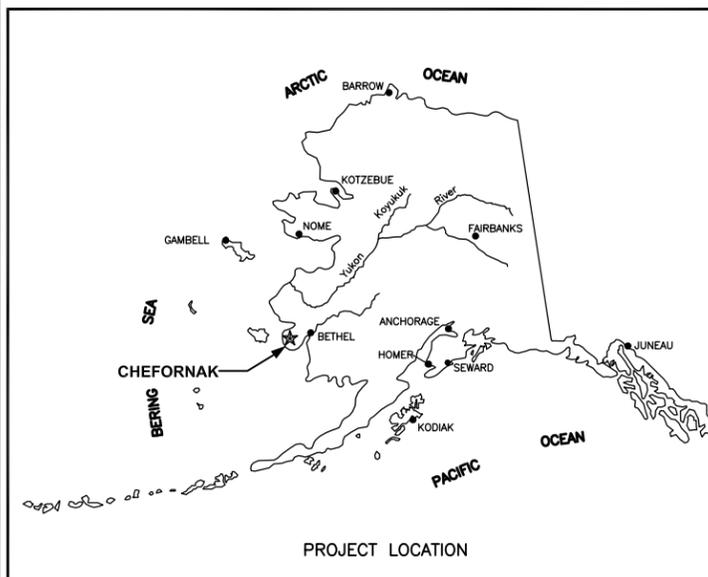


# CITY OF CHEFORNAK, ALASKA

## PUMP HOUSE 1 IMPROVEMENTS

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

ISSUED FOR CONSTRUCTION OCT. 2015



Location Map



Consultant

### RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

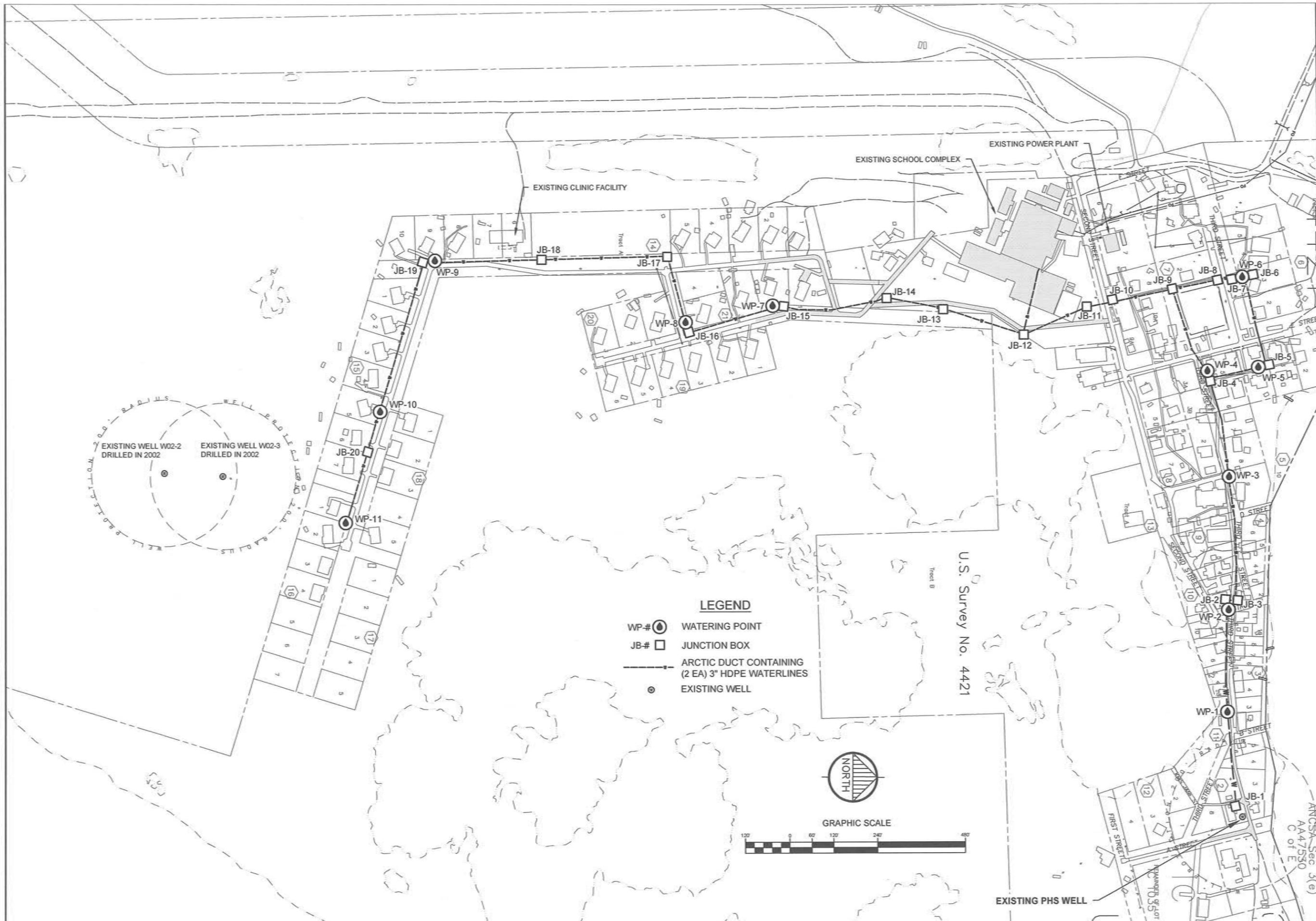
NAME \_\_\_\_\_ DATE \_\_\_\_\_

Construction Foreman \_\_\_\_\_  
 FINAL DESIGN (Date) \_\_\_\_\_  
 ADEC APPROVAL (Date) \_\_\_\_\_  
 Construction Period (From) \_\_\_\_\_ (To) \_\_\_\_\_  
 As-Builts (Date) \_\_\_\_\_

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G3.1	DESIGN CRITERIA
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G5.0	GEOTECHNICAL INFORMATION
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**LEGEND**

- WP-# WATERING POINT
- JB-# JUNCTION BOX
- ARCTIC DUCT CONTAINING (2 EA) 3" HDPE WATERLINES
- EXISTING WELL

	<p>RECORD DRAWING CERTIFICATE</p> <p>THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.</p>	<p>NAME _____</p> <p>DATE _____</p>
SCALE:	AS SHOWN	<p>BASED ON ORIGINAL DRAWING</p> <p>AS-BUILT</p> <p>AS-BUILT</p> <p>AS-BUILT</p>
CONSTRUCTION RECORD	<p>FIELD BOOK _____</p> <p>STARTING _____</p> <p>FOREMAN _____</p> <p>AS-BUILT _____</p> <p>INSPECTOR _____</p>	<p>9/28/15</p>
PUMP HOUSE 1 IMPROVEMENTS	EXISTING WATER DISTRIBUTION LOOP	CHEFORMAK, ALASKA
<p>CE2 ENGINEERS, INC.</p> <p>PO BOX 22596 ANCHORAGE, AK 99523 PH 907.546.8100 FAX 907.546.4016</p>		
REVISION	BY	DATE
Project No. _____	Date _____	
Designed _____	Drawn _____	
Approved _____	ECM	
Sheet No. _____	G2.1	
SHEET _____	OF _____	

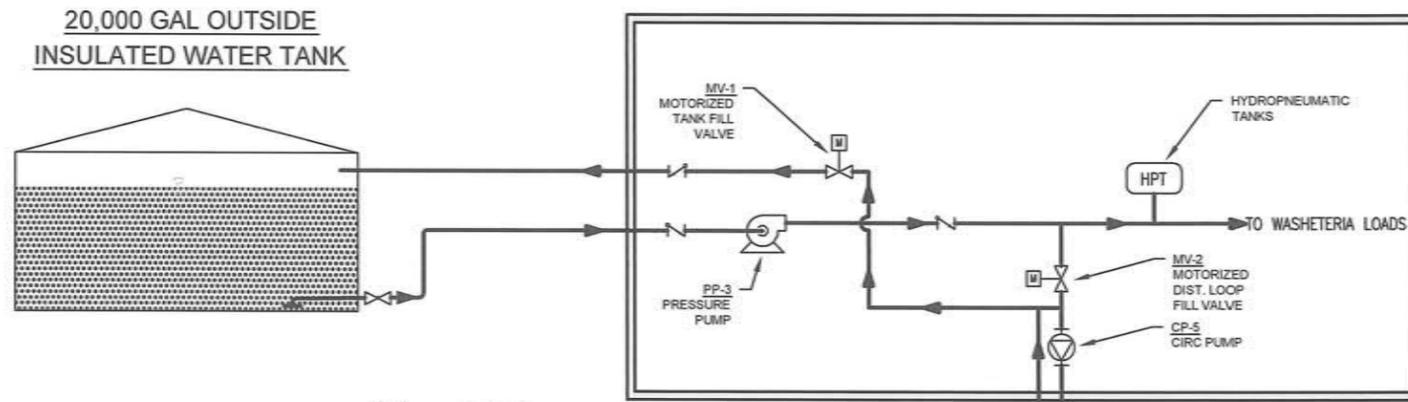
**SYSTEM SCHEMATIC DESCRIPTION**

- 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 IS CHLORINATED ( IF REQUIRED ), 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 20 TO 40 GPM OF WATER THROUGH COMMUNITY WATER DISTRIBUTION LOOP. HEAT EXCHANGER HE-1 PROVIDES BACKUP HEAT FOR THE WATER DISTRIBUTION LOOP IF THE WASTE HEAT RECOVERY SYSTEM AT THE POWER PLANT FAILS TO HEAT THE LOOP.
- 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 PUMPHOUSE 1 IN CASE THE HEATING SYSTEM AT THE CITY POWER PLANT FAILS.
- 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.
- PUMPHOUSE 2.** IF CONSTRUCTED 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 INTO A 2500 GALLON VERTICAL HDPE PLASTIC TANK. A LEVEL CONTROL SYSTEM WILL KEEP THE TANK WITHIN THREE-QUARTERS AND FULL LEVELS OF THE TANK.

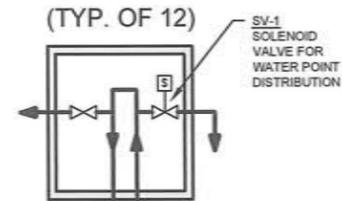
**CONT'D SYSTEM SCHEMATIC DESCRIPTION**

- 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.
- 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.
  - 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.
  - 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 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.

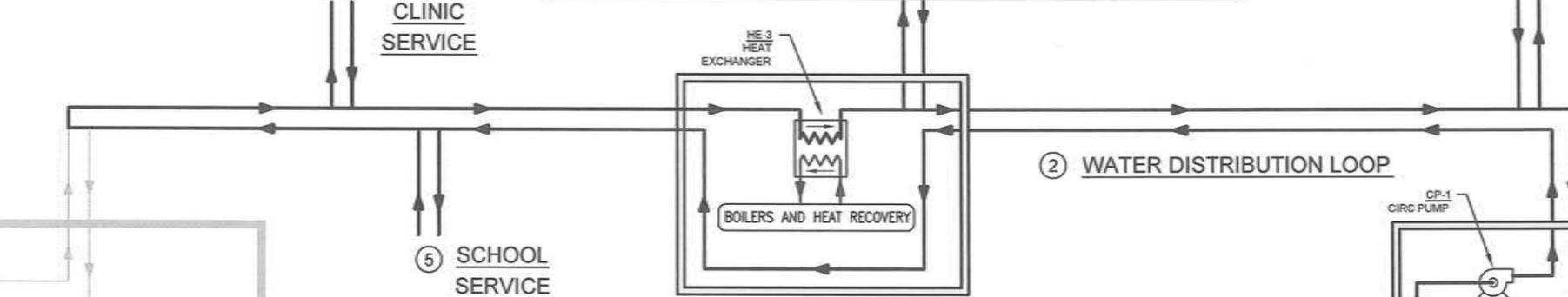
**⑦ WASHETERIA**



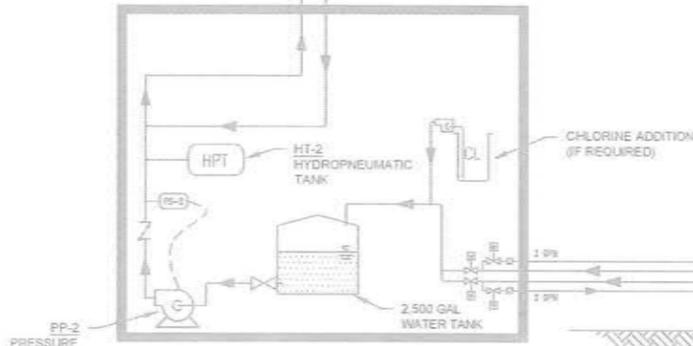
**③ WATERING POINT (TYP. OF 12)**



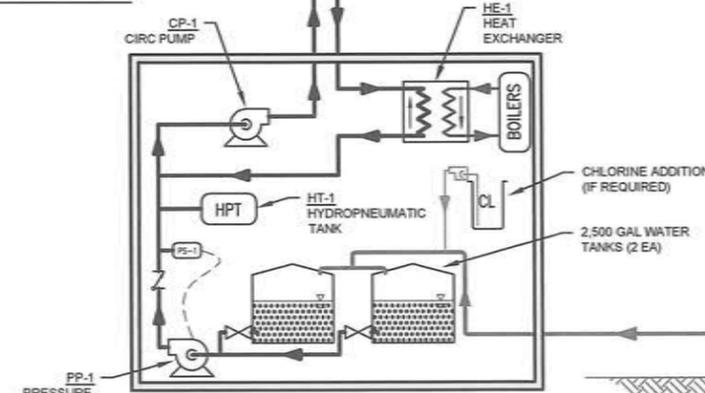
**② WATER DISTRIBUTION LOOP**



**④ PUMPHOUSE 2 (IF CONSTRUCTED)**



**① PUMPHOUSE 1**



WELL W02-3

WELL W02-2

EXISTING PHS WELL

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\G3.0 System Schematic.dwg, 9/4/2015 2:06:59 PM, cmerz, \\C02main\LANIER MP C2050\LD520C PCL 6

DATE \_\_\_\_\_

NAME \_\_\_\_\_

RECORD DRAWING CERTIFICATE  
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SCALE: AS SHOWN  
BASE IS ONE INCH EQUAL TO ORIGINAL DRAWING  
IF NOT ONE INCH ON SCALE IS ACCORDINGLY

CONSTRUCTION RECORD	FIELD BOOK	STAMP	FOREMAN	AS-BUILT	INSPECTOR
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9/28/15

STATE OF ALASKA  
DIVISION OF COMMUNITY AND ECONOMIC DEVELOPMENT  
REGISTERED PROFESSIONAL ENGINEER  
No. 10078  
EXPIRES 12/31/2018

PUMP HOUSE 1 IMPROVEMENTS  
SYSTEM SCHEMATIC PROCESS DISCUSSION  
CHEFORNAK, ALASKA

**CE2 ENGINEERS, INC.**  
PO BOX 23266 ANCHORAGE, AK 99523 PH: 907-346-0100 FAX: 907-346-0105

REVISION	BY	DATE

Project No. \_\_\_\_\_ Date JULY 2015  
Designed \_\_\_\_\_ PCW  
Drawn \_\_\_\_\_ CM  
Approved \_\_\_\_\_ PCLL

Sheet No. G3.0  
SHEET OF

# DESIGN CRITERIA

## COMMUNITY

POPULATION (2012) 434  
 DESIGN POPULATION (2034) 458  
 WATER CONSUMPTION (2034) 8,000 GPD (5.6 GPM AVERAGE FLOW)

### CONSISTING OF:

WATERING POINTS 1,000 GPD  
 CLINIC 1,000 GPD  
 SCHOOL 3,000 GPD  
 WASHETERIA 3,000 GPD

PLANNED WATER SUPPLY AT PUMP HOUSE 1 8,000 GPD (5.6 GPM)  
 WATER STORAGE, PUMP HOUSE 1 5,000 GAL

## CITY WELL (BY PUMP HOUSE 1)

WATER SOURCE: 118 FT DEEP WELL, 4 IN DIA.  
 CONTINUOUS PUMPING RATE 5.6 GPM AT DESIGN, 10 GPM MAX  
 (ADJUSTABLE)

WATER TREATMENT: NO TREATMENT OTHER THAN NSF-61 COMPLIANT, CHLORINE FEED FOR BACKUP. CHLORINE PRODUCES DISINFECTANT BYPRODUCTS (DBP) IN EXCESS OF MCL. WATER MAINLY USED FOR LAUNDRY AND BATHING.

## 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: 20 TO 40 GPM @18' TO 70' TDH  
 2 EACH 20 TO 40 GPM 1725 RPM VERTICAL MULTISTAGE PUMPS, PRIMARY/BACKUP

## ENVIRONMENTAL

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

## ELECTRICAL POWER

120/240 VOLTS, CENTER TAPPED NEUTRAL, SINGLE PHASE, 100 AMP SERVICE

**DRILLING LOG**

No. 1700-029 V.O. No. 4029 Location Cheforak, Alaska  
 Dated 5-30-65 Date Completed 5-16-65  
 Meter 2" Casing 103 1/2"  
 Make & Material 2-Brass-2-Stainless Steel Length 21 1/2' Diameter 4 inch  
 Pipe 8 Ft. Grout 5 Ft.  
 Loss: Hours Pumped 26 Static Level 5 1/2'  
 Available Drawdown 112 7 1/2' Drawdown 15 1/2'  
 Fresh Water GPM 9 Specific Capacity

Open Hole	Casing	Casing	FORMATION	DRILLER INITIAL
To	From	To		
0	5		Frozen Muck	RA
5	24		Hard Lava Rock	
24	40		Medium Hard Lava Rock	
40	44		Soft Lava Rock	
44	80		Frozen Silt	
80	96		Frozen Sand	
96	118 1/2		Fine Sand, Wood, sea shells, mica, small amount pea gravel and fresh water.	

Ch W. Mahalan - Construction Superintendent  
 Anchorage, Alaska.  
 Cheforak, Alaska. P.H.S. W.O. 4029  
 Driller: Richard Auliye, James Wickersham  
 Date Started - 3/30/65. Date Completed - 5/16/65.

Casing - 4 inch diameter, Set @ 103 1/2' grt.  
 Screen - 68 slot @ 100 to 118'  
 Production - Hours pumped - 26, Static level - 5 1/2', Draw down - 14 1/2', G.P.M. - 9.  
 Total depth - 118 1/2'.

FORMATION LOG:  
 FROZEN MUCK  
 HARD LAVA ROCK  
 MEDIUM HARD LAVA ROCK  
 SOFT LAVA ROCK  
 FROZEN SILT  
 FROZEN SAND  
 FINE SAND, WOOD, SEA SHELLS, MICA, SMALL AMOUNT PEA GRAVEL AND FRESH WATER.

DRILLER: RICHARD AULIYE, JAMES WICKERSHAM

1 1964 CITY WELL LOG  
 G3.1 NTS

## CHLORINE ADDITION CALCULATIONS

ASSUME 2 mg/l HYPOCHLORITE CONCENTRATION IN WELL WATER FLOW OF 10 GPM.

$QC_1 = Q_2C_2$  WHERE  $Q_1 =$  WELL WATER FLOW (10 GPM)  
 $C_1 = 2$  mg/l or  $R \times 2 \times 10^{-6}$   
 $Q_2 =$  METERING PUMP FLOW (GPM)  
 $C_2 = 1\%$  or 0.01

$Q_2 = \frac{Q_1C_1}{C_2} = \frac{10 \times 2 \times 10^{-6}}{0.01}$   
 $Q_2 = 0.0020$  GAL / MIN or 2.88 GAL / DAY OF 1% HYPOCHLORITE SOLUTION

RECORD DRAWING CERTIFICATE  
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SCALE: AS SHOWN  
 1" = 10' (IF NOT ONE INCH ON ORIGINAL DRAWING)  
 1" = 10' (IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY)

CONSTRUCTION RECORD  
 FIELD BOOK  
 STAKING  
 FOREMAN  
 AS-BUILT  
 INSPECTOR

STATE OF ALASKA  
 49th  
 PAUL C. WESBER  
 CE-10276  
 REGISTERED PROFESSIONAL ENGINEER

PUMP HOUSE 1 IMPROVEMENTS  
 DESIGN CRITERIA  
 CHEFORNAK, ALASKA

**CCE2**  
 ENGINEERS, INC.  
 PO BOX 23296 ANCHORAGE, AK 99523 PH: 907-548-0100 FAX: 907-548-1015

REVISION  
 CHLORINE CALCS  
 BY DATE  
 CM 10/15

Project No. \_\_\_\_\_ Date \_\_\_\_\_  
 Designated \_\_\_\_\_ PCW  
 Drawn \_\_\_\_\_ CM  
 Approved \_\_\_\_\_ FOLL

Sheet No. **G3.1**  
 SHEET OF \_\_\_\_\_

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# GENERAL NOTES

## GENERAL NOTES

- 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.
  - 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.
  - 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 IDENTIFIER 616. THE ELEVATION OF THE TOP OF CAP IS 77.68 FT.
  - THE BASIS OF HORIZONTAL CONTROL IS THE BEARING BETWEEN POINT IDENTIFIER 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.
  - 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 |
- 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.
  - 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.
  - CONSTRUCTION IN SENSITIVE AREAS - ANY DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES SHALL BE REPAIRED OR RESEEDDED AS NECESSARY TO RETURN THE AREAS AFFECTED BY CONSTRUCTION TO ITS PRECONSTRUCTION STATE.
  - 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.
  - 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.

- 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.
- 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.  
  
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 TO BE DISINFECTED AND TESTED FOR COLIFORM IN ACCORDANCE WITH AWWA C651-14. WATER TANKS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C652-11. WELLS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C654-13.

### BOARDWALK:

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

- 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).
- 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 BOULDER 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 BETWEEN 20' AND 30'.

### PIPING AND PLUMBING (GENERAL):

- 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.
- ALL PIPING SHALL BE LEAD FREE, CONSISTING OF SOLDERS NOT CONTAINING MORE THAN 0.2% LEAD AND PLUMBING COMPOUNDS NOT CONTAINING A WEIGHTED AVERAGE OF 0.25% LEAD ON THE WETTED SURFACES.
- ALL PLUMBING USING SOLDERED JOINTS SHALL USE A SOLDER CERTIFIED TO NOT TO CONTAIN LEAD (BRIDGET OR EQUAL).
- ALL PIPING SHALL BE SUPPORTED ADEQUATELY IN ACCORDANCE WITH CODE REQUIREMENTS AND MANUFACTURER'S MINIMUM SPACING REQUIREMENTS. PIPES SHALL BE SUPPORTED ON 1-5/8" SQUARE FRAMING CHANNELS AND PIPE CLAMPS (UNISTRUT OR EQUAL), OR PIPE HANGERS (CLEVIS HANGERS, ANVIL OR EQUAL).

### POLYPROPYLENE PIPE AND FITTINGS

- POLYPROPYLENE PIPE 2" IPS AND SMALLER SHALL BE NSF-61 LISTED FOR POTABLE WATER, AND SHALL HAVE A WORKING PRESSURE OF 150 PSI FOR SDR11 PIPE. ALL PIPE AND FITTINGS SHALL BE AQUATHERM PP-R "GREEN PIPE", WITH SDR11 WALL, OR SDR7.4 WALL ON SIZES SMALLER THAN 1" IPS (25 MM). JOINING PIPE AND FITTINGS SHALL BE PERFORMED USING SOCKET FUSION TECHNIQUE, WITH AQUATHERM SOCKET FUSION TOOLS, ACCESSORIES, AND INSTRUCTIONS. THREADED INSERTS SHALL BE LEAD-FREE BRASS.
- PIPE SHALL BE SUPPORTED BY PIPE CLAMPS AND HANGERS AS FOUND IN TABLE ON PAGE 4.5 OF AQUATHERM MANUAL, EDITION OF 2014 OR MORE CURRENT VERSION. PIPE SUPPORT INTERVALS FOR AQUATHERM GREEN PIPE SDR11 IS FOUND IN A TABLE ON PAGE 4.6 OF AFOREMENTIONED MANUAL.
- MIXING OF FUSION FITTINGS OF DIFFERENT MANUFACTURE IS NOT ALLOWED EXCEPT FOR THE SPECIAL CASE OF INSERTION TEES FOR GEORG FISCHER "SIGNET" FLOW METERS FM-1, FM-2, AND FM-3.

### PVC SCHEDULE 80 PRESSURE PIPE AND FITTINGS

- THIS SPECIFICATION COVERS PVC SCHEDULE 80 PIPE AND FITTINGS FOR PRESSURE APPLICATIONS. THIS SYSTEM IS INTENDED FOR PRESSURE APPLICATIONS WHERE THE OPERATING TEMPERATURE WILL NOT EXCEED 140° F.
- PIPE AND FITTINGS SHALL BE MANUFACTURED FROM VIRGIN RIGID PVC (POLYVINYL CHLORIDE) VINYL COMPOUNDS WITH A CELL CLASS OF 12454-B AS IDENTIFIED IN ASTM D 1784.
- PVC SCHEDULE 80 PIPE SHALL BE IRON PIPE SIZE (IPS) CONFORMING TO ASTM D 1785. PVC SCHEDULE 80 FITTINGS SHALL CONFORM TO ASTM D 2467. PVC SCHEDULE 80 THREADED FITTINGS SHALL CONFORM TO ASTM D 2464. PIPE AND FITTINGS SHALL BE MANUFACTURED AS A SYSTEM AND BE THE PRODUCT OF ONE MANUFACTURER. PIPE AND FITTINGS SHALL CONFORM TO NATIONAL SANITATION FOUNDATION (NSF) STANDARD 61 OR THE HEALTH EFFECTS PORTION OF NSF STANDARD 14.
- INSTALLATION SHALL COMPLY WITH THE LATEST INSTALLATION INSTRUCTIONS PUBLISHED BY THE MANUFACTURER AND SHALL CONFORM TO ALL TYPICAL PLUMBING, BUILDING, AND FIRE CODE REQUIREMENTS. SOLVENT CEMENT JOINTS SHALL BE MADE IN A TWO STEP PROCESS WITH PRIMER MANUFACTURED FOR THERMOPLASTIC PIPING SYSTEMS AND SOLVENT CEMENT CONFORMING TO ASTM D 2564. THE SYSTEM SHALL BE PROTECTED FROM CHEMICAL AGENTS, FIRE STOPPING MATERIAL, THREAD SEALANT, PLASTICIZED VINYL PRODUCTS, OR OTHER AGGRESSIVE CHEMICAL AGENTS NOT COMPATIBLE WITH PVC COMPOUNDS. SYSTEMS SHALL BE HYDROSTATICALLY TESTED AFTER INSTALLATION TO 100 PSI. TESTING WITH COMPRESSED AIR OR GAS IS NOT ALLOWED.

### COPPER TUBING AND FITTINGS:

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

### SERVICE LINES:

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

**MECHANICAL:** FOR MECHANICAL NOTES SEE SHEET M1.0 AND M1.1

### CHEMICAL ADDITIVES:

- ADDITIVES PROPOSED FOR WATER TREATMENT SHALL MEET THE REQUIREMENTS OF ANSI / NSF-60 AND BE CERTIFIED BY AN ANSI ACCREDITED ORGANIZATION.

### HYDRONIC PIPING:

- HYDRONIC HEAT TRACE:  
HYDRONIC HEAT TRACE (WHERE SPECIFIED) SHALL BE A MINIMUM OF 1/2" DIA. HEAT PEX.

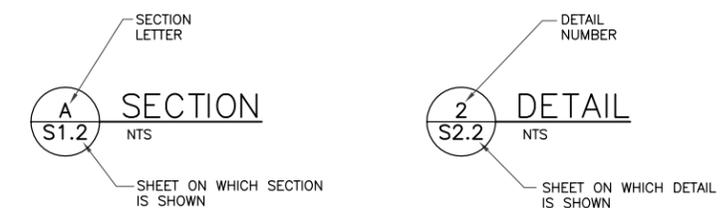
### SITE CONTROL:

PROPOSED PUMP HOUSE 1 WILL BE LOCATED ON LOT 7, BLOCK 2, TRACT A, US SURVEY 4421.

# LEGEND

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

## SECTION AND DETAIL DESIGNATIONS



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CONSTRUCTION RECORD	FIELD BOOK
STAKING	FOREMAN
AS-BUILT	INSPECTOR
<b>PUMP HOUSE 1 IMPROVEMENTS</b> <b>GENERAL NOTES AND LEGEND</b> CHEFORNAK, ALASKA	
REVISION	DATE
BY	CM
10/15	
UPDATED NOTES	
Project No.	SEPT. 2015
Date	Designed
Drawn	Approved
PCW	
Sheet No.	<b>G4.0</b>
SHEET	OF

# QUALITY ASSURANCE / QUALITY CONTROL PLAN CRITERIA

1. FOUNDATION MICROPILES SHALL REQUIRE PLACEMENT WITHIN LIMITS OF ERROR AND LOAD TESTING PER TECHNICAL SPECIFICATIONS OF BID PACKAGE.
2. BUILDING SHELL SHALL BE CONSTRUCTED PER ARCHITECTURAL AND STRUCTURAL SHEETS ON PLAN SET, AS WELL AS S.I.P. WALL MANUFACTURE'S ASSEMBLY INSTRUCTIONS. CONSTRUCTION STAGES AND DETAILS SHALL BE DOCUMENTED ON DAILY REPORTS AND PHOTOS. CONSTRUCTION INSPECTIONS SHALL BE SCHEDULED BY VILLAGE SAFE WATER INSPECTOR AT KEY MILESTONES.
3. INTERNAL AND EXTERNAL PIPING SHALL BE INSTALLED PER PLANS. IF CONFLICTS ARISE, CONTACT ENGINEER FOR RESOLUTION OF CONFLICTS. INSTALL AND SUPPORT PIPING PER MANUFACTURE'S INSTRUCTIONS.
4. ELECTRICAL SYSTEM SHALL BE INSTALLED PER LATEST NATIONAL ELECTRIC CODE BY LICENSED JOURNEYMAN ELECTRICIANS. VILLAGE SAFE WATER SHALL HAVE AN ELECTRICAL INSPECTOR CHECK ALL WORK TO SEE THAT IT MEETS CODE REQUIREMENTS AND INDUSTRY STANDARDS.
5. COMMISSIONING SHALL BE PREFORMED BY RELEVANT TRADES, UNDER OBSERVATION OF VILLAGE SAFE WATER INSPECTOR AND ENGINEER.

# DISCHARGING HYPOCHLORITE SOLUTION WATER AFTER DISINFECTION PROCESS

1. FILE A NOTICE OF INTENT (NOI) TO DISCHARGE PURGE AND CHLORINATED WATER UNDER STATE OF ALASKA GENERAL PERMIT #AKG003000. THIS IS REQUIRED FOR DISCHARGE TO WATER OR WETLANDS. SUBMIT AN NOI AND CERTIFIED BMP PLAN IN ACCORDANCE WITH PARTS 2.2, 2.2.8, AND 2.2.9 OF THE PERMIT TO RECEIVE DISCHARGE AUTHORIZATION. INFORMATION ON OBTAINING A PERMIT CAN BE OBTAINED FROM THE ADEC DIVISION OF WATER AT ANCHORAGE, 907.269.4597.
2. RUN THE WATER THROUGH A DECHLORINATOR, SUCH AS A VITA-D-CHLOR "BAZOOKA" DECHLORINATOR WITH LIQUID FEED FEATURE TO DECHLORINATE UP TO 200 PPM OF CHLORINE RESIDUAL. INFORMATION ON THE DECHLORINATOR IS FOUND AT [http://www.vita-d-chlor.com/equipment\\_bazooka.asp](http://www.vita-d-chlor.com/equipment_bazooka.asp) . SET UP PUMP, HOSES, AND DECHLORINATOR TO DRAIN INTO AN AREA THAT WILL NOT BE HARMED WHEN FLOODED.
3. MONITOR RESIDUAL CHLORINE LEVEL IN PUMPED DECHLORINATED WATER WITH FIELD CHLORINE MONITOR, SUCH AS A HACH POCKET COLORIMETER II FOR CHLORINE, PART #PCIICHLOR. THE INSTRUMENT MUST BE SENSITIVE TO READ LESS THAN 0.1 MG/L CHLORINE. RESIDUAL SHOULD STAY AT A MAXIMUM OF 0.1 MG/L OF CHLORINE DURING WATER DISCHARGES.

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PUMP HOUSE 1  
IMPROVEMENTS  
QUALITY ASSURANCE  
QUALITY CONTROL  
PLAN CRITERIA  
CHEFORNAK, ALASKA



REVISION	BY	DATE
UPDATED NOTES	CM	10/15

Project No. \_\_\_\_\_  
Date: SEPT. 2015  
Designed \_\_\_\_\_  
Drawn \_\_\_\_\_  
Approved: PCW

Sheet No. **G4.1**  
SHEET \_\_\_\_\_ OF \_\_\_\_\_

should review the design teams structural capacity needs for the foundation member for confirmation of bedrock support prior to issuing final design documents.

Drive shoes can be used with the piles, however the drive shoes must be of suitable dimension to allow for installed grouted anchors through pile annular space.

To resist the anticipated frost uplift forces the recommended foundation system would include all-thread rods grouted into the basalt rock through the tip of the seated micro-piles. The grouted anchor rods should be 0.75-inch diameter or as recommended by the structural engineer. The design is based on the grouted rods developing at least 80 pounds per square inch (psi) allowable strength along the grout / rock interface. The grouted anchor rods should be installed and grouted at least six (6) feet into competent basalt rock.

**6.1.2 Lateral Loading of Grouted Micro-Piles**

For preliminary design considerations, Ensoft's software LPile version 2012.6.37 was used to estimate lateral capacity for a range of pile head deflections. The lateral capacity of the piles should be further analyzed as the project develops with coordination from the structural and civil engineers. The pile capacity response to applied lateral loads will be affected by pile stickup height from the ground surface. Structural framing and bracing will further define the pile head conditions as free head, fixed head, or partially fixed head.

Table 1 shows the estimated deflection with applied lateral load for a vertically installed 6-inch diameter, schedule 40 pipe pile with 3-foot stickup through unfrozen silt. For example, a free head pile installed at the site with pile stickup height of three feet would develop a 1-inch deflection at the pile cap with an estimated applied lateral load of 1.4 kips. These preliminary calculations are presented for planning that will require confirmation as the lateral loads and pile geometry are determined. Pile stresses under these lateral loads should be reviewed by the structural engineer.

**Table 1: Estimated Lateral Deflection with Applied Lateral Load: 6-inch diameter Grouted Pipe Pile**

Pile Stickup	Pile Head Condition	0.25 inch Deflection	0.5 inch Deflection	1 inch Deflection
3 feet	Free Head	0.5 kips	0.85 kips	1.4 kips

**6.1.3 Seismic Design Criteria**

Based on site conditions observed, the proposed building locations should meet seismic site class "D" criteria as defined in the International Building Code Seismic site class "D" is defined as, "Stiff soil with an average Standard Penetration Test (SPT) "N" value between 15 and 50 in the upper 100 feet". It is important to note that relative densities based on SPT "N" values were not determined in this area under our scope of services. However, soils with SPT "N" values between 15 and 50 can be reasonably expected at these sites, particularly with depth. It is also reasonable to expect permafrost or basalt rock to be encountered within 100 feet below of the surface in areas around Chefornak.

The criteria are based on mapped spectral response acceleration for short periods ( $S_w$ ) of 0.2g and mapped spectral response accelerations for a 1 second period ( $S_1$ ) of 0.13g.

Site coefficient factors  $F_a$  and  $F_v$  of 1.6 and 2.2, respectively, are considered appropriate to determine seismic characteristics for Site Class "D". Based on these values, the design spectral response acceleration for short period and 1-second period for Site Class "D" can be determined using the following equations:

$$SD_s = 2/3 F_a S_w \text{ and } SD_1 = 2/3 F_v S_1$$

$$SD_s = 0.21g \text{ and } SD_1 = 0.19g$$

Liquefaction of saturated finer-grained soil, in particular fine to medium grained sands, may occur during seismic events. However, based on our site findings and our general knowledge of the area geology, the risk of liquefaction is considered low unless saturated fine grained sand soils are present. If the project warrants a more refined liquefaction analysis, site-specific geotechnical test borings will be necessary as part of the liquefaction assessment.

**6.1.4 Grouted Micro-Pile Installation**

While bedrock was not observed during this investigation previous explorations have noted discontinuous volcanic flow consisting of vesicular basalt below the silt at variable depths, but generally between 20 and 30 feet below ground surface. However, 40 foot depths, possibly deeper, to suitable end bearing basalt is possible in the area. Due to the lack of a site specific geotechnical drilling program the soil bedrock contact elevation should be expected to vary by up to 10 feet for planning purposes. Additional micro-pile length will be needed if greater variability in depth to bedrock is present. We do not advise reliance on skin friction or adfreeze bond shear strength for long-term pile axial capacity unless a site specific deeper geotechnical site investigation is conducted.

We have assumed the micro-pile can be advanced to a firm, non-yielding state on competent bedrock through the overlying silt and potential float rock with and air-track or similar drill. The annulus would then be cleaned of soil and rock fragments to the bedrock seating surface. After the pile interior annulus is properly cleaned we recommend minimum 0.75-inch diameter 75-ksi all-thread anchor rods be installed below the pile tip. The anchor rods would be installed through a nominal 3-inch diameter, or larger, bore hole advanced inside the pile through the underlying rock.

The anchor will require tremmie-placed grout from the bottom of the anchor upwards with a fast setting Portland cement or Fondue cement grout. If desired by the contractor, fine grained silica sand may be added to the grout mixture at no more than 1 sand : 3 gout by mass ratio. We recommend continuous grouting through the rock section without pre-tensioning. We have assumed that the anchor rods set at least 6 feet into competent hard basalt would be installed through each pile. The basalt through the grouted anchor section may be fractured or have significant voids thus grout loss may occur.

Grout sequencing of the anchors and piles warrants consideration. The anchors should be grouted their full rock embedment lengths with the grout extending no more than one (1) foot above the pile tip if the tension testing uses the pile as the reaction base. If the tension testing reaction base is independent of the pile, a thicker grout section inside the pile annular space is permitted.

After the rock section grout has cured, the anchor rods should be tensioned tested. We have assumed tensions will be conducted against the top plate. We recommend tensioning each rock section grouted anchor to 50-kips then backing down the lock off load of 15-kips. The Post Tensioning Institute's recommended practices for proof testing grouted anchors are recommended. Deflection and load measurements should be collected during anchor tensioning as part of the construction installation records.

We have assumed winter construction (frozen ground) for installing the grouted micro-pile foundation. We have based our recommendation on winter construction due to the challenging site conditions and to reduce adverse impacts on the existing tundra surface. If summer construction is under consideration, we recommend using temporary construction mats or an insulated permanent fill pad to protect the tundra surface. We should be notified as soon as possible if construction during thawed surface soil conditions is under consideration.

**6.2 Boardwalk Foundations**

Based on conversations with CE2 we understand that the preferred foundation for the boardwalk connecting Pumphouse #2 to the existing wells will be helical anchors. Helical anchors need to be sufficiently embedded to resist axial compression, frost heave forces, and lateral forces. Axial compression loads consist of the boardwalk's self-weight and traffic loads. The design axial compression helical anchor loads, used for analysis in this report, are 2.7 kips allowable load per helical anchor. The frost heave force is assumed to be 40 pounds per square inch (psi) uplift force acting over the riser's embedment within the active layer. For a minimum recommended riser diameter of 3.5 inches and an active layer of 4 feet (conservative estimate for the project area), the design frost force is 21 kips. We have assumed a 1,000 pound lateral load applied three feet above the ground surface for the purposes of this analysis.

**6.0 RECOMMENDATIONS**

**6.1 Pumphouse Foundations**

Based on the observed and inferred geologic and thermal conditions at the proposed pumphouse sites the use of a conventional shallow or mat foundation system could result in unacceptable differential settlement. Therefore, the recommended option for the proposed pumphouse foundations is drilled micro-piles seated on basalt with anchors advanced inside the micro-piles and grouted into the underlying basalt rock. Grouted micro-pile foundation systems have been successfully installed in areas of Alaska where challenging soil conditions overly relatively shallow bedrock. Site improvement such as buried utilities and facility access that will be constructed at shallower depths should consider the potential for differential settlement.

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. SEE NOTE 1 BELOW

The following recommendations include Golder's interpretation of the site geology and ground thermal conditions based on the geotechnical exploration data, prior experience in Chefornak and engineering judgment of permafrost conditions at this site, with consideration of preliminary structure geometry and proposed facility location on the site for the analysis.

**6.1.1 Grouted Micro-Pile Foundation Design**

The permafrost at Pumphouse #1 is considered "warm" and possibly degraded. Continued warming and thawing of the permafrost will result in unacceptable differential settlement if end bearing conditions are not developed or extensive passive subgrade cooling systems are not used. To accommodate the site conditions the building should be supported on micro-piles installed to an end bearing condition into the underlying bedrock. The micro-pile founded on bedrock will transfer the structural axial loads to the bedrock. End bearing on suitable rock will also accommodate additional down-drag forces on the piles as the surrounding permafrost warm or thaws. Anchoring the micro-pile with a rock anchor grouted into the underlying bedrock will resist the anticipated seasonal 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 may be encountered.

The recommended micro-pile foundation would consist of a minimum 6-inch diameter pipe pile seated on firm, competent bedrock. Schedule 40 or greater pipe piles are recommended with pile wall thickness determined by the structural engineer. Piles may be installed driven with or without predrilling vertically to end bearing in bedrock at the site. If seated on competent bedrock, axial capacities approaching the structural limits of the steel may be possible. It is assumed that the axial capacities and structural limits of the steel piles will be in excess of the actual design loads with a factor of safety of at least three. Golder

Chefornak Pumphotoes



Chefornak Pumphotoes



**NOTES**

- AXIAL PILE LOADS WILL RANGE FROM 7 TO 30 KIPS. ESTIMATED FROST HEAVE UPLIFT LOADS FOR 6" PIPE MICROPILES EXPECTED TO BE 30 KIPS.

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PUMP HOUSE 1 IMPROVEMENTS  
GEOTECHNICAL INFORMATION  
CHEFORKNAK, ALASKA



REVISION	DATE

Project No. \_\_\_\_\_ Date: JULY 2015  
Designed: \_\_\_\_\_ Drawn: \_\_\_\_\_ Approved: PCW

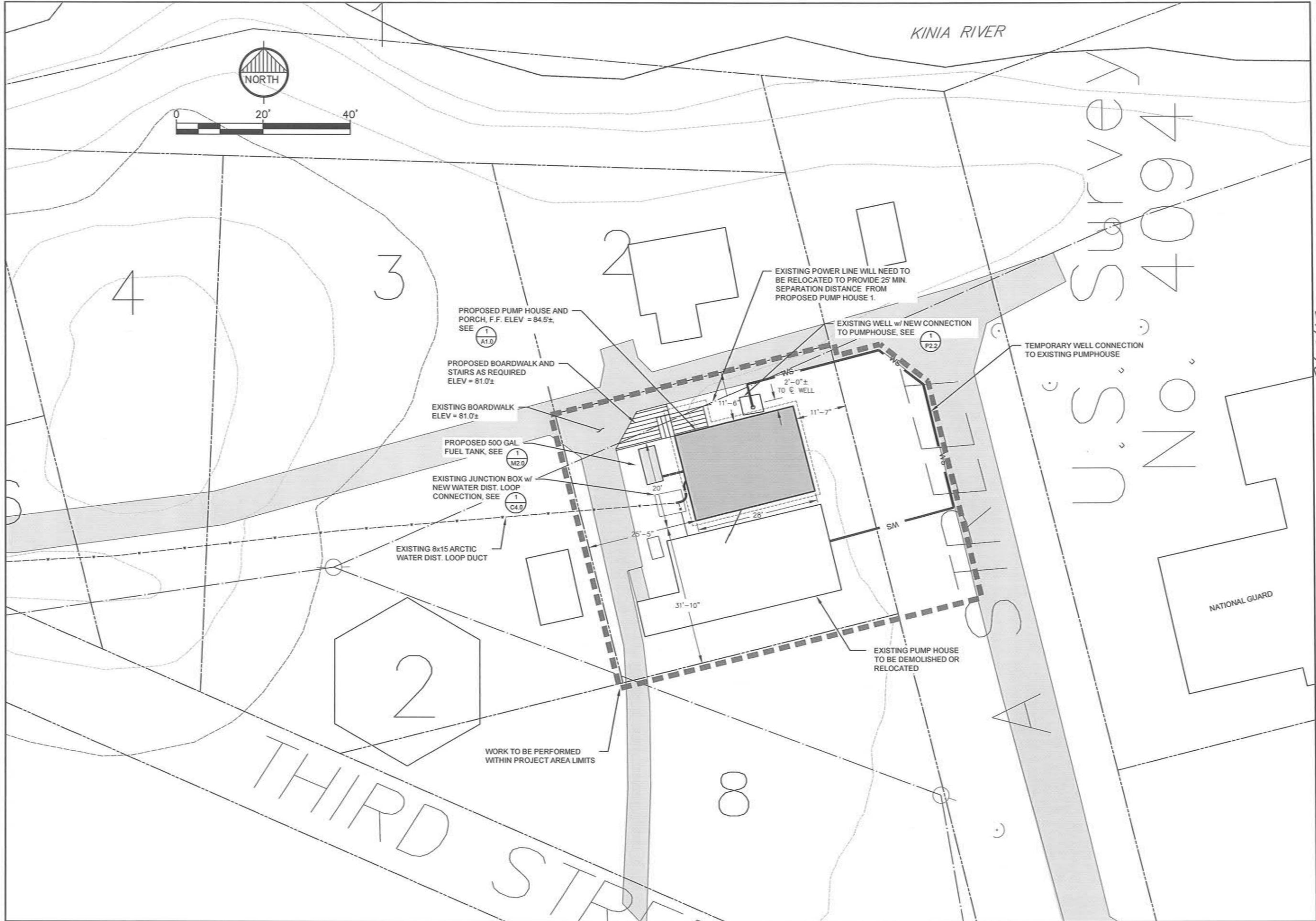
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9/29/15  
 PUMP HOUSE 1 IMPROVEMENTS  
 PROJECT AREA PLAN  
 CHEFORNAK, ALASKA

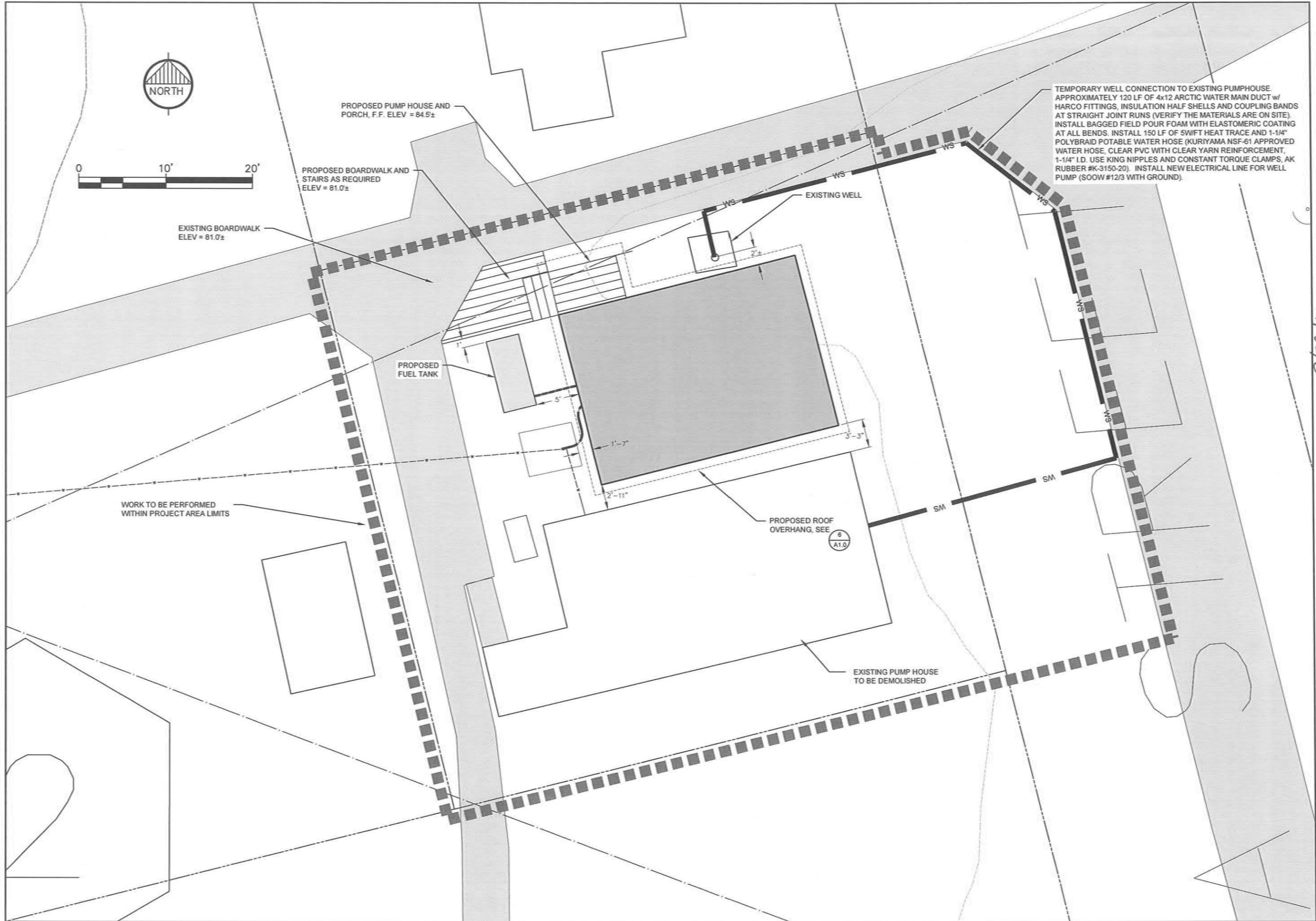


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Project No. \_\_\_\_\_ Date: SEPT. 2015  
 Designed: PCW Drawn: CMJ Approved: PCW

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 INSPECTOR \_\_\_\_\_

9/28/15

STATE OF ALASKA  
 49th  
 PAUL C. WOODRUFF  
 CE-10270  
 REG. STATE ENGINEER

PUMP HOUSE 1 IMPROVEMENTS  
 SITE PLAN  
 CHEFORNAK, ALASKA

**CE2**  
 ENGINEERS, INC.  
 PO BOX 23246 ANCHORAGE, AK 99523 PH 907-548-9110 FAX 907-548-1015

REVISION	BY	DATE

Project No. \_\_\_\_\_ Date \_\_\_\_\_ SEPT. 2015  
 Designed \_\_\_\_\_ PCW  
 Drawn \_\_\_\_\_ CMJ  
 Approved \_\_\_\_\_ PCWL

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# CONSTRUCTION AND DEMOLITION SEQUENCE

## GENERAL

IT IS OF THE UTMOST IMPORTANCE TO HAVE A WELL THOUGHT OUT PLAN FOR THE CONSTRUCTION OF PUMP HOUSE 1, IN ORDER TO EFFICIENTLY PERFORM THE WORK, AND TO TRANSFER OPERATIONS OF THE EXISTING PUMP HOUSE TO THAT OF THE NEW PUMP HOUSE 1. IT IS ALSO VITAL TO PERFORM THE WORK SO AS NOT TO ENDANGER THE EXISTING WELL WATER SYSTEM, PUMP HOUSE, AND WATER DISTRIBUTION SYSTEM. WE WANT TO MINIMIZE WATER INTERRUPTIONS, AND TO PERFORM CHANGE OVER TO THE NEW PUMP HOUSE 1 IN THE SUMMER IF POSSIBLE.

### STEP 1 - TEMPORARY WELL CONNECTION

CONVERT THE EXISTING CITY WELL TO THE NEW SYSTEM WITH A 3-IN PUMP, AS SHOWN ON THE DETAIL ON SHEET P2.2. THE EXISTING 4000 GAL WATER TANK IN THE PUMP HOUSE SHOULD BE FILLED BEFORE WORK COMMENCES, PREFERABLY AFTER SCHOOL IS SHUT DOWN FOR THE SUMMER VACATION. REMOVE THE EXISTING 4" WELL PUMP AND EXPAND THE WELL CASING TO 6" STEEL PIPE, AS SHOWN ON SHEET P2.2 OF THE PLANS. THE INSULATED BOX CONNECTING THE WELL TO THE NEW PUMP HOUSE 1 WILL NOT BE CONSTRUCTED UNTIL THE NEW BUILDING SHELL IS ERECTED. A TEMPORARY ELECTRICAL 12/2 WITH GROUND SOOW CORD AND 1-1/4" NSF HOSE LINE WILL BE INSTALLED FOR A TEMPORARY CONNECTION, LAID AROUND THE CONSTRUCTION AREA AND BROUGHT TO THE EXISTING PUMP HOUSE. THE NEW PUMP CONTROLLER WILL BE TEMPORARILY INSTALLED IN THE EXISTING PUMP HOUSE TO RUN THE NEW 3" WELL PUMP.

### STEP 2 - CONSTRUCT NEW PUMP HOUSE 1

INSTALL THE NEW MICROPILES AND COMMENCE THE CONSTRUCTION OF THE PUMP HOUSE AND INTERNALS. MAKE SURE THAT THE TWO 2500 GALLON WATER TANKS AND APPURTENANCES ARE INSTALLED BEFORE THE BUILDING IS SHELLD IN! THE TANKS WILL NOT FIT INSIDE THE BUILDING IF ALL THE WALLS ARE INSTALLED. ONCE THE WATERPROOF MEMBRANE AND THE CURB ARE INSTALLED, PLACE THE TWO TANKS WT-1 AND WT-2 INSIDE THE CURBED AREA. INSTALL ALL TANK APPURTENANCES, INCLUDING SUPPLY SHUT OFF VALVES, AND FILL BOTH TANKS FROM THE EXISTING OLD PUMP HOUSE.

### STEP 3 - DETERMINE DISTRIBUTION LOOP PIPE FLOW DIRECTIONS

OPEN WATER DISTRIBUTION LOOP ALUMINUM JUNCTION BOX IN FRONT OF THE EXISTING PUMP HOUSE. INSIDE THE PUMP HOUSE, LOCATE WATER DISTRIBUTION PIPING GOING THROUGH THE FLOOR AS SHOWN IN DETAIL 1. IDENTIFY AND LABEL "WATER IN" AND "WATER OUT" WITH TAGS. TRACE THE PIPING FROM THE PUMP HOUSE TO THE JUNCTION BOX AND LABEL THE PIPES IN THE JUNCTION BOX ACCORDINGLY.

### STEP 4 - CONNECT WATER DISTRIBUTION ECOFLEX PEX PIPING TO JUNCTION BOX

PER DETAILS IN SHEET C4.0, CONNECT 2 INCH ECOFLEX POTABLE PEX TWIN PIPING TO JUNCTION BOX. AT THIS TIME, BLOCK OFF PIPING INTO JUNCTION. CONNECT ECOFLEX PIPING IN NEW PUMP HOUSE 1 TO MATCH THE DISTRIBUTION LOOP WATER IN AND WATER OUT PIPES TO PIPING IN PUMPHOUSE.

PURGE, PRESSURE TEST AND DISINFECT TANKS AND WATER PIPING WHEN ABLE. DISPOSE OF SUPERCHLORINATED WATER BY FIRST NEUTRALIZING IT WITH SODIUM THIOSULFATE AND TESTING FOR LESS THAN 1 PPM CHLORINE IN WASTEWATER HAUL TRAILER, THEN DISPOSING OF NEUTRALIZED WASTEWATER IN HONEYBUCKET LAGOON. REFILL WATER TANKS WT-1 AND WT-2 TO THE TOP AND ADJUST ALL LEVEL AND PRESSURE CONTROLS AND VFDS.

### STEP 5 - INSTALL WELL CONNECTION BOX AND APPURTENANCES BETWEEN WELL CASING AND NEW PUMP HOUSE 1

COMPLETE WELL CONNECTION DETAILS AS SHOWN ON SHEET P2.2. MAKE SURE THAT 4000 GALLON WATER TANK IN EXISTING PUMP HOUSE IS FULL. COMPLETE WELL PUMP PIPING TO TANKS IN NEW PUMP HOUSE 1. REMOVE TEMPORARY PIPING AND POWER CORD TO OLD PUMP HOUSE. MOVE WELL WP-1 PUMP CONTROLLER FROM OLD PUMP HOUSE TO PUMP HOUSE 1 AND REWIRE. CHECK OPERATION OF WP-1 TO ENSURE THAT IT OPERATES CORRECTLY ON TANK LEVEL CONTROLLER SYSTEM FROM WT-1.

### STEP 6 - TRANSITION WATER DISTRIBUTION PIPING IN JUNCTION BOX FROM OLD PUMP HOUSE TO NEW PUMP HOUSE 1

SHUT DOWN PRESSURE PUMPS AND CIRCULATION PUMPS IN OLD PUMP HOUSE. SHUT OFF ALL VALVES IN PUMP HOUSE 1 AND OLD PUMP HOUSE THAT CONNECT WATER DISTRIBUTION PIPING TO THE OUTSIDE. CONNECT WATER DISTRIBUTION PIPING IN JUNCTION BOX TO ECOFLEX HDPE PIPING TO PUMP HOUSE 1. WHILE ISOLATION VALVES ARE OFF, INSTALL REMOTE TEMPERATURE SENSOR IN POWER HOUSE PIPING JUST UPSTREAM OF HEAT RECOVERY HEAT EXCHANGER FOR WATER DISTRIBUTION LOOP ON THE WATER SIDE OF THE HEAT EXCHANGER.

NOW SLOWLY OPEN WATER DISTRIBUTION LOOP ISOLATION VALVES IN PUMP HOUSE 1. START UP PRESSURIZATION AND WATER LOOP CIRCULATION PUMPS AND VENT AIR FROM PUMPS PERIODICALLY AS NEEDED. MONITOR AND ADJUST PRESSURE AND CIRCULATION PUMPS. THE WATER DISTRIBUTIO LOOP WILL GRADUALLY BLEED AIR FROM TRAPPED AREAS.

### STEP 7 - COMMISSION HYDRONIC HEATING SYSTEM

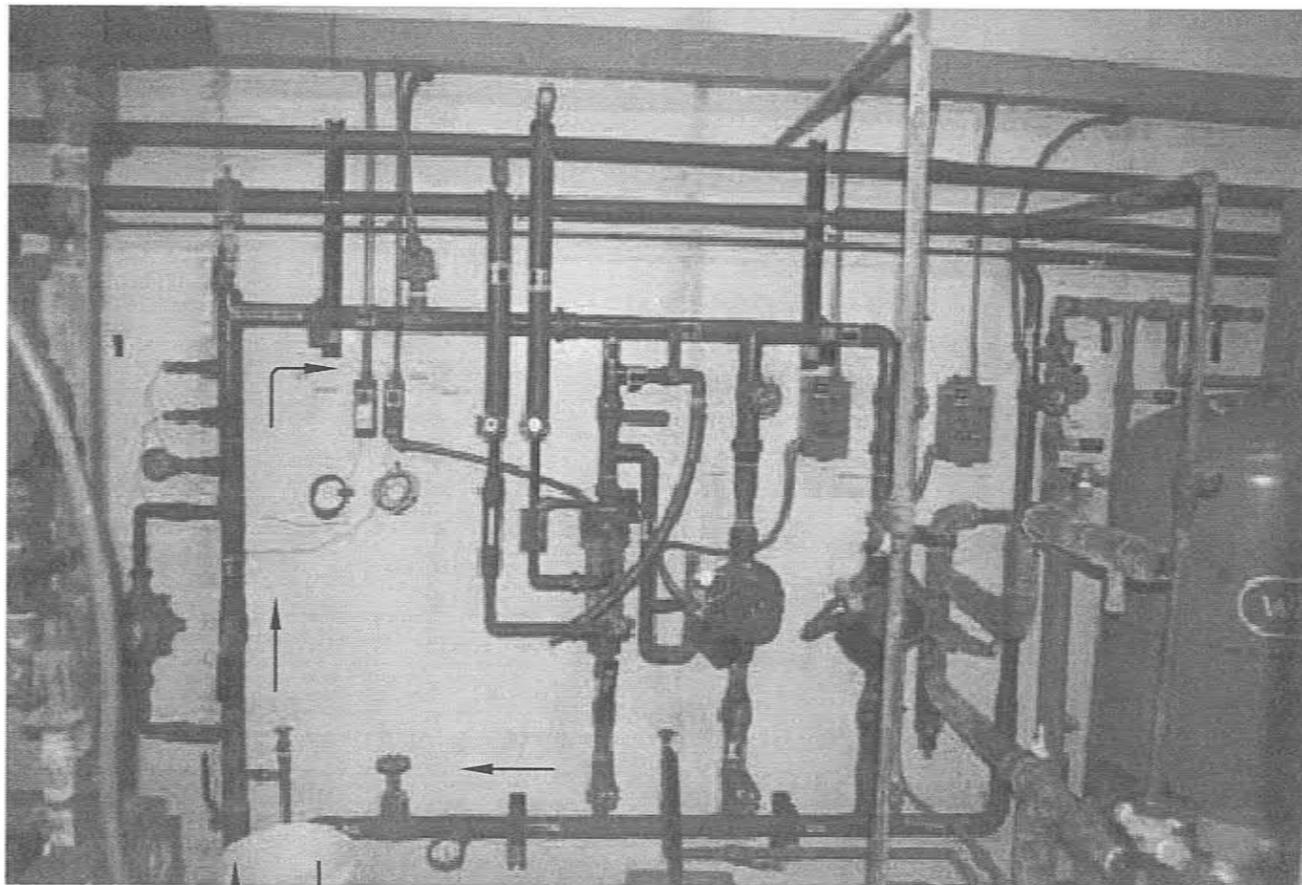
PERFORM COMMISSIONING OPERATIONS FOR PUMP HOUSE 1 HYDRONIC HEATING SYSTEM.

### STEP 8 - DECOMMISSION OLD PUMP HOUSE.

SHUT DOWN AND DRAIN ALL WATER FROM EXISTING PUMPS AND PIPING. REMOVE PIPING FOR SCRAP, AND REMOVE PUMPS AND OTHER EQUIPMENT FOR OTHER USES THAT THE CITY MAY HAVE. DISPOSE OF BROKEN EQUIPMENT AND TRASH. LEAVE NOTHING EXCEPT LIGHTING CIRCUITS ON FOR OLD PUMP HOUSE.

### STEP 9 - DISMANTLE OR MOVE OLD PUMP HOUSE AS DESIRED

THE CITY WILL HAVE TO DECIDE WHETHER TO DISMANTLE AND REMOVE THE OLD PUMP HOUSE, OR MOVE THE BUILDING TO ANOTHER LOCATION.



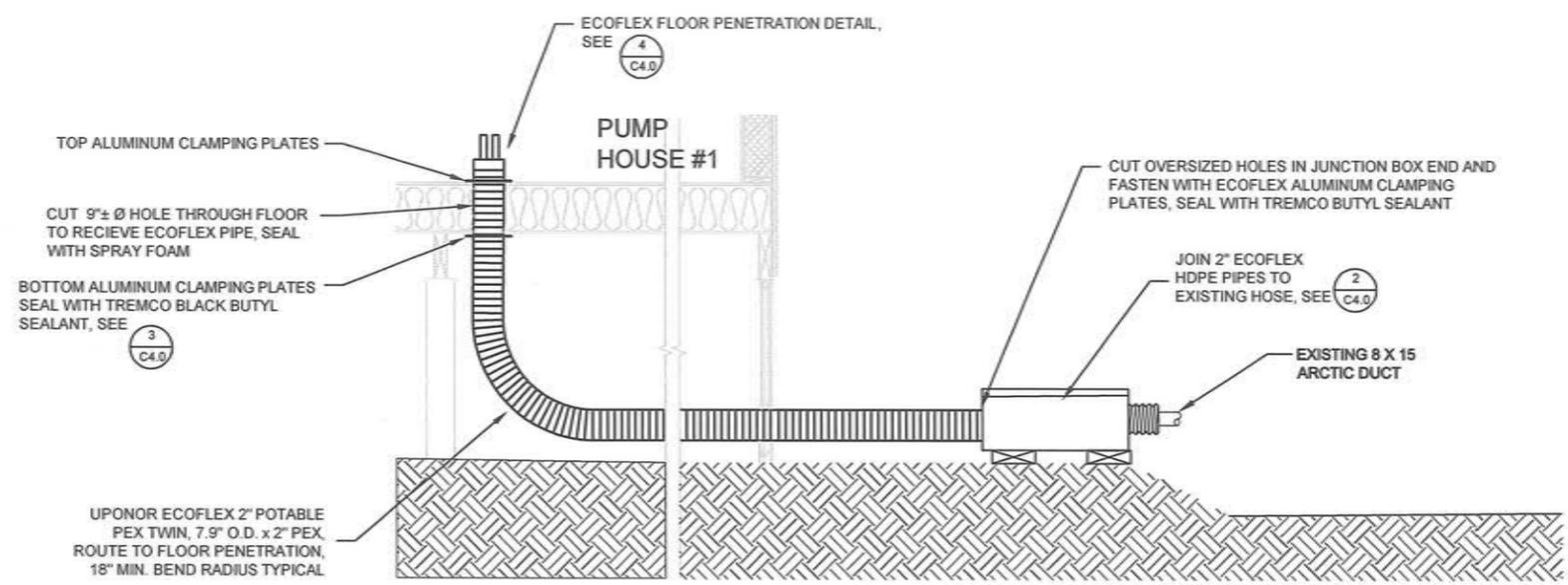
IN  
OUT  
WATER DISTRIBUTION  
LOOP PIPING  
THROUGH FLOOR

1  
C3.0 NTS  
EXISTING PUMPHOUSE WATER CIRCULATION PIPING

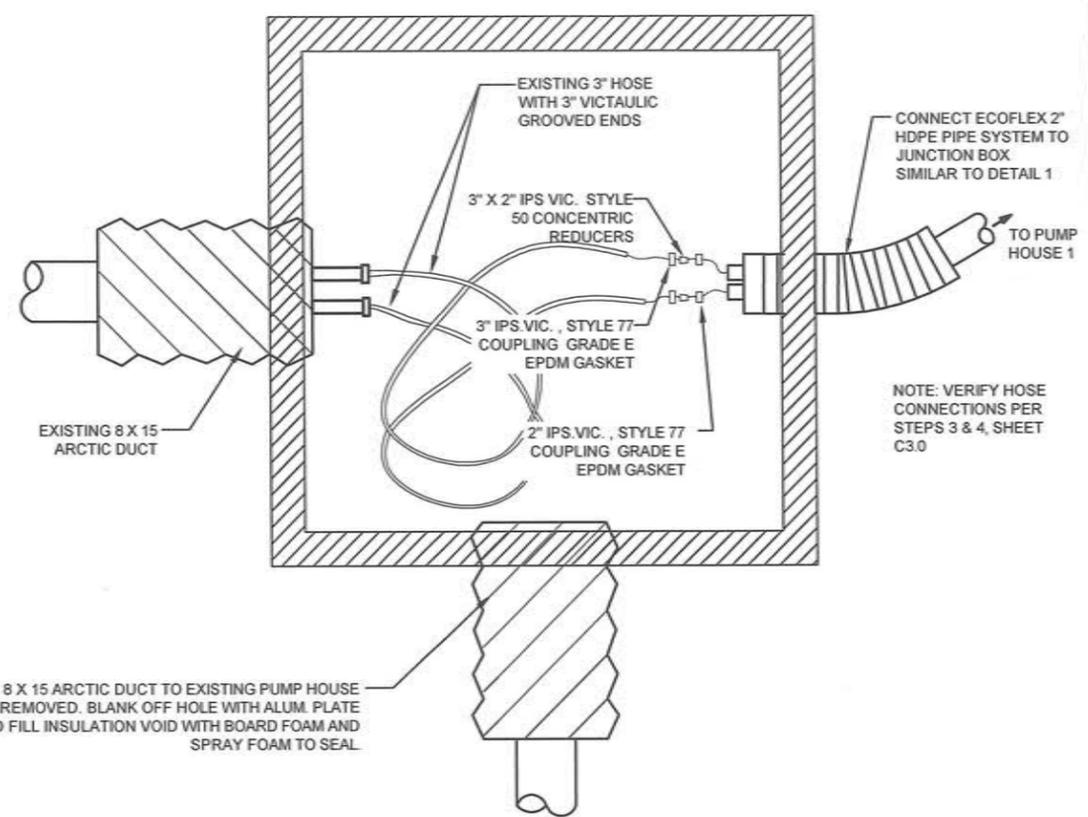
9/28/15

<p>RECORD DRAWING CERTIFICATE</p> <p>THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.</p> <p>SCALE: AS SHOWN</p> <p>CONSTRUCTION RECORD</p> <p>FIELD BOOK</p> <p>STARTING</p> <p>FOREMAN</p> <p>AS-BUILT</p> <p>INSPECTOR</p>	<p>NAME _____ DATE _____</p> <p>STATE OF ALASKA</p> <p>49 IN</p> <p>WELL C. DRIVER</p> <p>CE-10878</p> <p>100 BOX 22086 ANCHORAGE, AK 99503 PH 907-546-0100 FAX 907-546-0105</p> <p><b>CER ENGINEERS, INC.</b></p> <p>PUMP HOUSE 1 IMPROVEMENTS</p> <p>CONSTRUCTION AND DEMOLITION SEQUENCE</p> <p>CHEFORNAK, ALASKA</p>																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISION</th> <th>BY</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISION	BY	DATE																															<p>Project No. _____ Date JULY 2015</p> <p>Designed PCW</p> <p>Drawn CM</p> <p>Approved PCW</p> <p>Sheet No. C3.0 OF _____</p>
REVISION	BY	DATE																																

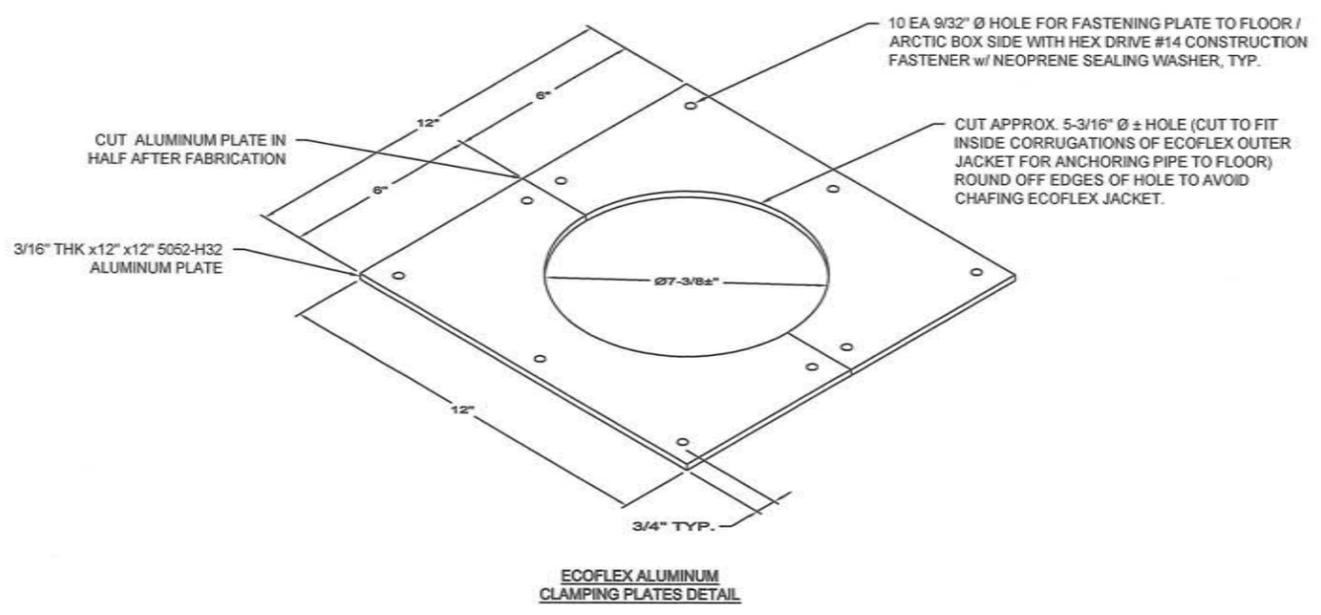
G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\C4.0 PIPING CHANGE OVER DETAILS.dwg, 9/23/2015 1:02:30 PM, cmetz, \\C02main\LANIER MP C2050\LD520C PCL 6



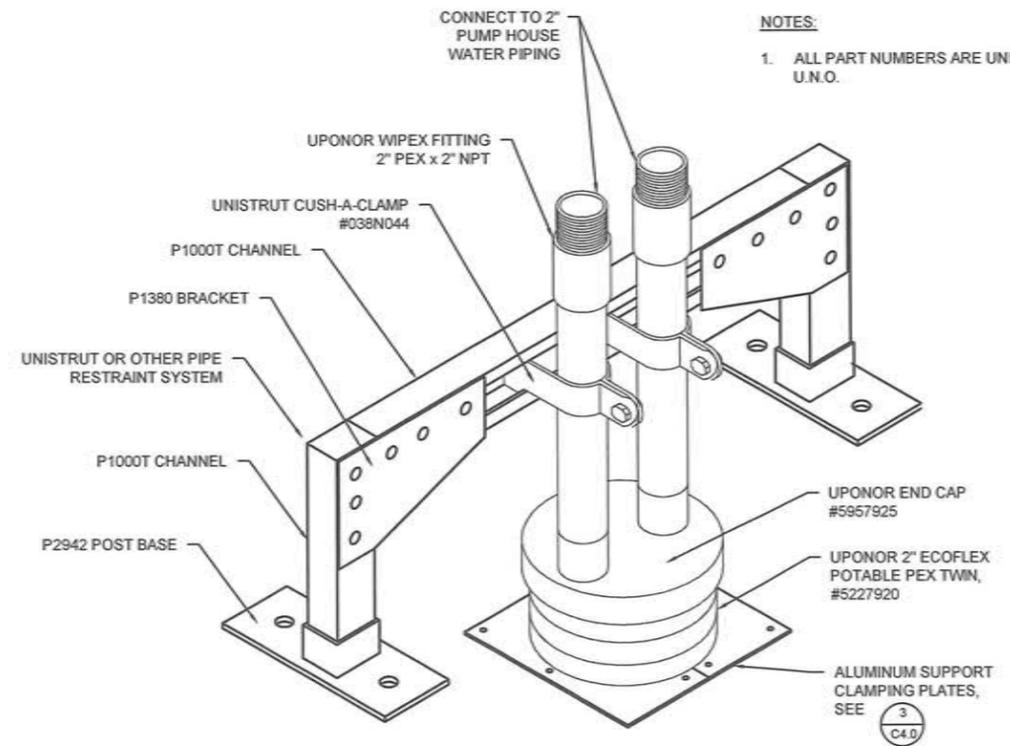
**1 WATER DISTRIBUTION LOOP CONNECTION**  
C4.0 NTS



**2 PUMP HOUSE JUNCTION BOX**  
C4.0 NTS



**3 ECOFLEX ALUMINUM CLAMPING PLATE**  
C4.0 NTS



**4 ECOFLEX FLOOR PENETRATION DETAIL**  
C4.0 NTS

DATE \_\_\_\_\_

NAME \_\_\_\_\_

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

SCALE: AS SHOWN

MADE IN THE UNITED STATES OF AMERICA

CONSTRUCTION RECORD

FIELD BOOK	STATION	FOREMAN	AS-BUILT	INSPECTOR
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9/28/15

**PUMP HOUSE 1 IMPROVEMENTS**  
**PIPING CHANGE OVER DETAILS**  
CHEFORNAK, ALASKA

BY	DATE

REVISION	

Project No. \_\_\_\_\_ Date: SEPT. 2015 Designed: PCW Drawn: JDU Approved: PSM

Sheet No. **C4.0** OF \_\_\_\_\_

# 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 2001 EDITION  
 INTERNATIONAL FIRE CODE 2009 EDITION  
 INTERNATIONAL FUEL GAS CODE 2009 EDITION

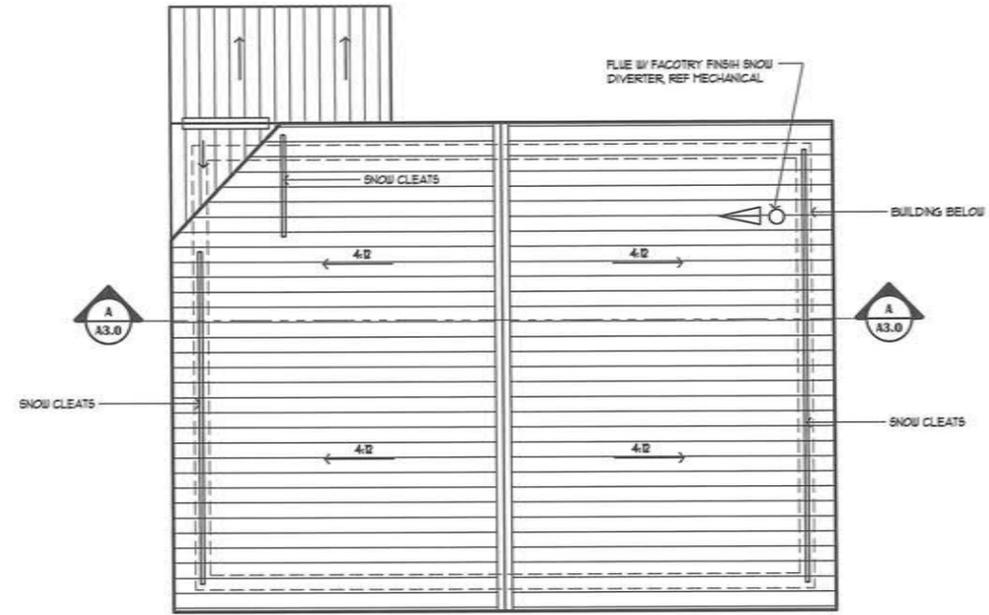
**CONSTRUCTION TYPE:** V-B  
**BUILDING OCCUPANCY:** U (UTILITY - WATER PUMP HOUSE)

**GROSS BUILDING AREA:** 560 SF.  
**BASIC ALLOWABLE HEIGHT AND AREA PER TABLE 503**  
 ALLOWABLE AREA: 5,000 SF. (U) 1 STORY = 675 < 5,000 = OK

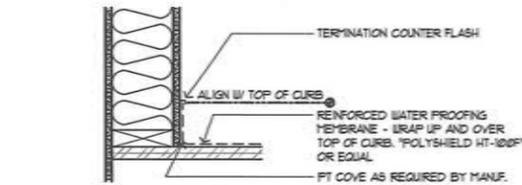
**FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE**  
 SEPARATION DISTANCE 10' ≤ X < 30' = 0 RATING REQUIRED FOR GROUP U TYPE VB

## LEGEND

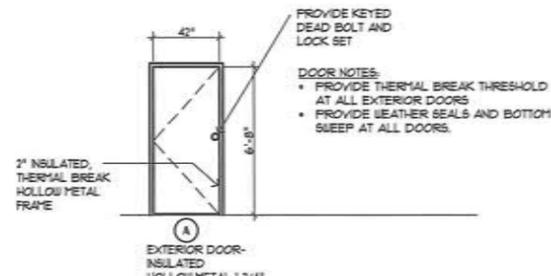
- WALL ASSEMBLY - SEE WALL TYPES.
- DOOR - SEE SCHEDULE
- WALL TYPE INDICATOR - SEE SHEET A11
- DOOR TYPE INDICATOR - SEE SHEET A11
- 1 HOUR WALL - FULL HT.
- FIRE EXTINGUISHER WITH WALL BRACKET  
NFPA 10 LB, DRY CHEMICAL (4A-60B-C)
- FENCE BELOW



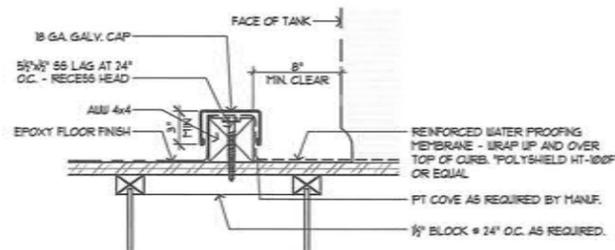
**6 ROOF PLAN**  
 SCALE: 1/4"=1'-0"  
 PLAN NORTH



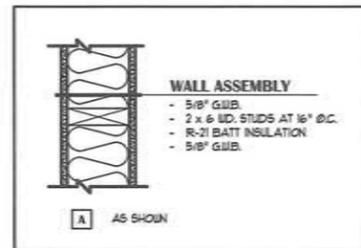
**5 CURB DETAIL @ EXT. WALL**  
 SCALE: 1/2"=1'-0"  
 NOTE: OCCURS ONLY AT TANK AREA



**3 DOOR SCHEDULE**  
 SCALE: 1/4"=1'-0"

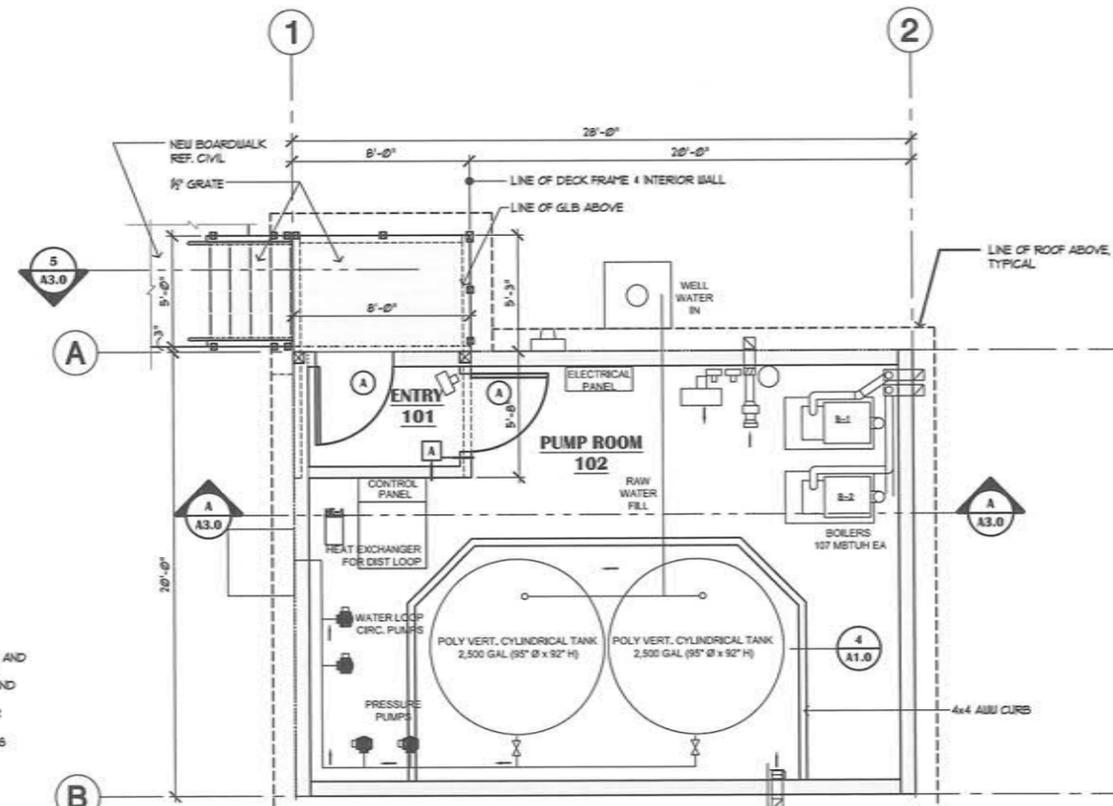


**4 CURB DETAIL @ FLOOR**  
 SCALE: 1/2"=1'-0"  
 NOTE: OCCURS ONLY AT TANK AREA



**2 WALL TYPES**  
 SCALE: 1/2"=1'-0"

- WALL TYPES-GENERAL NOTES:**
- ROOMS AND LAUNDRY ROOMS
  - ALL G.I.B. TO BE TYPE 'X'
  - CONTRACTOR TO PROVIDE BACKING AS REQUIRED FOR ALL WALL MOUNTED FIXTURES AND EQUIPMENT. BACKING NOT IDENTIFIED IN WALL TYPES, COORDINATE W/ MECHANICAL DUGGS AND MANUFACTURER CUT SHEETS.
  - REFER TO BUILDING SECTIONS FOR EXTERIOR WALL ASSEMBLY
  - INSTALL 1/2" A/C PLYWOOD UP TO 8' IN AREAS WITH WALL MOUNTED PUMPS. PAINT WHITE.



**1 FLOOR PLAN**  
 SCALE: 1/4"=1'-0"  
 PLAN NORTH



SCALE: AS SHOWN  
 MAY BE ONE ACTION ORIGINAL DRAWING  
 IF NOT ONE ACTION THIS SHEET SHALL BE REPRODUCED

CONSTRUCTION RECORD
FIELD BOOK
STAGING
FOREMAN
AS-BUILT
INSPECTOR



PUMP HOUSE #1 IMPROVEMENTS  
 FLOOR PLAN  
 CHEFORNAK, ALASKA



REVISION	BY	DATE

Project No. NVAR 1447  
 Date Sept. 1, 2015  
 Designed BT  
 Drawn JH  
 Approved PCW

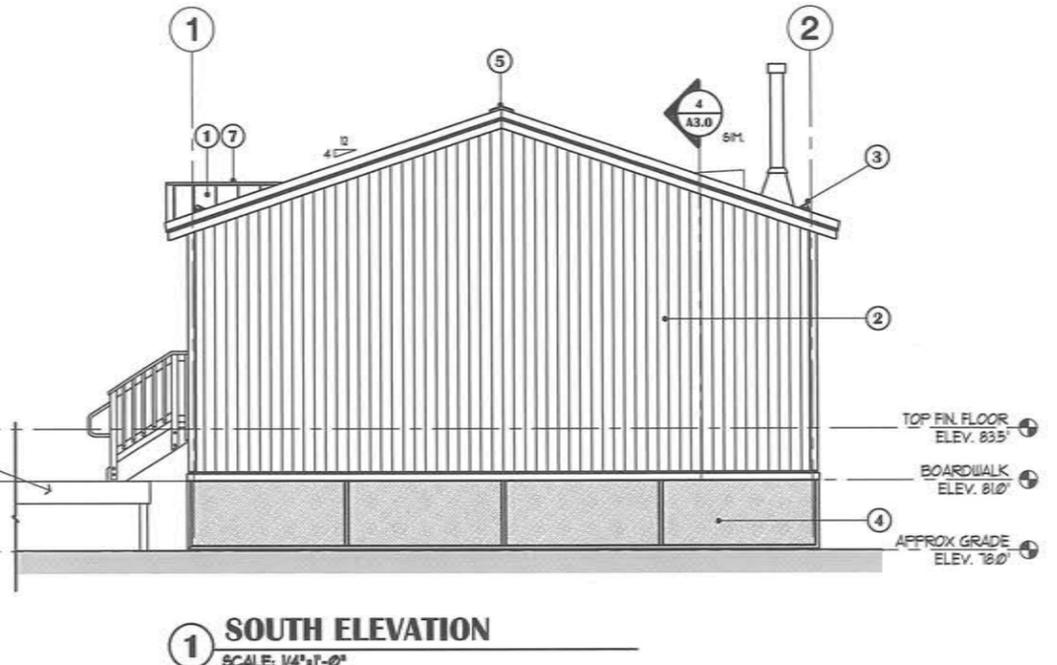
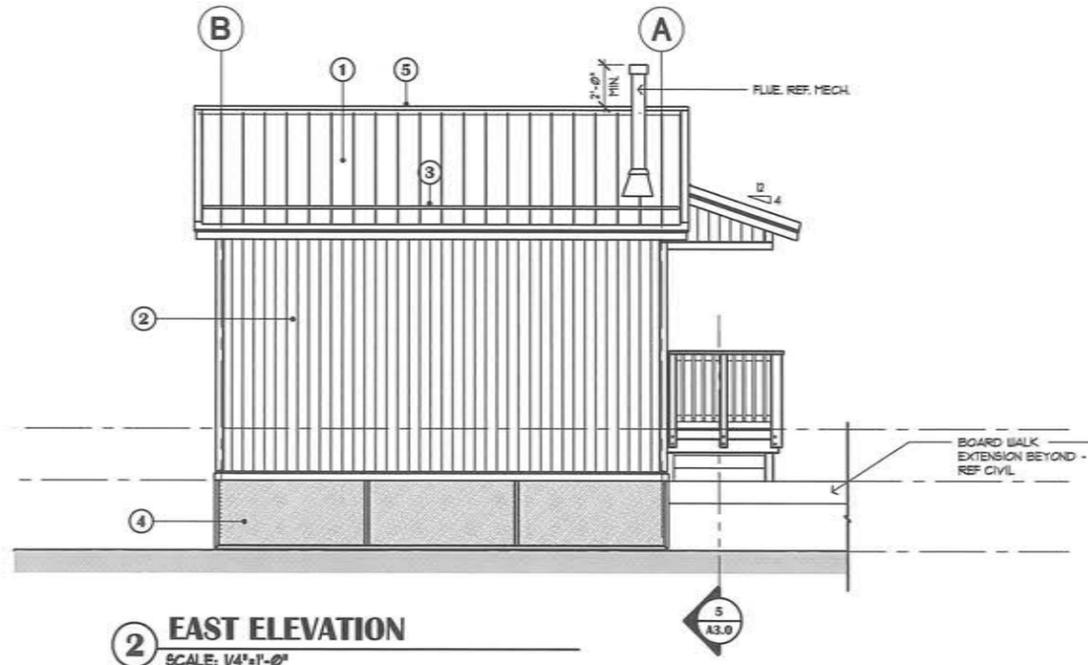
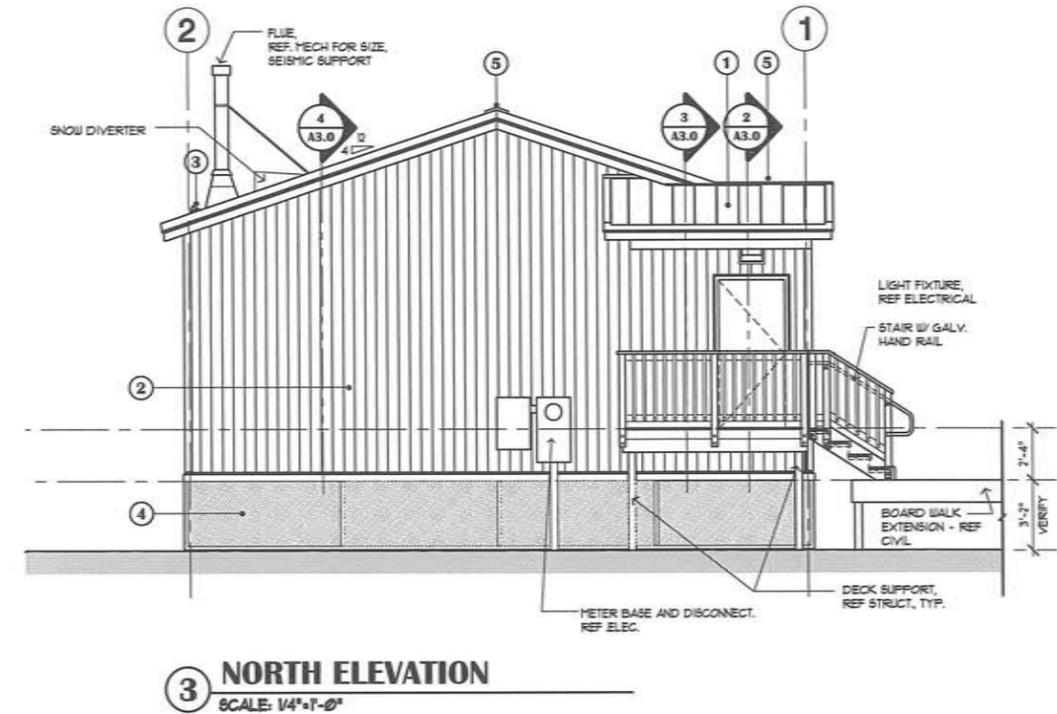
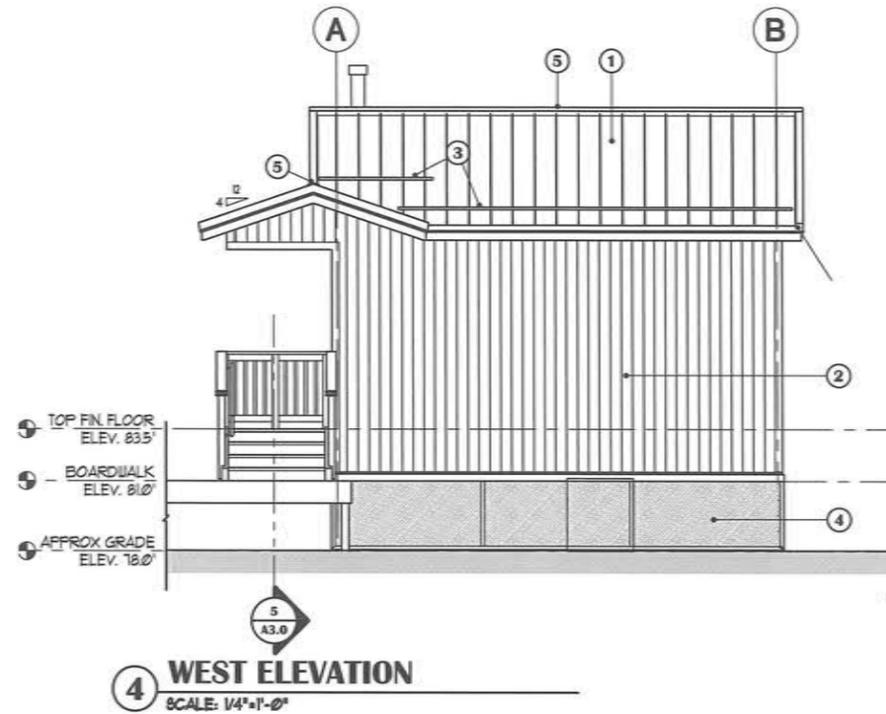
Sheet No. A1.0  
 SHEET OF

**GENERAL SHEET NOTES**

1 REFER TO CIVIL DRAWINGS FOR ALL FINAL SITE ELEVATIONS.

**MATERIAL LEGEND**

- 1 KULP-RIB® METAL ROOF OR EQUAL
- 2 METAL SIDING
- 3 "NO-GEN" SNOW CLEATS OR EQUAL
- 4 CHAIN LINK SKIRT W/ TOP & BOTTOM RAIL. PROVIDE 4"U x MAX ALLOWABLE HT. GATE W/ HINGES AND LOCKABLE CLASPS.
- 5 CONT. VENTED METAL RIDGE CAP. PROVIDE NON-VENTED AT ENTRY COVER



SCALE: AS SHOWN  
DATE TO BE NOTED ON ORIGINAL DRAWING  
IF NOT ONE NOTED ON ORIGINAL DRAWING, SCALE IS ACCURATE

CONSTRUCTION RECORD	
FIELD BOOK	
STAKING	
FOREMAN	
AS-BUILT	
INSPECTOR	



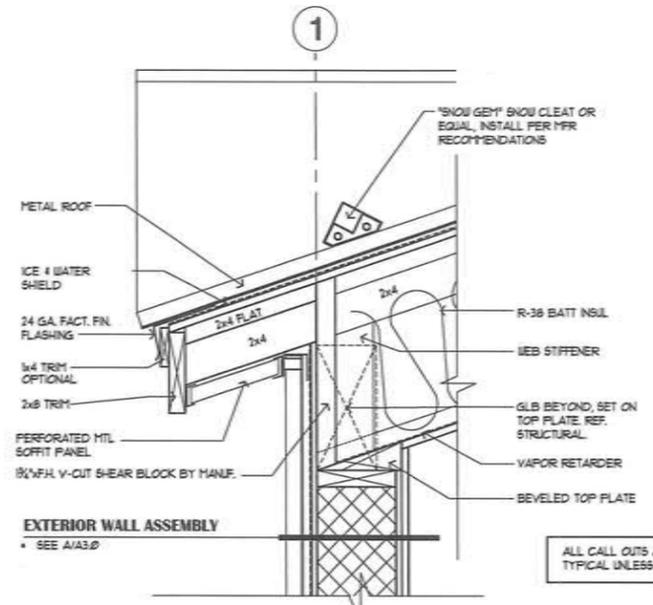
PUMP HOUSE #1 IMPROVEMENTS  
EXTERIOR ELEVATIONS  
CHEFORKNAK, ALASKA



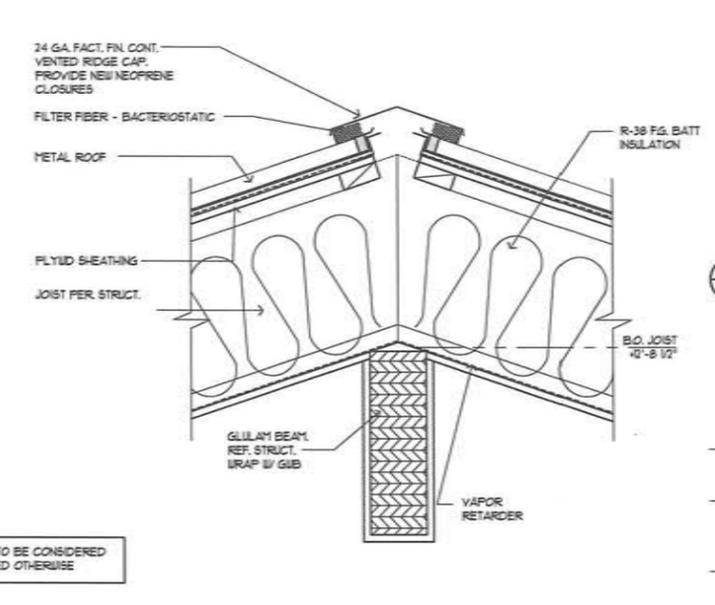
REVISION	BY	DATE

Project No. 1447	Date Sept. 1, 2015	Designed BT	Drawn JH	Approved PCW
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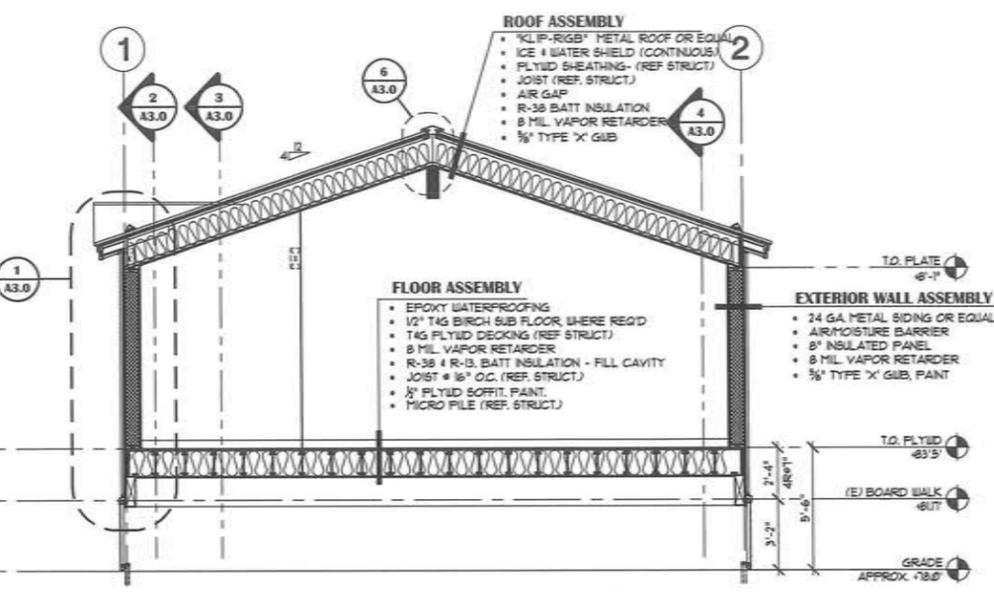
Sheet No. **A2.0**  
SHEET OF



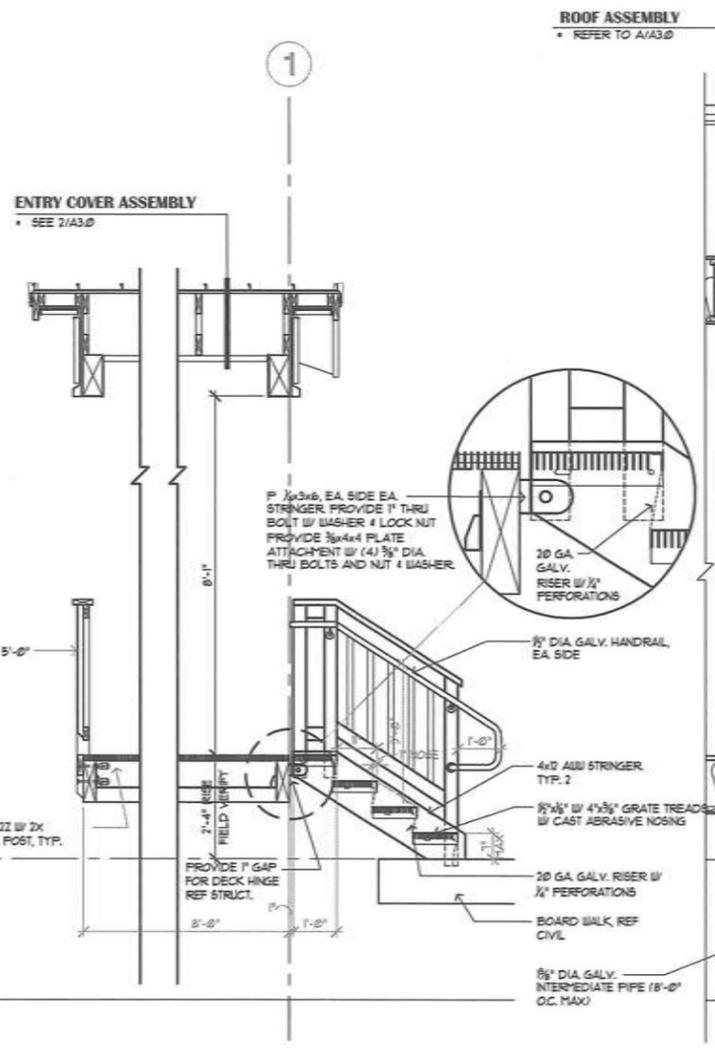
**7 EAVE DETAIL**  
SCALE: 1/2"=1'-0"



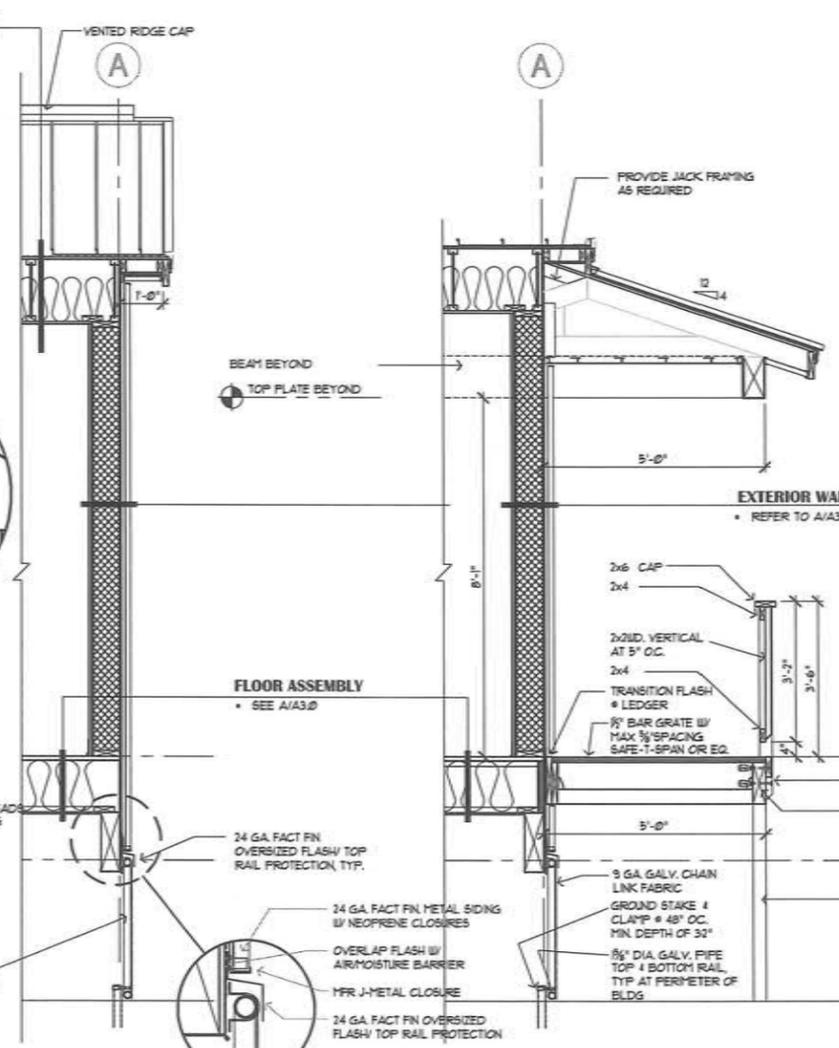
**6 RIDGE VENT DETAIL**  
SCALE: 1/2"=1'-0"



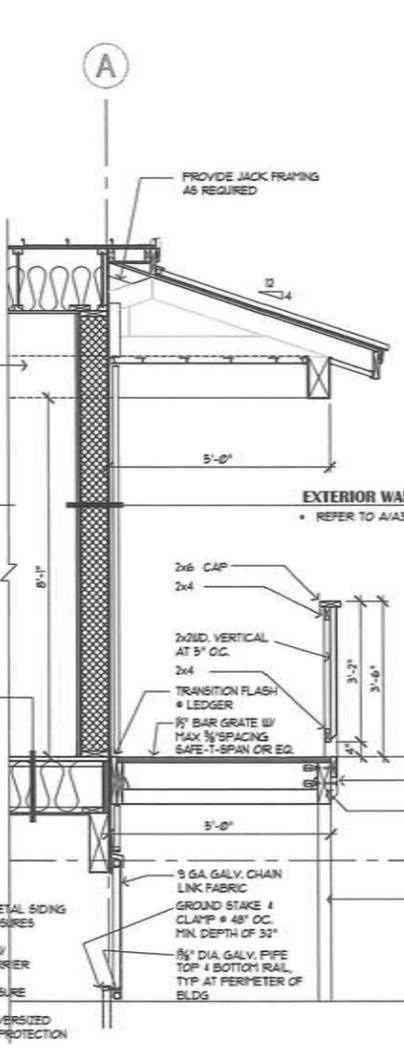
**A BUILDING SECTION**  
SCALE: 1/4"=1'-0"



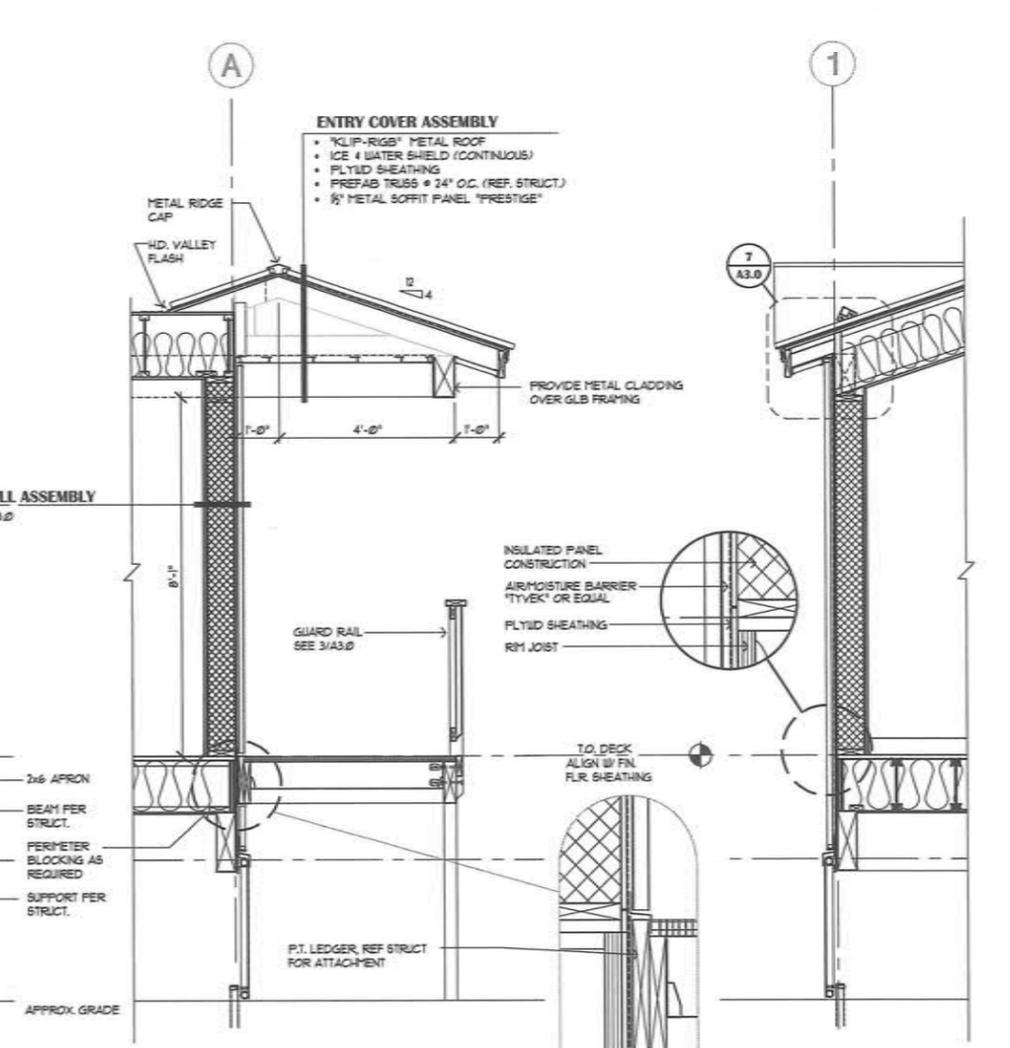
**5 WALL SECTION**  
SCALE: 1/2"=1'-0"



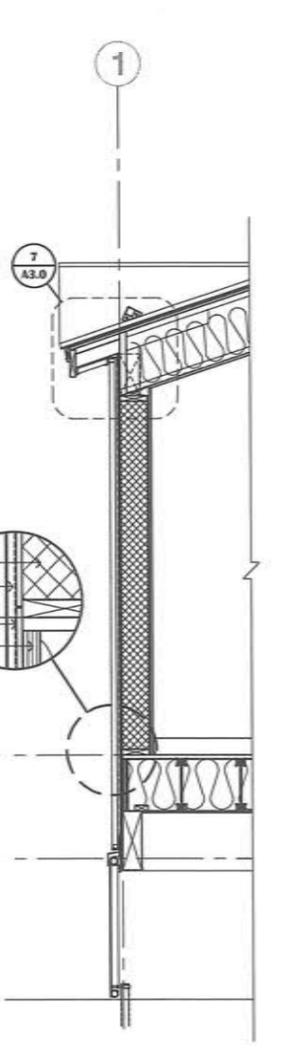
**4 WALL SECTION**  
SCALE: 1/2"=1'-0"



**3 WALL SECTION**  
SCALE: 1/2"=1'-0"



**2 WALL SECTION**  
SCALE: 1/2"=1'-0"



**1 WALL SECTION**  
SCALE: 1/2"=1'-0"

**invision** ARCHITECTURE  
1231 Commercial Blvd. #200  
Anchorage, Alaska 99503  
907-548-1128

SCALE: AS SHOWN

CONSTRUCTION RECORD

FIELD BOOK	STAKING	FORAMAN	AS-BUILT	INSPECTOR
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STATE OF ALASKA

PUMP HOUSE #1 IMPROVEMENTS

BUILDING SECTION

CHEFORNIAK, ALASKA

**CEE** ENGINEERS, INC.  
PO BOX 22094 ANCHORAGE AK 99523 PH: 907-348-1010 FAX: 907-348-0115

BY DATE	REVISION

Project No. 14/AVI 1447  
Date: Sept. 1, 2015  
Designed: BT  
Drawn: JH  
Approved: DGM

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 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 THIS SHEET  
MINIMUM ROOF LIVE LOAD = 20 PSF

**SNOW**

GROUND SNOW LOAD = 50 PSF  
ROOF SNOW LOAD = 40 PSF  
SNOW EXPOSURE FACTOR,  $C_e = 0.90$   
SNOW LOAD IMPORTANCE FACTOR = 1.0  
THERMAL FACTOR,  $C_t = 1.10$

**WIND DESIGN DATA**

VELOCITY = 130 MPH HOUR 3 SECOND GUST  
IMPORTANCE FACTOR,  $I_w = 1.15$   
EXPOSURE C  
INTERNAL PRESSURE COEFFICIENT,  $GCP_i = \pm 0.18$   
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**

$I_e = 1.25$   
 $S_a = .108g, S_1 = 0.06g, S_D1 = .116, S_D1 = 0.09$   
SITE CLASS D  
SEISMIC DESIGN CATEGORY B  
SEISMIC RESISTING SYSTEM = BEARING WALL,  
PLYWOOD SHEARWALLS,  $R = 6.5$   
SEISMIC BASE SHEAR =  $V_s = 2$  KIPS  $C_b = 0.05$   
EQUIVALENT LATERAL FORCE PROCEDURE

OCCUPANCY CATEGORY III

**FOUNDATION DESIGN**

FOUNDATION DESIGN IS BASED 6" Ø MICROPILE FOR A MAXIMUM 30 KIP TOTAL VERTICAL LOAD

**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 1/8" T&G

GLU LAM BEAMS SHALL BE 24F DF/HF WITH  $F_b = 2,400$  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.

**STRUCTURAL INSULATED WALL PANELS**

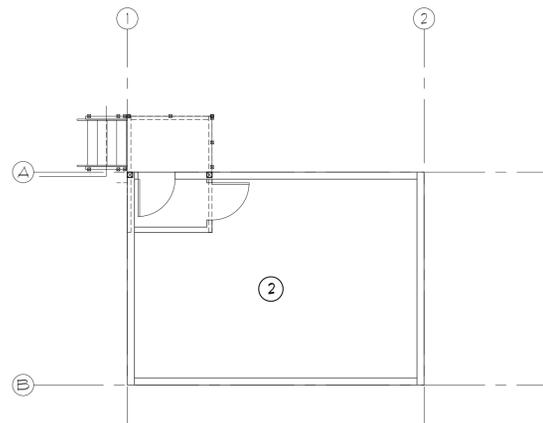
PANELS TO BE PROVIDED TO RESIST A MINIMUM OF 150 PLF RACKING SHEAR W/ A 660 PLF AXIAL LOAD. OUT OF PLANE WIND LOADING IS INDICATED IN THE COMPONENTS & CLADDING PRESSURE, THIS SHEET.

**ABBREVIATIONS**

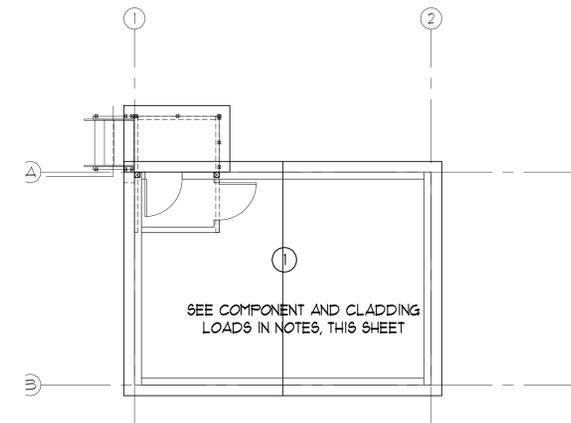
E.W. - EACH WAY  
IBC - INTERNATIONAL BUILDING CODE  
I.S. - INSIDE  
O.S. - OUTSIDE  
F.O.S. - FACE OF STUD  
HDG - HOT DIP GALVANIZED  
MFG - MANUFACTURER  
FFA - POST FROM ABOVE  
SIM. - SIMILAR TO  
SIP - STRUCTURAL INSULATED PANELS  
TYP. - TYPICAL  
UNO - UNLESS NOTED OTHERWISE  
W.T.E. - WITH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

**DESIGN LOAD SCHEDULE**

DESCRIPTION	SUPERIMPOSED DEAD LOAD (PSF)	LIVE LOAD (PSF)
① ROOF BALANCED SNOW LOAD	15	40
② FLOOR LOAD MECHANICAL	10	100



① Floor Design Load  
Scale: 1/8" = 1'-0"

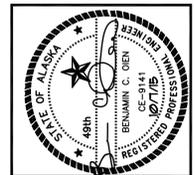


② Roof Design Load  
Scale: 1/8" = 1'-0"

**Oien Associates, Inc.**  
Construction Management Engineering Inspection  
1827 Hanson Drive  
Eagle River, AK 99571  
Phone: (907) 694-0507  
Fax: (907) 694-0506  
Email: bob@oien.com

SCALE:  
AS SHOWN  
BASE IS ONE INCH ON ORIGINAL DRAWING  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

CONSTRUCTION RECORD
FIELD BOOK
STAMPING
FOREMAN
AS-BUILT
INSPECTOR



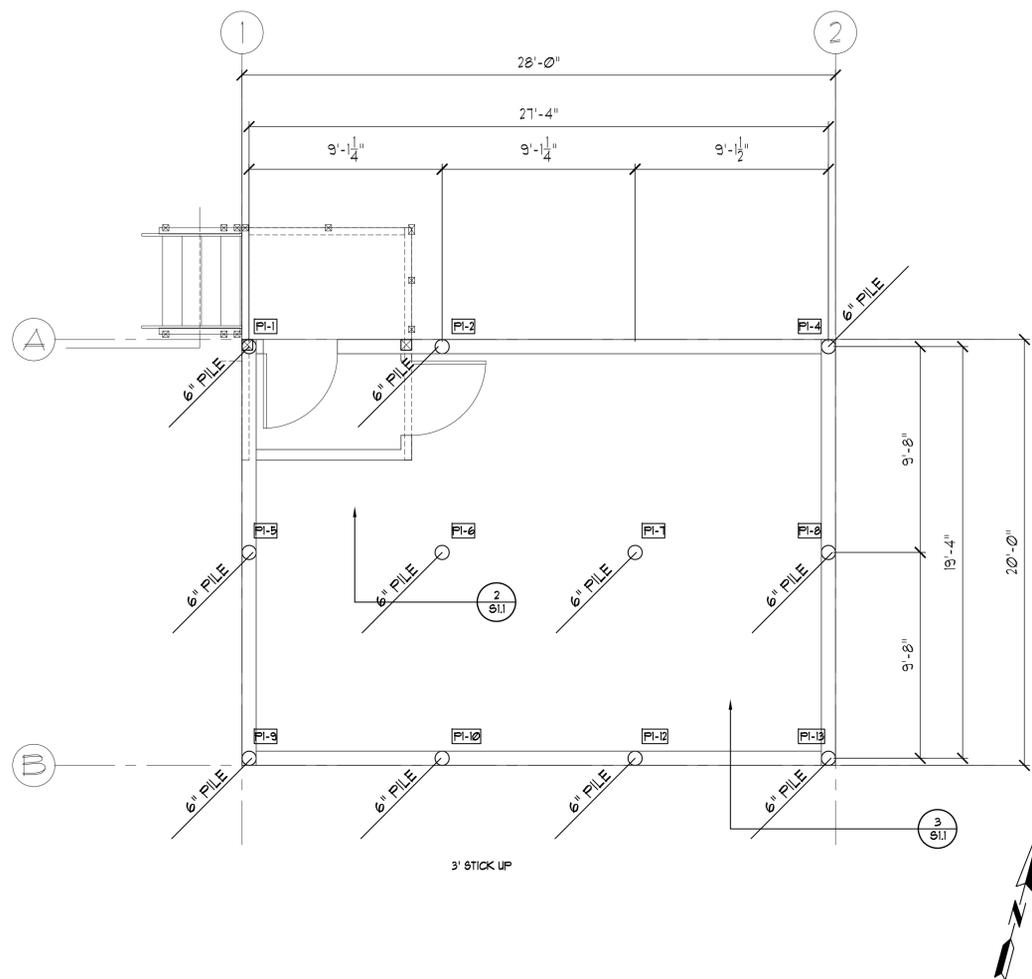
PUMP HOUSE 1  
**STRUCTURAL NOTES**  
CHEFORNAK, ALASKA

**CE2 ENGINEERS, INC.**  
P.O. BOX 22896 ANCHORAGE, AK 99522 PH: 907-346-1010 FAX: 907-346-1015

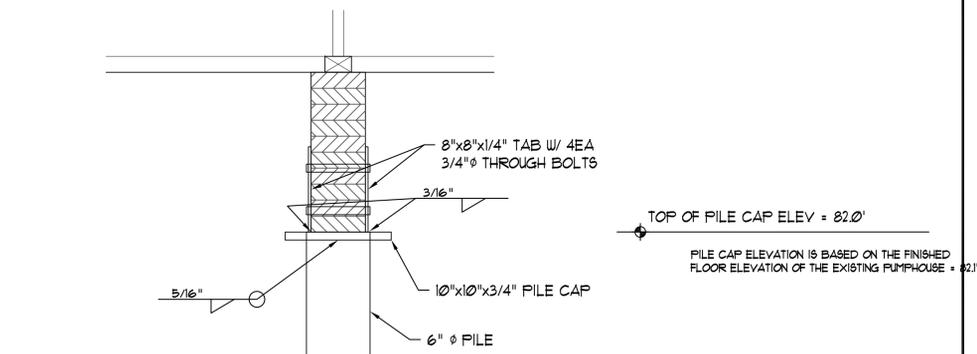
REVISION	BY	DATE
DEL PILE, ADD BRACE	ECO	10/7/15

Project No. 42754	Date 8/24/15	Designed ECO	Drawn RSL	Approved DAL
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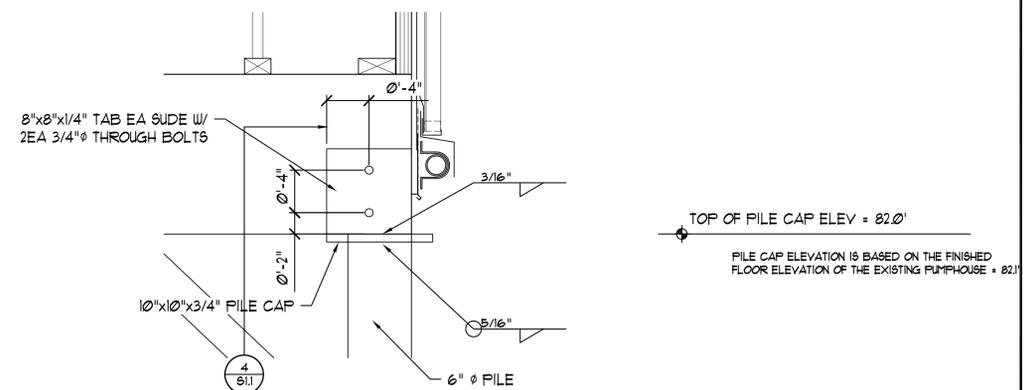
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SHEET OF



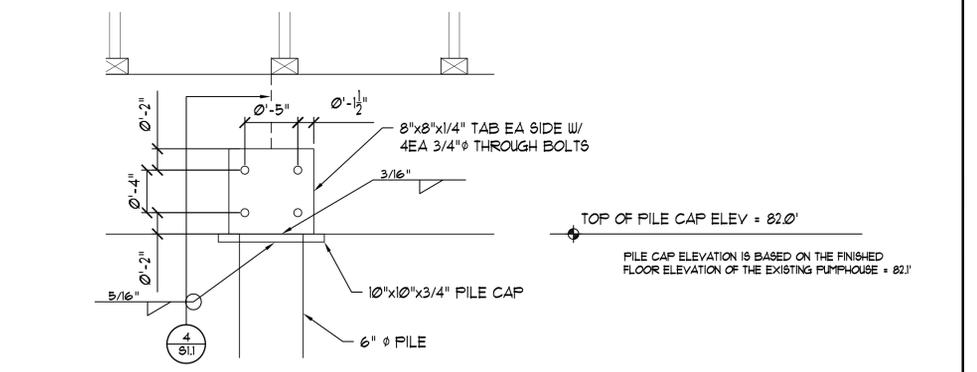
1 Pump House 1 - Pile Plan  
Scale: 1/4" = 1'-0"



4 Pile Cap Detail  
Scale: 1/2" = 1'-0"



3 Pile Cap Detail - End Pile  
Scale: 1/2" = 1'-0"

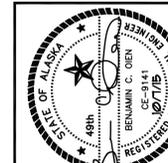


2 Pile Cap Detail - Interior Pile  
Scale: 1/2" = 1'-0"

Oien Associates, Inc.  
Construction Management Engineering Inspection  
2527 Hansen Drive  
Eagle River, AK 99571  
Phone: (907) 654-0507  
Fax: (907) 654-0506  
Email: bob@oien.com

SCALE:  
AS SHOWN  
BASE IS ONE INCH ON ORIGINAL DRAWING  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

CONSTRUCTION RECORD	
FIELD BOOK	
STAKING	
FOREMAN	
AS-BUILT	
INSPECTOR	



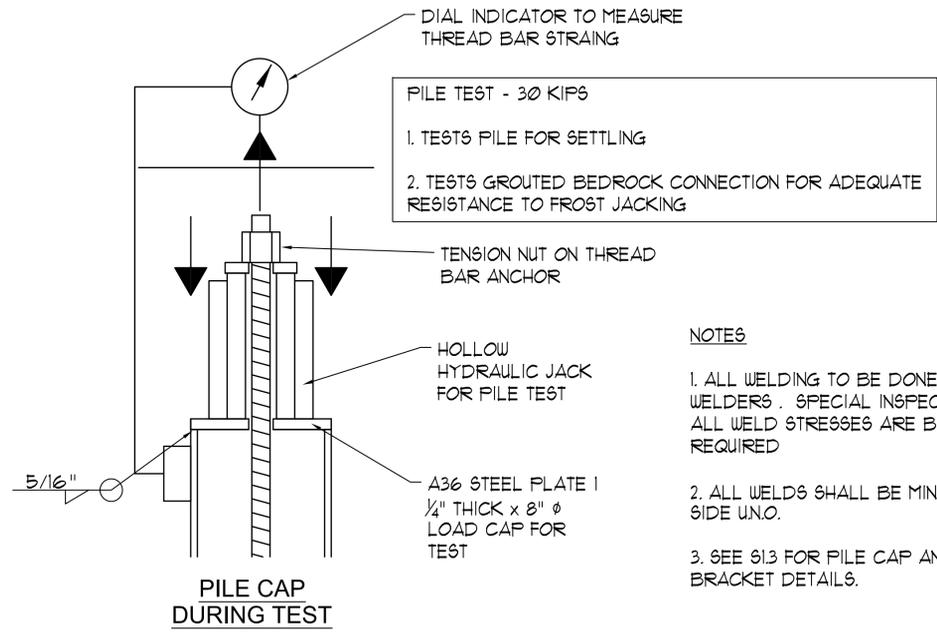
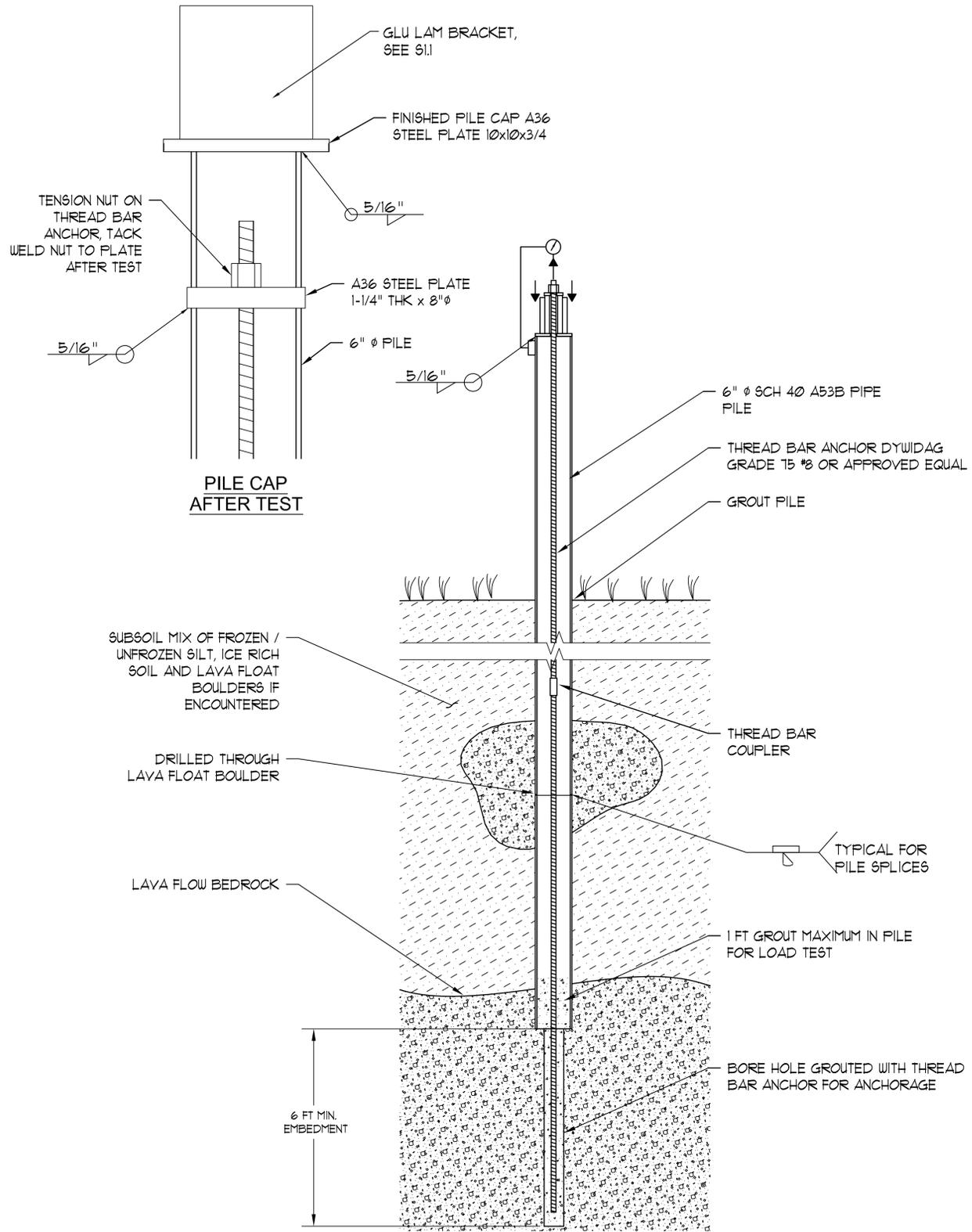
PUMP HOUSE 1  
FOUNDATION PLAN  
CHEFORNIAK, ALASKA



REVISION	BY	DATE
DEL PILE, ADD BRACE	BEO	10/7/15

Project No.	42754	Date	8/24/15	Designed	BEO	Drawn	RES	Approved	OAL
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Sheet No. S1.1  
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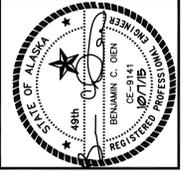
- NOTES**
- ALL WELDING TO BE DONE BY AWS CERTIFIED WELDERS. SPECIAL INSPECTION NOT REQUIRED AS ALL WELD STRESSES ARE BELOW 50% OF THE REQUIRED
  - ALL WELDS SHALL BE MINIMUM 3/16" FILLET ONE SIDE U.N.O.
  - SEE S1.3 FOR PILE CAP AND GLU LAM BEAM BRACKET DETAILS.

1 Micropile Detail  
S1.2 No Scale

**Oien Associates, Inc.**  
Construction Management Engineering Inspection  
1827 Hansen Drive  
Eagle River, AK 99571  
Phone: (907) 694-0507  
Fax: (907) 694-0506  
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CONSTRUCTION RECORD	FIELD BOOK	STAKING	FOREMAN	AS-BUILT	INSPECTOR
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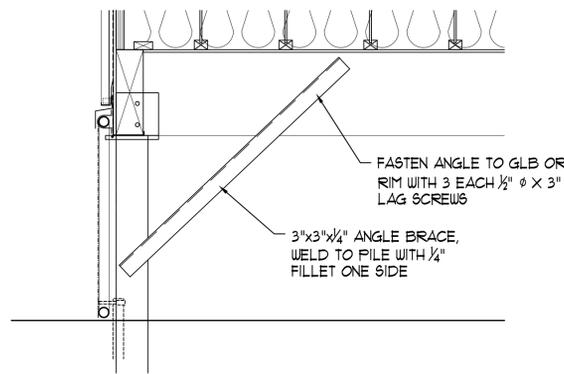
PUMP HOUSE 1  
MICROPILE DETAIL  
CHEFORKNAK, ALASKA



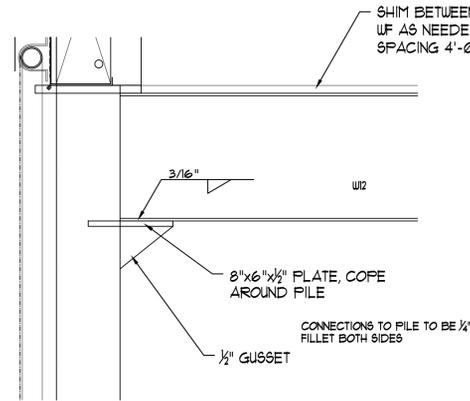
REVISION	BY	DATE
DEL PILE, ADD BRACE	ECO	10/7/15

Project No. 42754	Date 8/24/15	Designed BCO	Drawn REL	Approved OAL
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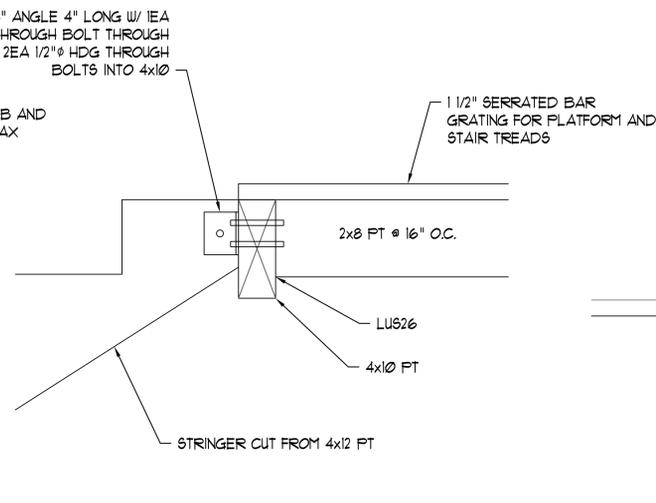
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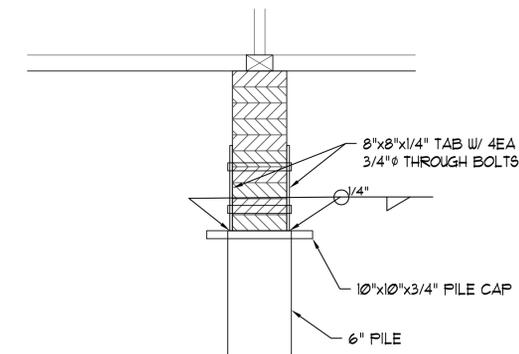
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S2.1  
Brace Connection  
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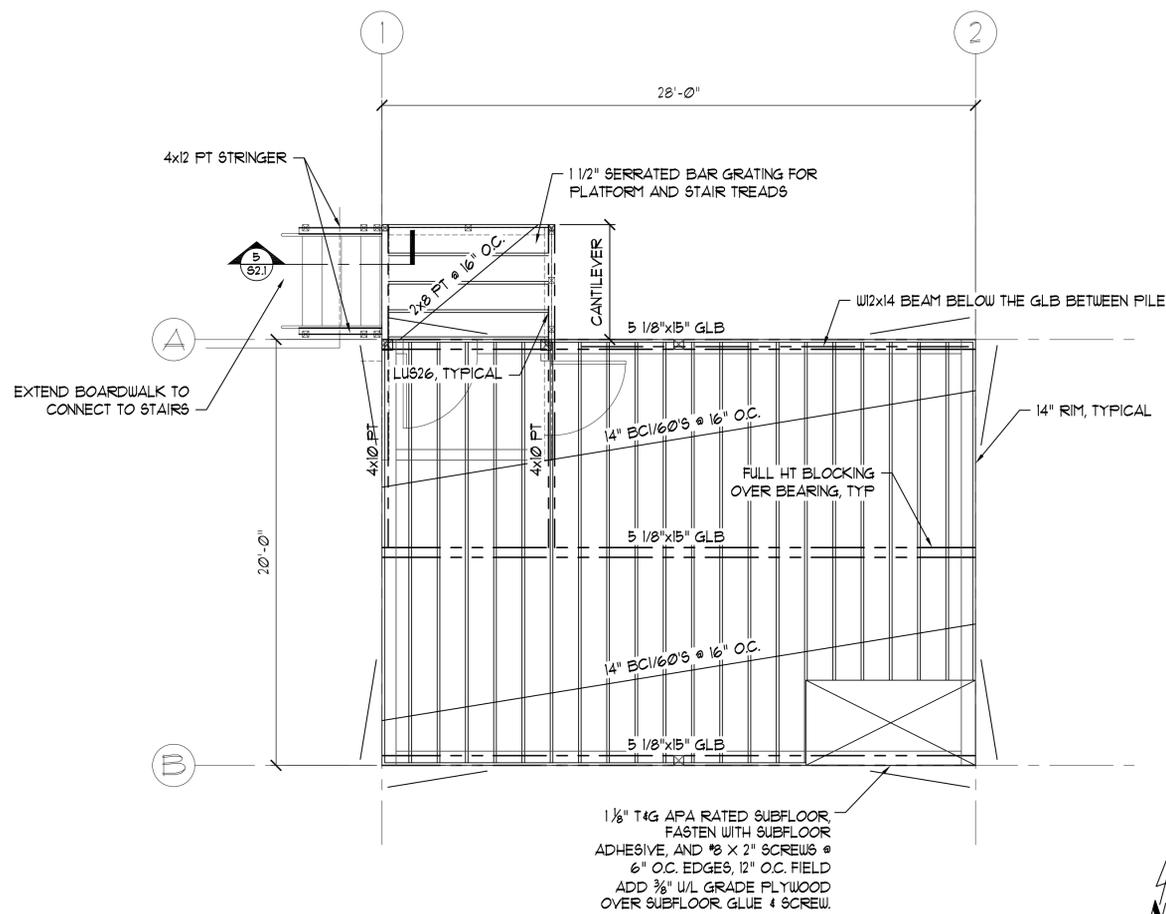
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W12 Connection  
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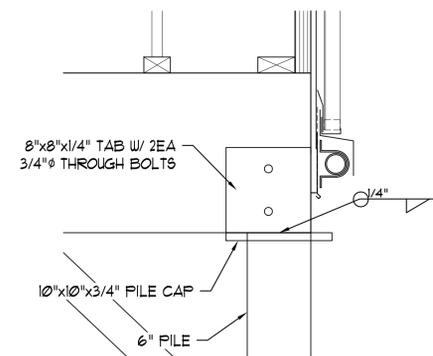
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S2.1  
Stair Stringer Attachment  
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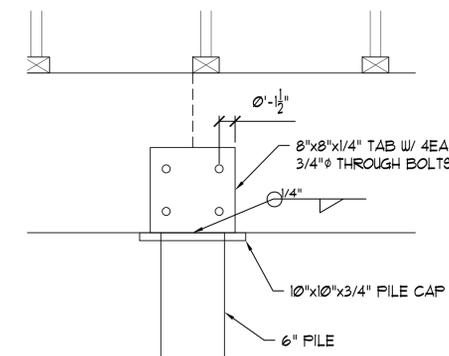
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S2.1  
File Cap Detail  
Scale: 1/2" = 1'-0"



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



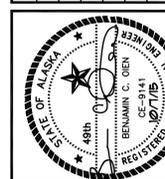
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S2.1  
File Cap Detail - End Pile  
Scale: 1/2" = 1'-0"



2  
S2.1  
File Cap Detail - Interior Pile  
Scale: 1/2" = 1'-0"

Oien Associates, Inc.  
Construction Management Engineering Inspection  
1827 Hansen Drive  
Eagle River, AK 99571  
Phone: (907) 694-0507  
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SCALE:	AS SHOWN
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INSPECTOR	



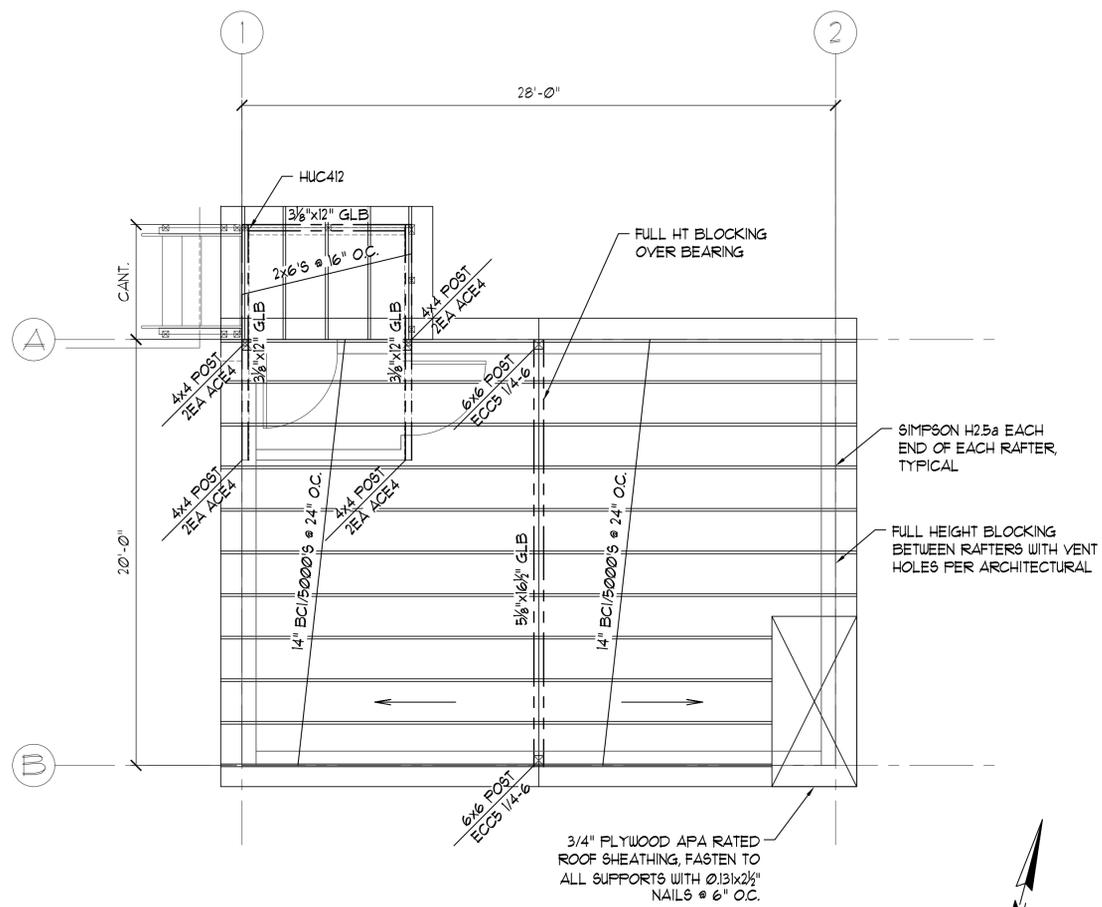
PUMP HOUSE 1  
PUMP HOUSE 1  
FLOOR FRAMING PLAN  
CHEFORNIAK, ALASKA

**CEI**  
ENGINEERS, INC.  
P.O. BOX 22896 ANCHORAGE, AK 99522 PH: 807-485-1010 FAX: 807-346-1015

REVISION	BY	DATE
DEL PILE, ADD BRACE	ECO	10/7/15

Project No.	42754	Date	8/24/15	Designed	ECO	Drawn	REJ	Approved	OAL
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Sheet No. S2.1  
SHEET OF



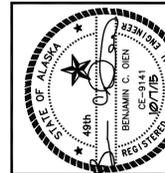
1 Pump House 1 - Roof Framing Plan

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

**Oien Associates, Inc.**  
 Construction Management Engineering Inspection  
 1827 Hansen Drive  
 Eagle River, AK 99571  
 Phone: (907) 694-0507  
 Fax: (907) 694-0506  
 Email: bob@oien.net

SCALE:  
 AS SHOWN  
 1" = 1'-0"  
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CONSTRUCTION RECORD	
FIELD BOOK	
STAMING	
FOREMAN	
AS-BUILT	
INSPECTOR	



PUMP HOUSE 1  
 PUMP HOUSE 1  
 ROOF FRAMING PLAN  
 CHEFORNIAK, ALASKA



REVISION	BY	DATE
DEL PILE, ADD BRACE	ECO	10/7/15

Project No.	42754
Date	8/24/15
Designed	B.C.O.
Drawn	R.R.J.
Approved	O.A.L.

Sheet No. **S3.1**  
 SHEET OF

CONSTRUCTION RECORD	FIELD BOOK
STAGING	FOREMAN
AS-BUILT	INSPECTOR



PUMP HOUSE 1  
 PUMP HOUSE 1  
 BUILDING SECTIONS  
 WALL SECTIONS  
 CHEFORNIAK, ALASKA

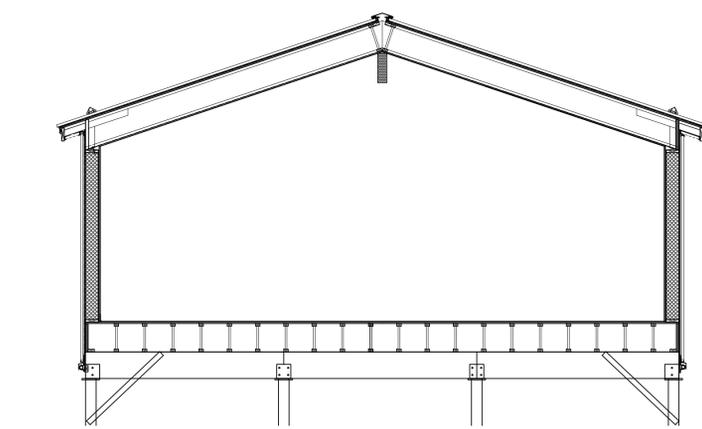


REVISION	BY	DATE
DEL FILE, ADD BRACE	BCO	10/7/15

Project No. 42754	Date 8/24/15	Designed BCO	Drawn RRL	Approved OAL
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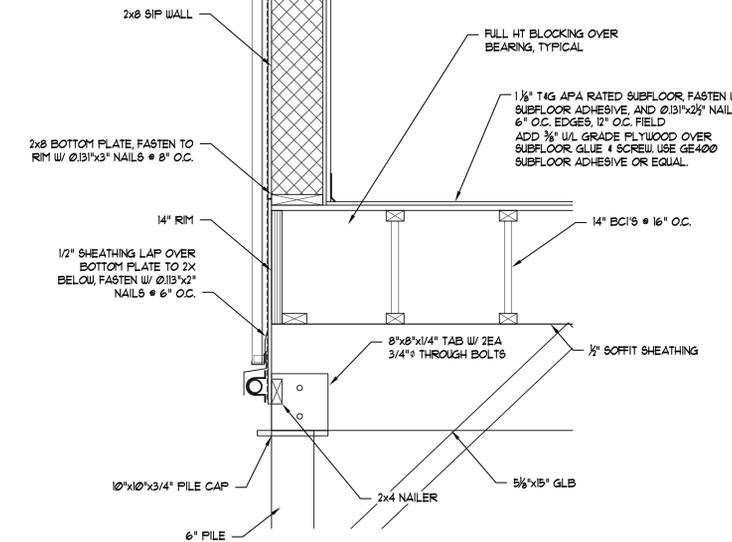
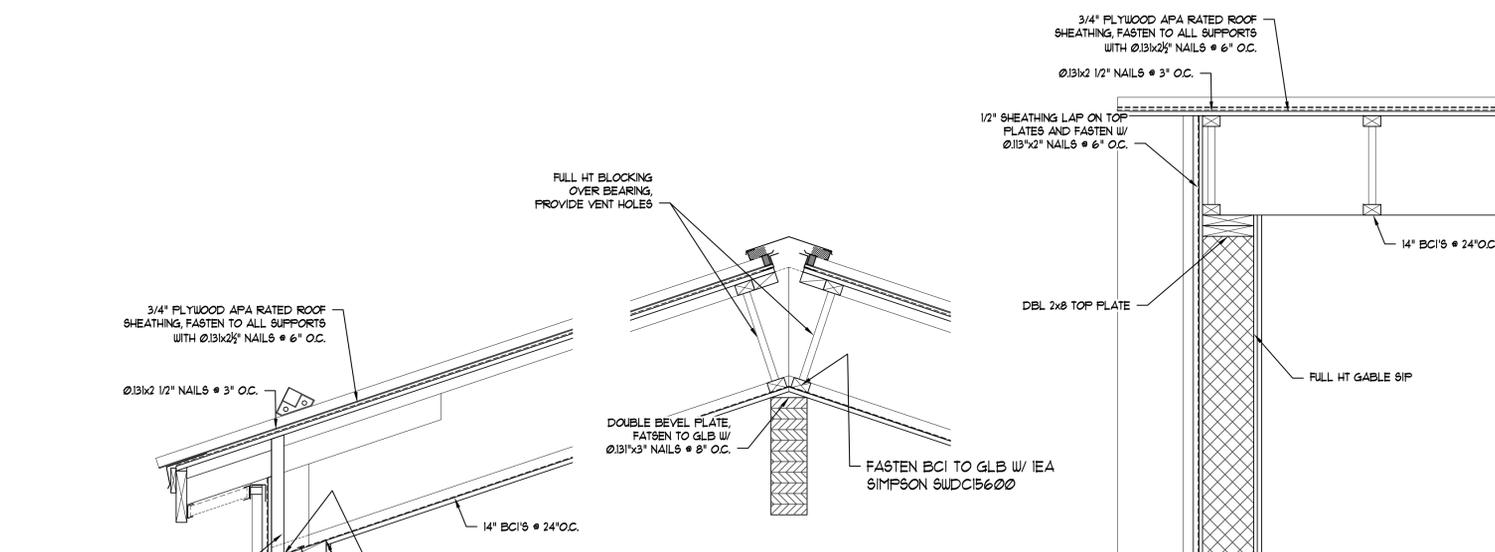
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2 Pump House 1 - Building Section  
 Scale: 1/2" = 1'-0"

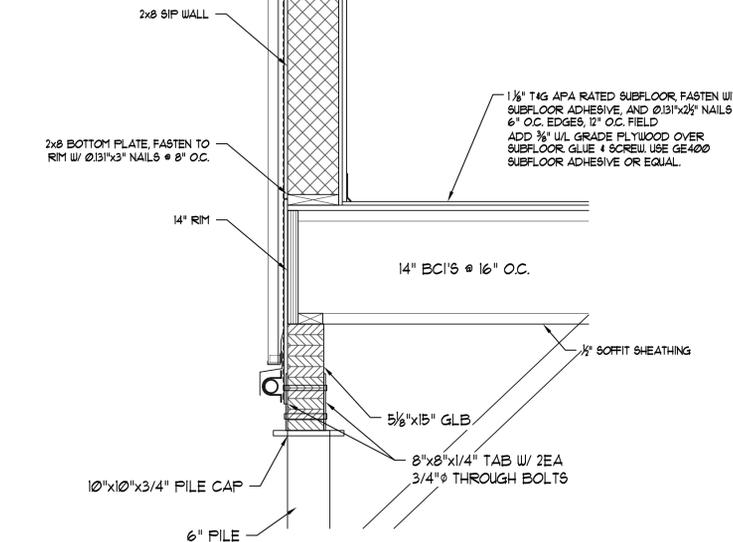


1 Pump House 1 - Building Section  
 Scale: 1/2" = 1'-0"

4 Beam Detail  
 Scale: 1" = 1'-0"



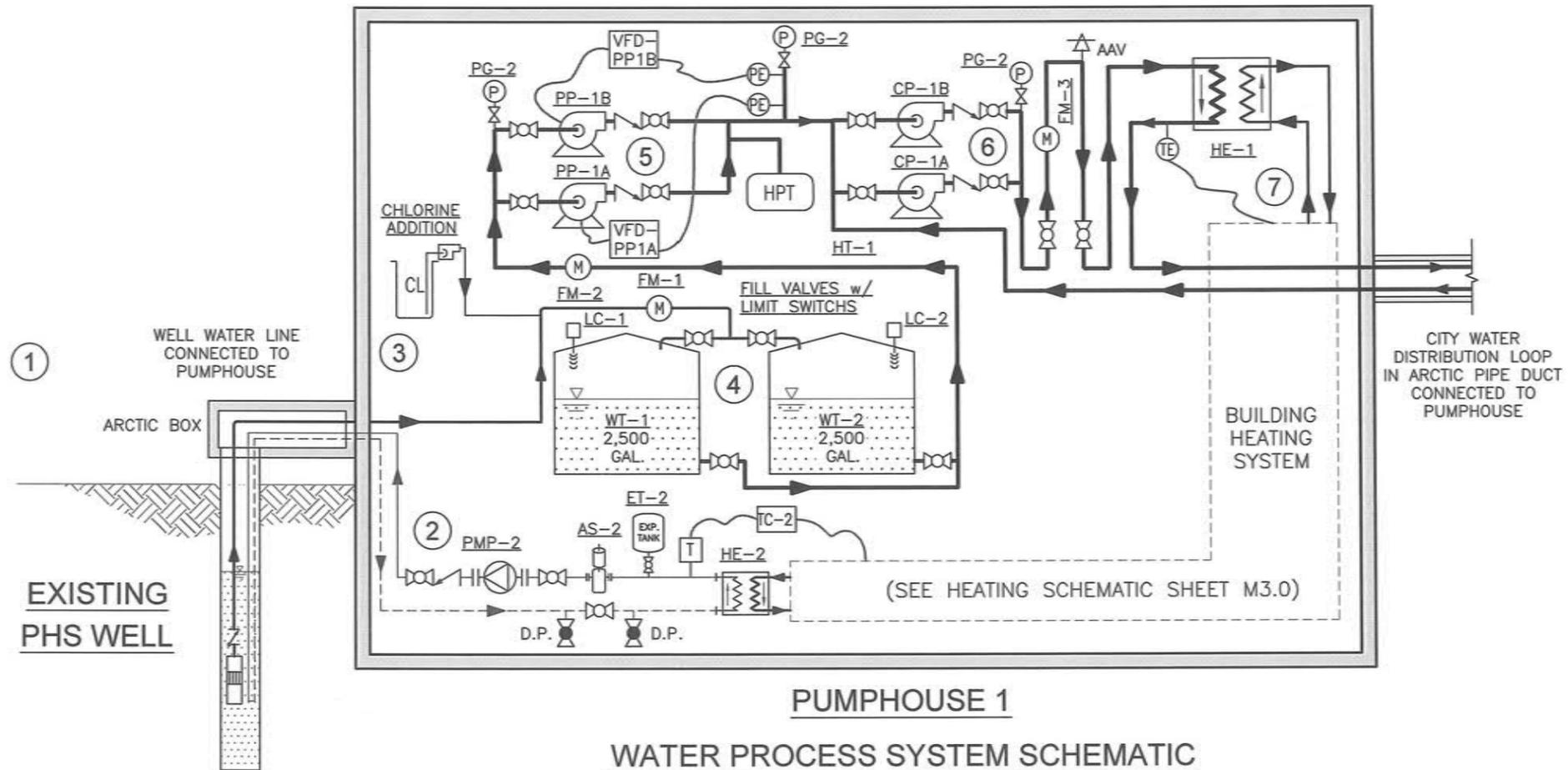
3 Wall Section  
 Scale: 1" = 1'-0"



5 Wall Section  
 Scale: 1" = 1'-0"

# WATER PRESSURIZATION & DISTRIBUTION LOOP SCHEMATIC DESCRIPTION

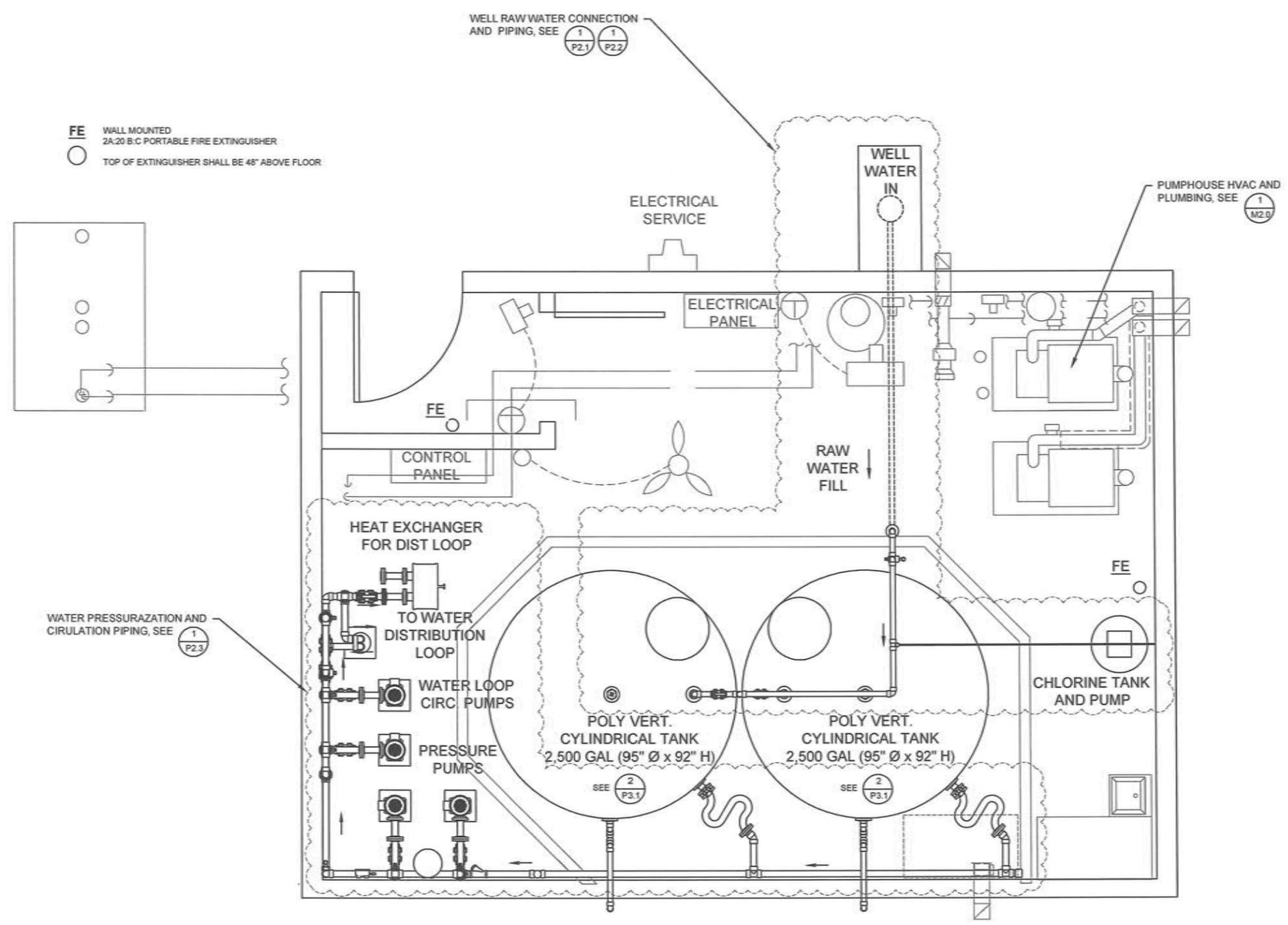
- ① EXISTING PHS WELL SUPPLIES WATER TO PUMPHOUSE 1 AT APPROXIMATELY 10 GPM.
- ② THE WELL, ARCTIC BOX AND ARCTIC PIPE CONNECTING THE WELL AND PUMPHOUSE ARE HEATED TO ABOVE FREEZING BY A HYDRONIC WATER LOOP HEATED BY HEAT EXCHANGER HE-4 FROM THE BUILDING HYDRONIC SYSTEM. WATER IS USED TO PREVENT CROSS CONTAMINATION OF WELL WATER BY A POSSIBLE LEAK IN THE HEAT TRANSFER PIPING.
- ③ THERE IS AN OPTION AVAILABLE TO ADD CHLORINE TO THE RAW WATER IF IT IS DEEMED NECESSARY.
- ④ (2 EA) 2500 GALLON VERTICAL HDPE WATER TANKS WILL SERVE AS STORAGE OF WATER FROM THE WELL. EACH TANK WILL HAVE ITS OWN SELF-CONTAINED ULTRASONIC LEVEL SENSOR. EACH TANK WILL BE ISOLATED FROM THE WELL WATER WITH A MANUAL ISOLATION VALVE.
- ⑤ PRESSURE PUMPS PP-1A AND PP-1B WILL PRESSURIZE THE WATER DISTRIBUTION LOOP TO A CONSTANT PRESSURE (SETPOINT ADJUSTABLE 40 TO 60 PSI). THE PUMPS WILL BE RUN BY VARIABLE FREQUENCY DRIVES (VFD) IN LEAD-LAG FASHION. PUMPHOUSE 1 WELL AND PRESSURE PUMPS WILL BE THE PRIMARY SOURCE OF WATER FOR THE WATER DISTRIBUTION LOOP.
- ⑥ CIRCULATION PUMPS CP-1A OR CP-1B WILL KEEP THE CITY WATER DISTRIBUTION LOOP FLOWING AT 20 TO 40 GPM. THESE WILL BE MULTI-STAGE 1750 RPM VERTICAL PUMPS WITH VERY HIGH EFFICIENCY TO KEEP ELECTRICAL COSTS DOWN.
- ⑦ BACKUP HEAT EXCHANGER HE-1 PROVIDES HEAT TO THE CITY WATER DISTRIBUTION LOOP IN CASE PRIMARY WASTE HEAT RECOVERY HEAT EXCHANGER IN POWER PLANT IS DOWN. THIS WILL INCREASE RELIABILITY OF THE WATER DISTRIBUTION LOOP SYSTEM.



G:\ACAD\CHEFORNAK\2014 Pump House Improvements\Pump House 1\1.0 Water Process Schematic Pump House 1.dwg, 9/23/2015 12:22:30 PM, cmerz, \\cc2main\LANIER MP C2050\LD520C PCL 6

SCALE: AS SHOWN	RECORD DRAWING CERTIFICATE THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.	CONSTRUCTION RECORD FIELD BOOK	STAGING	FOR MAN	AS-BUILT	INSPECTOR	NAME	DATE
<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">             STATE OF ALASKA              PROFESSIONAL ENGINEER              PAUL C. ROSSIGNOL              LICENSE NO. 10270              EXPIRES 12/31/2016           </div>		<b>PUMP HOUSE 1 IMPROVEMENTS</b> <b>WATER PROCESS SYSTEM SCHEMATIC</b> CHEFORNAK, ALASKA		 PO BOX 22046 ANCHORAGE, AK 99502 PH: 907-349-1000 FAX: 907-349-0515		Project No. _____ Date: <u>SEPT. 2015</u> Designed: <u>PCW</u> Drawn: <u>CM</u> Approved: <u>PCW</u>	SHEET <u>P1.0</u> OF _____	

G:\ACAD\CHEFORMAK\2014 Pumphouse Improvements\Pump House 1\P2.0 Water Process Piping and Equipment.dwg, 9/23/2015 12:31:21 PM, cmerz, \\c2main\LANIER MP C2050\LD520C PCL 6



**1**  
**P2.0** PUMP HOUSE FLOOR PLAN  
1/2" = 1'-0"

**FE** WALL MOUNTED  
2A:20 B.C PORTABLE FIRE EXTINGUISHER  
○ TOP OF EXTINGUISHER SHALL BE 48" ABOVE FLOOR

9/28/15

<b>REVISION</b>	<b>BY</b>	<b>DATE</b>

<b>Project No.</b> _____	<b>Date</b> SEPT. 2015	<b>Designed</b> PCW	<b>Drawn</b> CM	<b>Approved</b> PCW
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**Sheet No. P2.0**

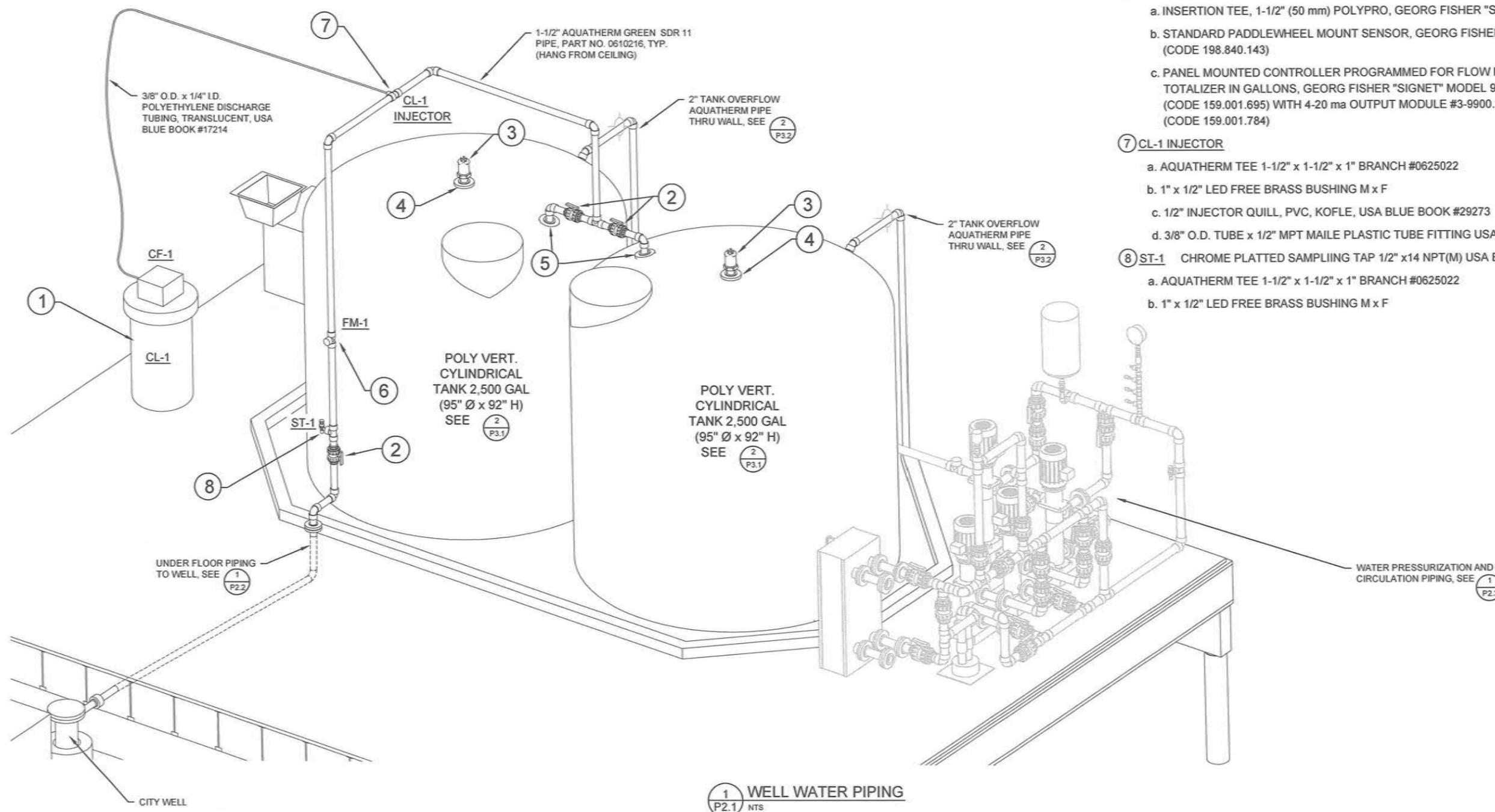
SHEET OF

**CE2 ENGINEERS, INC.**

PO BOX 22946 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-0515

<b>CONSTRUCTION RECORD</b>	<b>SCALE:</b>	<b>RECORD DRAWING CERTIFICATE</b>
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STAGING	IF NOT ONE INCH OR SMALLER ACCORDING TO SCALE	INFORMATION OBTAINED DURING
FOREMAN	0	CONSTRUCTION. INFORMATION PROVIDED
AS-BUILT	1	HEREIN IS ACCURATE TO THE BEST OF MY
INSPECTOR	1	KNOWLEDGE.
		NAME _____
		DATE _____

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\P2.1 WELL WATER PIPING.dwg, 9/25/2015 12:29:49 PM, cmerz, \\Coc2main\LANIER MP C2050\LD520C PCL 6



- ① CL-1 CHLORINE TANK, SNYDER 35 GAL. DOUBLE WALLED POLYTANK, PART NO. 1000112N AND CF-1 CHLORINE FEED PUMP, PERISTALTIC BLUE-WHITE #A1N10F-4T, USA BLUE BOOK #42179
- ② 1 1/2" AQUATHERM POLYPROPYLENE BALL VALVE #0041496
- ③ FLOWLINE LU77-5004 ECHO SWITCH LEVEL CONTROL
- ④ TANK LEVEL CONTROL FITTINGS (SEE DETAIL 2, SHEET P3.1)
  - a. FLOWLINE 2" NPT BULKHEAD FITTING, PVC, NUT ON TOP, #LM52-2890
  - b. FLOWLINE LM52-1400 2" NPT x 1" NTP (SCH 40) THREADED BUSHING
- ⑤ WELL PIPING BULHEAD FITTINGS
  - a. HAYWARD SF-SERIES 3" PVC SELF-ALIGNING BULKHEAD FITTING FxF, EPDM SEAL
  - b. REDUCER BUSHING, SCH 80 PVC 3" x 1 1/2" FxM, SPEARS #839-337C
  - c. 1 1/2" MALE ADAPTOR, SCH 80 PVC MxSOC, SPEARS # 836-015C
  - d. 3" SCH 80 PVC "STILL WELL" PIPE (SEE DETAIL 2, SHEET P3.1)
- ⑥ FM-1 FLOW METER ASSEMBLY (1-1/2")
  - a. INSERTION TEE, 1-1/2" (50 mm) POLYPRO, GEORG FISHER "SIGNET" #727310010
  - b. STANDARD PADDLEWHEEL MOUNT SENSOR, GEORG FISHER "SIGNET" #3-2536-P-0 (CODE 198.840.143)
  - c. PANEL MOUNTED CONTROLLER PROGRAMMED FOR FLOW IN GPM AND TOTALIZER IN GALLONS, GEORG FISHER "SIGNET" MODEL 9900 #3-9900-1P (CODE 159.001.695) WITH 4-20 ma OUTPUT MODULE #3-9900.398-1 (CODE 159.001.784)
- ⑦ CL-1 INJECTOR
  - a. AQUATHERM TEE 1-1/2" x 1-1/2" x 1" BRANCH #0625022
  - b. 1" x 1/2" LED FREE BRASS BUSHING M x F
  - c. 1/2" INJECTOR QUILL, PVC, KOFLE, USA BLUE BOOK #29273
  - d. 3/8" O.D. TUBE x 1/2" MPT MAILE PLASTIC TUBE FITTING USA BLUE BOOK #68398
- ⑧ ST-1 CHROME PLATTED SAMPLING TAP 1/2" x14 NPT(M) USA BLUE BOOK #47393
  - a. AQUATHERM TEE 1-1/2" x 1-1/2" x 1" BRANCH #0625022
  - b. 1" x 1/2" LED FREE BRASS BUSHING M x F

1 P2.1 WELL WATER PIPING NTS

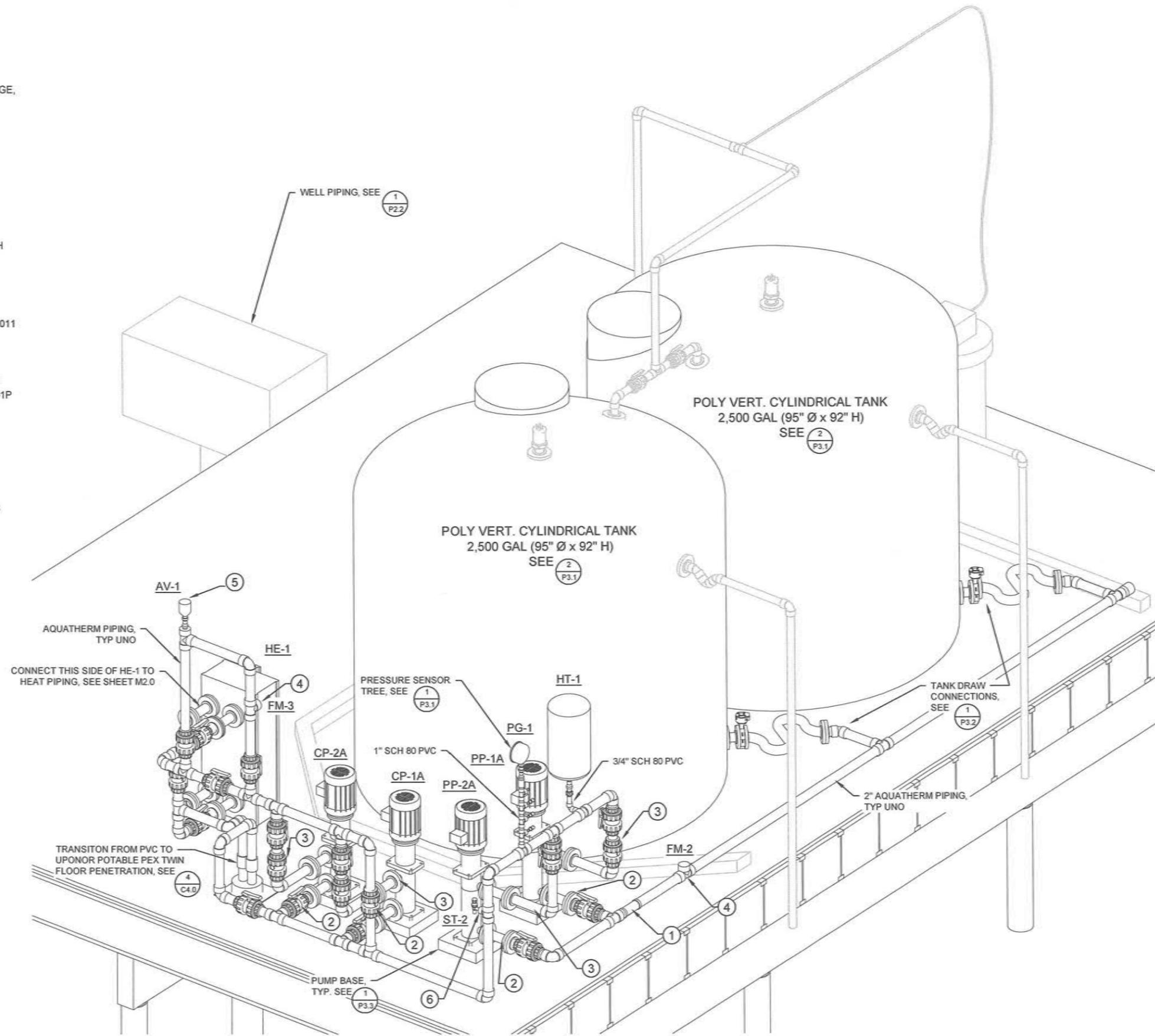
9/28/15

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THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.	
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# NOT ONE INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY.	
CONSTRUCTION RECORD	
FIELD BOOK	INSPECTOR
STAKING	FOREMAN
AS-BUILT	INSPECTOR
PUMP HOUSE 1 IMPROVEMENTS	WELL WATER PIPING
CHEFORNAK, ALASKA	
BY: _____	DATE: _____
REVISION: _____	DATE: _____
Project No. _____	Date: SEPT. 2015
Designed: _____	PCW
Drawn: _____	CM
Approved: _____	PCW
Sheet No. P2.1	
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G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\2.3 WATER PROCESS AND HEAT LOOP PIPING.dwg, 9/25/2015 12:42:38 PM, cmerz, \\ce2main\LANIER MP C2050\LD520C PCL 6

- ① 2" CLEAR PVC WYE STRAINER, SOCxSOC, HAYWARD #YS00200SE WITH BLOWOFF VALVE ADDED TO PORT IN FIELD
- ② **PUMP SUCTION ASSEMBLY**
  - a. 2" SUCTION FLEX ASSEMBLY, S/S 2" 200 LB FLANGE x S/S 2" 150 LB FLANGE, 8" OVERALL LENGTH, ALASKA RUBBER #2x8SSF300F
  - b. 2" SCH 80 PVC FLANGE, VANSTONE, FLGxSPIG, SPEARS #856-020
  - c. 2" FULL UNION SCH 80 PVC BALL VALVE, SOCxSOC, SPEARS #2329-020
- ③ **PUMP DISCHARGE ASSEMBLY**
  - a. 2" DISCHARGE FLEX ASSEMBLY, S/S 2" 200 LB FLANGE x S/S 2" 150 LB FLANGE, 8" OVERALL LENGTH, ALASKA RUBBER #2x8SSF300F
  - b. 2" SCH 80 90 DEG. EL, SOCxSOC, SPEARS #806-020
  - c. 2" FULL UNION SCH 80 PVC BALL CHECK VALVE, SPEARS #2229-020 WITH EPDM O-RING
  - d. 2" FULL UNION SCH 80 PVC BALL VALVE, SOCxSOC, SPEARS #2329-020
- ④ **FM-2 & FM-3 FLOW METER ASSEMBLY (2')**
  - a. INSERTION TEE, 2" (63 mm) POLYPRO, GEORG FISHER "SIGNET" #727310011
  - b. STANDARD PADDLEWHEEL MOUNT SENSOR, GEORG FISHER "SIGNET" #3-2536-P-0 (CODE 198.840.143)
  - c. PANEL MOUNTED CONTROLLER PROGRAMMED FOR FLOW IN GPM AND TOTALIZER IN GALLONS, GEORG FISHER "SIGNET" MODEL 9900 #3-9900-1P (CODE 159.001.695) WITH 4-20 ma OUTPUT MODULE #3-9900.398-1 (CODE 159.001.784)
- ⑤ **AV-1 AIR VENTING ASSEMBLY**
  - a. 2" SCH 80 PVC TEE, SOCxSOCxSOC, SPEARS #801-020
  - b. 2" x 3/4" SCH 80 PVC REDUCER BUSHING SPIGxSOC, SPEARS #837-248
  - c. 3/4" S/S REINFORCED SPIGOT FEMALE ADAPTOR, SPIGxSR FIPT, SPEARS #878-007SR
  - d. 3/4" LEGEND (NO LEAD) BALL VALVE, T-900, MxF-TNL MxF
  - e. 3/4" x 1 1/2" BRASS NIPPLE MxM
  - f. TACO 3/4" MIPT AUTO AIR VENT, FIPT, TACO #409 VENT
- ⑥ **ST-2 CHROME PLATTED SAMPLING TAP 1/2" x 14 NPT(M)**  
(USA BLUE BOOK #47393)
  - a. AQUATHERM TEE 1-1/2" x 1-1/2" x 1" BRANCH #0625022
  - b. 1" x 1/2" LED FREE BRASS BUSHING M x F

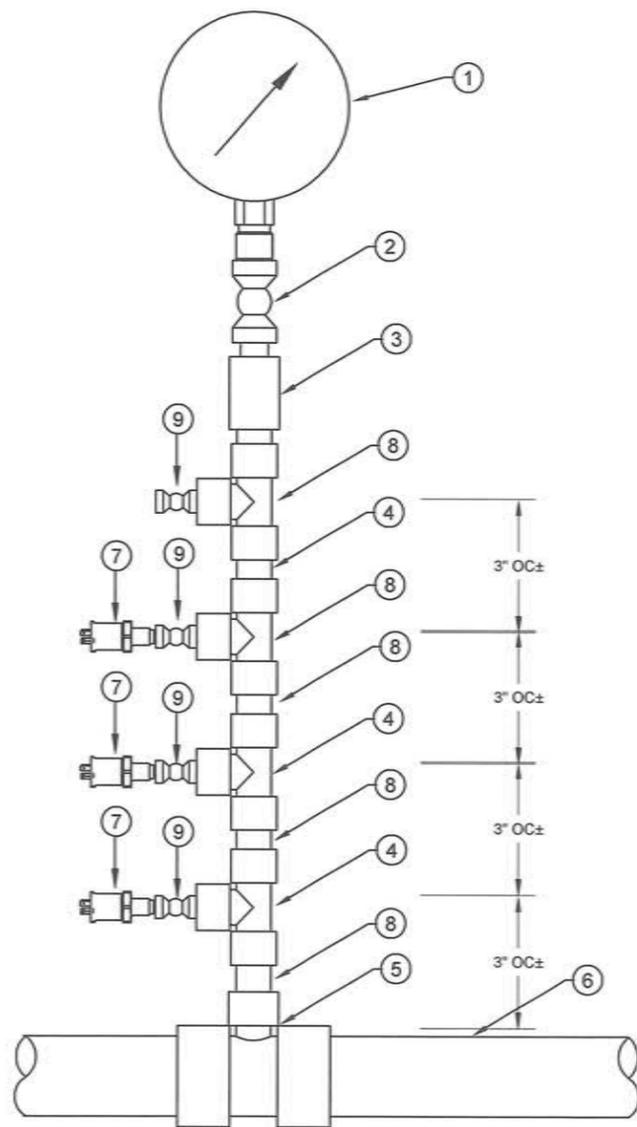


① WATER PRESSURIZATION AND CIRCULATION PIPING  
P2.3 N.T.S.

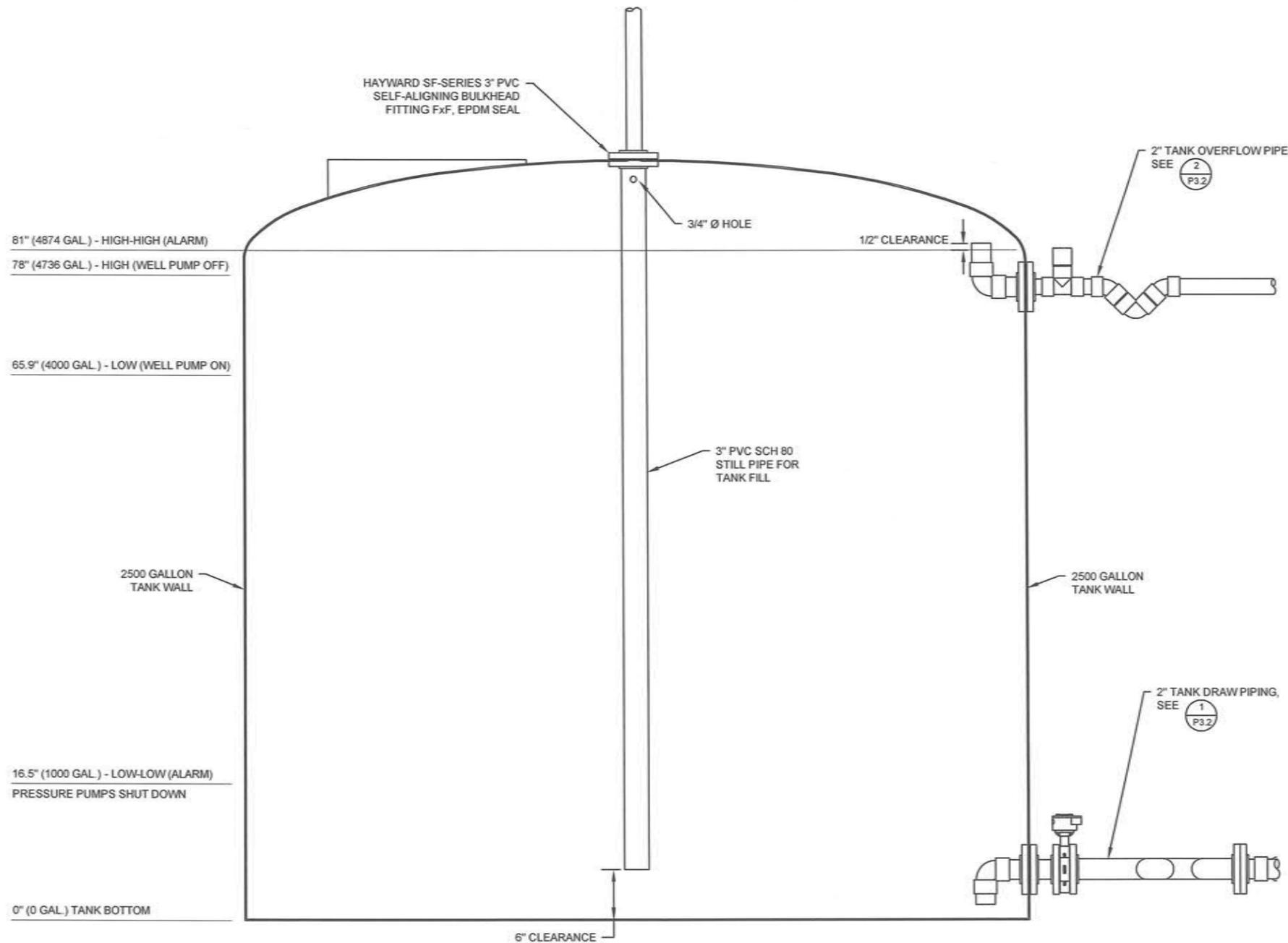
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SCALE: AS SHOWN	SCALE: 1" = 10'-0" UNLESS OTHERWISE NOTED
CONSTRUCTION RECORD	FIELD BOOK, STAGING, FOREMAN, AS-BUILT, INSPECTOR
PUMP HOUSE 1 IMPROVEMENTS	WATER PRESSURIZATION AND CIRCULATION PIPING
CHEFORNAK, ALASKA	CHEFORNAK, ALASKA
	
BY DATE	REVISION
Project No. _____ Date _____	Designed _____ Drawn _____ Approved _____
Date: SEPT. 2015	PCW CM PCWL
Sheet No. P2.3	SHEET OF

9/28/15

- 1 PRESSURE GAUGE, 0-100 psig, STAINLESS STEEL CASE AND INTERNALS, 1/2" MPT BOTTOM CONNECTION, 4" DIA. CASE, LIQUID FILLED CASE, WIKA TYPE 233.50
- 2 NO LEAD BALL VALVE, 1/2" MPT x FPT, T-HANDLE, LEGEND# T-900 MxF-TNL, 1/2"
- 3 AQUATHERM TRISITION PIECE 3/4" (25mm) x 1/2" F LEAD FREE BRASS, #0621101
- 4 AQUATHERM TRISITION TEE 3/4" (25MM) X 3/4" F LEAD FREE BRASS #0625012, WITH 3/4" X 1/4" BRASS BUSHING F X M
- 5 AQUATHERM REDUCING TEE 2" X 2" X 3/4" IPS, #0113554
- 6 AQUATHERM GREEN PIPE, SDR11, 2" IPS (63 MM OD), #0610218
- 7 PRESSURE TRANSMITTER 0-100 psig, 4-20 ma +\_0.25% FULL SCALE (BFSL) 1/2" MPT PROCESS CONNECTION MINI HERSCHMANN CONNECTOR, NOSHOK #100-100-1-2-2-7
- 8 AQUATHERM GREEN PIPE, SDR7.4, 3/4" IPS (25 MM OD), #0610810
- 9 NO LEAD BALL VALVE, 1/2" MPTxFPT, T-HANDLE, LEGEND #T-900 MxF-TNL, 1/2"



1 PRESSURE SENSOR TREE  
P3.1 NTS



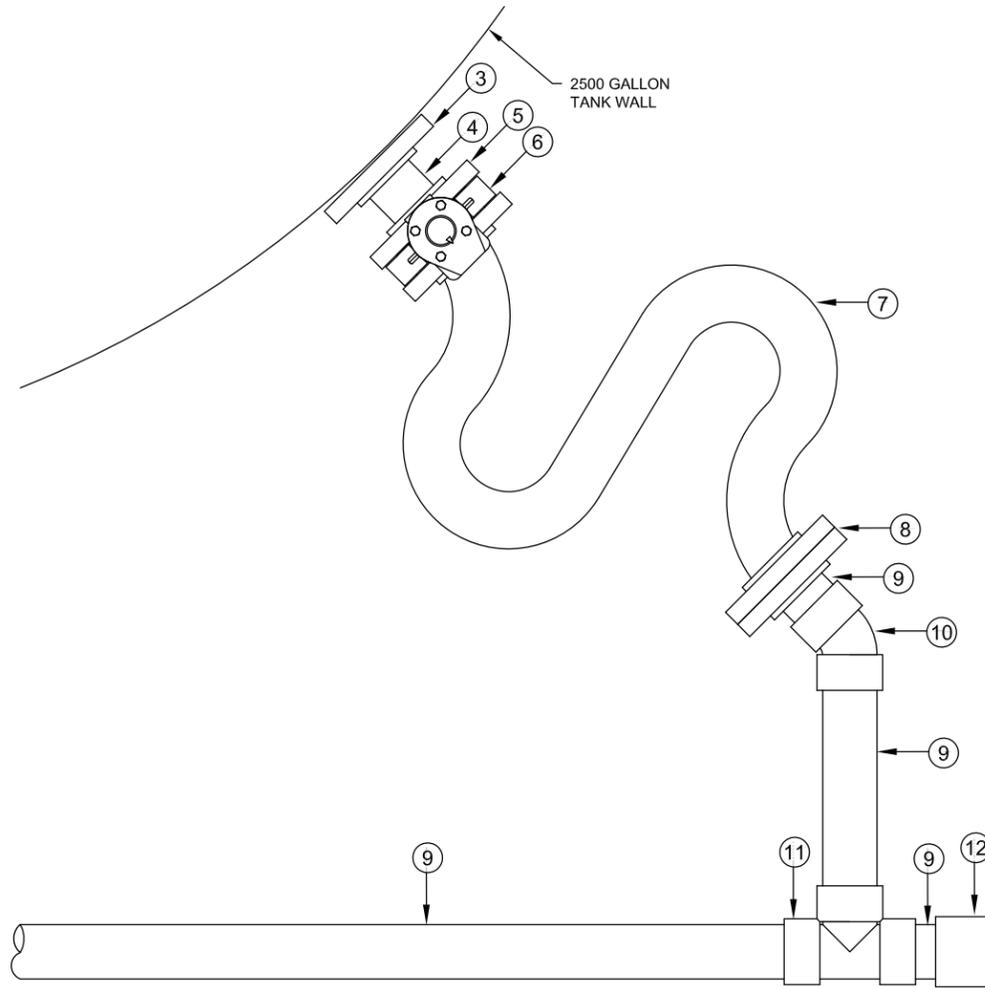
LEVEL CONTROL POINTS AND TANK FILL STILL PIPE

2 2500 GAL TANK  
P3.1 NTS

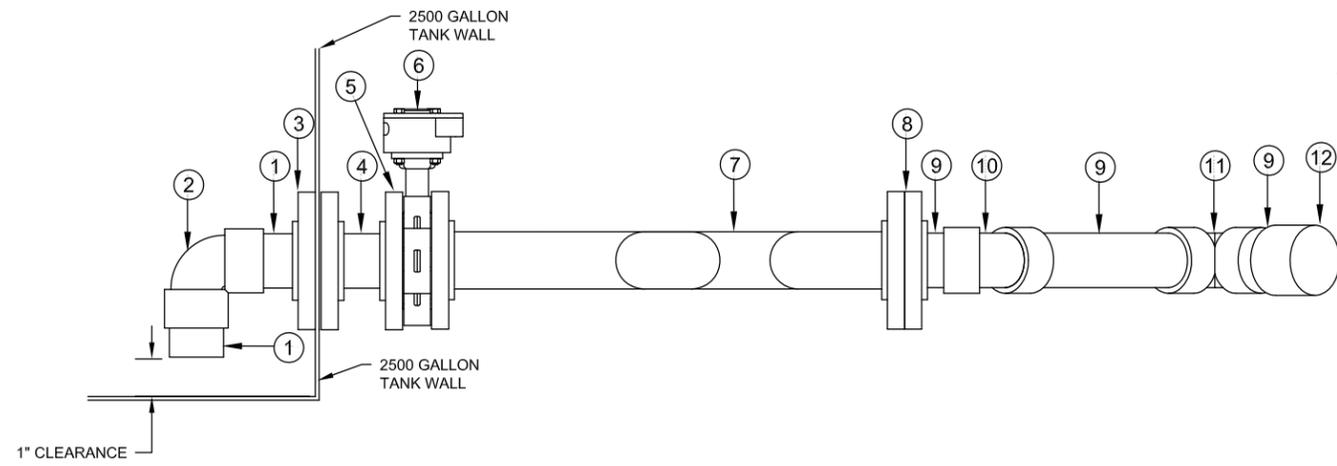
RECORD DRAWING CERTIFICATE	
THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.	
SCALE: AS SHOWN	NAME: _____
DATE: _____	DATE: _____
CONSTRUCTION RECORD	
FIELD BOOK	INSPECTOR
STATION	AS-BUILT
FOREMAN	INSPECTOR
PUMP HOUSE 1 IMPROVEMENTS WATER TANK AND PRESSURE TREE CHEFORNAK, ALASKA	
BY: _____	DATE: _____
REVISION	DATE
Project No. _____	Date: _____
Designed: _____	PCW
Drawn: _____	CM
Approved: _____	ECM
Sheet No. <b>P3.1</b>	
SHEET _____ OF _____	

9/28/15

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\P3.2 WATER TANK PIPING DETAILS.dwg, 10/12/2015 1:45:51 PM, cmerz, Adobe PDF



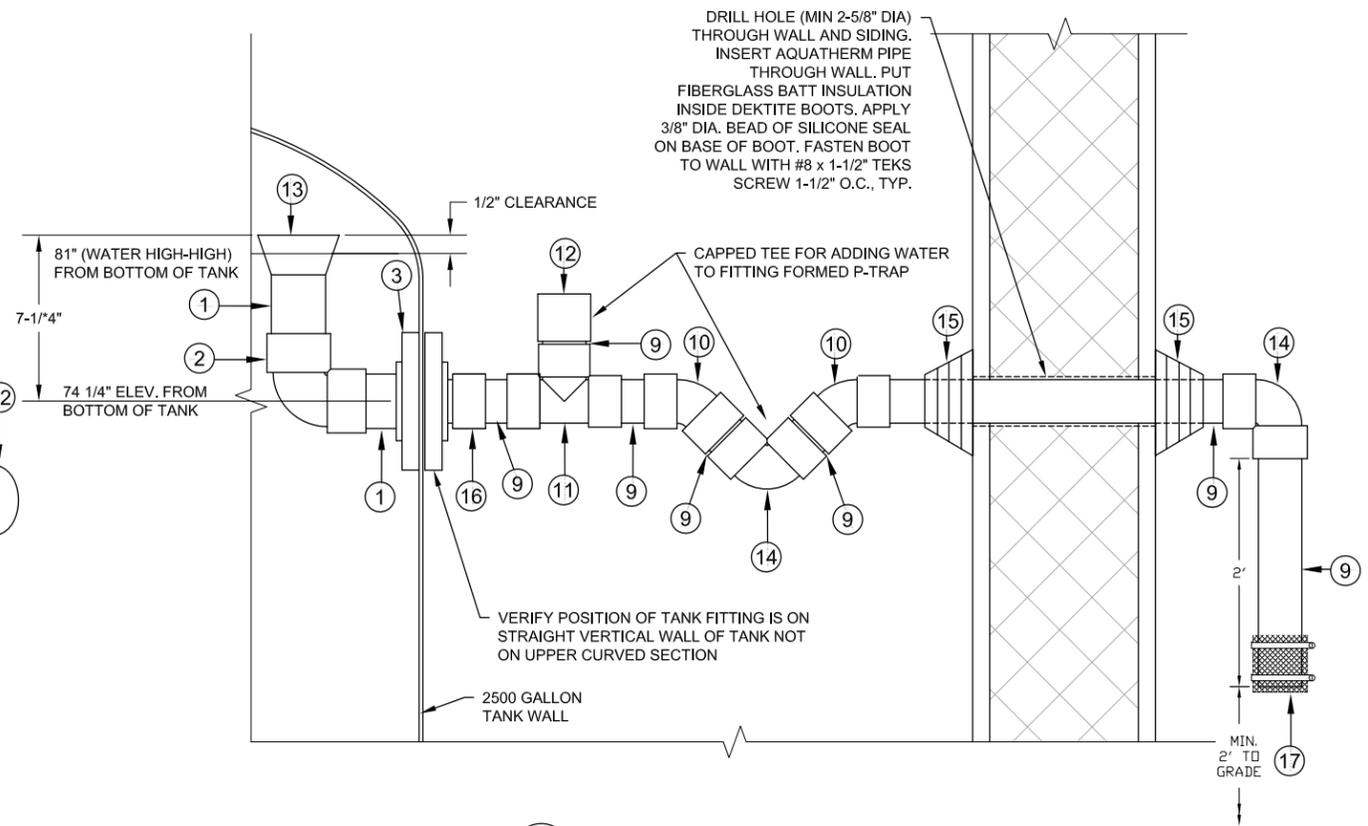
TANK DRAW CONNECTION PLAN



TANK DRAW SECTION

1 TANK DRAW PIPING DETAIL  
P3.2 NTS

- ① 2" SCH80 PVC PIPE
- ② 2" SCH80 PVC 90 DEG EL, SOC X SOC, SPEARS #806-020
- ③ 2" PVC TANK ADAPTOR, SOC X FIPT, SPEARS #871-020
- ④ 2" IPS X 4"L STD 304 SS THREADED NIPPLE, M X M
- ⑤ 2" IPS THREADED COMPANION FLANGE, 150#, 304 SS, FLG X F, FLANGE BOLTS AND NUTS
- ⑥ 2" BUTTERFLY VALVE, BRAY #31-0200-11010-119 WITH 01 SERIES MANUAL LEVER HANDLE WITH 10 POSITION NOTCHED PLATE
- ⑦ 2" SNYDER INDUSTRIES FLEXMASTER FLEXIBLE FITTING CONNECTOR, FLG X FLG, 2" RED RUBBER GASKETS, PART #5390100N95401L; FLANGE BOLTS AND NUTS, 304 SS
- ⑧ AQUATHERM 2" FLANGE ADAPTOR, SOCKET WELDED #0115518, WITH FLANGE RING #3315718
- ⑨ AQUATHERM 2" GREEN PIPE, SDR11 #0610218
- ⑩ AQUATHERM 2" 45 DEG ELBOW, SOCKET FUSION, #0112518
- ⑪ AQUATHERM 2" TEE, SOCKET FUSION, #0113118
- ⑫ AQUATHERM 2" NPT TRANSITION PIECE, SOCKET X FIPT, #0621120, LEAD FREE, PLUS 2" LEAD-FREE BRASS PIPE PLUG, MIPT
- ⑬ 3X2 SCH80 PVC REDUCING COUPLING, SOC X SOC, SPEARS #829-338
- ⑭ AQUATHERM 2" 90 DEG ELBOW, SOCKET FUSION, #0112118
- ⑮ DEKS INDUSTRIES DEKTITE FITTING # DF102G (DEKTITE NO. 2), FITS 1-1/4" OD TO 3-1/4" OD, GREY EPDM
- ⑯ AQUATHERM 2" NPT TRANSITION PIECE, SOCKET X MIPT, #06213231, LEAD FREE, PLUS 2" LEAD-FREE BRASS PIPE PLUG, MIPT
- ⑰ SHAPE 12"x12" PIECE 20x20 MESH TYPE 304 SS ON TO END OF OVERFLOW PIPE AND SECURE WITH (2 EA) SS WORMDRIVE HOSE CLAMPS 1/2" WIDE x 3-1/4" O.D.



2 TANK OVERFLOW PIPING DETAIL  
P3.2 NTS

RECORD DRAWING CERTIFICATE	NAME	DATE
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SCALE: AS SHOWN	AS-BUILT	INSPECTOR

CONSTRUCTION RECORD	FIELD BOOK	STAKING	FOREMAN	AS-BUILT	INSPECTOR

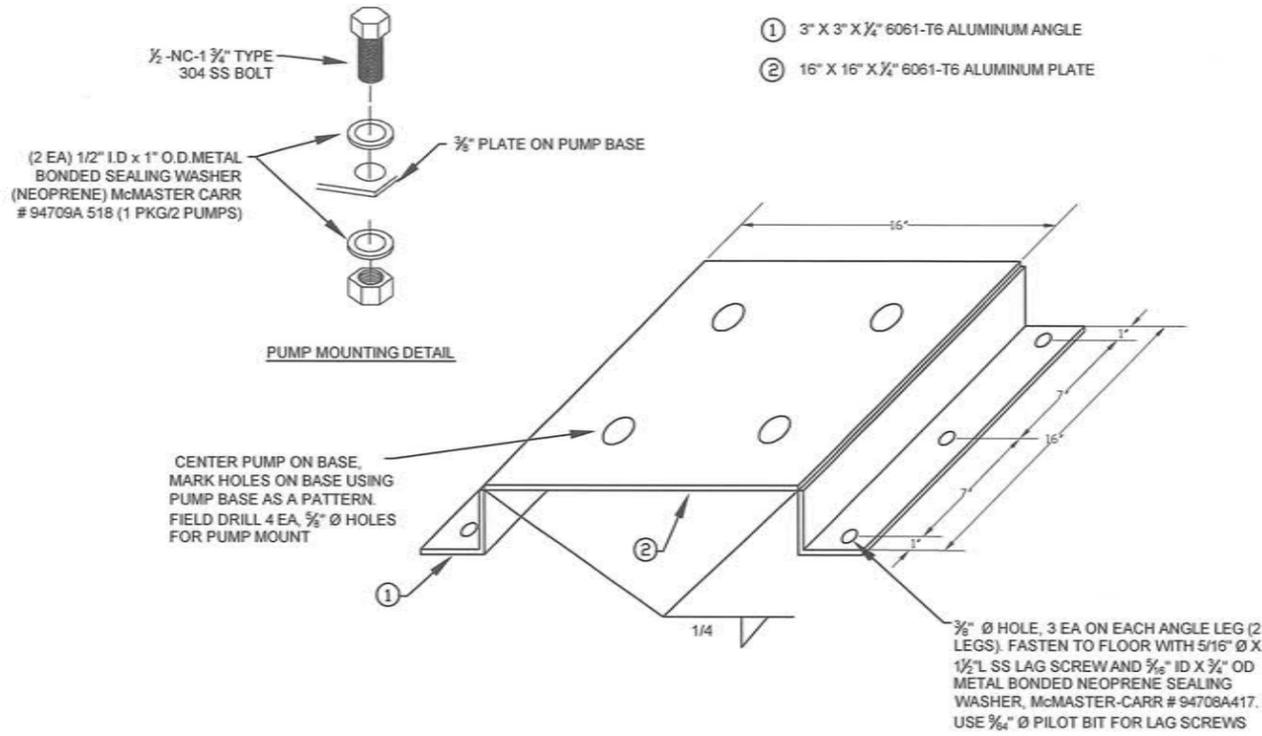


PUMP HOUSE 1 IMPROVEMENTS  
WATER TANK PIPING DETAILS  
CHEFORNAK, ALASKA

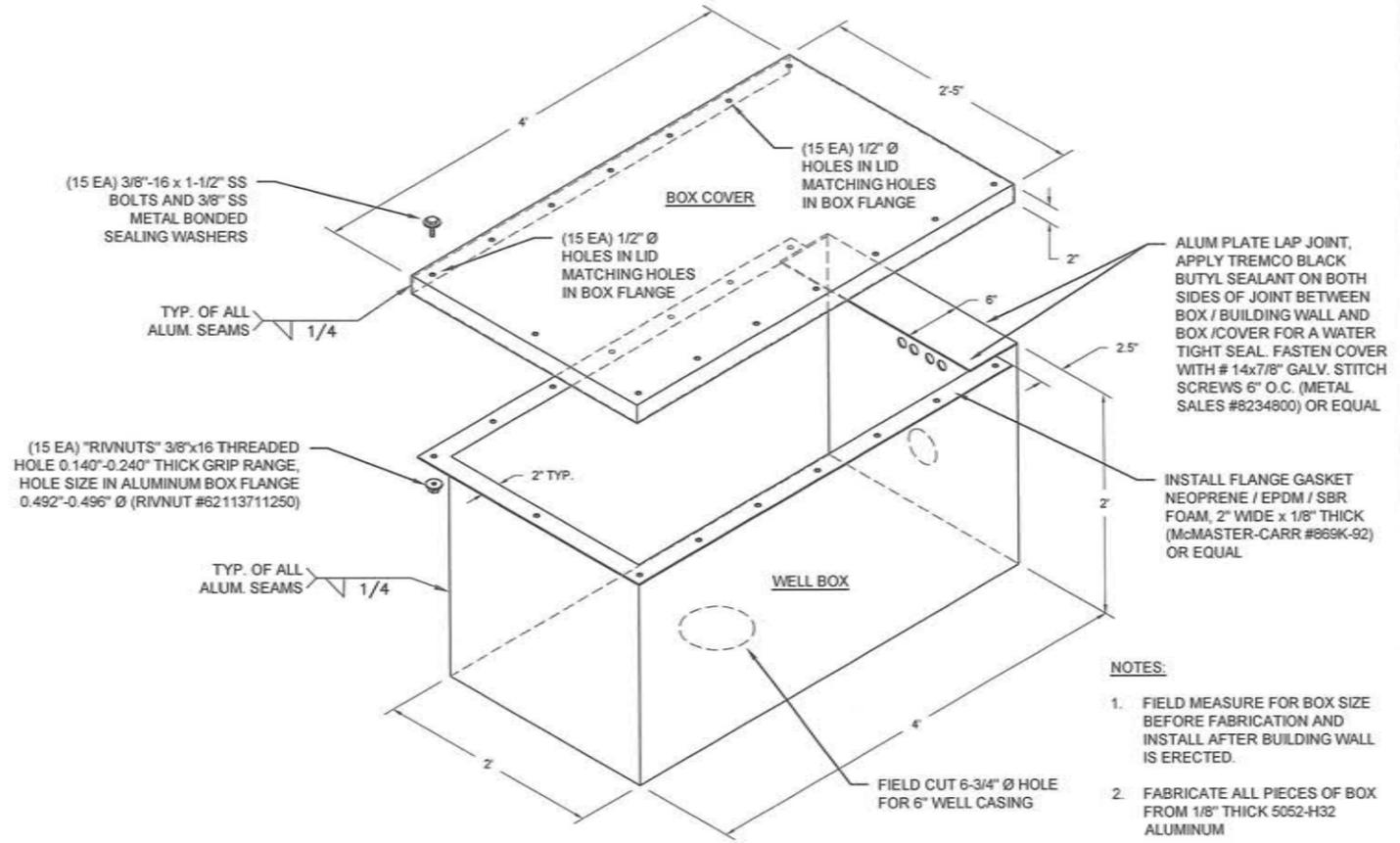


REVISION	BY	DATE
PIPE VARMINT SCREEN	CM	10/15

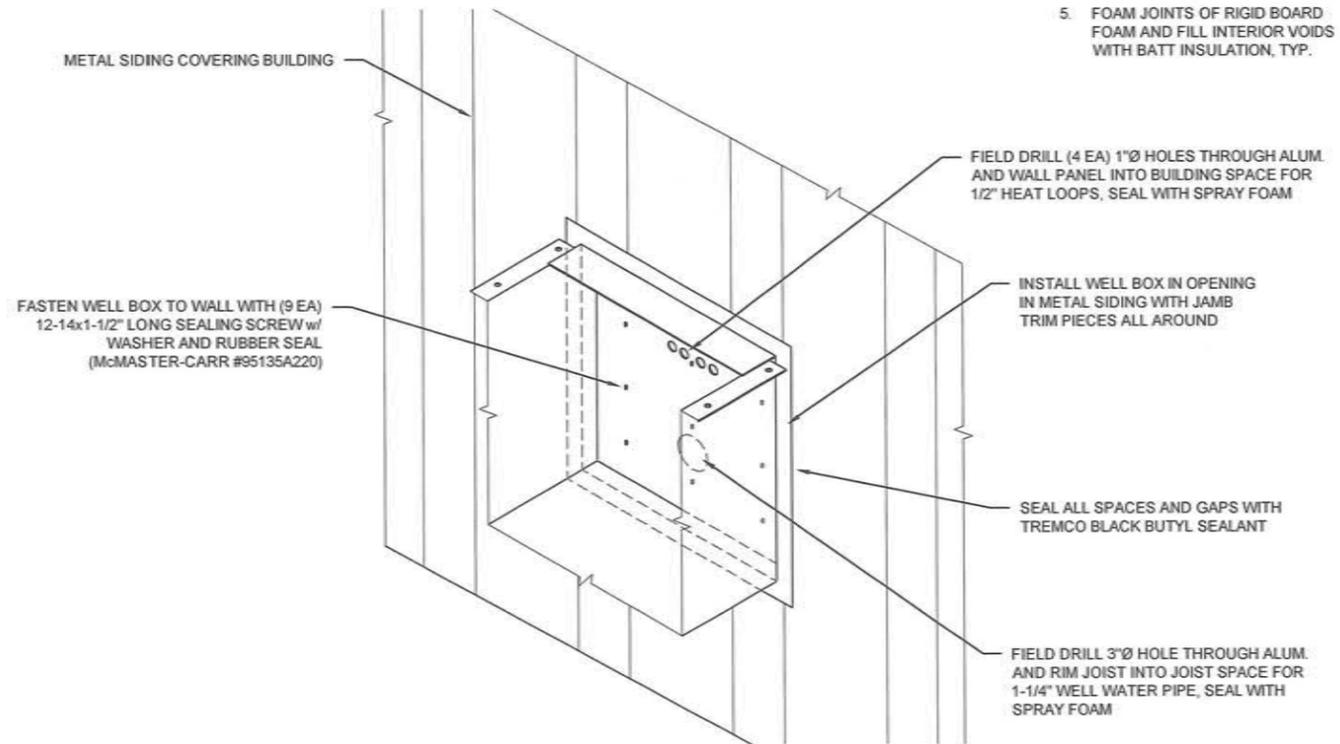
Project No.	Date	Designed	Drawn	Approved
	SEPT. 2015	PCW	CM	PCW



1 PUMP BASE  
 P3.3 1/2" = 1'-0"



2 WELL HEAD BOX CONSTRUCTION  
 P3.3 NTS



3 WELL HEAD BOX CONNECTION  
 P3.3 NTS

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CONSTRUCTION RECORD

FIELD BOOK

STARTING

FOREMAN

AS-BUILT

INSPECTOR

9/28/15

CHEFORNAK, ALASKA

PUMP HOUSE 1 IMPROVEMENTS

DETAILS

CHEFORNAK, ALASKA

CE2 ENGINEERS, INC.

PO BOX 22266 ANCHORAGE, AK 99502 PH 907-546-0100 FAX 907-546-0105

REVISION	BY	DATE

Project No. \_\_\_\_\_ Date \_\_\_\_\_ Sept. 2015  
 Designed \_\_\_\_\_ PCW  
 Drawn \_\_\_\_\_ JDU  
 Approved \_\_\_\_\_ PCW

Sheet No. P3.3 OF \_\_\_\_\_

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\14.0 EQUIPMENT LIST.dwg, 10/13/2015 12:31:34 PM, cmerz, Adobe PDF

REF. OR TAG NO.	EQUIPMENT DESCRIPTION	LOCATION	MANUFACTURER'S SPECIFICATION	SETPOINT
<b>AIR RELEASE, AUTOMATIC</b>				
AV-1	AUTOMATIC AIR RELEASE USED TO VENT AIR OUT OF WATER DISTRIBUTION LOOP AND HEAT EXCHANGER HE-1	WEST WALL OF PUMP HOUSE 1 ON WATER DISCHARGE PIPING	TACO #418 HY-VENT, 3/4" MPT, 150 PSIG, 240oF MAX TEMP.	N/A
<b>CHLORINE FEED</b>				
CL-1	CHLORINE SOLUTION FEED SYSTEM, 4.98 GPD (ADJ) PERISTALTIC PUMP AND 30 GAL DOUBLE WALL HDPE TANK, NSF-61 LISTED	BY EAST WALL PUMP HOUSE 1	BLUE-WHITE #A1N10F-4T PERISTALTIC PUMP WITH SNYDER #1010300N 30 GAL DOUBLE-WALLED HDPE TANK	7.57 ML/MIN OF 1% SODIUM HYPOCHLORITE SOLUTION WITH 10 GPM WELL WATER FLOW.
<b>FLOW METERS, FLOW SWITCH</b>				
FM-1	FLOWMETER WITH TURBINE-TYPE SENSOR, HANDLES 2.8-190 GPM THROUGH 1-1/2" PIPE, 1-1/2" SCH 80 PVC INSERTION TEE	CENTRAL AREA OF PUMP HOUSE 1 ON WELL WATER FEED LINE	FLOW METER ASSEMBLY-INSERTION TEE, 1-1/2" (50 mm) POLYPRO, GEORG FISHER "SIGNET" #727310010, STANDARD PADDLEWHEEL MOUNT SENSOR, GEORG FISHER "SIGNET" #3-2536-P-0 (CODE 198.840.143), PANEL MOUNTED CONTROLLER PROGRAMMED FOR FLOW IN GPM AND TOTALIZER IN GALLONS, GEORG FISHER "SIGNET" MODEL 9900 #3-9900-1P (CODE 159.001.695) WITH 4-20 ma OUTPUT MODULE #3-9900.398-1 (CODE 159.001.784)	
FM-2	FLOWMETER WITH TURBINE-TYPE SENSOR, HANDLES 3.1-314 GPM THROUGH 2" PIPE, 2" INSERTION TEE	ON 2" PVC LINE BETWEEN WT-2 OUTLET AND PRESSURE PUMP MANIFOLD.	FLOW METER ASSEMBLY-INSERTION TEE, 2" (63 mm) POLYPRO, GEORG FISHER "SIGNET" #727310011, STANDARD PADDLEWHEEL MOUNT SENSOR, GEORG FISHER "SIGNET" #3-2536-P-0 (CODE 198.840.143), PANEL MOUNTED CONTROLLER PROGRAMMED FOR FLOW IN GPM AND TOTALIZER IN GALLONS, GEORG FISHER "SIGNET" MODEL 9900 #3-9900-1P (CODE 159.001.695) WITH 4-20 ma OUTPUT MODULE #3-9900.398-1 (CODE 159.001.784)	
FM-3	FLOWMETER WITH TURBINE-TYPE SENSOR, HANDLES 3.1-314 GPM THROUGH 2" PIPE, 2" INSERTION TEE	WEST WALL OF PUMP HOUSE 1 ON WATER DISTRIBUTION LOOP PIPING	FLOW METER ASSEMBLY-INSERTION TEE, 2" (63 mm) POLYPRO, GEORG FISHER "SIGNET" #727310011, STANDARD PADDLEWHEEL MOUNT SENSOR, GEORG FISHER "SIGNET" #3-2536-P-0 (CODE 198.840.143), PANEL MOUNTED CONTROLLER PROGRAMMED FOR FLOW IN GPM AND TOTALIZER IN GALLONS, GEORG FISHER "SIGNET" MODEL 9900 #3-9900-1P (CODE 159.001.695) WITH 4-20 ma OUTPUT MODULE #3-9900.398-1 (CODE 159.001.784)	
FS-1	FLOW SWITCH, ELECTRONIC, USING HEATER & TEMPERATURE SENSING FOR FLOW (0.015 TO 0.5"/SEC), 3/4" MPT CONNECTION, 115 VAC, 2" INSERTION LENGTH	FLOW OF WATER IN DISTRIBUTION LOOP	FLUID COMPONENTS INTERNATIONAL (FCI) MODEL FLT93S-1A-1A102C-4BB00-00	UPPER END OF RANGE, ABOUT 0.5 FT/SEC
<b>EXPANSION AND HYDROPNEUMATIC TANKS</b>				
HT-1	HYDROPNEUMATIC TANK, 150 PSIG WORKING PRESSURE, 7.6 GAL TANK VOLUME, BLADDER TYPE, MAXIMUM ACCEPTANCE FACTOR 0.43	SE CORNER OF PUMP HOUSE 1 ON DISCHARGE LINE FROM PP-1A AND PP-1B	AMTROL WX-103, 3/4" MIPT SYSTEM CONNECTION	10 PSI AIR PRECHARGE
<b>HEAT EXCHANGERS</b>				
HE-1	DOUBLE WALLED SS PLATE-AND FRAME TYPE HEAT EXCHANGER FOR WATER DISTRIBUTION LOOP REHEAT, HOT 50% GLYCOL SIDE, 16.55 GPM FROM 170F TO 150F, 0.49 PSI DROP; 40 GPM ON COLD WATER SIDE, 45F TO 52F, 47F, 2.06 PSI DROP, 150,000 BTU/HR, 2" MIPT SS CONNECTIONS	WEST WALL OF PUMP HOUSE 1 ON WATER DISCHARGE PIPING	AMERIDEX #X-15-17-DW, DOUBLE WALL PLATE AND FRAME TYPE 316 SS CASSETTES, 2" MPT PORTS	N/A
<b>LEVEL CONTROLLERS</b>				
LC-1	ULTRASONIC LEVEL SENSOR, 4-20 MA OUTPUT, 3 EA SPDT RELAYS, 120 VAC POWER SUPPLY, PROGRAMMABLE IN PLACE, MEASURING DISTANCE 0.33 TO 9.8 FEET	TOP OF WATER TANK WT-1	FLOWLINE ECHOSWITCH #LU77-5004	PER TANK LEVELS SET BY ENGINEER AT STARTUP
LC-2	ULTRASONIC LEVEL SENSOR, 4-20 MA OUTPUT, 3 EA SPDT RELAYS, 120 VAC POWER SUPPLY, PROGRAMMABLE IN PLACE, MEASURING DISTANCE 0.33 TO 9.8 FEET	TOP OF WATER TANK WT-2	FLOWLINE ECHOSWITCH #LU77-5004	PER TANK LEVELS SET BY ENGINEER AT STARTUP
<b>MOTOR CONTROLS</b>				
MC-PP1A	VFD DRIVE CONTROLLER, 230 VAC 1 PH INPUT, 230 VAC 3 PH OUTPUT, VARIABLE TORQUE, NEMA 11 ENCLOSURE W/ KEYPAD	SW CORNER OF PUMP HOUSE 1, SOUTH WALL	ABB #ACQ550-U1-012A-2	50 PSIG INITIAL
MC-PP-1B	VFD DRIVE CONTROLLER, 230 VAC 1 PH INPUT, 230 VAC 3 PH OUTPUT, VARIABLE TORQUE, NEMA 11 ENCLOSURE W/ KEYPAD	SW CORNER OF PUMP HOUSE 1, SOUTH WALL	ABB #ACQ550-U1-012A-2	50 PSIG INITIAL
MC-CP-1A	VFD DRIVE CONTROLLER, 230 VAC 1 PH INPUT, 230 VAC 3 PH OUTPUT, VARIABLE TORQUE, NEMA 11 ENCLOSURE W/ KEYPAD	SW CORNER OF PUMP HOUSE 1, WEST WALL	ABB #ACQ550-U1-012A-2	45F RETURN TEMPERATURE OF WATER DISTRIBUTION LOOP
MC-CP-1B	VFD DRIVE CONTROLLER, 230 VAC 1 PH INPUT, 230 VAC 3 PH OUTPUT, VARIABLE TORQUE, NEMA 11 ENCLOSURE W/ KEYPAD	SW CORNER OF PUMP HOUSE 1, SOUTH WALL	ABB #ACQ550-U1-012A-2	45F RETURN TEMPERATURE OF WATER DISTRIBUTION LOOP

REF. OR TAG NO.	EQUIPMENT DESCRIPTION	LOCATION	MANUFACTURER'S SPECIFICATION	SETPOINT
<b>PRESSURE GAUGES</b>				
PG-1	PRESSURE GAUGE, 4" DIAMETER FACE, 0-100 PSIG, SILICONE FILLED, 1/2" MPT BOTTOM PIPING CONNECTION, STAINLESS STEEL CASE AND TUBE	MULTIPLE LOCATIONS	WIKA TYPE 233.5, 4" DIA CASE, 0-100 PSIG	N/A
PG-2	PRESSURE GAUGE, 4" DIAMETER FACE, 0-60 PSIG, SILICONE FILLED, 1/2" MPT BOTTOM PIPING CONNECTION, STAINLESS STEEL CASE AND TUBE	MULTIPLE LOCATIONS	WIKA TYPE 233.5, 4" DIA CASE, 0-60 PSIG	N/A
<b>PUMPS, CIRCULATING, BACKWASH, EFFLUENT, PRESSURE, SEWAGE, TRANSFER, ETC.</b>				
CP-1A, CP-1B	VERTICAL MULTI-STAGE CENTRIFUGAL PUMP, SS HOUSING, IMPELLER, & SHAFT, 40 GPM @ 70' TDH, 2" 300 LB SUCTION AND DISCHARGE FLANGES, 230 VAC 3 PH MOTOR W/ VFD	SE CORNER OF PUMP HOUSE 1, WEST WALL	GOUDS MODEL ESV VERTICAL MULTISTAGE PUMP, 5 STAGE, 1 HP 1750 RPM TEFC MOTOR, 230 V 3 PH, GOULDS CAT. # 15SV5WC8C20	SEE PUMP CURVE ON SHEET P4.1
PP-1A, PP-1B	VERTICAL MULTI-STAGE CENTRIFUGAL PUMP, SS HOUSING, IMPELLER, & SHAFT, 15 GPM @ 130' TDH, 2" 300 LB SUCTION AND DISCHARGE FLANGES, 230 VAC 3 PH MOTOR W/ VFD	SW CORNER OF PUMP HOUSE 1, SOUTH WALL	GOUDS MODEL ESV VERTICAL MULTISTAGE PUMP, 20 STAGE, 1 HP 1750 RPM TEFC MOTOR, 230 V 3 PH, GOULDS CAT. # 5SV20WC8B20	SEE PUMP CURVE ON SHEET P4.1
TP-1	SELF PRIMING TRANSFER PUMP, 1-1/2 X 1-1/2 FIPT, 1/3 HP, 115/230 VAC, 12-33 GPM @ 25' TO 10 FT TDH	SE CORNER OF PUMP HOUSE 1, SOUTH WALL	GRAINGER MODEL 4YKP5	N/A
WP-1	SUBMERSIBLE WELL PUMP, MULTI-STAGE, 1-1/4" FPT OUTLET, 10 GPM @ 175' TDH, 3.0" O.D. PUMP & MOTOR, 1/2 HP 230 V 1 PH, 2 WIRE CONNECTION WITH VFD 3-PHASE CONTROLLER AND MANUAL SPEED POTENTIOMETER	SET IN CITY WELL NORTH OF PUMP HOUSE 1	GRUNDFOS 10SQE05-160 3" SUBMERSIBLE WELL PUMP, 1/2 hp, 230 V SINGLE PHASE INPUT TO CU300 CONTROLLER, WHICH RUNS A 3 PHASE MOTOR IN PUMP. MANUAL SPEED POT SET TO 9 GPM. NO SUBS.	SEE PUMP CURVE ON SHEET P4.1
<b>PRESSURE RELIEF VALVES</b>				
PV-1	PRESSURE RELIEF VALVE, BRONZE BODY, 1" NPTF, 75 PSI, RIGHT ANGLE VALVE, ASME RATED	NEAR RAW WATER INLET TO HEAT EXCHANGER HE-1	WATTS #174A, 1"x1", 75 PSI	N/A
<b>PRESSURE SWITCHES AND TRANSDUCERS</b>				
PS-1	LOW PRESSURE ALARM SWITCH	PRESSURE SENSING INSTRUMENT TREE	HONEYWELL L604A 1185, 1/4" - 18 NPT FEMALE, WITH 1/4" MPT SIPHON LOOP	25 PSI WITH 15 PSI (MIN) DIFFERENTIAL
PT-1	PRESSURE TRANSDUCER, 0 TO 100 PSIG, 1/4" MIPT CONNECTION, 4-20 MA LOOP POWERED	PRESSURE SENSING INSTRUMENT TREE	NOSHOK 100 SERIES PART NO. 100-100-2-1-1-7	N/A
PT-2	PRESSURE TRANSDUCER, 0 TO 100 PSIG, 1/4" MIPT CONNECTION, 4-20 MA LOOP POWERED	PRESSURE SENSING INSTRUMENT TREE	NOSHOK 100 SERIES PART NO. 100-100-2-1-1-7	N/A
PT-3	PRESSURE TRANSDUCER, 0 TO 100 PSIG, 1/4" MIPT CONNECTION, 4-20 MA LOOP POWERED	PRESSURE SENSING INSTRUMENT TREE	NOSHOK 100 SERIES PART NO. 100-100-2-1-1-7	N/A
<b>TANKS</b>				
WT-1	HDPE VERTICAL CYLINDRICAL WATER STORAGE TANK, 95" DIA X 92" H, 2500 GAL, 16" DIA TOP MANWAY WITH VENT	IN CENTRAL AREA OF PUMP HOUSE 1	GREER TANK VERTICAL CYLINDRICAL HDPE TANK, 2500 GALLONS	N/A
WT-2	HDPE VERTICAL CYLINDRICAL WATER STORAGE TANK, 95" DIA X 92" H, 2500 GAL, 16" DIA TOP MANWAY WITH VENT	IN CENTRAL AREA OF PUMP HOUSE 1	GREER TANK VERTICAL CYLINDRICAL HDPE TANK, 2500 GALLONS	N/A
<b>THERMOMETERS, TEMPERATURE CONTROLLERS, AND TRANSDUCERS</b>				
TH-1	THERMOMETER, DIGITAL, SELF-POWERED, VARIABLE ANGLE MOUNTING, RANGE -40F TO +300F, WITH THERMOWELL	VARIOUS LOCATIONS, AS REQUIRED	WEISS #DVU35 ELECTRONIC THERMOMETER (INDUSTRIAL GLASS THERMOMETER STEM ASSEMBLY, 3 1/2" STEM LENGTH), WITH E35-75BS 3/4" NPT SOCKET	N/A
TT-1	PLATINUM RESISTANCE TEMPERATURE TRANSMITTER, 4-20 MA, 0/140F RANGE, CLASS B ACCURACY, 1/2" MIPT PROCESS CONNECTION, RIGHT ANGLE HIRSCHMANN CONNECTOR, 2.5" L STEM LENGTH, 6 MM STEM DIAMETER, 316 STAINLESS STEEL	RETURN LINE ON WATER DISTRIBUTION LOOP ON WEST WALL OF PUMP HOUSE 1	NOSHOK 800 SERIES, CATALOG NUMBER 800-0/140-1-1-8-8-025-6	N/A

**RECORD DRAWING CERTIFICATE**

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NAME \_\_\_\_\_ DATE \_\_\_\_\_

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SCALE: AS SHOWN

SCALE: 1" = 10'-0"

SCALE: 1" = 20'-0"

SCALE: 1" = 30'-0"

SCALE: 1" = 40'-0"

SCALE: 1" = 50'-0"

SCALE: 1" = 60'-0"

SCALE: 1" = 70'-0"

SCALE: 1" = 80'-0"

SCALE: 1" = 90'-0"

SCALE: 1" = 100'-0"

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**CONSTRUCTION RECORD**

FIELD BOOK \_\_\_\_\_

STAKING \_\_\_\_\_

FOREMAN \_\_\_\_\_

AS-BUILT \_\_\_\_\_

INSPECTOR \_\_\_\_\_

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**PUMP HOUSE 1 IMPROVEMENTS**

**EQUIPMENT LIST**

CHEFORNAK, ALASKA

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REVISION	CHANGED CL-1 INFO	BY	DATE

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Project No. \_\_\_\_\_ Date \_\_\_\_\_

Designed \_\_\_\_\_ PCW

Drawn \_\_\_\_\_ CM

Approved \_\_\_\_\_ PCW

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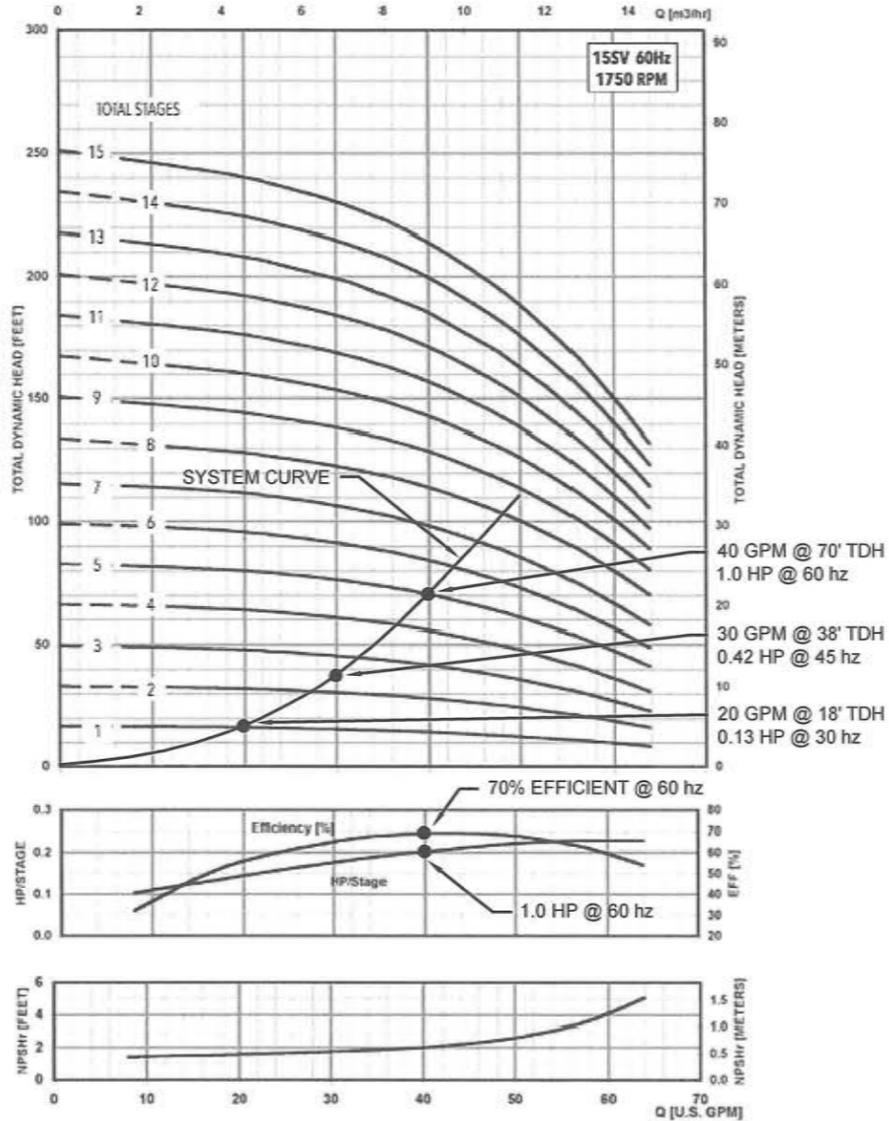
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Performance Curve

15SV 1750 RPM

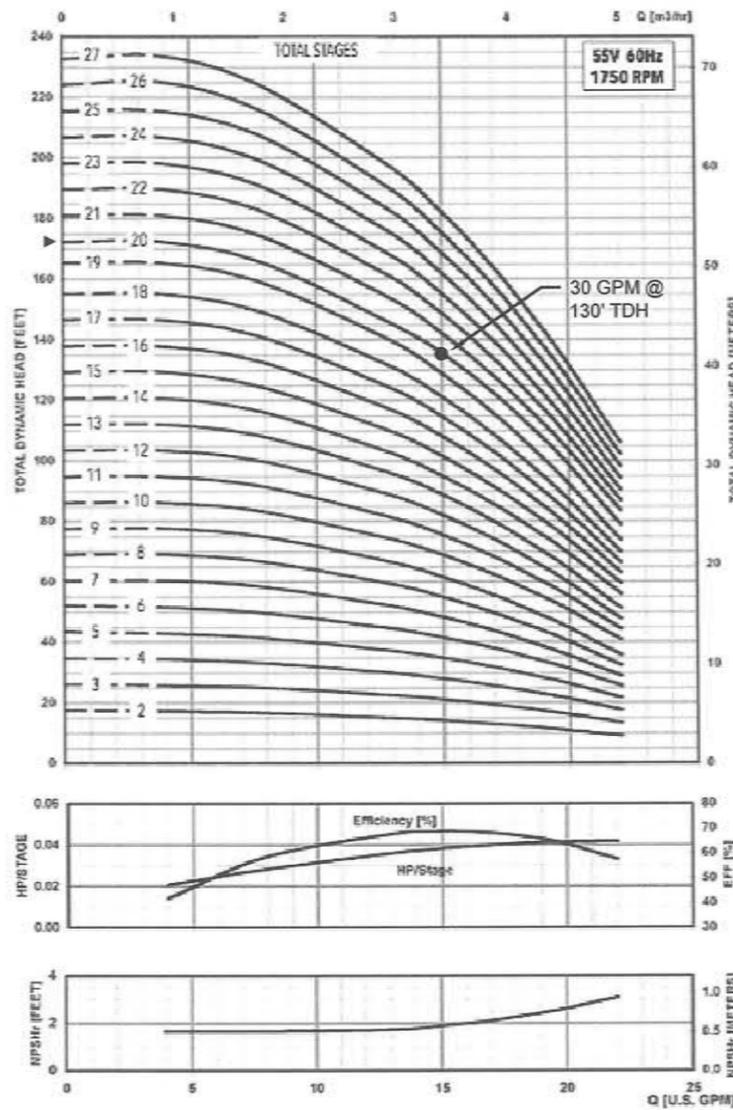


1 CP-1A, CP-1B PUMP PERFORMANCE CURVE  
C4.1 NTS

VARIABLE FLOW RATE CURVE  
CP-1A&B OPERATE WITH VFD'S THAT VARY THE FREQUENCY TO MAINTAIN A CONSTANT 45°F TEMPERATURE AT THE INLET OF THE WATER LOOP HEAT EXCHANGER IN THE CITY POWER PLANT.

60 Hz Performance Curve

5SV 1750 RPM

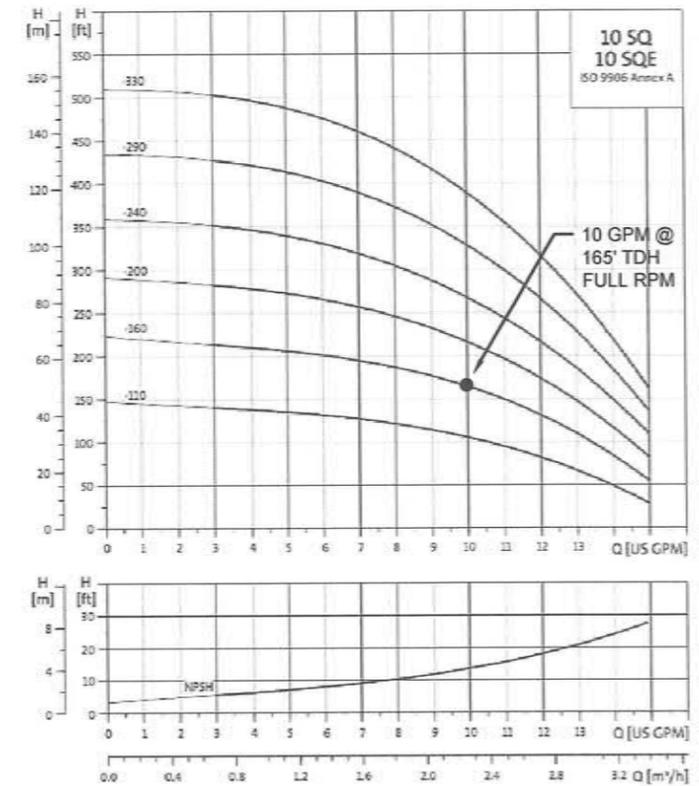


2 PP-1A, PP-1B PUMP PERFORMANCE CURVE  
C4.1 NTS

CONSTANT PRESSURE CURVE  
PP-1A&B OPERATE WITH VFD'S THAT VARY THE FREQUENCY TO MAINTAIN A CONSTANT 50 P.S.I.

60 Hz

10 SQ, SQE



3 WP-1 PUMP PERFORMANCE CURVE  
C4.1 NTS

CONSTANT FLOW RATE CURVE  
WP-1 PERFORMANCE CURVE MAXIMUM FLOW SET BY ADJUSTING SPEED POTENTIOMETER TO DESIRED FLOW RATE ON FM-1 (USUALLY 9 GPM)

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IF NOT ONE FOOT OR SCALE ACCORDINGLY

CONSTRUCTION RECORD  
FIELD BOOK  
STARTING FOREMAN AS-BUILT INSPECTOR



PUMP HOUSE 1 IMPROVEMENTS  
PUMP CURVES  
CHEFORNAK, ALASKA



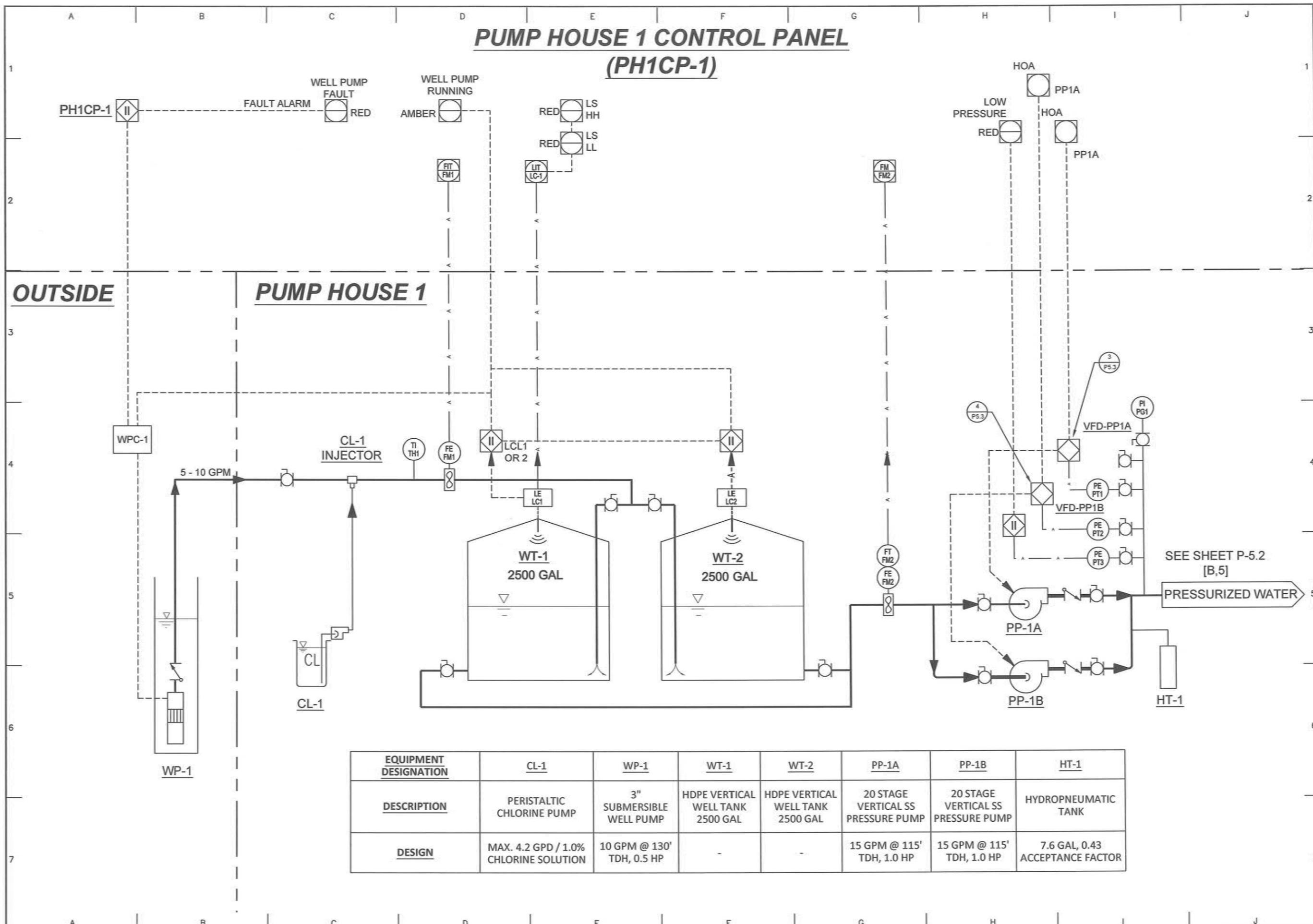
REVISION	BY	DATE

Project No. \_\_\_\_\_ Date JULY 2015  
Designed by PCW Drawn by CM Approved by PCW

Sheet No. P4.1  
SHEET OF



# PUMP HOUSE 1 CONTROL PANEL (PH1CP-1)



**OUTSIDE**

**PUMP HOUSE 1**

EQUIPMENT DESIGNATION	CL-1	WP-1	WT-1	WT-2	PP-1A	PP-1B	HT-1
DESCRIPTION	PERISTALTIC CHLORINE PUMP	3" SUBMERSIBLE WELL PUMP	HDPE VERTICAL WELL TANK 2500 GAL	HDPE VERTICAL WELL TANK 2500 GAL	20 STAGE VERTICAL SS PRESSURE PUMP	20 STAGE VERTICAL SS PRESSURE PUMP	HYDRO-PNEUMATIC TANK
DESIGN	MAX. 4.2 GPD / 1.0% CHLORINE SOLUTION	10 GPM @ 130' TDH, 0.5 HP	-	-	15 GPM @ 115' TDH, 1.0 HP	15 GPM @ 115' TDH, 1.0 HP	7.6 GAL, 0.43 ACCEPTANCE FACTOR

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# NOT ONE INCH ON SCALE UNLESS OTHERWISE NOTED

CONSTRUCTION RECORD  
FIELD BOOK STAMPS  
STAMPING FOR MAN AS-BUILT INSPECTOR

STATE OF ALASKA  
REGISTERED PROFESSIONAL ENGINEER  
PAUL C. 10276  
REGISTERED 1987

PUMP HOUSE 1 IMPROVEMENTS  
P&ID WATER CIRCULATION AND PRESSURIZATION  
CHEFORNAK, ALASKA

CE2  
ENGINEERS, INC.

PO BOX 22946 ANCHORAGE, AK 99502 PH: 907-349-1010 FAX: 907-349-0515

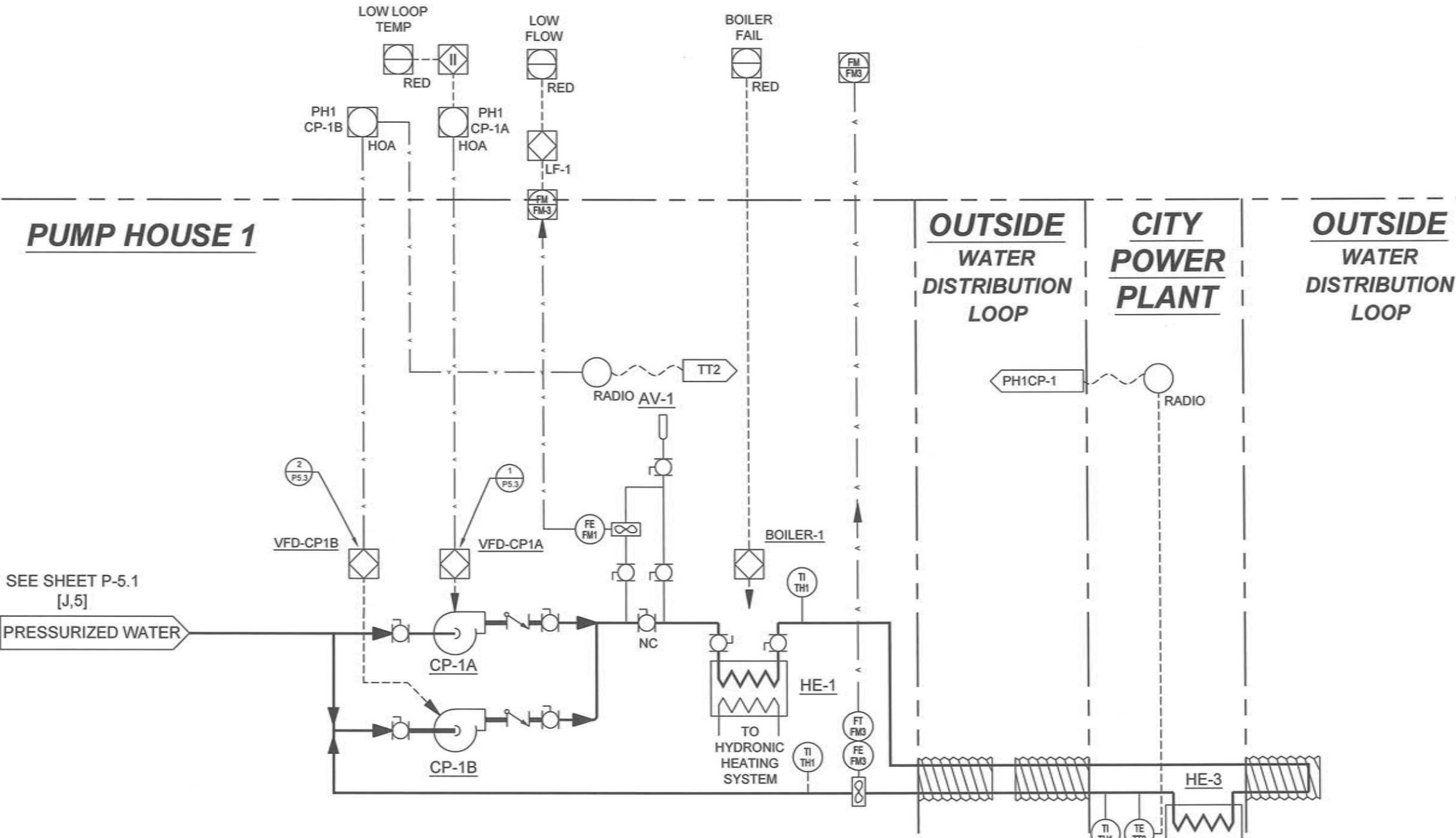
BY	DATE

Project No. \_\_\_\_\_ Date: SEPT. 2015 Designed: PCW Drawn: PCW Approved: PCW

Sheet No. **P5.1**  
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G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\PS.1 P&ID PART 1.dwg, 9/25/2015 11:54:39 AM, cmerz, \\ce2main\LANIER MP C2050\LD520C PCL 6

# PUMP HOUSE 1 CONTROL PANEL (PH1CP-1)



SEE SHEET P-5.1  
[J,5]  
PRESSURIZED WATER

EQUIPMENT DESIGNATION	CP-1A	CP-2A	HE-1	HE-3
DESCRIPTION	5 STAGE VERTICAL SS CIRCULATION PUMP	5 STAGE VERTICAL SS CIRCULATION PUMP	DOUBLE-WALL ED PLATE & FRAME HEAT EXCHANGER	DOUBLE-WALL ED PLATE & FRAME HEAT EXCHANGER
DESIGN	40 GPM @ 70' TDH, 1.0 HP	40 GPM @ 70' TDH, 1.0 HP	150,000 BTU/HR	300,000 BTU/HR

RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

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SCALE: AS SHOWN

BASED ON SECTION ORIGINAL DRAWING

IF NOT SHOWN IN THIS DRAWING, THE SHEET ADJUST SCALES ACCORDINGLY

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CONSTRUCTION RECORD	
FIELD BOOK	STARTING
FOREMAN	AS BUILT
INSPECTOR	

---

PUMP HOUSE 1 IMPROVEMENTS

P&ID WATER CIRCULATION AND PRESSURIZATION

CHEFORNIAK, ALASKA

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PO BOX 22894 ANCHORAGE, AK 99521 PH: 907-346-0100 FAX: 907-346-0115

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REVISION	BY	DATE

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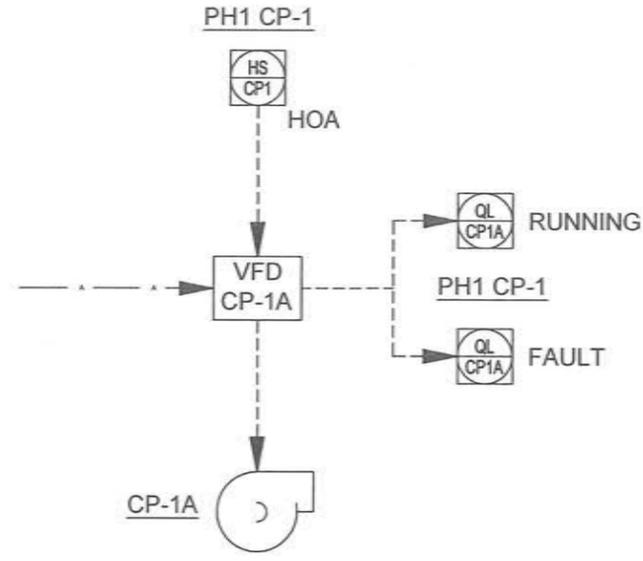
Project No. _____	Date: SEPT. 2015	Designed: PCW	Drawn: PCW	Approved: ECOL
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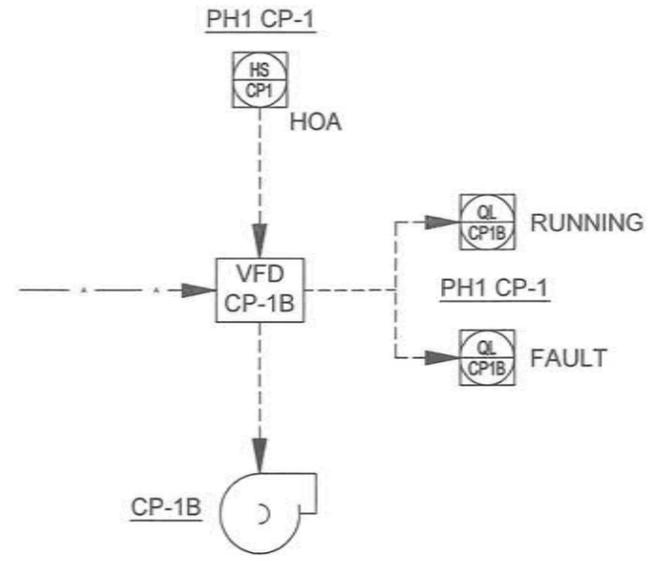
Sheet No. **P5.2**

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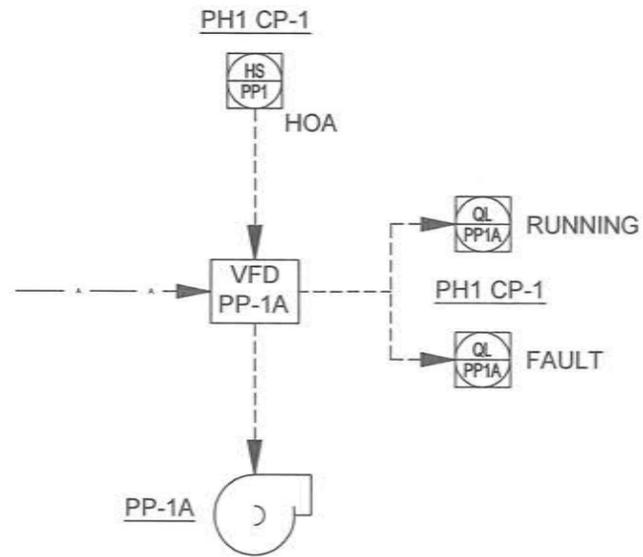
G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\P5.1 P&ID PART 1.dwg, 9/25/2015 11:55:25 AM, cmerz, \\Cezmain\LANIER MP C2050\LD520C PCL 6



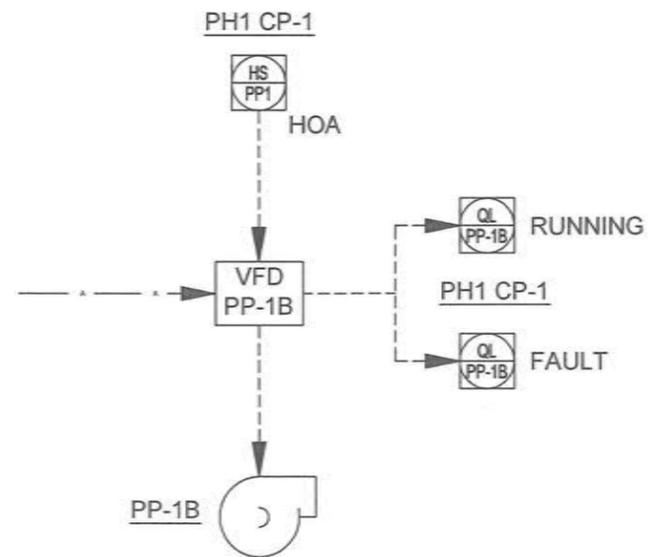
1 CP-1A CONTROLS AND INDICATORS  
 P5.3 N.T.S.



2 CP-1B CONTROLS AND INDICATORS  
 P5.3 N.T.S.



3 PP-1A CONTROLS AND INDICATORS  
 P5.3 N.T.S.



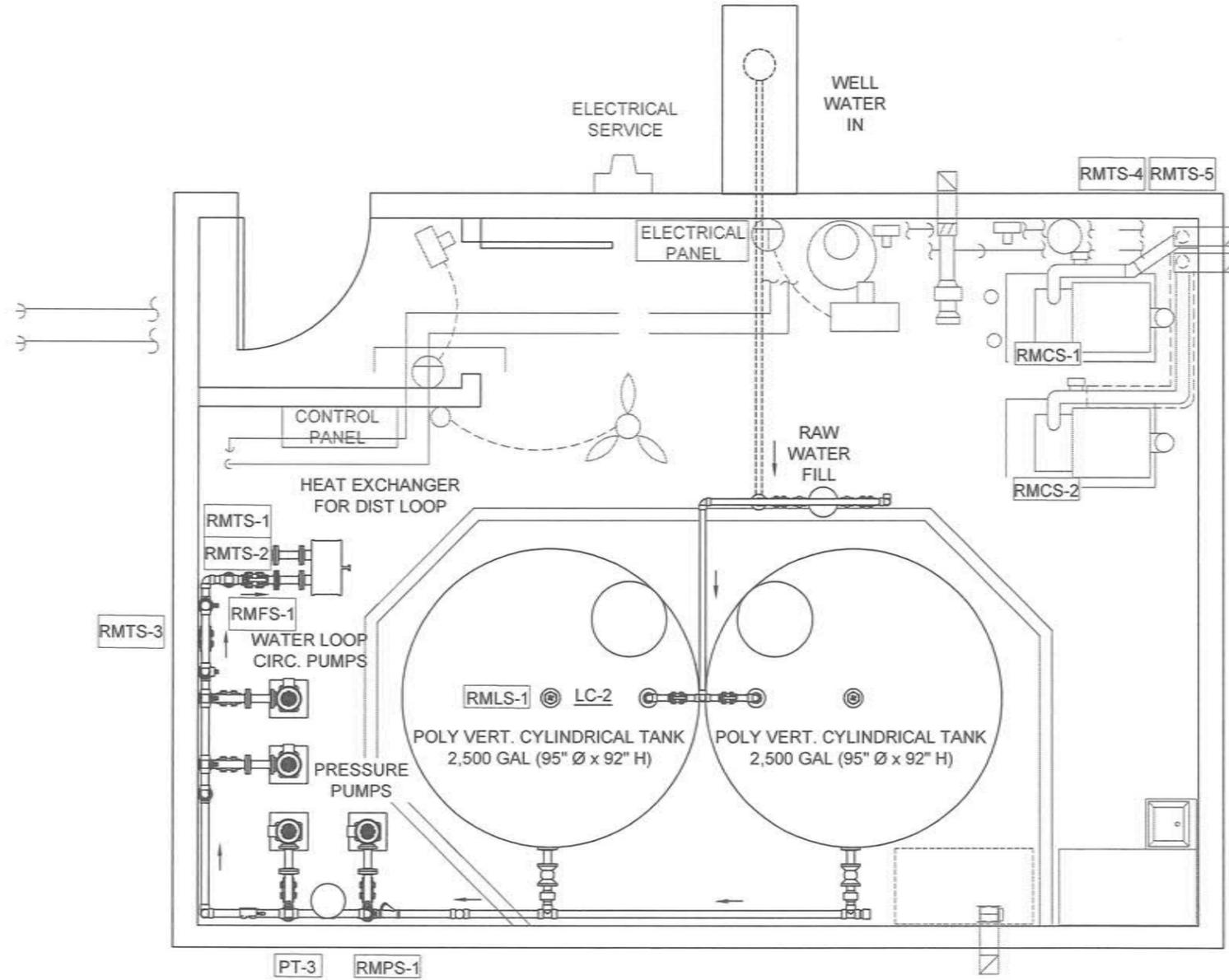
4 PP-1B CONTROLS AND INDICATORS  
 P5.3 N.T.S.

9/28/15

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: AS SHOWN BASE IS ONE INCH FOR ORIGINAL DRAWING IF ANY ONE INCH FOR THIS SHEET, ADJUST SCALES ACCORDINGLY	CONSTRUCTION RECORD FIELD BOOK STARTING _____ FOREMAN _____ AS-BUILT _____ INSPECTOR _____	STATE OF ALASKA REGISTERED PROFESSIONAL ENGINEER PAUL C. WESNER CE-10276
PUMP HOUSE 1 IMPROVEMENTS P&ID PUMP DETAILS CHEFORNAK, ALASKA		ENGINEERS, INC. PO BOX 2396 ANCHORAGE, AK 99523 PH: 907-548-0101 FAX: 907-548-0105	
Project No. _____ Date JULY 2015 Designed PCW Drawn PCW Approved PCW	REVISION BY   DATE	SHEET No. P5.3 SHEET OF	BY   DATE

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\PG.0 REMOTE SENSOR PLAN.dwg, 8/26/2015 1:11:52 PM, cmerz, \CE2\MAIN\LANIER MP 6001\LD360 PCL 6

WIRELESS SENSOR TABLE		
WIRELESS SENSOR TAG NUMBER	SENSOR FUNCTION	MONNIT PART NUMBER
RMLS-1	MEASURES LEVEL IN WATER TANKS IN GALLONS THROUGH 4020 MA SIGNAL FROM LC-1 ON WT-2	MNS-9-MA-W1-LD
RMPS-1	MEASURES WATER SYSTEM PRESSURE FROM 4-20 MA SIGNAL OFF PT-3	MNS-9-MA-W1-LD
RMTS-1	MEASURES WATER TEMPERATURE OUT TO DISTRIBUTION LOOP	MNS-9-WT-W1-LD
RMTS-2	MEASURES WATER TEMPERATURE FROM INCOMING DISTRIBUTION LOOP	MNS-9-WT-W1-LD
RMTS-3	MEASURES OUTSIDE AIR TEMPERATURE WITH 3 FT LONG REMOTE PROBE	MNS-9-TS-W1-LD
RMFS-1	WATER DISTRIBUTION LOOP FLOW SENSOR 4-20 MA THROUGH FM-3 CURRENT LOOP	MNS-9-MA-W1-LD
RMTS-4	MEASURES HYDRONIC LOOP SUPPLY TEMPERATURE	MNS-9-WT-W1-LD
RMTS-5	MEASURES HYDRONIC LOOP RETURN TEMPERATURE	MNS-9-WT-W1-LD
RMCS-1	NOTES BOILER B-1 ON TIME THROUGH CONTACT SWITCH ON BOILER CONTROL	MNS-9-CF-W1-LD
RMCS-2	NOTES BOILER B-2 ON TIME THROUGH CONTACT SWITCH ON BOILER CONTROL	MNS-9-CF-W1-LD
MONNIT ETHERNET GATEWAY	GATHERS WIRELESS SENSOR DATA AND SENDS IT TO CELL PHONE MODEM	-----
CLOUD GATE CELL PHONE MODEM	RECEIVES SENSOR DATA FROM ETHERNET GATEWAY AND SENDS IT OVER LOCAL CELL NETWORK TO MONNIT CLOUD	-----



1 REMOTE SENSOR LOCATIONS  
P6.0 MTS

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:  
AS SHOWN

1" = 10'-0" (AS SHOWN)  
1" = 20'-0" (AS SHOWN)  
1" = 40'-0" (AS SHOWN)  
1" = 80'-0" (AS SHOWN)

CONSTRUCTION RECORD

FIELD BOOK \_\_\_\_\_

STAKING \_\_\_\_\_

FOREMAN \_\_\_\_\_

AS-BUILT \_\_\_\_\_

INSPECTOR \_\_\_\_\_

STATE OF ALASKA  
REGISTERED PROFESSIONAL ENGINEER  
PAUL C. WESNER  
No. C-10276  
EXPIRES 12/31/2016

PUMP HOUSE 1 IMPROVEMENTS  
REMOTE SENSOR LOCATIONS  
CHEFORNAK, ALASKA

CE2

ENGINEERS, INC.  
PO BOX 20296 ANCHORAGE, AK 99523 PH 907-348-8000 FAX 907-348-1015

REVISION	BY	DATE

Project No.	JULY 2015	PCW	JDL	ECW
Date				
Designed				
Drawn				
Approved				

Sheet No. P6.0  
SHEET \_\_\_\_\_ OF \_\_\_\_\_

G:\ACAD\CHEFORMAK\2014 Pumphouse Improvements\Pump House 1\From Others\Fred Belz Mechanical\C407 M-1.0 CHEFORMAK PUMPHOUSE #1 LEGEND, NOTES, OVERVIEW.dwg, 9/1/2015 1:38:17 PM, cmerz, \\C02main\LANIER MP C2050\LD520C PCL 6

**MECHANICAL / HVAC SYSTEMS OVERVIEW**

MECHANICAL SYSTEMS FOR THE PUMP HOUSE ARE DESIGNED TO UTILIZE HEAT FROM THE BOILERS TO HEAT THE STRUCTURE, HEAT THE WELL HEAD AREA, AND TO PROVIDE ADD HEAT FOR THE VILLAGE DOMESTIC WATER LOOP.

MECHANICAL SYSTEMS ARE DESIGNED FOR MAINTENANCE BY LOCAL ON SITE PERSONNEL.

THE OUTSIDE AIR VENTILATION SYSTEM IS DESIGNED FOR OPERATION ONLY WHEN THE FACILITY IS OCCUPIED OR WHEN THE INSIDE AIR TEMPERATURE CAN CAUSE ELECTRICAL EQUIPMENT PROBLEMS.

THE HAND WASH SINK IS DESIGNED FOR CLEAN UP DURING REPAIRS IN THE AREA

**GENERAL NOTES:**

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.

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.

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

INSTRUCT OWNERS PERSONNEL FOR OPERATION AND MAINTENANCE PROCEDURES.

INSTALL ALL EQUIPMENT PER MANUFACTURERS RECOMMENDATIONS.

INSTALL EQUIPMENT TO PROVIDE EASE OF ACCESS FOR MAINTENANCE.

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

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.

**MECHANICAL DRAWING LIST**

- M-1.0 LEGEND DRAWING LIST GENERAL NOTES MECHANICAL/PLUMBING OVERVIEW
- M-1.1 PIPING AND MATERIALS LIST
- M-1.2 EQUIPMENT SCHEDULES
- M-1.3 CONTROLS
- M-1.4 CONTROLS
- M-1.5 CONTROLS
- M-2.0 MECHANICAL PLAN
- M-2.1 MECHANICAL SECTIONS
- M-2.2 MECHANICAL DETAILS
- M-2.3 MECHANICAL DETAILS
- M-3.0 HEATING SYSTEM DIAGRAM

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

**CAPSTONE ENGINEERING LLC**  
**MECHANICAL ENGINEERS**  
 12110 BUSINESS BLVD. STE. 6, P.O. BOX 169  
 EAGLE RIVER, ALASKA 99577  
 TELEPHONE: 907-414-1456  
 EMAIL: PBE@CEENET.NET



AUGUST 31, 2015

LEGEND DRAWING LIST NOTES MECH/PLG OVERVIEW

CHEFORMAK PUMPHOUSE #1  
 CHEFORMAK, ALASKA

DATE: AUGUST 31, 2015  
 DRAWN: F.H. BELZ  
 CHKD:  
 SCALE: AS NOTED  
 REVISED:  
 JOB NO. C 407

SHEET NO.  
 M-1.0 1 OF 11

G:\ACAD\CHEFORMAK\2014 Pumphouse Improvements\Pump House 1\From Others\Fred Belz Mechanical\C407 M-1.1 CHEFORMAK PUMPHOUSE #1 PIPING AND GENERAL MATERIALS.dwg, 9/1/2015 1:38:39 PM, cmerz, \\Ce2main\LANIER MP C2050\LD520C PCL 6

GLYCOL PIPING MATERIAL

GLYCOL PIPING SHALL BE TYPE L HARD DRAWN COPPER WITH WROUGHT COPPER FITTINGS, PEX TUBING, HDPE, BLACK STEEL, GALVANIZED STEEL, BRASS, OR CAST IRON  
USE HARRIS BRIDGIT OR EQUAL SOLDER FOR COPPER PIPING JOINTS  
VALVES: VALVES SHALL BE BRASS FULL PORT BALL-TYPE  
USE SWEAT OR NPT CONNECTIONS  
MFG: HAMMOND OR EQUAL RATED 400 PSI WOG  
CHECK VALVES: BRONZE SWING CHECK  
MFG: HAMMOND OR EQUAL  
PROVIDE HOSES AND FITTINGS AS REQUIRED FOR GLYCOL FILL AND WATER FILL

GLYCOL PIPING ACCESSORIES

FLOW CONTROL VALVES/CIRCUIT SETTERS: TACO ACUF SERIES OR EQUAL  
PRESSURE GAGES: BOURDON TUBE TYPE 2" DIAL  
THERMOMETERS: STRAP ON TYPE- DIAL INDICATOR  
AS-1 AIR SCOOP 2 INCH SIZE MFG: TACO 434 OR EQUAL  
AS-2 AIR SCOOP 1 INCH SIZE MFG: TACO 432 OR EQUAL  
MAV MANUAL AIR VENT: SCREWDRIVER VENT MFG: TACO 417 OR EQUAL  
AAV AUTO AIR VENT: VENT WITH 3/4" ISOLATION VALVE MFG: TACO 418 OR EQUAL

GLYCOL PIPING INSULATION

ALL GLYCOL PIPING SHALL BE INSULATED, VALVES ARE NOT INSULATED:  
INSULATION: GHS-GHR(180 F PIPING), HW PIPING: 1 INCH FIBERGLASS WITH SEALING JACKET AND FITTING COVERS

GLYCOL

GLYCOL 50-50 MIX INHIBITED PROPYLENE GLYCOL: MFG: DOWFROST OR EQUAL

GLYCOL OR FUEL OIL PIPING HANGERS

PROVIDE ROD AND CLEVIS OR TRAPEZE HANGERS FOR HANGING PIPING  
PROVIDE RIGID INSULATION AND INSULATION SHIELDS AT HANGERS  
PROVIDE WALL HANGERS AS REQUIRED  
HANGER SPACING AND SWAY BRACING PER NFPA 13  
PROVIDE UNISTRUT CUSH A CLAMPS FOR PUMP PIPING AREAS TO ALLOW FOR PIPE EXPANSION AND TO REDUCE PIPE STRAIN.

FUEL OIL SUPPLY PIPING MATERIAL

FUEL OIL PIPING SHALL BE LOW TEMP SCH 80 BLACK STEEL A333 BLACK STEEL WITH SOCKET WELD FITTINGS. WELDED JOINTS  
VALVES SHALL BE BRASS FULL PORT BALL-TYPE WITH NPT CONNECTIONS  
MFG: HAMMOND OR EQUAL RATED 400 PSI WOG

FUEL OIL PIPING ACCESSORIES

TL TIGER LOOP AIR ELIMINATOR ( 1 PER BOILER)  
MFG: WESTWOOD PRODUCTS INC TIGERLOOP ULTRA OR EQUAL  
FUSIBLE VALVES: FIROMATIC OR EQUAL  
CHECK VALVES: FIROMATIC OR EQUAL  
FF-1 FUEL FILTER: GENERAL FILTERS 1A-25B OR EQUAL (1 PER BOILER)

GLYCOL/FUEL OIL PIPING GENERAL NOTES

PROVIDE UNIONS OR FLANGES FOR SERVICE AND REPLACEMENT OF EQUIPMENT  
CLEAN AND DRY ALL PIPING BEFORE PUTTING INTO SERVICE  
MATERIALS AND ACCESSORIES SHALL BE AS SHOWN OR EQUAL,

BOILER INSTALLATION ACCESSORIES

PROVIDE 16 GA GALVANIZED SHEET METAL DRIP PANS UNDER OIL BURNERS, OIL FILTERS. VALVES AND TIGER LOOPS  
BOILER STACKS: SELKIRK METALBESTOS TYPE "PS"  
STACK WITH TYPE 304 STAINLESS STEEL INNER AND OUTER PIPES. VERIFY SIZES. PROVIDE DRAFT REGULATORS: FIELD OR EQUAL  
BOILER BASES: PROVIDE 28"WIDE X 48" DEEP X 3 1/2" THICK CONCRETE BASES FOR 2 BOILERS LAG BASES TO FLOOR AND PROVIDE CORNER ANGLES FOR SEISMIC RESTRAINT. SEE DETAILS  
COMBUSTION AIR: PROVIDE DUCTED COMBUSTION AIR FROM HOODS TO BURNERS PER DETAIL PROVIDE BACKDRAFT DAMPERS FOR PLUGGED DUCT OR PLUGGED HOOD OPERATION.

SEISMIC RESTRAINTS

PROVIDE CODE APPROVED WALL STRAPS FOR WATER MAKER TANKS AND HYDROPNEUMATIC TANKS  
SWAY BRACE HANGING PIPING PER NFPA 13  
PROVIDE GALVANIZED STEEL BASES LAGGED TO FLOOR AND BOLTED TO PUMPS FOR BASE MOUNTED PUMPS. BASES MAY BE FORMED OR WELDED CONSTRUCTION

HVAC DUCT WORK

ALL MATERIAL, SEALING, AND HANGERS TO BE PER IMC AND SMACNA STANDARDS

FLEX JOINTS AT INLINE FANS FOR VIBRATION REDUCTION

SEE DETAILS

POTABLE WATER PIPING FOR HAND WASH SINK AREA

PROVIDE COPPER PIPING MATCHING EXISTING WATER PIPING SPECIFICATION FOR SUPPLY SYSTEM.  
PROVIDE FLEXIBLE WATER SUPPLIES FROM WATER STOPS TO SINK AND WHERE SHOWN ON DIAGRAM  
WATER SUPPLIES SHALL HAVE PLATED FLEXIBLE JACKET  
WATER STOPS SHALL BE PLATED WHEEL HANDLE TYPE

WASTE PIPING FOR GRAY WATER IN HAND WASH SINK AREA

PROVIDE PLATED BRASS OR COPPER SINK FITTINGS AND P TRAP  
PROVIDE ABS, DWV COPPER, OR BRASS PIPING FOR BALANCE OF GRAY WATER SYSTEM.  
PROVIDE TANK CONNECTION FITTINGS PER TANK MANUFACTURERS SPECIFICATIONS

WATER AND GRAY WATER PIPE SUPPORTS

SUPPORTS SHALL BE PER UPC AND PER SPEC FOR SUPPLY SYSTEM

DUCT WORK:

GALVANIZED (STAINLESS STEEL WHERE SHOWN) WITH GAUGES PER SMACNA.  
PROVIDE 2" RIGID INSULATION WITH SCRIM COVER WHERE SHOWN. JOHNS MANVILLE OR EQUAL

CAPSTONE ENGINEERING LLC  
MECHANICAL ENGINEERS  
12110 BUSINESS BLVD. STE 6, PH# 169  
EAGLE RIVER, ALASKA 99577  
TELEPHONE: 907-414-1456  
EMAIL: pbelt@csenr.net



AUGUST 31, 2015

PIPING AND GENERAL MATERIALS  
CHEFORMAK PUMPHOUSE #1  
CHEFORMAK, ALASKA

DATE: AUGUST 31, 2015  
DRAWN: F.H. BELZ  
CHKD:  
SCALE: AS NOTED  
REVISED:  
JOB NO. C 407

SHEET NO. 2 OF 11  
M-1.1

G:\ACAD\CHEFORMAK\2014 Pumphouse Improvements\Pump House 1\From Others\Fred Belz Mechanical\C407 M-1.2 CHEFORMAK PUMPHOUSE #1 EQUIPMENT LIST.dwg, 9/1/2015 1:38:55 PM, cmezz, \\C62main\LANIER.MP C2050\LD520C PCL 6

BOILER SCHEDULE					
NUMBER	TYPE	INPUT	OUTPUT	MFG MODEL	NOTES
B-1 B-2	HOT WATER OIL FIRED CAST IRON	140 MBH 1.0 GPH	123 MBH DOE	WEIL MCLAIN U0-3E	BASE BOILER, NO CIRCULATOR, ALASKA DOUBLE HIGH LIMITS, LOW WATER CUT OFF, RIELLO 40 F3 BURNER DUCTED COMBUSTION AIR KIT FOR TO BURNER 5 AMPS / 115 V / 1 PH 6 INCH FLUE. PROVIDE WEIL MCLAIN AFM MODULE FOR DUAL BOILER CONTROL

PUMP SCHEDULE					
NUMBER	TYPE	FLUID PUMPED	GPM	FLUID-TDH FLUID TEMP	PUMP SELECTION-OR EQUAL
PMP-1A PMP-1B	INLINE CIRCULATOR WET ROTOR	PROP GLYCOL 50/50	25 GPM MAXIMUM 7 GPM MINIMUM	20 FT TDH 180 F	GRUNDFOS MAGNA3 32-100 F 60 HZ 98126824 OR EQUAL 1.61 AMPS / 120 V / 1 PH PROVIDE GRUNDFOS DPI, 0-1 BAR PRESSURE SENSOR WITH EACH PUMP
PMP-2	INLINE CIRCULATOR WET ROTOR	WATER	4 GPM	10 FT TDH 80 F IN	GRUNDFOS UP 15-42F OR EQUAL 1/25 HP / 115 V / 1 PH
PMP-3 △	INLINE PUMP	GLYCOL	3 GPM	50 FT TDH	LIBERTY 331 PORTABLE TRANSFER PUMP. 20 FT PLUG IN CORD, GARDEN HOSE CONNECTS 1/2 HP / 115V / 1PH

FUEL TANK SCHEDULE/FUEL OIL SERVICE				
NUMBER	TYPE	CAPACITY	PAINT	NOTES
FT-1	ABOVE GROUND DOUBLE WALL STEEL CONSTRUCTION SECONDARY CONTAINMENT INTEGRAL SKID MOUNTED	500 GALLON	MARINE GRADE EPOXY	UL 142 TANK STI F921 CONSTRUCTION: 50"OD X 72"LONG ASSEMBLY COMPLETE WITH REGULAR AND EMERGENCY VENTING PROVIDE FOR MINIMUM OF 2 EA FOS AND 2 EA FOR CONNECTIONS PROVIDE 2 EA 3/4" DIP TUBES AND 2 EA 3/4" ANTI SIPHON VALVES PROVIDE VISUAL TANK GAGE, STICK GAGE, ANTI SPILL FUNNEL FOR MANUAL FILL, END LADDER TO FILL PORT MFG: ANCHORAGE TANK, GREER TANK, OR APPROVED EQUAL

HEAT EXCHANGER SCHEDULE							
NUMBER	TYPE	HOT SIDE	HOT SIDE FLOW	COLD SIDE	COLD SIDE FLOW	CAPACITY	MFG: MODEL NUMBER
HE-1 △	PLATE & FRAME DOUBLE WALL	170 F EGT 150 F LGT 3 PSI PD MAX	16.5 GPM 50/50 PROP GLYCOL	40 F EWT 45 F LWT 3 PSI PD MAX	52.5 GPM WATER	150 MBH	DOUBLE WALL AMERIDEX X-15-17-DW 2"NPT PORTS
HE-2	HOT WATER MAKER	180 F EGT 3 PSI PD MAX	3 GPM 50/50 PROP GLYCOL	75 EWT 85F LWT 3 PSI PD MAX	4 GPM WATER	15 MBH	AMTROL CH-41ZDW DOUBLE WALL SUPERSTOR 45 GALLON DOUBLE WALL OR EQUAL. PROVIDE PT RELIEF VALVE

PLUMBING FIXTURE SCHEDULE						
NUMBER	TYPE	HW	CW	W	V	MFG: MODEL NUMBER & ACCESSORIES
HS-1	HAND SINK	1/2"	1/2"	1 1/2"	1 1/2"	JUST A-544-912 SINK JS-45-TGA FAUCET J-15-FS DRAIN WITH GRID STRAINER J-150 P TRAP
GWT-1 △	GRAY WATER TANK-POLY 52 GALLON			1 1/2" 2 EA	1 1/2"	RONCO B295 HOLDING TANK INCLUDES 4 INCH FILL WITH SCREW CAP-52 GAL 3 EA 1 1/2" CONNECTORS FOR 1 1/2" ABS. SHIPPED LOOSE 1 EA 3/4" DRAIN WITH HOSE CONNECTION W/CAP. SHIPPED LOOSE 28" LONG 21" HIGH 23" DEEP
TP-1	TRANSFER PUMP 12-33 GPM			1 1/2" 2 EA		GRAINGER 4YKP5 OR EQUAL. 1 1/2" SUCTION AND DISCHARGE SELF PIPING 1/3 HP / 115 V / 1 PH
HWH-1	HOT WATER HEATER	1/2"	1/2"			POINT OF USE TYPE: TANK TYPE : MFG: EEMAX #EMT 2.5 OR EQUAL 15 AMP/120 V / 1 PH. PROVIDE DRAIN PAN. T&P VALVE

UNIT HEATER SCHEDULE						
NUMBER	TYPE	OUTPUT	FLUID	EGT/LGT FLOW	MFG MODEL	NOTES
UH-1	HOT WATER PROPELLOR TYPE	25 MBH	50/50 PROP GLYCOL	180 F EGT 160 F LGT 3.0 GPM	MODINE HC-63	1/12 HP / 115 V / 1 PH TE MOTOR 1.2 AMPS
UH-2	HOT WATER PROPELLOR TYPE	10 MBH	50/50 PROP GLYCOL	180 F EGT 160 F LGT 2 GPM	MODINE HC 18	1/60 HP / 115 V / 1 PH TE MOTOR 0.8 AMPS

FAN SCHEDULE					
NUMBER	TYPE	CFM	EXT STATIC	MFG MODEL	NOTES
VF-1	INLINE FAN	75 CFM	0.5 IN WC	FANTEC FG-5	20 WATTS / 115 V / 1 PH W/SPEED CONTROL STEEL HOUSING/ 5 INCH FLANGES
CF-1	CEILING FAN			LEADING EDGE 36201	75 WATTS / 115 V / 1 PH W/SPEED CONTROL LEADING EDGE 12003 SPEED CONTROL

EXPANSION AND PRESSURE TANK SCHEDULE					
NUMBER	TYPE	ACCEPT-ANCE	FLUID TEMP	MFG MODEL	NOTES
ET-1	BLADDER EXPANSION	2.5 GAL	P GLYCOL 180 F	AMTROL EX-30	180 F GLYCOL SYSTEM EXPANSION TANK
ET-2	BLADDER EXPANSION	2.5 GAL	WATER 90 F	AMTROL EX 30	WATER HEAT SYSTEM FOR WELL HEAD

DAMPER SCHEDULE-MOTORIZED - CONTROL- BACKDRAFT				
NUMBER	TYPE	SIZE	CONTROL	MFG MODEL
BDD-1	INLINE BACKDRAFT DAMPER	8"WIDE X 8"HIGH		RUSKIN BD2/A2 OR EQUAL
CBD-1 CBD-2	INLINE BACKDRAFT DAMPER	6"WIDE X 7"HIGH	COUNTER BALANCED	RUSKIN CBD2 OR EQUAL
BDD-2	INLINE BACKDRAFT DAMPER	10"WIDE X 8"HIGH	COUNTER BALANCE	RUSKIN CBD2 OR EQUAL

△ ADD PMP-3, REVISE HE-1  
REVISE GWT-1 TO 52 GALLONS  
AUGUST 31, 2015

**CAPSTONE ENGINEERING LLC**  
**MECHANICAL ENGINEERS**  
 1210 BUSINESS BLVD STE 6 PHB 169  
 EAGLE RIVER, ALASKA 99577  
 TELEPHONE & FAX 907-414-1456  
 EMAIL phb@csengr.net



AUGUST 31, 2015

EQUIPMENT LIST  
 CHEFORMAK PUMPHOUSE #1  
 CHEFORMAK, ALASKA

DATE: AUGUST 31, 2015  
 DRAWN: F.H. BELZ  
 CHECKED: AS NOTED  
 SCALE: AS NOTED  
 REVISED: C 407  
 JOB NO.

SHEET NO. 3 OF 11  
 M-1.2

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\From Others\Fred Belz Mechanical\C407 M-1.3 CHEFORNAK PUMPHOUSE #1 CONTROLS AND SEQUENCE OF OPERATION.dwg, 9/1/2015 1:39:08 PM, cmerz, \\c2main\LANIER MP C2050\LD520C PCL 6

CONTROL VALVES

CV-1, CONTROL VALVE: 1/4 TURN MOTOR OPERATED VALVE 1 1/2 INCH NPT BRASS BODY  
SS BALL, SPRING RETURN 24 VAC ACTUATOR (FAIL OPEN) MFG: HONEYWELL VB2F 1350 OR EQUAL  
CV-2 CONTROL VALVE: 1/4 TURN MOTOR OPERATED VALVE 3/4 INCH NPT BRASS BODY  
SS BALL, SPRING RETURN 24 VAC ACTUATOR (FAIL OPEN) MFG: HONEYWELL VB2F 1350 OR EQUAL

OCCUPANCY SENSOR

OS-1 OCCUPANCY SENSOR: SENSOR DETECTS MOVEMENT AND CONTACTS CLOSE. 5 MINUTES TIMER ADJUSTIBLE  
SENSOR HAS CONTACTS RATED FOR 24 VAC AND OPERATES ON 120 VAC MFG::LEVITON ODCOS-11W OPER OR EQUAL

BALANCE VALVES

VALVES ARE BRASS BODY WITH BALANCE MECHANISM AND MEMORY STOP  
BV-1, BV-2, BV-3: 3/4 INCH WITH SWEAT FITTINGS. MFG: TACO ACCU FLOW OR EQUAL  
BV-4: 1 1/2 INCH WITH SWEAT FITTINGS. MFG: TACO ACCU FLOW OR EQUAL  
BV-5: 1 INCH WITH SWEAT FITTINGS. MFG: TACO ACCU FLOW OR EQUAL

THERMOSTATS

TH-1, TH-2, WALL THERMOSTATS-LINE VOLTAGE STAT MFG: HONEYWELL T4051A W/LOCKING COVER,  
TH-3, TH-4, TH-5, TH-6, TH-7 THERMOSTAT: WALL STAT-REMOTE BULB WITH ADJUSTIBLE DIFFERENTIAL  
0-100 F SET POINT, 3-10 F ADJUSTIBLE DIFFERENTIAL, 20 FT CAPILLAREY WITH BULB. MFG: HONEYWELL T675A1045 OR EQUAL

MULTIPLE BOILER CONTROLLER

WEIL MCLAIN ADVANCED FEATURES MODULE (AFM) OR EQUAL IF BOILERS PROVIDED DIFFER FROM  
BOILERS SPECIFIED.

SEQUENCE OF OPERATION B-1, B-2 BOILERS

BOILER CONTROLLER CONTROLS FIRING OF B-1 AND B-2 ON CALL FROM BOILER SUPPLY SENSOR SET POINT 180 F  
BOILER CONTROLLER LOWERS SET POINT ON RESET FROM OUTSIDE AIR SENSOR.

SEQUENCE OF OPERATION PMP-1A, PMP-1B HEATING CIRCULATOR PUMPS.

EITHER PMP-1 OR PMP-2 OPERATES WITH THE OTHER PUMP ON MANUAL STANDBY. OPERATION IS CONTINUOUS  
PUMP SPEED IS CONTROLLED BY A PRESSURE SENSOR ACROSS THE PUMP. SEPARATE CONTROLS ARE PROVIDED  
FOR EACH PUMP. SETPOINT 15 FT TDH AT VARYING FLOWS (ADJUSTIBLE)

SEQUENCE OF OPERATION: UH-1 AND UH-2 UNIT HEATERS:

COIL FLOW IS CONTINUOUS. WALL THERMOSTAT CYCLES THE FAN. SET POINT 60 F

SEQUENCE OF OPERATION: HE-2 HEAT EXCHANGER AND PMP-2

SYSTEM PROVIDES HEATING FOR WELL ENCLOSURE AND WELL CASING.  
TH-3 SENSES TEMPERATURE IN WELL ENCLOSURE. TH-4 SENSES OUTSIDE AIR TEMPERATURE  
SIGNAL FROM TH-3 OR TH-4 THERMOSTAT STARTS PMP-2 AND OPENS CV-2  
SET POINTS: TH-3 MAKE 35 F BREAK 45 F (ADJUSTIBLE)  
SET POINTS: TH-4 MAKE 25 F BREAK 35 F (ADJUSTIBLE)

SEQUENCE OF OPERATION: HE-1 HEAT EXCHANGER

SYSTEM PROVIDES HEATING FOR VILLAGE WATER SUPPLY LOOP  
TH-5 SENSES TEMPERATURE IN RETURN LINE TO HE-1. AND TH-6 SENSES TEMPERATURE ON SUPPLY LINE  
TH-5 OPENS CV-1 PROVIDING ADD HEAT. SET POINT 35 F MAKE 45 F BREAK  
TH-6 ACTS AS A HIGH LIMIT AND MAKES BELOW 60 F AND BREAKS AT 70 F

SEQUENCE OF OPERATION: VF-1 VENT FAN

SYSTEM PROVIDES VENTILATION AND BREATHING AIR FOR PUMP HOUSE  
TH-7 SENSES TEMPERATURE IN ROOM CLOSES TO START VF-1  
WHEN TEMPERATURE DROPS BELOW DIFFERENTIAL SETPOINT THE THERMOSTAT OPENS AND VF-1 STOPS  
SET 80 F MAKE 74 F BREAK ADJUSTIBLE

SIGNAL FROM OS-1 (OCCUPANCY SENSOR) STARTS VF-1  
WHEN OS-1 TIMES OUT VF-1 STOPS (SET 5 MINUTES ADJUSTIBLE)

CONTROLS(CONTINUED)

T-1, T-2, T-3 TRANSFORMER 115 VAC TO 24 VAC 50 VA FOOT MOUNTED  
MFG: HONEYWELL AT87-1106 OR EQUAL.

CR-1 CR-2 CR-3 CR-4 CONTROL RELAY: DPDT RELAY, 12 AMP@ 120 VAC POWER DUTY RATED  
WITH MAX 25 VA PILOT DUTY @ 24 VAC MFG: HONEYWELL R8222D1014 OR EQUAL

T-1 T-2 T-3 T-4 T-5 T-6 TERMINAL STRIP: 20 AMP 2 POLE /300 VOLT  
SCREW TERMINALS. MFG: GRAINGER 6ZEG6 OR EQUAL

T-4 T-5 POWER SUPPLY 120 VAC TO 24 VDC BOX MOUNTED  
MFG: KELE DCP-250 OR EQUAL

B-1 BULB MOUNTING BOX. 4 X 4 SQUARE DEEP ELECTRIC BOX WITH COVER. STAINLESS STEEL

MOUNTING SHELVES FOR TP-1 AND HWH-1  
CONSTRUCT SHELVES FROM 14 GA GALVANIZED SHEET METAL WELDED CONSTRUCTION  
SHELF MOUNTING VERTICAL BRACKETS SHALL BE MINIMUM 16 INCHES LONG WITH 1 1/2" FLANGES  
SHELF TOP SHALL HAVE MINIMUM 1 1/2" FLANGES ALL AROUND  
LAG SHELVES TO WALL PER STRUCTURAL AND ARCH

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EMAIL: phb@ce-engineers.net



AUGUST 31, 2015

CONTROLS AND SEQUENCE OF OPERATION  
CHEFORNAK PUMPHOUSE # 1  
CHEFORNAK, ALASKA

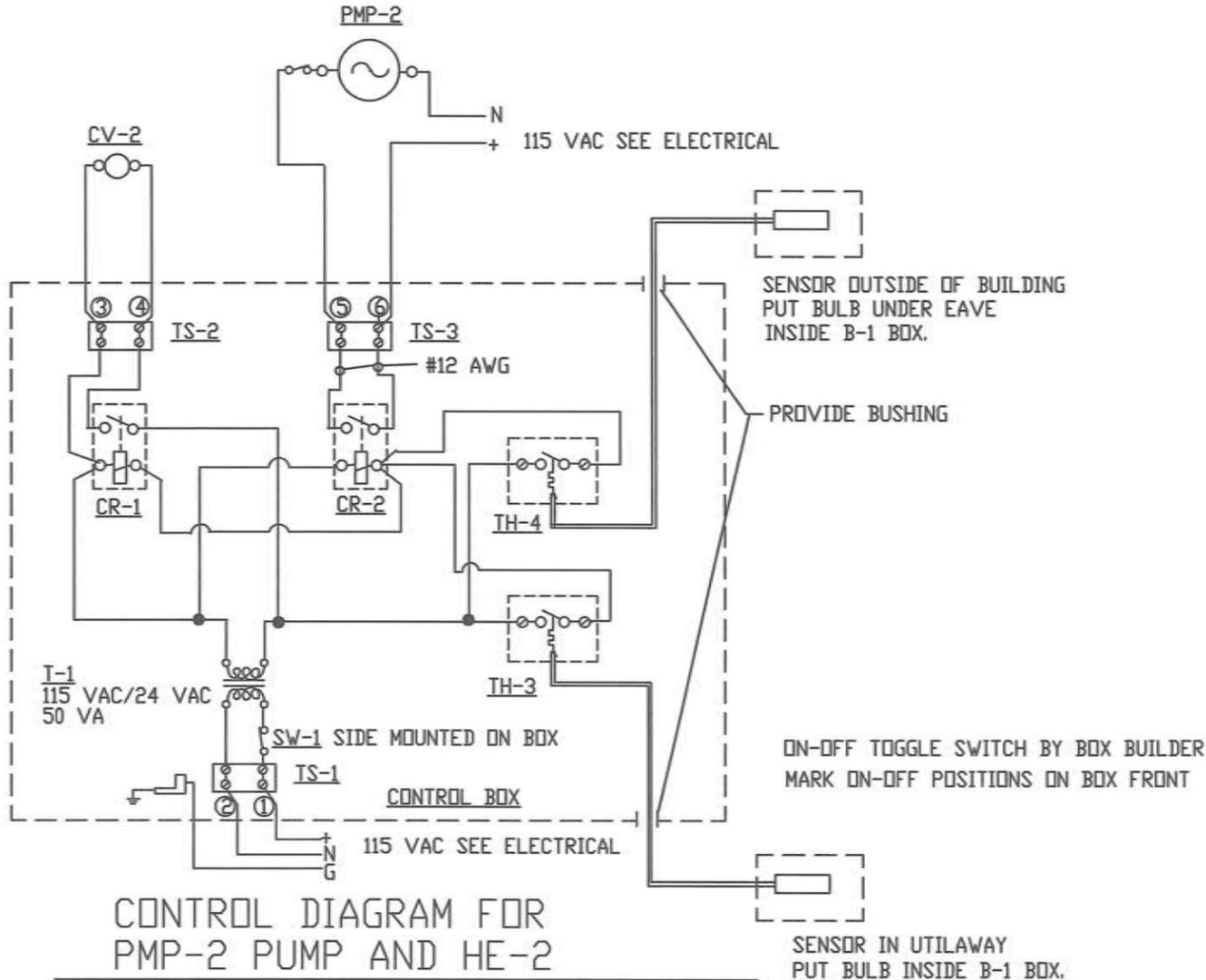
DATE: AUGUST 31, 2015  
DRAWN: F.H. BELZ  
CHKD:  
SCALE: AS NOTED  
REVISED:  
JOB NO. C407

SHEET NO. 4 OF 11  
M-1.3 11

G:\ACAD\CHEFORNAK\2014 Pumphouse Improvements\Pump House 1\From Others\Fred Belz Mechanical\C407 M-1.4 CHEFORNAK PUMPHOUSE #1 CONTROLS.dwg, 9/1/2015 1:39:21 PM, cmerz, \\c2main\LANIER MP C2050\LD520C PCL 6

NOTE: PROVIDE CONTROL BOX AT EQUIPMENT LOCATION. HINGED COVER WITH TRANSFORMER, SWITCH, RELAYS, TERMINAL STRIP, WIRING PROVIDE MIN 16 GA COPPER STRANDED WIRING ON 24 VAC CIRCUITS AND MINIMUM 14 GA STRANDED COPPER ON 115 VAC CIRCUITS 115 VAC WIRING PER ELECTRICAL PROVIDE EMT AND FLEX FOR ALL 24 VAC LOW VOLTAGE WIRING OUTSIDE OF BOXES

SEQUENCE OF OPERATION: HE-2 HEAT EXCHANGER AND PMP-2  
 SYSTEM PROVIDES HEATING FOR WELL ENCLOSURE AND WELL CASING.  
 TH-3 SENSES TEMPERATURE IN WELL ENCLOSURE. TH-4 SENSES OUTSIDE AIR TEMPERATURE  
 SIGNAL FROM TH-3 OR TH-4 THERMOSTAT STARTS PMP-2 AND OPENS CV-2  
 SET POINTS: TH-3 MAKE 35 F BREAK 45 F (ADJUSTIBLE)  
 SET POINTS: TH-4 MAKE 25 F BREAK 35 F (ADJUSTIBLE)  
 SEE ELECTRICAL



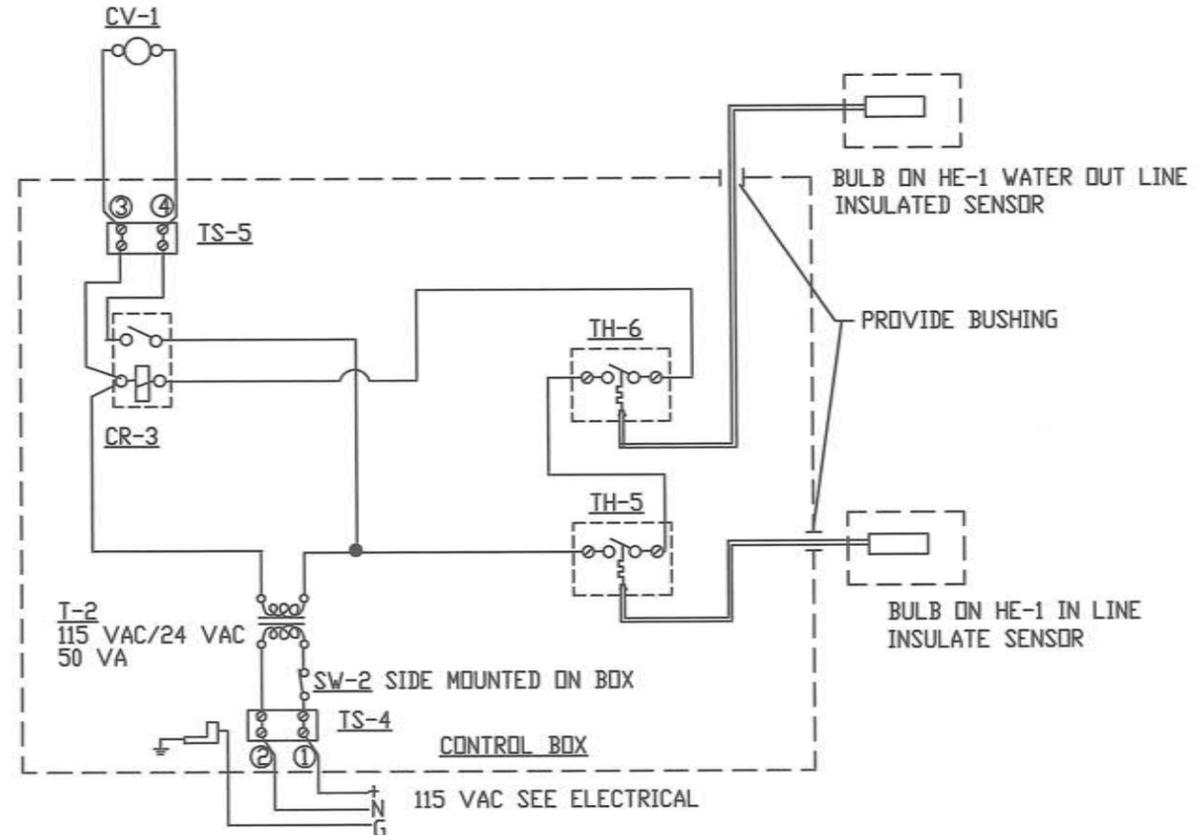
CONTROL DIAGRAM FOR PMP-2 PUMP AND HE-2

SCALE: NO SCALE

NOTE: PROVIDE CONTROL BOX AT EQUIPMENT LOCATION. HINGED COVER WITH TRANSFORMER, SWITCH, RELAYS, TERMINAL STRIP, WIRING PROVIDE MIN 16 GA COPPER STRANDED WIRING ON 24 VAC CIRCUITS AND MINIMUM 14 GA STRANDED COPPER ON 115 VAC CIRCUITS 115 VAC WIRING PER ELECTRICAL

PROVIDE EMT AND FLEX FOR ALL 24 VAC LOW VOLTAGE WIRING OUTSIDE OF BOXES

SEQUENCE OF OPERATION: HE-1 HEAT EXCHANGER  
 SYSTEM PROVIDES HEATING FOR VILLAGE WATER SUPPLY LOOP  
 TH-5 SENSES TEMPERATURE IN RETURN LINE TO HE-1. AND TH-6 SENSES TEMPERATURE ON SUPPLY LINE  
 TH-5 OPENS CV-1 PROVIDING ADD HEAT. SET POINT 35 F MAKE 45 F BREAK  
 TH-6 ACTS AS A HIGH LIMIT AND MAKES BELOW 60 F AND BREAKS AT 70 F



CONTROL DIAGRAM FOR HE-1 HEAT EXCHANGER

SCALE: NO SCALE

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 EMAIL: PUMPHOUSE@NET



AUGUST 31, 2015

HE-2 -PMP-2- HE-1 CONTROL DIAGRAMS  
 CHEFORNAK PUMPHOUSE #1  
 CHEFORNAK, ALASKA

DATE: AUGUST 31, 2015  
 DRAWN: F.H. BELZ  
 CHKD:  
 SCALE: AS NOTED  
 REVISED:  
 JOB NO. C407

SHEET NO. 5 OF 11  
 M-1.4

NOTE: PROVIDE CONTROL BOX AT EQUIPMENT LOCATION, HINGED COVER WITH TRANSFORMER, SWITCH, RELAYS, TERMINAL STRIP, WIRING PROVIDE MIN 16 GA COPPER STRANDED WIRING ON 24 VAC CIRCUITS AND MINIMUM 14 GA STRANDED COPPER ON 115 VAC CIRCUITS 115 VAC WIRING PER ELECTRICAL

PROVIDE EMT AND FLEX FOR ALL 24 VAC LOW VOLTAGE WIRING OUTSIDE BOXES

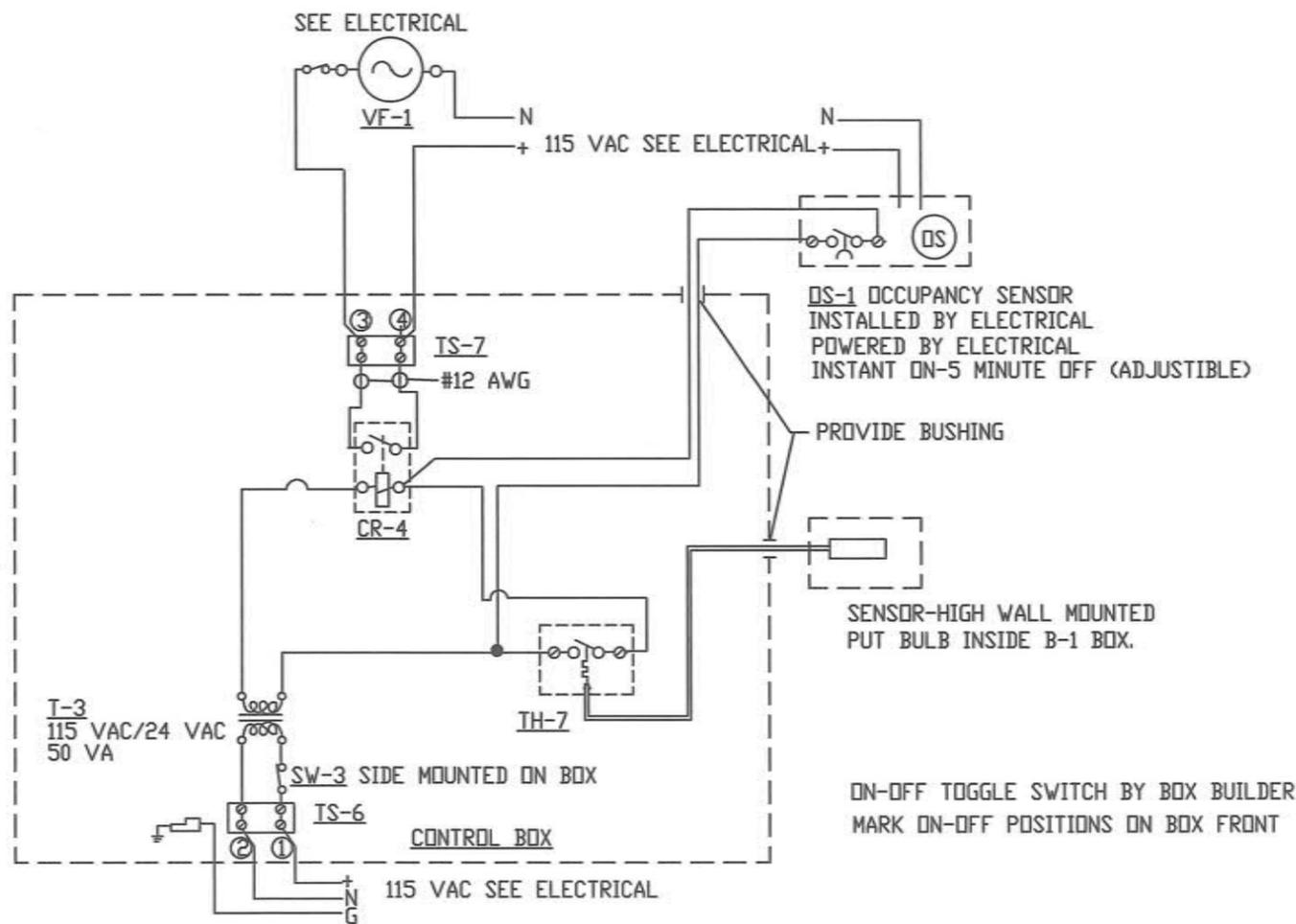
NOTE: PROVIDE CONTROL BOX AT EQUIPMENT LOCATION. HINGED COVER WITH TRANSFORMER, SWITCH, RELAYS, TERMINAL STRIP, WIRING PROVIDE MIN 16 GA COPPER STRANDED WIRING ON 24 VAC CIRCUITS AND MINIMUM 14 GA STRANDED COPPER ON 115 VAC CIRCUITS 115 VAC WIRING PER ELECTRICAL

PROVIDE EMT AND FLEX FOR ALL 24 VAC LOW VOLTAGE WIRING OUTSIDE BOXES

SEQUENCE OF OPERATION: VF-1 VENT FAN

SYSTEM PROVIDES VENTILATION AND BREATHING AIR FOR PUMP HOUSE  
 TH-7 SENSES TEMPERATURE IN ROOM CLOSES TO START VF-1  
 WHEN TEMPERATURE DROPS BELOW DIFFERENTIAL SETPOINT THE THERMOSTAT OPENS AND VF-1 STOPS  
 SET 80 F MAKE 74 F BREAK ADJUSTIBLE

SIGNAL FROM OS-1 (OCCUPANCY SENSOR) STARTS VF-1  
 WHEN OS-1 TIMES OUT VF-1 STOPS (SET 5 MINUTES ADJUSTIBLE)

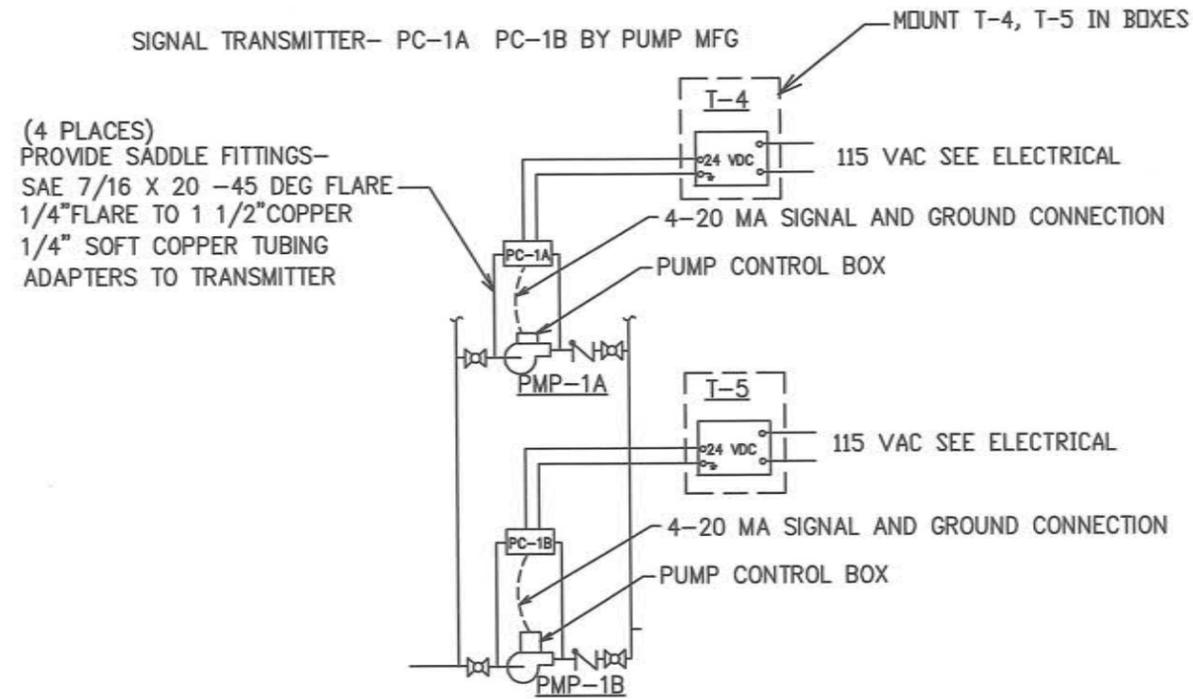


CONTROL DIAGRAM FOR VF-1 VENTILATION FAN

SCALE: NO SCALE

SEQUENCE OF OPERATION PMP-1A, PMP-1B HEATING CIRCULATOR PUMPS.

EITHER PMP-1 OR PMP-2 OPERATES WITH THE OTHER PUMP ON MANUAL STANDBY. OPERATION IS CONTINUOUS PUMP SPEED IS CONTROLLED BY A PRESSURE SENSOR ACROSS THE PUMP. SEPARATE CONTROLS ARE PROVIDED FOR EACH PUMP. SETPOINT 15 FT TDH AT VARYING FLOWS (ADJUSTIBLE)

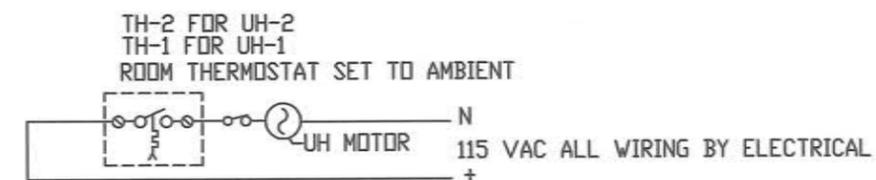


CONTROL DIAGRAM FOR PMP-1A PMP-1B

SCALE: NO SCALE

SEQUENCE OF OPERATION: UH-1 AND UH-2 UNIT HEATERS:

COIL FLOW IS CONTINUOUS. WALL THERMOSTAT CYCLES THE FAN. SET POINT 60 F



CONTROL DIAGRAM FOR UH-1 OR UH-2

SCALE: NO SCALE

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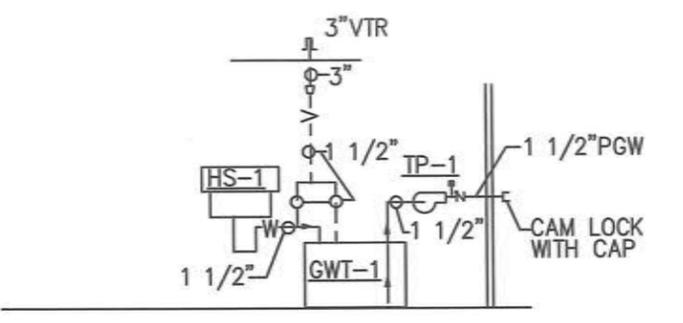
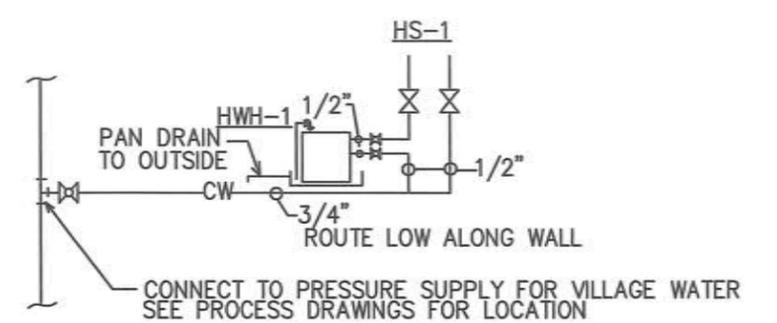
AUGUST 31, 2015

CONTROLS VF-1-UH-1- UH-2 - PMP-1A- PMP-1B  
 CHEFORNAK PUMPHOUSE #1  
 CHEFORNAK, ALASKA

DATE: AUGUST 31, 2015  
 DRAWN: F.M. BELZ  
 CHKD:  
 SCALE: AS NOTED  
 REVISED:  
 JOB NO. C407

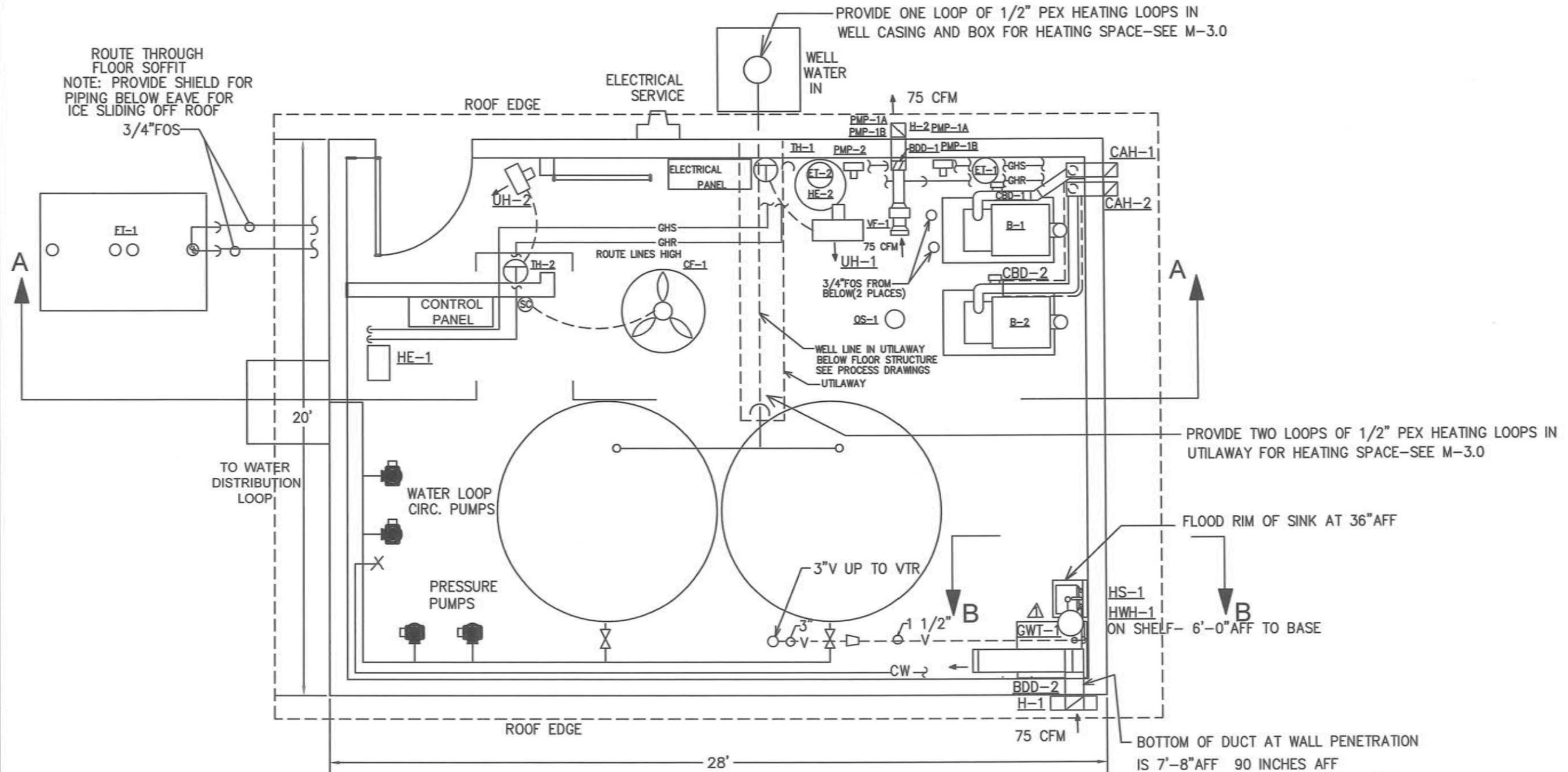
SHEET NO. 6 OF 11  
 M-1.5

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HW-CW PIPING DIAGRAM-WATER SUPPLY TO HS-1  
SCALE: NO SCALE

WASTE AND VENT DIAGRAM HS-1  
SCALE: NO SCALE



CHEFORNAK PUMPHOUSE #1 HVAC-PLUMBING PLAN  
SCALE: 1/4"=1'-0"

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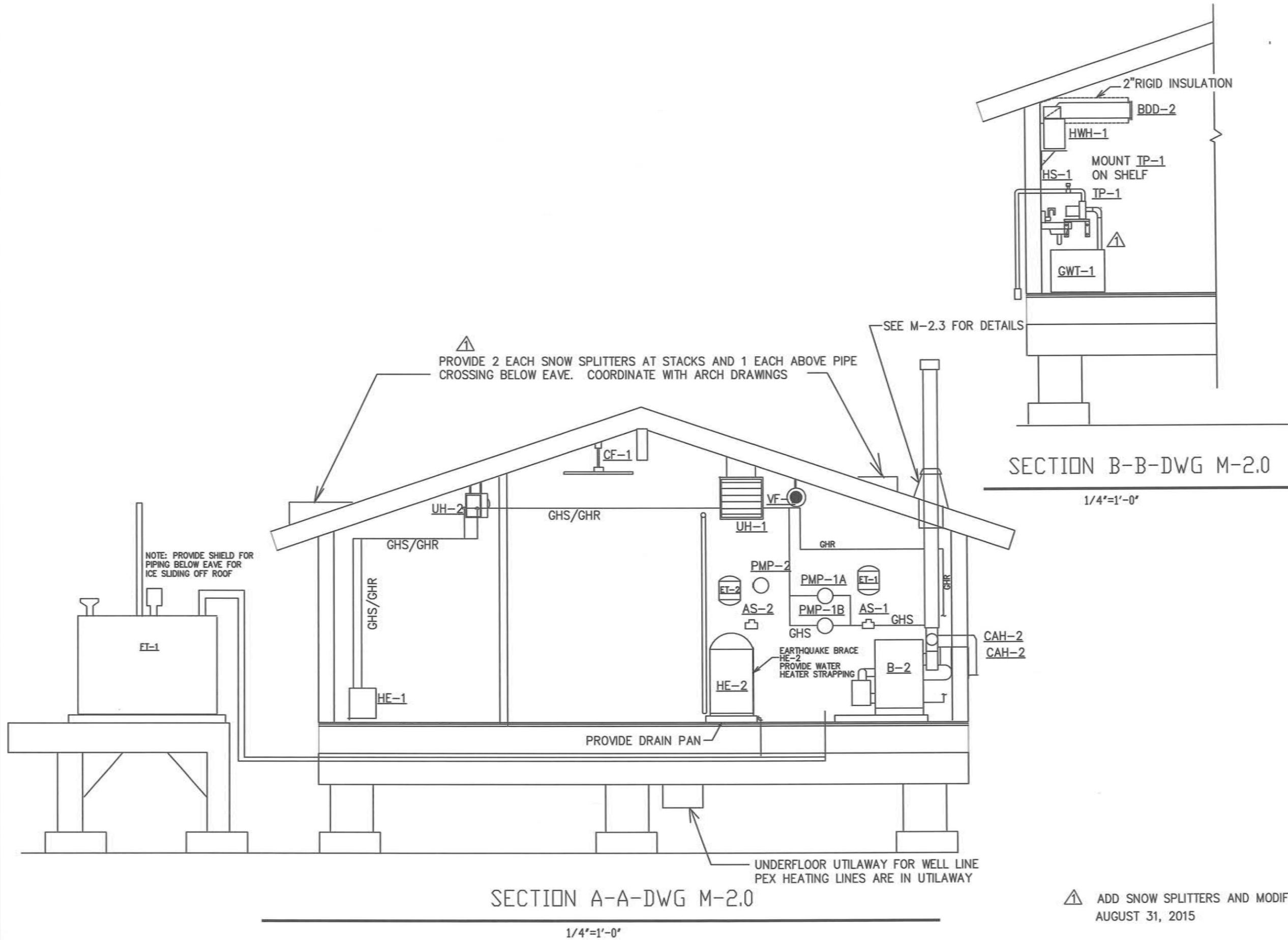
AUGUST 31, 2015

HVAC-PLUMBING PLAN - DETAILS  
CHEFORNAK PUMPHOUSE #1  
CHEFORNAK, ALASKA

DATE: AUGUST 31, 2015  
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M-2.0

△ MODIFY GWT-1 SIZE



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 EMAIL: fbelz@ce.net



AUGUST 31, 2015

SECTION B-B-DWG M-2.0

1/4"=1'-0"

SECTION A-A-DWG M-2.0

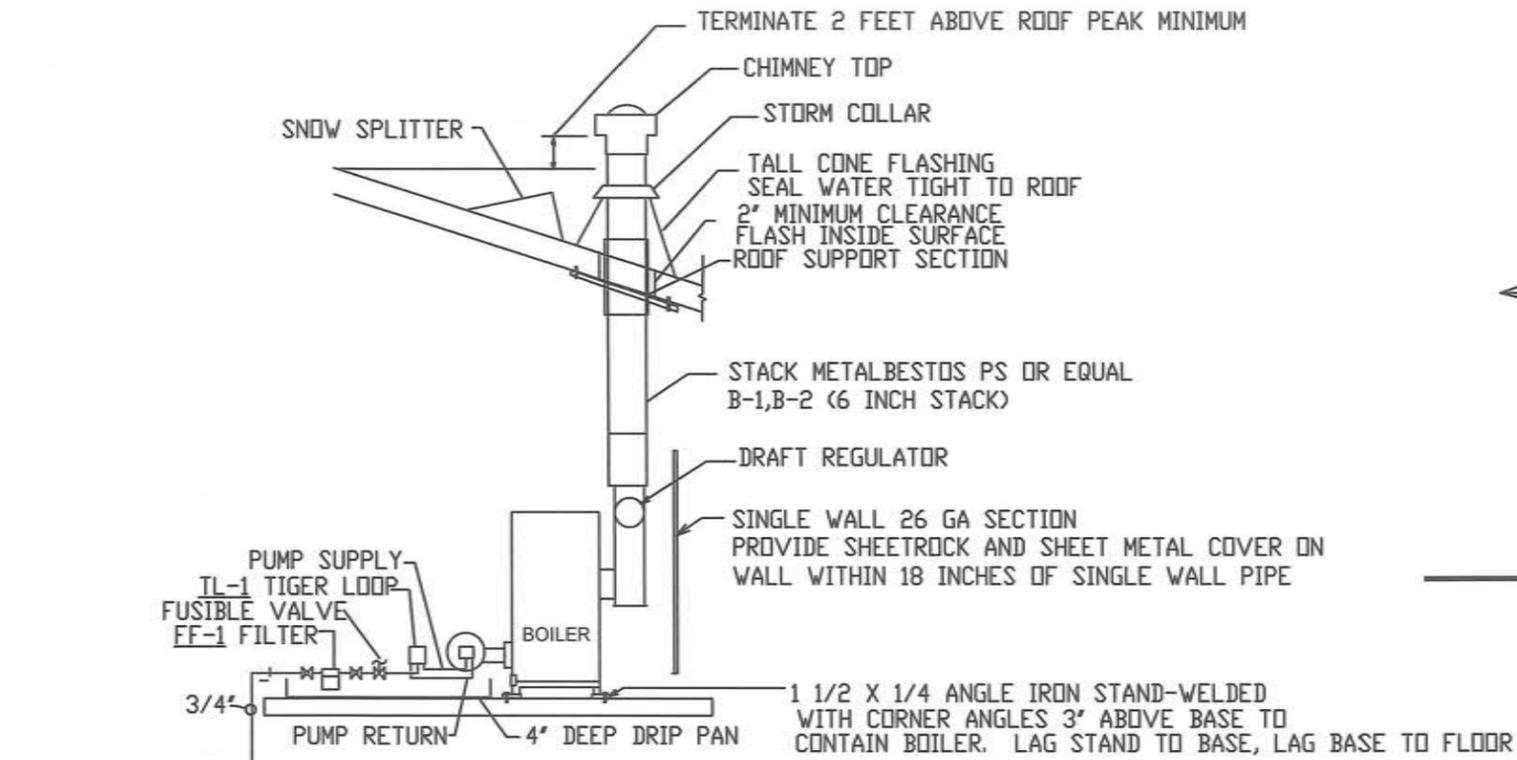
1/4"=1'-0"

▲ ADD SNOW SPLITTERS AND MODIFY GWT-1  
 AUGUST 31, 2015

MECHANICAL PLAN- SECTIONS  
 CHEFORNAK PUMPHOUSE #1  
 CHEFORNAK, ALASKA

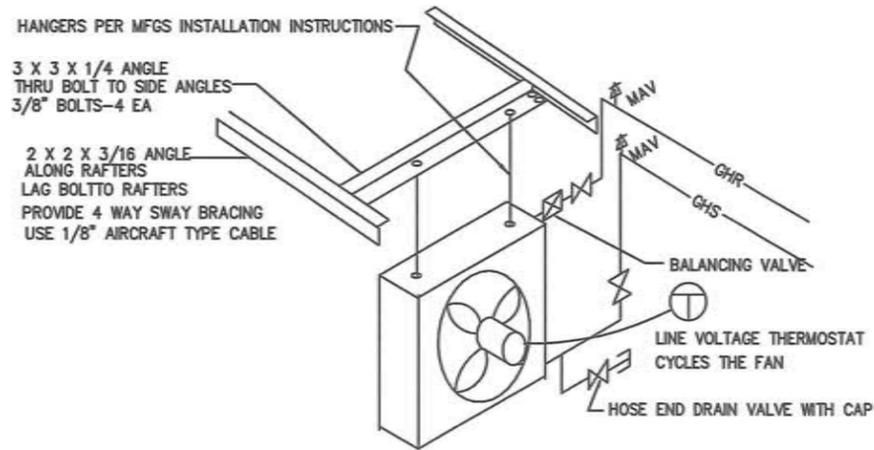
DATE:	AUGUST 31, 2015
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SCALE:	AS NOTED
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M-2.1	

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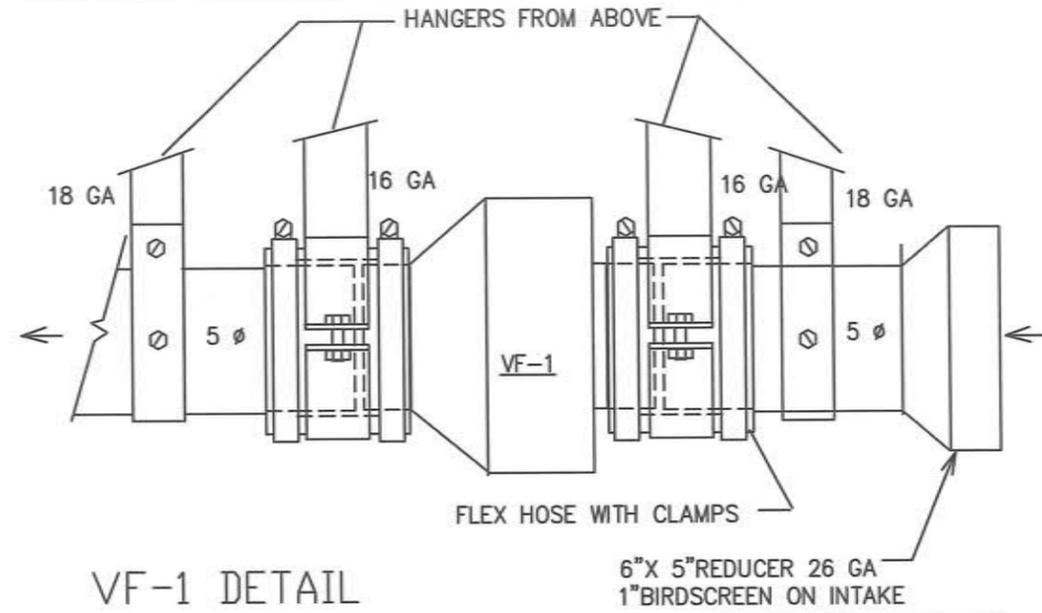
**BOILER FUEL OIL & STACK DETAIL**

NO SCALE



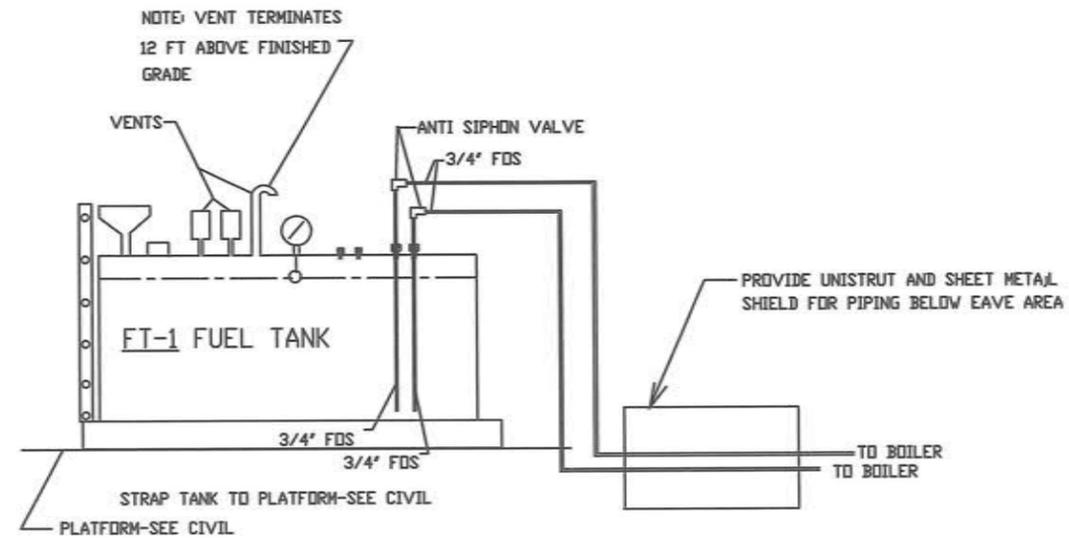
**UH-1,UH-2, UNIT HEATER DETAIL**

NO SCALE



**VF-1 DETAIL**

NO SCALE



**FT-1 FUEL TANK DETAIL**

NO SCALE

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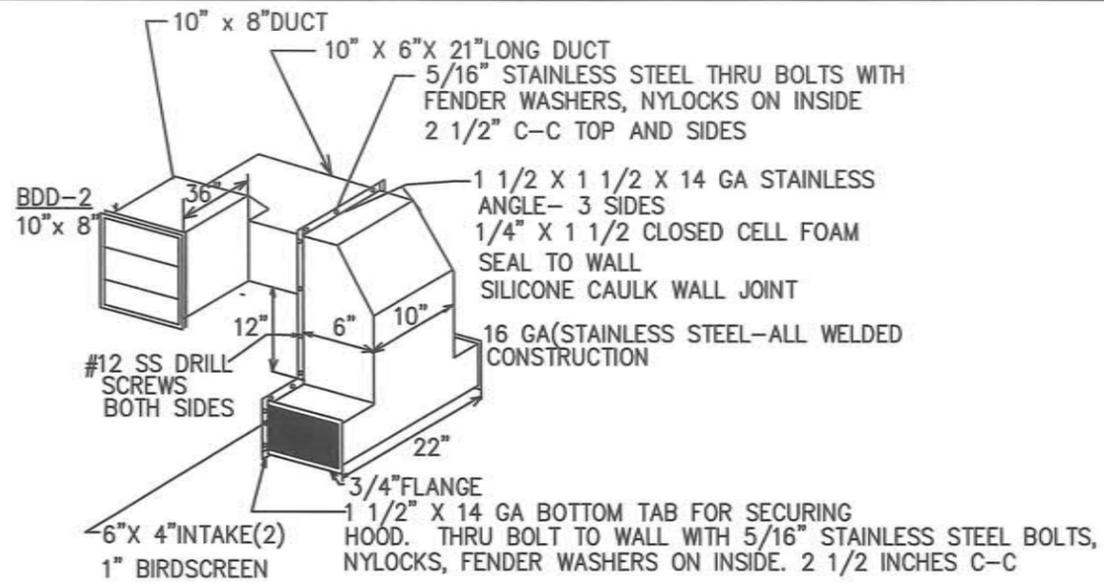
AUGUST 31, 2015

HVAC AND HEATING DETAILS  
 CHEFORNAK WASHETERIA  
 CHEFORNAK, ALASKA

DATE: AUGUST 31, 2015  
 DRAWN: F.A. BELZ  
 CHECKED:  
 SCALE: AS NOTED  
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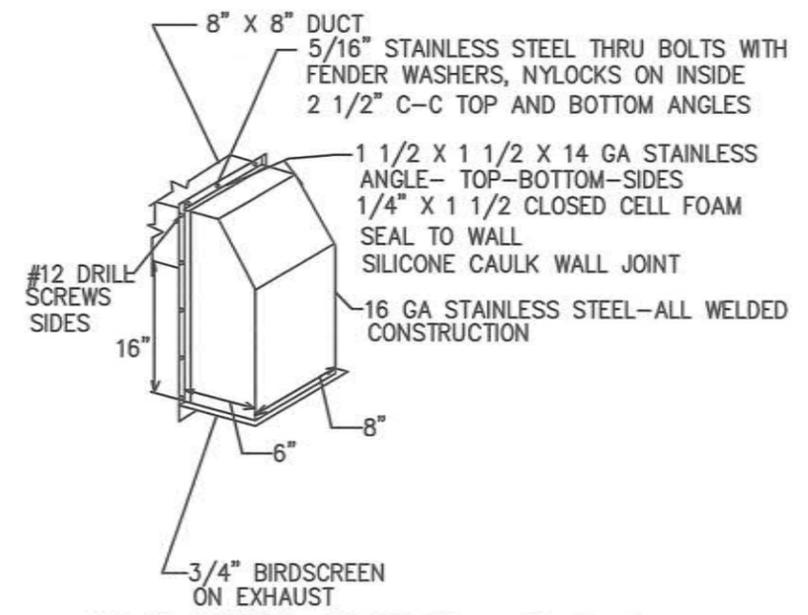
SHEET NO. 9 OF 11  
 M-2.2

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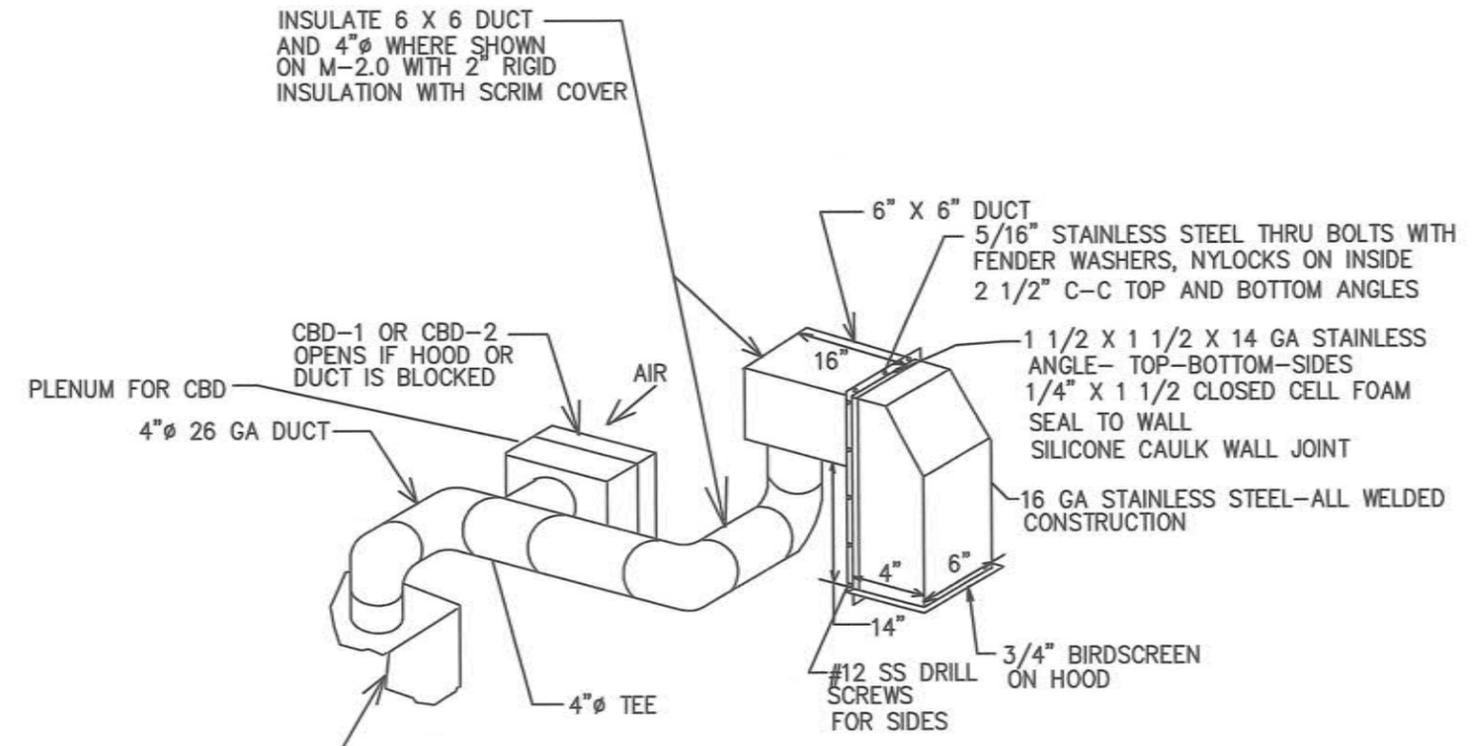
H-1 INTAKE HOOD DETAIL 10 X 6

SCALE: NO SCALE



H-2 HOOD DETAIL 8 X 6

SCALE: NO SCALE



CAH-1, CAH-2 HOOD DETAIL 6 X 6

SCALE: NO SCALE

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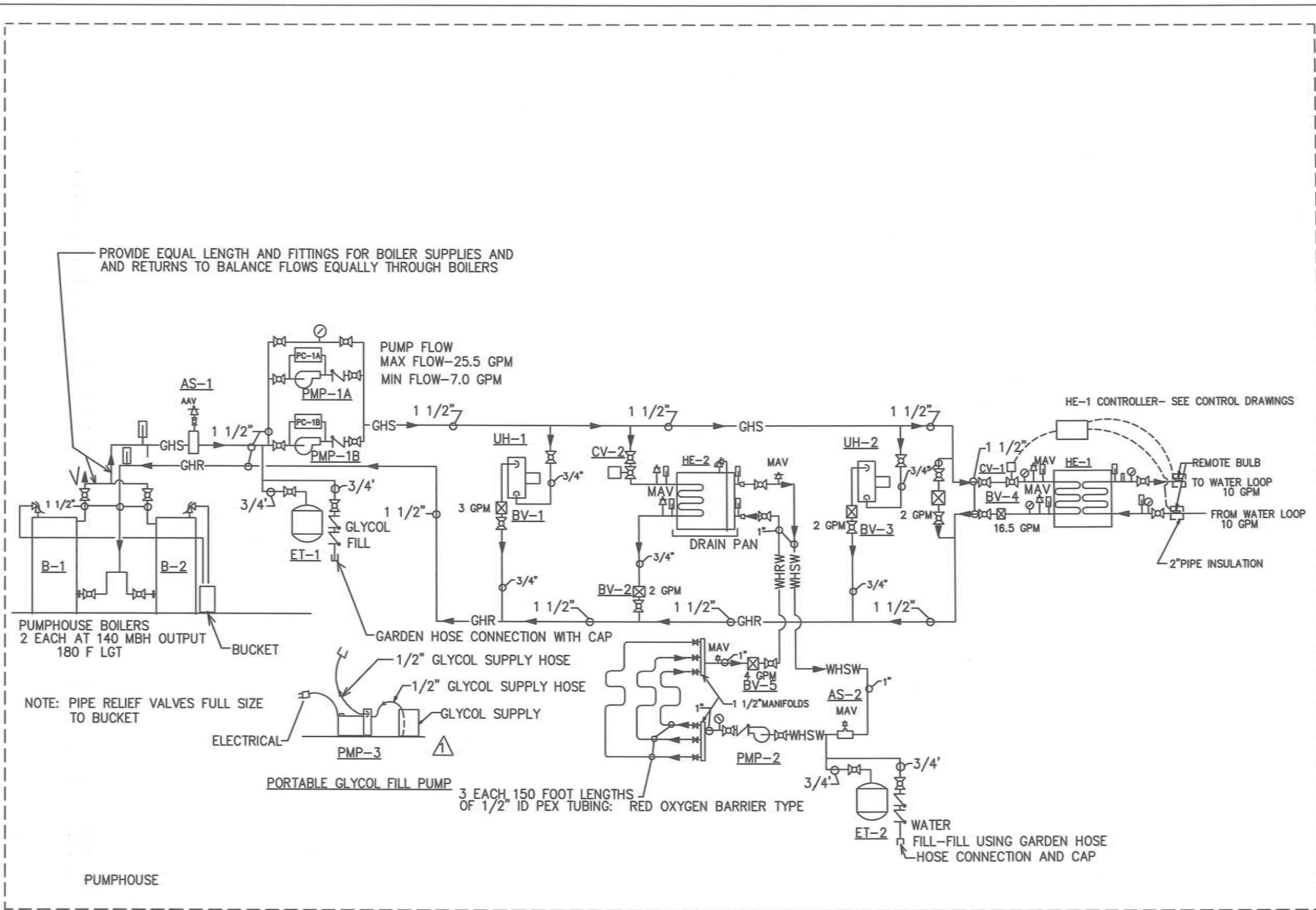


AUG 31, 2015

HVAC AND HEATING DETAILS  
CHEFORNAK PUMPHOUSE # 1  
CHEFORNAK, ALASKA

DATE: AUGUST 31, 2015  
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SCALE: AS NOTED  
REVISED:  
JOB NO. C407

SHEET NO. 10 OF 11  
M-2.3



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TELEPHONE 907-301-1414  
email: fred@capstone.net



AUG 31, 2015

HEATING AND WATER SUPPLY DIAGRAM  
CHEFORNAK PUMPHOUSE # 1  
CHEFORNAK, ALASKA

DATE: AUGUST 31, 2015  
DRAWN: F.H. BELZ  
CHKD:  
SCALE: AS NOTED  
REVISED:  
JOB NO.: C407

SHEET NO. 11 OF 11  
M-3.0

CHEFORNAK PUMPHOUSE # 1 HEATING SUPPLY DIAGRAM

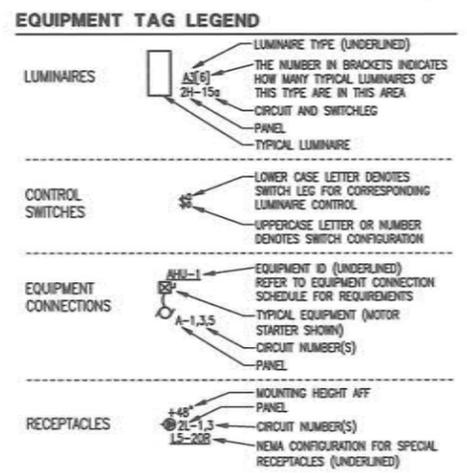
ADD GLYCOL FILL PUMP DETAIL

# 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
- ELECTRIC VAULT
- PHOTOCCELL 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
- SWITCH - THREE WAY
- SWITCH - FOUR WAY
- SWITCH CONTROL FOR FIXTURES DENOTED WITH "a" APPENDED TO CIRCUIT NUMBER
- SWITCH - LOW VOLTAGE
- SWITCH - ELECTRONIC DIMMER SWITCH COMPATIBLE WITH LIGHT FIXTURE
- SWITCH - KEYED
- SWITCH - PILOT LIGHT
- SWITCH - INTEGRAL MOTOR OVERLOAD
- SWITCH - VARIABLE SPEED CONTROL
- LIGHT CONTROL OCCUPANCY SENSOR - WALL SWITCH BOX MOUNTED
- LIGHT CONTROL OCCUPANCY SENSOR - CEILING MOUNTED
- POWER DISTRIBUTION PANELBOARD
- METERING DEVICE
- CURRENT TRANSFORMER ENCLOSURE
- POWER PANELBOARD (NEW - SURFACE; RECESSED), (EXISTING - SURFACE; RECESSED)
- 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)
- 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
- TELEVISION OUTLET (WALL; CEILING)
- DUAL CHANNEL SERVICE POLE
- TELECOMMUNICATION FLOOR STANDING RACK
- TELECOMMUNICATION WALL MOUNTED RACK
- TELECOMMUNICATION MAIN GROUNDING BUS
- TELECOMMUNICATION GROUNDING BUS
- CONTROL PANEL - TYPE AS NOTED (SURFACE; RECESSED)

- FIRE ALARM CONTROLLED MAGNETIC DOOR HOLDER / RELEASE
- ABORT STATION
- CARBON MONOXIDE DETECTOR
- HEAT DETECTOR - RATE OF RISE
- HEAT DETECTOR - FIXED TEMPERATURE AS NOTED
- SMOKE DETECTOR - PHOTOELECTRIC TYPE
- SMOKE DETECTOR - MULTI-SENSOR TECHNOLOGY TYPE
- SMOKE DETECTOR - DUCT MOUNTED
- SMOKE DETECTOR - BEAM RECEIVER
- SMOKE DETECTOR - BEAM TRANSMITTER
- FLAME DETECTOR
- LINE TYPE HEAT SENSITIVE CABLE DETECTOR
- FIRE ALARM HORN
- FIRE ALARM STROBE
- FIRE ALARM COMBINATION HORN/STROBE
- FIRE ALARM PULL STATION
- FIRE ALARM CONTROL PANEL
- FIRE SYSTEM ANNUNCIATOR PANEL
- HALON CONTROL PANEL
- FIRE ALARM SPEAKER STROBE
- WATER FLOW BELL - 120V CONTROLLED BY FLOW SWITCH
- FIRE ALARM FLOW SWITCH
- FIRE ALARM TAMPER SWITCH
- MICROPHONE INPUT JACK
- MICROPHONE INPUT JACK - FLOOR MOUNTED
- INTERCOM CALL BUTTON
- INTERCOM ADMINISTRATION PHONE
- SPEAKER (WALL; CEILING)
- CLOCK SPEAKER COMBINATION WALL MOUNT UNIT
- CLOCK - WALL MOUNTED
- SECURITY ACCESS CARD READER
- DOOR CONTROL SOLENOID
- DOOR MAGNETIC CONTACT
- SECURITY SYSTEM - GLASS BREAK SENSOR
- SECURITY SYSTEM - MOTION SENSOR
- SECURITY SYSTEM - DOOR POSITION SENSOR
- SECURITY SYSTEM - REQUEST TO EXIT MOTION DETECTOR
- SECURITY SYSTEM - ACCESS KEY PAD
- SECURITY SYSTEM - MOTION SENSOR - NARROW PATTERN
- SECURITY SYSTEM - CAMERA
- ACCESS PANEL
- LINE TYPE DENOTING CABLE TRAY
- LINE TYPE/LINEWEIGHT DENOTING FUTURE WORK
- LINE TYPE/LINEWEIGHT DENOTING EXISTING WORK TO REMAIN
- LINE TYPE/LINEWEIGHT DENOTING NEW WORK
- LINE TYPE/LINEWEIGHT DENOTING DEMO WORK
- DENOTES AVAILABLE FAULT CURRENT



# 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
AI	AMPS INTERRUPTING CAPACITY
C	CONDUIT OR CEILING
CAT	CATEGORY
CB	CIRCUIT BREAKER
CO	CONDUIT ONLY
CT	CURRENT TRANSFORMER
(D)	DEMOLISH
DISC	DISCONNECT
ECC	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
LTS	LIGHTING
MCA	MINIMUM CIRCUIT AMPCITY
MOP	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, #	PHASE
PAL	PANEL
PR	PRIMARY
REC	RECEPTACLE
(R)	RELOCATED
RIB	RELAY IN A BOX (MOTOR RATED)
SCCR	SHORT CIRCUIT CURRENT RATING
SE	SERVICE ENTRANCE RATED
SEC	SECONDARY
SSEB	SUPPLY SIDE EQUIPMENT BONDING JUMPER
SVC	SERVICE
TELECOM	TELECOMMUNICATION
TGB	TELECOMMUNICATION GROUNDING BUSBAR
TMBB	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)
XFR	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 PUSH-BUTTON	+46"

**NOTES:**

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

# GENERAL REQUIREMENTS

- 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.
- THE CONTRACTOR SHALL OBTAIN ALL REQUIRED CONSTRUCTION PERMITS AND PAY ALL ASSOCIATED FEES.
- 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.
- 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.
- 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.
- 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 AMPCITY 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.
- 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.
- DO NOT ROUTE RACEWAYS ON THE EXTERIOR SURFACE OF THE BUILDING, ROOF, OR FLOOR UNLESS SPECIFICALLY NOTED OTHERWISE.
- PROVIDE ALL WIRING AND EQUIPMENT IN WET AND EXTERIOR LOCATIONS USING EQUIPMENT AND WIRING METHODS RATED FOR WET ENVIRONMENTS.
- 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.
- 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.
- SEAL ALL PENETRATIONS. SEAL PENETRATIONS AT ALL FIRE WALLS WITH APPROVED FIRE STOPPING COMPOUND.
- 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.
- CONTRACTOR SHALL SUBMIT REQUEST FOR SUBSTITUTION IN WRITING TO THE ENGINEER.
- PROVIDE SEISMIC SUPPORT AND DESIGN PER IBC REQUIREMENTS.
- 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.

RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION. INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

SCALE: \_\_\_\_\_

DATE: \_\_\_\_\_

CONSTRUCTION RECORD

FIELD BOOK \_\_\_\_\_

STAKING \_\_\_\_\_

FOREMAN \_\_\_\_\_

AS-BUILT \_\_\_\_\_

INSPECTOR \_\_\_\_\_



CHEFORNAK PUMP HOUSE

ELECTRICAL LEGEND AND GENERAL REQUIREMENTS

CHEFORNAK, ALASKA



BY DATE				
REVISION				

Project No. \_\_\_\_\_

Date: MAY 2015

Designed: BLS

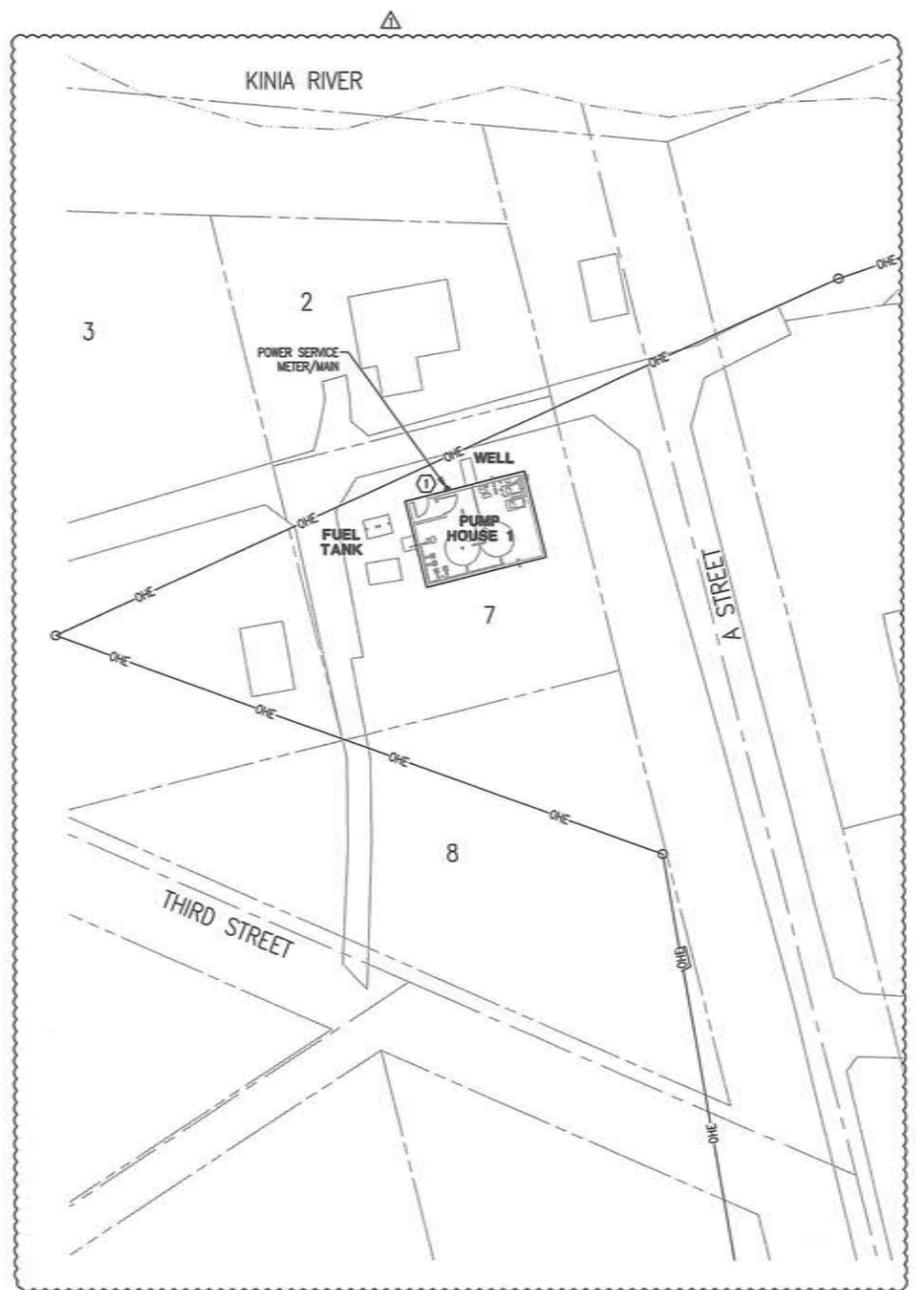
Drawn: BLS

Approved: EDC

**EIC ENGINEERS, INC**  
ELECTRICAL ENGINEERS

6927 OLD SEWARD HWY, SUITE 200  
ANCHORAGE, AK 99518  
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www.eiceng.com

BC JOB #E14-2149



**1 PUMP HOUSE 1 ELECTRICAL SITE PLAN**  
 E2.1 SCALE: 1" = 20'-0"



**SHEET NOTES**

① CONTRACTOR TO FIELD COORDINATE EXACT POWER SERVICE LOCATION AND CONNECTION REQUIREMENTS WITH UTILITY.

RECORD DRAWING CERTIFICATE  
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 NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE:  
 1" = 20'-0"  
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

CONSTRUCTION RECORD

FIELD BOOK	
STAKING	
FOREMAN	
AS-BUILT	
INSPECTOR	



CHEFORNAK PUMP HOUSE  
 ELECTRICAL SITE PLAN  
 CHEFORNAK, ALASKA



REVISION	BY	DATE
95% REVIEW COMMENTS	BLS	8.19.15

Project No.	Date	Designed	Drawn	Approved
	MAY 2015	BLS	BLS	EDC

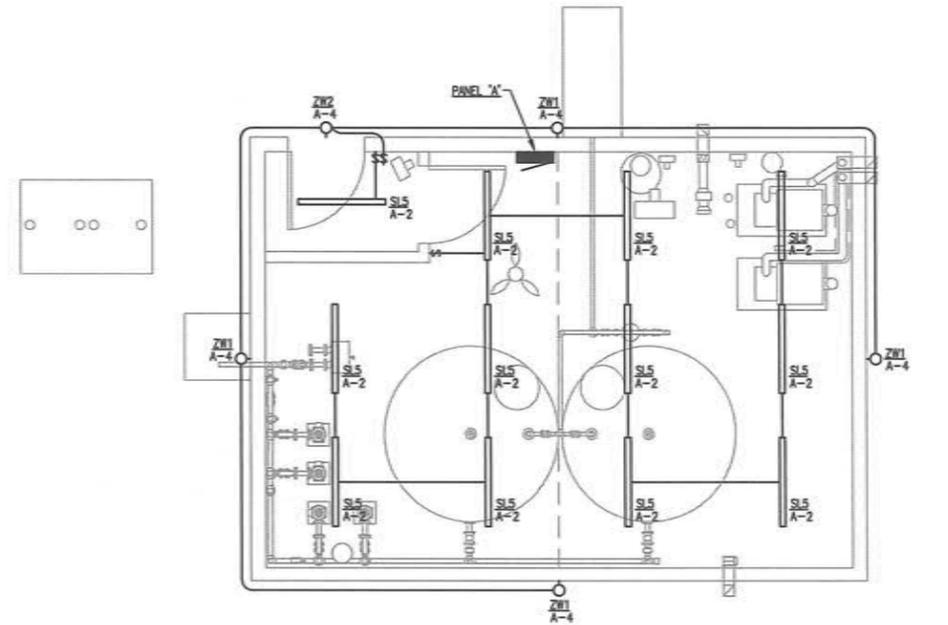
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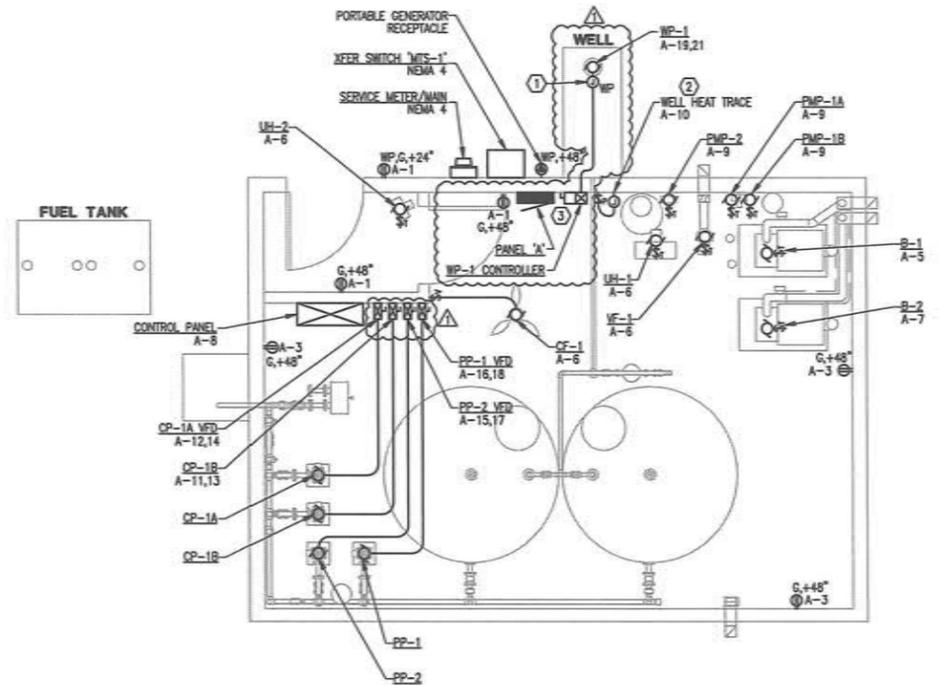
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LUMINAIRE SCHEDULE					
TYPE	DESCRIPTION	LAMPS	MOUNTING	MANUFACTURER/MODEL	NOTES
SLS	4FT LED STRIP W/ LENS	LED	CEILING SURFACE	LITHONIA #ZLN1-L48-5000LM-FST-MVOLT-40K-80CRI-WH	
ZW1	LED AREA LIGHT W/ CUTOFF OPTICS & INTEGRAL PHOTOCELL	LED	EXTERIOR WALL	LITHONIA #OLAN23-53K-120-PE-BZ	
ZW2	LED AREA LIGHT W/ CUTOFF OPTICS & INTEGRAL PHOTOCELL	LED	EXTERIOR WALL	LITHONIA #OLM14	
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 'ML' (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							CONDUCTORS & CONDUIT	NOTES	
		KVA	HP	FLA	MCA	MFS	V	FH			
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.	
CF-1	CEILING FAN		FHP					120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	1
CP-1A	WATER LOOP CIRCULATION PUMP		1					240	3	(3)12 AWG, (1)12 AWG EGC, 1/2" C.	
CP-1A VFD	WATER LOOP CIRC. PUMP VFD			12				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	3
CP-1B	WATER LOOP CIRCULATION PUMP		1					240	3	(3)12 AWG, (1)12 AWG EGC, 1/2" C.	
CP-1B VFD	WATER LOOP CIRC. PUMP VFD			12				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	3
PMP-1A	HEATING CIRC. PUMP		FHP					120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	2
PMP-1B	HEATING CIRC. PUMP		FHP					120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	2
PMP-2	HEATING CIRC. PUMP		FHP					120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	2
PP-1	PRESSURE PUMP		1					240	3	(3)12 AWG, (1)12 AWG EGC, 1/2" C.	
PP-1 VFD	PRESSURE PUMP VFD			12				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	3
PP-2	PRESSURE PUMP		1					240	3	(3)12 AWG, (1)12 AWG EGC, 1/2" C.	
PP-2 VFD	PRESSURE PUMP VFD			12				240	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	3
UH-1	UNIT HEATER		FHP					120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
UH-2	UNIT HEATER		FHP					120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
VF-1	VENTILATION FAN		FHP					120	1	(2)12 AWG, (1)12 AWG EGC, 1/2" C.	
WP-1	WELL PUMP		0.5					240	1	(2)12 AWG, (1)12 AWG EGC, 3/4" 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) FAN PROVIDED WITH WALL MOUNT SPEED CONTROL SWITCH. COORDINATE WITH MECHANICAL.											
2) PROVIDE HP RATED RELAY-IN-A-BOX (RIE) AS NECESSARY FOR CONTROL. COORDINATE ALL CONTROL REQUIREMENTS WITH MECHANICAL.											
3) 3 PHASE VFD WIRED FOR 1 PHASE INPUT AND 3 PHASE MOTOR OUTPUT.											



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



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

**SHEET NOTES**

- 1) PROVIDE WEATHERPROOF JUNCTION BOX FOR TRANSITIONING BETWEEN BUILDING WIRE AND WELL PUMP CABLE.
- 2) PROVIDE CONNECTION TO WELL HEAT TRACE. CONTROL FROM PILOT LIGHT SWITCH.
- 3) PROVIDE LOCKABLE DISCONNECT SWITCH FOR WELL PUMP.

RECORD DRAWING CERTIFICATE  
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NAME \_\_\_\_\_ DATE \_\_\_\_\_

SCALE: 1" = 1'-0"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

CONSTRUCTION RECORD  
FIELD BOOK \_\_\_\_\_  
STAKING \_\_\_\_\_  
FOREMAN \_\_\_\_\_  
AS-BUILT \_\_\_\_\_  
INSPECTOR \_\_\_\_\_



CHEFORNAK PUMP HOUSE  
PUMP HOUSE 1  
ELECTRICAL PLANS  
CHEFORNAK, ALASKA



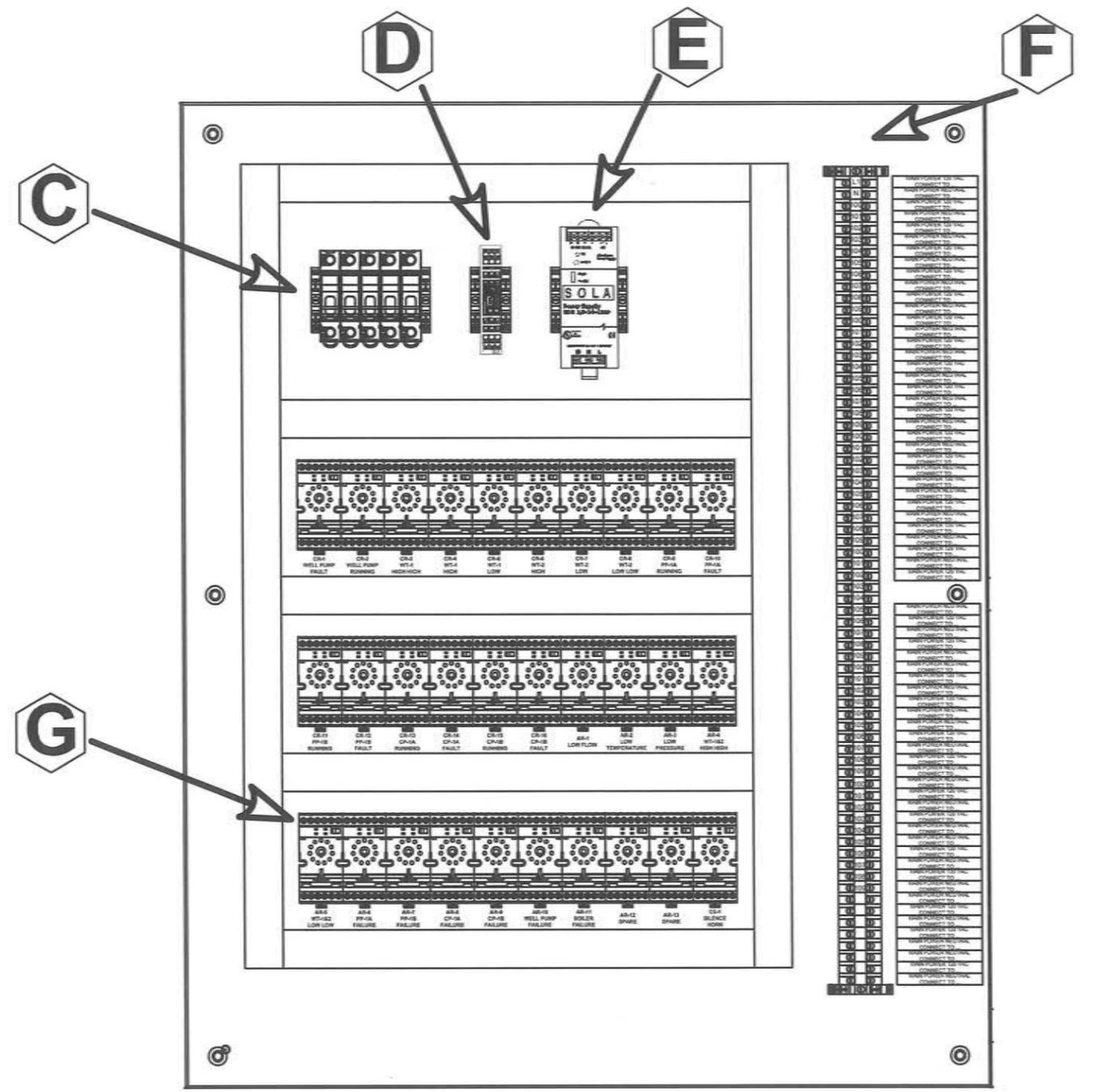
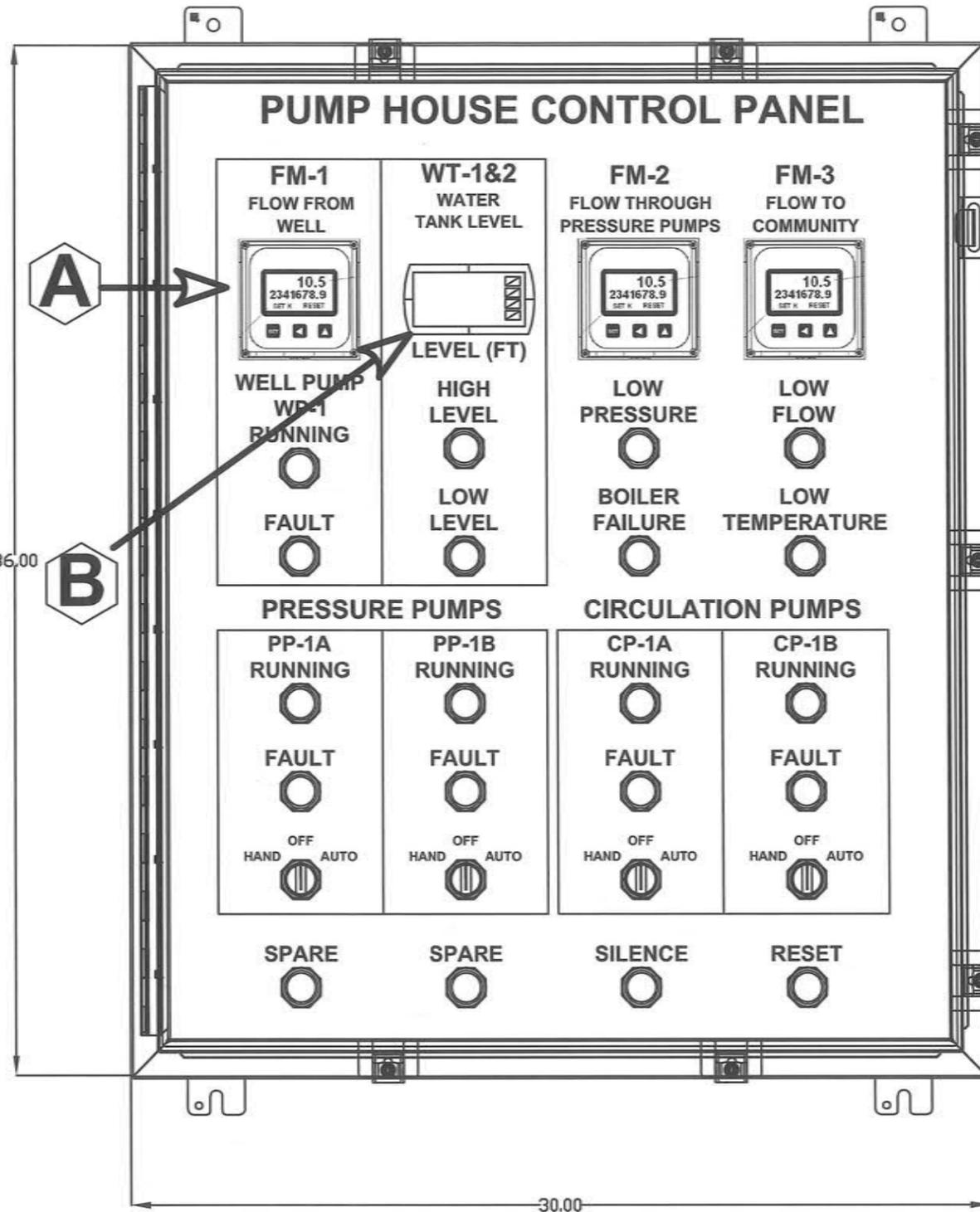
REVISION	BY	DATE
1	BLS	6.16.15

Project No. \_\_\_\_\_  
Date MAY 2015  
Designed BLS  
Drawn BLS  
Approved EDC

Sheet No. E3.1

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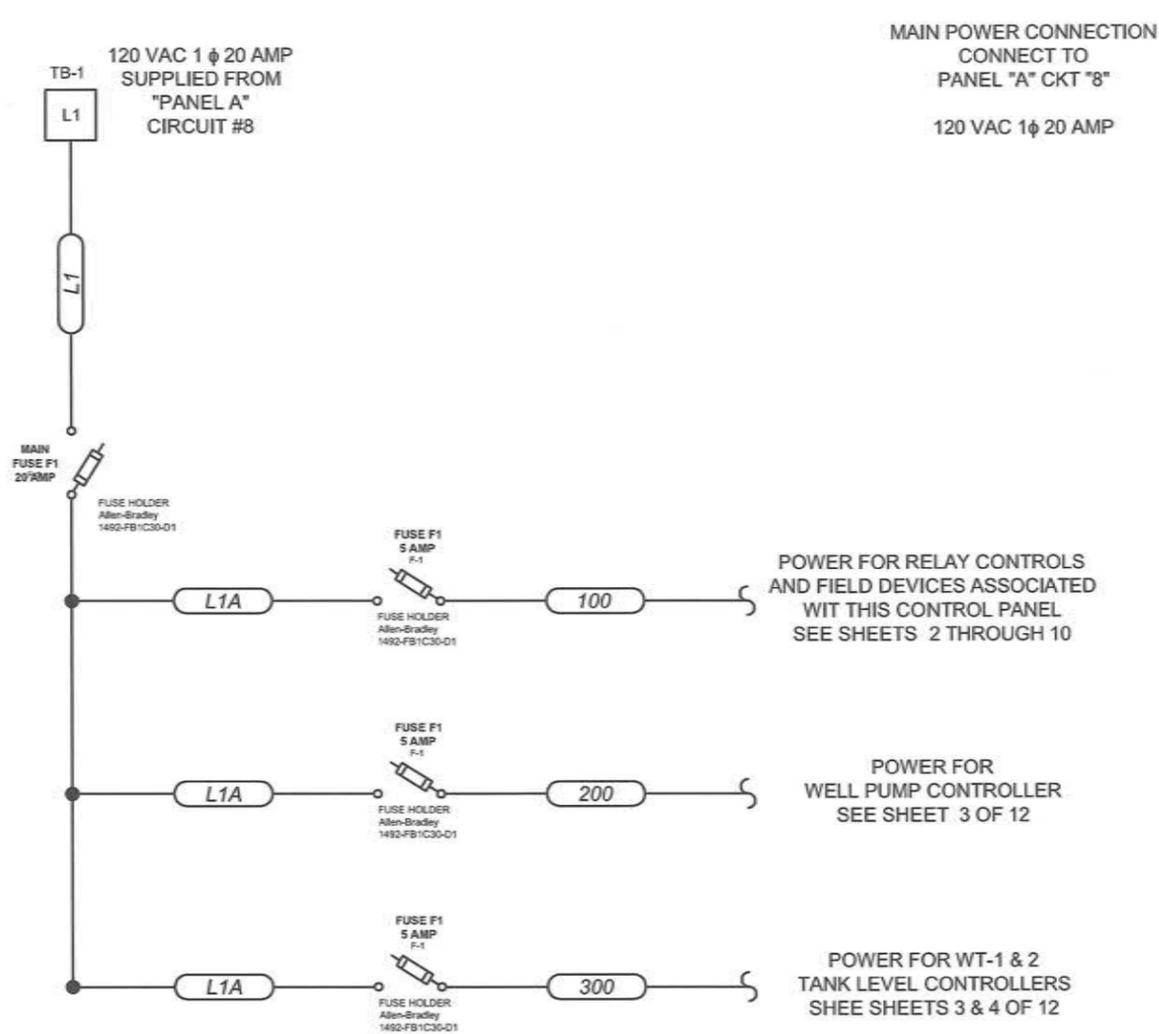




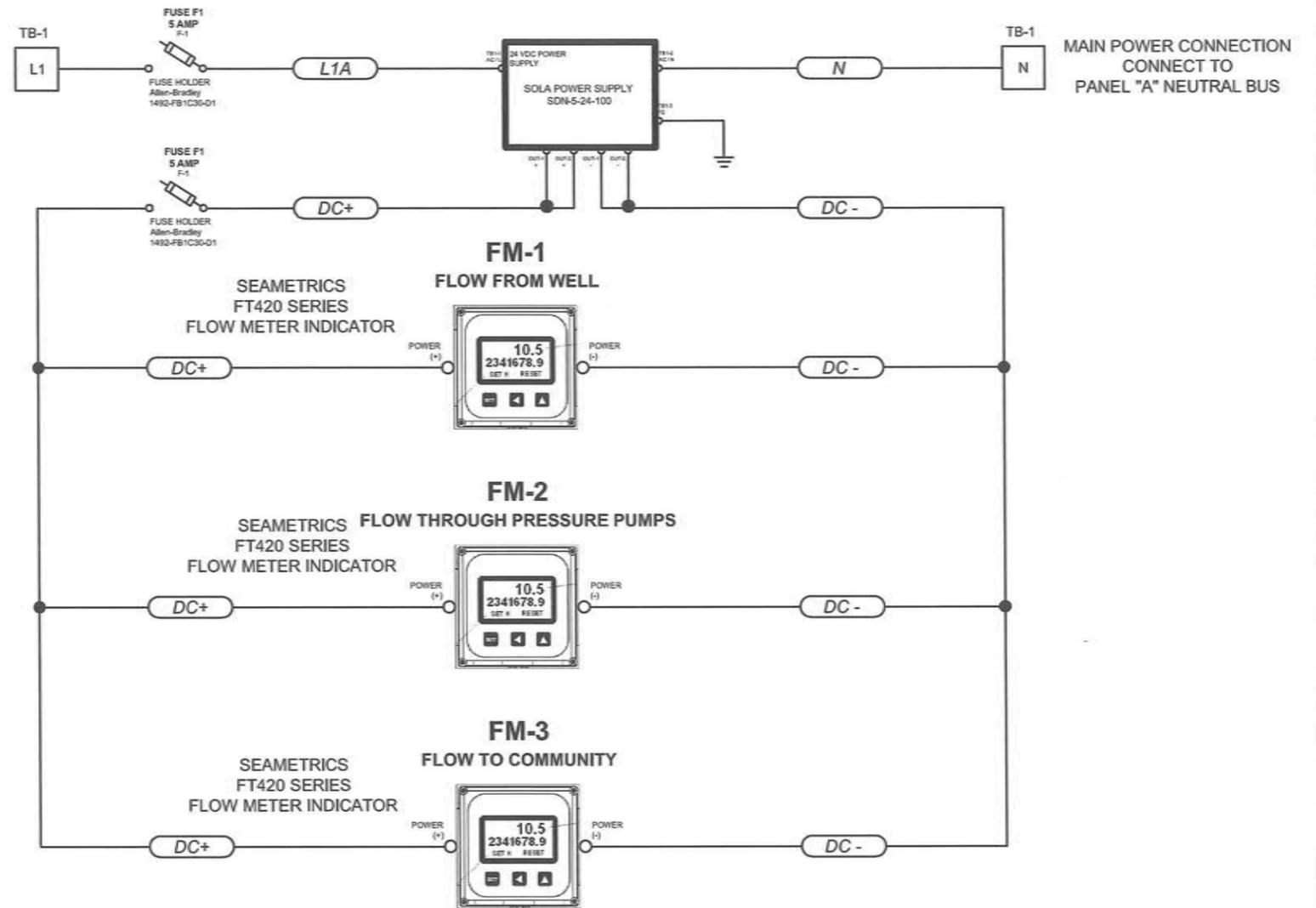
<b>A</b>	SEAMETRICS FT420 FLOW METER INDICATOR	<b>C</b>	ALLEN BRADLEY CIRCUIT BREAKERS 1489-	<b>E</b>	SOLA HD SDN 2.5-24-100 POWER SUPPLY	<b>G</b>	ALLEN BRADLEY 700-HA33A1 CONTROL RELAYS
<b>B</b>	PRECISION DIGITAL PD6000 PROCESS METER	<b>D</b>	OLEUMTECH BM-0900-RM1K WIRELESS ANALOG TRANSMITTER	<b>F</b>	ALLEN- BRADLEY 1492-CA11 TERMINAL BLOCKS		

PROJECT:		CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:		PUMP HOUSE CONTROL PANEL ELEVATIONS	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518			
DRAWN BY: CAS	FILE NAME: chefnak.dwg	SHEET:	OF
DATE: SEPT 9, 2015	PROJECT NUMBER:	1	12

### 120 VAC POWER SUPPLY & DISTRIBUTION



### 24 VDC POWER SUPPLY & FLOW METERS



PROJECT:	CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:	PUMP HOUSE CONTROL PANEL PUMP CONTROLS POWER SUPPLY	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518		
DRAWN BY: CAS	FILE NAME: chefornak_panel.dwg	SHEET: OF
DATE: SEPT 28, 2015	PROJECT NUMBER: 172-04	2 12

# WELL PUMP CONTROLS

NEUTRAL POWER FOR  
ALL 120 VAC POWERED DEVICES  
ASSOCIATED WITH THIS CONTROL PANEL  
SEE SHEET 2 OF 12

POWER FOR WELL PUMP  
CONTROLLER FROM FUSE "F-3"  
SHOWN ON SHEET 2 OF 12

EXISTING PHS WELL  
WELL PUMP CONTROLLER, REMOTE DEVICE -  
LOCATED AT WELL HEAD LOCATION

GRUNDFOS  
CU 300 WELL PUMP CONTROLLER

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
SHOWN ON SHEET 2 OF 12

CONNECTIONS SHOWN HERE  
ARE FROM GRUNDFOS  
CU 300 INSTRUCTION MANUAL  
SECTION 2.5 ELECTRICAL  
CONNECTION

CONNECTED TO WELL PUMP  
MOTOR  
(PROVIDED BY OTHERS)

ALARM RELAY  
WELL PUMP  
CONTROLLER  
FAULT

POWER FOR TANK LEVEL CONTROLLER  
FROM FUSE "F-4"  
SHOWN ON SHEET 2 OF 12

WT-1 TANK LEVEL CONTROLLER  
THIS DEVICE IS LOCATED ON THE ROOF OF WT-1

ALARM RELAY  
WATER LEVEL  
HIGH HIGH

CONTROL RELAY  
WATER LEVEL  
HIGH

CONTROL RELAY  
WATER LEVEL  
LOW

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
CONTINUED ON NEXT SHEET

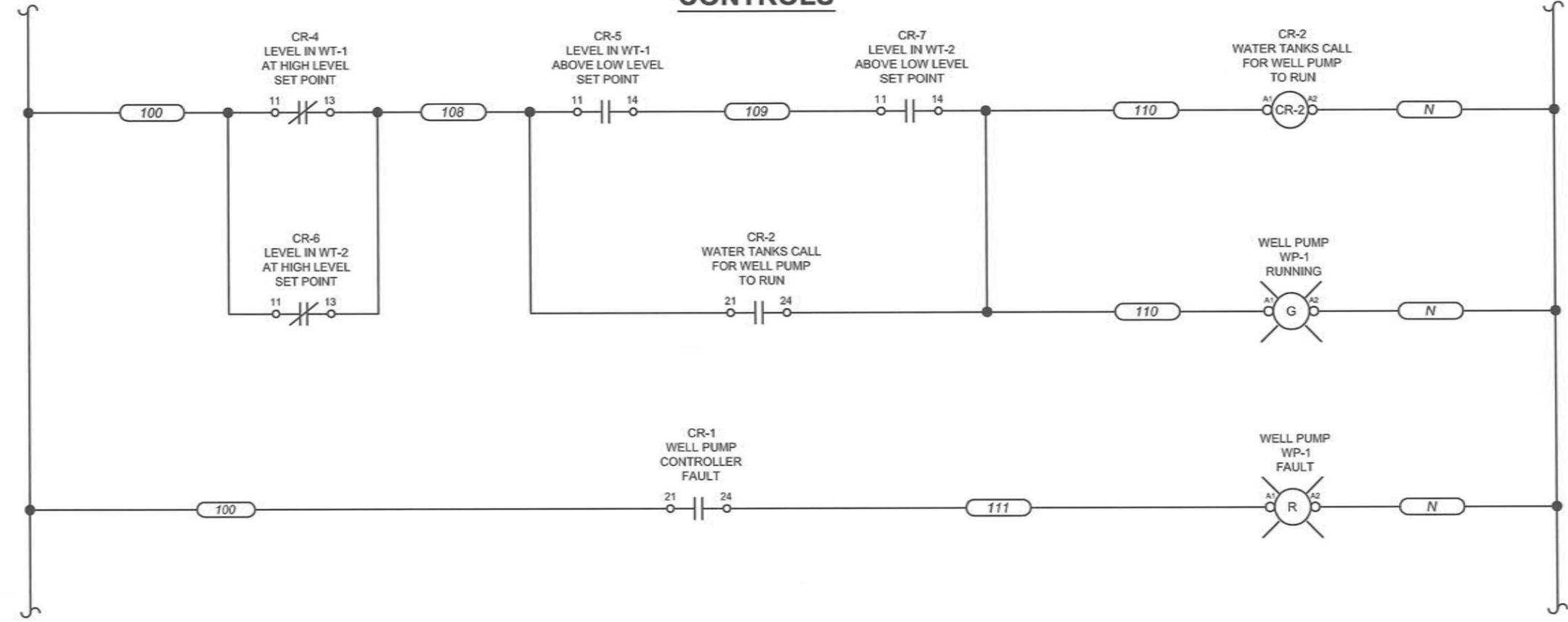
NEUTRAL POWER FOR RELAY CONTROLS  
AND OTHER DEVICES CONTINUED ON  
NEXT SHEET

PROJECT:		CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:		PUMP HOUSE CONTROL PANEL WELL PUMP CONTROLS	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518			
DRAWN BY: CAS	FILE NAME: Chefornak_panel.dwg	SHEET:	OF
DATE: SEPT 9, 2015	PROJECT NUMBER: 172-04	<b>3</b>	<b>12</b>

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
SHOWN ON SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET

### PHS WELL PUMP RELAY CONTROLS

NEUTRAL POWER FOR  
ALL 120 VAC POWERED DEVICES  
ASSOCIATED WITH THIS CONTROL PANEL  
SEE SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET



POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
CONTINUED ON NEXT SHEET

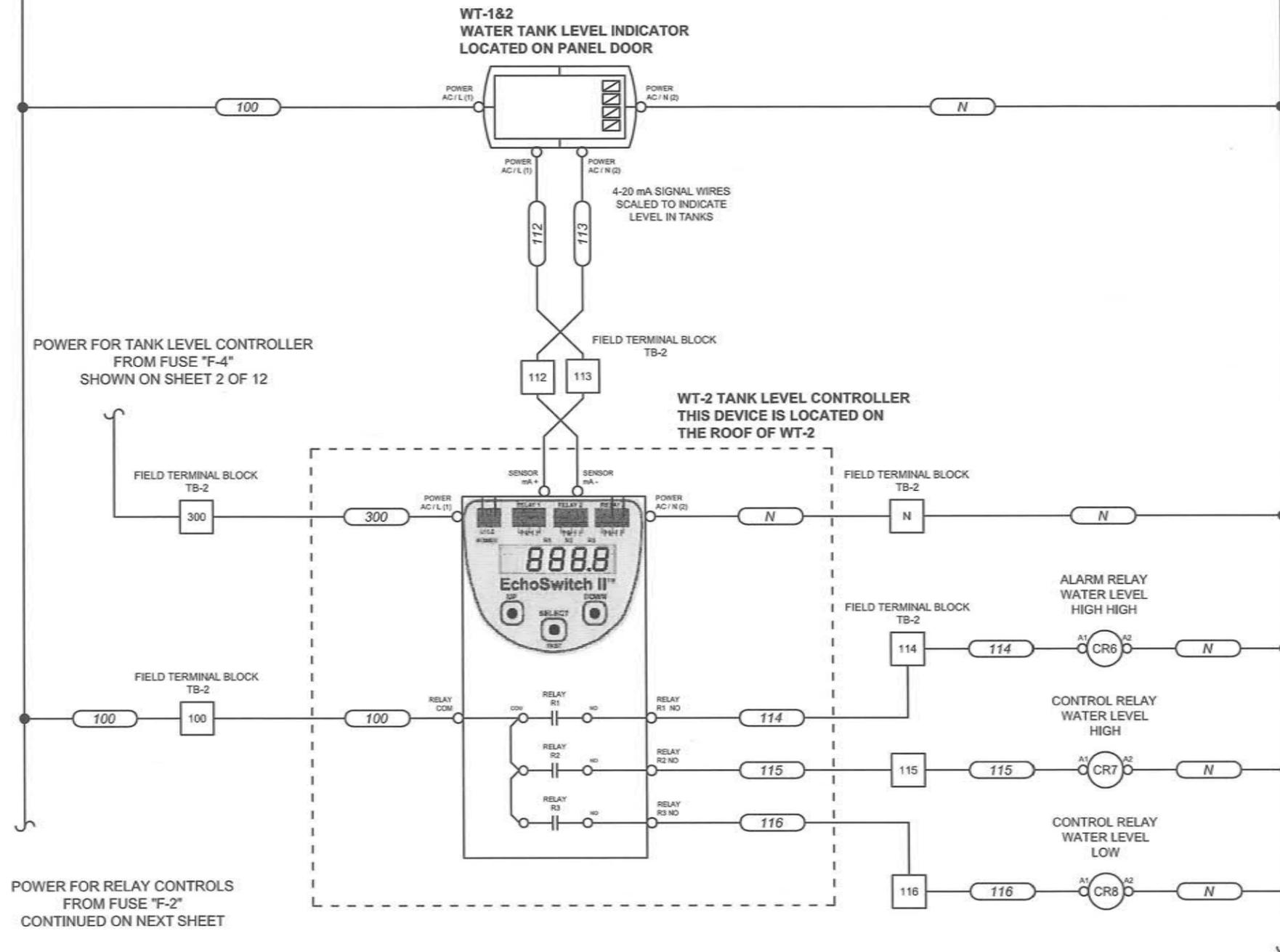
NEUTRAL POWER FOR RELAY CONTROLS  
AND OTHER DEVICES CONTINUED ON  
NEXT SHEET

PROJECT:	CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:	PUMP HOUSE CONTROL PANEL	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518		
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg	SHEET: OF
DATE: Sept. 4, 2015	PROJECT NUMBER: 172-04	4 12

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
SHOWN ON SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET

NEUTRAL POWER FOR  
ALL 120 VAC POWERED DEVICES  
ASSOCIATED WITH THIS CONTROL PANEL  
SEE SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET

### WATER TANK LEVEL INDICATOR & CONTROLS



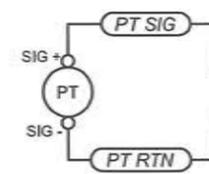
POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
CONTINUED ON NEXT SHEET

NEUTRAL POWER FOR RELAY CONTROLS  
AND OTHER DEVICES CONTINUED ON  
NEXT SHEET

PROJECT:	CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:	PUMP HOUSE CONTROL PANEL	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518		
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg	SHEET: OF
DATE: June 3, 2011	PROJECT NUMBER: 172-04	5 12

**PP-1A  
VFD INTERFACE WIRING**

**PT-PP-1A  
PRESSURE TRANSMITTER**  
PROVIDES PV INPUT TO PID MACRO,  
RUNNING IN THE VFD



THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE VFD ENCLOSURE

- |   |                                     |
|---|-------------------------------------|
| 1 | SHIELD                              |
| 2 | AI-1                                |
| 3 | AGND                                |
| 4 | 10V                                 |
| 5 | AI-2 ACTUAL SIGNAL (PID); 4...20 mA |
| 6 | AGND ANALOG INPUT CIRCUIT COMMON    |
| 7 | AO-1                                |
| 8 | AO-2                                |
| 9 | AGND                                |

AS PER:

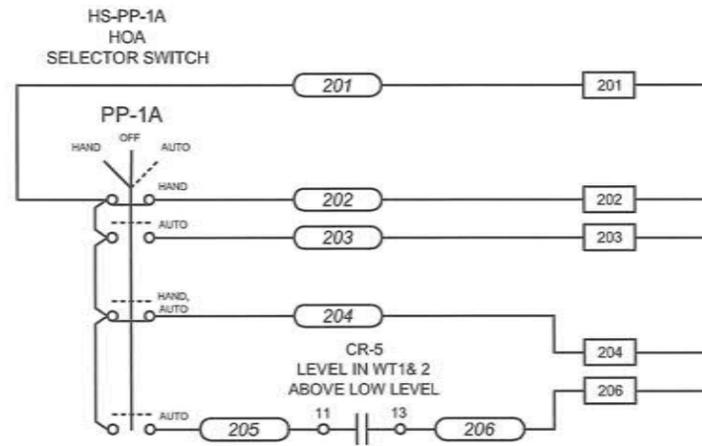
ABB ACQ-U1 USERS'S MANUAL, APPLICATION MANUAL,  
APPLICATIONS MACROS, PAGE 63

THIS MACRO PROVIDES PARAMETER SETTINGS FOR CLOSED LOOP  
CONTROL SYSTEMS SUCH AS PRESSURE CONTROL, FLOW CONTROL,  
ETC. TO ENABLE, SET THE VALUE OF PARAMETER 9902 TO 6  
(PID-CONTROL).

NOTE: PARAMETER 2108 START INHIBIT MUST REMAIN IN THE  
DEFAULT SETTING , 0 (OFF);

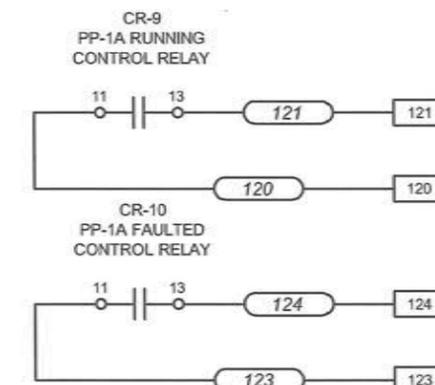
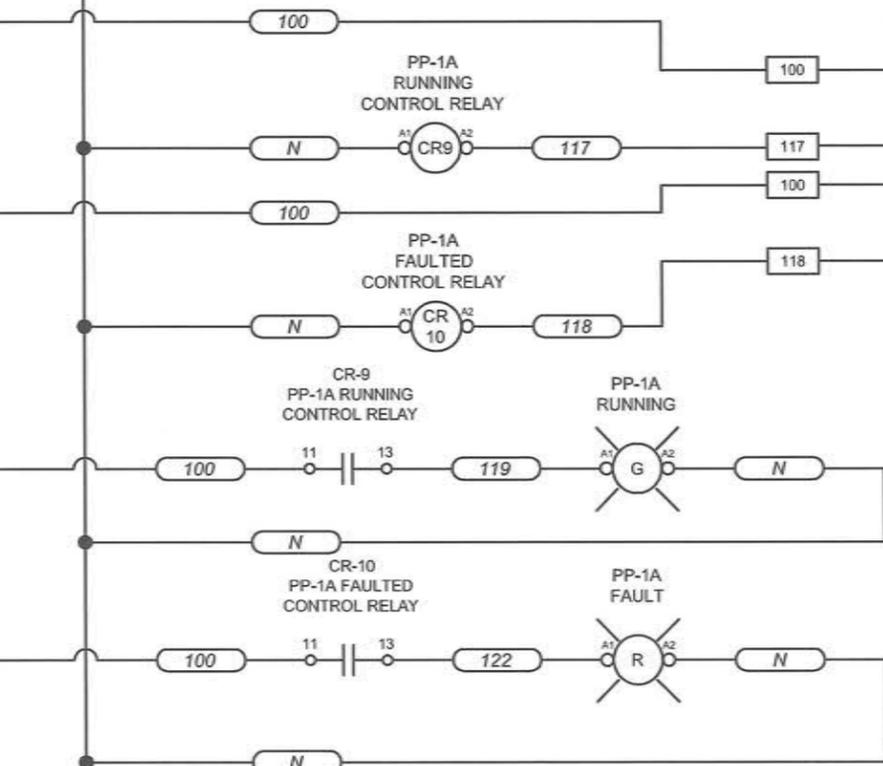
**PP-1A  
PRESSURE PUMP RELAY CONTROLS**

THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE CONTROL PANEL



POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
SHOWN ON SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
CONTINUED ON NEXT SHEET



DRY RELAY OUTPUT  
FOR CONNECTION TO  
ALARM PANEL

- |    |   |
|----|---|
| 10 | 24 VDC OUTPUT   |
| 11 | 24 VDC COMMON   |
| 12 | DIGITAL INPUT COMMON  |
| 13 | DI-1 (START/STOP HAND) ACTIVATION STARTS THE DRIVE                                |
| 14 | DI-2 EXT1/EXT2 ACTIVATION SELECTS PID CONTROL                                     |
| 15 | DI-3 (NOT USED)   |
| 16 | DI-4 (NOT USED)   |
| 17 | DI-5 (RUN ENABLE) DEACTIVATION ALWAYS STOPS DRIVE                                 |
| 18 | DI-6 (START/STOP AUTO (PID)) ACTIVATION STARTS DRIVE                              |
| 19 | RO-1C (COM)   |
| 20 | RO-1A (NC) RELAY OUTPUT 1 PROGRAMMABLE OPERATION (NOT USED)                       |
| 21 | RO-1B (NO)  |
| 22 | RO-2C (COM) RELAY OUTPUT 2 PROGRAMMABLE OPERATION ACTIVATED WHEN MOTER IS RUNNING |
| 23 | RO-2A (NC)  |
| 24 | RO-2B (NO)  |
| 25 | RO-3C (COM) RELAY OUTPUT 3 PROGRAMMABLE OPERATION ACTIVATED WHEN VFD IS FAULTED   |
| 26 | RO-3A (NC)  |
| 27 | RO-3B (NO)  |

PROJECT: CITY OF CHEFORNAK  
WATER & SEWER IMPROVEMENTS

TITLE: PUMP HOUSE CONTROL PANEL

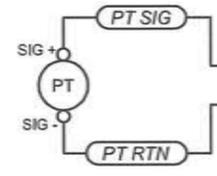
ALASKA METROLOGY & CALIBRATION SERVICES, INC.  
224 EAST 54 AVENUE  
ANCHORAGE, AK 99518

DRAWN BY: CAS FILE NAME: cheformak\_panel.dwg  
DATE: Sept 28, 2015 PROJECT NUMBER: 172-04

SHEET: OF  
**6** **12**

**PP-1B  
VFD INTERFACE WIRING**

PT-PP-1B  
PRESSURE TRANSMITTER  
PROVIDES PV INPUT TO PID MACRO,  
RUNNING IN THE VFD



- THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE VFD ENCLOSURE
- 1 SHIELD
  - 2 AI-1
  - 3 AGND
  - 4 10V
  - 5 AI-2 ACTUAL SIGNAL (PID): 4...20 mA
  - 6 AGND ANALOG INPUT CIRCUIT COMMON
  - 7 AO-1
  - 8 AO-2
  - 9 AGND

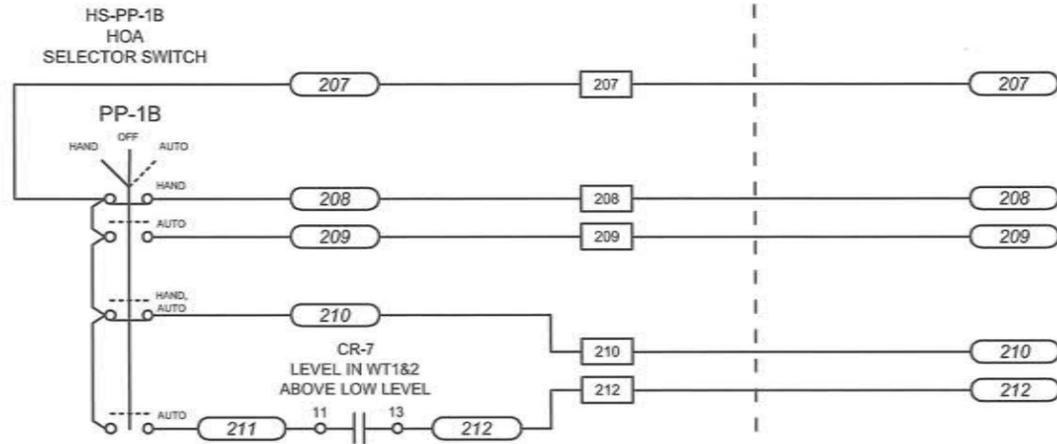
AS PER:  
ABB ACQ-U1 USERS'S MANUAL, APPLICATION MANUAL,  
APPLICATIONS MACROS, PAGE 63

THIS MACRO PROVIDES PARAMETER SETTINGS FOR CLOSED LOOP  
CONTROL SYSTEMS SUCH AS PRESSURE CONTROL, FLOW CONTROL,  
ETC. TO ENABLE, SET THE VALUE OF PARAMETER 9902 TO 6  
(PID-CONTROL).

NOTE: PARAMETER 2108 START INHIBIT MUST REMAIN IN THE  
DEFAULT SETTING , 0 (OFF);

**PP-1B  
PRESSURE PUMP RELAY CONTROLS**

THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE CONTROL PANEL

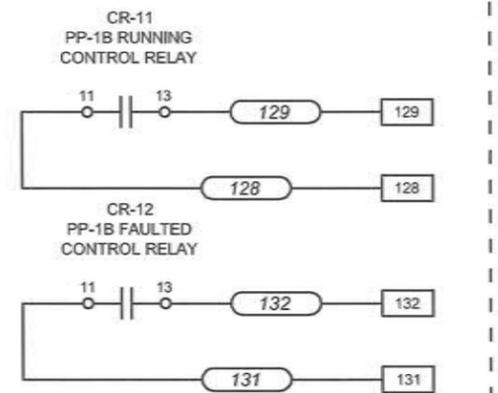
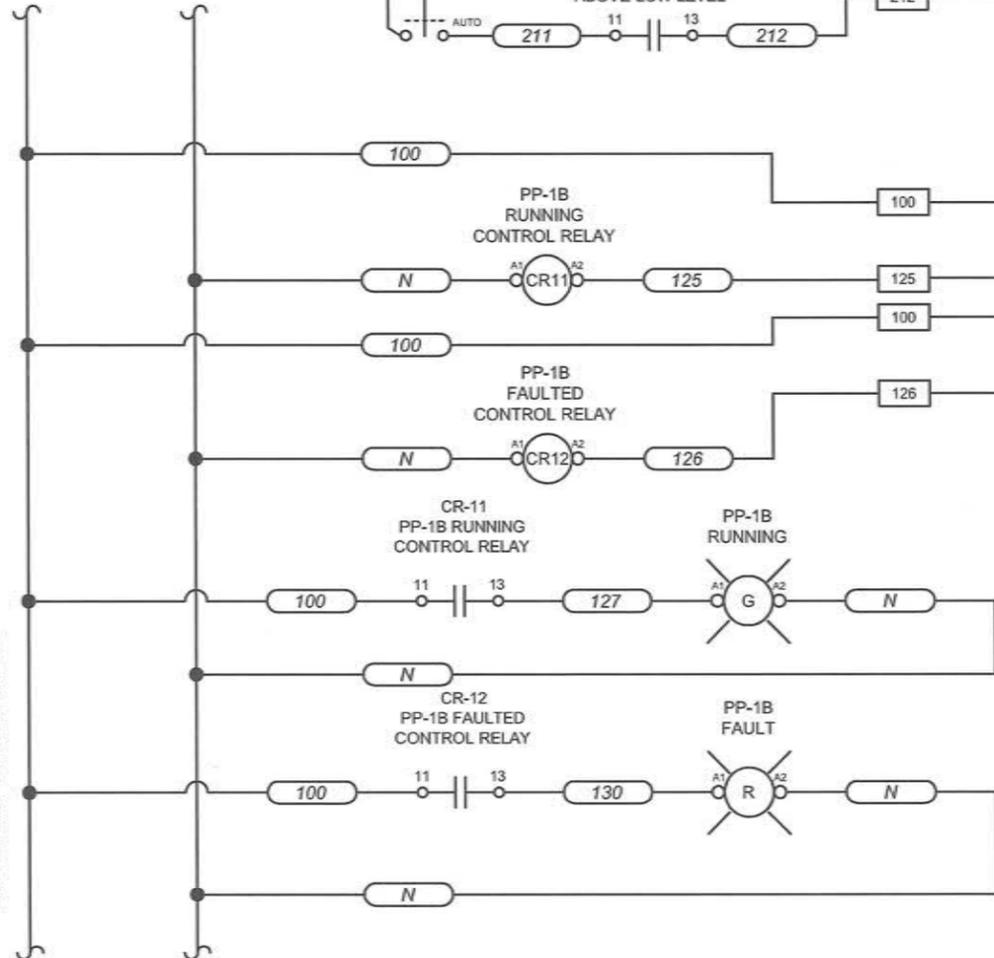


- 10 24 VDC OUTPUT
- 11 24 VDC COMMON
- 12 DIGITAL INPUT COMMON
- 13 DI-1 (START/STOP HAND) ACTIVATION STARTS THE DRIVE
- 14 DI-2 EXT1/EXT2 ACTIVATION SELECTS PID CONTROL
- 15 DI-3 (NOT USED)
- 16 DI-4 (NOT USED)
- 17 DI-5 (RUN ENABLE) DEACTIVATION ALWAYS STOPS DRIVE
- 18 DI-6 (START/STOP AUTO (PID)) ACTIVATION STARTS DRIVE

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
SHOWN ON SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET

- 19 RO-1C (COM) RELAY OUTPUT 1 PROGRAMMABLE OPERATION (NOT USED)
- 20 RO-1A (NC)
- 21 RO-1B (NO)
- 22 RO-2C (COM) RELAY OUTPUT 2 PROGRAMMABLE OPERATION ACTIVATED WHEN MOTER IS RUNNING
- 23 RO-2A (NC)
- 24 RO-2B (NO)
- 25 RO-3C (COM) RELAY OUTPUT 3 PROGRAMMABLE OPERATION ACTIVATED WHEN VFD IS FAULTED
- 26 RO-3A (NC)
- 27 RO-3B (NO)

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
CONTINUED ON NEXT SHEET

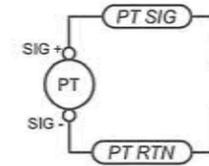


DRY RELAY OUTPUT  
FOR CONNECTION TO  
ALARM PANEL

PROJECT:		CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:		PUMP HOUSE CONTROL PANEL	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518			
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg	SHEET: 7	OF 12
DATE: Sept 28, 2015	PROJECT NUMBER: 172-04		

**CP-1A  
VFD INTERFACE WIRING**

PT-CP-1A  
PRESSURE TRANSMITTER  
PROVIDES PV INPUT TO PID MACRO,  
RUNNING IN THE VFD



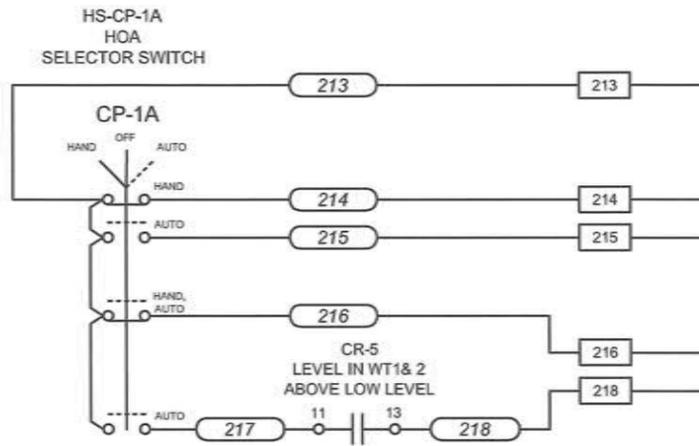
THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE VFD ENCLOSURE

- 1 SHIELD
- 2 AI-1
- 3 AGND
- 4 10V
- 5 AI-2 ACTUAL SIGNAL (PID): 4...20 mA
- 6 AGND ANALOG INPUT CIRCUIT COMMON
- 7 AO-1
- 8 AO-2
- 9 AGND

AS PER:  
ABB ACQ-U1 USERS'S MANUAL, APPLICATION MANUAL,  
APPLICATIONS MACROS, PAGE 63  
  
THIS MACRO PROVIDES PARAMETER SETTINGS FOR CLOSED LOOP  
CONTROL SYSTEMS SUCH AS PRESSURE CONTROL, FLOW CONTROL,  
ETC. TO ENABLE, SET THE VALUE OF PARAMETER 9902 TO 6  
(PID-CONTROL).  
  
NOTE: PARAMETER 2108 START INHIBIT MUST REMAIN IN THE  
DEFAULT SETTING , 0 (OFF);

**CP-1A  
CIRCULATION PUMP RELAY CONTROLS**

THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE CONTROL PANEL

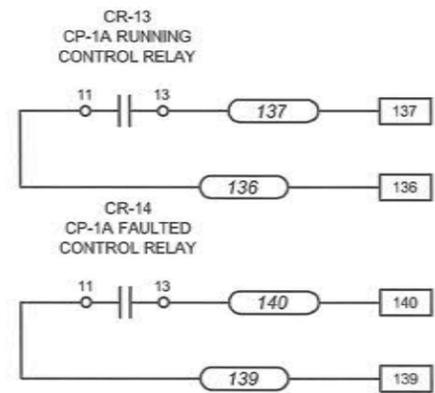
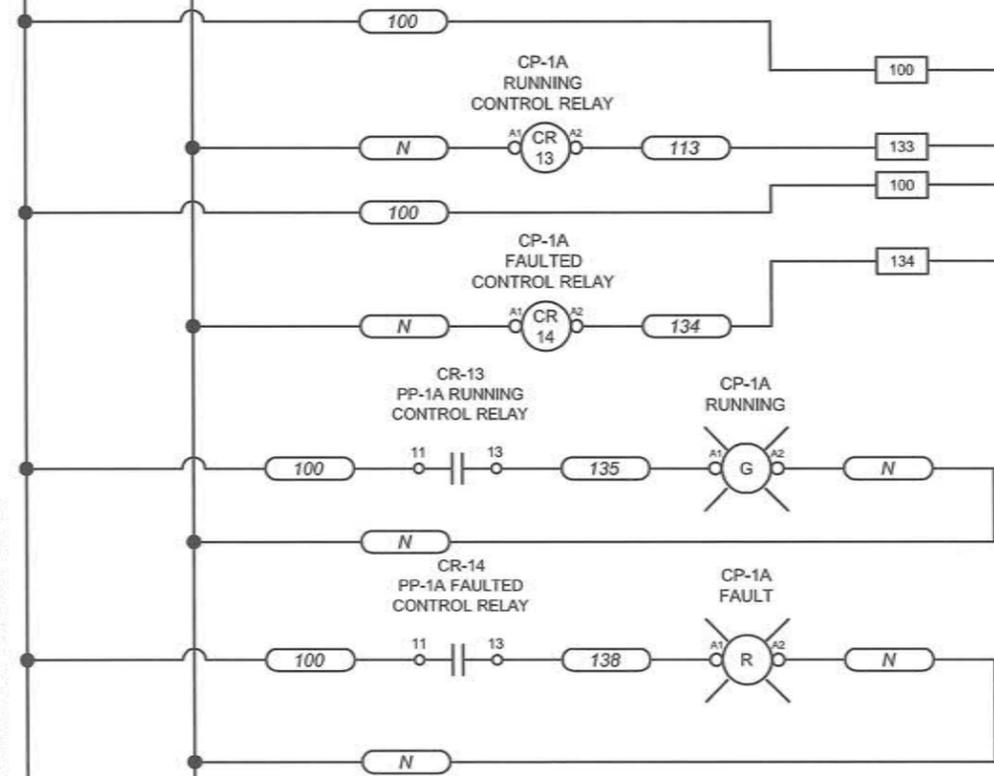


POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
SHOWN ON SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET

- 10 24 VDC OUTPUT
- 11 24 VDC COMMON
- 12 DIGITAL INPUT COMMON
- 13 DI-1 (START/STOP HAND) ACTIVATION STARTS THE DRIVE
- 14 DI-2 EXT1/EXT2 ACTIVATION SELECTS PID CONTROL
- 15 DI-3 (NOT USED)
- 16 DI-4 (NOT USED)
- 17 DI-5 (RUN ENABLE) DEACTIVATION ALWAYS STOPS DRIVE
- 18 DI-6 (START/STOP AUTO (PID)) ACTIVATION STARTS DRIVE

- 19 RO-1C (COM) RELAY OUTPUT 1 PROGRAMMABLE OPERATION (NOT USED)
- 20 RO-1A (NC)
- 21 RO-1B (NO)
- 22 RO-2C (COM) RELAY OUTPUT 2 PROGRAMMABLE OPERATION ACTIVATED WHEN MOTER IS RUNNING
- 23 RO-2A (NC)
- 24 RO-2B (NO)
- 25 RO-3C (COM) RELAY OUTPUT 3 PROGRAMMABLE OPERATION ACTIVATED WHEN VFD IS FAULTED
- 26 RO-3A (NC)
- 27 RO-3B (NO)

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
CONTINUED ON NEXT SHEET

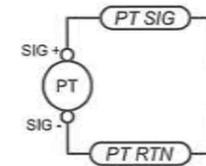


DRY RELAY OUTPUT  
FOR CONNECTION TO  
ALARM PANEL

PROJECT:		CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:		PUMP HOUSE CONTROL PANEL	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518			
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg	SHEET: 8	OF 12
DATE: Sept 28, 2015	PROJECT NUMBER: 172-04		

**CP-1B  
VFD INTERFACE WIRING**

**PT-CP-1B  
PRESSURE TRANSMITTER**  
PROVIDES PV INPUT TO PID MACRO,  
RUNNING IN THE VFD



- THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE VFD ENCLOSURE
- |   |                                     |
|---|-------------------------------------|
| 1 | SHIELD                              |
| 2 | AI-1                                |
| 3 | AGND                                |
| 4 | 10V                                 |
| 5 | AI-2 ACTUAL SIGNAL (PID): 4...20 mA |
| 6 | AGND ANALOG INPUT CIRCUIT COMMON    |
| 7 | AO-1                                |
| 8 | AO-2                                |
| 9 | AGND                                |

AS PER:  
ABB ACQ-U1 USERS'S MANUAL, APPLICATION MANUAL,  
APPLICATIONS MACROS, PAGE 63

THIS MACRO PROVIDES PARAMETER SETTINGS FOR CLOSED LOOP  
CONTROL SYSTEMS SUCH AS PRESSURE CONTROL, FLOW CONTROL,  
ETC. TO ENABLE, SET THE VALUE OF PARAMETER 9902 TO 6  
(PID-CONTROL).

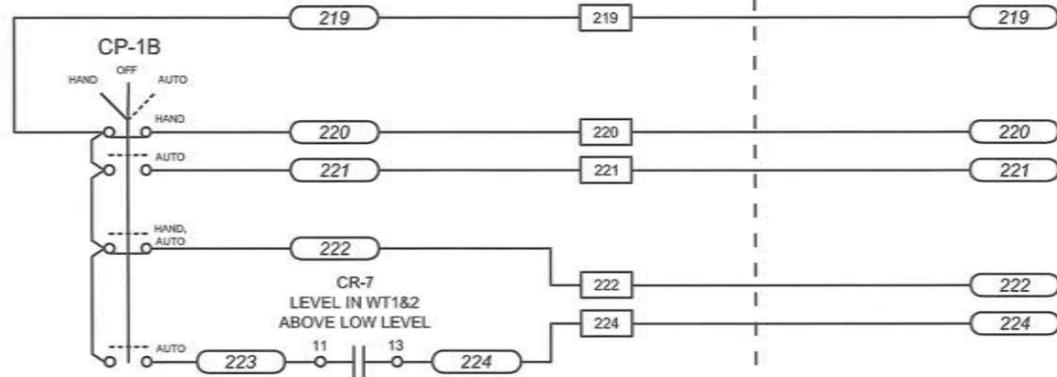
NOTE: PARAMETER 2108 START INHIBIT MUST REMAIN IN THE  
DEFAULT SETTING , 0 (OFF);

**CP-1B  
CIRCULATION PUMP RELAY CONTROLS**

THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE CONTROL PANEL

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
SHOWN ON SHEET 2 OF 12  
CONTINUED FROM PREVIOUS SHEET

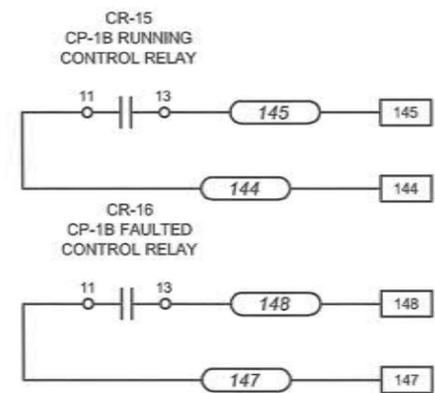
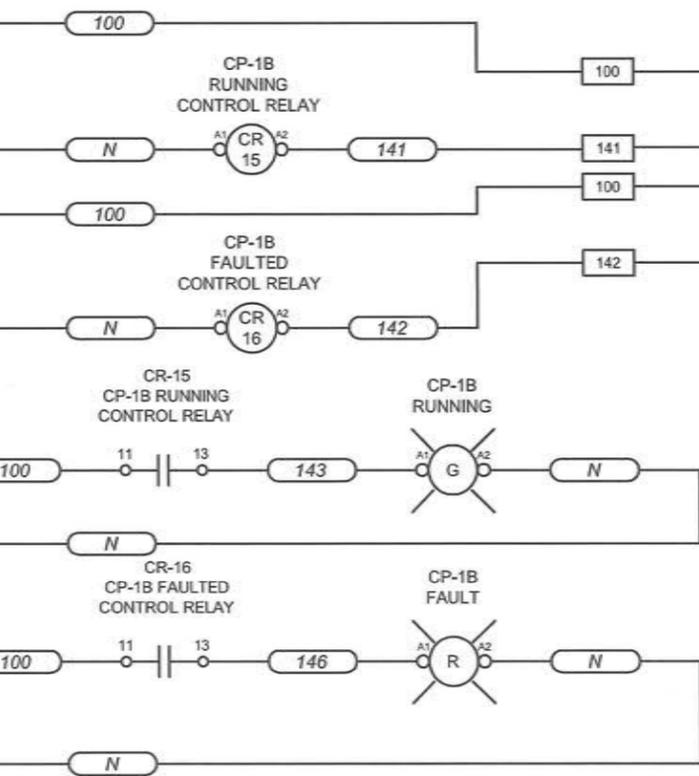
**HS-CP-1B  
HOA  
SELECTOR SWITCH**



- THE WIRING AND DEVICES SHOWN  
IN THIS DASHED RECTANGLE ARE LOCATED  
IN THE VFD ENCLOSURE
- |    |  |
|----|--|
| 10 | 24 VDC OUTPUT  |
| 11 | 24 VDC COMMON  |
| 12 | DIGITAL INPUT COMMON                                 |
| 13 | DI-1 (START/STOP HAND) ACTIVATION STARTS THE DRIVE   |
| 14 | DI-2 EXT1/EXT2 ACTIVATION SELECTS PID CONTROL        |
| 15 | DI-3 (NOT USED)                                      |
| 16 | DI-4 (NOT USED)                                      |
| 17 | DI-5 (RUN ENABLE) DEACTIVATION ALWAYS STOPS DRIVE    |
| 18 | DI-6 (START/STOP AUTO (PID)) ACTIVATION STARTS DRIVE |

- |    |             |                               |
|----|-------------|-------------------------------|
| 19 | RO-1C (COM) | RELAY OUTPUT 1                |
| 20 | RO-1A (NC)  | PROGRAMMABLE OPERATION        |
| 21 | RO-1B (NO)  | (NOT USED)                    |
| 22 | RO-2C (COM) | RELAY OUTPUT 2                |
| 23 | RO-2A (NC)  | PROGRAMMABLE OPERATION        |
| 24 | RO-2B (NO)  | ACTIVATED WHEN MOTER IS       |
| 25 | RO-3C (COM) | RELAY OUTPUT 3                |
| 26 | RO-3A (NC)  | PROGRAMMABLE OPERATION        |
| 27 | RO-3B (NO)  | ACTIVATED WHEN VFD IS FAULTED |

POWER FOR RELAY CONTROLS  
FROM FUSE "F-2"  
CONTINUED ON NEXT SHEET



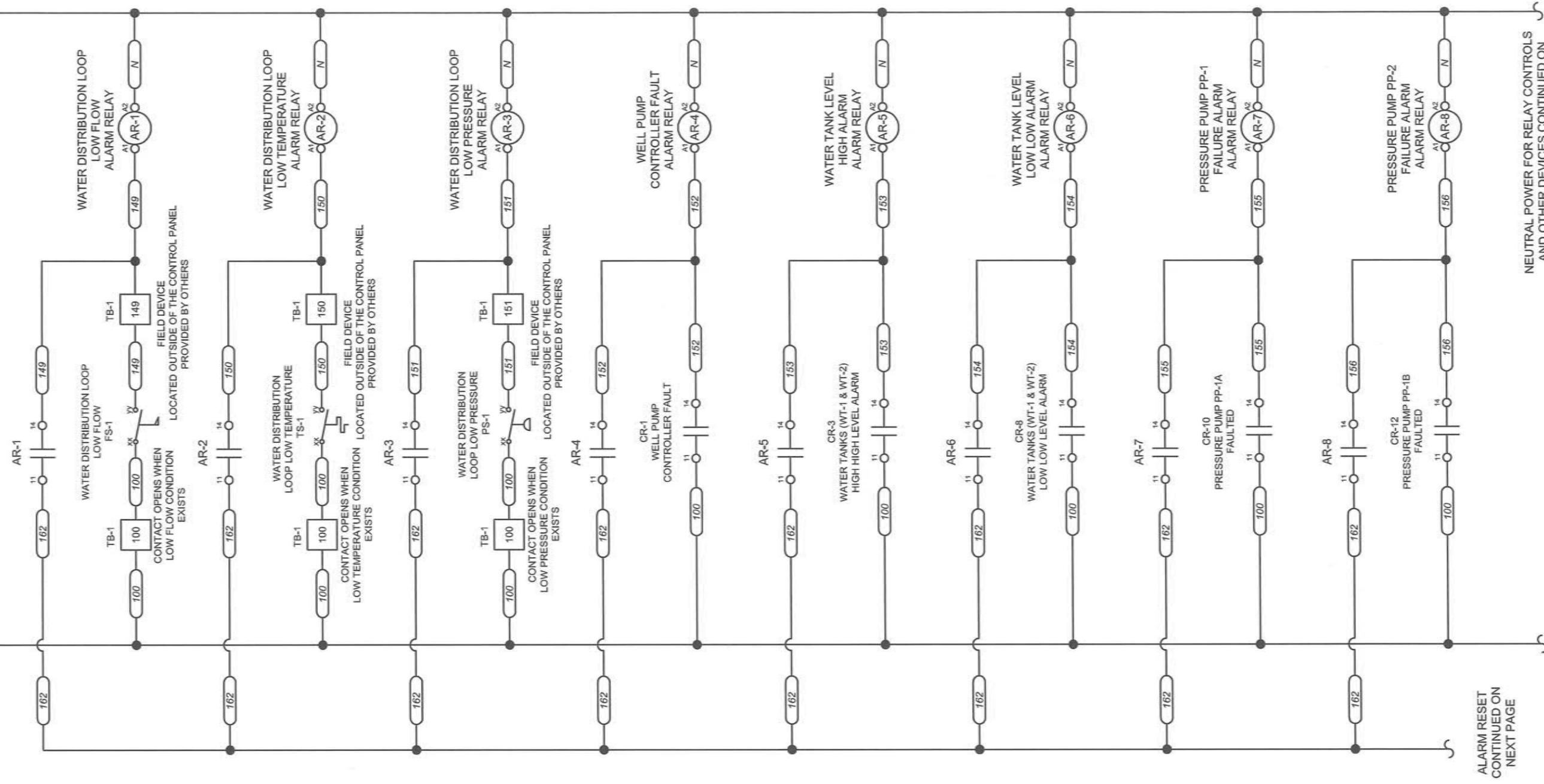
DRY RELAY OUTPUT  
FOR CONNECTION TO  
ALARM PANEL

PROJECT:		CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:		PUMP HOUSE CONTROL PANEL	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518			
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg	SHEET: 9	OF 12
DATE: June 3, 2011	PROJECT NUMBER: 172-04		

NEUTRAL POWER FOR ALL 120 VAC POWERED DEVICES ASSOCIATED WITH THIS CONTROL PANEL SEE SHEET 2 OF 12 CONTINUED FROM PREVIOUS SHEET

POWER FOR RELAY CONTROLS FROM FUSE "F-2" SHOWN ON SHEET 2 OF 12 CONTINUED FROM PREVIOUS SHEET

**ALARM INPUT CONTROLS**



NEUTRAL POWER FOR RELAY CONTROLS AND OTHER DEVICES CONTINUED ON NEXT SHEET

POWER FOR RELAY CONTROLS FROM FUSE "F-2" CONTINUED ON NEXT SHEET

ALARM RESET CONTINUED ON NEXT PAGE

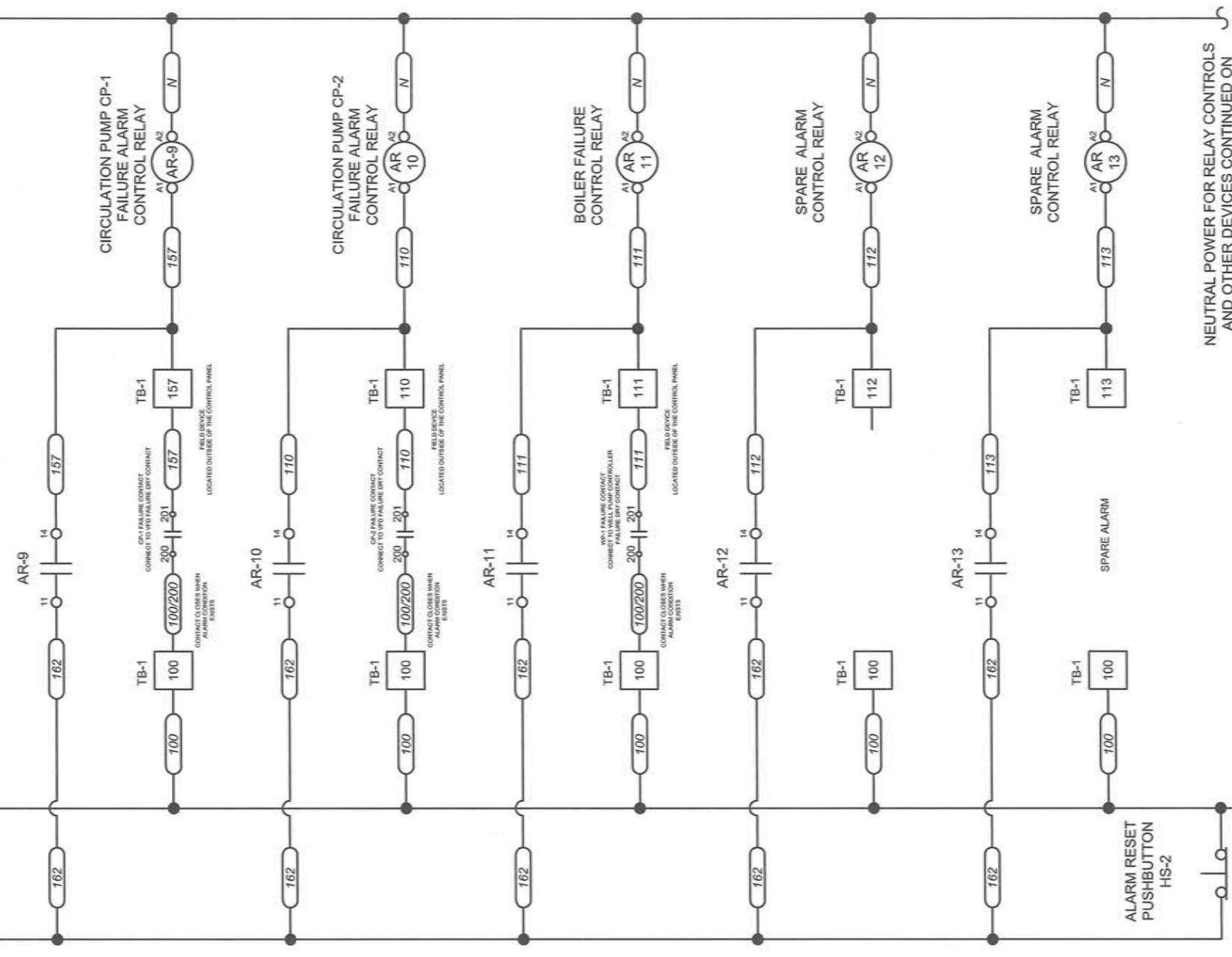
PROJECT:		CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:		PUMP HOUSE CONTROL PANEL ALARM INPUT CONROLS	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518			
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg	SHEET:	
DATE: Sept 28, 2015	PROJECT NUMBER: 172-04	10	12

NEUTRAL POWER FOR ALL 120 VAC POWERED DEVICES ASSOCIATED WITH THIS CONTROL PANEL SEE SHEET 2 OF 12 CONTINUED FROM PREVIOUS SHEET

POWER FOR RELAY CONTROLS FROM FUSE "F-2" SHOWN ON SHEET 2 OF 12 CONTINUED FROM PREVIOUS SHEET

ALARM RESET CIRCUIT CONTINUED FROM PREVIOUS PAGE

**ALARM INPUT CONTROLS**

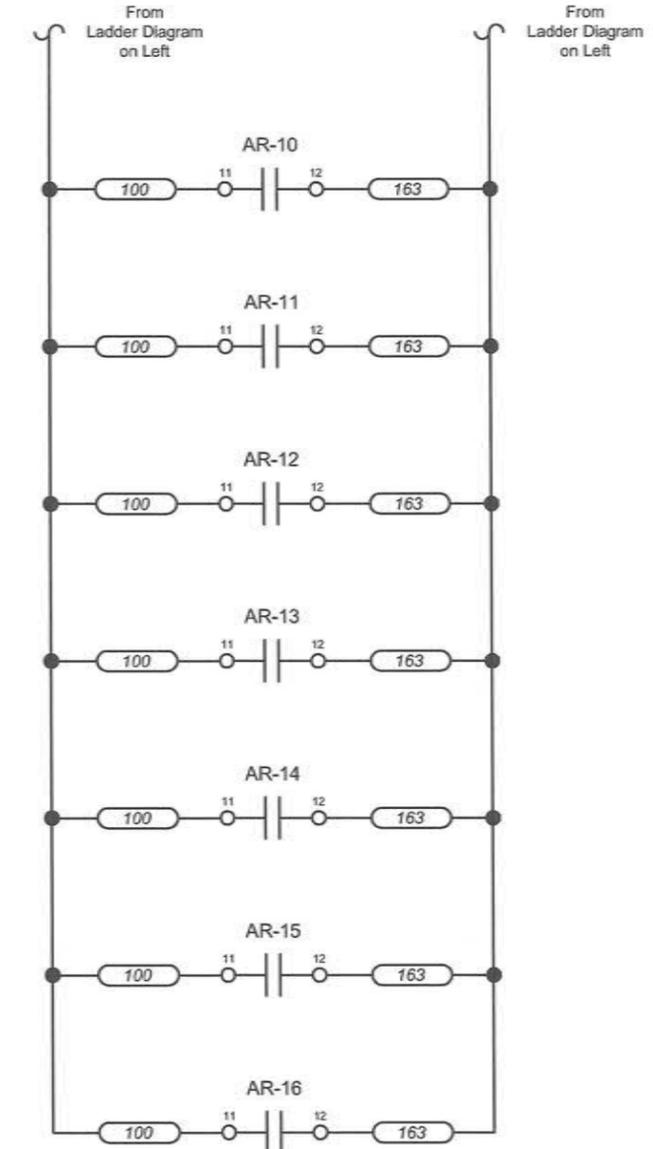
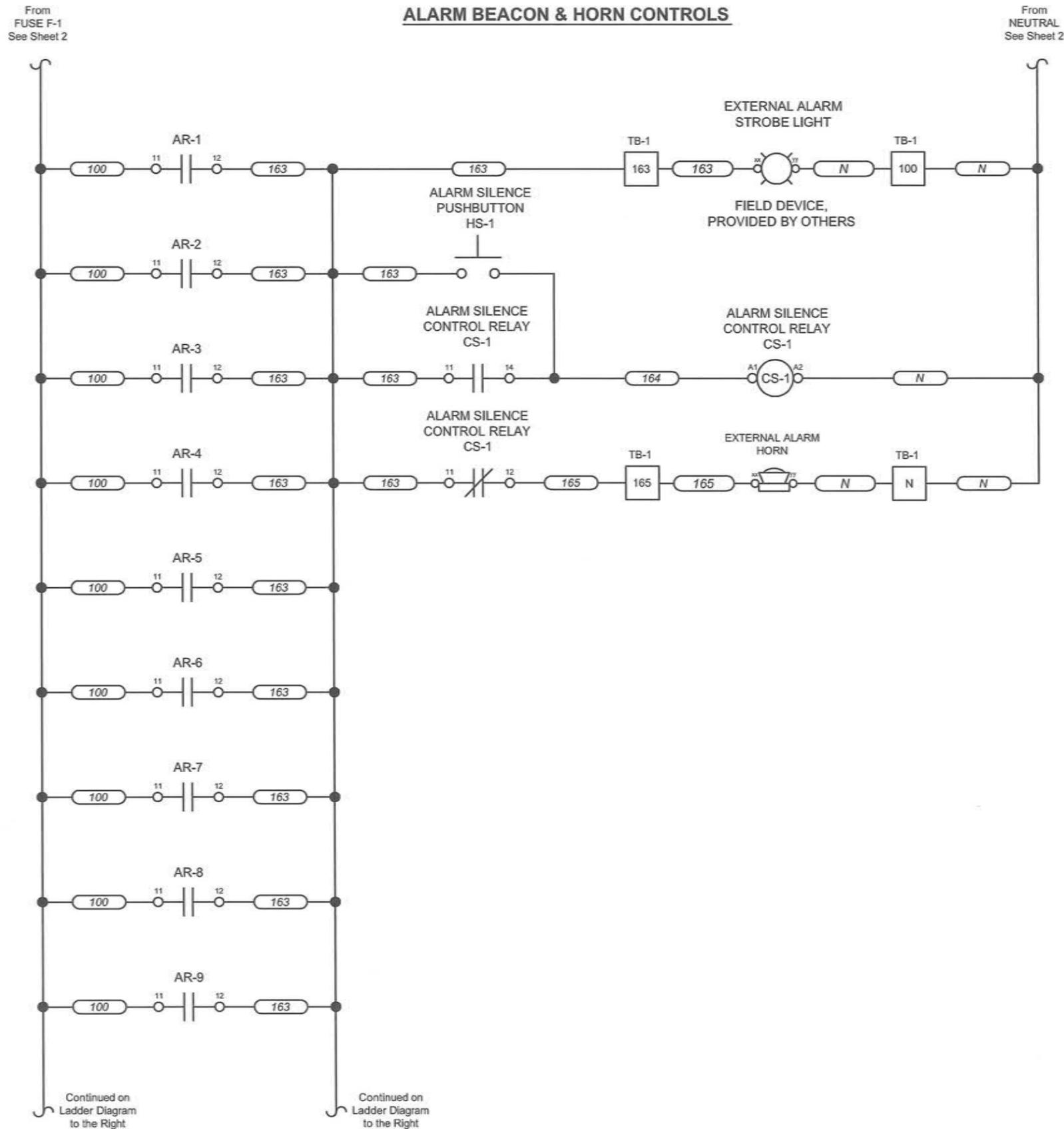


NEUTRAL POWER FOR RELAY CONTROLS AND OTHER DEVICES CONTINUED ON NEXT SHEET

POWER FOR RELAY CONTROLS FROM FUSE "F-2" CONTINUED ON NEXT SHEET

PROJECT:		CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE:		PUMP HOUSE CONTROL PANEL ALARM INPUT CONTROLS	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518			
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg	SHEET:	
Sept 28, 2015	PROJECT NUMBER: 172-04	11	12

### ALARM BEACON & HORN CONTROLS



PROJECT: CITY OF CHEFORNAK WATER & SEWER IMPROVEMENTS	
TITLE: PUMP HOUSE CONTROL PANEL ALARM BEACON & HORN CONTROLS	
ALASKA METROLOGY & CALIBRATION SERVICES, INC. 224 EAST 54 AVENUE ANCHORAGE, AK 99518	
DRAWN BY: CAS	FILE NAME: chefnak_panel.dwg
DATE: Sept 28, 2015	PROJECT NUMBER: 172-04
SHEET: 12 12	