROSSES THE EXISTING DISTRIBUTION AT THIS LOCATION. SEE SHEET E10.0 FOR COORDINATION REQUIREMENTS.

- SEE SHEET E12.10 FOR WORK INCLUDED IN THE BASE BID.
- ALL WORK FROM POLE 2 TO THE SOUTHEAST IS INCLUDED IN ADDITIVE ALTERNATIVE #1 AS NOTED ON THIS SHEET AND ENLARGED POWER PLANT SITE PLAN E12.11.
- ALL WORK FROM POLE 3 TO THE NORTHWEST AS NOTED ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #2.

MATCH LINE E12.6

MATCH LINE E12.2

MATCH LINE E12.7

SEE SHEET E12.10, E12.11 AND E12.12 FOR ENLARGED POWER PLANT SITE PLANS

NEW POWER PLANT

WORK IN THIS AREA SHALL BE PART OF ADDITIVE ALTERNATE #1

WORK IN THIS AREA SHALL BE PART OF ADDITIVE ALTERNATE #1

WORK IN THIS AREA SHALL BE PART OF ADDITIVE ALTERNATE #2

NOTE 1

NOTE 2

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN (1 of 9)

VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E12.1

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:08 AM

MATCH LINE E12.4

MATCH LINE E12.3

MATCH LINE E12.1

12-3
14
12F
NOTE 2
12-2
13
12E
12-1
8-5-3B
NOTE 1
12-2A
NOTE 3
12
12A
12B
12C
12D
10A
11
10
11A
9
7
8-5-1
8-5B
8-5
8-4
8-3
8-2
8
8-5A
8-6
NOTE 3
8-7
NOTE 3
8-3A
NOTE 1
8-2A
NOTE 1
8-1
8-1A
8-7A
8-2B
8-2C

ADDITIVE ALTERNATE #2 SHOWN, SEE PLAN THIS SHEET FOR BASE BID DISPENSER SERVICE.

NOTE 4
NOTE 5

BASE BID DISPENSER SERVICE

NOTES

1. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.
2. END NEW PRIMARY DISTRIBUTION AT EXISTING POLE. CONNECT NEW PRIMARY TO EXISTING PRIMARY. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.
3. NEW DISTRIBUTION CROSSES THE EXISTING DISTRIBUTION AT THIS LOCATION. SEE SHEET E10.0 FOR COORDINATION REQUIREMENTS.
4. INSTALL #4 TRIPLEX SECONDARY FOR NEW DISPENSER SERVICE. CONNECT TO EXISTING SECONDARY ON POLE.
5. SEE BULK FUEL UPGRADE SHEET E6.1 FOR SERVICE DETAILS.

ALL WORK ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #2 UNLESS OTHERWISE NOTED.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KEMPF EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN (2 of 9)

VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date: NOV 2021
Designed: TRK
Drawn: TRK
Approved: KH

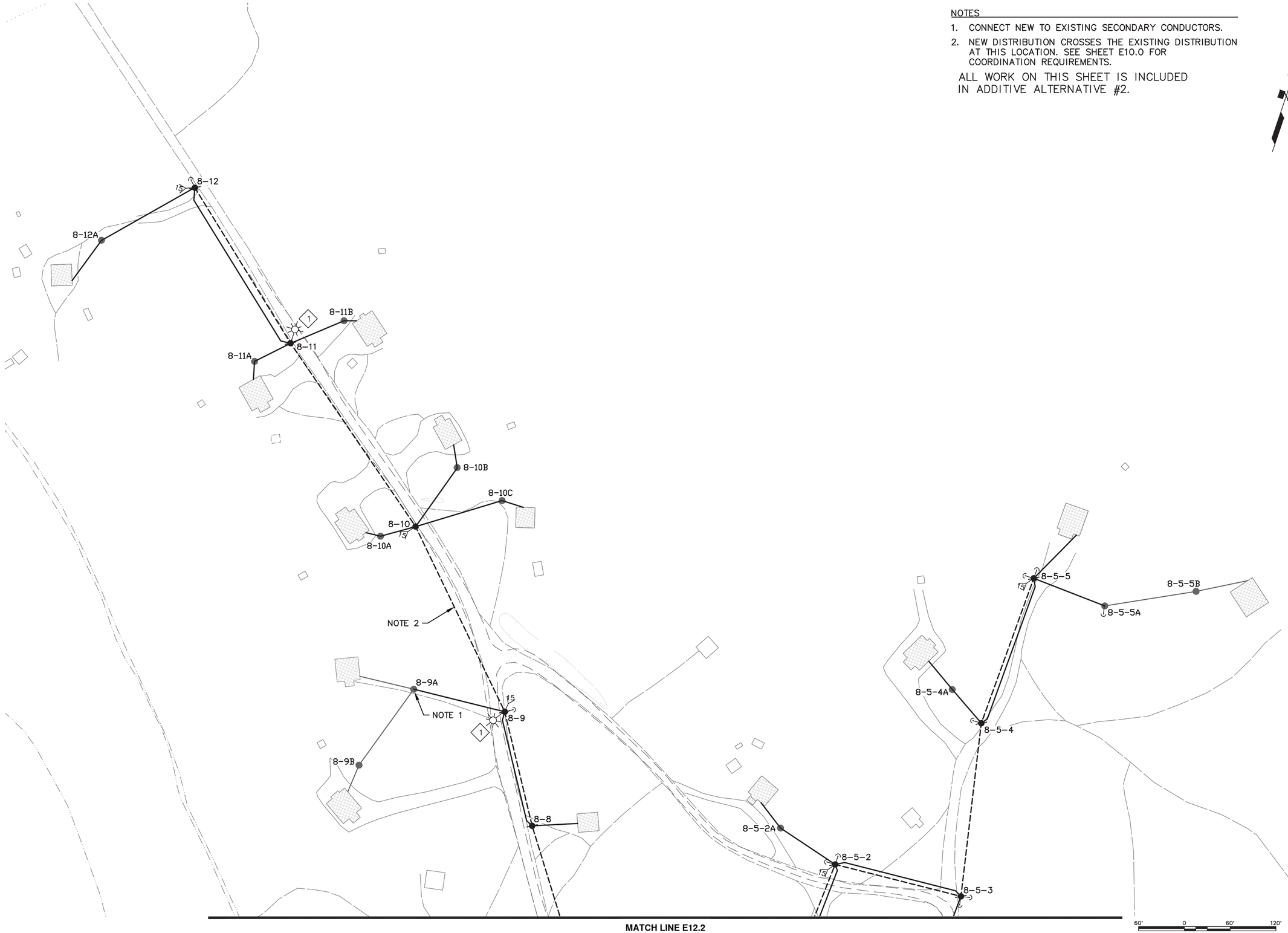
Sheet No. E12.2

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:08 AM

NOTES

1. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.
2. NEW DISTRIBUTION CROSSES THE EXISTING DISTRIBUTION AT THIS LOCATION. SEE SHEET E10.0 FOR COORDINATION REQUIREMENTS.

ALL WORK ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #2.



ALASKA ENERGY AUTHORITY

STATE OF ALASKA
49TH
REGISTERED PROFESSIONAL ENGINEER
T. K. Kemp
EE-11401
11/01/21

CRW ENGINEERING GROUP LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN
(3 of 9)

VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

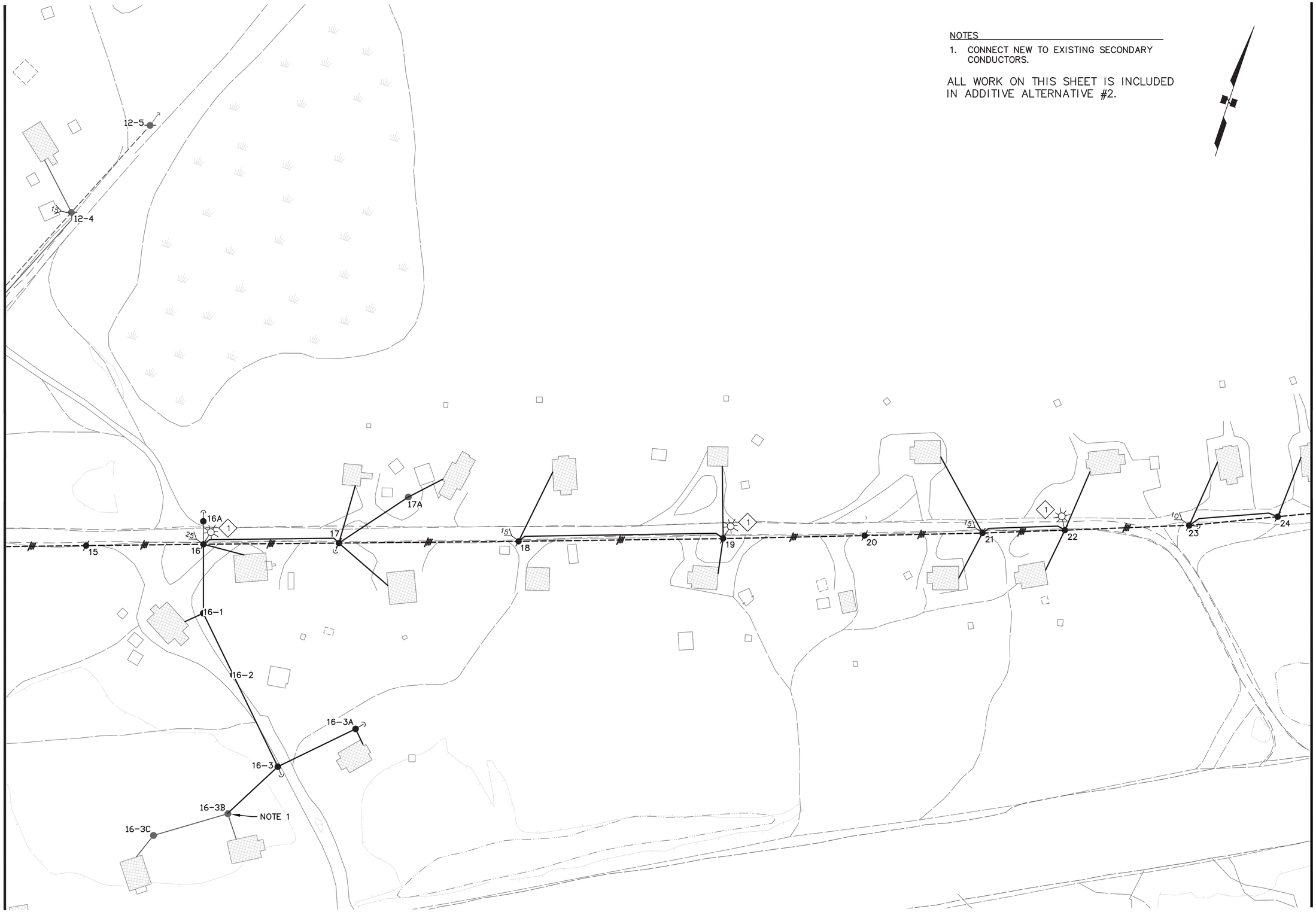
Sheet No.
E12.3

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:08 AM

NOTES

1. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.

ALL WORK ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #2.



ALASKA ENERGY AUTHORITY

STATE OF ALASKA
49 TH
REGISTERED PROFESSIONAL ENGINEER
K. Kamm
EE-11401
11/01/21

CRW ENGINEERING GROUP LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN
(4 of 9)

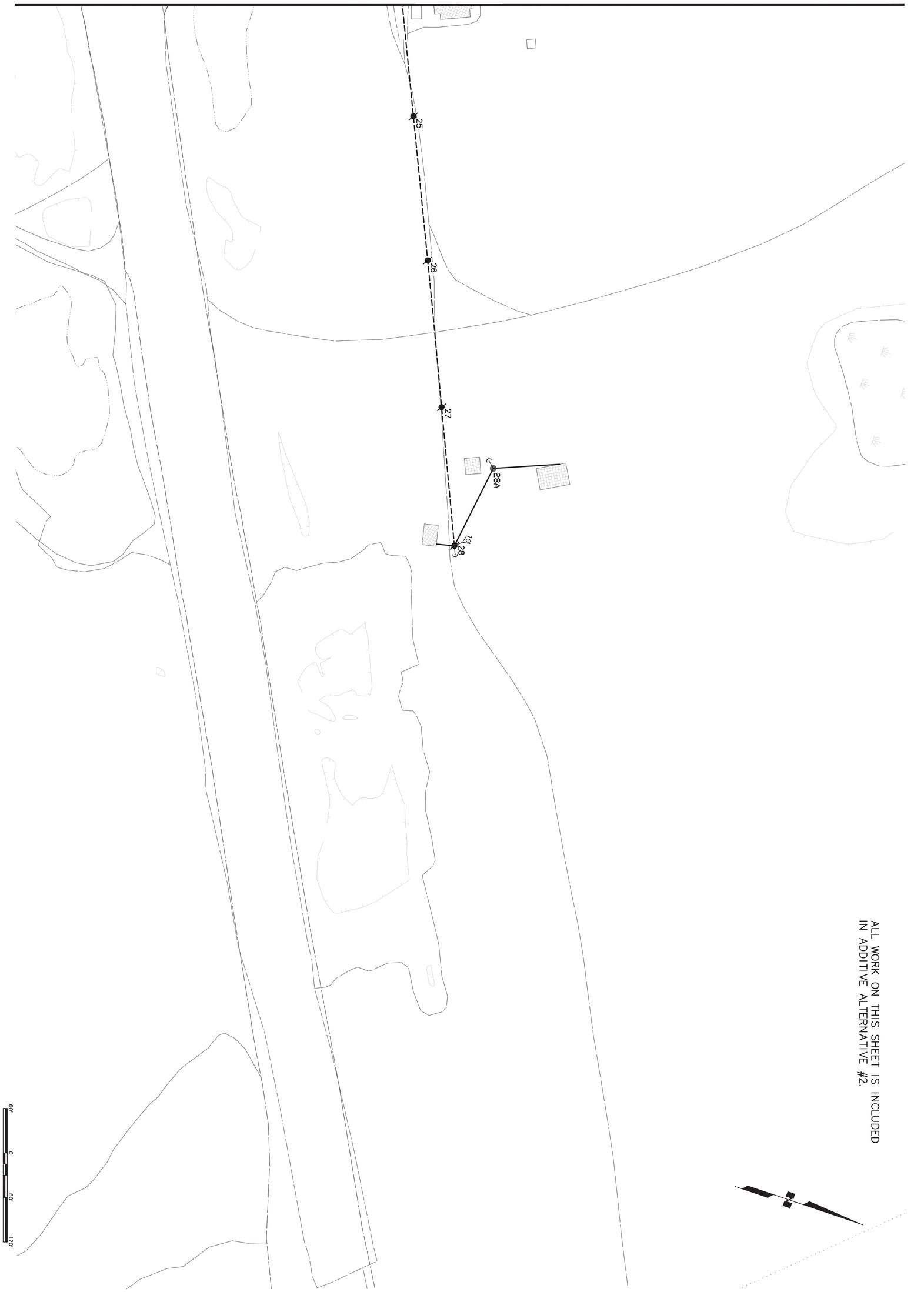
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No.
E12.4

MATCH LINE E12.4



ALL WORK ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #2.

60' 0 60' 120'

Sheet No. E12.5

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN
(5 of 9)

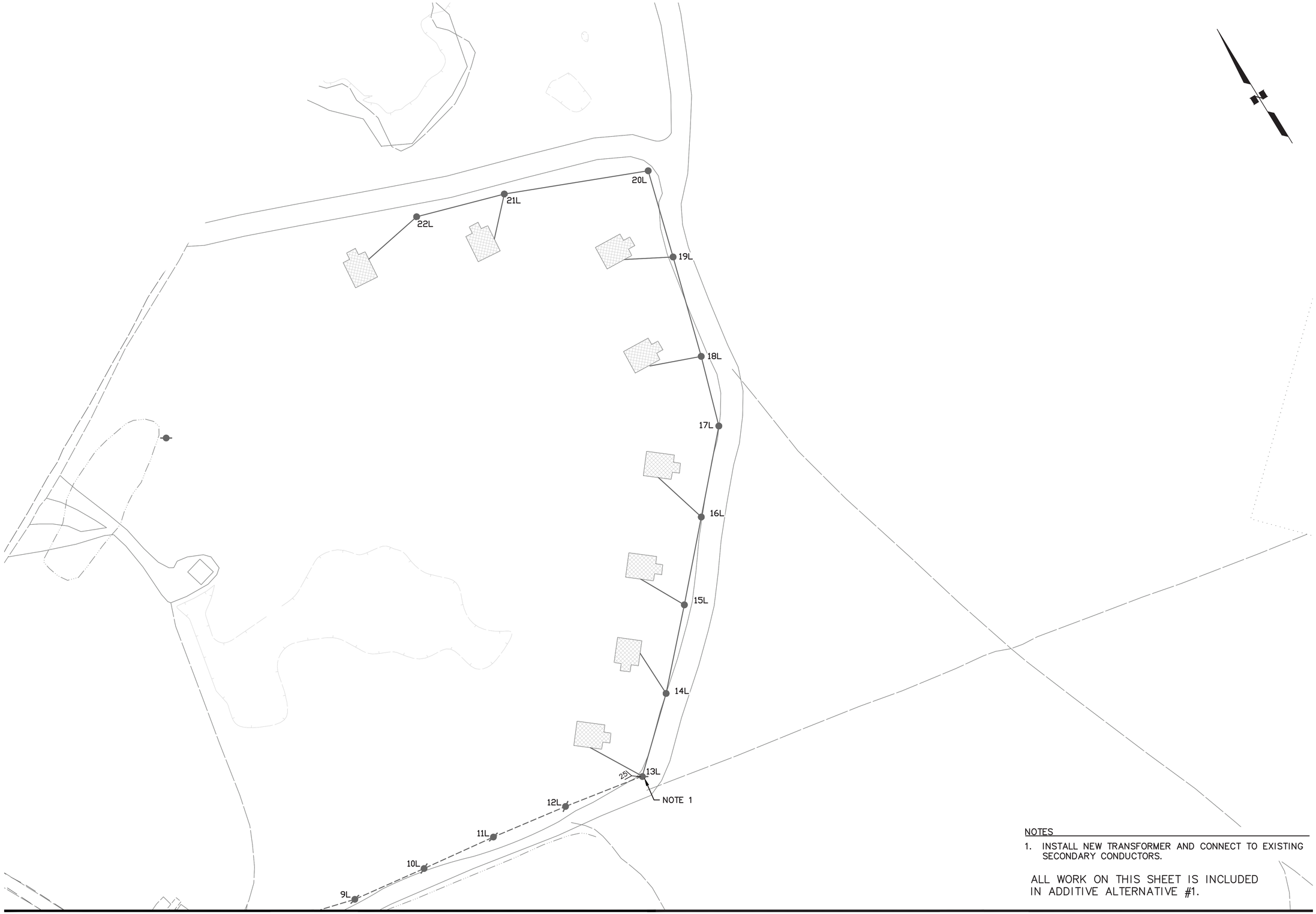
VENETIE, ALASKA

CRW ENGINEERING GROUP, LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

STATE OF ALASKA 49 TH
R. Keene
EE-14401
11/01/21
REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY



NOTES

1. INSTALL NEW TRANSFORMER AND CONNECT TO EXISTING SECONDARY CONDUCTORS.

ALL WORK ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #1.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC
PHONE: (907) 562-3252

Gray Stassel Engineering, Inc.
PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN
(6 of 9)

VENETIE, ALASKA

NO.	REVISION	BY	DATE
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Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No.
E12.6

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:09 AM

MATCH LINE E12.6

MATCH LINE E12.1

MATCH LINE E12.8

2-9-2B
2-9-2A
101
2-9-2
2-9-1
NOTE 2
2-10A
2-10
2-11
2-12
2-13
2-14
2-15
2-7
2-8
2-9
2-9A
2-10B
NOTE 1
2-11A
2-11A-1
2-11A-2
2-8A
2-11B
2-11A-1A
2-11C
2-11A-1C
2-11A-1B
2-11D

NOTES

1. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.
2. MOVE EXISTING PRIMARY TO NEW POLE AND CONNECT TO NEW PRIMARY.

ALL WORK ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #1.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN (7 of 9)

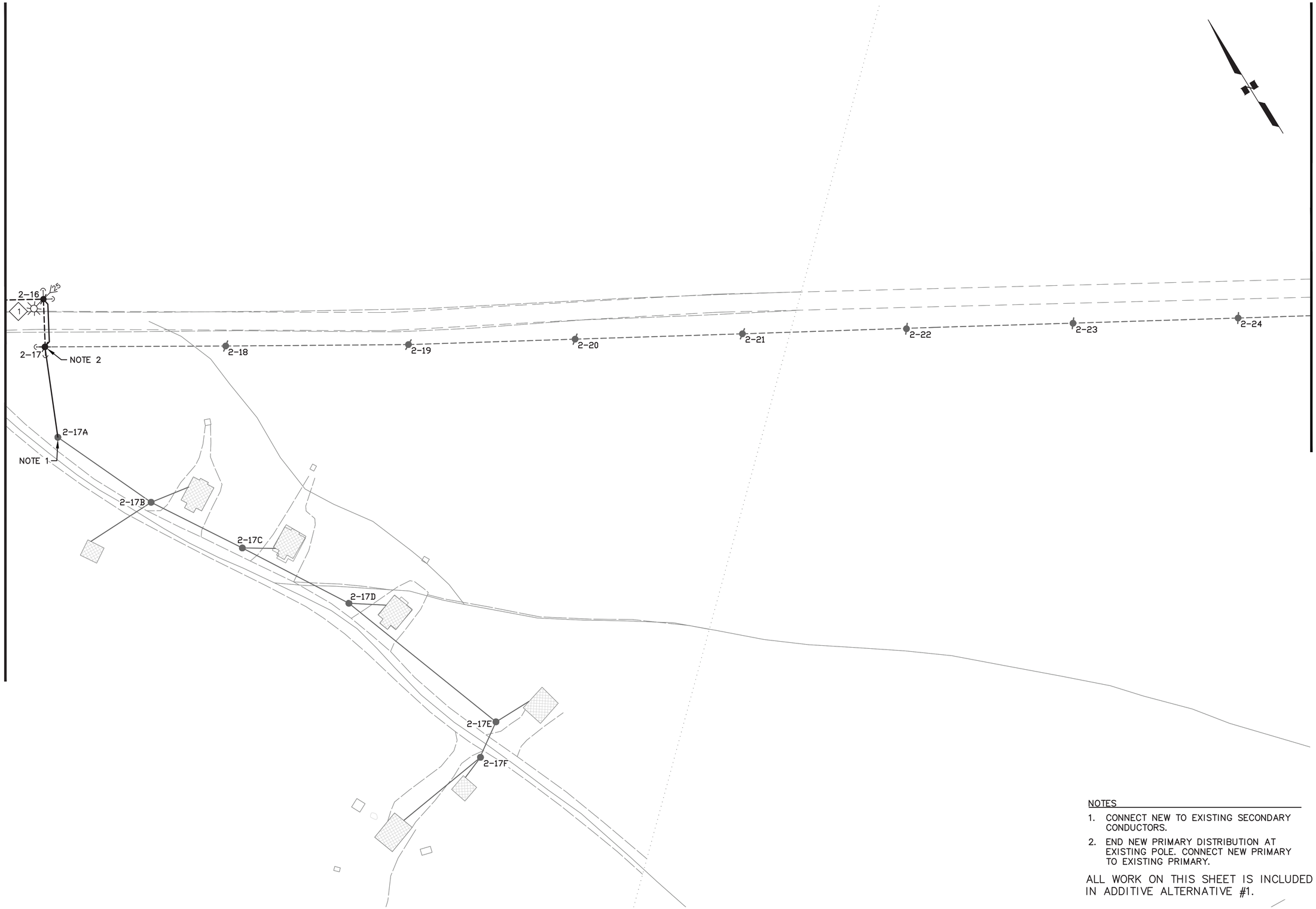
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E12.7

File: J:\Jobs\Data\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:09 AM



NOTES

1. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.
2. END NEW PRIMARY DISTRIBUTION AT EXISTING POLE. CONNECT NEW PRIMARY TO EXISTING PRIMARY.

ALL WORK ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATIVE #1.

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN (8 of 9)

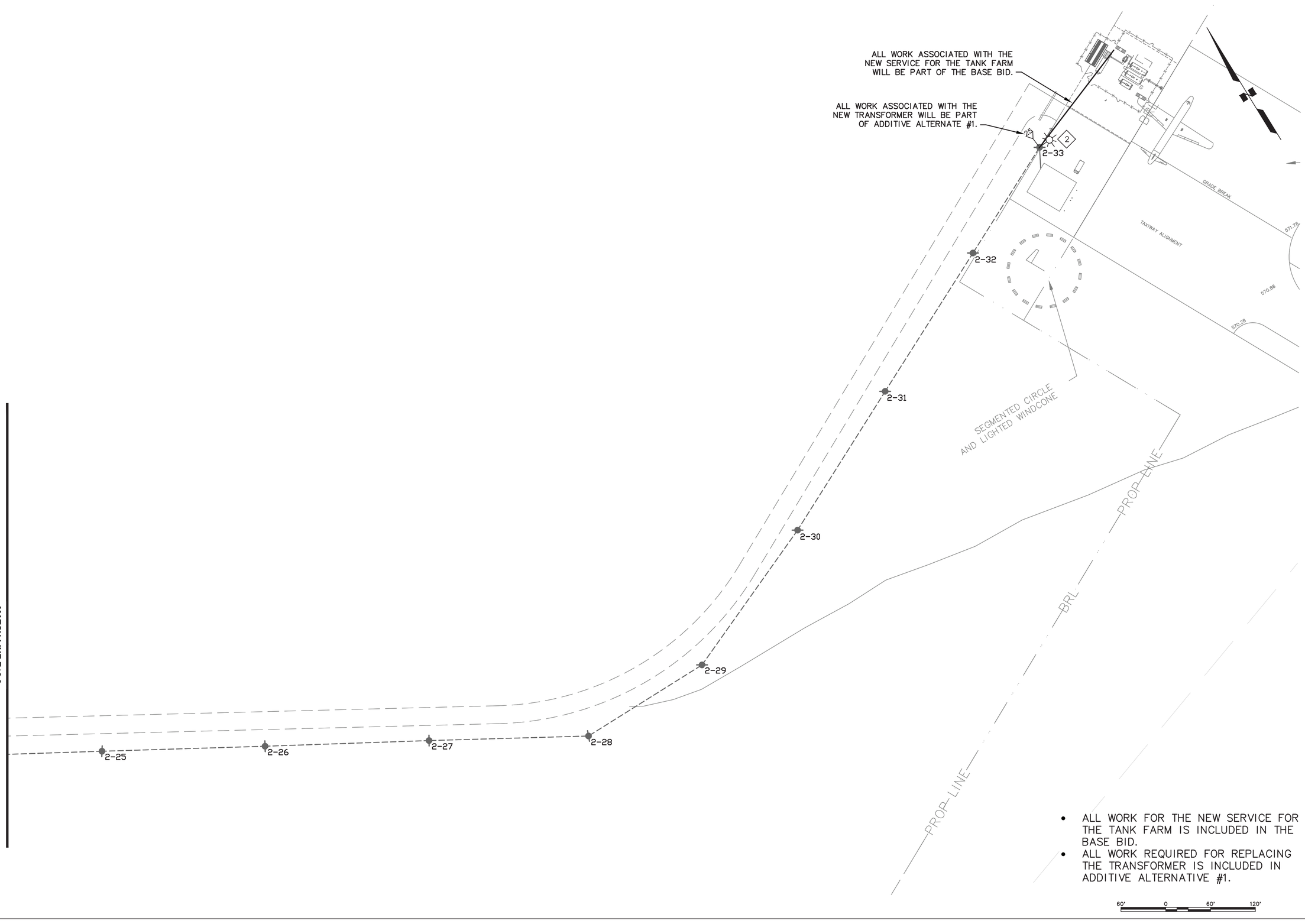
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date: NOV 2021
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E12.8

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:09 AM



ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

DISTRIBUTION PLAN (9 of 9)

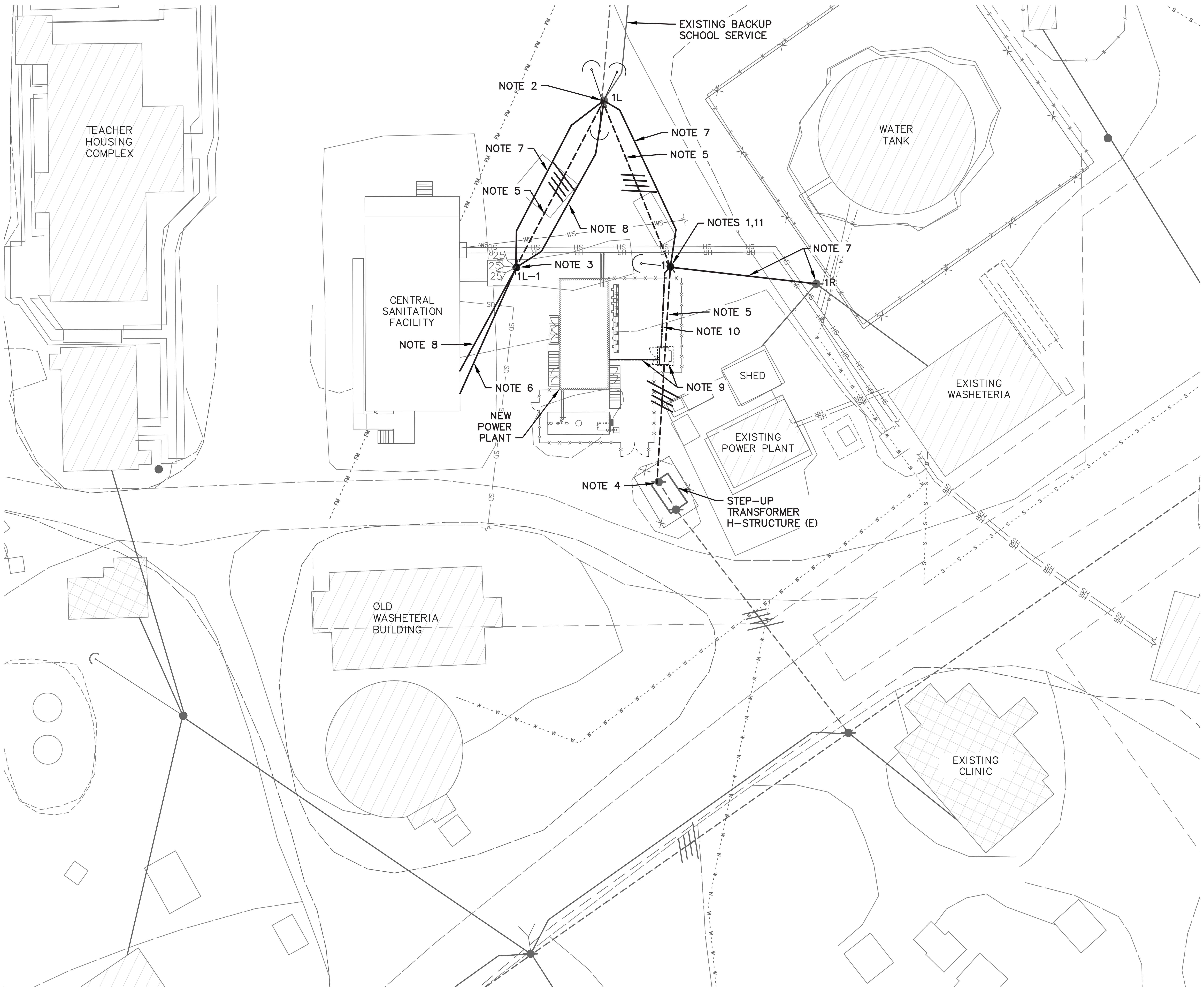
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E12.9

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:09 AM



1 E12.10 **ENLARGED POWER PLANT INTERM SITE PLAN**

Scale: 1"=20'

NOTES

PRIOR TO SITE CLEARING

1. INSTALL POLES 1.
2. MODIFY EXISTING POLE 1L WITH NEW HARDWARE AS SHOWN IN THE STAKING SHEETS.
3. INSTALL POLE 1L-1. INSTALL (3) 25KVA TRANSFORMERS SALVAGED FROM EXISTING POLE 1R. RE-SERVE CENTRAL SANITATION FACILITY, SHED AND WASHETERIA SERVICES.
4. MODIFY EXISTING STEP-UP TRANSFORMER H-STRUCTURE TO ACCOMMODATE PRIMARY DISTRIBUTION FROM POLE 1.
5. INSTALL PRIMARY CONDUCTORS (#2 ACSR) FROM POLE 1 TO POLE 1L AND EXISTING STEP-UP TRANSFORMER H-STRUCTURE AND FROM POLE 1L TO POLE 1L-1. USE SALVAGED CONDUCTORS WHERE POSSIBLE.
6. INSTALL #2/0 QUADPLEX FOR UTILITY SERVICE FOR CENTRAL SANITATION FACILITY. CONNECT TO EXISTING SERVICE RISER.
7. INSTALL #1/0 QUADPLEX FROM POLE 1L-1 TO EXISTING POLE 1R TO RE-SERVE EXISTING WASHETERIA AND SHED SERVICES. EXISTING POLE 1R TO REMAIN. CONNECT TO EXISTING SERVICE CONDUCTORS AT POLE 1R. ROUTE AS SHOWN. RE-USE EXISTING CONDUCTORS WHERE POSSIBLE.
8. INSTALL SALVAGED SERVICE CONDUCTORS FOR BACKUP SCHOOL SERVICE FROM EXISTING POLE 1L TO CENTRAL SANITATION FACILITY. CONNECT TO EXISTING SERVICE RISER.

PRIOR TO COMMISSIONING OF NEW PLANT

9. INSTALL NEW STEP-UP PAD MOUNT TRANSFORMER AND SECONDARY FEEDER FROM NEW POWER PLANT. SEE SHEET E1.3 FOR DETAILS.
10. INSTALL PRIMARY FEEDER, (3) EACH #1/0 JCN IN 2" HDPE DUCT.
11. INSTALL RISER AT POLE 1 AND CONNECT TO PRIMARY.

ALL WORK ON THIS SHEET IS INCLUDED IN THE BASE BID.

20' 0 20' 40'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49 TH R. Keene EE-14401 11/01/21 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

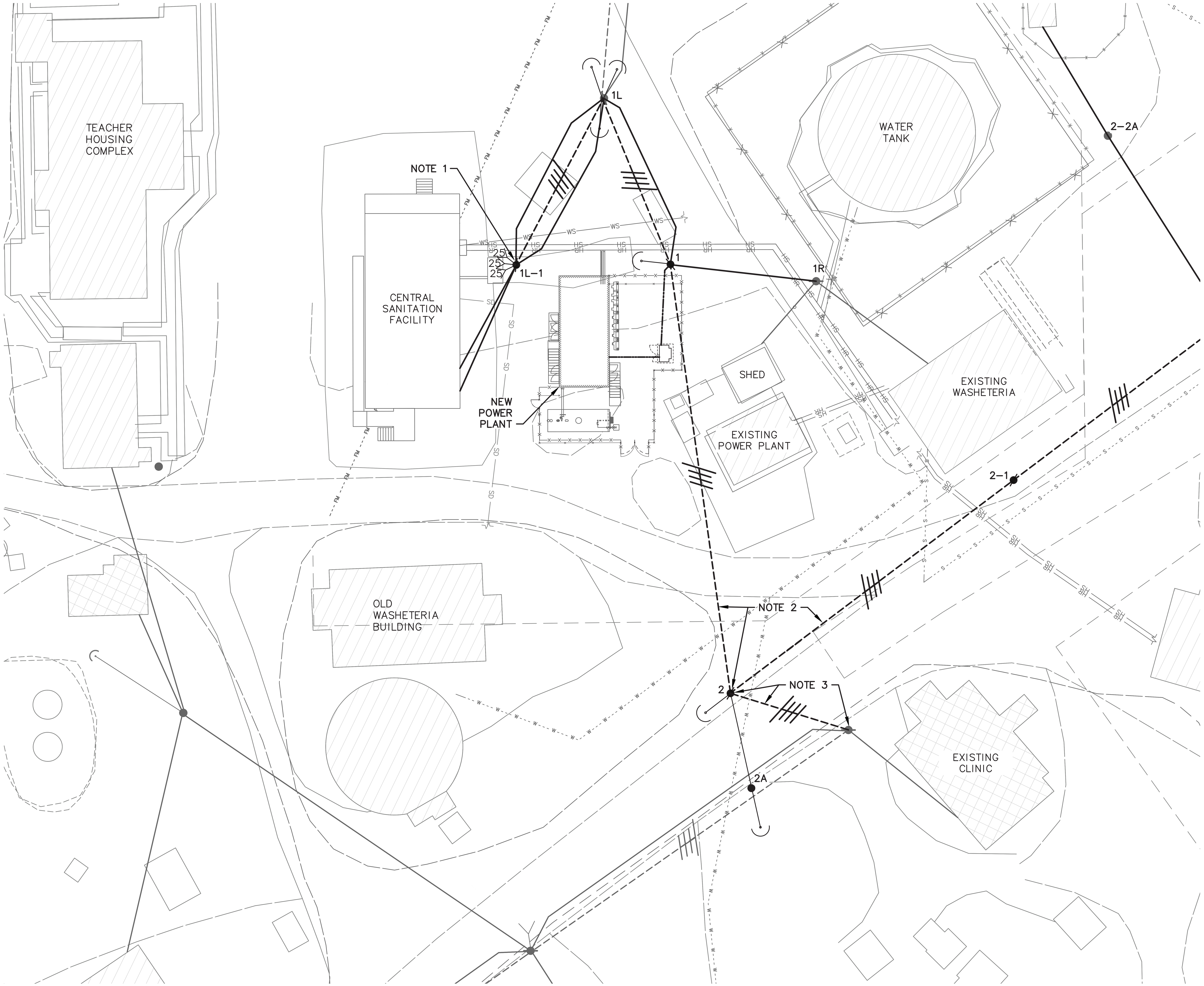
VENETIE ENERGY SYSTEM UPGRADE
ENLARGED POWER PLANT INTERIM SITE PLAN
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E12.10

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:09 AM



NOTES ADDITIVE ALTERNATIVE #1

1. REPLACE EXISTING TRANSFORMER BANK WITH NEW (3) 25KVA TRANSFORMERS ON POLE 1L-1. RE-SERVE CENTRAL SANITATION FACILITY, WASHETERIA AND SHED SERVICES FROM NEW TRANSFORMERS.
2. INSTALL POLE 2 AND ALL NEW DISTRIBUTION TO THE SOUTHEAST. CONNECT PRIMARY DISTRIBUTION TO POLE 1. SEE SHEETS E12.1 AND E12.6-E12.9 FOR OTHER WORK INCLUDED IN ADDITIVE ALTERNATE #1.
3. IF ADDITIVE ALTERNATE #2 IS NOT AWARDED, DO THE FOLLOWING:
   - INSTALL ADDITIONAL GUY AT POLE 2 TO BACKUP NEW DISTRIBUTION TO THE SOUTHEAST.
   - ADD HARDWARE TO POLE 2 TO CONNECT TO EXISTING POLE WEST OF CLINIC.
   - MODIFY EXISTING HARDWARE ON POLE WEST OF CLINIC TO ACCOMMODATE PRIMARY DISTRIBUTION FROM POLE 2.
   - CONNECT PRIMARY DISTRIBUTION FROM POLE 2 TO EXISTING POLE WEST OF CLINIC. USE SALVAGED #2 ACSR IF POSSIBLE.

ALL WORK NOTED ON THIS SHEET IS INCLUDED IN ADDITIVE ALTERNATE #1.

1 / E12.11 ENLARGED POWER PLANT ADDITIVE ALTERNATE #1 SITE PLAN

Scale: 1"=20'

20' 0 20' 40'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49 TH T. R. Keene EE-14401 11/01/21 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

ENLARGED POWER PLANT ADDITIVE ALTERNATE #1 SITE PLAN

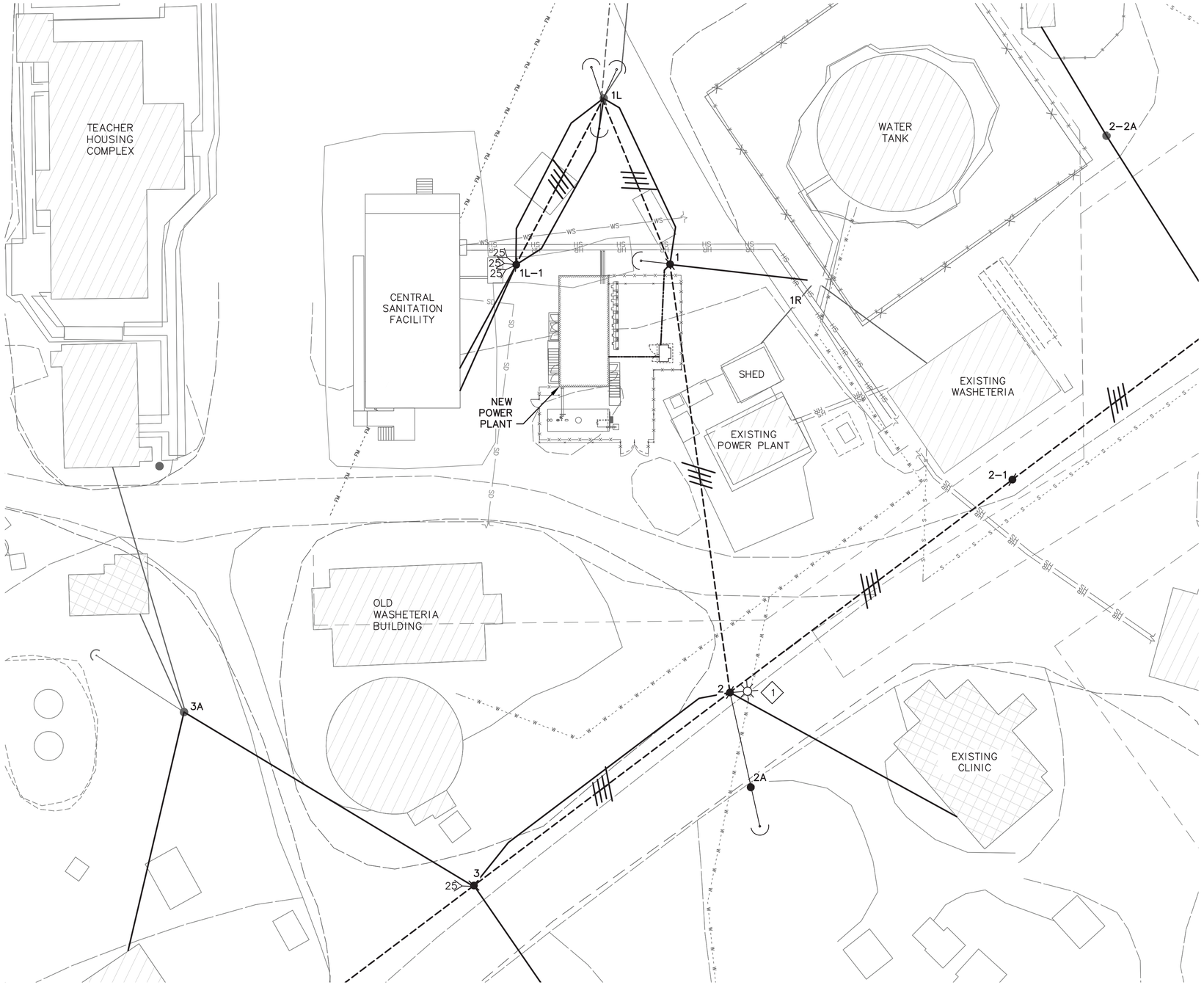
VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021
Designed TRK
Drawn TRK
Approved KH

Sheet No. E12.11

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:09 AM



NOTES

1. THIS PLAN SHOWS THE FINAL CONFIGURATION UPON COMPLETION OF ADDITIVE ALTERNATES #1 AND #2 FOR THE DISTRIBUTION.

1 / E12.12 **ENLARGED POWER PLANT ADDITIVE FINAL SITE PLAN**

Scale: 1"=20'

20' 0 20' 40'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER TRACY K. KAMM EE-11401 11/01/21

CRW ENGINEERING GROUP LLC PHONE: (907) 562-3252

Gray Stassel Engineering, Inc. PHONE: (907) 349-0100

VENETIE ENERGY SYSTEM UPGRADE

ENLARGED POWER PLANT FINAL SITE PLAN

VENETIE, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	11/01/21

Plot Date NOV 2021 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E12.12

File: J:\JobsData\30416.00 Venetie BFU RPSU Project\001 CADD 2019\01 Working Set\03 Electrical\30416.00 Venetie RPSU.dwg Plot Date: 11/3/2021 9:09 AM

VENETIE ENERGY SYSTEM UPGRADE

STAKING SHEETS

ISSUED FOR CONSTRUCTION
NOVEMBER 2021

CRW ENGINEERING GROUP, LLC
3940 ARCTIC BLVD, SUITE 300
ANCHORAGE, ALASKA 99503

REV. NO.	DATE	DESCRIPTION	BY
0	11/1/21	ISSUED FOR CONSTRUCTION	TRK

CRW ENGINEERING GROUP, LLC
3940 ARCTIC BLVD, SUITE 300
ANCHORAGE, ALASKA 99503
(907) 562-3252

DESIGNER	DATE
TRK	November 1, 2021
CHECKER	**DATE**
TRK	November 1, 2021
DIST. ENG.	**DATE**
TRK	November 1, 2021

VENETIE ENERGY SYSTEM UPGRADE

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR No.	CONDUCTOR SIZE/TYPE	CONDUCTOR Back Span	POLE HEIGHT	POLE CLASS	PRIMARY ASSEMBLY No.	PRIMARY ASSEMBLY Units	GUYS No.	GUYS Units	ANCHORS No.	ANCHORS Units	XFMRS No.	XFMRS Units	SECONDARY CONDUCTOR SERVICE No.	SECONDARY CONDUCTOR SERVICE SIZE/TYPE	SECONDARY CONDUCTOR BACKFEED Back Span	SECONDARY CONDUCTOR BACKFEED No.	SECONDARY CONDUCTOR BACKFEED SIZE/TYPE	SECONDARY SERVICE No.	SECONDARY SERVICE Units	MISCELLANEOUS CONSTRUCTION UNITS No.	MISCELLANEOUS CONSTRUCTION UNITS Units	RIGHT OF WAY	REMARKS/COMMENTS/NOTES
1		14	3	#1/0 AWG	35	40	4	1	C2.21	1	E1.1La	1	F6.8													PROVIDE #2 ACSR JUMPERS.
				15 KV, JCN				1	C5.21																	
				2"C HDPE				1	UC2a																	
1R																		55	1	#1/0 QUAD	2	N5.2				EXISTING POLE EXISITNG SERVICES TO REMAIN
1L			4	#2 ACSR	65			3	C5.21	3	E1.1La	3	F6.8					65	1	#1/0 QUAD						EXISTING POLE PROVIDE #2 ACSR JUMPERS.
1L-1			4	#2 ACSR	60	40	3	1	C5.21					1	G3.3-25 208Y120V 3-PHASE	1	#2/0 QUAD	60	1	#1/0 QUAD	2	N5.2	1	H1.1		
2L																										EXISTING POLE
3L														1	G1.4-15 120/240V 1-PHASE						1 1	J3.1 N7.6	1	H1.1		EXISTING POLE
4L																		150	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
4LA						35	4									1	#4 TRIPLEX	85	1	#1/0 TRIPLEX	3	J3.1				
4LB						35	4									1	#4 TRIPLEX	100	1	#1/0 TRIPLEX	3	J3.1				
4LC						35	4			1	E1.1La	1	F6.8			1	#4 TRIPLEX	105	1	#1/0 TRIPLEX	2	J3.1				
5L																										EXISTING POLE

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
6L																										EXISTING POLE
7L																										EXISTING POLE
8L																										EXISTING POLE
9L																										EXISTING POLE
10L																										EXISTING POLE
11L																										EXISTING POLE
12L																										EXISTING POLE
13L														1	G1.5-15 120/240V 1-PHASE						2 1	J3.1 N7.6	1	H1.1		EXISTING POLE
14L																										EXISTING POLE
15L																										EXISTING POLE
16L																										EXISTING POLE
17L																										EXISTING POLE
18L																										EXISTING POLE
19L																										EXISTING POLE

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
20L																										EXISTING POLE
21L																										EXISTING POLE
22L																										EXISTING POLE
2			4	#2 ACSR	155	40	4	1	C5.21							1	#4 TRIPLEX				2	J3.1				PROVIDE #2 ACSR JUMPERS. INSTALL STREET LIGHT
								1	C6.21																	
2A						40	4			1	E1.1La	1	F6.8													
										1	E1.4L															
2-1			4	#2 ACSR	130	40	4	1	C6.11																	
								1	S1.3																	
2-2			4	#2 ACSR	95	40	4	1	C1.11					1	G1.4-25	1	#2 TRIPLEX				3	J3.1	1	H1.1		INSTALL STREET LIGHT
															120/240V						1	N7.6				
															1-PHASE											
2-2A																1	#2 TRIPLEX	80	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
2-3			4	#2 ACSR	100	40	4	1	C1.11							2	#4 TRIPLEX	80	1	#1/0 TRIPLEX	3	J3.1				
2-4			4	#2 ACSR	160	40	4	1	C1.11	1	E1.1La	1	F6.8								2	J3.1				INSTALL STREET LIGHT SEE NOTE 4
2-4A						35	4									1	#4 TRIPLEX	120	1	#1/0 TRIPLEX	3	J3.1				
2-4B						35	4									1	#4 TRIPLEX	135	1	#1/0 TRIPLEX	2	J3.1				
2-5			4	#2 ACSR	115	40	4	1	C1.11	1	E1.1La	1	F6.8	1	G1.4-15			115	1	#1/0 TRIPLEX	2	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
2-5A						35	4									2	#4 TRIPLEX	95	1	#1/0 TRIPLEX	4	J3.1				

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
2-5B																										EXISTING POLE
2-5C																										EXISTING POLE
2-6			4	#2 ACSR	170	40	4	1	C1.11																	
2-7			4	#2 ACSR	120	40	4	1	C1.11	1	E1.1La	1	F6.8			1	#4 TRIPLEX				2	J3.1				
2-8			4	#2 ACSR	260	40	4	1	C1.11	1	E1.1La	1	F6.8	1	G1.4-10 120/240V 1-PHASE			260	1	#1/0 TRIPLEX	2 1	J3.1 N7.6	1	H1.1		INSTALL STREET LIGHT
2-8A																1	#4 TRIPLEX	200	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
2-9			4	#2 ACSR	155	40	4	1	C2.21 A5.1														1	H1.1		PROVIDE #2 ACSR JUMPERS.
2-9A						40	4			1 1	E1.1La E1.4L	1	F6.8													
2-9-1																										EXISTING POLE
2-9-2																										EXISTING POLE
2-9-2A																										EXISTING POLE
2-9-2B																										EXISTING POLE
2-10			4	#2 ACSR	140	40	4	1	C1.11												2	J3.1				
2-10A																1	#4 TRIPLEX	45	1	#4 TRIPLEX	2	J3.1				EXISTING POLE

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
2-10B																1	#2 TRIPLEX	110	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
2-11			4	#2 ACSR	140	40	4	1	C1.11	1	E1.1La	1	F6.8	1	G1.4-15 120/240V 1-PHASE			140	1	#1/0 TRIPLEX	2 1	J3.1 N7.6	1	H1.1		INSTALL STREET LIGHT
2-11A																		125	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
2-11A-1																										EXISTING POLE
2-11A-2																										EXISTING POLE
2-11A-1A																										EXISTING POLE
2-11A-1B																										EXISTING POLE
2-11A-1C																										EXISTING POLE
2-11B																										EXISTING POLE
2-11C																										EXISTING POLE
2-11D																										EXISTING POLE
2-12			4	#2 ACSR	160	40	4	1	C1.11																	
2-13			4	#2 ACSR	160	40	4	1	C1.11																	
2-14			4	#2 ACSR	250	40	4	1	C1.11														1	H1.1		

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
2-15			4	#2 ACSR	255	40	4	1	C1.11																	
2-16			4	#2 ACSR	240	40	4	1	C5.21	2	E1.1La	2	F6.8	1	G1.4-25						1	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
								1	A5.1						120/240V						1	N7.6				INSTALL STREET LIGHT
															1-PHASE											
2-17			2	#2 ACSR	65	40	4	2	A5.1	2	E1.1La	2	F6.8					65	1	#1/0 TRIPLEX	2	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
2-17A																		120	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
2-17B																										EXISTING POLE
2-17C																										EXISTING POLE
2-17D																										EXISTING POLE
2-17E																										EXISTING POLE
2-17F																										EXISTING POLE
2-18																										EXISTING POLE
2-19																										EXISTING POLE
2-20																										EXISTING POLE
2-21																										EXISTING POLE
2-22																										EXISTING POLE
2-23																										EXISTING POLE
2-24																										EXISTING POLE
2-25																										EXISTING POLE
2-26																										EXISTING POLE
2-27																										EXISTING POLE
2-28																										EXISTING POLE

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE			BACKFEED							
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
2-29																										EXISTING POLE
2-30																										EXISTING POLE
2-31																										EXISTING POLE
2-32																										EXISTING POLE
2-33														1	G1.5-25	2	#2 TRIPLEX				2	J3.1	1	H1.1		EXISTING POLE
															120/240V						1	N7.6				INSTALL STREET LIGHT
															1-PHASE											
3			4	#2 ACSR	120	40	4	1	C1.11	1	E1.1La	1	F6.8	1	G1.4-25			120	1	#2 TRIPLEX	2	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
3A																1	#4 TRIPLEX	120	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
3B																		150	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
3C																		165	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
4		30	4	#2 ACSR	170	40	4	2	C5.21					1	G1.4-15						3	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
															120/240V						1	N7.6				INSTALL STREET LIGHT
															1-PHASE											
4A						35	4									2	#4 TRIPLEX	50	1	#1/0 TRIPLEX	3	J3.1				
4B																1	#4 TRIPLEX	85	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
5		14	4	#2 ACSR	175	40	4	1	C2.21							1	#4 TRIPLEX	175	1	#1/0 TRIPLEX	3	J3.1				
5A																		85	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
6		2	4	#2 ACSR	230	40	4	1	C6.21																	INSTALL STREET LIGHT
								1	S1.3																	
7			4	#2 ACSR	165	40	4	1																		

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
8		23 40	4	#2 ACSR	165	40	4	3	C5.21	1	E1.1La	1	F6.8			1	#4 TRIPLEX	175	1	#1/0 TRIPLEX	3	J3.1				PROVIDE #2 ACSR JUMPERS. INSTALL STREET LIGHT
8-1		65	4	#2 ACSR	275	40	4	2	C5.21	2	E1.1La	2	F6.8								2	J3.1				PROVIDE #2 ACSR JUMPERS.
8-1A																1	#2 TRIPLEX	120	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-2			4	#2 ACSR	225	40	4	2	C5.21					1	G1.4-25 120/240V 1-PHASE	2	#4 TRIPLEX	225	1	#1/0 TRIPLEX	3 1	J3.1 N7.6	1	H1.1		INSTALL STREET LIGHT
8-2A																		105	1	#1/0 TRIPLEX	4	J3.1				EXISTING POLE
8-2B																										EXISTING POLE
8-2C																										EXISTING POLE
8-3		6	4	#2 ACSR	225	40	4	1	C2.21	1	E1.1La	1	F6.8	1	G1.4-15 120/240V 1-PHASE						1 1	J3.1 N7.6				
8-3A																		180	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
8-4		2	4	#2 ACSR	215	40	4	1	C1.11	1	E1.1La	1	F6.8			1	#4 TRIPLEX	215	1	#2 TRIPLEX	2	J3.1				
8-5		42 19	4	#2 ACSR	245	40	4	3	C5.21	1	E1.1La	1	F6.8	1	G1.5-25 120/240V 1-PHASE						3 1	J3.1 N7.6	1	H1.1		PROVIDE #2 ACSR JUMPERS. INSTALL STREET LIGHT
8-5A						35	4			1	E1.1La	1	F6.8			1	#4 TRIPLEX	90	1	#2 TRIPLEX	2	J3.1				
8-5B																1	#4 TRIPLEX	145	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-5-1		2	2	#2 ACSR	215	40	4	1	A2.1							1	#4 TRIPLEX				1	J3.1				

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
8-5-2		83	2	#2 ACSR	225	40	4	1	A4.2	2	E1.1La	2	F6.8	1	G1.5-15			225	1	#1/0 TRIPLEX	3	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
															120/240V						1	N7.6				
															1-PHASE											
8-5-2A																1	#4 TRIPLEX	90	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-5-3		98	2	#2 ACSR	175	40	4	1	A4.1	2	E1.1La	2	F6.8					175	1	#1/0 TRIPLEX	2	J3.1				PROVIDE #2 ACSR JUMPERS.
8-5-3A						35	4			2	E1.1La	2	F6.8					185	1	#1/0 TRIPLEX	2	J3.1				
8-5-3B																		195	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
8-5-4		13	2	#2 ACSR	230	40	4	1	A3.4	1	E1.1La	1	F6.8								2	J3.1				PROVIDE #2 ACSR JUMPERS.
8-5-4A																1	#4 TRIPLEX	60	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-5-5			2	#2 ACSR	205	40	4	1	A5.1	2	E1.1La	2	F6.8	1	G1.5-15	1	#4 TRIPLEX	205	1	#1/0 TRIPLEX	3	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
8-5-5A										1	E1.1La	1	F6.8					105	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-5-5B																										EXISTING POLE
8-6			2	#2 ACSR	120	40	4	1	A1.01																	
8-7		17	2	#2 ACSR	160	40	4	1	A4.2	2	E1.1La	2	F6.8								2	J3.1				
8-7A						35	4									1	#4 TRIPLEX	195	1	#2 TRIPLEX	2	J3.1				
8-8			2	#2 ACSR	240	40	4									1	#4 TRIPLEX				2	J3.1				

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
8-9		12	2	#2 ACSR	155	40	4	1	A2.3	1	E1.1La	1	F6.8	1	G1.5-15			155	1	#1/0 TRIPLEX	2	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
															120/240V						1	N7.6				INSTALL STREET LIGHT
															1-PHASE											
8-9A																		125	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
8-9B																										EXISTING POLE
8-10		9	2	#2 ACSR	270	40	4	1	A2.3					1	G1.5-15						2	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
															120/240V						1	N7.6				
															1-PHASE											
8-10A																1	#4 TRIPLEX	50	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-10B																1	#4 TRIPLEX	100	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-10C																1	#4 TRIPLEX	120	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-11			2	#2 ACSR	290	40	4	1	A1.01												2	J3.1				INSTALL STREET LIGHT
8-11A																1	#4 TRIPLEX	55	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-11B																1	#4 TRIPLEX	80	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
8-12			2	#2 ACSR	245	40	4	1	A5.1	1	E1.1La	1	F6.8	1	G1.5-15			245	1	#1/0 TRIPLEX	2	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
8-12A																1	#4 TRIPLEX	145	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
9	29		4	#2 ACSR	175	40	4	2	C5.21	2	E1.1La	2	F6.8	1	G1.4-25	1	#4 TRIPLEX	175	1	#1/0 TRIPLEX	3	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
															120/240V						1	N7.6				
															1-PHASE											
10			4	#2 ACSR	125	40	4	1	C1.11	1	E1.1La	1	F6.8			1	#4 TRIPLEX	175	1	#1/0 TRIPLEX	3	J3.1				

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
10A						35	4									2	#4 TRIPLEX	135	1	#1/0 TRIPLEX	3	J3.1				
11			4	#2 ACSR	85	40	4	1	C1.11	1	E1.1La	1	F6.8			1	#4 TRIPLEX	85	1	#1/0 TRIPLEX	3	J3.1				
11A						35	4			2	E1.1La	2	F6.8			2	#4 TRIPLEX	190	1	#1/0 TRIPLEX	3	J3.1				
12		47	4	#2 ACSR	210	40	4	2	C5.21	1	E1.1La	1	F6.8	1	G1.4-25	1	#4 TRIPLEX				2	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
								1	A5.2						120/240V						1	N7.6				INSTALL STREET LIGHT
															1-PHASE											
12A						35	4									1	#4 TRIPLEX	135	1	#1/0 TRIPLEX	3	J3.1				
12B						35	4									3	#4 TRIPLEX	125	1	#1/0 TRIPLEX	3	J3.1				
12C						35	4									1	#4 TRIPLEX	120	1	#1/0 TRIPLEX	3	J3.1				
12D						35	4			2	E1.1La	2	F6.8					110	1	#1/0 TRIPLEX	2	J3.1				
12E																		125	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
12F																1	#4 TRIPLEX	110	1	#1/0 TRIPLEX	3	J3.1				EXISTING POLE
12-1			2	#2 ACSR	175	40	4	1	A1.01	1	E1.1La	1	F6.8	1	G1.5-10	1	#4 TRIPLEX				2	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
12-2			2	#2 ACSR	80			2	A5.1									80	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE PROVIDE #2 ACSR JUMPERS.
12-2A																										EXISTING POLE
12-3																										EXISTING POLE

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE			BACKFEED							
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
12-4														1	G1.5-10						1	N7.6	1	H1.1		EXISTING POLE
															120/240V											
															1-PHASE											
12-5																										EXISTING POLE
13			4	#2 ACSR	175	40	4	1	C1.11					1	G1.4-15	1	#4 TRIPLEX				2	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS.
															120/240V						1	N7.6				
															1-PHASE											
14			4	#2 ACSR	110	40	4	1	C1.11							2	#4 TRIPLEX	110	1	#1/0 TRIPLEX	2	J3.1				
15			4	#2 ACSR	175	40	4	1	C1.11																	
16			4	#2 ACSR	160	40	4	1	C1.11					1	G1.4-25	1	#4 TRIPLEX				3	J3.1	1	H1.1		INSTALL STREET LIGHT
															120/240V						1	N7.6				
															1-PHASE											
16A						40	4			1	E1.1La	1	F6.8													
										1	E1.4L															
16-1						35	4									1	#4 TRIPLEX	95	1	#1/0 TRIPLEX	3	J3.1				
						35	4																			
16-2																		95	1	#1/0 TRIPLEX	2	J3.1				
16-3						35	4											140	1	#1/0 TRIPLEX	3	J3.1				
16-3A						35	4									1	#4 TRIPLEX	120	1	#1/0 TRIPLEX	2	J3.1				
16-3B																		95	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
16-3C																										EXISTING POLE
17			4	#2 ACSR	180	40	4	1	C1.11	1	E1.1La	1	F6.8			2	#4 TRIPLEX	180	1	#1/0 TRIPLEX	4	J3.1				

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
17A																1	#4 TRIPLEX	180	1	#2 TRIPLEX	2	J3.1				EXISTING POLE
18			4	#2 ACSR	240	40	4	1	C1.11					1	G1.4-15	1	#4 TRIPLEX				3	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
19			4	#2 ACSR	270	40	4	1	C1.11							2	#4 TRIPLEX	270	1	#1/0 TRIPLEX	3	J3.1				INSTALL STREET LIGHT
20			4	#2 ACSR	190	40	4	1	C1.11																	
21			4	#2 ACSR	160	40	4	1	C1.11					1	G1.4-15	2	#4 TRIPLEX				3	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
22			4	#2 ACSR	110	40	4	1	C1.11							2	#4 TRIPLEX	110	1	#1/0 TRIPLEX	3	J3.1				INSTALL STREET LIGHT
23			4	#2 ACSR	165	40	4	1	C5.21	1	E1.1La	1	F6.8	1	G1.4-10	1	#4 TRIPLEX	180			2	J3.1	1	H1.1		
								1	A5.1						120/240V						1	N7.6				
															1-PHASE											
24			2	#2 ACSR	120	40	4	1	A1.01							1	#4 TRIPLEX	120	1	#1/0 TRIPLEX	2	J3.1				
25			2	#2 ACSR	195	40	4	1	A1.01																	
26			2	#2 ACSR	195	40	4	1	A1.01																	
27			2	#2 ACSR	200	40	4	1	A1.01																	
28			2	#2 ACSR	190	40	4	1	A5.1	1	E1.1La	1	F6.8	1	G1.5-10	1	#4 TRIPLEX				2	J3.1	1	H1.1		
															120/240V						1	N7.6				
															1-PHASE											
28A										1	E1.1La	1	F6.8			1	#4 TRIPLEX	120	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE		BACKFEED								
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		

STAKING SHEET NOTES:

1. SEE PROJECT DETAIL DRAWINGS FOR MODIFIED RUS CONSTRUCTION UNITS. UNLESS OTHERWISE INDICATED, GUY LEADS SHALL BE 30 FEET.
2. ON THE RUS CONSTRUCTION UNIT G1.4 AND G1.5 AN ARMOR ROD IS INDICATED AT THE CONNECTION TO THE LINE WITH A HOT LINE CLAMP. DO NOT INSTALL SURGE ARRESTERS ON TRANSFORMERS.
3. RUS ASSEMBLY H1.1 SHALL USE #4 AWG COPPER FOR POLE GROUND CONDUCTOR. ALUMINUM CONDUCTORS SHALL NOT BE USED.
4. INSTALL 120 VOLT METER AND BASE ON THE POLE WITH THE TOP OF THE METER BASE AT 5'-0" ABOVE GRADE LEVEL. INSTALL UNISTRUT SUPPORT ON THE PILE AS REQUIRED. THE METER BASE SHALL BE STAINLESS STEEL. INSTALL 1-1/4" CONDUIT RISER UP TO THE LIGHT WITH WEATHERHEAD. ROUTE POWER SUPPLY FOR LIGHT THROUGH METER.