CITY OF CHEFORNAK, ALASKA

PUMP HOUSE #2 IMPROVEMENTS

IN COOPERATION WITH STATE OF ALASKA
VILLAGE SAFE WATER AND THE CITY OF
CHEFORNAK, ALASKA

OCT. 2014 - 35% ISSUED FOR AGENCY APPROVAL

PROJECT LOCATION

Location Map

CE2 ENGINEERS, INC.
PO BOX 232946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

STATE OF ALASKA
49TH
PAUL C. WEISNER
CE-10276
REGISTERED PROFESSIONAL ENGINEER

Consultant

RECORD DRAWING CERTIFICATE

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NAME DATE

Construction Foreman _____

FINAL DESIGN (Date) _____

ADEC APPROVAL (Date) _____

Construction Period (From) _____ (To) _____

As-Builts (Date) _____

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CONSTRUCTION RECORD

FIELD BOOK

STAKING

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INSPECTOR

STATE OF ALASKA 49TH PAUL C. WESNER CE-10276 REGISTERED PROFESSIONAL ENGINEER

PUMP HOUSE #2 IMPROVEMENTS

VICINITY MAP

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.

PO BOX 232949 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

REVISION	BY	DATE

Project No.

Date SEPT. 2014

Designed

Drawn CM

Approved PCW

Sheet No. G2.0

SHEET ____ OF ____

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pumphouse 2\G2.0 Vicinity Map #2.dwg, 10/8/2014 12:55:08 PM, cmerz, \\Ce2main\LANIER MP C2050/LD520C PCL 6

SYSTEM SCHEMATIC DESCRIPTION

(1) **PUMPHOUSE 1.** THIS PUMPHOUSE IS THE MAIN WATER SOURCE FOR THE CITY OF CHEFORNAK'S WATER FOR THE WATERING POINTS, WASHETERIA, AND SCHOOL. WATER FROM THE EXISTING PHS DRILLED WELL IS PUMPED AT APPROXIMATELY 15 GPM INTO THE PUMPHOUSE. IT FLOWS THROUGH TWO CARTRIDGE FILTERS, IS CHLORINATED, AND THEN FLOWS INTO TWO EA 2500 GALLON VERTICAL HDPE PLASTIC TANKS. A LEVEL CONTROL SYSTEM KEEPS THE TANKS WITHIN THREE-QUARTERS AND FULL LEVELS OF THE TANK.

PRESSURE PUMP P-1 PROVIDES CONSTANT PRESSURE (ADJUSTABLE) FROM 40 TO 60 PSI, USING A PRESSURE SENSOR AND A VARIABLE FREQUENCY DRIVE (VFD). HYDROPNEUMATIC TANK HT-1 PROVIDES A CUSHION FOR STOPPING AND STARTING PP-1 SMOOTHLY.

CIRCULATING PUMP CP-1 CIRCULATES 35 TO 40 GPM OF WATER THROUGH COMMUNITY WATER DISTRIBUTION LOOP. HEAT EXCHANGER HE-1, ALONG WITH CIRCULATING PUMP CP-3 PROVIDES BACKUP HEAT FOR THE WATER DISTRIBUTION LOOP IF THE WASTE HEAT RECOVERY SYSTEM AT THE POWER PLANT FAILS TO HEAT THE LOOP.

(2) **WATER DISTRIBUTION LOOP.** THIS INSULATED LOOP DISTRIBUTES WATER TO THE WATERING POINTS, THE SCHOOL, CLINIC, WASHETERIA, AND OTHER USERS THROUGH 2 EA 3-IN HDPE BARE PIPES CONTAINED IN AN INSULATED 8-IN ARCTIC PIPE DUCT. THE DUCT LENGTH IS APPROXIMATELY 5,000 FT LONG AND THE WATER LOOP IS APPROXIMATELY 10,000 FT LONG.

THE WATER LOOP IS HEATED BY RECOVERED ENGINE HEAT AT THE CITY POWER PLANT, BUT CAN BE HEATED FROM EITHER PUMPHOUSE 1 OR 2 IN CASE THE HEATING SYSTEM AT THE CITY POWER PLANT FAILS.

(3) **TYPICAL WATERING POINT.** THIS WELL INSULATED AND HEATED WATERING POINT DISPENSES WATER TO CUSTOMERS THROUGH A HOSE. IT ALSO SUPPLIES LARGER AMOUNTS OF WATER FOR HIGHER FLOWS THROUGH A CAM-LOCK HOSE CONNECTION ON THE SIDE OF THE ENCLOSURE.

(4) **PUMPHOUSE 2.** THIS PUMPHOUSE WILL BE THE BACKUP WATER SOURCE FOR THE CITY OF CHEFORNAK'S WATER FOR THE WATERING POINTS, WASHETERIA, AND SCHOOL. WATER FROM THE EXISTING 2002 DRILLED WELL FIELD WILL BE PUMPED AT APPROXIMATELY 6 GPM INTO THE PUMPHOUSE TO MINIMIZE INCREASED SALINITY. WELL WATER WILL FLOW THROUGH TWO CARTRIDGE FILTERS, CHLORINATED, THEN INTO 1 EA 2500 GALLON VERTICAL HDPE PLASTIC TANK. A LEVEL CONTROL SYSTEM WILL KEEP THE TANK WITHIN THREE-QUARTERS AND FULL LEVELS OF THE TANK.

CONT'D SYSTEM SCHEMATIC DESCRIPTION

PRESSURE PUMP PP-2 WILL PROVIDE CONSTANT PRESSURE (ADJUSTABLE) FROM 40 TO 60 PSI, USING A PRESSURE SENSOR AND A VARIABLE FREQUENCY DRIVE (VFD). HYDROPNEUMATIC TANK HT-2 WILL PROVIDE A CUSHION FOR STOPPING AND STARTING PP-1 SMOOTHLY.

CIRCULATING PUMP CP-2 CIRCULATES 35 TO 40 GPM OF WATER THROUGH COMMUNITY WATER DISTRIBUTION LOOP. HEAT EXCHANGER HE-2, ALONG WITH CIRCULATING PUMP CP- PROVIDE BACKUP HEAT FOR THE WATER DISTRIBUTION LOOP IF THE WASTE HEAT RECOVERY SYSTEM AT THE POWER PLANT FAILS TO HEAT THE LOOP.

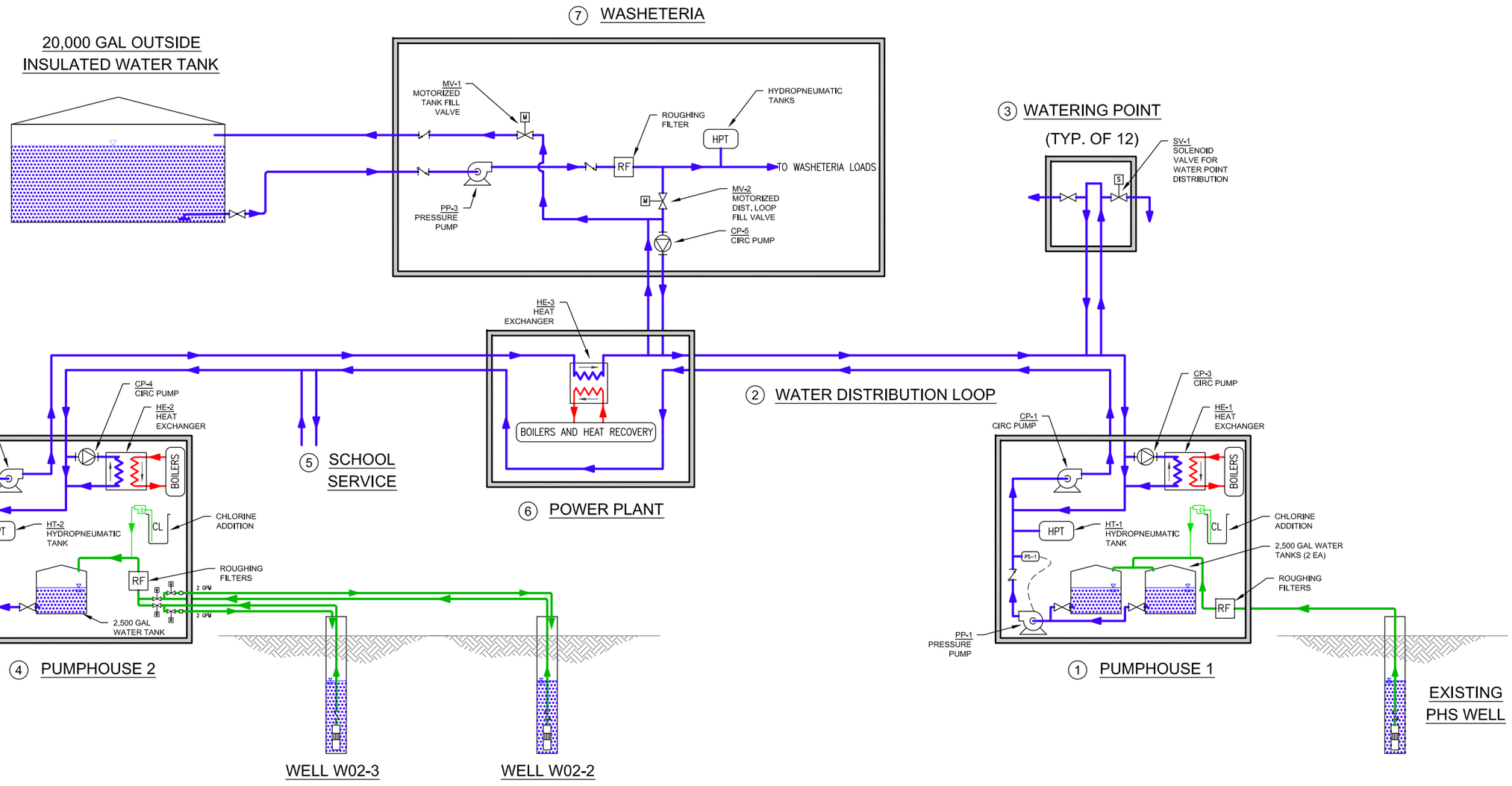
(5) **SCHOOL SERVICE.** A CIRCULATING LINE IN AN INSULATED ARCTIC PIPE DUCT FROM A JUNCTION BOX ON THE WATER DISTRIBUTION LOOP GOES TO THE WATER TREATMENT MODULE AT THE SCHOOL, WHERE THE WATER UNDERGOES AN ULTRAFILTRATION/REVERSE OSMOSIS TREATMENT PROCESS TO PRODUCE POTABLE WATER FOR SCHOOL USE.

(6) **CITY POWER PLANT.** A HEAT RECOVERY SYSTEM EXTRACTS HEAT FROM THE ENGINE GLYCOL COOLING SYSTEM AND USES THAT HEAT TO WARM THE WATER THROUGH HEAT EXCHANGER HE-3 UP TO 55°F FOR OUTGOING WATER TO THE DISTRIBUTION LOOP. HEAT EXCHANGERS IN PUMPHOUSES 1 AND 2 PROVIDE DOUBLE BACKUP FOR HEATING THE WATER DISTRIBUTION LOOP FOR MAXIMUM SURVIVABILITY.

(7) **WASHETERIA.** THE 22,000-GAL VERTICAL INSULATED WATER TANK IS USED TO MEET THE NEEDS OF THE WASHETERIA, AND TO PROVIDE A WATER RESERVE FOR THE SYSTEM IF THE EXISTING PHS WELL IS DOWN FOR MAINTENANCE OR A PROBLEM. THIS TANK WILL PROVIDE TWO DAYS OF FEEDWATER FOR THE SCHOOL WATER TREATMENT SYSTEM. THE TANK IS FILLED THROUGH MOTORIZED FILL VALVE MV-1 FROM THE WATER DISTRIBUTION LOOP.

THE WASHETERIA IS PRESSURIZED BY PRESSURE PUMP PP-3. WATER FLOWS THROUGH A CARTRIDGE FILTER TO THE WASHETERIA PLUMBING, AND SYSTEM PRESSURE OF 40-60 PSI IS STORED IN TWO HYDROPNEUMATIC TANKS.

IN THE EVENT WATER IS NEEDED IN THE WATER DISTRIBUTION LOOP, MOTORIZED VALVE MV-2 OPENS AND ALLOWS A MAXIMUM OF 7 GPM INTO THE SYSTEM. CIRCULATING PUMP CP-5 PROVIDES CONTINUOUS CIRCULATION OF WATER BETWEEN THE Washeteria AND THE WATER DISTRIBUTION LOOP TO PREVENT FREEZING.



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CONSTRUCTION RECORD
FIELD BOOK
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INSPECTOR

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER
PAUL C. MESNER CE-10276

PUMP HOUSE #2 IMPROVEMENTS

SYSTEM SCHEMATIC PROCESS DISCRIPTION

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 222646 ANCHORAGE, AK 99522 PH: 907-348-1010 FAX: 907-348-1015

DATE	BY	REVISION

Project No. _____ Date SEPT. 2014
Designed PCW Drawn CM Approved PCW

Sheet No. G3.0
SHEET _____ OF _____

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DESIGN CRITERIA

COMMUNITY

POPULATION (2012)	434
DESIGN POPULATION (2034)	458
WATER CONSUMPTION (2034)	9,764 GPD
PLANNED WATER SUPPLY AT PUMP HOUSE 1	6,509 GPD (4.5 GPM)
PLANNED WATER SUPPLY AT PUMP HOUSE 2	3,255 GPD (2.3 GPM)
WATER STORAGE, PUMP HOUSE 1	5,000 GAL
WATER STORAGE, PROPOSED PUMP HOUSE 2	2,500 GAL
WATER STORAGE, PROPOSED WASHETERIA	20,000 GAL

CITY WELLS (BY PUMP HOUSE 2)

WATER SOURCE:	2 WELLS EACH, 277 FT DEEP WELLS, 6 IN DIA.
CONTINUOUS PUMPING RATE	2 @ 3 GPM = 6 GPM AT DESIGN
WATER TREATMENT:	2 CARTRIDGE FILTERS IN SERIES 10 MICRON 1ST STAGE 5 MICRON 2ND STAGE 170 SF PLEAT AREA EA

WATER PRESSURIZATION

2 EA 15 GPM MULTISTAGE PRESSURE PUMPS LEAD/LAG, MAX 30 GPM, CONTROLLED BY VFD/PRESSURE SENSOR, SET POINT ADJUSTABLE BETWEEN 40 AND 50 PSIG

1 EA HYDROPNEUMATIC BUFFER TANK, 3 GAL ACCEPTANCE FACTOR

WATER DISTRIBUTION

CIRCULATION:	35 TO 40 GPM @40 TO 59' TDH 2 EA 35 TO 40 GPM 1725 RPM VERTICAL MULTISTAGE PUMPS, PRIMARY/BACKUP

ENVIRONMENTAL

DESIGN MINIMUM OUTDOOR TEMPERATURE:	-45°F
DESIGN ANNUAL HEATING DEGREE DAYS AT 65°F	13,200° F*DAYS/YR
DESIGN ANNUAL HEATING DEGREE DAYS AT 50°F	7,900° F*DAYS/YR

ELECTRICAL POWER

120/240 VOLTS, CENTER TAPPED NEUTRAL, SINGLE PHASE

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INSPECTOR

STATE OF ALASKA 49TH
PAUL C. MESNER CE-10276 REGISTERED PROFESSIONAL ENGINEER

PUMP HOUSE #2 IMPROVEMENTS
DESIGN CRITERIA
CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 223948 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

REVISION	BY	DATE

Project No. _____ Date SEPT. 2014
Designed PCW
Drawn CM
Approved PCW

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GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE DONE IN A SAFE WORKMANLIKE MANNER TO INDUSTRY STANDARDS AND IN CONFORMANCE WITH APPLICABLE LOCAL STATE AND FEDERAL CODES AND REGULATIONS. HIGH STANDARDS OF WORKMANSHIP SHOWING A SENSE OF PRIDE BY WORKMEN SHALL BE MAINTAINED. WORKERS SHALL BE PREPARED TO SIGN THEIR INDIVIDUAL WORK AS IF IT WAS THEIR OWN ARTWORK.
2. ALL MATERIALS SHALL MEET OR EXCEED THE MINIMUM QUALITY STANDARDS SPECIFIED IN THE DRAWINGS. ANY MATERIAL IN CONTACT WITH THE WELL WATER OR POTABLE WATER SHALL BE NSF 61 APPROVED. SOLDER CONTAINING LEAD SHALL NOT BE ALLOWED.
3. THE BASIS OF VERTICAL CONTROL IS THE 3" BLM BRASS CAP OF USS 4412, TR-A, CORNER 11, BLOCK 6, AS SHOWN ON SURVEY CONTROL SHEET C1.0 AS POINT INDENTIFIER 616. THE ELEVATION OF THE TOP OF CAP IS 77.68 FT.
4. THE BASIS OF HORIZONTAL CONTROL IS THE BEARING BETWEEN POINT INDENTIFIER 600 AND POINT IDENTIFIER 616 AS SHOWN ON SURVEY CONTROL SHEET C1.0. THE BEARING IS NORTH 7° 14' 42" E WITH A LENGTH OF 2988.5 FEET.
5. EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATION TO THE BEST KNOWLEDGE OF THE ENGINEER AT THE TIME OF DESIGN. UTILITY RECORDS MAY NOT BE COMPLETELY ACCURATE. THE PROJECT SUPERINTENDENT SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF UTILITIES WITHIN EACH CONSTRUCTION REACH PRIOR TO CONSTRUCTION. ALL UTILITIES ARE ABOVE GROUND UNLESS OTHERWISE NOTED.

WATER AND SEWER -	CHEFORNAK WATER AND SEWER UTILITY	(907) 867-8301
ELECTRIC -	NATERKAQ LIGHT PLANT	(907) 867-8213
TELEPHONE -	UNITED UTILITIES, INC.	(800) 478-2020

6. THE PROJECT SUPERINTENDENT SHALL BE RESPONSIBLE FOR MAINTAINING A CLEAN SET OF AS-BUILT "RED LINE" RECORD DRAWINGS SHOWING LOCATION AND SWING TIES TO ALL BURIED SYSTEM COMPONENTS. ALL ELEVATIONS SHALL BE MARKED ASB (AS-BUILT) OR F.C. (FIELD CHANGED) WITH THE CORRECT VALUE INSERTED. DRAWINGS SHALL BE KEPT CURRENT IN RED PENCIL AND UPDATED DAILY IN A NEAT AND LEGIBLE FASHION. A COPY OF THE AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE CITY OF CHEFORNAK AND THE VILLAGE SAFE WATER PROJECT ENGINEER.
7. GENERAL RESTORATION - THE AREAS IMPACTED BY CONSTRUCTION SHALL BE RETURNED TO PRECONSTRUCTION CONDITION OR BETTER. CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE AREA AND DISPOSED OF IN A PROPER MANNER. DUE CARE AND CAUTION SHALL BE TAKEN TO AVOID DISTURBING PERSONAL PROPERTY.
8. CONSTRUCTION IN SENSITIVE AREAS - TIMBER MATS OR PADS SHALL BE USED TO PROTECT VEGETATIVE COVER DURING CONSTRUCTION. ANY DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES SHALL BE REPAIRED OR RESEEDED AS NECESSARY TO RETURN THE AREAS AFFECTED BY CONSTRUCTION TO ITS PRECONSTRUCTION STATE.
9. THE CONSTRUCTION SITE SHALL BE ADEQUATELY PROTECTED, RESTRICTED AND BARRICADED IN THE BEST PUBLIC INTERESTS OF HEALTH, SAFETY AND WELFARE, WITH VISIBLE AND STABLE BARRIERS, UNDERSTANDABLE, LARGE-PRINT WARNING SIGNS, AND OTHER PRECAUTIONARY EQUIPMENT AND MEASURES AS REQUIRED. ALL SAFETY MEASURES SHALL BE IN CONFORMANCE WITH APPLICABLE STATE OF ALASKA DOT AND OSHA SAFETY REQUIREMENTS.
10. EXISTING BOARDWALK SHALL BE REMOVED ONLY WHERE INDICATED ON THE PLANS AND IN ALL AREAS WHERE THE EXISTING BOARDWALK CONFLICTS WITH THE PROPOSED BOARDWALK ALIGNMENT. REMOVED BOARDWALK MATERIAL WITH ANY SALVAGE VALUE SHALL BE CLEANED OF FASTENERS (NAILS, SCREWS, PLATES, ETC.) AND NEATLY STACKED AT A LOCATION DESIGNATED BY THE CITY. PROVIDE STICKERS BETWEEN EVERY THIRD ROW IN THE STACK. EXISTING BOARDWALK MATERIAL WITH NO SALVAGE VALUE SHALL BE DISPOSED OF AT THE LANDFILL.

GENERAL DESIGN CRITERIA:

SEE SHEET G3.1

WATERLINES / WATER TANK:

TESTING - ALL TESTING SHALL BE IN CONFORMANCE WITH THE FOLLOWING REQUIREMENTS.

A. PLUMBING TESTING - PERFORM A TEST OF WATERLINES. ALL POTABLE WATER PIPING MUST BE PRESSURIZED TO 90 PSI WITH WATER AND LEFT FOR 1 HOUR. AFTER THE INITIAL STABILIZATION PERIOD WITH NO LOSS IN PRESSURE.

B. ALL TESTS SHALL BE WITNESSED BY A REPRESENTATIVE DESIGNATED BY THE OWNER (CITY OF CHEFORNAK). UPON SUCCESSFUL COMPLETION OF A TEST THE RESULTS OF THE TEST SHALL BE DOCUMENTED ON A TEST FORM AND ACKNOWLEDGED BY SIGNATURE OF THE OWNER'S REPRESENTATIVE WITNESSING THE TEST AND BY THE PROJECT SUPERINTENDENT. THE SUPERINTENDENT'S RED LINED AS-BUILT DRAWINGS SHALL ALSO NOTE, FOR EACH SEGMENT OF THE SYSTEM TESTED, THE TIME AND DATE OF THE TEST AND THE NAME OF THE OWNER'S WITNESS. COPIES OF THIS TEST SHALL BE SENT TO VSW ENGINEER.

C. THE CONSTRUCTION MANAGER WILL SUBMIT A QA/QC MANUAL OF ALL TESTING FOR REVIEW.

WATER PIPING SHALL BE BUTT FUSED, HDPE SDR 11 (PE 3408), ROUTED THROUGH AN INSULATED ARCTIC PIPE DUCT. THE DUCT SHALL HAVE A 4"Ø HDPE, SDR 17 CORE PIPE, 3" MINIMUM OF 3-4 LB/CF POLYURETHANE FOAM AND AN 12"ØX16 GAUGE CORRUGATED ALUMINUM JACKET.

DISINFECTION - ALL WATERLINES AND WATER TANKS TO BE DISINFECTED AND TESTED FOR COLIFORM IN ACCORDANCE WITH AWWA C651/3.

BOARDWALK:

ALL BOARDWALK MATERIALS SHALL BE AS SPECIFIED IN THE DRAWINGS AND MEET THE FOLLOWING REQUIREMENTS:

A. LUMBER: HEMLOCK AND DOUGLAS FIR (HEM-FIR) GRADE #2 OR BETTER. ALL SIZES ARE GIVEN IN NOMINAL DIMENSIONS (I.E., 4X12 WILL MEASURE 3 1/2" THICK BY 11 1/2" WIDE).

B. WOOD TREATMENT: ALL WOOD MATERIALS USED SHALL BE TREATED WITH THE WOOD PRESERVATIVE CROMATED COPPER ARSENATE (CCA) AT THE FOLLOWING CONCENTRATIONS:
"SOIL CONTACT" (INCLUDES ALL SLEEPERS) - 0.6 POUNDS PER CUBIC FOOT
ABOVE GROUND (>6" ABOVE GROUND) - 0.4 POUNDS PER CUBIC FOOT

GENERAL STRUCTURAL NOTES

SEE STRUCTURAL GENERAL NOTES, SHEET S0.1

BUILDING FOUNDATION
A FOUNDATION INVESTIGATION WAS PREPARED BY GOLDER AND ASSOCIATES. SOILS IN THE AREA GENERALLY CONSIST OF A VESICULAR BASALT BOLDER MATRIX WITH A THIN ORGANIC MAT OVERLAYING SILT. MARGINAL TEMPERATURE PERMAFROST AS WELL AS THAWED SOIL CONDITIONS EXIST IN THE PROJECT AREA. BEDROCK IS FOUND AT DEPTHS BETWEN 20' AND 30'.

PIPING (GENERAL):

1. ALL PIPING AND FITTINGS SHALL BE NSF-61 COMPLIANT WHERE SUCH PIPING AND FITTINGS ARE IN CONTACT WITH RAW OR POTABLE WATER IN THE WATER TREATMENT OR DISTRIBUTION PROCESS.
2. ALL PIPING SHALL BE LEAD FREE.
3. ALL PLUMBING USING SOLDERED JOINTS SHALL USE A SOLDER CERTIFIED TO NOT TO CONTAIN LEAD (BRIDGET OR EQUAL)

COPPER TUBING AND FITTINGS:

1. ALL COPPER TUBING SHALL BE ASTM B75 DRAWN TEMPER, ANSI/NSF-61 CERTIFIED, TYPE L THICKNESS.
2. COPPER SOLDER FITTINGS SHALL BE PRODUCED IN ACCORDANCE WITH ASME/ANSI B16.22, AND SHALL BE ANSI/NSF-61 CERTIFIED.

SERVICE LINES:

1. HDPE MATERIAL

A) LISTED BY THE PPI WITH DESIGNATION OF PE-4710
B) CELL CLASSIFICATION OF PE-445574C OR BETTER IN ACCORDANCE WITH ASTM D3350
C) MUST EXCEED 1000 HOURS WHEN TESTED IN ACCORDANCE WITH ASTM F1248 RING ENVIRONMENTAL STRESS CRACK RESISTANCE TEST) WITH FEWER THAN 50 PERCENT FAILURES.
D) APPROVED BY THE NATIONAL SANITATION FOUNDATION (NSF) FOR POTABLE WATER SERVICE.
E) SHALL CONTAIN TWO PERCENT (2%) CARBON BLACK FOR ULTRAVIOLET (UV) PROTECTION AND SHALL BE HOMOGENEOUS THROUGHOUT.

MECHANICAL: FOR MECHANICAL NOTES SEE SHEET M1.1

HYDRONIC PIPING:

1. HYDRONIC HEAT TRACE:
HYDRONIC HEAT TRACE (WHERE SPECIFIED) SHALL BE A MINIMUM OF 3/4" DIA. HEAT PEX.

PIPELINE TESTING:

1. GENERAL:
ALL TESTING SHALL BE IN CONFORMANCE WITH THE FOLLOWING REQUIREMENTS:
ALL TESTS SHALL BE WITNESSED BY A REPRESENTATIVE DESIGNATED BY THE COMMUNITY. UPON SUCCESSFUL COMPLETION OF A TEST THE RESULTS OF THE TEST SHALL BE DOCUMENTED ON A TEST FORM AND ACKNOWLEDGED BY SIGNATURE OF THE COMMUNITY'S REPRESENTATIVE WITNESSING THE TEST AND BY THE PROJECT SUPERINTENDENT. THE SUPERINTENDENT'S RED LINED AS-BUILT DRAWINGS SHALL ALSO NOTE THE TIME AND DATE OF THE TEST, AS WELL AS THE NAME OF THE COMMUNITY'S WITNESS, FOR EACH PIPE SEGMENT TESTED.

2. GLYCOL HEAT TRACE TESTING - PERFORM HYDROSTATIC TESTING OF GLYCOL HEAT TRACE. HYDROSTATIC TESTS SHALL BE PERFORMED AFTER INSTALLATION. FILL THE LINE WITH WATER AND REMOVE AIR PRIOR TO STARTING THE TEST. PRESSURIZE TO 1.5 X OPERATING PRESSURE (80 PSI) = 120 PSI AND LEAVE FOR A MINIMUM OF 1-HOUR. AFTER THIS INITIAL PERIOD, ADD WATER TO BRING THE PRESSURE UP TO 120 PSI AND BEGIN A 4-HOUR TEST. FOR THE GLYCOL LOOP TO BE ACCEPTED THERE SHOULD BE NO LOSS IN PRESSURE. NO VISIBLE LEAKS SHOULD BE NOTED UPON A VISUAL INSPECTION OF EACH JOINT UNDER PRESSURE.

LEGEND

EXISTING PLAN VIEW	EXISTING PROFILE VIEW	PROPOSED PLAN VIEW	PROPOSED PROFILE VIEW	DESCRIPTION
				PROPOSED BOARD ROAD (WIDTH AS NOTED)
				EXISTING BOARD ROAD TO REMAIN
				EXISTING BOARD ROAD TO BE REMOVED
				GROUND PROFILE
W		W		WATERMAIN
		WM		FUTURE WATERMAIN
		FM		FUTURE WASTEWATER FORCEMAIN
E				OVERHEAD ELECTRIC
POL				PETROLEUM/OIL/LUBRICANTS
				UTILITY POLE AND GUY WIRE ANCHOR
X				FENCE
24				CONTOUR LINE
				SHORELINE
				EXISTING GROUND
				STRUCTURE
				EARTHWORK SLOPE
				NATURAL GROUND OR COMPACTED SOIL
				DIRECTION OF DRAINAGE
				PROPERTY LINE OR SECTION LINE
				MATCHLINE
				PERMANENT EASEMENT
		A.W.W.		ALL WEATHER WOOD
CMP				CORRUGATED METAL PIPE
(XX.XX)				EXISTING GRADE ELEV.
		TOB:		TOP OF BOARD ROAD ELEV.
OR B.C.				BRASS CAP MONUMENT AS NOTED
				TEST HOLE
24.5				SPOT ELEVATION
27				BLOCK NUMBER
3A				LOT NUMBER
IPS				IRON PIPE SIZE (INDUSTRY STANDARD OUTSIDE PIPE DIAMETER)
WW X				6" WELL
		M.B.		MECHANICAL BOLT
		G.R.C.		GALVANIZED RIGID CONDUIT
		ELEV.		ELEVATION

SECTION AND DETAIL DESIGNATIONS

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INSPECTOR

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER PAUL C. WISNER CE-10276

PUMP HOUSE #2 IMPROVEMENTS
GENERAL NOTES AND LEGEND
CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 223046 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

REVISION	BY	DATE

Project No. _____ Date SEPT. 2014 Designed _____ Drawn _____ Approved PCW

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SHEET _____ OF _____

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NOTE: THIS TECHNICAL MEMORANDUM IS SUPPLIED IN LIEU OF FINAL GEOTECHNICAL REPORT TO BE ISSUED AT THE END OF SEPTEMBER 2014.

Golder Associates

TECHNICAL MEMORANDUM

Date: September 15, 2014
To: Paul Weisner, PE
From: Peter Calvin, PE; Richard Mitchells, PE
cc:
RE: **PRELIMINARY GEOTECHNICAL FINDINGS - CHEFORNAK PUMPHOUSE**

Project No.: 1405906
Company: CE2 Engineers, Inc.
Email: p.weisner@ce2engineers.com

This technical memorandum provides Golder Associates (Golder) preliminary geotechnical findings for the proposed Chefornak Pumphouse project, including an initial review of the preferred grouted micro-pile foundation for the two pump houses planned for Chefornak, Alaska. This document should serve as a working document based on currently available data and may be revised as the project progresses. This memorandum will be followed by a report providing more detailed engineering recommendations.

The two new pumphouses are planned as part of a water system improvement project in Chefornak Alaska. The structures will be of a similar design, with dimensions of approximately 42 by 30 feet. We understand that the preferred foundation type would be a 6-inch diameter grouted micropile system. The micropile would be drilled and driven to the point it is adequately seated in competent bed rock. A smaller diameter hole would then be drilled into the bedrock and a rock anchor would be grouted in place to resist the anticipated frost uplift forces. This type of foundation system has distinct advantages over other deep foundations in that it can be installed in areas with variable thermal and groundwater conditions and in areas where float rock and boulders could be encountered.

While the pile axial loads have not been finalized, CE2 has indicated they are to be in the range of 7-kips to 14-kips (per pile) for geotechnical design purposes. For frost uplift, we have used design stress of 40-pounds per square inch (psi) along the pile perimeter though the expected active layer. At these design loads, the frost uplift will exceed the axial compressive design loads.

Golder conducted a limited geotechnical investigation at the proposed projects sites in August 2014. Due to limited funding, a site-specific geotechnical drilling program was not authorized. The investigation involved advancing a series of shallow depth hand probes and drill holes to characterize the near surface soil and thermal conditions. The maximum depth of exploration for this investigation was 8 feet below ground surface. For geotechnical data pertaining to the conditions below 8 feet we have relied on the information presented in our February 20, 2013 report to CE2 "Conceptual Geotechnical Considerations for Triodedic Frame Foundation Systems, Chefornak, AK".

Based on a review of relevant reports and our geotechnical experience in Chefornak, the generalized subsurface conditions in the community consist of an organic mat overlying fine-grained organic and

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inorganic silt. Discontinuous volcanic flow consisting of vesicular basalt has been encountered below the silt at variable depths, but generally between 20 and 30 feet below ground surface. However, basalt boulders have been located closer to ground surface in certain areas in and around the community. Degrading permafrost is present in the community, particularly near larger surface water bodies, in damaged tundra areas, and under snow drifts.

During our August 2014 limited geotechnical investigation we found that the thermal conditions at pump house 1 were highly variable ranging from 2 feet to over 8 feet below ground surface near the existing pump house. Additionally pockets of relic seasonal frost were found between 5 and 6 feet below ground surface. The highly variable thermal conditions are likely due to the dumping of backwash from the pump house, standing water and thermal influence of the nearby board walk. The subsurface thermal conditions at pump house 2 were found to be more consistent, likely due to the lack of development in the area. The depth of thaw was found to be between 2 and 3 feet below ground surface.

Based on the information gathered during our limited geotechnical investigation and review of relevant geotechnical reports, the proposed drilled and grouted micro pile foundation is suitable for this application. If seated into competent bedrock the proposed 6-inch diameter pile is expected to provide adequate bearing capacity. Rock anchors will need to be installed inside the pile interior and grouted into competent bedrock to account for the frost uplift forces. Due variable subsurface thermal states the pile diameter may need to be adjusted to account for lateral deflections.

This technical memorandum will be followed by more detailed engineering recommendations when we complete the laboratory analysis and the project loading design is finalized. If you have any comments or questions please contact us.

Golder Associates

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INSPECTOR

STATE OF ALASKA
PAUL C. WEISNER
CE-10276
REGISTERED PROFESSIONAL ENGINEER

PUMP HOUSE #2 IMPROVEMENTS
GEOTECHNICAL INFORMATION
CHEFORNAK, ALASKA

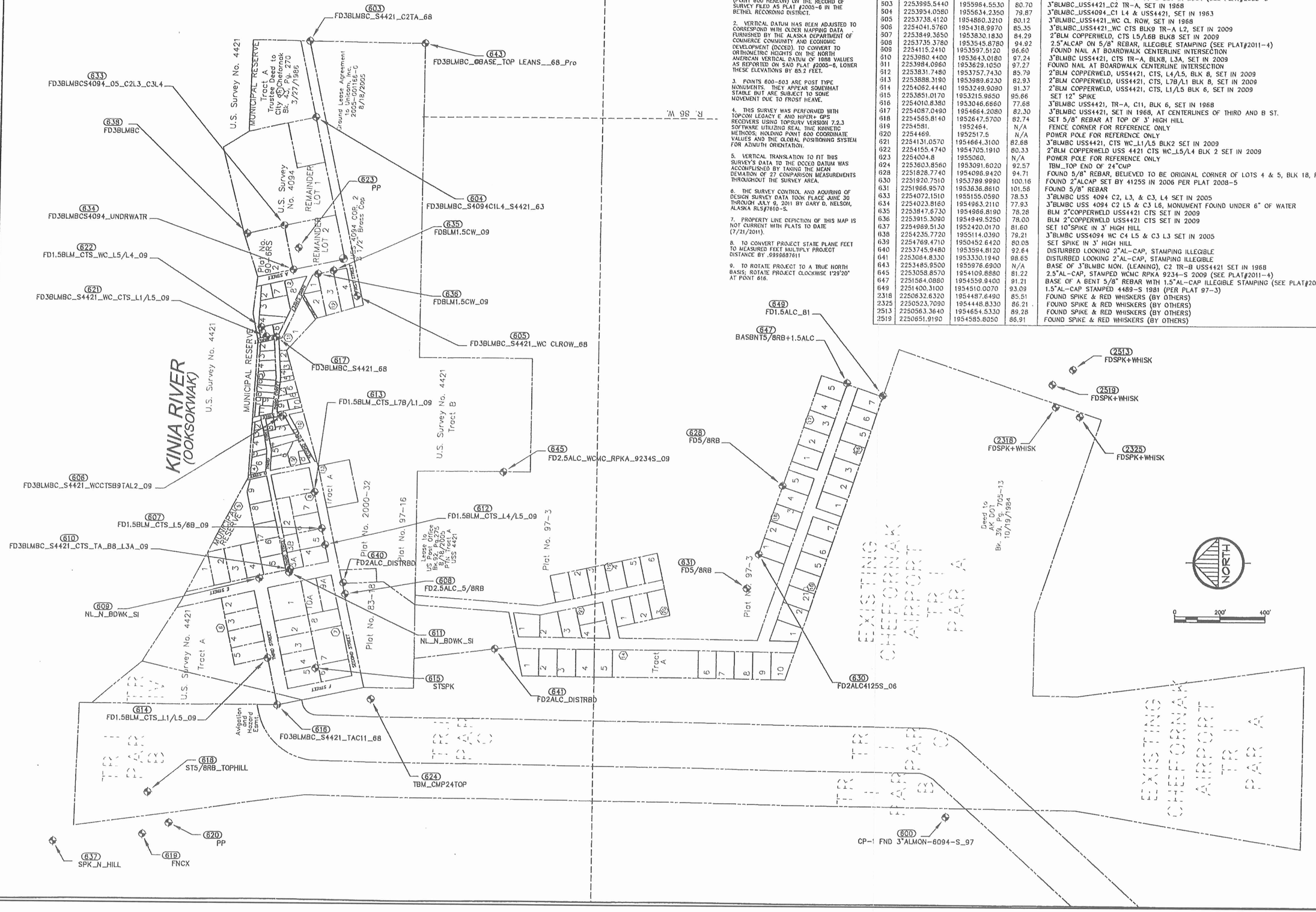
CE2 ENGINEERS, INC.
PO BOX 230246 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

REVISION | BY | DATE

Project No. ____ Date SEPT. 2014 Designed ____ Drawn ____ Approved PCW

Sheet No. G5.0
SHEET ____ OF ____

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pumphouse 2\G5.0 GEOTECHNICAL.dwg, 9/29/2014 12:38:03 PM, cmerz, \\Ce2main\LANIER MP C2050/LD520C PCL 6



SURVEY NOTES:

1. PROJECT DATA AND COORDINATES ARE SHOWN IN FEET AS ALASKA STATE PLANE ZONE 8 ON THE NORTH AMERICAN DATUM OF 1983; BASED ON VALUES REPORTED FOR CP-1 (POINT 600 HEREON) ON THE RECORD OF SURVEY FILED AS PLAT #2005-6 IN THE BETHEL RECORDING DISTRICT.

2. VERTICAL DATUM HAS BEEN ADJUSTED TO CORRESPOND WITH OLDER MAPPING DATA FURNISHED BY THE ALASKA DEPARTMENT OF COMMERCE COMMUNITY AND ECONOMIC DEVELOPMENT (DCCED). TO CONVERT TO ORTHOMETRIC HEIGHTS ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 VALUES AS REPORTED ON SAID PLAT #2005-6, LOWER THESE ELEVATIONS BY 85.2 FEET.

3. POINTS 600-603 ARE POST TYPE MONUMENTS. THEY APPEAR SOMEWHAT STABLE BUT ARE SUBJECT TO SOME MOVEMENT DUE TO FROST HEAVE.

4. THIS SURVEY WAS PERFORMED WITH TOPCON LEGACY E AND HIPER+ GPS RECEIVERS USING TOPSURV VERSION 7.2.3 SOFTWARE UTILIZING REAL TIME KINETIC METHODS; HOLDING POINT 600 COORDINATE VALUES AND THE GLOBAL POSITIONING SYSTEM FOR AZIMUTH ORIENTATION.

5. VERTICAL TRANSLATION TO FIT THIS SURVEY'S DATA TO THE DCCED DATUM WAS ACCOMPLISHED BY TAKING THE MEAN DEMATION OF 27 COMPARISON MEASUREMENTS THROUGHOUT THE SURVEY AREA.

6. THE SURVEY CONTROL AND AQUIRING OF DESIGN SURVEY DATA TOOK PLACE JUNE 30 THROUGH JULY 9, 2014 BY GARY D. NELSON, ALASKA RLS#7610-S.

7. PROPERTY LINE DEFICTION OF THIS MAP IS NOT CURRENT WITH PLATS TO DATE (7/21/2011).

8. TO CONVERT PROJECT STATE PLANE FEET TO MEASURED FEET MULTIPLY PROJECT DISTANCE BY .9999887611

9. TO ROTATE PROJECT TO A TRUE NORTH BASIS; ROTATE PROJECT CLOCKWISE 1°29'20" AT POINT 616.

POINT IDENTIFYER	NORTHING	EASTING	ELEV.	DESCRIPTION
600	2251046.2030	1952669.7760	112.56	CP-1 FND 3"ALMON BY 6094-S SET IN 1997 (SEE PLAT#2005-6)
601	2247914.9780	1954419.7530	101.79	3"BRASS CAP, GPS-1, BY 10161-S SET IN 2004 (SEE PLAT#2005-6)
602	2245867.7620	1954440.7260	115.38	3"BRASS CAP, GPS-2, BY 10161-S SET IN 2004 (SEE PLAT#2005-6
603	2253995.5440	1955964.5530	80.70	3"BLMBC_USS4421_C2 TR-A, SET IN 1968
604	2253954.0580	1955634.2350	79.87	3"BLMBC_USS4094_C1 L4 & USS4421, SET IN 1963
605	2253738.4120	1954860.3210	80.12	3"BLMBC_USS4421_WC CL ROW, SET IN 1968
606	2254041.5760	1954318.9970	85.35	3"BLMBC_USS4421_WC CTS BLK9 TR-A L2, SET IN 2009
607	2253849.3650	1953830.1830	84.29	2"BLM COPPERWELD, CTS L5/L6B BLK8 SET IN 2009
608	2253735.3780	1953545.8780	94.92	2.5"ALCAP ON 5/8" REBAR, ILLEGIBLE STAMPING (SEE PLAT#2011-4)
609	2254115.2410	1953597.5120	96.60	FOUND NAIL AT BOARDWALK CENTERLINE INTERSECTION
610	2253980.4400	1953643.0180	97.24	3"BLMBC USS4421, CTS TR-A, BLK8, L3A, SET IN 2009
611	2253984.0960	1953629.1050	97.27	FOUND NAIL AT BOARDWALK CENTERLINE INTERSECTION
612	2253831.7480	1953757.7430	85.79	2"BLM COPPERWELD, USS4421, CTS, L4/L5, BLK 8, SET IN 2009
613	2253888.3190	1953989.6230	82.93	2"BLM COPPERWELD, USS4421, CTS, L7B/L1 BLK 8, SET IN 2009
614	2254062.4440	1953249.9090	91.37	2"BLM COPPERWELD, USS4421, CTS, L1/L5 BLK 6, SET IN 2009
615	2253851.0170	1953215.9650	95.66	SET 12" SPIKE
616	2254010.8380	1953046.6860	77.68	3"BLMBC USS4421, TR-A, C11, BLK 6, SET IN 1968
617	2254087.0490	1954684.2080	82.30	3"BLMBC USS4421, SET IN 1968, AT CENTERLINES OF THIRD AND B ST.
618	2254565.8140	1952647.5700	82.74	SET 5/8" REBAR AT TOP OF 3' HIGH HILL
619	2254581.	1952464.	N/A	FENCE CORNER FOR REFERENCE ONLY
620	2254469.	1952517.5	N/A	POWER POLE FOR REFERENCE ONLY
621	2254131.0570	1954664.3100	82.68	3"BLMBC USS4421, CTS WC_L1/L5 BLK2 SET IN 2009
622	2254155.4740	1954705.1910	80.33	2"BLM COPPERWELD USS 4421 CTS WC_L5/L4 BLK 2 SET IN 2009
623	2254004.8	1955060.	N/A	POWER POLE FOR REFERENCE ONLY
624	2253603.8560	1953091.6020	92.57	TBM_TOP END OF 24"CMP
628	2251828.7740	1954096.9420	94.71	FOUND 5/8" REBAR, BELIEVED TO BE ORIGINAL CORNER OF LOTS 4 & 5, BLK 18, PLAT 97-3
630	2251920.7510	1953789.9990	100.16	FOUND 2"ALCAP SET BY 4125S IN 2006 PER PLAT 2008-5
631	2251966.9570	1953636.8610	101.56	FOUND 5/8" REBAR
633	2254072.1510	1955155.0590	78.53	3"BLMBC USS 4094 C2, L3, & C3, L4 SET IN 2005
634	2254023.8180	1954963.2110	77.93	3"BLMBC USS 4094 C2 L5 & C3 L6, MONUMENT FOUND UNDER 6" OF WATER
635	2253847.6730	1954966.8190	78.28	BLM 2"COPPERWELD USS4421 CTS SET IN 2009
636	2253915.3090	1954949.5250	78.00	BLM 2"COPPERWELD USS4421 CTS SET IN 2009
637	2254969.5130	1952420.0170	81.60	SET 10"SPIKE IN 3' HIGH HILL
638	2254235.7720	1955114.0390	79.21	3"BLMBC USS4094 WC C4 L5 & C3 L3 SET IN 2005
639	2254769.4710	1950452.6420	80.08	SET SPIKE IN 3' HIGH HILL
640	2253745.9480	1953594.8120	92.64	DISTURBED LOOKING 2"AL-CAP, STAMPING ILLEGIBLE
641	2253084.8330	1953330.1940	98.65	DISTURBED LOOKING 2"AL-CAP, STAMPING ILLEGIBLE
643	2253485.9500	1955976.6900	N/A	BASE OF 3"BLMBC MON. (LEANING), C2 TR-B USS4421 SET IN 1968
645	2253058.8570	1954109.8880	81.22	2.5"AL-CAP, STAMPED WCMC RPKA 9234-S 2009 (SEE PLAT#2011-4)
647	2251564.0880	1954559.9400	91.21	BASE OF A BENT 5/8" REBAR WITH 1.5"AL-CAP ILLEGIBLE STAMPING (SEE PLAT#2011-4)
649	2251400.3100	1954510.0070	93.09	1.5"AL-CAP STAMPED 4489-S 1981 (PER PLAT 97-3)
2318	2250632.6320	1954487.6490	85.51	FOUND SPIKE & RED WHISKERS (BY OTHERS)
2325	2250523.7090	1954448.8330	86.21	FOUND SPIKE & RED WHISKERS (BY OTHERS)
2513	2250563.3640	1954654.5330	89.28	FOUND SPIKE & RED WHISKERS (BY OTHERS)
2519	2250651.9190	1954585.8050	86.91	FOUND SPIKE & RED WHISKERS (BY OTHERS)

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STATE OF ALASKA 49TH GARY D. NELSON LS 7610 9-30-14

SURVEY CONTROL

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 220648 ANCHORAGE, AK 99522 PH: 907-349-1019 FAX: 907-349-1015

BY	DATE
REVISION	

Project No.
Date
Designed CM
Drawn GN
Approved

Sheet No.
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STATE OF ALASKA 49TH PAUL C. WESNER CE-10276 REGISTERED PROFESSIONAL ENGINEER

PUMP HOUSE #2 IMPROVEMENTS

PUMP HOUSE #2 SITE PLAN

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 232948 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

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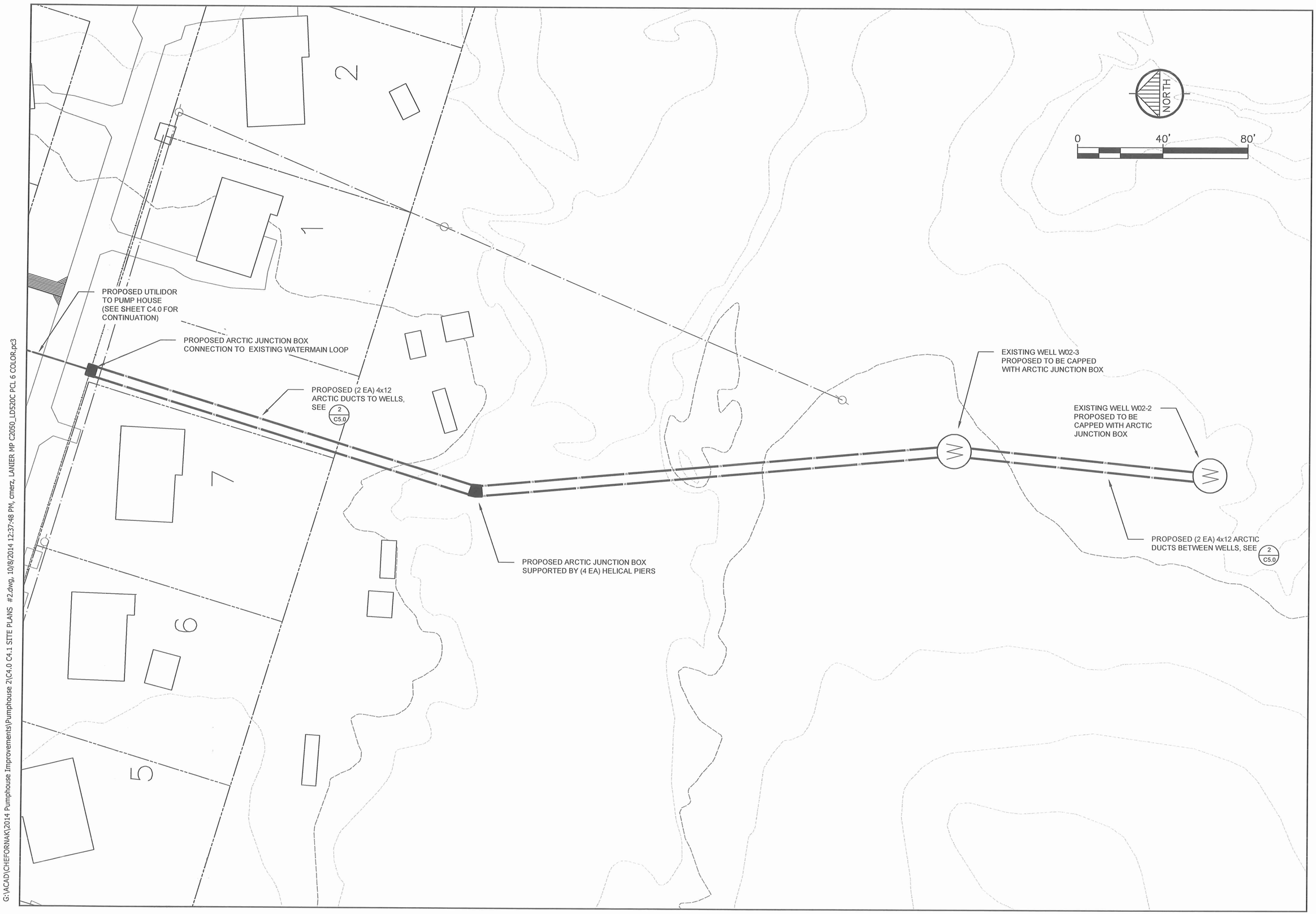

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PUMP HOUSE #2 IMPROVEMENTS

WELL FIELD SITE PLAN

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
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Date SEPT. 2014

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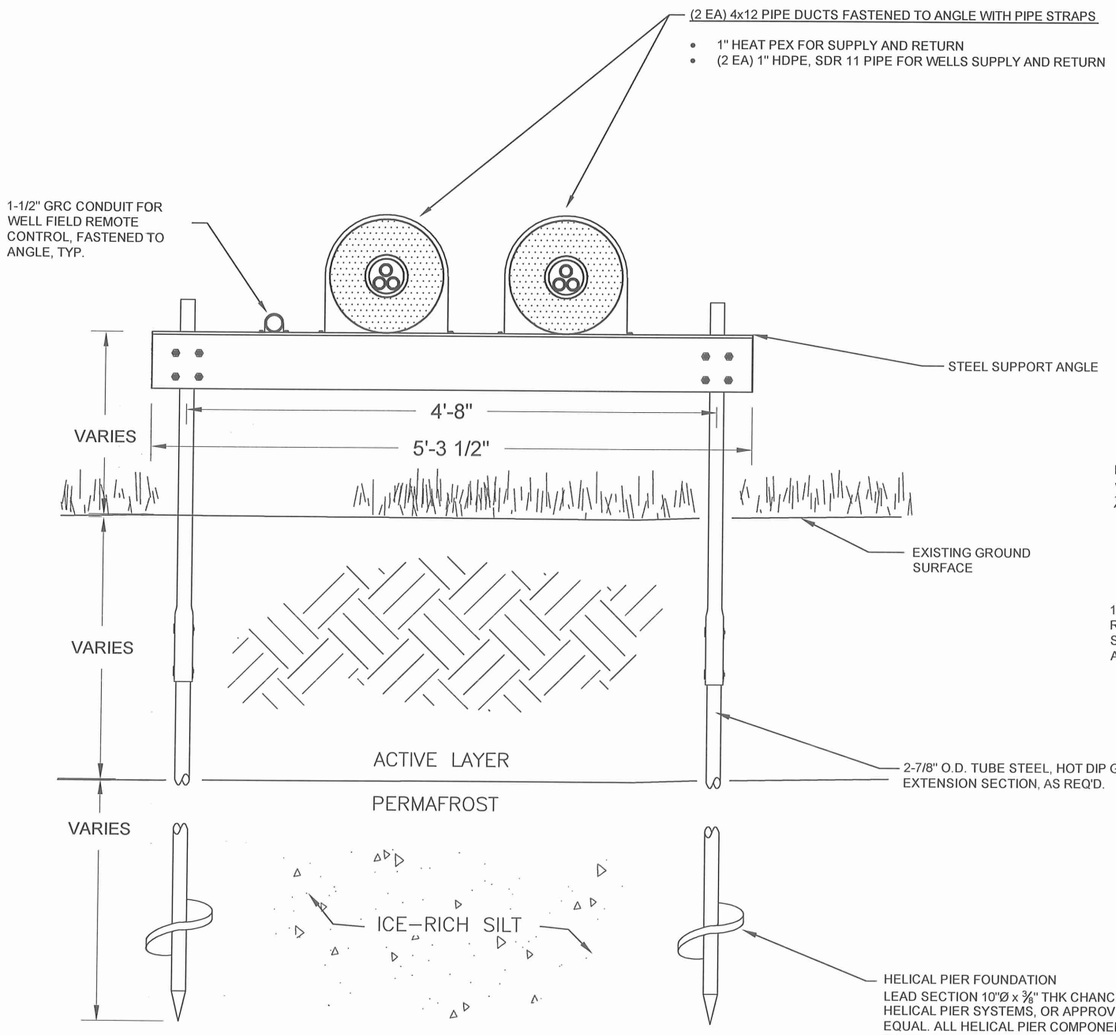
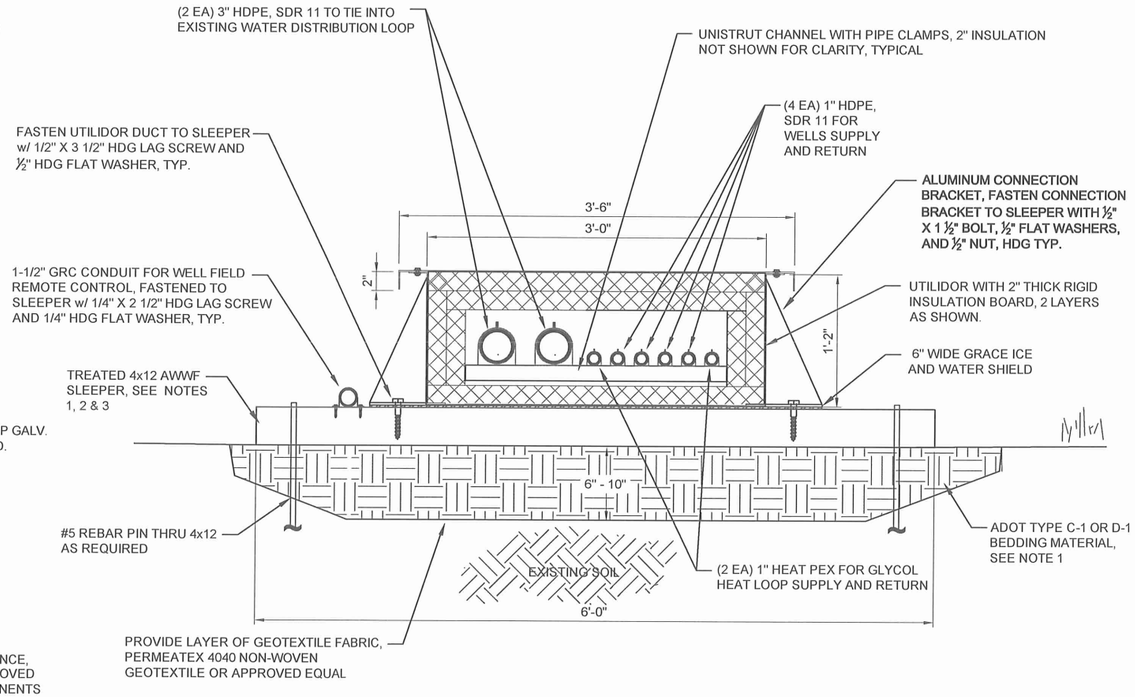


2 C5.0 HELICAL PIER PIPE SUPPORTS TYPICAL
NTS

NOTES:

1. REMOVE ALL ORGANIC MATERIAL 6-10" BENEATH THE 4x12 SLEEPERS AND REPLACE WITH ADOT TYPE C-1 MATERIAL.
2. STACK UP TO 2 SLEEPERS AS FIELD REQUIRED.
3. UTILIDOR SLEEPER SUPPORTS WILL BE PLACED EVERY 6' O.C.
4. PROVIDE INSULATING GASKETS AND/OR COATINGS BETWEEN DISSIMILAR METALS, TYP.



1 C5.0 UTILIDOR SECTION TYPICAL
NTS

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STATE OF ALASKA 49TH PAUL C. WESNER CE-10276 REGISTERED PROFESSIONAL ENGINEER

PUMP HOUSE #2 IMPROVEMENTS

UTILIDOR / PIPE SUPPORT DETAILS

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 223046 ANCHORAGE, AK 99522 PH: 907-349-1010 FAX: 907-349-1015

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Project No. _____ Date SEPT. 2014
Designed PCW
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Approved PCW

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SHEET _____ OF _____

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CODE ANALYSIS

PROJECT: CHEFORNAK PUMP HOUSE 1

APPLICABLE CODES:

INTERNATIONAL BUILDING CODE	2009 EDITION
INTERNATIONAL MECHANICAL CODE	2009 EDITION
NATIONAL ELECTRICAL CODE	2008 EDITION
UNIFORM PLUMBING CODE	2007 EDITION
INTERNATIONAL FIRE CODE	2009 EDITION
INTERNATIONAL FUEL GAS CODE	2009 EDITION
ADA - ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES	2009 EDITION

CONSTRUCTION TYPE: V-B

BUILDING OCCUPANCY: U (UTILITY - WATER PUMP HOUSE)

GROSS BUILDING AREA: 576 SF.

BASIC ALLOWABLE HEIGHT AND AREA PER TABLE 503

ALLOWABLE AREA: 5,000 SF. (U)/ 1 STORY = 576 < 5,000 = OK

OCCUPANCY SEPARATION PER 508.3.2 NON-SEPARATED OCCUPANCIES

NO SEPARATION REQUIRED.

INCIDENTAL USE AREA SEPARATION (PER 508.2.5 & TABLE 508.2.5)

BOILER ROOM EQUIPMENT ROOM < 15 PSI AND 10 HP

FURNACE < 400,000 BTU = NO RATED WALLS REQUIRED

FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE

SEPARATION DISTANCE 10'-5" X < 30' = 0 RATING REQUIRED FOR GROUP U/ TYPE VB

LEGEND

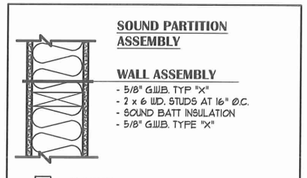
APPLIES TO SHEET A1.1 & A1.2

- WALL ASSEMBLY - SEE WALL TYPES.
- DOOR - SEE SCHEDULE
- (1) KEYED SHEET NOTE - SEE SHEET A1.1
- (A1) WALL TYPE INDICATOR - SEE SHEET A1.1
- (B) DOOR TYPE INDICATOR - SEE SHEET A1.1
- (W1) WINDOW TYPE INDICATOR - SEE SHEET A1.1
- 1 HOUR WALL - FULL HT.
- (FE) FIRE EXTINGUISHER WITH WALL BRACKET NFPA 10 LB. DRY CHEMICAL (4A-60B:C)
- FENCE BELOW

DOOR NOTES:
- PROVIDE THERMAL BREAK THRESHOLD AT ALL EXTERIOR DOORS
- PROVIDE WEATHER SEALS AND BOTTOM SWEEP AT ALL EXTERIOR DOORS.

3 DOOR SCHEDULE

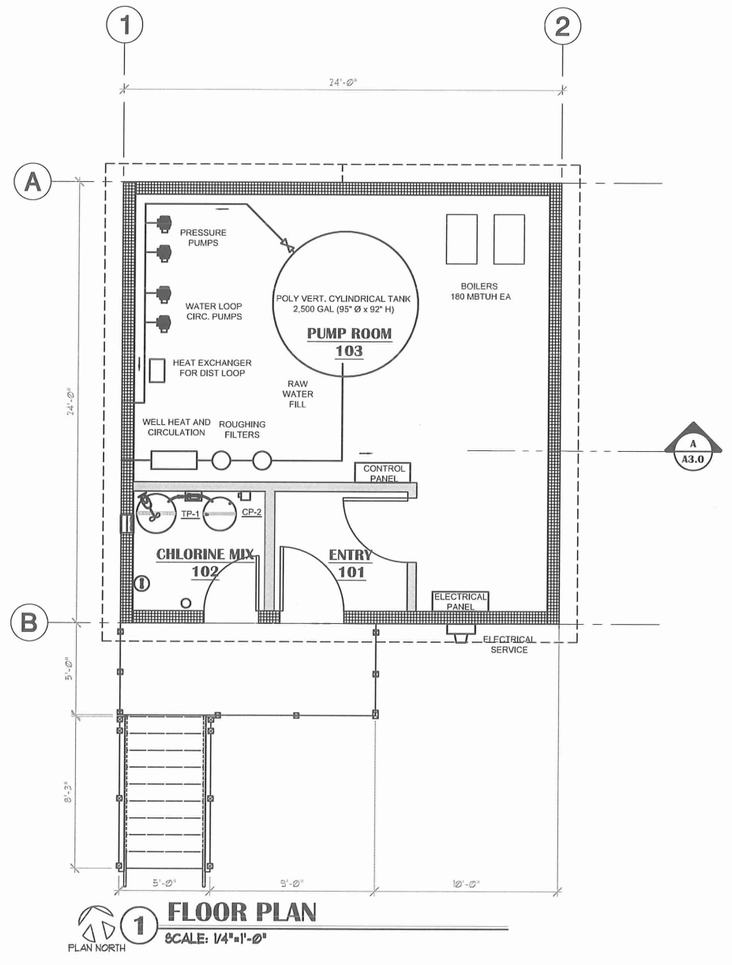
SCALE: 1/4"=1'-0"



WALL TYPES-GENERAL NOTES:
1. WET SIDE OF WALL REFERS TO TOILET/SHOWER ROOMS AND LAUNDRY ROOMS
2. ALL GWB TO BE TYPE 'X'
3. CONTRACTOR TO PROVIDE BACKING AS REQUIRED FOR ALL WALL MOUNTED FIXTURES AND EQUIPMENT. BACKING NOT IDENTIFIED IN WALL TYPES, COORDINATE W/ INTERIOR ELEVATIONS AND MANUFACTURER CUT SHEETS.
4. REFER TO BUILDING SECTIONS FOR EXTERIOR WALL ASSEMBLY

2 WALL TYPES

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



1 FLOOR PLAN

SCALE: 1/4"=1'-0"

Envision ARCHITECTURE

CE2 ENGINEERS, INC.
PO BOX 202346 ANCHORAGE, AK 99523 PH: 907-346-1010 FAX: 907-346-1015

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INSPECTOR

REVISION	BY	DATE

PUMP HOUSE #2 IMPROVEMENTS

FLOOR PLAN

CHEFORNAK, ALASKA

Project No. ____ Date Sept 2014
Designed BT
Drawn JH
Approved POW

Sheet No. A1.0

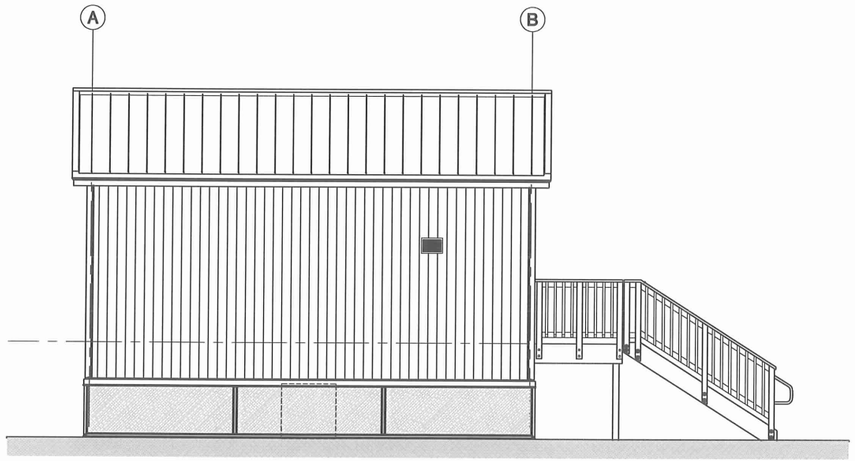
SHEET ____ OF ____

GENERAL SHEET NOTES

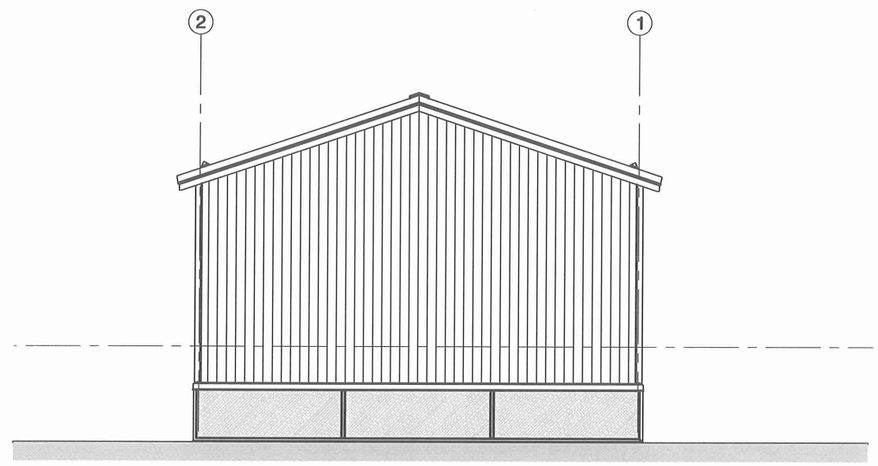
1. REFER TO CIVIL DRAWINGS FOR ALL FINAL SITE ELEVATIONS.

MATERIAL LEGEND

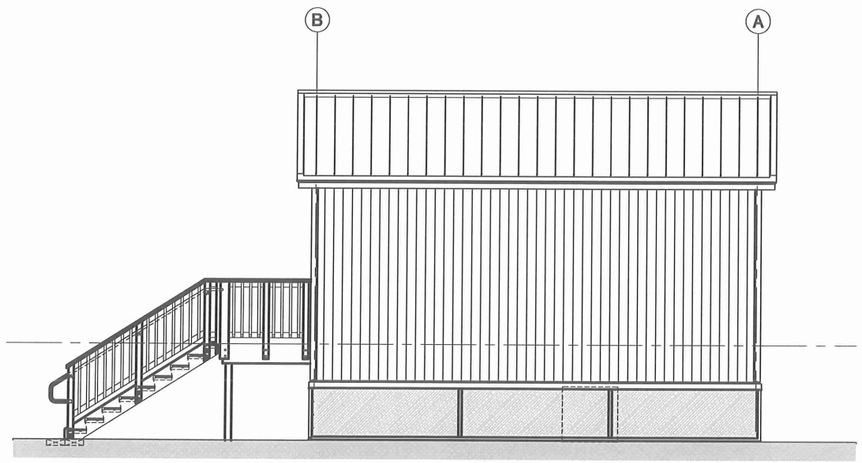
1. STANDING SEAM METAL ROOF
2. METAL SIDING
3. SNOW CLEATS
4. CHAIN LINK SKIRT W/ TOP & BOTTOM RAIL
5. METAL FASCIA/SOFFIT
6. VINYL WINDOW - REF. SHEET A11
7. CONT. METAL RIDGE CAP
8. H.M. DOOR - REF. SHEET A11



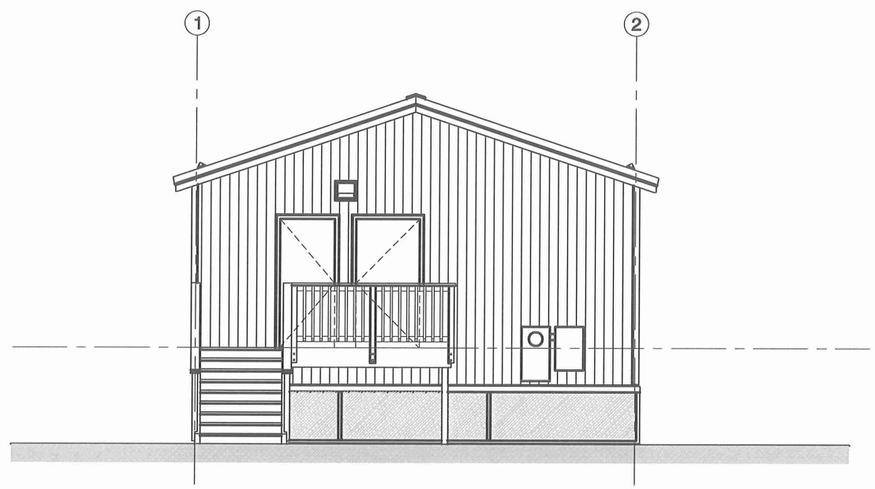
4 WEST ELEVATION
SCALE: 1/4"=1'-0"



3 NORTH ELEVATION
SCALE: 1/4"=1'-0"



2 EAST ELEVATION
SCALE: 1/4"=1'-0"



1 SOUTH ELEVATION
SCALE: 1/4"=1'-0"

Envision ARCHITECTURE

SCALE: AS SHOWN

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FIELD BOOK
STAKING
FOREMAN
AS-BUILT
INSPECTOR

PUMP HOUSE #2 IMPROVEMENTS

EXTERIOR ELEVATIONS

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 232946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

REVISION	BY	DATE

Project No. ____ Date Sept 2014
Designed BT
Drawn JH
Approved POW

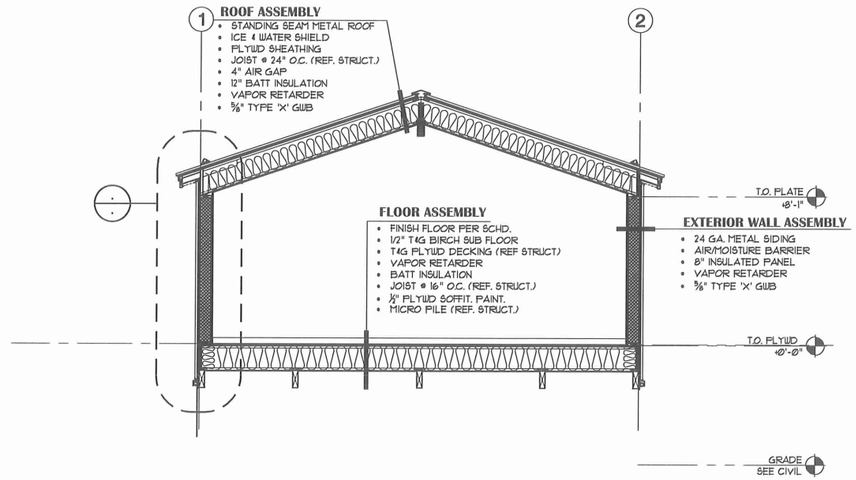
Sheet No.
A2.0
SHEET ____ OF ____

GENERAL SHEET NOTES

1. REFER TO CIVIL DRAWINGS FOR ALL FINAL SITE ELEVATIONS.

MATERIAL LEGEND

1. STANDING SEAM METAL ROOF
2. METAL SIDING
3. SNOW CLEATS
4. CHAIN LINK SKIRT W/ TOP & BOTTOM RAIL
5. METAL FASCIA/SOFFIT
6. VINYL WINDOW - REF. SHEET A11
7. CONT. METAL RIDGE CAP
8. H.M. DOOR - REF. SHEET A11



A **BUILDING SECTION**

SCALE: 1/4"=1'-0"

Avision ARCHITECTURE

CE2 ENGINEERS, INC.
PO BOX 232046 ANCHORAGE, AK 99523 PH: 907-345-1010 FAX: 907-345-1015

SCALE: AS SHOWN

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CONSTRUCTION RECORD

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AS-BUILT	
INSPECTOR	

REVISION	BY	DATE

PUMP HOUSE #2 IMPROVEMENTS

BUILDING SECTION

CHEFORNAK, ALASKA

Project No.	
Date	Sept 2014
Designed	BT
Drawn	JH
Approved	PCW

Sheet No.
A3.0
SHEET_____OF_____

STRUCTURAL NOTES

THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS AMONG THE DRAWINGS BEFORE STARTING ANY WORK OR FABRICATION. ANY DISCREPANCIES FOUND AMONG THE DRAWINGS, SITE CONDITIONS, SPECIFICATIONS AND THESE NOTES SHALL BE REPORTED TO THE ARCHITECT/ ENGINEER AT ONCE.

ALL CONSTRUCTION SHALL COMPLY WITH THE 2009 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE LOCAL BUILDING OFFICIAL.

SAFETY - THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL OSHA AND DOSH SAFETY STANDARDS. THE CONTRACTOR IS IN CHARGE OF ALL SAFETY MATTERS ON AND AROUND THE JOB SITE. PROVIDE TEMPORARY ERECTION BRACING AND SHORING AS REQUIRED FOR STABILITY OF THE STRUCTURE DURING ALL PHASES OF CONSTRUCTION.

CODE
2009 INTERNATIONAL BUILDING CODE (IBC)

DESIGN LIVE LOADS

FLOOR LOADS - SEE DESIGN LOAD SCHEDULE SHEET S-1.1
MINIMUM ROOF LIVE LOAD = 20 PSF

SNOW

GROUND SNOW LOAD = 50 PSF
ROOF SNOW LOAD = 40 PSF
SNOW EXPOSURE FACTOR, Ce = 0.90
SNOW LOAD IMPORTANCE FACTOR = 1.0
THERMAL FACTOR, Ct = 1.0

WIND DESIGN DATA

VELOCITY = 130 MPH HOUR 3 SECOND GUST
IMPORTANCE FACTOR, Iw = 1.0
EXPOSURE C
INTERNAL PRESSURE COEFFICIENT, GCpi = ± 0.18
COMPONENTS AND CLADDING PRESSURES,
ROOF
ZONE 3 - WITHIN 8' OF CORNERS = 92.3 PSF
ZONE 2 - WITHIN 8' OF EAVE AND PEAK = 62.4 PSF
ZONE 1 - EVERYWHERE ELSE = 36.0 PSF
WALLS
ZONE 5 - WITHIN 8' OF VERTICAL CORNERS = 52.5 PSF
ZONE 4 - EVERYWHERE ELSE = 42.6 PSF

SEISMIC DESIGN DATA

Ie = 1.0
Ss = .108g, S1 = 0.06g, SDS = .116, SD1 = 0.09
SITE CLASS D
SEISMIC DESIGN CATEGORY D
SEISMIC RESISTING SYSTEM = BEARING WALL, PLYWOOD SHEARWALLS, R = 6.5
SEISMIC BASE SHEAR = Vs= 34.3 KIPS Cs = 0.11
EQUIVALENT LATERAL FORCE PROCECURE

OCCUPANCY CATEGORY II

FOUNDATION DESIGN

FOUNDATION DESIGN IS BASED ON PILING DESIGN BY OTHERS.

WOOD PRODUCTS

ALL LUMBER SHALL BE A MINIMUM OF HF#2 FOR ALL BRIDGING, BLOCKING AND FRAMING REQUIRED. MINIMUM FASTENING TO BE PER IBC TABLE 2304.9.1 UNLESS SPECIFICALLY NOTED IN THESE DRAWINGS. PROVIDE POSITIVE CONNECTION UTILIZING SIMPSON HANGERS OR FRAMED BEAM POCKETS TO RESIST VERTICAL AND LATERAL LOADING AT ALL POST CAPS AND BASES, BEARING WALLS.

WOOD I- JOISTS - PROVIDE WOOD I JOISTS AS MANUFACTURED BY BOISE CASCADE, TRUSS JOIST, ROSEBURG OR EQUAL. PROVIDE FULL DEPTH SOLID BLOCKING AT ALL SUPPORTS. COORDINATE ALL HANGERS WITH ACTUAL JOIST SIZE. SUBMIT CONTRACTOR CHECKED ENGINEER SHOP DRAWINGS STAMPED BY AN ALASKAN LICENSED PROFESSIONAL ENGINEER PRIOR TO FABRICATION AND INSTALLATION.

FLOOR SHEATHING - USE APA RATED SHEATHING, TONGUE AND GROOVE, USE 48 SPAN RATING.

GLU LAM BEAMS SHALL BE 24F DF/HF WITH Fb=2,400 psi. USE V4 FOR SIMPLE SPANS AND V8 FOR CANTILEVERS OR BEAMS CONTINUOUS OVER SUPPORTS.

ROOF SHEATHING: USE APA RATED SHEATHING. UPPER ROOF SHEATHING WITH SUPPORTS @ 24" O.C. USE MINIMUM 3/4" SHEATHING WITH A 24/16 SPAN RATING.

WALL SHEATHING: USE APA RATED SHEATHING. PROTECT SHEATHING FROM THE WEATHER UNLESS IT IS RATED FOR EXTERIOR EXPOSURE. PROVIDE FRAMING OR BLOCKING BEHIND ALL PANEL EDGES. PROVIDE MINIMUM 3/8" FROM EDGE TO CENTER OF NAIL. DRIVE NAILS FLUSH, DO NOT OVERDRIVE FASTENERS. PROVIDE FASTENERS PER SHEARWALL SCHEDULE.

ALL WOOD IN CONTACT WITH CONCRETE OR EXPOSED TO THE WEATHER SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH AMERICAN WOOD PRESERVATIVE ASSOCIATION. PROVIDE PRESSURE TREATED FOUNDATION SILL PLATES, PROVIDE 3X3X.229" MIN. PLATE WASHERS FOR FOUNDATION ANCHOR BOLTS.

ABBREVIATIONS

E.W. - EACH WAY
IBC - INTERNATIONAL BUILDING CODE
I.S. - INSIDE
O.S. - OUTSIDE
F.O.S. - FACE OF STUD
HDG - HOT DIP GALVANIZED
MFG - MANUFACTURER
FFA - POST FROM ABOVE
SIM. - SIMILAR TO
SIP - STRUCTURAL INSULATED PANELS
TYP. - TYPICAL
UNO - UNLESS NOTED OTHERWISE
W.T.E. - WITH THE EXCEPTION
W.W.M. - WELDED WIRE MESH

IF THIS SHEET IS LESS THAN 22"X34" IT IS A REDUCED PRINT - SCALE ACCORDINGLY

STATE OF ALASKA - PRELIMINARY - NOT FOR CONSTRUCTION - 49951 - BENJAMIN C. RISLEY - REGISTERED PROFESSIONAL ENGINEER - CE-9141

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Eagle River, AK 99577
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email: bcoien@gci.net

Chefornak Pump House 2

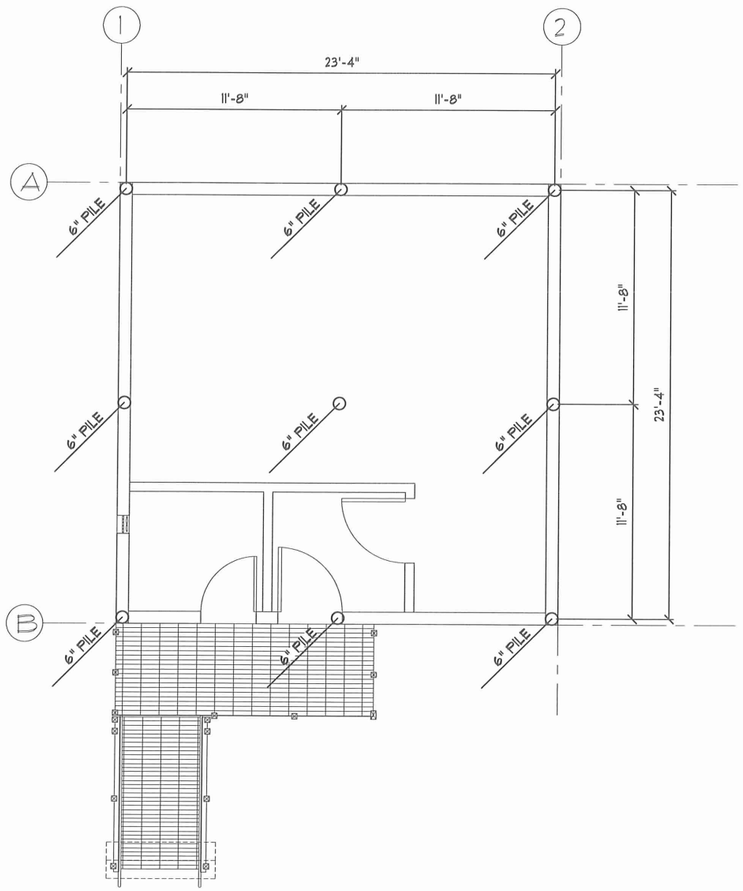
Chefornak, Alaska

NO.	REVISION	DATE

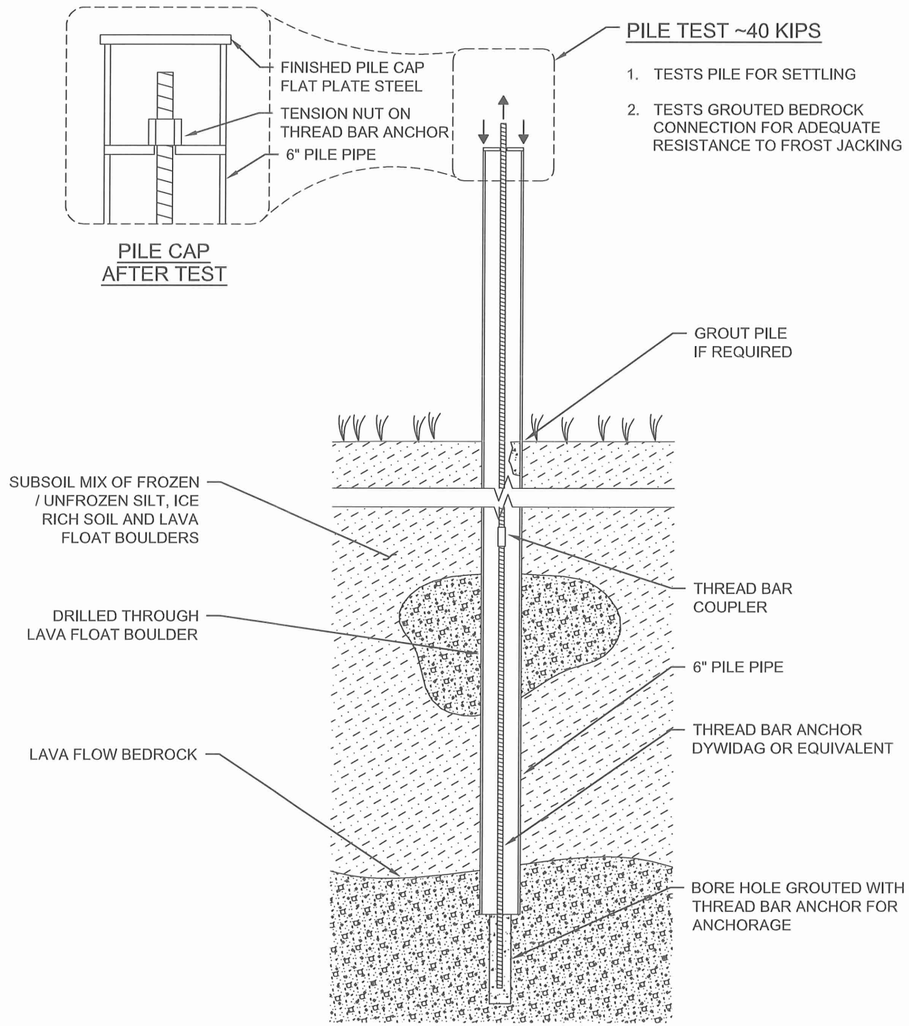
JOB NO.	42754-2
DATE	9/12/14
DRAWN	RRJ
REVIEWED	BCO

SHEET TITLE:
STRUCTURAL NOTES

SHEET NO.
S0.1



1 S1.1 Pump House 2 - Foundation Plan
Scale: 1/4" = 1'-0"



2 S1.1 Typical Micropile
Scale: NTS

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49th
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Chefornak Pump House 2
Chefornak, Alaska

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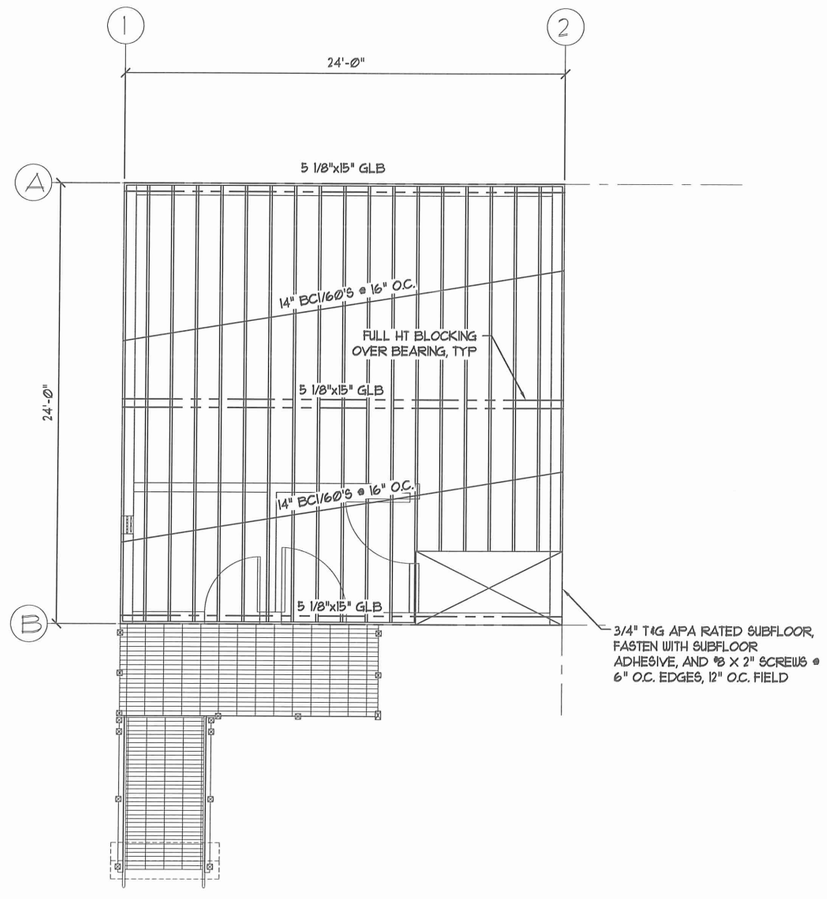
SHEET TITLE:
PUMP HOUSE 2
FOUNDATION PLAN

SHEET NO.
S1.1



1 / S2.1 Pump House 2 - Floor Framing Plan
Scale: 1/4" = 1'-0"

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Chefornak Pump House 2

Chefornak, Alaska

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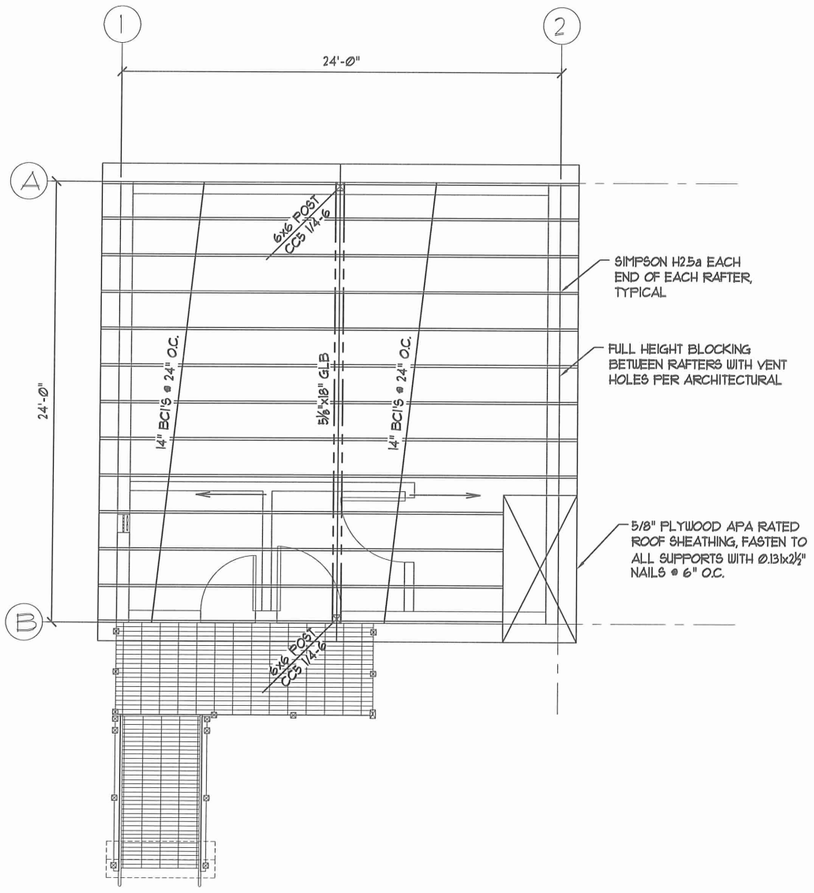
SHEET TITLE:
PUMP HOUSE 2
FLOOR FRAMING PLAN

SHEET NO.
S2.1



1 / S3.1 Pump House 2 - Roof Framing Plan
Scale: ¼" = 1'-0"

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Chefornak Pump House 2

Chefornak, Alaska

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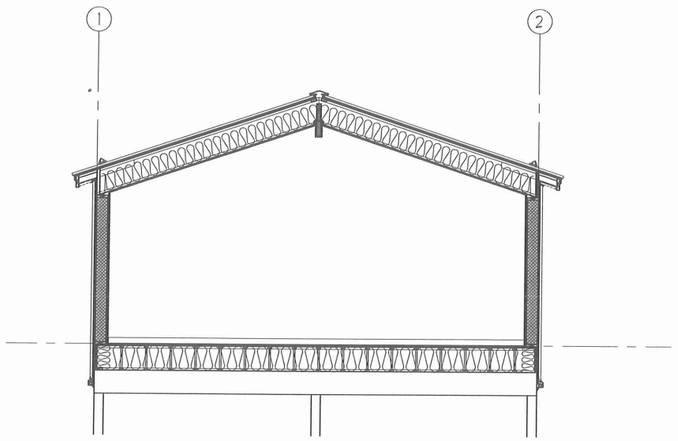
SHEET TITLE:
PUMP HOUSE 2
ROOF FRAMING PLAN

SHEET NO.
S3.1



1 S4.1 Pump House 2 - Building Section
Scale: 1/4" = 1'-0"

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Chefornak Pump House 2

Chefornak, Alaska

NO.	REVISION	DATE

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SHEET TITLE:
PUMP HOUSE 2
BUILDING SECTION,
WALL SECTION

SHEET NO.
S4.1

GENERAL NOTES:

1. PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR COMPLETE SAFE WORKABLE SYSTEMS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED. TEST ALL SYSTEMS TO ASSURE PROPER OPERATION. USE NEW EQUIPMENT OF THE LATEST DESIGN.

2. CONTRACTOR SHALL COMPLY WITH THE APPLICABLE LOCAL, STATE, AND NATIONAL CODES, ORDINANCES, AND REGULATIONS AFFECTING MATERIALS AND METHODS USED AND RECOMMENDED PRACTICES AS SET FORTH BY NFPA, UMC, UPC, NFC, UBC, UL, NEC EXCEPT IN CASES WHERE STATUTES GOVERN.

3. DURING FINAL INSPECTION, DEMONSTRATE THAT THE ENTIRE INSTALLATION OPERATES SATISFACTORILY IN ACCORDANCE WITH DRAWINGS. PROVIDE FLUID AND AIR BALANCE OF MECHANICAL SYSTEMS AND BALANCE REPORT.

4. INSTRUCT OWNERS PERSONNEL FOR OPERATION AND MAINTENANCE PROCEDURES. INSTALL ALL EQUIPMENT PER MANUFACTURERS INSTALLATION INSTRUCTIONS
INSTALL EQUIPMENT TO PROVIDE CODE ACCESS FOR MAINTENANCE.

5. PROVIDE ACCESS DOORS FOR CONCEALED EQUIPMENT, VALVES, DAMPERS, AND OTHER MECHANICAL DEVICES REQUIRING SERVICING OR ADJUSTMENT.

6. DO NOT SPRING OR BEND PIPE TO FIT CONDITIONS OR MAKE-UP JOINTS. PROVIDE VALVES FOR BRANCH LINES AS REQUIRED OR SHOWN. MAINTAIN CURRENT "AS-BUILTS" AS THE PROJECT PROGRESSES AND TURN THEM OVER TO THE OWNER AT THE TIME OF FINAL INSPECTION.

LEGEND

SYMBOL	ABBREV.	DESCRIPTION
		FLOW ARROW
—GHS—	GHS	GLYCOL HEATING SUPPLY
—GHR—	GHR	GLYCOL HEATING RETURN
— CW —	CW	DOM. COLD WATER SUPPLY
—CWC—	CWC	DOM. COLD WATER CIRC.
— HW —	HW	DOM. HOT WATER
—HWC—	HWC	DOM. HOT WATER CIRCULATED
—WTHS—	WTHS	WATER TANK HEAT SUPPLY
—WTHR—	WTHR	WATER TANK HEAT RETURN
— W —	W	WASTE OR SEWER
— V —	V	VENT
	VTR	VENT THROUGH ROOF
		BALL VALVE
		PRESS. RELIEF VALVE
		CHECK VALVE
CO	C.O.	CLEAN OUT
—FOS—	FOS	FUEL OIL SUPPLY
—FOR—	FOR	FUEL OIL RETURN
	PMP-	PUMP
	ET	EXPANSION TANK
		PRESSURE GAGE'
		THERMOMETER
	TS	THERMOSTAT
NC	NC	VALVE NORMALLY CLOSED
NO	NO	VALVE NORMALLY OPEN
SC	SC	SPEED CONTROL
SW	SW	SWITCH
AAV	AAV	AUTO AIR VENT
	MAV	MANUAL AIR VENT
		CIRCUIT SETTER /BALANCING VALVE
10 X 8		DUCT WIDTH X HEIGHT
RG-1 300 CFM		GRILL NUMBER AIRFLOW AND DIRECTION
TE	TE	TEMPERATURE ELEMENT

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INSPECTOR

CAPSTONE ENGINEERING LLC
PMB 169
12110 BUSINESS BLVD
EAGLE RIVER, AK 99577

PUMP HOUSE #2 IMPROVEMENTS

MECHANICAL NOTES

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 232248 ANCHORAGE, AK 99523 PH: 907-348-1010 FAX: 907-348-1015

REVISION	BY	DATE

Project No. ____ Date SEPT. 2014 Designed FB Drawn CM Approved FB

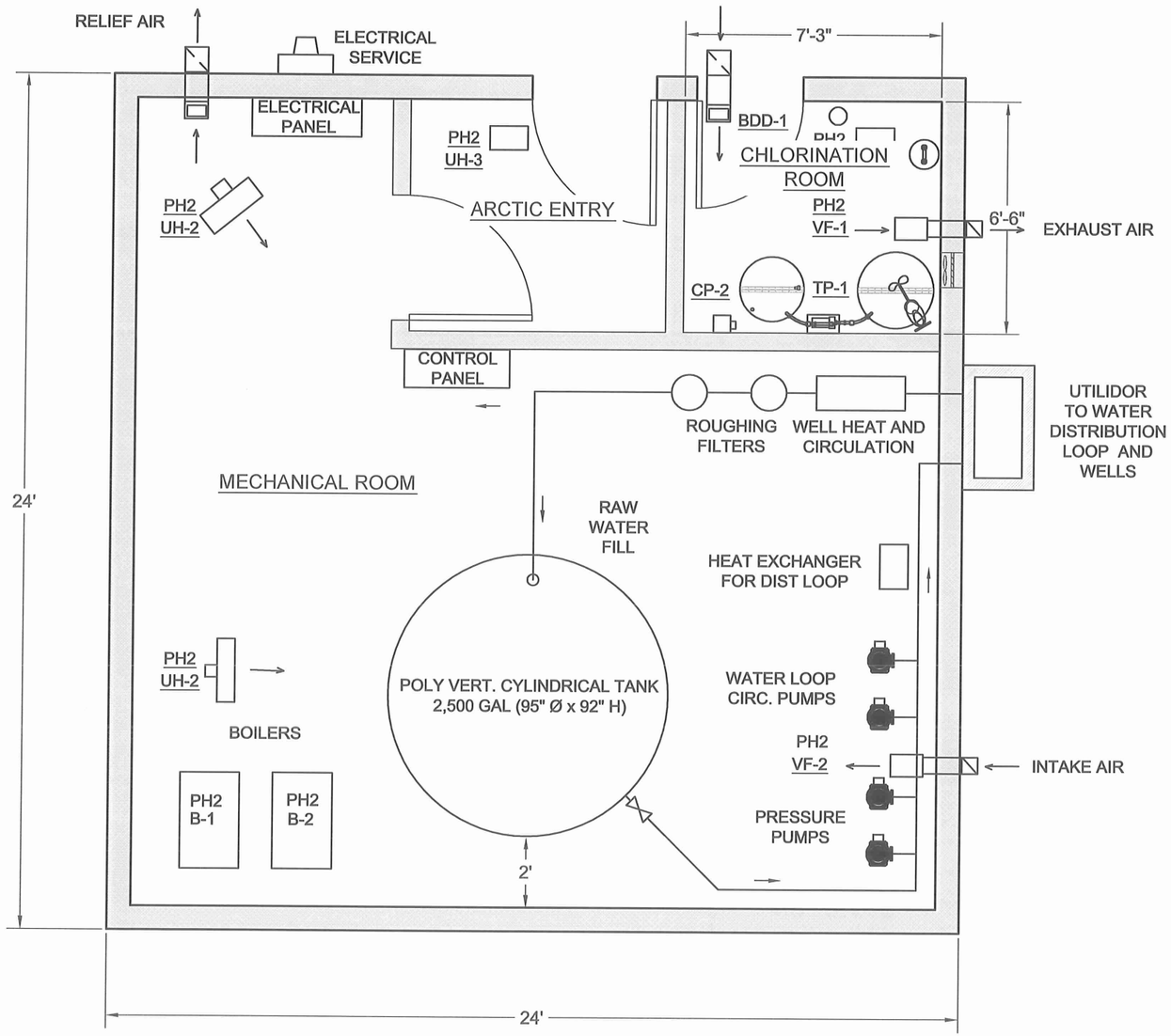
Sheet No. M1.0
SHEET ____ OF ____

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\From Others\Beltz Mechanical\M1.0 Mechanical Notes 2.dwg, 10/6/2014 3:27:03 PM, cmerz, \\Ce2main\LANIER MP C2050/LD520C PCL 6

PROPOSED PUMP HOUSE DESCRIPTION

THE TWO PROPOSED PUMP HOUSES WOULD PROVIDE THE NECESSARY INFRASTRUCTURE THAT WOULD SUPPORT THE ORIGINAL PHS WELL IN THE NORTHEAST CORNER OF THE COMMUNITY, AS WELL AS THE TWO WELLS IN THE SOUTH PART OF THE COMMUNITY DRILLED IN 2002. FEATURES OF THE PROPOSED PUMP HOUSES INCLUDE THE FOLLOWING:

- THE BUILDING WOULD BE CONSTRUCTED OF STRUCTURAL INSULATED PANELS (SIP) FOR HIGH INSULATION VALUE, AS WELL AS RAPID ERECTION OF THE BUILDING SHELL.
- THE BUILDING FOUNDATION WOULD BE A TRIODETIC® SPACE FRAME ON THE TUNDRA. THIS SPACE FRAME WOULD EVENLY DISTRIBUTE THE BUILDING LOAD EVENLY OVER THE GROUND SURFACE WITHOUT THE EXPENSE OF DRILLING AND SETTING PILES.
- AN HDPE VERTICAL TANK OF 2,500 GALLONS CAPACITY WOULD PROVIDE A BUFFER BETWEEN THE WELLS AND THE WATER DISTRIBUTION SYSTEM.
- WATER FROM WELLS WOULD ENTER THE BUILDING AND BE FILTERED, CHLORINATED, AND WOULD FLOW INTO THE WATER STORAGE TANK. A SEPARATE ROOM WOULD PROVIDE FOR CHLORINATION. LEVEL CONTROLS IN THE TANK WOULD CONTROL THE WELL PUMP, AND WOULD PROTECT PRESSURE PUMPS FROM DRY RUNNING.
- TWO PRESSURE PUMPS WOULD PROVIDE PRESSURIZATION OF THE COMMUNITY WATER DISTRIBUTION LOOP THAT FEEDS THE WATERING POINTS AND THE SCHOOL.
- TWO CIRCULATION PUMPS NEXT TO THE PRESSURE PUMPS PROVIDE CIRCULATION OF THE WATER DISTRIBUTION LOOPS, ALONG WITH OTHER CIRCULATION PUMPS IN THE OTHER PUMP HOUSE AND IN THE MECHANICAL AREA OF THE WASHETERIA.
- HEAT WOULD BE PROVIDED THROUGH TWO OIL-FIRED CONDENSING BOILERS FOR THE BUILDING SPACE, WELL HEAT, AND BACKUP HEAT OF THE WATER DISTRIBUTION LOOP. THERE IS ALSO THE POSSIBILITY OF USING WASTE HEAT FROM THE POWER PLANT FOR SOME LOW LEVEL HEATING OF WATER IN THE PUMP HOUSE. THIS WILL HAVE TO BE LATER INVESTIGATED.
- ELECTRIC POWER FOR THE PUMP HOUSE WOULD BE PROVIDED FROM THE VILLAGE POWER PLANT DISTRIBUTION SYSTEM.
- A SIMPLE CONTROL PANEL WOULD PROVIDE AUTOMATIC CONTROL OF THE PUMP HOUSE FUNCTIONS, MONITORING OF THE CRITICAL OPERATIONAL PARAMETERS OF THE PUMP HOUSE AND WELLS, WITH MANUAL OPERATING BACKUP.



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EAGLE RIVER, AK 99577

PUMP HOUSE #2 IMPROVEMENTS
MECHANICAL PLAN
CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 232948 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

REVISION	BY	DATE

Project No. _____
Date SEPT. 2014
Designed FB
Drawn CM
Approved FB

Sheet No.
M2.0
SHEET _____ OF _____

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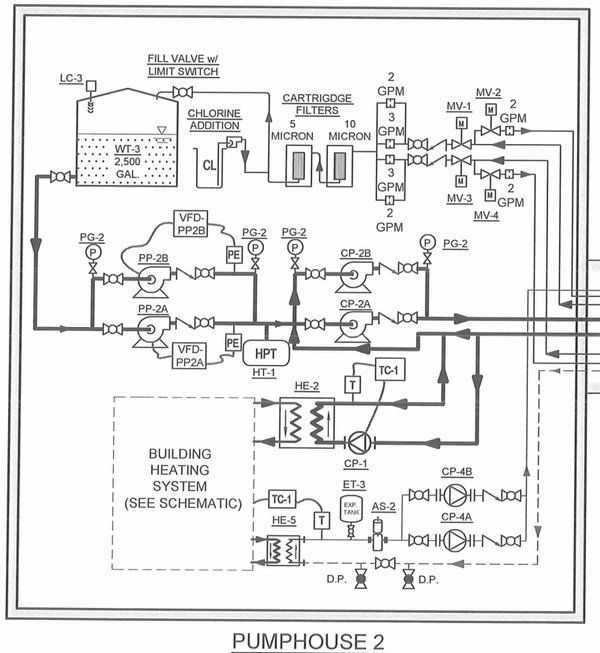
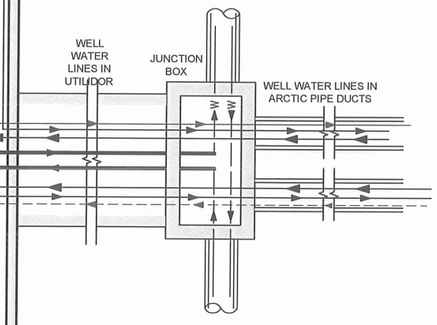
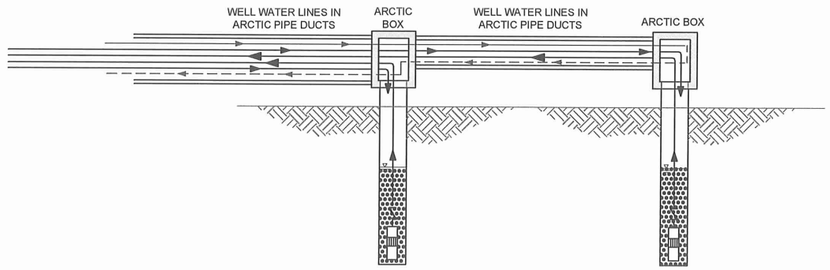


PUMPHOUSE 2





WELL W02-3 WELL W02-2

WATER PROCESS DESCRIPTION

EXISTING WELL W02-2 SUPPLIES WATER TO PUMPHOUSE 2 AT 3 TO 5 GPM. THE LOW RATE OF FLOW IS SET TO PREVENT HIGH LEVELS OF TOTAL DISSOLVED SOLIDS (TDS) FROM BEING PUMPED OUT OF THE AQUIFER, DUE TO UPCONING OF THE MORE SALINE LAYER OF WATER BELOW THE TOP OF THE WATER BEARING LAYER.

EXISTING WELL W02-3 SUPPLIES WATER TO PUMPHOUSE 2 AT 3 TO 5 GPM FOR THE SAME REASON AS (1) ABOVE.

THE WELLS ARE KEPT THAWED BY CONTINUOUSLY CIRCULATING 2 GPM FROM THE WELL PUMP THROUGH A FLOW REGULATOR (DOLE VALVE), AND BACK TO THE WELL TO WITHIN 10 FT OF THE TOP OF THE WELL SCREEN. THIS IS DONE DURING THE TIME WATER IS NOT REQUIRED TO BE PUMPED TO PUMPHOUSE 2. MOTORIZED VALVES DIRECT FLOW EITHER BACK TO THE WELL OR TO THE 2500 GALLON WATER TANK IN PUMPHOUSE 2. FLOW INTO THE TANK IS REGULATED BY DOLE VALVES FROM EACH WELL PUMP. TWO PARALLEL DOLE VALVES PROVIDE 2, 3, OR 5 GPM TO THE WELL BY USE OF MANUAL BALL VALVES.

THE TOTAL LENGTH OF 4" X 12" ARCTIC PIPE USED AS A DUCT BETWEEN THE WELL FIELD AND PUMPHOUSE 2 IS APPROXIMATELY 1300 LINEAL FEET. THIS IS HEATED BY A HYDRONIC LOOP MADE UP OF 1" COPPER TUBE SIZED PEX, CIRCULATED WITH A CIRCULATING PUMP, AND HEATED FROM THE PUMPHOUSE HYDRONIC SYSTEM THROUGH A SINGLE-WALLED HEAT EXCHANGER.

TWO CARTRIDGE FILTERS PROVIDE FILTRATION TO 5 MICRONS OF THE WELL WATER. THE FIRST FILTER CAPTURES CONTAMINANTS TO 10 MICRONS, AND THE SECOND FILTER CAPTURES TO 5 MICRONS.

A 2500 GALLON VERTICAL HDPE WATER TANK WILL SERVE AS STORAGE OF WATER FROM THE WELL. THE TANK WILL HAVE ITS OWN SELF-CONTAINED ULTRASONIC LEVEL SENSOR FOR LEVEL CONTROL AND INDICATION.

PRESSURE PUMPS PP-2A AND PP-2B WILL PRESSURIZE THE WATER DISTRIBUTION LOOP TO A CONSTANT PRESSURE (SETPOINT ADJUSTABLE AT 40 TO 60 PSI). THE PUMPS WILL BE RUN BY VARIABLE FREQUENCY DRIVES (VFD) IN LEAD-LAG FASHION. PUMPHOUSE 2 WELL AND PRESSURE PUMPS WILL BE THE BACKUP SOURCE OF WATER FOR THE WATER DISTRIBUTION LOOP.

CIRCULATION PUMPS CP-2A OR CP-2B WILL KEEP THE CITY WATER DISTRIBUTION LOOP FLOWING AT 35 TO 40 GPM. THESE WILL BE MULTI-STAGE 1750 RPM VERTICAL PUMPS WITH VERY HIGH EFFICIENCY TO KEEP ELECTRICAL COSTS DOWN. THESE PUMPS WILL SERVE AS BACK-UP CIRCULATORS FOR PUMPHOUSE 1.

BACKUP HEAT EXCHANGER HE-2 PROVIDES HEAT TO THE CITY WATER DISTRIBUTION LOOP IN CASE PRIMARY WASTE HEAT RECOVERY HEAT EXCHANGER IN POWER PLANT OR BACKUP HEAT EXCHANGER IN PUMPHOUSE 1 ARE DOWN. THIS WILL INCREASE RELIABILITY OF THE WATER DISTRIBUTION LOOP SYSTEM.

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PMB 169
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EAGLE RIVER, AK 99577

PUMP HOUSE #2 IMPROVEMENTS

WATER PROCESS SCHEMATIC

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 232048 ANCHORAGE, AK 99523 PH: 907-346-1015 FAX: 907-349-1015

REVISION	BY	DATE

Project No. ____
Date SEPT. 2014
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Sheet No. M2.1
SHEET ____ OF ____

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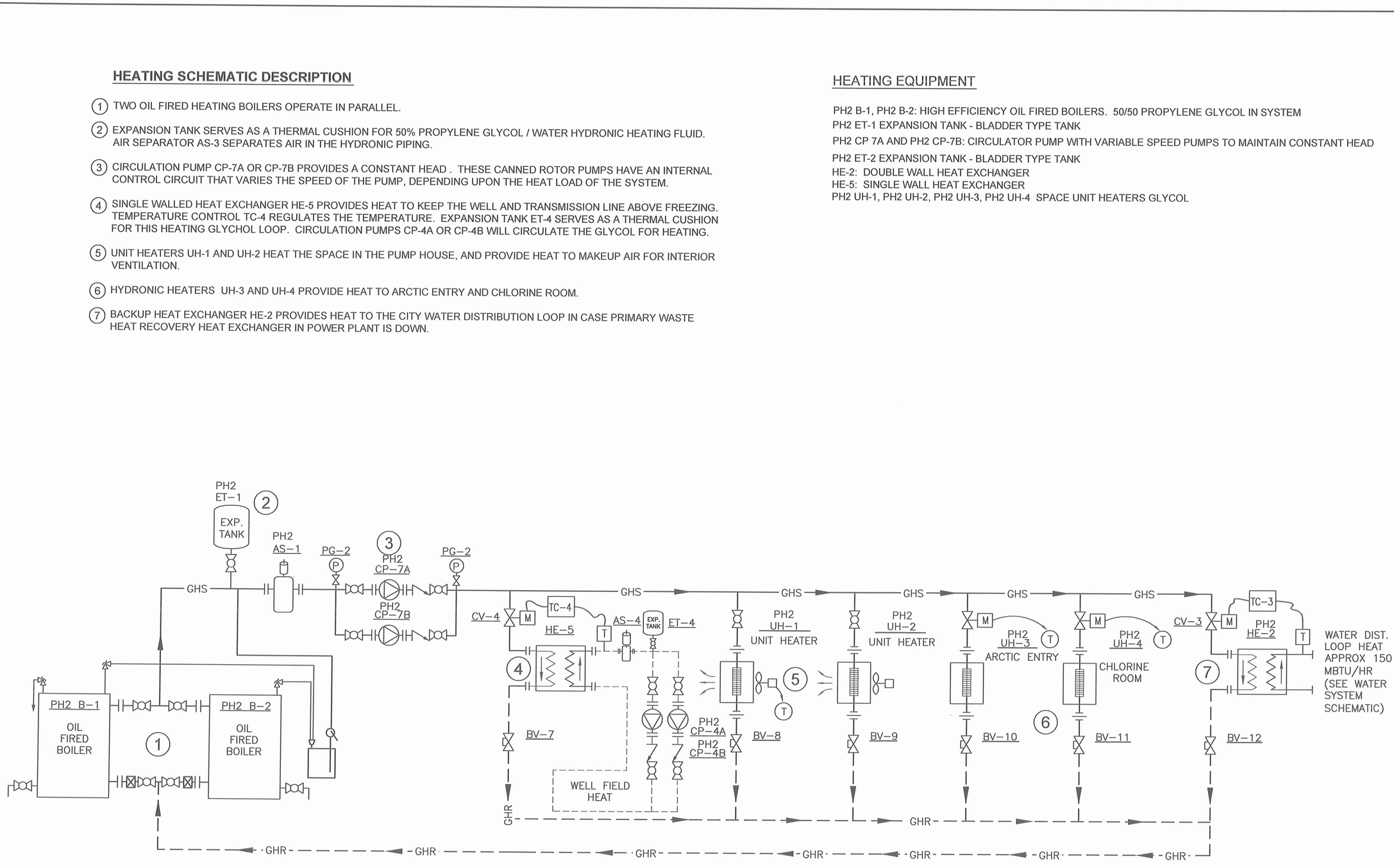
HEATING SCHEMATIC DESCRIPTION

1. TWO OIL FIRED HEATING BOILERS OPERATE IN PARALLEL.
2. EXPANSION TANK SERVES AS A THERMAL CUSHION FOR 50% PROPYLENE GLYCOL / WATER HYDRONIC HEATING FLUID. AIR SEPARATOR AS-3 SEPARATES AIR IN THE HYDRONIC PIPING.
3. CIRCULATION PUMP CP-7A OR CP-7B PROVIDES A CONSTANT HEAD . THESE CANNED ROTOR PUMPS HAVE AN INTERNAL CONTROL CIRCUIT THAT VARIES THE SPEED OF THE PUMP, DEPENDING UPON THE HEAT LOAD OF THE SYSTEM.
4. SINGLE WALLED HEAT EXCHANGER HE-5 PROVIDES HEAT TO KEEP THE WELL AND TRANSMISSION LINE ABOVE FREEZING. TEMPERATURE CONTROL TC-4 REGULATES THE TEMPERATURE. EXPANSION TANK ET-4 SERVES AS A THERMAL CUSHION FOR THIS HEATING GLYCHOL LOOP. CIRCULATION PUMPS CP-4A OR CP-4B WILL CIRCULATE THE GLYCOL FOR HEATING.
5. UNIT HEATERS UH-1 AND UH-2 HEAT THE SPACE IN THE PUMP HOUSE, AND PROVIDE HEAT TO MAKEUP AIR FOR INTERIOR VENTILATION.
6. HYDRONIC HEATERS UH-3 AND UH-4 PROVIDE HEAT TO ARCTIC ENTRY AND CHLORINE ROOM.
7. BACKUP HEAT EXCHANGER HE-2 PROVIDES HEAT TO THE CITY WATER DISTRIBUTION LOOP IN CASE PRIMARY WASTE HEAT RECOVERY HEAT EXCHANGER IN POWER PLANT IS DOWN.

HEATING EQUIPMENT

PH2 B-1, PH2 B-2: HIGH EFFICIENCY OIL FIRED BOILERS. 50/50 PROPYLENE GLYCOL IN SYSTEM
PH2 ET-1 EXPANSION TANK - BLADDER TYPE TANK
PH2 CP 7A AND PH2 CP-7B: CIRCULATOR PUMP WITH VARIABLE SPEED PUMPS TO MAINTAIN CONSTANT HEAD
PH2 ET-2 EXPANSION TANK - BLADDER TYPE TANK
HE-2: DOUBLE WALL HEAT EXCHANGER
HE-5: SINGLE WALL HEAT EXCHANGER
PH2 UH-1, PH2 UH-2, PH2 UH-3, PH2 UH-4 SPACE UNIT HEATERS GLYCOL



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CAPSTONE ENGINEERING LLC
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PUMP HOUSE #2 IMPROVEMENTS
HEATING SYSTEM SCHEMATIC
CHEFORNAK, ALASKA

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ELECTRICAL LEGEND

(NOTE: THIS IS A STANDARD LEGEND AND NOT ALL SYMBOLS ARE NECESSARILY USED.)

- EXTERIOR LIGHT FIXTURE, POLE MOUNTED, HEADS AS SHOWN
- HAND HOLE
- E — ELECTRIC VAULT
- PC — PHOTOCELL CONTROL
- LUMINAIRE – TYPE AS NOTED ON PLAN
- LUMINAIRE – WALL MOUNTED: TYPE AS NOTED ON PLAN
- LUMINAIRE – EMERGENCY LIGHT
- TRACK LIGHTING – TRACK LENGTH AS SCALED: TYPE AS NOTED ON PLAN
- EMERGENCY LIGHTING UNIT (WALL; CEILING; REMOTE HEAD): TYPE "E", UON
- EMERGENCY BATTERY TO POWER REMOTE HEAD(S); TYPE "ERB", UON
- EXIT SIGN (CEILING; WALL); SHADE DENOTES FACE; ARROWS AS INDICATED; TYPE "X", UON
- $ — SWITCH – SINGLE POLE, SINGLE THROW, UON
- $3 — SWITCH – THREE WAY
- $4 — SWITCH – FOUR WAY
- $a — SWITCH CONTROL FOR FIXTURES DENOTED WITH "a" APPENDED TO CIRCUIT NUMBER
- $L — SWITCH – LOW VOLTAGE
- $D — SWITCH – ELECTRONIC DIMMER SWITCH COMPATIBLE WITH LIGHT FIXTURE
- $K — SWITCH – KEYED
- $P — SWITCH – PILOT LIGHT
- $T — SWITCH – INTEGRAL MOTOR OVERLOAD
- $V — SWITCH – VARIABLE SPEED CONTROL
- $OC — LIGHT CONTROL OCCUPANCY SENSOR – WALL SWITCH BOX MOUNTED
- OC — LIGHT CONTROL OCCUPANCY SENSOR – CEILING MOUNTED
- POWER DISTRIBUTION PANELBOARD
- METERING DEVICE
- CT — CURRENT TRANSFORMER ENCLOSURE
- POWER PANELBOARD ([NEW – SURFACE; RECESSED], [EXISTING – SURFACE; RECESSED])
- T — TRANSFORMER: APPROX. PHYSICAL SIZE AS SCALED; ACTUAL RATING AS NOTED ON ONE–LINE DIAGRAMS
- MOTOR CONNECTION
- COMBINATION BATHROOM FAN/LIGHT: TYPE AS NOTED ON PLAN
- NON–FUSED SAFETY SWITCH
- FUSED SAFETY SWITCH
- ENCLOSED CIRCUIT BREAKER SWITCH
- MOTOR STARTER
- COMBINATION MOTOR STARTER SAFETY SWITCH
- PUSH BUTTON CONTROL STATION
- JUNCTION BOX OR EQUIPMENT CONNECTION – FLEX OR RECEPTACLE AS REQUIRED (CEILING; WALL; FLOOR)
- J FSD — POWER CONNECTION TO FSD CONTROLLED BY FIRE ALARM SYSTEM
- SIMPLEX RECEPTACLE
- DUPLEX RECEPTACLE
- DOUBLE DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE – SPLIT WIRED FOR SWITCH CONTROL OF LOWER OUTLET
- DUPLEX RECEPTACLE – GFCI PROTECTED
- DUPLEX RECEPTACLE – GFCI PROTECTED MOUNTED +48" AFF
- DUPLEX RECEPTACLE – GFCI PROTECTED MOUNTED ABOVE COUNTERTOP
- DUPLEX RECEPTACLE – MOUNTED ABOVE COUNTERTOP
- DUPLEX RECEPTACLE – FLOOR MOUNTED FIRE RATED POKE THROUGH, UON
- DOUBLE DUPLEX RECEPTACLE – FLOOR MOUNTED FIRE RATED POKE THROUGH, UON
- RECEPTACLE – PENDANT MOUNTED FROM CEILING
- RECEPTACLE – FLUSH MOUNTED IN CEILING
- DRYER RECEPTACLE – 30A, 3 POLE, 4 WIRE NEMA 14–30R
- ELECTRIC RANGE RECEPTACLE – 50A, 3 POLE, 4 WIRE, NEMA 14–50R
- SPECIAL PURPOSE RECEPTACLE – NEMA CONFIGURATION AS NOTED (SURFACE; WALL)
- GROUND CONNECTION POINT
- DUAL CHANNEL SURFACE MOUNTED RACEWAY – LENGTH AS SCALED
- SINGLE CHANNEL SURFACE MOUNTED RACEWAY – LENGTH AS SCALED
- TELECOMMUNICATION OUTLET (WALL; FLOOR)
- TELEPHONE OUTLET
- TV — TELEVISION OUTLET (WALL; CEILING)
- DUAL CHANNEL SERVICE POLE
- TELECOMMUNICATION FLOOR STANDING RACK
- TELECOMMUNICATION WALL MOUNTED RACK
- TMGB — TELECOMMUNICATION MAIN GROUNDING BUS
- TGB — TELECOMMUNICATION GROUNDING BUS
- CONTROL PANEL – TYPE AS NOTED (SURFACE; RECESSED)
- FIRE ALARM CONTROLLED MAGNETIC DOOR HOLDER / RELEASE
- ABORT STATION
- CO — CARBON MONOXIDE DETECTOR
- HEAT DETECTOR – RATE OF RISE
- 135° — HEAT DETECTOR – FIXED TEMPERATURE AS NOTED
- SMOKE DETECTOR – PHOTOELECTRIC TYPE
- M — SMOKE DETECTOR – MULTI–SENSOR TECHNOLOGY TYPE
- SMOKE DETECTOR – DUCT MOUNTED
- BR — SMOKE DETECTOR – BEAM RECEIVER
- BT — SMOKE DETECTOR – BEAM TRANSMITTER
- FLAME DETECTOR
- LINE TYPE HEAT SENSITIVE CABLE DETECTOR
- FIRE ALARM HORN
- FIRE ALARM STROBE
- FIRE ALARM COMBINATION HORN/STROBE
- P — FIRE ALARM PULL STATION
- FCP — FIRE ALARM CONTROL PANEL
- FSA — FIRE SYSTEM ANNUNCIATOR PANEL
- HCP — HALON CONTROL PANEL
- FIRE ALARM SPEAKER STROBE
- WATER FLOW BELL – 120V CONTROLLED BY FLOW SWITCH
- FIRE ALARM FLOW SWITCH
- FIRE ALARM TAMPER SWITCH
- M — MICROPHONE INPUT JACK
- M — MICROPHONE INPUT JACK – FLOOR MOUNTED
- INTERCOM CALL BUTTON
- INTERCOM ADMINISTRATION PHONE
- S — SPEAKER (WALL; CEILING)
- CLOCK SPEAKER COMBINATION WALL MOUNT UNIT
- CLOCK – WALL MOUNTED
- CR — SECURITY ACCESS CARD READER
- DS — DOOR CONTROL SOLENOID
- DM — DOOR MAGNETIC CONTACT
- GB — SECURITY SYSTEM – GLASS BREAK SENSOR
- MS — SECURITY SYSTEM – MOTION SENSOR
- PS — SECURITY SYSTEM – DOOR POSITION SENSOR
- MD — SECURITY SYSTEM – REQUEST TO EXIT MOTION DETECTOR
- KP — SECURITY SYSTEM – ACCESS KEY PAD
- R — SECURITY SYSTEM – MOTION SENSOR – NARROW PATTERN
- SC — SECURITY SYSTEM – CAMERA
- ACCESS PANEL
- LINETYPE DENOTING CABLE TRAY
- LINETYPE/LINEWEIGHT DENOTING FUTURE WORK
- LINETYPE/LINEWEIGHT DENOTING EXISTING WORK TO REMAIN
- LINETYPE/LINEWEIGHT DENOTING NEW WORK
- LINETYPE/LINEWEIGHT DENOTING DEMO WORK
- X — DENOTES AVAILABLE FAULT CURRENT

EQUIPMENT TAG LEGEND

LUMINAIRES — A3[6] 2H–15a
- LUMINAIRE TYPE (UNDERLINED)
- THE NUMBER IN BRACKETS INDICATES HOW MANY TYPICAL LUMINAIRES OF THIS TYPE ARE IN THIS AREA
- CIRCUIT AND SWITCHLEG
- PANEL
- TYPICAL LUMINAIRE

CONTROL SWITCHES — $a/b
- LOWER CASE LETTER DENOTES SWITCH LEG FOR CORRESPONDING LUMINAIRE CONTROL
- UPPERCASE LETTER OR NUMBER DENOTES SWITCH CONFIGURATION

EQUIPMENT CONNECTIONS — AHU–1, A–1,3,5
- EQUIPMENT ID (UNDERLINED) REFER TO EQUIPMENT CONNECTION SCHEDULE FOR REQUIREMENTS
- TYPICAL EQUIPMENT (MOTOR STARTER SHOWN)
- CIRCUIT NUMBER(S)
- PANEL

RECEPTACLES — +48", 2L–1,3, L5–20R
- MOUNTING HEIGHT AFF
- PANEL
- CIRCUIT NUMBER(S)
- NEMA CONFIGURATION FOR SPECIAL RECEPTACLES (UNDERLINED)

ABBREVIATIONS

(E)	EXISTING
A	AMPERES
AC	ABOVE COUNTER
AFF	ABOVE FINISHED FLOOR
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AIC	AMPS INTERRUPTING CAPACITY
C	CONDUIT OR CELCIUS
CAT	CATEGORY
CB	CIRCUIT BREAKER
CO	CONDUIT ONLY
CT	CURRENT TRANSFORMER
(D)	DEMOLISH
DISC	DISCONNECT
EGC	EQUIPMENT GROUNDING CONDUCTOR
F	FAHRENHEIT
FAA	FIRE ALARM ANNUNCIATOR
FACP	FIRE ALARM CONTROL PANEL
FHP	FRACTIONAL HORSEPOWER
FLA	FULL LOAD AMPS
FSD	FIRE SMOKE DAMPER
FT	FEET
FU	FUSE
G	GROUND FAULT CIRCUIT INTERRUPTER
GEC	GROUNDING ELECTRODE CONDUCTOR
HP	HORSEPOWER
ID	IDENTIFICATION
IN	INCHES
KVA	KILOVOLT–AMPERE
KW	KILOWATT
LRA	LOCKED ROTOR AMPS
LTG	LIGHTING
MCA	MINIMUM CIRCUIT AMPACITY
MDP	MAIN DISTRIBUTION PANEL
MDS	MAIN DISTRIBUTION SWITCHBOARD
MFS	MAXIMUM FUSE SIZE
(N)	NEW
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
P	POLES
PC	PHOTO CELL
PH, ø	PHASE
PNL	PANEL
PRI	PRIMARY
REC	RECEPTACLE
(R)	RELOCATED
RIB	RELAY IN A BOX (MOTOR RATED)
SCCR	SHORT CIRCUIT CURRENT RATING
SE	SERVICE ENTRANCE RATED
SEC	SECONDARY
SSEBJ	SUPPLY SIDE EQUIPMENT BONDING JUMPER
SVC	SERVICE
TELECOM	TELECOMMUNICATION
TGB	TELECOMMUNICATION GROUNDING BUSBAR
TMGB	TELECOMMUNICATION MAIN GROUNDING BUSBAR
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VA	VOLT–AMPERES
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS OR WIRE
WG	WIRE GUARD
WP	WEATHERPROOF (NEMA 4 RATED)
XFMR	TRANSFORMER

MOUNTING HEIGHT SCHEDULE

PANELBOARDS (TOP)	+70"
SPECIAL SYSTEM PANELS (TOP)	+66"
POWER METER BASE (CENTER LINE OF SOCKET)	+66"
CONTACTORS, MOTOR STARTERS, DISCONNECT SWITCHES (TOP)	+66"
RECEPTACLES IN OFFICE AREAS	+18"
RECEPTACLES IN NON–FINISHED AND MECHANICAL SPACES	+46"
ABOVE COUNTER DEVICES (DENOTED "AC" OR BY SYMBOL)	SEE NOTES
WALL MOUNTED SWITCHES	+46"
TELECOMMUNICATION OUTLETS	+18"
WALL MOUNTED TELEPHONE OUTLET (DENOTED "W")	+54"
CLOCK OUTLETS	+80" TO BOTTOM
HORNS/STROBES/HORN STROBES/DOORBELL RINGER	+80" TO BOTTOM
PULL STATIONS, PUSH BUTTONS, DOORBELL PUSHBUTTON	+46"

NOTES:
1) COORDINATE AND INSTALL ALL EQUIPMENT AND DEVICES WITH THE ARCHITECTURAL PLANS AND ANY SPECIFICALLY DENOTED REQUIREMENTS.
2) MOUNTED HEIGHTS SHALL PREVAIL UNLESS OTHERWISE NOTED OR FIELD CONDITIONS REQUIRE DEVIATION.
3) MOUNTING HEIGHTS ARE FROM FINISHED FLOOR TO THE CENTERLINE OF THE DEVICE UNLESS OTHERWISE NOTED.
4) COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF OUTLETS DENOTED AS ABOVE COUNTER TO BE INSTALLED 6" ABOVE COUNTERS OR BACKSPLASHES, WHICHEVER IS HIGHER.

GENERAL REQUIREMENTS

1. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE 2011 EDITION OF THE NATIONAL ELECTRIC CODE, STATE, MUNICIPAL, AND FEDERAL LAWS, AMENDMENTS AND/OR ORDINANCES GOVERNING THE PROJECT. IF IN ANY INSTANCE THE PLANS AND SPECIFICATIONS ARE IN DIRECT CONFLICT WITH SUCH CODES, LAWS, AND/OR ORDINANCES, THE CODE, LAWS, AND/OR ORDINANCES SHALL HAVE JURISDICTION AND THE WORK IN QUESTION SHALL BE INSTALLED ACCORDING TO THE CODES, LAWS, AND/OR ORDINANCES. ALL WORK SHALL BE PERFORMED UNDER THE SUPERVISION OF A CERTIFIED ELECTRICIAN.
2. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED CONSTRUCTION PERMITS AND PAY ALL ASSOCIATED FEES.
3. MATERIALS AND EQUIPMENT SHALL BE COMMERCIAL GRADE AND ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED. ALL ELECTRICAL EQUIPMENT SHALL INCLUDE THE SEAL OF A NATIONALLY RECOGNIZED TESTING LABORATORY FOR THE PURPOSE FOR WHICH IT IS INSTALLED. WHENEVER POSSIBLE, SIMILAR ITEMS SHALL BE SUPPLIED BY THE SAME MANUFACTURER THROUGHOUT THE PROJECT.
4. COORDINATE AND PROVIDE THE EQUIPMENT WITH THE SHORT CIRCUIT CURRENT RATING (SCCR) FOR THE AVAILABLE FAULT CURRENT AT THE POINT OF THE SYSTEM WHERE INSTALLED. SERIES RATING OF EQUIPMENT IS ACCEPTABLE. PROVIDE ARC FAULT WARNING LABELS ON ALL PANELBOARDS, MCC UNITS AND SIMILAR EQUIPMENT PER NEC REQUIREMENTS.
5. THE FOLLOWING WIRING METHODS SHALL BE ACCEPTABLE FOR INSTALLATION OF ELECTRICAL CIRCUITS: TYPE MC CABLE, INTERMEDIATE METAL CONDUIT, RIGID METAL CONDUIT, RIGID NONMETALLIC CONDUIT (FOR UNDERGROUND USE ONLY), ELECTRICAL METALLIC TUBING, FLEXIBLE METALLIC TUBING, FLEXIBLE METAL CONDUIT, AND LIQUID TIGHT FLEXIBLE CONDUIT. ALL WIRING METHODS SHALL INCLUDE AN EQUIPMENT GROUNDING CONDUCTOR TO BE INSTALLED THEREIN AND SIZED FOR THE CIRCUITS SERVED. ALL CLASSIFIED AREAS SHALL USE RIGID CONDUIT, AND WIRING METHODS AND MATERIALS RATED FOR EXPLOSION PROOF PER NEC AND THE CLASSIFICATIONS NOTED ON THE PLANS.
6. ALL CONDUCTORS SHALL BE COPPER. ALL CONDUCTORS IN UNHEATED SPACES OF THE BUILDING OR LOCATED OUTSIDE OF THE BUILDING ARE REQUIRED TO HAVE TYPE XHHW 90 DEGREE C INSULATION. ALL CONDUCTORS LOCATED IN HEATED SPACES CAN BE XHHW OR THHN 90 DEGREE C INSULATION UNLESS NOTED OTHERWISE. CONDUCTOR AMPACITY SHALL BE BASED ON TABLE 310–16 OF THE NEC. USE 60–DEGREE C. RATING FOR CIRCUITS TERMINATING ON DEVICES RATED BELOW 100A. USE 75–DEGREE C RATING FOR CIRCUITS TERMINATING ON DEVICES AND IN ENCLOSURES RATED 100A AND OVER. DERATE CONDUCTORS PER NEC REQUIREMENTS.
7. CONCEAL ALL ELECTRICAL RACEWAYS, BOXES, CABLING, CONDUCTORS AND THE LIKE IN WALLS, BELOW FLOORS, SLABS OR ABOVE FINISHED CEILING SPACES. ELECTRICAL EQUIPMENT AND WIRING CAN BE EXPOSED IN MECHANICAL ROOMS, TELECOMMUNICATION ROOMS OR WHERE SPECIFICALLY NOTED.
8. DO NOT ROUTE RACEWAYS ON THE EXTERIOR SURFACE OF THE BUILDING, ROOF, OR FLOOR UNLESS SPECIFICALLY NOTED OTHERWISE.
9. PROVIDE ALL WIRING AND EQUIPMENT IN WET AND EXTERIOR LOCATIONS USING EQUIPMENT AND WIRING METHODS RATED FOR WET ENVIRONMENTS.
10. PROVIDE ACCESS PANELS FOR ALL LOCATION NECESSARY TO ACCESS ELECTRICAL EQUIPMENT AND JUNCTION BOXES. ACCESS PANELS SHALL BE FIRE RATED EQUAL TO OR EXCEEDING THE ADJACENT WALL OR CEILING CONSTRUCTION AND PAINTED TO MATCH.
11. CONNECT ALL EMERGENCY LIGHTING UNITS AND MODULES TO THE LOCAL AREA LIGHTING CIRCUITS AHEAD OF ANY SWITCHES OR RELAYS. LOCATE REMOTE TEST SWITCHES AND INDICATOR LIGHTS AS NECESSARY FOR TEST SWITCHES ON EMERGENCY MODULES.
12. SEAL ALL PENETRATIONS. SEAL PENETRATIONS AT ALL FIRE WALLS WITH APPROVED FIRE STOPPING COMPOUND.
13. OUTLET BOXES LOCATED BACK TO BACK IN FIRE RATED WALLS SHALL BE SPACED A MINIMUM OF 2 FEET HORIZONTALLY OR PROVIDE AN APPROVED FIRE PROTECTIVE MATERIAL PLACED ON OR AROUND THEM LISTED FOR THE FIRE RATING OF THE WALL.
14. CONTRACTOR SHALL SUBMIT REQUEST FOR SUBSTITUTION IN WRITING TO THE ENGINEER.
15. PROVIDE SEISMIC SUPPORT AND DESIGN PER IBC REQUIREMENTS.
16. THE ELECTRICAL CONTRACTOR SHALL CONTACT SERVING UTILITY CO. AND VERIFY EXACT SERVICE REQUIREMENTS FOR POWER. THE CONTRACTOR SHALL COORDINATE AND PROVIDE ALL REQUIREMENTS OF SERVING UTILITY AND ALL EQUIPMENT SHALL CONFORM TO THE SERVING UTILITY STANDARDS AND REQUIREMENTS.

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STATE OF ALASKA — PRELIMINARY NOT FOR CONSTRUCTION — PROFESSIONAL ENGINEER — 49th

CHEFORNAK PUMP HOUSE
ELECTRICAL LEGEND AND GENERAL REQUIREMENTS
CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
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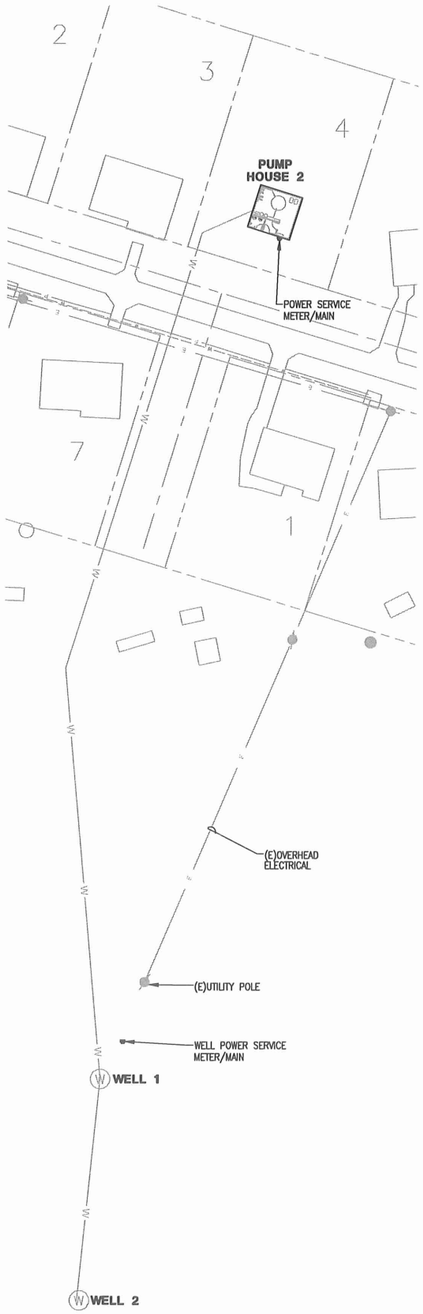

1 E2.1 **PUMP HOUSE 2 ELECTRICAL SITE PLAN**

SCALE: 1" = 40'-0"

PLAN N

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CHEFORNAK PUMP HOUSE

ELECTRICAL SITE PLAN

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
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LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMPS	MOUNTING	MANUFACTURER/MODEL	NOTES
LB4	4FT LED WRAP W/ PRISMATIC LENS	LED	CEILING SURFACE	LITHONIA #LBL4-LP835	
LW4	4FT ENCLOSED & GASKETED LED W/ WET LABEL	LED	CEILING SURFACE	LITHONIA #FEM4-LED-IMAFL	
ZW1	LED AREA LIGHT W/ CUTOFF OPTICS & INTEGRAL PHOTOCELL	LED	EXTERIOR WALL	LITHONIA #OLW14	

STANDARD NOTES

A) CATALOG NUMBERS ARE FOR GENERAL REFERENCE AND ARE NOT INCLUSIVE OF ALL OPTIONS OR REQUIREMENTS DENOTED ON PLANS AND SPECIFICATIONS.
B) REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND PROVIDE MOUNTING HARDWARE/FLANGES ETC FOR ALL LUMINAIRES FOR CEILING TYPES SHOWN.
C) LUMINAIRES NOTED ON THE FLOOR PLANS AS 'NL' (NIGHTLIGHT) SHALL BE CONNECTED TO UNSWITCHED POWER CIRCUIT NOTED ON DRAWINGS.

REFERENCED NOTES

1) NOT USED

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

UNIT ID	LOCATION OR FUNCTION	LOAD RATINGS KVA	HP	FLA	MCA	MFS	V	PH	CONDUCTORS & CONDUIT	NOTES
B-1	BOILER			5			120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
B-2	BOILER			5			120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
CP-1A	WATER LOOP CIRCULATION PUMP		3/4				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
CP-1B	WATER LOOP CIRCULATION PUMP		3/4				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
EF-1	EXHAUST FAN		FHP				120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
MM-1	MIXING TANK		FHP				120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	1
PP-1	PRESSURE PUMP		1.5				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
PP-2	PRESSURE PUMP		1.5				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
WP-1	WELL PUMP		1				240	1	(2)10 AWG, (1)10 AWG EGC, 3/4" C.	
TP-1	TRANSFER PUMP		FHP				120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	

STANDARD NOTES

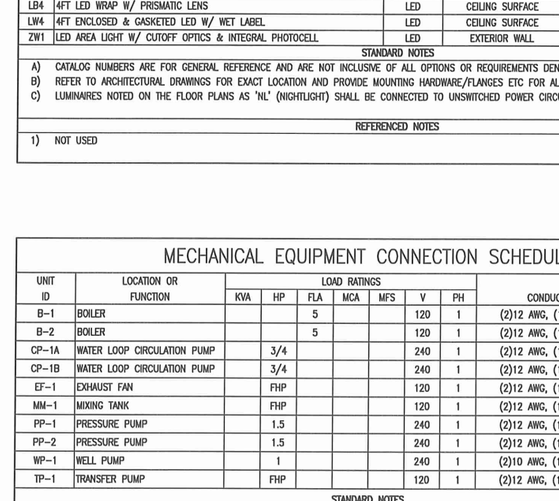
A) REFER TO FLOOR PLAN DRAWINGS FOR EQUIPMENT TYPE REQUIREMENTS, LOCATIONS AND QUANTITIES.
B) COORDINATE ALL CONNECTION REQUIREMENTS WITH MECHANICAL AND ACTUAL EQUIPMENT SUPPLIED PRIOR TO ROUGH-IN.

REFERENCED NOTES

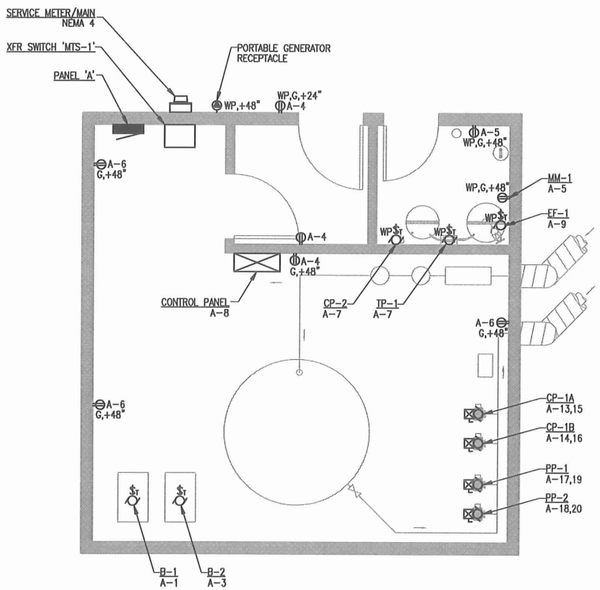
1) CORD AND PLUG CONNECTION.
2) PROVIDE HP RATED RELAY-IN-A-BOX (RIB) AS NECESSARY FOR CONTROL. COORDINATE ALL CONTROL REQUIREMENTS WITH MECHANICAL.

SHEET NOTES

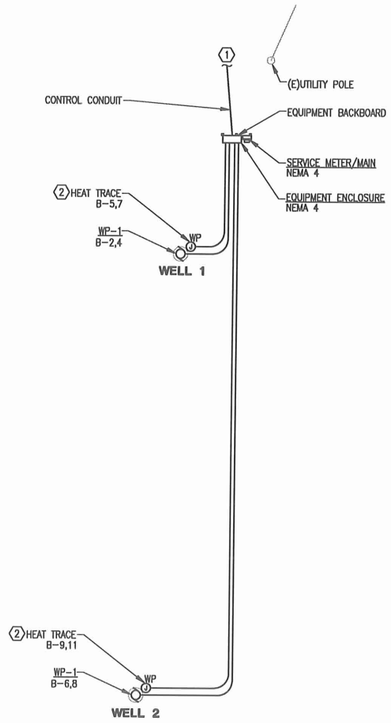
1. PROVIDE 1" CONDUIT BACK TO PUMP HOUSE FOR WELL PUMP AND HEAT TRACE CONTROL WIRING.
2. PROVIDE POWER CONNECTION TO HEAT TRACE. COORDINATE WITH CIVIL.



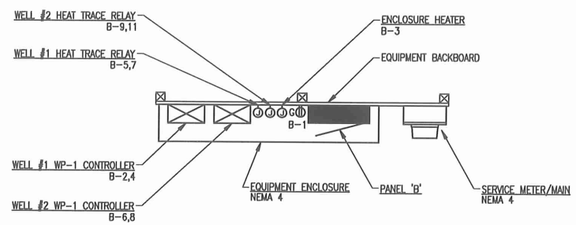
1 E3.1 **PUMP HOUSE 2 - LIGHTING PLAN**
SCALE: 1/4" = 1'-0"



2 E3.1 **PUMP HOUSE 2 - POWER PLAN**
SCALE: 1/4" = 1'-0"



3 E3.1 **REMOTE WELL - POWER PLAN**
SCALE: 1" = 20'-0"



4 E3.1 **REMOTE WELL EQUIPMENT ENCLOSURE - POWER PLAN**
SCALE: NONE

RECORD DRAWING CERTIFICATE
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.
NAME DATE

SCALE:
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CONSTRUCTION RECORD
FIELD BOOK
STAKING
FOREMAN
AS-BUILT
INSPECTOR

"STATE OF ALASKA - NOT FOR CONSTRUCTION - PRELIMINARY - ENGINEER"

CHEFORNAK PUMP HOUSE
PUMP HOUSE 2
ELECTRICAL PLANS
CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 220345 ANCHORAGE, AK 99522 PH: 907-345-1010 FAX: 907-345-1015

REVISION	BY	DATE

Project No. | Date SEPT 2014 | Designed BLS | Drawn BLS | Approved EDC

Sheet No. E3.1

EIC ENGINEERS, INC
ELECTRICAL ENGINEERS
6927 OLD SEWARD HWY, SUITE 200
ANCHORAGE, AK 99518
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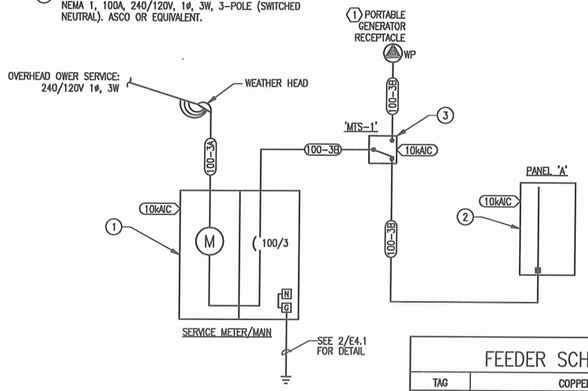
www.elceng.com
EIC JOB #E14-2149

DETAIL EQUIPMENT

1. SERVICE METER/MAIN– SE RATED, NEMA 4, 100A BUS, 100A MAIN CB, 240/120V, 1ø, 3W. CIRCLE AW OR EQUIVALENT.
2. PANEL 'A'– NEMA 1, 100A, 240/120V, 1ø, 3W, 100A MAIN CB, 42 SPACE. SQUARE D TYPE NQOD OR EQUIVALENT.
3. MANUAL TRANSFER SWITCH 'MTS–1'– NEMA 1, 100A, 240/120V, 1ø, 3W, 3–POLE (SWITCHED NEUTRAL). ASCO OR EQUIVALENT.

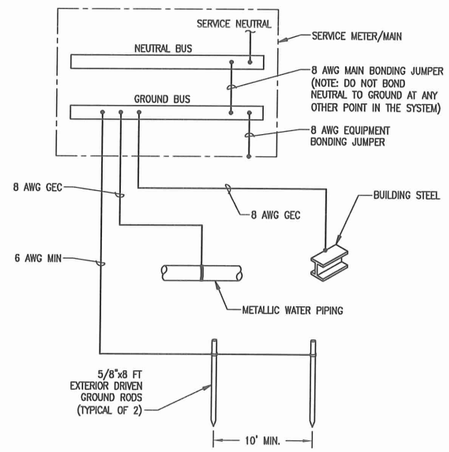


FEEDER SCHEDULE		
TAG	COPPER	NOTES
100–3A	1.25"C, (3)2 AWG, (1)8 AWG GEC	
100–3B	1.25"C, (3)2 AWG, (1)8 AWG EGC	
STANDARD NOTES		
A) ALL WIRE SIZES NOTED ARE COPPER.		
REFERENCED NOTES		
1) NOT USED.		

DETAIL NOTES

1. CONTRACTOR TO FIELD VERIFY PORTABLE GENERATOR RECEPTACLE CONFIGURATION WITH OWNER.

1 PUMP HOUSE 2 - POWER ONE-LINE DIAGRAM
E4.2 SCALE: NONE



DETAIL NOTES

1. BOND ALL PIPING AND BUILDING DISCONTINUITIES TO PROVIDE ELECTRICALLY CONTINUOUS SYSTEM. PROVIDE BOND JUMPER EQUAL TO GROUNDING ELECTRODE CONDUCTOR FOR THAT SYSTEM.
2. PROVIDE RACEWAY FOR ALL CONDUCTORS. RACEWAY TO BE METALLIC IN PLENUM AIR SPACES. WHERE METALLIC RACEWAY IS USED BOND EACH END TO CONDUCTOR.
3. ALL CONDUCTOR SIZES SHOWN ARE COPPER.

2 PUMP HOUSE 2 - GROUNDING SYSTEM DIAGRAM
E4.2 SCALE: NONE

VOLTAGE:240/120V, 1PH, 3W
BUS: 100
MAIN:LUGS ONLY – FED BY 100A OPD

PANEL "A" SCHEDULE

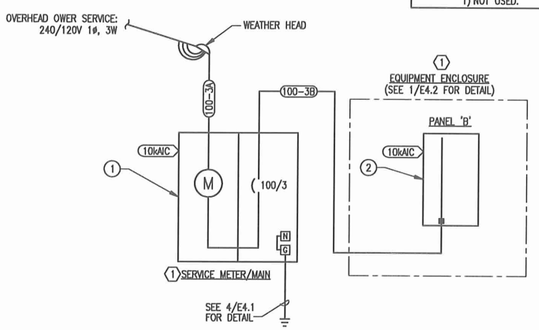
MIN. A.I.C. RATING: SEE 1LINE
ENCLOSURE: NEMA 1
MOUNTING: SURFACE
LOCATION: "PUMP HOUSE 2"

LOAD DESCRIPTION	NOTE	KVA	LOAD	AMP	P	CKT	A	B	CKT	AMP	P	LOAD DESCRIPTION	NOTE	KVA	LOAD
B–1		0.60	M	20	1	1			2	20	1	LTG– PUMP HOUSE, EXTERIOR		0.40	L
B–2		0.60	M	20	1	3			4	20	1	REC– PUMP HOUSE, EXTERIOR		0.54	R
REC– PUMPHOUSE, MH–1		0.37	N	20	1	5			6	20	1	REC–PUMP HOUSE		0.54	R
CP–2, TP–1		0.38	M	20	1	7			8	20	1	CONTROL PANEL		0.25	C
EF–1		0.19	M	20	1	9			10	20	1	SPARE			S
SPARE			S	20	1	11			12	20	1	SPARE			S
CP–1A		1.66	M	20	2	13			14	20	2	CP–1B		1.66	M
			–	–	–	15			16	–	–				–
PP–1		2.40	LM	20	2	17			18	20	2	PP–2		2.40	M
			–	–	–	19			20	–	–				–
– SPACE –						21			22		1	– SPACE –			
– SPACE –						23			24		1	– SPACE –			
– SPACE –						25			26		1	– SPACE –			
– SPACE –						27			28		1	– SPACE –			
– SPACE –						29			30		1	– SPACE –			
– SPACE –						31			32		1	– SPACE –			
– SPACE –						33			34		1	– SPACE –			
– SPACE –						35			36		1	– SPACE –			
– SPACE –						37			38		1	– SPACE –			
– SPACE –						39			40		1	– SPACE –			
– SPACE –						41			42		1	– SPACE –			

SUMMARY BY LOAD TYPE	CONNECTED KVA PH A	PH B	FEED	TOTAL KVA	NEC %	NEC TOTAL	NOTES:
G GENERAL LOADS					N/A		
A APPLIANCE					0.75		
E ELECTRIC RANGE					1.00		
L LIGHTING	0.4			0.4	1.25	0.5	
R RECEPTACLES	0.5	0.5		1.1	10K+50%	1.1	
M MOTORS	3.8	3.8		7.5	1.00	7.5	
LM LARGEST MOTOR	1.2	1.2		2.4	1.25	3.0	
C CONTINUOUS		0.3		0.3	1.25	0.3	
N NON–CONTINUOUS	0.4			0.4	1.00	0.4	
S SPARE					1.00		
X NON–COINCIDENT					0.00		
K KITCHEN					1.00		
D DRYER					1.00		
O OTHER					1.00		
EXIST'G TO REMAIN					1.25		
F FEEDER					1.25		
TOTAL KVA (PHASE)	6.2	5.8		12.0		12.8	
TOTAL AMPERES	51.3	48.6		50.0		53.1	
PHASE BALANCE, ABC	A–B						
PERCENT	5.5%						

DETAIL EQUIPMENT

1. SERVICE METER/MAIN– SE RATED, NEMA 4, 100A BUS, 100A MAIN CB, 240/120V, 1ø, 3W. CIRCLE AW OR EQUIVALENT.
2. PANEL 'B'– NEMA 1, 100A, 240/120V, 1ø, 3W, 100A MAIN CB, 24 SPACE. SQUARE D TYPE NQOD OR EQUIVALENT.
3. MANUAL TRANSFER SWITCH 'MTS–1'– NEMA 1, 100A, 240/120V, 1ø, 3W, 3–POLE (SWITCHED NEUTRAL). ASCO OR EQUIVALENT.

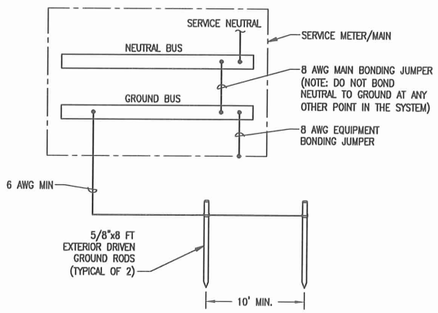


FEEDER SCHEDULE		
TAG	COPPER	NOTES
100–3A	1.25"C, (3)2 AWG, (1)8 AWG GEC	
100–3B	1.25"C, (3)2 AWG, (1)8 AWG EGC	
STANDARD NOTES		
A) ALL WIRE SIZES NOTED ARE COPPER.		
REFERENCED NOTES		
1) NOT USED.		

DETAIL NOTES

1. CONTRACTOR TO MOUNT SERVICE METER/MAIN AND EQUIPMENT ENCLOSURE TO BACKBOARD.

3 REMOTE WELL - POWER ONE-LINE DIAGRAM
E4.2 SCALE: NONE



DETAIL NOTES

1. BOND ALL PIPING AND BUILDING DISCONTINUITIES TO PROVIDE ELECTRICALLY CONTINUOUS SYSTEM. PROVIDE BOND JUMPER EQUAL TO GROUNDING ELECTRODE CONDUCTOR FOR THAT SYSTEM.
2. ALL CONDUCTOR SIZES SHOWN ARE COPPER.

4 REMOTE WELL - GROUNDING SYSTEM DIAGRAM
E4.2 SCALE: NONE

VOLTAGE:240/120V, 1PH, 3W
BUS: 100
MAIN:LUGS ONLY – FED BY 100A OPD

PANEL "B" SCHEDULE

MIN. A.I.C. RATING: SEE 1LINE
ENCLOSURE: NEMA 1
MOUNTING: SURFACE
LOCATION: "REMOTE WELL"

LOAD DESCRIPTION	NOTE	KVA	LOAD	AMP	P	CKT	A	B	CKT	AMP	P	LOAD DESCRIPTION	NOTE	KVA	LOAD
REC– EQUIPMENT ENCLOSURE		0.18	R	20	1	1			2	20	2	WELL #1 WP–1		1.92	LM
ENCLOSURE HEATER		1.00	C	20	1	3			4	–	–				–
WELL #1 HEAT TRACE	1	1.00	C	20	2	5			6	20	2	WELL #2 WP–1		1.92	M
		–	–	–	–	7			8	–	–				–
WELL #2 HEAT TRACE	2	1.00	C	20	2	9			10	–	1	– SPACE –			
		–	–	–	–	11			12		1	– SPACE –			
– SPACE –					1	13			14		1	– SPACE –			
– SPACE –					1	15			16		1	– SPACE –			
– SPACE –					1	17			18		1	– SPACE –			
– SPACE –					1	19			20		1	– SPACE –			
– SPACE –					1	21			22		1	– SPACE –			
– SPACE –					1	23			24		1	– SPACE –			

SUMMARY BY LOAD TYPE	CONNECTED KVA PH A	PH B	FEED	TOTAL KVA	NEC %	NEC TOTAL	NOTES:
G GENERAL LOADS					N/A		1. PROVIDE 30mA GFPE CIRCUIT BREAKER.
A APPLIANCE					0.75		
E ELECTRIC RANGE					1.00		
L LIGHTING					1.25		
R RECEPTACLES	0.2			0.2	10K+50%	0.2	
M MOTORS	1.0	1.0		1.9	1.00	1.9	
LM LARGEST MOTOR	1.0	1.0		1.9	1.25	2.4	
C CONTINUOUS	1.0	2.0		3.0	1.25	3.8	
N NON–CONTINUOUS					1.00		
S SPARE					1.00		
X NON–COINCIDENT					0.00		
K KITCHEN					1.00		
D DRYER					1.00		
O OTHER					1.00		
EXIST'G TO REMAIN					1.25		
F FEEDER					1.25		
TOTAL KVA (PHASE)	3.1	3.9		7.0		8.3	
TOTAL AMPERES	25.8	32.7		29.3		34.4	
PHASE BALANCE, ABC	A–B						
PERCENT	23.4%						

EIC ENGINEERS, INC
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EIC JOB #E14-2149

RECORD DRAWING CERTIFICATE
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DATE

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CONSTRUCTION RECORD
FIELD BOOK
STAKING
FOREMAN
AS-BUILT
INSPECTOR

PRELIMINARY - NOT FOR CONSTRUCTION
STATE OF ALASKA
49th
DANIEL C. OSBORNE

CHEFORNAK PUMP HOUSE

PUMP HOUSE 2
ELECTRICAL
DIAGRAMS & DETAILS

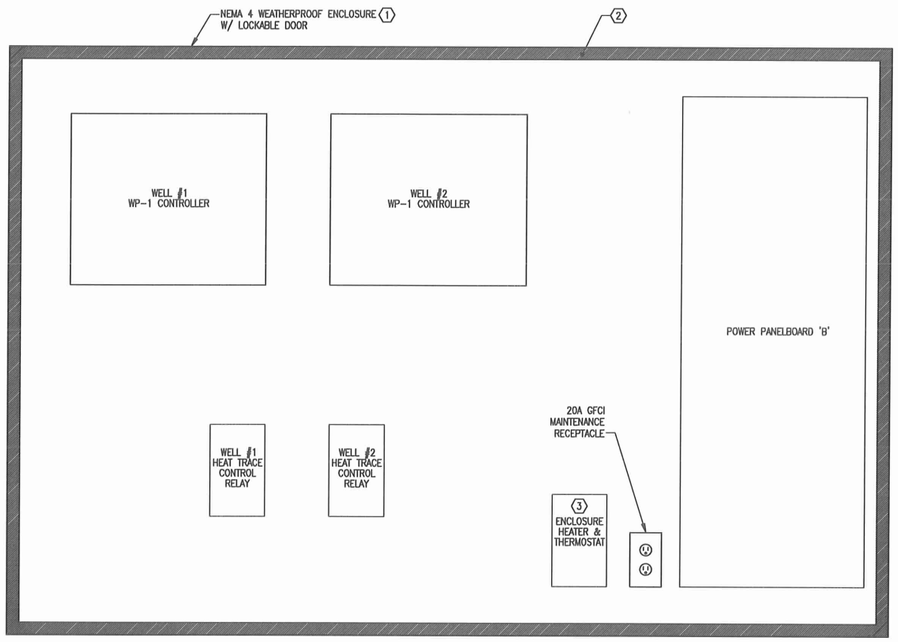
CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 232946 ANCHORAGE, AK 99523 PH: 907-348-1010 FAX: 907-348-1015

REVISION	BY	DATE

Project No.
Date SEPT 2014
Designed BLS
Drawn BLS
Approved EDC

Sheet No.
E4.1



DETAIL NOTES

1. PROVIDE INSULATED AND HEATED WEATHERPROOF ENCLOSURE. CONTRACTOR TO SIZE ENCLOSURE AS NECESSARY PER ACTUAL EQUIPMENT DIMENSIONS.
2. 1" BLUE BOARD INSULATION (FRONT, TOP, SIDES, BOTTOM).
3. PROVIDE 120V ELECTRIC HEATER WITH INTEGRAL THERMOSTAT. SIZE AS REQUIRED.

1 EQUIPMENT ENCLOSURE DETAIL

E4.2

SCALE: NONE

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FIELD BOOK	
STAKING	
FOREMAN	
AS-BUILT	
INSPECTOR	

STATE OF ALASKA BRIAN L. SCHMIDT 9739 PRELIMINARY NOT FOR CONSTRUCTION 9/19/14 REGISTERED PROFESSIONAL ENGINEER

CHEFORNAK PUMP HOUSE

PUMP HOUSE 2 ELECTRICAL DIAGRAMS & DETAILS

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.
PO BOX 202846 ANCHORAGE, AK 99523 PH: 907-349-1016 FAX: 907-349-1015

No.	REVISION	BY	DATE

Project No. Date SEPT 2014 Designed BLS Drawn BLS Approved EDC

Sheet No. E4.2

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EIC JOB #E14-2149