March 10, 2022

TO: HOLDERS LIST

SUBJECT: Terminal 3 & Terminal 4 Shore Power Project
CONTRACT NO. 071357

ADDENDUM NUMBER # 01

This addendum is issued to add, revise, and clarify the following:

SPECIFICATIONS

SECTION 00 01 10 – Table of Contents

- Add new Section 33 77 00.01 – Medium Voltage Shore Power Switches PLC-HMI.

SECTION 00 11 13 – Advertisement for Bids

- Revise section to reflect new bid date of April 5, 2022.

SECTION 00 73 46 – Washington State Prevailing Wage Rates

- Revise Article 1.01 to reflect new bid date of April 5, 2022.

SECTION 26 12 16 – Medium Voltage Power Substations

- Add new Article 2.10 that addresses neutral grounding resistor (NGR) specifications.

SECTION 33 77 00 – Medium Voltage Shore Power Switches in Walk-In Enclosures

- Revise Articles 1.02, 2.05, and 2.09 to clarify that arc-resistant rating requirement applies only to breakers, not to switches.

SECTION 33 77 00.01 – Medium Voltage Shore Power Switches PLC-HMI

- Add new section to address human machine interface (HMI), programmable logic controller (PLC), and battery specifications.

DRAWINGS

SHEET C4.2 – Pier 3 Enlarged Striping Plan

- Add Sheet C4.2 to high-resolution bid set. Sheet was omitted from original set due to scanning error.

END OF SECTION

TERMINAL 3 & TERMINAL 4 SHORE POWER PROJECT

PROJECT NO. 201100.01 | CONTRACT NO. 071357

Scope of Work: The Work required for this Project includes:
Installation of medium voltage (13.8kV to 6.6kV) electrical shore to ship power systems for the Terminal 3 and Terminal 4 vessel berths including substations and equipment such as transformers, switchgear assemblies, walk-in enclosures (including shore power switches, relays, controls, metering, status indications, and interlocks), power factor correction capacitors in enclosures, and 7.2kV shore power receptacles. Work includes installation of one new shore power vault on Pier 3 bullrail, wharf modification and trenching work, coordination with Tacoma Power for power switch and revenue metering installation, acceptance testing, and vessel commissioning.

The Port has been awarded Environmental Protection Agency (EPA), State of Washington Department of Ecology (Ecology), and TransAlta Grants for the work. Pursuant to 40 CFR, Section 33.301, the prime contractor shall make good faith efforts to award subcontracts to the fullest extent practicable to Disadvantaged Business Enterprises (DBEs). The winning contractor shall maintain all records documenting good faith efforts and provide to the Port when requested. See Section 00 72 00, Article 5.02 for additional detail.

Bid Estimate: Estimated cost range is $7,463,000 to $8,641,000, plus Washington State Sales Tax (WSST).

In accordance with RCW 39.04.320, fifteen (15) percent apprenticeship participation is required for certain projects estimated to cost one million ($1,000,000) dollars or more. Bidders may contact the Department of Labor and Industries, Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530, by phone (360) 902-5320, or e-mail at Apprentice@lni.wa.gov, to obtain information on available apprenticeship programs.

Sealed Bid Date/ Time/Location: Bids will be received at the Front Reception Desk, Port Administration Office, One Sitcum Plaza, Tacoma, Washington 98421 until **2:00 P.M. on** ~~**March 22, 2022**~~**April 5, 2022**, at which time they will be publicly opened and read aloud and the apparent low bid will be determined.

Pre-Bid Conference and Site Tour: A pre-Bid conference and site visit have been set for 3/02/2022 at 11:30am. The site visit will convene at the Port's Administrative building, located at One Sitcum Plaza, and will travel to the site after a brief meeting. The following Personal Protective Equipment

PART 1 - GENERAL

1.01 PREVAILING AND OTHER REQUIRED WAGES

A. The Contractor shall pay (and shall ensure that all Subcontractors of any tier pay) all prevailing wages and other wages (such as Davis-Bacon Act wages) applicable to the Project.

B. Pursuant to RCW 39.12, "Prevailing Wages on Public Works," no worker, laborer, or mechanic employed in the performance of any part of the Work shall be paid less than the "prevailing rate of wage" in effect as of the date that bids are due.

1. Based on the Bid Date, the applicable effective date for prevailing wages for this Project is ~~March 22, 2022~~April 5, 2022.

C. The State of Washington prevailing wage rates applicable for this public works Project, which is located in Pierce County, may be found at the following website address of the Department of Labor and Industries:

https://lni.wa.gov/prevailing-wage-policies

D. The schedule of the prevailing wage rates is made a part of the Contract Documents by reference as though fully set forth herein, and a printed copy of the applicable prevailing wage rates are also available for viewing at the Port Administration Building, located at 1 Sitcum Plaza, Tacoma, WA 98421 (253-383-5841). Upon request to the Procurement Department at procurement@portoftacoma.com, the Port will email or mail a hard copy of the applicable Journey Level prevailing wages for this Project.

E. Questions relating to prevailing wage data should be addressed to the Industrial Statistician.

Mailing Address: Washington State Department of Labor and Industries
Prevailing Wage Office
P.O. Box 44540
Olympia, WA 98504

Telephone: (360) 902-5335

Facsimile: (360) 902-5300

1. If there is any discrepancy between the provided schedule of prevailing wage rates and the published rates applicable under WAC 296-127-011, the applicable published rates shall apply with no increase in the Contract Sum. It is the Contractor's responsibility to ensure that the correct prevailing wage rates are paid.

F. Statement to Pay Prevailing Wages

1. Prior to any payment being made by the Port under this Contract, the Contractor, and each Subcontractor of any tier, shall file a Statement of Intent to Pay Prevailing Wages with the Department of Labor and Industries for approval.

2. The statement shall include the hourly wage rate to be paid to each classification of workers entitled to prevailing wages, which shall not be less than the prevailing rate of wage, and the estimated number of workers in each classification employed on the Project by the Contractor or a Subcontractor of any tier, as well as the Contractor's contractor registration number and other information required by the Department of Labor and Industries.

2.10 NEUTRAL GROUNDING RESISTOR (NGR)

A. This specification covers design, manufacture and testing of Neutral Grounding Resistors (NGR) for installation outdoors onto a concrete pad or power transformer.

B. Applicable Standards:

1. The NGR shall be designed, manufactured and tested as per the latest revisions of IEEE-32.

C. Manufacturer:

1. Resistor shall be as manufactured by Post Glover Resistors or Engineer Approved Equal.

2. The resistive elements shall be low temperature coefficient, resistor grade stainless steel or nickel chromium rigidly supported at each end to allow for expansion due to heating.

3. The resistor shall be mounted in corrosion resistant support frames, using stainless-steel hardware.

4. For all medium voltage applications, the entire resistor frame shall be mounted on insulators rated for the system voltage.

5. All resistor terminals and interconnections between units shall be stainless-steel, using stainless-steel hardware including lock washers. High current connections shall be spot or TIG welded as appropriate.

6. Connections between resistor and bushings or current transformers shall be solid copper or stainless-steel bus or copper cables.

D. Enclosure:

1. The frame of the enclosure shall be made from structural steel angles made from heavy gauge steel, welded together, or bolted together with stainless-steel hardware. The top of the enclosure shall be solid, slightly overhung and sloped. It shall be embossed with stiffening ribs. The enclosure shall have forged eyebolts in each corner for lifting purposes.

2. The bottom of the enclosure shall be screened with expanded or perforated metal with openings of 1/2" or less. This screening shall be welded or bolted in and is not removable. It shall be elevated 4 to 6 inches above the base of the unit.

3. Bolt-on side covers on all four sides shall be used. Screened covers may be furnished for certain applications. Stainless-steel hardware shall be used. Louvered or screened openings shall not exceed 1/2".

4. A durable nameplate, permanently attached to one side cover shall show the manufacturer and the complete rating.

5. Painted enclosures shall be suitably sanded, cleaned, primed and painted. Stainless-steel and aluminum enclosures (in particular) shall be protected from scratching during manufacture, assembly and shipment.

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. The provisions and intent of the Contract, the General Conditions and General Requirements, apply to this work as if specified in this section. Work related to this section is described in the following sections:

1. Section 26 01 26 – Acceptance Testing of Electrical Systems
2. Section 26 05 00 – Common Work Results for Electrical
3. Section 26 05 13 – Medium Voltage Cables and Accessories
4. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables
5. Section 26 05 33 – Raceways and Boxes for Electrical Systems
6. Section 26 05 53 – Identification for Electrical System
7. Section 26 05 73 – Overcurrent Protective Device Coordination Study
8. Section 26 12 16 - Medium Voltage Power Substations
9. Section 26 24 16 – Panelboards
10. Section 26 28 00 – MV Automatic Power Factor Correction Capacitors
11. Section 26 90 11 - High Voltage Shore Power Receptacles
12. Section 33 71 19 – Electrical Underground Ducts and Manholes
13. Section 33 79 00 – Site Grounding
14. Section 03 33 00 – Cast-In-Place Concrete

1.02 WORK INCLUDED:

A. Provide 15KV switchgear line up, rated 13.8kV (6.6kVSystem), 1,200 Amps, complete with accessories and ratings as indicated on the drawings and as specified herein.

B. Switchgear line-up shall be NEMA 12 type, inside a walk-in enclosure, with following characteristics:

1. Arc-Resistant per ANSI/IEEE C37.20.7, except the three medium voltage switches.
2. 1,200 Amp metal-clad enclosed vacuum circuit breaker units in separate compartments, (secondary main breaker and capacitor bank breaker).
3. Copper bus throughout the switchgear line-up.
4. Shore power disconnects.
    a. Switches
    b. Grounding provisions
    c. Kirk-key interlocks
    d. Batteries

blasting. Should rust form on the surface prior to coating, the entire surface shall be re-blasted.

2. Coating Application: The steel surfaces shall be completely prime coated from top to bottom with nominal thickness of 1.5 mils of a rust inhibiting PPG red oxide alkyd primer. The steel surfaces shall be prime coated with an electrostatically applied wet coat of a one component, moisture cure, zinc rich, polyurethane coating in a single coat application with a normal thickness of 3 mils dry finish thickness (DFT). The steel surfaces shall be finish painted with an electrostatically applied wet coat of 2.5 mils of a standard gray similar to the switchgear line-up.

3. The paint finish shall exceed a minimum of 5000 hours salt spray testing and have a 5-year warranty from date of substantial completion.

2.05 15KV SWITCHGEAR LINE-UP DETAILS:

A. Switchgear line-up shall consist of these assemblies, and as indicated on the drawings:

1. Source 15KV Switchgear line-up, arc-resistant per ANSI/IEEE C37.20.7, with 1,200A Buss.

2. One 1,200 Amp frame, 15KV metal/clad, vacuum main circuit breaker with potential transformers (PT's) and current transformers (CT's) ratings as indicated on the drawings.

3. One 1,200 Amp frame, 15KV metal/clad, vacuum circuit breaker with potential transformers (PT's) and current transformers (CT's) for the automatic power factor correction capacitors, ratings as indicated on the drawings.

4. Three (3) 1,200 Amp frame, 15KV metal/clad, shore power switches. Arc resistant rating is not required for switches.

5. Power transformer (PT) to power the circuit breaker operators, heaters, and three (3) metering PTs to serve power monitors and trip relays.

6. Circuit breaker control relays, types as indicated on the drawings.

Provide raceway in switchgear line-ups for data wiring to metering cabinet located remote (within 100') from switchgear. Provide metering cabinet, equipment, metering software, and touch screen HMI.

2.06 15KV SWITCHGEAR RATINGS:

A. The complete switchgear line-up shall comply with these electrical ratings:

1.	Circuit Breaker Interrupting	500MVA
2.	Design Voltage	15KV
3.	System Voltage	6.6KV
4.	BIL	95KV
5.	Momentary Rating	25kA RMS SYM. (40kA ASYM)
6.	Main Bus Rating	1200A, 15KV

All hardware used on conductors shall have high tensile strength and anti-corrosive plating.

C. A code size ground bus shall run continuously through each line-up and be securely connected to the steel frame of each bay. Provide lug provisions for code size ground conductor connections. Provide ground studs in all compartments.

D. Provisions shall allow convenient extension of both the main bus and the ground bus to future adjacent bays.

2.09 METAL ENCLOSED SHORE POWER LOAD BREAK SWITCHES

A. Switches shall be mounted in a self-standing steel structure and 1200 Amp copper bus for connection to outgoing medium voltage cables to shore power receptacles.

B. Operation shall be by a permanently installed long operating handle, up for closed and down for open and grounded on the front of the switch. Handle shall operate a quick-make, quick-break over-toggle operating mechanism linked to operate all three phases simultaneously.

C. The contact closing arc shall occur at the ends of the switch blades, not on the main contact area. Closing force shall securely close the switch even into short circuit forces.

D. Attached spring operated arcing blades shall direct the opening current arc through arc chutes. Arcing surfaces shall be tungsten.

E. Each cubicle shall have IR windows installed, to enable use of infrared cameras without opening the switch cubicle.

F. Ratings:

1.	Medium Voltage	15.0kV (6.6kV System).
2.	Impulse Withstand	95kV.
3.	60 Cycle Withstand	36kV.
4.	Continuous Current	1,200 Amps.
5.	1,200 Amp Switching	10 Operations.
6.	Momentary Amps	61,000 ASYM.
7.	2 Second Amps	38,000 ASYM.
8.	Fault Closing Amps	61,000 ASYM.
9.	S.C. Rating	500 MVA.
10.	Mechanical Endurance	100,000 Operations.

11. Arc resistant rating is not required for switches.

G. Acceptable Manufacturers:

1. Eaton
2. Schneider Electric (Square D)

PART 1 GENERAL

1.01 SUMMARY OF WORK

A. This section includes requirements for design, fabrication, installation and delivery of PLC and HMI hardware and software to be installed in the walk-in medium-voltage enclosures and associated auxiliary equipment, as shown on the drawings and as specified herein.

1.02 GOVERNING CODES, STANDARDS AND REFERENCES

A. ANSI C12.1 - Code for Electricity Metering

B. ANSI C39.1 - Requirements for Electrical Analog Indicating Instruments

C. ANSI/IEEE C2 National Electric Safety Code.

D. ANSI/IEEE C37.90 - Relays and Relay Systems Associated with Electric Power Apparatus.

E. ANSI Z55.1 – Gray Finishes for Industrial Apparatus and Equipment.

F. NETA ATS (International Electrical Testing Association) – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

G. NFPA 70 – National Electric Code

H. NEMA Standards

1.03 ADMINISTRATIVE

REQUIREMENTS NOT

USED

1.04 SUBMITTALS

A. Preconstruction Submittals

B. Construction Submittals

1. Submit materials data in accordance with of Section 01 33 00 - Submittals. Furnish manufacturers' technical literature, standard details, product specifications, and installation instructions for all products.

2. Submittals shall include the following:

a. Product Data: Provide dimensions; mounting arrangements; location for cable entries; shipping and operating weights; and manufacturer's technical data on features, performance, electrical ratings, characteristics, and finishes. Include the following:

(1) Features, characteristics, and ratings of individual equipment.

(2) Statement of compliance with seismic rating.

b. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. Include the following:

(1) Tabulation of installed devices with features and ratings.

(2) Outline and general arrangement drawing showing dimensions, and weights of each equipment.

(3) Drawing of cable termination compartments showing preferred locations for conduits and indicating space available for cable terminations.

(4) Master drawing index.

(5) Front view elevation.

(6) Nameplate Schedule.

(7) Nameplate diagram per ANSI requirements.

(8) Single-Line Drawings.

(9) Three-Line Wiring Diagrams: Detail wiring for signal, and control systems and differentiate between manufacturer-installed and field-installed wiring.

(10) Conduit entry/exit locations.

(11) Cable terminal sizes.

c. Wiring Diagrams: Provide single-line diagram and three-line diagram and schematics showing instrumentation and control connections and connection diagrams for field wiring requirements for each individual section.

d. Test Reports: Provide certified results of factory tests and field acceptance tests.

e. Manufacturer Seismic Qualification Certification: Submit certification that all components will withstand seismic forces defined in Section 26 05 48 - Seismic Controls for Electrical and Communication Work. Include the following:

(1) Basis of Certification: Verify that withstand certification is based on actual test of assembled components.

(a) The term “withstand” means that all components will remain in place without

separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event.

(2) Dimensioned Outline Drawings of Equipment Units: Identify center of gravity and locate and describe mounting and anchorage provisions.

(3) Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

(4) The components' manufacturer shall furnish comprehensive instruction manual covering the installation and operation of its various components.

(5) Equipment submittal shall be received by the Engineer maximum twelve calendar weeks after "Notice to Proceed". If required, an additional two weeks will be granted starting at Contractor's receipt of submittal review comments to reconcile comments and issues. The Engineer shall receive revised submittal within this two-week period.

(6) Welding: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months and reports for required testing and inspection.

C. Closeout Submittals

1. Final record drawings.

2. Operation and maintenance manuals.

3. Original certified test reports.

1.05 QUALITY ASSURANCE

A. UL Listed Equipment: Provide UL listed equipment where it is available in the specified ratings.

B. Manufacturer Qualifications: Engage a firm experienced in manufacturing equipment similar to those indicated for this Project and with a greater than 10- year record of successful in-service performance.

C. Testing Agency Qualifications: Testing agency meeting OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907 or a member company of the InterNational Electrical Testing Association and that is acceptable to Authority Having Jurisdiction.

1. Testing Agency's Field Supervisor: Person currently

certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Section 26 01 26 - Acceptance Testing of Electrical Systems.

D. Comply with NFPA 70, as adopted and administered by the Authority Having Jurisdiction.

E. Comply with ANSI/IEEE C37.90 - “Relays and Relay Systems Associated with Electric Power Apparatus.”

F. Comply with ANSI/IEEE C2 - National Electrical Safety Code.

G. Comply with NEMA standards.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect equipment from exposure to dirt, fumes, water, corrosive substances, and physical damage.

B. Store so condensation will not form on or in equipment.

C. Apply temporary heat where required to obtain suitable service conditions.

D. Handle equipment per factory installation instructions.

1.07 WARRANTY

A. Manufacturer shall warrant equipment to be free from defects in materials and workmanship for no less than 2 years from date of acceptance test.

B. All materials and workmanship shall be warranted by manufacturer (parts and labor) for a period of 24 months following project completion and acceptance.

C. Warranty for coating adhesion and integrity per ASTM Standards under normal operating conditions for a period of 20 years.

1.08 EXTRA MATERIALS

A. Spare and extra parts shall be identified for all products, but not provided. Include spare parts information in Operation and Maintenance Manuals.

B. Maintenance Tools: Furnish tools and miscellaneous items required for testing, inspection, maintenance, and operation. Include the following:

PART 2 PRODUCTS -

2.01 MANUFACTURERS

A. CONTROL BATTERY SYSTEM

1. System Requirements: Battery shall have number of cells and ampere-hour capacity rating as required for design. Cycle battery before shipment to guarantee rated capacity on installation. Arrange battery to operate ungrounded.

a. One DC circuit breaker shall supply power to no

more than one switchgear section.

b. Typically maintain float voltage of 2.25V per cell and equalize voltage of 2.38V per cell.

2. Battery: Gel lead-calcium type in sealed, clear plastic or glass containers, complete with electrolyte, fully charged and arranged for shipment with electrolyte in cells. Limit weight of each container to not more than 90 lb. and cells per container to not more than 3. System batteries shall be suitable for service at an ambient temperature ranging from 0°F to 90°F. Limit variation of current output to 0.8 percent for each degree below 77°F down to 0°F.

3. Rack: Two-step, non-conductive, acid-resistant rack sized to fit the available space with electrical connections between battery cells and between rows of cells; include two flexible connectors with bolted-type terminals for output leads. Rate battery rack, cell supports, and anchorage for seismic requirements.

4. Accessories:

a. Thermometers with specific-gravity correction scales.

b. Hydrometer syringes.

c. Set of socket wrenches and other tools required for battery maintenance.

d. Wall-mounting, nonmetallic storage rack fitted to store above items.

e. Set of cell numerals.

5. Charger: Static-type silicon rectifier equipped with automatic regulation and provision for manual and automatic adjustment of charging rate. Unit shall automatically maintain output voltage within 0.5 percent from no load to rated charger output current, with ac input-voltage variation of plus or minus 10 percent and input-frequency variation of plus or minus 3 Hz. Charger shall include the following features:

a. DC ammeter.

b. DC Voltmeter: Maximum error of 5 percent at full-charge voltage; operates with toggle switch to select between battery and charger voltages.

c. Ground Indication: Two appropriately labeled lights to indicate circuit ground, connected in series between negative and positive terminals, with midpoint junction connected to ground by normally open push-button contact.

d. Capacity: Sufficient to supply steady load, float-charge battery between 2.20 and 2.25 V per cell and equalizing charge at 2.33 V per cell and a maximum

of 2.4Vpc.

e. Charging-Rate Switch: Manually operated switch provides for transferring to higher charging rate. Charger operates automatically after switch operation until manually reset.

f. Source AC power supply requirements are: 120 V, 60 Hz, subject to plus or minus 10 percent variation in voltage and plus or minus 3- Hz variation in frequency. After loss of ac power supply for any interval, charger automatically resumes charging battery. Charger regulates rate of charge to prevent damage due to overload and to prevent fuses or circuit breakers from opening.

g. Protective Feature: Current-limiting device or circuit, which limits output current to rating of charger but does not disconnect charger from either battery or ac supply; to protect charger from damage due to overload, including short circuit on output terminals.

h. Electrical Filtering: Reduces charger's audible noise to less than 26 dB.

6. Fiber optic Ethernet network communication cables to all necessary devices.

B. Programmable Logic Controller (PLC)

1. The PLC shall be utility grade, with EMI immunity and must comply to IEC 61000-4.4 Electrical Fast Transient Standard.

2. The PLC shall be microprocessor based, with input and outputs required to meet all switchgear control and HMI functions. The PLC shall be mounted inside the switchgear HMI section and provide interlocking logic and control of circuit breaker permissives, circuit breaker closures, lockouts, indicating lights, alarms, space heater operation and other operations. A 48Vdc distribution panel shall power the PLC.

3. The PLC shall indicate all equipment status and perform all automation functions. All programmable logic and data shall remain in the memory upon loss of dc power supply. Upon power up, the PLC shall determine the status of the system and ensure an orderly and safe return to operations.

4. Upon loss of power or other PLC malfunction, the PLC shall fail in a safe manner, including but not limited to tripping the main 6.6 kV circuit breaker and locking it out.

5. The PLC logic shall ensure that more than one SPO circuit cannot be energized at the same time, by tripping the main circuit breaker when any attempt is made to close more than one SPO Power Switch. PLC sequence of operation interlock is only to complement the mechanical interlocks. The

mechanical interlock shall be the primary means of operation control.

6. Acceptable manufacturers include:

   a. Allen Bradley

   b. Schneider Electric

   c. Or Approved Equal

C. Ethernet switches must have IEC 61850-3 EMI immunity, -40 to 85 operating range, Layer 3 routing and redundant features for substation conditions, ruggedized, modular and rack mount design with maximum flexibility with high fiber optic and Gigabit port density. It shall meet IEEE 1613 industry standard for error- free device operation for substation environments.

D. Human Machine Interface (HMI)

1. The HMI shall be microprocessor based ruggedized touch screen with rack mounted sliding backup keyboard with built-in track ball located on the front panel of the switchgear HMI section. Hardware performance shall include -

   a. Time Sync via GPS synchronization clock signal (for all events and alarms)

   b. Data logging with backup and uploading capabilities

   c. Fault record with waveform captures capabilities

   d. Run Protection Relay Parameters Setting Programs

   e. Provision for future SCADA connectivity

2. HMI screen views shall be as follows:

   a. HMI navigation shall be browser-based interface with home button, backward arrow button, forward arrow button, refresh button, list history of screens visited and etc. for screen navigation

   b. Status of all breakers and disconnect switches shall be displayed along with voltage, current and power values for the transformer and shore power receptacle circuits.

   c. The HMI status screen shall graphically show the 13.8 kV and 6.6 kV shore power system, Single-line with real time graphical status (color changes according to energized equipment busbars, transformer, breakers, and load interrupter switches) with the following:

      (1) Transformer status from transformer monitoring system: coil temperatures

      (2) NGR current

      (3) Breaker status, position (draw out/rack in),

status (charged, opened, closed tripped) voltage, current and all the data from meter

(4) Medium voltage load interrupter switch status, current on each cable from protection relay

(5) Shore power outlet status, interlock key status

(6) 86 lockout reset help screen to instruct operator the reset process

(7) Ethernet communication status screens

(8) Map view locations of SPO Vaults and Shore Power Substation and its respective upstream Substation

(9) Power management (tabulated format real time data KW, KVAR, KVA, pf, KWH, KVARH, KVA demand and etc.)

(10) Alarm on primary blown fuse protections and instruction to de-energized upstream equipment,

(11) HMI Alarm Screens which activate the switchgear exterior alarms and horns

(12) Alarms that are annunciated on the screen adjacent to the corresponding single line graphic symbol. Alarm conditions shall flash until reset by touch screen, and reset to normal when the condition has been corrected.

3. HMI Control Screens:

a. Breaker Closing and Opening control

b. Sequence of Operation screens with real time data: Step by Step operation instruction for connecting Shore Power to the Ship as well as disconnecting Shore Power from the ship which is animated along with single line diagram and instructions, as shown on the drawings.

4. HMI Substation Maintenance Screens

a. Space heater monitoring

b. Substation Control Power Battery monitoring

c. Load Interrupter Switch maintenance reminder alert from HMI triggered by Load Interrupter switch number of counter operation (a memory bit that is being incremented by Load Interrupter position I/O into the PLC)

5. HMI System Diagnostic Screens

a. Multitask to program parameters settings on all protection relays, PLC, HMI, Power Monitor Ethernet Switch/Network Controller, GPS time Sync Receiver and etc.

b. Submit screen graphics and sequence of operation to the Engineer for approval.

c. Power system restoration instructional screens, including Step by Step instructions to put system back to normal operation status from a power outage situation.

E. Acceptable manufacturers include:

1. Wonderware
2. GE
3. Siemens
4. Rockwell
5. Engineer Approved Equal

F. GPS Clock: Walk-in switchgear shall include GPS unit which provides date and time information to all data-logging and time stamped devices.

PART 3 EXECUTION –

3.01 INSTALLATION

A. Locations and Layout: Exact locations and physical layout of equipment and components may be varied as required to suit manufacturer's design and as approved, provided the required functions and operations are accomplished.

3.02 IDENTIFICATION

A. Identify field-installed wiring and components and provide warning signs as specified in Section 26 05 53 – Identification for Electrical Systems.

B. Identify equipment name, designation, power source, source location and voltage rating.

C. Identify all devices, controls, and wiring.

D. Provide warning and caution signs, where indicated or required by the Authority Having Jurisdiction.

3.03 Testing Agency:

A. Engage a qualified independent testing firm to perform field quality-control testing as specified in Section 26 01 26 - Acceptance Testing of Electrical Systems.

B. Electrical Contractor shall accompany the independent testing firm field service technician and assist as required during field tests.

3.04 START-UP-SERVICES

A. Equipment start-up services shall be provided by the manufacturer under the direction of the Contractor after equipment is installed and. Provide the services of a qualified factory-trained engineer. The factory-trained engineer shall certify that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations

3.05 DEMONSTRATION AND TRAINING

A. Engage a factory-authorized service representative to train Port's maintenance personnel in the following:

1. Train Port's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance for two normal workdays at the jobsite.

2. Review data in the maintenance manuals. Refer to Section 01 78 23.13 - Operations and Maintenance Data.

3. Schedule training with Port with at least seven days' advance notice.

3.06 OPERATION AND MAINTENANCE MANUALS

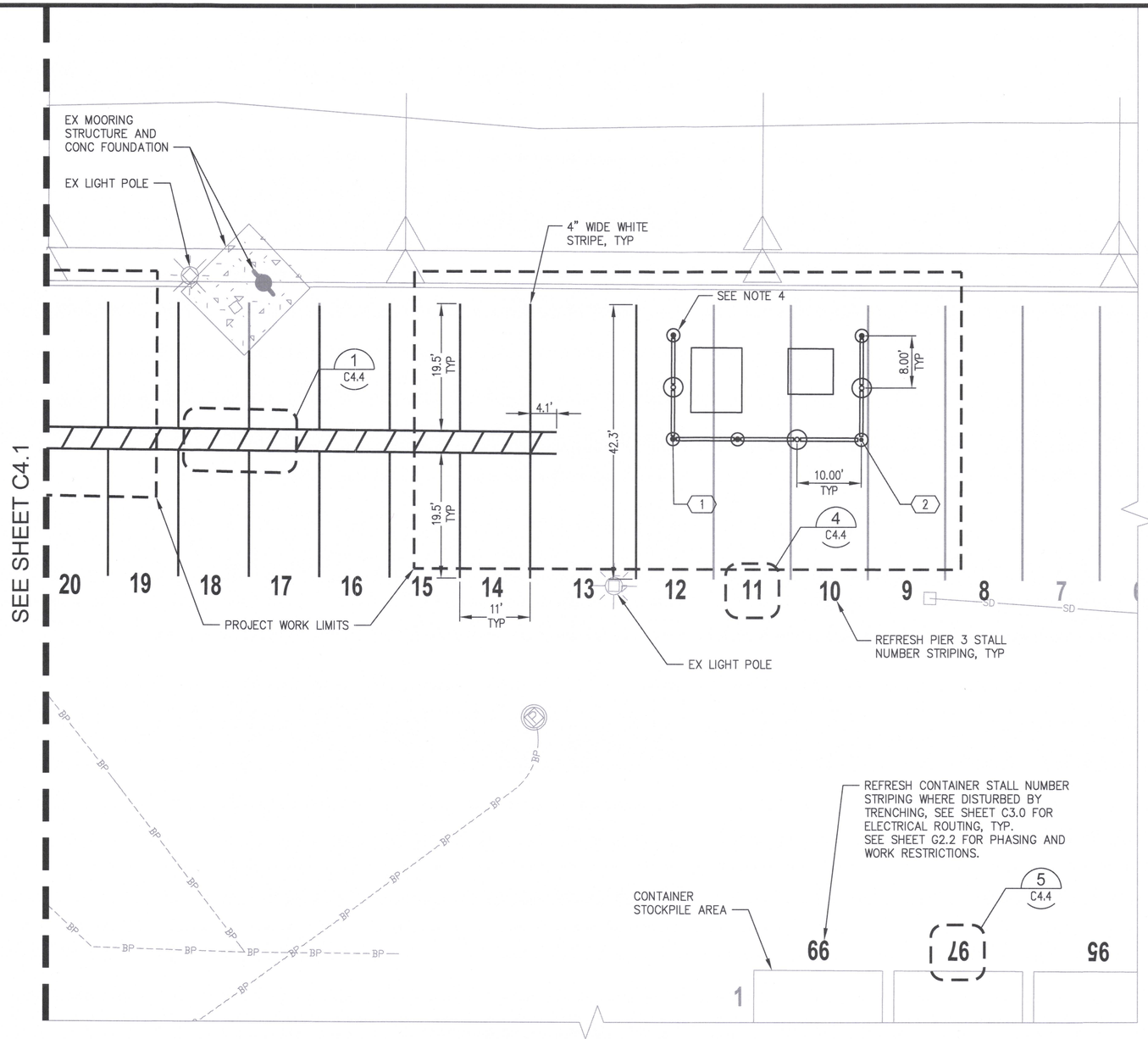
A. Comply with Operations and Maintenance Section.

B. Gather record drawings and as-furnished information for all components (including appurtenances, PTs, relays, etc.) and generate an "integrated, unit specific, operation and maintenance manual", complete with schematic diagrams of upstream and downstream systems feeding and being fed by "this" system.

1. Location of devices, PTs, CTs, relays, metering, etc. shall be clearly identified and the function of each unit in the overall scheme of things explained.

2. A binder containing a collection of generic devices cut sheets and disjointed O&M guidelines for generic equipment does not meet this requirement.

END OF SECTION



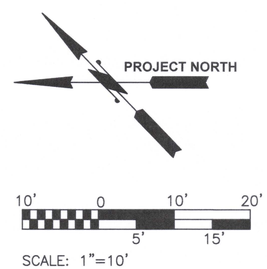
2 ENLARGED STRIPING PLAN - PIER 3
C1.1, C3.2 — NTS

NOTES

1. CONTRACTOR SHALL COORDINATE WORK WITH PORT FOR ANY STRIPING OUTSIDE OF WORK LIMITS.
2. WHERE TRENCHING OR OTHER DEMOLITION ACTIVITIES IMPACT EXISTING STRIPING, THE ENTIRE STRIPE SHALL BE "REFRESHED".
3. ADDITIONAL STRIPING LOCATION ON PIERS NOT SHOWN. SEE STRUCTURAL DRAWINGS AND DETAIL 2 ON C4.4 FOR STRIPING ON PIER.
4. BOLLARD LAYOUT BASED ON ASSUMED EQUIPMENT SIZING. CONTRACTOR SHALL COORDINATE BOLLARD LAYOUT WITH ACTUAL EQUIPMENT SHOP DRAWINGS AND PROVIDE TO ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

BOLLARD HORIZONTAL CONTROL POINTS

POINT ID	NORTHING	EASTING
1	714585.02	1165177.17
2	714564.69	1165198.21



SCALE: 1"=10'

Port of Tacoma
P.O. BOX 1837 TACOMA, WA 98401 (253)383-5841
kpff
2407 North 31st Street, Suite 100 Tacoma, Washington 98407 (253) 396-01501 Fax (253) 396-01612

MARK:	REVISION:	BY:	APPR:	DATE:

	CHECKED BY	DATE
DESIGNED	SJS	02/02/2022
DRAWN	RAD	02/02/2022
QA/QC	PROJ. ENGR	DATE

APPROVED: DIRECTOR ENG. DATE

PRINTED BY: dyu Feb 02, 2022
PORT ADDRESS: ONE SITCUM PLAZA TACOMA, WA 98421
DRAWING SCALE: AS NOTED

TERMINAL 3 / TERMINAL 4
SHORE POWER
PIER 3 ENLARGED STRIPING PLAN

TOWNSHIP:	SECTION:
RANGE:	
DAT–HRZ:	VERT:
PARCEL:	
CONT/CONS: 071357	
M. ID: 201100.01	
PHASE: BID SET	

6658
C4.2
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