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TECHNICAL MEMORANDUM

PND Project Number: 192080
To: Mr. Karl Hagerman, Utilities Director, Petersburg Borough
Date: February 15, 2023
From: Tyler Bradshaw, P.E., PND Engineers
Subject: Pump Station 4 Alternatives Assessment Technical Memorandum
CC: Mark Morris, Morris Engineering Group

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1 Background and Project Description

Petersburg Borough (PB) desires to replace Pump Station 4 (PS4) and associated force main discharge pipe. Located on Sandy Beach Road at the intersection of undeveloped Ramona Street right of way, Pump Station 4 is the second largest pump station in the PB sewer collection system. PS4 consists of a buried wet well with a buried drywell housing the pumps and controls. An adjacent brick maintenance building contains the backup generator system and primary power service. PS4 was originally constructed in 1975; the pumps were upgraded in 1989 to three Allis-Chalmers 50 HP vertical, non-clog pumps with design original design flow of approximately 1800 GPM each. The electrical and backup generator system is further described in the attached electrical technical memorandum, developed by Morris Engineering Group (MEG).

PS4 discharges into an approximately 1000-foot long, ten-inch cast iron force main which traverses Nordic Drive and Sandy Beach Road, to a discharge manhole at the intersection of Sandy Beach Road and undeveloped Augusta Street right of Way. Both the pump station and the force main are nearing their useful service life and are creating a heavy maintenance burden for PB.



Figure 1 - Pump Station 4 and Force Main

In 2020, PND performed an assessment of rehabilitation and replacement alternatives for the force main. The project and focus of the study at the time included only the force main, however, with an understanding that PB desired to replace Pump Station 4 in the near future, the study included a precursory evaluation of an alternate alignment utilizing undeveloped Borough rights of way within the Hungry Point Subdivision, assuming a full replacement of PS4. In light of recent PB discussion on the potential development of the Hungry Point Subdivision and the increasing need to update PS4, in addition to the force main, PB ultimately elected to proceed with an alternate force main alignment through Hungry Point Subdivision and full replacement of PS4.

The proposed project replaces existing PS4 with a new wet well including submersible Flygt pumps and a dry valve vault, similar to other newer PB pump stations. The proposed force main will be constructed of HDPE and traverses through undeveloped Ramona Street right of way to Augusta Street where a new gravity sewer main will carry wastewater to the discharge manhole in Sandy Beach Road. PB retained PND to evaluate alternatives for location and installation methods for the pump station and pipe systems. The intent of this report is to present alternatives and recommendations to PB regarding the cost and work required to replace PS4 and the force main. The assessment focuses on three areas of investigation:

1. Pump Station Location. Three alternative locations are evaluated. One utilizes adjacent privately owned property and two remain entirely within PB right of way.

2. Pipe installation. Two alternatives are evaluated. "Floating" pipe over unsuitable subgrade utilizing a reinforced trench, and over excavating trenches down to a suitable base.
3. Electrical Controls Housing. Three alternatives are evaluated. Exterior rated electrical panels, an electrical controls hut, and full replacement of the existing generator building with a new facility.

The recommendations contained herein are based on professional judgment and experience utilizing available data. Recommendations contained in this report should be considered as options; other alternatives may be feasible and may become more apparent and preferred as design progresses.

2 Assessment Methods, Testing and Criteria

PND and MEG began by meeting on site with Justin Haley, PB Wastewater Operations Supervisor to inspect the existing facility, and connected infrastructure. As built data was collected as available and measured as accessible.

Flow measurements were taken in order to confirm the existing flow rates for the influent at the time of testing and the average discharge flow from the existing pumps. At the time of testing, pump two was out of service, pumps one and three were operational. Results from draw down flow testing are reported in **Table 1**.

Operation	Average Flow Rate (GPM)
Pump 1 Discharge	1299
Pump 2 Discharge	1178
Inflow	401

Table 1 - Existing PS4 Average Flow Rates

Additional measurements were performed on electrical systems as reported in the MEG technical memorandum found in **Appendix A**.

PND and PB performed soil probes to measure the depth of the organic overburden, generally peat, to the hard pan beneath throughout the areas where pipe lines are proposed. The approximate surface profile of the hard pan strata is shown in the drawings found in **Appendix B**.

Central Southeast Surveyors (CSS) performed a topographic and utilities survey of the site. Survey drawings Can be Found in **Appendix B**.

Following the field visit and data collection, PND met with PB to discuss preliminary results and establish minimum design criteria for the assessment and future PS4 design. A summary of preliminary design criteria established in coordination with PB is as follows:

- Pump Station will consist of 3 Flygt submersible pumps.
- Design peak flow shall be 2000 GPM.
- Peak flow can be met with two pumps operating and one pump in reserve. 3 pumps shall never operate simultaneously.
- Minimum flow shall be approximately 300 GPM.
- Force main shall traverse through the undeveloped Ramona Street right of way to discharge into a manhole at the Augusta Street intersection, note this requires right of way acquisition through to PB owned lots.
- Gravity system shall traverse from the force main discharge manhole through the undeveloped Augusta Street right of way to an existing manhole on Sandy Beach Road.

- Provide for future development of the Hungry Point Subdivision by installing a stub to the wet well and finishing the pipe trenches with surface course to a minimum of 12-feet wide.
- VFDs are required.
- Reuse the existing backup generator system if possible.
- Additional electrical criteria are listed in the MEG technical memorandum found in **Appendix A**.

The above assumptions and criteria are common to all alternatives.

3 Alternatives Assessment

In order to develop alternatives and accurately estimate costs, PND and MEG began the assessment by performing preliminary design and calculations for hydraulic and electrical systems, then coordinated with suppliers to procure quotations for permanent and temporary pump systems, as well as electrical components. Quotations and product data for hydraulic systems can be found in **Appendix D**. Electrical systems information can be found in **Appendix A**.

The alternatives assessment focuses on three main areas of investigation as follows:

1. Pump Station Location, three alternatives are presented.
2. Pipe Trenching and Installation Methods, two alternatives are presented.
3. Electrical Controls and Housings, three alternatives are presented.

A description of each alternative follows. Preliminary Drawings can be found in **Appendix B**. Itemized cost estimates and a matrix of costs for each combination of alternatives is presented in **Appendix C**.

3.1 Pump Station Location

PND reviewed layout, survey data, site constraints and environmental conditions. The wet well excavation will be approximately 20-feet to 25-feet deep, with a base elevation of approximately 1-foot above Mean Lower Low Water. Without shoring and damming, it is likely that tidal water will inundate excavations at applicable tide levels; for the wet well, due to its depth, water intrusion could occur for the entire duration of the work. Additionally, significant run-off was observed adjacent to the existing generator building, which appears to be a drainage from the adjacent hillside, southeast of the Pump Station. Considering the anticipated water infiltration from both sides, the limited space available, and the risk of destabilizing excavations and nearby structures, PND is recommending sheet pile shoring be utilized to install the new wet well under all alternatives and has assumed sheet pile shoring for all alternatives and cost estimates.

Three alternatives for PS4 location were reviewed.

3.1.1 Alternative A

Description

Alternative A assumes a portion of privately owned Lot 10, adjacent to PS4 can be acquired by the PB and utilizes the space to construct the Pump Station in its entirety, outside of the limits of the existing PS4 in order to minimize down time. A site plan of Alternative A can be found on sheet C2 of the Drawings in **Appendix B**.

Alternative A allows for the entirety of the wet well and valve vault to be installed without impacting the existing pump station. It is assumed that the new pipelines will be fully installed prior to startup and testing. Bypass pumping is thereby minimized, only required for brief intervals during startup and testing and final connections.

Estimated Cost

The estimated construction cost for Alternative A is \$952,845. This does not include piping or electrical work which are described in Sections 3.2 and 3.3. An itemized estimate is included in **Appendix C**.

Alternative A requires property acquisition from Lot 10, adjacent to the existing PS4. PB reports that this acquisition may occur as a “land swap” with the property owner for other Borough owned land. No costs have been included for the property acquisition in the estimates for Alternative A.

Pros

- Minimizes system downtime and bypass pumping.
- Existing generator building remains.
- Least cost alternative.

Cons

- Requires property acquisition

3.1.2 Alternative B

Alternative B installs the new wet well and valve vault north of the existing PS4, closer to the roadway. New infrastructure will be installed entirely within PB right of way and the existing generator building remains. A site plan of Alternative B can be found on sheet C3 of the Drawings in **Appendix B**.

Due to restricted footprint, Alternative B results in more impact to existing infrastructure when compared to Alternative A. The water main will be relocated to accommodate the wet well and work must occur within the roadway to install the wet well, resulting in additional traffic control requirements.

Alternative B results in more bypass pumping and temporary piping when compared to Alternative A, but less when compared to Alternative C.

Given the site constraints, impacts to nearby infrastructure and proximity to structures and property, PND considers Alternative B to be at the highest risk for unforeseen costs.

Estimated Cost

The estimated construction cost for Alternative B is \$1,043,803. This does not include piping or electrical work which are described in Sections 3.2 and 3.3. An itemized estimate is included in **Appendix C**.

Pros

- Existing generator building remains.
- Constructed entirely within PB right of way.

Cons

- Highest risk of unforeseen costs.
- Considerable impacts to nearby infrastructure.
- Less clearance to roadway.

3.1.3 Alternative C

Alternative C completely replaces the existing PS4 in place, entirely within PB right of way. A site plan of Alternative C can be found on sheet C4 of the Drawings in **Appendix B**.

The existing wet well and dry vault will be removed in their entirety and the new wet well valve vault installed in the void. The depth of the existing wet well and the new wet well are similar, thereby minimizing excavation costs and the risk of encountering bedrock or hard pan within the excavation.

The generator will be salvaged, but the existing generator building will be removed in its entirety and new wood framed building will be installed to house the existing generator and all PS4 electrical equipment.

Alternative C requires extensive bypass pumping and temporary piping and electrical systems as the existing lift station must be completely removed before the new lift station can be installed. Temporary system would be designed to remain in place for an extended period, and would include float switches, an alarm system, and back up pump systems.

Estimated Cost

The estimated construction cost for Alternative C is \$1,109,830. This does not include piping or electrical work which are described in Sections 3.2 and 3.3. An itemized estimate is included in **Appendix C**.

Pros

- Constructed entirely within PB right of way.
- Less risk when compared to Alternative B.
- New building centralizes all electrical equipment.
- Increased service life with new building and equipment.

Cons

- Highest construction cost alternative.
- Bypass and temporary piping required for longer interval.
- More elaborate bypass and temporary piping system required.

3.2 Pipe Trenching and Installation Methods

Description

The existing soils through the areas where the pipelines will be installed are primarily soft, organic overburden and peat ranging in depth from 8-feet -16-feet over hard pan glacial till, or bedrock. Two methods for the installation of pipe lines were explored:

1. Floating – Floating the pipes involves limiting the pipe trench such that it is entirely within the soft, otherwise unsuitable soils. The trench is reinforced with geofabric and a layer of imported backfill beneath the pipe bedding in order to stabilize the pipe within the surrounding unsuitable soils. The trench is backfilled with imported backfill. This method can result in minor differential settlement throughout the pipelines due to varying subgrade consistency and bearing pressures. This method is most effective with flexible pressure pipe systems with fused joints, such as HDPE, where the minor differential settlements throughout the pipeline has little impact on the efficacy of the system. With jointed pipes, sensitive to slope variations, such as PVC gravity sewer, the method can be employed effectively under certain conditions, but is generally less effective and can result in varying slopes and stress on joints, or in extreme cases, joint separation. PND has employed the method successfully for both pressure and gravity sewer systems.

2. Full trench excavation to stable subgrade – This method involves over-excavating the pipe trench such that all soft, unsuitable soils are removed from the trench to a suitable subbase and imported backfill is placed beneath the pipeline bedding to ensure a stable base. This method limits differential settlement to the extent possible, but results in additional excavation and imported fill costs.

Trench details can be found in the Drawings in **Appendix B**. For this assessment it is assumed that the force main pipe will be installed via the floating method for all alternatives. Cost estimates were developed using both methods for the gravity pipe and structures.

Estimated Costs

Estimated construction costs for pipe installations is presented in **Table 2**. Itemized estimates are included in **Appendix C**.

Pipe Installation Method	Estimated Construction Budget
Floating	\$686,576
Excavated to Hardpan	\$759,176

Table 2- Pipe Installation Costs

3.3 Electrical Controls and Housing

PB requested PND review alternatives for an electrical hut, similar to Pump Station 5, verses exterior electrical panels, similar to Scow Bay 1. During the course of the analysis PND determined it prudent to assess an alternative which places the new wet well in the same location as the existing wet well. Under this alternative, the existing generator building requires removal. As a result, a third electrical alternative, including full replacement of the generator building with a new timber framed structure sized to enclose the backup generator and all pump station electrical equipment was evaluated. Electrical impacts and work descriptions can be found in the MEG Technical Memo, **Appendix A**. Estimated costs are presented in **Table 3**, itemized cost estimates can be found in **Appendix C**.

Electrical Option	Estimated Construction Budget
Panels	\$558,500
Hut	\$537,500
Full Building Replacement	\$633,500

Table 3- Electrical and Housing Costs

4 Total Project Costs

Cost estimates presented in **Section 3**, are estimated construction budgets for the work required for the individual alternatives. Additional project costs include engineering to date, permitting, final design and construction contract administration and inspection. Further, PND has assumed the Pumps will be furnished by PB, outside of the construction contract. These additional project costs are summarized in the cost estimate matrix found in **Appendix C**. The least cost alternative for this project is estimated to be Alternative A with an electrical hut and floating gravity sewer pipe. Total recommended project budget for this Alternative, including a 10% construction contingency is **\$3,117,997**.

5 Additional Considerations

The excavation for and installation of the wet well is one of the most labor intensive and costly aspects of the project. As previously noted, the excavation will be deep. The consistency of the subgrade at depth and the level of water intrusion that can be anticipated is presently unknown. PND’s recommendation to utilize sheet pile shoring around this excavation will mitigate the potential risk and allows for the most accurate estimate of the work required and cost thereof, however, there remains

a degree of uncertainty, especially related to the difficulty that may be encountered in excavation of the hard material below the peat layer. A test pit exploration in the proposed wet well location for Alternative A would aid in better understanding subgrade conditions and mitigating construction risk associated with this uncertainty.

Floating gravity pipelines can be successful, especially when pipe slopes are such that minor variations resulting from some differential settlement over time will have minimal impact on the overall drainage capabilities. Portions of the gravity sewer pipe in this project have slopes PND would consider candidates for such an installation, however it may not be advisable over the entirety of the gravity system. The overall cost difference between the two options is less than \$80,000, however if budget constraints dictate, a design that incorporates both methods may result in savings without significantly increasing risk to the efficacy of the system.

6 Summary and Recommendations

This alternatives assessment required project design and development for the varying alternatives to a preliminary design level, providing a head start on final design for the selected alternative.

Of the Alternatives presented herein, Alternative A is the least cost and results in the least impact to existing infrastructure. It is considered the option with the least risk of unforeseen costs. Should the adjacent property be available, PND recommends Alternative A.

As discussed in Section 5, floating the gravity system is not advisable for the entirety of the system. PND recommends excavation to hardpan for the upper portion of the gravity system; floating the lower portion of the system could be considered should budget constraints dictate.

Any alternative for the electrical equipment installation will be equally effective, however indoor equipment will likely marginally increase service life. In consideration of increased service life and lower estimated cost, the PND recommends a hut installation of the electrical equipment. A full building replacement may also be considered.

The estimated project budget for Alternative A with pipes trenches to hard pan and an electrical hut is **\$3,212,377**.

7 Appendices

- Appendix A – MEG Electrical Technical Memorandum
- Appendix B – Drawings
- Appendix C – Cost Estimates
- Appendix D – Product and Vendor Data

***APPENDIX A – MEG TECHNICAL
MEMORANDUM***



February 15, 2023

Tyler Bradshaw, P.E.
Principal Engineer
PND Engineers
9360 Glacier Highway, Suite 100
Juneau, AK 99801

RE: Petersburg Pump Station 4 – Electrical Options

Tyler,

The scope for all Options will consist of demolition of the Electrical in the existing Wet Well. Due to the NEC Code violations in the existing Generator Building, some work will be required to relocate electrical equipment inside the building to remedy the violations.

Morris Engineering performed a draw-down test of the Wet Well while running on the existing 150kW generator. Testing was performed with one 50 HP running and with both 50 HP pumps running. The generator was able to run both 50 HP at a load of 35 HP each. We are confident that the generator can run the two 30 HP design pumps.

To provide radio communications from Pump Station 4 to the Wastewater Treatment Plant would require installing a 50 ft. wooden pole 700 ft. uphill from the pump station, trenching in power and fiberoptic cables from the pump station, installing a repeater and radio gear at the pole, installing a 30 ft. wooden pole and radio at the WWTP, and connecting the radio to the WWTP communications equipment. This cost (~\$88K) is included in the Cost Estimate, though it is recommended that the Petersburg Borough set up internet service at the pump station for SCADA communications. According to AP&T, internet service is available at the site. Monthly rate varies \$75 to \$110 per month depending on speed. Using local internet service will reduce the cost by approximately \$88,000.

There is a need to provide temporary power to (2) 50 HP bypass pumps during construction of the new wet well and valve vault. The existing 150 kW backup generator at the pump station is too small to run (2) 50 HP pumps. It is recommended that the new Electrical infrastructure (either Option) be installed first. Then the temporary pumping package could be fed from the new Electrical Service. A trailer-mounted backup generator would need to be rented and plugged into the new generator receptacle during the bypass period to provide backup power for the temporary pumps.

Electrical Option 1, Civil Alternative A & B

A new Electrical Service will feed a 200A, Type 4X Meter Main and Type 4X electrical equipment mounted to racks under the eaves of the existing Generator Building. The Meter Main will feed a new 225A stainless steel Type 4X automatic transfer switch (ATS) which will provide power to a 74"x72"x24" stainless steel electrical enclosure mounted on a concrete pad and secured to a rack. The electrical enclosure will house fused disconnects and variable frequency drives (VFDs) which will drive the three 30 HP Wet Well pumps. The enclosure will also house the new Pump Control Panel, step-down transformer, and a load center.

The new Pump Control Panel will provide PLC control of the VFDs and communications with the Petersburg SCADA system. A submersible pressure transducer will communicate the Wet Well level to the PLC along with three backup float switches.

Backup power will be provided by the existing generator in the event of Utility power failure. The backup power feed will first go through a Type 4X manual double-throw switch before being routed to the ATS. The manual switch will be wired to a Type 4X circuit breaker and a portable generator receptacle. Should the existing generator fail, the power feed can be manually switched to the portable generator power.

Rack-mounted Type 4X stainless steel junction boxes will be mounted to provide splice points for the pump power cables, pressure transducer, and float switches. The conduits will have seal-off fittings from the junction boxes to the Classified Wet Well to prevent combustible gases from escaping.

Electrical Option 2, Civil Alternative A & B

A new Electrical Service will feed a 200A, Type 4X Meter Main and a new 10'x10' fiberglass Electrical Shelter mounted on a concrete pad. The Electrical Shelter will house Type 1 electrical equipment in lieu of long-lead Type 4X stainless steel electrical equipment. The Meter Main will feed a new 225A ATS which will provide power to a 480V panelboard. The panelboard will distribute power to the VFDs which will drive the three 30 HP Wet Well pumps. The Electrical Shelter will also house the Pump Control Panel, step-down transformer, and a load center feeding 120/240V power for the Pump Control Panel, lighting, heater, receptacles, and SCADA communications equipment.

The new Pump Control Panel will provide PLC control of the VFDs and communications with the Petersburg SCADA system. A submersible pressure transducer will communicate the Wet Well level to the PLC along with three backup float switches.

Backup power will be provided by the existing generator in the event of Utility power failure. The backup power feed will first go through a Type 4X manual double-throw switch before being routed to the ATS. The manual switch will be wired to a Type 4X circuit breaker and a portable generator receptacle mounted external to the shelter. Should the existing generator fail, the power feed can be manually switched to portable generator power.

Rack-mounted Type 4X stainless steel junction boxes will be mounted to provide splice points for the pump power cables, pressure transducer, and float switches. The conduits will have seal-off fittings from the junction boxes to the Classified Wet Well to prevent combustible gases from escaping.

Electrical Option 3, Civil Alternative C

The existing ATS and the Existing Generator will be salvaged. The existing Generator Building will be demolished. A new Generator Building will be constructed and the salvaged ATS and Generator will be reinstalled.

The existing Electrical Service will feed a new 200A Type 4X Meter Main. The Meter Main will feed the reinstalled 225A ATS which will provide power to a new 480V panelboard. The panelboard will provide power to the VFDs which will drive the three 30 HP Wet Well pumps. New electrical equipment will include: Pump Control Panel, step-down transformer, load center, lighting, heaters, receptacles, SCADA communications equipment, Generator cooling system, battery charger, and louvers.

The new Pump Control Panel will provide PLC control of the VFDs and communications with the Petersburg SCADA system. A submersible pressure transducer will communicate the Wet Well level to the PLC along with three backup float switches.

Backup power will be provided by the existing generator in the event of power failure. The backup power feed will first go through the ATS before being routed to a manual double-throw switch. The manual switch will be wired to a circuit breaker and a portable generator receptacle mounted external to the building. Should the existing generator fail, the power feed can be manually switched to portable generator power.

Rack-mounted Type 4X stainless steel junction boxes will be mounted to provide splice points for the pump power cables, pressure transducer, and float switches. The conduits will have seal-off fittings from the junction boxes to the Classified Wet Well to prevent combustible gases from escaping.

The cost of a New Generator Building is NOT included in the Electrical Cost Estimate.

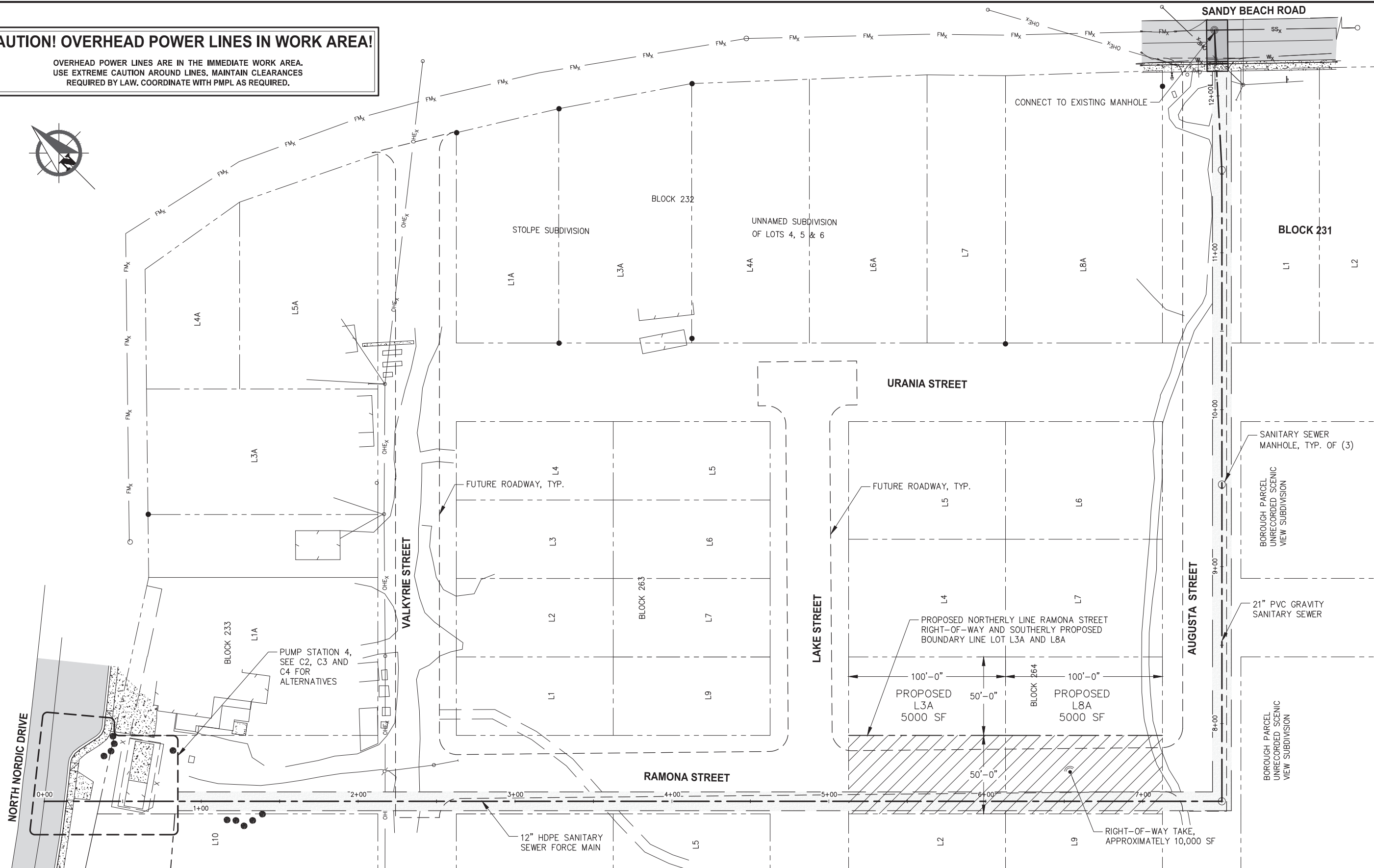
Thank you,

Mark Morris, P.E.
Principal
Morris Engineering Group, Inc.

APPENDIX B - DRAWINGS

CAUTION! OVERHEAD POWER LINES IN WORK AREA!

OVERHEAD POWER LINES ARE IN THE IMMEDIATE WORK AREA. USE EXTREME CAUTION AROUND LINES. MAINTAIN CLEARANCES REQUIRED BY LAW. COORDINATE WITH PMPL AS REQUIRED.



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Juneau, Alaska 99801
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Fax: 907-586-2099
www.pndengineers.com

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PRELIMINARY

DATE: 2/15/23

**PETERSBURG BOROUGH
PUMP STATION 4
FORCE MAIN REPLACEMENT**

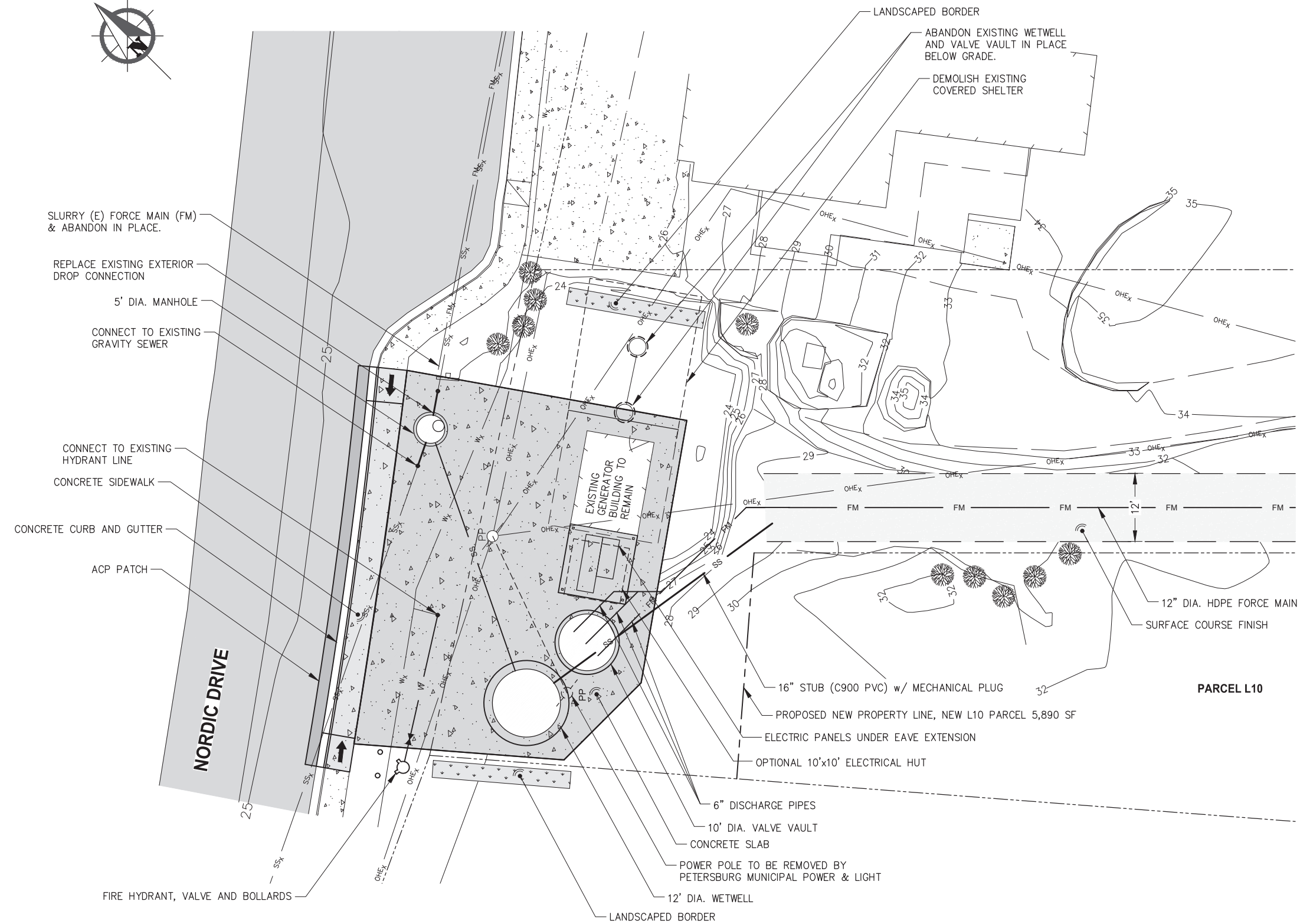
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PND PROJECT #: 192080

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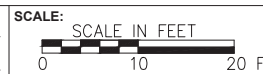


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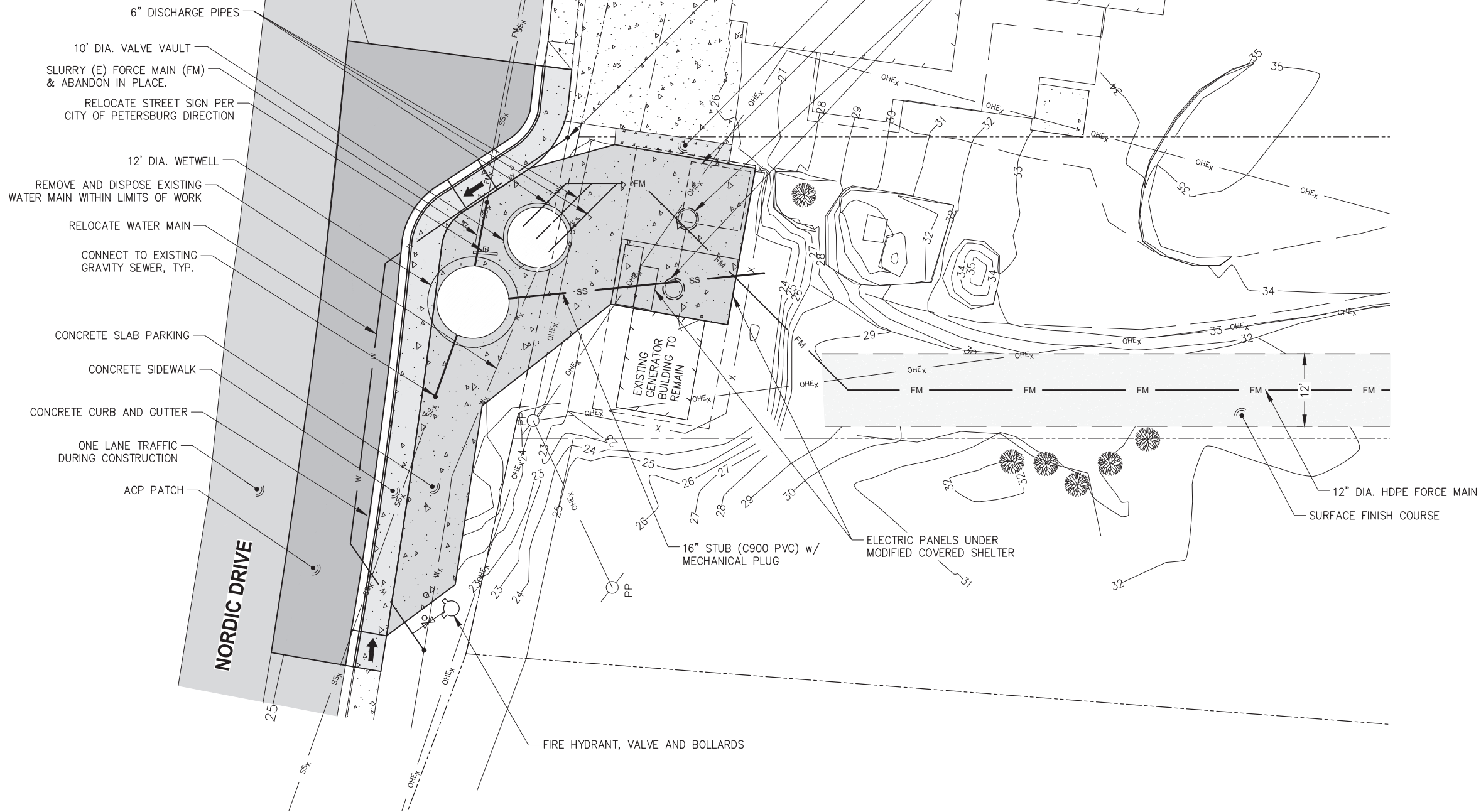
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 PUMP STATION 4
 FORCE MAIN REPLACEMENT**

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 SITE PLAN - ALTERNATIVE A**

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Juneau, Alaska 99801
Phone: 907-586-2093
Fax: 907-586-2099
www.pndengineers.com

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**PETERSBURG BOROUGH
PUMP STATION 4
FORCE MAIN REPLACEMENT**

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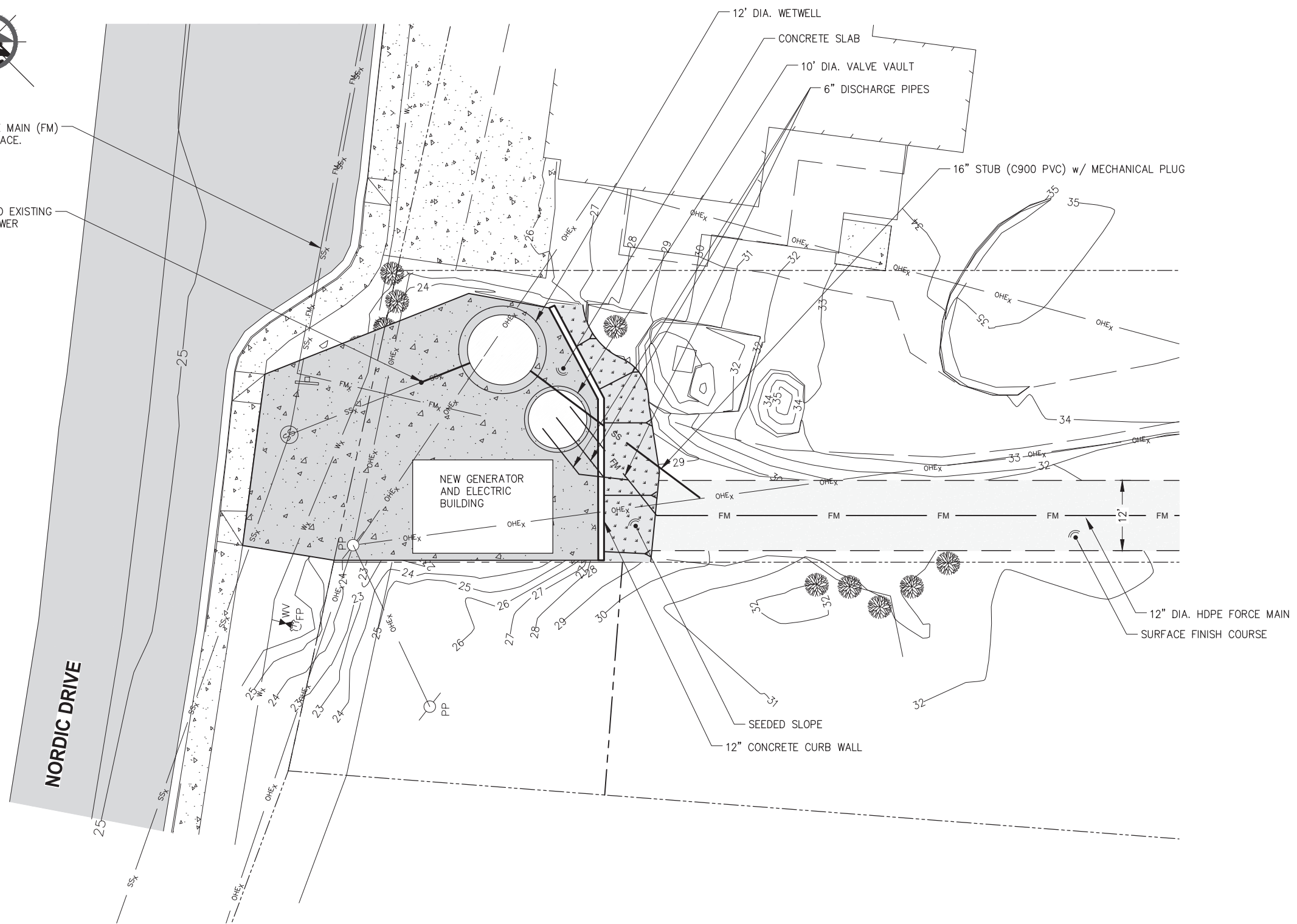
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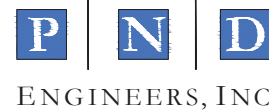


SLURRY (E) FORCE MAIN (FM)
& ABANDON IN PLACE.

CONNECT TO EXISTING
GRAVITY SEWER

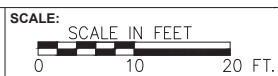


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**PETERSBURG BOROUGH
PUMP STATION 4
FORCE MAIN REPLACEMENT**

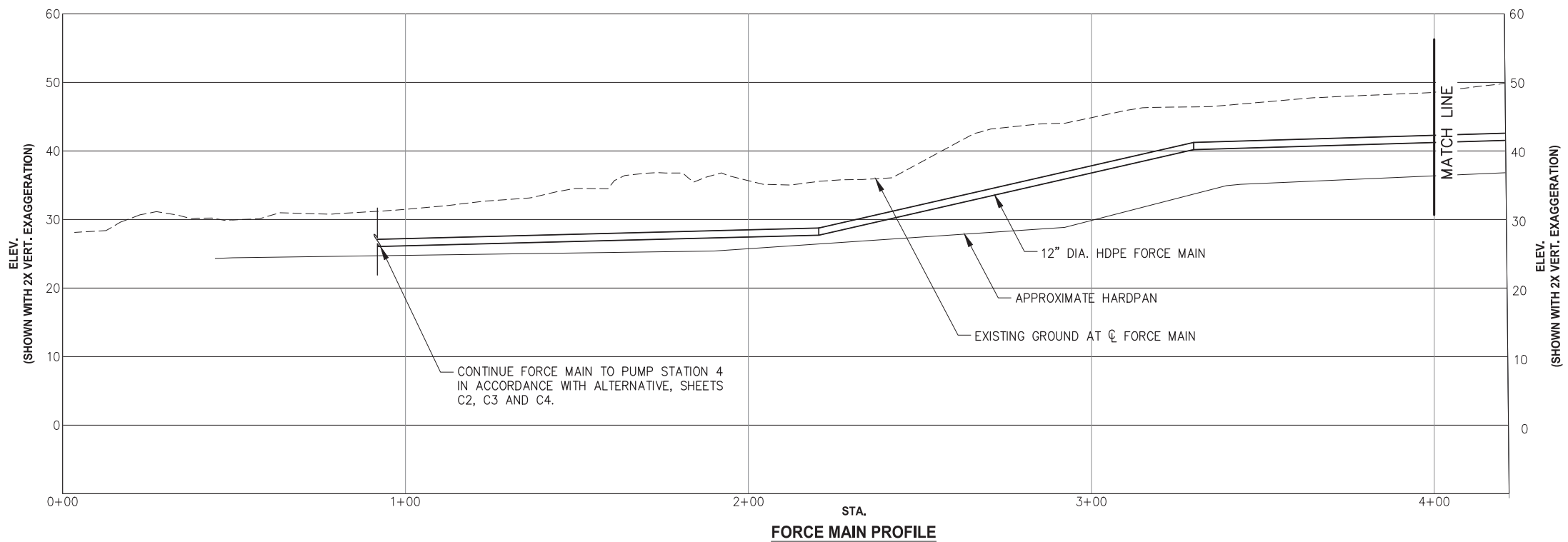
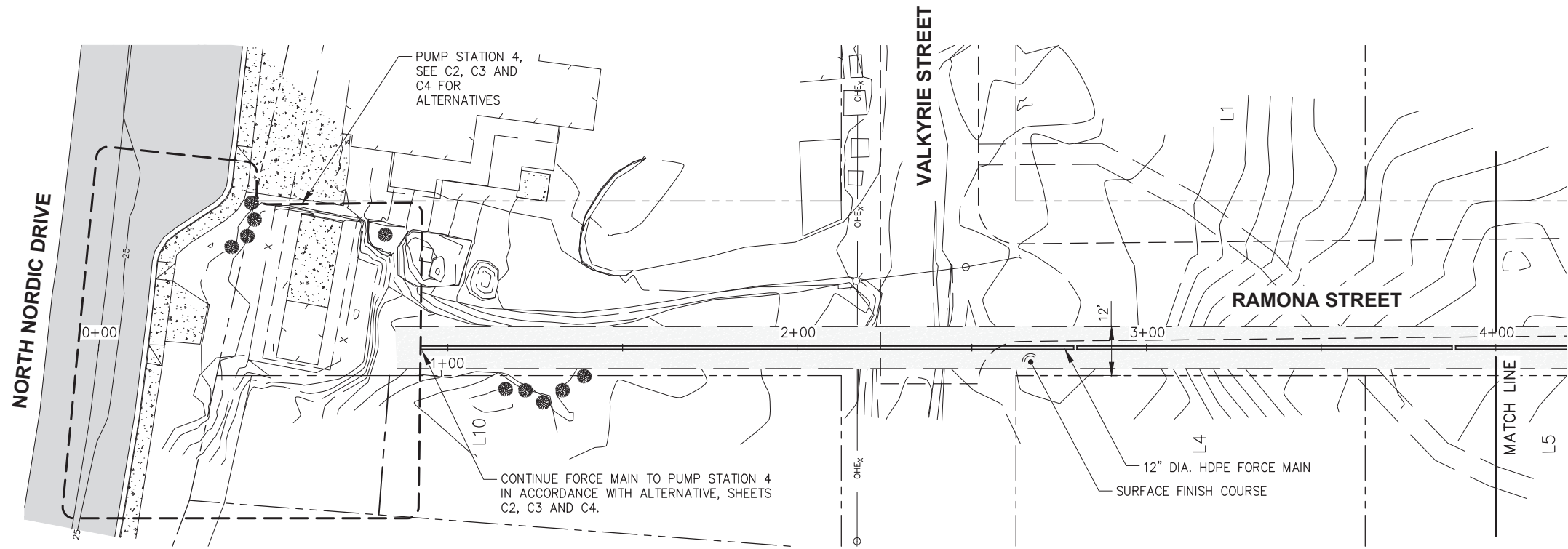
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SITE PLAN - ALTERNATIVE C**

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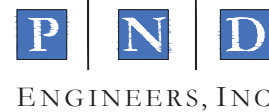
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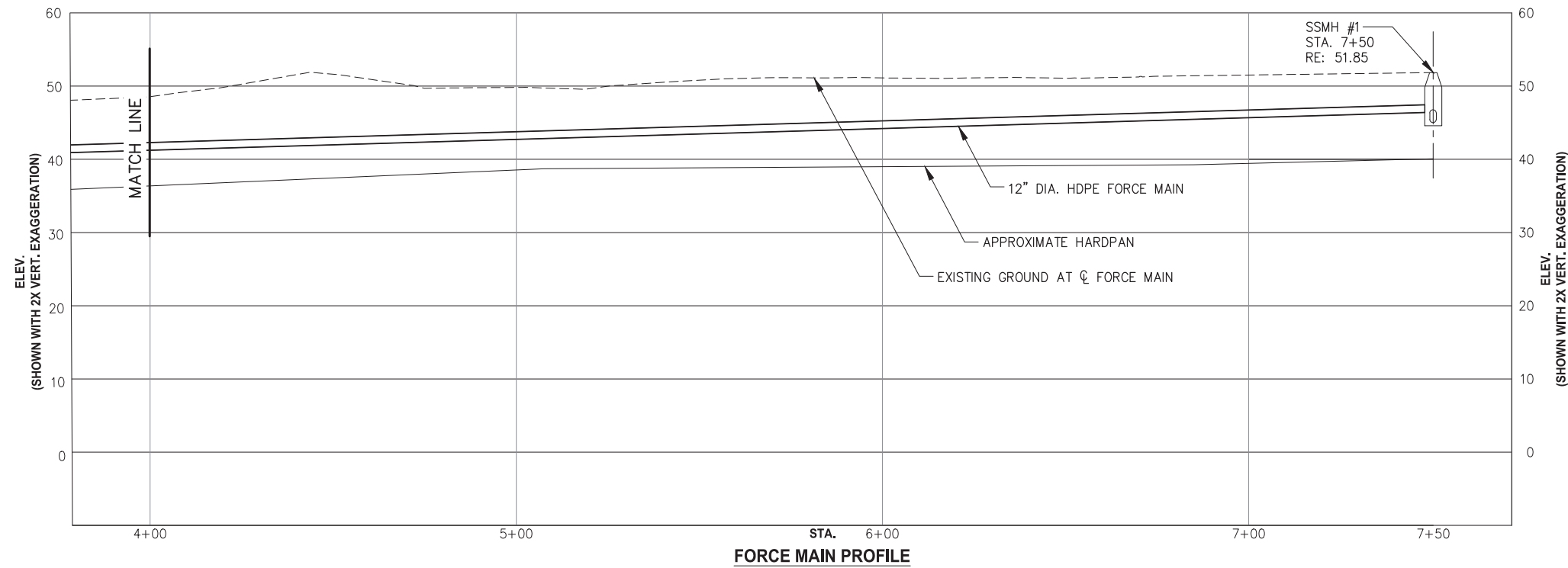
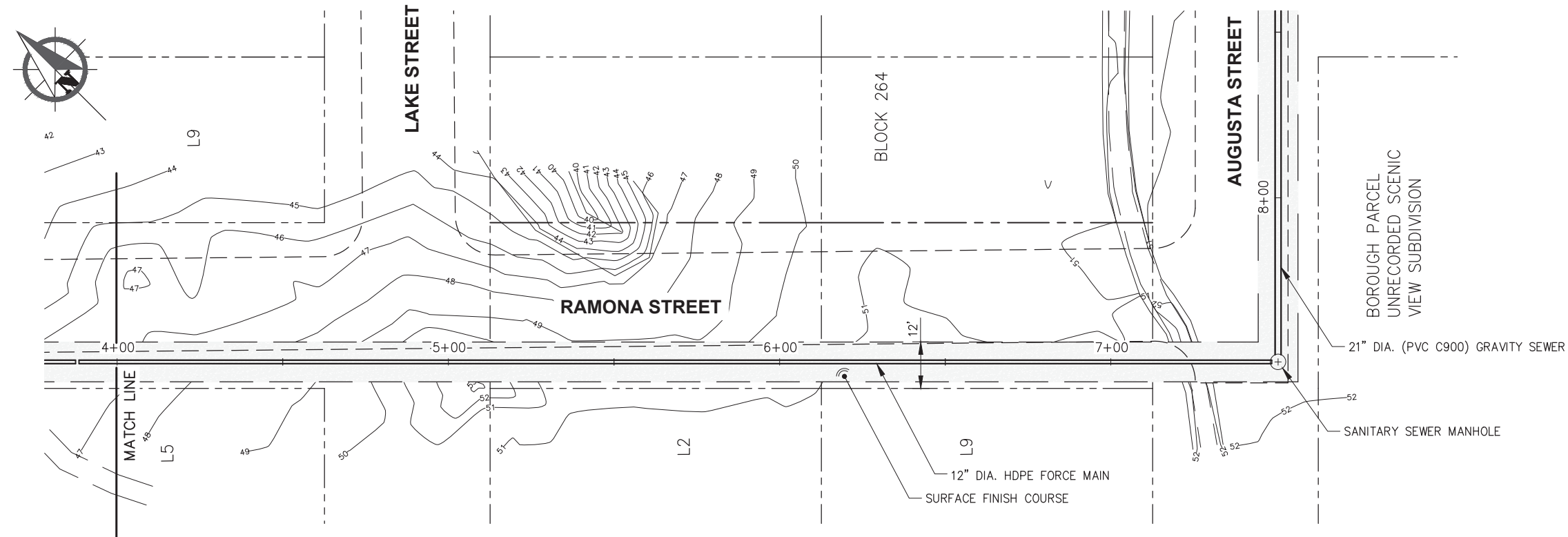
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**PETERSBURG BOROUGH
PUMP STATION 4
FORCE MAIN REPLACEMENT**

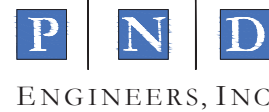
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**SANITARY SEWER FORCE MAIN
PLAN AND PROFILE**

C5

PND PROJECT #: 192080 C.A.N. NO.: AECC250



REVISIONS					
REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.



9360 Glacier Highway Suite 100
 Juneau, Alaska 99801
 Phone: 907-586-2093
 Fax: 907-586-2099
 www.pndengineers.com

DESIGN: TCB CHECKED: TCB
 DRAWN: WRB APPROVED: _____



PRELIMINARY
 DATE: 2/15/23

**PETERSBURG BOROUGH
 PUMP STATION 4
 FORCE MAIN REPLACEMENT**

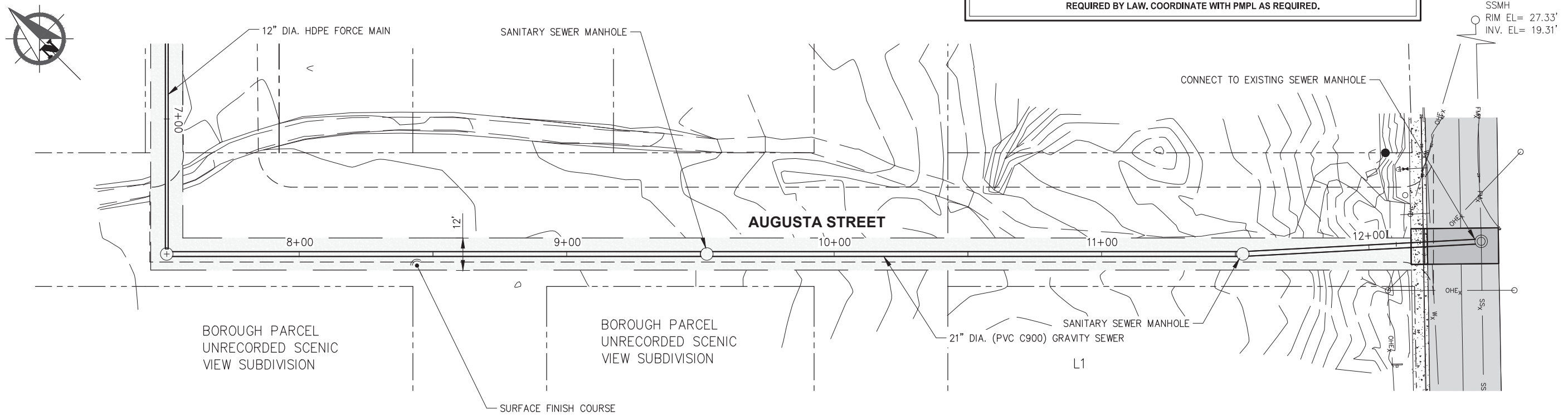
SHEET TITLE:
**SANITARY SEWER FORCE MAIN
 PLAN AND PROFILE**

PND PROJECT #: 192080 C.A.N. NO.: AECC250

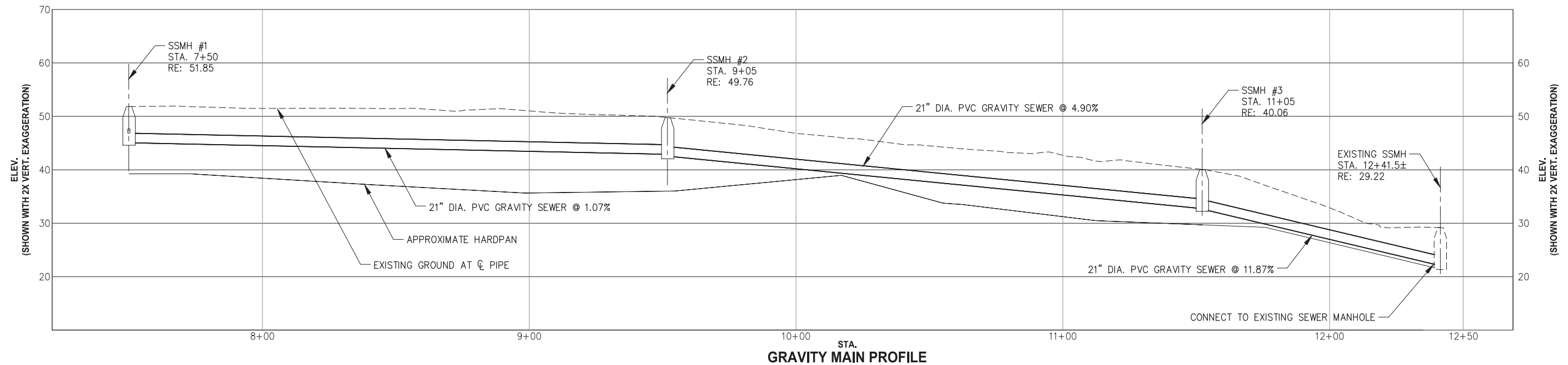
C6

CAUTION! OVERHEAD POWER LINES IN WORK AREA!

OVERHEAD POWER LINES ARE IN THE IMMEDIATE WORK AREA.
USE EXTREME CAUTION AROUND LINES. MAINTAIN CLEARANCES
REQUIRED BY LAW. COORDINATE WITH PMPL AS REQUIRED.



SSMH
RIM EL= 27.33'
INV. EL= 19.31'



GRAVITY MAIN PROFILE



REVISIONS					
REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.



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DESIGN: TCB CHECKED: TCB
DRAWN: WRB APPROVED: _____



PRELIMINARY

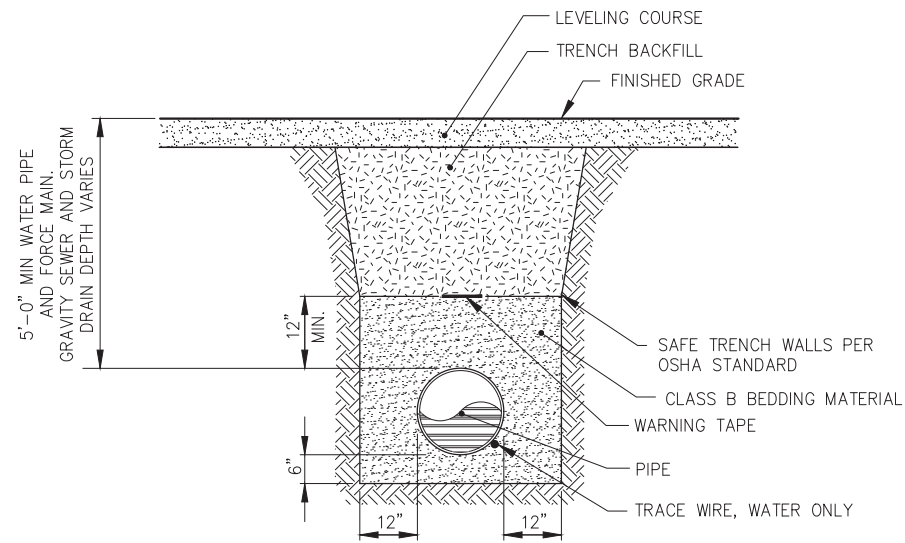
DATE: 2/15/23

**PETERSBURG BOROUGH
PUMP STATION 4
FORCE MAIN REPLACEMENT**

SHEET TITLE:
**SANITARY SEWER
PLAN AND PROFILE**

C7

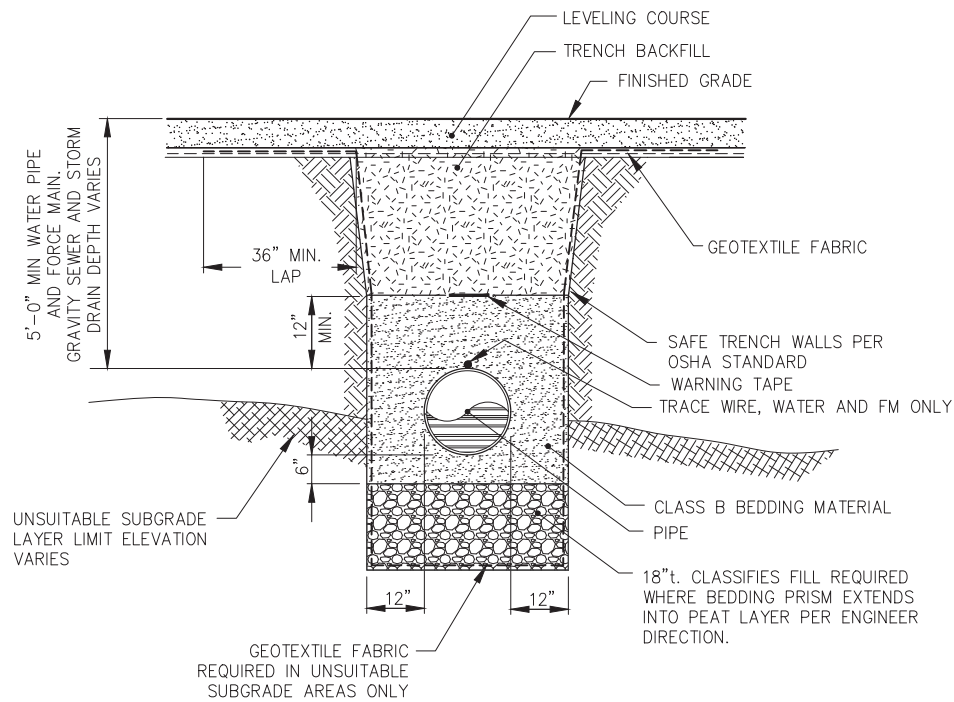
PND PROJECT #: 192080 C.A.N. NO.: AECC250



PIPE TRENCH DETAIL WITHOUT SUBGRADE REINFORCEMENT

NOTES:

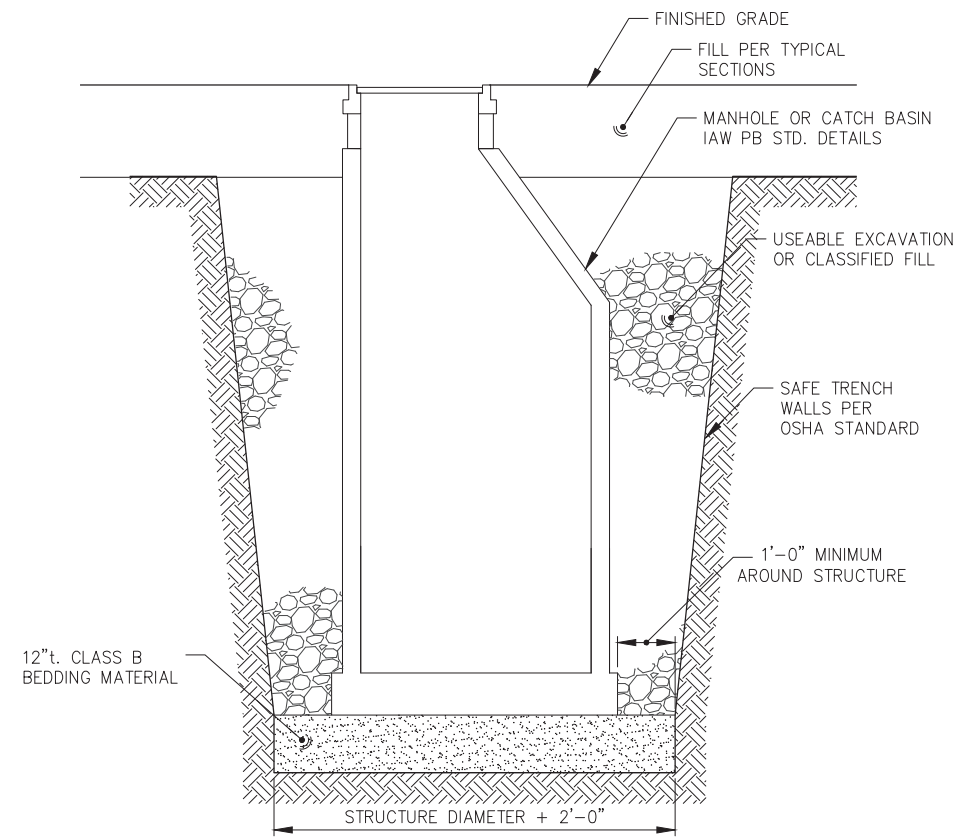
1. DETAIL APPLIES TO ALL PIPE UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. PIPE INSULATION SHALL BE PLACED OVER WATER PIPE AT ALL LOCATIONS WHERE DEPTH OF BURY MUST BE LESS THAN 5' AS DETERMINED AND DIRECTED BY THE ENGINEER.



PIPE TRENCH DETAIL WITH SUBGRADE REINFORCEMENT

NOTES:

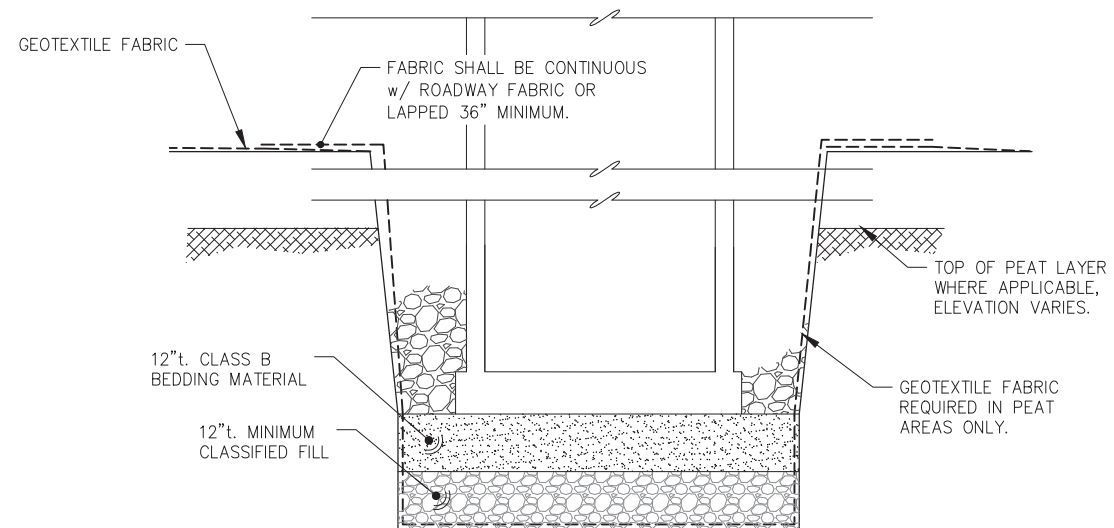
1. DETAIL SHALL BE UTILIZED IN AREAS WHERE BOTTOM OF TRENCH IS WITHIN UNSUITABLE MATERIAL AS DETERMINED BY THE ENGINEER.
2. GEOTEXTILE FABRIC SHALL BE CONTINUOUS WITH ROADWAY FABRIC OR LAPPED A MINIMUM OF 36" AS SHOWN.
3. PIPE INSULATION SHALL BE PLACED OVER WATER PIPE AT ALL LOCATIONS WHERE DEPTH OF BURY MUST BE LESS THAN 5' AS DETERMINED AND DIRECTED BY THE ENGINEER.



STRUCTURE SUPPORT DETAIL WITHOUT SUBGRADE REINFORCEMENT

NOTES:

1. DETAIL APPLIES TO ALL STORM STRUCTURES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.



STRUCTURE SUPPORT DETAIL WITH SUBGRADE REINFORCEMENT

NOTES:

1. DETAIL SHALL BE UTILIZED IN AREAS WHERE BOTTOM OF TRENCH IS WITHIN UNSUITABLE MATERIAL AND ELSEWHERE AS DETERMINED BY THE ENGINEER.
2. DETAILS AND CALLOUTS NOT SHOWN SIMILAR TO STRUCTURE SUPPORT DETAIL WITHOUT SUBGRADE REINFORCEMENT AND PB STD. DTLS.



REVISIONS					
REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.



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Fax: 907-586-2099
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DESIGN: _____ CHECKED: _____
DRAWN: _____ APPROVED: _____

SCALE:

PRELIMINARY

DATE: 2/15/23

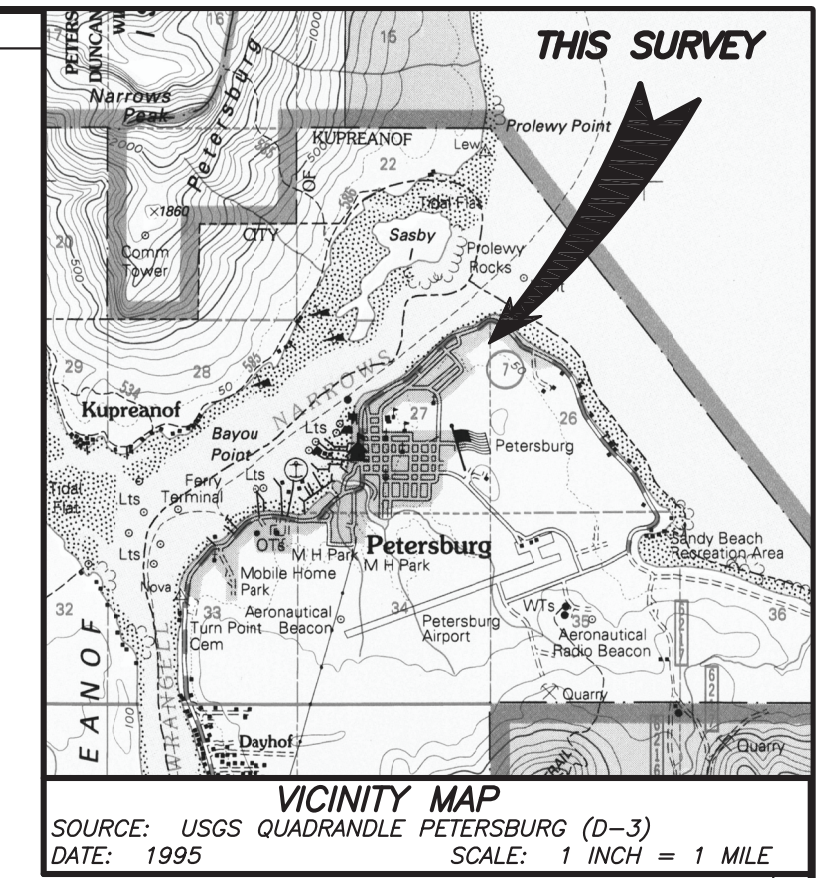
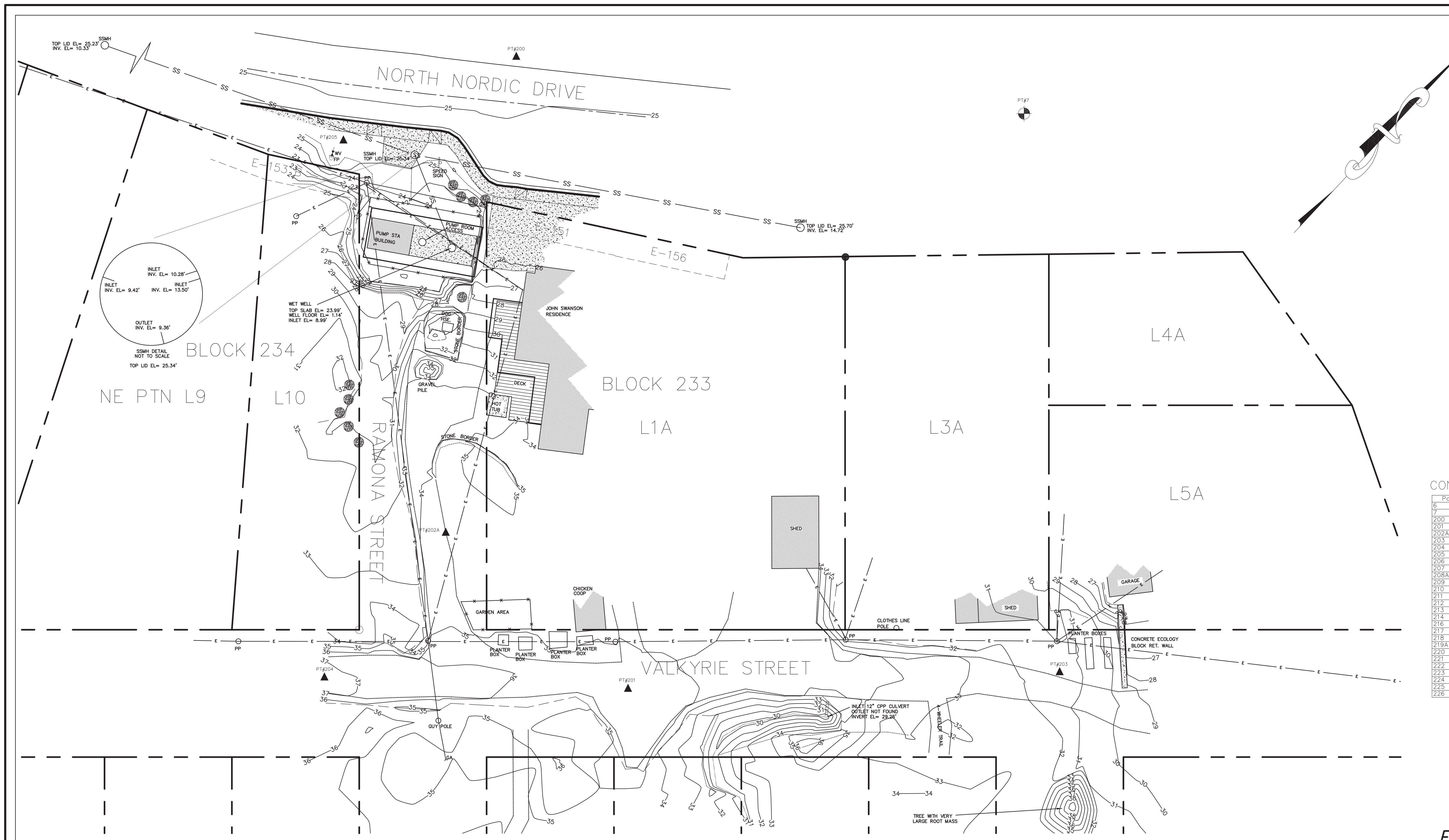
**PETERSBURG BOROUGH
PUMP STATION 4
FORCE MAIN REPLACEMENT**

SHEET TITLE:

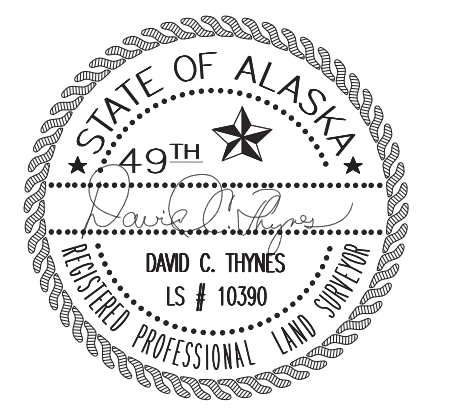
UTILITY DETAILS

C8

PND PROJECT #: 192080 C.A.N. NO.: AECC250



SURVEYOR'S CERTIFICATE
 I HEREBY CERTIFY THAT I AM PROPERLY REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA, AND THAT THIS PLAT REPRESENTS A SURVEY MADE BY ME AND UNDER MY DIRECT SUPERVISION, AND THE MONUMENTS SHOWN HEREON ACTUALLY EXIST AS DESCRIBED, AND THAT ALL DIMENSIONS AND OTHER DETAILS ARE CORRECT.



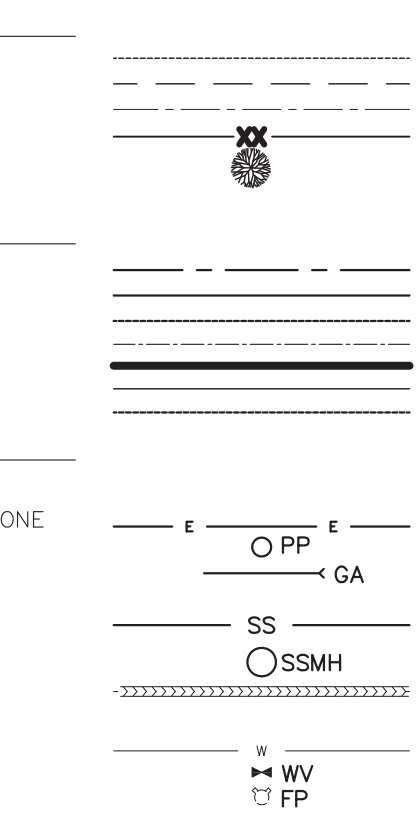
CONTROL POINT TABLE

Point	Northing	Easting	Elevation	Description
6	51385.960	17765.550	0.00	BCM SB-6
7	51696.710	18221.810	23.83	BCM SB-7
200	51577.015	18060.850	23.65	SET H&T
201	51425.539	18262.159	35.50	SET H&T
202A	51421.526	18168.040	34.00	SET H&T
203	51545.760	18381.623	31.37	SET H&T
204	51347.446	18171.940	37.28	SET H&T
205	51506.716	18033.607	29.66	SET H&T
206	51699.934	18476.129	23.74	BCM SB-8
207	50834.650	19396.372	33.26	BCM SB-9
208A	51299.278	18679.789	30.13	SET H&T
209	51208.065	18765.419	43.70	SET H&T
210	51170.733	18680.755	47.74	SET H&T
211	51049.249	18543.051	51.81	SET H&T
212	51129.370	18624.949	48.12	SET H&T
213	51252.170	18324.460	47.36	SET H&T
214	51421.470	18168.035	34.00	SET H&T
216	51462.917	18443.490	34.06	SET H&T
217	51341.733	18543.128	42.85	SET H&T
218	51292.190	18653.722	43.19	SET H&T
219A	51230.514	18680.005	46.68	SET H&T
220	51207.988	18765.359	43.78	SET H&T
221	51465.758	18357.299	33.46	SET H&T
222	51363.928	18525.582	41.92	SET H&T
223	51259.830	18834.011	40.40	SET H&T
224	51304.921	18922.297	29.32	SET PK
225	51483.705	18086.724	24.04	SET H&T
226	51433.434	18531.641	35.03	SET PK

**PETERSBURG BOROUGH
 PUMP STATION 4
 FORCE MAIN REPLACEMENT
 TOPOGRAPHIC SURVEY**

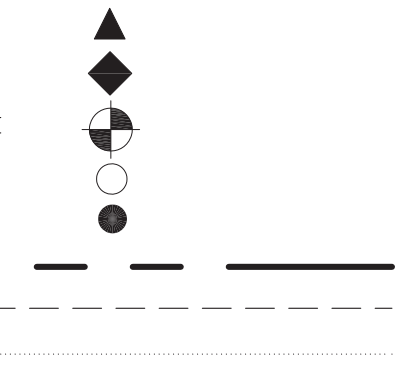
LEGEND

- BREAK FEATURES**
 TOP SLOPE
 TOE SLOPE
 STREAM/DITCH CENTERLINE
 CONTOUR LINE
 LANDSCAPE TREE
- ROADS**
 CENTERLINE PAVED ROAD
 EDGE PAVED ROAD
 EDGE GRAVEL ROAD
 DITCH CENTERLINE
 GUTTER FLOWLINE
 EDGE CONCRETE
 EDGE TRAIL
- UTILITIES**
 ELECTRICAL
 OHEAD ELECTRICITY/CABLE/PHONE
 POWER POLE
 GUY ANCHOR
 SEWER
 SANITARY SEWER GRAVITY
 SANITARY SEWER MANHOLE
 STORM SEWER
 WATER
 MUNICIPAL WATER
 VALVE BOX
 FIRE HYDRANT



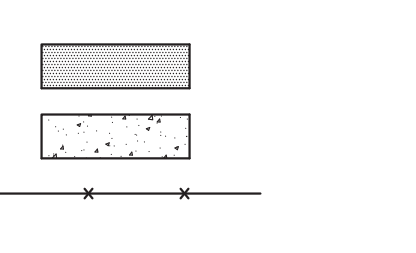
CONTROL & MONUMENTATION

- WOOD HUB & TACK CONTROL POINT
 MASONRY NAIL (PK NAIL) CONTROL POINT
 A.D.O.T. B.C.M. CONTROL MON IN MON CASE
 1/2" G.I.P. MON. RECOVERED
 ALUMINUM CAP MON. RECOVERED
 BOUNDARY LINE
 EASEMENT LINE
 SURVEY LIMITS



STRUCTURES

- BUILDING/SHED
 CONCRETE SLAB/WALL/SIDEWALK
 CHAINLINK FENCE



REVISIONS:

12/6/22		
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NOTES:

- PROJECT CONTROL FOR THIS TOPOGRAPHIC SURVEY ARE POINTS 6, 7, 200, 201, 202A, 203-207, 208A, 209-218, 219A & 220-226 AS SHOWN ON THIS MAP.
- VERTICAL CONTROL FOR THIS SURVEY IS BASED UPON THE PUBLISHED ELEVATION FOR U.S.A.C.E. B.C.M. NH-3 LOCATED IN A CONCRETE SIDEWALK BORDERING THE PETERSBURG NORTH HARBOR PARKING AREA, THE PUBLISHED ELEVATION = 25.58' M.L.L.W. DATUM. ELEVATIONS WERE TRANSFERRED TO THE PUMP STATION 4 CONTROL NETWORK USING A PRECISE SURVEY GRADE GEOMAX ZENITH35 PRO RTK GPS SYSTEM WITH THE BASE OCCUPYING NH-3 AND THE ROVER OCCUPYING POINT 200 WITH ADDITIONAL OBSERVATIONS ON POINTS 202A, 206, & 211. U.S.A.C.E. VERTICAL CONTROL IS BASED ON THE 1983-2001 TIDAL EPOCH AS REFERENCED BY TIDE STATION, 9451434 AND WAS PART OF A U.S.A.C.E. PROJECT UNDERTAKEN IN 2008.
- HORIZONTAL CONTROL IS BASED ON A.D.O.T. CONTROL MONUMENTS INSTALLED ALONG SANDY BEACH ROAD. COORDINATES ARE BASED ON THE LOCAL GROUND COORDINATE SYSTEM "SANDY BEACH ROAD-GRID" USED IN A.D.O.T. PROJECT #68076 AND IN THE RECORD OF SURVEY PERFORMED BY RICK G. BRAUN IN 2006 (PLAT No. 2008-2 PETERSBURG RECORDING DISTRICT), SHEETS 6 AND 7 CONTAINING RECORD INFORMATION RELEVANT TO THIS PROJECT.
- THE ACCURACY OF THIS SURVEY IS GREATER THAN 1:10,000.
- BURIED UTILITIES EXIST IN THE PUMPSTATION 4 AREA AS WELL AS IN THE AREA OF THE AUGUSTA STREET - SANDY BEACH ROAD INTERSECTION. MUNICIPAL WATER, SANITARY SEWER AND STORM SEWER INFORMATION WAS TRANSFERRED FROM THE PETERSBURG BOROUGH "2014LARGEWATERANDSEWERGISMAP" DRAWING FOR THE AUGUSTA/SANDY BEACH ROAD INT; HOWEVER, SIGNIFICANT DIFFERENCES BETWEEN FIELD LOCATES AND THE BOROUGH DRAWING DETAILS NEAR THE PUMP STATION PREVENTED THE BOROUGH'S MUNICIPAL WATER LINENWORK FROM BEING INCORPORATED WITH THIS TOPOGRAPHIC MAP. FIELD LOCATES PERFORMED BY PETERSBURG BOROUGH MUNICIPAL WATER STAFF IS RECOMMENDED PRIOR TO EXCAVATION.
- THE MONUMENT AT THE INTERSECTION OF VALKYRIE AND RAMONA STREETS WAS FOUND SET VERY DEEP IN A CAST IRON MONUMENT CASE. THE MONUMENT CASE HAS BEEN DISTURBED AND IS LEANING SEVERELY IN THE ROAD FILL SUCH THAT A PLUMB LINE CANNOT REACH THE MONUMENT ITSELF. IT IS RECOMMENDED THAT THIS MONUMENT BE RESTORED AND RESET NEAR THE ROAD SURFACE DURING THE CONSTRUCTION PHASE OF THIS PROJECT AS IT IS REFERENCED BY MANY SURVEYS IN U.S. SURVEY 1215 A.

- RECORD PLATS USED FOR THIS SURVEY INCLUDE THE FOLLOWING:
 U.S. SURVEY 1252 A, A.D.O.T. R.O.S. SANDY BEACH ROAD CONTROL PLAT #2008-2
 A.D.O.T. R.O.W. MAP PROJECT No. S-0937 PLAT 85-35, UNNAMED RESUBDIVISION PLAT #81-26,
 STOLPE SUBDIVISION PLAT #2008-18, AND UNNAMED SUBDIVISION PLAT #79-9.
- THE FOLLOWING ELEVATION DETAILS WERE MEASURED IN THE PUMP STATION 4 PUMP CHAMBER AND WET WELL:
 WET WELL INLET INVERT EL= 8.99'
 PUMP ROOM FLOOR BELOW ACCESS SHAFT EL= 1.18'; TOP OF DISCHARGE PIPE FLANGE AT PUMP CONNECTION EL= 3.30'; TOP OF DISCHARGE PIPE MANIFOLD AT 90' ELBOW EL= 3.04';
 TOP OF INLET PIPE FROM WET WELL AT WALL PENETRATION EL= 1.82'.

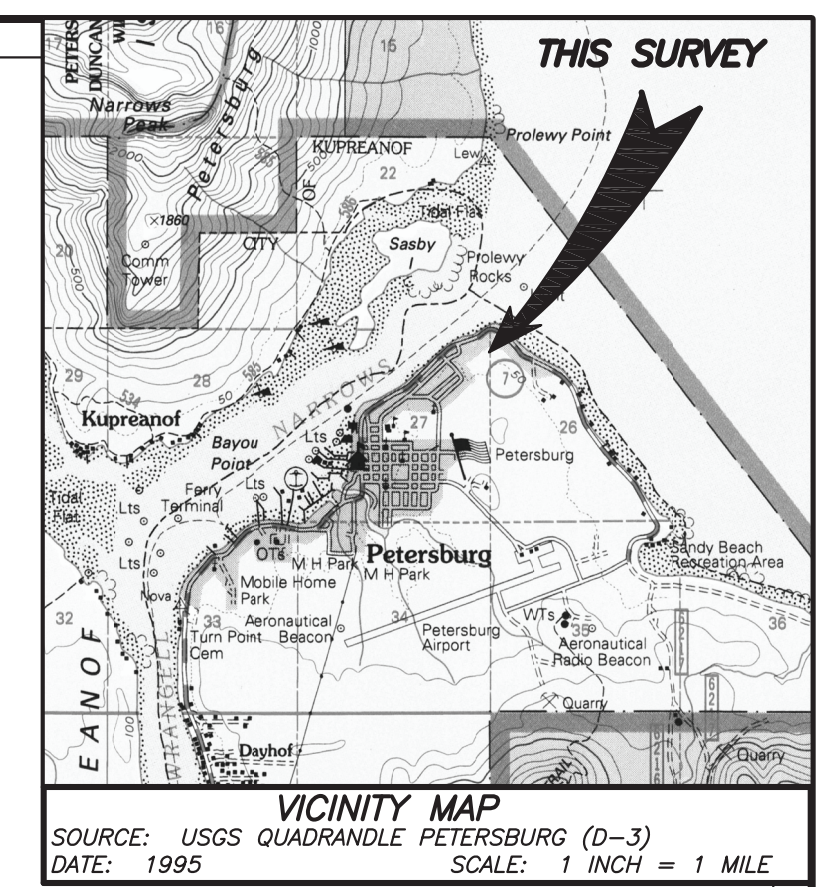
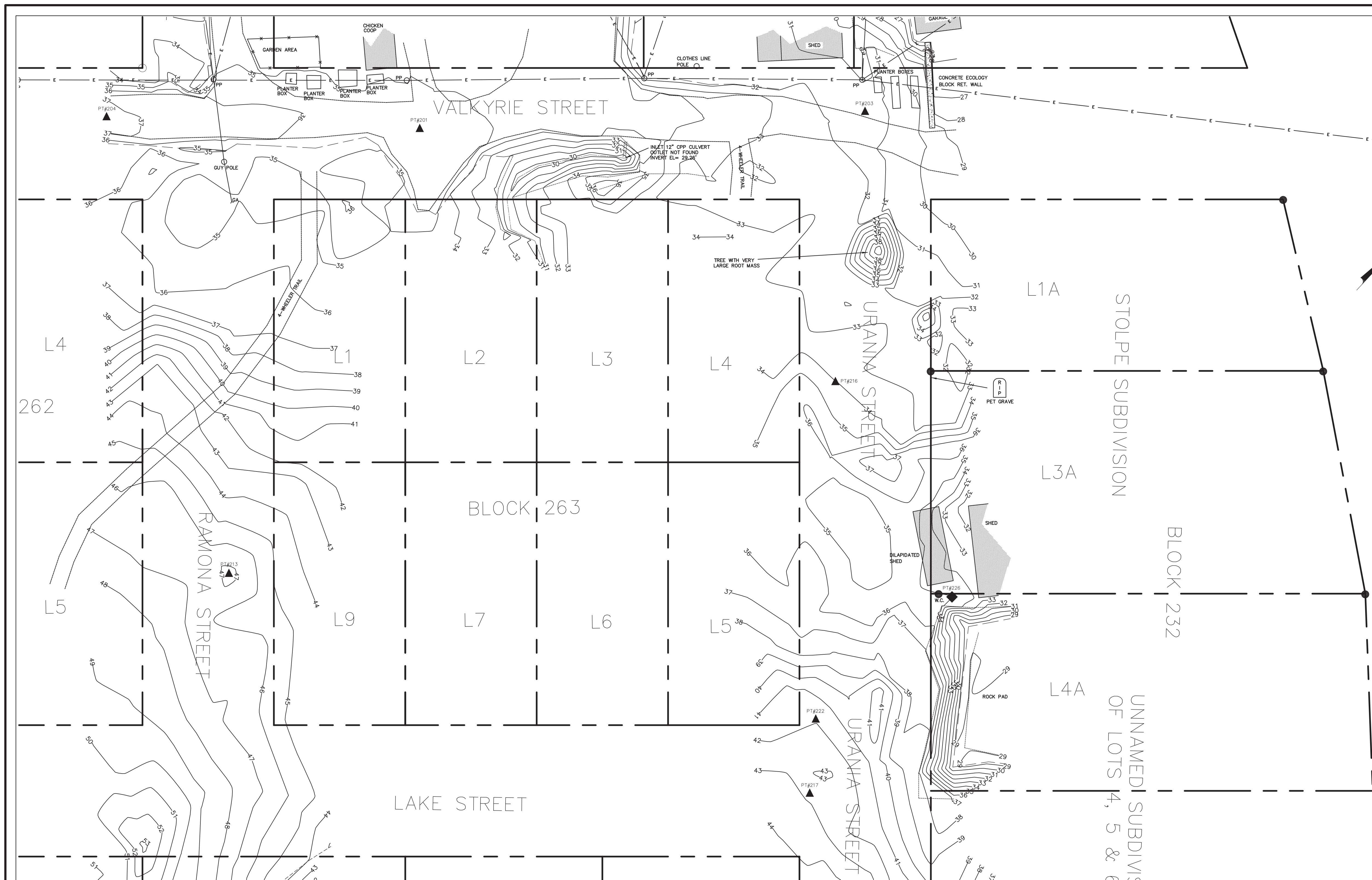
CLIENT: PND ENGINEERS INC.
 9360 GLACIER HWY., STE. 100
 JUNEAU, ALASKA 99801



SURVEYOR
CENTRAL SOUTHEAST SURVEYORS
 P.O. BOX 533, PETERSBURG AK 99833
 PH (907) 518-0075

SURVEY COMPLETED 11/27/22

DRAWN BY D.C.T. DRAWING No. PNDPUMP4 2022



SURVEYOR'S CERTIFICATE
 I HEREBY CERTIFY THAT I AM PROPERLY REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA, AND THAT THIS PLAT REPRESENTS A SURVEY MADE BY ME AND UNDER MY DIRECT SUPERVISION, AND THE MONUMENTS SHOWN HEREON ACTUALLY EXIST AS DESCRIBED, AND THAT ALL DIMENSIONS AND OTHER DETAILS ARE CORRECT.



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225	51483.705	18086.724	24.04	SET H&T
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- LEGEND**
- BREAK FEATURES**
- TOP SLOPE
 - TOE SLOPE
 - STREAM/DITCH CENTERLINE
 - CONTOUR LINE
 - LANDSCAPE TREE
- ROADS**
- CENTERLINE PAVED ROAD
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- UTILITIES**
- ELECTRICAL**
- O'HEAD ELECTRICITY/CABLE/PHONE
 - POWER POLE
 - GUY ANCHOR
- SEWER**
- SANITARY SEWER GRAVITY
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 - STORM SEWER
- WATER**
- MUNICIPAL WATER
 - VALVE BOX
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- WOOD HUB & TACK CONTROL POINT
 - MASONRY NAIL (PK NAIL) CONTROL POINT
 - A.D.O.T. B.C.M. CONTROL MON IN MON CASE
 - 1/2" G.I.P. MON. RECOVERED
 - ALUMINUM CAP MON. RECOVERED
 - BOUNDARY LINE
 - EASEMENT LINE
 - SURVEY LIMITS
- STRUCTURES**
- BUILDING/SHED
 - CONCRETE SLAB/WALL/SIDEWALK
 - CHAINLINK FENCE
- REVISIONS:**
- | | | |
|---------|--|--|
| 12/6/22 | | |
|---------|--|--|

- NOTES:**
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 WET WELL SUMP FLOOR EL= 1.14'; WET WELL INLET INVERT EL= 8.99'
 PUMP ROOM FLOOR BELOW ACCESS SHAFT EL= 1.18'; TOP OF DISCHARGE PIPE FLANGE AT
 PUMP CONNECTION EL= 3.30'; TOP OF DISCHARGE PIPE MANIFOLD AT 90° ELBOW EL= 3.04';
 TOP OF INLET PIPE FROM WET WELL AT WALL PENETRATION EL= 1.82'.

**PETERSBURG BOROUGH
 PUMP STATION 4
 FORCE MAIN REPLACEMENT
 TOPOGRAPHIC SURVEY**

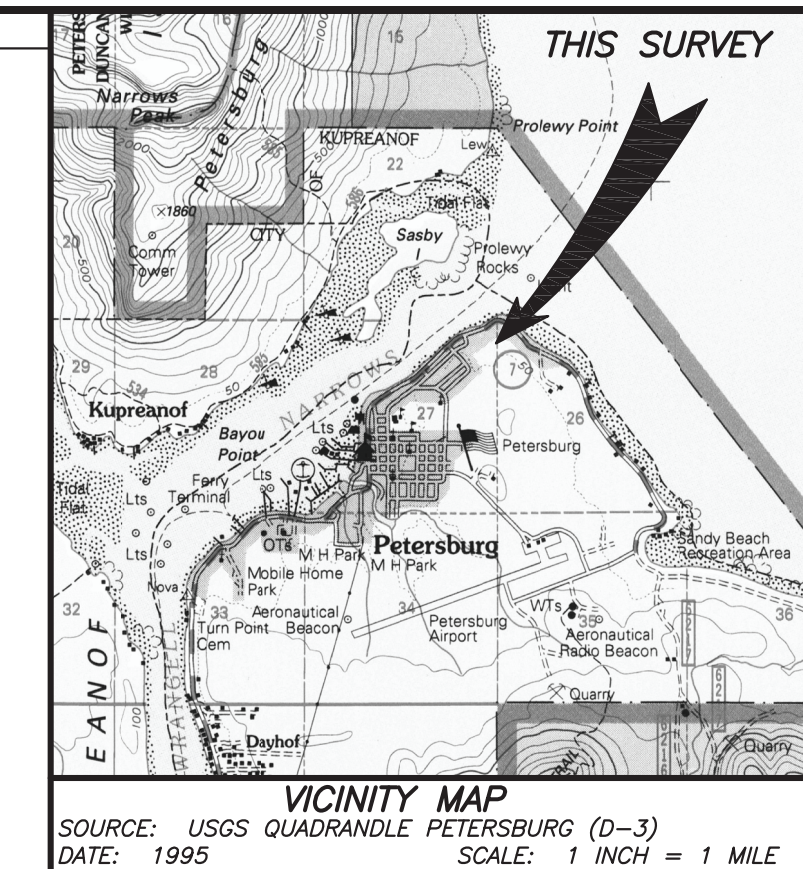
CLIENT: PND ENGINEERS INC.
 9360 GLACIER HWY., STE. 100
 JUNEAU, ALASKA 99801



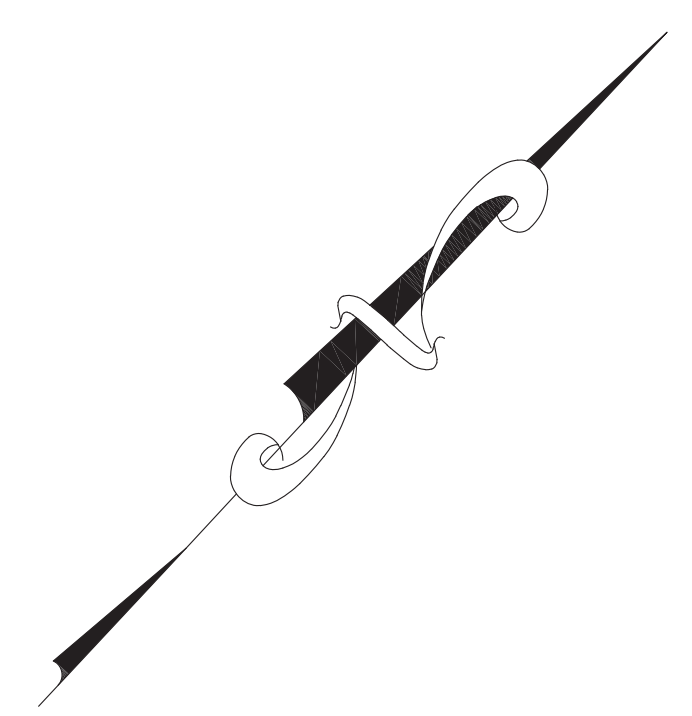
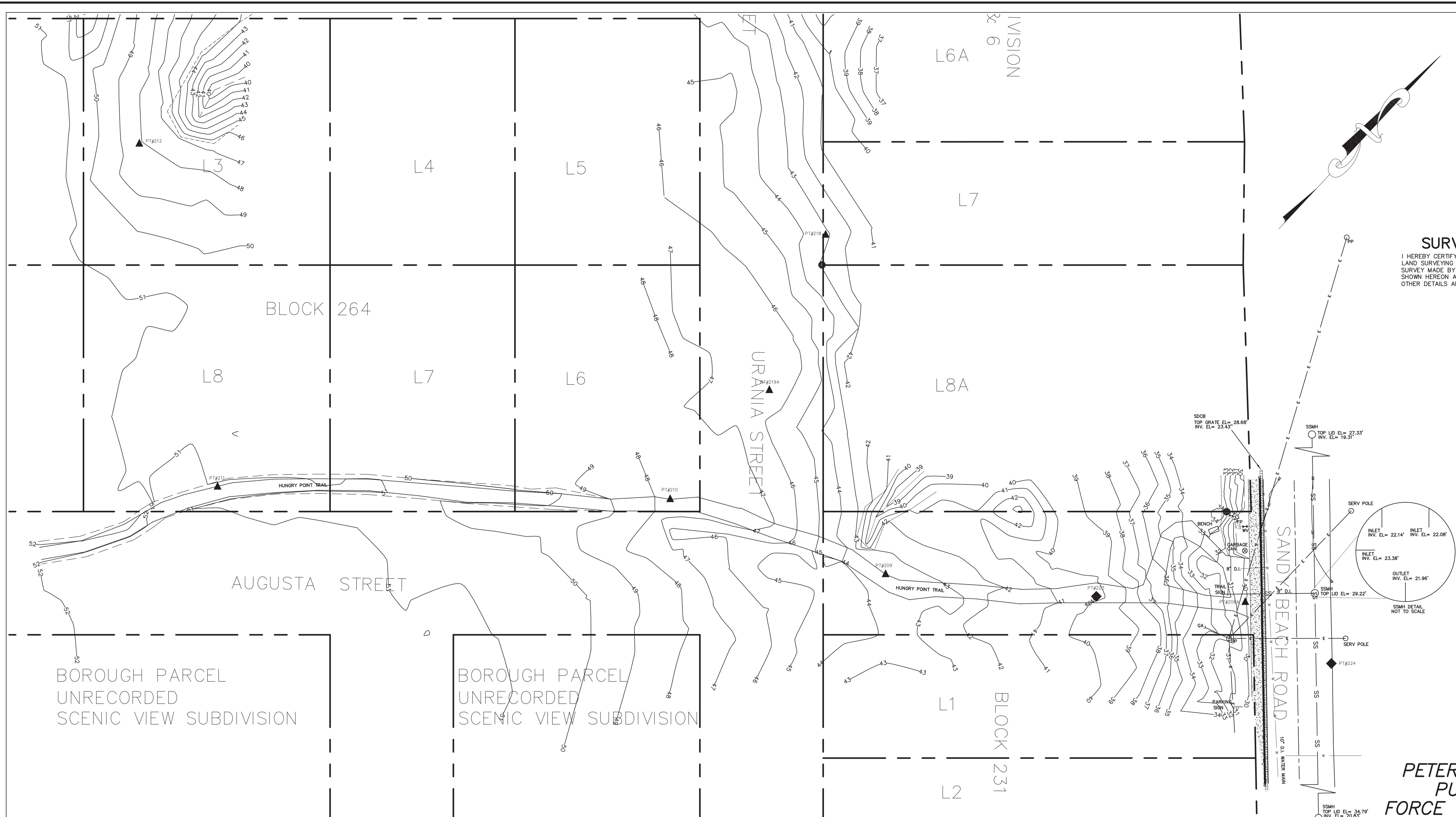
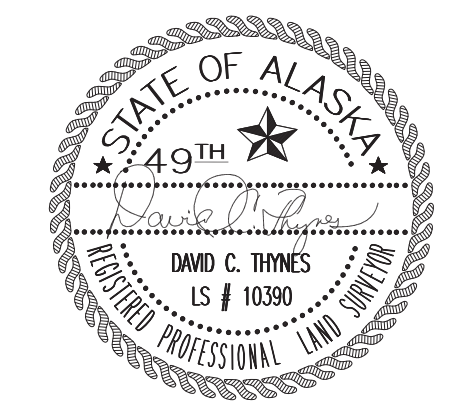
SURVEYOR
CENTRAL SOUTHEAST SURVEYORS
 P.O. BOX 533, PETERSBURG AK 99833
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SURVEY COMPLETED 11/27/22

DRAWN BY D.C.T. DRAWING No. PNDPUMP4 2022



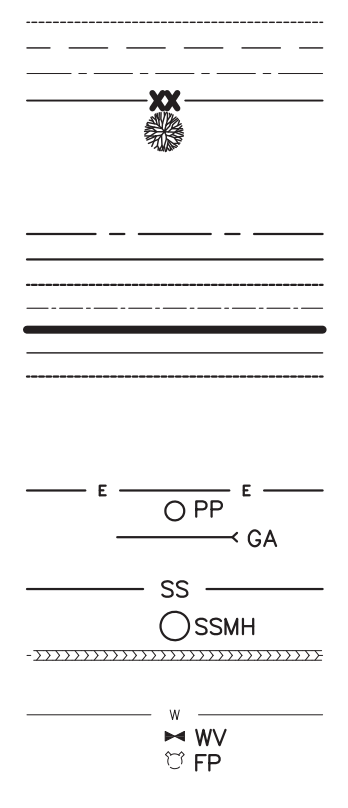
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- PROJECT CONTROL FOR THIS TOPOGRAPHIC SURVEY ARE POINTS 6, 7, 200, 201, 202A, 203-207, 208A, 209-218, 219A & 220-226 AS SHOWN ON THIS MAP.
 - VERTICAL CONTROL FOR THIS SURVEY IS BASED UPON THE PUBLISHED ELEVATION FOR U.S.A.C.E. B.C.M. NH-3 LOCATED IN A CONCRETE SIDEWALK BORDERING THE PETERSBURG NORTH HARBOR PARKING AREA. THE PUBLISHED ELEVATION = 25.58' M.L.L.W. DATUM. ELEVATIONS WERE TRANSFERRED TO THE PUMP STATION 4 CONTROL NETWORK USING A PRECISE SURVEY GRADE GEOMAX ZENITH35 PRO RTK GPS SYSTEM WITH THE BASE OCCUPYING NH-3 AND THE ROVER OCCUPYING POINT 200 WITH ADDITIONAL OBSERVATIONS ON POINTS 202A, 206, & 211. U.S.A.C.E. VERTICAL CONTROL IS BASED ON THE 1983-2001 TIDAL EPOCH AS REFERENCED BY TIDE STATION, 9451434 AND WAS PART OF A U.S.A.C.E. PROJECT UNDERTAKEN IN 2008.
 - HORIZONTAL CONTROL IS BASED ON A.D.O.T. CONTROL MONUMENTS INSTALLED ALONG SANDY BEACH ROAD. COORDINATES ARE BASED ON THE LOCAL GROUND COORDINATE SYSTEM "SANDY BEACH ROAD-GRID" USED IN A.D.O.T. PROJECT #68076 AND IN THE RECORD OF SURVEY PERFORMED BY RICK G. BRAUN IN 2008 (PLAT No. 2008-2 PETERSBURG RECORDING DISTRICT), SHEETS 6 AND 7 CONTAINING RECORD INFORMATION RELEVANT TO THIS PROJECT.
 - THE ACCURACY OF THIS SURVEY IS GREATER THAN 1:10,000.
 - BURIED UTILITIES EXIST IN THE PUMPSTATION 4 AREA AS WELL AS IN THE AREA OF THE AUGUSTA STREET - SANDY BEACH ROAD INTERSECTION. MUNICIPAL WATER, SANITARY SEWER AND STORM SEWER INFORMATION WAS TRANSFERRED FROM THE PETERSBURG BOROUGH "2014LARGEWATERANDSEWERMAP" DRAWING FOR THE AUGUSTA/SANDY BEACH ROAD INT. HOWEVER, SIGNIFICANT DIFFERENCES BETWEEN FIELD LOCATES AND THE BOROUGH DRAWING DETAILS NEAR THE PUMP STATION PREVENTED THE BOROUGH'S MUNICIPAL WATER NETWORK FROM BEING INCORPORATED WITH THIS TOPOGRAPHIC MAP. FIELD LOCATES PERFORMED BY PETERSBURG BOROUGH MUNICIPAL WATER STAFF IS RECOMMENDED PRIOR TO EXCAVATION.
 - THE MONUMENT AT THE INTERSECTION OF VALKYRIE AND RAMONA STREETS WAS FOUND SET VERY DEEP IN A CAST IRON MONUMENT CASE. THE MONUMENT CASE HAS BEEN DISTURBED AND IS LEANING SEVERELY IN THE ROAD FILL SUCH THAT A PLUMB LINE CANNOT REACH THE MONUMENT ITSELF. IT IS RECOMMENDED THAT THIS MONUMENT BE RESTORED AND RESET NEAR THE ROAD SURFACE DURING THE CONSTRUCTION PHASE OF THIS PROJECT AS IT IS REFERENCED BY MANY SURVEYS IN U.S. SURVEY 1215 A.
 - RECORD PLATS USED FOR THIS SURVEY INCLUDE THE FOLLOWING:
 U.S. SURVEY 1252 A, A.D.O.T. R.O.S. SANDY BEACH ROAD CONTROL PLAT #2008-2
 A.D.O.T. R.O.W. MAP PROJECT No. S-0937 PLAT 85-35, UNNAMED RESUBDIVISION PLAT #81-26, STOLPE SUBDIVISION PLAT #2006-18, AND UNNAMED SUBDIVISION PLAT #79-9.
 - THE FOLLOWING ELEVATION DETAILS WERE MEASURED IN THE PUMP STATION 4 PUMP CHAMBER AND WET WELL:
 WET WELL SUMP FLOOR EL= 1.14'; WET WELL INLET INVERT EL= 8.99'
 PUMP ROOM FLOOR BELOW ACCESS SHAFT EL= 1.18'; TOP OF DISCHARGE PIPE FLANGE AT PUMP CONNECTION EL= 3.30'; TOP OF DISCHARGE PIPE MANIFOLD AT 90° ELBOW EL= 3.04'; TOP OF INLET PIPE FROM WET WELL AT WALL PENETRATION EL= 1.82'.

LEGEND

- BREAK FEATURES**
 TOP SLOPE
 TOE SLOPE
 STREAM/DITCH CENTERLINE
 CONTOUR LINE
 LANDSCAPE TREE
- ROADS**
 CENTERLINE PAVED ROAD
 EDGE PAVED ROAD
 EDGE GRAVEL ROAD
 DITCH CENTERLINE
 OUTIER FLOWLINE
 EDGE CONCRETE
 EDGE TRAIL
- UTILITIES**
 ELECTRICAL
 O'HEAD ELECTRICITY/CABLE/PHONE
 POWER POLE
 GUY ANCHOR
- SEWER**
 SANITARY SEWER GRAVITY
 SANITARY SEWER MANHOLE
 STORM SEWER
- WATER**
 MUNICIPAL WATER
 VALVE BOX
 FIRE HYDRANT



CONTROL & MONUMENTATION

- WOOD HUB & TACK CONTROL POINT
 MASONRY NAIL (PK NAIL) CONTROL POINT
 A.D.O.T. B.C.M CONTROL MON IN MON CASE
 1/2" G.I.P. MON. RECOVERED
 ALUMINUM CAP MON. RECOVERED
 BOUNDARY LINE
 EASEMENT LINE
 SURVEY LIMITS
- STRUCTURES**
 BUILDING/SHED
 CONCRETE SLAB/WALL/SIDEWALK
 CHAINLINK FENCE
- REVISIONS:
 12/6/22

CONTROL POINT TABLE

Point	Northing	Eastng	Elevation	Description
6	51385.960	17765.550	0.00	BOM SB-6
7	51596.710	18221.810	23.83	BOM SB-7
200	51577.015	18060.850	23.65	SET H&T
201	51425.529	18262.159	35.50	SET H&T
202A	51421.526	18168.040	34.00	SET H&T
203	51545.760	18381.623	31.37	SET H&T
204	51347.446	18171.940	37.28	SET H&T
205	51506.718	18033.607	25.66	SET H&T
206	51699.934	18476.129	23.74	BOM SB-8
207	50834.650	19396.372	33.26	BOM SB-9
208A	51299.278	18879.789	30.13	SET H&T
209	51208.065	18765.419	43.70	SET H&T
210	51170.733	18680.755	47.74	SET H&T
211	51049.249	18543.051	51.81	SET H&T
212	51129.370	18424.949	48.12	SET H&T
213	51252.170	18324.460	47.36	SET H&T
214	51421.470	18186.035	34.00	SET H&T
216	51462.917	18443.490	34.06	SET H&T
217	51341.733	18543.128	42.85	SET H&T
218	51292.190	18653.722	43.19	SET H&T
219A	51230.514	18680.005	46.88	SET H&T
220	51207.988	18765.359	43.78	FND H&T
221	51465.758	18357.299	33.46	SET H&T
223	51563.928	18525.587	41.92	SET H&T
223	51259.830	18834.011	40.40	SET H&T
224	51304.921	18922.297	29.32	SET PK
225	51483.705	18086.724	24.04	SET H&T
226	51433.434	18531.641	35.03	SET PK

**PETERSBURG BOROUGH
 PUMP STATION 4
 FORCE MAIN REPLACEMENT
 TOPOGRAPHIC SURVEY**

CLIENT: PND ENGINEERS INC.
 9360 GLACIER HWY., STE. 100
 JUNEAU, ALASKA 99801



SURVEYOR
CENTRAL SOUTHEAST SURVEYORS
 P.O. BOX 533, PETERSBURG AK 99833
 PH (907) 518-0075

SURVEY COMPLETED 11/27/22

DRAWN BY D.C.T. DRAWING No. PNDPUMP4 2022

APPENDIX C - ESTIMATES



PETERSBURG BOROUGH
PUMP STATION 4



ROM Cost Estimate Matrix
Prepared By PND Engineers on February 15, 2023

Alternative A with Options							
	Cost	A.1.1	A.1.2	A.1.3	A.2.1	A.2.2	A.2.3
A	PUMP STATION ALT. A	\$952,845	\$952,845	\$952,845	\$952,845	\$952,845	\$952,845
1	PIPE INSTALLATION, FLOATING	\$686,576	\$686,576	\$686,576			
2	PIPE INSTALLATION, HARDPAN	\$759,176			\$759,176	\$759,176	\$759,176
1	ELECTRICAL, PANELS (Includes Covered Shelter/ Eave Mods)	\$558,500			\$558,500		
2	ELECTRICAL HUT (Includes Hut)	\$537,500	\$537,500			\$537,500	
3	ELECTRICAL BUILDING RECONSTRUCT (Includes Building)	\$633,500		\$633,500			\$633,500
ESTIMATED CONSTRUCTION BID PRICE		\$2,197,921	\$2,176,921	\$2,272,921	\$2,270,521	\$2,249,521	\$2,345,521
CONSTRUCTION CONTINGENCY (10%)		\$219,792	\$217,692	\$227,292	\$227,052	\$224,952	\$234,552
PRELIMINARY DESIGN AND SURVEY (Includes to date engineering expenses)		\$113,000	\$113,000	\$113,000	\$113,000	\$113,000	\$113,000
OWNER FURNISHED PUMPS		\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000
PERMITTING		\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
FINAL DESIGN (Estimated at 10% of Construction Costs)		\$219,792	\$217,692	\$227,292	\$227,052	\$224,952	\$234,552
CA/CI (Estimated at 10% of Construction Costs)		\$219,792	\$217,692	\$227,292	\$227,052	\$224,952	\$234,552
TOTAL RECOMMENDED PROJECT BUDGET		\$3,145,297	\$3,117,997	\$3,242,797	\$3,239,677	\$3,212,377	\$3,337,177

Alternative B with Options							
	Cost	B.1.1	B.1.2	B.1.3	B.2.1	B.2.2	B.2.3
B	PUMP STATION ALT. B	\$1,043,803	\$1,043,803	\$1,043,803	\$1,043,803	\$1,043,803	\$1,043,803
1	PIPE INSTALLATION, FLOATING	\$686,576	\$686,576	\$686,576			
2	PIPE INSTALLATION, HARDPAN	\$759,176			\$759,176	\$759,176	\$759,176
1	ELECTRICAL, PANELS (Includes Covered Shelter/ Eave Mods)	\$558,500			\$558,500		
2	ELECTRICAL HUT (Includes Hut)	\$537,500	\$537,500			\$537,500	
3	ELECTRICAL BUILDING RECONSTRUCT (Includes Building)	\$633,500		\$633,500			\$633,500
ESTIMATED CONSTRUCTION BID PRICE		\$2,288,879	\$2,267,879	\$2,363,879	\$2,361,479	\$2,340,479	\$2,436,479
CONSTRUCTION CONTINGENCY (10%)		\$228,888	\$226,788	\$236,388	\$236,148	\$234,048	\$243,648
PRELIMINARY DESIGN AND SURVEY (Includes to date engineering expenses)		\$113,000	\$113,000	\$113,000	\$113,000	\$113,000	\$113,000
OWNER FURNISHED PUMPS		\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000
PERMITTING		\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
FINAL DESIGN (Estimated at 10% of Construction Costs)		\$228,888	\$226,788	\$236,388	\$236,148	\$234,048	\$243,648
CA/CI (Estimated at 10% of Construction Costs)		\$228,888	\$226,788	\$236,388	\$236,148	\$234,048	\$243,648
TOTAL RECOMMENDED PROJECT BUDGET		\$3,263,542	\$3,236,242	\$3,361,042	\$3,357,922	\$3,330,622	\$3,455,422

Alternative C with Options							
	Cost	C.1.1	C.1.2	C.1.3	C.2.1	C.2.2	C.2.3
C	PUMP STATION ALT. C	\$1,109,830	\$1,109,830	\$1,109,830	\$1,109,830	\$1,109,830	\$1,109,830
1	PIPE INSTALLATION, FLOATING	\$686,576	\$686,576	\$686,576			
2	PIPE INSTALLATION, HARDPAN	\$759,176			\$759,176	\$759,176	\$759,176
1	ELECTRICAL, PANELS (Includes Covered Shelter/ Eave Mods)	\$558,500			\$558,500		
2	ELECTRICAL HUT (Includes Hut)	\$537,500	\$537,500			\$537,500	
3	ELECTRICAL BUILDING RECONSTRUCT (Includes Building)	\$633,500		\$633,500			\$633,500
ESTIMATED CONSTRUCTION BID PRICE		\$2,354,906	\$2,333,906	\$2,429,906	\$2,427,506	\$2,406,506	\$2,502,506
CONSTRUCTION CONTINGENCY (10%)		\$235,491	\$233,391	\$242,991	\$242,751	\$240,651	\$250,251
PRELIMINARY DESIGN AND SURVEY (Includes to date engineering expenses)		\$113,000	\$113,000	\$113,000	\$113,000	\$113,000	\$113,000
OWNER FURNISHED PUMPS		\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000
PERMITTING		\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
FINAL DESIGN (Estimated at 10% of Construction Costs)		\$235,491	\$233,391	\$242,991	\$242,751	\$240,651	\$250,251
CA/CI (Estimated at 10% of Construction Costs)		\$235,491	\$233,391	\$242,991	\$242,751	\$240,651	\$250,251
TOTAL RECOMMENDED PROJECT BUDGET		\$3,349,378	\$3,322,078	\$3,446,878	\$3,443,758	\$3,416,458	\$3,541,258

- Denotes Unlikely Combination of Alternatives, Estimate May Be Invalid.
- Denotes Least Cost Option
- Denotes Recommended Option



**PETERSBURG BOROUGH
PUMP STATION 4**



ROM Cost Estimate

Prepared By PND Engineers on November 29, 2022

Pump Station 4 Alternative A (Excludes Forcemain and Gravity Pipe)

Item	Item Description	Units	Quantity	Unit Cost	Amount
15.01	Mobilization/Demobilization	LS	All Req'd	\$85,895	\$85,895
20.04(a)	Clearing and Grubbing	LS	All Req'd	\$8,000	\$8,000
20.07	Remove Sidewalk	SY	40	\$30	\$1,200
20.08	Remove Curb and Gutter	LF	70	\$25	\$1,750
20.09	Remove Pavement	SY	15	\$30	\$450
20.10(a)	Unusable Excavation	CY	900	\$25	\$22,500
20.12	Dewatering	LS	All Req'd	\$30,000	\$30,000
20.15	Furnish Trench Backfill	CY	700	\$42	\$29,400
20.22	Leveling Course	CY	100	\$70	\$7,000
20.30	Sheetpile Shoring, 40-foot long	PC.	60	\$4,500	\$270,000
30.02	Curb and Gutter	LF	70	\$75	\$5,250
30.03	Sidewalk	SY	40	\$165	\$6,600
30.07(a)	Lift Station Concrete Slab on Grade	SY	350	\$180	\$63,000
30.07(b)	Roadway Patch	SY	15	\$180	\$2,700
50.02(a)	Furnish & Install Pipe, PVC Gravity Sewer	LF	90	\$170	\$15,300
50.02(b)	Furnish & Install Pipe, 12" HDPE SDR 17 Force Main Pipe	LF	30	\$170	\$5,100
50.02(c)	Connect to Existing Sewer Pipe	EA	2	\$2,500	\$5,000
50.03(a)	Construct Sanitary Sewer Manhole Type A	EA	1	\$10,000	\$10,000
50.03(b)	Connect to Existing Manhole	EA	0	\$5,000	\$0
50.20	Decommission Existing Lift Station	LS	All Req'd	\$12,000	\$12,000
50.20(b)	Demolish Existing Covered Shelter	LS	All Req'd	\$5,000	\$5,000
60.04	Fire Hydrant	LS	All Req'd	\$8,000	\$8,000
60.06	Yard Hydrant	LS	All Req'd	\$5,000	\$5,000
65.02(a)	Construction Survey Measurement	LS	All Req'd	\$30,000	\$30,000
70.07(a)	Remove Pipe	LF	60	\$20	\$1,200
70.07(b)	Slurry or Foam to Abandon Existing Force Main	LF	1100	\$55	\$60,500
70.12	Traffic Maintenance	LS	All Req'd	\$3,000	\$3,000
70.13	Bollard	EA	4	\$2,000	\$8,000
75.04	Landscaping	LS	All Req'd	\$5,000	\$5,000
09900	Concrete Coatings	LS	All Req'd	\$35,000	\$35,000
11176(a)	Furnish and Install 12' dia. Wet Well with Pipe and Equipment	LS	All Req'd	\$100,000	\$100,000
11176(b)	Furnish and Install 10' dia. Valve Vault with Pipe and Equipment	LS	All Req'd	\$90,000	\$90,000
11176(d)	Install and Remove Temporary Pipes and Equipment	LS	All Req'd	\$5,000	\$5,000
11176(e)	Bypass Pumping	LS	All Req'd	\$5,000	\$5,000
11176(f)	Approved Work Plan	LS	All Req'd	\$3,000	\$3,000
ESTIMATED CONSTRUCTION BID PRICE					\$944,845
PMPL POLE RELOCATION					\$1,000
ADDITIONAL SURVEY and PLATTING					\$7,000
CONSTRUCTION BUDGET ALTERNATIVE A					\$952,845



**PETERSBURG BOROUGH
PUMP STATION 4**



ROM Cost Estimate

Prepared By PND Engineers on November 29, 2022

Pump Station 4 Alternative B (Excludes Forcemain and Gravity Pipe)

Item	Item Description	Units	Quantity	Unit Cost	Amount
15.01	Mobilization/Demobilization	LS	All Req'd	\$94,528	\$94,528
20.04(a)	Clearing and Grubbing	LS	All Req'd	\$3,000	\$3,000
20.07	Remove Sidewalk	SY	65	\$30	\$1,950
20.08	Remove Curb and Gutter	LF	110	\$25	\$2,750
20.09	Remove Pavement	SY	185	\$30	\$5,550
20.10(a)	Unusable Excavation	CY	900	\$25	\$22,500
20.12	Dewatering	LS	All Req'd	\$30,000	\$30,000
20.15	Furnish Trench Backfill	CY	700	\$42	\$29,400
20.22	Leveling Course	CY	200	\$70	\$14,000
20.30	Sheetpile Shoring, 2-Foot x 40-foot long	PC.	60	\$4,500	\$270,000
30.02	Curb and Gutter	LF	110	\$75	\$8,250
30.03	Sidewalk	SY	65	\$165	\$10,725
30.07(a)	Lift Station Concrete Slab on Grade	SY	210	\$180	\$37,800
30.07(b)	Roadway Patch	SY	185	\$180	\$33,300
50.02	Furnish & Install Pipe, PVC Gravity Sewer	LF	55	\$170	\$9,350
51.02	Furnish & Install Pipe, 12" HDPE SDR 17 Force Main Pipe	LF	60	\$170	\$10,200
50.02(c)	Connect to Existing Sewer Pipe	EA	2	\$2,500	\$5,000
50.03(a)	Construct Sanitary Sewer Manhole Type A	EA	0	\$10,000	\$0
50.03(b)	Connect to Existing Manhole	EA	0	\$5,000	\$0
50.20	Decommission Existing Lift Station	LS	All Req'd	\$12,000	\$12,000
50.20(b)	Modify Existing Shelter	LS	All Req'd	\$10,000	\$10,000
50.20(c)	Remove Existing Sewer Manhole	LS	All Req'd	\$5,000	\$5,000
60.01	12" HDPE Water Main	LF	105	\$160	\$16,800
60.01(b)	Connect to Existing Water Main	EA	2	\$2,500	\$5,000
60.04	Fire Hydrant	LS	All Req'd	\$8,000	\$8,000
60.06	Yard Hydrant	LS	All Req'd	\$5,000	\$5,000
65.02(a)	Construction Survey Measurement	LS	All Req'd	\$30,000	\$30,000
70.10	Striping and Signage	LS	All Req'd	\$5,000	\$5,000
70.07(a)	Remove Pipe	LF	60	\$20	\$1,200
70.07(b)	Slurry or Foam to Abandon Existing Force Main	LF	1100	\$55	\$60,500
70.12	Traffic Maintenance	LS	All Req'd	\$3,000	\$3,000
70.13	Bollard	EA	2	\$2,000	\$4,000
75.04	Landscaping	LS	All Req'd	\$3,000	\$3,000
09900	Concrete Coatings	LS	All Req'd	\$35,000	\$35,000
11176(a)	Furnish and Install 12' dia. Wet Well with Pipe and Equipment	LS	All Req'd	\$100,000	\$100,000
11176(b)	Furnish and Install 10' dia. Valve Vault with Pipe and Equipment	LS	All Req'd	\$90,000	\$90,000
11176(d)	Install and Remove Temporary Pipes and Equipment	LS	All Req'd	\$25,000	\$25,000
11176(c)	Bypass Pumping	LS	All Req'd	\$30,000	\$30,000
11176(f)	Approved Work Plan	LS	All Req'd	\$3,000	\$3,000
ESTIMATED CONSTRUCTION BID PRICE					\$1,039,803
ADDITIONAL SURVEY and PLATTING					\$4,000
CONSTRUCTION BUDGET ALTERNATIVE B					\$1,043,803



**PETERSBURG BOROUGH
PUMP STATION 4**



ROM Cost Estimate

Prepared By PND Engineers on November 29, 2022

Pump Station 4 Alternative C (Excludes Forcemain and Gravity Pipe)

Item	Item Description	Units	Quantity	Unit Cost	Amount
15.01	Mobilization/Demobilization	LS	All Req'd	\$100,530	\$100,530
20.04(a)	Clearing and Grubbing	LS	All Req'd	\$3,000	\$3,000
20.07	Remove Slab	SY	20	\$30	\$600
20.08	Remove Curb and Gutter	LF	0	\$25	\$0
20.09	Remove Pavement	SY	0	\$30	\$0
20.10(a)	Unusable Excavation	CY	900	\$25	\$22,500
20.12	Dewatering	LS	All Req'd	\$30,000	\$30,000
20.15	Furnish Trench Backfill	CY	750	\$42	\$31,500
20.22	Leveling Course	CY	100	\$70	\$7,000
20.30	Sheetpile Shoring, 40-foot long	PC.	76	\$4,500	\$342,000
30.02	Curb and Gutter	LF	0	\$75	\$0
30.03	Sidewalk	SY	0	\$165	\$0
30.07(a)	Lift Station Concrete Slab on Grade	SY	300	\$180	\$54,000
30.07(b)	Roadway Patch	SY	0	\$165	\$0
50.02	Furnish & Install Pipe, PVC Gravity Sewer	LF	40	\$170	\$6,800
51.02	Furnish & Install Pipe, 12" HDPE SDR 17 Force Main Pipe	LF	10	\$170	\$1,700
50.02(c)	Connect to Existing Sewer Pipe	EA	1	\$2,500	\$2,500
50.03(a)	Construct Sanitary Sewer Manhole Type A	EA	0	\$10,000	\$0
50.03(b)	Connect to Existing Manhole	EA	0	\$5,000	\$0
50.20	Decommission Existing Lift Station	LS	All Req'd	\$30,000	\$30,000
50.20(b)	Demolish Existing Building	LS	All Req'd	\$30,000	\$30,000
60.04	Fire Hydrant	LS	All Req'd	\$8,000	\$8,000
60.06	Yard Hydrant	LS	All Req'd	\$5,000	\$5,000
65.02(a)	Construction Survey Measurement	LS	All Req'd	\$30,000	\$30,000
70.07(a)	Remove Pipe	LF	60	\$20	\$1,200
70.07(b)	Slurry or Foam to Abandon Existing Force Main	LF	1100	\$55	\$60,500
70.12	Traffic Maintenance	LS	All Req'd	\$3,000	\$3,000
70.13	Bollard	EA	2	\$2,000	\$4,000
70.04	Landscaping	LS	All Req'd	\$4,000	\$4,000
09900	Concrete Coatings	LS	All Req'd	\$35,000	\$35,000
11176(a)	Furnish and Install 12' dia. Wet Well with Pipe and Equipment	LS	All Req'd	\$100,000	\$100,000
11176(b)	Furnish and Install 10' dia. Valve Vault with Pipe and Equipment	LS	All Req'd	\$90,000	\$90,000
11176(d)	Install and Remove Temporary Pipes and Equipment	LS	All Req'd	\$25,000	\$25,000
11176(e)	Bypass Pumping and Temp. Piping	LS	All Req'd	\$75,000	\$75,000
11176(f)	Approved Work Plan	LS	All Req'd	\$3,000	\$3,000
ESTIMATED CONSTRUCTION BID PRICE					\$1,105,830
ADDITIONAL SURVEY and PLATTING					\$4,000
CONSTRUCTION BUDGET ALTERNATIVE C					\$1,109,830



**PETERSBURG BOROUGH
PUMP STATION 4**



ROM Cost Estimate

Prepared By PND Engineers on February 15th 2023

Floating Pipes

Item	Item Description	Units	Quantity	Unit Cost	Amount
15.01	Mobilization/Demobilization	LS	All Req'd	\$62,416	\$62,416
20.04(a)	Clearing and Grubbing	AC	0.5	\$80,000	\$40,000
20.07	Remove Sidewalk	SY	12	\$30	\$360
20.08	Remove Curb and Gutter	LF	20	\$25	\$500
20.09	Remove Pavement	SY	65	\$30	\$1,950
20.10(a)	Unusable Excavation	CY	4900	\$20	\$98,000
20.12	Dewatering	LS	All Req'd	\$8,000	\$8,000
20.15	Furnish Trench Backfill	CY	4000	\$42	\$168,000
20.22	Leveling Course	CY	500	\$70	\$35,000
20.25	Geotextile Fabric	SY	1100	\$10	\$11,000
20.30	Shoring - Trenches	LS	All Req'd	\$5,000	\$5,000
30.02	Curb and Gutter	LF	30	\$75	\$2,250
30.03	Sidewalk	SY	20	\$165	\$3,300
30.07(b)	Roadway Patch	SY	60	\$180	\$10,800
50.02	Furnish & Install Pipe, 21" PVC SDR18 Gravity Sewer	LF	500	\$150	\$75,000
51.02	Furnish & Install Pipe, 12" HDPE SDR 17 Force Main Pipe	LF	700	\$150	\$105,000
50.03(a)	Construct Sanitary Sewer Manhole Type A	EA	3	\$10,000	\$30,000
50.03(b)	Connect to Existing Manhole	EA	1	\$5,000	\$5,000
65.02(a)	Construction Survey Measurement	LS	All Req'd	\$20,000	\$20,000
70.12	Traffic Maintenance	LS	All Req'd	\$5,000	\$5,000
ESTIMATED CONSTRUCTION BID PRICE					\$686,576

Excavated to Hardpan

Item	Item Description	Units	Quantity	Unit Cost	Amount
15.01	Mobilization/Demobilization	LS	All Req'd	\$69,016	\$69,016
20.04(a)	Clearing and Grubbing	AC	0.5	\$80,000	\$40,000
20.07	Remove Sidewalk	SY	12	\$30	\$360
20.08	Remove Curb and Gutter	LF	20	\$25	\$500
20.09	Remove Pavement	SY	65	\$30	\$1,950
20.10(a)	Unusable Excavation	CY	6000	\$20	\$120,000
20.12	Dewatering	LS	All Req'd	\$8,000	\$8,000
20.15	Furnish Trench Backfill	CY	5100	\$42	\$214,200
20.22	Leveling Course	CY	500	\$70	\$35,000
20.25	Geotextile Fabric	SY	1100	\$8	\$8,800
20.30	Shoring - Trenches	LS	All Req'd	\$5,000	\$5,000
30.02	Curb and Gutter	LF	30	\$75	\$2,250
30.03	Sidewalk	SY	20	\$165	\$3,300
30.07(b)	Roadway Patch	SY	60	\$180	\$10,800
50.02	Furnish & Install Pipe, 21" PVC SDR18 Gravity Sewer	LF	500	\$150	\$75,000
51.02	Furnish & Install Pipe, 12" HDPE SDR 17 Force Main Pipe	LF	700	\$150	\$105,000
50.03(a)	Construct Sanitary Sewer Manhole Type A	EA	3	\$10,000	\$30,000
50.03(b)	Connect to Existing Manhole	EA	1	\$5,000	\$5,000
65.02(a)	Construction Survey Measurement	LS	All Req'd	\$20,000	\$20,000
70.12	Traffic Maintenance	LS	All Req'd	\$5,000	\$5,000
ESTIMATED CONSTRUCTION BID PRICE					\$759,176



**PETERSBURG BOROUGH
PUMP STATION 4**



**ROM Cost Estimate
Prepared By PND Engineers on February 15th 2023**

Electrical Panels

Item	Item Description	Units	Quantity	Unit Cost	Amount
260500	Electrical and Panels, All	LS	All Req'd	\$531,000	\$531,000
260500(b)	Eve Extension and Structural Mods	LS	All Req'd	\$20,000	\$20,000
ESTIMATED CONSTRUCTION BID PRICE					\$551,000
PMPL WORK					\$7,500
CONSTRUCTION BUDGET PANELS					\$558,500

Electrical Hut

Item	Item Description	Units	Quantity	Unit Cost	Amount
260500	Electrical and Huts, All	LS	All Req'd	\$520,000	\$520,000
260500(b)	Structural Mods	LS	All Req'd	\$10,000	\$10,000
ESTIMATED CONSTRUCTION BID PRICE					\$530,000
PMPL WORK					\$7,500
CONSTRUCTION BUDGET HUT					\$537,500

Electrical, New Building

Item	Item Description	Units	Quantity	Unit Cost	Amount
260500	Electrical in New Building, All	LS	All Req'd	\$530,000	\$530,000
260500(b)	New Timber Framed Building	SF	384	\$250	\$96,000
ESTIMATED CONSTRUCTION BID PRICE					\$626,000
PMPL WORK					\$7,500
CONSTRUCTION BUDGET BUILDING					\$633,500



PO Box 210049, Auke Bay, AK 99821, 907-789-3350, 907-789-3360 (fax)
 email: mark@morrisengineeringgroup.com

15-Feb-23

Cost Estimate

Project: Petersburg Pump Station 4 Renovation

Description: Electrical Option 1, Civil Alternative A & B
 Assumes adding a new 200A Electrical Service feeding Electrical equipment rack-mounted on the outside of the Existing Generator Building. Demo of existing wet well Electrical.

Labor wage w/ Benefits: 95
 Labor Multiplier: 1.5
 Material Multiplier: 1.25

Item	Quantity	Cost per unit	Total Material	Labor per unit	Total Labor	
Demolition Electrical Existing Wetwell	1	\$1,500.00	\$1,875.00	80	\$11,400.00	
2" Schedule 80 PVC	500	\$1.10	\$687.50	0.03	\$2,137.50	
No. 2/0 XHHW	1500	\$2.50	\$4,687.50	0.2	\$42,750.00	
No. 6 XHHW	500	\$0.60	\$375.00	0.2	\$14,250.00	
Building wiring	1	\$4,500.00	\$5,625.00	24	\$3,420.00	
Re work in Generator Building	1	\$4,500.00	\$5,625.00	124	\$17,670.00	
Relocate ATS	1	\$1,500.00	\$1,875.00	18	\$2,565.00	
PLC Panel	1	\$35,000.00	\$43,750.00	60	\$8,550.00	
Variable Frequency Drives	3	\$9,000.00	\$33,750.00	16	\$6,840.00	\$207,832.50
Service Equip						
METER MAIN	1	\$12,000.00	\$15,000.00	24	\$3,420.00	
Fuse Disconnects	3	\$2,500.00	\$9,375.00	8	\$3,420.00	
Building panel	1	\$3,500.00	\$4,375.00	8	\$1,140.00	
GROUNDING	1	\$400.00	\$500.00	16	\$2,280.00	
Transformer	1	\$1,500.00	\$1,875.00	16	\$2,280.00	
Racks	2	\$5,000.00	\$12,500.00	60	\$17,100.00	
74"x72"x24" SS Enclosure, Double Door, Type 4X	1	\$20,000	\$25,000.00	12	\$1,710.00	
225A Automatic Transfer Switch, Type 4X	1	\$10,000	\$12,500.00	12	\$1,710.00	
200A Manual Transfer Switch, Type 4X	1	\$12,000	\$15,000.00	8	\$1,140.00	
200/3 MCCB w/ Type 4X enclosure	1	\$8,000	\$10,000.00	6	\$855.00	
Portable Generator Receptacle	1	\$2,000	\$2,500.00	4	\$570.00	\$144,250.00
Wetwell Electrical						
Stainless Steel Junction Boxes	3	\$3,500.00	\$13,125.00	8	\$3,420.00	
Wetwell Electrical Installation	1	\$1,500.00	\$1,875.00	18	\$2,565.00	
Sealoffs	8	\$250.00	\$2,500.00	3	\$3,420.00	
Wiring to J-boxes	1	\$1,500.00	\$1,875.00	8	\$1,140.00	
Pressure Transducer	1	\$1,500	\$1,875.00	6	\$855.00	
Float Switches	3	\$200	\$750.00	4	\$1,710.00	\$35,110.00
Lighting						
CONTACTOR-BUILDING LTG	1	\$751.22	\$939.03	16	\$2,280.00	
Indoor luminaires	4	\$175.00	\$875.00	3	\$1,710.00	
Exterior Luminaires	3	\$175.00	\$656.25	3	\$1,282.50	\$7,742.78
Radio Communications						
Radio Pair	1	\$5,000.00	\$6,250.00	16	\$2,280.00	
Radio Enclosure	1	\$5,000.00	\$6,250.00	6	\$855.00	
Fiber Cable	800	\$2.00	\$2,000.00	0.01	\$1,140.00	
Power Cable	800	\$1.50	\$1,500.00	0.03	\$3,420.00	
Trenching	700	\$5	\$4,375.00	0.12	\$11,970.00	
2"C	700	\$2	\$1,750.00	0.15	\$14,962.50	
Pull Box	2	\$800.00	\$2,000.00	12	\$3,420.00	
Wood Pole	2	\$4,000.00	\$10,000.00	30	\$8,550.00	
Riser on Pole with Weatherhead	2	\$1,000.00	\$2,500.00	16	\$4,560.00	\$87,782.50
Subtotals			\$267,970.28		\$214,747.50	\$482,717.78

Total Mat. & Labor	\$482,717.78
Profit (10%)	\$48,271.78

Grand Total Electrical	\$530,989.55
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Power and Telephone Service

PMPL Service	\$ 3,500.00
Tele Service	\$ 2,500.00
Conduit & Trenching	\$ 1,500.00
New Electrical Utility Services	\$ 7,500.00



PO Box 210049, Auke Bay, AK 99821, 907-789-3350, 907-789-3360 (fax)
 email: mark@morrisingengineeringgroup.com

15-Feb-23

Cost Estimate

Project: Petersburg Pump Station 4 Renovation

Description: Electrical Option 2, Civil Alternative A & B
 Assumes adding a new 200A Electrical Service feeding a fiberglass Electrical building with equipment mounted inside and outside. Demo of existing wet well Electrical.

Labor wage w/ Benefits: 95
 Labor Multiplier: 1.5
 Material Multiplier: 1.25

Item	Quantity	Cost per unit	Total Material	Labor per unit	Total Labor	
Demolition Electrical Existing Wetwell	1	\$1,500.00	\$1,875.00	80	\$11,400.00	
2" Schedule 80 PVC	500	\$1.10	\$687.50	0.03	\$2,137.50	
No. 2/0 XHHW	1500	\$2.50	\$4,687.50	0.2	\$42,750.00	
No. 6 XHHW	500	\$0.60	\$375.00	0.2	\$14,250.00	
Building wiring	1	\$4,500.00	\$5,625.00	24	\$3,420.00	
Re work in Generator Building	1	\$4,500.00	\$5,625.00	124	\$17,670.00	
Relocate ATS	1	\$1,500.00	\$1,875.00	18	\$2,565.00	
PLC Panel	1	\$35,000.00	\$43,750.00	60	\$8,550.00	
TVSS	1	\$1,500.00	\$1,875.00	8	\$1,140.00	
Variable Frequency Drives	3	\$9,000.00	\$33,750.00	16	\$6,840.00	
Unit Heater	1	\$750.00	\$937.50	8	\$1,140.00	
Receptacles	4	\$70.00	\$350.00	2	\$1,140.00	
Electrical Shelter	1	\$35,000	\$43,750.00	48	\$6,840.00	
Shelter Foundation	1	\$7,000	\$8,750.00	24	\$3,420.00	
Wireway	1	\$1,000	\$1,250.00	4	\$570.00	
225A Automatic Transfer Switch, Type 1	1	\$5,000	\$6,250.00	24	\$3,420.00	
480V 3-PH Panelboard	1	\$3,000	\$3,750.00	16	\$2,280.00	
50/3 Feeder	3	\$700	\$2,625.00	2	\$855.00	
40/3 Feeder	1	\$700	\$875.00	2	\$285.00	
15kVA Transformer	1	\$2,500	\$3,125.00	16	\$2,280.00	
100A, 120/240V Load Center	1	\$600	\$750.00	12	\$1,710.00	
200A Manual Transfer Switch, Type 1	1	\$3,000	\$3,750.00	12	\$1,710.00	
200/3 MCCB w/ Type 1 enclosure	1	\$3,400	\$4,250.00	8	\$1,140.00	
Portable Generator Receptacle	1	\$2,000	\$2,500.00	2.5	\$356.25	\$320,906.25
Service Equip						
METER MAIN	1	\$12,000.00	\$15,000.00	24	\$3,420.00	
GROUNDING	1	\$400.00	\$500.00	16	\$2,280.00	\$21,200.00
Wetwell Electrical						
Stainless Steel Junction Boxes	3	\$3,500.00	\$13,125.00	8	\$3,420.00	
Wetwell Electrical Installation	1	\$1,500.00	\$1,875.00	18	\$2,565.00	
Sealoffs	8	\$250.00	\$2,500.00	3	\$3,420.00	
Wiring to J-boxes	1	\$1,500.00	\$1,875.00	8	\$1,140.00	
Pressure Transducer	1	\$1,500	\$1,875.00	6	\$855.00	
Float Switches	3	\$200	\$750.00	4	\$1,710.00	\$35,110.00
Lighting						
CONTACTOR-BUILDING LTG	1	\$751.22	\$939.03	16	\$2,280.00	
Indoor luminaires	4	\$175.00	\$875.00	3	\$1,710.00	
Exterior Luminaires	3	\$175.00	\$656.25	3	\$1,282.50	\$7,742.78
Radio Communications						
Radio Pair	1	\$5,000.00	\$6,250.00	16	\$2,280.00	
Radio Enclosure	1	\$5,000.00	\$6,250.00	6	\$855.00	
Fiber Cable	800	\$2.00	\$2,000.00	0.01	\$1,140.00	
Power Cable	800	\$1.50	\$1,500.00	0.03	\$3,420.00	
Trenching	700	\$5	\$4,375.00	0.12	\$11,970.00	

2"C	700	\$2	\$1,750.00	0.15	\$14,962.50	
Pull Box	2	\$800.00	\$2,000.00	12	\$3,420.00	
Wood Pole	2	\$4,000.00	\$10,000.00	30	\$8,550.00	
Riser on Pole with Weatherhead	2	\$1,000.00	\$2,500.00	16	\$4,560.00	\$87,782.50
Subtotals			\$259,632.78		\$213,108.75	\$472,741.53
Total Mat. & Labor			\$472,741.53			
Profit (10%)			\$47,274.15			

Grand Total Electrical	\$520,015.68
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Power and Telephone Service

PMPL Service	\$	3,500.00
Tele Service	\$	2,500.00
Conduit & Trenching	\$	1,500.00
New Electrical Utilty Services	\$	7,500.00



PO Box 210049, Auke Bay, AK 99821, 907-789-3350, 907-789-3360 (fax)
 email: mark@morrisingengineeringgroup.com

15-Feb-23

Cost Estimate

Project: Petersburg Pump Station 4 Renovation

Description: Electrical Option 3, Civil Alternative C
 Assumes demolition of the existing building, construction of a new generator building, procuring a new generator, and installation of all new electrical equipment. Demo of existing wet well Electrical.

Labor wage w/ Benefits: 95
 Labor Multiplier: 1.5
 Material Multiplier: 1.25

Item	Quantity	Cost per unit	Total Material	Labor per unit	Total Labor	
Demolition Electrical Existing Wetwell	1	\$1,500.00	\$1,875.00	80	\$11,400.00	
2" Schedule 80 PVC	500	\$1.10	\$687.50	0.03	\$2,137.50	
No. 2/0 XHHW	1500	\$2.50	\$4,687.50	0.2	\$42,750.00	
No. 6 XHHW	500	\$0.60	\$375.00	0.2	\$14,250.00	
Building wiring	1	\$4,500.00	\$5,625.00	24	\$3,420.00	
Relocate ATS	1	\$1,500.00	\$1,875.00	18	\$2,565.00	
PLC Panel	1	\$35,000.00	\$43,750.00	60	\$8,550.00	
TVSS	1	\$1,500.00	\$1,875.00	8	\$1,140.00	
Variable Frequency Drives	3	\$9,000.00	\$33,750.00	16	\$6,840.00	
Unit Heater	1	\$750.00	\$937.50	8	\$1,140.00	
Receptacles	4	\$70.00	\$350.00	2	\$1,140.00	
Existing Generator Relocation	1	\$1,500.00	\$1,875.00	120	\$17,100.00	
200A Manual Transfer Switch, Type 1	1	\$3,000	\$3,750.00	12	\$1,710.00	
200/3 MCCB w/ Type 1 enclosure	1	\$3,400	\$4,250.00	8	\$1,140.00	
Portable Generator Receptacle	1	\$2,000	\$2,500.00	2.5	\$356.25	
Cooling System	1	\$1,500	\$1,875.00	65	\$9,262.50	
Battery Charger	1	\$750	\$937.50	3	\$427.50	
Louvers	3	\$2,500	\$9,375.00	16	\$6,840.00	\$252,518.75
Service Equip						
METER MAIN	1	\$12,000.00	\$15,000.00	24	\$3,420.00	
PANEL MDP	1	\$25,000.00	\$31,250.00	20	\$2,850.00	
Building panel	1	\$3,500.00	\$4,375.00	8	\$1,140.00	
GROUNDING	1	\$400.00	\$500.00	16	\$2,280.00	
Transformer	1	\$1,500.00	\$1,875.00	16	\$2,280.00	
Panel G	1	\$4,500.00	\$5,625.00	24	\$3,420.00	\$74,015.00
Wetwell Electrical						
Stainless Steel Junction Boxes	3	\$3,500.00	\$13,125.00	8	\$3,420.00	
Wetwell Electrical Installation	1	\$1,500.00	\$1,875.00	18	\$2,565.00	
Sealoffs	8	\$250.00	\$2,500.00	3	\$3,420.00	
Wiring to J-boxes	1	\$1,500.00	\$1,875.00	8	\$1,140.00	
Pressure Transducer	1	\$1,500	\$1,875.00	6	\$855.00	
Float Switches	3	\$200	\$750.00	4	\$1,710.00	\$35,110.00
Lighting						
CONTACTOR-BUILDING LTG	1	\$751.22	\$939.03	16	\$2,280.00	
Indoor luminaires	4	\$175.00	\$875.00	3	\$1,710.00	
Exterior Luminaires	3	\$175.00	\$656.25	3	\$1,282.50	\$7,742.78
Radio Communications						
Radio Pair	1	\$5,000.00	\$6,250.00	16	\$2,280.00	
Radio Enclosure	1	\$5,000.00	\$6,250.00	6	\$855.00	
Fiber Cable	800	\$2.00	\$2,000.00	0.01	\$1,140.00	
Power Cable	800	\$1.50	\$1,500.00	0.03	\$3,420.00	
Trenching	700	\$5	\$4,375.00	0.12	\$11,970.00	
2"C	700	\$2	\$1,750.00	0.15	\$14,962.50	
Pull Box	2	\$800.00	\$2,000.00	12	\$3,420.00	

Wood Pole	2	\$4,000.00	\$10,000.00	30	\$8,550.00	
Riser on Pole with Weatherhead	2	\$1,000.00	\$2,500.00	16	\$4,560.00	\$87,782.50
Temp Bypass						
Control Panel Installation	2	\$2,500.00	\$6,250.00	16	\$4,560.00	
Floats	2	\$1,500.00	\$3,750.00	12	\$3,420.00	
Pumps	2	\$800.00	\$2,000.00	12	\$3,420.00	\$23,400.00
Subtotals			\$252,070.28		\$228,498.75	\$480,569.03
Total Mat. & Labor			\$480,569.03			
Profit (10%)			\$48,056.90			

Grand Total Electrical	\$528,625.93
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Power and Telephone Service

PMPL Service	\$	3,500.00
Tele Service	\$	2,500.00
Conduit & Trenching	\$	1,500.00
New Electrical Utility Services	\$	7,500.00