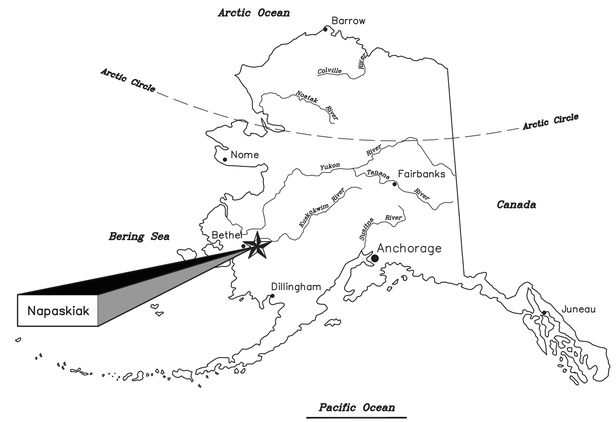
NAPASKIAK POWER SYSTEM UPGRADE PROJECT
ON SITE CONSTRUCTION



CIVIL DRAWINGS

C1	VICINITY MAP
C2	DEMOLITION PLAN
C3	DEMOLITION SITE PHOTOS
C4	SITE PLAN
C5	EXISTING SITE CONTOUR PLAN
C6	GRADING PLAN
C7	TYPICAL SECTIONS

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A2	INTERIOR ELEVATIONS & DOOR/WINDOW DETAILS & SCHEDULE
A3	EXTERIOR ELEVATIONS & ROOFING NOTES & TRIM DETAILS
A4	BUILDING SECTIONS & DETAILS

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S1.2	FOUNDATION DETAILS
S2	MODULE FRAMING PLANS & DETAILS
S3	MODULE SECTIONS DETAILS
S4	ROOF FRAMING PLAN & DETAILS
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S5.2	STAIRS/LANDINGS FABRICATION DETAILS
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S5.4	RADIATOR & CHARGE AIR COOLER SUPPORT FABRICATION DETAILS

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M1.2	WARNING SIGN & FIRE EXTINGUISHER PLAN, SIGN & VALVE TAG SCHEDULES
M1.3	SYSTEM START UP & SEQUENCE OF OPERATIONS
M1.4	POWER PLANT & HEAT RECOVERY VICINITY PLAN, SITE PLAN, & DETAILS
M1.5	POWER PLANT ENLARGED MECHANICAL SITE PLAN & DETAILS
M2.1	MECHANICAL PENETRATIONS PLAN, ELEVATIONS & DETAILS
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M3.2	WALL ELEVATIONS & PIPING DETAILS
M3.3	MECHANICAL DETAILS
M3.4	GENERATOR FABRICATION DETAILS
M4.1	COOLANT & HEAT RECOVERY PIPING PLAN & DETAILS
M4.2	COOLANT & HEAT RECOVERY ISOMETRICS & DETAILS
M4.3	ENGINE COOLANT & HEAT RECOVERY PIPING DETAILS
M4.4	GLYCOL STORAGE & EXPANSION TANKS FABRICATION
M5.1	DIESEL FUEL & USED OIL PIPING PLAN, DIAGRAM, & DETAILS
M5.2	DIESEL FUEL & USED OIL PIPING ELEVATIONS & DETAILS
M5.3	USED OIL HOPPER & BLENDER INSTALLATION DETAILS
M5.4	200 GALLON DAY TANK FABRICATION
M5.5	USED OIL BLENDER FILTER BANK LAYOUT & CONFIGURATION
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M8.3	HEAT RECOVERY SYSTEM TYPICAL CUH WALL-MOUNT DETAILS
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M8.5	HEAT RECOVERY SYSTEM BUILDING A ENLARGED PLANS & DETAILS
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M8.7	HEAT RECOVERY SYSTEM BUILDINGS C & D ENLARGED PLANS
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M8.9	HEAT RECOVERY SYSTEM BUILDINGS G ENLARGED PLANS & DETAILS
FS1	FIRE SUPPRESSION SYSTEM PLAN, SECTION, LEGEND, & NOTES

ELECTRICAL – POWER PLANT

E1.1	ELECTRICAL LEGENDS & SCHEDULES
E1.2	OVERALL POWER PLANT & HEAT RECOVERY VICINITY PLAN
E1.3	POWER PLANT ELECTRICAL SITE PLAN & DETAILS
E1.4	POWER PLANT FEEDER & STEP UP TRANSFORMER PLAN
E1.5	STEP UP TRANSFORMER BANK DEMOLITION & INTERIM CONFIGURATION
E1.6	STEP UP TRANSFORMER BANK FINAL CONFIGURATION & DETAILS
E1.7	POWER PLANT GROUNDING PLAN & FEEDER DETAILS
E1.8	POWER PLANT COMMUNICATION PLAN & DETAILS
E2	MODULE GROUNDING PLAN & DETAILS
E3.1	WIREWAY PLAN, BUILDING SECTION, & DETAILS
E3.2	ELEVATIONS & DETAILS
E3.3	ELEVATIONS & DETAILS
E4.1	RECEPTACLE & LIGHTING PLANS & PANELBOARD
E4.2	STATION SERVICE PLAN, DETAILS, & PANELBOARD
E5	INSTRUMENTATION & DATA PLAN & DETAILS
E6.1	SWITCHGEAR ENCLOSURE LAYOUT, SETTING TABLE, & DETAILS
E6.2	SWITCHGEAR ONE-LINE & DETAILS
E6.3	24VDC ENGINE WIRING JUNCTION BOX
E7.1	DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS
E7.2	DAY TANK CONTROL PANEL LAYOUT & TERMINAL STRIPS
E7.3	DAY TANK CONTROL PANEL NOTES, SEQUENCE OF OPERATIONS & INTERCONNECT DETAILS
E7.4	DAY TANK FILTER WATER INDICATION PANEL
E8.1	HEAT RECOVERY SYSTEM BUILDING A ELECTRICAL PLAN & DETAILS
E8.2	HEAT RECOVERY SYSTEM BUILDING B ELECTRICAL PLAN
E8.3	HEAT RECOVERY SYSTEM BUILDINGS C & D ELECTRICAL PLANS
E8.4	HEAT RECOVERY SYSTEM BUILDINGS E, F, & G ELECTRICAL PLANS

ELECTRICAL – DISTRIBUTION

E10.0	DISTRIBUTION LEGEND, ABBREVIATIONS, SPECIFICATIONS & NOTES
E10.1	DISTRIBUTION DETAILS
E11.0	OVERALL DISTRIBUTION SITE PLAN
E11.1	DISTRIBUTION DEMOLITION PLAN (1 OF 4)
E11.2	DISTRIBUTION DEMOLITION PLAN (2 OF 4)
E11.3	DISTRIBUTION DEMOLITION PLAN (3 OF 4)
E11.4	DISTRIBUTION DEMOLITION PLAN (4 OF 4)
E12.1	DISTRIBUTION PLAN (1 OF 4)
E12.2	DISTRIBUTION PLAN (2 OF 4)
E12.3	DISTRIBUTION PLAN (3 OF 4)
E12.4	DISTRIBUTION PLAN (4 OF 4)

THIS DRAWING SET INCLUDES DRAWINGS THAT SHOW WORK THAT IS INCLUDED IN THIS CONTRACT AND REFERENCE DRAWINGS THAT SHOW WORK PERFORMED UNDER THE PRIOR MODULE ASSEMBLY CONTRACT. SEE RED NOTES ON EACH SHEET FOR DELINEATION OF SCOPE.

THIS DRAWING SET SHOWS WORK THAT IS UNDER THE BASE BID AND ADDITIVE ALTERNATES. ALL WORK SHOWN IS INCLUDED IN THE BASE BID UNLESS SPECIFICALLY INDICATED AS ADDITIVE ALTERNATE.

ISSUED FOR CONSTRUCTION
NOV 2023

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: ON-SITE CONSTRUCTION SCHEDULE OF DRAWINGS

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

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

DRAWN BY: BCG	SCALE: NO SCALE
DESIGNED BY: BCG	DATE: 11/13/23
FILE NAME: NAPS PP G1	SHEET: G1
PROJECT NUMBER:	

1 **VICINITY MAP**

ALL WORK ON SHEETS C1 THROUGH C7 IS INCLUDED IN THE ON SITE CONTRACT.

100' 0 100' 200'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — REGISTERED PROFESSIONAL ENGINEER — Karl Hulse — Kurt K. Hulse — CE-10583 — 12/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE

VICINITY MAP

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	KH	12/15/22

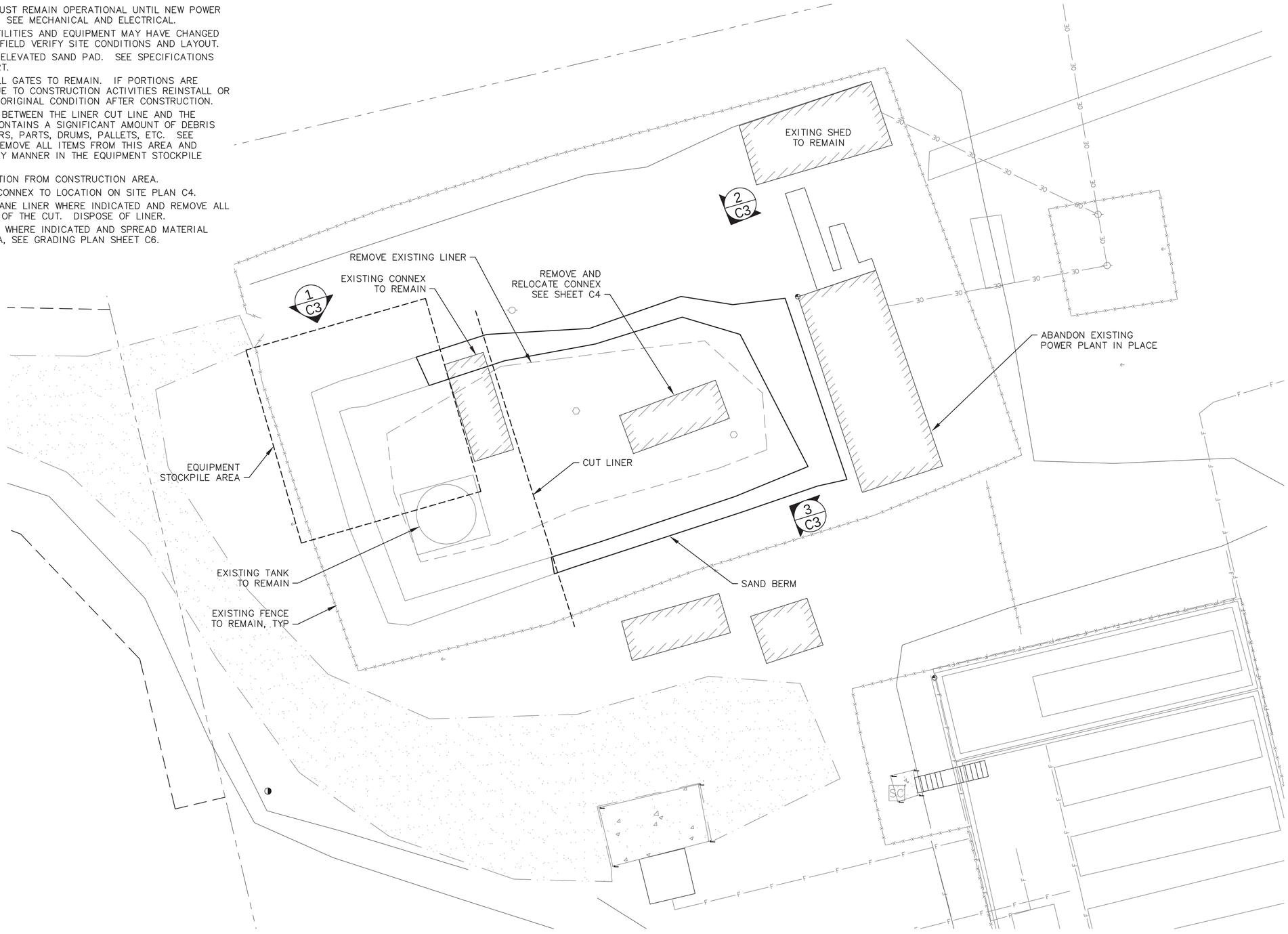
Plot Date 12/14/22 — Designed KEG — Drawn KEG — Approved KH

Sheet No. C1

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\01 Civil\72309.00 Vicinity Map.dwg Plot Date: 12/14/2022 2:57 PM

NOTES:

1. EXISTING POWER PLANT MUST REMAIN OPERATIONAL UNTIL NEW POWER PLANT IS COMMISSIONED. SEE MECHANICAL AND ELECTRICAL.
2. LOCATION OF EXISTING UTILITIES AND EQUIPMENT MAY HAVE CHANGED SINCE TIME OF SURVEY. FIELD VERIFY SITE CONDITIONS AND LAYOUT.
3. THE PROJECT SITE IS AN ELEVATED SAND PAD. SEE SPECIFICATIONS FOR GEOTECHNICAL REPORT.
4. EXISTING FENCING AND ALL GATES TO REMAIN. IF PORTIONS ARE REMOVED OR DAMAGED DUE TO CONSTRUCTION ACTIVITIES REINSTALL OR REPLACE TO RESTORE TO ORIGINAL CONDITION AFTER CONSTRUCTION.
5. THE CONSTRUCTION AREA BETWEEN THE LINER CUT LINE AND THE EXISTING POWER PLANT CONTAINS A SIGNIFICANT AMOUNT OF DEBRIS INCLUDING OLD GENERATORS, PARTS, DRUMS, PALLETS, ETC. SEE PHOTOS ON SHEET C3. REMOVE ALL ITEMS FROM THIS AREA AND STACK IN A NEAT ORDERLY MANNER IN THE EQUIPMENT STOCKPILE AREA.
6. CLEAR AND GRUB VEGETATION FROM CONSTRUCTION AREA.
7. RELOCATE ONE EXISTING CONNEX TO LOCATION ON SITE PLAN C4.
8. CUT THE EXISTING MEMBRANE LINER WHERE INDICATED AND REMOVE ALL LINER ON THE EAST SIDE OF THE CUT. DISPOSE OF LINER.
9. CUT EXISTING SAND BERM WHERE INDICATED AND SPREAD MATERIAL OVER CONSTRUCTION AREA, SEE GRADING PLAN SHEET C6.



1 **DEMOLITION PLAN**

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — REGISTERED PROFESSIONAL ENGINEER — Karl Hulse — Karl R. Hulse — CE-10583 — 12/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DEMOLITION PLAN

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	KH	12/15/22

Plot Date 12/9/22
Designed KEG
Drawn KEG
Approved KH

Sheet No. C2

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\01 Civil\72309.00 Demolition Plan.dwg Plot Date: 12/14/2022 2:58 PM

1 **SITE PHOTO - NORTHWEST**

2 **SITE PHOTO - NORTHEAST**

3 **SITE PHOTO - SOUTHEAST**

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — REGISTERED PROFESSIONAL ENGINEER — Karl Hulse — Kevin R. Hulse — CE-10583 — 12/15/22

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

NAPASKIAK POWER SYSTEM UPGRADE

DEMOLITION SITE PHOTOS

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	KH	12/15/22

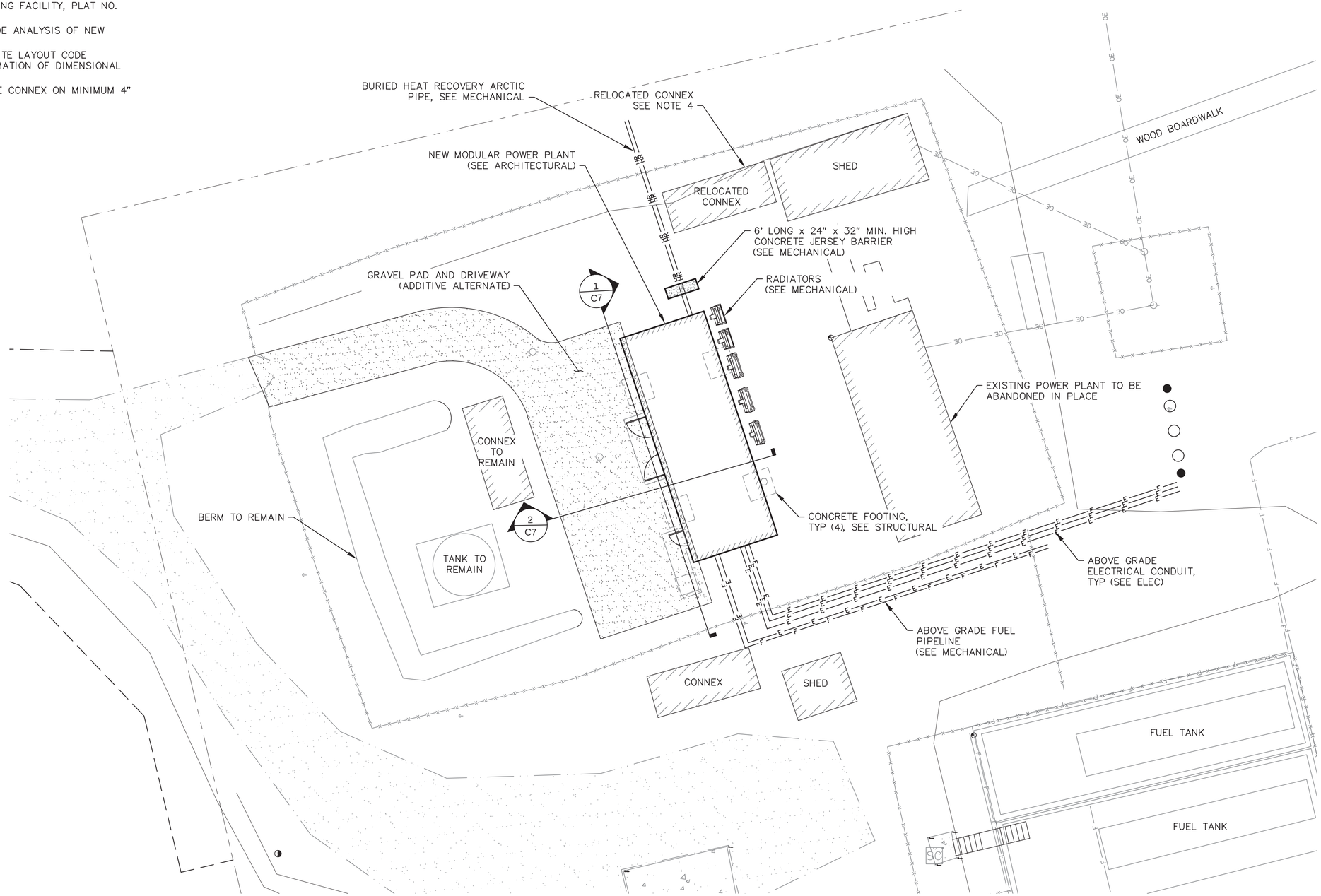
Plot Date 12/9/22 — Designed KEG — Drawn KEG — Approved KH

Sheet No. C3

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\01 Civil\72309.00 Demolition Plan.dwg Plot Date: 12/14/2022 2:58 PM

NOTES:

1. THE NEW NAPASKIAK POWER PLANT IS LOCATED ON THE SAME PARCEL OF LAND AS THE EXISTING POWER PLANT AND THE NAPASKIAK BULK FUEL STORAGE AND DISPENSING FACILITY, PLAT NO. 2003–17.
2. SEE SHEET A1 FOR CODE ANALYSIS OF NEW POWER PLANT.
3. SEE SHEET M1.4 FOR SITE LAYOUT CODE ANALYSIS AND CONFIRMATION OF DIMENSIONAL CLEARANCES.
4. LEVEL AREA AND PLACE CONNEX ON MINIMUM 4" THICK DUNNAGE.



1 **SITE PLAN**

10' 0 10' 20'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — Karl R. Hulse — CE-10583 — 12/15/22 — REGISTERED PROFESSIONAL ENGINEER

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

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

NAPASKIAK POWER SYSTEM UPGRADE

SITE PLAN

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	KH	12/15/22

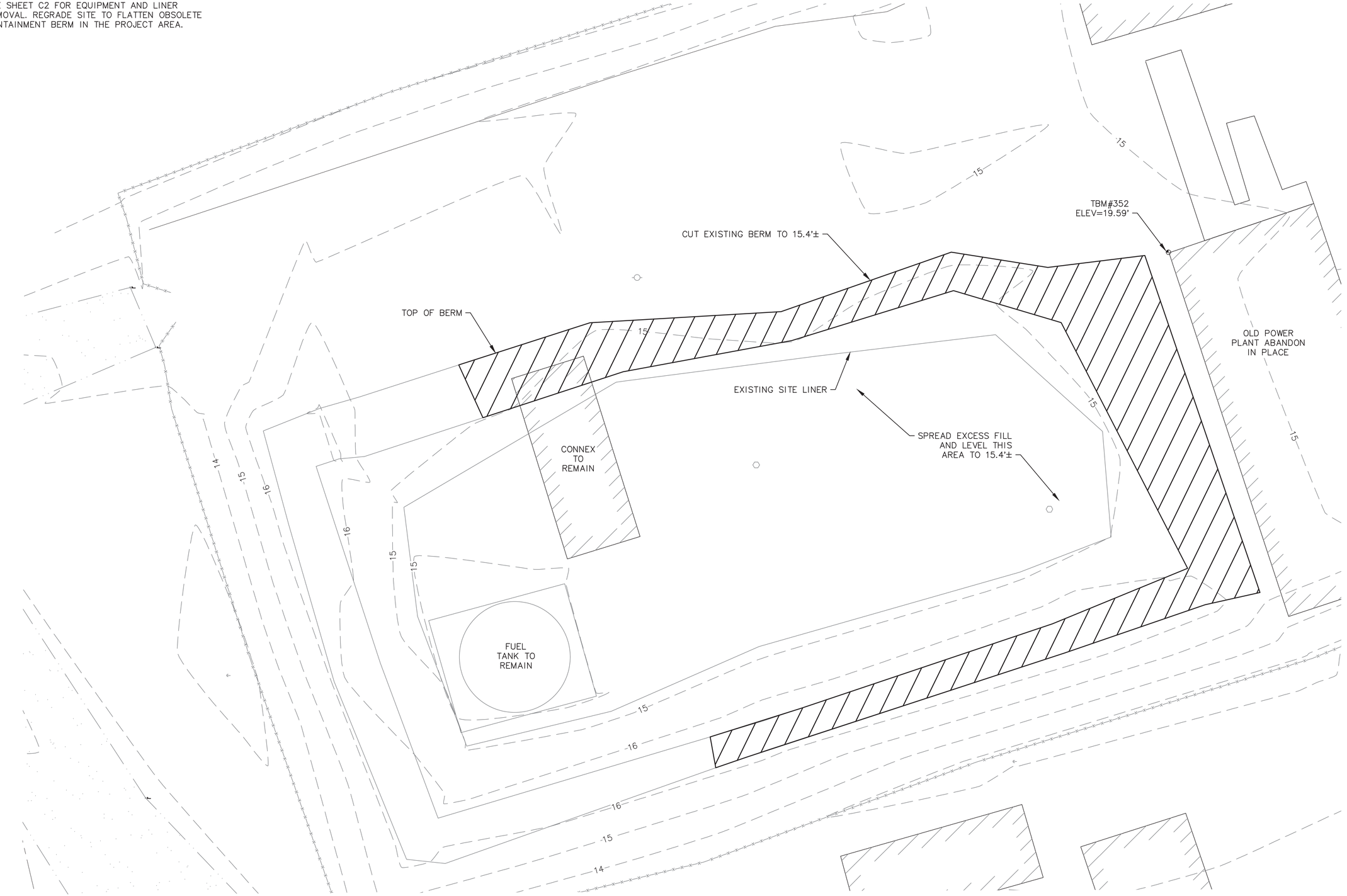
Plot Date 12/9/22 | Designed KEG | Drawn KEG | Approved KH

Sheet No. C4

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\01 Civil\72309.00 Site Plan.dwg Plot Date: 12/14/2022 2:59 PM

NOTES:

1. SEE SHEET C2 FOR EQUIPMENT AND LINER REMOVAL. REGRADE SITE TO FLATTEN OBSOLETE CONTAINMENT BERM IN THE PROJECT AREA.



1 **EXISTING SITE CONTOUR PLAN**

5' 0 5' 10'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — Karl R. Hulse — CE-10583 — 12/15/22 — REGISTERED PROFESSIONAL ENGINEER

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

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

NAPASKIAK POWER SYSTEM UPGRADE

EXISTING SITE CONTOUR PLAN

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	KH	12/15/22

Plot Date 12/9/22 — Designed KEG — Drawn KEG — Approved KH

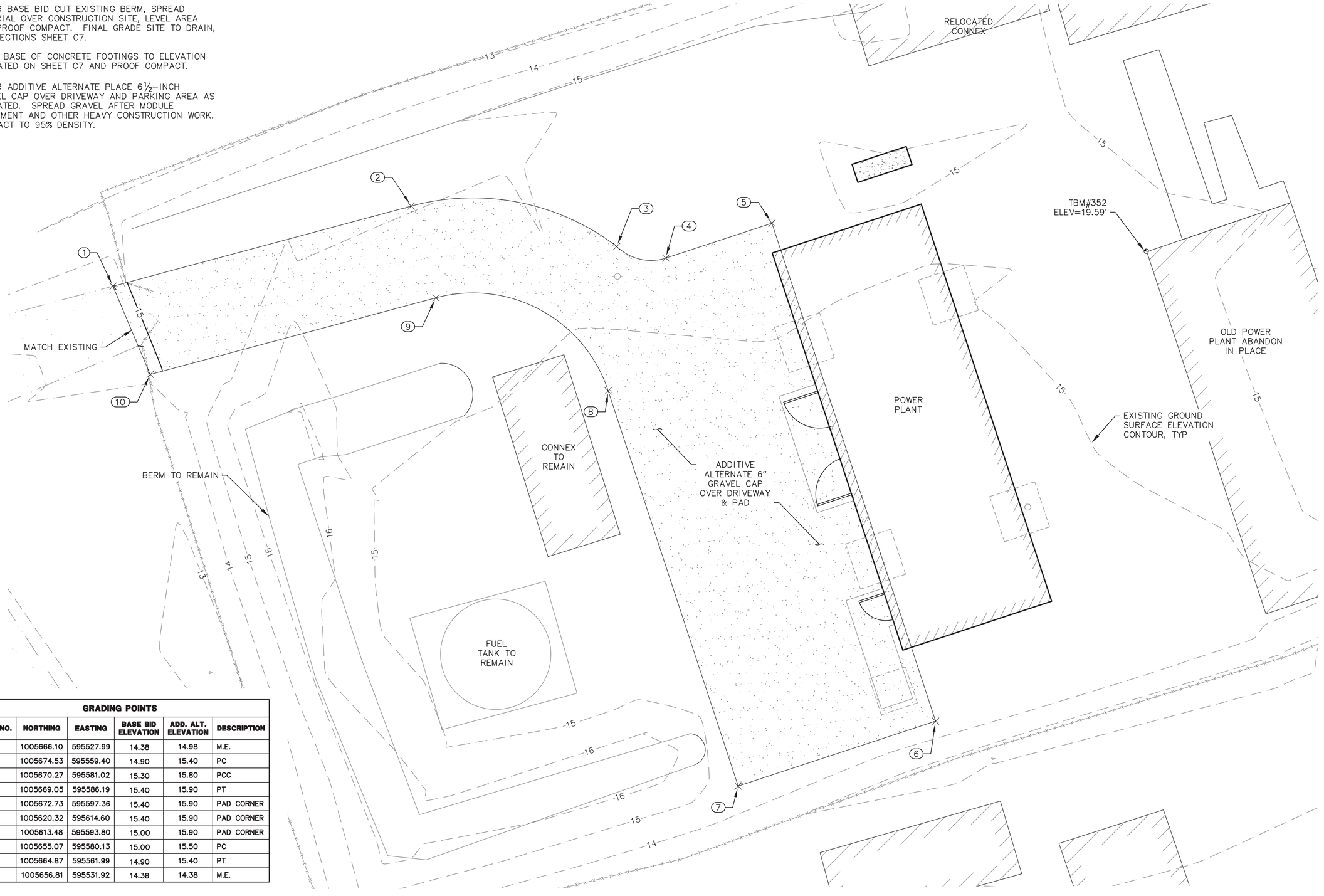
Sheet No. C5

Plot Date: 12/14/2022 3:02 PM

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\01 Civil\72309.00 Existing Site Grades.dwg

NOTES:

1. UNDER BASE BID CUT EXISTING BERM, SPREAD MATERIAL OVER CONSTRUCTION SITE, LEVEL AREA AND PROOF COMPACT. FINAL GRADE SITE TO DRAIN, SEE SECTIONS SHEET C7.
2. LEVEL BASE OF CONCRETE FOOTINGS TO ELEVATION INDICATED ON SHEET C7 AND PROOF COMPACT.
3. UNDER ADDITIVE ALTERNATE PLACE 6½–INCH GRAVEL CAP OVER DRIVEWAY AND PARKING AREA AS INDICATED. SPREAD GRAVEL AFTER MODULE PLACEMENT AND OTHER HEAVY CONSTRUCTION WORK. COMPACT TO 95% DENSITY.



GRADING POINTS					
POINT NO.	NORTHING	EASTING	BASE BID ELEVATION	ADD. ALT. ELEVATION	DESCRIPTION
1	1005666.10	595527.99	14.38	14.98	M.E.
2	1005674.53	595559.40	14.90	15.40	PC
3	1005670.27	595581.02	15.30	15.80	PCC
4	1005669.05	595586.19	15.40	15.90	PT
5	1005672.73	595597.36	15.40	15.90	PAD CORNER
6	1005620.32	595614.60	15.40	15.90	PAD CORNER
7	1005613.48	595593.80	15.00	15.90	PAD CORNER
8	1005655.07	595580.13	15.00	15.50	PC
9	1005664.87	595561.99	14.90	15.40	PT
10	1005656.81	595531.92	14.38	14.38	M.E.

1 **FINISHED GRADING PLAN**

PROVDE GRAVEL PAD UNDER ADDITIVE ALTERNATE #2.

5' 0 5' 10'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — Karl R. Hulse — CE-11583 — 12/15/22 — REGISTERED PROFESSIONAL ENGINEER

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

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

NAPASKIAK POWER SYSTEM UPGRADE

GRADING PLAN

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	KH	12/15/22

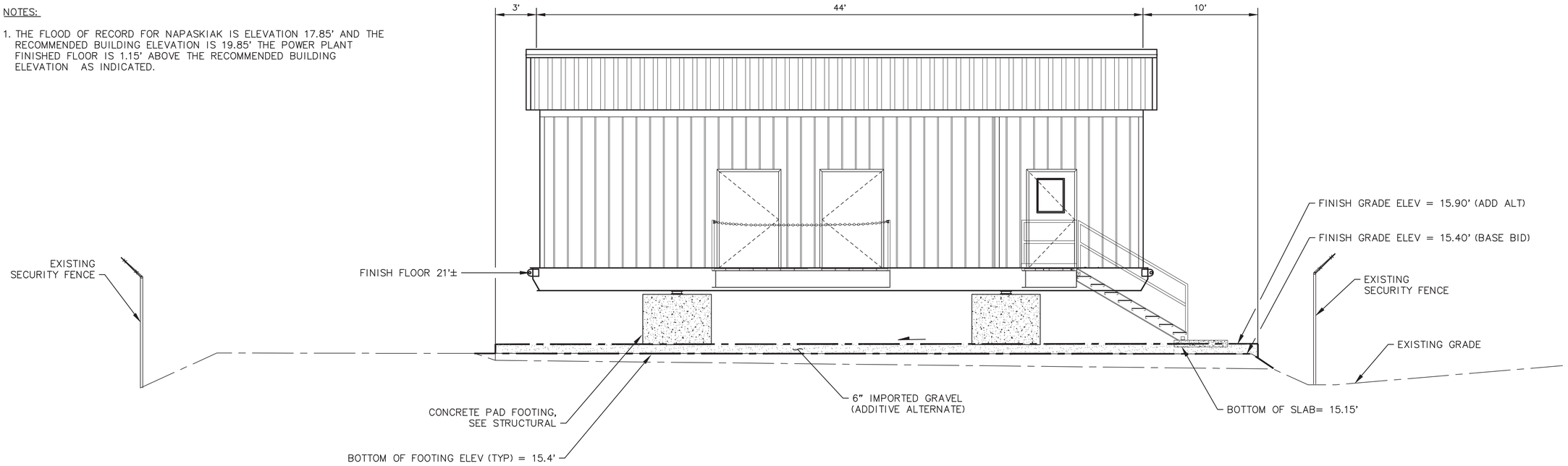
Plot Date 12/9/22 — Designed KEG — Drawn KEG — Approved KH

Sheet No. C6

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\01 Civil\72309.00 Grading Plan.dwg Plot Date: 12/14/2022 3:02 PM

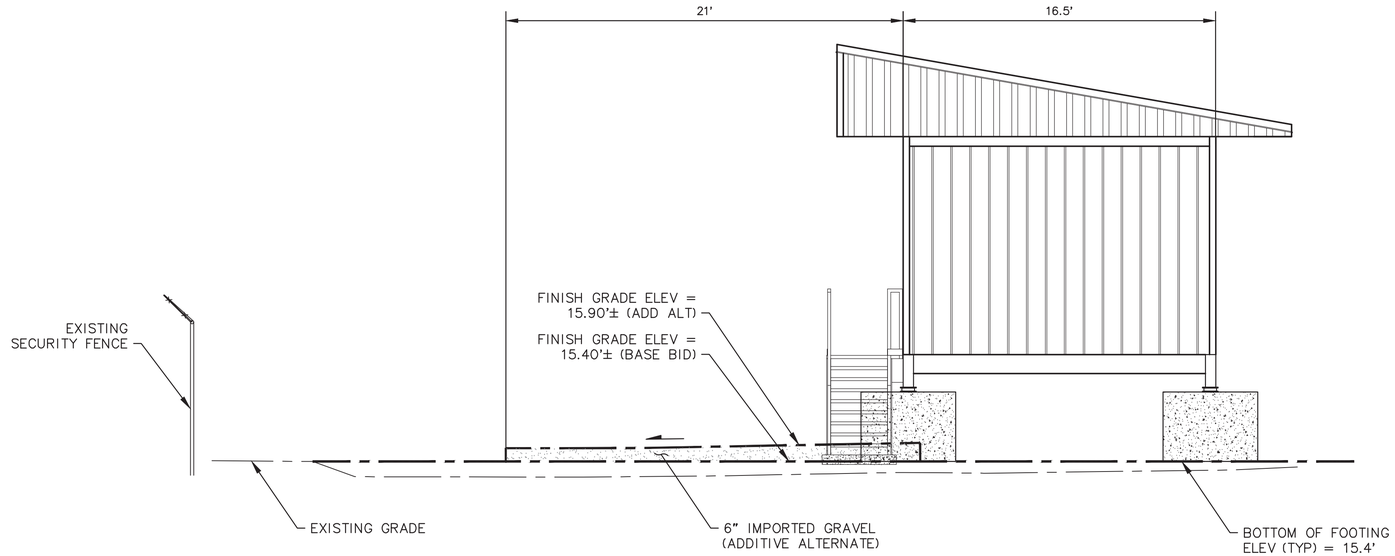
NOTES:

1. THE FLOOD OF RECORD FOR NAPASKIAK IS ELEVATION 17.85' AND THE RECOMMENDED BUILDING ELEVATION IS 19.85' THE POWER PLANT FINISHED FLOOR IS 1.15' ABOVE THE RECOMMENDED BUILDING ELEVATION AS INDICATED.



1 **TYPICAL SECTION**

4' 0 4' 8'



2 **TYPICAL SECTION**

4' 0 4' 8'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — 49TH — Karl R. Hulse — CE-10583 — REGISTERED PROFESSIONAL ENGINEER — 12/15/22

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

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NAPASKIAK POWER SYSTEM UPGRADE

TYPICAL SECTIONS

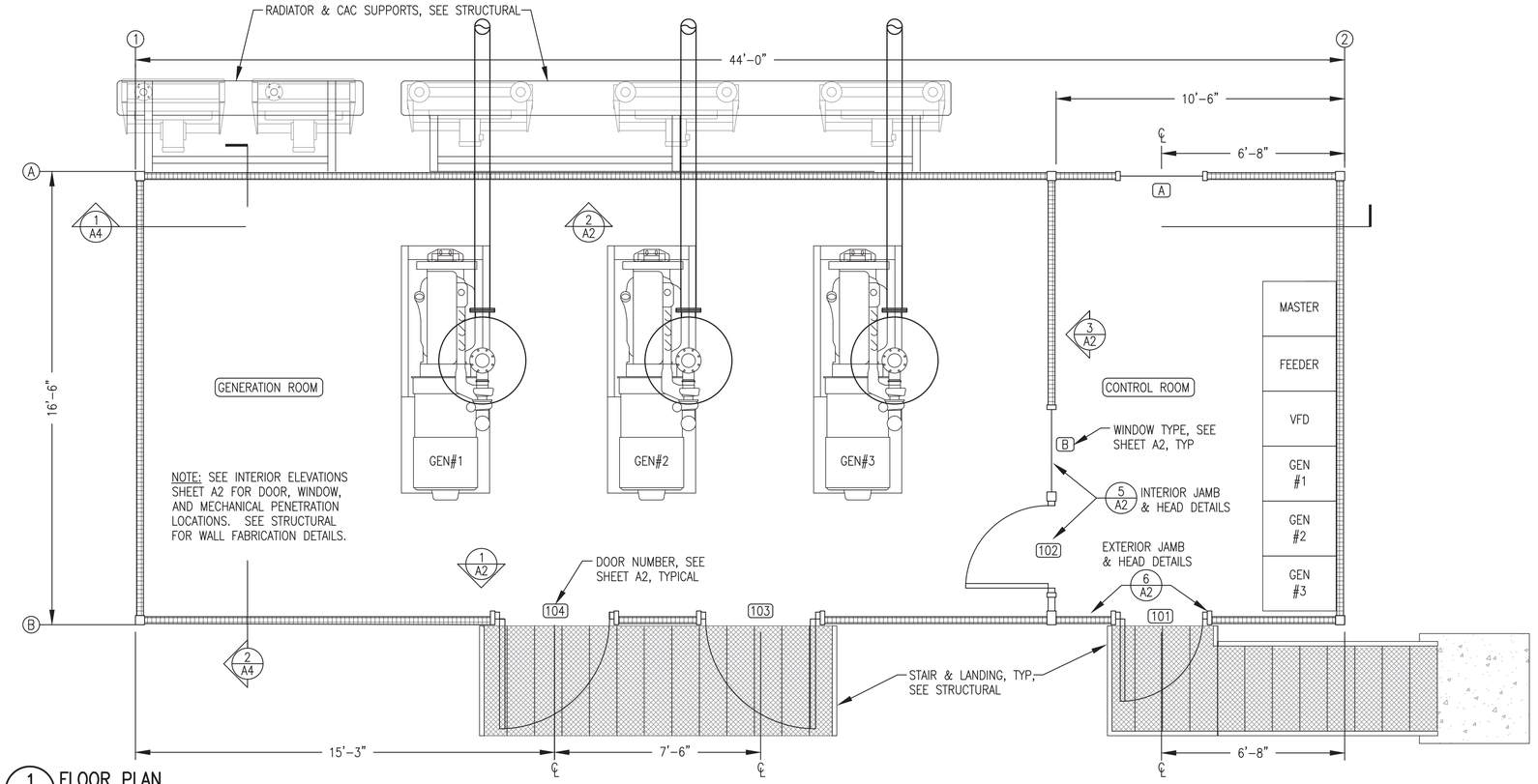
NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	KH	12/15/22

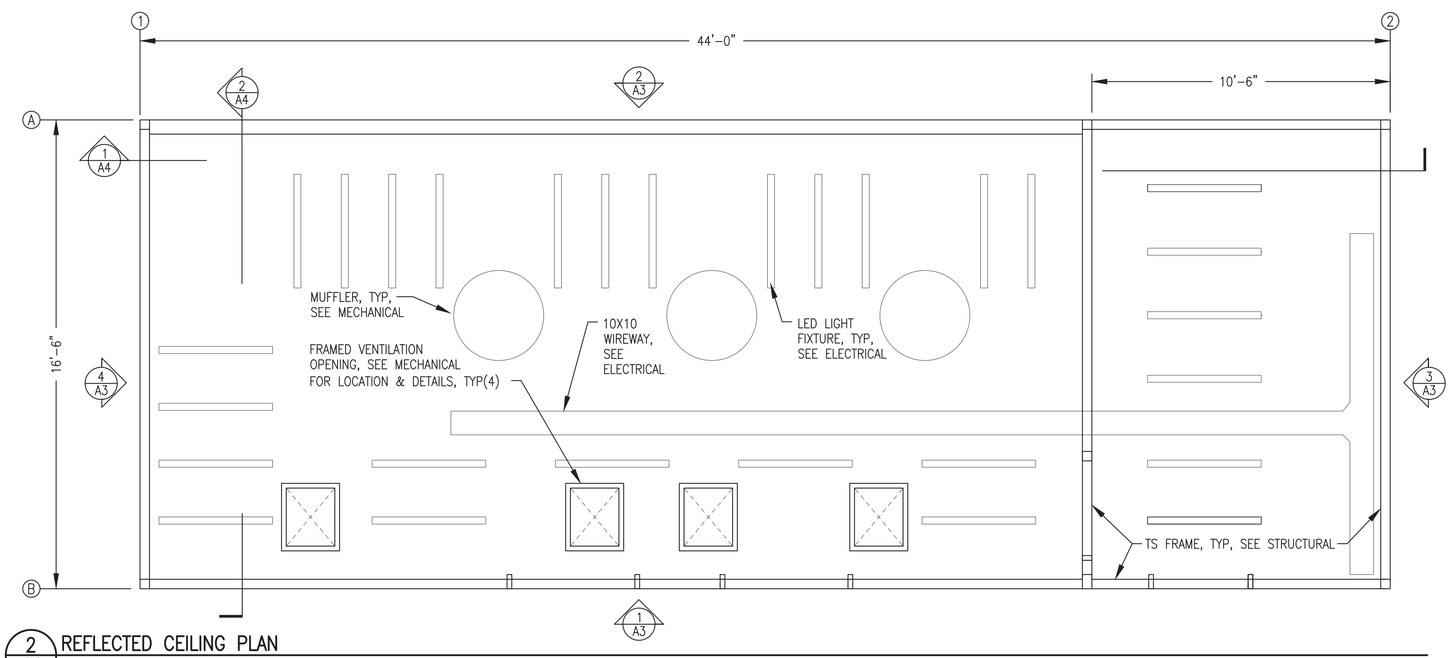
Plot Date 12/9/22 — Designed KEG — Drawn KEG — Approved KH

Sheet No. C7

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\01 Civil\72309.00 Sections.dwg Plot Date: 12/14/2022 3:03 PM



1 A1 FLOOR PLAN
3/8"=1'-0"



2 A1 REFLECTED CEILING PLAN
3/8"=1'-0"

CODE ANALYSIS – 2021 EDITION INTERNATIONAL BUILDING CODE

OCCUPANCY CLASSIFICATION	REF: IBC–2021, SEC. 306.2
GROUP F–1: FACTORY INDUSTRIAL MODERATE HAZARD – ELECTRIC GENERATION PLANT	
TYPE OF CONSTRUCTION	REF: IBC–2021, TABLE 601
TYPE V–B (NON–RATED)	REF: IBC–2021, SEC. 602.5
BUILDING HEIGHTS AND AREAS	REF: IBC–2021, TABLES 504.3, 504.4, & 506.2
MAX ALLOWED = 40'–0" 1 STORY 8,500 S.F	ACTUAL = 18'–0" 1 STORY 730 S.F
FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS	REF: IBC–2021, TABLE 601
STRUCTURAL FRAME: 0 HR BEARING WALLS: 0 HR INTERIOR PARTITIONS: 0 HR	FLOOR: 0 HR
FIRE RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS	REF: IBC–2021, SEC. 705.5
EXTERIOR WALLS 10' < X < 30' 0 HR	
FIRE PROTECTION SYSTEM	REF: IBC–2021, SEC. 903.2.4
FIRE PROTECTION NOT REQUIRED. WATER MIST FIRE SUPPRESSION SYSTEM PROVIDED (SEE MECHANICAL).	
OCCUPANT LOAD	REF: IBC–2021, TABLE 1004.5
MECHANICAL/STORAGE = 300 S.F./PERSON	730 S.F./300 S.F. PER OCCUPANT = 2 OCCUPANTS
MEANS OF EGRESS – TRAVEL DISTANCE	REF: IBC–2021, TABLE 1017.2
MAX ALLOWED = 200'	ACTUAL = 42'
COMBUSTIBLE LIQUIDS STORAGE	REF: IBC–2021, TABLE 307.1(1)(i)
MAX ALLOWED = 660 GAL CLASS II LIQUIDS	ACTUAL = 200 GAL CLASS II (DIESEL FUEL DAY TANK)
MAX ALLOWED = 13200 GAL CLASS IIIB LIQUIDS	ACTUAL = 110 GAL CLASS IIIB (GLYCOL & LUBE OIL)
STATIONARY STORAGE BATTERY SYSTEMS	REF: IFC–2021, TABLE 1207.1.1
MAX EXEMPT = 50 GAL (FLOODED LEAD ACID)	ACTUAL = 6 GAL (6 BATTERIES AT 1 GAL MAX EACH)

ARCHITECTURAL GENERAL NOTES:

1) SEE CIVIL SITE PLAN FOR LOCATION AND LAYOUT. PROVIDE SEPARATION TO PROPERTY BOUNDARIES IN ACCORDANCE WITH CODE ANALYSIS.
2) PROVIDE A COMPLETE AND OPERATIONAL FACILITY. ALL WORK TO BE IN ACCORDANCE WITH CURRENT APPROVED EDITIONS OF THE IBC, IMC, IFC, AND NEC INCLUDING STATE OF ALASKA AMENDMENTS.
3) SEE SHEET A2 FOR DOOR AND WINDOW DETAILS AND SCHEDULE. SEE SHEETS A3 AND A4 FOR DESCRIPTION OF FIELD INSTALLED ROOF SYSTEM.
4) INSULATE ALL WALLS, FLOORS, AND CEILINGS WITH HIGH TEMPERATURE MINERAL FIBER ACOUSTICAL FIRE BATT INSULATION, MIN R VALUE 4 PER INCH, MIN 2000F MELTING TEMP. ROXUL AFB OR EQUAL. FILL ALL PANEL VOIDS OR PROVIDE THICKNESS AS INDICATED ON DRAWINGS. MECHANICALLY FASTEN FLOOR INSULATION TIGHT TO FLOOR.
5) UPON COMPLETION OF FABRICATION ROUND ALL CORNERS AND GRIND EDGES SMOOTH AND PAINT ALL INTERIOR AND EXTERIOR EXPOSED STEEL. PERFORM ALL PAINTING IN A WARM DRY ENVIRONMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS INCLUDING DRYING TIME TO RE–COAT.
6) SANDBLAST EXTERIOR SURFACE TO SSPC–SP–10. PRIME WITH ONE COAT OF REINFORCED INORGANIC ZINC PRIMER, DEVOE CATHA–COAT 302 OR APPROVED EQUAL, COLOR GREEN, TO 3 MILS DRY FILM THICKNESS. COVER WITH TWO COATS OF EPOXY, DEVOE BAR–RUST 236 OR APPROVED EQUAL, TO 10 MILS DRY FILM THICKNESS. FIRST COAT COLOR GRAY, SECOND COAT COLOR WHITE.
7) FINISH EXTERIOR WALLS AND SKIDS (ALL EXPOSED VERTICAL EXTERIOR SURFACES) WITH ONE COAT OF ALIPHATIC URETHANE ENAMEL, DEVOE DEVTHANE 389 OR APPROVED EQUAL, COLOR WHITE, TO 3 MILS DRY FILM THICKNESS. NOTE: TOTAL EXTERIOR COATING BUILD 16 MILS MINIMUM DRY FILM THICKNESS.
8) SANDBLAST INTERIOR SURFACE TO SSPC–SP–6. PRIME AND FINISH WITH TWO COATS OF EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, TO 8 MILS TOTAL DRY FILM THICKNESS. CEILING COLOR WHITE. WALL AND FLOOR COLOR ANSI 61 GRAY. NOTE THAT FIRST COAT ON WALLS AND FLOOR MAY BE WHITE.
9) SANDBLAST ALL EXTERIOR PLATFORMS AND FABRICATIONS AND APPLY 3 COATS OF COLD GALVANIZING COMPOUND, ZRC OR EQUAL, TO 9 MILS MINIMUM DRY FILM THICKNESS. SEE STRUCTURAL.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT FOR FIELD INSTALLATION OF PREVIOUSLY FABRICATED STAIRS AND SUPPORTS AS INDICATED ON STRUCTURAL.

REV #2
ISSUED FOR CONSTRUCTION
NOV 2022

STATE OF ALASKA 49 TH
David G. Thompson
No. 7034
11/1/22
REGISTERED PROFESSIONAL ARCHITECT

REV.	DESCRIPTION	DATE	BY
2	REVISED TO 2021 CODES	11/1/22	BCG
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

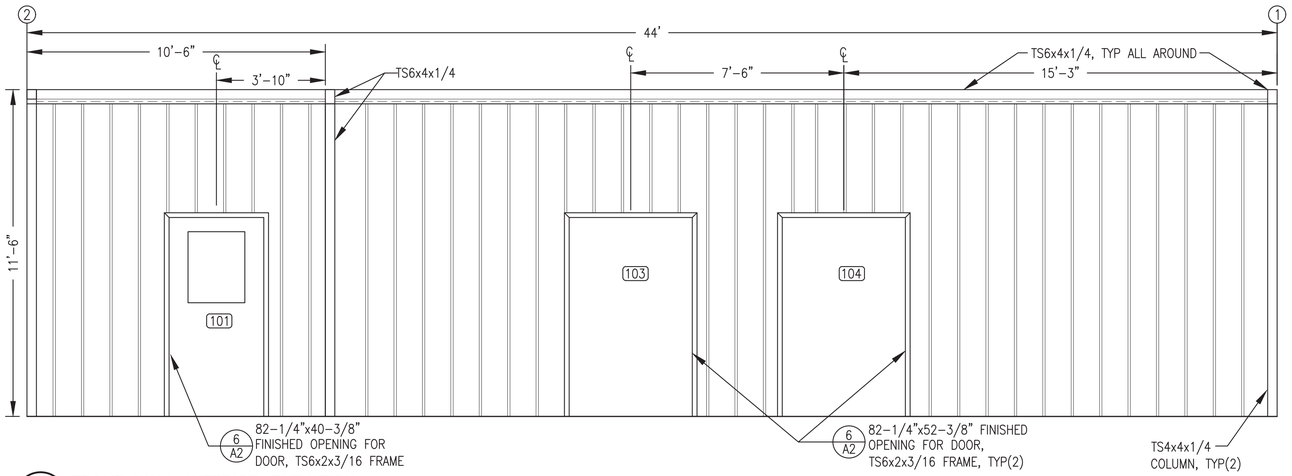
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: FLOOR PLAN, REFLECTED CEILING PLAN, CODE ANALYSIS, & GENERAL NOTES

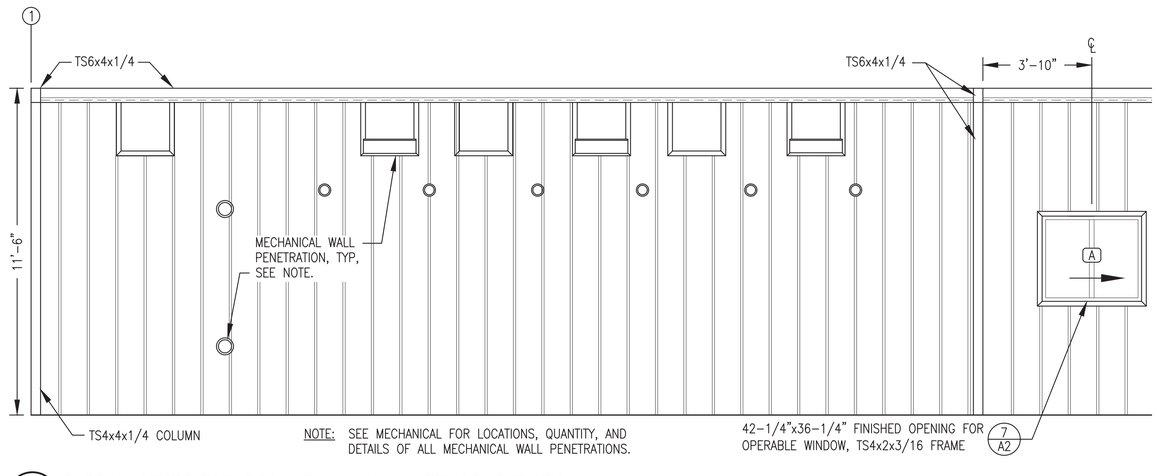
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: DGT/BCG
FILE NAME: NAPS PP A1–4
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 4/18/22
SHEET: A1



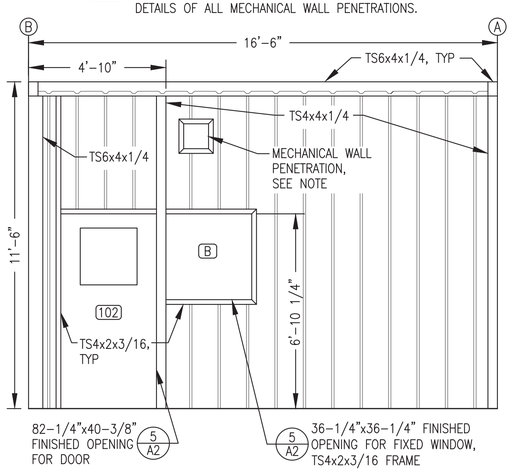
1 A2 FRONT WALL INTERIOR ELEVATION

3/8"=1'-0"



2 A2 PARTIAL GENERATOR ROOM BACK WALL INTERIOR ELEVATION

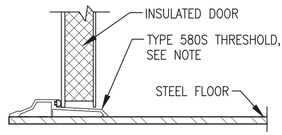
3/8"=1'-0"



3 A2 CONTROL ROOM WALL INTERIOR ELEVATION

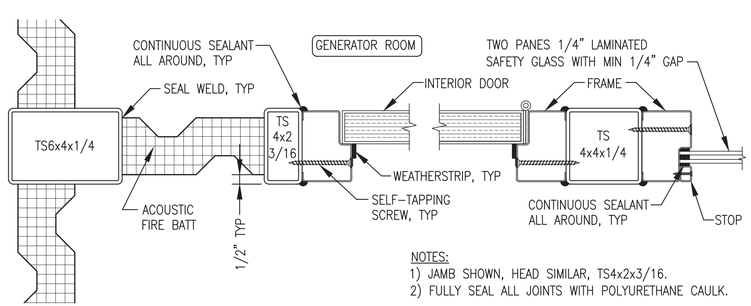
3/8"=1'-0"

NOTE: SET THRESHOLD IN CONTINUOUS BED OF POLYURETHANE CAULK & CAULK ENDS TO JAMB TO FORM LIQUID TIGHT CONTAINMENT.



4 A2 TYPICAL DOOR THRESHOLD

NO SCALE



5 A2 INTERIOR DOOR AND WINDOW JAMB/HEAD

3"=1'-0"

FRAMED OPENING NOTES:

1) FABRICATE FRAMED OPENINGS FOR DOORS, WINDOWS, ETC, WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS. GRIND OUT INSIDE OF MITERED CORNERS TO PROVIDE FULL CLEAR OPENING.
2) FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED AND LOCATE TO INSIDE EDGE OR CENTERLINE AS INDICATED.

DOOR CONSTRUCTION							FRAME CONSTRUCTION						
DOOR NO.	WIDTH	HEIGHT	THICK NESS	MATERIAL	CORE	REMARKS	WALL THICK.	MATERIAL	TYPE	PROFILE	PREP.	FIRE RATING	HDWR. GROUP
101	3'-0"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE	24"x24" RE-LIGHT {4}	N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-1
102	3'-0"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE	24"x24" RE-LIGHT {4}	N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-2
103	4'-0"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE		N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-3
104	4'-0"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE		N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-3

DOOR HARDWARE:

HW-1

3 EA	HINGES	HAGER	BB1191 4.5 x 4.5NRP x 630
1 EA	EXIT DEVICE	PRECISION	2108 x 4908AX3 x 630
1 EA	CORE	BEST	BROWN CONSTRUCTION CORE
1 EA	DOOR CLOSER W/SPRING STOP	LCN	4040 x SCUSH x 689
1 EA	KICK PLATE	ROCKWOOD	K1050 10 x 34 x 630
1 EA	WEATHER STRIP	PEMKO	2891AS x 36 (HEAD)
2 EA	WEATHER STRIP	PEMKO	290AS x 80 (SIDE JAMBS)
1 EA	THRESHOLD	HAGER	580S x 36

HW-2

3 EA	HINGES	HAGER	BB1191 4.5 x 4.5 x 630
1 EA	EXIT DEVICE	PRECISION	2108 x 4908AX3 x 630
1 EA	DOOR CLOSER	LCN	4040 x CUSH x 689
1 EA	KICK PLATE	ROCKWOOD	K1050 10 x 34 x 630
1 EA	MOP PLATE	ROCKWOOD	K1050 10 x 35 x 630
1 EA	SOUND SEAL	PEMKO	2891AS x 36 (HEAD)
2 EA	SOUND SEAL	PEMKO	290AS x 80 (SIDE JAMBS)
1 EA	THRESHOLD	HAGER	580S x 36

HW-3

3 EA	HINGES	HAGER	BB1191 4.5 x 4.5NRP x 630
1 EA	EXIT LOCK	SCHLAGE	ND25D x RHODES x 626
1 EA	OVERHEAD STOP HEAVY DUTY	ROCKWOOD	OH905H x US32D
1 EA	WEATHER STRIP	PEMKO	2891AS x 48 (HEAD)
2 EA	WEATHER STRIP	PEMKO	290AS x 80 (SIDE JAMBS)
1 EA	THRESHOLD	HAGER	580S x 48

NOTES:

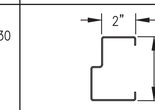
{1} DOORS AND HOLLOW METAL FRAMES GALVANIZED AND FACTORY PRIMED. ALL FRAMES WELDED CONSTRUCTION, DIMPLED AND PUNCHED.

{2} DOORS TO HAVE SOLID POLYURETHANE INSULATION CORE WITH TOPS INVERTED AND CAULKED WATER TIGHT.

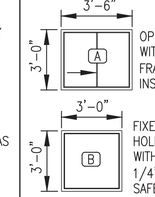
{3} FINISH ALL DOORS AND HOLLOW METAL FRAMES WITH TWO COATS OF PAINT IDENTICAL TO INTERIOR WALLS AND FLOORS AS SPECIFIED ON SHEET A1.

{4} INSTALL INSULATED RE-LIGHT WITH TWO PANES OF 1/4" LAMINATED SAFETY GLASS WITH 1/2" AIR GAP IN EACH DOOR PANEL, 24"x24" OR 24"x18" AS INDICATED.

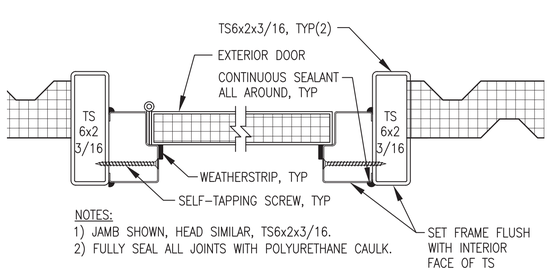
DOOR FRAME PROFILE:



WINDOW TYPES:

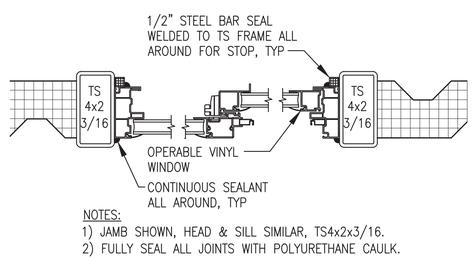


NOTE: DIMENSIONS ARE OVERALL FRAME SIZE.



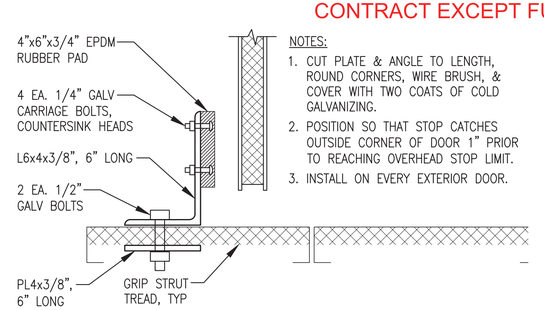
6 A2 TYPICAL EXTERIOR DOOR JAMB/HEAD

3"=1'-0"



7 A2 TYPICAL EXTERIOR WINDOW JAMB/HEAD/SILL

3"=1'-0"



8 A2 TYPICAL EXTERIOR DOOR BOTTOM STOP

NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT FURNISH AND INSTALL DOOR STOPS AS PART OF THE ON SITE CONTRACT

REV#1 ISSUED JUNE 2022

STATE OF ALASKA 49 TH David G. Thompson No. 7034 6/6/22 REGISTERED PROFESSIONAL ARCHITECT

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

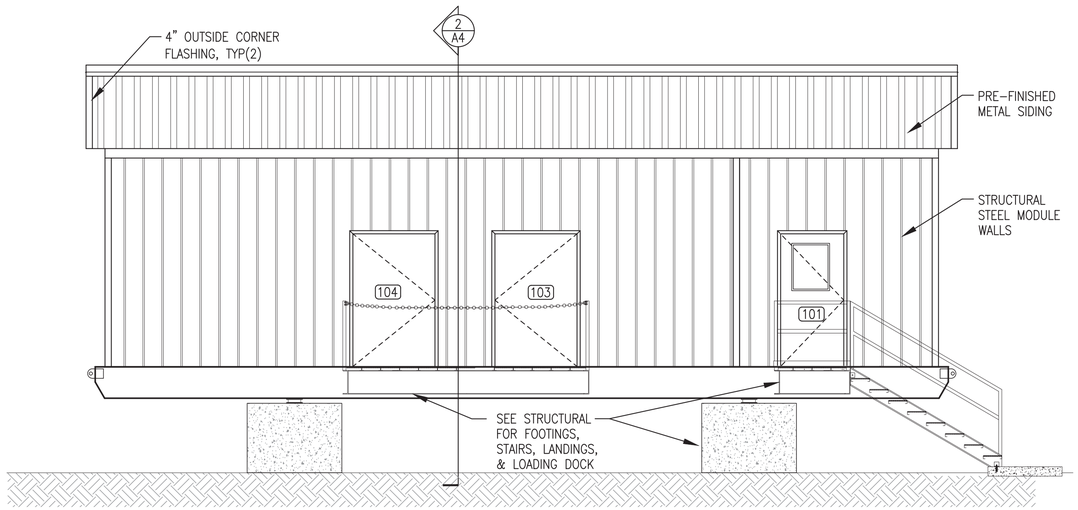
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

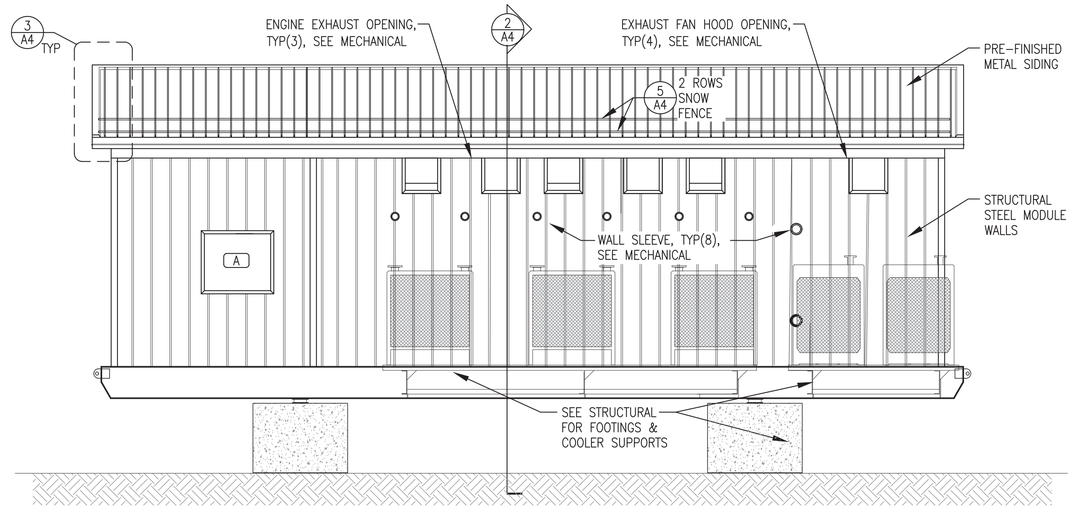
TITLE: INTERIOR ELEVATIONS & DOOR/WINDOW DETAILS & SCHEDULE

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

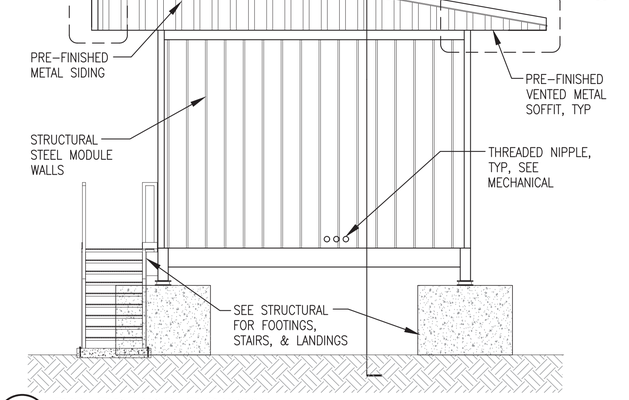
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: DGT/BCG | DATE: 4/18/22
FILE NAME: NAPS PP A1-A4 | SHEET: A2
PROJECT NUMBER:



1 A3 FRONT EXTERIOR ELEVATION
1/4"=1'-0"



2 A3 BACK EXTERIOR ELEVATION
1/4"=1'-0"



3 A3 END EXTERIOR ELEVATION
1/4"=1'-0"

ROOFING SYSTEM NOTES:

1) FIELD INSTALL TRUSSES TO MODULE STRUCTURE, SEE STRUCTURAL. FIELD INSTALL PLYWOOD SHEATHING, ICE AND WATER SHIELD, AND METAL ROOFING/SIDING AS INDICATED. SEAL AND FLASH ALL SEAMS TO FORM A CONTINUOUS WEATHERPROOF SEAL.

2) ALL ROOFING, SIDING, SOFFIT, TRIM, AND FLASHING SHALL BE MIN 24 GAUGE GALVANIZED STEEL WITH KYNAR FINISH, COOL MATTE BLACK. ALL FASTENERS SHALL BE CORROSION RESISTANT COATED SCREWS AND RIVETS.

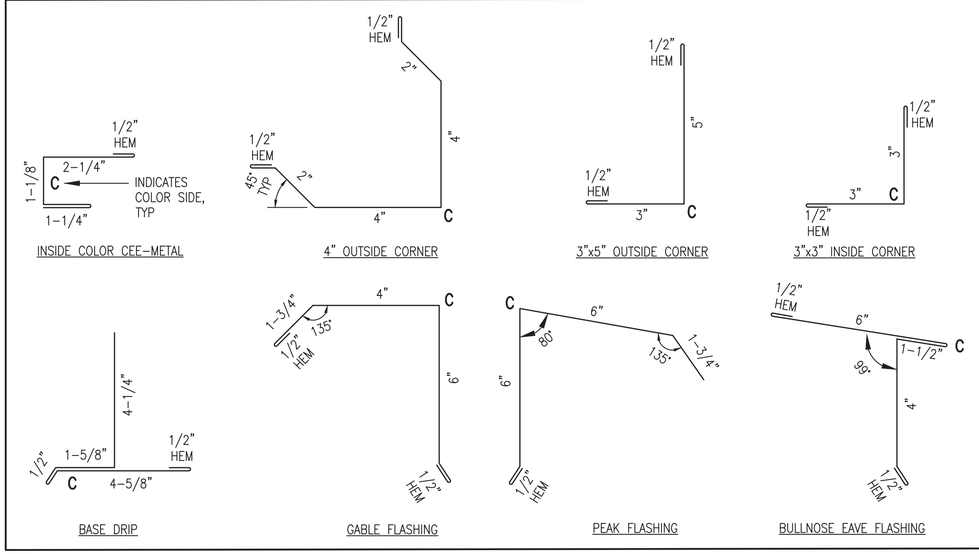
3) ROOFING SHALL BE MECHANICAL STANDING SEAM TYPE, 24 GAUGE, 16" NET COVERAGE, 2" HIGH RIBS AT 16" O.C. WITH TWO PENCIL RIBS BETWEEN. AEP SPAN SPAN LOK HP OR EQUAL. FURNISH CLIPS AND FASTENERS AS REQUIRED TO MEET LOAD CONDITIONS INDICATED ON SHEET S1.

4) SIDING SHALL BE LOW PROFILE, 24 GAUGE, 36" NET COVERAGE, 1-1/4" HIGH MAJOR RIBS AND 1/4 HIGH MINOR RIBS AT 12" O.C. AEP SPAN SUPER-SPAN OR EQUAL. FURNISH FASTENERS AS REQUIRED TO MEET LOAD CONDITIONS INDICATED ON SHEET S1.1.

5) VENTED SOFFIT PANELS SHALL BE 24 GAUGE GALVANIZED STEEL, 12" NET COVERAGE, KYNAR FINISH, 1" STANDOFF FROM SUBSTRATE, CONCEALED FASTENERS, WITH TWO PENCIL RIBS PROVIDING MINIMUM 7.8% NET FREE AREA. AEP SPAN FLUSH PANEL OR EQUAL.

6) SEE SHEET A4 FOR ROOF MOUNTED SNOW FENCE.

ROOFING SYSTEM TRIM & FLASHING:



FIELD INSTALLED ROOF SYSTEM AND FOOTINGS SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

REVISION #2 ISSUED JULY 2022

REV.	DESCRIPTION	DATE	BY
2	REVISED ROOF SYSTEM COLOR PER COMMUNITY REQUEST	7/15/22	BCG
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

STATE OF ALASKA 49 TH
David G. Thompson No. 7034 7/15/22
REGISTERED PROFESSIONAL ARCHITECT

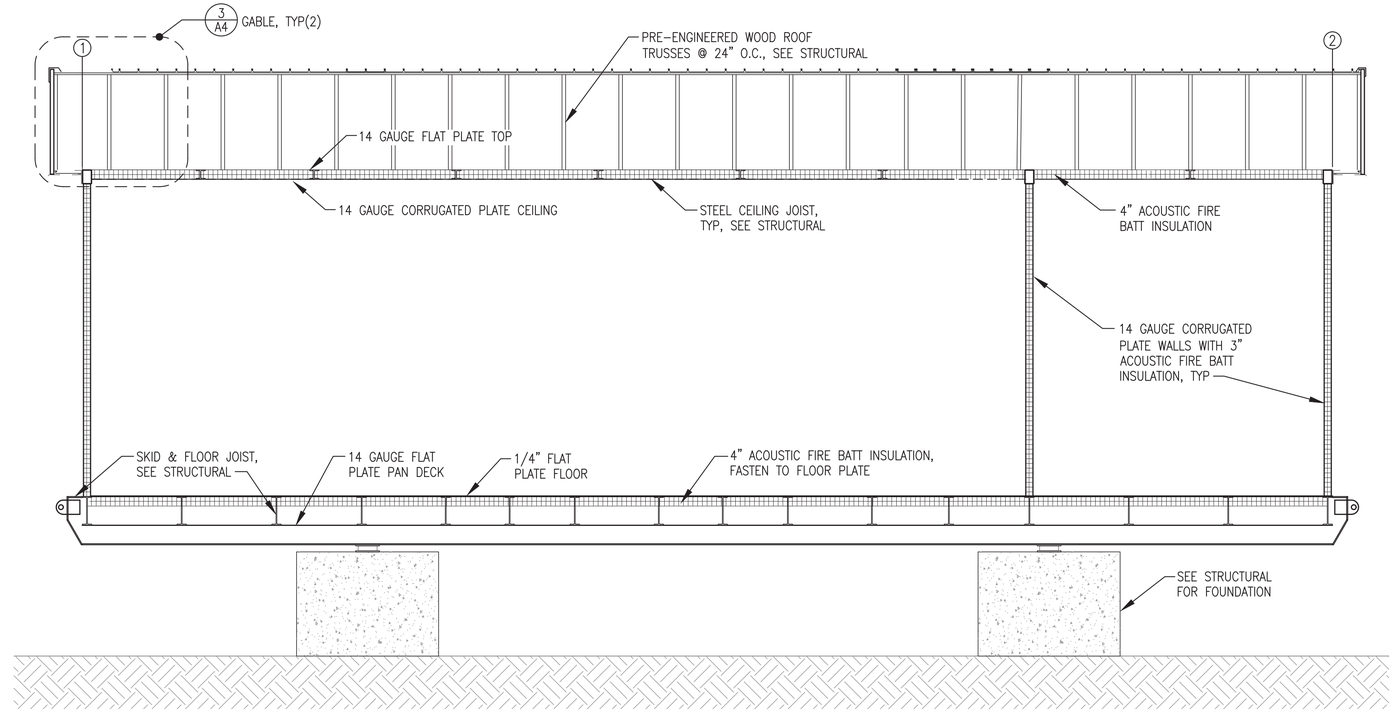
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

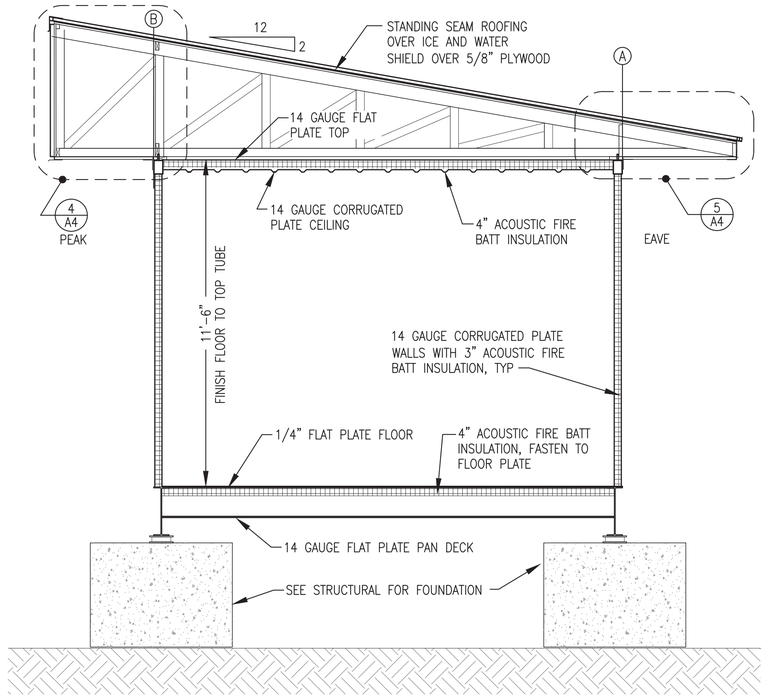
TITLE: EXTERIOR ELEVATIONS & ROOFING NOTES & TRIM DETAILS

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

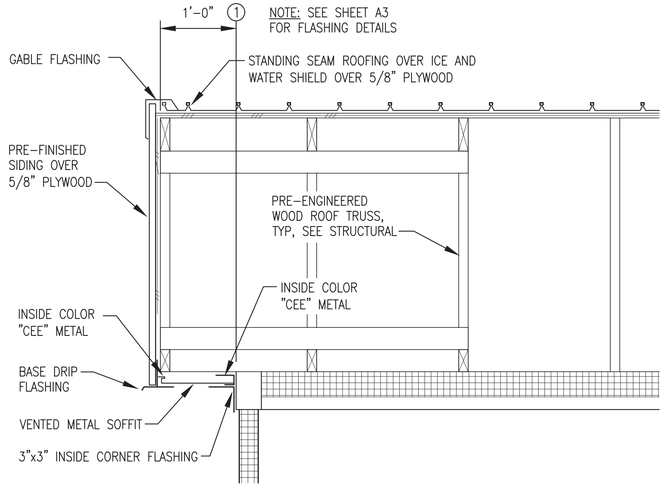
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: DGT/BCG | DATE: 4/18/22
FILE NAME: NAPS PP A1-A4 | SHEET: A3
PROJECT NUMBER:



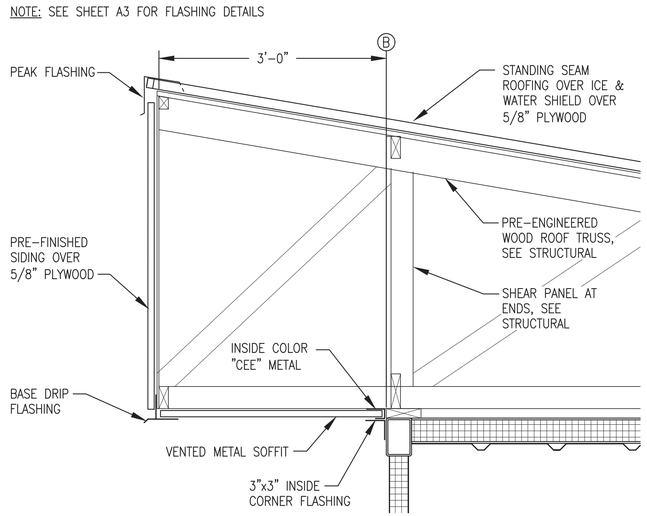
1 A4 BUILDING SECTION
3/8"=1'-0"



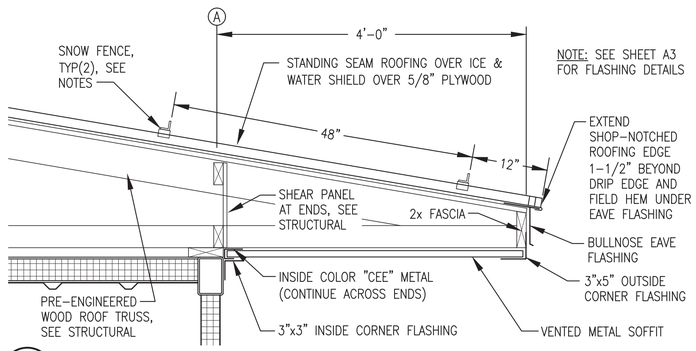
2 A4 BUILDING SECTION
3/8"=1'-0"



3 A4 GABLE DETAIL
1"=1'-0"



4 A4 PEAK DETAIL
1"=1'-0"



5 A4 EAVE DETAIL
1"=1'-0"

SNOW FENCE NOTES:

1) PROVIDE 2 ROWS OF SNOW RETENTION FENCE AS INDICATED.
2) SNOW FENCE SHALL BE L.M. CURBS COLOR GUARD OR APPROVED EQUAL. FURNISH COMPLETE SYSTEM INCLUDING UNPUNCHED COLOR GUARD, SPLICES, VERSA CLIPS, SNO CLIPS III, S5-U CLAMPS, AND ALL REQUIRED FASTENERS.

FIELD INSTALLED ROOF SYSTEM AND FOOTINGS SHOWN
THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

REV#1 ISSUED
JUNE 2022

STATE OF ALASKA
49 TH
David G. Thompson
No. 7034
6/6/22
REGISTERED PROFESSIONAL ARCHITECT

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

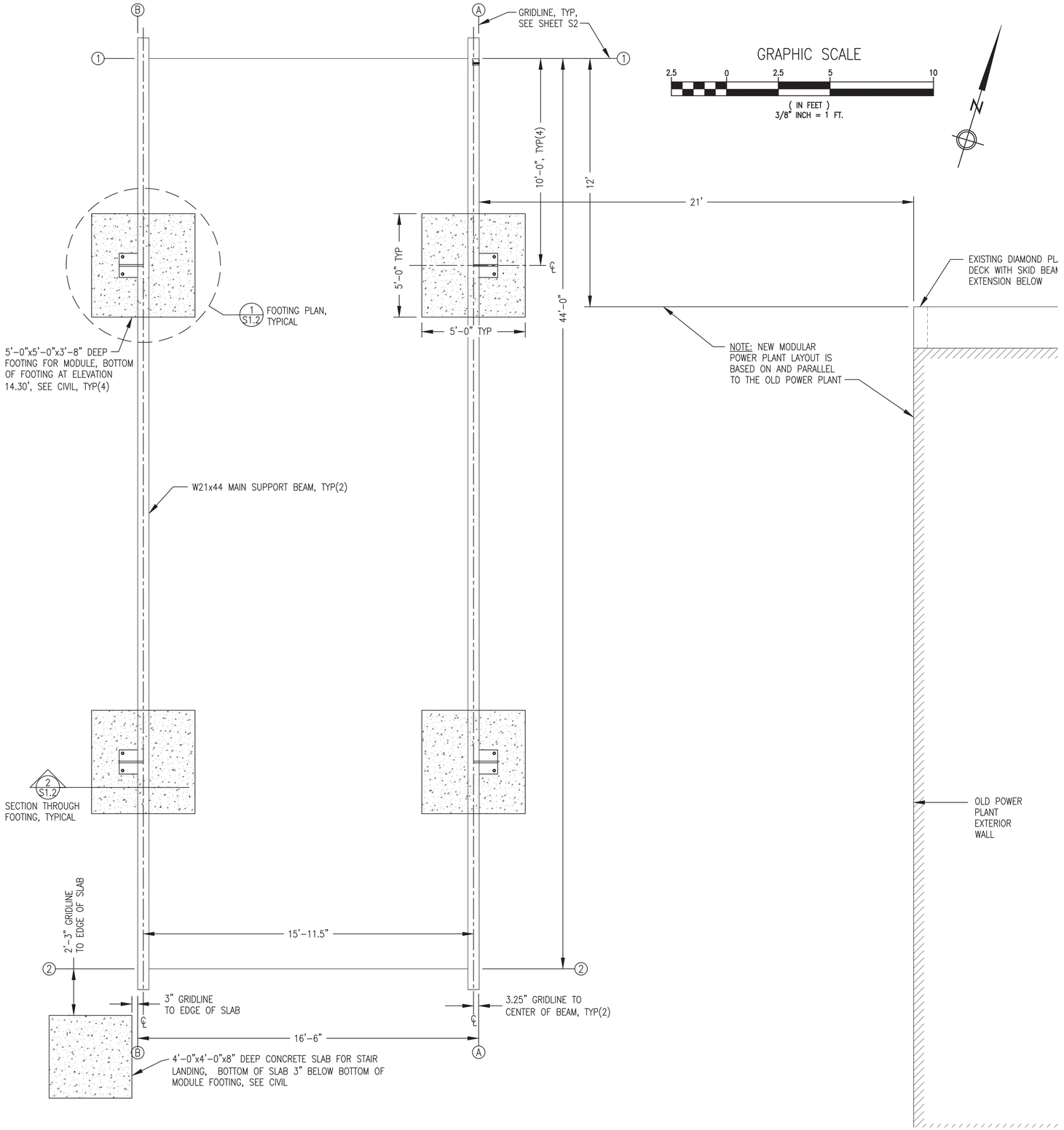
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: BUILDING SECTIONS & DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: DGT/BCG	DATE: 4/18/22
FILE NAME: NAPS PP A1-A4	SHEET: A4
PROJECT NUMBER:	



STRUCTURAL GENERAL NOTES:

1.0 DESIGN LOADS:

A.	BUILDING CODE:	2021 INTERNATIONAL BUILDING CODE, ASCE 7-16
B.	FLOOR LIVE LOADS: (IBC TABLE 1607.1)	
	LIGHT STORAGE/MANUFACTURING	125 PSF OR 2000 POUND POINT LOAD
	MAXIMUM GENERATOR UNIT WEIGHT	7,000 POUNDS
C.	SNOW LOADS: (ASCE 7-10)	
	GROUND SNOW LOAD, Pg =	70 PSF
	COEFFICIENT OF EXPOSURE, Ce =	1.0 PARTIALLY EXPOSED
	SNOW IMPORTANCE FACTOR, Is =	1.2 CATEGORY IV
	THERMAL COEFFICIENT, Ct =	1.2 COLD, VENTILATED ROOF
	ROOF/FLAT SNOW LOAD, Pf =	65 PSF
D.	WIND LOADS:	
	BASIC WIND SPEED =	163 MPH, 3 SECOND GUST
	RISK CATEGORY =	CATEGORY IV
	EXPOSURE CLASSIFICATION =	EXPOSURE C
E.	SEISMIC LOADING:	
	SEISMIC =	Ss = 0.273 S1 = 0.118
	SEISMIC IMPORTANCE FACTOR =	1.50 , CATEGORY IV
	SITE CLASS	"D" (DEFAULT)
	BASIC SEISMIC FORCE RESISTANCE SYSTEM	
	BUILDING = BEARING WALL WITH STEEL SHEAR PANELS	
	FOUNDATION = SPREAD CONCRETE FOOTINGS	
	SEISMIC RESPONSE COEFFICIENT	R = 7.0

MODULE FOUNDATION SYSTEM SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

REV #2
ISSUED FOR CONSTRUCTION
NOV 2022

STATE OF ALASKA 49TH
David G. Thompson
No. 14226
11/1/22
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	REVISED TO INCLUDE ONSITE FOUNDATION DESIGN	11/1/22	BCG
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

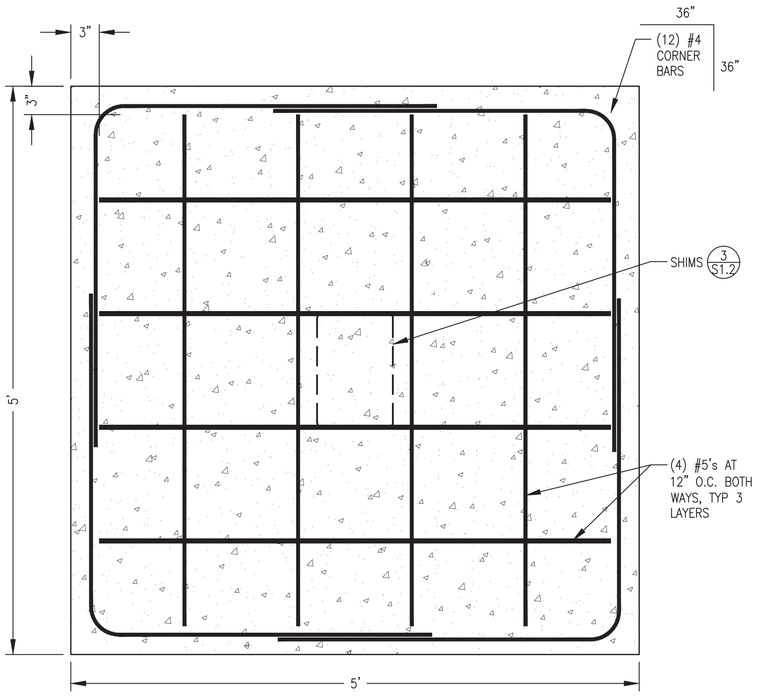
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

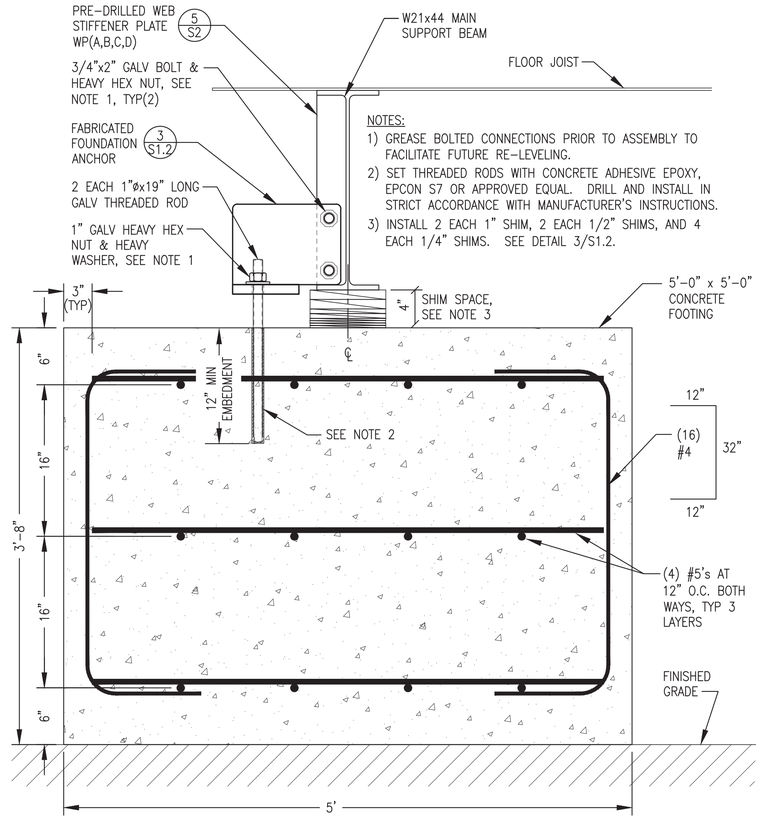
TITLE: CODE ANALYSIS, STRUCTURAL NOTES & FOUNDATION PLAN

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

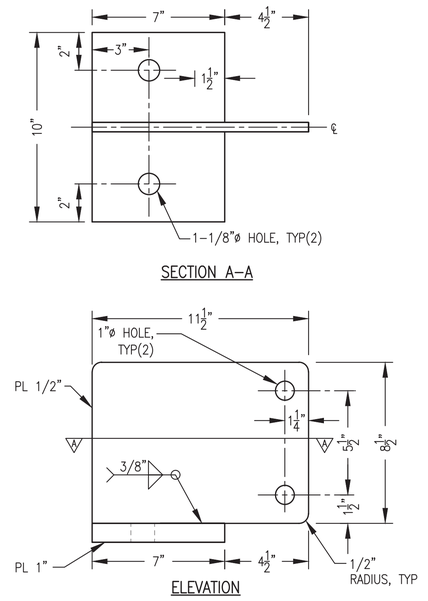
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: DGT/BCG | DATE: 4/18/22
FILE NAME: NAPS PP S1-5 | SHEET: S1.1
PROJECT NUMBER:



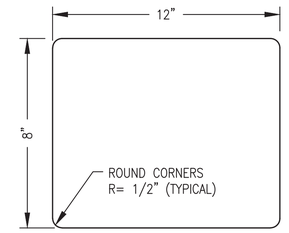
1/S1.2 FOOTING PLAN
1 1/2"=1'-0"



2/S1.2 SECTION THROUGH FOOTING
1 1/2"=1'-0"



3/S1.2 TYPICAL FOUNDATION ANCHOR & SHIM FABRICATION
3"=1'-0"



TYPICAL SHIM

SHIM FABRICATION TABLE		
THICKNESS	QUANTITY	MATERIAL
1/4"	16	GALV STEEL
1/2"	8	GALV STEEL
1"	8	GALV STEEL

ANCHOR & SHIM FABRICATION NOTES:

1) FABRICATE FOUR IDENTICAL ANCHOR ASSEMBLIES. DO NOT SHEAR ANCHOR PLATES. CUT WITH WATER JET, TORCH, OR SAW.
2) FABRICATE FROM ASTM A-36 STEEL PLATE.
3) MAKE ALL JOINTS AND CONNECTIONS WITH CONTINUOUS GROOVE OR FILLET WELDS.
4) FABRICATE SHIMS OF QUANTITY AND THICKNESS AS DESCRIBED IN SHIM FABRICATION TABLE.
5) UPON COMPLETION OF FABRICATION ROUND ALL OUTSIDE CORNERS AND GRIND ALL EDGES SMOOTH.
6) SAND BLAST ALL PIECES TO SSPC-SP-6. COAT WITH 3 COATS OF COLD GALVANIZING COMPOUND, ZRC OR APPROVED EQUAL TO 9 MILS MINIMUM DRY FILM THICKNESS.

MODULE FOUNDATION SYSTEM SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION NOV 2022

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER David G. Thompson No. 14226 11/1/22

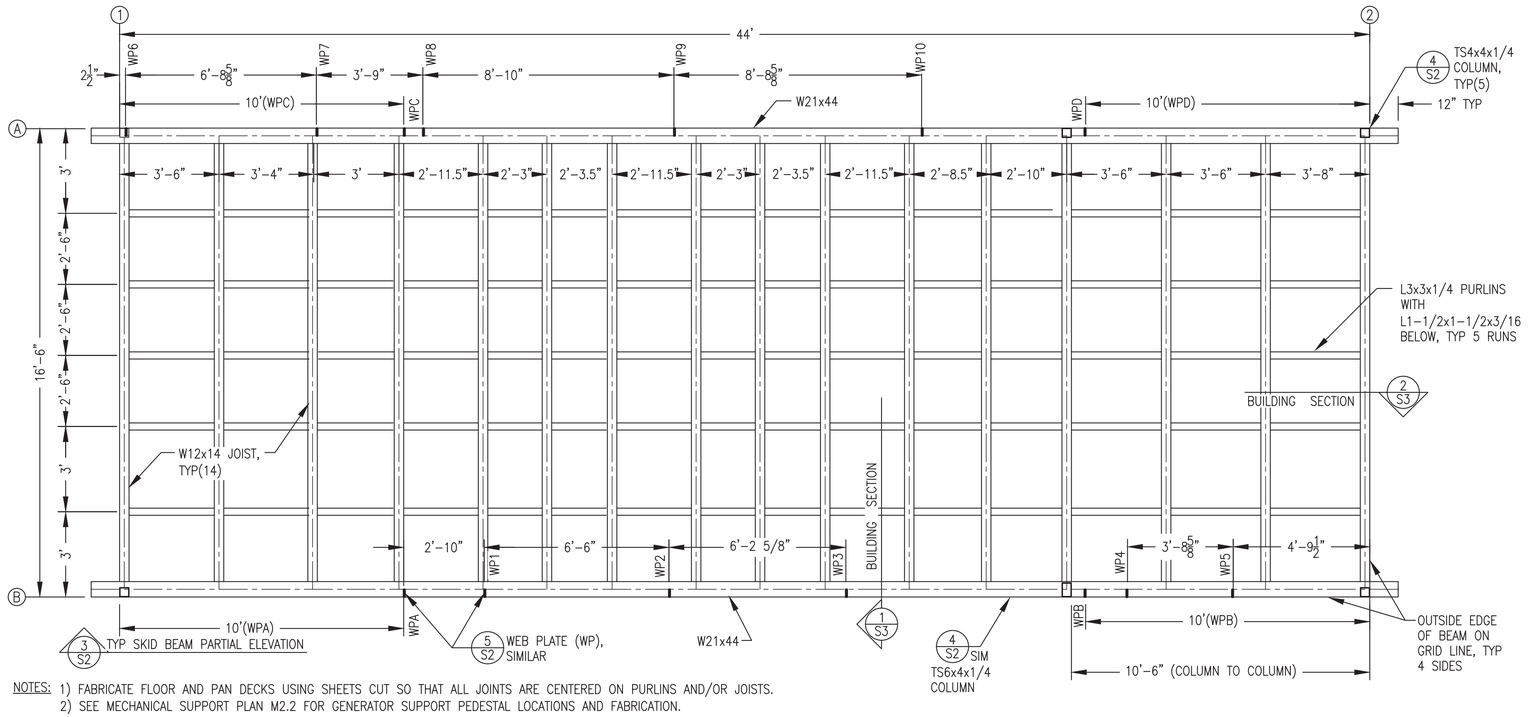
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: FOUNDATION DETAILS

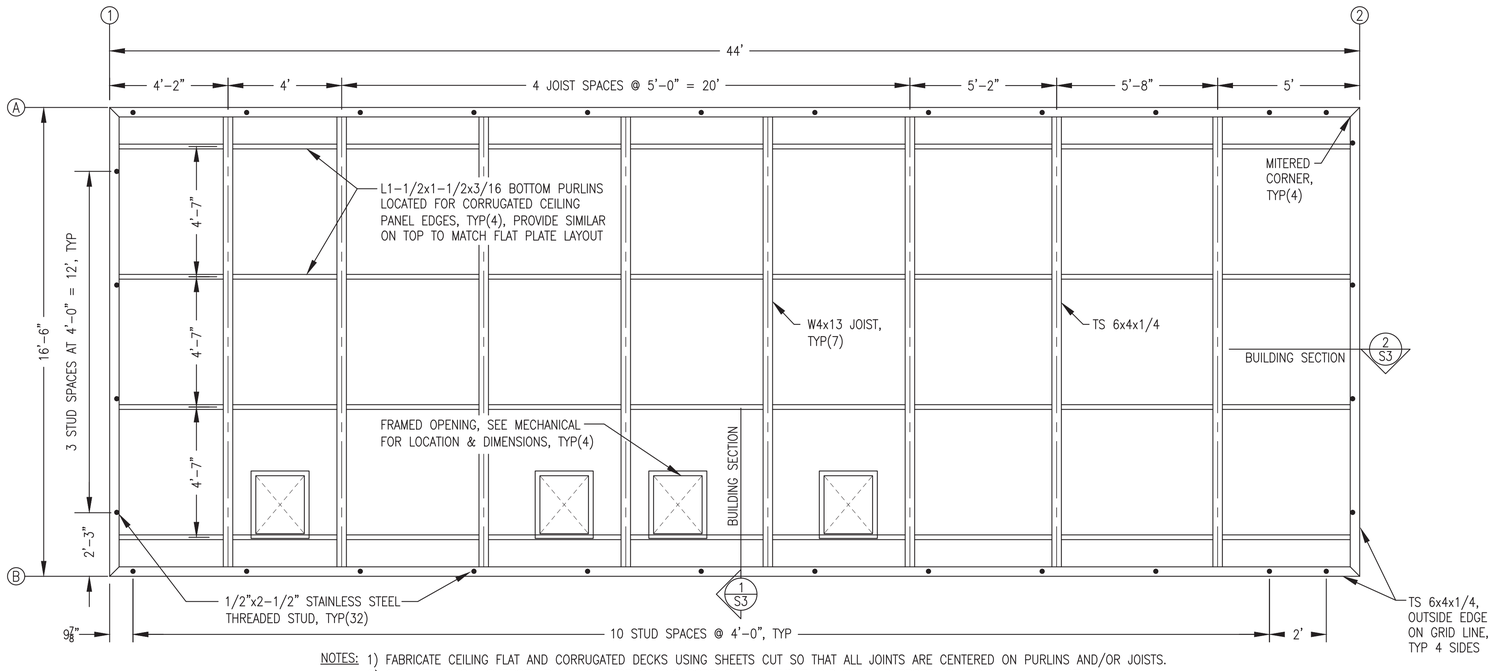
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: DGT/BCG	DATE: 11/1/22
FILE NAME: NAPS PP S1-5	SHEET: S1.2
PROJECT NUMBER:	



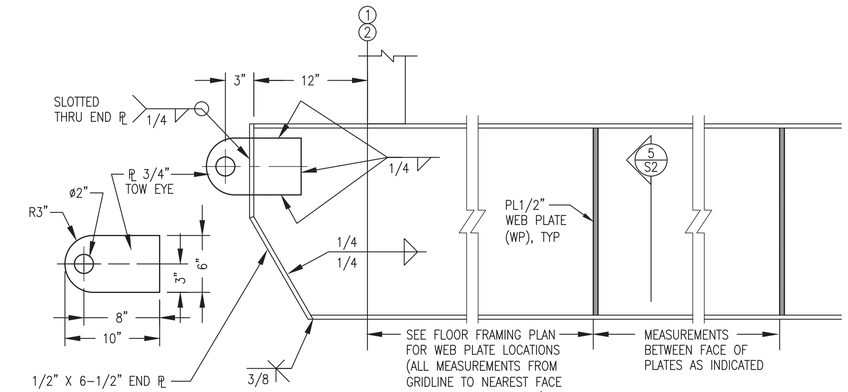
NOTES: 1) FABRICATE FLOOR AND PAN DECKS USING SHEETS CUT SO THAT ALL JOINTS ARE CENTERED ON PURLINS AND/OR JOISTS.
2) SEE MECHANICAL SUPPORT PLAN M2.2 FOR GENERATOR SUPPORT PEDESTAL LOCATIONS AND FABRICATION.

1 S2 FLOOR FRAMING PLAN
3/8"=1'–0"

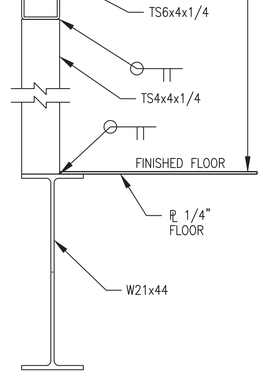


NOTES: 1) FABRICATE CEILING FLAT AND CORRUGATED DECKS USING SHEETS CUT SO THAT ALL JOINTS ARE CENTERED ON PURLINS AND/OR JOISTS.
2) SEE MECHANICAL SUPPORT PLAN M2.3 FOR CEILING CORRUGATION LAYOUT AND STRUT SUPPORT LOCATION AND INSTALLATION.
3) PROVIDE ADDITIONAL L1–1/2" BOTTOM PURLINS AGAINST PERIMETER TS AS REQUIRED FOR CORRUGATED CEILING SUPPORT.

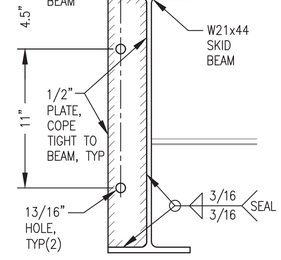
2 S2 CEILING FRAMING PLAN
3/8"=1'–0"



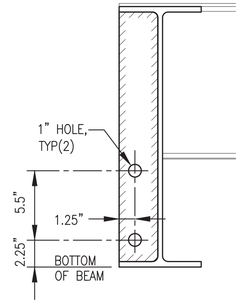
3 S2 TYPICAL SKID BEAM PARTIAL ELEVATION
1–1/2"=1'–0"



4 S2 TYP CORNER COLUMN
1–1/2"=1'–0"



TYPICAL WP(1 – 10) FOR SKID ATTACHMENTS



TYPICAL WP(A,B,C,D,) FOR MODULE FOUNDATION

NOTE: DO NOT SHEAR WEB PLATES. CUT WITH WATER JET, TORCH, OR SAW.

5 S2 WEB PLATE (WP) FABRICATION
2"=1'–0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REV#1 ISSUED JUNE 2022

STATE OF ALASKA 49TH David G. Thompson No. 14226 6/6/22 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

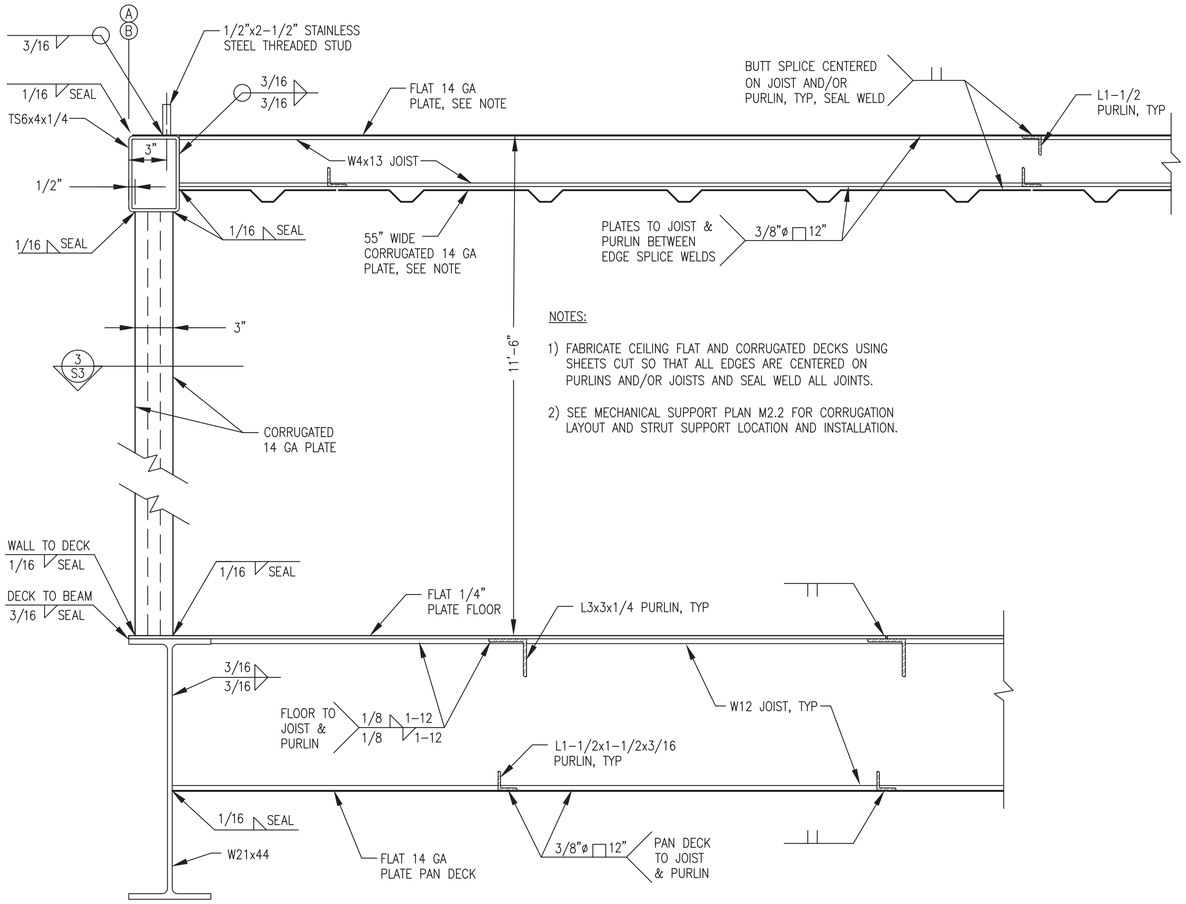
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

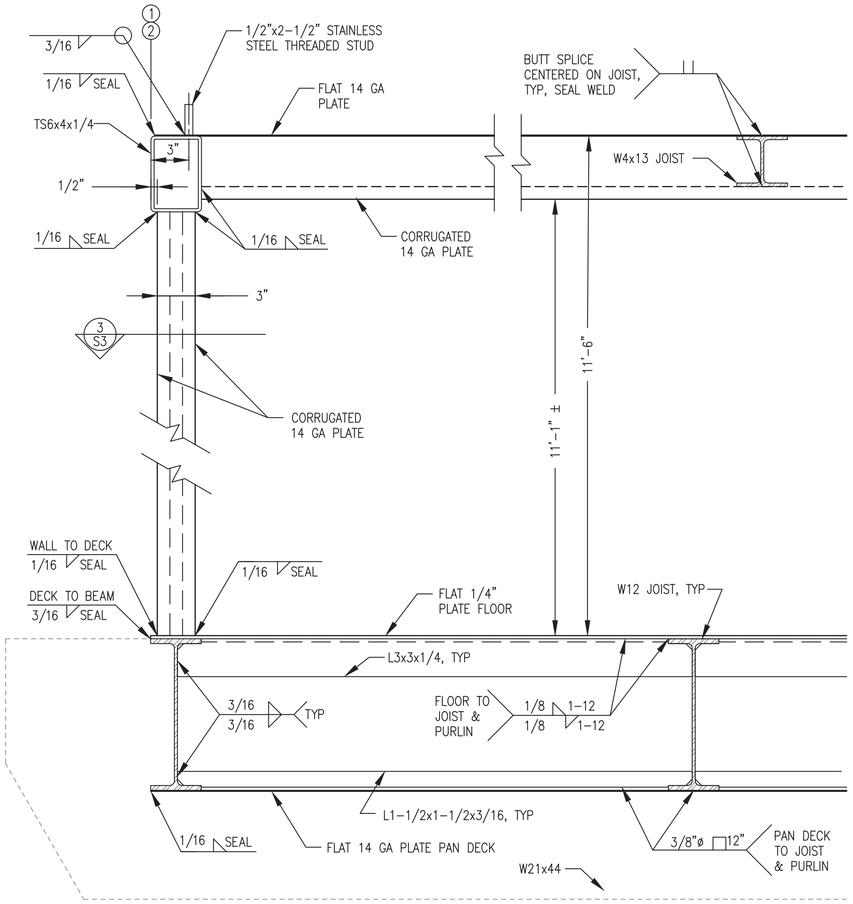
TITLE: MODULE FRAMING PLANS & DETAILS

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

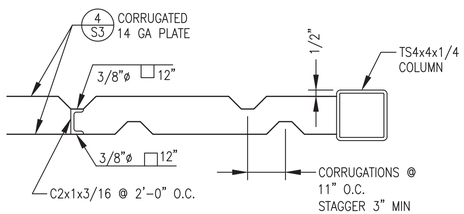
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: DGT/BCG	DATE: 4/18/22
FILE NAME: NAPS PP S1–5	SHEET: S2
PROJECT NUMBER:	



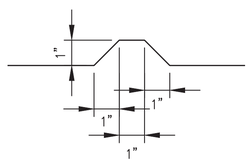
1 S3 TYPICAL BUILDING SECTION
2"=1'-0"



2 S3 TYPICAL BUILDING SECTION
2"=1'-0"



3 S3 TYPICAL EXTERIOR WALL – PLAN VIEW
2"=1'-0"



4 S3 TYPICAL CORRUGATION
4"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REV#1 ISSUED JUNE 2022

STATE OF ALASKA 49TH
David G. Thompson No. 14226 6/6/22
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

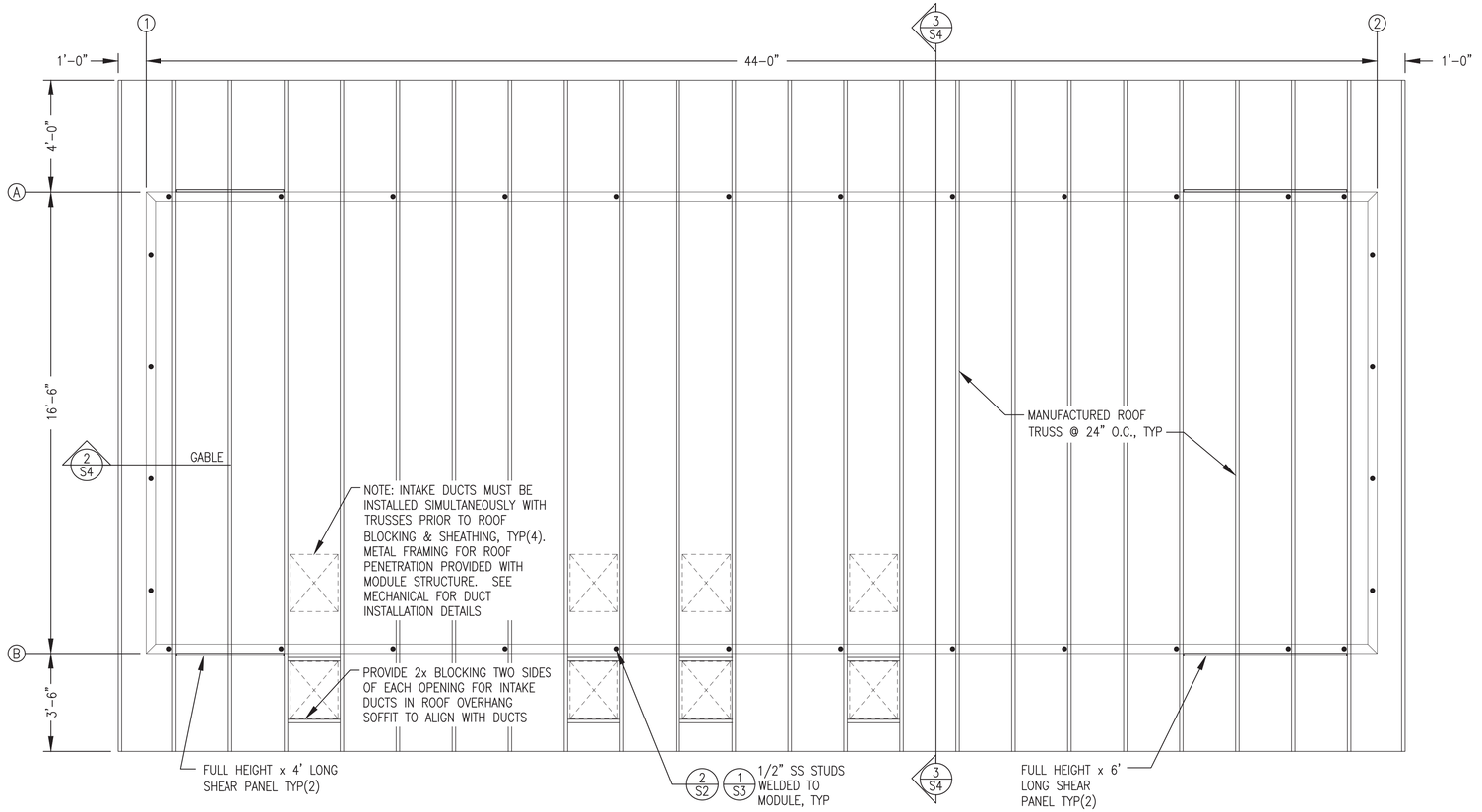
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

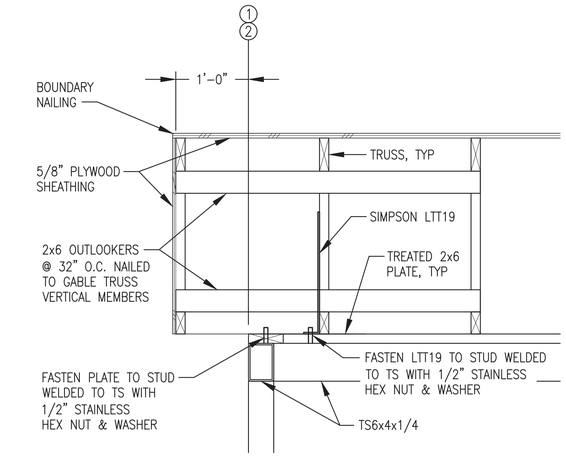
TITLE: MODULE SECTIONS DETAILS

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

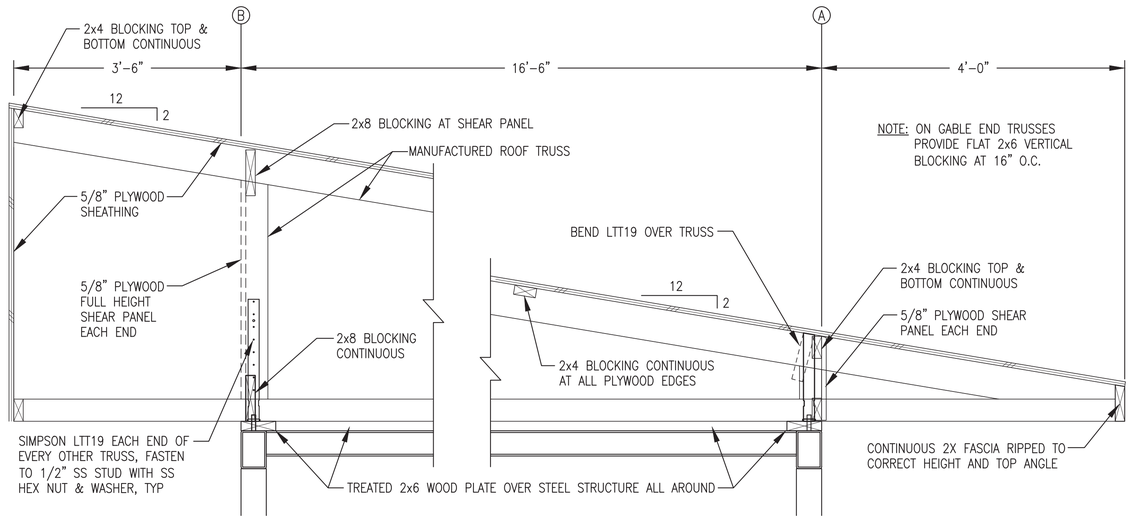
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: DGT/BCG	DATE: 4/18/22
FILE NAME: NAPS PP S1-5	SHEET: S3
PROJECT NUMBER:	



1/S4 ROOF FRAMING PLAN
3/8"=1'-0"



2/S4 TYPICAL GABLE
1"=1'-0"



3/S4 ROOF TRUSS INSTALLATION
NO SCALE

STAINLESS STEEL STUDS WERE WELDED TO THE MODULE AS PART OF THE PRIOR MODULE FABRICATION CONTRACT. ALL OTHER WORK THIS SHEET IS INCLUDED IN THE ON SITE SCOPE.

REVISION #2 ISSUED JULY 2022

STATE OF ALASKA 49TH
David G. Thompson No. 14226 7/15/22
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	REVISED FOR INTAKE DUCT INSTALLATION NOTES	7/15/22	BCG
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

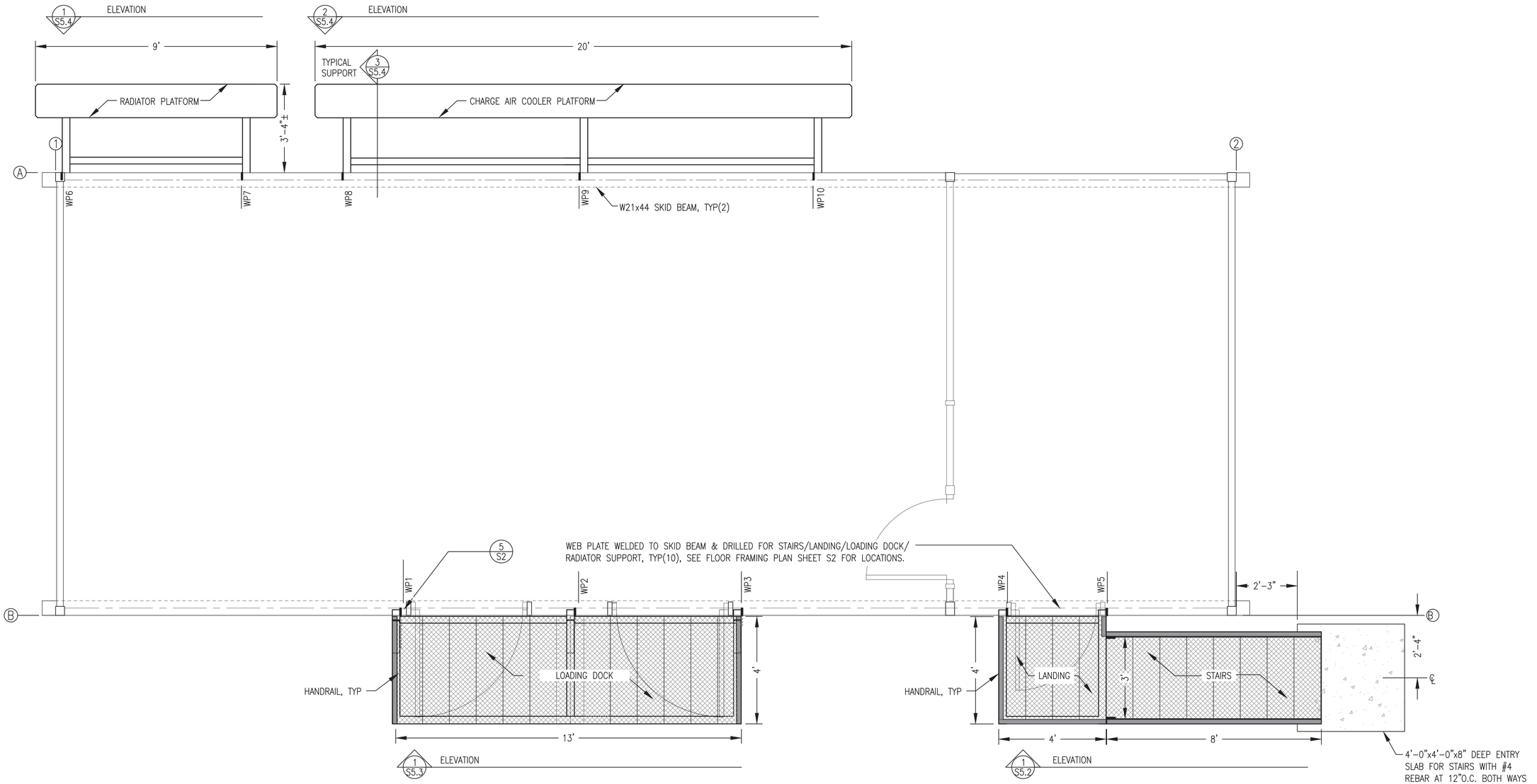
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: ROOF FRAING PLAN & DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: DGT/BCG | DATE: 4/18/22
FILE NAME: NAPS PP S1-5 | SHEET: S4
PROJECT NUMBER:



1 S5.1 STAIRS, LANDINGS, LOADING DOCK & RADIATOR SUPPORT PLAN

1/2"=1'-0"

EXTERIOR ASSEMBLY FABRICATION GENERAL NOTES:

1) THESE NOTES APPLY TO THE SHOP FABRICATION OF ALL EXTERIOR ASSEMBLIES SHOWN ON THE S5 SHEETS INCLUDING STAIRS, LANDINGS, LOADING DOCK, & RADIATOR SUPPORT.
2) FABRICATE FROM ASTM A-36 STEEL SHAPES AND PLATE. STAIR AND PLATFORM TREADS TO BE PRE-GALVANIZED 2"x11-3/4"x12 GA. GRIP STRUT.
3) RACK ALL SUPPORT BRACKETS LEVEL & PERPENDICULAR TO SKID WITH CONNECTIONS BOLTED TIGHT PRIOR TO WELDING.
4) MAKE ALL JOINTS WITH CONTINUOUS GROOVE OR FILLET WELDS.
5) SANDBLAST OR WIRE BRUSH ENDS OF PRE-GALV TREADS PRIOR TO WELDING TREADS TO STRUCTURE.
6) UPON COMPLETION OF WELDING ROUND CORNERS AND GRIND EDGES SMOOTH.
7) SANDBLAST ALL FABRICATIONS EXCEPT PRE-GALVANIZED GRIP STRUT TO SSPC-SP-6 AND APPLY 3 COATS OF COLD GALVANIZING COMPOUND, ZRC OR EQUAL.
8) FURNISH GALVANIZED STEEL NUTS, BOLTS, AND WASHERS FOR FIELD ASSEMBLY.

ALL EXTERIOR ASSEMBLIES THIS SHEET WERE FABRICATED AS PART OF THE PRIOR MODULE FABRICATION.
CONCRETE SLAB AND FINAL INSTALLATION OF EXTERIOR ASSEMBLIES IS INCLUDED IN THE ON SITE SCOPE.

REVISION #1
ISSUED JUNE
2022

STATE OF ALASKA
49 TH
David G. Thompson
No. 14226
6/6/22
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

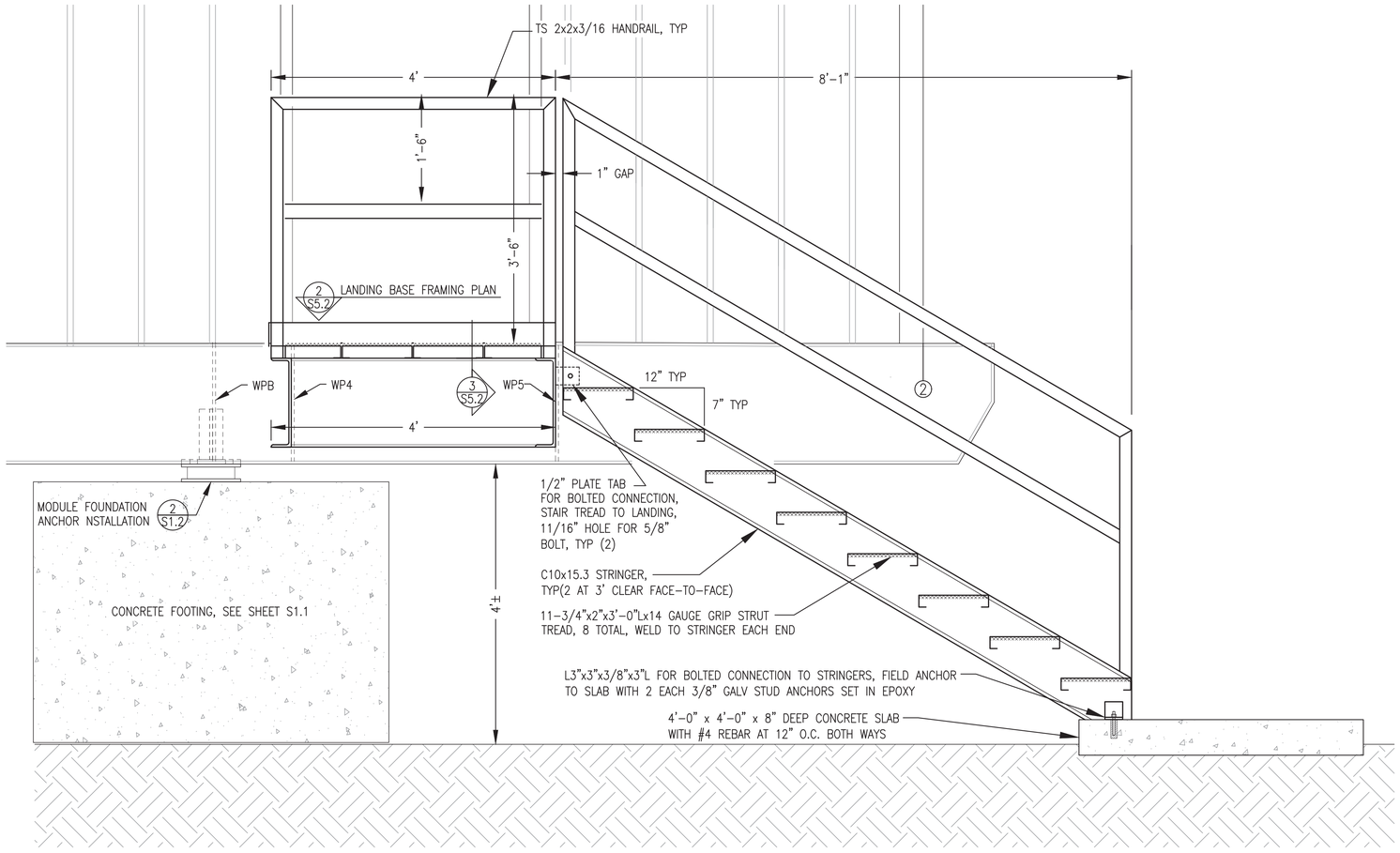
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

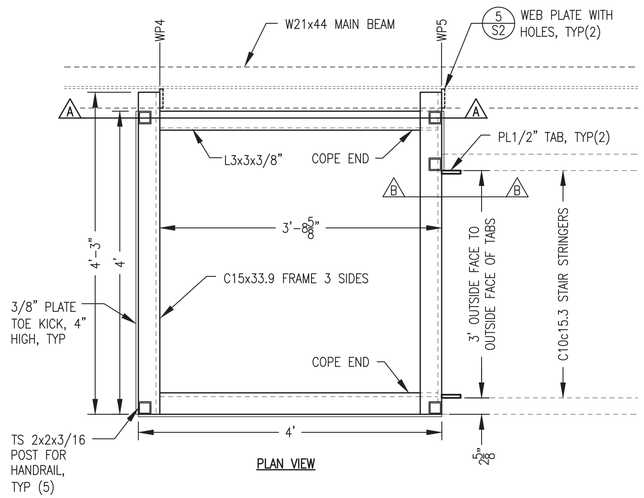
TITLE: STAIRS, LANDINGS, LOADING DOCK, & RADIATOR SUPPORT PLAN

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

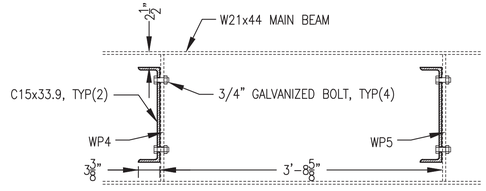
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: DGT/BCG	DATE: 4/18/22
FILE NAME: NAPS PP S1-5	SHEET: S5.1
PROJECT NUMBER:	



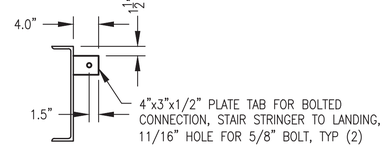
1 S5.2 STAIR/LANDING ELEVATION
1"=1'-0"



PLAN VIEW



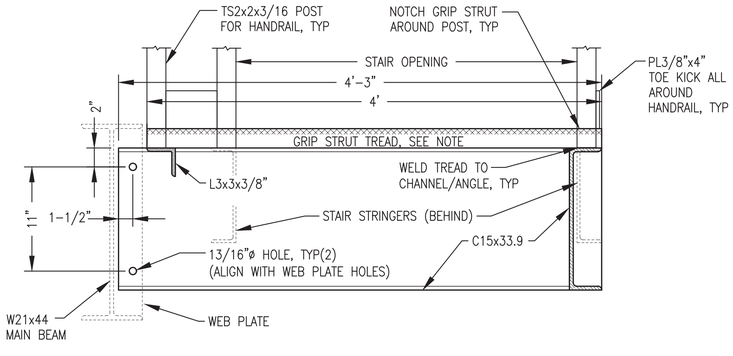
SECTION A-A



SECTION B-B

2 S5.2 LANDING BASE FRAMING PLAN & SECTIONS
1"=1'-0"

NOTE: INSTALL 4 EACH 11-3/4"x2"x4'-0"Lx14 GAUGE GRIP STRUT TREADS.



3 S5.2 LANDING SECTION & MAIN BEAM CONNECTION DETAIL
1-1/2"=1'-0"

ALL EXTERIOR ASSEMBLIES THIS SHEET WERE FABRICATED AS PART OF THE PRIOR MODULE FABRICATION. CONCRETE SLAB AND FINAL INSTALLATION OF EXTERIOR ASSEMBLIES IS INCLUDED IN THE ON SITE SCOPE.

REVISION #1
ISSUED JUNE
2022

STATE OF ALASKA
49TH
David G. Thompson
No. 14226
6/6/22
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

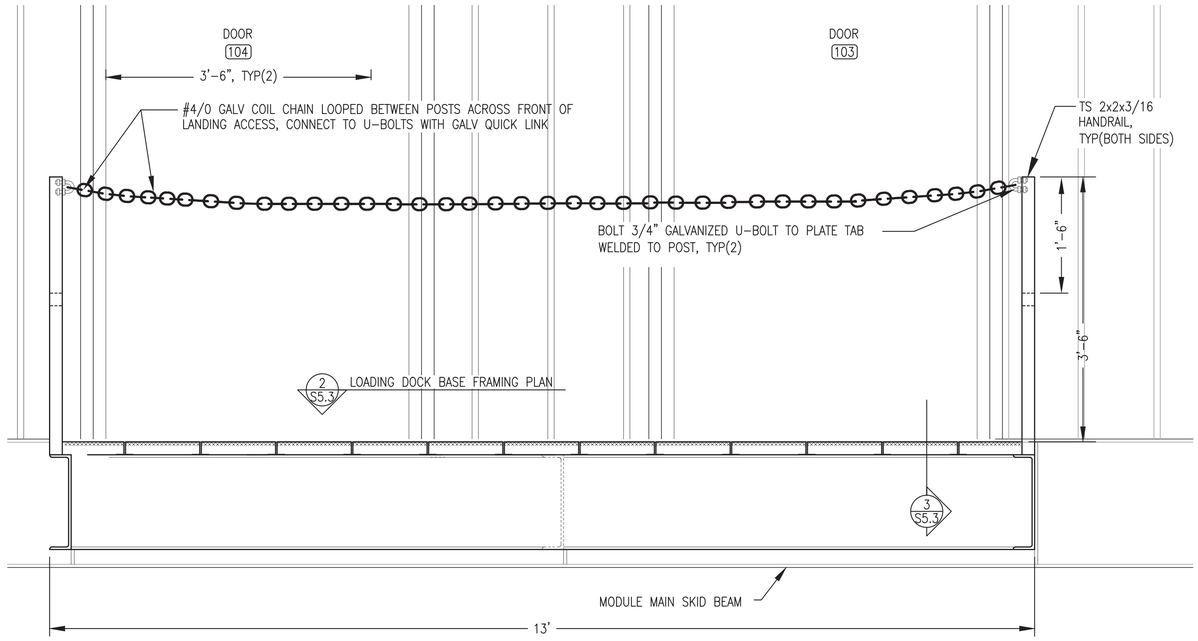
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

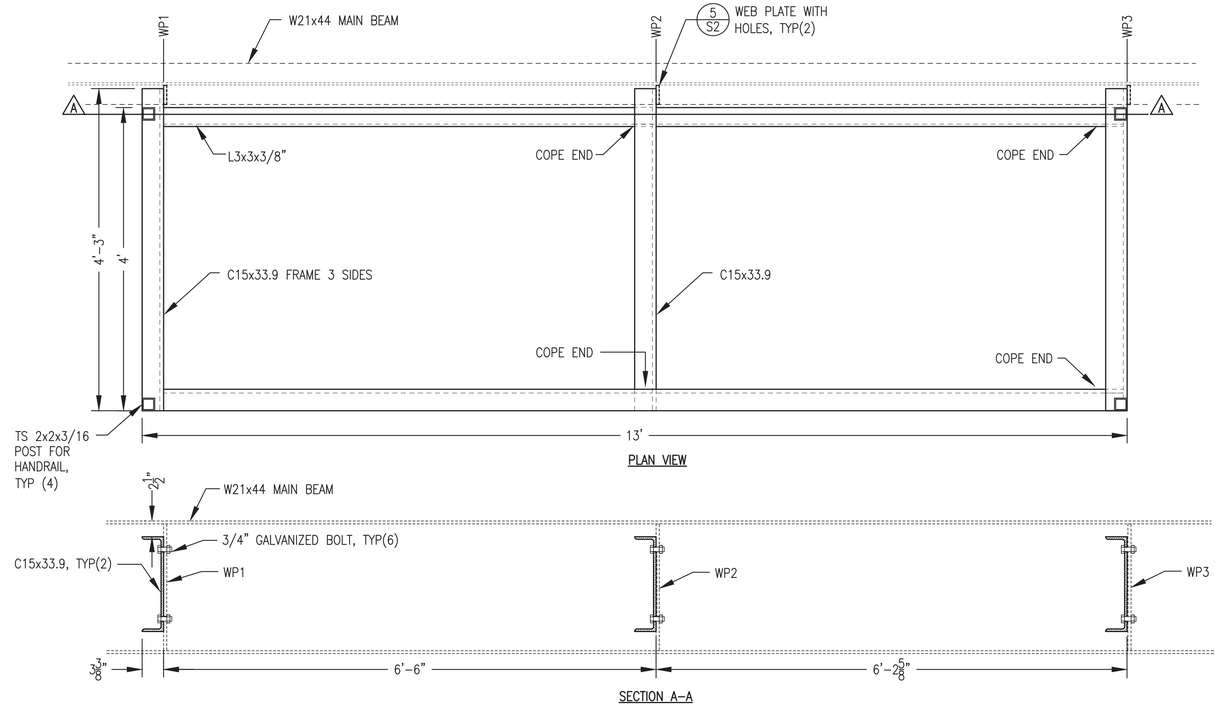
TITLE: STAIRS/LANDINGS FABRICATION DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: DGT/BCG | DATE: 4/18/22
FILE NAME: NAPS PP S1-5 | SHEET: S5.2
PROJECT NUMBER:

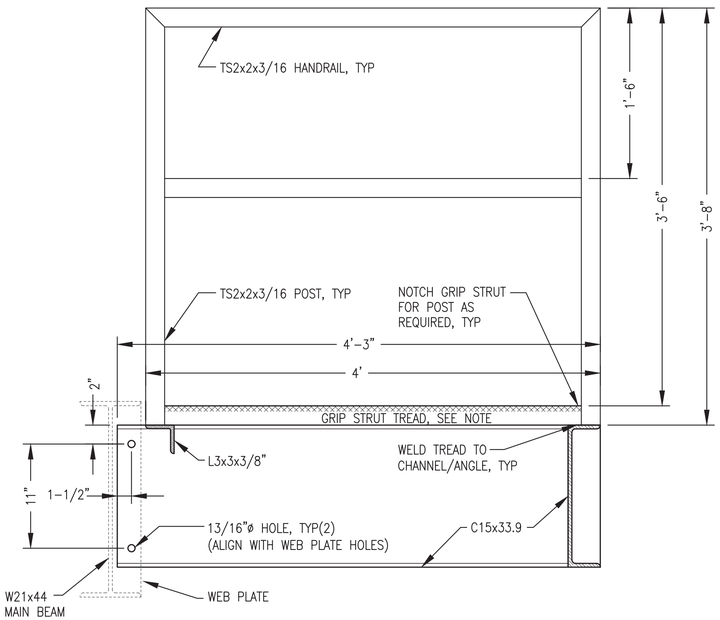


1 S5.3 LOADING DOCK ELEVATION
1"=1'-0"



2 S5.3 LOADING DOCK BASE FRAMING PLAN & SECTION
1"=1'-0"

NOTE: INSTALL 11 EACH 11-3/4"x2"x4'-0"Lx14 GAUGE GRIP STRUT TREADS.



3 S5.3 LOADING DOCK SECTION & MAIN BEAM CONNECTION DETAIL
1-1/2"=1'-0"

ALL EXTERIOR ASSEMBLIES THIS SHEET WERE FABRICATED AS PART OF THE PRIOR MODULE FABRICATION. FINAL INSTALLATION OF EXTERIOR ASSEMBLIES IS INCLUDED IN THE ON SITE SCOPE.

REV#1 ISSUED JUNE 2022

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER David G. Thompson No. 14226 6/6/22

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

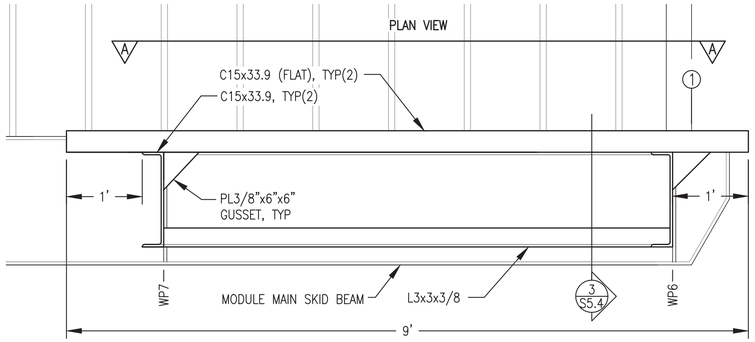
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

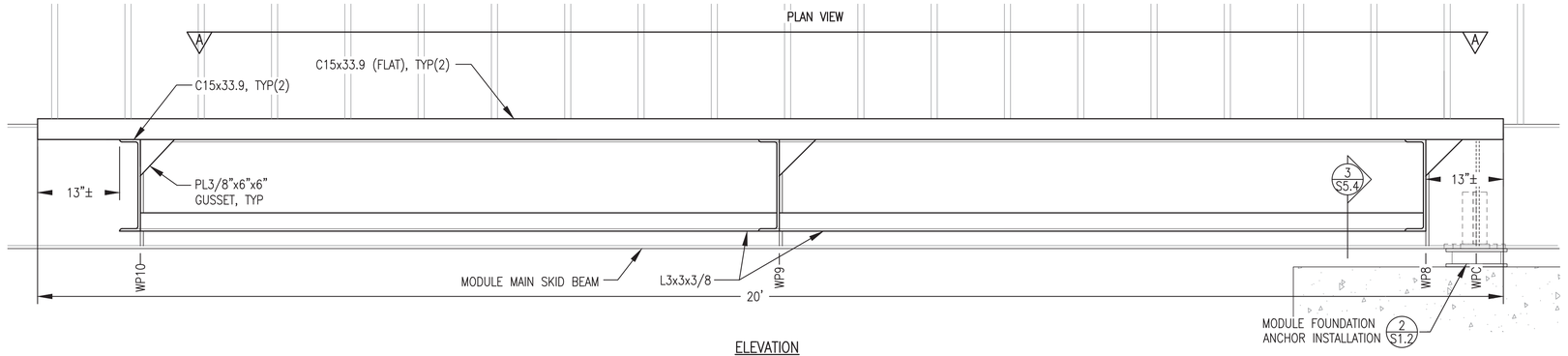
TITLE: LOADING DOCK FABRICATION DETAILS

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

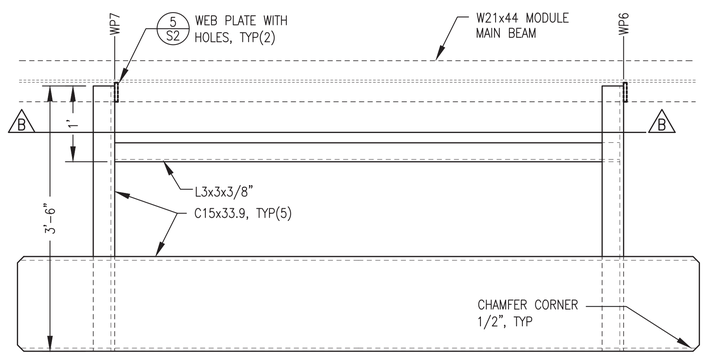
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: DGT/BCG | DATE: 4/18/22
FILE NAME: NAPS PP S1-5 | SHEET: S5.3
PROJECT NUMBER:



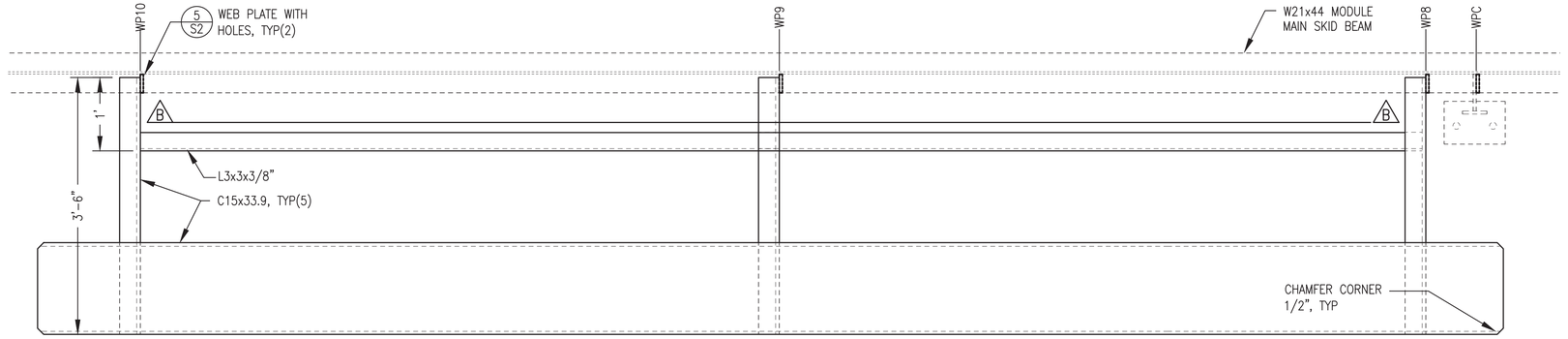
ELEVATION



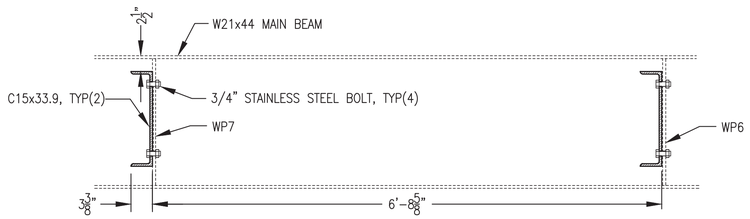
ELEVATION



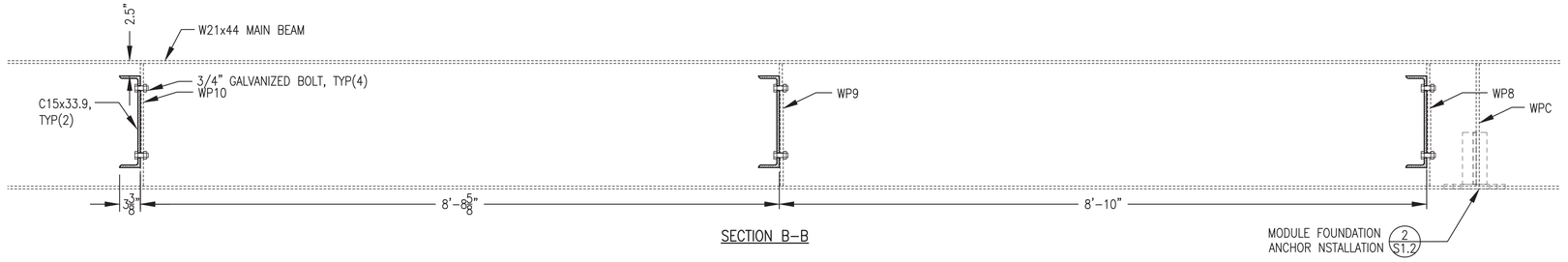
PLAN VIEW A–A



PLAN VIEW A–A



SECTION B–B



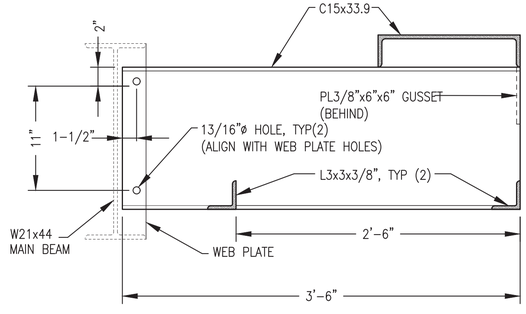
SECTION B–B

1 S5.4 RADIATOR SUPPORT ELEVATION

1"=1'-0"

2 S5.4 CHARGE AIR COOLER SUPPORT ELEVATION

1"=1'-0"



3 S5.4 TYPICAL SUPPORT SECTION

1-1/2"=1'-0"

ALL EXTERIOR ASSEMBLIES THIS SHEET WERE FABRICATED AS PART OF THE PRIOR MODULE FABRICATION. FINAL INSTALLATION OF EXTERIOR ASSEMBLIES IS INCLUDED IN THE ON SITE SCOPE.

REV#1 ISSUED
JUNE 2022

STATE OF ALASKA
49TH
David G. Thompson
No. 14226
6/6/22
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/6/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: RADIATOR & CHARGE AIR COOLER SUPPORT FABRICATION DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: DGT/BCG	DATE: 4/18/22
FILE NAME: NAPS PP S1-5	SHEET: S5.4
PROJECT NUMBER:	

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
- (TS) TEMPERATURE SENSOR
- (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
R-1 R-2	GLYCOL RADIATOR	SINGLE PASS, 5 ROW, VERTICAL CORE, 3" FLANGED CONNECTIONS, GALVANIZED OR EPOXY COATING, EXPANDED METAL GUARD. 15,000 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
CAC1 CAC-2 CAC-3	GEN#3 CHARGE AIR COOLER	SINGLE PASS, VERTICAL ALUMINUM CORE, 4" FLANGED TOP CONNECTIONS, EPOXY COATING, EXPANDED METAL GUARD. 1340 SCFM CHARGE AIR AT 395F IN AND 110F OUT AT 75F AMBIENT, 34" H2O 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
TV-1	COOLANT THERMOSTATIC VALVE	4" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 175F NOMINAL TEMPERATURE	FPE PART NO. A4010-175
TV-2	HEAT RECOV. THERMOSTATIC VALVE	2-1/2" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 185F NOMINAL TEMPERATURE,	FPE PART NO. A2510-185
ET-1	GEN COOLANT EXPANSION TANK	30 GALLON CAPACITY TANK, 12.75" O.D x 60" 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
GT-1	ENGINE COOLANT GLYCOL STORAGE TANK	60 GALLON CAPACITY, 36"x10"x44"HIGH FABRICATED RECTANGULAR STEEL TANK, SEE FABRICATION DETAIL	CUSTOM FABRICATION

MODULE HEAT RECOVERY SYSTEM & PLANT HEATING EQUIPMENT SCHEDULE:

HX-1	POWER PLANT HEAT EXCHANGER	316 SS PLATES, BRAZED CONST., 2-1/2" SOLDER CUP PORTS, 500 MBH MIN CAPACITY. PRIMARY: 60 GPM 195F EWT (50% ETHYLENE) 3.0 PSI MAX WPD, SECONDARY: 60 GPM 185F LWT (50% PROPYLENE) 3.0 PSI MAX WPD	SWEP INTERNATIONAL AB B120THx90/1P-SC-4x66.85
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	55 GPM AT 9' TDH (SET TO CONSTANT PRESSURE MODE CP1), 1/3 HP, 115V, 1ø, WITH 2" NPT FLANGES	GRUNDFOS MAGNA1 50-80F CP1
P-HR1B	HEAT RECOV. SECONDARY	30 GPM AT 38' TDH (SET TO CONSTANT PRESSURE MODE CP3), 1-1/2 HP, 208-230V, 1ø, WITH 2-1/2" NPT FLANGES	GRUNDFOS MAGNA1 65-150F CP3
CUH-1	CONTROL ROOM HEAT	WALL MOUNTED HOT WATER CABINET UNIT HEATER, 17 MBH AT 1 GPM 180F EWT & 60F EAT.	TOYOTOMI HC-190 WITH WALL MOUNT BRACKET
ET-2	HEAT RECOV. EXP. TANK	BLADDER TYPE EXPANSION TANK, 159 GALLON TANK, 56 GALLON ACCEPTANCE VOL, 125 PSIG WORKING PRESSURE, 12 PSIG PRE-CHARGE.	AMTROL AX-260

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.

VENTILATION EQUIPMENT SCHEDULE:

EF-1 EF-2 EF-3	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 EF-3 COMB AIR	FAN & INTAKE DAMPERS	OPPOSED BLADE LOW-LEAKAGE CONTROL DAMPER, AIRFOIL BLADES, GALVANIZED STEEL CONSTRUCTION, ACETAL BEARINGS, STAINLESS STEEL JAMB SEALS, TPE BLADE SEALS.	GREENHECK VCD-33
(MD)	MOTORIZED DAMPER ACTUATOR	MULTI-VOLTAGE SPRING RETURN ACTUATOR	BELIMO AF-BUP

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 FOOT MOUNT 56C FRAME MOTOR, 1,725 RPM, 1/2 HP, 115VAC.	MICROPUMP GA-V21.J8FS.A PUMP WITH #81518 ADAPTER & CENTURY #C826V1 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 791000FV10-P WATER-IN-FUEL RR30880E ELEMENTS 2020V10
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)
FOC-1	FUEL OIL COOLER	HORIZONTAL CORE, 1-1/2" FLANGED CONNECTIONS, ENAMEL COATING, EXPANDED METAL DISCHARGE GUARD. 10 GPM NO.1 DIESEL FUEL, 450BTU/MIN WITH 120F MAX OIL OUTLET TEMPERATURE AT 80F AMBIENT, 1 PSI MAX OIL PRESSURE DROP. 1-1/2 HP, 208V, 3PH MOTOR SUITABLE FOR VFD OPERATION AT 10:1.	DIESEL RADIATOR PART NO. DR4147-00
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 OR KECKLEY PART # BVF1RF2RSSRGSL-100 NEMA 7 ACTUATOR - 600 IN-LBS TORQUE, 10 SECOND STROKE TIME, 0.50 LOCKED ROTOR AMPS. RCS MODEL SXR-1023
PF	PIPELINE FILTER	SINGLE ELEMENT FILTER, DIE-CAST ALUMINUM HEAD, EPOXY COATED CARBON STEEL FILTER HOUSING COMPLETE WITH 1/8" VENT AND DRAIN VALVES AND BUNA-N O-RING, 1-1/2" FPT INLET/OUTLET, 150 PSIG MAXIMUM OPERATING PRESSURE, 50 GPM @ 3 PSI TDH. PROVIDE THREE SPARE 25 MICRON AQUACON DIESEL FUEL FILTER CARTRIDGES AND THREE SPARE BUNA-N HOUSING O-RINGS.	VELCON FILTER HOUSING: #VF-61E FILTER CARTRIDGES: #AD-51225 HOUSING O-RING: #G-0986

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
(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)	DAY TANK/HOPPER 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
(TS)	FUEL OIL RETURN TEMP SENSOR	PTC PROBE, 2" LONG, WITH 2m LONG JACKET CABLE (FURNISHED WITH TEMPERATURE CONTROLLER ELECTRICAL TEM 24)	PENN A99BB-200C

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.

ALL MATERIALS AND EQUIPMENT ON SCHEDULES THIS SHEET WERE FURNISHED AS PART OF THE PRIOR MODULE ASSEMBLY PROJECT EXCEPT FOR THOSE ITEMS SPECIFICALLY INDICATED IN RED CLOUDS WHICH ARE TO BE FURNISHED AND INSTALLED AS PART OF THE ON SITE SCOPE.

REV #1 ISSUED FOR ON SITE CONSTRUCTION DECEMBER 2022

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

REV.	DESCRIPTION	DATE	BY
1	REVISED TO COORDINATE WITH FINAL ON-SITE DESIGN	12/15/22	BCG

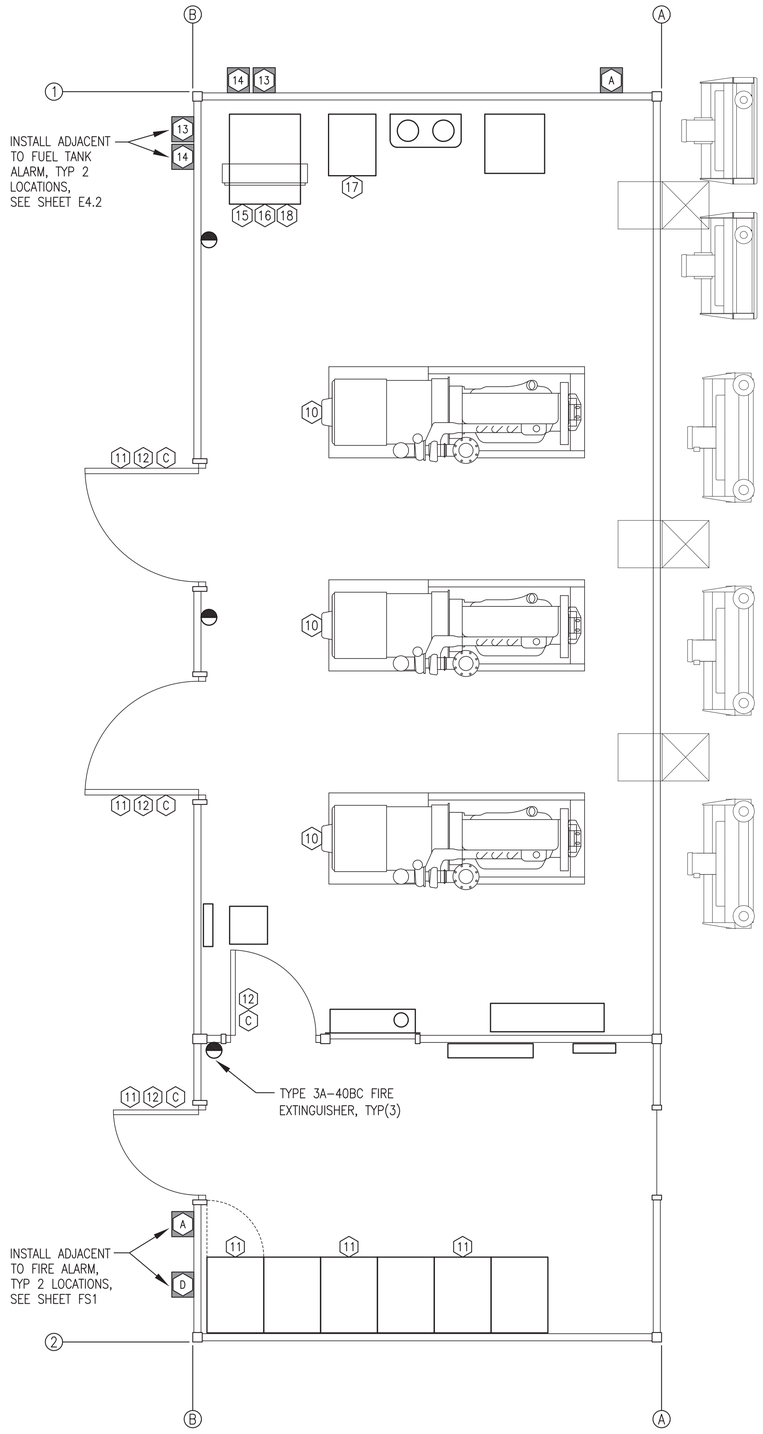
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK 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: 7/29/22
FILE NAME: NAPS PP M1 | SHEET: M1.1
PROJECT NUMBER:



1 M1.2 POWER PLANT WARNING SIGN & FIRE EXTINGUISHER PLAN
3/8"=1'-0"

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 "NORMALLY CLOSED, OPEN ONLY FOR TEMPORARY MAINTENANCE OF COOLER"
26 "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF FILTER"

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 "NORMALLY CLOSED, OPEN ONLY FOR ADDING FLUID – PROPYLENE GLYCOL ONLY"
62 "NORMALLY OPEN, HEAT RECOVERY SUPPLY"
63 "NORMALLY OPEN, HEAT RECOVERY RETURN"
64 "NORMALLY CLOSED, OPEN ONLY FOR AIR BLEED & PURGE"
65 "NORMALLY OPEN, CLOSE ONLY TO CLEAN STRAINER"
66 "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE"

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" ROUND BRASS TAG LABELED "N.O." FOR NORMALLY OPEN VALVES AND 1-1/2" SQUARE 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 not used
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 "LEAVE MAIN VALVE OPEN ON ONLY ONE OF UTILITY TANKS U1-U4 AT A TIME FOR AUTOMATIC DAY TANK FILL. CHECK BULK TANK LEVEL DAILY, SWITCH TO A DIFFERENT BULK TANK WHEN LEVEL DROPS BELOW 12" "

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 TANK FARM 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) VERIFY ENGINE OIL HAS NOT BEEN CONTAMINATED WITH GLYCOL OR OTHER FLUIDS
2) LOCK & TAG GENERATOR OUT OF SERVICE
3) OPEN NORMALLY CLOSED DRAIN VALVE AT GEN
4) TURN ON PUMP TIMER & PUMP OUT ENGINE OIL
5) CHANGE FILTER & PLACE OLD ONE IN HOPPER
6) CLOSE DRAIN VALVE & REFILL ENGINE
7) RUN ENGINE, SHUT OFF, & CHECK DIPSTICK
8) TOP OFF & PLACE ENGINE BACK IN SERVICE"

18 18 "THE PIPELINE FILTER CONTAINS A WATER BLOCKING ELEMENT. THE ELEMENT SHOULD BE CHANGED AT A MINIMUM EVERY FALL AFTER FREEZE UP AND IF PUMPING RATE SLOWS DOWN. TURN OFF DAY TANK CONTROL PANEL IN POWER PLANT, CLOSE MANUAL BALL VALVE AND CONFIRM THAT ACTUATED BALL VALVE IS FULLY CLOSED PRIOR TO CHANGING FILTER."

ALL DECALS, SIGN BOARDS, FIRE EXTINGUISHERS, AND VALVE TAGS WERE FURNISHED AND INSTALLED AS PART OF THE PRIOR MODULE ASSEMBLY PROJECT EXCEPT FOR THOSE ITEMS SPECIFICALLY INDICATED IN RED CLOUDS WHICH ARE TO BE FURNISHED AND INSTALLED AS PART OF THE ON SITE SCOPE.

ISSUED FOR CONSTRUCTION JULY 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

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

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M1 | SHEET: M1.2
PROJECT NUMBER:

Final (Permanent) Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	One Gen	350	310	---
Level 2	Two Gens	700	620	280
Level 3	All	1050	---	560
Note: All generators are equal capacity. Manually select priority for each.				
Temporary Demand Control for Shop Load Test with 300kW Load Bank				
Level 1	One Gen	150	135	---
Level 2	Two Gens	300	270	120
Level 3	All	450	---	240
Note: Temporarily set to reduced values in order to test all demand levels.				

Engine-Generator Alarm Settings (EZGN Genset Controller)			
Function	Normal Range	Alarm	Shut Down
Overspeed	1795-1805	----	1900 RPM
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	-----
Charge Air Temp.	100-120°F	140°F	150°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 (EZGN Genset Controller)	
Function	Setting
Gen Breaker Trip Setpoint (EZGN Rated Current)	600 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	4.7
T.O.C. Curve Selection	U4
T.O.C. Time Dial	5.00
E.M Reset delay (Y/N)	N
Constant Time Adder (seconds)	0.00
Minimum Response Time (seconds)	0.00
Maximum Phase T.O.C. Torque Control	1

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

Charge Air Cooler VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	Not Used
PID Reference Temperature	100°F
Proportional Gain	0.2
Integral Gain	0.1
Derivative	0

POWER PLANT GENERATION SWITCHGEAR OPERATION

THIS POWER PLANT IS DESIGNED TO OPERATE IN 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 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 GENERATORS IN AUTO 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. THE RED BREAKER CLOSED LAMP WILL ILLUMINATE.

DEMAND CONTROL OPERATION (AUTO MODE):

1) GENERATORS ARE CONSIDERED AVAILABLE FOR DEMAND CONTROL ONLY WHEN THEIR EZGN IS IN THE AUTO MODE AND THERE ARE NO ALARMS. 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) NOTE THAT ALL GENERATORS ARE EQUAL CAPACITY AND THE OPERATOR MUST SELECT A PRIORITY LEVEL FOR EACH GENERATOR USING THE SCADA SYSTEM.
6) 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 EZGN MAN BUTTON, THEN PRESS THE "I" (START) BUTTON. AFTER THE ENGINE STARTS AND STABILIZES, PRESS THE CONTACTOR CLOSE BUTTON ON THE EZGN. 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 EZGN STOP BUTTON. THE ENGINE WILL COOL DOWN FOR THREE MINUTES THEN SHUT OFF. NOTE THAT PRESSING THE RED STOP BUTTON TWICE WILL IMMEDIATELY SHUT DOWN THE GENERATOR.
7) TO MANUALLY ADD A SECOND GENERATOR TO MEET AN INCREASING LOAD, REPEAT STEP 3. TO MANUALLY REMOVE A SECOND GENERATOR TO MEET A DECREASING LOAD, REPEAT STEP 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 EZGN 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 EZGN MAN BUTTON ON THE GENERATOR TO BE SERVICED. THE PLC WILL START ANOTHER GENERATOR. ONCE THE OTHER GENERATOR IS ON LINE, PRESS THE EZGN 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 "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 EZGN.

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 BULK TANKS IN THE ADJACENT TANK FARM INTERMEDATE TANK. IT HAS AUTOMATIC FILL CONTROLS WITH REDUNDANT HIGH AND LOW LEVEL ALARMS AND TIMERS. SEE FUEL SYSTEM CONTROL PANEL DRAWING SHEET E7.3 FOR DETAILED SEQUENCE OF OPERATION.

DAY TANK FILTER – THE DAY FILTER HAS WATER DETECTION PROBES. AN ALARM LAMP WILL ILLUMINATE WHEN WATER IS PRESENT IN THE FUEL. SEE WATER INDICATION PANEL DRAWING SHEET E7.4.

MANUAL USED ENGINE OIL DRAIN – USED OIL PUMP P-UO1 IS USED TO PUMP USED ENGINE OIL FROM THE ENGINE OIL PANS TO THE USED OIL HOPPER. P-UO1 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. NOTE THAT WHEN THERE IS NO USED OIL IN THE HOPPER THE DIESEL PUMP STILL RUNS TO USE THE BLENDER AS A FUEL "POLISHING" FILTER. SEE FUEL SYSTEM 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 OPERATING SETPOINT. SEE THE RADIATOR 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" "EF-2" AND "EF-3". 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 THREE EXHAUST FANS ON THE WALL ABOVE THE FRONT OF THE GENERATORS, EF-1 EF-2 AND EF-3. 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, 80F, 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 TEMPERATURE CONTROLLER ON THE HEATER CYCLES THE PUMP AND THE HEATER FAN ON AND OFF AS REQUIRED TO MAINTAIN TEMPERATURE IN THE CONTROL ROOM, 65 F, ADJUSTABLE.

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 ADJACENT BUILDINGS IN THE COMMUNITY AS SHOWN ON SHEET M8.1.

SYSTEM STARTUP

FUEL OIL PUMPS – 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 FILL ALL FILTER BODIES, PRIME ALL PIPING, AND BLEED OFF AIR.

VERIFY OPERATION OF ALL FUEL SYSTEM 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 PROPYLENE GLYCOL SOLUTION. SEE HYDRONIC PIPING SPECIFICATION 23 21 13.

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

VERIFY PROPER OPERATION OF THERMOMETERS, PRESSURE GAUGES, AND ELECTRIAL INSTRUMENTATION DEVICES. SET SWITCHES ON DIFFERENTIAL PRESSURE GAUGES TO SETPOINTS INDICATED. CALIBRATE THERMOMETERS AND ALL ELECTRICAL INSTRUMENTATION DEVICES INCLUDING TEMPERATURE TRANSMITTERS, PRESSURE TRANSMITTERS, DIFFERENTIAL PRESSURE SWITCHES, FLOW METERS, ENERGY METERS, LEVEL GAUGES, ETC. SEE INSTRUMENTATION AND CONTROL DEVICES SPECIFICATION 23 09 00.

CLEAN ALL PIPING 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.

INITIAL TESTING WAS PERFORMED AS PART OF THE MODULE ASSEMBLY CONTRACT. FINAL SYSTEM STARTUP, TESTING, AND COMMISSIONING IS INCLUDED IN THE ON SITE SCOPE.

ISSUED FOR CONSTRUCTION
JULY 2022

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

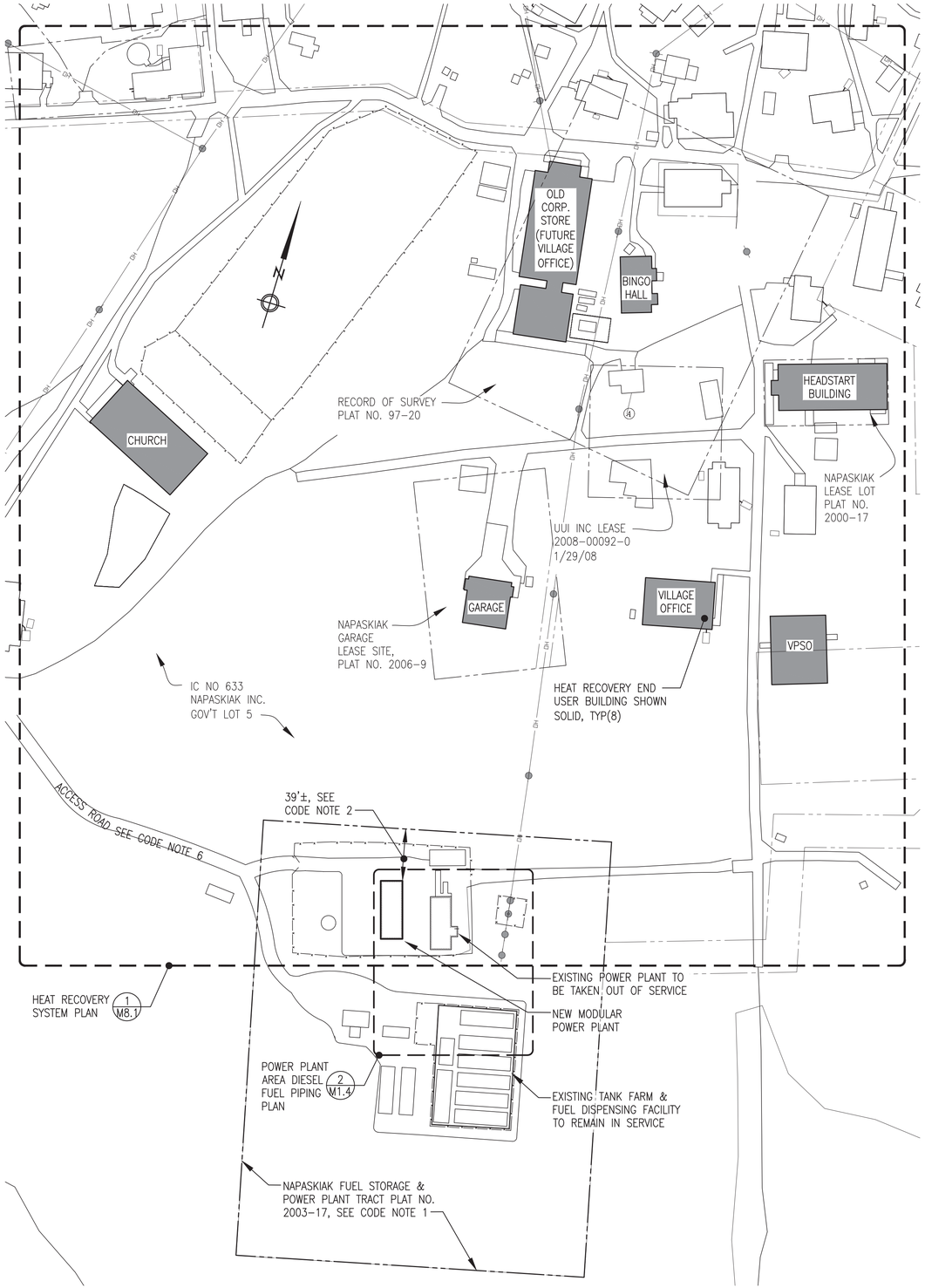
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

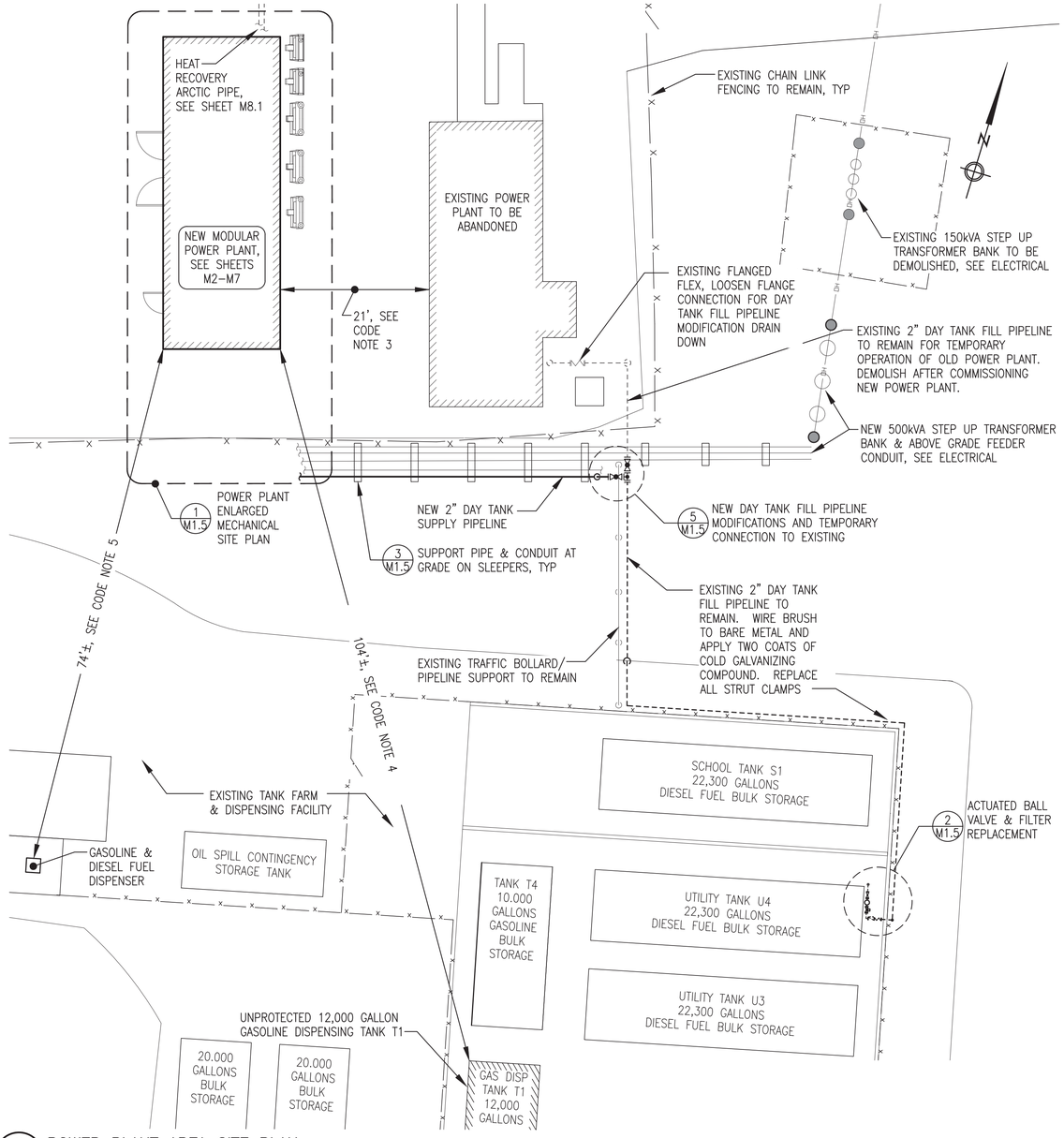
TITLE: SYSTEM START UP & SEQUENCE OF OPERATIONS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M1 | SHEET: M1.3
PROJECT NUMBER:



1 M1.4 OVERALL POWER PLANT & HEAT RECOVERY VICINITY PLAN
1"=50'



2 M1.4 POWER PLANT AREA SITE PLAN
1"=10'

SITE LAYOUT CODE NOTES

1) THE NEW NAPASKIAK POWER PLANT IS LOCATED ON THE SAME PARCEL OF LAND AS THE EXISTING POWER PLANT AND THE NAPASKIAK BULK FUEL STORAGE AND DISPENSING FACILITY, PLAT NO. 2003-17.
2) THE IBC REQUIRES 10' MINIMUM CLEARANCE FROM THE POWER PLANT TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON, SEE CODE ANALYSIS ON SHEET A1. THE NEW POWER PLANT WILL BE LOCATED MORE THAN 35' FROM THE NEAREST PROPERTY LINE.
3) THE NEW POWER PLANT IS CLASSIFIED F-1. THE EXISTING POWER PLANT WILL LIKELY BE USED IN THE FUTURE FOR COLD STORAGE AS EITHER S-1 OR S-2. AN IMAGINARY PROPERTY LINE IS ASSUMED AT 10' FROM THE OLD POWER PLANT SO THE NEW POWER PLANT WILL BE MORE THAN 10' FROM THIS LINE.
4) THE IFC REQUIRES 50' MINIMUM CLEARANCE FROM THE EXISTING UNPROTECTED DISPENSING TANK TO THE NEAREST IMPORTANT BUILDING. THE NEW POWER PLANT WILL BE LOCATED MORE THAN 100' FROM THE DISPENSING TANK.
5) THE IFC REQUIRES 10' MINIMUM CLEARANCE FROM THE DISPENSER TO BUILDINGS NOT HAVING 1-HOUR FIRE RESISTANCE. THE NEW POWER PLANT WILL BE LOCATED MORE THAN 70' FROM THE DISPENSER.
6) THE IFC REQUIRES FIRE APPARATUS ROADWAY ACCESS TO WITHIN 150' OF EVERY PORTION OF THE FACILITY. THE EXISTING ACCESS ROAD AND EARTHEN PAD PROVIDES ACCESS TO WITHIN 25' OF ALL PORTIONS OF THE NEW POWER PLANT.

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

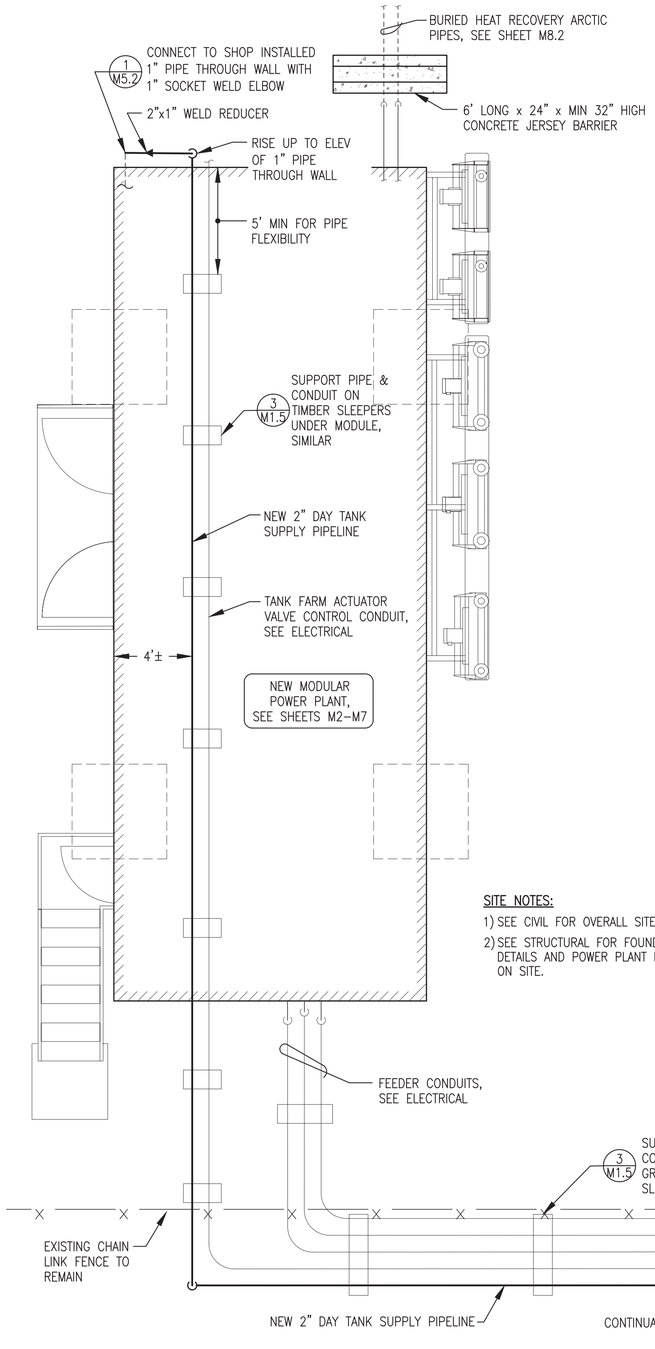
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: POWER PLANT & HEAT RECOVERY VICINITY PLAN, SITE 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: 12/15/22
FILE NAME: NAPS PP M1	SHEET: M1.4
PROJECT NUMBER:	

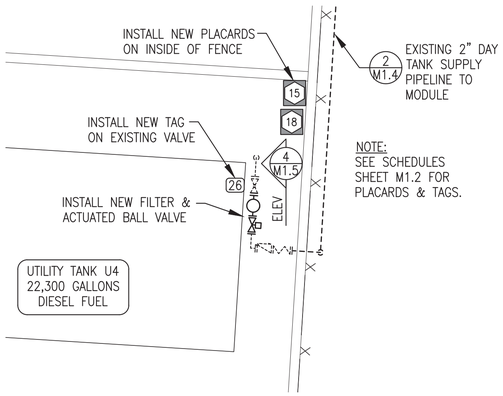


SITE NOTES:

1) SEE CIVIL FOR OVERALL SITE LAYOUT.
2) SEE STRUCTURAL FOR FOUNDATION DETAILS AND POWER PLANT LOCATION ON SITE.

1 M1.5 POWER PLANT ENLARGED MECHANICAL SITE PLAN

1/4"=1'-0"



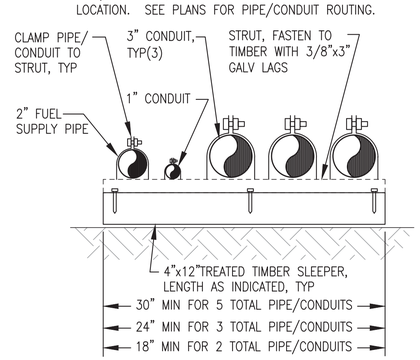
NOTE:
SEE SCHEDULES SHEET M1.2 FOR PLACARDS & TAGS.

2 M1.5 ACTUATED BALL VALVE & FILTER REPLACEMENT PLAN

1/4"=1'-0"

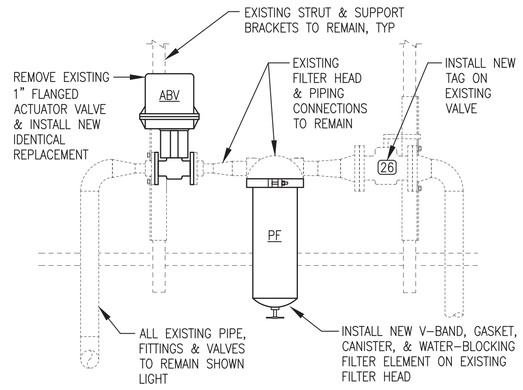
NOTES:

1. PROVIDE SUPPORTS AT 8'± O.C.
2. PIPE/CONDUIT QUANTITIES ON SUPPORTS VARY BY LOCATION. SEE PLANS FOR PIPE/CONDUIT ROUTING.



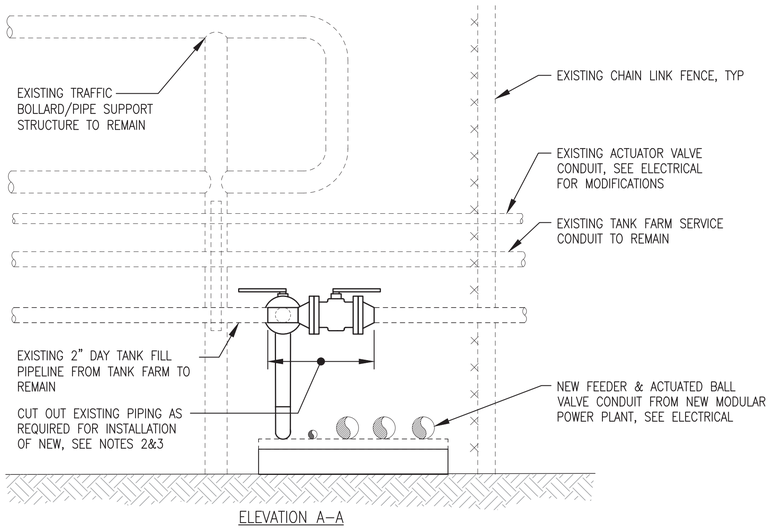
3 M1.5 PIPE/CONDUIT SLEEPER SUPPORT

NO SCALE

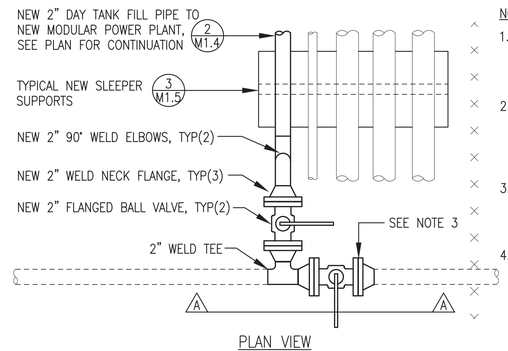


4 M1.5 ACTUATED BALL VALVE & FILTER REPLACEMENT ELEVATION

NO SCALE



ELEVATION A-A



PLAN VIEW

NOTES:

1. ALL NEW & EXISTING PIPE 2" SCH 80. NEW 2" PIPE & FITTINGS SHOWN WITH DARK, SOLID LINES. EXISTING PIPE & FITTINGS TO REMAIN SHOWN WITH LIGHT, DASHED LINES.
2. PRIOR TO MODIFYING PIPING, ENSURE THAT DAY TANK IN OLD POWER PLANT IS FULL. TURN OFF DAY TANK PANEL & DRAIN PIPE BY LOOSENING FLANGE AT FLEX CONNECTOR LOCATED NEAR THE OLD POWER PLANT.
3. INERT PIPE PRIOR TO CUTTING & PERFORM ALL WELDING IN ACCORDANCE WITH APPROPRIATE HOT WORK PROCEDURES PER NFPA 51B.
4. AFTER NEW PLANT IS COMMISSIONED CLOSE VALVE, DRAIN & REMOVE PIPING BEYOND THIS JOINT, REMOVE HANDLE, & INSTALL BLIND FLANGE.

5 M1.5 NEW DAY TANK FILL PIPELINE CONNECTION TO EXISTING

NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION
DECEMBER 2022

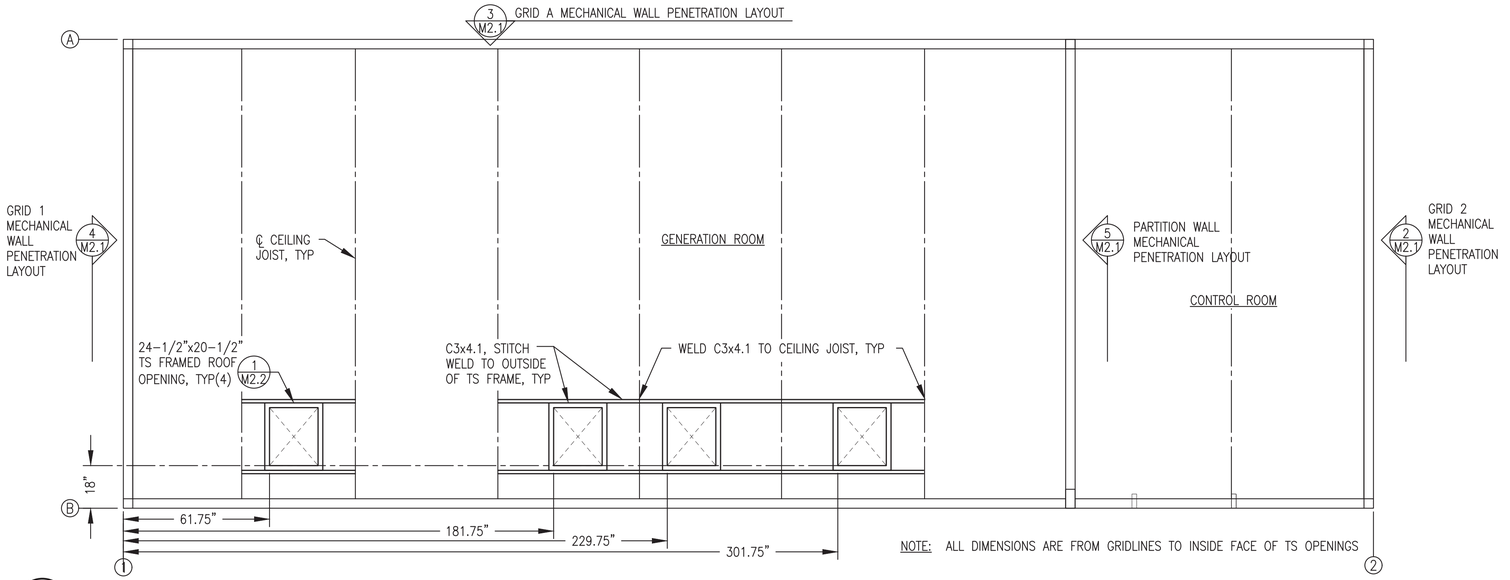
STATE OF ALASKA 49TH
BRIAN C. GRAY ME 8210
REGISTERED PROFESSIONAL ENGINEER

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: POWER PLANT ENLARGED MECHANICAL SITE PLAN & DETAILS

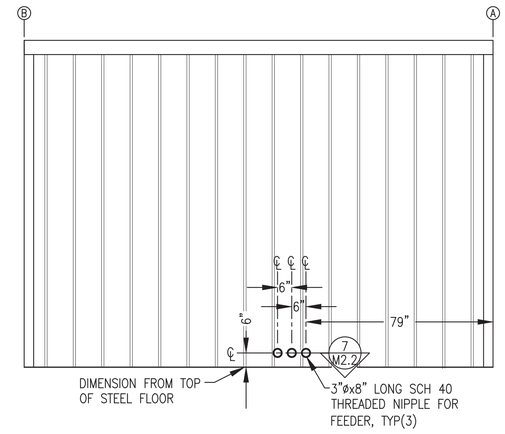
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 12/15/22
FILE NAME: NAPS PP M1	SHEET: M1.5
PROJECT NUMBER:	



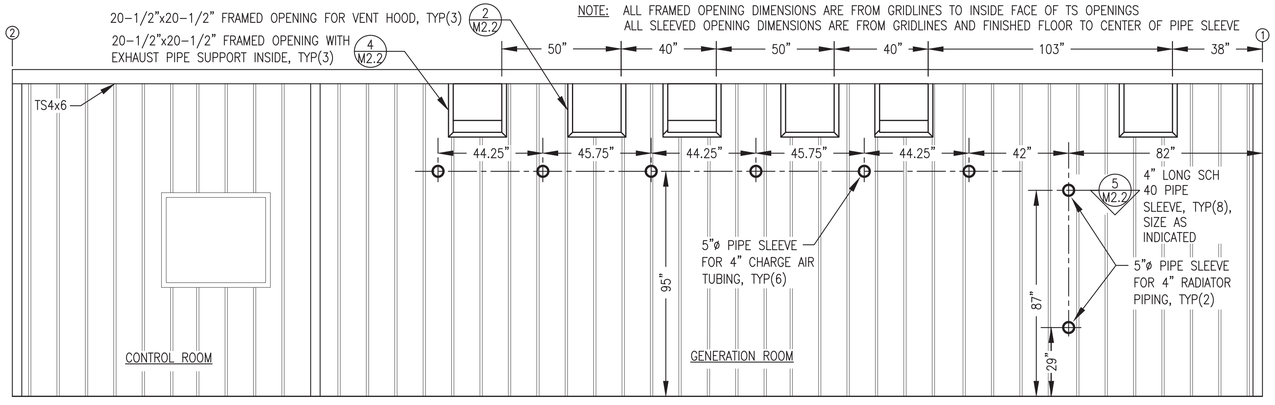
1 M2.1 MECHANICAL PENETRATION LAYOUT & ROOF PLAN

3/8"=1'–0"



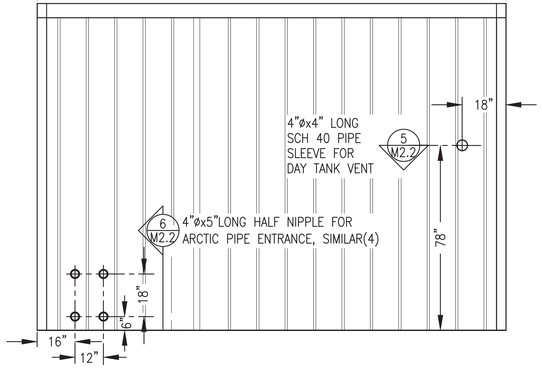
2 M2.1 GRID 2 MECHANICAL WALL PENETRATION LAYOUT – EXTERIOR ELEVATION

3/8"=1'–0"



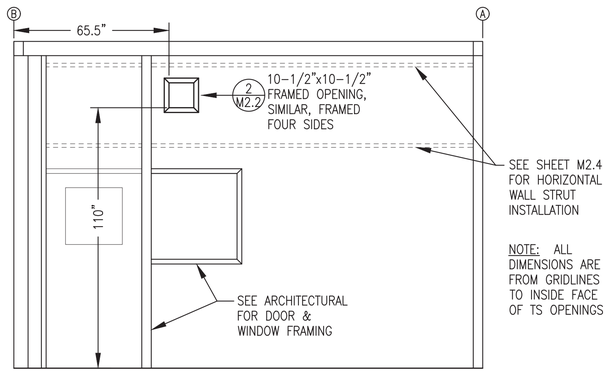
3 M2.1 GRID A MECHANICAL WALL PENETRATION LAYOUT – EXTERIOR ELEVATION

3/8"=1'–0"



4 M2.1 GRID 1 MECHANICAL WALL PENETRATION LAYOUT – EXTERIOR ELEVATION

3/8"=1'–0"



5 M2.1 PARTITION MECHANICAL WALL PENETRATION LAYOUT – INTERIOR ELEVATION

3/8"=1'–0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REVISION #2
ISSUED JULY
2022

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

REV.	DESCRIPTION	DATE	BY
2	DETAIL 2 ADDED THIRD NIPPLE & CHANGED DIMENSIONS	7/6/22	BCG
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/9/22	BCG

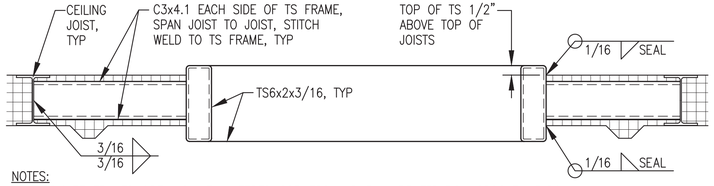
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: MECHANICAL PENETRATIONS PLAN, ELEVATIONS & DETAILS

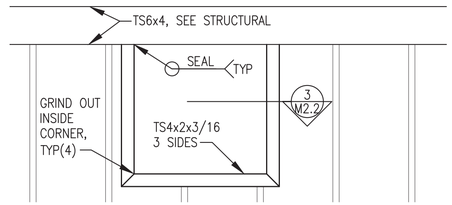
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: RAM PP M2–M7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 4/18/22
SHEET: M2.1



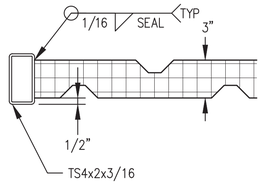
NOTES:
1) FABRICATE FRAMED OPENING WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS.
2) FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED ON PLANS.
3) GRIND OUT INSIDE OF MITERED CORNERS TO PROVIDE FULL CLEAR OPENING.

1 M2.2 TYPICAL ROOF OPENING DETAIL
2"=1'-0"



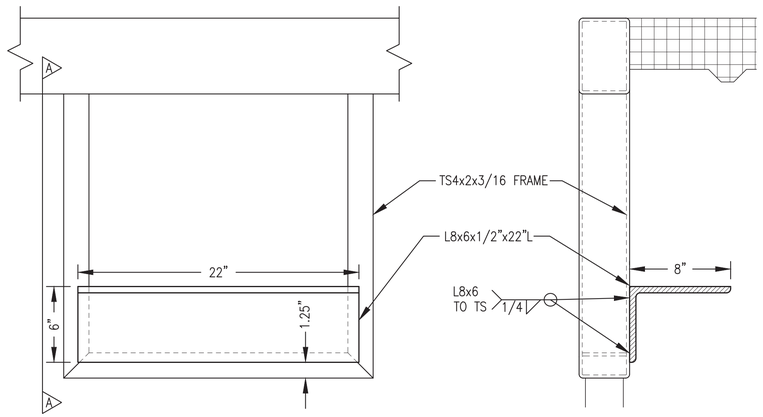
NOTE: SEE ELEVATION FOR INSIDE CLEAR OPENING SIZE.

2 M2.2 TYPICAL WALL OPENING – ELEVATION
1"=1'-0"

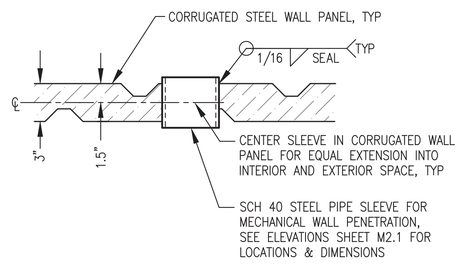


NOTES:
1) FABRICATE FRAMED OPENING WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS.
2) FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED ON ELEVATIONS.
3) GRIND OUT INSIDE OF MITERED CORNERS TO PROVIDE FULL CLEAR OPENING.

3 M2.2 TYPICAL SECTION THROUGH WALL OPENING
2"=1'-0"

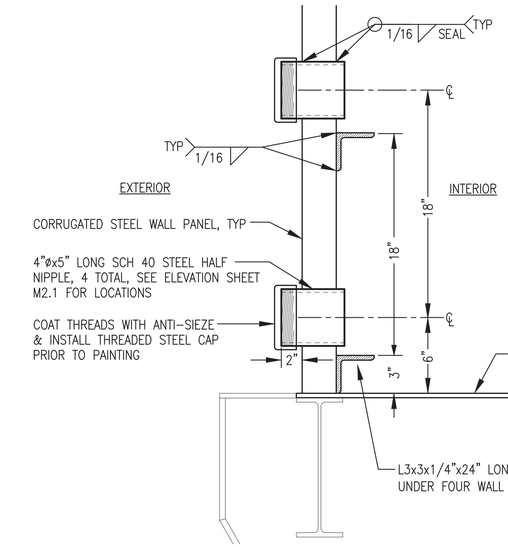


4 M2.2 EXHAUST PIPE SUPPORT AT FRAMED OPENING
2"=1'-0"

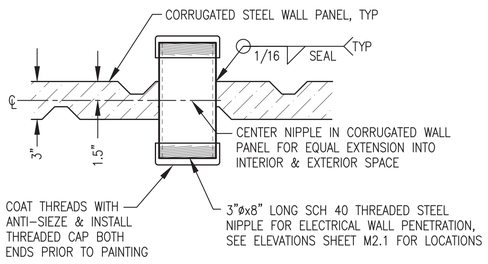


PLAN VIEW

5 M2.2 TYPICAL WALL PENETRATION PIPE SLEEVE
2"=1'-0"



6 M2.2 TYPICAL HEAT RECOVERY ARCTIC PIPE WALL PENETRATION
2"=1'-0"



PLAN VIEW

7 M2.2 TYPICAL ELECTRIC POWER FEEDER CONDUCTOR WALL PENETRATION
2"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REVISION #1
ISSUED JUNE 2022

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

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/9/22	BCG

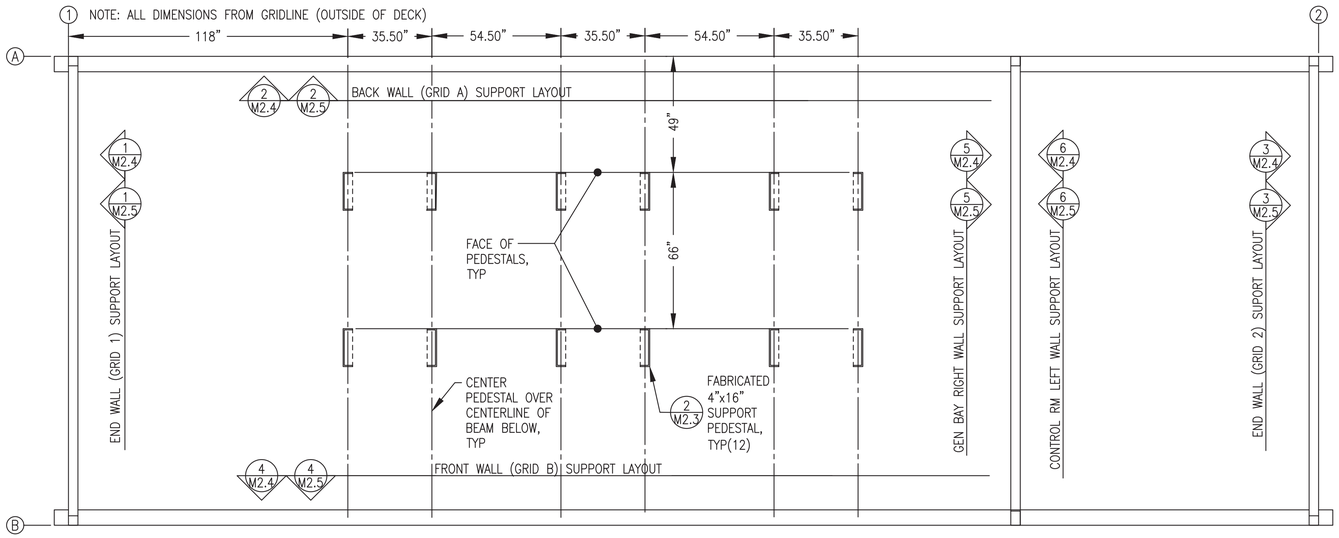
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

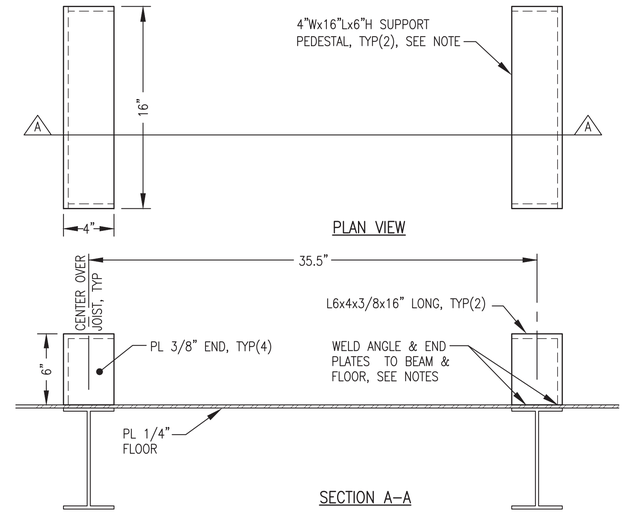
TITLE: MECHANICAL PENETRATION DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/18/22
FILE NAME: RAM PP M2-M7 | SHEET: M2.2
PROJECT NUMBER:



1 M2.3 MODULE MECHANICAL SUPPORT PLAN
3/8"=1'-0"

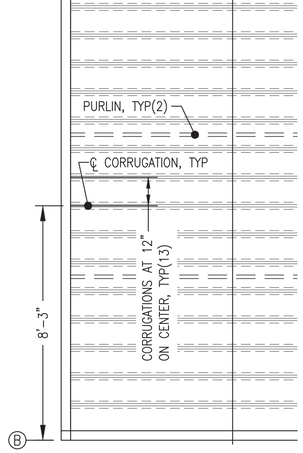


NOTES: 1) MAKE ALL JOINTS WITH CONTINUOUS GROOVE OR FILLET WELDS.
2) SLOT FLOOR PLATE 3 SIDES, WELD PEDESTAL TO TOP OF BEAM, THEN SEAL WELD TO FLOOR PLATE ALL AROUND INSIDE & OUT.

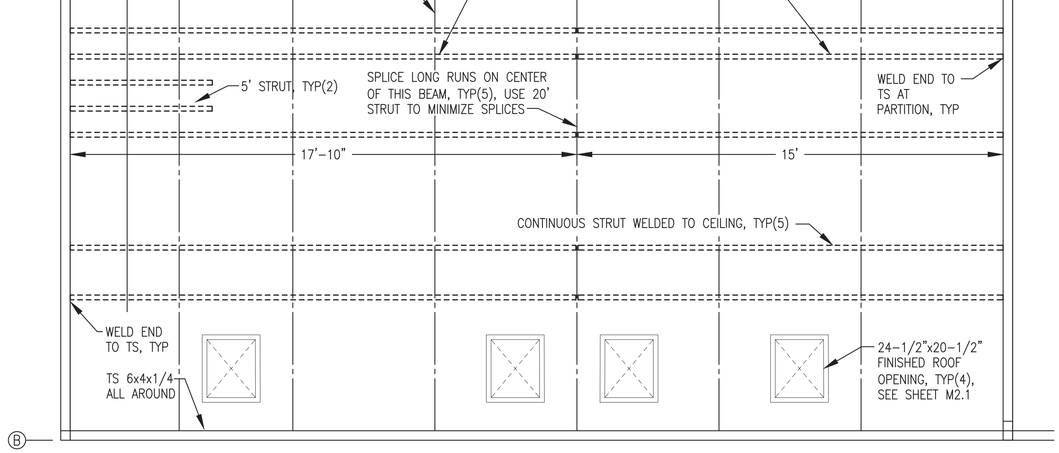
2 M2.3 SUPPORT PEDESTAL FABRICATION
2"=1'-0"

GENERAL NOTES:

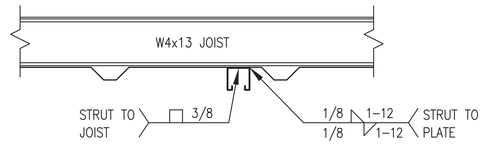
1) FABRICATE PEDESTALS FROM ASTM A36 ANGLE AND PLATES AS SHOWN.
2) ALL STRUT 12 GAUGE 1-5/8"x1-5/8" SOLID BACK PLAIN (UNFINISHED). B-LINE B22-PLN OR EQUAL. PURCHASE IN 20' LENGTHS TO MINIMIZE SPLICES.
3) INSTALL ALL SUPPORTS INDICATED AND GRIND SMOOTH PRIOR TO SANDBLASTING MODULE. SANDBLAST AND PAINT ALL SUPPORTS THIS SHEET EQUIVALENT TO MODULE INTERIOR. SEE SHEET A1 FOR PAINTING SPECIFICATIONS.



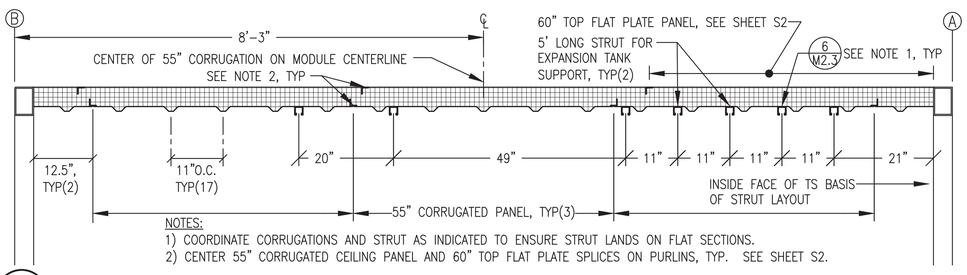
3 M2.3 CEILING PLATE CONFIGURATION LAYOUT
3/8"=1'-0"



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



6 M2.3 STRUT ATTACHMENT TO CEILING
NO SCALE



NOTES:
1) COORDINATE CORRUGATIONS AND STRUT AS INDICATED TO ENSURE STRUT LANDS ON FLAT SECTIONS.
2) CENTER 55" CORRUGATED CEILING PANEL AND 60" TOP FLAT PLATE SPLICES ON PURLINS, TYP. SEE SHEET S2.

5 M2.3 SECTION THROUGH CEILING - CORRUGATION & STRUT LAYOUT
3/4"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REVISION #1
ISSUED JUNE
2022

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

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/9/22	BCG

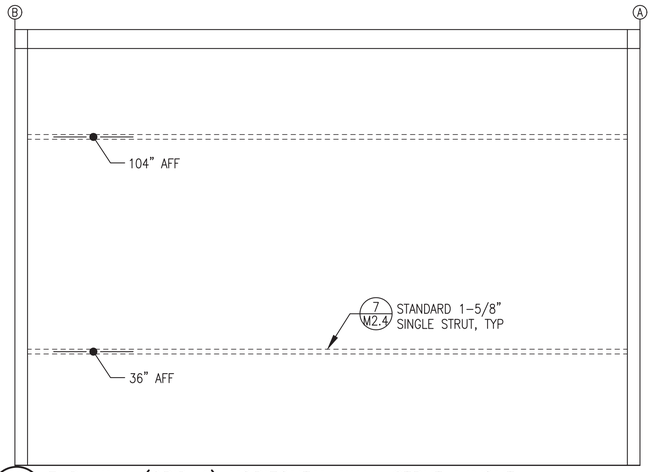
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

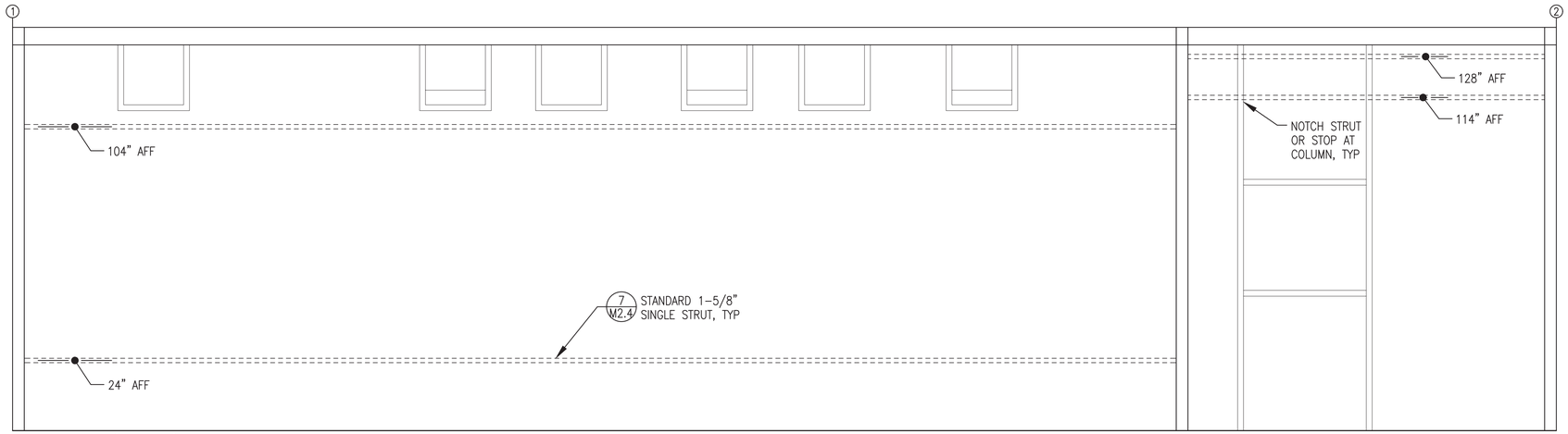
TITLE: MECHANICAL SUPPORT PLANS & DETAILS

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

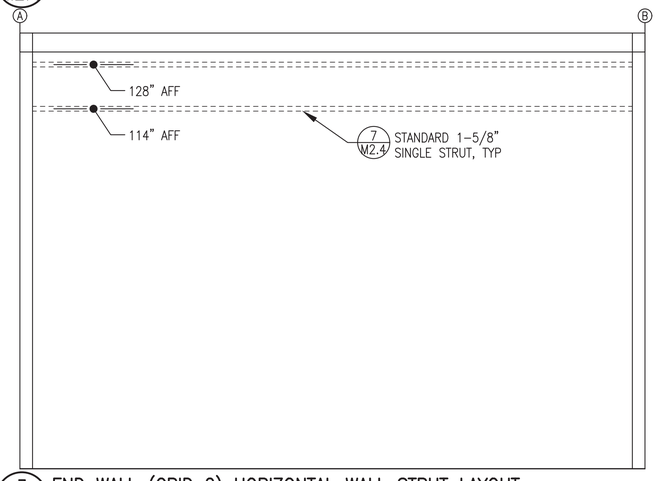
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 4/18/22
FILE NAME: RAM PP M2-M7	SHEET: M2.3
PROJECT NUMBER:	



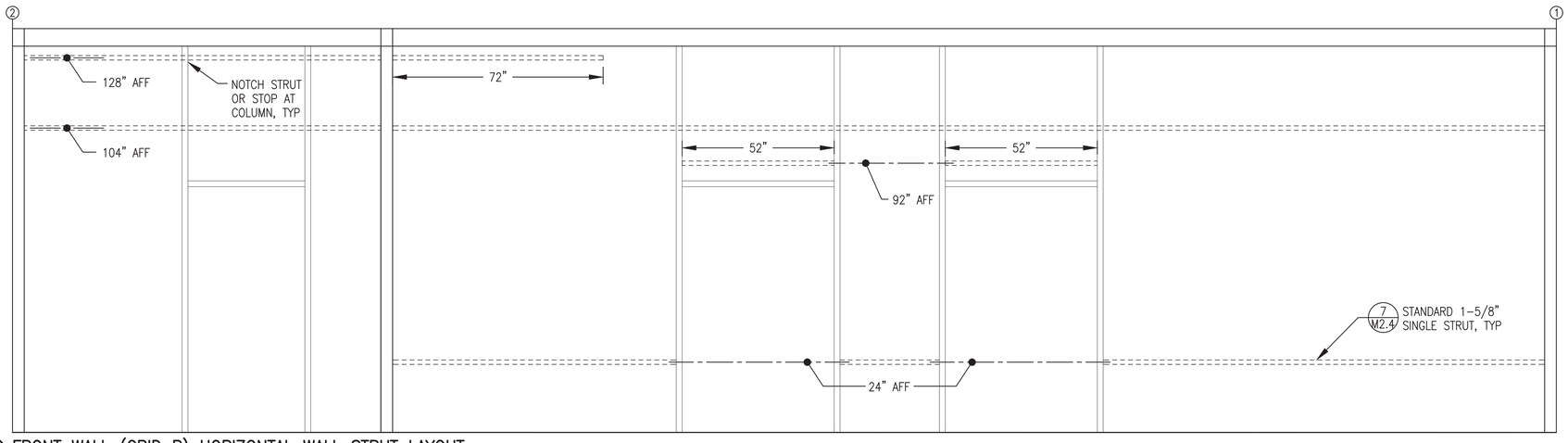
1 M2.4 END WALL (GRID 1) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



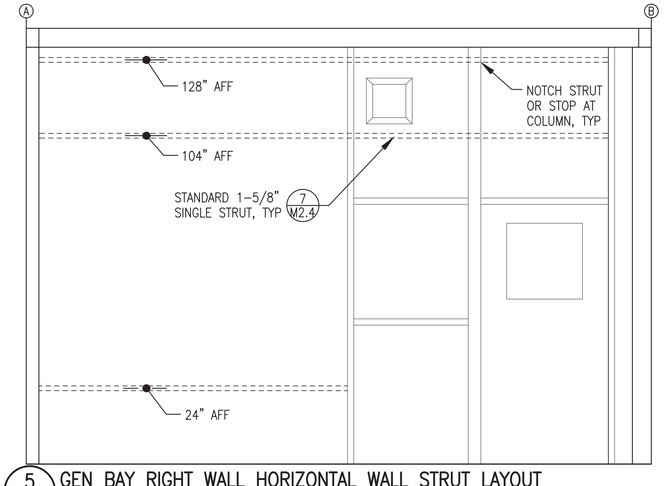
2 M2.4 BACK WALL (GRID A) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



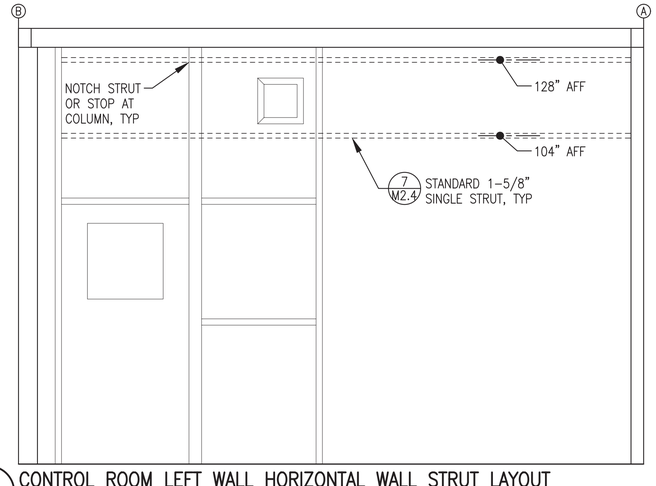
3 M2.4 END WALL (GRID 2) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



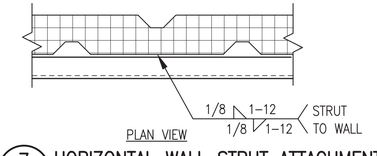
4 M2.4 FRONT WALL (GRID B) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



5 M2.4 GEN BAY RIGHT WALL HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



6 M2.4 CONTROL ROOM LEFT WALL HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



7 M2.4 HORIZONTAL WALL STRUT ATTACHMENT
NO SCALE

HORIZONTAL WALL STRUT NOTES:

1) ALL LOCATIONS ARE CENTERLINE OF STRUT ABOVE FINISHED FLOOR (AFF).
2) ALL STRUT SHALL BE 12 GAUGE, 1-5/8" x 1-5/8", PLAIN (UN-FINISHED BLACK) WITH SOLID BACK, B-LINE B22-PLN OR EQUAL.
3) PRIOR TO PAINTING MODULE, WELD ALL HORIZONTAL STRUT SECTIONS TO WALLS AS SHOWN. SANDBLAST AND PAINT STRUT WITH MODULE INTERIOR WALLS. SEE SHEET A1 FOR PAINTING SPECIFICATIONS.

REVISION #1
ISSUED JUNE
2022

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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REV.	DESCRIPTION	DATE	BY
1	REVISED FOR NEW ENGINE/GENERATOR SELECTION	6/9/22	BCG

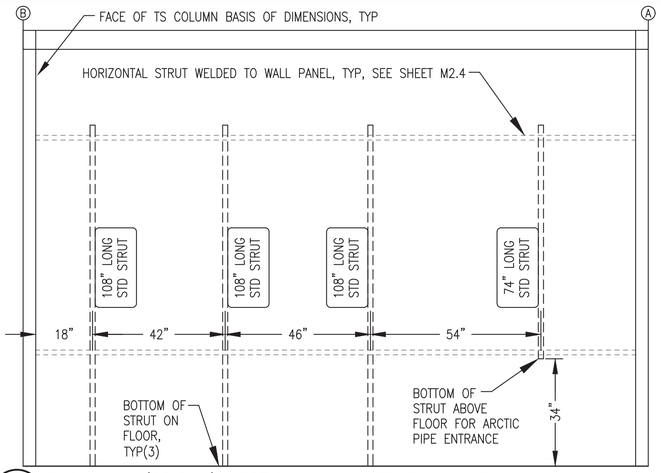
ALASKA ENERGY AUTHORITY

PROJECT:
NAPASKIAK POWER SYSTEM UPGRADE

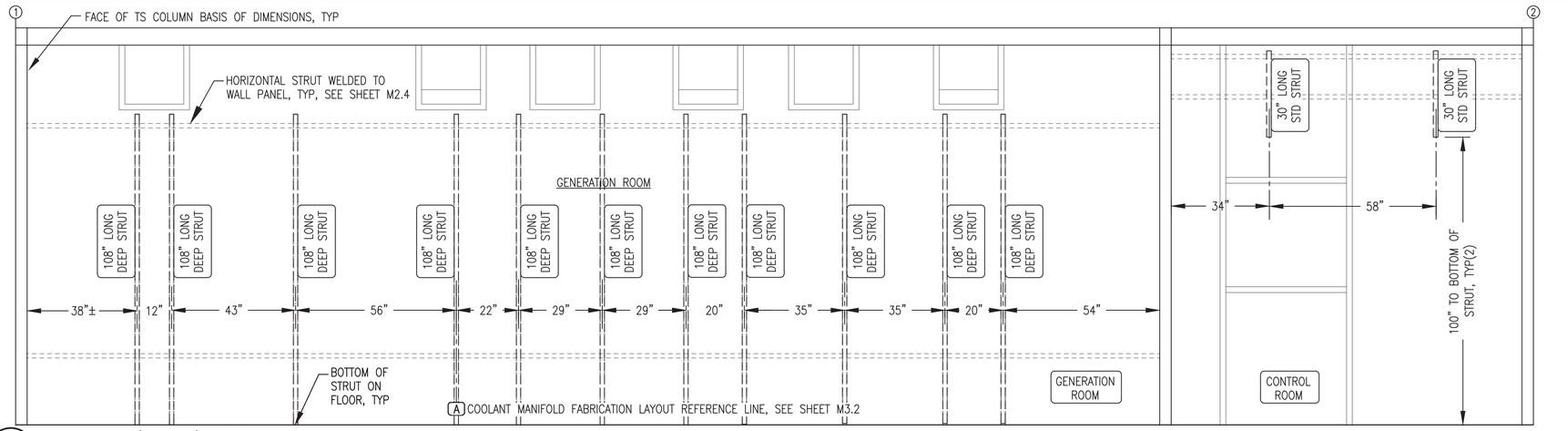
TITLE:
MECHANICAL SUPPORT
HORIZONTAL WALL STRUT INSTALLATION

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 4/18/22
FILE NAME: RAM PP M2-M7	SHEET: M2.4
PROJECT NUMBER:	



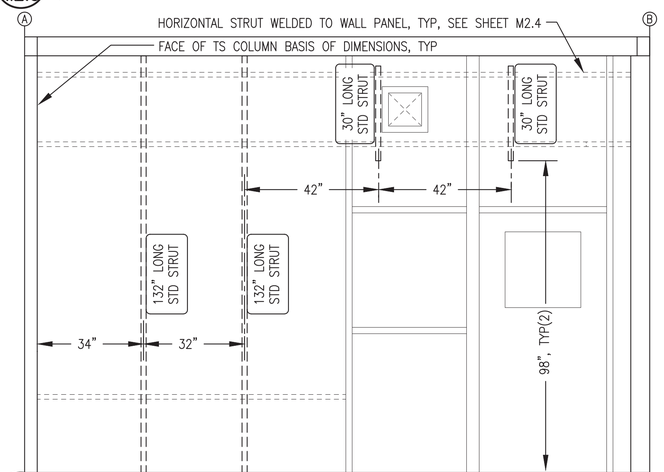
1 M2.5 END WALL (GRID 1) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



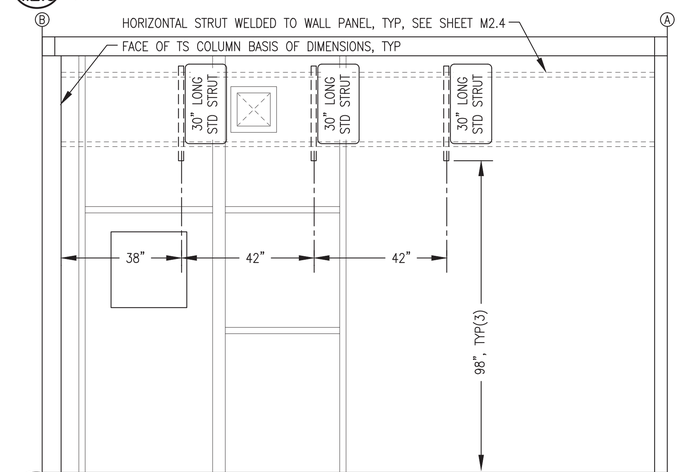
2 M2.5 BACK WALL (GRID A) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"

3 M2.5 END WALL (GRID 2) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"

4 M2.5 FRONT WALL (GRID B) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



5 M2.5 GEN ROOM INTERIOR WALL VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



6 M2.5 CONTROL ROOM INTERIOR WALL VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"

VERTICAL WALL STRUT NOTES:

1) ALL HORIZONTAL LOCATIONS ARE CENTERLINE OF STRUT FROM FACE OF TS COLUMNS. ALL VERTICAL LOCATIONS ARE END OF STRUT ABOVE FINISHED FLOOR.

2) ALL STRUT SHALL BE 12 GAUGE, PRE-GALVANIZED FINISH WITH SLOTTED BACK. "STD" DESIGNATES STANDARD 1-5/8" x 1-5/8" SINGLE STRUT, B-LINE B22-SH-GALV OR EQUAL. "DEEP" DESIGNATES 3-1/4" x 1-5/8" SINGLE STRUT, B-LINE B11-SH-GALV OR EQUAL.

3) FASTEN ALL VERTICAL STRUT SECTIONS TO HORIZONTAL STRUT WITH 1/2"x1" ALLEN HEAD CAP SCREWS & STRUT NUTS.

4) ONLY MAJOR WALL MOUNTED EQUIPMENT SUPPORT STRUT SHOWN THIS SHEET. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR OTHER EQUIPMENT, PIPING, AND WIREWAY STRUT SUPPORT DETAILS.

ISSUED FOR CONSTRUCTION
JULY 2022

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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

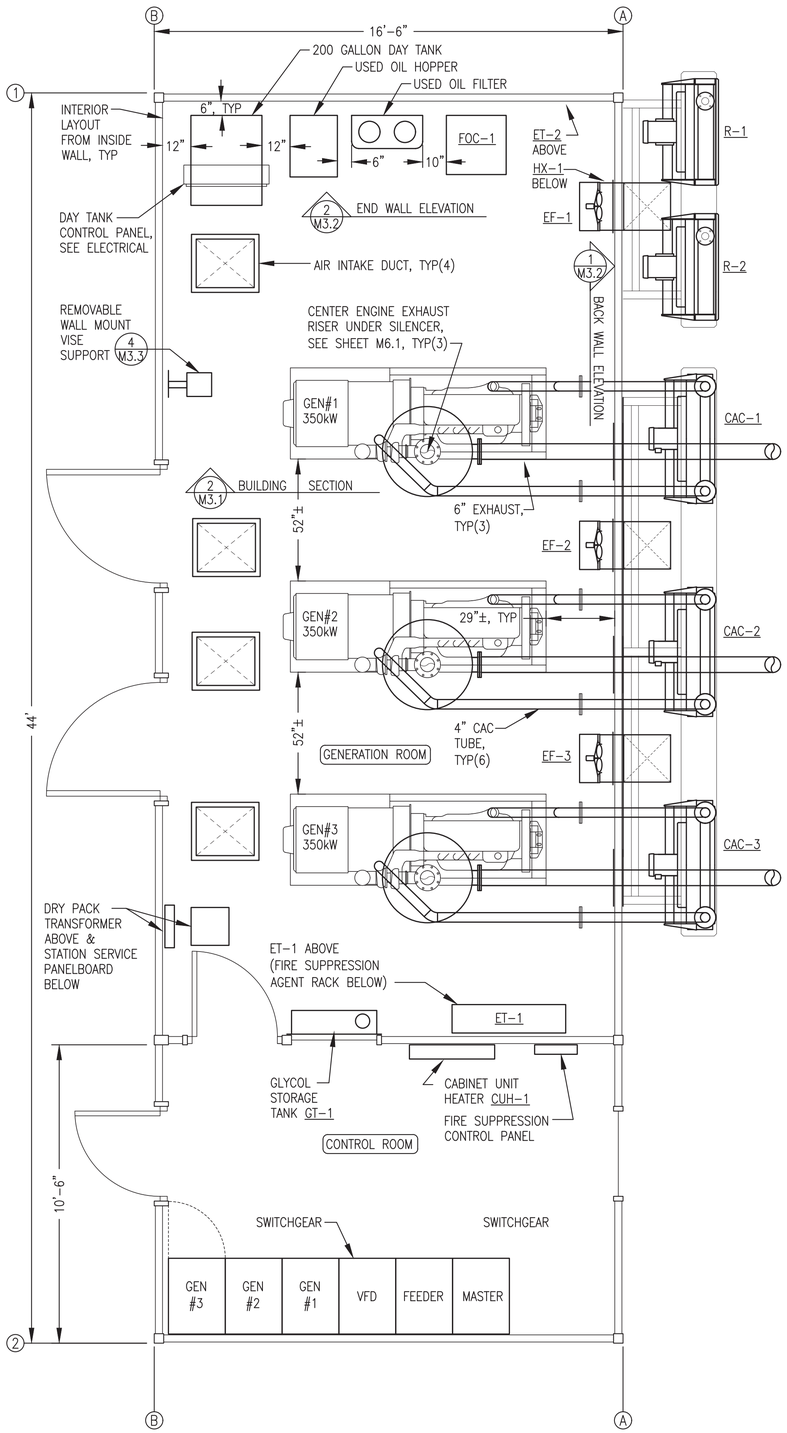
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

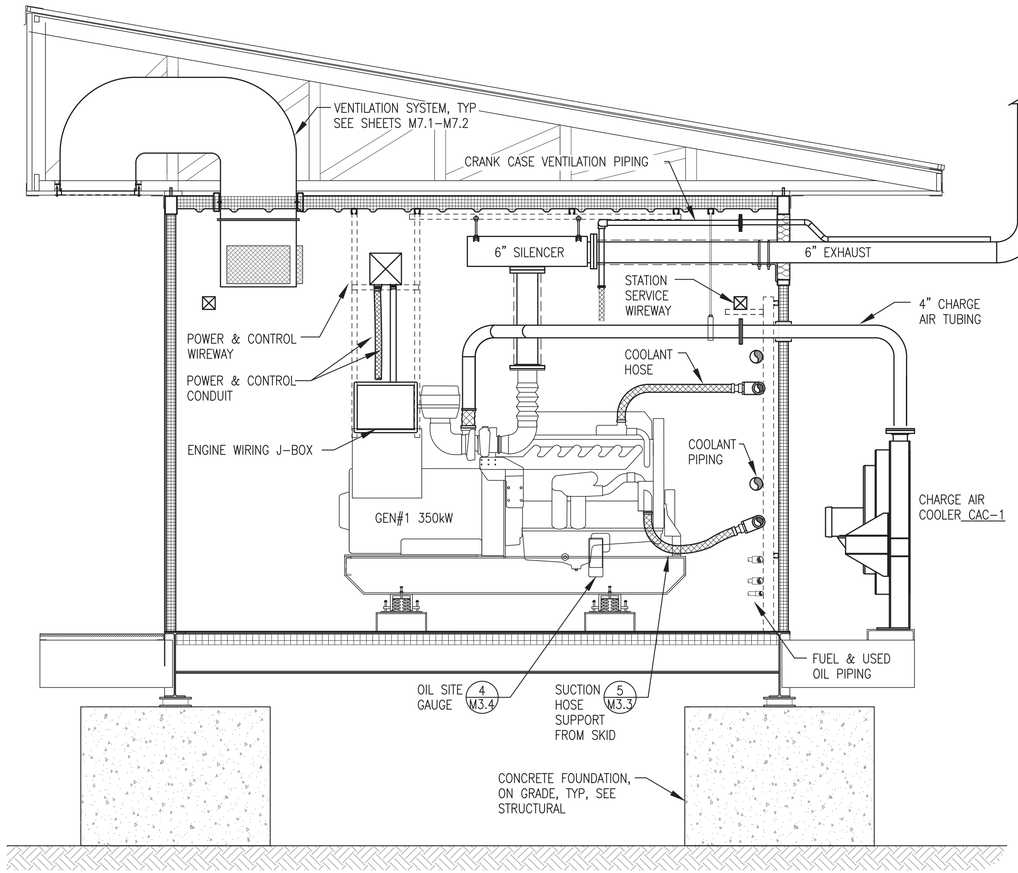
TITLE: MECHANICAL SUPPORT
VERTICAL WALL STRUT INSTALLATION

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M2.5
PROJECT NUMBER:	



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



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

NOTE: ADJUST SPRING VIBRATION ISOLATOR LEVELING BOLTS TO ACHIEVE A UNIFORM INSTALLATION HEIGHT OF APPROXIMATELY 5-3/4" THEN TIGHTEN LOCKING NUTS. ADJUST NUTS ON STABILIZER BOLTS TO ACHIEVE A UNIFORM CLEARANCE OF APPROXIMATELY 1/8" THEN TIGHTEN LOCKING NUTS. VERIFY UNIT MOVES FREELY ON ISOLATORS.

LOCATE GENERATOR TO ALIGN WITH EXHAUST ABOVE PRIOR TO DRILLING PEDESTALS THEN FASTEN ISOLATOR TO PEDESTAL WITH 1/2" BOLTS

SEE SHEET M2.3 FOR SUPPORT PEDESTAL LOCATIONS & FABRICATION

3 M3.1 TYPICAL VIBRATION ISOLATOR INSTALLATION
1"=1'-0"

EQUIPMENT LAYOUT GENERAL NOTES:

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

ENGINE-GENERATOR SCHEDULE

GENSET	DESCRIPTION
GEN #1, #2, & #3	ENGINE – 500 HP, 350 eKW PRIME, MTU-DETROIT 6063TK35. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 450 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HCI534D.

ENGINE-GENERATOR CODE COMPLIANCE NOTES

1) PER IMC 915.1 THE ENGINE-GENERATORS AND ASSOCIATED MECHANICAL SYSTEMS SHALL BE IN INSTALLED COMPLIANCE WITH NFPA 37. SEE THE ABOVE REFERENCED DRAWINGS FOR ADDITIONAL DETAIL.
2) PER IMC 915.1 THE ENGINE-GENERATORS SHALL BE FABRICATED AND ASSEMBLED IN ACCORDANCE WITH U.L. 2200. SEE ENGINE-GENERATOR SPECIFICATIONS FOR ADDITIONAL DETAIL.

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. FIELD INSTALLATION OF COMPONENTS EXTERIOR TO THE MODULE UNDER THE ON SITE CONTRACT ARE DELINEATED ON SHEETS THAT FOLLOW.

ISSUED FOR CONSTRUCTION
JULY 2022

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

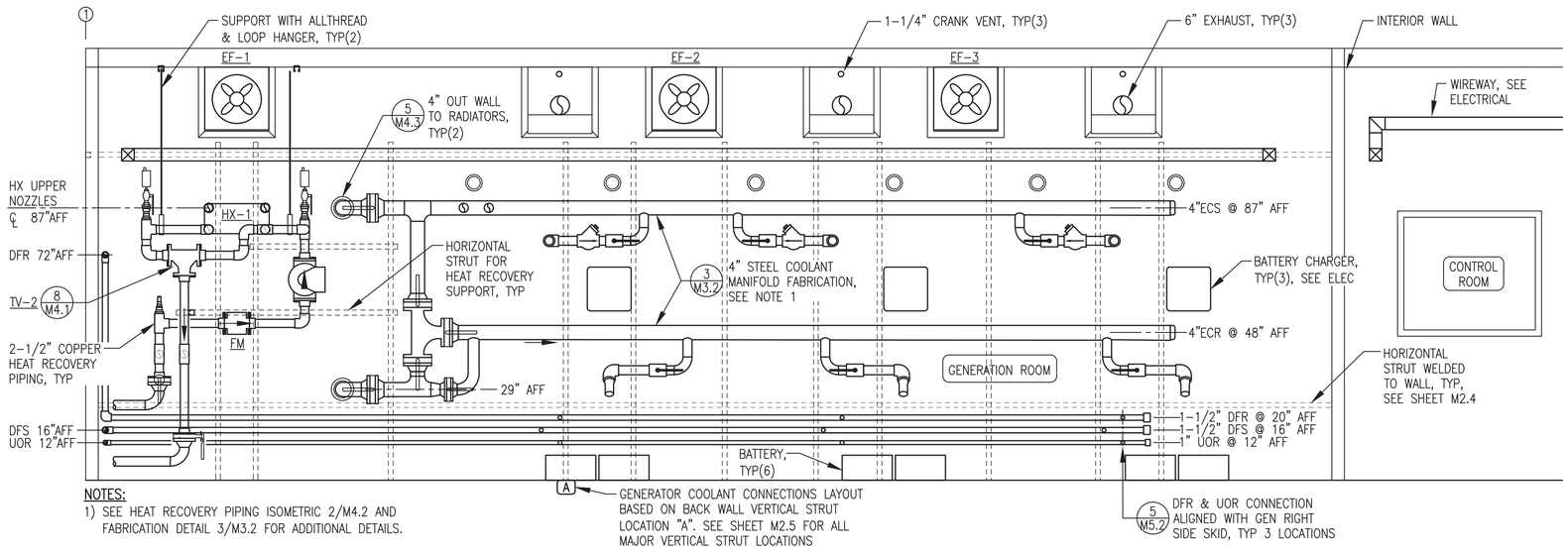
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: EQUIPMENT LAYOUT PLAN, SECTION, & DETAILS

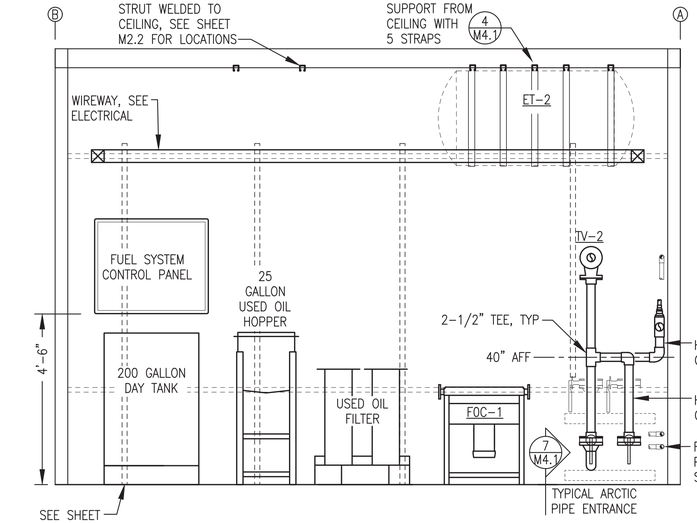
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M3.1
PROJECT NUMBER:



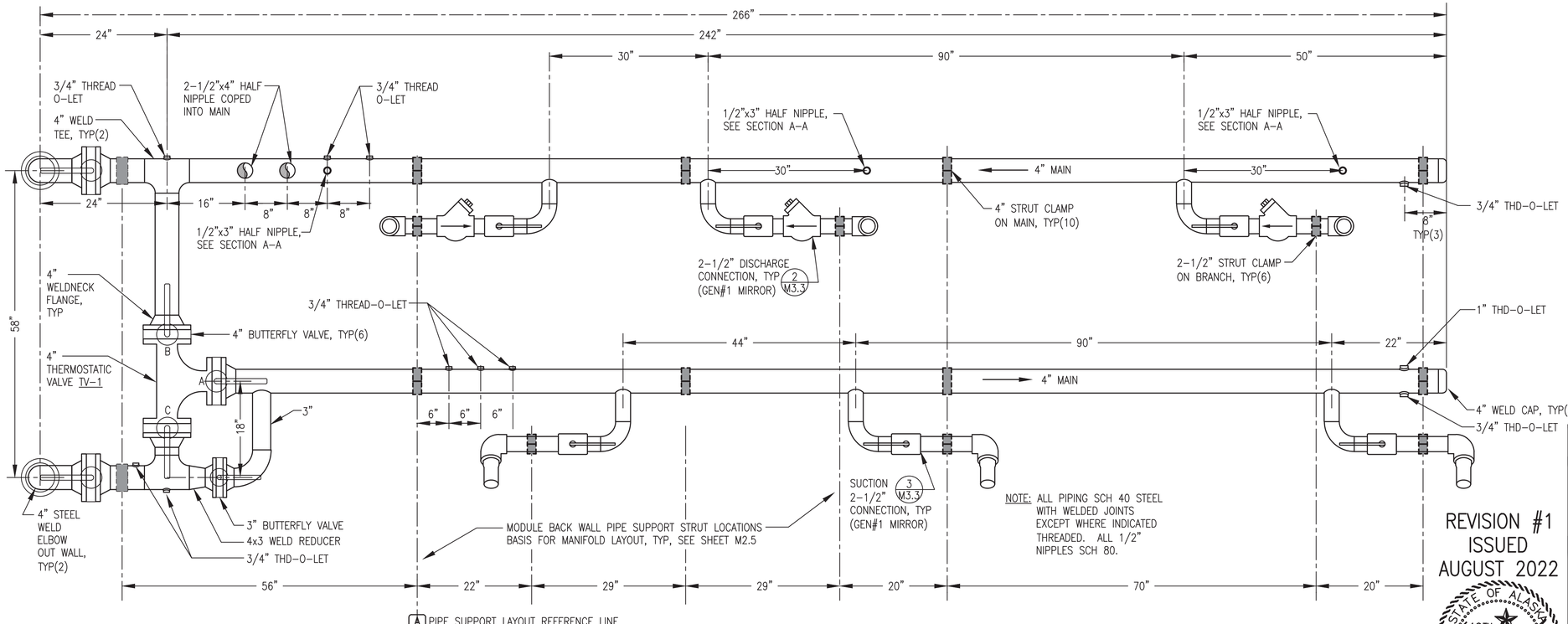
NOTES:
1) SEE HEAT RECOVERY PIPING ISOMETRIC 2/M4.2 AND FABRICATION DETAIL 3/M3.2 FOR ADDITIONAL DETAILS.

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

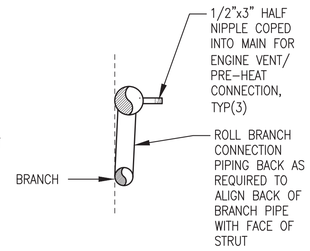


NOTES:
1) SEE HEAT RECOVERY PIPING ISOMETRIC 2/M4.2 FOR ADDITIONAL DETAILS.
2) SEE FUEL SYSTEM PLAN & ELEVATIONS SHEET M5.1 FOR ADDITIONAL DETAILS.

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



NOTE: ALL PIPING SCH 40 STEEL WITH WELDED JOINTS EXCEPT WHERE INDICATED THREADED. ALL 1/2" NIPPLES SCH 80.



TYPICAL SECTION A-A

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

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

REVISION #1
ISSUED
AUGUST 2022

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

REV.	DESCRIPTION	DATE	BY
1	REVISED TO COORDINATE WITH FINAL ON-SITE DESIGN	8/26/22	BCG

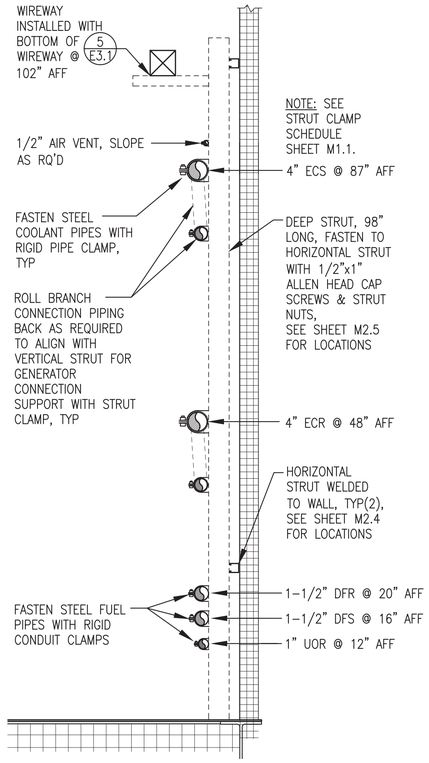
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

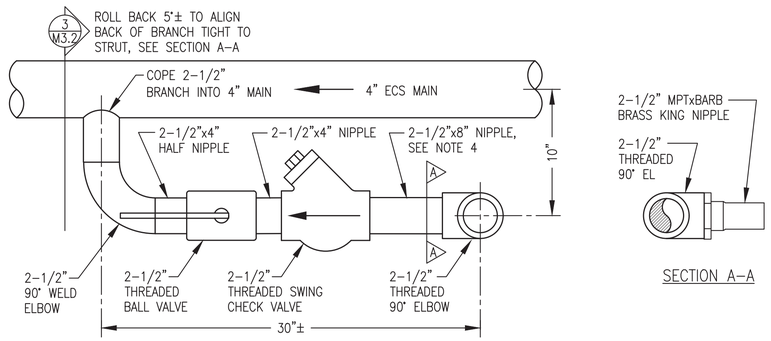
TITLE: WALL ELEVATIONS & PPING DETAILS

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

DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: NAPS PP M2-7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 7/29/22
SHEET: M3.2

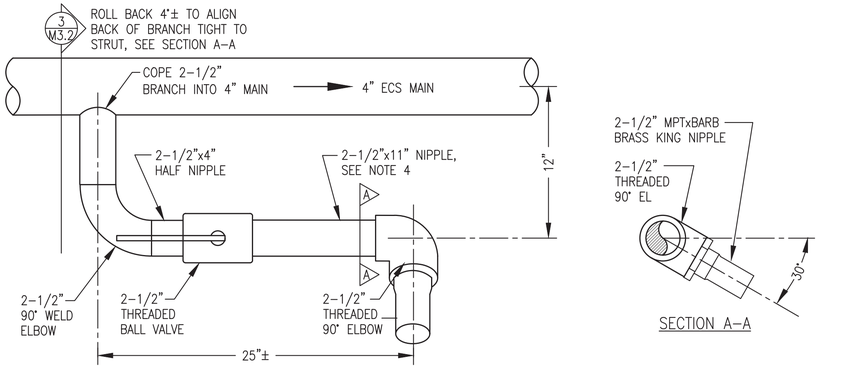


1 M3.3 TYPICAL PIPE SUPPORT AT BACK WALL
1"=1'-0"



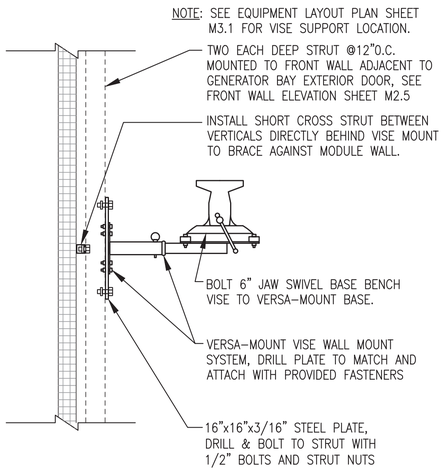
NOTES:
1) GEN#2 & GEN#3 DISCHARGE CONNECTION SHOWN, GEN#1 MIRROR IMAGE
2) MAIN PIPING 4" STEEL WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
3) ALL PIPING SCHEDULE 40 STEEL.
4) ADJUST NIPPLE LENGTH AS REQUIRED TO PROVIDE FOR 30"± OVERALL LENGTH AND TO ENSURE EXPOSED PIPE SECTION ALIGNED WITH STRUT FOR CLAMP.

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

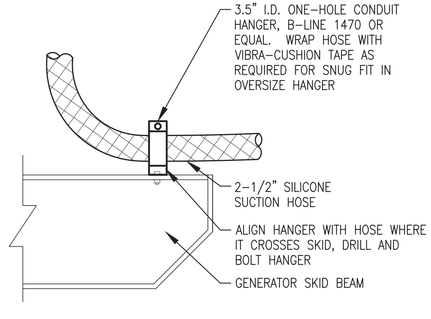


NOTES:
1) GEN#2 & GEN#3 SUCTION CONNECTION SHOWN, GEN#1 MIRROR IMAGE
2) MAIN PIPING 4" STEEL WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
3) ALL PIPING SCHEDULE 40 STEEL.
4) ADJUST NIPPLE LENGTH AS REQUIRED TO PROVIDE FOR 24"± OVERALL LENGTH AND TO ENSURE EXPOSED PIPE SECTION ALIGNED WITH STRUT FOR CLAMP.

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



4 M3.3 REMOVABLE BENCH VISE INSTALLATION
NO SCALE



5 M3.3 TYPICAL GENERATOR SUCTION HOSE SUPPORT
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

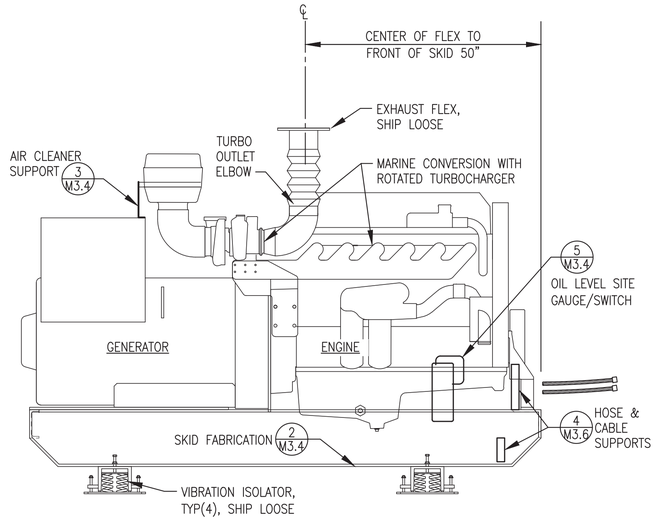
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: MECHANICAL DETAILS

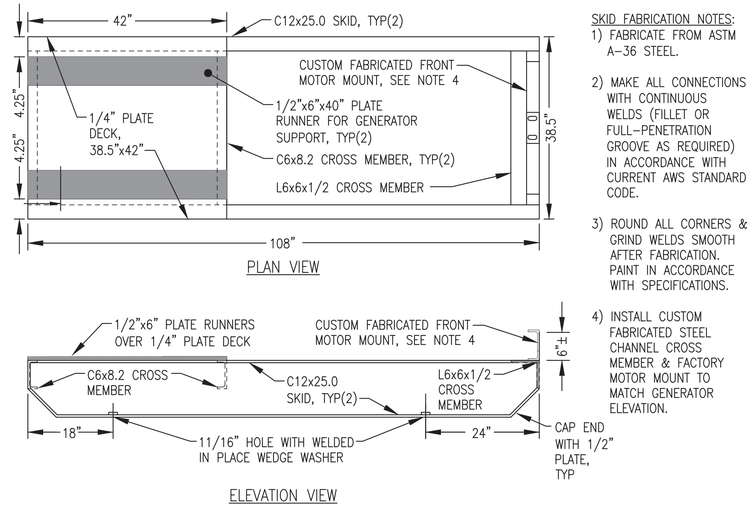
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: NAPS PP M2-7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 7/29/22
SHEET: M3.3



1 M3.4 TYPICAL GENERATOR ASSEMBLY

3/4"=1'-0"

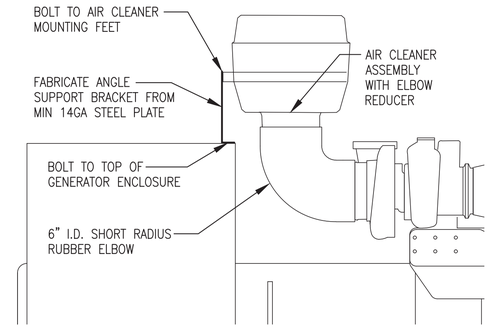


SKID FABRICATION NOTES:

1) FABRICATE FROM ASTM A-36 STEEL.
2) 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 IN ACCORDANCE WITH SPECIFICATIONS.
4) INSTALL CUSTOM FABRICATED STEEL CHANNEL CROSS MEMBER & FACTORY MOTOR MOUNT TO MATCH GENERATOR ELEVATION.

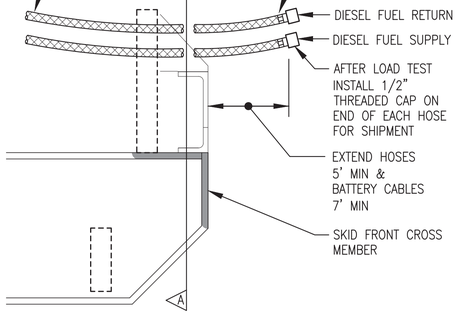
2 M3.4 TYPICAL GENERATOR SKID FABRICATION

3/4"=1'-0"

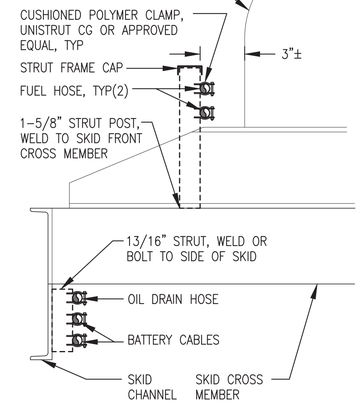


3 M3.4 TYPICAL GENERATOR AIR CLEANER INSTALLATION

3/4"=1'-0"



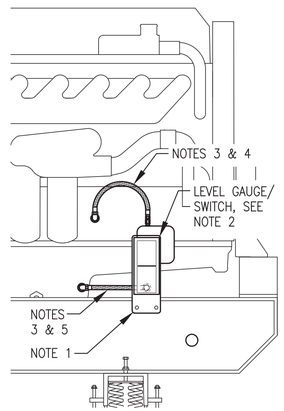
ELEVATION (SIDE) VIEW



SECTION A-A

4 M3.4 TYPICAL SKID FUEL/OIL HOSE & BATTERY CABLE SUPPORT

NO SCALE



NOTES:

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

5 M3.4 TYPICAL OIL LEVEL GAUGE/SWITCH INSTALLATION

1"=1'-0"

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ISSUED FOR CONSTRUCTION JULY 2022

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

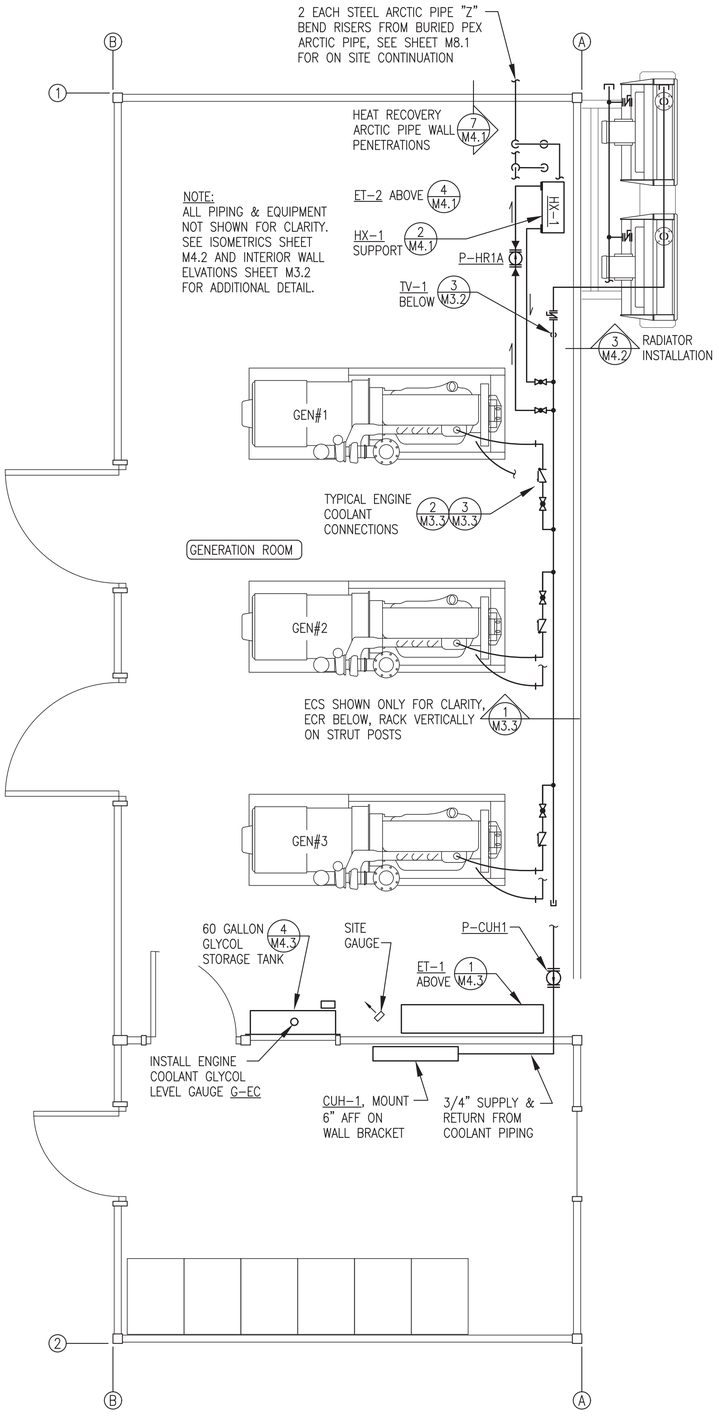
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

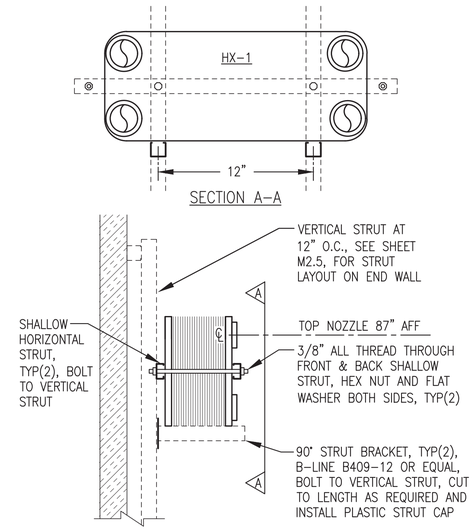
TITLE: GENERATOR FABRICATION DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M3.4
PROJECT NUMBER:	

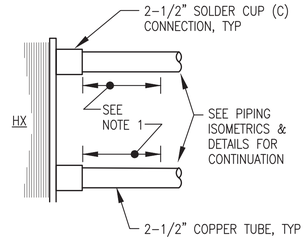


1 M4.1 COOLANT AND HEAT RECOVERY PIPING PLAN
3/8"=1'-0"

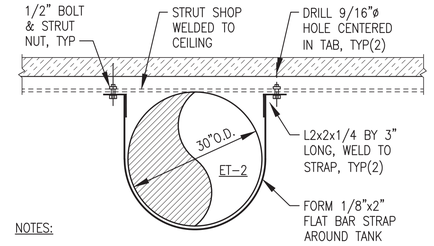


2 M4.1 HEAT EXCHANGER HX-1 SUPPORT FROM WALL
NO SCALE

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

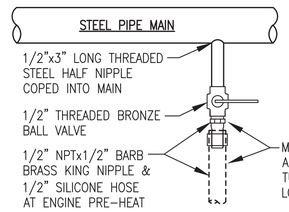


3 M4.1 TYPICAL HX PIPING CONNECTION
NO SCALE



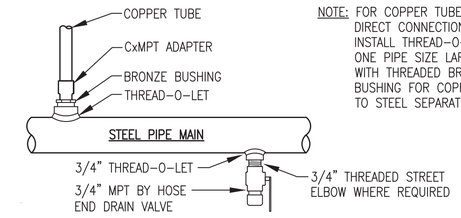
NOTES:
1) SMOOTH EDGES AFTER FABRICATION, WIRE BRUSH, SOLVENT CLEAN, AND PAINT WITH TWO COATS OF COLD GALVANIZING COMPOUND.
2) ONE STRAP SHOWN. INSTALL FIVE IDENTICAL STRAPS.

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



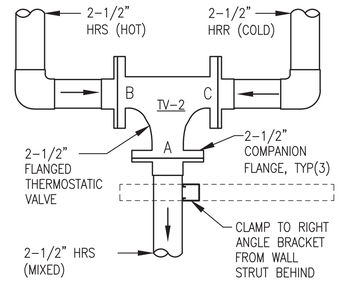
NOTE: 1/2" ENGINE PRE-HEAT/VENT HOSE CONNECTION SHOWN. PROVIDE SIMILAR SOLDER COPPER BRANCH CONNECTIONS WHERE SHOWN, SIZE AS INDICATED.

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

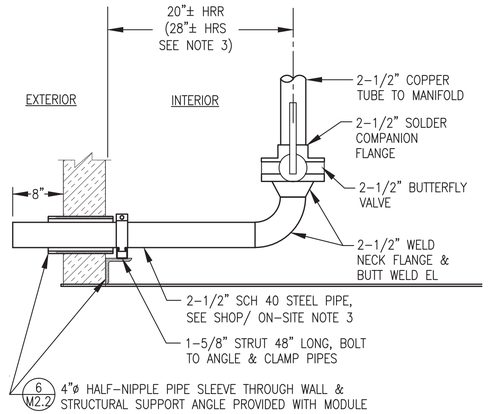


NOTE: FOR COPPER TUBE DIRECT CONNECTION INSTALL THREAD-O-LET ONE PIPE SIZE LARGER WITH THREADED BRONZE BUSHING FOR COPPER TO STEEL SEPARATION.

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



8 M4.1 TV-2 INSTALLATION
NO SCALE



7 M4.1 HEAT RECOVERY ARCTIC PIPE WALL PENETRATIONS
NO SCALE

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

ARCTIC PIPE SHOP/ON-SITE NOTES:
1) SHOP INSTALLATION SHOWN. STUB PIPE 8" MIN BEYOND WALL & TEMPORARILY CONNECT SUPPLY TO RETURN FOR TESTING.
2) AS PART OF ON-SITE PREP FOR SHIPPING REMOVE TEMPORARY CONNECTION, BREAK FLANGE JOINT, & STORE PIPE IN MODULE. BRACE BUTTERFLY VALVE AS REQUIRED & INSTALL 4" THREADED PIPE CAP FOR SHIPPING.
3) IN FIELD REMOVE THREADED PIPE CAP, REINSTALL PIPE THROUGH WALL & CONNECT TO ARCTIC PIPE, SEE SHEET M8.
4) SHOP INSULATE COPPER TUBE UP TO BUTTERFLY VALVE. SHOP CUT & FIT INSULATION & JACKET FOR STEEL PIPE TO WALL BUT SHIP LOOSE FOR FIELD INSTALLATION.

REVISION #1 ISSUED AUGUST 2022

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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

REV.	DESCRIPTION	DATE	BY
1	REVISED TO COORDINATE WITH FINAL ON-SITE DESIGN	8/26/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: COOLANT & HEAT RECOVERY PIPING PLAN & DETAILS

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

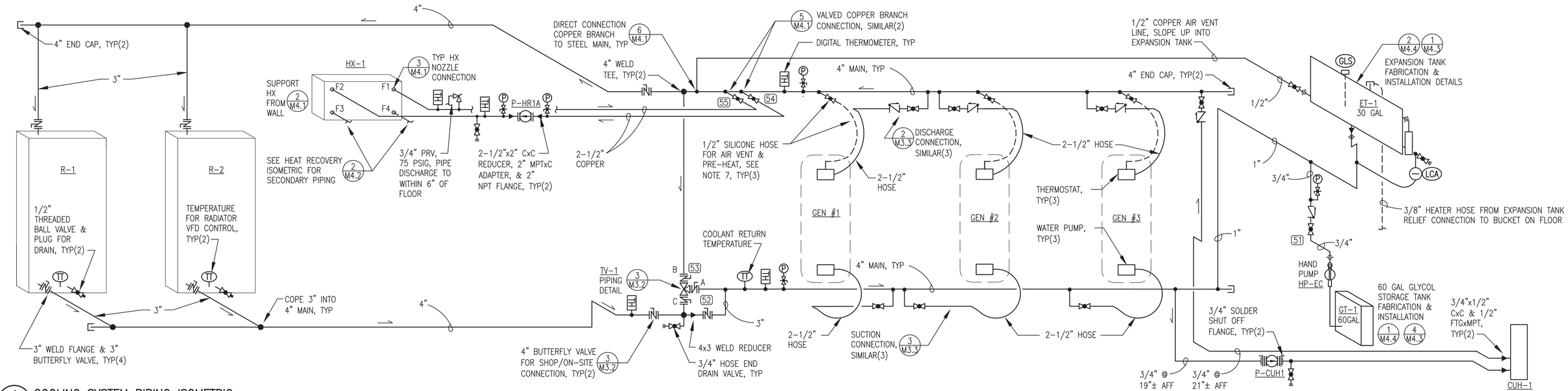
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M4.1
PROJECT NUMBER:	

COOLING SYSTEM ISOMETRIC NOTES:

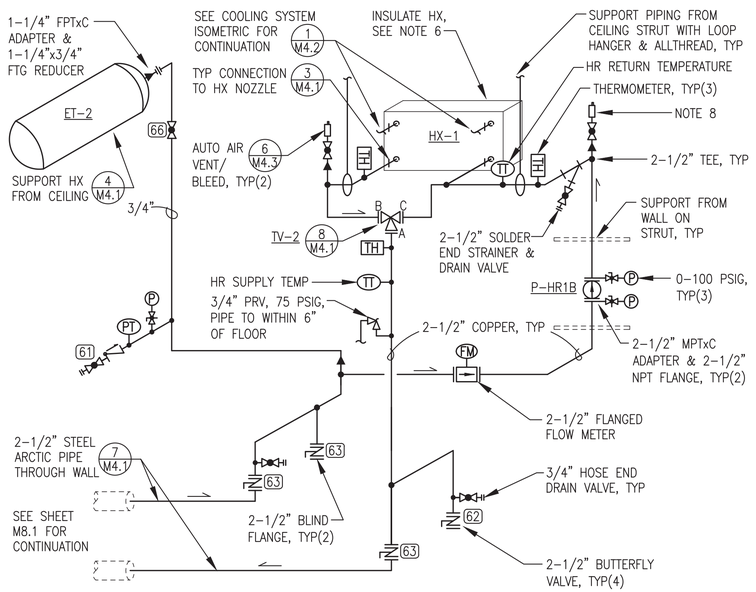
1) ALL PIPING SHOWN THIS ISOMETRIC 4" SCH 40 STEEL WITH WELDED JOINTS UNLESS SPECIFICALLY INDICATED OTHERWISE, SEE DETAIL 3/M3.2 FOR COOLING MANIFOLD DETAILS. ALL ENGINE BRANCH CONNECTIONS SCH 40 STEEL WITH WELDED AND THREADED JOINTS. ALL OTHER PIPE SHOWN THIS ISOMETRIC TYPE "L" HARD DRAWN COPPER WITH SOLDER JOINTS UNLESS SPECIFICALLY INDICATED OTHERWISE.
2) SEE COOLANT MANIFOLD FABRICATION DETAIL 3/M3.2 FOR CONNECTIONS TO STEEL MAINS. SEE DETAILS 2&3/M3.3 FOR BRANCH PIPING CONNECTIONS. SEE DETAILS 2/M4.3 FOR INSTRUMENTATION CONNECTIONS.
3) ALL COOLANT PRESSURE GAUGES 0-30 PSIG.
4) SEE ELECTRICAL INSTRUMENTATION SCHEDULE FOR TEMPERATURE TRANSMITTERS AND OTHER INSTRUMENTATION.
5) UPON COMPLETION OF FABRICATION VALVE OFF CABINET UNIT HEATER AND FLUSH PIPING TO REMOVE ALL DEBRIS, SEE SPECIFICATIONS.
6) SHOP INSULATE COOLANT PIPING MAINS FROM GENERATOR VALVES TO BUTTERFLY VALVES AT WALL PENETRATIONS. SHOP CUT & FIT INSULATION & JACKET FROM VALVES TO WALL BUT SHIP LOOSE FOR FIELD INSTALLATION. ALL OTHER PIPING NOT INSULATED.
7) 3/4" THREADED BALL VALVE, 3/4"MPTx5/8" BARB BRASS KING NIPPLE, & 1/2" HOSE FOR ENGINE VENT & PRE-HEAT.
8) SET P-HR1A TO OPERATE ON SPEED II. SET P-CUH1 TO OPERATE ON SPEED 3

HYDRONIC PIPING SHOP/ON-SITE NOTES:

1) SEE SPECIFICATION 23 21 13 FOR COOLING AND HEAT RECOVERY PIPING TESTING, FLUSHING, DRAINING, AND FILLING REQUIREMENTS.
2) SEE DETAILS 7/M4.1, 3/M4.2, AND 5/M4.3 FOR SHOP/FIELD REQUIREMENTS FOR PIPING THROUGH THE EXTERIOR WALLS.



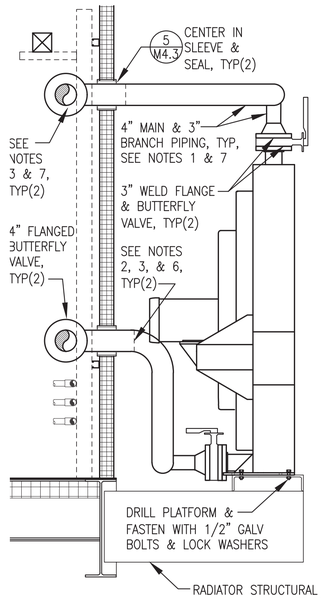
1 M4.2 COOLING SYSTEM PIPING ISOMETRIC
NO SCALE



2 M4.2 HEAT RECOVERY SYSTEM PIPING ISOMETRIC
NO SCALE

HEAT RECOVERY ISOMETRIC NOTES:

1) ALL PIPING SHOWN THIS ISOMETRIC TYPE "L" COPPER WITH SOLDER JOINTS, 2-1/2"ø 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.
4) SEE INSTRUMENTATION SCHEDULE FOR TEMPERATURE AND PRESSURE TRANSMITTERS AND FLOW METER.
5) UPON COMPLETION OF FABRICATION FLUSH PIPING TO REMOVE ALL DEBRIS, SEE SPECIFICATIONS.
6) INSULATE ALL HEAT RECOVERY PIPING MAINS. WRAP HEAT EXCHANGER WITH 1" RIGID FOIL-BACK FIBERGLASS INSULATION ALL AROUND AND TAPE ALL SEAMS.
7) SET P-HR1B TO OPERATE ON CP2.
8) RISE UP BEHIND WIREWAY FOR THIS AIR VENT CONNECTION.



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

RADIATOR SHOP/ON-SITE NOTES:

STEPS 1-2 APPLY TO SHOP FABRICATION:
1) INSTALL STRUCTURAL SUPPORT, RADIATOR, VALVES, & ALL PIPING AS INDICATED.
2) DURING SHOP FABRICATION MAKE A SINGLE PASS ROOT WELD AT ONE POINT TO ALLOW FOR REMOVAL OF RADIATORS.

STEPS 3-5 APPLY TO ON-SITE WORK INCLUDING SHIPPING PREPARATION:
3) MAKE A CLEAN SQUARE CUT THROUGH SINGLE PASS WELD. TAKE APART FLANGE AT BUTTERFLY VALVE. REMOVE PIPE THROUGH WALL & STORE IN MODULE. SEAL WALL PENETRATION FOR SHIPPING.
4) REMOVE ELECTRICAL CONNECTIONS AS INDICATED ON SHEET E3.3.
5) REMOVE COMPLETE RADIATOR ASSEMBLY INCLUDING STRUCTURAL SUPPORT & RADIATORS TO PACK FOR SHIPPING. NOTE THAT IF PIPING MANIFOLDS ARE REMOVED, BLIND FLANGE RADIATOR CONNECTIONS.
6) IN FIELD BOLT RADIATOR ASSEMBLY TO MODULE, REINSTALL PIPING SECTIONS, & MAKE FINAL PIPE WELD CONNECTIONS.
7) AFTER PRESSURE TESTING, CLEAN ALL EXTERIOR PIPING & COVER WITH TWO COATS OF COLD GALVANIZING COMPOUND. SEAL WALL PENETRATION IN ACCORDANCE WITH DETAIL.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

REVISION #1 ISSUED AUGUST 2022

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

REV.	DESCRIPTION	DATE	BY
1	REVISED TO COORDINATE WITH FINAL ON-SITE DESIGN	8/26/22	BCG

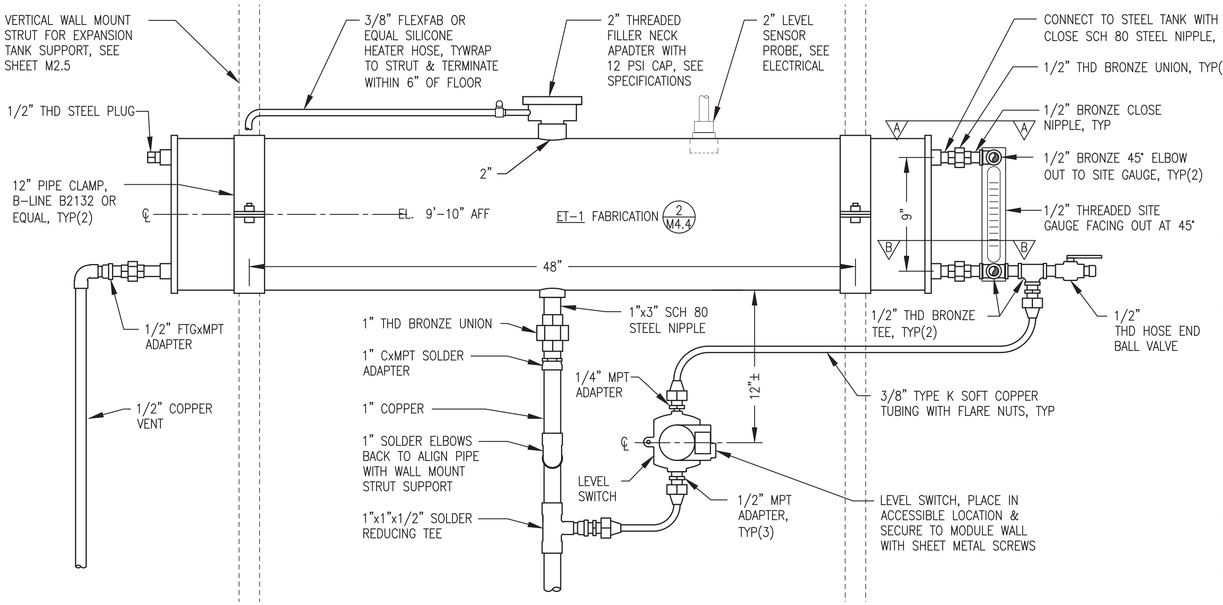
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

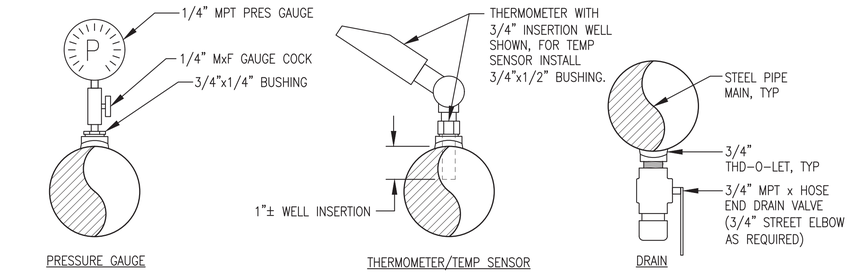
TITLE: COOLANT & HEAT RECOVERY ISOMETRICS & DETAILS

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

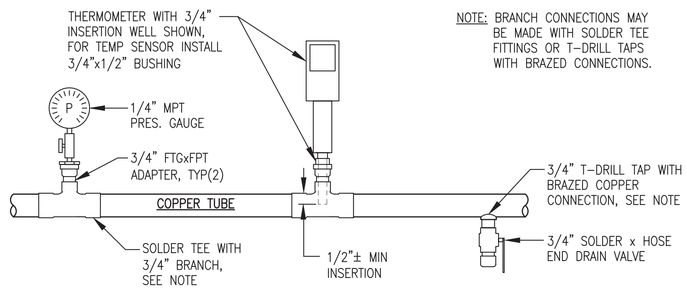
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M4.2
PROJECT NUMBER:	



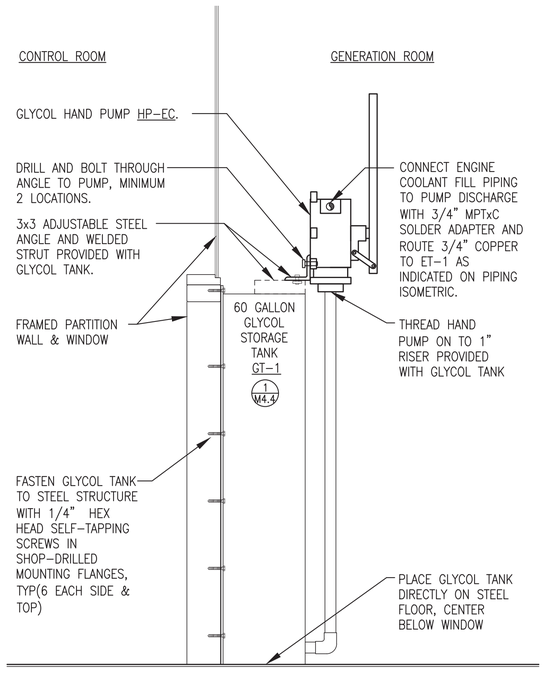
1 M4.3 **24 GAL EXPANSION TANK ET-1 INSTALLATION**
NO SCALE



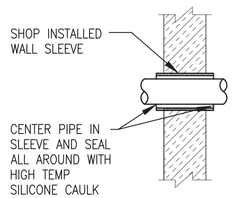
2 M4.3 **TYP INSTRUMENT/DRAIN INSTALLATION IN STEEL PIPE**
NO SCALE



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



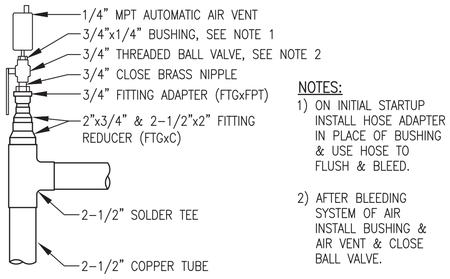
4 M4.3 **GLYCOL STORAGE TANK & HAND PUMP HP-EC INSTALLATION DETAIL**
NO SCALE



SHOP/ON-SITE NOTES:
1) SEAL OPENINGS AS PART OF ON-SITE WORK.

GENERAL NOTES:
1) THIS DETAIL FOR COOLANT PIPING WITH SHOP INSTALLED WALL SLEEVES.
2) FOR ALL PIPE/CONDUIT LESS THAN 2" O.D. AND WITHOUT A SHOP INSTALLED WALL SLEEVE, HOLE SAW OPENING APPROXIMATELY 1/4" LARGER THAN PIPE O.D. THROUGH WALL & SEAL ALL AROUND WITH POLYURETHANE CAULKING.

5 M4.3 **COOLANT PIPING WALL PENETRATION**
NO SCALE



NOTES:
1) ON INITIAL STARTUP INSTALL HOSE ADAPTER IN PLACE OF BUSHING & USE HOSE TO FLUSH & BLEED.
2) AFTER BLEEDING SYSTEM OF AIR INSTALL BUSHING & AIR VENT & CLOSE BALL VALVE.

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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: ENGINEER 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: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M4.3
PROJECT NUMBER:	

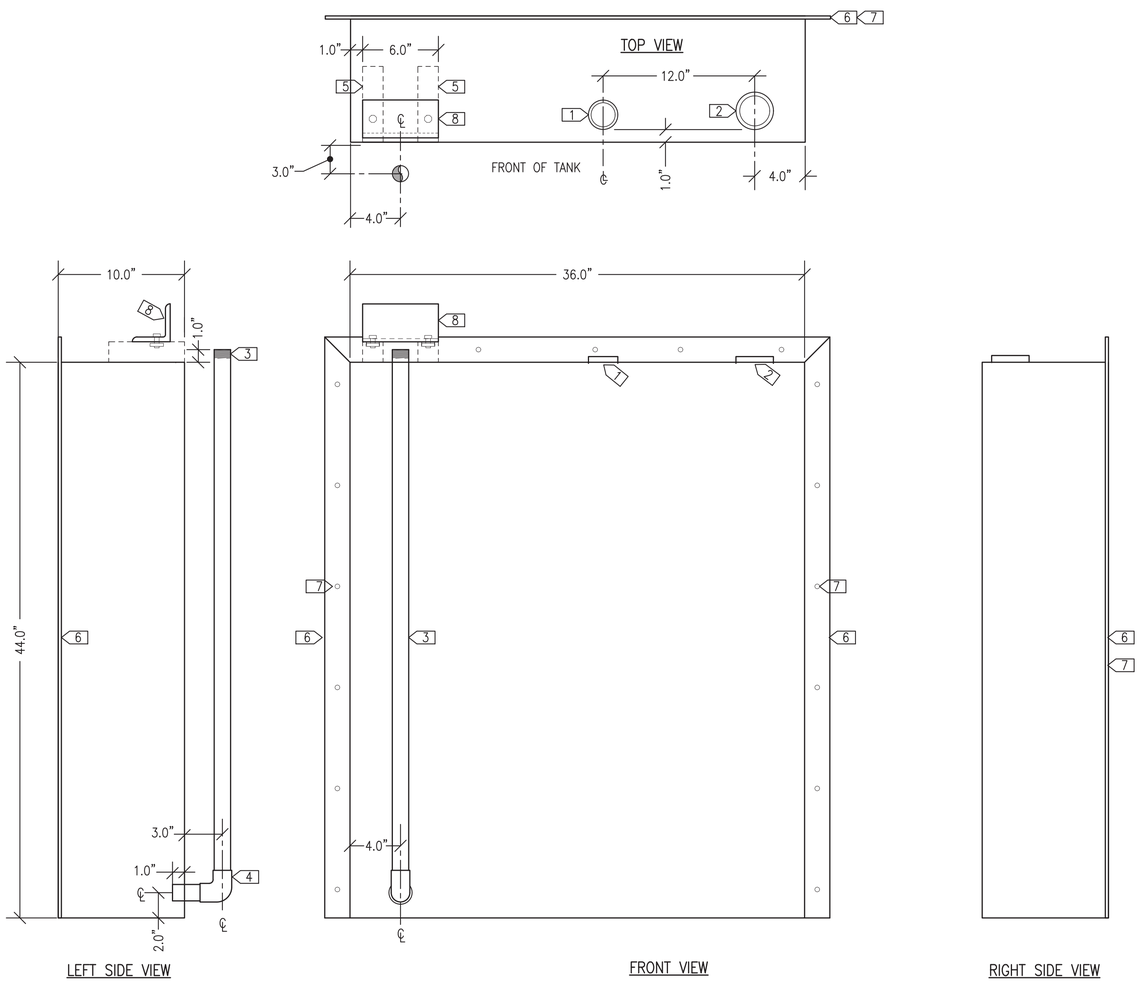
GLYCOL TANK GENERAL NOTES:

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 COVER WITH TWO COATS OF 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 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 THREE SIDES
7. 3/8" HOLE AT 8" O.C. ALL AROUND
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.

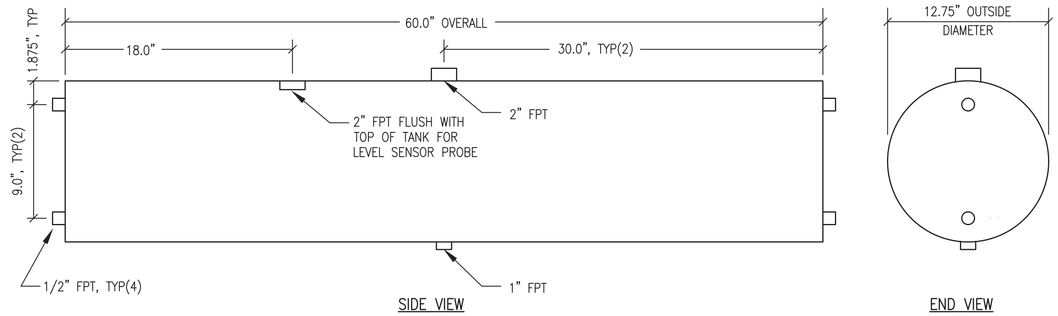
BACK OF TANK



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

EXPANSION TANK GENERAL NOTES:

1) FABRICATE SINGLE WALL 30 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. PAINT 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 30 GALLON GLYCOL EXPANSION TANK ET-1
1"=6"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION JULY 2022

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

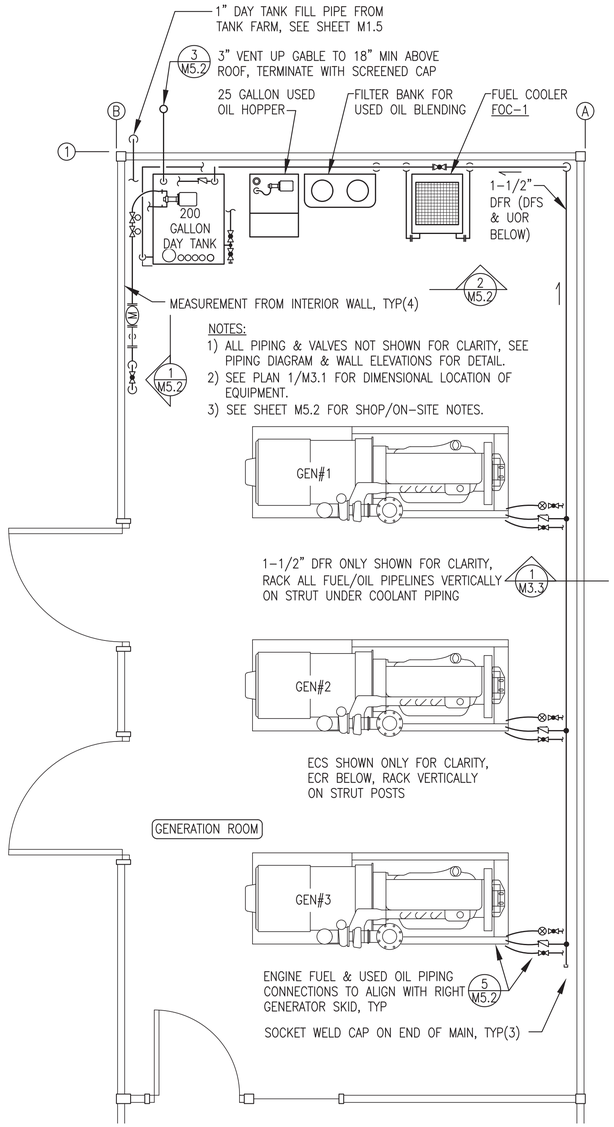
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

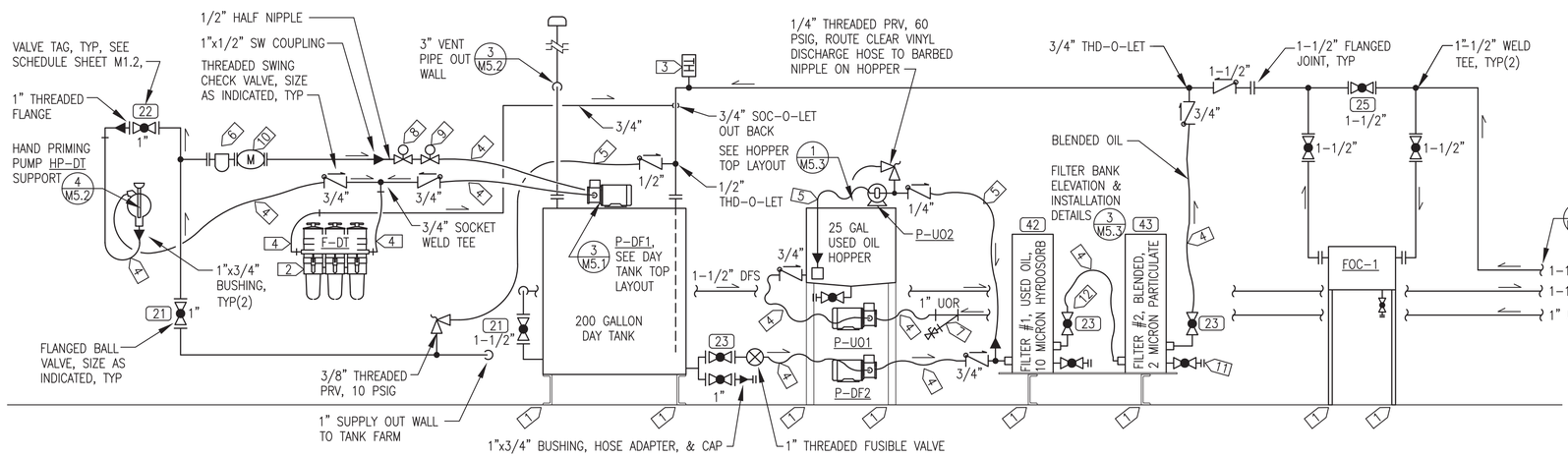
TITLE: GLYCOL STORAGE & EXPANSION TANKS FABRICATION

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M4.4
PROJECT NUMBER:	



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



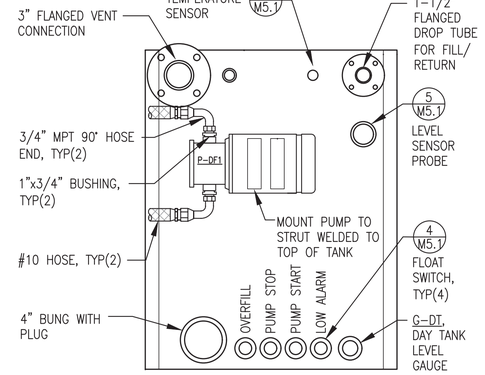
PIPING DIAGRAM SPECIFIC NOTES:

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 GAUGE COCK BLOW DOWN.
7. 1" THREADED "Y" STRAINER IN 1" UOR WITH GAUGE COCK BLOW DOWN.
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:

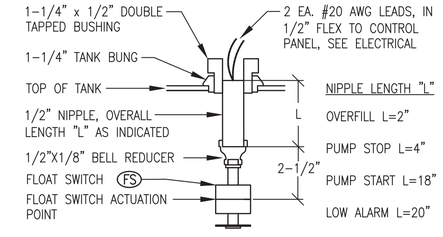
1) FABRICATE DAY TANK, FILTER BANK, & HOPPER IN ACCORDANCE WITH FABRICATION DETAILS.
2) ALL DFS, DFR & UOR PIPING SCH 80. ALL UOR 1". ALL DFS & DFR 1-1/2" EXCEPT WHERE INDICATED AS 3/4". ALL VENT PIPING 3" SCH 40.
3) ALL DFS, DFR & UOR PIPING JOINTS SOCKET OR BUTT WELD EXCEPT FOR THREADED CONNECTIONS TO EQUIPMENT & VALVES. ALL VENT PIPING JOINTS THREADED.
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



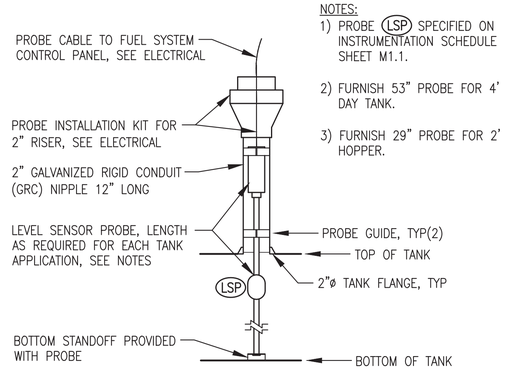
3 M5.1 TOP OF DAY TANK – PLAN VIEW
NO SCALE

NOTES:
1) FLOAT SWITCH (FS) SPECIFIED ON INSTRUMENTATION SCHEDULE SHEET M1.1.
2) PRIOR TO INSTALLATION CHASE THREADS ON FLOAT SWITCH WITH 1/8" PIPE DIE TO CLEAN OFF ANY EXCESS EPOXY, USE CARE TO AVOID DAMAGING WIRES.

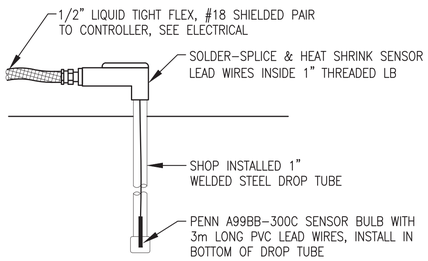


4 M5.1 DAY TANK FLOAT SWITCH INSTALLATION
NO SCALE

NOTES:
1) PROBE (LSP) SPECIFIED ON INSTRUMENTATION SCHEDULE SHEET M1.1.
2) FURNISH 53" PROBE FOR 4' DAY TANK.
3) FURNISH 29" PROBE FOR 2' HOPPER.



5 M5.1 TYPICAL LEVEL SENSOR PROBE INSTALLATION
NO SCALE



6 M5.1 COOLER TEMPERATURE SENSOR INSTALLATION
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION JULY 2022

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

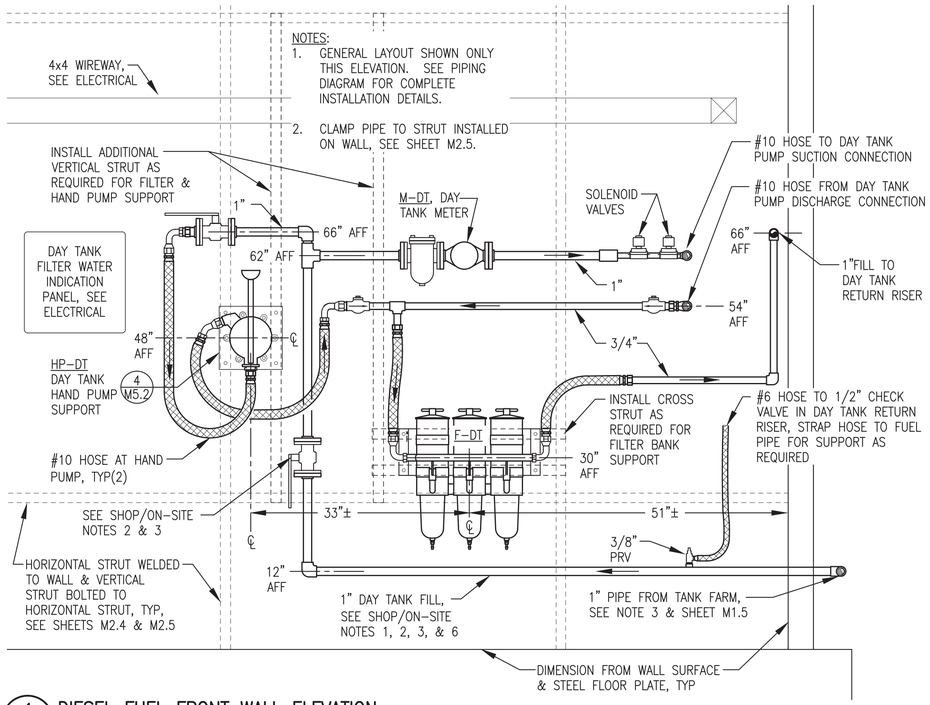
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

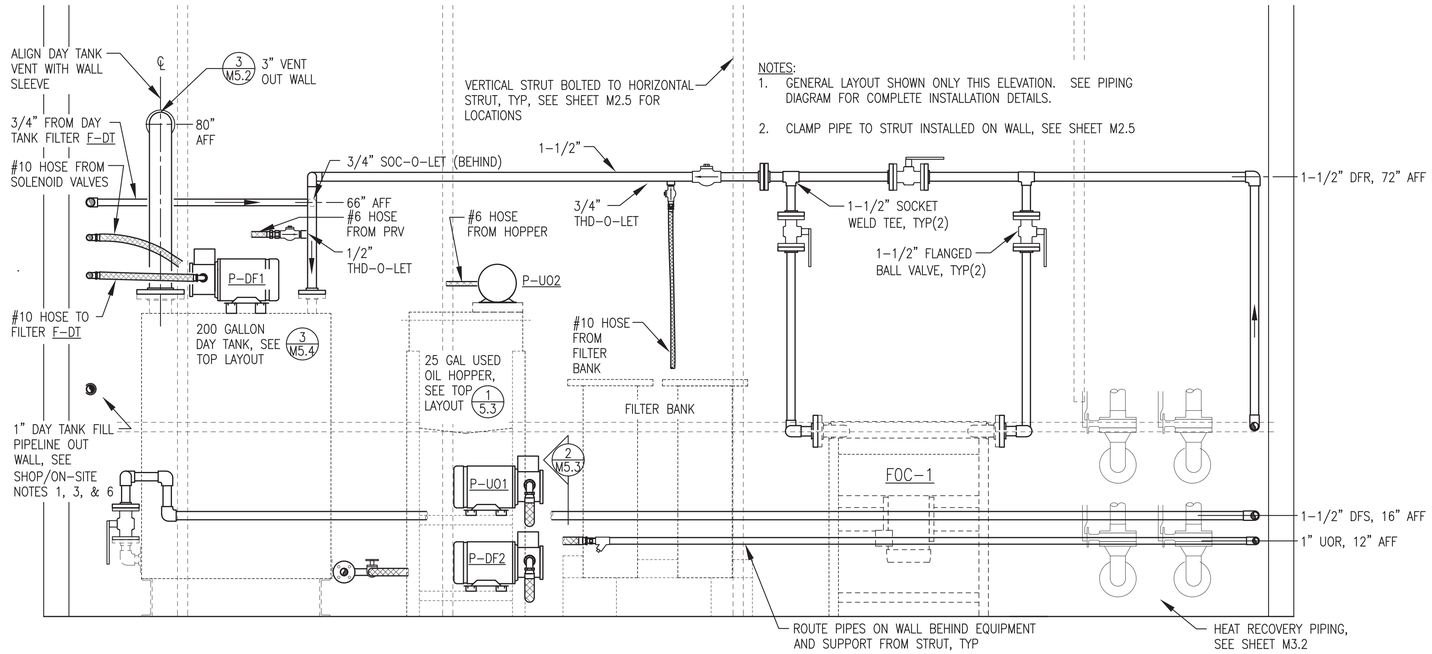
TITLE: DIESEL FUEL & USED OIL PIPING PLAN, DIAGRAM, & DETAILS

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

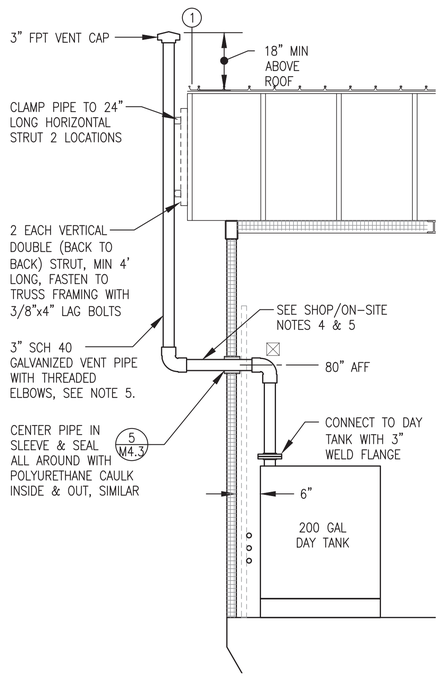
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M5.1
PROJECT NUMBER:



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



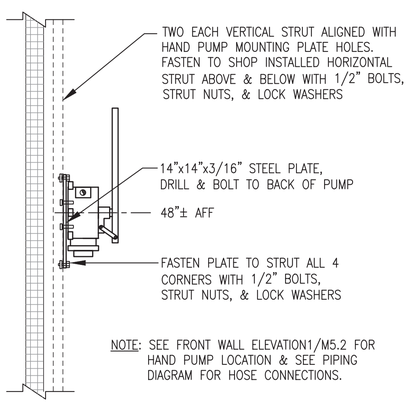
2 M5.2 DIESEL FUEL & USED OIL END WALL ELEVATION
1"=1'



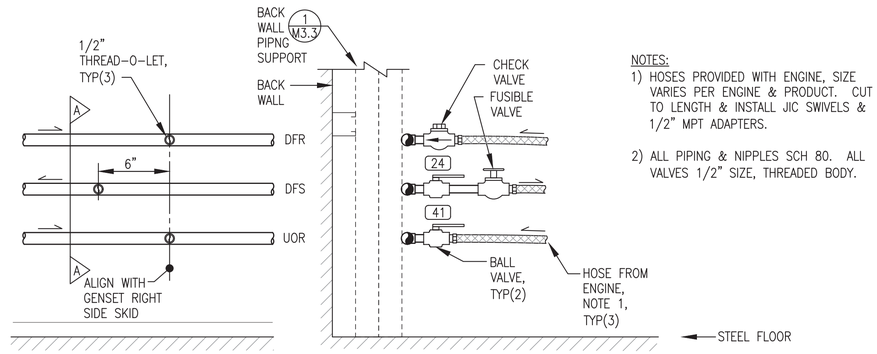
3 M5.2 DAY TANK VENT INSTALLATION
1/2"=1'-0"

FUEL SHOP/ON-SITE NOTES:

1. DURING SHOP FABRICATION HOLE SAW 1-1/2"ø OPENING FOR DAY TANK FILL PIPE, STUB PIPE 12" MIN BEYOND WALL, & TERMINATE WITH 1" MALE THREAD FOR TESTING.
2. UPON COMPLETION OF TESTING CLOSE VALVE, DRAIN PIPE, DISCONNECT FLANGE FROM VALVE THEN SLIDE PIPE OVER & SECURE FOR SHIPPING. SEAL WALL OPENING.
3. AS PART OF ON-SITE INSTALLATION REINSTALL FILL PIPE THEN CUT THREADS OFF EXTERIOR END & INSTALL SOCKET WELD ELBOW.
4. DURING SHOP FABRICATION INSTALL TEMPORARY VENT PIPE OUT WALL. UPON COMPLETION OF TESTING REMOVE TEMPORARY PIPE & SEAL WALL OPENING FOR SHIPPING.
5. AS PART OF ON-SITE INSTALLATION INSTALL 3" GALVANIZED THREADED VENT PIPE OUT WALL & UP TO VENT CAP. SEE DETAIL 3/M5.2. AT CONTRACTOR'S OPTION VENT PIPE MAY HAVE WELD JOINTS & CARBON STEEL WELD ELBOWS. AFTER FABRICATION CLEAN & COAT WITH COLD GALVANIZING COMPOUND.
6. UPON FINAL ON-SITE ASSEMBLY SEAL 1" FILL PIPE TO EXTERIOR WALL & 3" VENT PIPE TO WALL SLEEVE WITH POLYURETHANE CAULKING ALL AROUND.



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



BACK WALL ELEVATION

SIDE ELEVATION

5 M5.2 ENGINE FUEL PIPING CONNECTION
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

ISSUED FOR CONSTRUCTION
JULY 2022

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

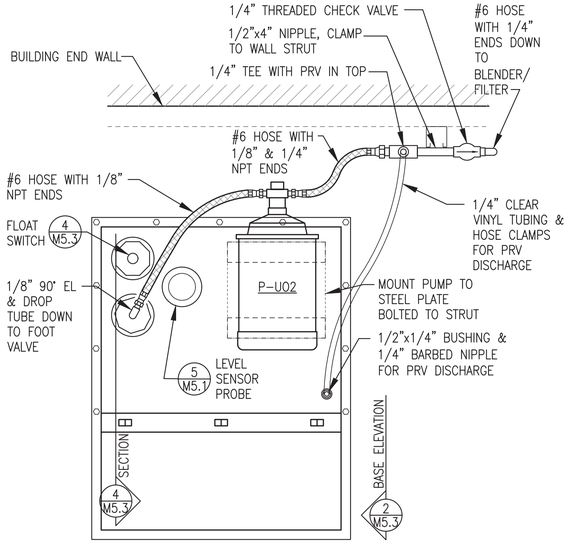
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

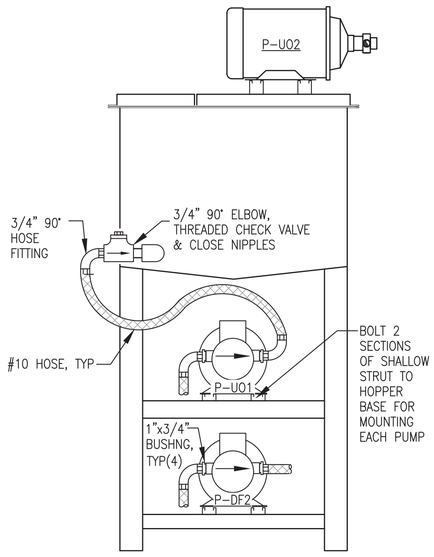
TITLE: DIESEL FUEL & USED OIL PIPING ELEVATIONS & DETAILS

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

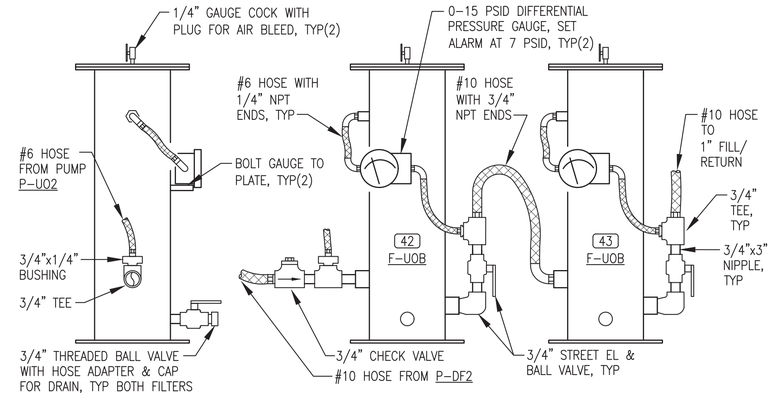
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M5.2
PROJECT NUMBER:



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



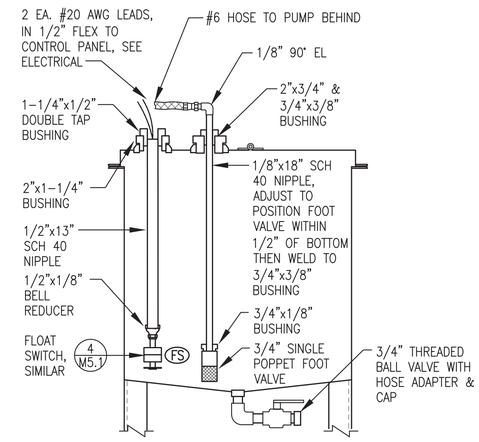
2 M5.3 HOPPER BASE ELEVATION
NO SCALE



FILTER #1 INLET SIDE ELEVATION

FRONT ELEVATION

3 M5.3 FILTER BANK ELEVATIONS
NO SCALE



4 M5.3 SECTION THROUGH HOPPER
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

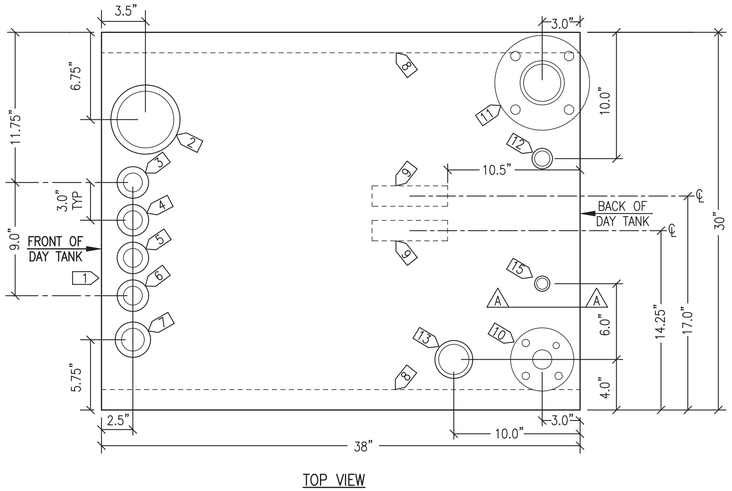
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK 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: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M5.3
PROJECT NUMBER:	



TOP VIEW

DAY TANK SPECIFICATIONS:

1) FABRICATE SINGLE WALL 200 GALLON NOMINAL CAPACITY DAY TANK. FABRICATE IN ACCORDANCE WITH UL 142.

2) FABRICATE FROM ASTM A-36 STEEL PLATE, 10 GAUGE MINIMUM EXCEPT FOR TOP 3/16" MINIMUM. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS IN ACCORDANCE WITH UL 142 FIGURE 6.5 – #1, #6, #7, OR #8.

3) PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. ALL STRUT TO BE 1-5/8"x1-5/8"x12 GA SOLID BACK PLAIN (BLACK), B-LINE B22 PLN OR EQUAL. SEAL WELD ALL TANK ATTACHMENTS.

4) INSTALL ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 – #4 UNLESS INDICATED OTHERWISE. ALL DROP TUBES SCH 40 ASTM A53 STEEL PIPE WITH MPT OR FLANGED END AS INDICATED.

5) PRESSURE TEST COMPLETED ASSEMBLY TO 5 PSIG MAXIMUM USING SOAPY WATER SOLUTION ON ALL WELD JOINTS.

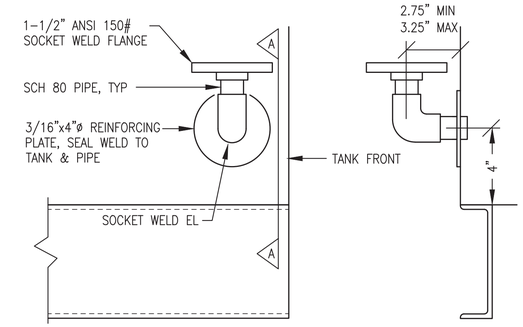
6) UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.

7) LABEL ALL OPENINGS WITH 1/4" BLACK LETTERS INDICATING FUNCTION AS LISTED IN PARENTHESES IN SPECIFIC NOTES.

8) UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS AND AIR DRY INTERIOR. SEAL ALL MPT OPENINGS WITH THREADED STEEL CAPS. SEAL FPT TANK OPENINGS WITH THREADED STEEL PIPE PLUGS WHERE INDICATED. INSTALL 1-1/4" VENT CAP WHERE INDICATED. SEAL ALL OTHER FPT OPENINGS WITH PLASTIC OR STEEL PLUGS.

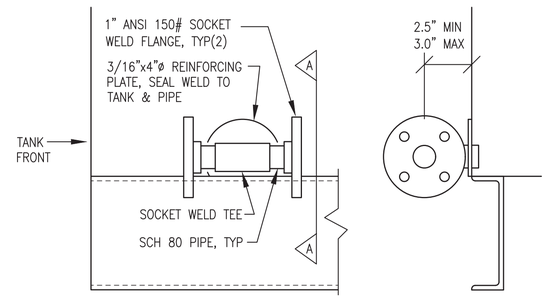
DAY TANK SPECIFIC NOTES:

1. PROVIDE 2" HIGH LETTERING: "DIESEL FUEL 200 GALLONS"
2. 4" FPT (MANUAL FILL) – INSTALL THREADED STEEL PLUG
3. 1-1/4" FPT (OVERFILL) – INSTALL VENT CAP FOR SHIPPING
4. 1-1/4" FPT (PUMP STOP)
5. 1-1/4" FPT (PUMP START)
6. 1-1/4" FPT (LOW ALARM)
7. 1-1/2" FPT (TANK GAUGE)
8. 38"L STRUT, ENDS FLUSH WITH TANK
9. 6"L STRUT
10. 1-1/2" 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
15. 1" MPT FOR TEMPERATURE SENSING



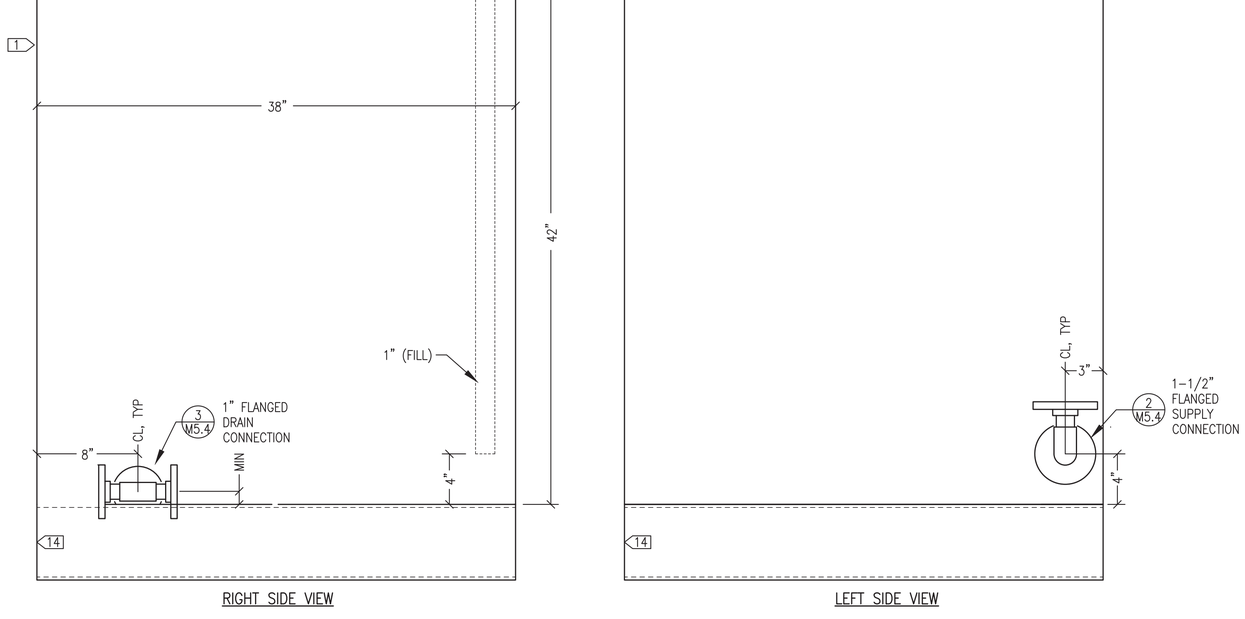
LEFT SIDE ELEVATION SECTION A-A

2 M5.4 **1-1/2" FLANGED SUPPLY CONNECTION**
NO SCALE



RIGHT SIDE ELEVATION SECTION A-A

3 M5.4 **1" FLANGED DRAIN CONNECTION**
NO SCALE



RIGHT SIDE VIEW LEFT SIDE VIEW PARTIAL SECTION A-A

1 M5.5 **200 GALLON SINGLE WALL DAY TANK**
1"=6"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION JULY 2022

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

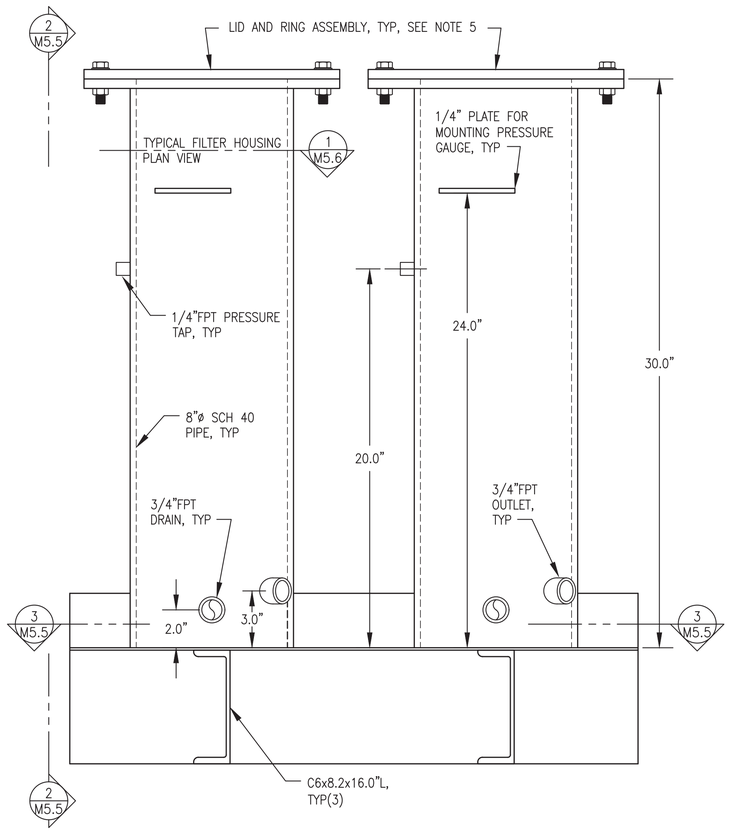
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

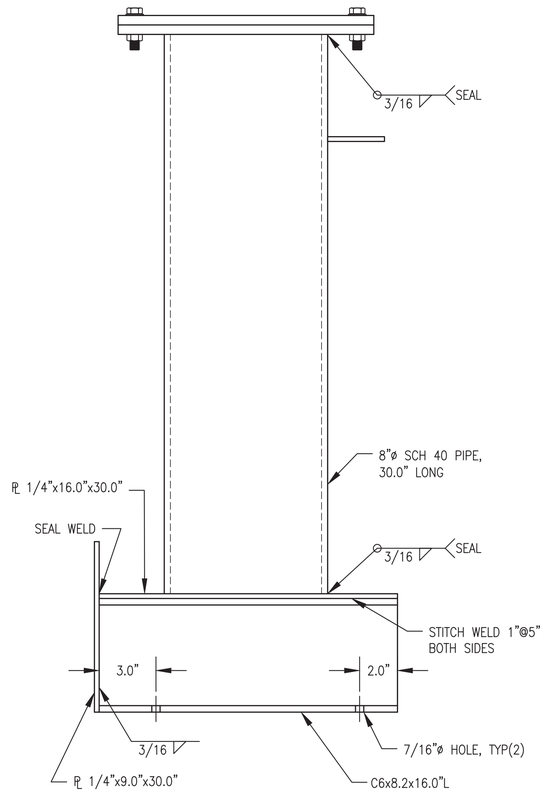
TITLE: 200 GALLON DAY TANK FABRICATION

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

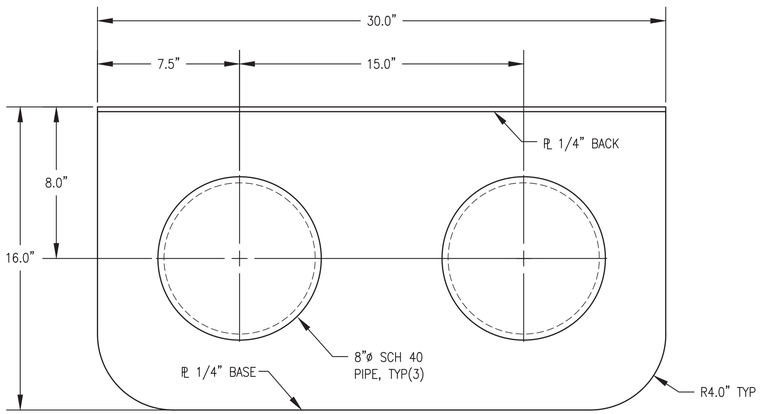
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M5.4
PROJECT NUMBER:	



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.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

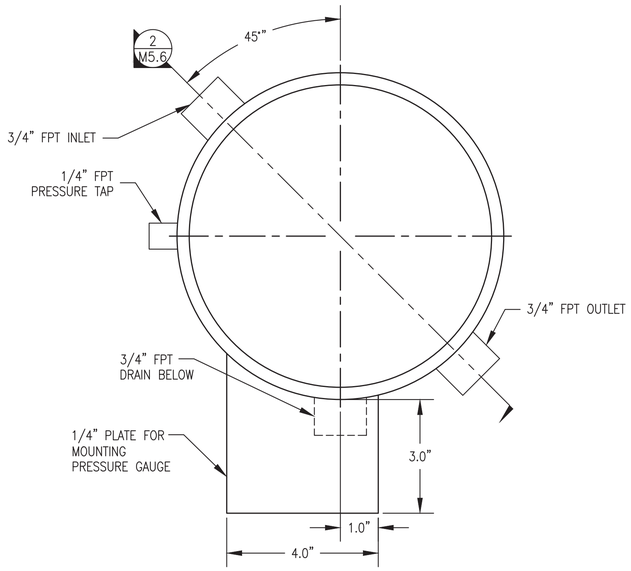
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

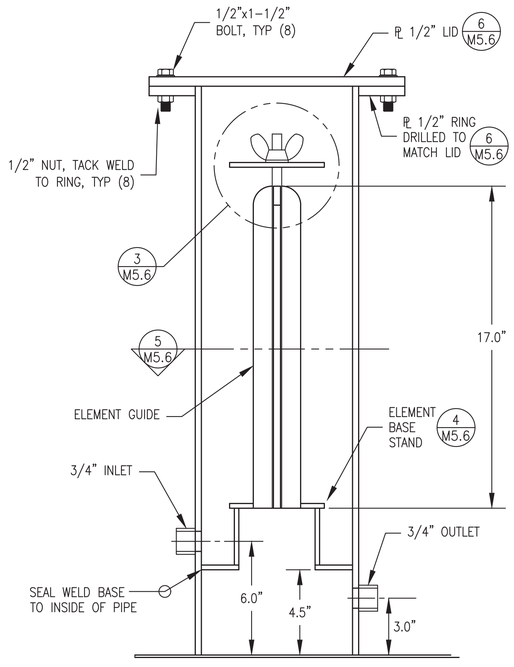
TITLE: USED OIL BLENDER
FILTER BANK LAYOUT & CONFIGURATION

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

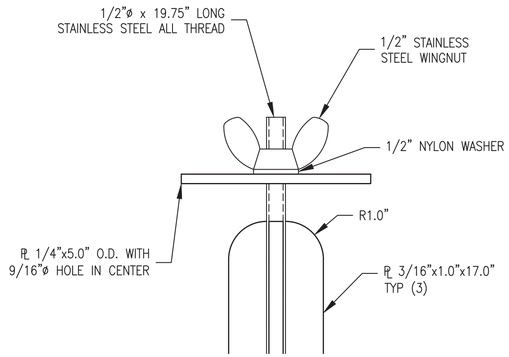
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2–7	SHEET: M5.5
PROJECT NUMBER:	



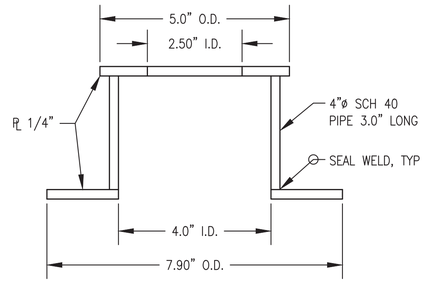
1 M5.6 TYPICAL FILTER HOUSING – PLAN VIEW
1/2" = 1"



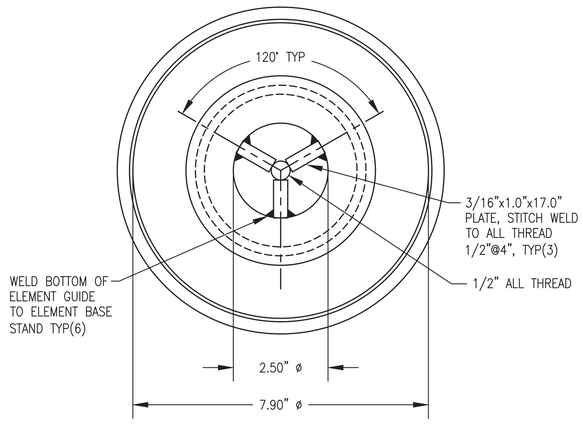
2 M5.6 TYPICAL SECTION THROUGH FILTER HOUSING
1/4" = 1"



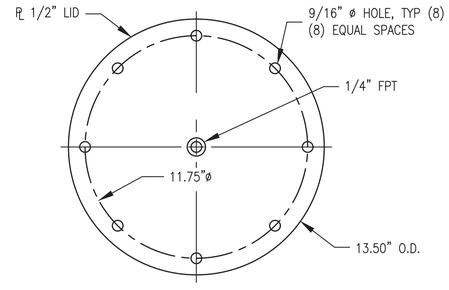
3 M5.6 ELEMENT RETAINER CAP
1/2" = 1"



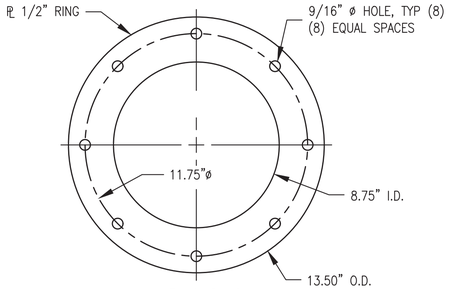
4 M5.6 ELEMENT BASE STAND
1/2" = 1"



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



LID



MATING RING

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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION JULY 2022

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

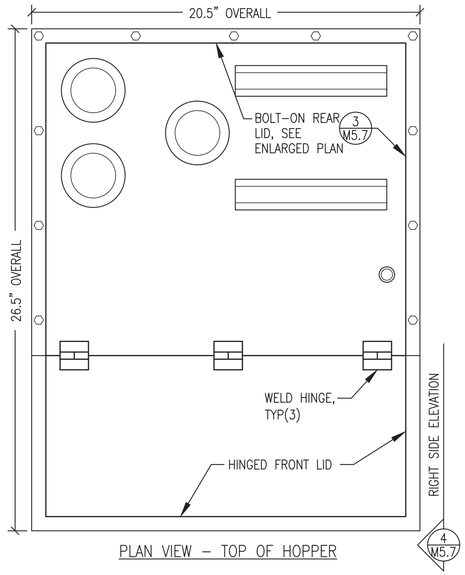
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

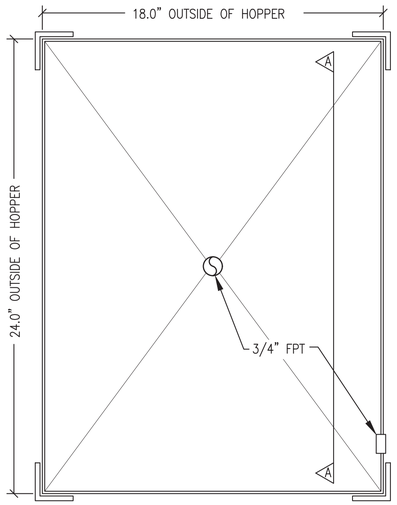
TITLE: USED OIL BLENDER
TYPICAL FILTER HOUSING DETAILS

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

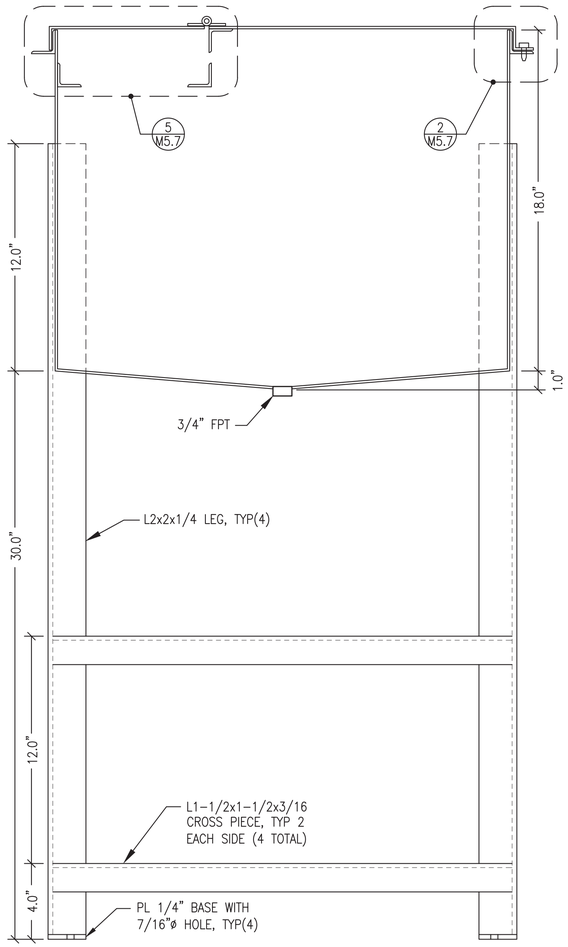
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M5.6
PROJECT NUMBER:



PLAN VIEW – TOP OF HOPPER



PLAN VIEW – BOTTOM OF HOPPER



SECTION A–A

1 M5.7 HOPPER PLAN & SECTION
3"=1'-0"

FABRICATION NOTES:

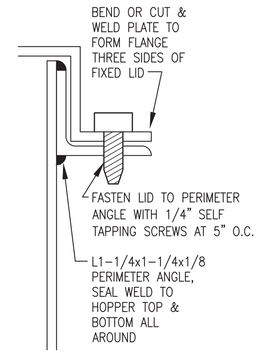
1) FABRICATE SINGLE WALL 25 GALLON USABLE CAPACITY HOPPER.

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.

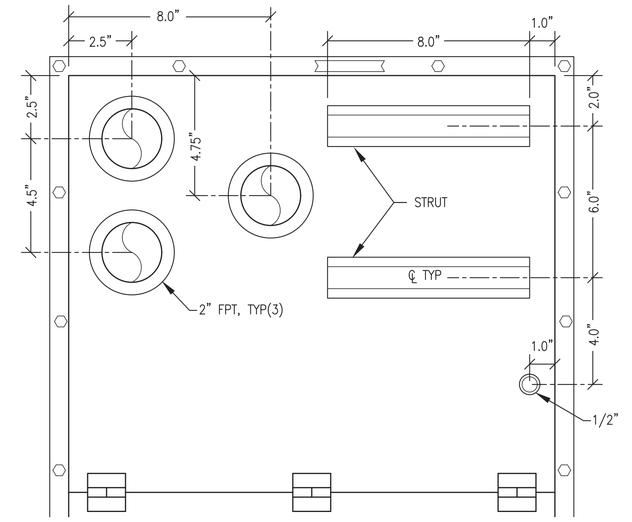
3) PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. INSTALL ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 – #1, #2, #4, OR #6. ALL STRUT TO BE 1-5/8"x1-5/8"x12 GA SOLID BACK PLAIN (BLACK), B-LINE B22 PLN OR EQUAL. FURNISH ALL FASTENERS AS INDICATED.

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.

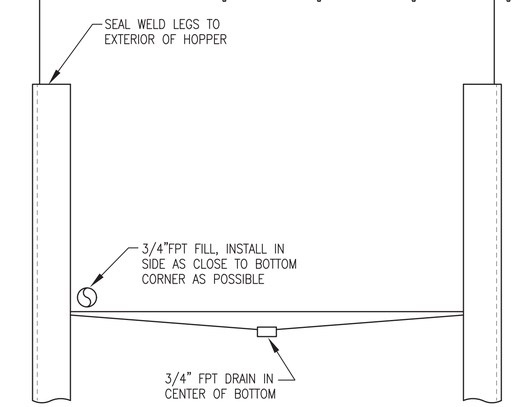
5) PRIOR TO SHIPPING, SEAL ALL FPT OPENINGS WITH PLASTIC OR STEEL PLUGS.



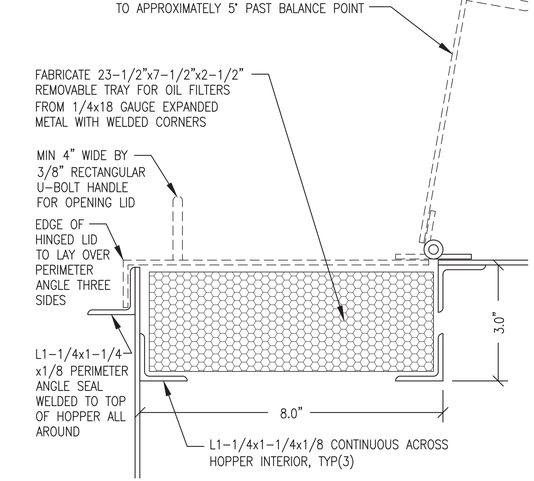
2 M5.7 FIXED LID PERIMETER ATTACHMENT
12"=1'-0"



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



4 M5.7 HOPPER RIGHT SIDE ELEVATION
3"=1'-0"



5 M5.7 HINGED LID & FILTER TRAY DETAIL
6"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

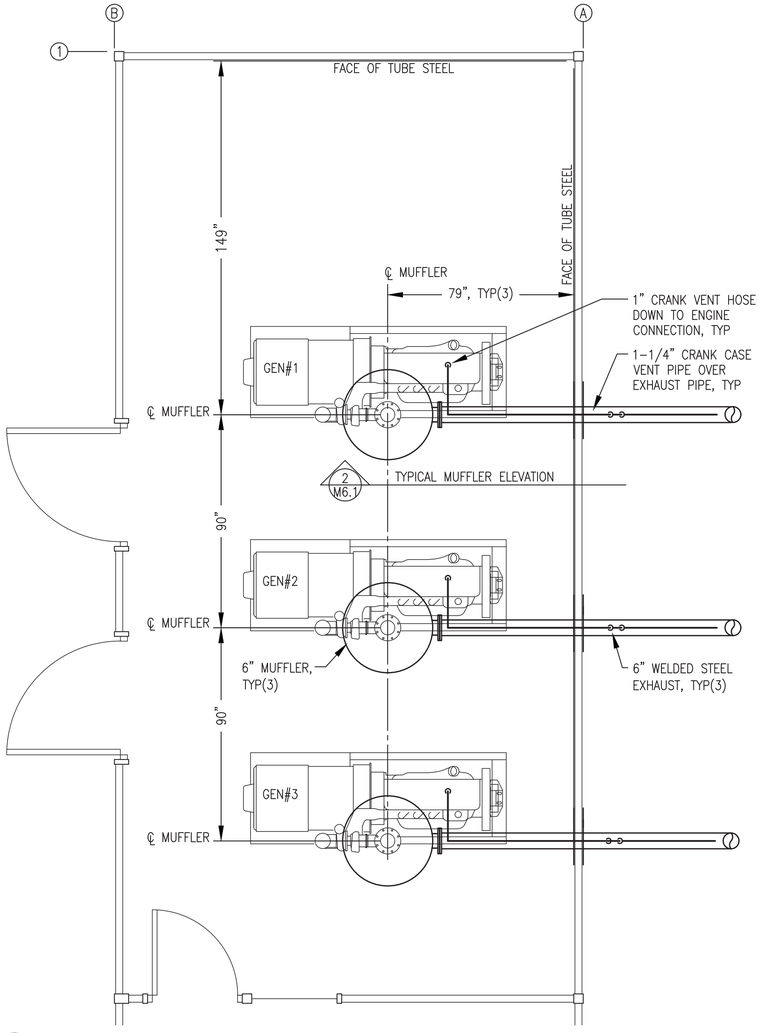
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: USED OIL BLENDER
25 GALLON HOPPER FABRICATION

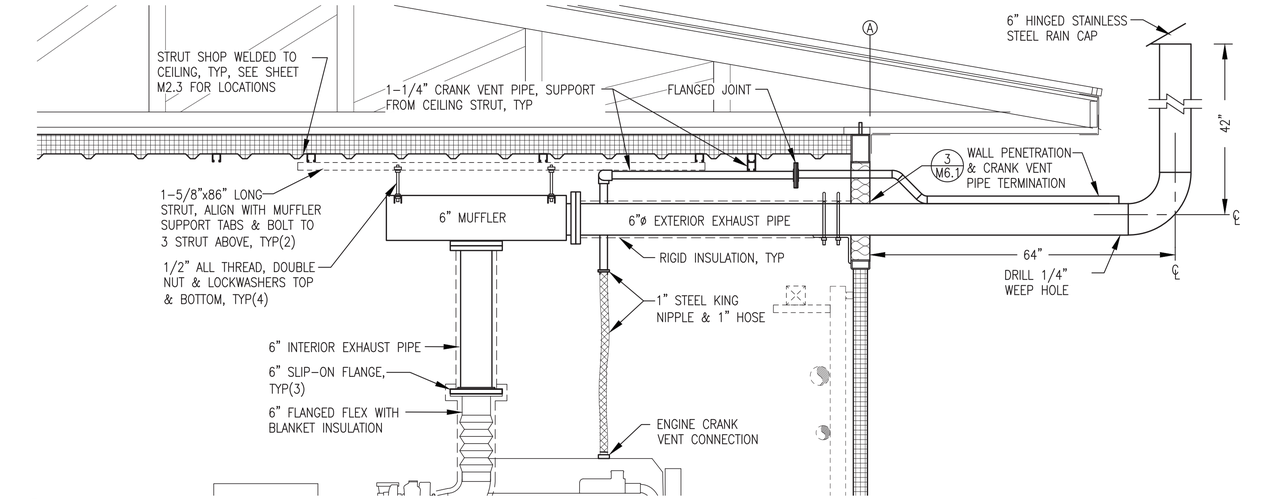
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M5.7
PROJECT NUMBER:



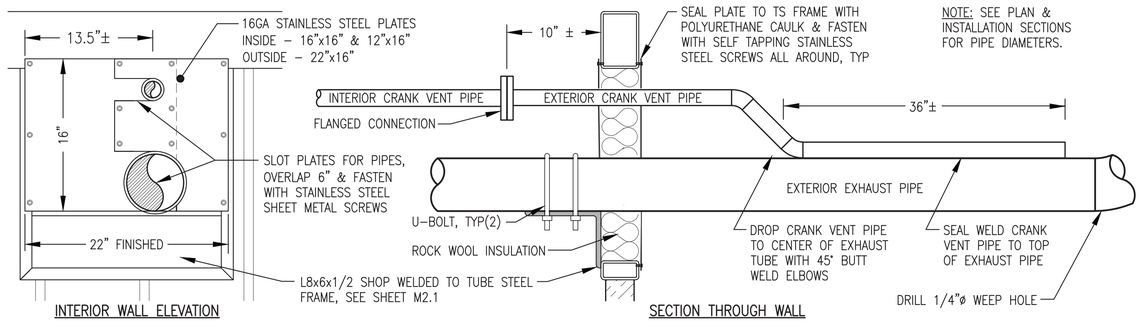
1 M6.1 MUFFLER, EXHAUST & CRANK VENT PIPE PLAN

3/8"=1'-0"



2 M6.1 TYPICAL MUFFLER, EXHAUST, AND CRANK VENT PIPE INSTALLATION

3/4"=1'-0"



3 M6.1 WALL PENETRATION & CRANK VENT PIPE TERMINATION

NO SCALE

EXHAUST & CRANK VENT GENERAL NOTES:

1) THE MAXIMUM EXHAUST TEMPERATURE FOR THE ENGINES IS LESS THAN 1400°F. THE WALLS AND CEILING ARE NON-COMBUSTIBLE CONSTRUCTION CONSISTING OF STEEL WITH HIGH TEMPERATURE ROCKWOOL INSULATION.

2) ALL EXTERIOR EXHAUST PIPE AND FITTINGS (FROM MUFFLER TO RAIN CAP) TYPE 304L STAINLESS STEEL WITH BUTT WELD FITTINGS. INTERIOR EXHAUST PIPE RISER (FROM FLEX TO MUFFLER) CARBON STEEL OR MAY BE STAINLESS AT CONTRACTORS OPTION. ALL FLANGES ANSI 150# FLAT FACED SLIP ON.

3) ALL EXTERIOR CRANK VENT PIPE AND FITTINGS TYPE 304L STAINLESS STEEL WITH BUTT WELD FITTINGS. ALL INTERIOR CRANK VENT PIPE AND FITTINGS CARBON STEEL WITH SOCKET WELD FITTINGS OR MAY BE STAINLESS AT CONTRACTORS OPTION. ALL FLANGES ANSI 150# RAISED FACE SOCKET WELD.

4) ALL EXHAUST FLANGE BOLTS BLACK OR STAINLESS STEEL. COAT WITH HIGH TEMPERATURE ANTI-SIEZE COMPOUND. ALL EXHAUST FLANGE GASKETS HIGH TEMPERATURE FULL FACE.

EXHAUST & CRANK VENT SHOP/ON-SITE NOTES:

1) SHOP FABRICATE COMPLETE EXHAUST AND CRANK VENT PIPING SYSTEM AS INDICATED.

2) SHOP INSTALL BLANKET INSULATION ON FLEX AND RIGID INSULATION FROM FLEX TO MUFFLER. SHOP FIT INSULATION FROM MUFFLER TO WALL, LABEL FOR THE ASSOCIATED GENERATOR AND STORE INSIDE MODULE.

3) SHOP FABRICATE STAINLESS STEEL COVER PLATES BUT DO NOT INSTALL. LABEL COVER PLATES FOR THE ASSOCIATED GENERATOR AND STORE INSIDE MODULE. SHOP FURNISH ROCK WOOL INSULATION AND PACKAGE LOOSE SHIP WITH COVER PLATES.

4) UPON COMPLETION OF TESTING BREAK EXHAUST FLANGE JOINT ON MUFFLER OUTLET AND CRANK VENT FLANGE JOINT AND REMOVE U-BOLTS. REMOVE PIPING FOR SHIPPING AND TEMPORARILY SEAL WALL PENETRATION.

5) IN FIELD REINSTALL PIPING WITH NEW FLANGE GASKETS. RE-INSTALL PIPING INSULATION. INSULATE WALL PENETRATION, INSTALL COVER PLATES, AND SEAL TO WALL.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ ON SITE NOTES.

REVISION #1
ISSUED
JULY 2023

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

REV.	DESCRIPTION	DATE	BY
1	REVISED TO ALIGN EXHAUST WITH MODIFIED MARINE TURBO MOUNTING	7/5/22	BCG

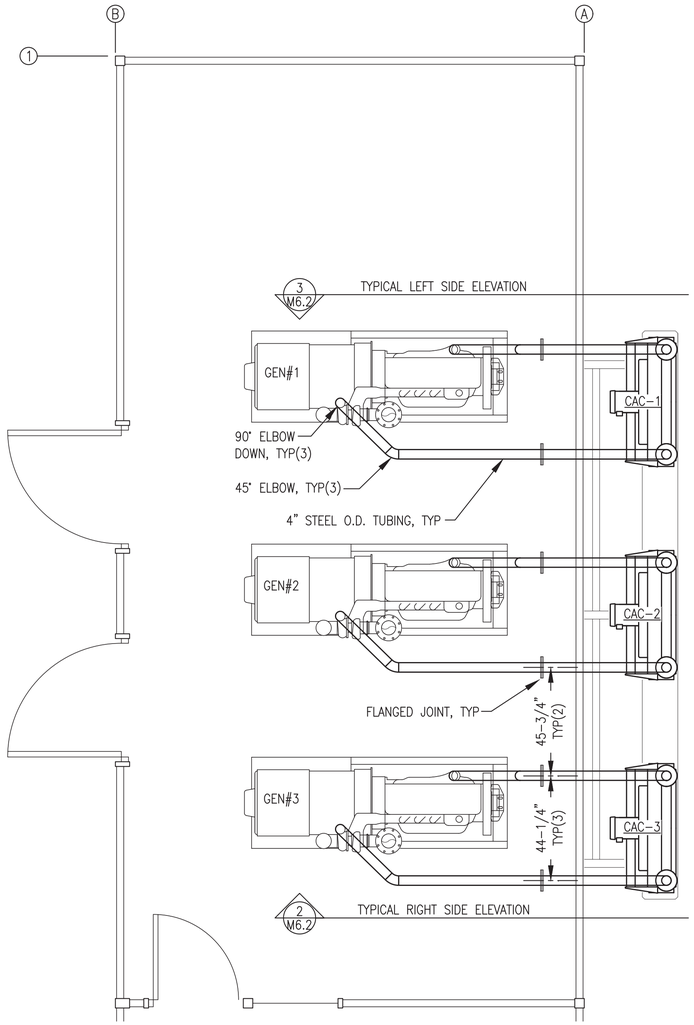
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

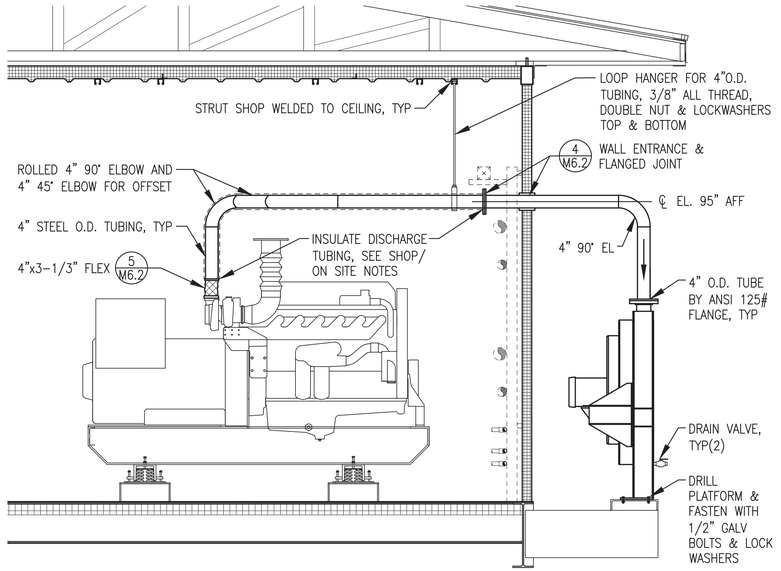
TITLE: EXHAUST & CRANK VENT PLAN & DETAILS

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

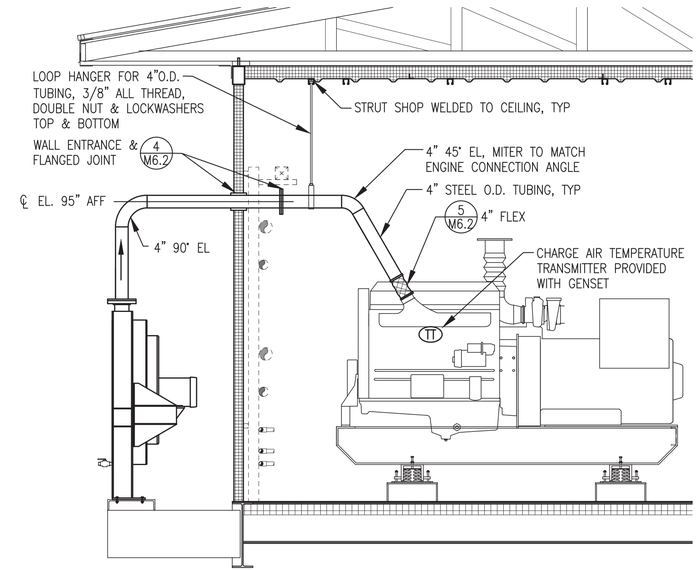
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M6.1
PROJECT NUMBER:



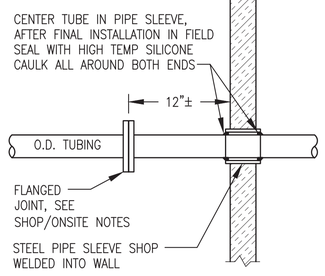
1 M6.2 CHARGE AIR PLAN
3/8"=1'-0"



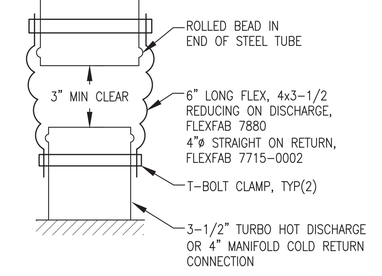
2 M6.2 TYPICAL GENERATOR CHARGE AIR RIGHT SIDE (DISCHARGE) ELEVATION
1/2"=1'-0"



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



4 M6.2 TUBING WALL PENETRATION
NO SCALE



5 M6.2 CHARGE AIR FLEX CONNECTION
NO SCALE

CHARGE AIR SYSTEM GENERAL NOTES:

1) ALL TUBING TO BE LIGHT WALL CARBON STEEL O.D. TUBING. ALL ELBOWS TO BE LONG RADIUS SWEEP FITTINGS TO MATCH TUBING. ALL JOINTS TO BE WELDED EXCEPT AS INDICATED.

2) MAKE COOLER CONNECTIONS AND FLANGED JOINTS WITH O.D. TUBE BY ANSI 125# STEEL PLATE FLANGES, G.T. EXHAUST OR EQUAL.

3) ALL CHARGE AIR FLANGE GASKETS HIGH TEMPERATURE FULL FACE. ALL CHARGE AIR FLANGE BOLTS GALVANIZED STEEL. COAT WITH HIGH TEMPERATURE ANTI-SIEZE COMPOUND.

4) ALL FLEX CONNECTIONS HIGH TEMPERATURE DOUBLE HUMP SILICONE TURBO SLEEVES WITH RINGS. SEE DETAILS FOR SPECIFIC DESCRIPTIONS & PART NUMBERS. FASTEN WITH STAINLESS STEEL T-BOLT CLAMPS.

CHARGE AIR SYSTEM SHOP/ON-SITE NOTES:

1) ALL CHARGE AIR SYSTEM COMPONENTS TO BE FURNISHED AND INSTALLED AS PART OF MODULE SHOP FABRICATION INCLUDING ADDITIONAL FLANGES, GASKETS, AND BOLTS FOR ON-SITE INSTALLATION.

2) AS PART OF MODULE SHOP FABRICATION PAINT ALL TUBING AND FLANGES WITH COLD GALVANIZING COMPOUND. AS PART OF ON SITE WORK RE-COAT WELD AREAS AND OTHER DEFECTS.

3) DURING SHOP FABRICATION RUN TUBING CONTINUOUS FROM COOLER TO ENGINE.

4) AS PART OF BREAK DOWN FOR SHIPPING CUT TUBING 12" INSIDE WALL AT LOCATION OF FLANGE JOINT, BREAK FLANGE JOINT ON COOLER, REMOVE INTERIOR AND EXTERIOR TUBING, AND TEMPORARILY SEAL WALL PENETRATION FOR SHIPPING.

5) AS PART OF ON SITE WORK REINSTALL ALL TUBING, INSTALL NEW FLANGE JOINT AT CUT, INSTALL NEW HIGH TEMPERATURE FULL FACE GASKETS AT NEW JOINT AND AT COOLER, AND COAT WELD AREA THEN SEAL WALL PENETRATION.

6) AS PART OF ON SITE WORK INSULATE INTERIOR CHARGE AIR DISCHARGE TUBING FROM FLEX AT ENGINE TO FLANGE AT WALL PENETRATION.

7) AS PART OF ON SITE WORK FURNISH AND INSTALL 1/2" THREADED BALL VALVE IN COOLER AND PLUG FOR TANK DRAIN, 2 PER COOLER.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

ISSUED FOR CONSTRUCTION
JULY 2022

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

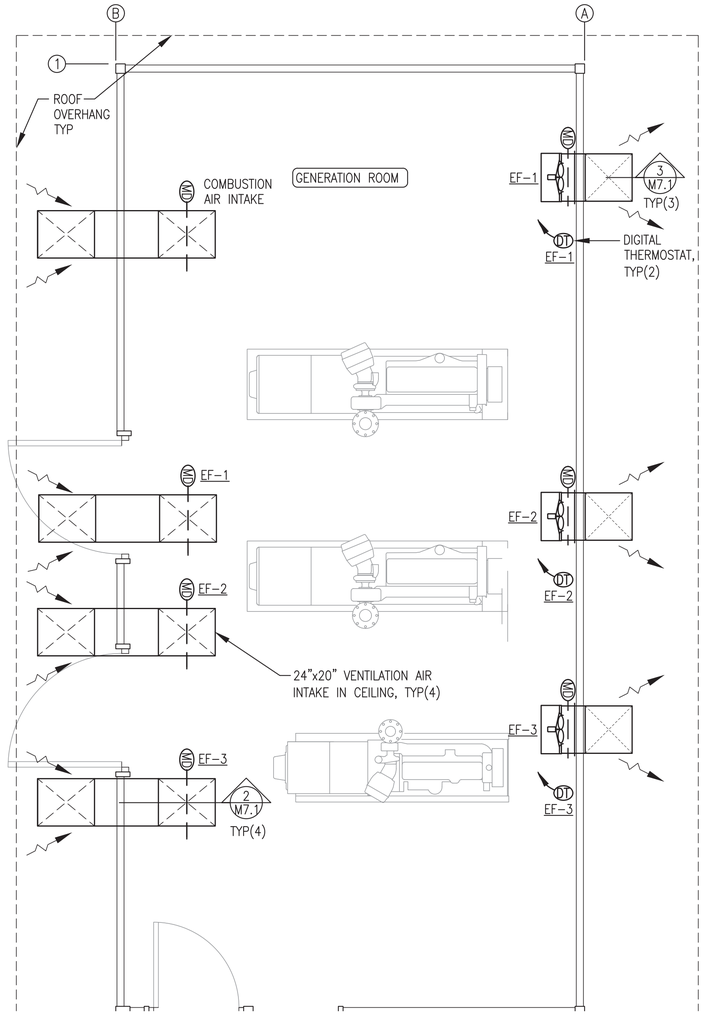
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

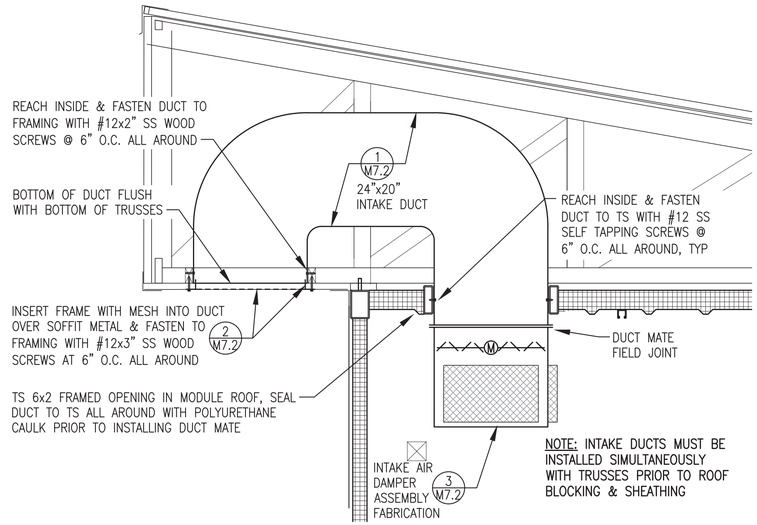
TITLE: CHARGE AIR SYSTEM PLAN, ELEVATIONS, & DETAILS

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

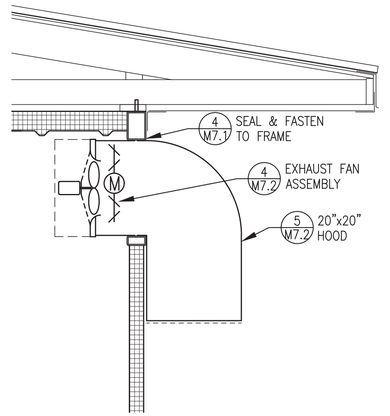
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/29/22
FILE NAME: NAPS PP M2-7	SHEET: M6.2
PROJECT NUMBER:	



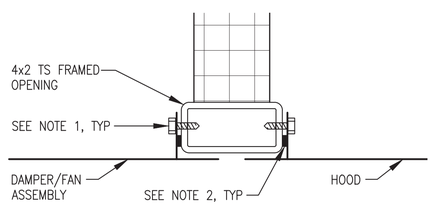
1 M7.1 VENTILATION PLAN
3/8"=1'-0"



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



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



NOTES:

1) FASTEN MOUNTING FLANGE TO TS WITH #12 STAINLESS STEEL SELF TAPPING SCREWS. ON HOODS FASTEN ON TOP AND SIDES ONLY. ON EXHAUST FANS FASTEN ON SIDES ONLY.
2) SEAL MOUNTING FLANGE TO TS WITH CONTINUOUS BEAD OF POLYURETHANE CAULKING ALL AROUND.

4 M7.1 TYPICAL WALL PENETRATION
4"=1'-0"

VENTILATION SYSTEM SHOP/ON-SITE NOTES:

1) FURNISH ENTIRE VENTILATION SYSTEM AS PART OF MODULE SHOP FABRICATION.
2) DURING SHOP FABRICATION INSTALL EXHAUST FAN ASSEMBLIES. TEST FIT EXTERIOR HOODS AND INTAKE DUCTS BUT DO NOT INSTALL.
3) DURING SHOP FABRICATION TEMPORARILY CONNECT INTAKE DAMPERS TO ELECTRICAL ROUGH IN AND TEST TO VERIFY FUNCTION. SEE SHEET E4.2.
4) AS PART OF ON-SITE WORK INSTALL EXHAUST HOODS AND INTAKE DUCTING AS INDICATED.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

ISSUED FOR CONSTRUCTION JULY 2022

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

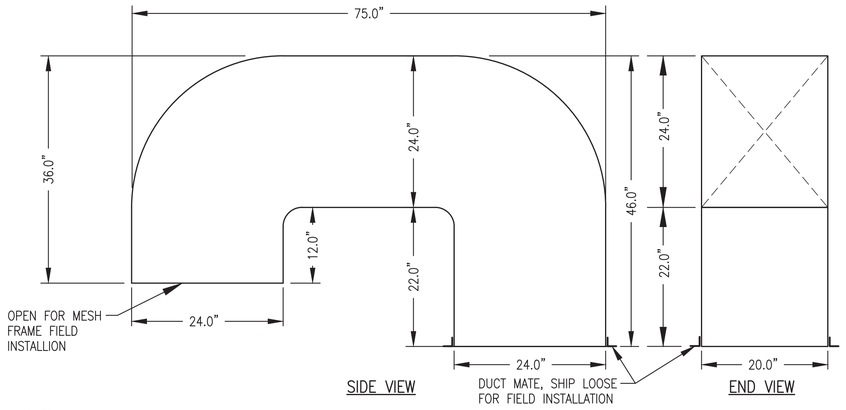
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: VENTILATION PLAN & DETAILS

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

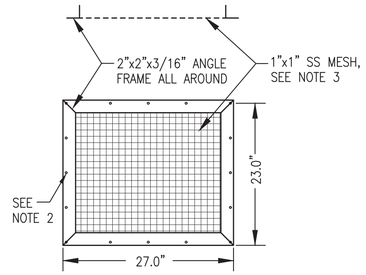
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M7.1
PROJECT NUMBER:



NOTES:

1) FABRICATE 4 IDENTICAL DUCTS 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) DUCTS ARE DESIGNED TO FIELD INSTALL BETWEEN TRUSSES. FABRICATE IN ONE PIECE AS INDICATED. DO NOT ADD JOINTS.

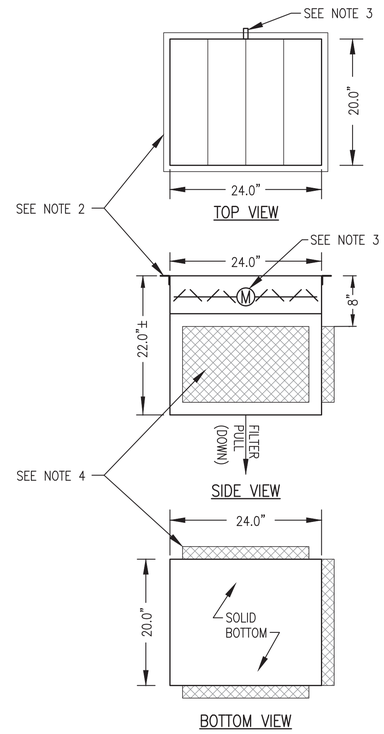
1 M7.2 INTAKE DUCT FABRICATION
1"=1'-0"



NOTES:

1) FABRICATE 3 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.

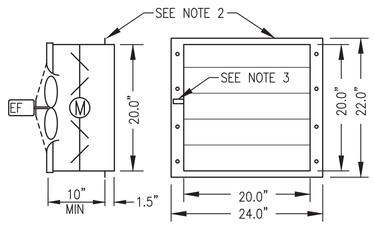
2 M7.2 INTAKE MESH FRAME
1"=1'-0"



NOTES:

1) FABRICATE 4 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. SEE PLAN VIEW FOR DAMPER ACTUATOR ORIENTATION.
4) INSTALL FRAME FOR REMOVABLE 20"x12"x2" MERV 8 FILTERS. FABRICATE FROM "C" CHANNEL THREE SIDES WITH LATCHING HINGED COVER ON BOTTOM TO ALLOW FILTERS TO SLIDE DOWN FOR REMOVAL. ON 20" SIDE EXTEND FILTER FRAME BEYOND DUCT EACH WAY AS REQUIRED.

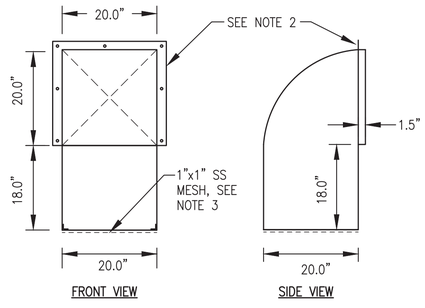
3 M7.2 INTAKE AIR DAMPER FABRICATION
1"=1'-0"



NOTES:

1) FABRICATE 3 IDENTICAL ASSEMBLIES COMPLETE WITH FAN AND DAMPER MOUNTED AND SEALED TO DUCT.
2) PROVIDE 2" WIDE MOUNTING FLANGE ON SIDES WITH 1/4" HOLES AT 5" O.C. PROVIDE 1" MOUNTING FLANGE ON TOP AND BOTTOM WITHOUT HOLES.
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 M7.2 EXHAUST FAN ASSEMBLY FABRICATION
1"=1'-0"



NOTES:

1) FABRICATE 3 IDENTICAL HOODS FROM 0.090" THICK TYPE 5052 ALUMINUM WITH ALL WELDED SEAMS.
2) PROVIDE 2" WIDE MOUNTING FLANGE ON TOP & SIDES WITH 1/4" HOLES AT 9" O.C.
3) INSTALL 1"x1" STAINLESS STEEL WIRE MESH IN HEMMED STAINLESS STEEL FRAME AND FASTEN TO ANGLE FRAME WITH STAINLESS STEEL SCREWS ALL AROUND.

5 M7.2 EXHAUST HOOD FABRICATION
3/4"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR

ISSUED FOR CONSTRUCTION JULY 2022

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

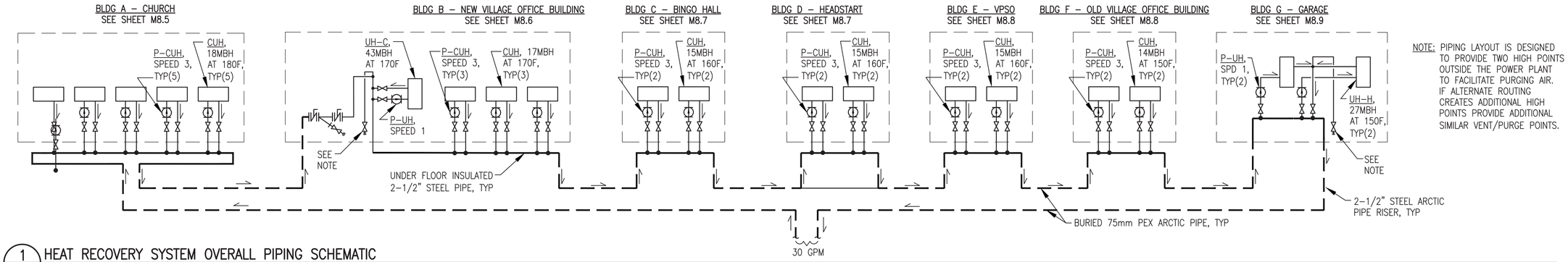
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: SHEET METAL FABRICATION & DETAILS

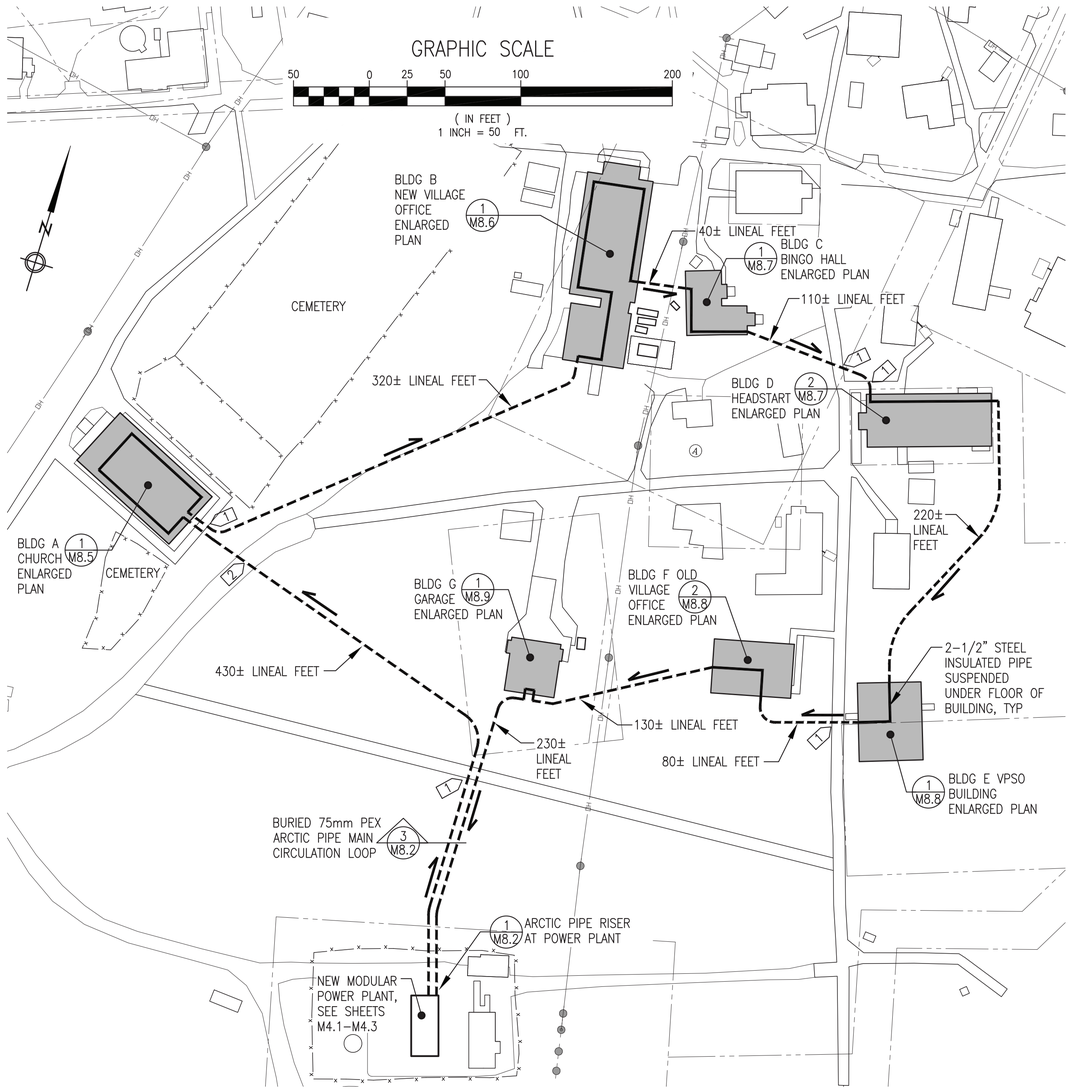
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/29/22
FILE NAME: NAPS PP M2-7 | SHEET: M7.2
PROJECT NUMBER:



NOTE: PIPING LAYOUT IS DESIGNED TO PROVIDE TWO HIGH POINTS OUTSIDE THE POWER PLANT TO FACILITATE PURGING AIR. IF ALTERNATE ROUTING CREATES ADDITIONAL HIGH POINTS PROVIDE ADDITIONAL SIMILAR VENT/PURGE POINTS.

1 M8.1 HEAT RECOVERY SYSTEM OVERALL PIPING SCHEMATIC
NO SCALE



2 M8.1 HEAT RECOVERY SYSTEM OVERALL PLAN
1"=50'

END USER BUILDING HEAT RECOVERY EQUIPMENT SCHEDULE:

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
CUH	OCCUPIED SPACE HEAT	WALL MOUNTED HOT WATER CABINET UNIT HEATER, 17 MBH AT 1 GPM 180F EWT & 60F EAT	TOYOTOMI HC–190 WITH WALL MOUNT BRACKET
UH–C UH–H	SHOP/STORAGE SPACE HEAT	HORIZONTAL DISCHARGE HOT WATER UNIT HEATER, 60.2 MBH AT 6.3 GPM 200F EWT AND 60F EAT, 1/12HP, 120V, 1ø	MODINE HC–86–S–01
P–CUH	CABINET UNIT HEATER CIRC PUMP	1 GPM AT 18' TDH, 1/25HP, 115V, 1ø. WITH 3/4" NPT SHUT OFF FLANGE & 1/2" SOLDER COMPANION FLANGE	GRUNDFOS UPS 15–58FC SPEED 3
P–UH	UNIT HEATER CIRC PUMP	5 GPM AT 4' TDH, 1/25HP, 115V, 1ø. PROVIDE WITH 3/4" SOLDER COMPANION FLANGES	GRUNDFOS UPS 15–58FC SPEED 1

NOTE: UNIT HEATER AND CABINET UNIT HEATER RATINGS ON SCHEDULE ARE BASED ON WATER AT STANDARD TEMPERATURE. RATINGS SHOWN ON SCHEMATIC ARE REDUCED FOR 50% GLYCOL AT REDUCED TEMPERATURE.

HEAT RECOVERY SYSTEM FILLING, FLUSHING, AND PURGING PROCEDURES:

A. AFTER PRESSURE TESTING ALL PIPING, BLEED AIR RESERVOIR ON THE EXPANSION TANK IN THE MODULE AS REQUIRED TO MAINTAIN 10 PSIG RESIDUAL WITH THE SYSTEM EMPTY.

B. AT END USER BUILDINGS, CLOSE ISOLATION VALVES AT EACH UNIT HEATER AND CABINET UNIT HEATER TO ENSURE NO FLOW THROUGH THE HEATER COILS PRIOR TO FILLING SYSTEM. VERIFY THAT THE CABINET UNIT HEATER HOSES ARE NOT CONNECTED TO HEATERS.

C. FILL THE ENTIRE HEAT RECOVERY PIPING SYSTEM WITH PROPYLENE GLYCOL SOLUTION TO 20 PSIG MINIMUM WITH SYSTEM COLD. VENT AIR FROM ALL HIGH POINT VENTS PRIOR TO STARTING CIRCULATING PUMPS. NOTE THAT HIGH POINT BLEEDS ARE LOCATED IN THE MODULE AND IN BUILDINGS B AND G.

D. CYCLE MAIN HEAT RECOVERY LOOP CIRC PUMP P–HR1B ON AND OFF AND VENT HIGH POINTS UNTIL ALL AIR HAS BEEN PURGED FROM THE MAIN PIPING LOOP. USE HOSES AND BUCKETS TO PURGE AND CAPTURE SALVAGED GLYCOL.

E. ADD PROPYLENE GLYCOL SOLUTION AS REQUIRED TO MAINTAIN 20 PSIG MINIMUM WITH SYSTEM COLD. WITH DIESEL GENERATOR(S) RUNNING, START THE HEAT RECOVERY SYSTEM PRIMARY AND SECONDARY CIRCULATION PUMPS P–HR1A AND P–HR1B. BRING THE ENTIRE HEAT RECOVERY SYSTEM UP TO NORMAL TEMPERATURE (170°F MINIMUM) AND ADD PROPYLENE GLYCOL SOLUTION AS REQUIRED TO BRING SYSTEM PRESSURE TO 30 PSIG MINIMUM AT EXPANSION TANK.

F. CIRCULATE HOT GLYCOL FOR 24 HOURS MINIMUM THEN SHUT PUMPS OFF. ISOLATE AND CLEAN PIPING STRAINERS WHICH ARE LOCATED IN THE MODULE AND IN BUILDING B. AFTER CLEANING STRAINERS OPEN STRAINER ISOLATION VALVES.

G. IN BUILDINGS B AND G USE HOSES AND BUCKETS TO PURGE AIR AND DEBRIS FROM HIGH POINT BLEEDS THEN OPEN BRANCH PIPING VALVES TO UNIT HEATERS. SET THE PUMPS TO THE SPECIFIED SPEED, OPEN THE ISOLATION VALVES, AND TURN UP THE THERMOSTAT TO START THE ASSOCIATED CIRC PUMP. CYCLE UNIT HEATER PUMPS ON AND OFF AND VENT BLEED FITTING UNTIL ALL AIR HAS BEEN PURGED AND CAPTURE SALVAGED GLYCOL.

H. GO TO EACH CABINET UNIT HEATER IN THE SYSTEM. PLACE THE CABINET UNIT HEATER HOSES IN A BUCKET AND CRACK VALVES TO PURGE AIR AND DEBRIS. BLEED A MINIMUM OF 1 GALLON FROM EACH HOSE TO ENSURE BRANCH PIPING IS COMPLETELY FLUSHED AND CAPTURE SALVAGED GLYCOL. RAISE HOSE ENDS AND CRACK VALVES TO FILL HOSES WITH FLUID THEN MAKE FINAL CONNECTION TO THE CABINET UNIT HEATERS. USING THERMOSTAT CONTROL, CYCLE CABINET UNIT HEATER PUMPS ON AND OFF AND VENT BLEED FITTINGS ON TOP OF CABINET UNIT HEATERS.

I. WHEN THE ENTIRE SYSTEM COMES UP TO NORMAL TEMPERATURE (170°F MINIMUM) ADD PROPYLENE GLYCOL SOLUTION AS REQUIRED TO BRING SYSTEM PRESSURE TO 30 PSIG MINIMUM AT EXPANSION TANK.

J. VERIFY PROPER FUNCTION OF ALL INSTRUMENTATION AND CALIBRATE ALL DEVICES. VERIFY POWER PLANT HEAT RECOVERY READINGS ON SWITCHGEAR SCADA SYSTEM.

K. GO THROUGH THE ENTIRE SYSTEM INCLUDING ALL END USER BUILDINGS AND CHECK FOR LEAKS. PERFORM FUNCTIONAL TEST OF EACH UNIT HEATER AND CABINET UNIT HEATER THERMOSTATIC CONTROLS, VERIFYING THAT FAN AND PUMP CYCLE ON AND OFF TOGETHER.

L. ADD PROPYLENE GLYCOL SOLUTION AS REQUIRED TO BRING SYSTEM PRESSURE TO 30 PSIG MINIMUM AT EXPANSION TANK. FILTER SALVAGED GLYCOL WITH 30 MICRON FILTER AND PLACE BACK IN DRUMS. STORE ALL EXCESS PROPYLENE GLYCOL SOLUTION IN THE ORIGINAL DRUMS SEALED FOR LONG–TERM STORAGE. VERIFY THAT DRUMS ARE CLEARLY LABELED "PROPYLENE GLYCOL" WITH YELLOW LETTERING.

ARCTIC PIPE GENERAL NOTES:

1) THE DRAWINGS SHOW APPROXIMATE LOCATION OF SOME EXISTING ABOVE GRADE FEATURES. THERE ARE NO KNOWN UNDERGROUND UTILITIES. PRIOR TO BEGINNING EXCAVATION, LOCATE ALL ABOVE GRADE FEATURES AND VERIFY THERE ARE NO UNDERGROUND UTILITIES.

2) TAKE CARE TO PROTECT EXISTING BUILDING FOUNDATIONS, BOARDWALKS, AND OTHER EXISTING FEATURES WHEN EXCAVATING FOR ARCTIC PIPE. BACKFILL WITH EXCAVATION SPOILS OR SAND, COMPACT, AND BLEND INTO EXISTING GRADE. RESTORE ALL EXCAVATION AREAS TO ORIGINAL CONDITION UPON COMPLETION.

3) ANY UTILITIES DAMAGED DURING EXCAVATION SHALL BE REPAIRED PROMPTLY TO THE SATISFACTION OF THE AUTHORITY AND THE UTILITY AT NO COST TO THE AUTHORITY

4) ALL BURIED ARCTIC PIPE IS 75mm PRE–INSULATED PEX WITH PR JACKET. ALL ARCTIC PIPE RISERS AT ABOVE TO BELOW GRADE TRANSITIONS ARE WELDED 2–1/2" SCH 40 STEEL WITH POLYURETHANE INSULATION AND WATERPROOF HDPE CASING. ALL ABOVE GRADE PIPE ROUTED UNDER BUILDINGS IS WELDED 2–1/2" SCH 40 STEEL WITH FIELD INSTALLED 1–1/2" FIBERGLASS INSULATION AND ALUMINUM JACKET. SEE SPECIFICATIONS.

5) LENGTHS OF BURIED RUNS INDICATED THIS PLAN ARE APPROXIMATE, FIELD VERIFY. FURNISH 75mm PEX ARCTIC PIPE IN ADEQUATE LENGTHS TO ALLOW CONTINUOUS RUNS BETWEEN BUILDING RISERS. DO NOT INSTALL SPLICE JOINTS BETWEEN RISERS.

6) TAKE CARE TO PROTECT EXISTING BUILDING FOUNDATIONS, BOARDWALKS, AND OTHER EXISTING FEATURES WHEN EXCAVATING FOR ARCTIC PIPE. BACKFILL WITH EXCAVATION SPOILS, COMPACT, AND GRADE. RESTORE EXCAVATION AREAS TO ORIGINAL CONDITION UPON COMPLETION.

ARCTIC PIPE SPECIFIC NOTES:

1 BURY ARCTIC PIPE UNDER EXISTING BOARDWALK. CAREFULLY DISASSEMBLE AND REMOVE SECTION OF BOARDWALK AS REQUIRED FOR TRENCHING. REINSTALL BOARDWALK TO MATCH ORIGINAL AFTER COMPLETING ARCTIC PIPE INSTALLATION.

2 BURY ARCTIC PIPE UNDER EXISTING ROAD. BACKFILL WITH CLEAN SANDY SOIL, COMPACT, AND BLEND INTO EXISTING ROAD SURFACE.

ALL WORK ON SHEETS M8.1 THROUGH M8.9 IS INCLUDED IN THE ON SITE CONTRACT.

PROVIDE ENTIRE HEAT RECOVERY SYSTEM AS SHOWN ON SHEETS M8.1 THROUGH M8.9 UNDER ADDITIVE ALTERNATE #1.

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

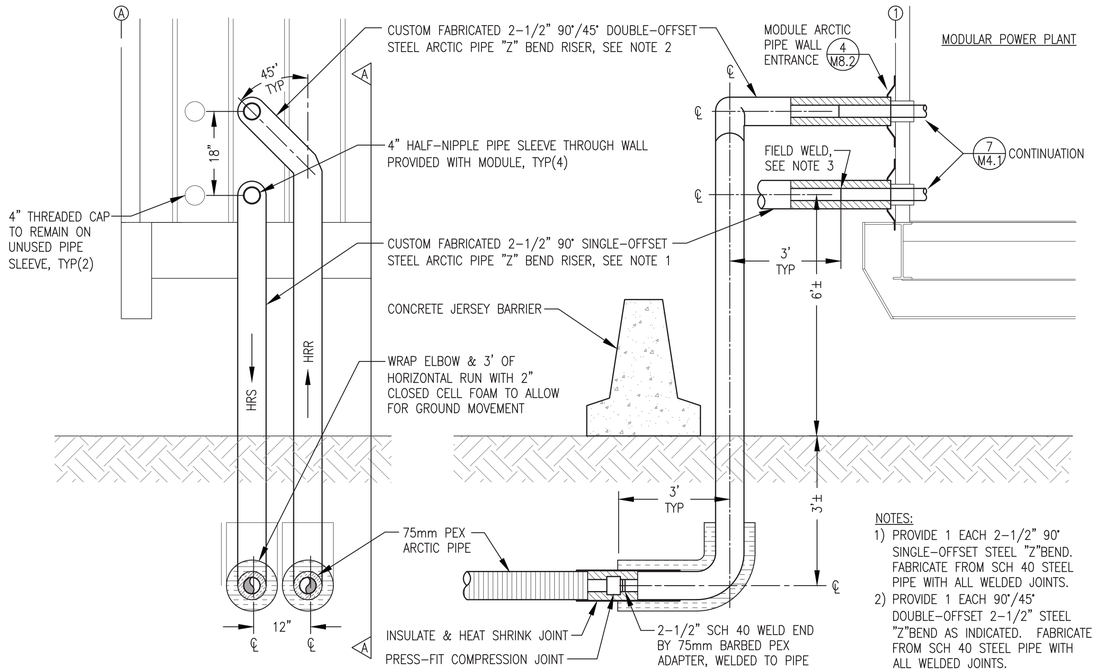
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM OVERALL PLAN, SCHEMATIC, & EQUIPMENT SCHEDULE

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

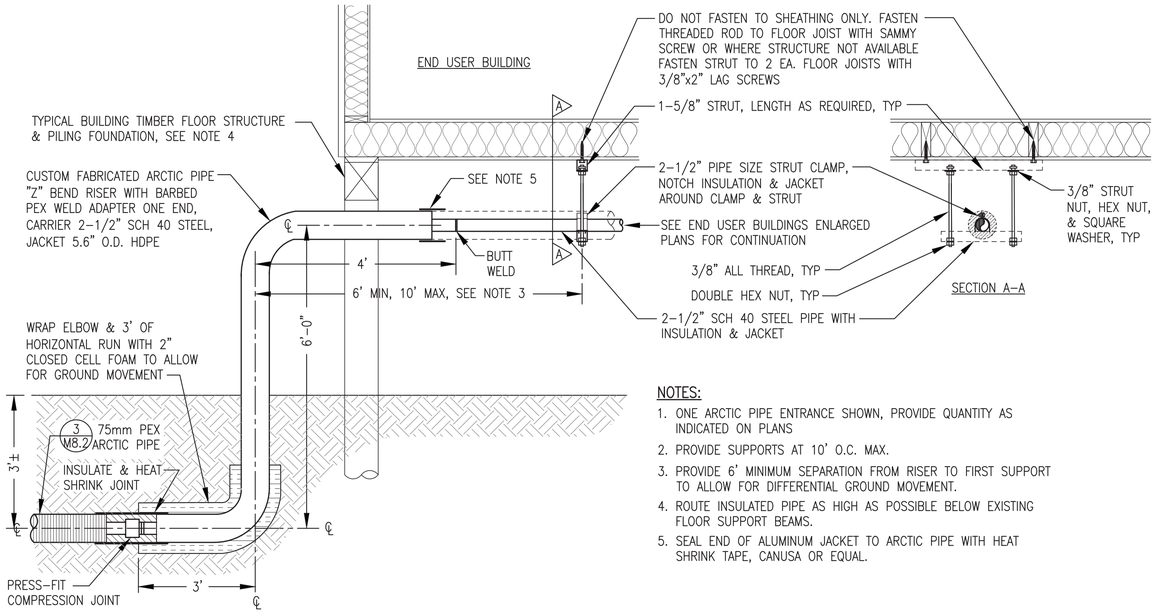
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 12/15/22
FILE NAME: NAPS PP M8	SHEET: M8.1
PROJECT NUMBER:	



NOTES:

1) PROVIDE 1 EACH 2-1/2" 90° SINGLE-OFFSET STEEL "Z"BEND. FABRICATE FROM SCH 40 STEEL PIPE WITH ALL WELDED JOINTS.
2) PROVIDE 1 EACH 90°/45° DOUBLE-OFFSET 2-1/2" STEEL "Z"BEND AS INDICATED. FABRICATE FROM SCH 40 STEEL PIPE WITH ALL WELDED JOINTS.
3) FIELD WELD 2-1/2" "Z" BEND TO SHOP FABRICATED 2-1/2" PIPE.

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

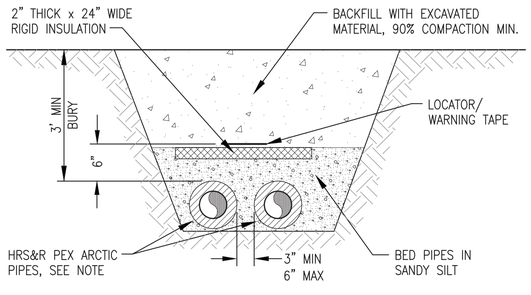


NOTES:

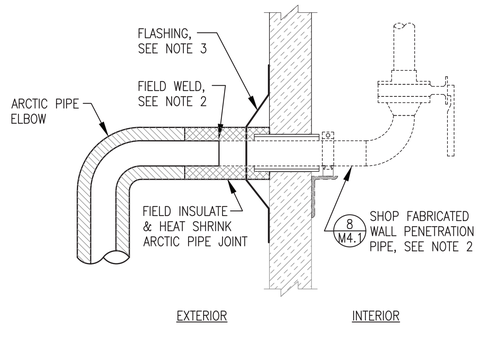
1. ONE ARCTIC PIPE ENTRANCE SHOWN, PROVIDE QUANTITY AS INDICATED ON PLANS
2. PROVIDE SUPPORTS AT 10' O.C. MAX.
3. PROVIDE 6' MINIMUM SEPARATION FROM RISER TO FIRST SUPPORT TO ALLOW FOR DIFFERENTIAL GROUND MOVEMENT.
4. ROUTE INSULATED PIPE AS HIGH AS POSSIBLE BELOW EXISTING FLOOR SUPPORT BEAMS.
5. SEAL END OF ALUMINUM JACKET TO ARCTIC PIPE WITH HEAT SHRINK TAPE, CANUSA OR EQUAL.

2 M8.2 TYPICAL BURIED ARCTIC PIPE RISER AND UNDER-FLOOR PIPE SUPPORT AT END USER BUILDING
NO SCALE

NOTE: BURY HRS&R ARCTIC PIPES TOGETHER AS SHOWN NEAR MODULE, ELSEWHERE INSTALL SINGLE ARCTIC PIPE, SEE PLAN 2/M8.1.



3 M8.2 TYPICAL BURIED ARCTIC PIPE INSTALLATION
NO SCALE



NOTES:

1) ONE ARCTIC PIPE SHOWN. PROVIDE TWO SIMILAR.
2) FIELD REINSTALL SHOP FABRICATED PIPE SECTION THROUGH WALL AND WELD TO ARCTIC PIPE.
3) INSTALL MULTI-FLASH #5 RETROFIT MF501BA WALL FLASHING OVER ARCTIC PIPE. SEAL TO WALL SURFACE WITH POLYURETHANE CAULKING & FASTEN TO WALL WITH STAINLESS STEEL SHEET METAL SCREWS ALL AROUND.

4 M8.2 ARCTIC PIPE WALL ENTRANCE AT MODULE
NO SCALE

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM ARCTIC PIPE DETAILS

Gray Stassel Engineering, Inc.
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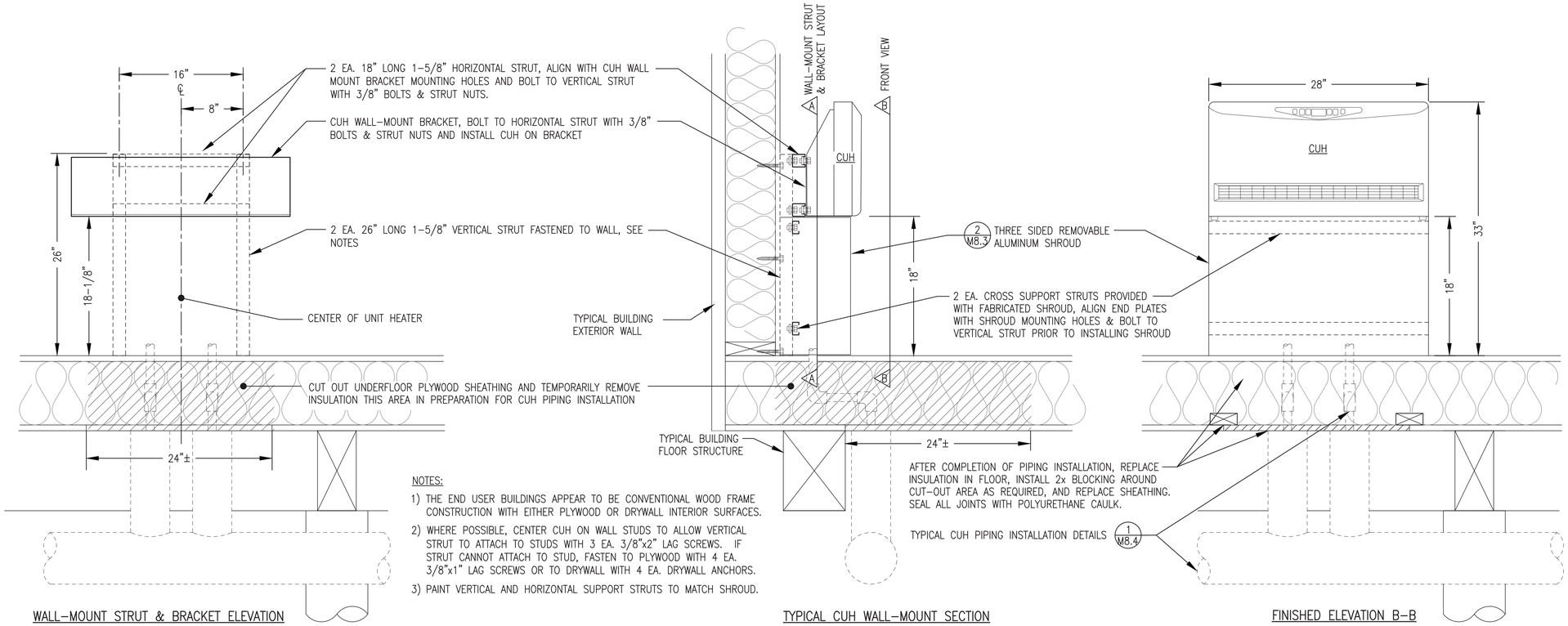
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 12/15/22
FILE NAME: NAPS PP M8 | SHEET: M8.2
PROJECT NUMBER:

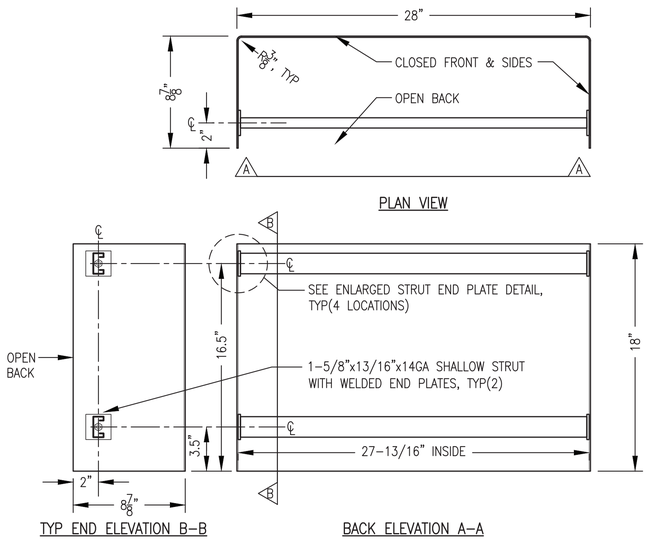


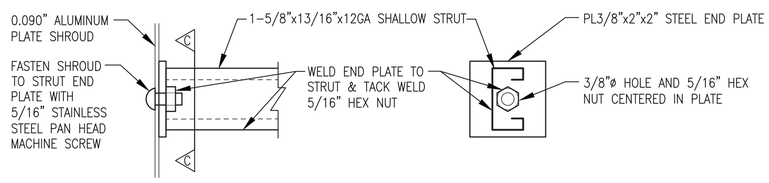
NOTES:

1) THE END USER BUILDINGS APPEAR TO BE CONVENTIONAL WOOD FRAME CONSTRUCTION WITH EITHER PLYWOOD OR DRYWALL INTERIOR SURFACES.
2) WHERE POSSIBLE, CENTER CUH ON WALL STUDS TO ALLOW VERTICAL STRUT TO ATTACH TO STUDS WITH 3 EA. 3/8"x2" LAG SCREWS. IF STRUT CANNOT ATTACH TO STUD, FASTEN TO PLYWOOD WITH 4 EA. 3/8"x1" LAG SCREWS OR TO DRYWALL WITH 4 EA. DRYWALL ANCHORS.
3) PAINT VERTICAL AND HORIZONTAL SUPPORT STRUTS TO MATCH SHROUD.

1 M8.3 TYPICAL END USER BUILDING CABINET UNIT HEATER (CUH) & SHROUD WALL-MOUNT INSTALLATION

NO SCALE





NOTES:

1. FABRICATE 3-SIDED SHROUD WITH OPEN TOP, BOTTOM, AND BACK FROM 0.090" 5052-H32 MILL FINISH ALUMINUM PLATE.
2. UPON COMPLETION OF SHROUD FABRICATION ROUND ALL OUTSIDE CORNERS AND GRIND ALL EDGES SMOOTH. PREPARE AND PAINT ALL EXTERIOR SURFACES WITH TWO COATS OF ALKYD ENAMEL, COLOR TO MATCH CUH.
3. UPON COMPLETION OF STRUT END PLATE FABRICATION, WIRE BRUSH ALL WELD AREAS AND BARE STEEL AND PAINT WITH ONE COAT OF COLD GALVANIZING COMPOUND.
4. PROVIDE ALL FASTENERS AND HARDWARE AS INDICATED THIS DETAIL AND ATTACH CROSS STRUTS TO SHROUD FOR SHIPPING.

2 M8.3 TYPICAL CUH ALUMINUM SHROUD FABRICATION DETAIL

2"=1'-0"

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM TYPICAL CUH WALL-MOUNT DETAILS

Gray Stassel Engineering, Inc.
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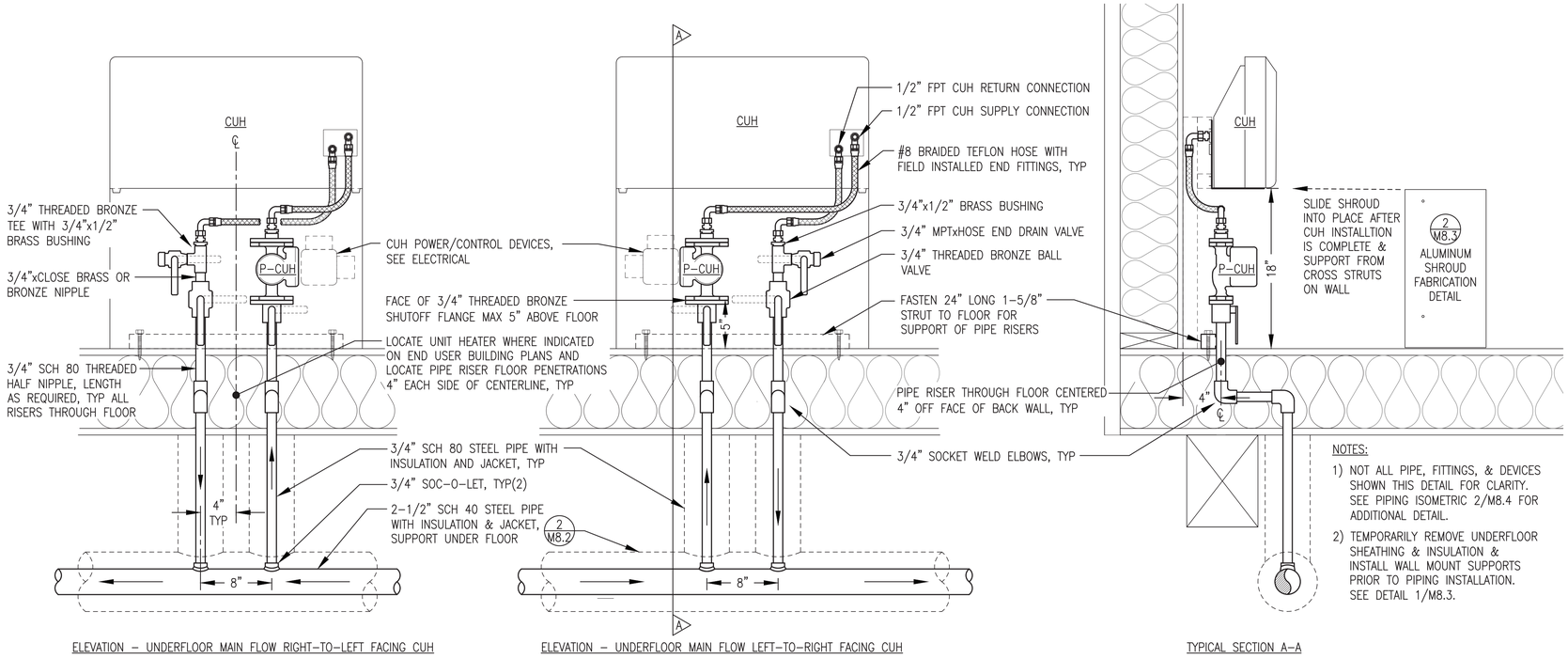
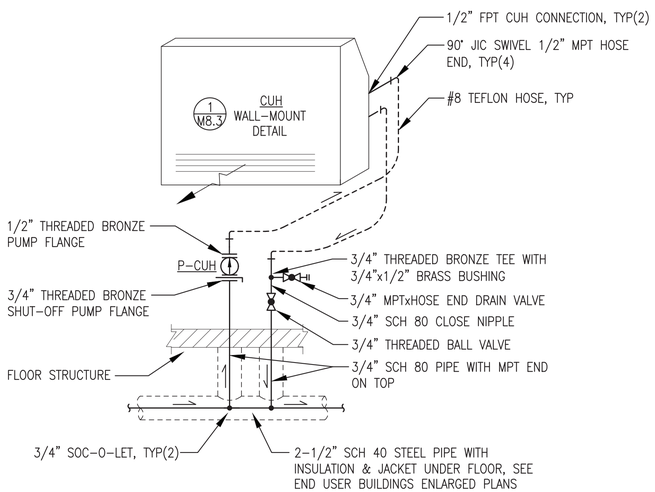
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 12/15/22
FILE NAME: NAPS PP M8 | SHEET: M8.3
PROJECT NUMBER:



1/M8.4 TYPICAL END USER BUILDING CABINET UNIT HEATER (CUH) PIPING INSTALLATION DETAIL

NO SCALE



END USER CUH PIPING ISOMETRIC NOTES:

1) INSTALLATION FOR CUH WITH UNDER FLOOR SUPPLY MAIN FLOW FROM LEFT TO RIGHT SHOWN THIS ISOMETRIC. PIPING FOR CUH WITH SUPPLY MAIN FLOW FROM RIGHT TO LEFT REQUIRES MIRRORED PIPING LAYOUT. SEE DETAIL 1/M8.4 FOR BOTH PIPING LAYOUTS.
2) ALL PIPING SHOWN THIS ISOMETRIC IS STEEL WITH WELDED JOINTS EXCEPT WHERE SPECIFICALLY INDICATED AS THREADED, 2-1/2" SCH 40, 3/4" SCH 80.
3) PROVIDE PUMP SUCTION AND DISCHARGE FLANGES AS SPECIFICALLY INDICATED.
4) ALL HOSES TEFLON (TFPE) HOSE WITH STAINLESS STEEL OUTER BRAID, EATON WEATHERHEAD H243 OR EQUAL. PROVIDE STEEL JIC SWIVEL ENDS WITH 1/2" NPT ADAPTERS. PROVIDE HOSE TO MATCH CONNECTION SIZES. PROVIDE LENGTHS AS APPROPRIATE FOR EACH INSTALLATION WITHOUT EXTRA LOOPS OR COILS. SEE SPECIFICATIONS.
5) ALL UNDERFLOOR PIPING INSULATED. ALL INTERIOR PIPING NOT INSULATED. ALL PIPING NOT PAINTED.
6) SEAL ALL EXTERIOR PIPE FLOOR PENETRATIONS. SEE DETAIL 1/M8.3.
7) ALL VALVES NORMALLY OPEN EXCEPT FOR DRAIN VALVES.
8) CLOSE ISOLATION VALVES AND DO NOT CONNECT TO CUH UNTIL AFTER PIPING MAINS HAVE BEEN FLUSHED. CRACK VALVES TO FLUSH AND PURGE BRANCH PIPING AND HOSES THEN MAKE FINAL CONNECTIONS. SEE NOTES SHEET M8.1.
9) SET PUMP TO OPERATE AT SPEED 3.

2/M8.4 TYPICAL END USER BUILDING CABINET UNIT HEATER (CUH) PIPING ISOMETRIC

NO SCALE

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

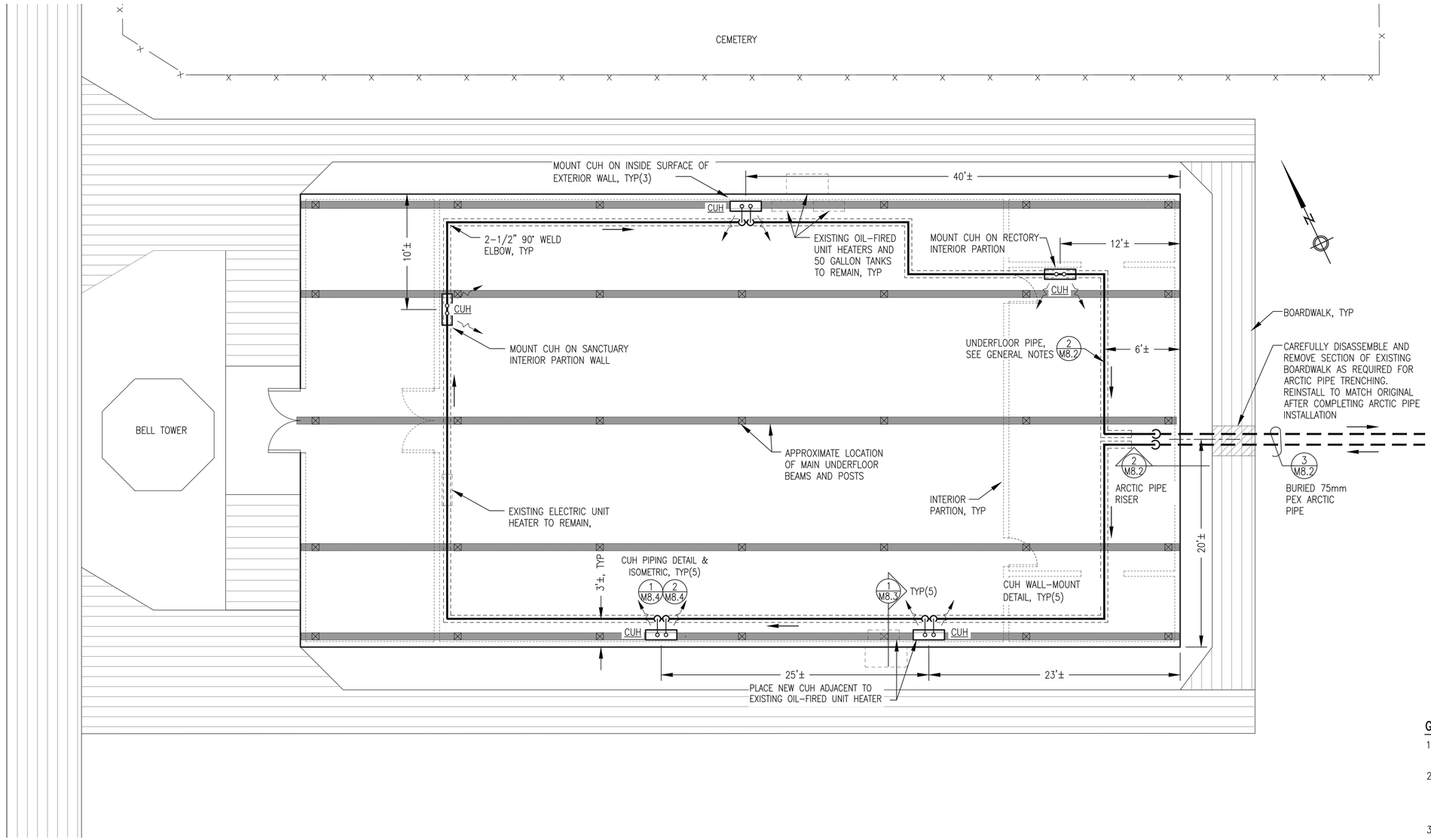
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
TYPICAL CUH PIPING 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: 12/15/22
FILE NAME: NAPS PP M8 | SHEET: M8.4
PROJECT NUMBER:



1/M8.5 BUILDING A RUSSIAN OTHODOX CHURCH ENLARGED UNDERFLOOR PIPING PLAN
3/16"=1'-0"

GENERAL NOTES:

1) ALL UNDERFLOOR PIPING TO BE 2-1/2" SCH 40 STEEL PIPE WITH INSULATION AND JACKET, SEE SPECIFICATIONS.
2) UNDERFLOOR PIPING DIMENSIONS ARE APPROXIMATE, FIELD ROUTE AS REQUIRED TO ALIGN BELOW CUH LOCATIONS AND TO CLEAR ALL SUPPORT STRUCTURES AND OTHER UNDERFLOOR UTILITIES.
3) SEE OVERALL PLAN SHEET M8.1 FOR CONTINUATION OF BURIED HEAT RECOVERY MAINS.

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

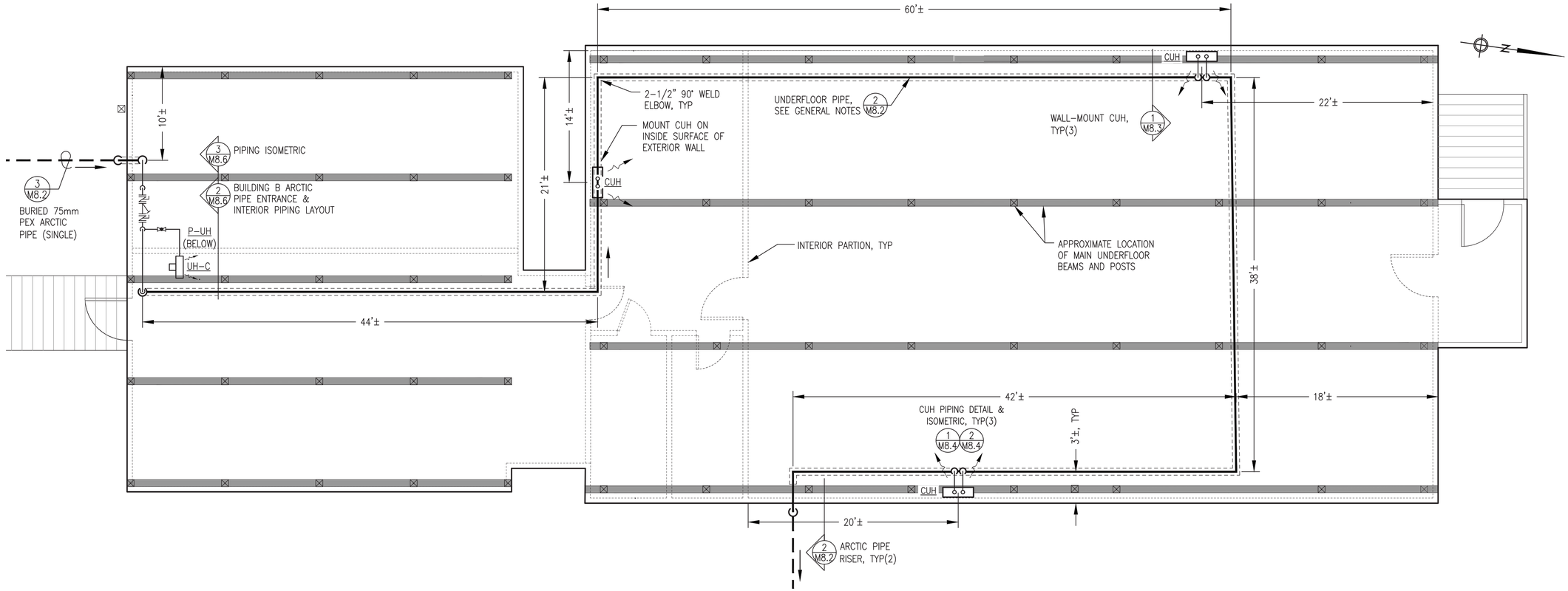
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
BUILDING A ENLARGED PLANS & DETAILS

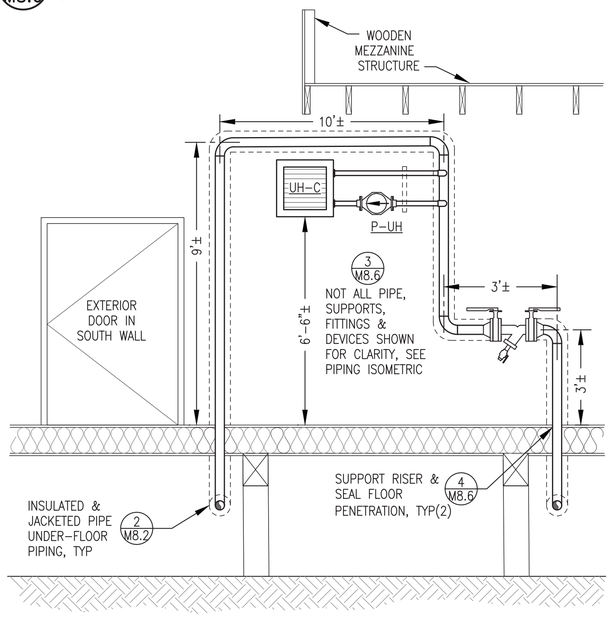
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: NAPS PP M8
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 12/15/22
SHEET: M8.5



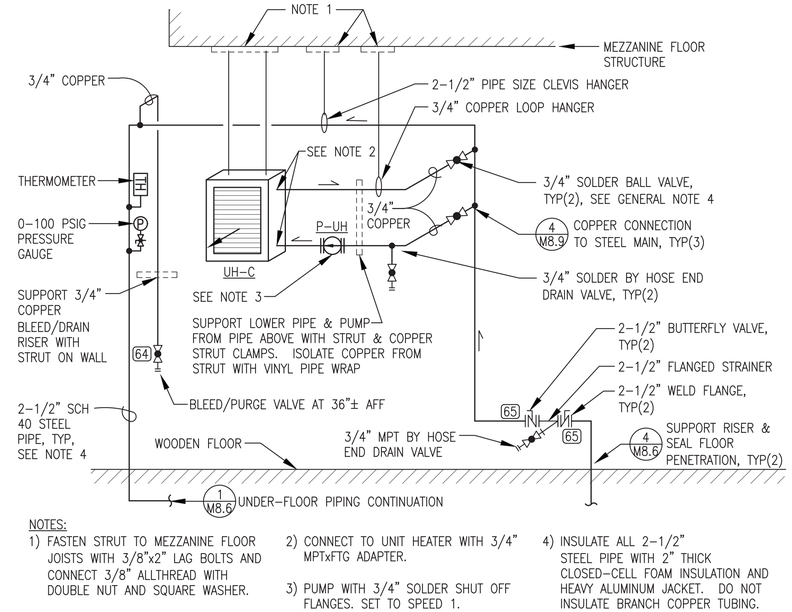
1 M8.6 BUILDING B NEW OFFICE BUILDING ENLARGED UNDERFLOOR PIPING PLAN

3/16"=1'-0"



2 M8.6 BUILDING B ARCTIC PIPE ENTRANCE AND UH-C PIPING LAYOUT

NO SCALE

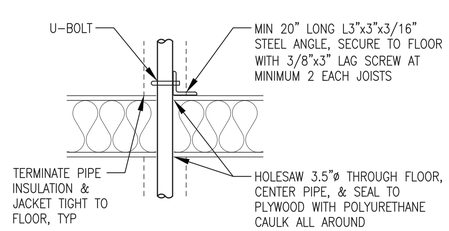


NOTES:

1) FASTEN STRUT TO MEZZANINE FLOOR JOISTS WITH 3/8"x2" LAG BOLTS AND CONNECT 3/8" ALLTHREAD WITH DOUBLE NUT AND SQUARE WASHER.
2) CONNECT TO UNIT HEATER WITH 3/4" MPTxFTG ADAPTER.
3) PUMP WITH 3/4" SOLDER SHUT OFF FLANGES. SET TO SPEED 1.
4) INSULATE ALL 2-1/2" STEEL PIPE WITH 2" THICK CLOSED-CELL FOAM INSULATION AND HEAVY ALUMINUM JACKET. DO NOT INSULATE BRANCH COPPER TUBING.

3 M8.6 BUILDING B HEAT ARCTIC PIPE ENTRANCE & PIPING ISOMETRIC

NO SCALE



4 M8.6 STEEL PIPE FLOOR PENETRATION

NO SCALE

GENERAL NOTES:

1) ALL UNDERFLOOR PIPING TO BE 2-1/2" SCH 40 STEEL PIPE WITH INSULATION AND JACKET, SEE SPECIFICATIONS.
2) UNDERFLOOR PIPING DIMENSIONS ARE APPROXIMATE, FIELD ROUTE AS REQUIRED TO ALIGN BELOW CUH LOCATIONS AND TO CLEAR ALL SUPPORT STRUCTURES AND OTHER UNDERFLOOR UTILITIES.
3) SEE OVERALL PLAN SHEET M8.1 FOR CONTINUATION OF BURIED HEAT RECOVERY MAINS.
4) CLOSE ISOLATION VALVES UNTIL AFTER PIPING MAINS HAVE BEEN FLUSHED. OPEN VALVES TO FLUSH AND PURGE BRANCH PIPING. SEE NOTES SHEET M8.1.

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM BUILDING B ENLARGED PLANS & DETAILS

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

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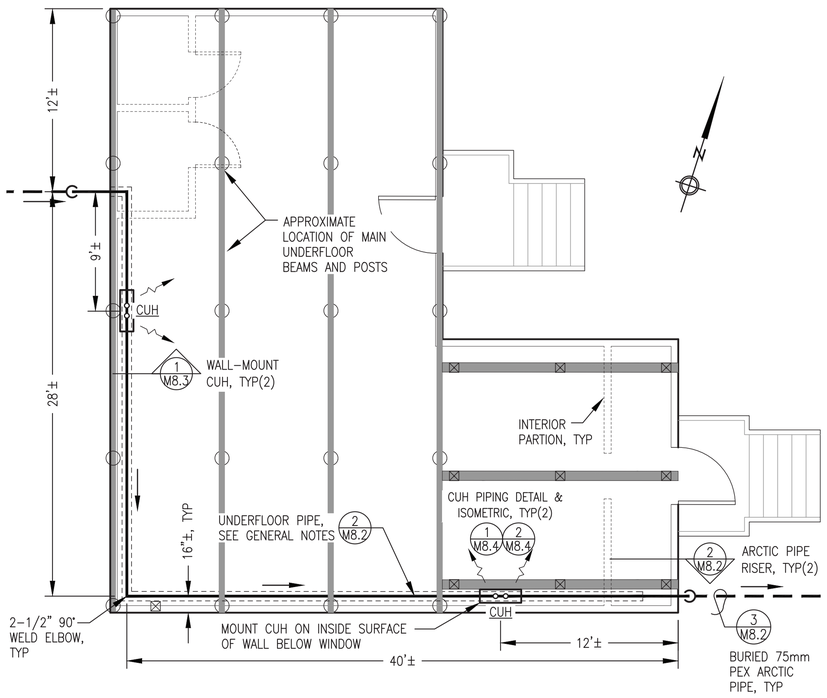
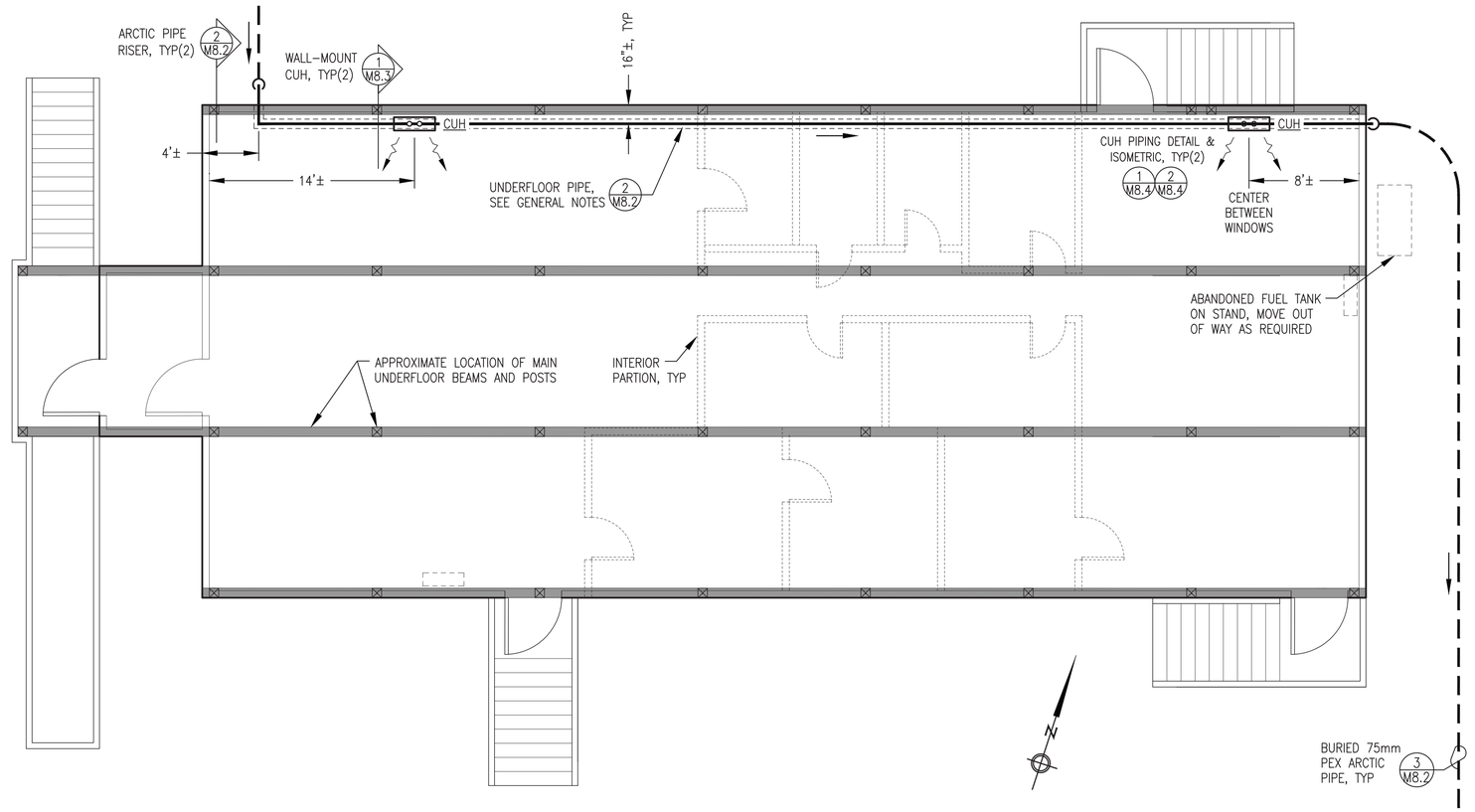
DESIGNED BY: BCG | DATE: 12/15/22
FILE NAME: NAPS PP M8 | SHEET: M8.6
PROJECT NUMBER:



1 M8.7 BUILDING C BINGO HALL ENLARGED UNDERFLOOR PIPING PLAN
3/16"=1'-0"



2 M8.7 BUILDING D HEADSTART ENLARGED UNDERFLOOR PIPING PLAN
3/16"=1'-0"

GENERAL NOTES:

1) ALL UNDERFLOOR PIPING TO BE 2-1/2" SCH 40 STEEL PIPE WITH INSULATION AND JACKET, SEE SPECIFICATIONS
2) UNDERFLOOR PIPING DIMENSIONS ARE APPROXIMATE, FIELD ROUTE AS REQUIRED TO ALIGN BELOW CUH LOCATIONS AND TO CLEAR ALL SUPPORT STRUCTURES AND OTHER UNDERFLOOR UTILITIES.
3) SEE OVERALL PLAN SHEET M8.1 FOR CONTINUATION OF BURIED HEAT RECOVERY MAINS.

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
BUILDINGS C & D ENLARGED PLANS

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

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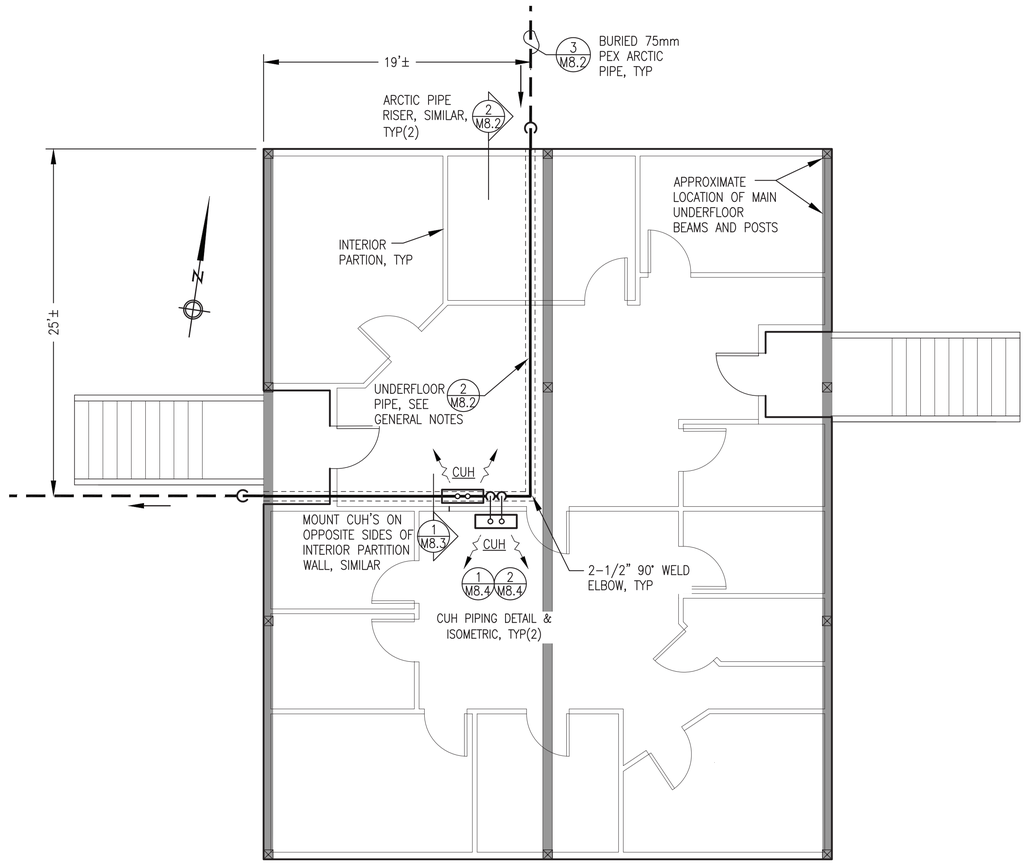
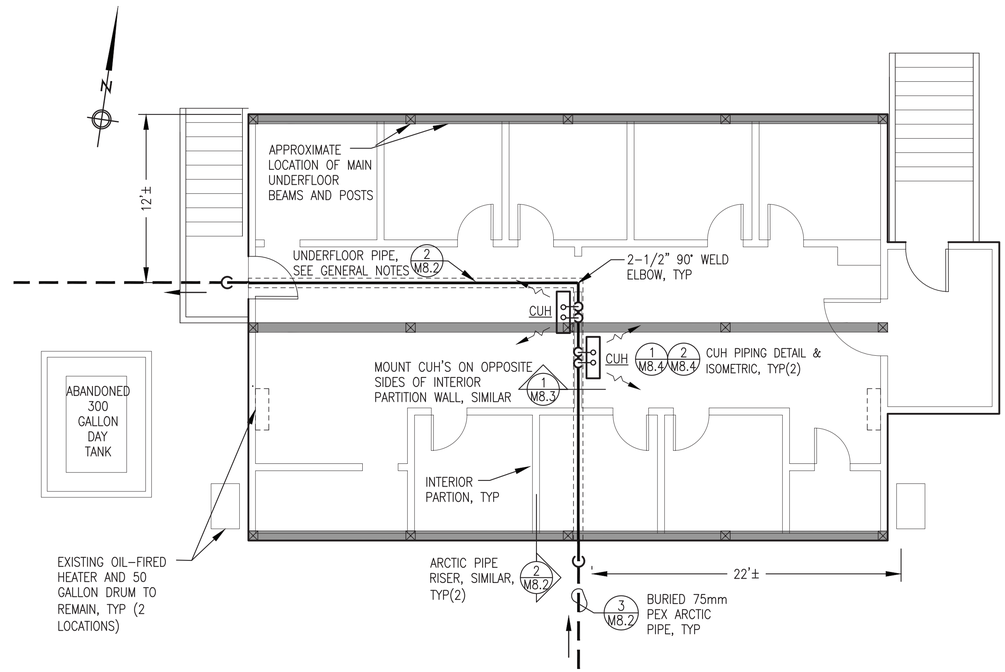
DESIGNED BY: BCG | DATE: 12/15/22
FILE NAME: NAPS PP M8 | SHEET: M8.7
PROJECT NUMBER:



1 M8.8 BUILDING E VPSO ENLARGED PIPING PLAN
3/16"=1'-0"



2 M8.8 BUILDING F OLD OFFICE BUILDING ENLARGED UNDERFLOOR PIPING PLAN
3/16"=1'-0"

GENERAL NOTES:

1) ALL UNDERFLOOR PIPING TO BE 2-1/2" SCH 40 STEEL PIPE WITH INSULATION AND JACKET, SEE SPECIFICATIONS
2) UNDERFLOOR PIPING DIMENSIONS ARE APPROXIMATE, FIELD ROUTE AS REQUIRED TO ALIGN BELOW CUH LOCATIONS AND TO CLEAR ALL SUPPORT STRUCTURES AND OTHER UNDERFLOOR UTILITIES.
3) SEE OVERALL PLAN SHEET M8.1 FOR CONTINUATION OF BURIED HEAT RECOVERY MAINS.

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

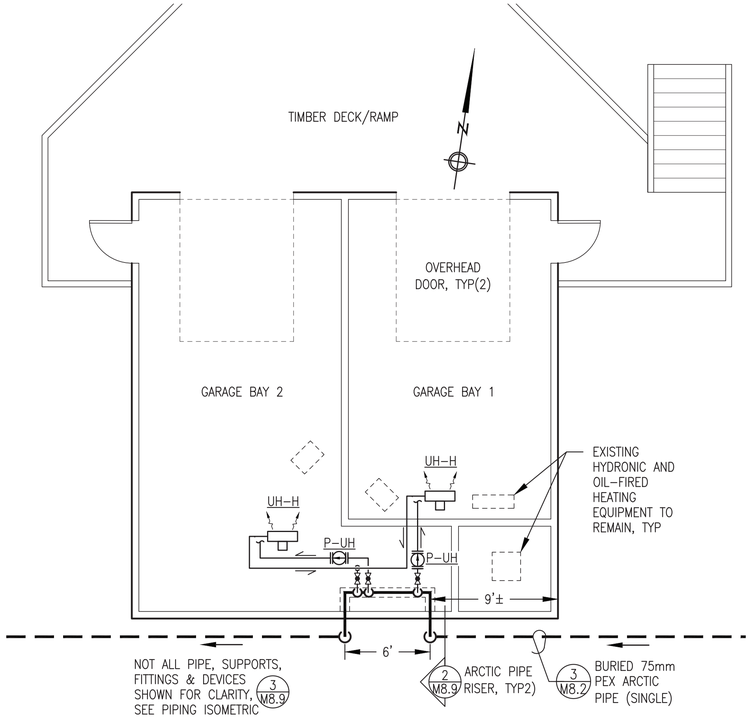
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

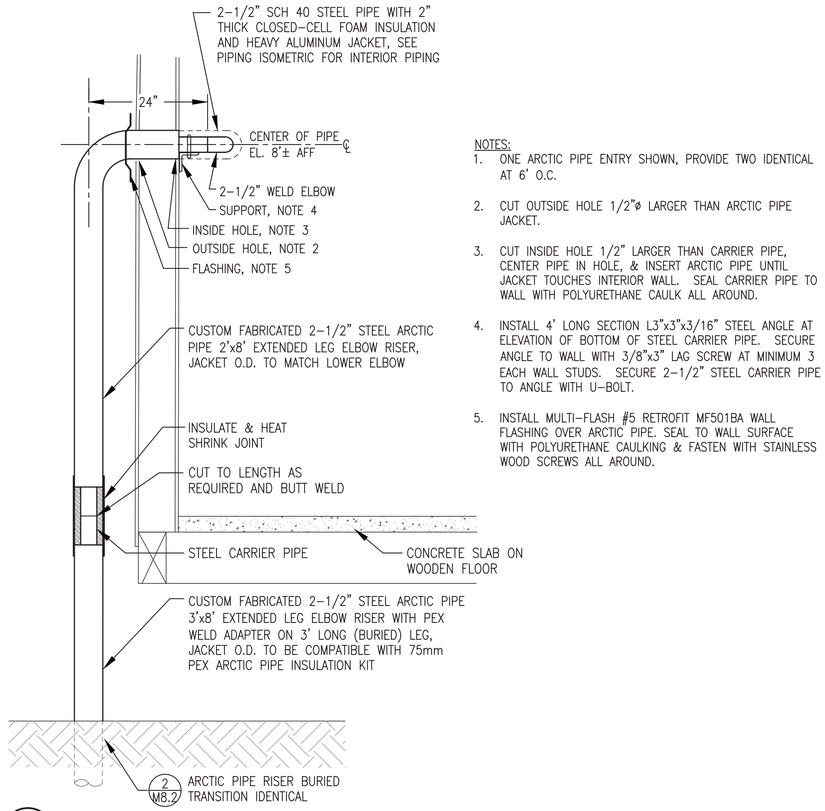
TITLE: HEAT RECOVERY SYSTEM
BUILDINGS E & F ENLARGED PLANS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 12/15/22
FILE NAME: NAPS PP M8 | SHEET: M8.8
PROJECT NUMBER:

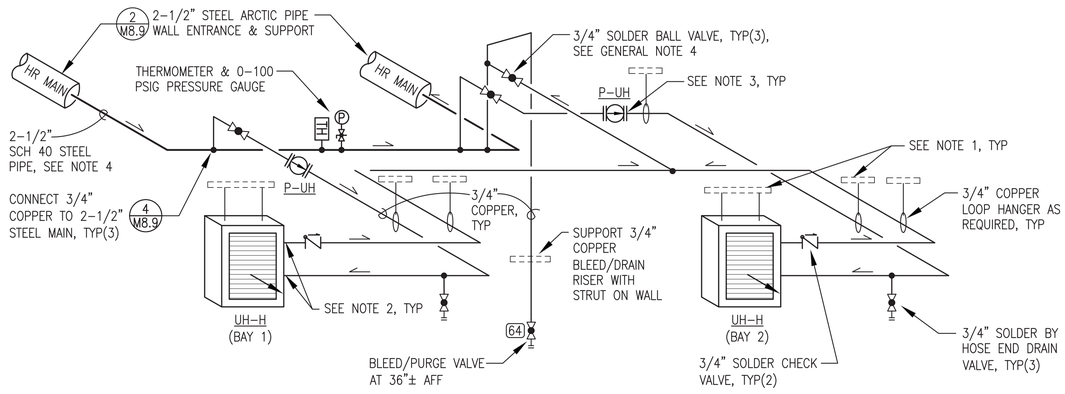


1/M8.9 BUILDING G GARAGE ENLARGED PIPING PLAN
3/16"=1'-0"



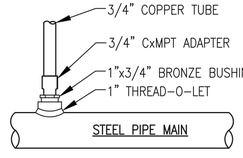
2/M8.9 ARCTIC PIPE RISER AT GARAGE BUILDING G
3/4"=1'-0"

NOTES:
1. ONE ARCTIC PIPE ENTRY SHOWN, PROVIDE TWO IDENTICAL AT 6' O.C.
2. CUT OUTSIDE HOLE 1/2"ø LARGER THAN ARCTIC PIPE JACKET.
3. CUT INSIDE HOLE 1/2" LARGER THAN CARRIER PIPE, CENTER PIPE IN HOLE, & INSERT ARCTIC PIPE UNTIL JACKET TOUCHES INTERIOR WALL. SEAL CARRIER PIPE TO WALL WITH POLYURETHANE CAULK ALL AROUND.
4. INSTALL 4' LONG SECTION L3"x3"x3/16" STEEL ANGLE AT ELEVATION OF BOTTOM OF STEEL CARRIER PIPE. SECURE ANGLE TO WALL WITH 3/8"x3" LAG SCREW AT MINIMUM 3 EACH WALL STUDS. SECURE 2-1/2" STEEL CARRIER PIPE TO ANGLE WITH U-BOLT.
5. INSTALL MULTI-FLASH #5 RETROFIT MF501BA WALL FLASHING OVER ARCTIC PIPE. SEAL TO WALL SURFACE WITH POLYURETHANE CAULKING & FASTEN WITH STAINLESS WOOD SCREWS ALL AROUND.



NOTES:
1) FASTEN STRUT TO ROOF STRUCTURE WITH 3/8"x2" LAG BOLTS AND CONNECT 3/8" ALLTHREAD WITH DOUBLE NUT AND SQUARE WASHER.
2) CONNECT TO UNIT HEATER WITH 3/4" MPTxFTG ADAPTER.
3) PUMP WITH 3/4" SOLDER FLANGES. SET TO SPEED 1.
4) INSULATE ALL 2-1/2" STEEL PIPE WITH 2" THICK CLOSED-CELL FOAM INSULATION AND HEAVY ALUMINUM JACKET. DO NOT INSULATE BRANCH COPPER TUBING.

3/M8.9 BUILDING G PIPING ISOMETRIC
NO SCALE



NOTE: FOR COPPER TUBE DIRECT CONNECTION INSTALL THREAD-O-LET ONE PIPE SIZE LARGER WITH THREADED BRONZE BUSHING FOR COPPER TO STEEL SEPARATION.

4/M8.9 DIRECT CONNECTION TO STEEL MAIN
NO SCALE

GENERAL NOTES:

1) PIPING DIMENSIONS ARE APPROXIMATE, FIELD ROUTE AS REQUIRED TO CLEAR ALL SUPPORT STRUCTURES.
2) SEE OVERALL PLAN SHEET M8.1 FOR CONTINUATION OF BURIED HEAT RECOVERY MAINS.
3) CLOSE ISOLATION VALVES UNTIL AFTER PIPING MAINS HAVE BEEN FLUSHED. CRACK VALVES TO FLUSH AND PURGE BRANCH PIPING. SEE NOTES SHEET M8.1.

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

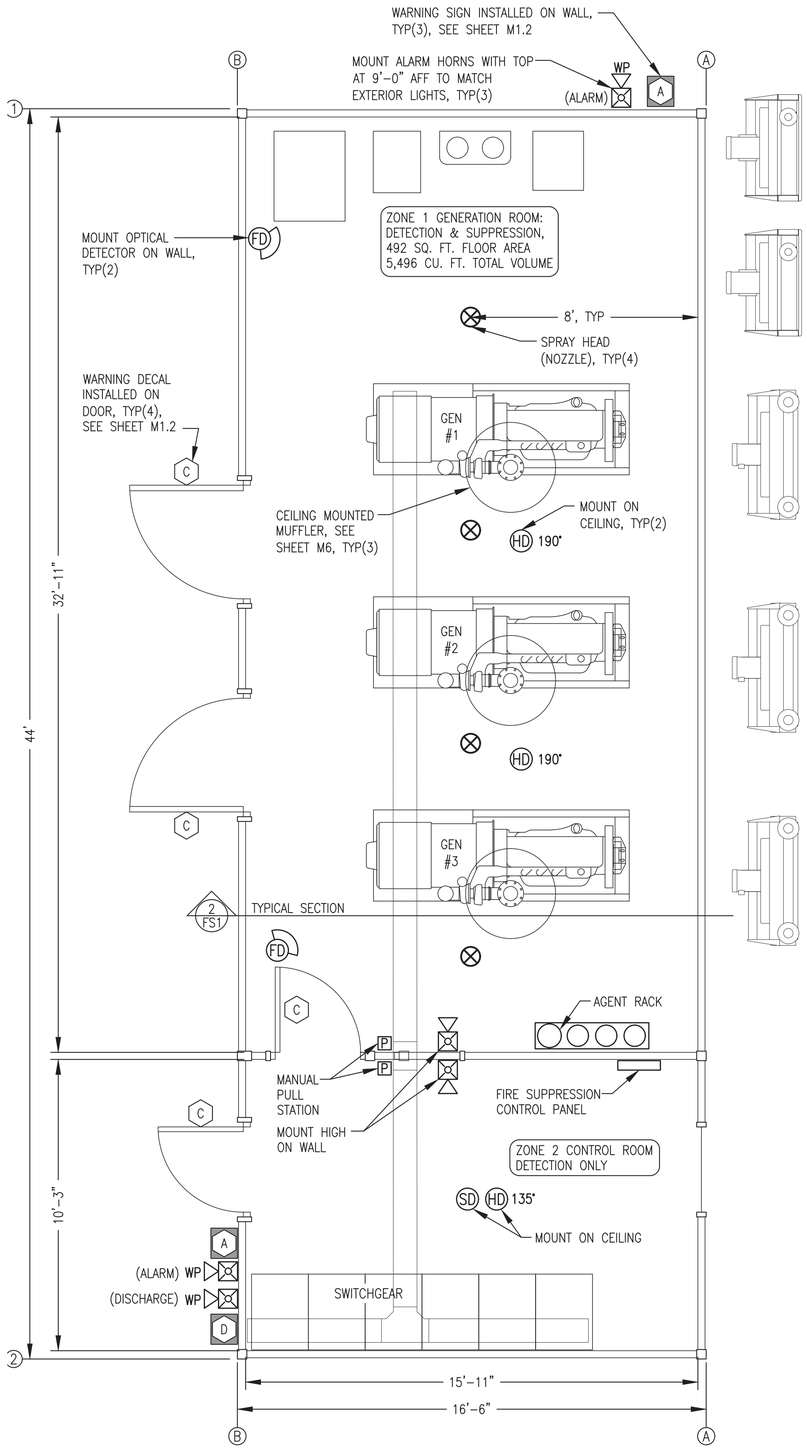
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

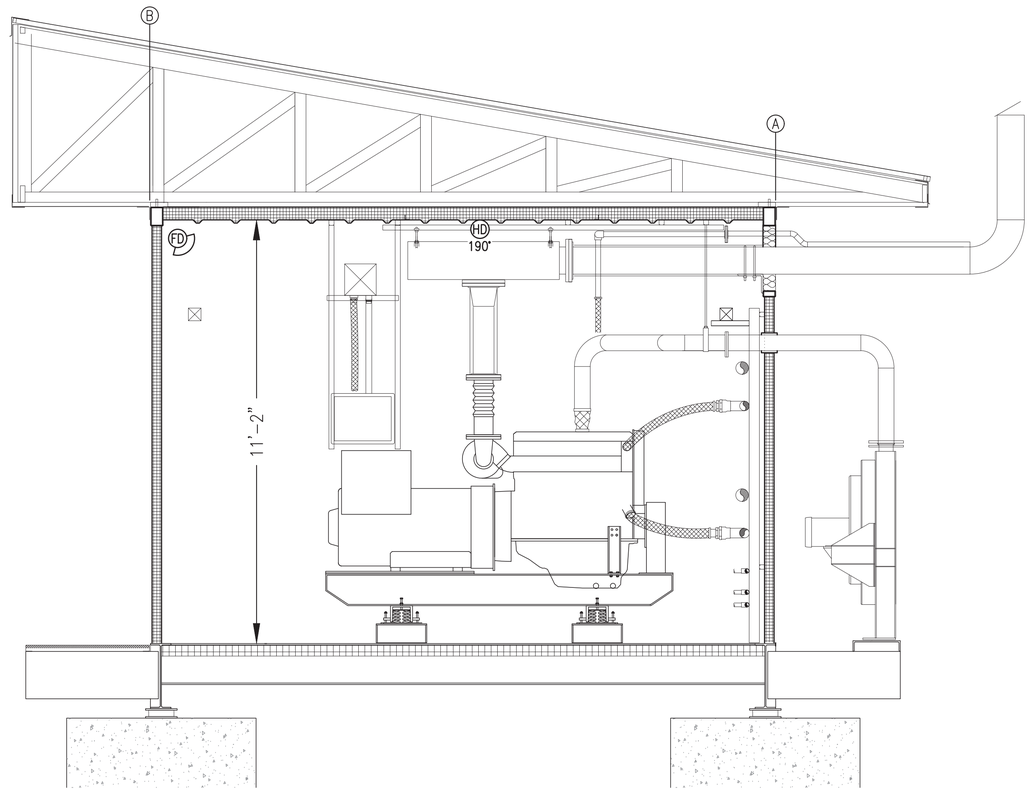
TITLE: HEAT RECOVERY SYSTEM BUILDING G ENLARGED PLAN & DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 12/15/22
FILE NAME: NAPS PP M8	SHEET: M8.9
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 11'-2 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.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE. SEE SPECIFICATION 21 13 30 FOR DELINEATION OF FINAL RE-ASSEMBLY, TESTING, AND COMMISSIONING THAT IS INCLUDED IN THE ON SITE SCOPE.

ISSUED FOR CONSTRUCTION
JULY 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK 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: 7/29/22
FILE NAME: NAPS PP FS1 | SHEET: FS1
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	LINE VOLTAGE THERMOSTAT	HEATING/COOLING THERMOSTAT, 16 FLA @ 120V, SPDT, 50F TO 80F RANGE.	DAYTON 1UHH2
◇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	$ 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, 20" WIDE NEMA 1 ENCLOSURE, SURFACE MOUNT, NO KNOCKOUTS	SIEMENS TYPE P1 OR SQUARE D TYPE NQ
◇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/CAC 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, 20VA OUTPUT, 1/2" THREADED HUB MOUNT	FUNCTIONAL DEVICES TR20VA001
◇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
◇25	FOC-1 ENCLOSED CONTACTOR	NEMA 1 ENCLOSURE WITH IEC STYLE CONTACTOR, 5.4-27A ADJUSTABLE RANGE SOLID STATE OVERLOAD, HAND-OFF-AUTO CONTROL, 16A, 208V 3-PHASE.	ALLEN-BRADLEY 109-C16AD-OLR ENCLOSED CONTACTOR, 193-EEEB OVERLOAD, 198-3SS HOA, & 193-ERA OVERLOAD RESET
◇26	FOC-1 TEMP CONTROLLER	NEMA 1 120/240 VAC PROGRAMMABLE TEMPERATURE CONTROLLER WITH PTC TEMPERATURE SENSOR AND 2m LONG JACKETED CABLE	PENN A421ABC-02C

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.

UNLESS INDICATED OTHERWISE ALL CONDUCTORS SHALL USE THE FOLLOWING COLOR CODE:
- 480-VOLT POWER (PHASE) CONDUCTORS
  - PHASE A: BROWN
  - PHASE B: ORANGE
  - PHASE C: YELLOW
- 120/208-VOLT POWER (PHASE) CONDUCTORS
  - PHASE A: BLACK
  - PHASE B: RED
  - PHASE C: BLUE
- NEUTRAL: WHITE, NO EXCEPTIONS
- GROUND: GREEN OR BARE, NO EXCEPTIONS
- 24 VOLT DC CONDUCTORS
  - +24VDC: RED or RED W/GRAY STRIPE
  - -24VDC: BLACK or BLACK W/GRAY STRIPE

CONTROL AND INSTRUMENT CONDUCTORS MAY BE COLOR CODED PER MANUFACTURER'S STANDARD

NOTES:
1) COLOR CODING FOR NO. 6 AWG AND SMALLER CONDUCTORS SHALL BE BY USING CONDUCTORS WITH CONTINUOUS COLOR EMBEDDED IN THE INSULATION.
2) COLOR CODING FOR CONDUCTORS LARGER THAN NO. 6, SHALL BE BY:
   A) CONTINUOUS COLOR EMBEDDED IN THE INSULATION, OR
   B) BLACK CABLE WITH SCOTCH 35 OR APPROVED EQUAL MARKING (PHASE) TAPE. AT EVERY ACCESSIBLE LOCATION A MINIMUM 3" LONG SECTION OF CONDUCTOR SHALL BE SPIRAL WRAPPED. NOTE THAT PHASE TAPE MAY NOT BE USED ON COLORED CABLE, BLACK CABLE ONLY.
3) 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	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.		125V, 20A, DUPLEX RECEPTACLE
		(T)	LINE VOLTAGE THERMOSTAT
		(DT)	DIGITAL THERMOSTAT, MODULATING
◇#	ELECTRICAL ITEM - SEE EQUIPMENT SCHEDULE	$	SNAP SWITCH / SMALL MOTOR DISCONNECT
(1/4)	MOTOR (HORESPOWER INDICATED)	T$	TIMER SWITCH
(MD)	MOTORIZED DAMPER - SEE MECHANICAL		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)	TANK LEVEL SENSOR PROBE

ALL MATERIALS AND EQUIPMENT ON SCHEDULES THIS SHEET WERE FURNISHED AS PART OF THE PRIOR MODULE ASSEMBLY PROJECT EXCEPT FOR THOSE ITEMS SPECIFICALLY INDICATED IN RED CLOUDS WHICH ARE TO BE FURNISHED AND INSTALLED AS PART OF THE ON SITE SCOPE.

REV #1 ISSUED FOR ON SITE CONSTRUCTION DECEMBER 2022

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

REV.	DESCRIPTION	DATE	BY
1	REVISED TO COORDINATE WITH FINAL ON-SITE DESIGN	12/15/22	BCG

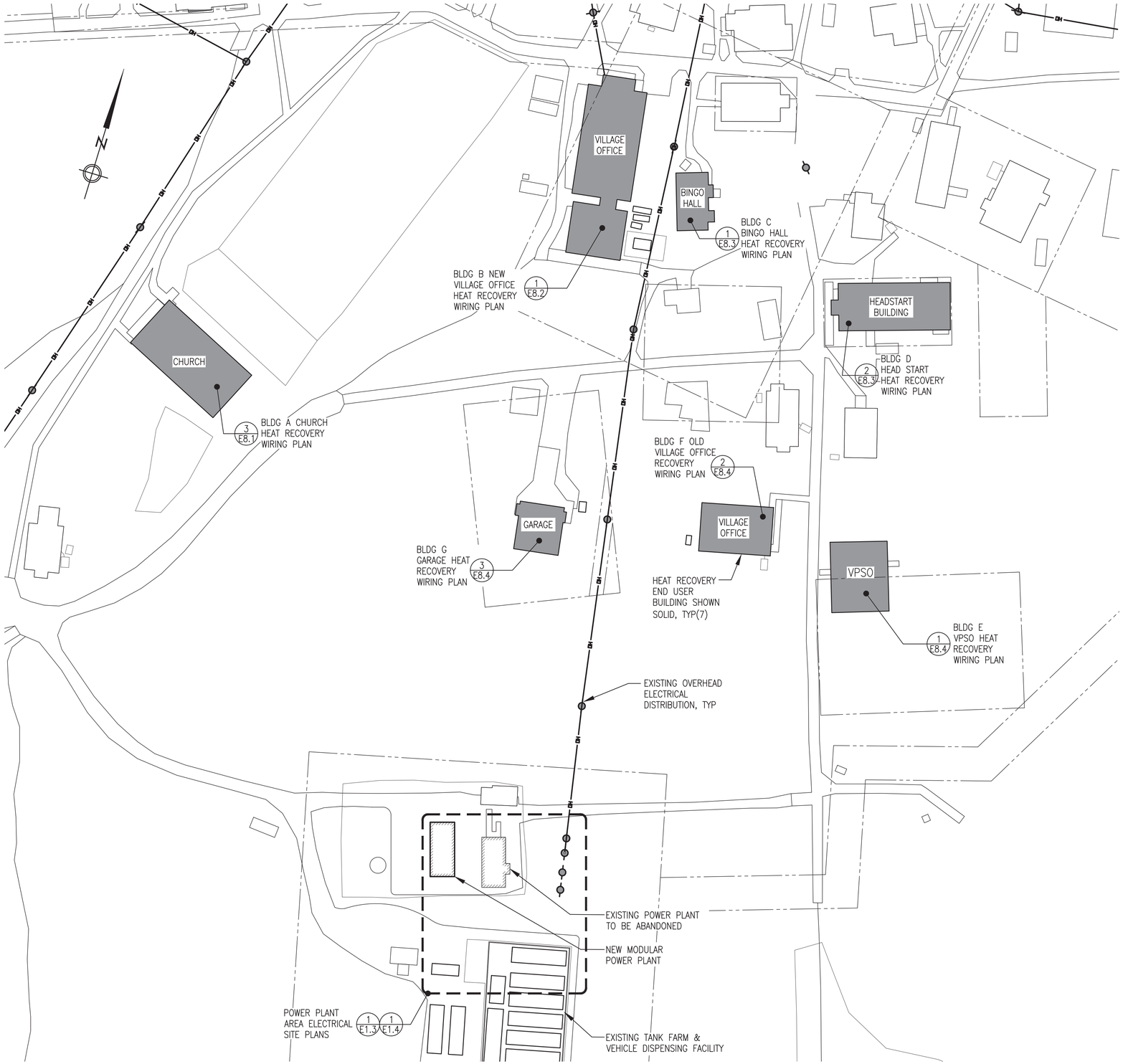
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: ELECTRICAL LEGENDS & SCHEDULES

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 7/29/22
FILE NAME: NAPS E1 | SHEET: E1.1
PROJECT NUMBER:



1 E1.2 OVERALL POWER PLANT & HEAT RECOVERY VICINITY PLAN
1"=40'

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

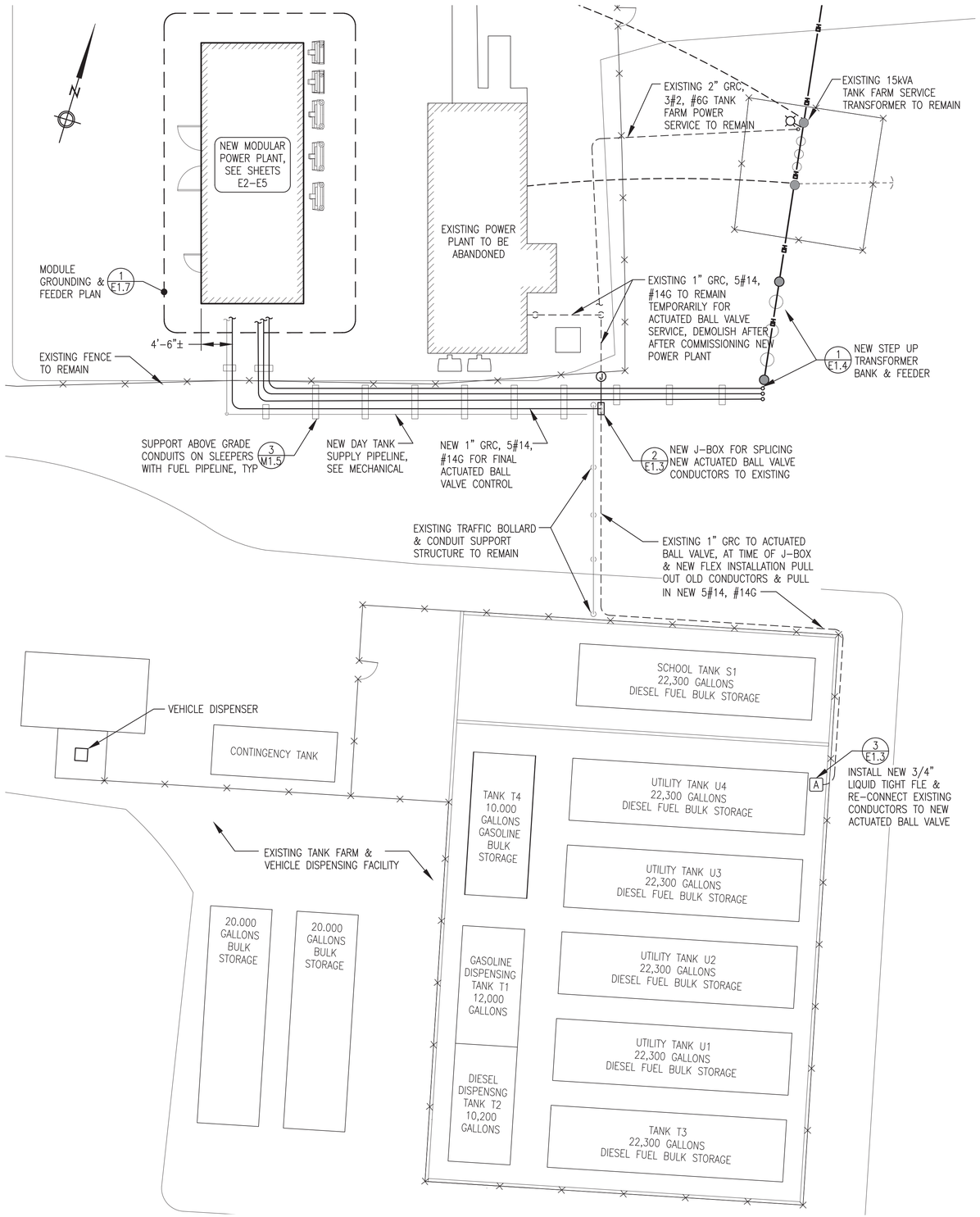
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: OVERALL POWER PLANT & HEAT RECOVERY VICINITY PLAN

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

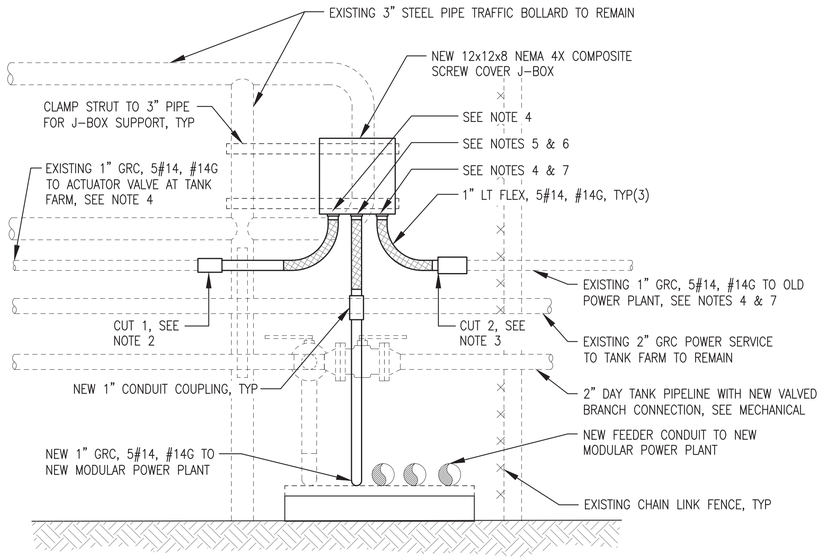
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 12/15/22
FILE NAME: NAPS PP E1	SHEET: E1.2
PROJECT NUMBER:	



1 E1.3 POWER PLANT ELECTRICAL SITE PLAN & DETAILS
1"=10'

NOTES:

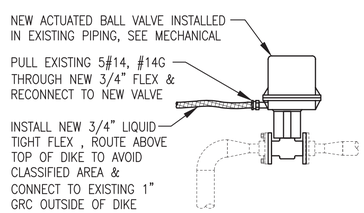
1. NEW CONDUIT & DEVICES SHOWN WITH DARK, SOLID LINES. EXISTING CONDUIT & DEVICES SHOWN WITH LIGHT, DASHED LINES.
2. CUT 1 – CUT EXISTING 1" CONDUIT & CONDUCTORS NEAR A JOINT AT A LOCATION THAT ALLOWS CONDUCTORS FROM OLD POWER PLANT TO REACH INTO J-BOX. INSTALL NEW THREADED COUPLING FOR NEW CONDUIT TO J-BOX.
3. CUT 2 – TEMPORARILY PULL CONDUCTORS BACK TOWARD OLD POWER PLANT PRIOR TO CUTTING CONDUIT. INSTALL NEW COMPRESSION COUPLING FOR NEW CONDUIT TO J-BOX. PULL EXISTING CONDUCTORS FROM OLD POWER PLANT INTO J-BOX.
4. REMOVE FLEX AT ACTUATED VALVE (SEE DETAIL 3) & PULL NEW 5/14, #14G FROM J-BOX TO ACTUATED VALVE. PERMANENTLY CONNECT TO TO ACTUATED VALVE. TEMPORARILY CONNECT NEW CONDUCTORS TO EXISTING CONDUCTORS FROM OLD POWER PLANT WITH WIRE NUTS TO ALLOW ACTUATOR VALVE OPERATION FROM OLD POWER PLANT TO CONTINUE.
5. PULL NEW 5#14, #14G FROM NEW POWER PLANT & TEMPORARILY COIL IN J-BOX FOR FUTURE PERMANENT CONNECTION.
6. WHEN NEW PLANT IS COMMISSIONED, DISCONNECT CONDUCTORS FROM OLD POWER PLANT. SOLDER SPLICE & HEAT SHRINK CONDUCTORS FROM NEW POWER PLANT TO CONDUCTORS FROM ACTUATED VALVE TO ALLOW ACTUATOR VALVE OPERATION FROM NEW POWER PLANT DAY TANK CONTROL PANEL.
7. REMOVE CONDUIT & CONDUCTORS FROM OLD POWER PLANT AND SEAL UNUSED CONDUIT ENTRANCE IN J-BOX.



2 E1.3 ACTUATED BALL VALVE CONDUCTOR SPLICE BOX INSTALLATION – ELEVATION VIEW
NO SCALE

NOTES:

1) DURING CONSTRUCTION THE EXISTING CONDUCTORS FROM THE OLD POWER PLANT IN THE SPLICE BOX WILL ALLOW THE NEW ACTUATED BALL VALVE TO BE CONTROLLED FROM THE OLD POWER PLANT DAY TANK CONTROL PANEL.
2) WHEN THE NEW MODULAR POWER PLANT IS COMMISSIONED, THE NEW CONDUCTORS FROM THE NEW POWER PLANT WILL ALLOW THE NEW ACTUATED BALL VALVE TO BE CONTROLLED FROM THE NEW POWER PLANT DAY TANK CONTROL PANEL. SEE DETAIL 2/E1.3.



3 E1.3 ACTUATOR VALVE CONNECTION
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

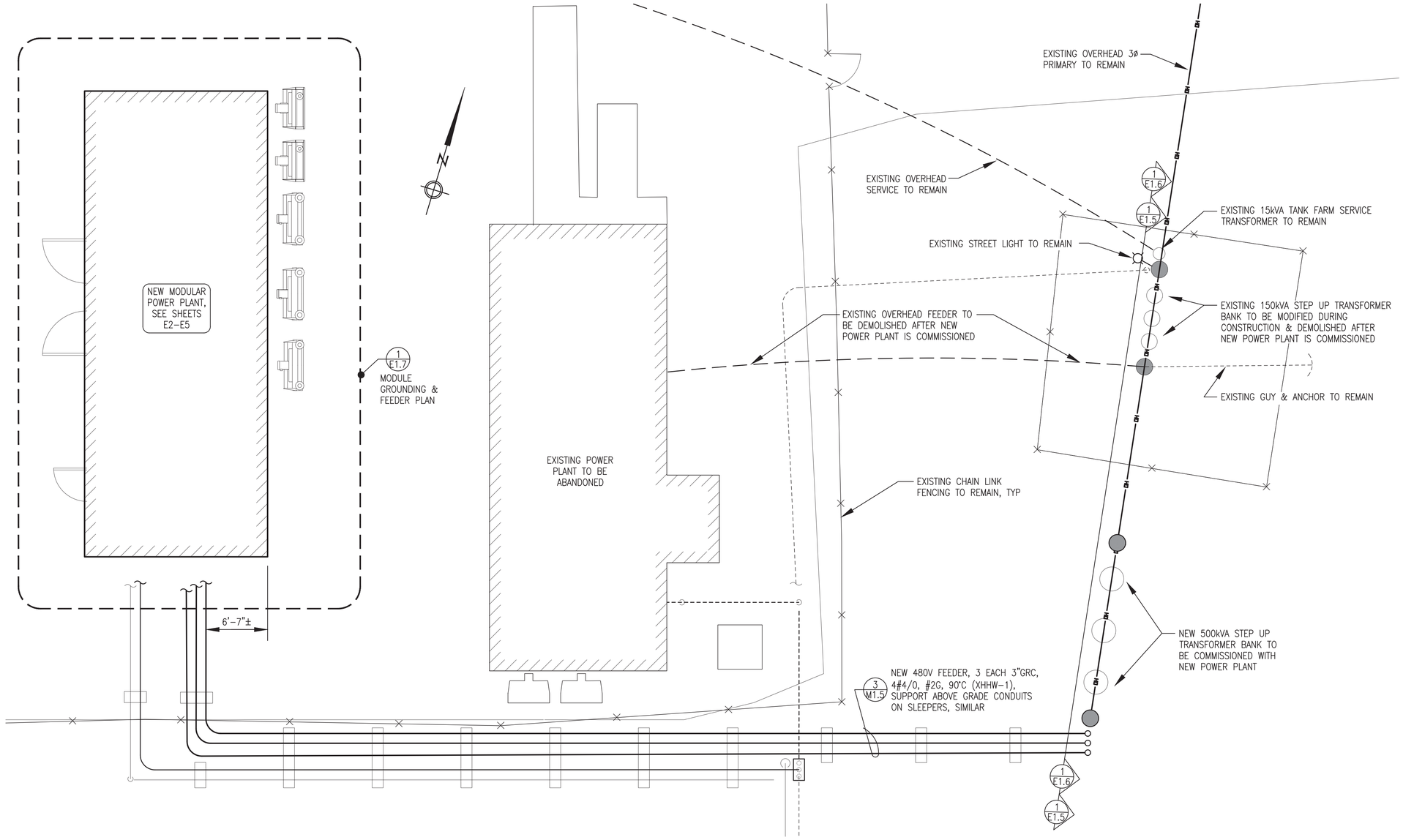
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: POWER PLANT ELECTRICAL SITE 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: 12/15/22
FILE NAME: NAPS PP E1	SHEET: E1.3
PROJECT NUMBER:	



1 E1.4 POWER PLANT FEEDER & STEP UP TRANSFORMER PLAN
1"=6'

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

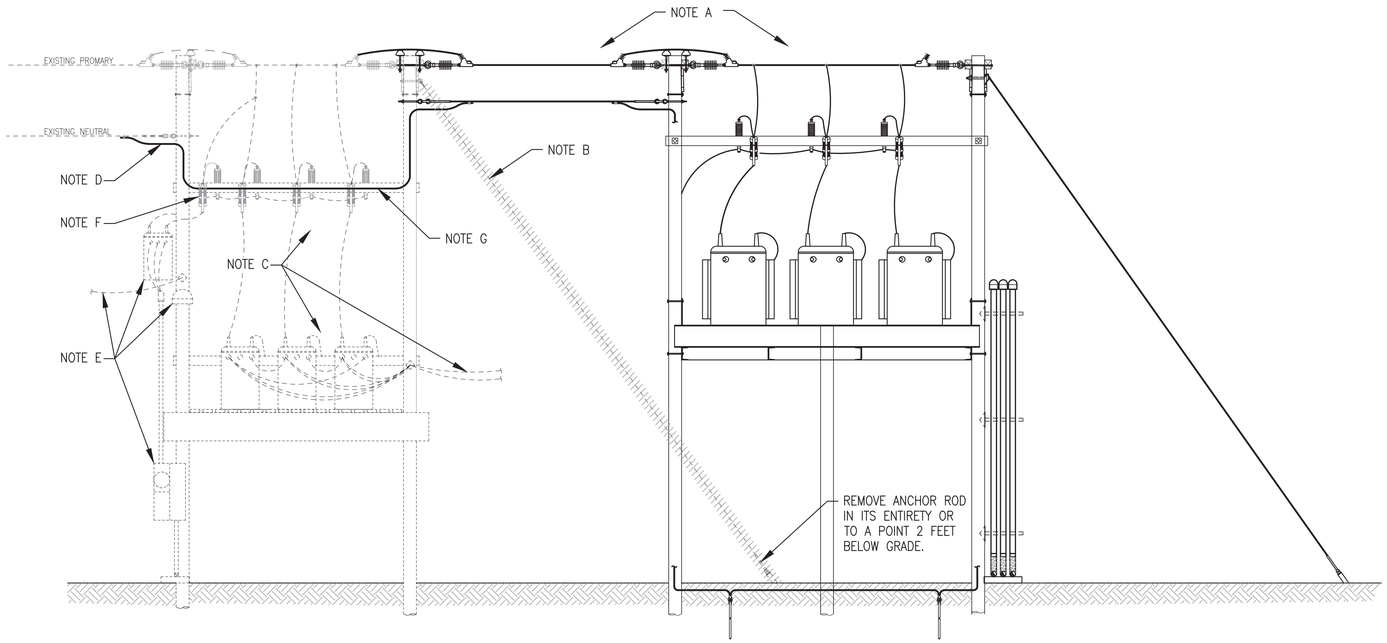
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: POWER PLANT FEEDER & STEP UP TRANSFORMER PLAN

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 12/15/22
FILE NAME: NAPS PP E1	SHEET: E1.4
PROJECT NUMBER:	



1 / E1.5 STEP UP TRANSFORMER BANK DEMOLITION & INTERIM CONFIGURATION
1/4"=1'

WORK SEQUENCE FOR INTERIM OPERATION OF OLD AND NEW POWER PLANTS AND TRANSFORMER BANKS

A. SEE FINAL CONFIGURATION FOR SPECIFIC INSTALLATION DETAILS OF ALL NEW UNITS SHOWN WITH DARK, SOLID LINES.

B. THE EXISTING OVERHEAD ANCHOR WILL INTERFERE WITH INSTALLATION OF THE NEW 500kVA STEP UP TRANSFORMER BANK. TEMPORARILY SUPPORT OR BRACE THE EXISTING OVERHEAD DISTRIBUTION AS REQUIRED TO REMOVE THE EXISTING ANCHOR AND TO INSTALL THE TWO NEW POLES AND NEW ANCHOR.

C. THE NAPASKIAK POWER PLANT PROVIDES PRIMARY POWER TO THE ENTIRE COMMUNITY; THEREFORE, THE EXISTING 150kVA STEP UP TRANSFORMER BANK AND 480V OVERHEAD FEEDER FROM EXISTING POWER PLANT MUST REMAIN IN SERVICE UNTIL THE NEW INSTALLATION IS COMPLETE AND THE NEW POWER PLANT AND NEW STEP UP TRANSFORMER BANK HAVE BEEN COMMISSIONED. AFTER COMMISSIONING OF NEW PLANT AND TRANSFORMER BANK IS COMPLETE, DEMOLISH THE OLD TRANSFORMER BANK AND 480V FEEDER FROM OLD POWER PLANT AS SHOWN ON FINAL CONFIGURATION

D. TEMPORARILY INSTALL #1/0 BARE COPPER NEUTRAL EXTENSION TO AVOID PROXIMITY TO THE EXISTING PRIMARY TRANSFORMER JUMPERS DURING INTERIM OPERATIONS. STAPLE THE NEUTRAL CONDUCTOR TO EXISTING WOODEN POLES AND STRUCTURE AS REQUIRED TO ROUTE TO NEW OVERHEAD EXTENSION. UPON COMMISSIONING OF NEW POWER PLANT AND NEW STEP UP TRANSFORMER BANK, INSTALL NEW NEUTRAL AND DEMOLISH TEMPORARY. SEE FINAL CONFIGURATION.

E. THE EXISTING 15kVA TRANSFORMER, TANK FARM SERVICE, METER, STREET LIGHT, AND OVERHEAD SERVICE TO STORAGE BUILDING WILL REMAIN PERMANENTLY. RECONNECT PRIMARY JUMPER TO TRANSFORMER AS REQUIRED AFTER DEMOLITION OF OLD STEP UP TRANSFORMER BANK, SEE FINAL CONFIGURATION.

F. REMOVE EXISTING FUSED CUTOUT AND ARRESTER AND RELOCATE TO SIDE OF POLE WITH NEW SINGLE PHASE CUTOUT/ARRESTER EXTENSION BRACKET.

G. AFTER FINAL CONFIGURATION IS COMPLETE, REMOVE TIMBER.

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

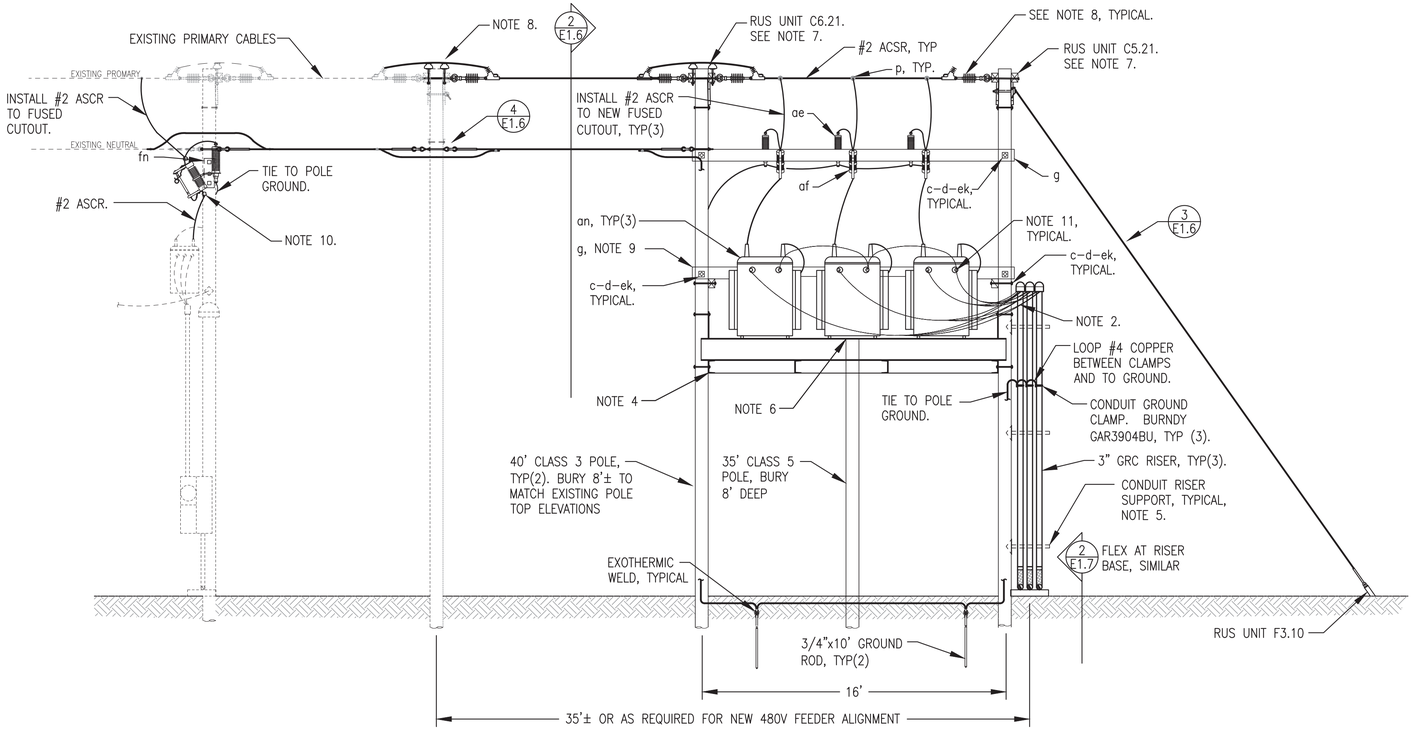
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: STEP UP TRANSFORMER BANK DEMOLITION & INTERIM CONFIGURATION

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 12/15/22
FILE NAME: NAPS PP E1	SHEET: E1.5
PROJECT NUMBER:	



1 E1.6 STEP UP TRANSFORMER BANK FINAL CONFIGURATION
1/4"=1'

ITEM	QTY	MATERIAL LIST
c	AS REQUIRED	BOLT, MACHINE 5/8" X REQUIRED LENGTH.
c-1	AS REQUIRED	BOLT, MACHINE 1/2" X REQUIRED LENGTH.
d	AS REQUIRED	WASHER, SQUARE 2-1/4".
d-1	AS REQUIRED	WASHER, ROUND, 1-3/8".
g	2	3-5/8"x7-1/2"x17'-0" TREATED HUGHES BROS. CROSSARM.
i	AS REQUIRED	BOLT, CARRIAGE, 3/8" X REQUIRED LENGTH.
p	AS REQUIRED	COMPRESSION CONNECTORS.
ae	3	ARRESTER, SURGE, 7.65 kV MCOV, WITH MOUNTING HARDWARE.
af	3	CUTOUT, DISTRIBUTION, OPEN (15 KV). PROVIDE 21 AMP SloFast FUSE LINKS WITH MOUNTING HARDWARE.
an	3	TRANSFORMER, 277V-7.2 kV, 167 kVA.
ek	AS REQUIRED	LOCKNUTS.
fn	1	BRACKET, EXTENSION, 18".

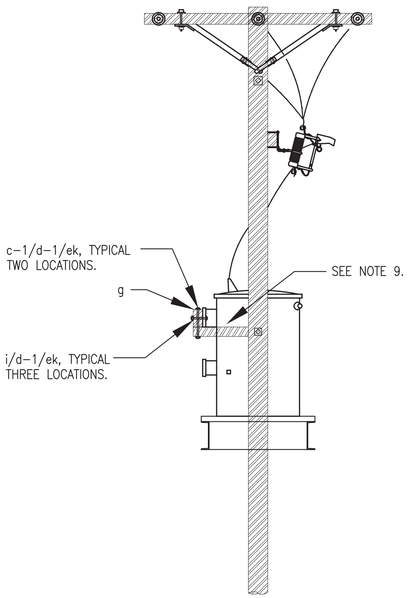
GENERAL NOTE:S

1) ADDITIONAL CONSTRUCTION UNITS AND MATERIAL REQUIRED FOR THE CONSTRUCTION OF THE PLATFORM SHALL BE PROVIDED AS REQUIRED FOR THE RUS UNITS REFERENCED.

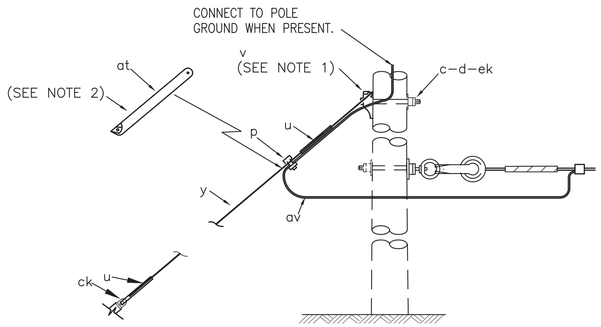
2) ALL CONSTRUCTION SHALL CONFORM TO RUS SPECIFICATIONS.

3) VERIFY EXISTING SYSTEM PHASE ROTATION AND MATCH NEW SYSTEM TO THE EXISTING.

NOTES:
1) EXISTING CONDUCTORS, POLES, AND HARDWARE TO REMAIN SHOWN WITH LIGHT, DASHED LINES. NEW CONDUCTORS, POLES AND EQUIPMENT SHOWN WITH DARK, SOLID LINES. ALL UNITS TO BE DEMOLISHED SPECIFICALLY INDICATED WITH NOTES.
2) CONDUCTORS AS INDICATED. SEE SWITCHGEAR ONE-LINE DIAGRAM. ROUTE NEW CABLE ON NEW SUPPORTS OVER TO NEW TRANSFORMERS. MAKE CONNECTIONS AT TRANSFORMERS AS REQUIRED FOR WYE CONNECTION.
3) TIE H2 BUSHING TO GROUND. GROUND TRANSFORMER TANKS, MINIMUM #4 COPPER. CONNECT ALL ARRESTERS TO GROUND AND GROUND ALL METALLIC PARTS.
4) ALUMAFORM 3PAL-16 TRANSFORMER PLATFORM, OR ENGINEER APPROVED EQUAL. INSTALL PLATFORM IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS USING MATERIAL PROVIDED OR IDENTIFIED BY THE MANUFACTURER.
5) CONDUIT SUPPORT SHALL BE B-LINE BB12-18, HOT DIP GALVANIZED. ATTACH WITH FOUR 1/4" HOT DIP GALVANIZED LAG BOLTS.
6) PROVIDE EXTRA POLE KIT. CUT POLE AS REQUIRED TO MATCH ELEVATION OF PLATFORM.
7) ADJUST DIMENSIONS AS NECESSARY TO MATCH EXISTING PLATFORM.
8) INSTALL INSULATORS IN ACCORDANCE WITH RUS UNIT A2.021, TWO EACH CROSSARM, AND A2.01 ON POLE.
9) INSTALL CROSSARM TIMBER TO PROVIDE SUPPORTS FOR TRANSFORMERS. CUT STANDARD CROSSARM AND ATTACH TO POLES FOR TIMBER SUPPORT. LOCATION OF TIMBER AND LENGTH OF CUT CROSSARMS TO BE FIELD ADJUSTED AS REQUIRED FOR TRANSFORMERS PROVIDED. ALL INSTALLATION SHALL BE LEVEL AND PLUMB. CUTS SHALL BE SQUARE.
10) REINSTALL FUSED CUTOUT AND ARRESTER ON NEW EXTENSION BRACKET. POSITION BRACKET AS REQUIRED TO COORDINATE WITH NEUTRAL.
11) PROVIDE DUAL RATED COMPRESSION LUGS ON CABLE ENDS FOR CONNECTION TO TRANSFORMER SECONDARY LOAD PADS. PROVIDE COLD SHRINK OR HEAT SHRINK MOISTURE SEAL AT END OF CABLE. MOISTURE SEAL SHALL EXTEND OVER THE INSULATION AND THE LUG TO PROVIDE A WATER TIGHT CONNECTION.



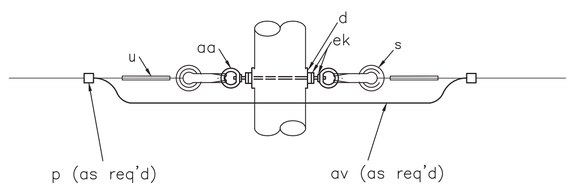
2 E1.6 TRANSFORMER BANK NEW WORK SECTION
3/8"=1'



NOTES:
1. PROVIDE PRE-FORMED GUY DEADEND (u.) OTHER DEADEND MATERIAL SHALL NOT BE SUBSTITUTED.
2. INSTALL RED STRIPED REFLECTIVE TAPE ON BOTH SIDES OF GUY GUARD. INSTALL TAPE IN WARM ENVIRONMENT, ABOVE MANUFACTURE RECOMMENDED TEMPERATURE.
3. 2-5/8" MACHINE BOLTS AND 2-3" SQUARE, CURVED WASHERS MAY BE USED TO INSTALL GUY ATTACHMENT.

ITEM	QTY	MATERIAL
c	1	Bolt, machine, 3/4 x req'd length.
ci	1	Clevis, thimble, 5/8", (20,000 lbs.).
ck	1	Clamp, anchor bonding.
d	1	Washer, square, 4", curved.
p		Connectors, guy bond and as req'd.
u	2	Deadend for guy strand, heavy duty preformed.
v	1	Guy attachment, guy hook type.
y		Guy wire, 3/8" EHS.
at	1	Guy marker, Yellow.
av		Jumpers, as required.
ek	1	Locknuts.

3 E1.6 E1.1La SINGLE DOWN GUY
NO SCALE



ITEM	QTY	MATERIAL
d	2	Washer, square 3" curve
n	1	Bolt,double arming,5/8" x req'd length
p		Connectors, as req'd
aa	2	Nut, eye, 5/8"
av		Jumpers, as req'd
ek	4	Locknuts
s	2	Clevis, secondary, swinging, insulated
u	2	Deadend for neutral, heavy duty preformed.

DESIGN PARAMETERS: PERMITTED LONGITUDINAL LOADING: 5,000 lbs.

4 E1.6 N6.1a NEUTRAL ASSEMBLY - DOUBLE DEADEND
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

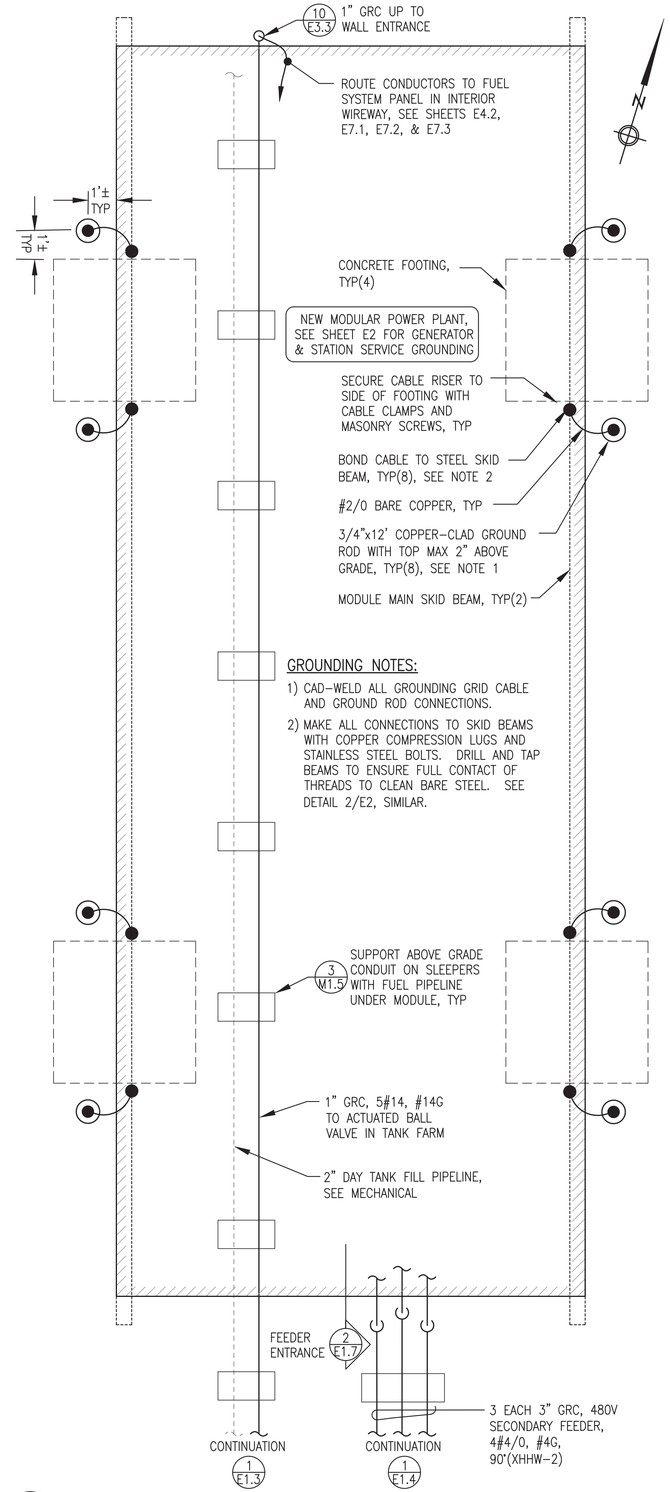
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

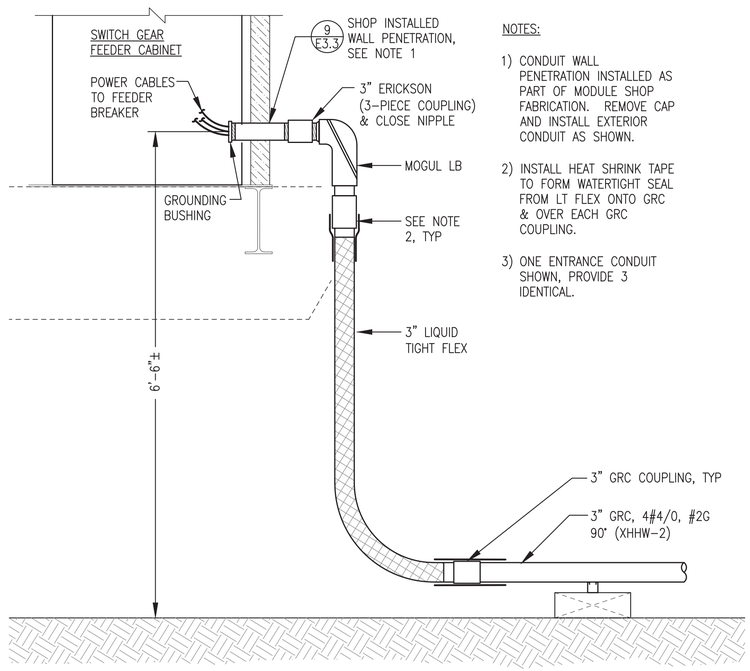
TITLE: STEP UP TRANSFORMER BANK FINAL CONFIGURATION & DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 12/15/22
FILE NAME: NAPS PP E1 | SHEET: E1.6
PROJECT NUMBER:



1 E1.7 POWER PLANT GROUNDING & FEEDER PLAN
3/8"=1'-0"



NOTES:

1) CONDUIT WALL PENETRATION INSTALLED AS PART OF MODULE SHOP FABRICATION. REMOVE CAP AND INSTALL EXTERIOR CONDUIT AS SHOWN.
2) INSTALL HEAT SHRINK TAPE TO FORM WATERTIGHT SEAL FROM LT FLEX ONTO GRC & OVER EACH GRC COUPLING.
3) ONE ENTRANCE CONDUIT SHOWN, PROVIDE 3 IDENTICAL.

2 E1.7 FEEDER ENTRANCE
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

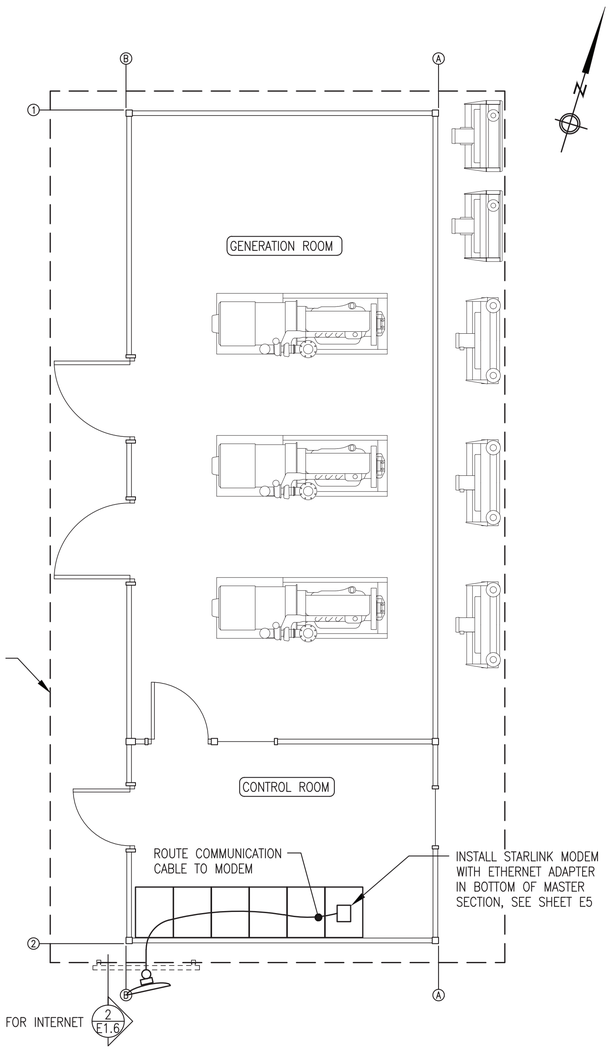
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: POWER PLANT GROUNDING PLAN & FEEDER 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: 12/15/22
FILE NAME: NAPS PP E1	SHEET: E1.7
PROJECT NUMBER:	



1 E1.8 POWER PLANT COMMUNICATION PLAN
1/4"=1'-0"

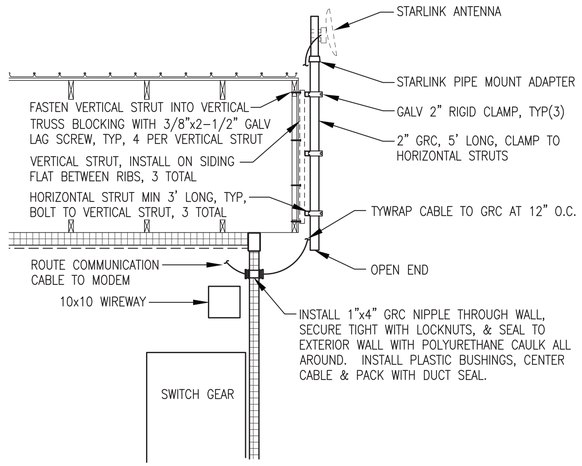
INTERNET SERVICE GENERAL NOTES:

1) THE INTERNET SERVICE SHALL HAVE THE FOLLOWING MINIMUM PERFORMANCE CHARACTERISTICS:
   20 MBPS DOWNLOAD
   5 MBPS UPLOAD
   NO MONTHLY DATA LIMIT
   STARLINK STANDARD OR APPROVED EQUAL.

2) FURNISH AND INSTALL COMPLETE SYSTEM WITH ANTENNA, PIPE MOUNT ADAPTER, MODEM, CABLE, CONNECTORS, ETHERNET ADAPTER, AND ACCESSORIES REQUIRED TO PROVIDE INTERNET SERVICE TO THE NEW POWER PLANT.

3) UPON COMPLETION OF INSTALLATION THE INTERNET SYSTEM SHALL BE COMMISSIONED IN ACCORDANCE WITH THE SERVICE PROVIDER'S REQUIREMENTS.

4) IN ADDITION TO FURNISHING AND INSTALLING SYSTEMS, THE CONTRACTOR SHALL PRE-PAY FOR A 1 YEAR INTERNET SERVICE CONTRACT.



2 E1.8 COMMUNICATIONS ANTENNA & MAST INSTALLATION DETAILS
1/2"=1'-0"

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

REV#1
ISSUED FOR
CONSTRUCTION
NOV 2023

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

REV.	DESCRIPTION	DATE	BY
1	CHANGED INTERNET SERVICE TO STARLINK	11/10/23	BCG

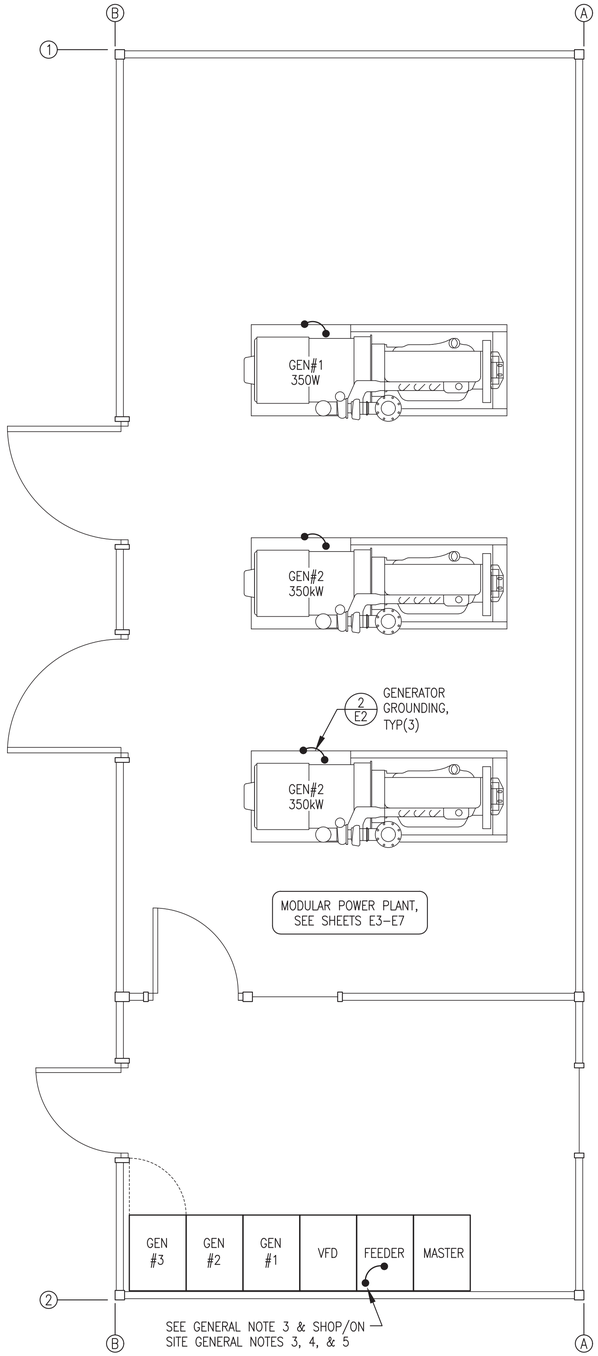
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: POWER PLANT COMMUNICATION 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: 12/15/22
FILE NAME: NAPS PP E1	SHEET: E1.8
PROJECT NUMBER:	



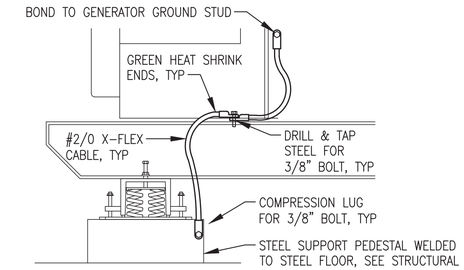
1 E2 MODULE GROUNDING PLAN
3/8"=1'-0"

GROUNDING GENERAL NOTES:

1) POWER PLANT STRUCTURE IS A CONTINUOUSLY WELDED STEEL MODULE WHICH WILL BE FIELD BONDED TO THE GROUNDING GRID.
2) MAKE ALL CABLE CONNECTIONS TO STRUCTURE, SKIDS, OR SUPPORT PEDESTALS WITH COPPER COMPRESSION LUGS AND STAINLESS STEEL BOLTS. DRILL AND TAP STRUCTURAL MEMBERS TO ENSURE FULL CONTACT OF THREADS TO CLEAN BARE STEEL. SEE DETAIL 2/E2, SIMILAR.
3) IN FEEDER SECTION PROVIDE #2/0 BARE COPPER JUMPER FROM GROUND BUS TO STEEL FLOOR. SEE DETAIL 2/E2, SIMILAR.

GROUNDING SHOP/ON–SITE NOTES:

1) ALL WORK SHOWN THIS SHEET TO BE PERFORMED AS PART OF THE SHOP FABRICATION.
2) FIELD INSTALLATION OF GROUND GRID AND BONDING TO MODULE TO BE PERFORMED AS PART OF THE ON–SITE WORK. SEE ENLARGED SITE PLAN.
3) AS PART OF SHOP FABRICATION WORK, TEMPORARILY BOND SWITCHGEAR NEUTRAL BUS TO GROUND BUS FOR LOAD BANK TESTING AND LEAVE IN PLACE.
4) AS PART OF ON–SITE WORK LEAVE NEUTRAL TO GROUND BUS BONDING JUMPER IN PLACE AS REQUIRED FOR LOAD BANK TESTING.
5) REMOVE JUMPER AFTER LOAD BANK TESTING AND PRIOR TO CONNECTING TO THE GRID FOR COMMISSIONING.



2 E2 GENERATOR GROUNDING
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

ISSUED FOR CONSTRUCTION
JULY 2022

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

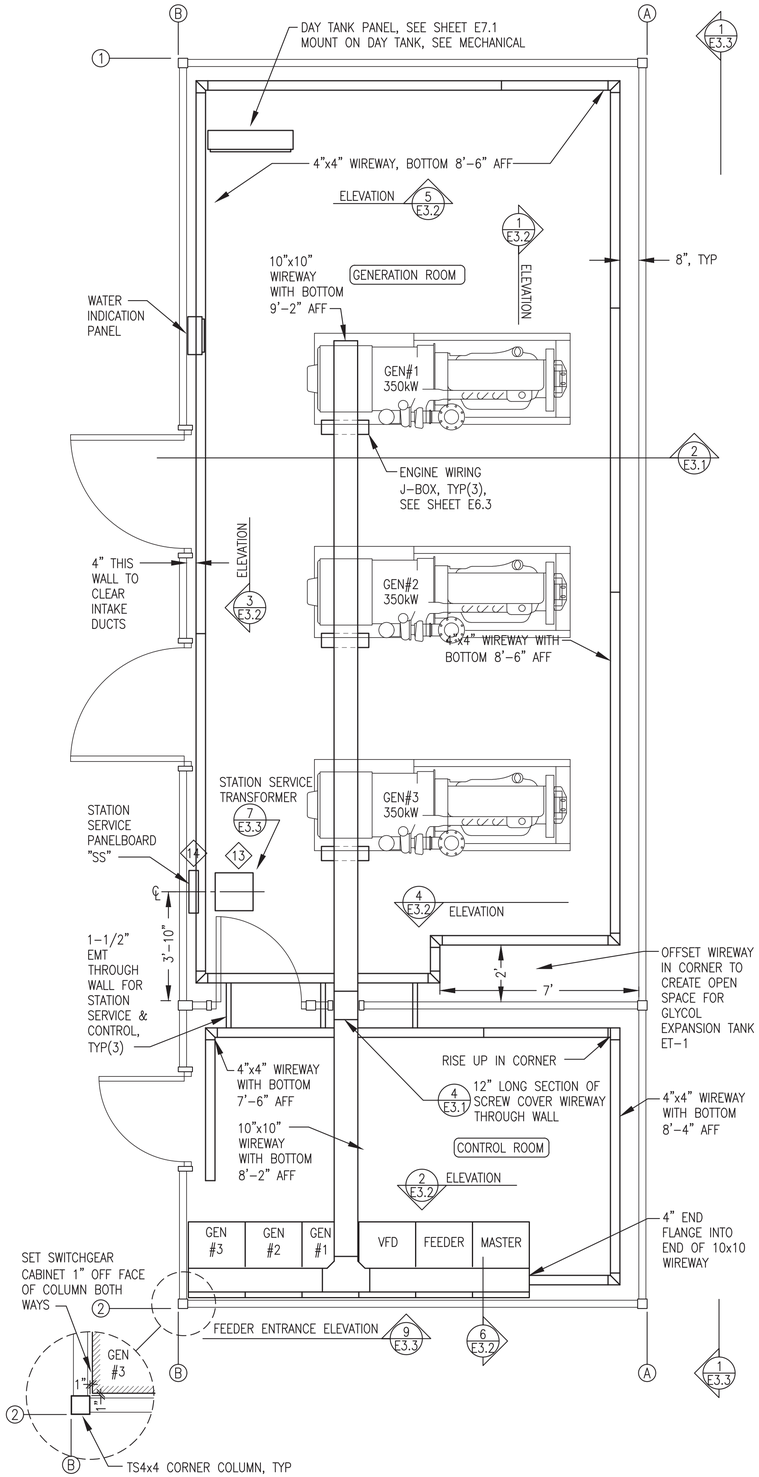
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

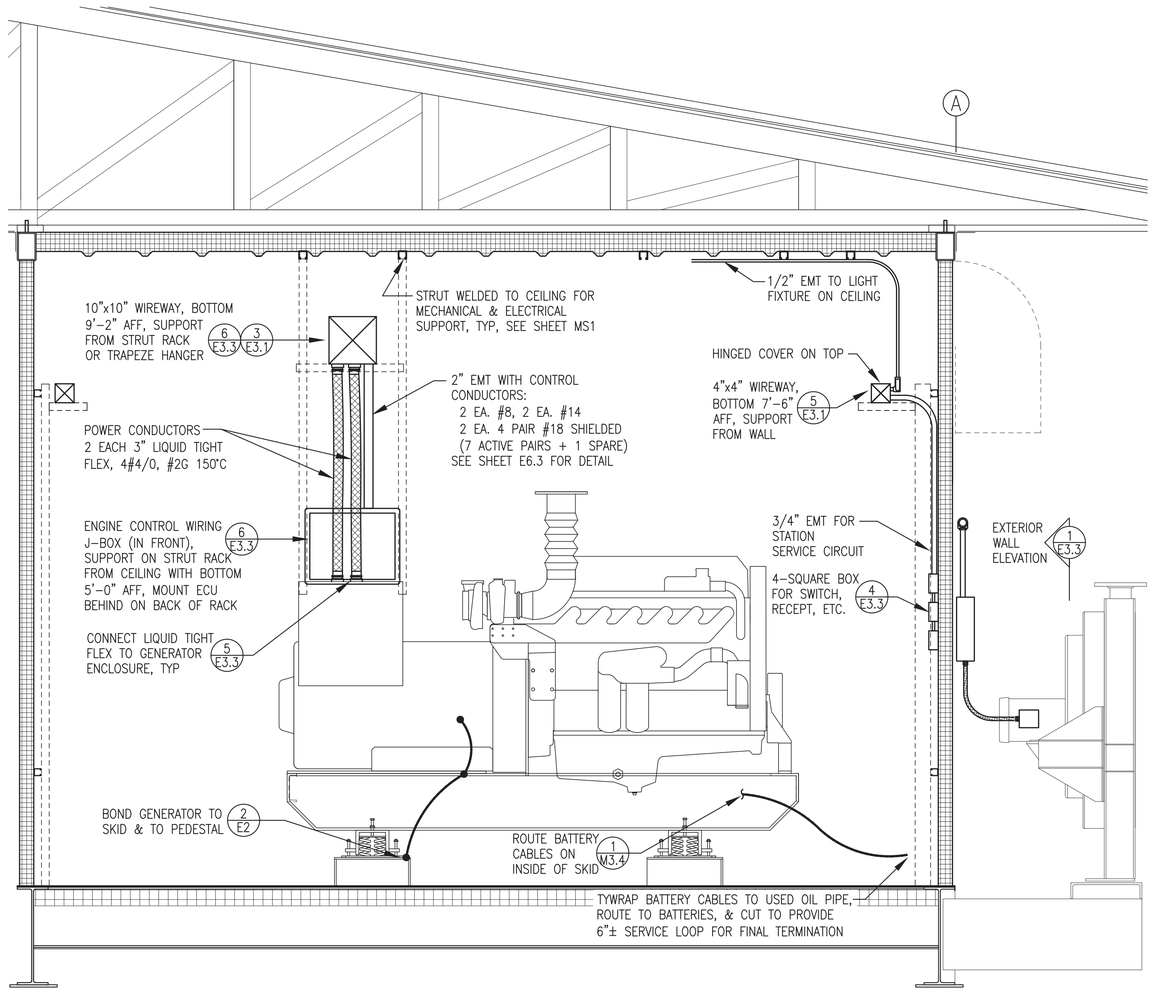
TITLE: MODULE GROUNDING PLAN & DETAILS

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

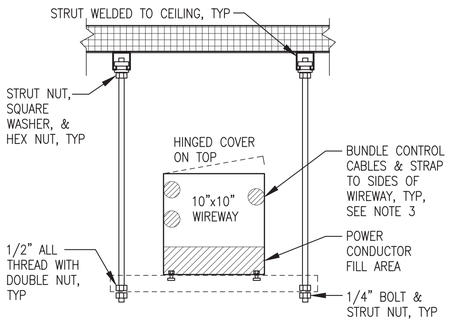
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 7/29/22
FILE NAME: NAPS PP E2–5	SHEET: E2
PROJECT NUMBER:	



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

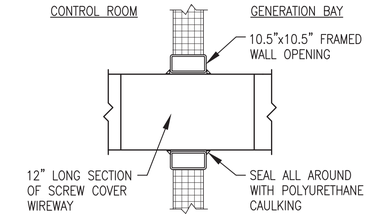


2 E3.1 TYPICAL MODULE SECTION
3/4"=1'-0"

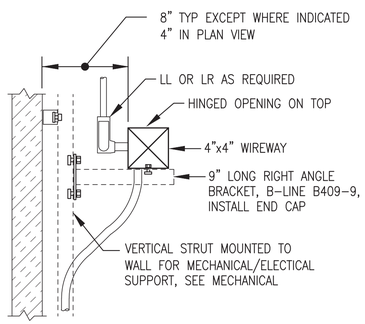


NOTES:
1) INSTALL HANGER AT EACH JOINT & AT END.
2) HANGER NOT REQUIRED AT ENGINE J-BOX SUPPORT, SEE DETAIL 4/E4.3.
3) STRAP CABLES AT 5' O.C. MIN USING 3M 06292 OR EQUAL STICKY BACK BASES. FASTEN BASES TO WIREWAY SIDE WITH MACHINE BOLTS.

3 E3.1 10" WIREWAY TRAPEZE HANGER
NO SCALE



4 E3.1 WIREWAY WALL PENETRATION
NO SCALE



5 E3.1 4" WIREWAY SUPPORT FROM WALL
NO SCALE

ENGINE-GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1, GEN #2, & GEN #3	ENGINE – 500 HP, 350 eKW PRIME, MTU-DETROIT 6063TK35. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 450 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HCI534D.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

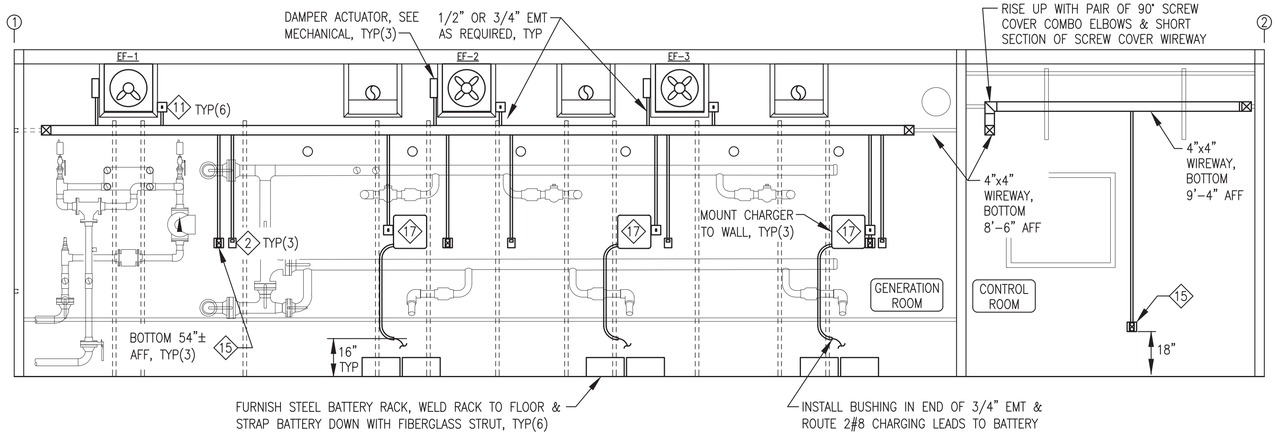
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

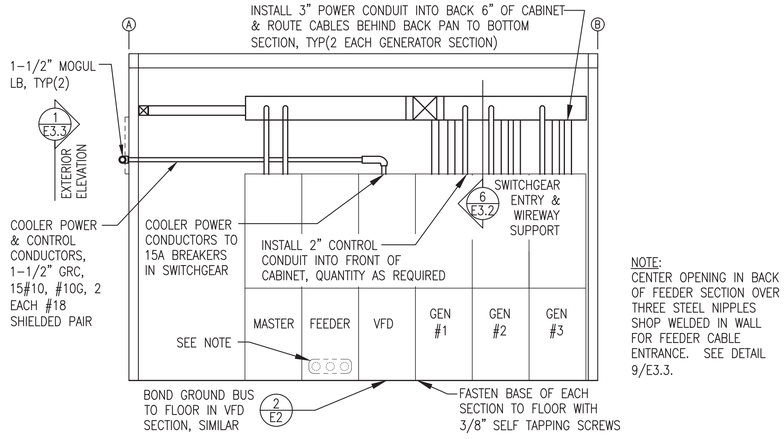
TITLE: WIREWAY PLAN, BUILDING SECTION, & DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 7/29/22
FILE NAME: NAPS PP E2-5 | SHEET: E3.1
PROJECT NUMBER:

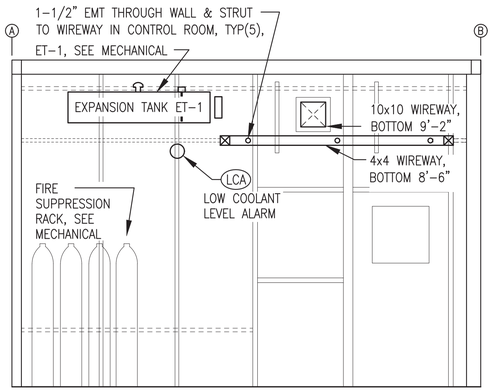


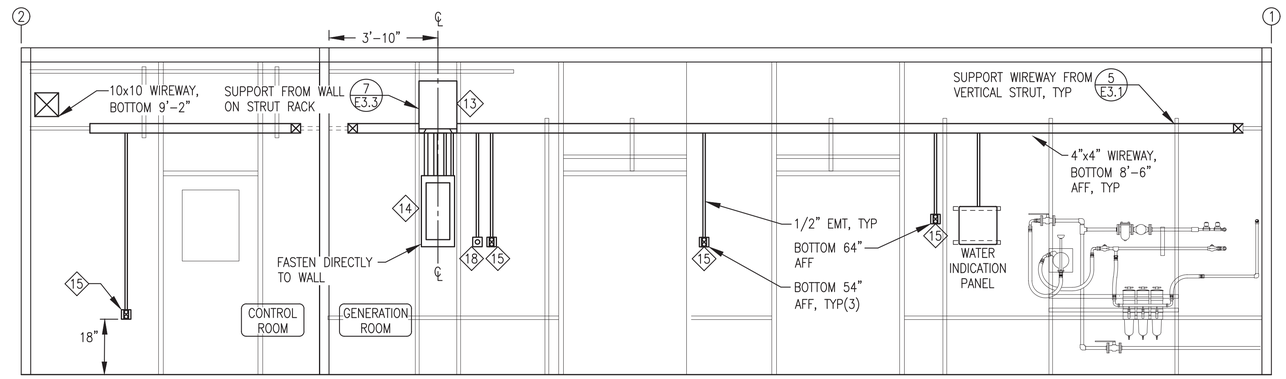
1 E3.2 WALL ELEVATION AT GRID A
3/8"=1'-0"



NOTE:
CENTER OPENING IN BACK OF FEEDER SECTION OVER THREE STEEL NIPPLES SHOP WELDED IN WALL FOR FEEDER CABLE ENTRANCE. SEE DETAIL 9/E3.3.

2 E3.2 WALL ELEVATION AT GRID 2
3/8"=1'-0"

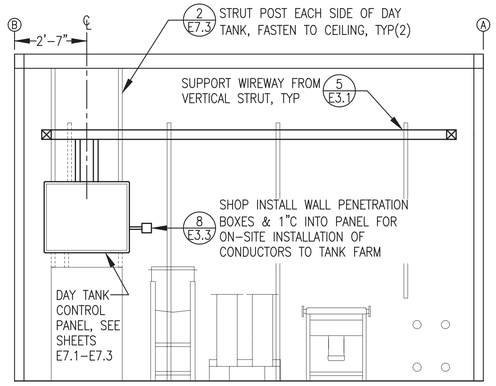




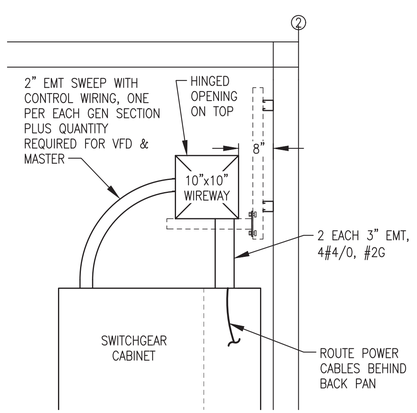
3 E3.2 WALL ELEVATION AT GRID B
3/8"=1'-0"

4 E3.2 INTERIOR WALL ELEVATION
3/8"=1'-0"

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



5 E3.2 WALL ELEVATION AT GRID 1
3/8"=1'-0"



6 E3.2 SWITCHGEAR ENTRY & WIREWAY SUPPORT
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

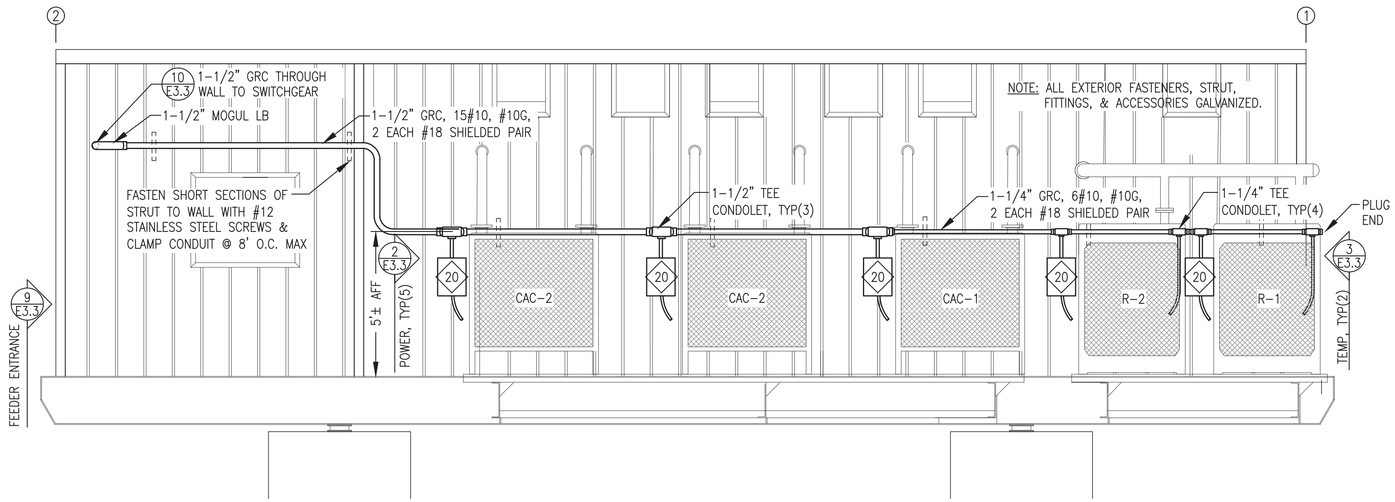
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

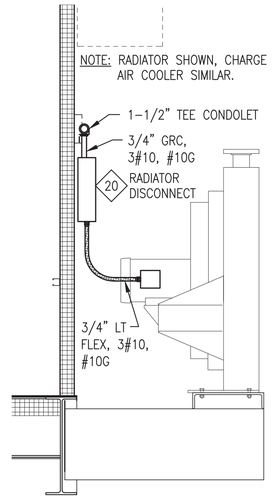
TITLE: ELEVATIONS & DETAILS

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

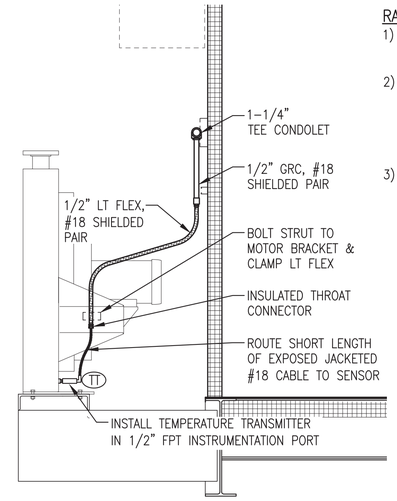
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 7/29/22
FILE NAME: NAPS PP E2-5 | SHEET: E3.2
PROJECT NUMBER:



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

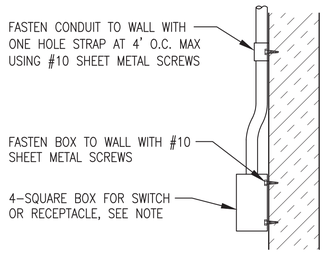


2 E3.3 RADIATOR POWER CONNECTION
3/4"=1'–0"



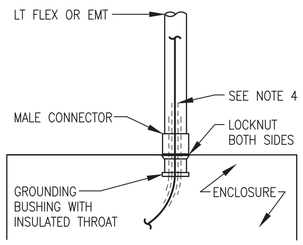
3 E3.3 RADIATOR TEMPERATURE TRANSMITTER
3/4"=1'–0"

RADIATOR SHOP/ON–SITE NOTES:
1) DURING SHOP FABRICATION INSTALL ALL DEVICES AND RACEWAYS AS INDICATED.
2) AS PART OF ON–SITE WORK, IF RADIATORS ARE REMOVED FOR SHIPPING DISCONNECT LIQUID TIGHT FLEXES AND SEAL ENDS. COIL AND SECURE CONDUCTORS AND FLEXES FOR SHIPPING.
3) AS PART OF ON–SITE WORK REINSTALL AS INDICATED.



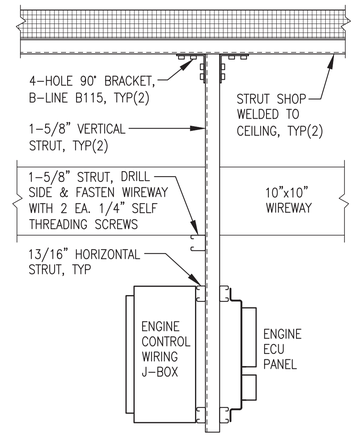
NOTE: INSTALL THERMOSTATS & TIMER SWITCHES IN DEEP SINGLE GANG BELL BOX INSTEAD OF 4–SQUARE BOX.

4 E3.3 TYPICAL INTERIOR DEVICE MOUNTING
NO SCALE

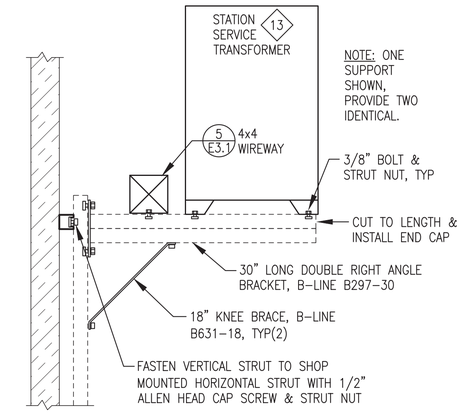


NOTES:
1) THIS DETAIL APPLIES TO CONNECTIONS TO WIREWAY, GENERATOR ENCLOSURES, SWITCHGEAR, AND PANELS.
2) AT A MINIMUM INSTALL GROUNDING BUSHING ON ALL GENERATOR POWER CONDUIT, COMMUNITY FEEDER CONDUIT, STATION SERVICE FEEDERS, AND WHERE OTHERWISE INDICATED OR REQUIRED. BOND GROUNDING BUSHING TO EQUIPMENT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

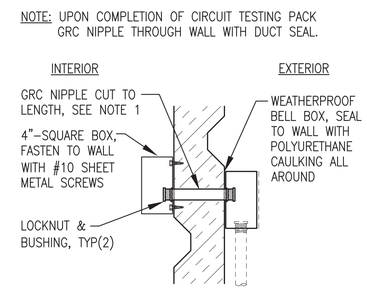
5 E3.3 TYP ENCLOSURE CONNECTION
NO SCALE



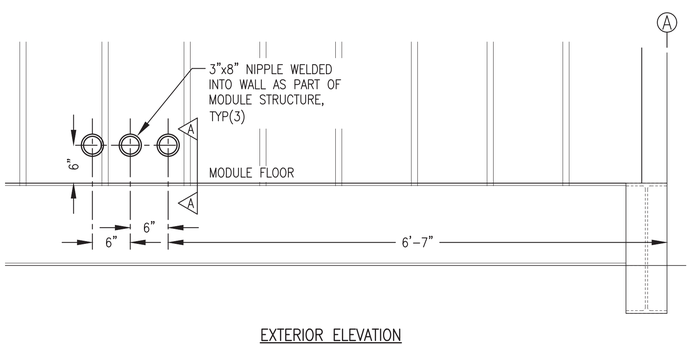
6 E3.3 ENGINE WIRING J–BOX SUPPORT
NO SCALE



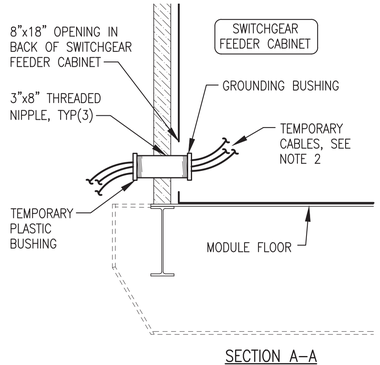
7 E3.3 STATION SERVICE TRANSFORMER SUPPORT
NO SCALE



8 E3.3 TYP EXTERIOR WALL–MOUNT DEVICE
NO SCALE



EXTERIOR ELEVATION

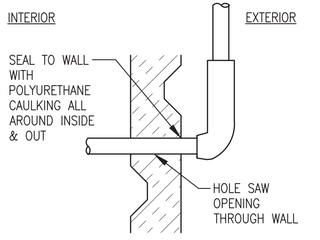


SECTION A–A

9 E3.3 FEEDER ENTRANCE DETAIL
1"=1'–0"

FEEDER SHOP/ON–SITE NOTES:
1) DURING SHOP FABRICATION INSTALL TEMPORARY FEEDER CABLES THROUGH ONE NIPPLE AS SHOWN. SPARE NIPPLE TO REMAIN CAPPED.
2) ROUTE TEMPORARY CABLES TO LOAD BANK FOR TESTING. AFTER TESTING INSTALL THREADED CAP ON EXTERIOR END OF NIPPLE.
3) INSTALL FEEDER TO TRANSFORMER AS PART OF ON–SITE WORK, SEE SHEET E1.2. FOR CONTINUATION.
4) UPON COMPLETION OF TESTING PACK GRC NIPPLES THROUGH WALL WITH DUCT SEAL.

NOTE: UPON COMPLETION OF CIRCUIT TESTING PACK GRC NIPPLE THROUGH WALL WITH DUCT SEAL.



10 E3.3 TYP CONDUIT WALL PENETRATION
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

ISSUED FOR CONSTRUCTION JULY 2022

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

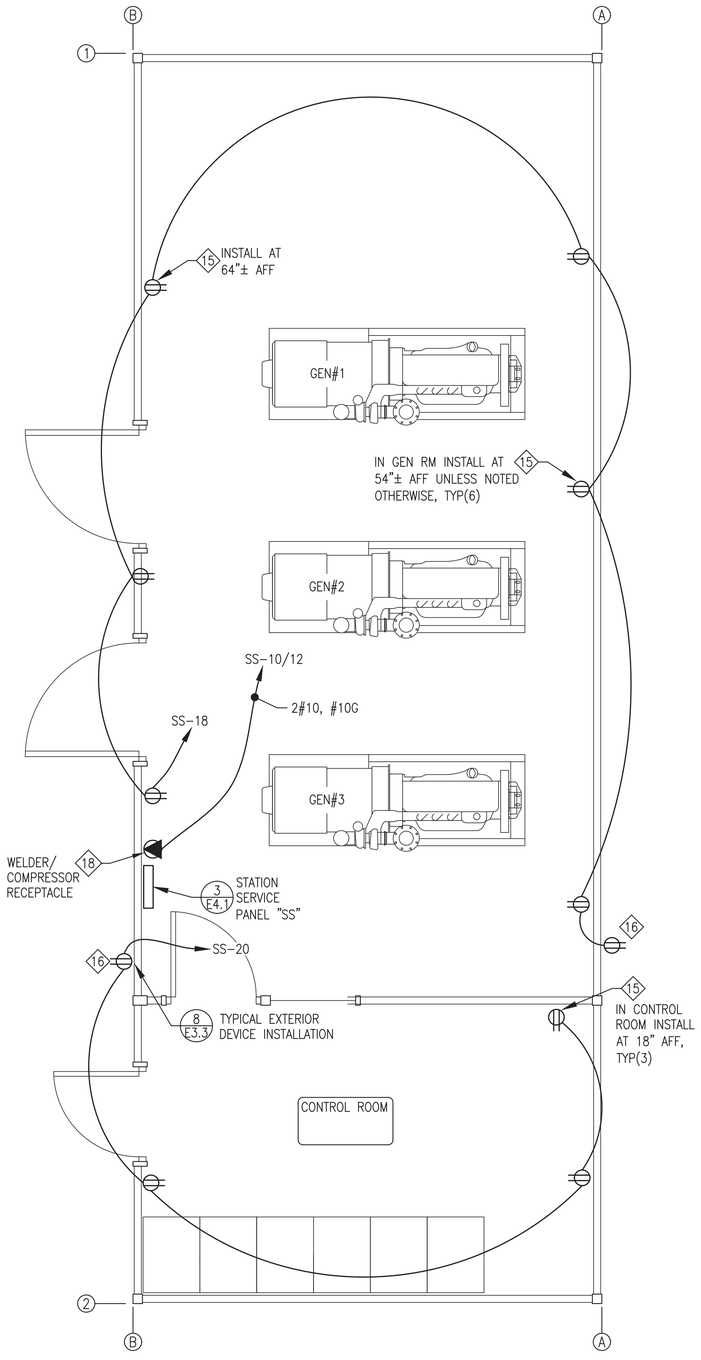
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: ELEVATIONS & DETAILS

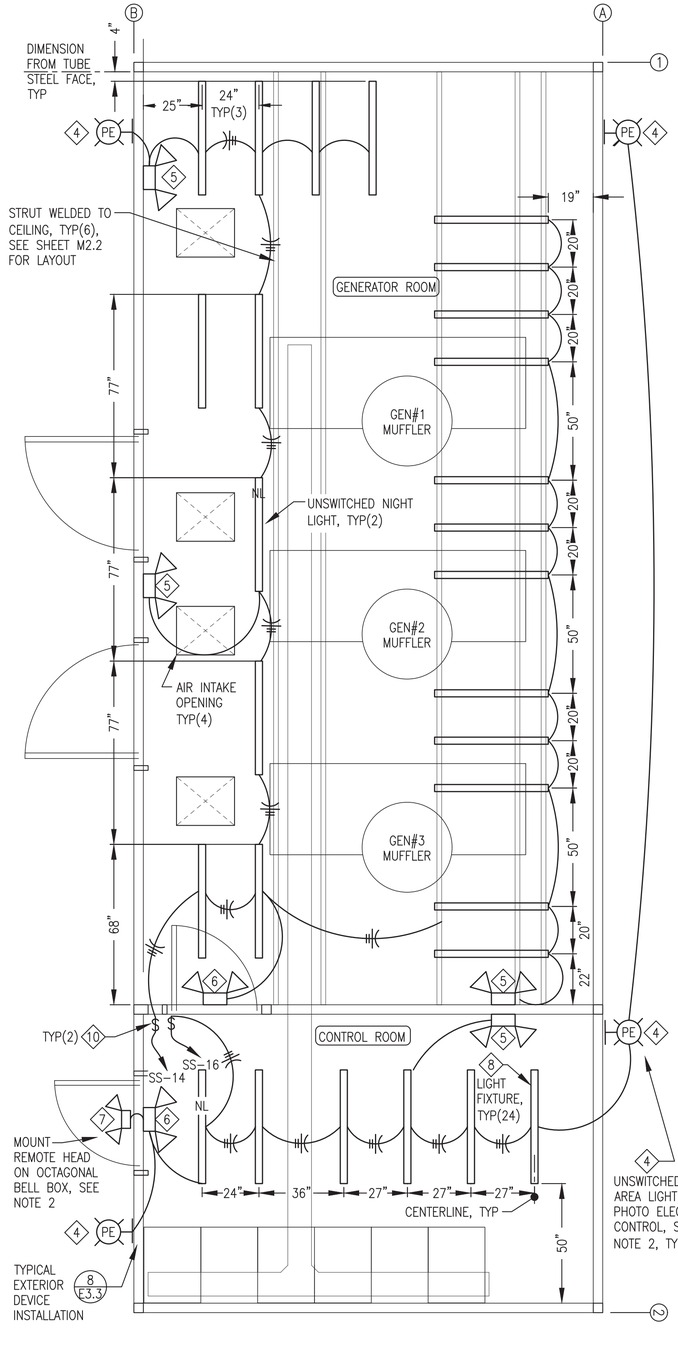
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 7/29/22
FILE NAME: NAPS PP E2–5	SHEET: E3.3
PROJECT NUMBER:	



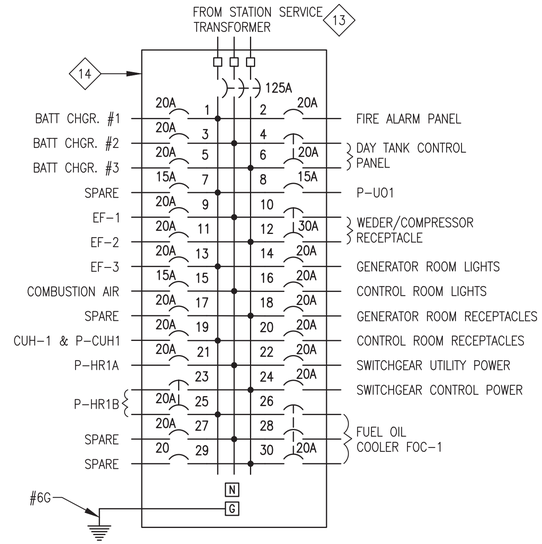
NOTES:
1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.

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 AND EMERGENCY LIGHTS WITH TOP 10'-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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION JULY 2022

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

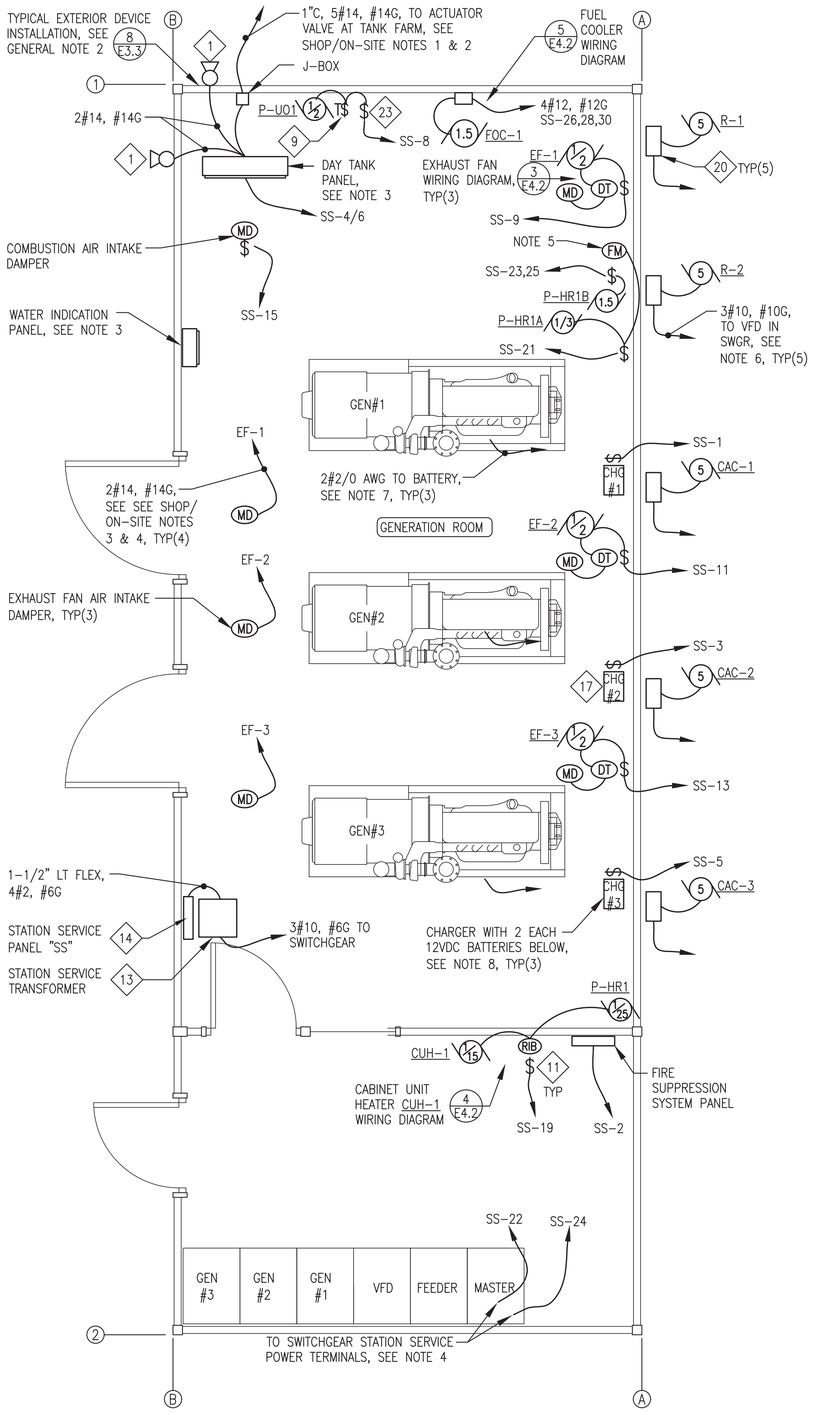
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK 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: 7/29/22
FILE NAME: NAPS PP E2-5	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 10'-0" AFF TO MATCH EXTERIOR LIGHTS, SEE SHEET E4.1

3) SEE SHEETS E7.1-E7.4 FOR DAY TANK AND WATER INDICATION PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.

4) SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL POWER AND CONTROL WIRING.

5) INSTALL FLOW METER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. PROVIDE CONTROL POWER FROM P-HR1A DISCONNECT.

6) ROUTE RADIATOR VFD POWER CONDUCTORS IN SEPARATE EXTERIOR CONDUIT, SEE ELEVATION 1/E3.3. DO NOT ROUTE IN WIREWAY. NOTE THAT CONDUCTORS ARE OVERSIZED FOR 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, SEE DETAIL 2/E3.1. 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.

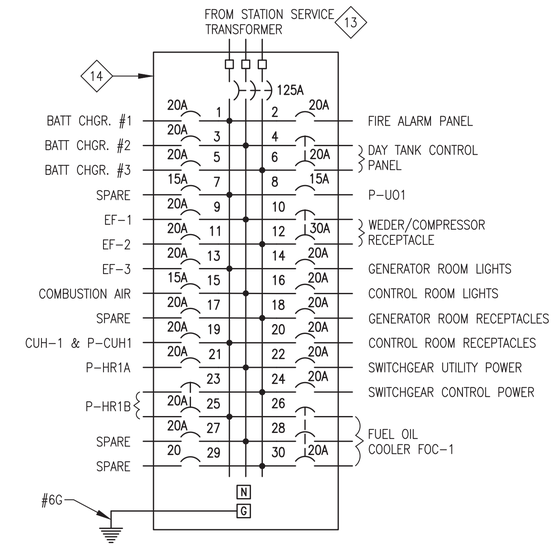
STATION SERVICE SHOP/ON-SITE NOTES:

1) DURING SHOP FABRICATION INSTALL WALL PENETRATION AND CONDUIT INTO DAY TANK PANEL. SEE ELEVATION 5/E3.2.

2) AS PART OF ON-SITE WORK INSTALL CONDUIT AND CONDUCTORS TO ACTUATOR VALVE AT TANK FARM, SEE ENLARGED SITE PLAN.

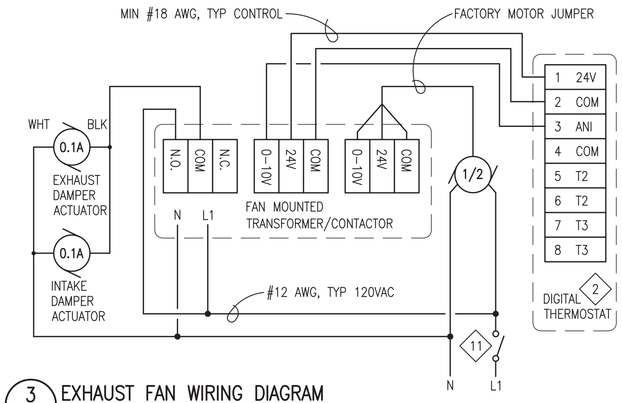
3) DURING SHOP FABRICATION INSTALL CEILING MOUNTED BOX ADJACENT TO DAMPER ACTUATOR AND TEMPORARILY CONNECT DAMPER TO VERIFY OPERATION.

4) AS PART OF ON-SITE WORK INSTALL CONDUIT AND CONDUCTORS TO DAMPER ACTUATOR. SEE SHEET M7.



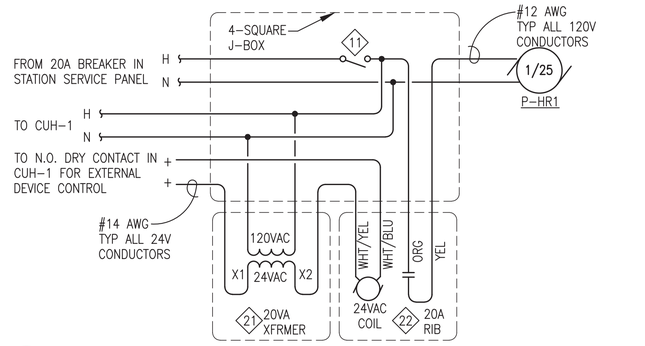
2 E4.2 STATION SERVICE PANEL "SS"

NO SCALE



3 E4.2 EXHAUST FAN WIRING DIAGRAM

NO SCALE



4 E4.2 CUH-1 WIRING DIAGRAM

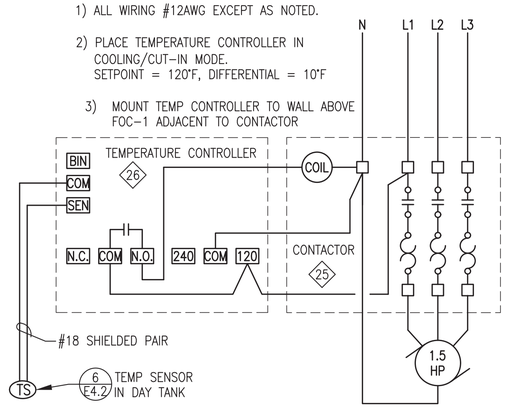
NO SCALE

NOTES:

1) ALL WIRING #12AWG EXCEPT AS NOTED.

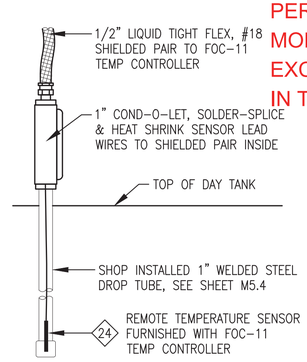
2) PLACE TEMPERATURE CONTROLLER IN COOLING/CUT-IN MODE. SETPOINT = 120°F, DIFFERENTIAL = 10°F

3) MOUNT TEMP CONTROLLER TO WALL ABOVE FOC-1 ADJACENT TO CONTACTOR



5 E4.2 FOC-1 WIRING DIAGRAM

NO SCALE



6 E4.2 TANK TEMP SENSOR INSTALLATION

NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

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

REVISION #1 ISSUED AUGUST 2022

REV.	DESCRIPTION	DATE	BY
1	REVISED TO COORDINATE WITH FINAL ON-SITE DESIGN	8/26/22	BCG

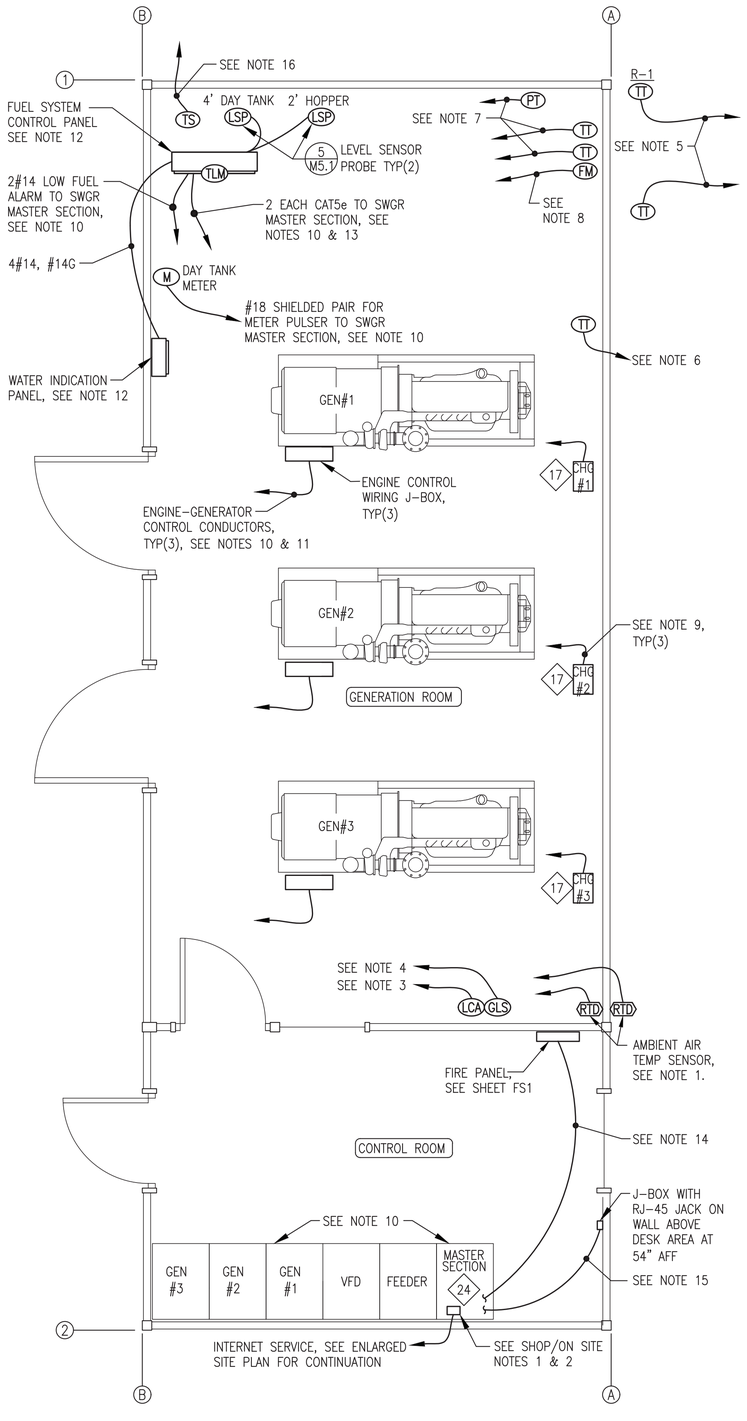
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK 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: 7/29/22
FILE NAME: NAPS PP E2-5	SHEET: E4.2
PROJECT NUMBER:	



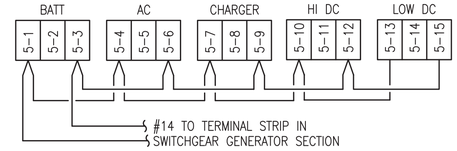
1 E5 INSTRUMENTATION & DATA PLAN
3/8"=1'-0"

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 RBB WIFI ROUTER MODEM AND INTERNET ROUTER ON TOP OF MASTER SECTION IN RACK OR CABINET. CONNECT MODEM TO ROUTER. CONNECT ROUTER TO ETHERNET SWITCH INSIDE MASTER SECTION. CONNECT BOTH TO 120VAC UPS. SEE NOTE 10 AND SHOP/ON SITE NOTES 1 AND 2.
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 ENGINE-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 IN DESK AREA TO ETHERNET SWITCH IN MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
16. INSTALL FUEL COOLER TEMP SENSOR IN DAY TANK AND ROUTE #18 SHIELDED PAIR TO FUEL COOLER CONTROLLER, SEE DETAILS 5/E4.2 AND 6/E4.2.

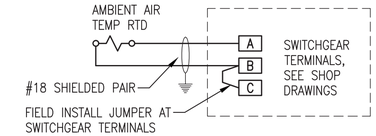
INSTRUMENTATION SHOP/ON-SITE NOTES:

1. AS PART OF SHOP FABRICATION INSTALL ETHERNET SWITCH IN MASTER SECTION.
2. AS PART OF ON-SITE WORK INSTALL STARLINK MODEM WITH ETHERNET ADAPTER IN BOTTOM OF MASTER SECTION. CONNECT MODEM TO ETHERNET SWITCH AND TO 120VAC UPS INSIDE MASTER SECTION. SEE NOTE 10.



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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

REV#1
ISSUED FOR CONSTRUCTION
NOV 2023

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

REV.	DESCRIPTION	DATE	BY
1	CHANGED INTERNET SERVICE TO STARLINK	11/10/23	BCG

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: INSTRUMENTATION & DATA PLAN & DETAILS

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

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: NAPS PP E2-5
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 7/29/22
SHEET: E5

Final (Permanent) Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	One Gen	350	310	---
Level 2	Two Gens	700	620	280
Level 3	All	1050	---	560
Note: All generators are equal capacity. Manually select lead unit.				
Temporary Demand Control for Shop Load Test with 300kW Load Bank				
Level 1	One Gen	150	135	---
Level 2	Two Gens	300	270	120
Level 3	All	450	---	240
Note: Temporarily set to reduced values in order to test all demand levels.				

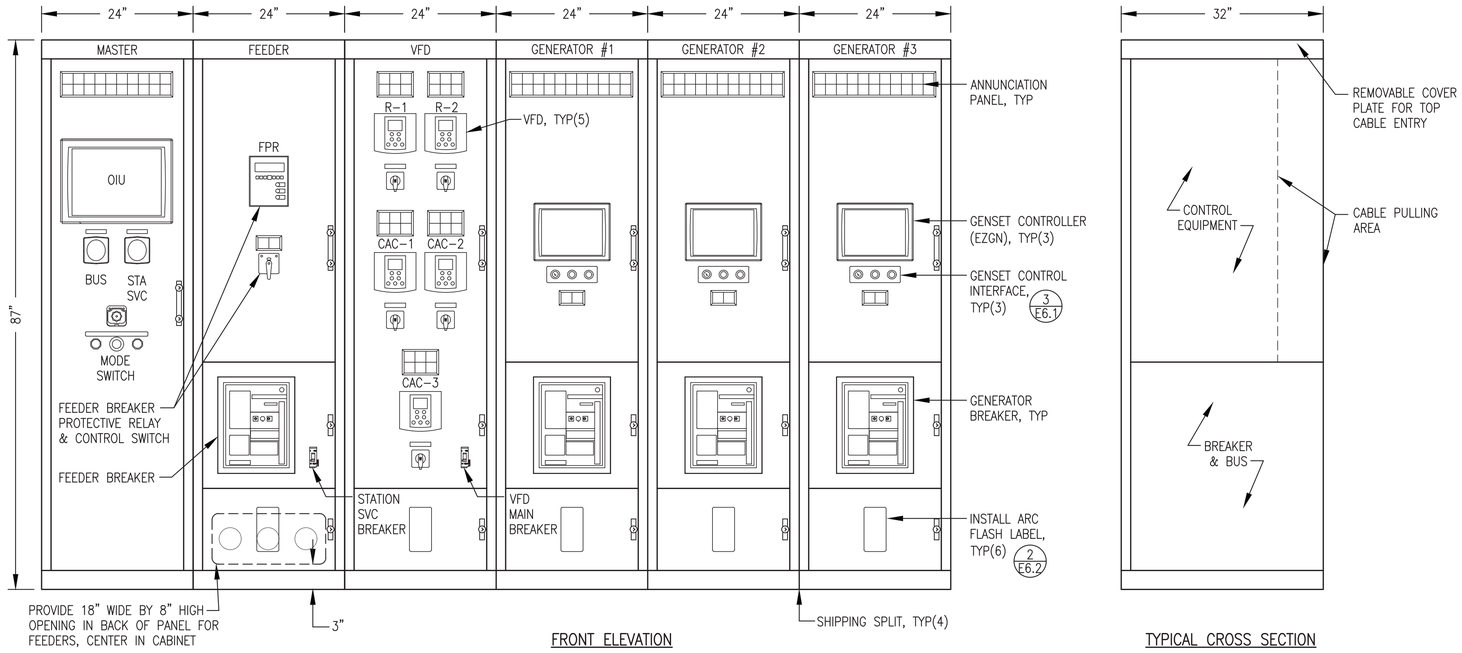
Engine-Generator Alarm Settings (EZGN Genset Controller)			
Function	Normal Range	Alarm	Shut Down
Overspeed	1795-1805	----	1900 RPM
Oil Pressure	30-50 PSI	14.5 PSI	10 PSI
Air Filter Vacuum	1-10" H2O	15" H2O	20" H2O
Coolant Temp.	180-200°F	210°F	215°F
Exhaust Temp.	500-850°F	900°F	-----
Charge Air Temp.	100-120°F	140°F	150°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 (EZGN Genset Controller)	
Function	Setting
Gen Breaker Trip Setpoint (EZGN Rated Current)	600 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	4.7
T.O.C. Curve Selection	U4
T.O.C. Time Dial	5.00
E.M Reset delay (Y/N)	N
Constant Time Adder (seconds)	0.00
Minimum Response Time (seconds)	0.00
Maximum Phase T.O.C. Torque Control	1

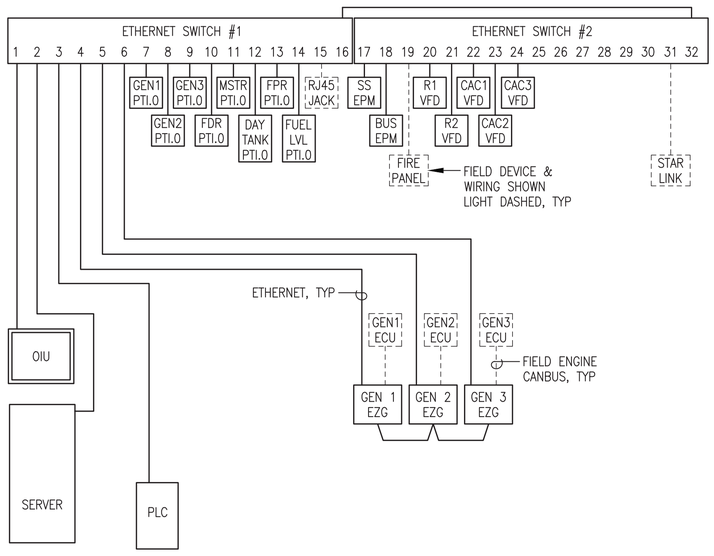
Radiator VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	1
PID Reference Temperature	175°F
Proportional Gain	0.93
Integral Gain	0.3
Derivative	0
Minimum Speed	10 Hz.
Low Speed Timeout	10 sec.
Loss of Phase	Ignore

Charge Air Cooler VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	Not Used
PID Reference Temperature	100°F
Proportional Gain	0.2
Integral Gain	0.1
Derivative	0

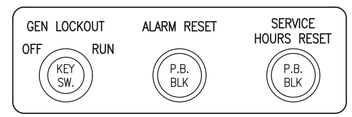


1/E6.1 SWITCHGEAR ENCLOSURE LAYOUT
NO SCALE

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



2/E6.1 COMMUNICATION SCHEMATIC
NO SCALE



INTERFACE CONTROLS LEGEND:
P.B. PUSH BUTTON
KEY SW. KEY OPERATED LOCKABLE SWITCH

EASYGEN INTERFACE CONTROLS

3/E6.1 GENSET CONTROL (EZGN) INTERFACE CONTROLS
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REV#1
ISSUED FOR CONSTRUCTION
NOV 2023

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

REV.	DESCRIPTION	DATE	BY
1	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG

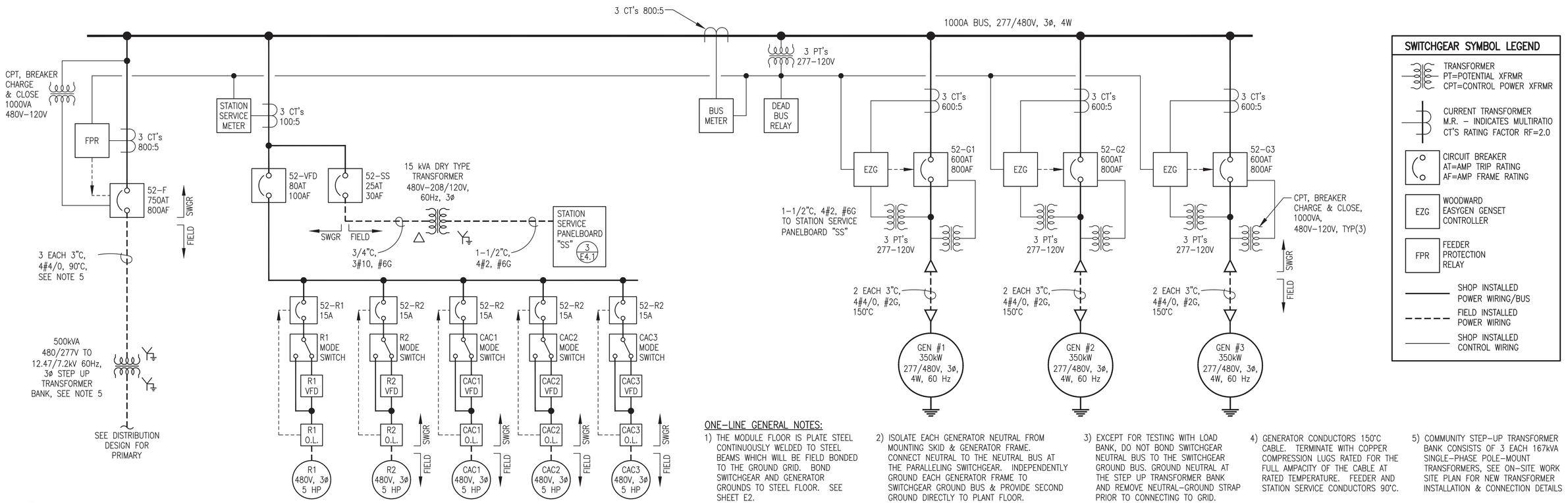
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: SWITCHGEAR ENCLOSURE LAYOUT, SETTING TABLE, & 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: 7/29/22
FILE NAME: NAPS PP E6	SHEET: E6.1
PROJECT NUMBER:	



SWITCHGEAR SYMBOL LEGEND

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

1 E6.2 SWITCHGEAR ONE–LINE DIAGRAM

NO SCALE

ONE–LINE GENERAL NOTES:

1) THE MODULE FLOOR IS PLATE STEEL CONTINUOUSLY WELDED TO STEEL BEAMS WHICH WILL BE 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) EXCEPT FOR TESTING WITH LOAD BANK, DO NOT BOND SWITCHGEAR NEUTRAL BUS TO THE SWITCHGEAR GROUND BUS. GROUND NEUTRAL AT THE STEP UP TRANSFORMER BANK AND REMOVE NEUTRAL–GROUND STRAP PRIOR TO CONNECTING TO GRID.
4) GENERATOR CONDUCTORS 150°C CABLE. TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT RATED TEMPERATURE. FEEDER AND STATION SERVICE CONDUCTORS 90°C.
5) COMMUNITY STEP–UP TRANSFORMER BANK CONSISTS OF 3 EACH 167kVA SINGLE–PHASE POLE–MOUNT TRANSFORMERS, SEE ON–SITE WORK SITE PLAN FOR NEW TRANSFORMER INSTALLATION & CONNECTION DETAILS

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.

WARNING

07-13-2022

Arc Flash and Shock Hazard Appropriate PPE Required

Arc Flash Boundary	1.6 ft
Incident Energy (cal/cm²)	1.3
Working Distance	18.0 in

Arc-rated long-sleeve shirt and arc-rated pants or arc-rated coverall and/or arc flash suit, Arc-rated face shield, Arc-rated jacket, Hard hat, Arc-rated hard hat liner, Safety glasses, Hearing protection, Leather gloves and Leather work shoes.

Shock Hazard Exposure: **480 V**
Shock Hazard **when covers removed**

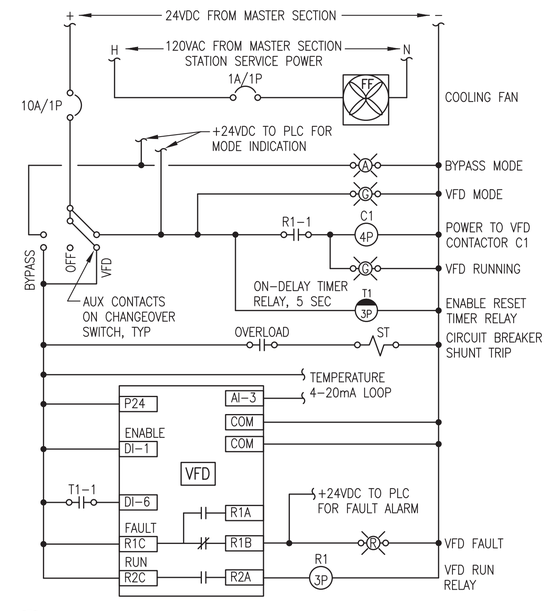
Limited Approach	3.5 ft	Class 00
Restricted Approach	1.0 ft	Insulating Gloves
		V-rating 500 VAC

GENERATOR

FEEDER

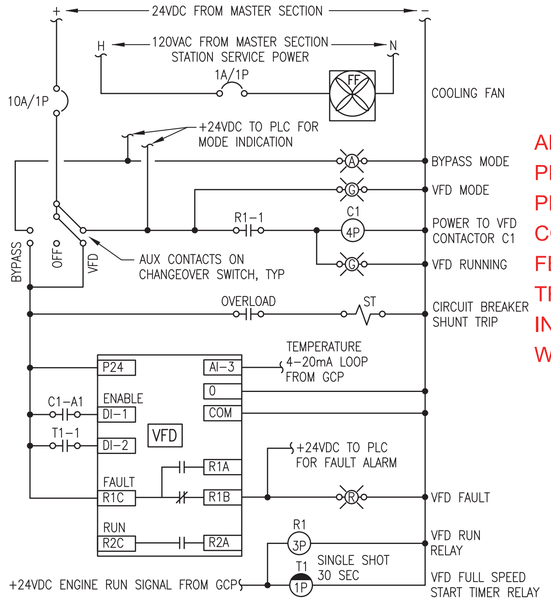
2 E6.2 ARC FLASH LABELS

NO SCALE



3 E6.2 TYPICAL RADIATOR VFD LOGIC DIAGRAM

NO SCALE



4 E6.2 TYPICAL CHARGE AIR COOLER VFD LOGIC DIAGRAM

NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT FOR THE FEEDER AND STEP UP TRANSFORMER WHICH ARE INCLUDED IN THE ON SITE WORK.

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

ISSUED FOR CONSTRUCTION JULY 2022

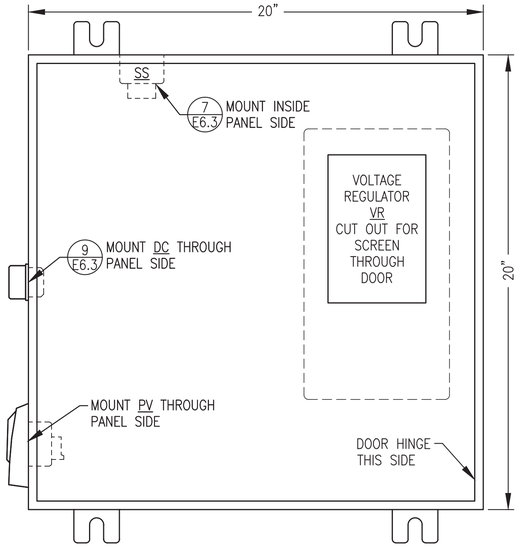
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

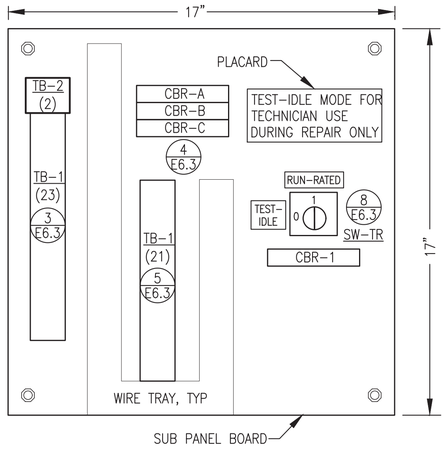
TITLE: SWITCHGEAR ONE–LINE & DETAILS

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

DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 7/29/22
FILE NAME: NAPS 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

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
DC	DEUTSCH	HD10-9-1939P	DIAGNOSTIC CONNECTOR, 9-PIN, CAN-BUS
	DEUTSCH	HD18-009	CONNECTOR STRAIN RELIEF
	DEUTSCH	HDC16-9	CONNECTOR PROTECTIVE DUST CAP
	DEUTSCH	HD10-9-GKT	CONNECTOR GASKET
	DEUTSCH	JDL062397	CONNECTOR LANYARD
ENCL.	HOFFMAN	A20H20ALP	20x20x8" NEMA 12
	HOFFMAN	A20P20	BACK PANEL
PV	MURPHY	PV101-C	POWER VIEW (NON-TIER 4) WITH HARNESS
SS	JOHN DEERE	AT145341	STARTER AUXILIARY SOLENOID, 24V
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

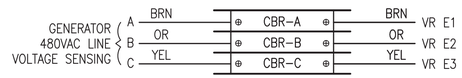
BRAND SPECIFIC NOTE: SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE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

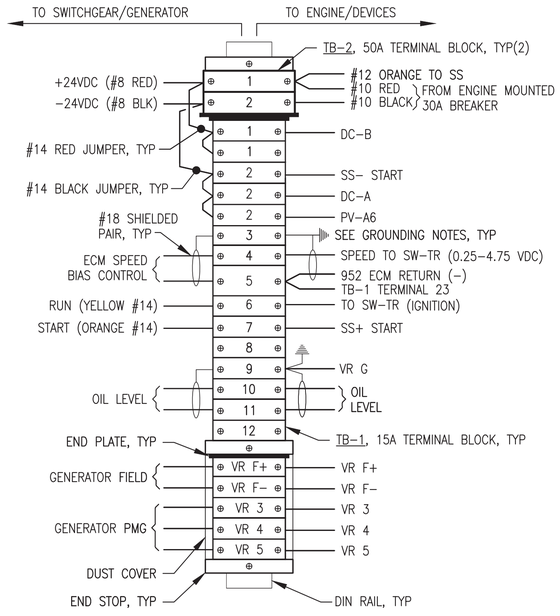
1) PROVIDE ASSEMBLY WITH ALL DEVICES AND WIRING INDICATED.
2) INSTALL IN A NEMA 12 ENCLOSURE WITH MOUNTING FLANGES AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL AND HINGED LOCKABLE DOOR. SIZE AS INDICATED.
3) PROVIDE DIN RAIL, TERMINAL END PLATES, TERMINAL END STOPS, TERMINAL DUST COVERS AND OTHER MISCELLANEOUS 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 BACK PANEL 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 AT ENGINE J-BOX ONLY. CLIP DRAIN WIRES AT OPPOSITE ENDS.

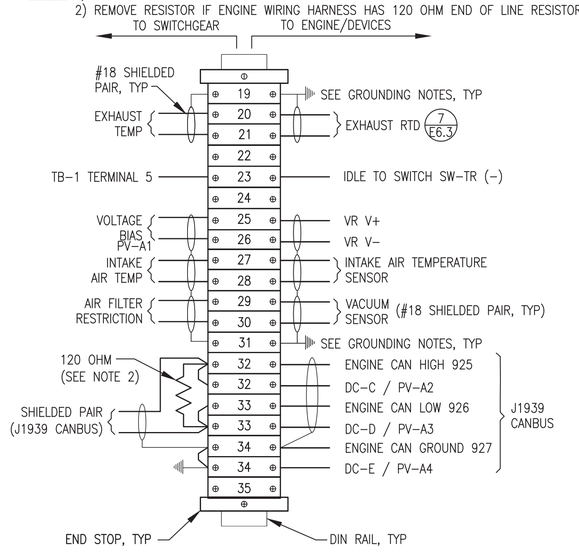


4 E6.3 CIRCUIT BREAKER CONNECTIONS
NO SCALE

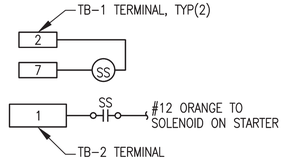


3 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE

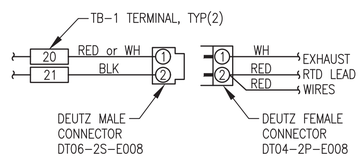
NOTES: 1) ALL RESISTORS 0.25W.
2) REMOVE RESISTOR IF ENGINE WIRING HARNESS HAS 120 OHM END OF LINE RESISTOR.



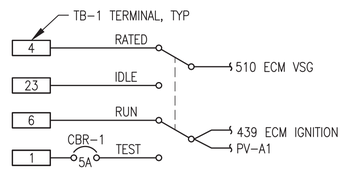
5 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE



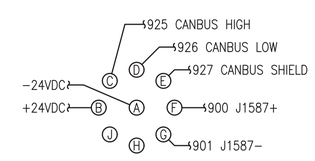
6 E6.3 STARTER AUX SOLENOID SS WIRING
NO SCALE



7 E6.3 EXHAUST RTD CONNECTOR
NO SCALE



8 E6.3 TEST-IDLE/RUN-RATED SWITCH SW-TR WIRING
NO SCALE



9 E6.3 DIAGNOSTIC CONNECTOR WIRING
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION JULY 2022

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

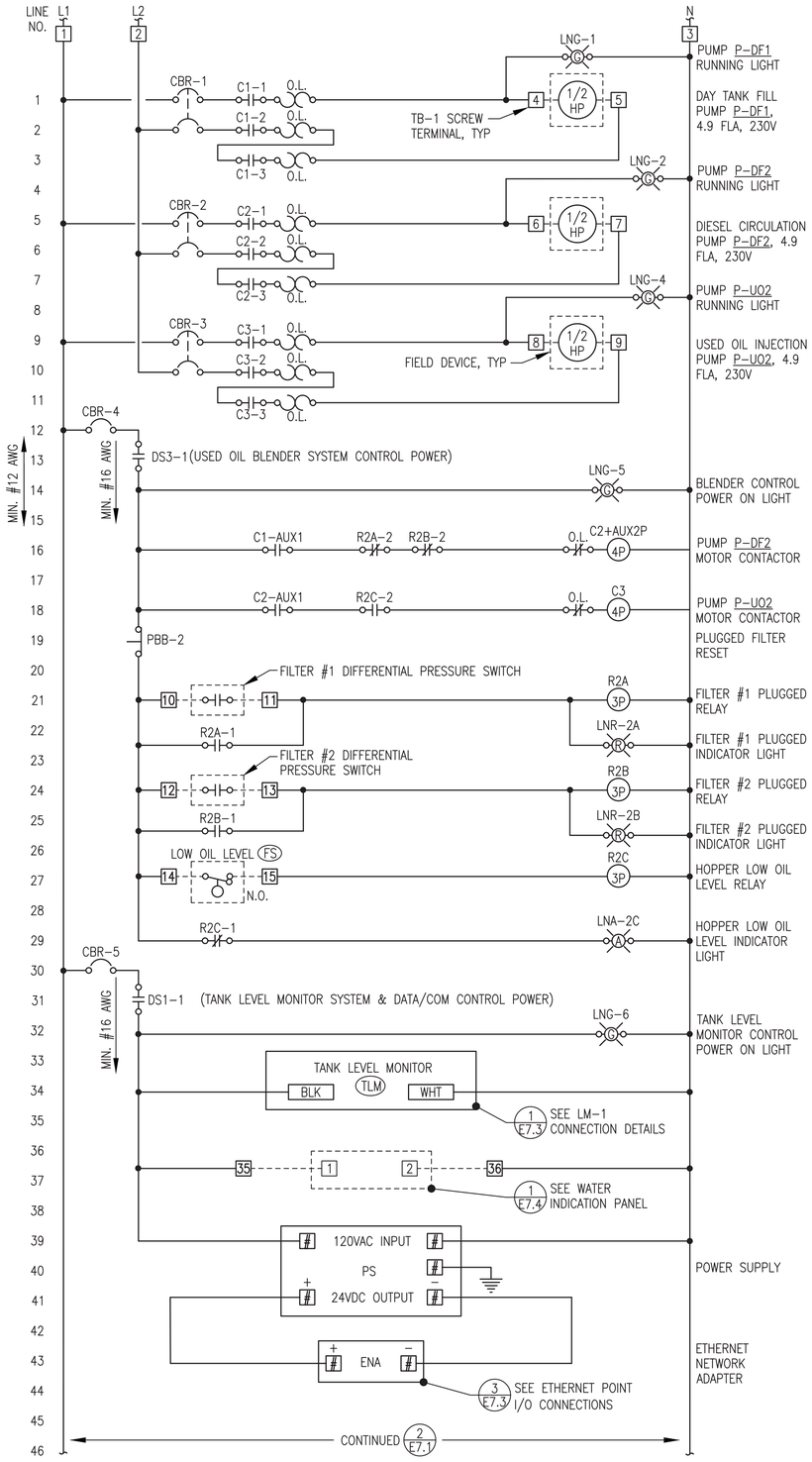
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

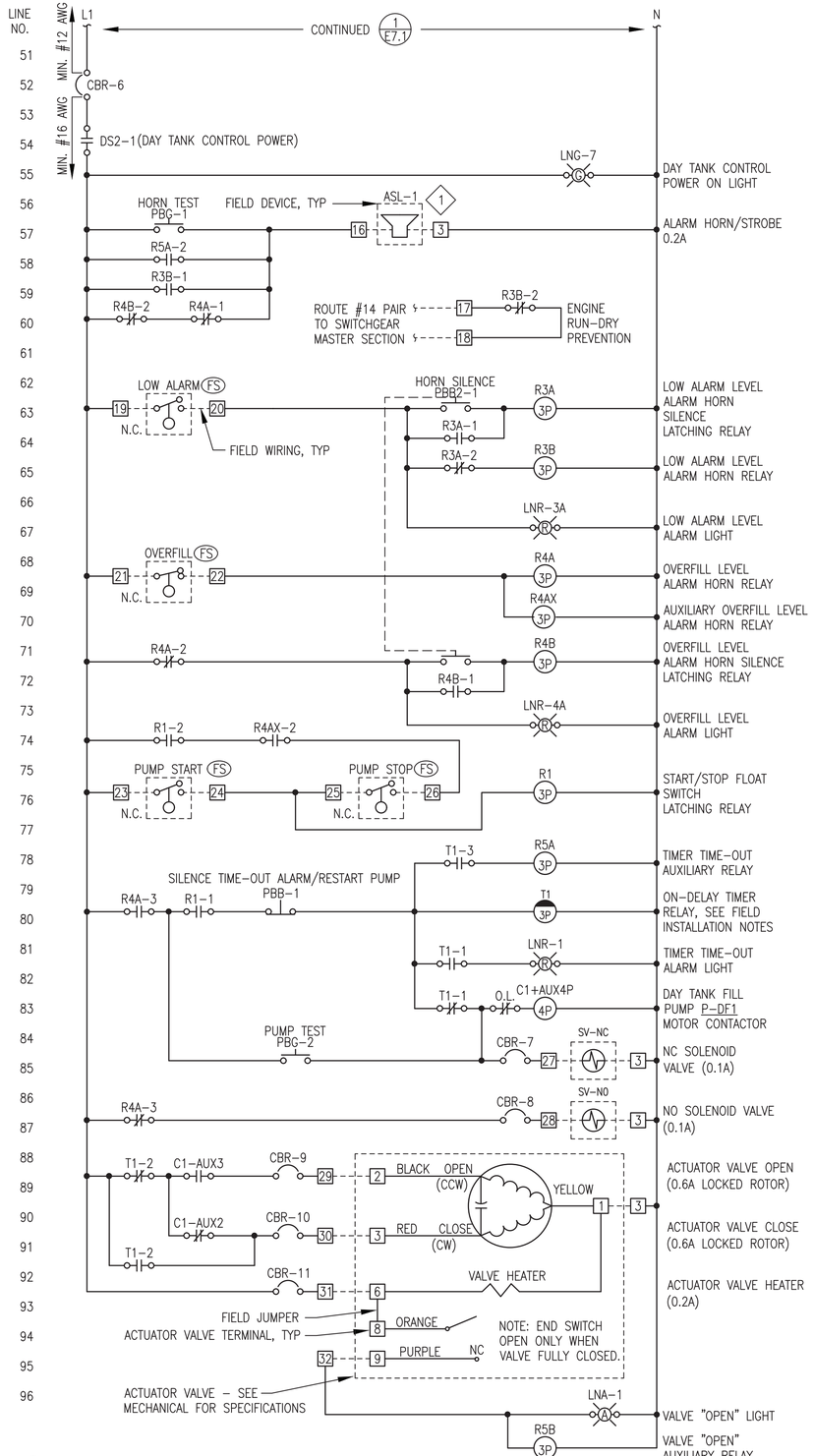
TITLE: 24VDC ENGINE WIRING JUNCTION BOX

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

DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 7/29/22
FILE NAME: NAPS PP E6 | SHEET: E6.3
PROJECT NUMBER:



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



2 E7.1 DAY TANK LOGIC DIAGRAM
NO SCALE

BILL OF MATERIALS

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

TAG	MANUFACTURER	MODEL	DESCRIPTION
AUX2P	ALLEN-BRADLEY	100FA11	AUXILIARY CONTACT FOR CONTACTOR, 2 POLE, NO, NC
AUX4P	ALLEN-BRADLEY	100FA31	AUXILIARY CONTACT FOR CONTACTOR, 4 POLE, 3NO, 1NC
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
DI8	ALLAN-BRADLEY	1734-IB8	DIGITAL INPUT MODULE, 24VDC, 8 POINT, SINKING
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
PS	PULS	CP5.241-S1	5A, 120VAC/24VDC POWER SUPPLY
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 SHEET M1.1		

LEGEND

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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT FOR TERMINATION AT THE PANEL OF EXTERIOR FIELD CONDUCTORS SHOWN ON SHEET E1.7 IS INCLUDED IN THE ON SITE WORK.

REV#1
ISSUED FOR CONSTRUCTION
NOV 2023

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

REV.	DESCRIPTION	DATE	BY
1	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG

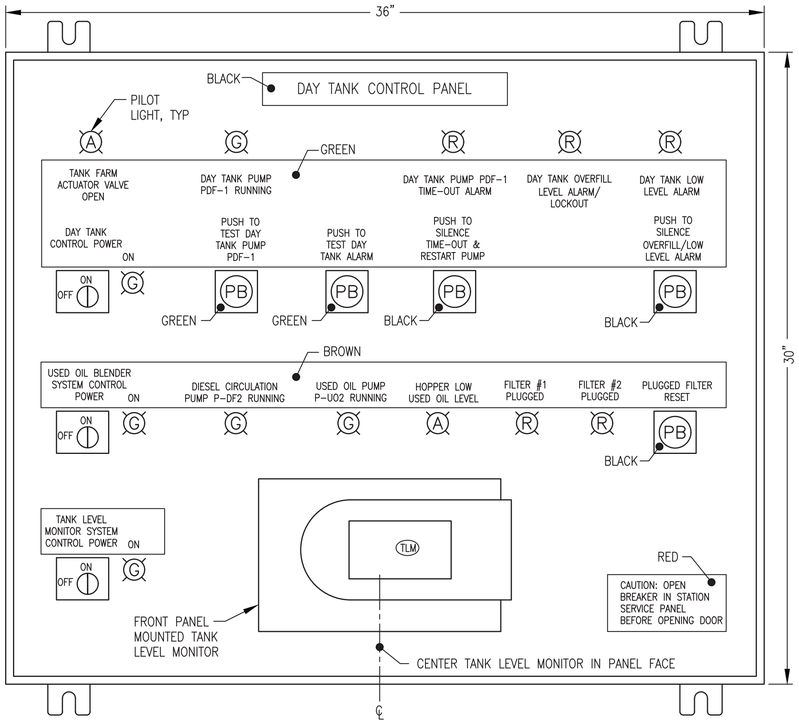
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

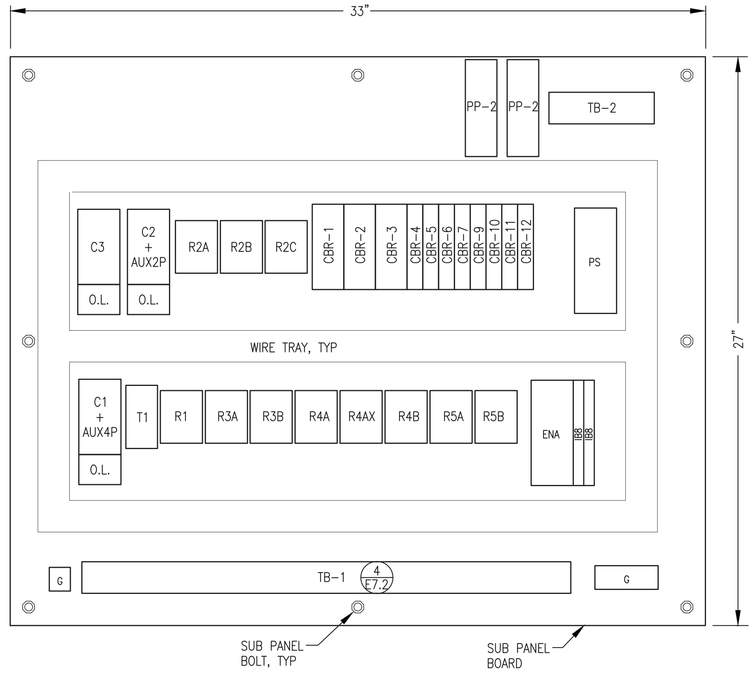
TITLE: DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS

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

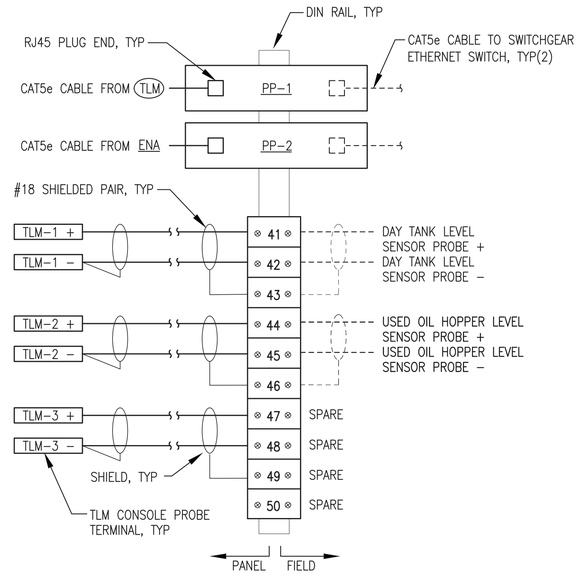
DRAWN BY: BCG/JTD
DESIGNED BY: CWV/BCG
FILE NAME: NAPS PP E7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 7/29/22
SHEET: E7.1



1 E7.2 FRONT PANEL LAYOUT
NO SCALE



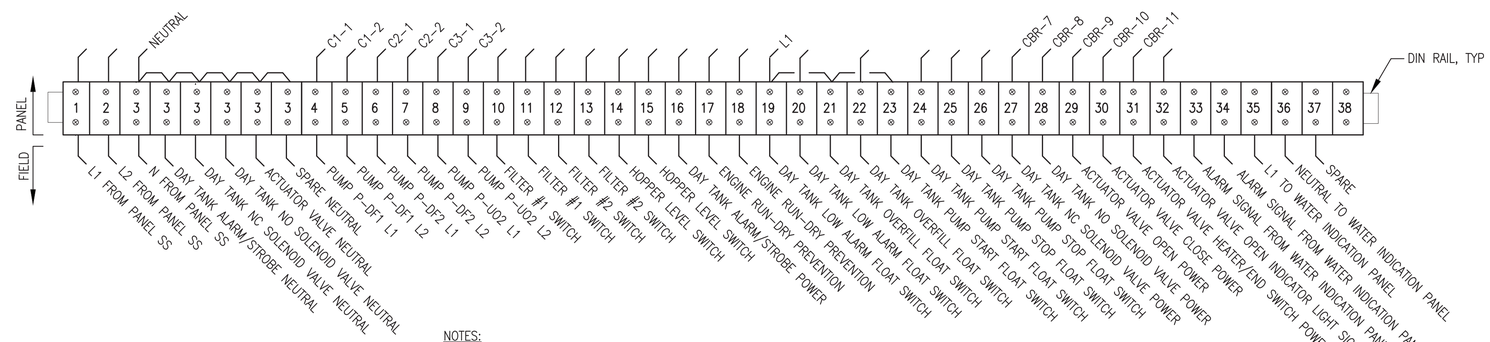
2 E7.2 SUB PANEL LAYOUT
NO SCALE



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.

3 E7.2 TB–2 TERM STRIP 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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REV#1
ISSUED FOR CONSTRUCTION
NOV 2023

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

REV.	DESCRIPTION	DATE	BY
1	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK 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: 7/29/22
FILE NAME: NAPS 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.

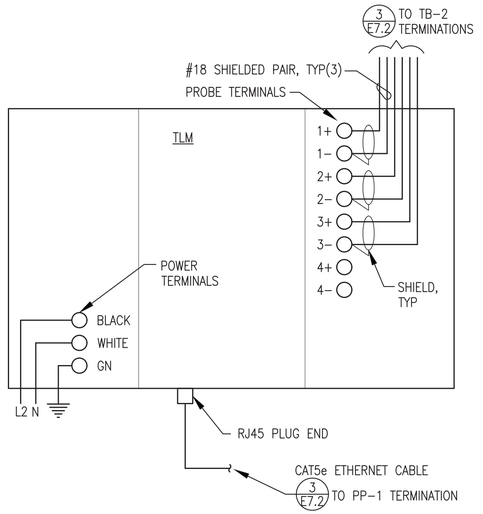
USED OIL BLENDER SYSTEM SEQUENCE OF OPERATIONS:

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.

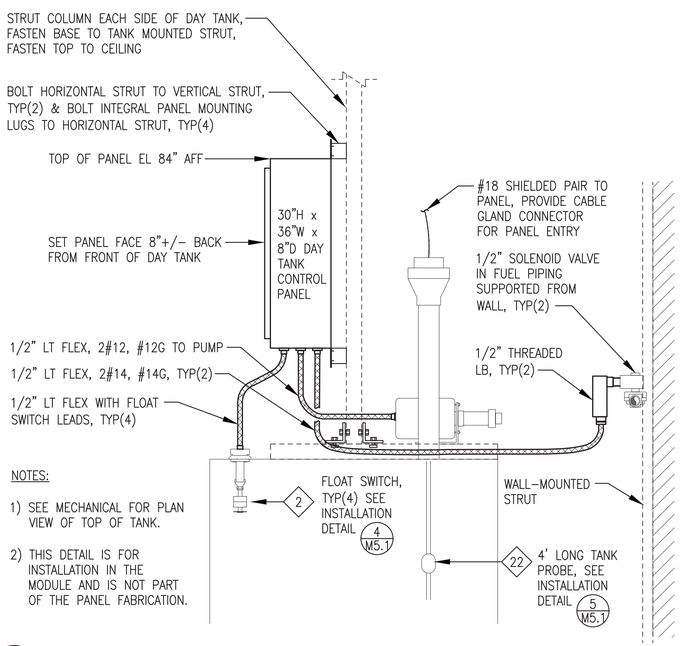
2) NORMAL OPERATION – WHENEVER THE DAY TANK FILL SEQUENCE IS INITIATED, BOTH THE DIESEL CIRCULATING PUMP P-DF2 AND THE USED OIL INJECTION PUMP P-UO2 RUN AND THE ASSOCIATED GREEN PUMP RUNNING LIGHTS ARE ON.

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.

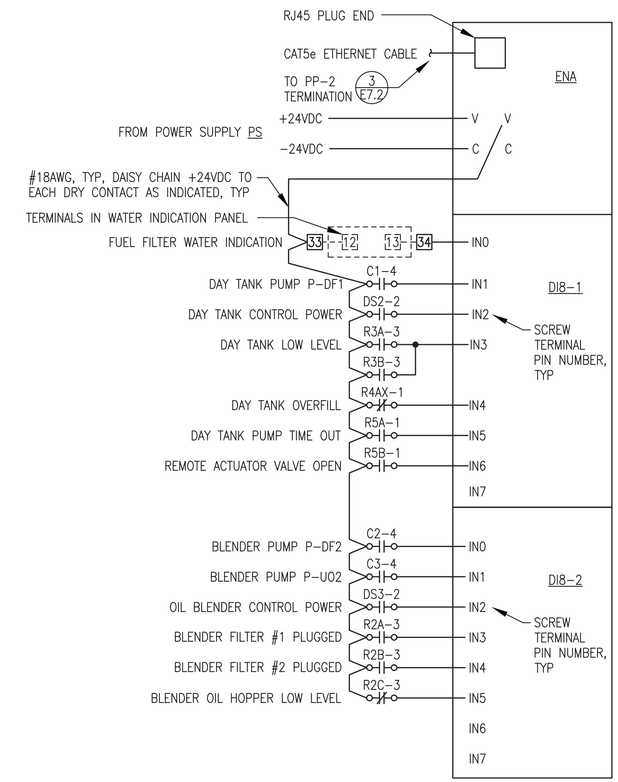
4) HOPPER LOW OIL LEVEL – WHEN THE OIL LEVEL FALLS BELOW THE LOW LEVEL FLOAT SWITCH, USED OIL INJECTION PUMP P-UO2 STOPS RUNNING AND THE AMBER HOPPER LOW OIL LEVEL LIGHT TURNS ON. PUMP P-UO2 WILL NOT OPERATE UNTIL THE USED OIL LEVEL IN THE HOPPER RISES ABOVE THE LOW LEVEL. RESET IS NOT REQUIRED.



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



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



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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

REV#1
ISSUED FOR CONSTRUCTION
NOV 2023

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

REV.	DESCRIPTION	DATE	BY
1	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG

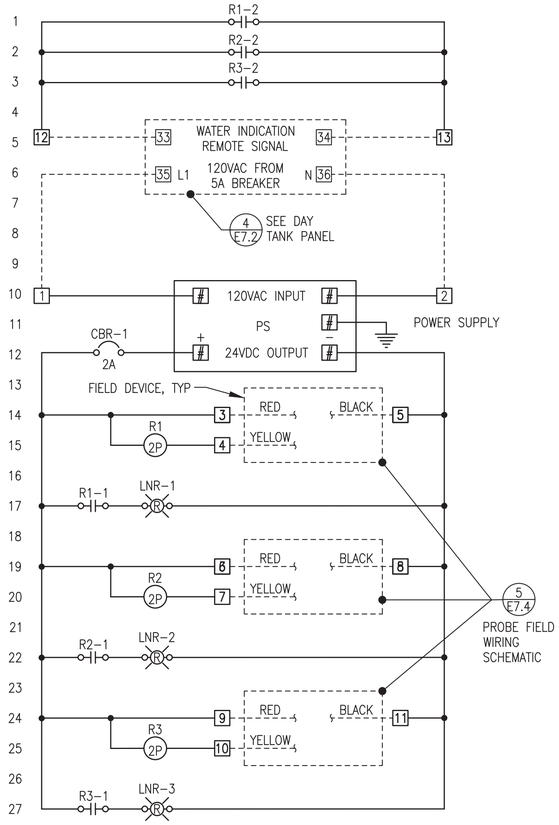
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

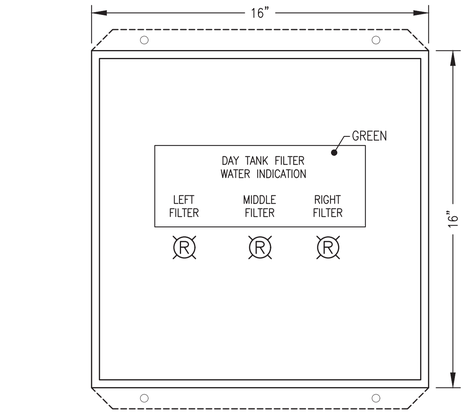
TITLE: DAY TANK CONTROL PANEL NOTES, SEQUENCE OF OPERATIONS & INTERCONNECT DETAILS

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

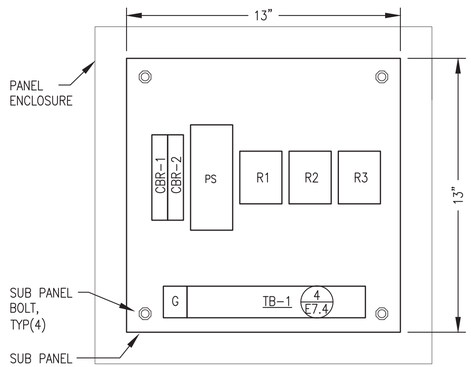
DRAWN BY: BCG/JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 7/29/22
FILE NAME: NAPS PP E7	SHEET: E7.3
PROJECT NUMBER:	



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

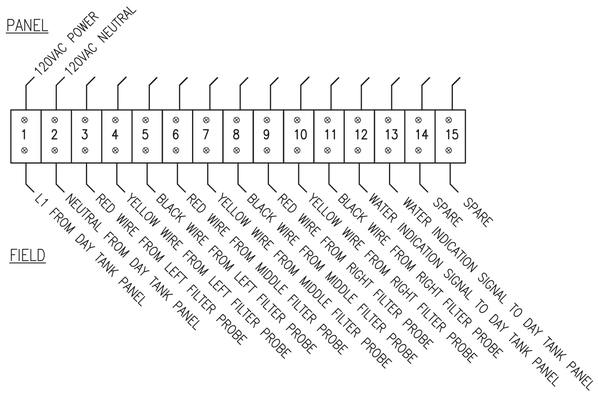
PANEL SHOP FABRICATION NOTES:

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.

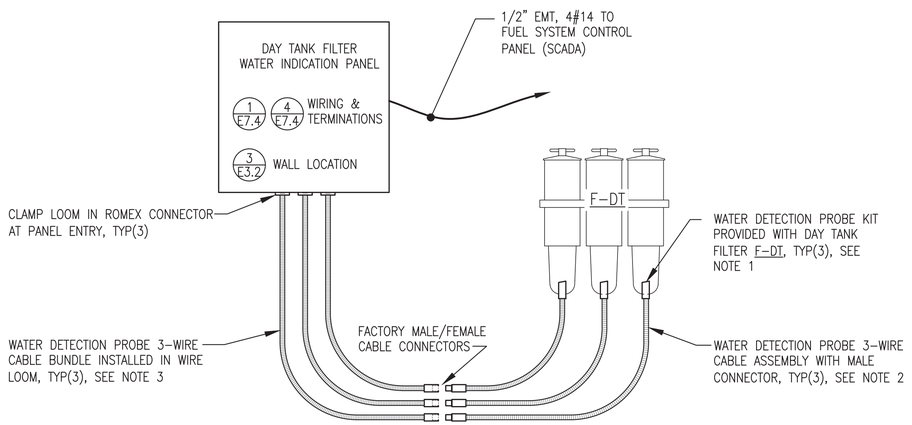
4) CONNECT DEVICES WITH MANUFACTURER PROVIDED CABLES IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS.



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



5 E7.4 FIELD WIRING SCHEMATIC
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.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION
JULY 2022

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

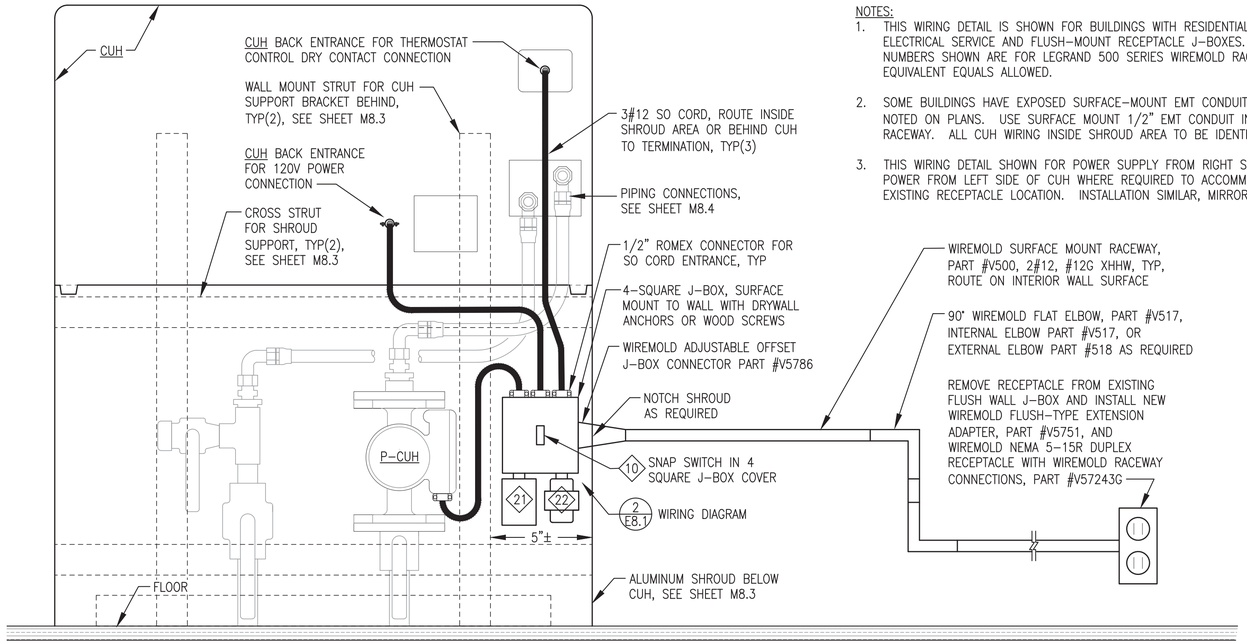
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK 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
DESIGNED BY: CWV/BCG
FILE NAME: NAPS PP E7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 7/29/22
SHEET: E7.4

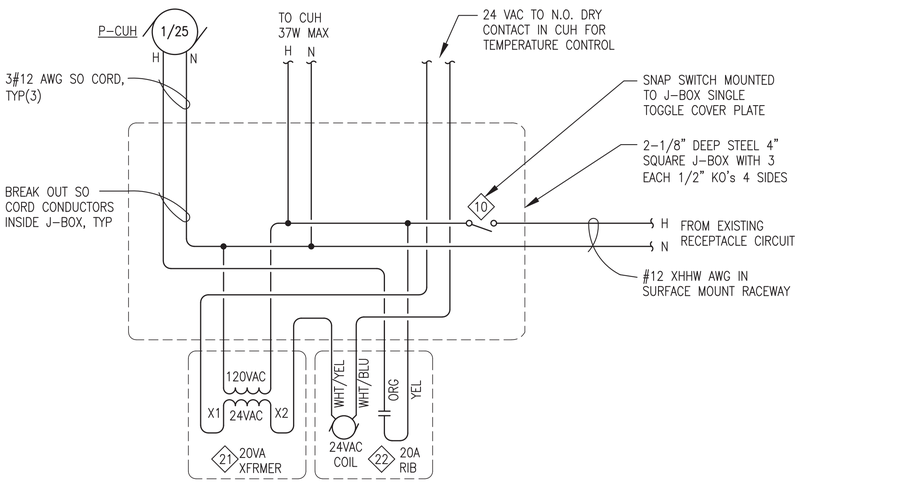


NOTES:

1. THIS WIRING DETAIL IS SHOWN FOR BUILDINGS WITH RESIDENTIAL STYLE IN-WALL ELECTRICAL SERVICE AND FLUSH-MOUNT RECEPTACLE J-BOXES. WIREMOLD PART NUMBERS SHOWN ARE FOR LEGRAND 500 SERIES WIREMOLD RACEWAY & FITTINGS. EQUIVALENT EQUALS ALLOWED.
2. SOME BUILDINGS HAVE EXPOSED SURFACE-MOUNT EMT CONDUIT AND J-BOXES AS NOTED ON PLANS. USE SURFACE MOUNT 1/2" EMT CONDUIT IN PLACE OF WIREMOLD RACEWAY. ALL CUH WIRING INSIDE SHROUD AREA TO BE IDENTICAL TO THIS DETAIL.
3. THIS WIRING DETAIL SHOWN FOR POWER SUPPLY FROM RIGHT SIDE OF CUH. PROVIDE POWER FROM LEFT SIDE OF CUH WHERE REQUIRED TO ACCOMMODATE NEAREST EXISTING RECEPTACLE LOCATION. INSTALLATION SIMILAR, MIRROR IMAGE.

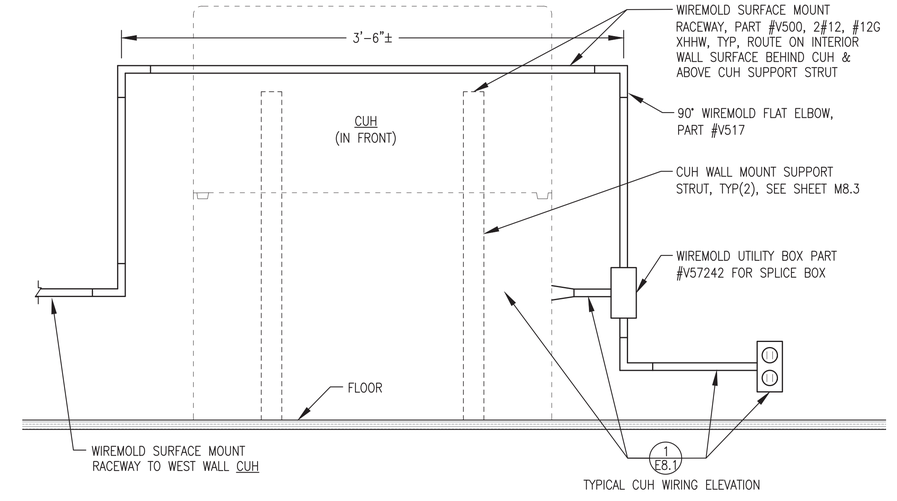
1 E8.1 TYPICAL CUH WIRING ELEVATION

NO SCALE



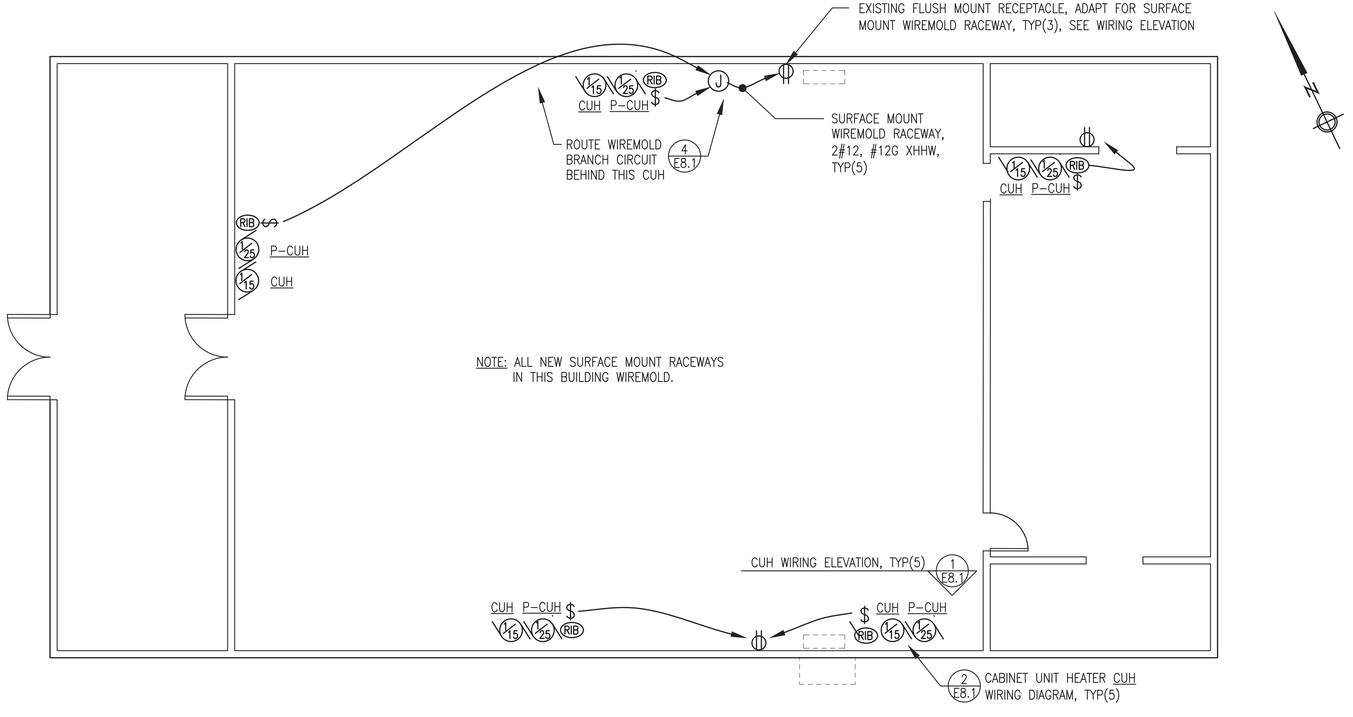
2 E8.1 TYPICAL CUH WIRING DIAGRAM

NO SCALE



4 E8.1 WIREMOLD RACEWAY BRANCH CIRCUIT BEHIND CUH ON CHURCH NORTH WALL

NO SCALE



3 E8.1 BUILDING A RUSSIAN OTHODOX CHURCH ELECTRICAL PLAN

3/16"=1'-0"

ALL WORK ON SHEETS E8.1 THROUGH E8.4 IS INCLUDED IN THE ON SITE CONTRACT.
PROVIDE ENTIRE HEAT RECOVERY SYSTEM AS SHOWN ON SHEETS E8.1 THROUGH E8.4 UNDER ADDITIVE ALTERNATE #1.

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

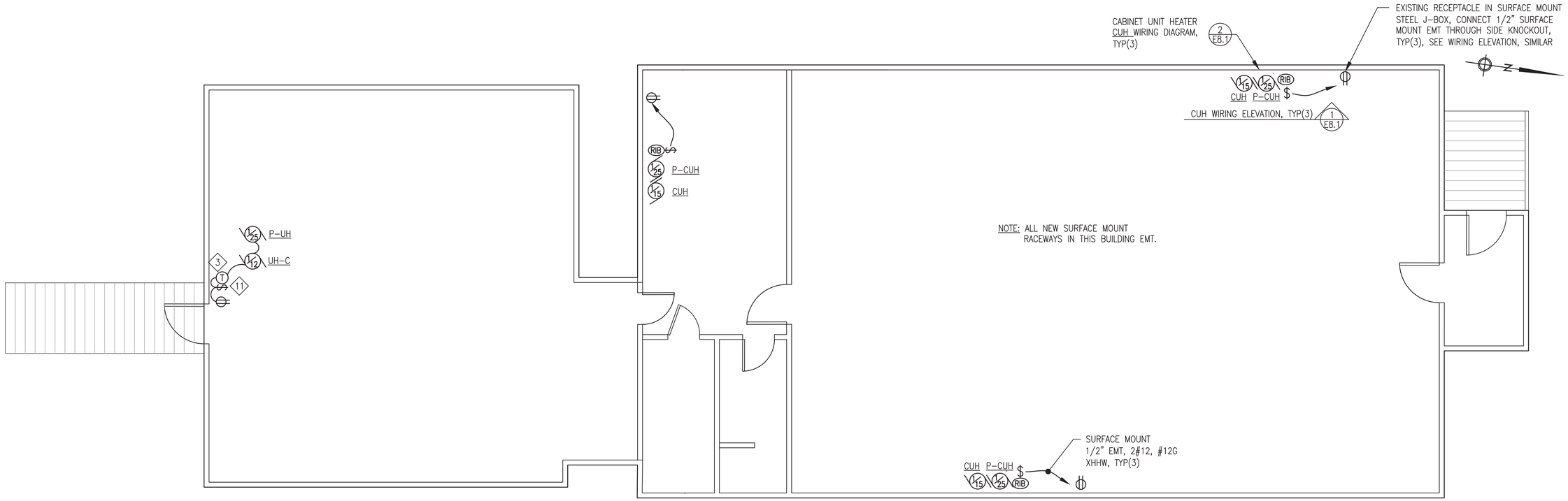
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
BUILDING A ELECTRICAL 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: 12/15/22
FILE NAME: NAPS PP E8	SHEET: E8.1
PROJECT NUMBER:	



1 E8.2 BUILDING B NEW OFFICE BUILDING ELECTRICAL PLAN
3/16"=1'-0"

ISSUED FOR
CONSTRUCTION
DECEMBER 2022

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

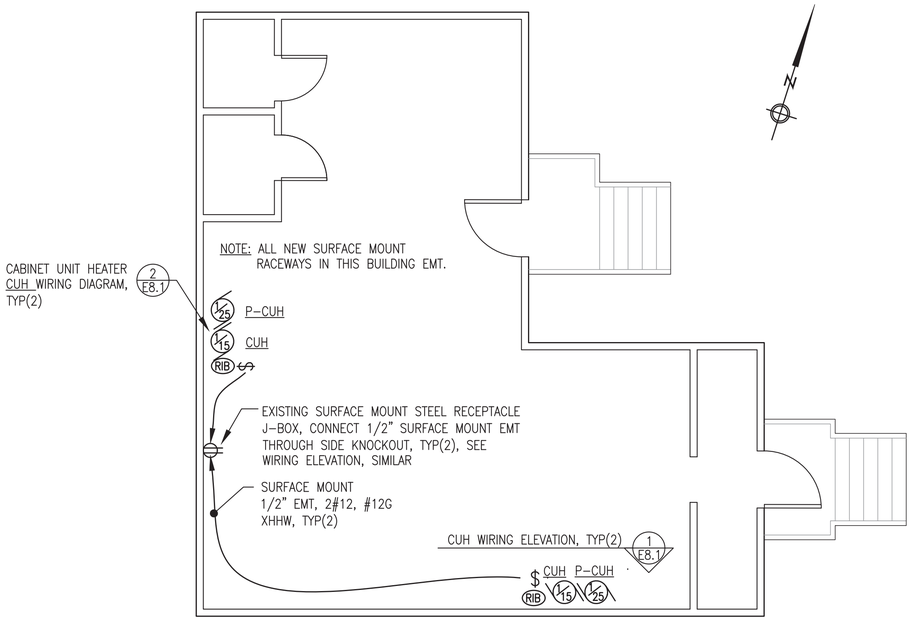
ALASKA ENERGY AUTHORITY

PROJECT:
NAPASKIAK POWER SYSTEM UPGRADE

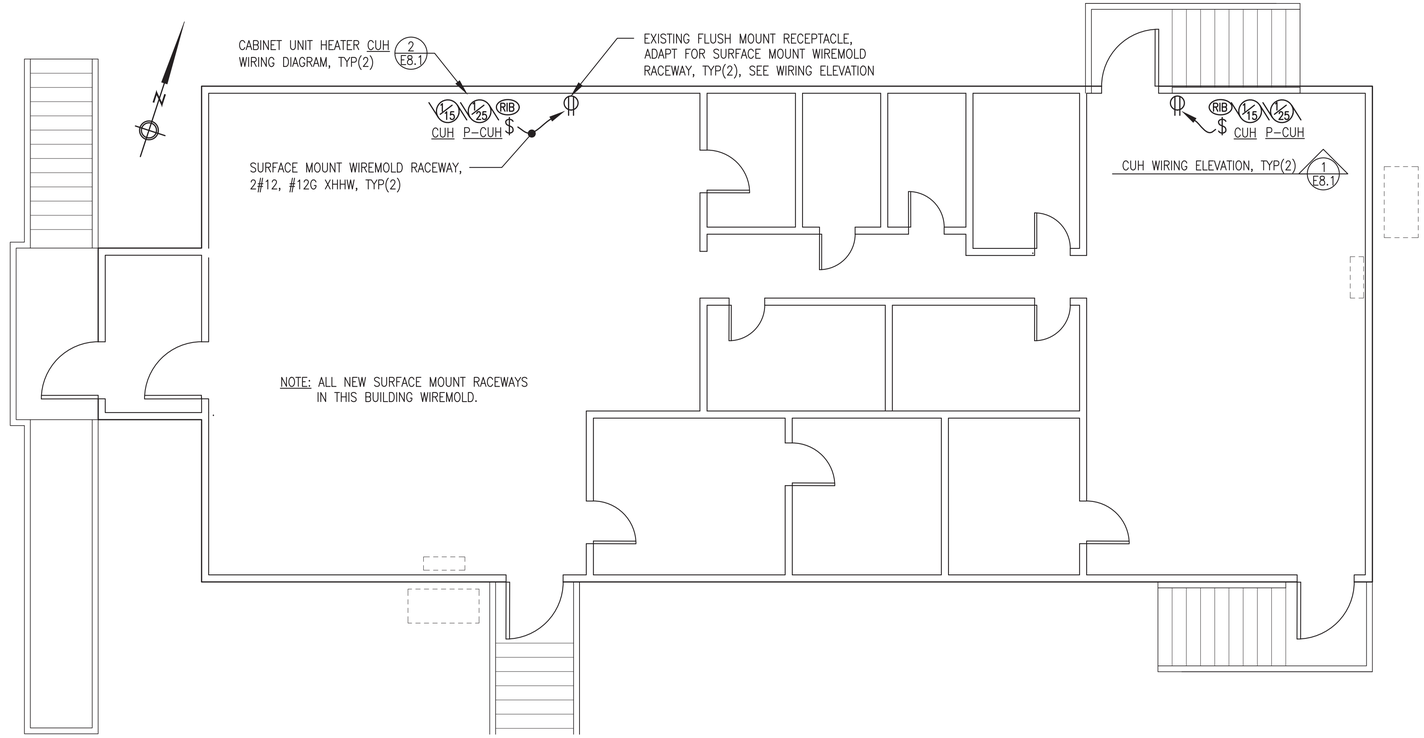
TITLE:
HEAT RECOVERY SYSTEM
BUILDING B ELECTRICAL PLAN

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 12/15/22
FILE NAME: NAPS PP E8	SHEET: E8.2
PROJECT NUMBER:	



1 E8.3 BUILDING C BINGO HALL ELECTRICAL PLAN
3/16"=1'-0"



2 E8.3 BUILDING D HEADSTART ELECTRICAL PLAN
3/16"=1'-0"

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

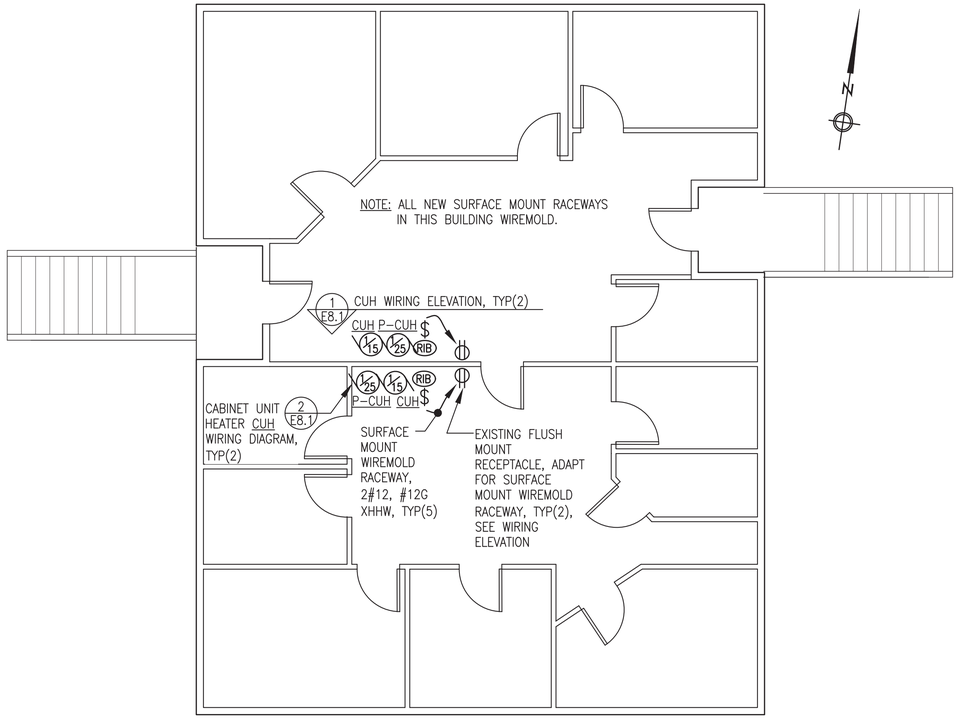
ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
BUILDINGS C & D ELECTRICAL PLANS

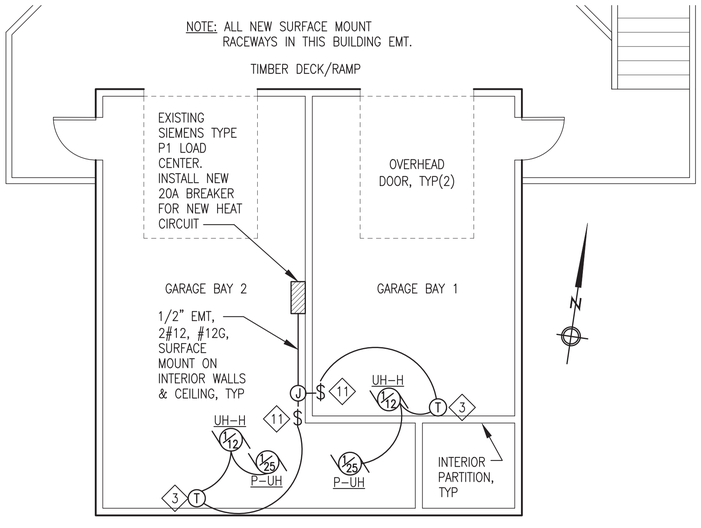
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 12/15/22
FILE NAME: NAPS PP E8	SHEET: E8.3
PROJECT NUMBER:	



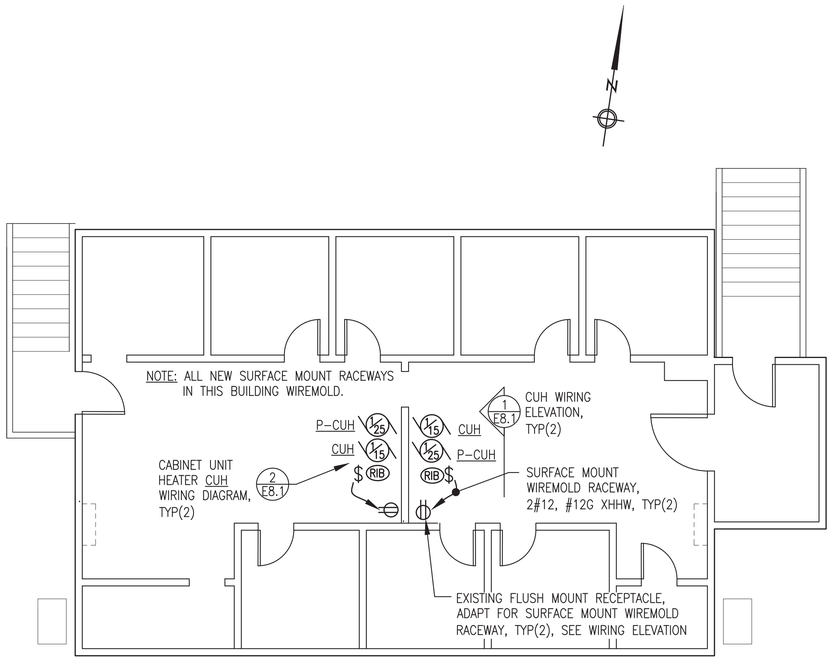
1 E8.4 BUILDING E VPSO ELECTRICAL PLAN

3/16"=1'-0"



3 E8.4 BUILDING G GARAGE ELECTRICAL PLAN

3/16"=1'-0"



2 E8.4 BUILDING F OLD OFFICE BUILDING ELECTRICAL PLAN

3/16"=1'-0"

ISSUED FOR CONSTRUCTION DECEMBER 2022

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

ALASKA ENERGY AUTHORITY

PROJECT: NAPASKIAK POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM BUILDINGS E, F, & G ELECTRICAL PLANS

Gray Stassel Engineering, Inc.

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 12/15/22
FILE NAME: NAPS PP E8	SHEET: E8.4
PROJECT NUMBER:	

DISTRIBUTION SYSTEM GENERAL NOTES

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

2. ALL INSTALLATION SHALL MEET THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL SAFETY CODE (NESC), ANSI C2, AND THE NATIONAL ELECTRICAL CODE, NFPA 70, INCLUDING ANY STATE OF ALASKA AMENDMENTS. RUS BULLETIN 1728F–804, SPECIFICATIONS AND DRAWINGS FOR 12.47/7.2 kV LINE CONSTRUCTION SHALL BE FOLLOWED UNLESS SPECIFICALLY MODIFIED BY THESE DRAWINGS OR SPECIFICATIONS. ALL MATERIALS SHALL BE RUS APPROVED. 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 NAPASKIAK ELECTRIC UTILITY (OWNER). PRIOR TO COMMENCING WORK ON THE UPGRADE, MEET WITH NAPASKIAK ELECTRIC UTILITY TO DEVELOP AN OUTAGE SCHEDULE THAT WILL KEEP DISRUPTIONS OF POWER TO THE CUSTOMERS TO A MINIMUM. NAPASKIAK ELECTRIC UTILITY SHALL HAVE FINAL AUTHORITY ON WHEN OUTAGES CAN OCCUR.

4. 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 BEING TAKEN OUT OF SERVICE SHALL BE REMOVED AFTER COMPLETION OF THE INSTALLATION, ENERGIZATION, AND SERVICE CONVERSIONS TO THE NEW ELECTRICAL DISTRIBUTION SYSTEM. POLES THAT HAVE TELECOM SYSTEM CONDUCTORS OR EQUIPMENT ATTACHED SHALL NOT BE REMOVED.

5. ALL EXISTING UTILITIES MAY NOT BE SHOWN. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO DIGGING HOLES FOR POLES AND ANCHORS. COORDINATE WITH THE NAPASKIAK ELECTRIC UTILITY AND THE CITY OF NAPASKIAK TO LOCATE UNDERGROUND UTILITIES.

6. 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.

7. 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.

8. THE SITE PLANS 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.

9. SEE CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL INFORMATION.

10. 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.

11. 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.

12. NEW TRANSFORMERS ADD TO THE DISTRIBUTION SYSTEM OR REPLACING EXISTING TRANSFORMERS SHALL BE CONNECTED TO PHASES IN A WAY THAT BALANCES THE DISTRIBUTION SYSTEM. DURING CONSTRUCTION LOAD IMBALANCE SHOULD BE KEPT TO A MINIMUM AND SHALL NOT EXCEED 10%.

TELECOM SYSTEM GENERAL NOTES

1. THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM POLES ARE SHARED WITH THE TELECOM SYSTEM, UNITED UTILITY, INC. CONTRACTOR SHALL NOT DISRUPT THE EXISTING TELECOM SYSTEM WITHOUT THE CONSENT OF THE TELECOM COMPANY. ANY PART OF THE EXISTING TELECOM SYSTEM DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE TELCOM COMPANY.

2. UNLESS OTHERWISE NOTED ON THE DRAWINGS, THE EXISTING TELECOM SYSTEM SHALL REMAIN AS IS. WHERE POLES WITH TELECOM CONDUCTORS OR EQUIPMENT ARE REPLACED, TELECOM CONDUCTORS OR EQUIPMENT SHALL BE REATTACHED TO THE NEW POLE.

3. POLES TAKEN OUT OF SERVICE THAT HAVE TELECOM CONDUCTORS OR EQUIPMENT ATTACHED SHALL NOT BE REMOVED.

DISTRIBUTION UPGRADE SCOPE OF WORK

1. THE SCOPE OF WORK FOR UPGRADING THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM IN NAPASKIAK, ALASKA, IS AS FOLLOWS:
   - REPLACE EXISTING TRANSFORMERS NOTED. UPSIZE TRANSFORMERS WHERE REQUIRED TO ACCOMMODATE THE NUMBER OF SERVICES BEING SERVED.
   - INSTALL NEW TRANSFORMERS TO REDUCE EXCESSIVELY LONG SECONDARY RUNS.
   - RESET LEANING POLES, RE–TENSION GUYS, INSTALL NEW GUYS AND ANCHORS WHERE NEEDED AND REPLACE POLES TO RAISE LOW SECONDARY CONDUCTORS OR WHERE POLE CONDITION REQUIRE REPLACEMENT.
   - EXTEND PRIMARY DISTRIBUTION WHERE REQUIRED.

2. THE LIMIT OF CONSTRUCTION FOR NEW SERVICE DROPS IS THE CONNECTION TO THE EXISTING SERVICE MAST OF THE HOUSE BEING SERVED. THE CONTRACTOR SHALL REMOVE THE EXISTING SECONDARY SERVICE DROP CONDUCTORS AS INDICATED ON THE DRAWINGS AND INSTALL NEW SERVICE CONDUCTORS AS INDICATED ON THE DRAWINGS. 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 NAPASKIAK ELECTRIC UTILITY FOR RESOLUTION. THE CONTRACTOR SHALL PROVIDED NOTIFICATION FAR ENOUGH IN ADVANCE TO ALLOW NAPASKIAK ELECTRIC UTILITY TIME TO REPAIR OR REPLACE THE SERVICE MAST.

DISTRIBUTION SYSTEM INSTALLATION NOTES

1. SEE SPECIFICATIONS FOR EQUIPMENT REQUIREMENTS AND COMPLETE REQUIREMENTS FOR ELECTRICAL DISTRIBUTION INSTALLATION.

2. WHERE RUS UNITS ARE REFERENCED, MATERIAL ITEMS MAY NOT BE LISTED IN THE MATERIAL LIST. CONTRACTOR SHALL REFER TO RUS UNIT REFERENCED TO DETERMINE WHAT MATERIAL MUST BE PROVIDED.

3. ANY MODIFIED RUS CONSTRUCTION UNIT OR ANY NEW CONSTRUCTION UNITS ARE INCLUDED IN THE DETAIL SHEETS OF THE DRAWINGS. ANY STANDARD RUS CONSTRUCTION UNITS REFERENCED ON THE DRAWINGS OR STAKING SHEETS SHALL BE OBTAINED BY THE CONTRACTOR. FAILURE TO HAVE THE CORRECT RUS CONSTRUCTION UNIT WILL NOT BE ACCEPTABLE AS AN EXCUSE FOR AN INCORRECT INSTALLATION.

4. ALL HARDWARE SHALL BE ALUMINUM, HOT DIP GALVANIZED, OR STAINLESS STEEL. ALL SMALL FASTENERS SHALL BE STAINLESS STEEL.

5. PRIMARY OVERHEAD CONDUCTOR SHALL #2 ACSR.

6. ALL INSULATOR TIES SHALL BE PREFORMED TYPE. ALL NEUTRAL AND PHASE CONDUCTOR DEADENDS SHALL BE PREFORMED TYPE.

7. ALL PHASE CONDUCTOR DEADENDS SHALL BE MADE USING A SHOE TYPE CLAMP.

8. NOT ALL GROUNDS ARE SHOWN. GROUND NEUTRAL WIRE AND TRANSFORMER GROUNDED BUSHING ALONG WITH TRANSFORMER CASE. ROUTE #4 AWG SOLID COPPER GROUND CONDUCTOR DOWN POLE GROUND. ATTACH COPPER GROUND CONDUCTOR TO POLE WITH COPPER PLATED STAPLES. ALL CONNECTIONS TO CABLE SHALL BE MADE WITH COPPER COMPRESSION LUGS. NO ALUMINUM CONNECTORS OR CABLES SHALL BE USED, EXCEPT AT CONNECTIONS TO ACSR. AT ACSR CONNECTIONS, USE CONNECTORS RATED FOR COPPER/ALUMINUM.

9. ALL QUANTITIES MAY NOT BE SHOWN. DETERMINE QUANTITIES OF ALL NECESSARY MATERIAL AND EQUIPMENT.

10. ARMOR RODS SHALL BE PROVIDED FOR ALL NEW ACSR CONDUCTORS. ARMOR RODS SHALL BE INSTALLED AT EACH INSULATOR BUT WILL NOT BE REQUIRED AT PRIMARY DEAD–END ASSEMBLIES.

11. INSULATORS SHALL BE SELECTED TO PROPERLY ACCOMMODATE THE ARMOR ROD INSTALLED ON THE CONDUCTOR.

DISTRIBUTION SYSTEM TEMPORARY INSTALLATION NOTES

1. THE UPGRADES TO THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM WILL REQUIRE TEMPORARY INSTALLATIONS TO MINIMIZE OUTAGES AND MAINTAIN POWER TO THE CUSTOMERS DURING THE CONSTRUCTION OF THE UPGRADES. AS INDICATED, ALL OUTAGES SHALL BE COORDINATED WITH AND APPROVED BY THE NAPASKIAK ELECTRIC UTILITY. ACCEPTABLE METHODS WILL BE AS FOLLOWS:

   a) 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 UPGRADES.

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

2. IN ALL CASES, THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE BEST METHOD OF MAINTAINING POWER TO CUSTOMERS WHILE THE UPGRADES ARE BEING INSTALLED. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL REQUIRED FOR TEMPORARY INSTALLATIONS.

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.

ALL WORK ON SHEETS E10.0 THROUGH E12.4 IS INCLUDED IN THE ON SITE CONTRACT.

PROVIDE DISTRIBUTION UPGRADES UNDER ADDITIVE ALTERNATE #3 AND #4 AS SHOWN ON THE FOLLOWING SHEETS.

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 2–PHASE OVERHEAD PRIMARY	NEW 2–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

(NOTE: STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED.)
*SINGLE PHASE UNLESS OTHERWISE NOTED

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH — EE-11401 — 12/15/22 — REGISTERED PROFESSIONAL ENGINEER

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DISTRIBUTION LEGEND, ABBREVATIONS, SPECIFICATIONS & NOTES

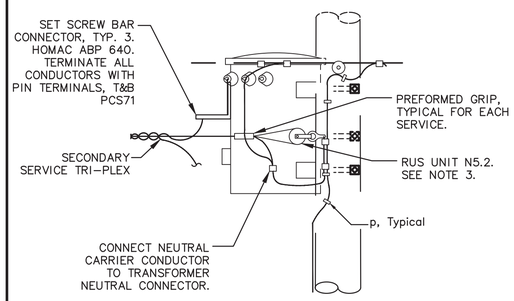
NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22 — Designed TRK — Drawn TRK — Approved KH

Sheet No. E10.0

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:52 PM

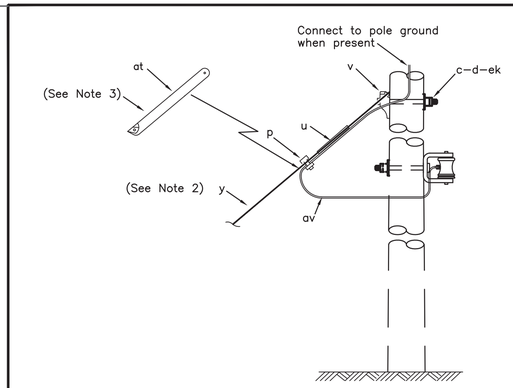


NOTES:
1) THIS CONSTRUCTION UNIT APPLIES ONLY TO SINGLE-PHASE SECONDARY CONNECTIONS AT SINGLE-PHASE TRANSFORMERS. FOR CONNECTIONS THREE-PHASE TRANSFORMERS SEE APPROPRIATE RUS CONSTRUCTION UNIT.
2) FOR POLE GROUNDING, TRANSFORMER GROUNDING, NEUTRAL CONNECTIONS, ETC. SEE THE APPROPRIATE RUS CONSTRUCTION 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. 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

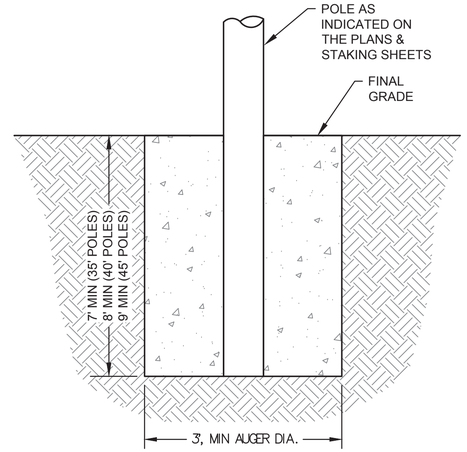
DESIGN PARAMETERS:

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. AUGER MINIMUM 3' DIAMETER HOLE, DEPTH AS INDICATED.
2. BACKFILL WITH GRAVEL AND COMPACT IN MAXIMUM 8" LIFTS.

1 / E10.1 **TYPICAL POLE INSTALLATION**
Scale: NTS

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — 49TH — REGISTERED PROFESSIONAL ENGINEER — T. K. KAMM — EE-11401 — 12/15/22 — PROFESSIONAL ENGINEER

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

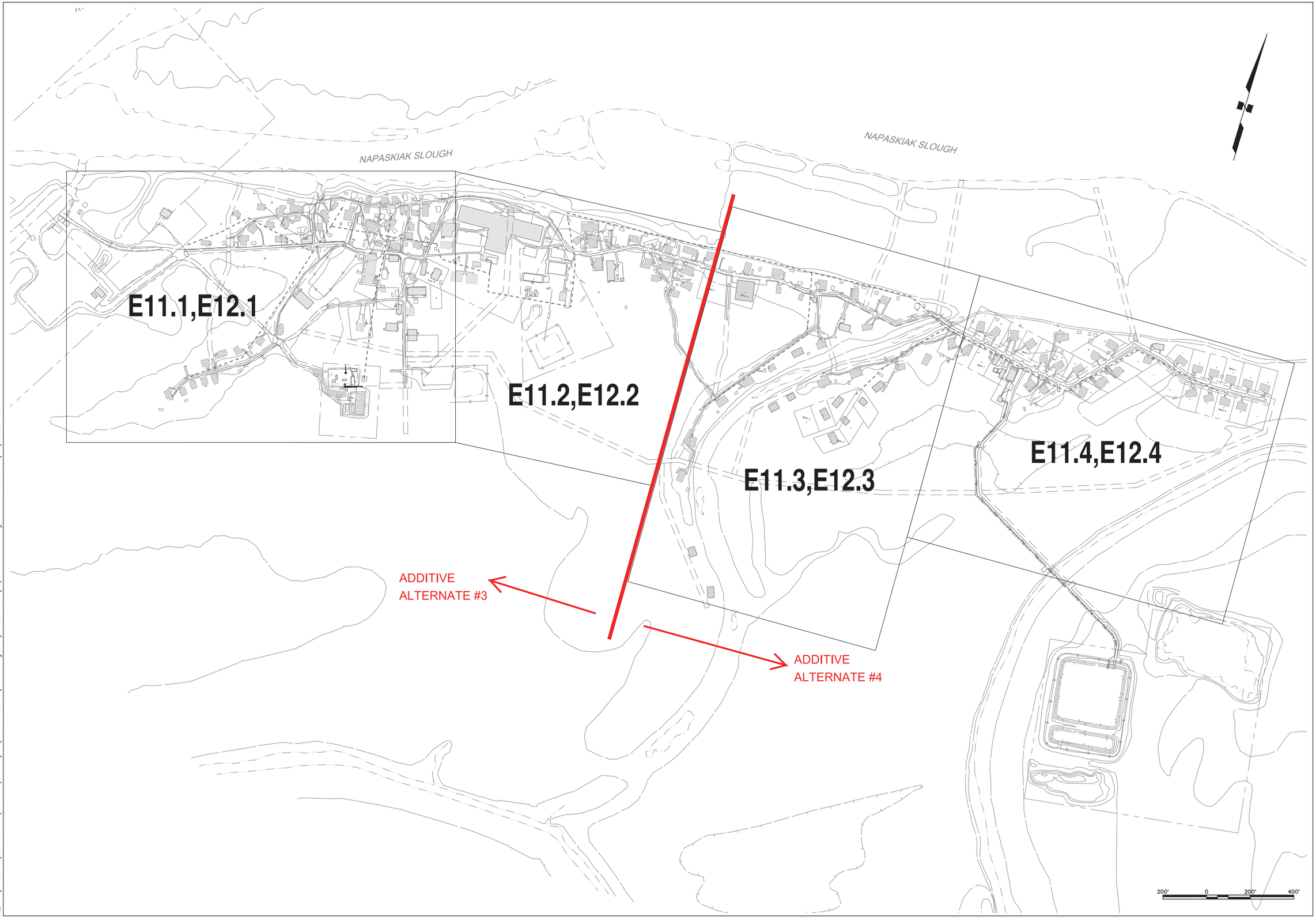
NAPASKIAK POWER SYSTEM UPGRADE
DISTRIBUTION DETAILS
NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E10.1

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:52 PM



ALASKA ENERGY AUTHORITY

STATE OF ALASKA
49 TH
REGISTERED PROFESSIONAL ENGINEER
K. KAMM
EE-11401
12/15/22
EXPIRATION DATE

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

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

NAPASKIAK POWER SYSTEM UPGRADE

OVERALL DISTRIBUTION SITE PLAN

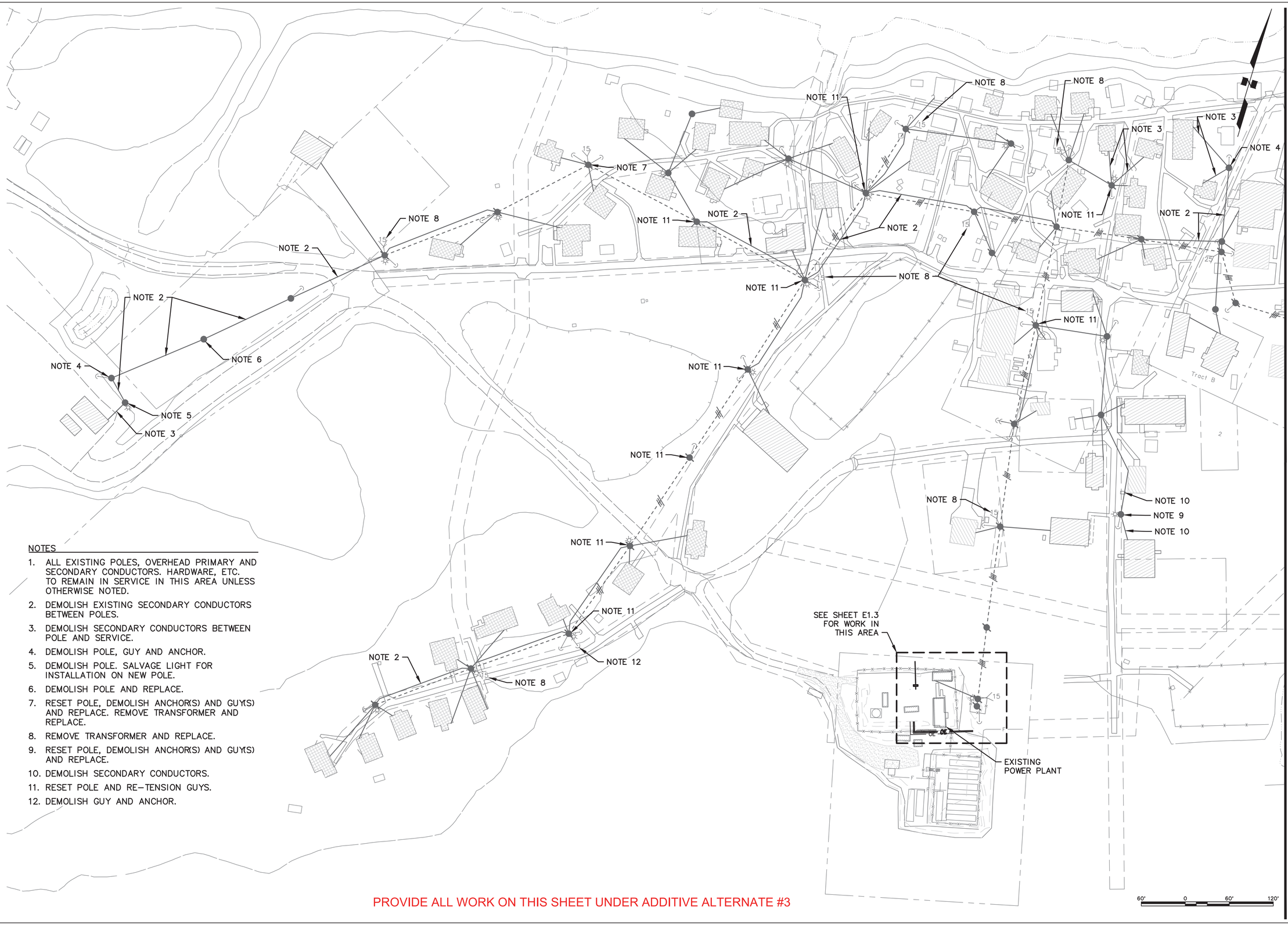
NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No.
E11.0

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:52 PM



NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY AND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED.
2. DEMOLISH EXISTING SECONDARY CONDUCTORS BETWEEN POLES.
3. DEMOLISH SECONDARY CONDUCTORS BETWEEN POLE AND SERVICE.
4. DEMOLISH POLE, GUY AND ANCHOR.
5. DEMOLISH POLE. SALVAGE LIGHT FOR INSTALLATION ON NEW POLE.
6. DEMOLISH POLE AND REPLACE.
7. RESET POLE, DEMOLISH ANCHOR(S) AND GUY(S) AND REPLACE. REMOVE TRANSFORMER AND REPLACE.
8. REMOVE TRANSFORMER AND REPLACE.
9. RESET POLE, DEMOLISH ANCHOR(S) AND GUY(S) AND REPLACE.
10. DEMOLISH SECONDARY CONDUCTORS.
11. RESET POLE AND RE-TENSION GUYS.
12. DEMOLISH GUY AND ANCHOR.

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #3

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KEMPF EE-11401 2/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DISTRIBUTION DEMOLITION PLAN
(1 of 4)

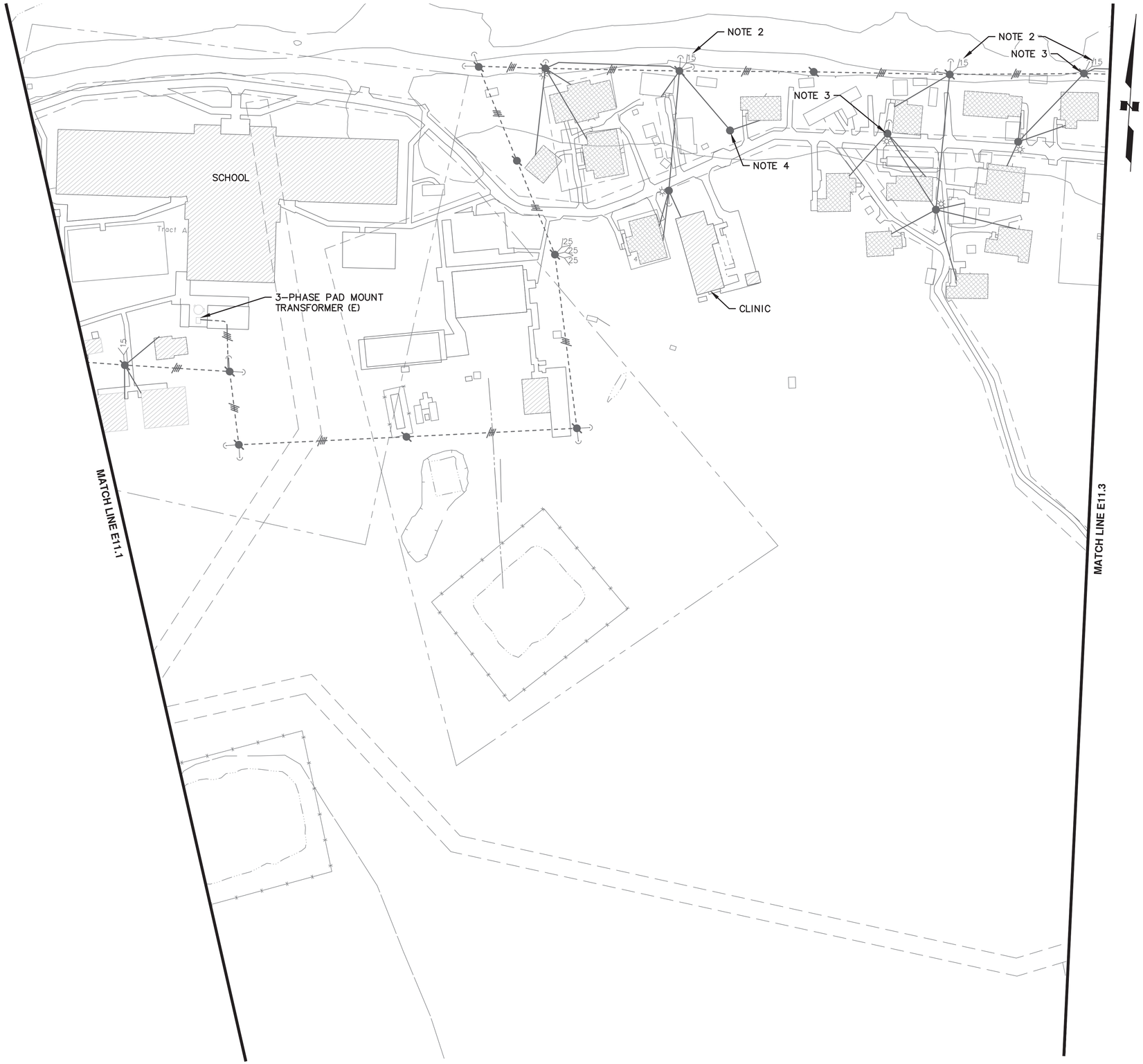
NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.1

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:52 PM



NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY AND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED.
2. REMOVE TRANSFORMER AND REPLACE.
3. RESET POLE, DEMOLISH ANCHOR(S) AND GUY(S) AND REPLACE.
4. RESET POLE AND ADD GUY AND ANCHOR.

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #3

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. K. KEMPF EE-11401 12/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DISTRIBUTION DEMOLITION PLAN (2 of 4)

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

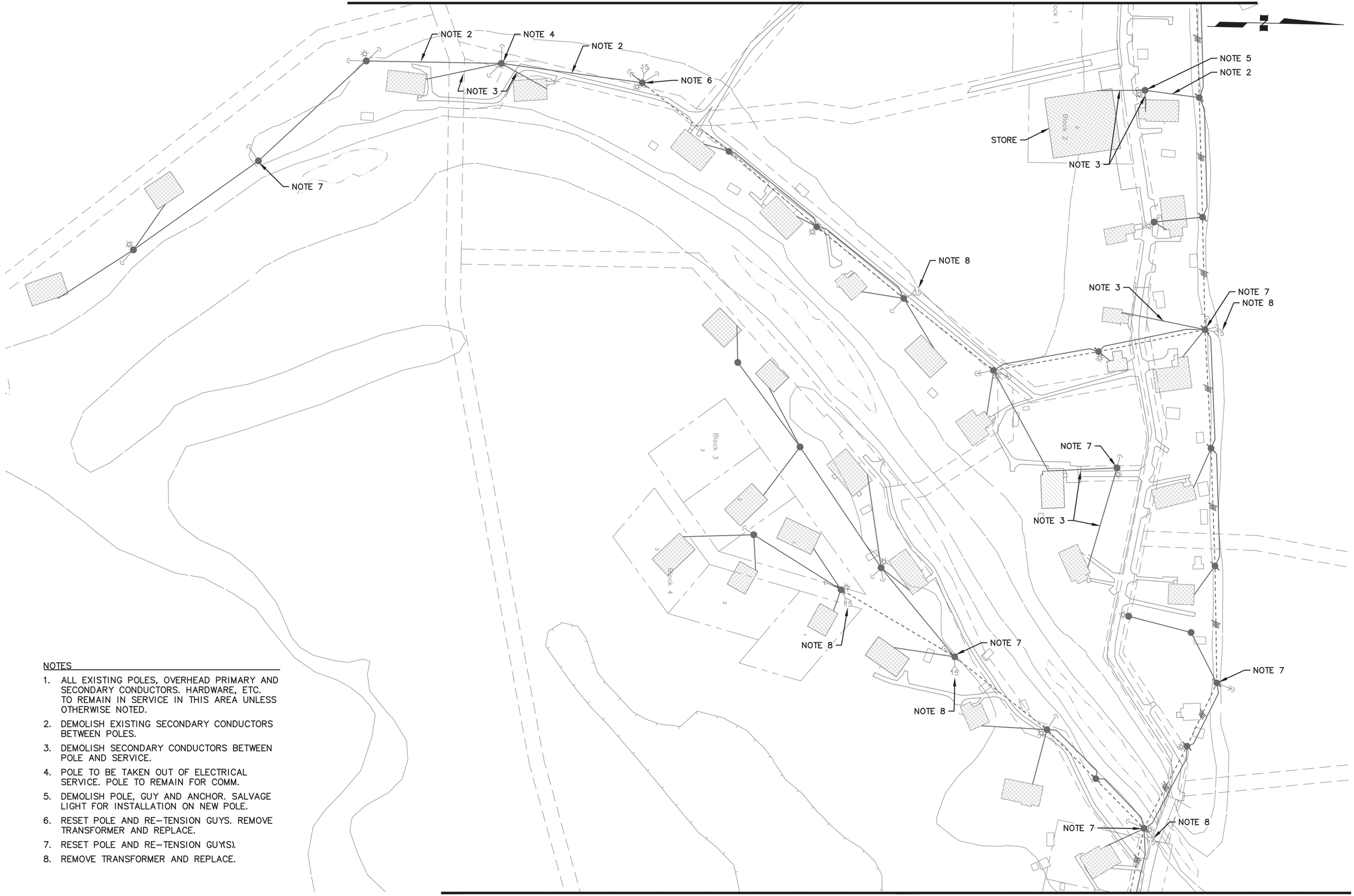
Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.2

Plot Date: 12/13/2022 1:53 PM

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg

MATCH LINE E11.2



NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY AND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED.
2. DEMOLISH EXISTING SECONDARY CONDUCTORS BETWEEN POLES.
3. DEMOLISH SECONDARY CONDUCTORS BETWEEN POLE AND SERVICE.
4. POLE TO BE TAKEN OUT OF ELECTRICAL SERVICE. POLE TO REMAIN FOR COMM.
5. DEMOLISH POLE, GUY AND ANCHOR. SALVAGE LIGHT FOR INSTALLATION ON NEW POLE.
6. RESET POLE AND RE-TENSION GUYS. REMOVE TRANSFORMER AND REPLACE.
7. RESET POLE AND RE-TENSION GUY(S).
8. REMOVE TRANSFORMER AND REPLACE.

MATCH LINE E11.4

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #4

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. KARNS EE-11401 12/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE
DISTRIBUTION DEMOLITION PLAN
(3 of 4)
NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.3

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:53 PM

NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY AND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED.
2. DEMOLISH SECONDARY CONDUCTORS BETWEEN POLES.
3. RESET POLE AND ADD GUY AND ANCHOR.
4. REMOVE TRANSFORMER AND REPLACE.

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #4

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. KARNS EE-11401 12/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DISTRIBUTION DEMOLITION PLAN (4 of 4)

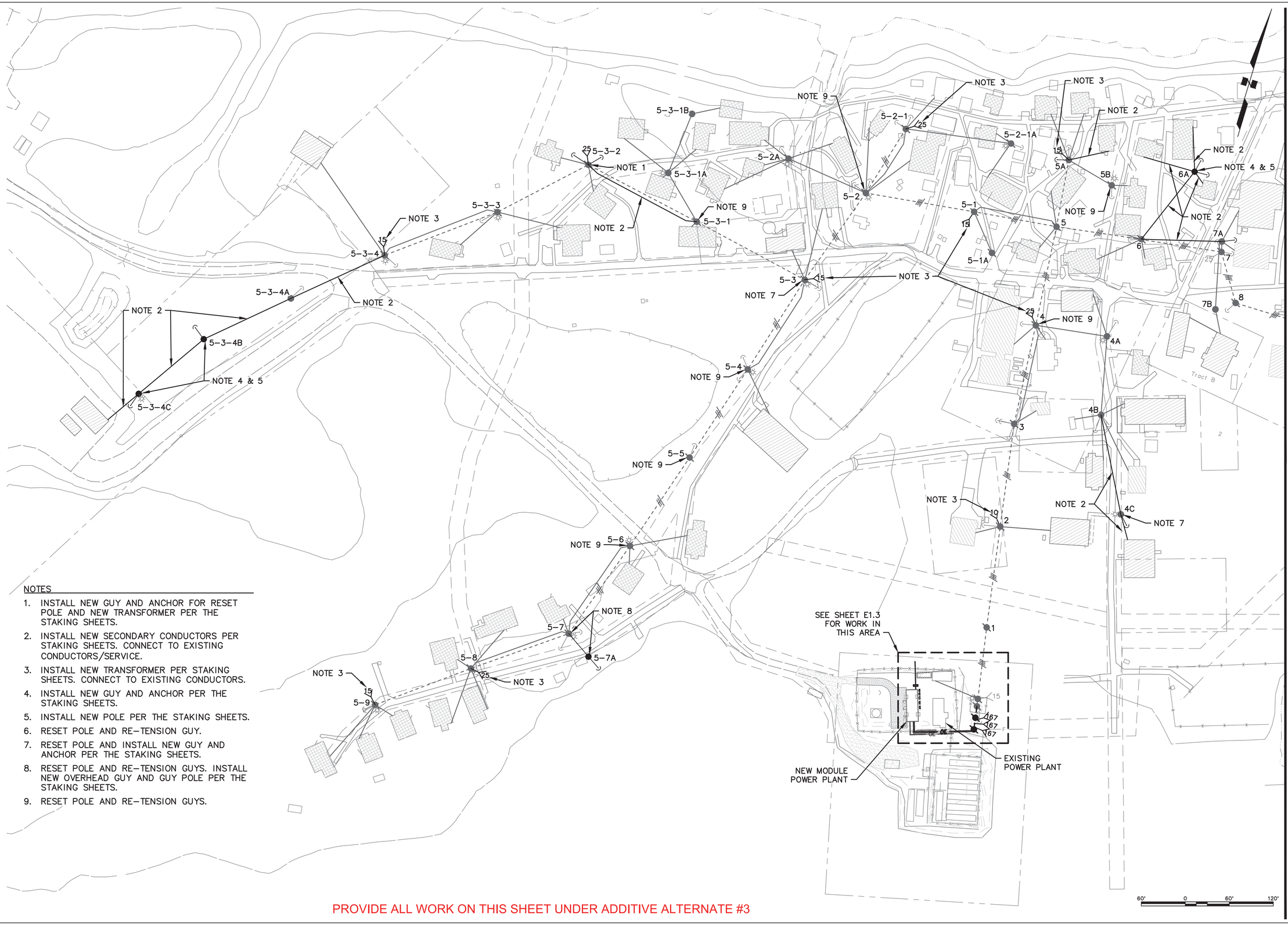
NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.4

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:53 PM



NOTES

1. INSTALL NEW GUY AND ANCHOR FOR RESET POLE AND NEW TRANSFORMER PER THE STAKING SHEETS.
2. INSTALL NEW SECONDARY CONDUCTORS PER STAKING SHEETS. CONNECT TO EXISTING CONDUCTORS/SERVICE.
3. INSTALL NEW TRANSFORMER PER STAKING SHEETS. CONNECT TO EXISTING CONDUCTORS.
4. INSTALL NEW GUY AND ANCHOR PER THE STAKING SHEETS.
5. INSTALL NEW POLE PER THE STAKING SHEETS.
6. RESET POLE AND RE-TENSION GUY.
7. RESET POLE AND INSTALL NEW GUY AND ANCHOR PER THE STAKING SHEETS.
8. RESET POLE AND RE-TENSION GUYS. INSTALL NEW OVERHEAD GUY AND GUY POLE PER THE STAKING SHEETS.
9. RESET POLE AND RE-TENSION GUYS.

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #3

MATCH LINE E12.2

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED ELECTRICAL ENGINEER EE-11401 12/15/22 PROFESSIONAL ENGINEER

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

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

NAPASKIAK POWER SYSTEM UPGRADE

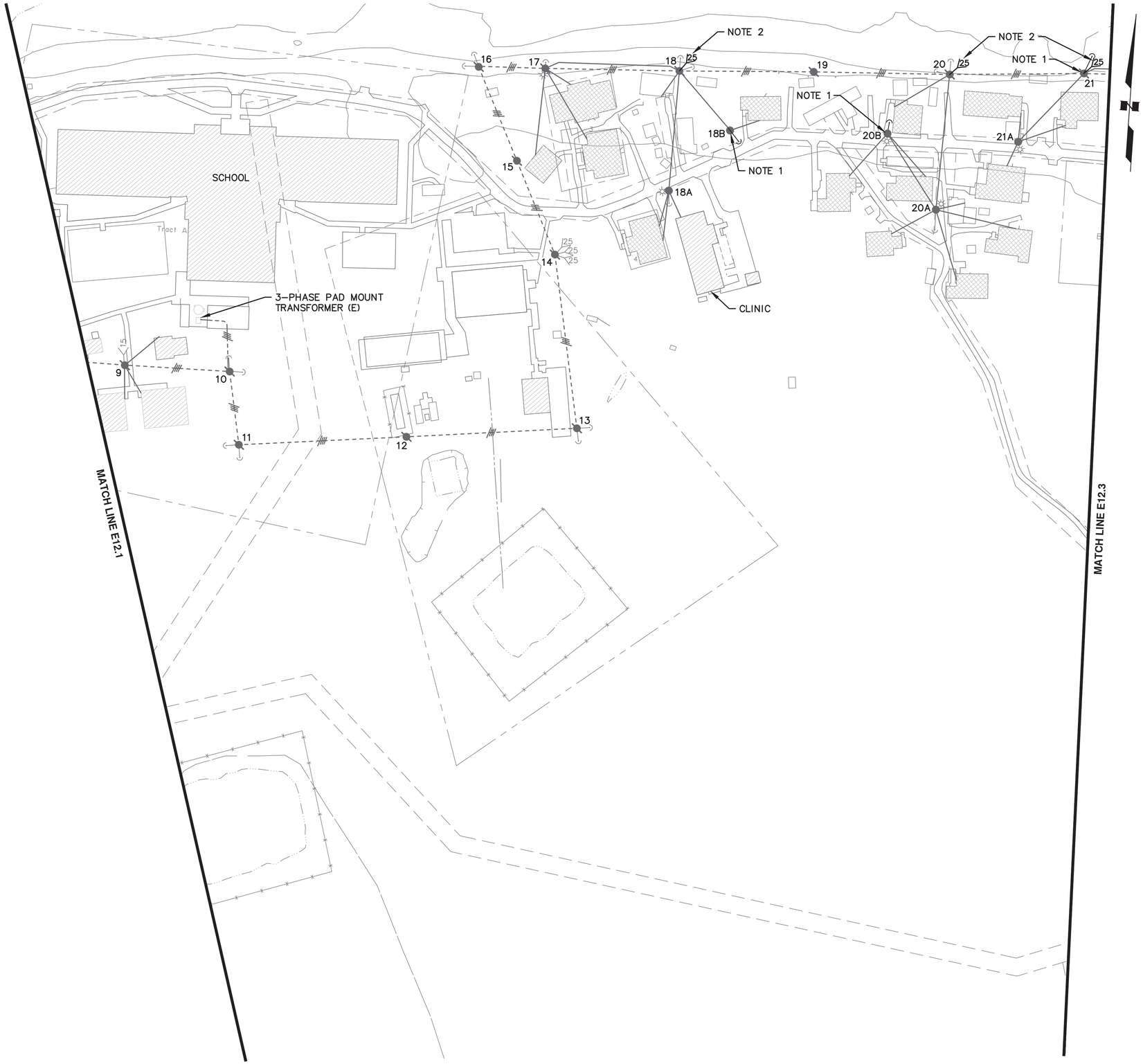
DISTRIBUTION PLAN
(1 of 4)

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No. E12.1



NOTES

1. INSTALL NEW GUY AND ANCHOR PER THE STAKING SHEETS FOR RESET POLE.
2. INSTALL NEW TRANSFORMER PER STAKING SHEETS. CONNECT TO EXISTING CONDUCTORS.

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #3

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER T. K. KEMPF EE-11401 12/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DISTRIBUTION PLAN (2 of 4)

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E12.2

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:53 PM

MATCH LINE E12.2

NOTE 3
15
NOTE 6
NOTE 1 & 4
NOTE 1 & 4
24–9
NOTE 2
NOTE 2
24–9A
24–8
NOTE 2
NOTE 2
24–7
NOTE 1
NOTE 2
NOTE 3
10
24–6
NOTE 4 & 5
NOTE 6
NOTE 7
24–9B
24–5
24–9C
24–4
NOTE 3
15
24–3
29–3C
24–2
24–1
NOTE 1 & 4
22A
NOTE 2
NOTE 4
22
STORE
Block 2
23A
23
NOTE 1
NOTE 2
NOTE 7
NOTE 3
24A
24
25
NOTE 7
NOTE 2
NOTE 4
NOTE 8
25
29–3B
25A
25B
NOTE 1
NOTE 2
29–4A
26
29–3A
29–4
15
27B
27A
NOTE 3
NOTE 9
29–3
29
NOTE 9
27
NOTE 3
29–2
28
29–1
NOTE 7
29
NOTE 10
25
29A
NOTE 4
NOTE 3

NOTES

1. INSTALL NEW POLE PER THE STAKING SHEETS.
2. INSTALL NEW SECONDARY CONDUCTORS PER STAKING SHEETS. CONNECT TO EXISTING CONDUCTORS/SERVICE.
3. INSTALL NEW TRANSFORMER PER STAKING SHEETS. CONNECT TO EXISTING CONDUCTORS.
4. INSTALL NEW GUY AND ANCHOR PER THE STAKING SHEETS.
5. RESET POLE AND RE–TENSION GUY. INSTALL NEW HARDWARE PER THE STAKING SHEETS. CONNECT TO NEW TO EXISTING PRIMARY.
6. INSTALL NEW PRIMARY PER THE STAKING SHEETS.
7. RESET POLE AND RE–TENSION GUY(S).
8. INSTALL NEW GUY AND ANCHOR FOR EXISTING POLE.
9. RESET POLE AND RE–TENSION GUY. INSTALL NEW GUY(S) AND ANCHOR(S) PER THE STAKING SHEETS.
10. INSTALL NEW OVERHEAD GUY AND GUY POLE PER THE STAKING SHEETS.

MATCH LINE E12.4

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #4

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KARNS EE-11401 12/15/22

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DISTRIBUTION PLAN (3 of 4)

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No. E12.3

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:53 PM

NOTES

1. INSTALL NEW GUY AND ANCHOR FOR RESET POLE. SEE STAKING SHEETS.
2. INSTALL NEW SECONDARY CONDUCTORS PER STAKING SHEETS. CONNECT TO EXISTING CONDUCTORS.
3. INSTALL NEW TRANSFORMER PER STAKING SHEETS. CONNECT TO EXISTING CONDUCTORS.
4. INSTALL NEW GUY AND ANCHOR PER THE STAKING SHEETS.

PROVIDE ALL WORK ON THIS SHEET UNDER ADDITIVE ALTERNATE #4

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED ELECTRICAL ENGINEER T. KEMPF EE-11401 2/15/22 PROFESSIONAL ENGINEER

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

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

NAPASKIAK POWER SYSTEM UPGRADE

DISTRIBUTION PLAN (4 of 4)

NAPASKIAK, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	12/15/22

Plot Date 12/9/22
Designed TRK
Drawn TRK
Approved KH

Sheet No. E12.4

File: J:\JobsData\72309.00 Napaskiak Rpsu Project\00 Cadd 2019\01 Working Set\03 Electrical\Napaskiak RPSU.dwg Plot Date: 12/13/2022 1:53 PM

NAPASKIAK RPSU
DISTRIBUTION UPGRADES

STAKING SHEETS

ISSUED FOR CONSTRUCTION
DECEMBER 2022

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

ALL WORK ON THE STAKING SHEETS IS INCLUDED IN THE ON SITE CONTRACT.

PROVIDE DISTRIBUTION UPGRADES FROM LOCATION 2 THROUGH LOCATION 21 UNDER ADDITIVE ALTERNATE #3 AND FROM LOCATION 22 THROUGH 38 UNDER ADDITIVE ALTERNATE #4 AS SHOWN ON THE DRAWINGS.

REV. NO.	DATE	DESCRIPTION	BY
0	12/2/22	ISSUED FOR CONSTRUCTION	TRK

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

DESIGNER	DATE
TRK	December 2, 2022
CHECKER	**DATE**
TRK	December 2, 2022
DIST. ENG.	**DATE**
TRK	December 2, 2022

NAPASKIAK RPSU DISTRIBUTION UPGRADES

STAKING SHEETS SHOW ONLY LOCATION WHERE NEW WORK IS REQUIRED.

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
2														1	G1.4-10	2	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE NEW #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
4														1	G1.4-25	2	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											RESET POLE AND RE-TENSION GUY.
															1-PHASE											REPLACE XFMR.
																										PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
4B																2	EXISTING				1	J3.1				EXISTING POLE.
																										CONNECT NEW TO EXISTING SECONDARY
																										CONNECT NEW TO EXISTING SECONDARY
4C										1	E1.1La	1	F3.10			1	#4 TRIPLEX	140	1	#4 TRIPLEX	2	J3.1				EXISTING POLE.
																										RESET POLE.
																										INSTALL NEW GUY AND ANCHOR.
5A										1	E1.1La	1	F3.10	1	G1.4-15	2	EXISTING						1	H1.1		EXISTING POLE.
															120/240V	1	#4 TRIPLEX									REPLACE XFMR.
															1-PHASE											PROVIDE NEW #2 ACSR JUMPERS.
																										INSTALL NEW GUY AND ANCHOR.
																										CONNECT CONDUCTORS TO NEW XFMR.
5B																1	EXISTING									EXISTING POLE.
																										RESET POLE AND RE-TENSION GUY.
5-1														1	G1.4-15								1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE NEW #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
5-2																										EXISTING POLE.
																										RESET POLE AND RE-TENSION GUY.
5-2-1														1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE NEW #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
5-3														1	G1.4-15	2	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											RESET POLE AND RE-TENSION GUYS.
															1-PHASE											REPLACE XFMR.
																										PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.

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		
5-3-1																1	EXISTING						1	H1.1		EXISTING POLE. RESET POLE. CONNECT NEW TO EXISTING SECONDARY
5-3-2										2	E1.1La	2	F3.10	1	G1.4-25 120/240V 1-PHASE	2	EXISTING	175	1	#1/0 TRIPLEX	3	J3.1	1	H1.1		EXISTING POLE. RESET POLE, REMOVE GUYS/ANCHORS. INSTALL NEW GUYS AND ANCHORS. REPLACE XFMR. PROVIDE #2 ACSR JUMPERS. CONNECT CONDUCTORS TO NEW XFMR.
5-3-4														1	G1.4-15 120/240V 1-PHASE	1	EXISTING				1	J3.1	1	H1.1		EXISTING POLE. REPLACE XFMR. PROVIDE NEW #2 ACSR JUMPERS. CONNECT CONDUCTORS TO NEW XFMR.
5-3-4A																		141	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE.
5-3-4B						35	4			1	E1.1La	1	F3.10					132	1	#1/0 TRIPLEX	2	J3.1				NEW POLE
5-3-4C						35	4			1	E1.1La	1	F3.10			1	#4 TRIPLEX	116	1	#1/0 TRIPLEX	2	J3.1				NEW POLE INSTALL SALVAGED LIGHT ON NEW POLE
5-4																1	EXISTING									EXISTING POLE. RESET POLE AND RE-TENSION GUYS.
5-5																										EXISTING POLE. RESET POLE AND RE-TENSION GUY.
5-6																2	EXISTING									EXISTING POLE. RESET POLE AND RE-TENSION GUY.
5-7																1	EXISTING									EXISTING POLE. RESET POLE AND RE-TENSION GUYS. REMOVE (1) GUY/ANCHOR PER PLANS. CONNECT NEW OVERHEAD GUY.
5-7A						40	4			1	E1.1La	1	F3.10										1	E1.4L		NEW POLE INSTALL OVERHEAD GUY
5-8														1	G1.4-25 120/240V 1-PHASE	4	EXISTING						1	H1.1		EXISTING POLE. REPLACE XFMR. PROVIDE NEW #2 ACSR JUMPERS. CONNECT CONDUCTORS TO NEW XFMR.

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		
5-9														1	G1.4-15	3	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE NEW #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
6										2	E1.1La	2	F3.10			3	#4 TRIPLEX	120	1	#1/0 TRIPLEX	3	J3.1				EXISITING POLE
																										CONNECT NEW TO EXISTING SECONDARY
6A						35	4			2	E1.1La	2	F3.10			3	#4 TRIPLEX	120	1	#1/0 TRIPLEX	3	J3.1				NEW POLE
7A										1	E1.1La	1	F3.10			2	EXISTING	115	1	#1/0 TRIPLEX	1	J3.1				EXISITING POLE
																										CONNECT NEW TO EXISTING SECONDARY
18														1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
18B										1	E1.1La	1	F3.10			1	EXISTING									EXISTING POLE.
																										RESET POLE.
																										INSTALL NEW GUYS AND ANCHORS.
20														1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
20B										1	E1.1La	1	F3.10			2	EXISTING									EXISTING POLE.
																										RESET POLE, REMOVE GUY/ANCHOR.
																										INSTALL NEW GUY AND ANCHOR.
21										1	E1.1La	1	F3.10	1	G1.4-25								1	H1.1		EXISTING POLE.
															120/240V											RESET POLE.
															1-PHASE											INSTALL NEW GUY AND ANCHOR.
																										REPLACE XFMR.
																										PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
22										1	E1.1La	1	F3.10								1	J3.1				EXISTING POLE.
																										INSTALL NEW GUY AND ANCHOR.
																										CONNECT NEW TO EXISTING SECONDARY
22A						35	4			2	E1.1La	2	F3.10			1	#4 TRIPLEX	120	1	#1/0 TRIPLEX	3	J3.1				NEW POLE
																1	#1/0 TRIPLEX									INSTALL SALVAGED LIGHT ON NEW POLE
24														1	G1.4-25	1	EXISTING				1	J3.1	1	H1.1		EXISTING POLE.
															120/240V											RESET POLE AND RE-TENSION GUY.
															1-PHASE											REPLACE XFMR.
																										PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
24A						35	4									1	#4 TRIPLEX	75	1	#2 TRIPLEX	2	J3.1				NEW 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		
24-3														1	G1.4-15	2	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
24-6								1	A5.1	1	E1.1La	1	F3.10	1	G1.4-10						1	J3.1	1	H1.1		EXISTING POLE.
															120/240V								1	N7.6		RESET POLE AND RE-TENSION GUYS.
															1-PHASE											INSTALL NEW GUY AND ANCHOR.
																										REPLACE XFMR.
																										PROVIDE #2 ACSR JUMPERS.
																										CONNECT NEW TO EXISTING PRIMARY.
24-7		110	2	#2 ACSR	175	45	4	1	A1.1							1	#4 TRIPLEX	110	1	#1/0 TRIPLEX	3	J3.1				NEW POLE.
24-8		115	2	#2 ACSR	110	45	4	1	A2.1	1	E1.1La	1	F3.10			1	#4 TRIPLEX	115	1	#1/0 TRIPLEX	2	J3.1				NEW POLE.
24-9			2	#2 ACSR	115	45	4	1	A5.1	2	E1.1La	2	F3.10	1	G1.4-15			115	1	#1/0 TRIPLEX	1	J3.1	1	H1.1		NEW POLE.
															120/240V								1	N7.6		
															1-PHASE											
24-9A																		55	1	#1/0 TRIPLEX	1	J3.1				EXISTING POLE.
																										CONNECT NEW TO EXISTING SECONDARY
24-9B																										EXISTING POLE.
																										RESET POLE AND RE-TENSION GUY.
25										1	E1.1La	1	F3.10			1	EXISTING									EXISTING POLE.
																										INSTALL NEW GUY AND ANCHOR.
																										CONNECT NEW TO EXISTING SECONDARY
25A										1	E1.1La	1	F3.10					130	1	#2 TRIPLEX	2	J3.1				EXISTING POLE.
																										RESET POLE AND RE-TENSION GUY.
																										INSTALL NEW GUY AND ANCHOR.
25B						35	4									1	#4 TRIPLEX	70	1	#2 TRIPLEX	2	J3.1				NEW POLE
																										ATTACH TELECOM TO NEW POLE.
27										2	E1.1La	2	F3.10													EXISTING POLE.
																										RESET POLE AND RE-TENSION GUYS.
																										INSTALL NEW GUYS AND ANCHORS.
29														1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											RESET POLE AND RE-TENSION GUY.
															1-PHASE											REPLACE XFMR.
																										PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
																										CONNECT TO OVERHEAD GUY.
29A						45	4			1	E1.1La	1	F3.10										1	E1.4L		NEW POLE.
																										INSTALL OVERHEAD GUY

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		
29-3										1	E1.1La	1	F3.10	1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											RESET POLE AND RE-TENSION GUY.
															1-PHASE											INSTALL NEW GUY AND ANCHOR.
																										REPLACE XFMR.
																										PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
29-4														1	G1.4-15	2	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
30A										1	E1.1La	1	F3.10			2	EXISTING									EXISTING POLE.
																										INSTALL NEW GUY AND ANCHOR.
31														1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
31B										2	E1.1La	2	F3.10			2	EXISTING									EXISTING POLE.
																										RESET POLE.
																										INSTALL NEW GUYS AND ANCHORS.
32														1	G3.3-15								1	H1.1		EXISTING POLE.
															208Y120V											REPLACE XFMRS.
															3-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
34														1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
35														1	G1.4-25								1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.
36																3	EXISTING				1	J3.1				EXISTING POLE.
																										CONNECT NEW TO EXISTING SECONDARY
37																2	EXISTING	140	1	#1/0 TRIPLEX	1	J3.1				EXISTING POLE.
																										CONNECT NEW TO EXISTING SECONDARY
38														1	G1.4-25	1	EXISTING						1	H1.1		EXISTING POLE.
															120/240V											REPLACE XFMR.
															1-PHASE											PROVIDE #2 ACSR JUMPERS.
																										CONNECT CONDUCTORS TO NEW XFMR.

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.