

**Maine Maritime Academy  
Castine, Maine**

**Pier Upgrades and Waterfront Improvements Project  
March 1, 2024  
ADDENDUM NO. 3**

Prospective bidders and all concerned are hereby advised of the following changes/modifications in the Maine Maritime Academy Waterfront Campus Pier Upgrades and Waterfront Improvements Issued-for-Bidding Drawings and Project Manual dated January 26, 2024 and are hereby requested to change their copies accordingly.

Addendum No. 3 consists of 4 pages of Response to Questions and Other Revisions, 31 re-issued IFB Drawing Sheets, and 3 re-issued Specifications Sections for a total of 56 pages. Addendum No 3 addresses some of the bidder questions received. Subsequent addendum will address the outstanding bidder questions and additional revisions to the IFB Drawing Set and the IFB Project Manual.

Submit written questions during the bid phase via email to Jake Jacobs with cc to Cheryl Coviello.

[Jake.Jacobs@collierseng.com](mailto:Jake.Jacobs@collierseng.com)

[Cheryl.Coviello@gza.com](mailto:Cheryl.Coviello@gza.com)

Make the following changes to the Bidding Documents, Project Manual and Specifications:

**RESPONSE TO GENERAL QUESTIONS**

1. Is there a deadline for bid questions?

Response 1: Yes. See Addendum No. 2.

2. Please provide MMA security Pass instructions/requirements.

Response 2: **REPLACE** IFB Specification Section 01 05 00 Supplemental Conditions Part 1.2 as follows:

“All Contractor and Subcontractor employees shall have on their person a valid Transportation Worker Identification Credential (TWIC) or other government issued identification with their legal name and photograph. The TWIC or other government issued identification shall be kept on-person and visible when on MMA property. It may be kept on-person and not visible when it would present a safety concern during certain construction activities. During such construction activities, the TWIC or other government issued identification shall be made visible upon request. (Escort is not required of individuals without a TWIC.) Contractor shall submit a list of all employees and subcontractor’s employees working on site. Contractor shall submit updates when changes occur to maintain a current and accurate list.”

3. Is compensatory mitigation fee of \$22,710.72 on page 101 of 760 by others?

Response 3: The Contractor is not responsible for the compensatory mitigation fee.

### **OTHER REVISIONS TO IFB PROJECT MANUAL**

#### **IFB Specification Section 01 05 00 Supplemental Conditions**

1. Below Part 6.2: **ADD** Part 6.3 as follows:

6.3 The Contractor shall coordinate any interruptions and temporary disconnect of MMA's seawater intake system that runs between Andrews Hall and the existing pier with the Owner's Representative a minimum of two weeks in advance for review, approval and scheduling with Maritime Academy.

#### **IFB Specification Section 23 05 33 Heat Trace**

1. See the attached revised specification section for revision to the highlighted content regarding the redundant heat trace.  
Paragraph 2.2.B  
P Paragraphs 2.9.D.1 and 2.9.D.2  
Paragraphs 2.9.E.1 and 2.9.E.2

#### **IFB Specification Section 23 14 29 Sump Pumps**

1. ADD the attached specification section.

#### **IFB Specification Section 23 21 16 Piping Specialties**

1. See the attached revised specification section for revision to the highlighted content.  
Paragraph 2.10.A  
Paragraph 2.10.C

### **OTHER REVISIONS TO IFB DRAWINGS**

**REPLACE** the following IFB Drawing Sheets with the attached. A general description is provided for MEP revisions. See each re-issued drawing sheet for revisions.

1. G-002 Drawing Index Sheet
2. C-202 Grading & Utility Plan B
3. C-702 Site Construction Details
4. S-102 Waterfront Structures Demolition and Removal Plan
5. S-104 Waterfront Structures Layout Plan
6. S-105 West Bulkhead and Retaining Wall Plan – 1
7. S-106 West Bulkhead and Retaining Wall Plan – 2
8. S-107 West Bulkhead and Retaining Wall Sections – 1
9. S-108 West Bulkhead and Retaining Wall Sections – 2
10. S-109 West Bulkhead and Retaining Wall Details – 1

11. S-113 Pier Layout Plan
12. S-114 Pier Pile Plan
13. S-115 Pier Framing Plan
14. S-117 Pier Deck Grading Plan
15. M-200 Mechanical Site Plan – New Work
  - a. Removed ~100 ft of DCW pipe and adjusted the termination location for the ship’s DCW connections.
  - b. Identified access hatch locations for pier utility trench
16. M-202 Steam Vault – New Work
  - a. Changed the sump pump in vault STMH-1 to an electric type, and made the sump pit more shallow.
17. M-203 Steam Vault – New Work – Structural
  - a. Changed the sump pump in vault STMH-1 to an electric type, and made the sump pit more shallow.
18. M-204 mechanical Trench Plan – New Work
  - a. Added (2) 3” ball valve, and (2) 1” blowdown/drain valves to the DCW line in the utility trench.
  - b. Showed the new location for the DCW pipe termination for the ship’s connections.
19. M-205 Mechanical Pier Part Plan – New Work
  - a. Removed a plan view showing the DCW route that no longer exists.
20. M-301 Mechanical Trench Profiles – New Work
  - a. Added (2) 3” ball valve, and (2) 1” blowdown/drain valves to the DCW line in the utility trench.
  - b. Showed the new location for the DCW pipe termination for the ship’s connections.
  - c. Updated the note for the steam/condensate hose requirements.
21. M-302 Mechanical Sections – New Work
  - a. Changed the sump pump in vault STMH-1 to an electric type.
  - b. Made the sump pit more shallow.
22. M-501 Steam P&ID – New Work
  - a. Removed the steam line to the sump pump, now that it’s electric powered.
  - b. Updated the note for the steam/condensate hose requirements.
23. M-704 Mechanical Details
  - a. Updated the sump pump/pit detail to reflect the new electric powered pump selection.
  - b. Updated the sanitary ship connection detail.
  - c. Updated the DCW ship connection detail.
24. M-801 Mechanical Schedules
  - a. Updated the sump pump schedule to reflect the new electric powered pump selection.
  - b. Updated the heat trace schedule. Redundant heat trace on all lines except for the sump pump/piping is now in the base bid. Previously, this was listed as a bid alternate.
25. E-201 Electrical Site Part Plan A
  - a. Updated layout of the exterior electrical equipment.
  - b. Added medium voltage pad mounted switch adjacent to UT-2 for the 6.6kV ship feed.
26. E-202 Electrical Site Part Plan B
  - a. Added sump pump connection. Sump pump located in steam manhole STMH-01.
  - b. Added approximate location of Power Panels P1 and P2 within Andrews Hall.

- c. Removed plan note symbol "1".
- 27. E-203 Electrical Pier Part Plan A
  - a. Revised description of NSMV 480V and 6.6kV SPO connection gear on pier.
- 28. E-301 Electrical Butterfly Diagrams
  - a. Updated the medium voltage manhole work.
  - b. Bifurcate the 6.6kV ship feeder to energize both shore power receptacles.
- 29. E-501 Electrical One-Line Diagrams
  - a. Updated single line to address shore power outlet safeties and overcurrent protection.
  - b. Remove 1200A breaker adjacent the 1500kVA transformer and associated relaying for the 450V SPO.
    - i. Updated to (3) 400A breakers, each individually feeding the 450V receptacles. Shunt tripping for each receptacle and associated breaker.
  - c. Remove 1200A and kirk-key system from the 450V shore power outlet.
  - d. Remove 700A medium voltage breaker from the 6.6kV shore power outlet.
    - i. Updated to (1) medium voltage padmount switch adjacent the 3500kVA transformer.
  - e. Show the manhole and bifurcation of the 6.6kV ship feeder to energize both shore power receptacles.
  - f. Updated kirk-key system for the 6.6kV shore power outlet.
  - g. Updated drawing notes to add clarity to the shore power outlet changes.
- 30. E-702 Electrical Details
  - a. Added STMH-01 sump pump detail.
- 31. E-801 Electrical Schedules
  - a. Modified description within existing Power Panel P1 schedule.



SECTION 23 05 33

HEAT TRACE

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Provide a complete pipeline heat tracing system as shown on the Drawings and in conformance with the requirements in this Section and Section 230500 "Mechanical General Provisions".

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

A. This Section describes requirements for a complete electrical heat tracing system including heat tracing panelboard, temperature self-regulating polymer heat trace cables for insulated pipeline applications, line voltage thermostat controls, cold junction boxes, cable splices, end-of-line indicator lights, and related accessories.

1.4 DEFINITIONS

A. Refer to the definitions in Division 26 Section "Electrical General Provisions".

1.5 QUALIFICATIONS

A. Manufacturer's Factory Qualifications: Manufacturing facilities shall have accreditation to ISO 9000:2000 or an equivalent quality management system acceptable to the Engineer. The manufacturing company shall be listed in a published NRTL directory of companies offering NRTL-listed and labeled products. All components of the heat tracing system shall be manufactured by one company.

B. Testing Firm Qualifications: An independent firm, with experience and capability to conduct specified tests, and is a member company of NETA or is an NRTL as defined by OSHA in 19 CFR 1910.7, acceptable to the AHJ.

C. Testing Firm's Field Supervisor Qualifications: person currently certified by NETA or NICET to supervise on-site testing specified in Part 3.

1.6 REFERENCE STANDARDS

A. Factory Mutual Research Corporation

B. IEEE 515-1997 IEEE Standard for the Testing, Design, Installation and Maintenance of Electrical Resistance Heat Tracing for Industrial Applications 1997

C. UL 746B Standard for Polymeric Materials; Long Term Property Evaluations

1.7 SUBMITTALS

A. Shop Drawings: Include the following:

1. Compliance Statement: as described in Division 26 Section "Electrical General Provisions".
2. Product Data: Manufacturer's technical data sheets for each heat trace component proposed to be installed for this Project.

3. Shop Drawings: Specially prepared power and control wiring diagrams showing factory and field wiring, and details for attaching heat tracing components to mechanical piping.
- B. Coordination Drawings: Submit scaled plans, sections, elevations, details, and schedules showing heating cable layout with heat trace panelboard(s), thermostats, cold junction boxes, splices, taps, and panelboard schedules.
- C. Field Test Reports: Record and interpret test results for compliance with specified performance requirements.
- D. Qualification Data: For testing firm and testing firm's field supervisor.
- E. Installation Instructions: As published by manufacturer.
- F. Operation and Maintenance Manual: For electric heat tracing components, to include in Operation and Maintenance Manuals specified in Special Conditions and in Division 26 Section "Electrical General Provisions".
- G. Warranties: Special warranties specified in this Section.

## 1.8 QUALITY ASSURANCE

- A. Compliance Statement: Review Specifications and submit a Compliance Statement as described in Division 26 Section "Electrical General Provisions".
- B. Source Limitations: Obtain heat tracing cables and accessories from a single qualified manufacturer.
- C. Unit Responsibility: The heat tracing system manufacturer shall be responsible for the design of the entire heat tracing system described in this Section.
- D. Comply with NEC requirements.

## 1.9 COORDINATION

- A. Coordinate layout and installation of electric heating cables and system components with mechanical piping construction specified in Division 23.

## PART 2 - PRODUCTS

### 2.1 BASIS OF DESIGN

- A. The heat tracing design shown on the Drawings is based on Chromalox Heat Trace and their design guidelines. Chromalox is represented by RL Stone (POC: Patty Schmidt 888-404-8882).
- B. Heat tracing systems by other specified manufacturers will be acceptable on the following conditions:
  1. The Contractor and the manufacturer shall re-design the heat tracing system for the specified performance requirements, and adjust the quantity and conduit and wire sizes for branch circuits, the heat trace cable lengths, the quantity and trip ratings of branch circuit breakers, and the quantity and location of cold junction boxes, to suit the proposed alternate manufacturer's products.
  2. No delays to completion of the Project.
  3. No additional cost to the Owner.

### 2.2 DESCRIPTION OF WORK

- A. General: Heat trace will be used for the following services: 3" sanitary sewer force main, 2" sanitary branch lines, 3-1/2" domestic cold water, 1-1/4" domestic cold water branch lines, 2" condensate return, and a sump pump

with 2" discharge pipe. The sanitary sewer, and domestic cold water lines will be polypropylene pipe with field applied insulation/jacketing, and will be heat traced throughout the pier trench and above/below the pier. The condensate and sump pump discharge piping will be carbon steel pipe with field applied insulation/jacketing. The condensate will run in the pier trench and above the pier at its termination, as well as a separate run aboveground by Andrews Hall that runs down into a vault. The sump pump and discharge pipe will exclusively reside in the vault by Andrews Hall.

**B. Redundancy: Provide a redundant heat trace circuit for each line so that if one system breaks, the other will still be operational. One circuit will be set to maintain 45°F (adj., main circuit), and the other to maintain 40°F (adj., backup circuit). No redundant controller is required. Redundant heat trace cable applies to all systems being heat traced in this project with the exception of the sump pump and discharge piping in Vault STMH-1.**

C. Installation:

1. General: Install heat trace cable on piping, fittings, and valves per manufacturer's recommendations.
2. Sump Pump/Pipe Heat Trace: Install the power connection and end termination above the top of the sump pit to protect it from water damage. Install heat trace cable on pump per manufacturer's recommendations (similar to valve installation) to ensure good coverage. Install with aluminum tape as the pump will not be insulated.

2.3 MANUFACTURERS

A. Provide products by one of the following manufacturers:

1. Chromalox (Basis of Design)
2. Ray Chem
3. Nelson Heat Tracing Systems
4. Approved equal.

2.4 NRTL CERTIFICATION

A. Heat trace cable and electrical components shall be NRTL listed and labeled in accordance with NEC Article 100, and OSHA requirements in 29 CFR 1910.7

2.5 ELECTRICAL RATINGS

A. Power Supply Voltage: 277V, 1 phase, 60 Hz.

2.6 HEAT TRACING CABLES

A. Self-Regulating Cable – Low Temperature

1. Basis of Design: Chromalox SRL
2. Service: Domestic Cold Water, Sanitary Sewer
3. Twin 16 AWG copper buss wires.
4. Semi-conductive polymer core matrix. Self-regulating component of the cable, the electrical resistance varies with temperature.
5. Polyolefin jacket: Flame retardant, electrically insulates the matrix and buss wires and provides resistance to water and some inorganic chemical solutions.
6. Tinned Copper Braid – Provides additional mechanical protection and a positive ground path.
7. High Temperature Fluoropolymer or TPR Overjacket for additional corrosion resistance.

B. Self-Regulating Cable – Medium Temperature

1. Basis of Design: Chromalox SRM
2. Service: Condensate Return, steam trap stations, sump pump and discharge
3. Twin 14 AWG copper buss wires.
4. Semi-conductive polymer core matrix. Self-regulating component of the cable, the electrical resistance varies with temperature.
5. High Temperature Fluoropolymer Jacket: Flame retardant, electrically insulates the matrix and buss wires and provides corrosion resistance.
6. Metallic Braid – Provides additional mechanical protection and a positive ground path.
7. High Temperature Fluoropolymer or TPR Overjacket for additional corrosion resistance.

2.7 ENCLOSURES

- A. Thermostat housings, cold junction boxes, and other electrical enclosures shall be cast aluminum with plastic coating, zinc-coated malleable iron with plastic coating, stainless steel, or fiberglass-reinforced plastic, rated NEMA 4X in accordance with NEMA 250.
- B. Covers: gasketed and fastened with brass or stainless-steel screws.
- C. Electrical enclosures shall be suitable for outdoor use in the ambient conditions at the installation site.
- D. Condensation inside electrical enclosures shall be prevented by one or more of the following methods:
1. Conduits shall enter enclosures at the bottom wherever it is physically possible. Side entry is permissible. Top entry shall be avoided, and where unavoidable, top entry conduits shall be fitted with explosion-proof seal off fittings, breathers, and drains.
  2. Condensation buildup shall be prevented by heat from control transformers and other electrical components. If insufficient heat is available from component heat losses, anti-condensation heaters shall be provided.

2.8 PERFORMANCE REQUIREMENTS

- A. Heat Tracing Application: freeze protection
- B. Minimum Ambient Design Temperature: -40°F
- C. Maximum Ambient Air Design Temperature: 110°F
- D. Maintain Temperature: 40°F
- E. Maximum Sheath Temperature: 80°F
- F. Insulation type and thickness: As shown on the Drawings and specified in Division 23.
- G. Cable shall be capable of providing at least 90 percent of nominal power output over a temperature range from 40 to 150°F pipe temperature, and shall be capable of crossing over itself without overheating.
- H. The electrical heat tracing system shall maintain at least 75% of the specified wattage output in the specified environment for a minimum design life of 20 years when operated and maintained at less than the maximum continuous exposure temperature in accordance with the manufacturer's recommendations. The heat tracing system shall be certified to operate at 90% of power output after 1000 hours of exposure to the maximum intermittent exposure temperature when tested in accordance with UL 746B.

## 2.9 TEMPERATURE CONTROL AND MONITORING

- A. Provide a UL listed microprocessor-based temperature control monitoring and power distribution system.
- B. Provide both outdoor controllers with a visual alarm probe on top for easy visual indication of a fault or other error.
- C. Both controllers will be installed outside and exposed to ocean air. Provide stainless steel outer case or other material resistant to outdoor, salty environment.

### D. Pier Controller – Line Sensing

1. Basis of Design: Chromalox IntelliTrace ITLS
2. Service: 2" Condensate Return, 3" Sanitary Sewer, 2" Sanitary Sewer, 3-1/2" Domestic Cold Water, 1-1/4" Domestic Cold Water, all with redundant circuits.
3. Enclosure: NEMA 4X
4. Operating Temperature: -40°F to 104°F.
5. Supply Voltage: 277V/1PH/60Hz
6. Communication: BACnet IP
7. Control: Engage circuits based on local ambient temperature sensor readings maintain freeze protection.
8. Alarms: Process, deviation, high/low and latching/non-latching programmable temperature alarms.
9. On/Off and PID control modes
10. Display: High resolution TFT display
11. Separate LED indicators for power, load and alarm for each circuit shall be provided on front panel.

### E. Land-side Controller – Line Sensing

1. Basis of Design: Chromalox IntelliTrace ITC2, with ITC1 for redundant condensate circuit
2. Service: 2" Condensate Return (with redundant circuit), Sump Pump and 2" Discharge Piping
3. Enclosure: NEMA 4X
4. Operating Temperature: -40°F to 104°F.
5. Supply Voltage: 208V/3PH/60Hz
6. Communication: BACnet IP
7. Control: Engage circuits based on temperature sensor readings on condensate lines to maintain freeze protection.
8. Alarms: Process, deviation, high/low and latching/non-latching programmable temperature alarms.
9. On/Off and PID control modes
10. Display: High resolution TFT display
11. Separate LED indicators for power, load and alarm for each circuit shall be provided on front panel.

## 2.10 HEAT TRACE ACCESSORIES

- A. Cable and Accessory Supports: Provide wrapping tapes, cable ties, and pipe clamps to fasten heat trace cables and accessories in place in accordance with manufacturer's installation instructions.

- B. Cold Junction Boxes: Threaded opening suitable for  $\frac{3}{4}$  inch threaded conduit connection, cast aluminum with protective coating and gasketed screw cover. Provide green grounding screw for equipment ground wire, and spring clamp or screw terminals for line and neutral wires.
- C. Illuminated End Seals: Heat shrink insulation with "cable energized" LED type indicator lamp.
- D. Splices: Compression connectors, with heat shrink insulation over conductors and over outer jacket.
- E. Aluminum tape: Apply over heat trace cable for full length of plastic piping.
- F. Warning Labels: OSHA-approved colors and materials, with legend "Warning: Hazardous Voltage May Be Present From Electric Heat Tracing Under Pipe Insulation. Disconnect Heat Tracing Power Supplies Before Removing Pipe Insulation or Working On Heat Tracing."

## 2.11 FACTORY QUALITY ASSURANCE

- A. Factory Quality Certification
  - 1. Submit copy of factory quality assurance certificate.
- B. Manufacturing Process
  - 1. Heat tracing components shall be manufactured or outsourced in accordance with the factory quality certification documents.
- C. Factory Quality Assurance
  - 1. Cable production shall be monitored, controlled, and tested in accordance with the manufacturer's quality assurance program.
  - 2. Components shall be tagged and shipment shall be checked for completeness.

## 2.12 PACKAGING FOR SHIPMENT

- A. Package components in watertight pouches inside corrugated cardboard boxes with manufacturer and contents clearly labeled.

## 2.13 WARRANTY

- A. Provide parts and labor warranty in accordance with Division 01 and Division 26 Section "Electrical General Provisions".
- B. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- C. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of electric heating cables that fail in materials or workmanship within specified warranty period.
- D. Warranty Period: Two years from date of Substantial Completion.

## PART 3 - EXECUTION

### 3.1 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle heat tracing components in accordance with manufacturer's instructions and recommendations.

### 3.2 INSPECTION PRIOR TO INSTALLATION

- A. Piping and supports shall be substantially complete without burrs or sharp protrusions, tested, and clean prior to starting installation of heat tracing.
- B. Examine surfaces and substrates to receive heating cables for compliance with specified requirements for installation, including manufacturer's installation instructions and recommendations.

### 3.3 INSTALLATION

- A. Follow heat trace manufacturer's installation instructions and recommendations.
- B. Test cable bus wires on reel for electrical continuity before installing.
- C. Test cable insulation resistance on reel before installing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Cut cable to length required, and fasten to piping with tape, ties, and supports furnished by the heat trace manufacturer.
- F. Install heater-to-cold lead connections in accessible locations.
- G. Install end-of-line illuminated terminations in readily visible locations.
- H. Wrap valves and actuation stems in accordance with manufacturer's recommendations.
- I. Connect wiring in accordance with approved field wiring diagrams.
- J. Start acceptance tests.
- K. Apply pipe insulation.
- L. Finish acceptance tests

### 3.4 WIRING CONNECTIONS

- A. Connect heating cables and other components to power supply wiring as shown on the Drawings, or as shown on approved re-design drawings provided by a specified alternate heat trace manufacturer.
- B. Connect control wiring as shown on the manufacturer's approved field wiring diagrams.
- C. Grounding: Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems".
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

### 3.5 IDENTIFICATION IN THE FIELD

- A. Apply heat trace warning labels to heat traced piping, spaced at 5 foot intervals.
- B. Provide typed branch circuit panelboard schedule identifying each cold junction box.

### 3.6 ACCEPTANCE TESTING

- A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each enclosed controller element, cable, branch circuit, and control circuit.
  2. Test continuity of each circuit.
- B. Perform the following field tests and inspections and prepare test reports:
1. Testing prior to initial energization, before application of pipe insulation:
    - a. Test cables for electrical continuity.
    - b. Test cables for insulation resistance. Replace cables if measured resistance is less than 10 megaohms to ground.
    - c. Report results in writing.
  2. Functional testing after energization:
    - a. Set thermostatic controls and monitor operation of heat tracing system under actual operating conditions if possible, otherwise test system with empty piping.
    - b. Test cables to verify rating and power input. Energize branch circuit wiring. Record ambient temperature. Measure voltage and current simultaneously, and record test results at one minute intervals for 10 minutes.
  3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

### 3.7 DEMONSTRATION AND TRAINING

- A. Review installation with Owner's Representative.

### 3.8 SPARE PARTS AND SPECIAL TOOLS

- A. 90 days prior to Substantial Completion, provide a list of spare parts and special tools recommended by the Manufacturer for this Project, with prices.

### 3.9 PROTECTION

- A. Protect installed heating tracing system from damage in accordance Manufacturer's recommendations.

END OF SECTION



**SECTION 23 14 29**

**SUMP PUMPS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

A. Section Includes:

1. Submersible sump pumps.

**1.3 ACTION SUBMITTALS**

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

**1.4 CLOSEOUT SUBMITTALS**

A. Operation and Maintenance Data: For pumps and controls, to include in operation and maintenance manuals.

**1.5 QUALITY ASSURANCE**

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

**1.6 DELIVERY, STORAGE, AND HANDLING**

A. Retain shipping flange protective covers and protective coatings during storage.

B. Protect bearings and couplings against damage.

C. Comply with pump manufacturer's written rigging instructions for handling.

**PART 2 - PRODUCTS**

**2.1 SUBMERSIBLE SUMP PUMPS**

A. Submersible, Fixed-Position, Single-Seal Sump Pumps:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. BJM Pumps.

- b. Liberty Pumps.
  - c. Pentair Pump Group.
  - d. Zoeller Company. (Basis of Design)
2. Description: Factory-assembled and -tested sump-pump unit.
  3. Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sump pump as defined in HI 1.1-1.2 and HI 1.3.
  4. Pump Casing: Cast iron, with strainer inlet, legs that elevate pump to permit flow into impeller, and vertical discharge for piping connection.
  5. Impeller: Statically and dynamically balanced, ASTM A 48/A 48M, Class No. 25 A cast iron design for clear wastewater handling, and keyed and secured to shaft.
  6. Pump and Motor Shaft: Stainless steel, with factory-sealed, grease-lubricated ball bearings.
  7. Seal: Mechanical.
  8. Motor: Hermetically sealed capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.
    - a. Motor Housing Fluid: Oil.
  9. Temperature: Up to 200°F.
  10. Power and Controls:
    - a. Power: Plug-in type, powered from vault receptacle.
    - b. Switch Type: High-temperature, mechanical float switch with float rods and rod buttons. Rated for 200°F continuous operation.
    - c. Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 24 INCHES.
    - d. MECHANICAL SWITCH BOX MOUNTED ON THE DISCHARGE PIPE ABOVE THE OPERATING LEVEL WHERE THE PUMP ENGAGES.
  11. Performance: Refer to schedule on drawings for electrical and mechanical performance.
  12. BASIS OF DESIGN: ZOELLER M3137.

## 2.2 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements."
  1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- B. Motors for submersible pumps shall be hermetically sealed.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in for plumbing piping to verify actual locations of storm drainage piping connections before sump pump installation.

### 3.2 INSTALLATION

A. Pump Installation Standards: Comply with HI 1.4 for installation of sump pumps.

### 3.3 CONNECTIONS

A. Comply with requirements for piping specified in Section 232113 "Basic Piping Materials and Methods." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

### 3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Pumps and controls will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

### 3.5 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

### 3.6 ADJUSTING

A. Adjust pumps to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust control set points.

### 3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain controls and pumps.

END OF SECTION

SECTION 23 21 16

PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

A. This Section provides the specification for pipe specialties. Pipe specialties include:

1. Strainers
2. Manual/Automatic Air Vents
3. Pressure Gauges
4. Dielectric Fittings
5. Pressure Regulating/Reducing Valves
6. Steam Traps
7. Condensate Flash Arrestor/Spurge Pipes
8. Flexible Hoses for Steam and Condensate

1.3 SUBMITTALS

A. In accordance with Section 013300 "Submittal Procedures", submit the following:

1. Materials of construction
2. Dimensions
3. Flow ranges
4. Pressure Ranges
5. Schedules indicating service
6. Pressure drops
7. Manufacturer's cut sheets

B. Operation and Maintenance Manuals: Submit manufacturer's maintenance data for all equipment.

1.4 QUALITY ASSURANCE

A. Comply with applicable portions of American Society of Engineers (ASME) and Instrument Society of America (ISA) standards pertaining to construction and installation of gauges and meters, including:

1. ANSI/ASME B31.1: Power Piping.
2. ANSI/ASME Boiler and Pressure Vessel Code: Section VIII, Division 1 - Unfired Pressure Vessels.
3. MSS - Manufacturers Standardization Society.

B. Certification: Provide thermometers and gauges whose accuracies are certified by the manufacturer for the specified operating conditions.

- C. Calibration: Provide calibration for all measurement devices after installation and start-up.
- D. Single-source Responsibility: Obtain each category of specialty device from one source and by a single manufacturer.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store equipment in a dry location, away from the weather, dust, and debris.
- B. Retain shipping flange protective covers and protective coatings during storage.
- C. Inspect items immediately upon arrival and report any irregularities or damage immediately to the manufacturer/supplier and Engineer.

### PART 2 - PRODUCTS

#### 2.1 STRAINERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong
  - 2. Keckley
  - 3. Titan
  - 4. Mueller
  - 5. Spirax-Sarco
- B. Strainers shall be "Y" type, unless otherwise indicated on Contract Drawings.
- C. Construction
  - 1. Steam Service (HPS):
    - a. Sizes 2 inches NPS and below: Body shall be cast carbon steel in accordance with ASTM A-126 Class B. Strainer shall be ANSI Class 250. Connections shall be threaded.
    - b. Sizes 2-1/2-inch NPS and above: Body shall be cast carbon steel in accordance with ASTM A216 Grade WCB. Strainer shall be ANSI Class 300. Connections shall be Class 300 flanges.
  - 2. All Other Services:
    - a. Body shall be heavy-duty cast iron in accordance with ASTM A-126 Class B. Strainer shall be ANSI Class 125 and shall have a design pressure of 125 psig at 450 deg. F. Connections shall be Class 125 flanges.
- D. Strainer Screen:
  - 1. Provide strainer screen with a minimum net free area of 2 1/2 times the cross-sectional area of the entering pipe.
  - 2. All strainer screens shall be 1/8-inch-thick Type 316 stainless steel with perforations as listed below, unless smaller perforations are required by the valve or device which it protects.

SIZES	WATER		STEAM	
	Material	Opening	Material	Opening
1½" to 4"	304SS	0.062" perf	304SS	0.045" perf
5" to 6"	304SS	0.125" perf	304SS	0.045" perf

3. Provide a screen blowdown valve for each strainer. The valve shall be the full size of the blow-off tapping. Provide shut-off valve in accordance with Section 230523 "Valves". Provide nipple with cap downstream of valve in accordance with the pipe system specifications as specified in Section 232113 "Basic Piping Materials and Methods". Select the length of the nipple connecting to blow-off valve to the strainer basket connection so that the blow-off valve is clear of insulation.
4. Provide flanged strainers with flanges tapped for pressure gauge installation. Provide pressure gauges as indicated on P&ID's.

E. Connections: Strainer connections shall be as specified for the union type as listed in the individual piping group specifications in Section 232113 "Basic Piping Materials and Methods".

## 2.2 AIR CONTROL DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amtrol, Inc.
2. Armstrong Pumps, Inc.
3. Bell & Gossett Domestic Pump; a division of ITT Industries.
4. Taco.
5. Wessels Company.

B. Manual Air Vents:

1. Body: Bronze.
2. Internal Parts: Nonferrous.
3. Operator: Screwdriver or thumbscrew.
4. Inlet Connection: NPS 1/2
5. Discharge Connection: NPS 1/8.
6. CWP Rating: 150 psig.
7. Maximum Operating Temperature: 400 °F.

C. Automatic Air Vents:

1. Body: Bronze or cast iron.
2. Internal Parts: Nonferrous.
3. Operator: Noncorrosive metal float.
4. Inlet Connection: NPS 1/2.
5. Discharge Connection: NPS 1/4.
6. CWP Rating: 150 psig.

7. Maximum Operating Temperature: 400 °F.

2.3 PRESSURE GAUGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AMETEK, Inc.; U.S. Gauge.
2. Ashcroft Inc.
3. Trerice, H. O. Co.
4. Weiss Instruments, Inc.
5. WIKA Instrument Corporation - USA.
6. Winters Instruments - U.S.

B. Description:

1. Standard: ASME B40.100.
2. Type: ASME B40.1, Grade A, Type 316 stainless steel, Bourdon-tube pressure gauge, with bottom stem mounted connection.
3. Case: Type 300 Series stainless steel. Case hermetically sealed. Silicone liquid filled. Dial size shall be 4 inch minimum.
4. Connector: Steel with 1/4-inch male NPT.
5. Movement: Mechanical, with link to pressure element and connection to pointer.
6. Scale: White coated aluminum with permanently marked etchings.
7. Range: Units shall appear in PSIG. PSIG upper range shall be between 150% and 300% of the system normal operating pressure, unless as noted otherwise below:

SERVICE	RANGE (PSIG)	FIGURE INTERVALS (PSIG)	MINOR DIVISIONS (PSIG)
High Pressure Steam	0-200	20	2

8. Accuracy: 1% of full scale per ASME B40.1, accuracy Grade A.

2.4 PRESSURE GAUGE ACCESSORIES

A. Isolation Valves

1. For all pressure gauges, provide a shutoff valve as specified for the specific piping system in Section 230523 “Valves”.
2. Valves shall be located minimum 2 inches outside of insulation.

B. Snubber

1. For all systems, provide a 1/2-inch pressure snubber. Snubber shall be a stainless steel bushing with corrosion-resistant porous metal disc through which the pressure fluid is filtered.
2. Select disc pore size for fluid served and pressure rating.
3. For any pressure gauges that can experience severe pulsation, provide an additional snubber in series with the first snubber.

C. Siphon

1. For all steam systems and on systems conveying liquid products operating above 200 degrees Fahrenheit provide a fabricated coil siphon or "pig tail".
2. Siphon shall be constructed of material as specified for the specific piping system in Section 232113 "Basic Piping Materials and Methods".
3. Siphon shall be provided in addition to snubber as specified above.

2.5 DIELECTRIC FITTINGS

A. General Requirements:

1. Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
2. Provide assembly or fitting with insulating material isolating joining of dissimilar metals, to prevent galvanic action and stop corrosion.
3. Insulating Material: Suitable for system fluid, pressure, and temperature.
4. Dielectric Unions: Factory-fabricated, union assembly, for 250 psig minimum working pressure at 180 deg. F.
5. Dielectric Couplings: Galvanized steel coupling with inert and non-corrosive, thermoplastic lining, threaded with 300 psig minimum working pressure at 225 deg. F.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Capitol Manufacturing Company.
  - b. Central Plastics Company.
  - c. Hart Industries International, Inc.
  - d. Jomar International Ltd.
  - e. Matco-Norca, Inc.
  - f. McDonald, A. Y. Mfg. Co.
  - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - h. Wilkins; a Zurn company.
2. Description:
  - a. Standard: ASSE 1079.
  - b. Pressure Rating: 250 psig minimum at 180 °F.
  - c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Capitol Manufacturing Company.
  - b. Central Plastics Company.
  - c. Matco-Norca, Inc.
  - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - e. Wilkins; a Zurn company.
2. Description:



- a. Standard: ASSE 1079.
- b. Factory-fabricated, bolted, companion-flange assembly.
- c. Pressure Rating: To match intended service.
- d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Advance Products & Systems, Inc.
  - b. Calpico, Inc.
  - c. Central Plastics Company.
  - d. Pipeline Seal and Insulator, Inc.
2. Description:
  - a. Nonconducting materials for field assembly of companion flanges.
  - b. Pressure Rating: To match intended service.
  - c. Gasket: Neoprene or phenolic.
  - d. Bolt Sleeves: Phenolic or polyethylene.
  - e. Washers: Phenolic with steel backing washers.
  - f. Field assembled

E. Dielectric Nipples:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Elster Perfection.
  - b. Matco-Norca, Inc.
  - c. Precision Plumbing Products, Inc.
  - d. Victaulic Company.
2. Description:
  - a. Standard: IAPMO PS 66
  - b. Electroplated steel nipple. complying with ASTM F 1545.
  - c. Pressure Rating: 300 psig at 225 °F
  - d. End Connections: Male threaded or grooved.
  - e. Lining: Inert and noncorrosive, propylene.

## 2.6 STEAM BACKPRESSURE CONTROL VALVES

A. General: All Pressure Regulating Valves shall have the following characteristics:

1. Type: The valve shall be self-operated external pilot type, single seated, metal diaphragm actuated, normally closed design. The valve shall function quickly and shut tight on dead end service. There shall be no springs in the steam space and no stuffing box. The valve shall be easy to maintain with all parts accessible without removal from the line. The valve shall modulate to maintain an upstream pressure setpoint.
2. Construction: All pressure regulating valve components shall be constructed from the following materials:

- a. Body: Cast Steel, ASTM A216 WCB
  - b. Stem: 303 Stainless Steel, ASTM A582
  - c. Disc: 420 Stainless Steel, ASTM A743 CA-40
  - d. Seat: 420 Stainless Steel, ASTM A743 CA-40
  - e. Gasket: Non-asbestos
  - f. Diaphragm: Stainless Steel, MIL-S-5059C
  - g. Spring: Steel
3. Valve Port: Where the manufacturer offers valve ports of various sizes (i.e. full port or reduced port), the reduced port shall be the default selection when selecting the appropriate valve body size. This selection is preferred to allow the installation of a full port in the future if steam demands increase. Full ports may be utilized with Engineer's approval.
  4. Pressure Drop: Valve spring shall be able to operate at a 5 PSID pressure differential.
  5. Basis of Design: Pressure regulating valves shall be Spence Type E5 or approved equal.

B. Backpressure Regulating Pilots: All backpressure regulating valves shall have backpressure regulating pilots with the following characteristics.

1. Type: The pilot shall be separate from the main valve and connected with a male union. The pilot shall be a normally closed design with packless construction with a strainer screen built into the pilot inlet.
2. Construction: All pressure regulating pilot valves shall be constructed from the following materials:
  - a. Body: Cast Steel, ASTM A216 GR. WCB
  - b. Stem: 303 Stainless Steel, ASTM A582 COND A
  - c. Disc: 440 Stainless Steel, ASTM A276-75 COND A
  - d. Seat: 420 Stainless Steel, ASTM A4276 COND A
  - e. Gasket: Non-asbestos
  - f. Diaphragm: 301 Stainless Steel, MIL-5-5059C
  - g. Spring Inconel
3. Basis of Design: Backpressure regulating pilot valves shall be Spence Type Q or approved equal.

C. Muffling Orifice Plates: For each steam pressure reducing valve provide a muffling orifice plate at the enlarged line size on the outlet of the backpressure control valve. The Muffling Orifice Plate should be provided by the same manufacturer as the valve and the selection of the valve should account for the muffling orifice plate. Orifice plate to be installed with 150 psi weld neck flanges.

## 2.7 STEAM PRESSURE REDUCING VALVES – DIRECT ACTING TYPE

A. General: For each steam pressure-powered pump, provide a direct acting pressure reducing valve to adjust the steam supply pressure to the level appropriate for pump operation. Reducing valve shall have the following characteristics:

1. Type: Self-operate, internal pilot.
2. Construction:
  - a. Rated for minimum pressure of 200 psig @ 400°F.
  - b. Body: Cast Iron, Ductile Iron, Cast Steel, or Stainless Steel.
  - c. Internals: All stainless steel.
3. Basis of Design: Spence Type D50 or approved equal.

## 2.8 STEAM TRAPS

### A. General:

1. Refer to the Contract Drawings for details of the steam trap stations that include the drip leg, drip leg valve, steam trap, and all steam trap related items.
2. Provide steam condensate traps at locations indicated on the Contract Drawings and of type as indicated in the Steam Trap Schedule listed in the Contract Drawings. The capacity of the steam trap provided shall satisfy the design flow listed on the Steam Trap Schedule for both the operating and maximum conditions of pressure, differential pressure, and steam temperature. Connection sizes of traps are provided as a basis of design; however, actual sizes are dependent upon the actual selection of the steam trap.
3. Steam trap sizing selection and location is based on the piping layout as presented in the Contract Drawings. The Contractor is responsible for informing the Engineer of any piping layout changes that could affect the sizing, selection, and location of the steam traps.

### B. Acceptable Manufacturers: Armstrong, Spence/Nicholson, Spirax Sarco, Watson McDaniel

### C. Thermodynamic (TD):

1. Construction:
  - a. General: Traps shall be designed for 600 psi, 800 degree F. All stainless steel machined bar stock construction, integral seat design with multiple balanced outlet ports, non-gasketed sealing cap, and Rockwell 50C hardened disc and integral seat working surfaces.
  - b. Body: Stainless Steel AISI 420
  - c. Disc: Stainless Steel AISI 420
  - d. Cap: Stainless Steel AISI 416
2. Connections: Size of connection shall depend on the flow requirements. Type of connection shall be screwed ends.
3. Design Basis: Spirax Sarco TD-52

## 2.9 CONDENSATE FLASH ARRESTORS/SPARGE PIPES

A. General: Manufactured flash arrestor/sparge pipe designed to reduce the water hammer created when high pressure condensate mixes with lower pressure condensate. The flash arrestor is designed to control the creation of flash steam by allowing high pressure condensate to mix with low pressure condensate through many small holes, rather than a single concentrated stream. Refer to the Contract Drawings for location of each flash arrestor.

B. Capacity: Provide flash arrestors of capacity based on the steam traps to which they will be connected. The manufacturer shall provide connection sizes to each flash arrestor based on the size of the main pumped condensate line and based on the condensate load to be handled.

### C. Construction

1. Body: Schedule 80 Carbon Steel
2. Sparge Assemble: Schedule 80 Stainless Steel
3. End Connections: Butt-weld or socket unless otherwise noted.
4. Testing: Dye Penetrant.
5. Fabrication and Welding: Per ASME Section IX Codes and Standards.

D. Manufacturer: Envirosep, Advanced Steam Technology, Watson McDaniel, or other manufacturer as approved by Designer.

## PIPING SPECIALTIES

## 2.10 FLEXIBLE HOSES FOR STEAM AND CONDENSATE

A. General: Flexible hoses shall be provided for steam and condensate for the purpose of connecting these services to the ship when it is in port. The hoses shall be removable, and will belong to the Campus when the ship is not in port. Hoses shall be 150 ft in length minimum, and may be provided in multiple sections (ie 3x 50 ft lengths).

B. Material: Hoses shall be constructed of corrugated stainless steel with a double stainless steel braid, rated for the design conditions of the system. Minimum rating of 350°F at 100 psig.

C. Connections: The hoses shall be provided with a stainless steel class 150 flange per ASME B16.5 on either end. The contractor shall also provide a spool transition piece between an ANSI flange and a JIS flange to connect to the ship's JIS flange. Steam hoses and flanges shall be 6", and condensate shall be 3".

D. Basis of design: Hosecraft USA SB2

## PART 3 - EXECUTION

### 3.1 GENERAL INSTALLATION

A. Install pipe specialties in accordance with manufacturer's instructions and as shown on the Contract Drawings.

### 3.2 AIR VENTS INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting. Route drain piping on air vents as full sized pipe to nearest floor or indirect drain. Terminate drain piping in a manner that any discharge can be easily observed by plant operators.

### 3.3 PRESSURE GAUGE INSTALLATION

A. Install pressure gauges in pipe coupling or tee as required. Provide shutoff valve, snubber, and/or siphon as specified. Locate pressure gauge in most readable position.

### 3.4 STEAM TRAP INSTALLATION

A. Provide all steam trap accessories in accordance with the details on the Contract Drawings.

B. Install steam traps at an elevation with respect to the drip leg in accordance with the manufacturer's instructions to ensure hydraulic head during start-up.

C. Install steam traps in accessible locations as close as possible to connected equipment, but not more than 48 inches from connected equipment.

D. Unless otherwise indicated, install gate valve, strainer, and union upstream from trap; install union, check valve, and gate valve downstream from trap.

E. Provide drip legs with sizes and configurations as detailed on Contract Drawings. In addition, provide drip legs at low points and natural drainage points such as ends of mains, bottoms of risers, and ahead of pressure regulators, control valves, isolation valves, pipe bends, and expansion joints.

1. On straight runs with no natural drainage points, install drip legs at intervals not exceeding 300 feet where pipe is pitched down in direction of steam flow and a maximum of 150 feet where pipe is pitched up in direction of steam flow.
2. Drip legs shall be the same size as the main pipe.
3. Install gate valve at drip leg drains and strainer blowdowns to allow removal of dirt and scale. Gate valves shall meet the requirements of Section 230523 "Valves".

## PIPING SPECIALTIES

4. Install steam trap stations close to drip legs, while allowing for adequate access for service and maintenance.

### 3.5 STRAINERS INSTALLATION

- A. Install strainers where indicated and at places not indicated but where required by a manufacturer's instruction to protect his equipment.
- B. Install steam strainers horizontally on their side with screen chamber at the 3 or 9 o'clock position. Provide blowdown drain with valve and cap. Install strainers vertically only when required and when the direction of flow is down.

### 3.6 INSULATION AND IDENTIFICATION OF SPECIALTIES

- A. Insulate all pipe specialties in accordance with Section 230719 "Insulation for Piping and Equipment". Do not insulate moving parts unless insulation sleeves are provided. Do not insulate steam traps.

END OF SECTION







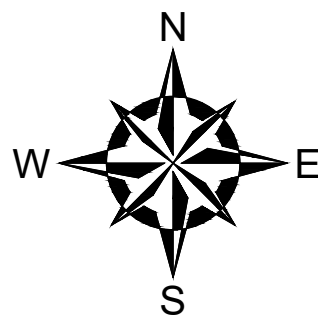










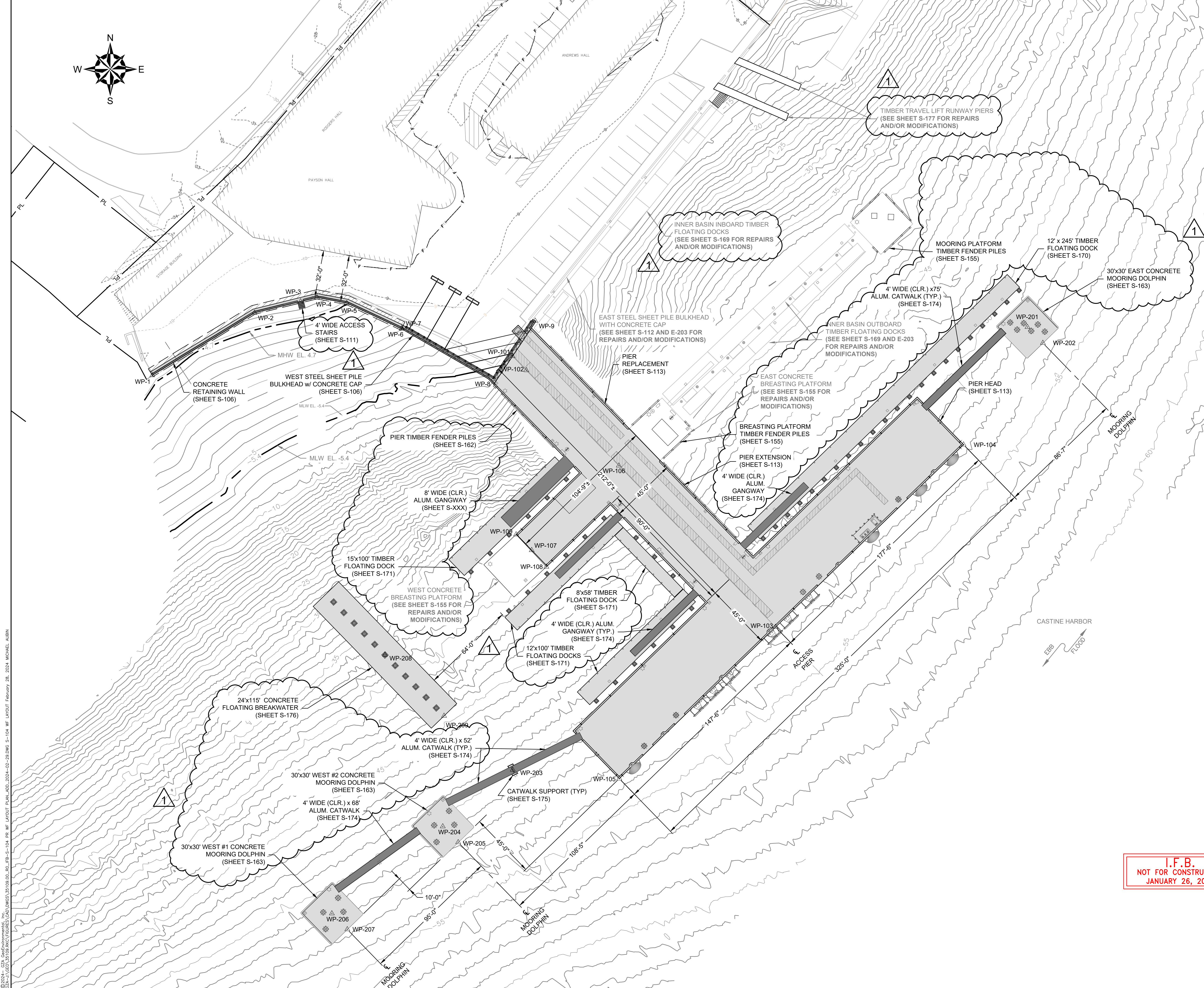


**LEGEND:**

DESCRIPTION	EXISTING
LAYOUT WORKING POINT	WP-1

**LAYOUT POINT COORDINATES**

POINT I.D.	EASTING	NORTHING	LOCATION DESCRIPTION
WP-1	906476.054	262511.801	TOP CORNER OF RETAINING WALL
WP-2	906476.349	262554.167	BEND IN RETAINING WALL
WP-3	906507.544	262561.855	CENTERLINE OF ACCESS STAIRS
WP-4	906518.595	262564.579	BEND IN RETAINING WALL
WP-5	906538.814	262560.773	BEND IN RETAINING WALL
WP-6	906575.985	262543.322	TOP CORNER OF RETAINING WALL
WP-7	906576.233	262543.839	INTERLOCK OF STEEL SHEETPILE
WP-8	906638.490	262509.284	CORNER OF SHEETPILE BULKHEAD
WP-9	906666.510	262548.722	INTERLOCK OF STEEL SHEETPILE
WP-101	906651.158	262524.769	CENTERLINE OF PIER REPLACEMENT
WP-102	906660.444	262515.201	CENTER OF PILE CAP "BENT B"
WP-103	906829.308	262341.195	CENTERLINE OF PIER EXTENSION
WP-104	906956.887	262464.810	NORTHEAST CORNER OF PIER HEAD
WP-105	906723.457	262238.472	SOUTHWEST CORNER OF PIER HEAD
WP-106	906723.165	262450.570	CENTERLINE OF PILE CAP H
WP-107	906664.123	262393.284	CENTERLINE OF PILE CAP H
WP-108	906674.044	262382.008	SOUTHWEST CORNER OF BREASTING PLATFORM
WP-109	906653.547	262403.914	NORTHEAST CORNER OF BREASTING PLATFORM
WP-201	907000.020	262544.485	CENTERPOINT OF EAST MOORING DOLPHIN
WP-202	90710.466	262533.721	CENTERLINE OF EAST MOORING DOLPHIN
WP-203	906651.279	262244.401	CENTERPOINT OF CATWALK SUPPORT
WP-204	906603.870	262206.027	CENTERPOINT OF WEST #2 MOORING DOLPHIN
WP-205	906614.316	262195.262	CENTERLINE OF WEST #2 MOORING DOLPHIN
WP-206	906528.730	262147.043	CENTERPOINT OF WEST #1 MOORING DOLPHIN
WP-207	906539.177	262136.278	CENTERLINE OF WEST #1 MOORING DOLPHIN
WP-208	906564.709	262322.244	CENTERPOINT OF FLOATING BREAKWATER
WP-209	906604.726	262280.954	CENTERLINE OF FLOATING BREAKWATER

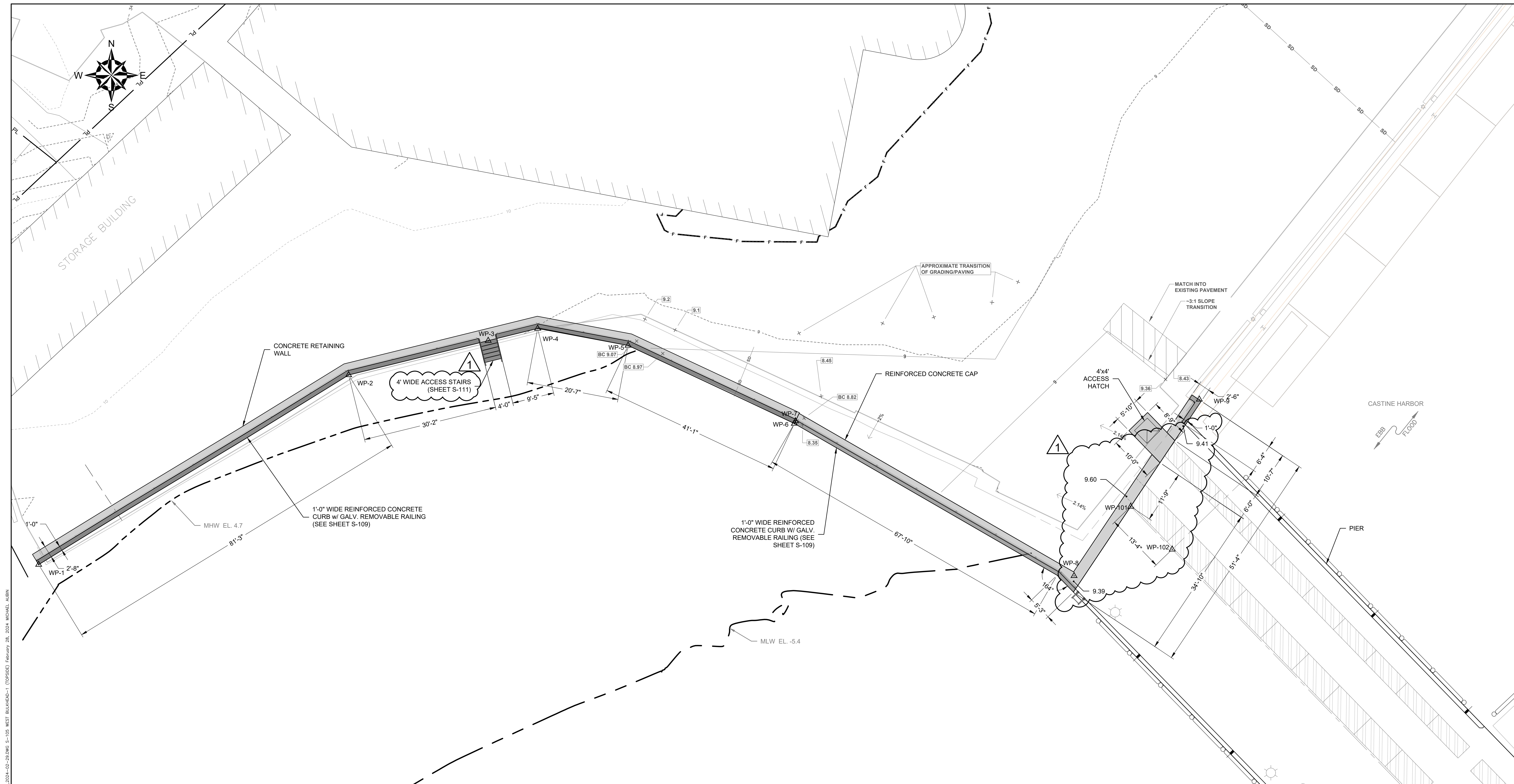


**I.F.B.**  
**NOT FOR CONSTRUCTION**  
**JANUARY 26, 2024**

1		ADDENDUM #3	DDF	3/1/2024
NO.	ISSUE/DESCRIPTION	BY	DATE	
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS PIER UPGRADES AND WATERFRONT IMPROVEMENTS CASTINE, MAINE				
<b>WATERFRONT STRUCTURES LAYOUT PLAN</b>				
PREPARED BY: GZA Geotechnical, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME		
PROJ MGR: RKC	DESIGNED BY: AFS	REVIEWED BY: CWC	CHECKED BY: DDF	<b>DRAWING</b> <b>S-104</b> SHEET NO. 33 OF 142
DATE: JANUARY 2024	PROJECT NO. 03.0035109.00	SCALE: AS NOTED	REVISION NO.	

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**LEGEND:**

DESCRIPTION	EXISTING
LAYOUT WORKING POINT	WP-1
PROPOSED SPOT ELEVATION	9.39



**I.F.B.**  
**NOT FOR CONSTRUCTION**  
**JANUARY 26, 2024**

ADDENDUM #3		DDF	3/1/2024
NO.	ISSUE/DESCRIPTION	BY	DATE
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**MAINE MARITIME ACADEMY WATERFRONT CAMPUS**  
**PIER UPGRADES AND WATERFRONT IMPROVEMENTS**  
**CASTINE, MAINE**

**WEST BULKHEAD AND RETAINING WALL PLAN -1**

PREPARED BY:		PREPARED FOR:	
<b>GZA Geoscientific, Inc.</b> Engineers and Scientists <small>www.gza.com</small>		<b>MAINE MARITIME ACADEMY</b> <b>CASTINE, ME</b>	
PROJ MGR: RKC	DESIGNED BY: AFS	REVIEWED BY: CWC	CHECKED BY: DDF
DATE: JANUARY 2024	PROJECT NO: 03.0035109.00	DRAWN BY: MEA	SCALE: AS NOTED
		REVISION NO:	

**S-105**  
 SHEET NO. 34 OF 142





**LEGEND:**

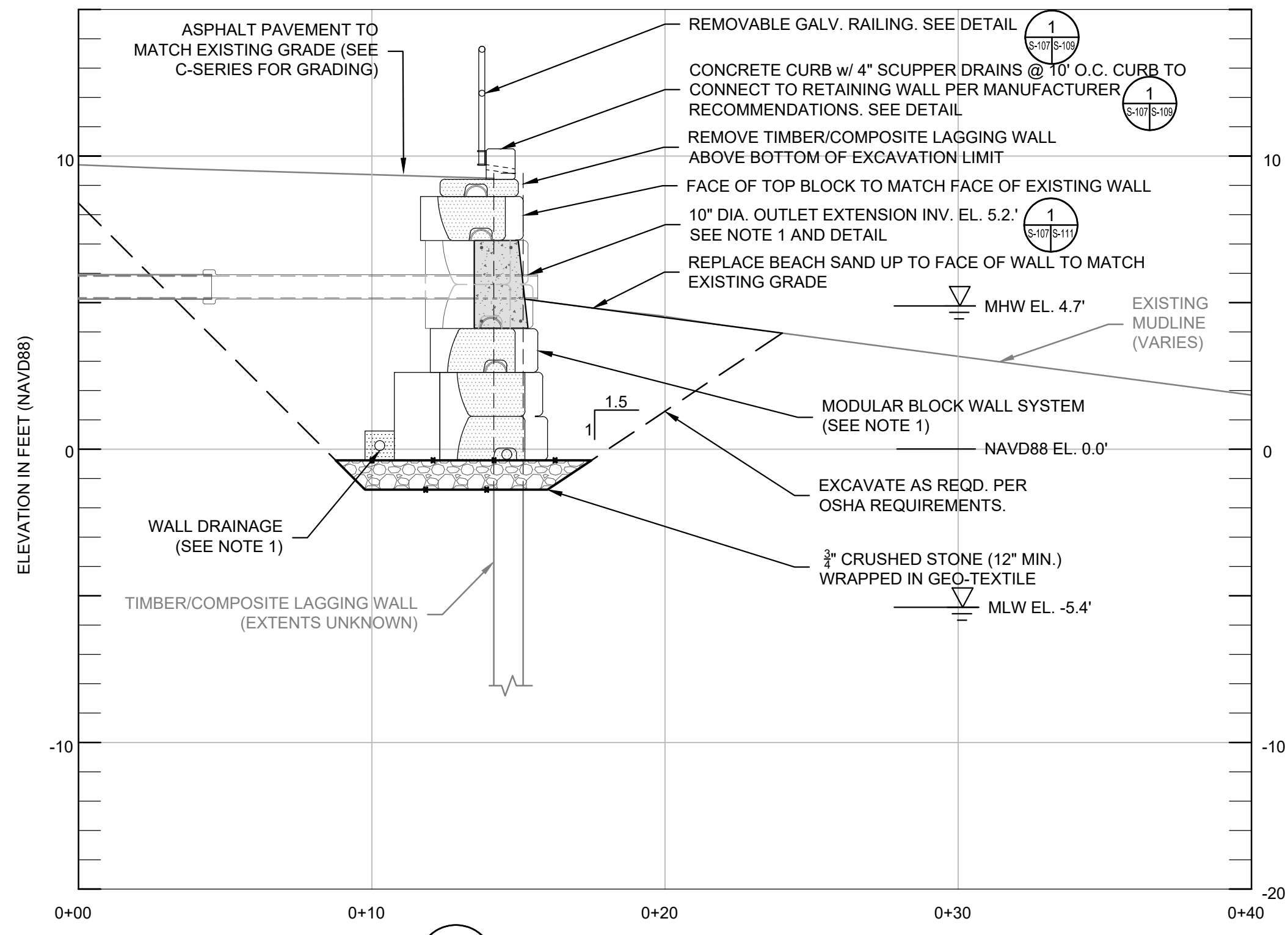
DESCRIPTION	EXISTING
LAYOUT WORKING POINT	WP-1

**I.F.B.**  
**NOT FOR CONSTRUCTION**  
**JANUARY 26, 2024**

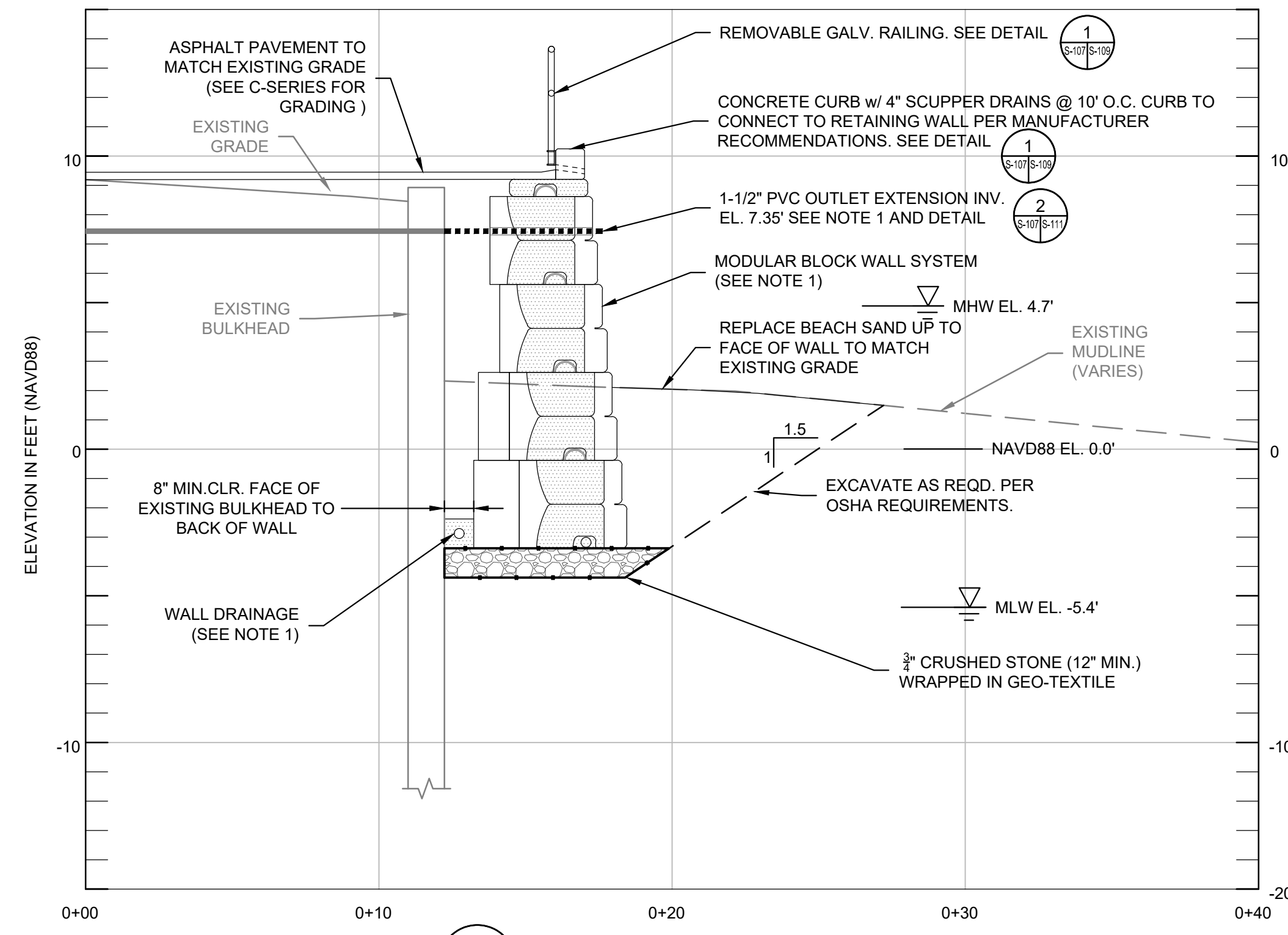
<b>ADDENDUM #3</b>		<b>DDF</b>	<b>3/1/2024</b>
NO.	ISSUE/DESCRIPTION	BY	DATE
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS PIER UPGRADES AND WATERFRONT IMPROVEMENTS CASTINE, MAINE			
WEST BULKHEAD AND RETAINING WALL PLAN - 2			
PREPARED BY: <b>GZA</b> Geotechnical, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: <b>MAINE MARITIME ACADEMY CASTINE, ME</b>	
PROJ MGR: RKC	REVIEWED BY: CWC	CHECKED BY: DDF	<b>DRAWING</b>
DESIGNED BY: AFS	DRAWN BY: MEA	SCALE: AS NOTED	<b>S-106</b>
DATE: JANUARY 2024	PROJECT NO. 03.0035109.00	REVISION NO.	SHEET NO. 35 OF 142

© 2024 - GZA Geotechnical, Inc. BULKHEAD PLAN\_ADD\_2024-10-29.DWG S-106 WEST BULKHEAD-2 (SUBSURFACE) February 28, 2024 MICHAEL ALBIN

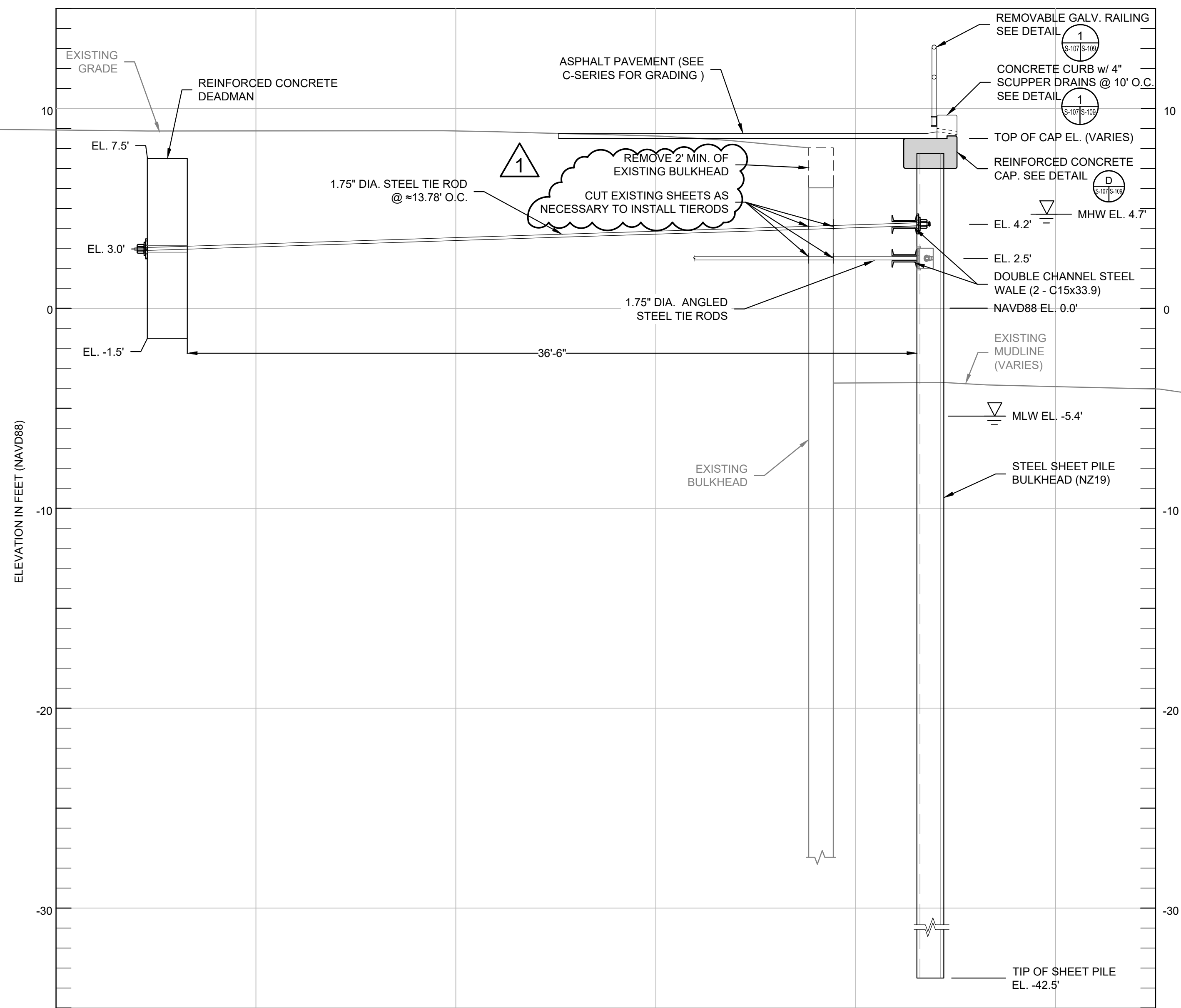




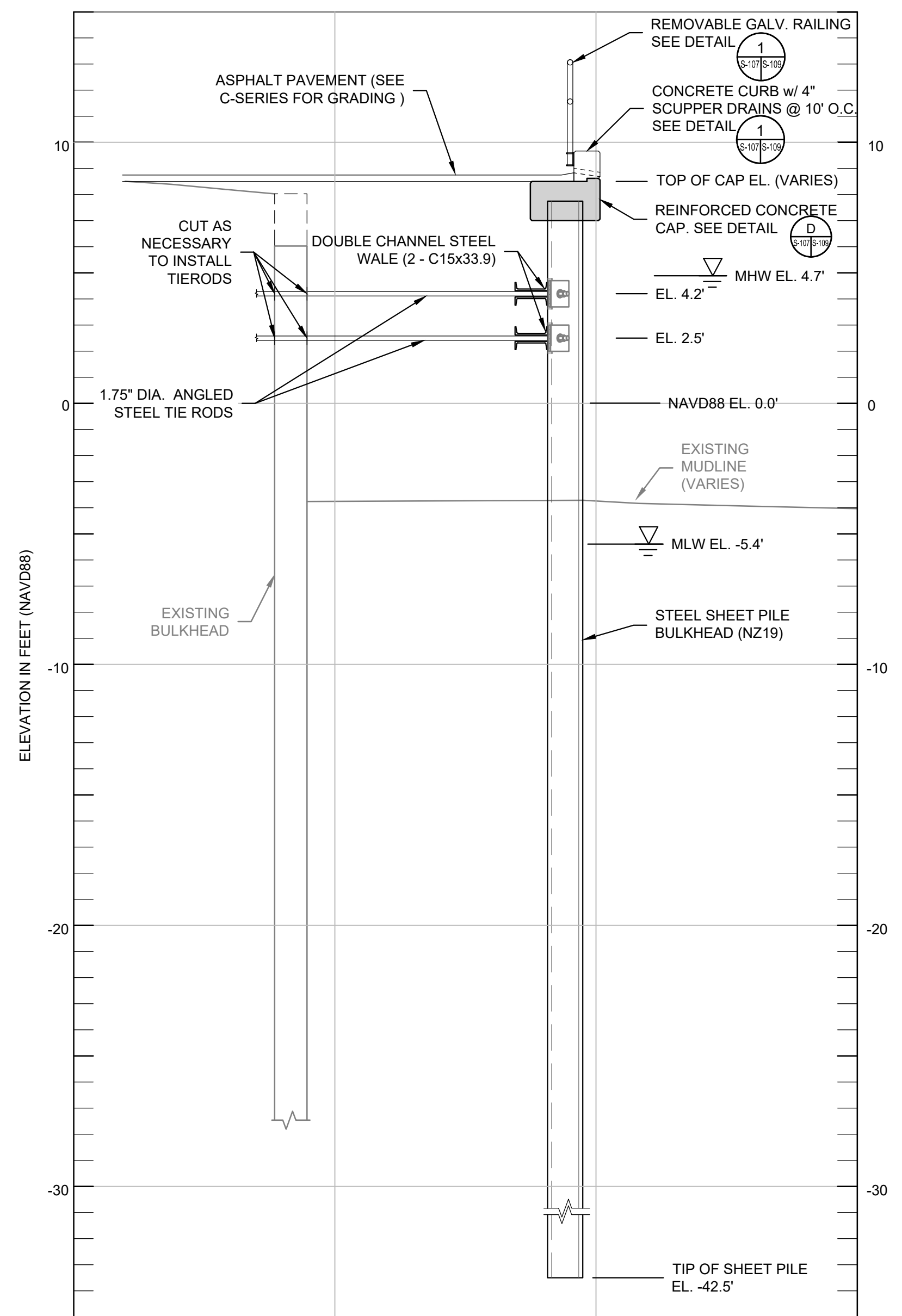
**A** SECTION - WEST RETAINING WALL  
SCALE: 1" = 4'



**B** SECTION - WEST RETAINING WALL  
SCALE: 1" = 4'



**C** SECTION - WEST SHEET PILE BULKHEAD  
SCALE: 1" = 4'



**D** SECTION - WEST SHEET PILE BULKHEAD  
SCALE: 1" = 4'

- NOTES:**
1. MODULAR BLOCK WALL SYSTEM SHOWN IS SCHEMATIC AND DOES NOT REPRESENT FINAL CONDITIONS. WALL SHALL BE CONSTRUCTED PER THE PROJECT SPECIFICATIONS AND MANUFACTURER RECOMMENDATIONS.

**I.F.B.**  
**NOT FOR CONSTRUCTION**  
**JANUARY 26, 2024**



ADDENDUM #3		DDF	3/1/2024
NO.	ISSUE/DESCRIPTION	BY	DATE

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**MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE**

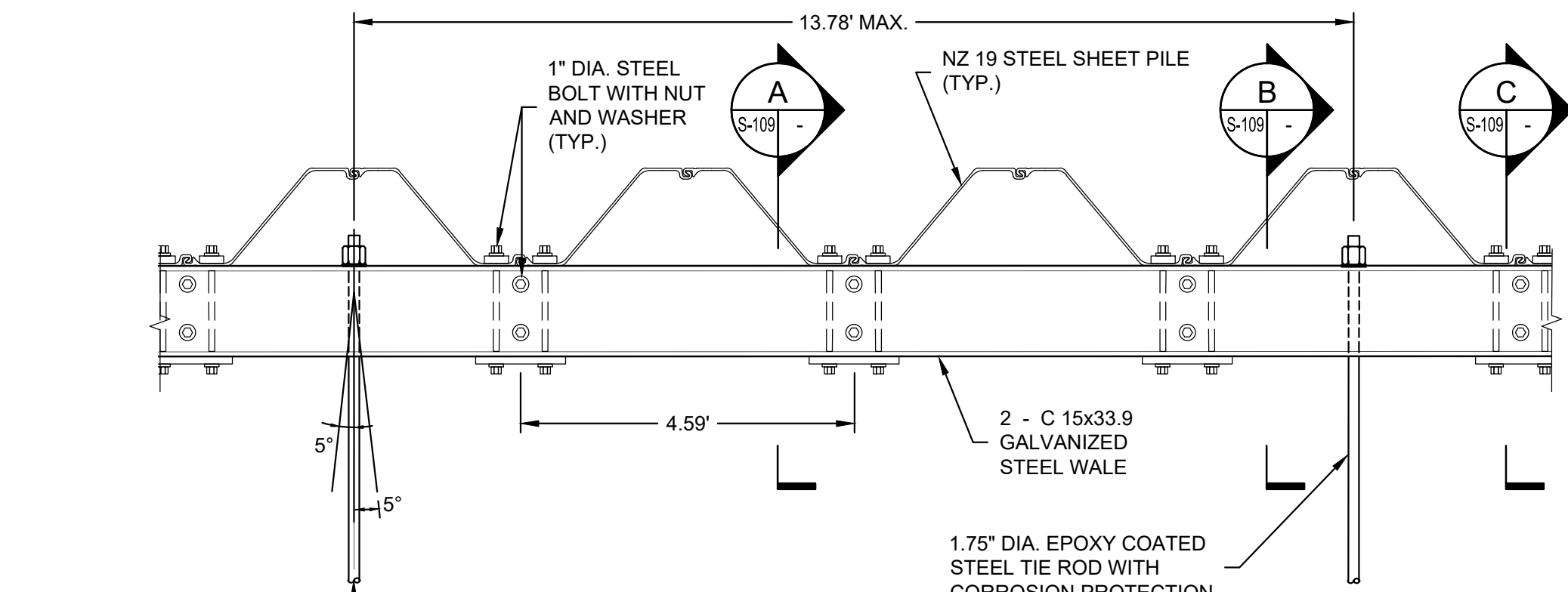
**WEST BULKHEAD AND RETAINING WALL SECTIONS - 1**

PREPARED BY: <b>GZA</b> GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME
PROJ MGR: RKC DESIGNED BY: AFS DATE: JANUARY 2024	REVIEWED BY: CWC DRAWN BY: MEA PROJECT NO.: 35109.00
CHECKED BY: DDF SCALE: AS NOTED REVISION NO.:	<b>S-107</b> SHEET NO. 36 OF 142

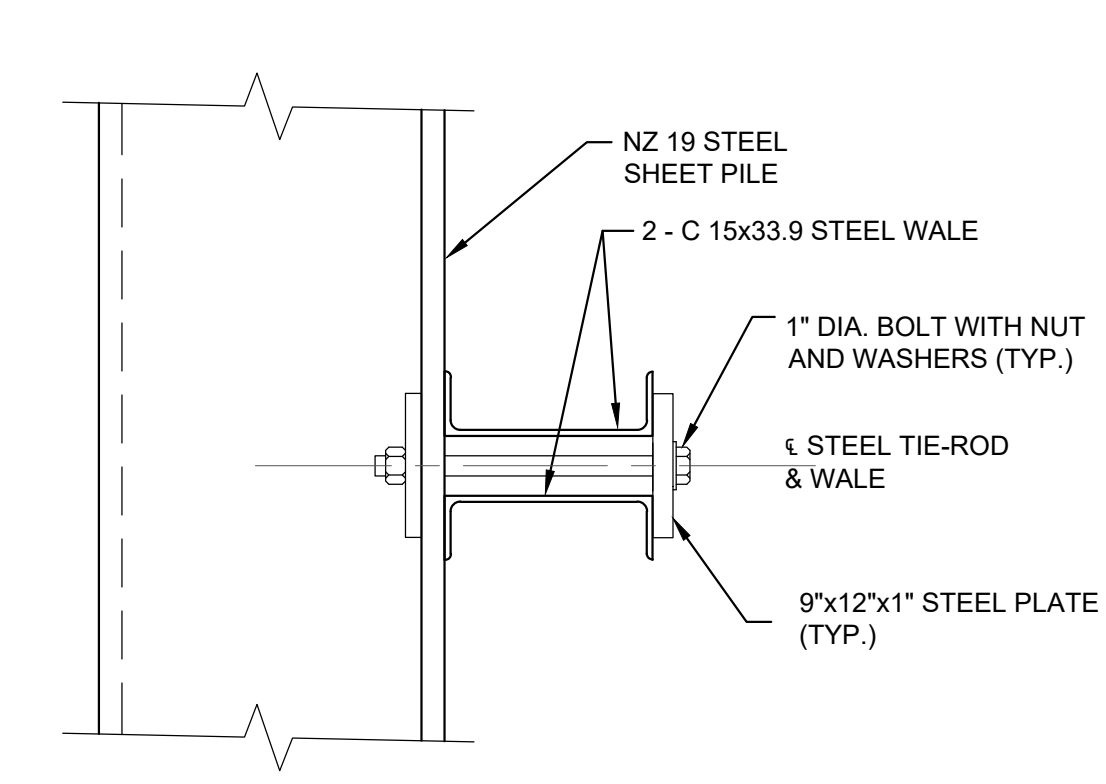
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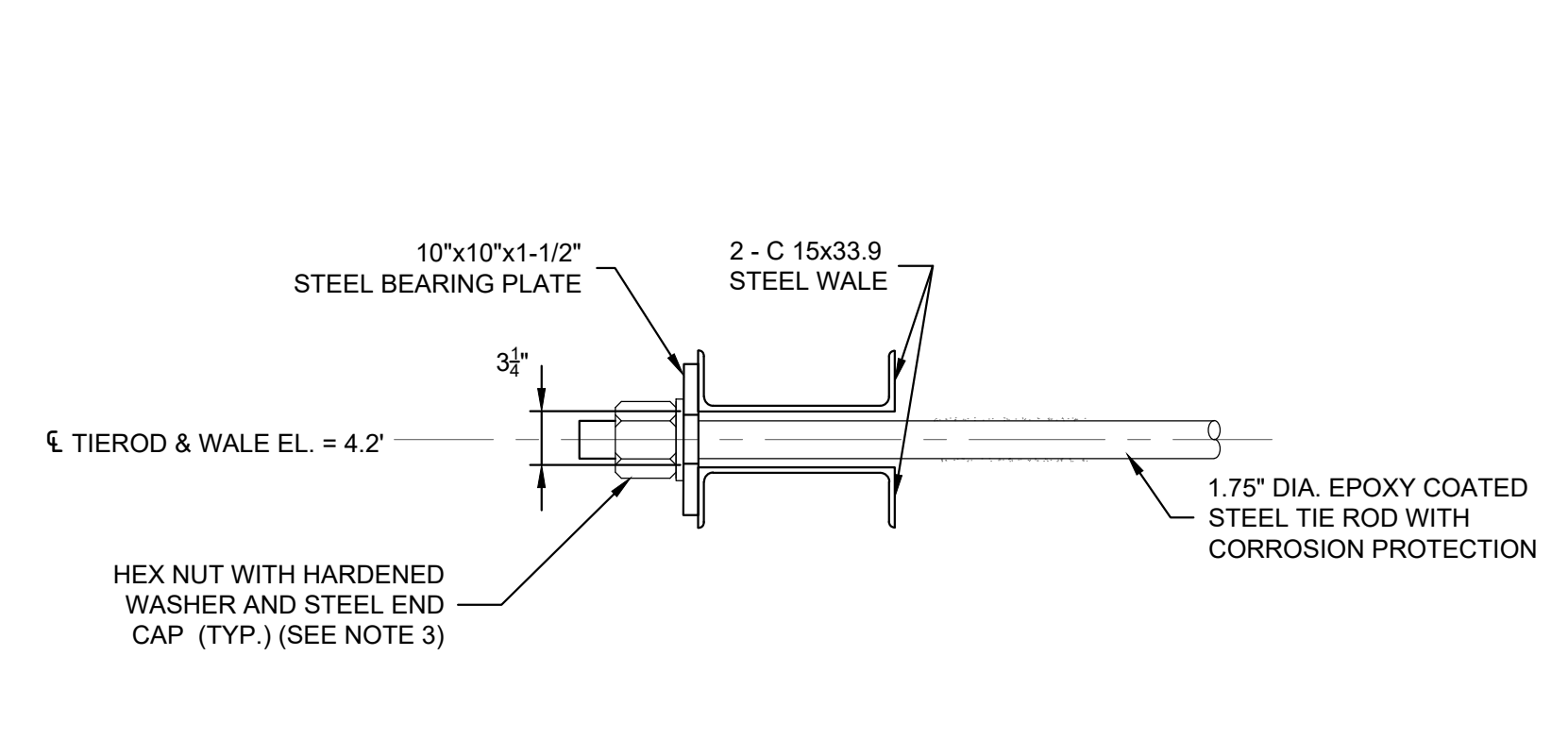




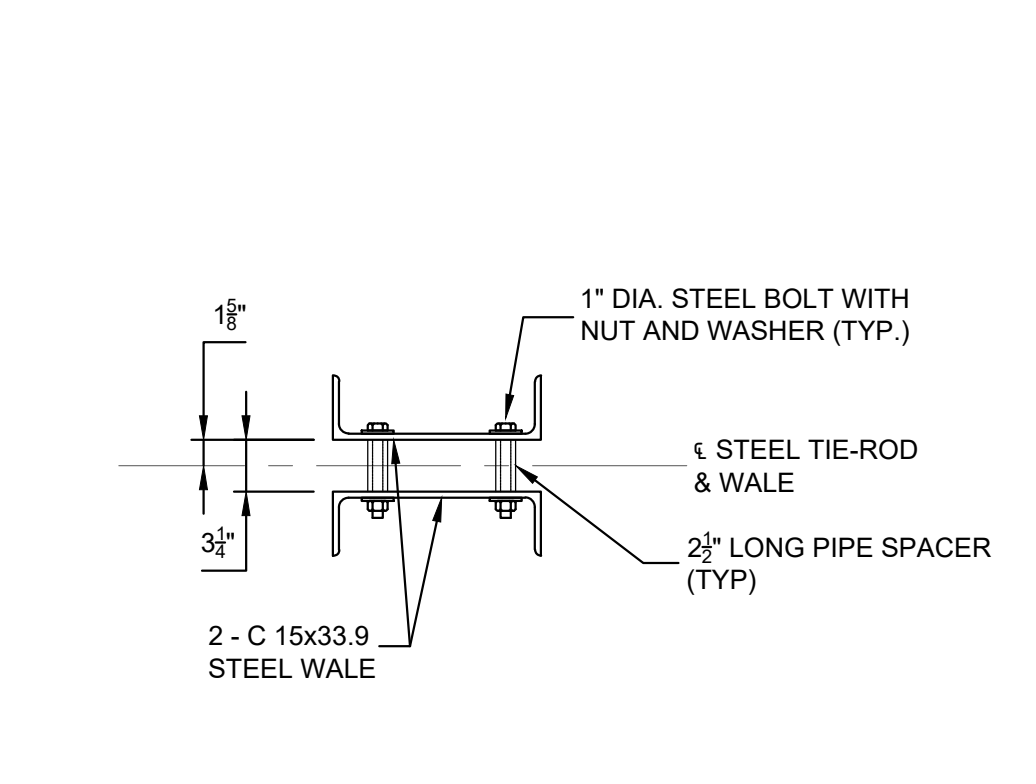
**1 PARTIAL PLAN - SHEET PILE WALL W/ TIEBACK ANCHORS (TYP.)**  
SCALE: 1"=2'



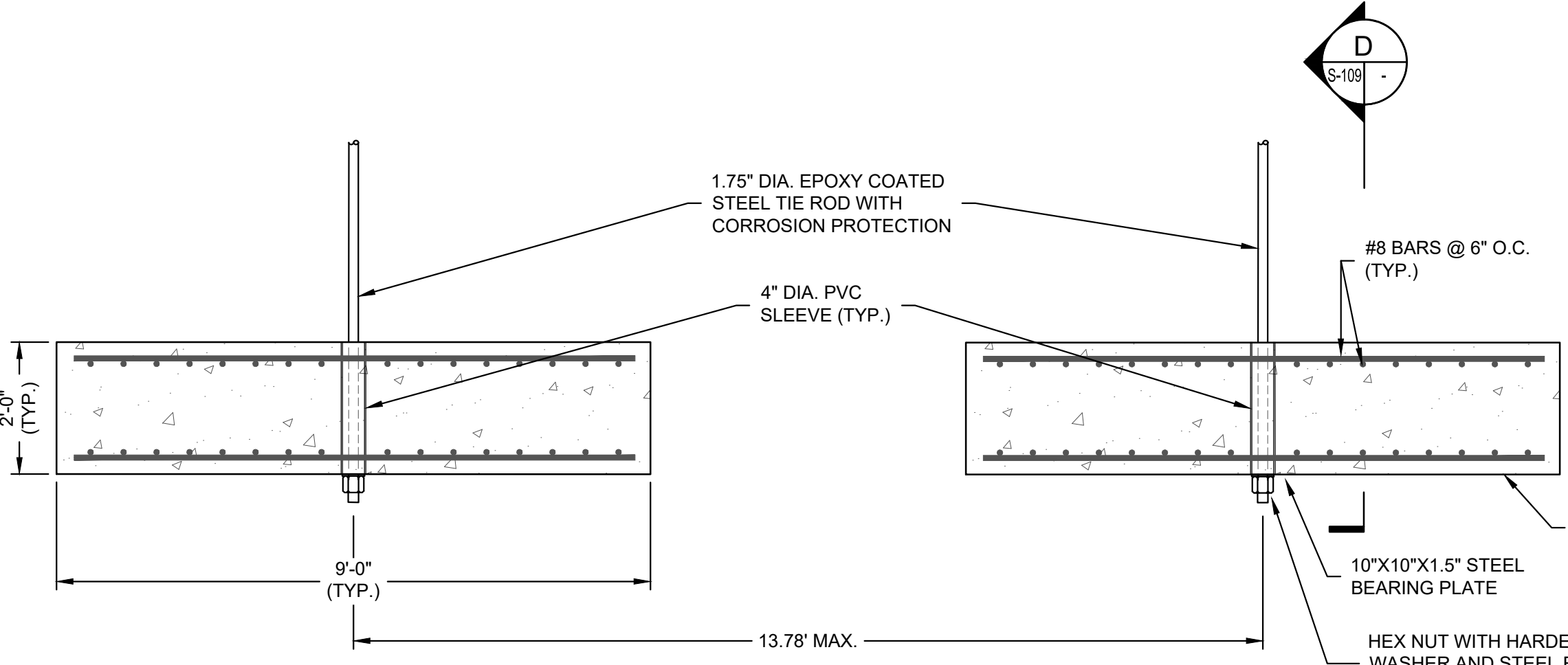
**A SECTION - C 15x33.9 SHEET PILE/WALE CONNECTION**  
NOT TO SCALE



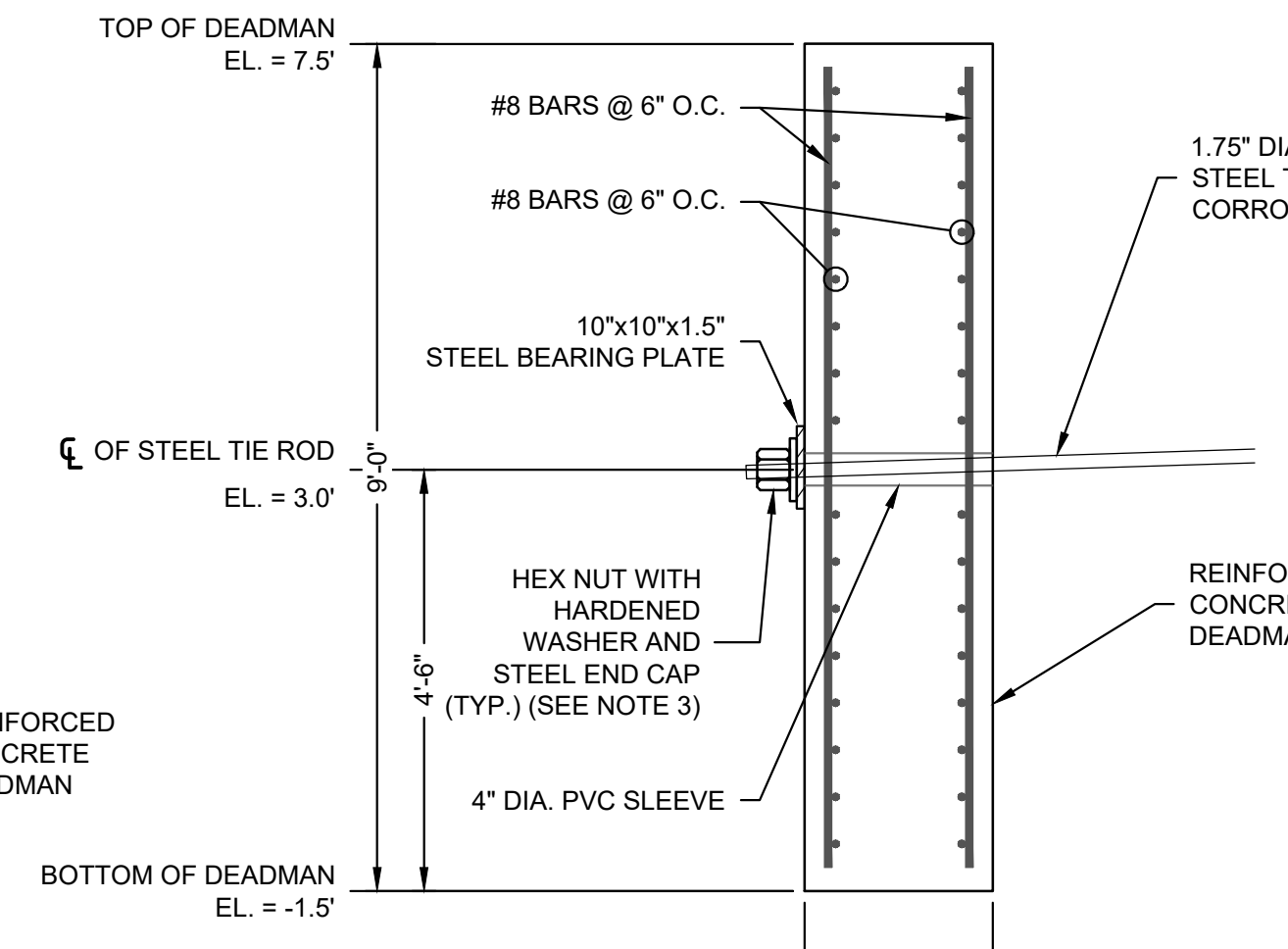
**B SECTION - TIE ROD CONNECTION**  
NOT TO SCALE



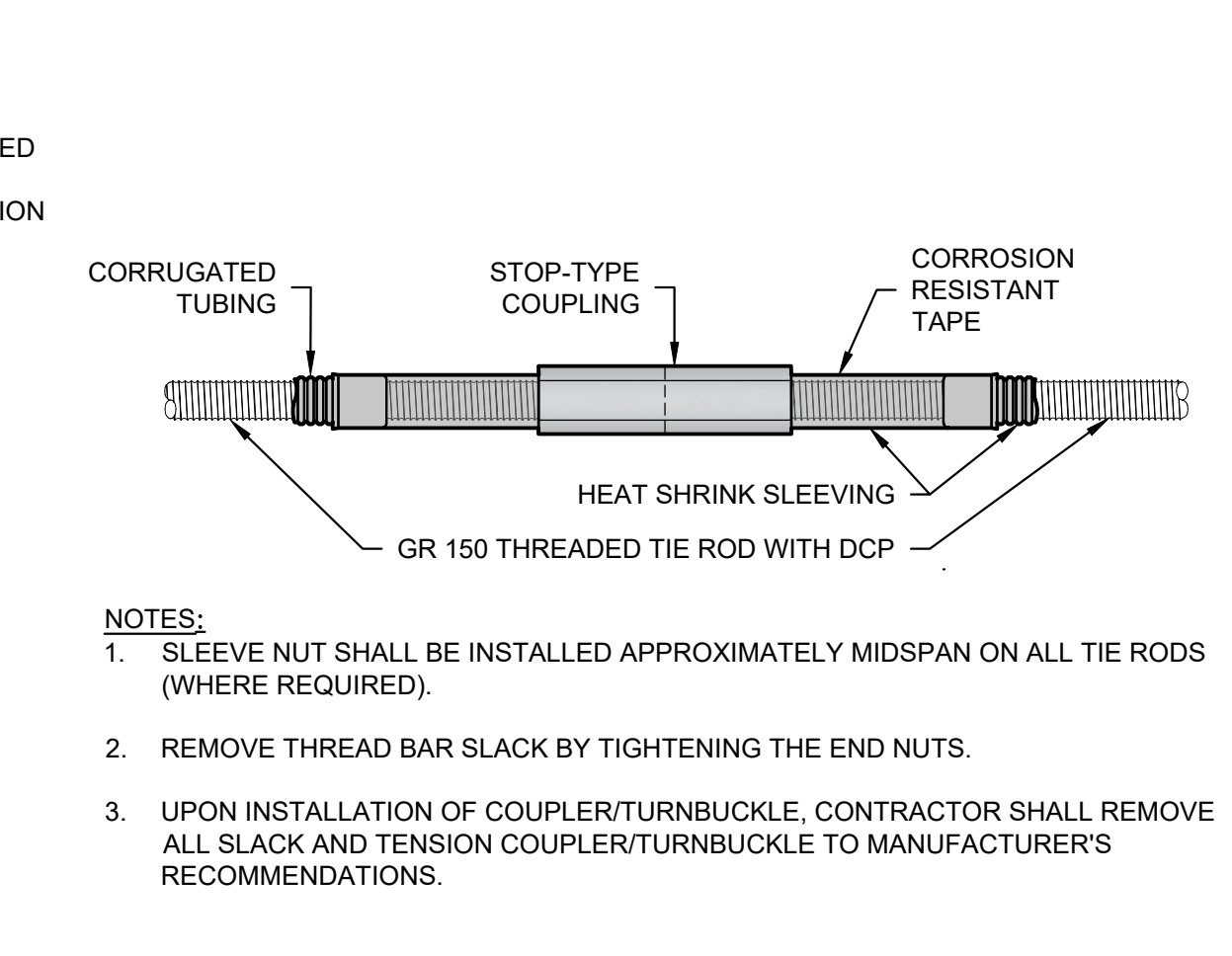
**C SECTION - WALE SPACER CONNECTION**  
NOT TO SCALE



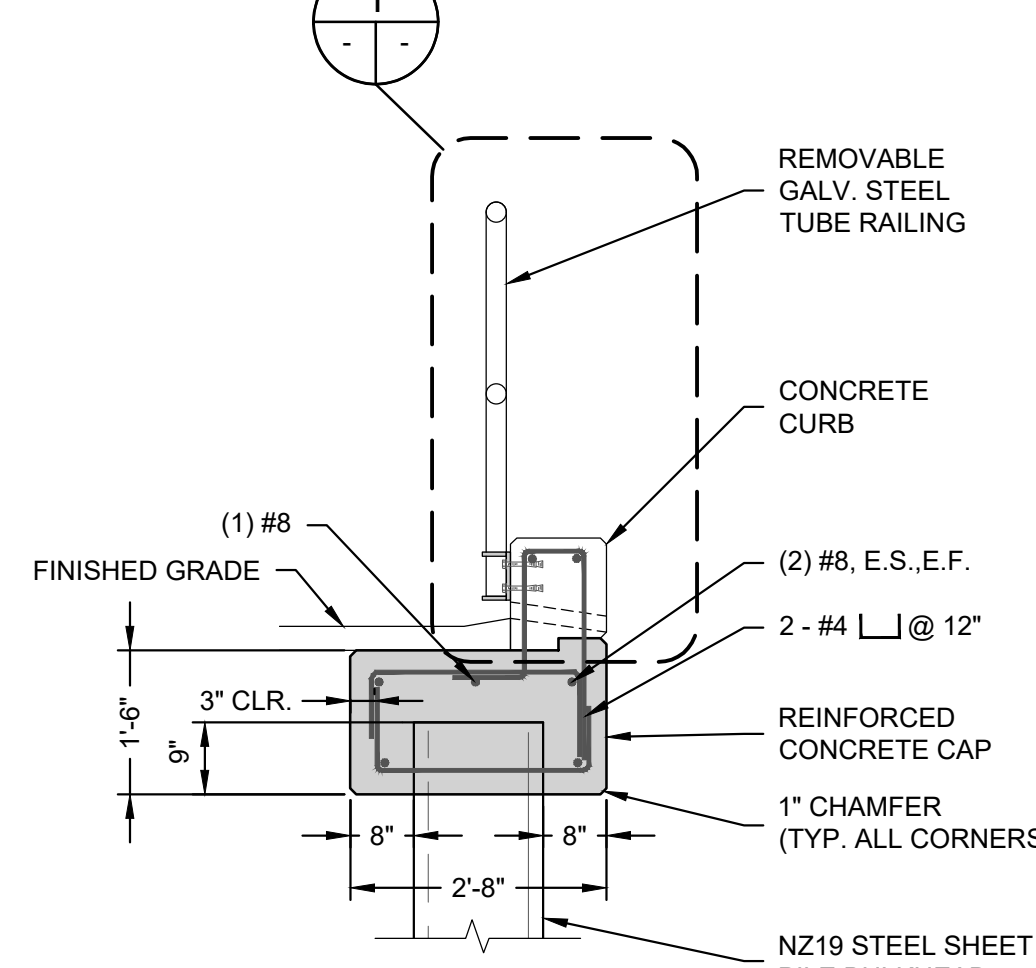
**2 PARTIAL PLAN - CONCRETE DEADMAN W/ TIEBACK ANCHORS**  
SCALE: 1"=2'



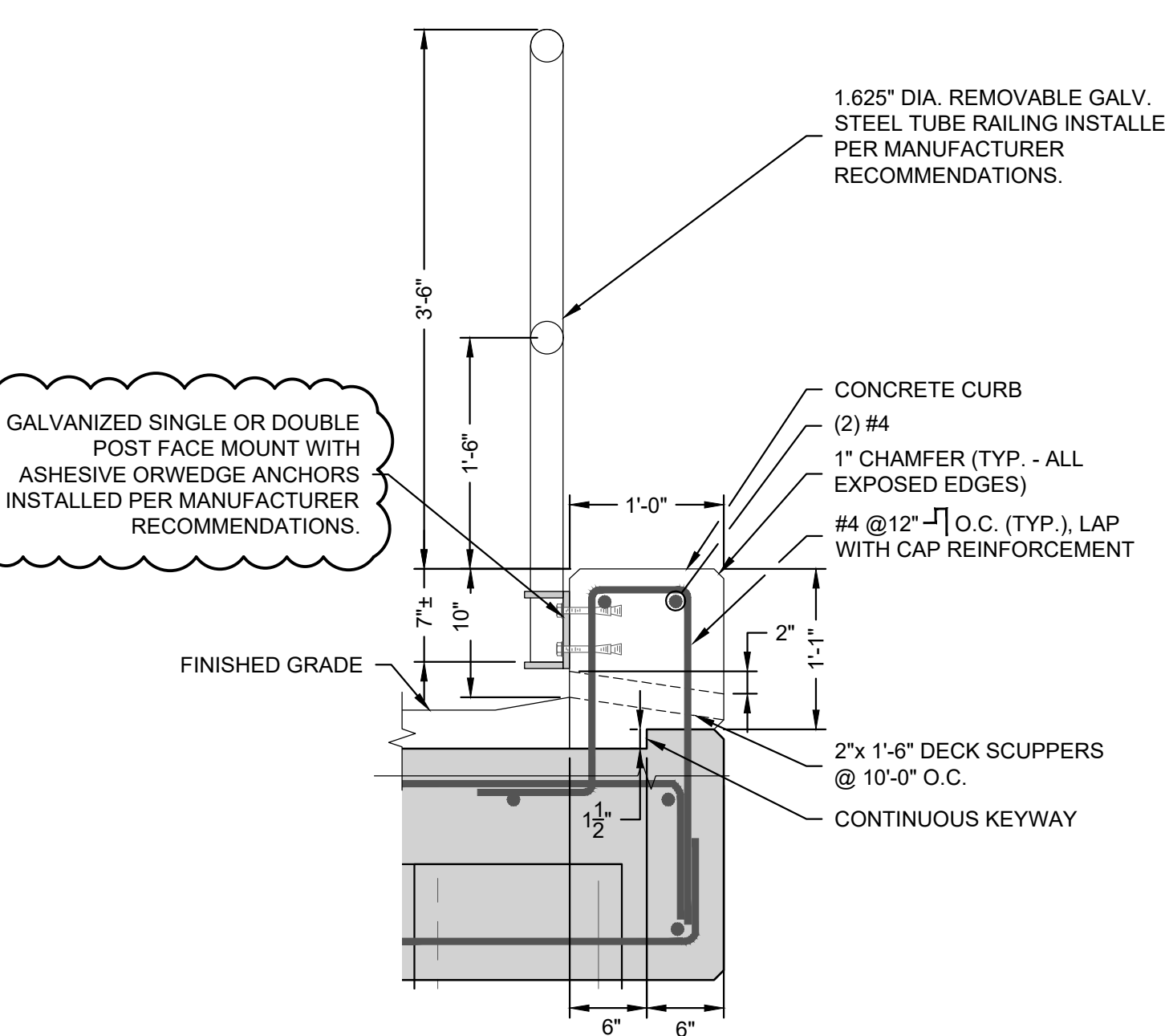
**D SECTION - CONCRETE DEADMAN W/ TIEBACK ANCHORS**  
SCALE: 1"=2'



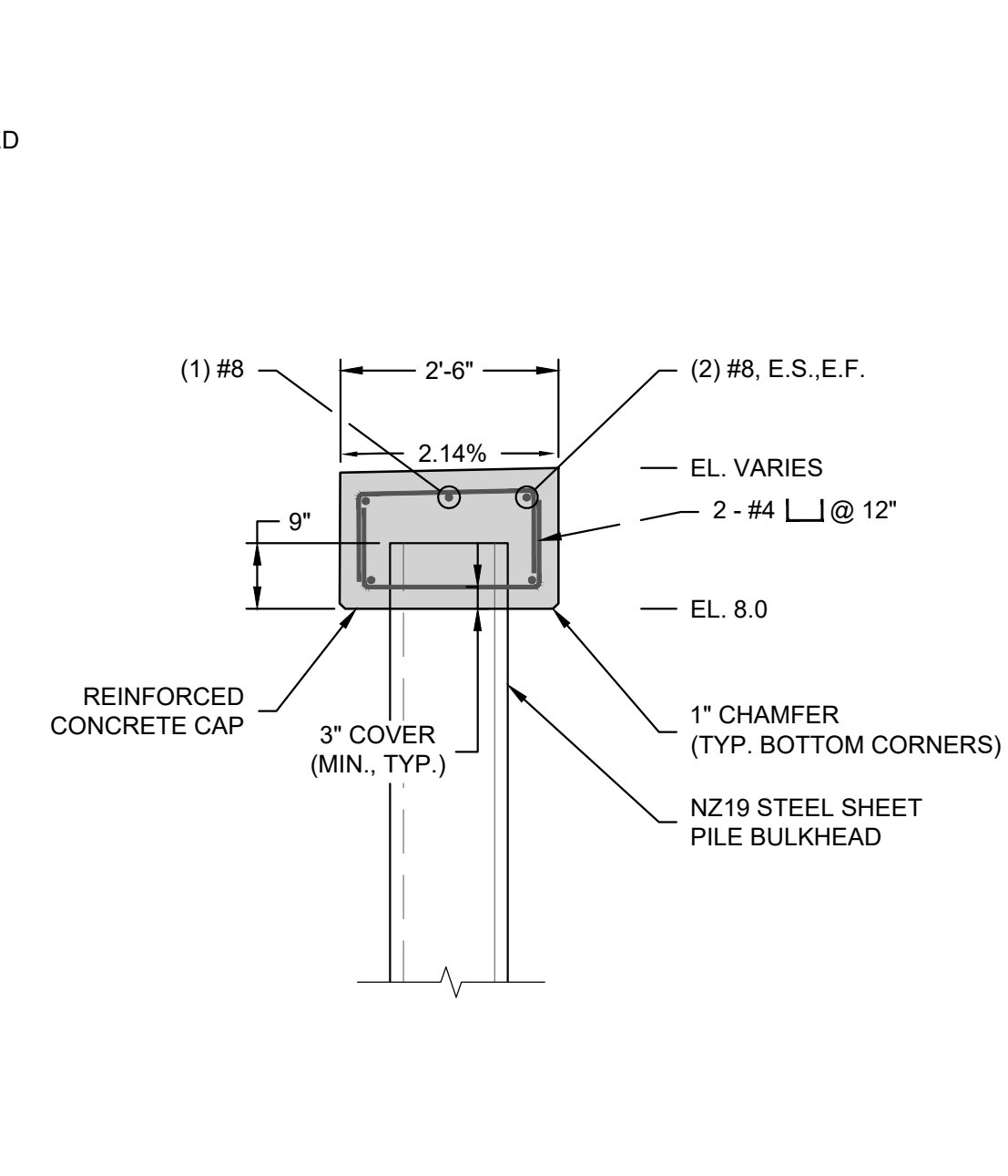
**5 DETAIL - THREAD BAR COUPLER**  
SCALE: 1"=1'



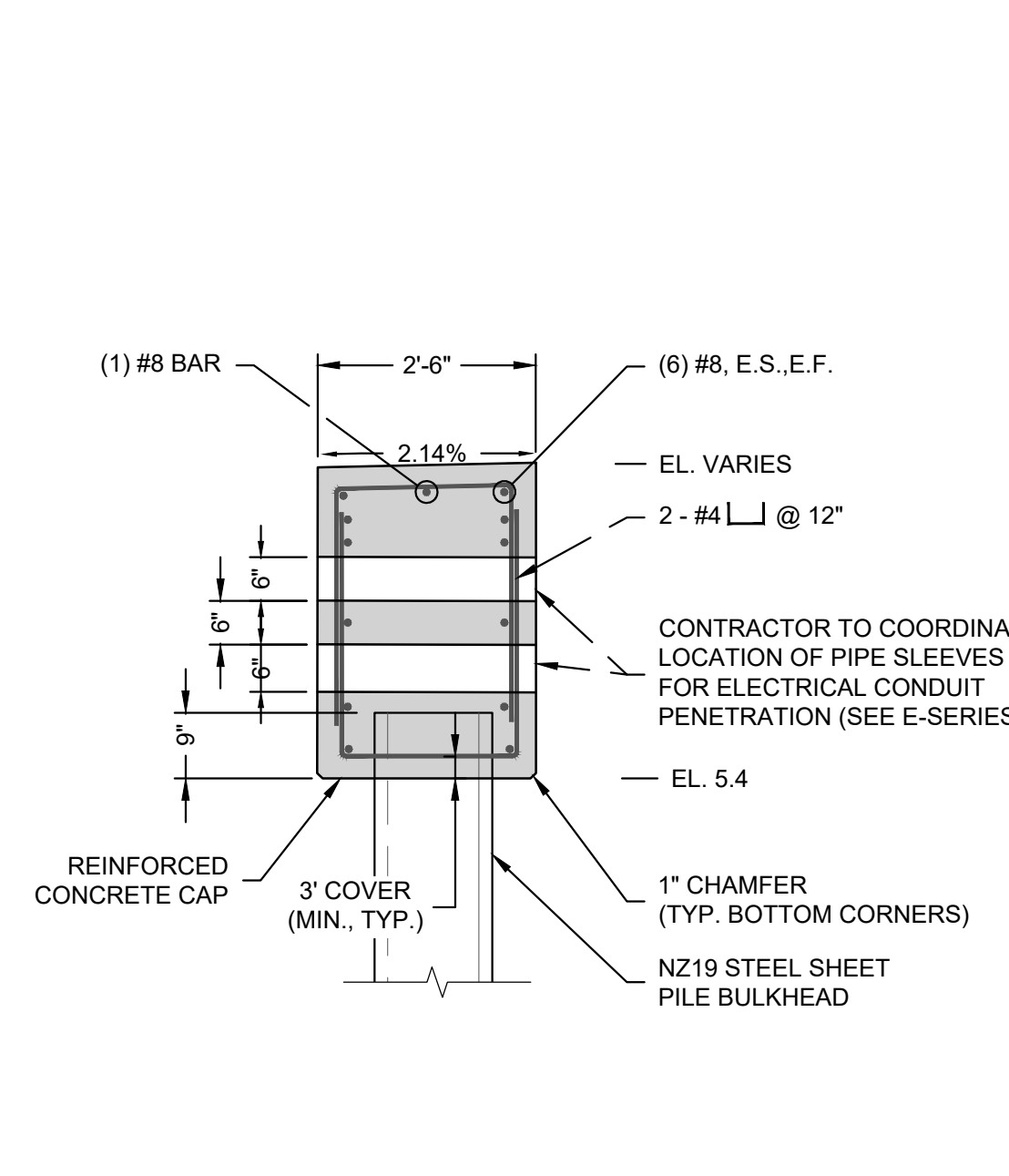
**D SECTION - CONCRETE BULKHEAD CAP**  
SCALE: 1"=2'



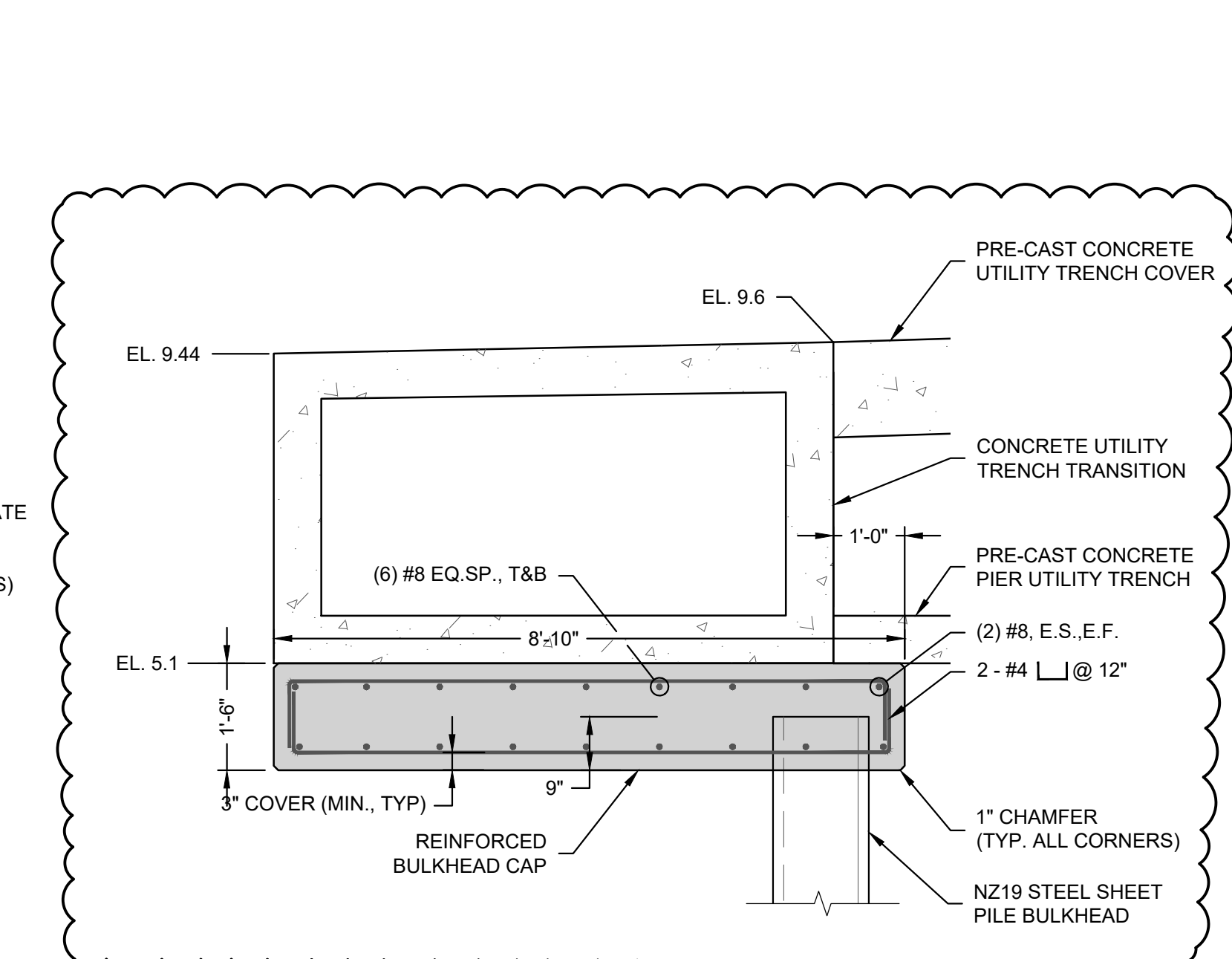
**1 DETAIL - CONCRETE CURB AND RAILING**  
SCALE: 1"=1'



**D SECTION - CONCRETE CAP AT PIER TRANSITION**  
SCALE: 1"=2'



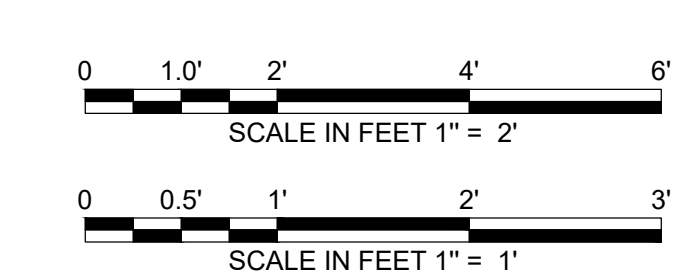
**E SECTION - CONCRETE CAP AT ELECTRICAL TRENCH**  
SCALE: 1"=2'



**F SECTION - CONCRETE CAP AT MECHANICAL TRENCH**  
SCALE: 1"=2'

- NOTES:**
- NO TORCH CUTTING OR BURNING OF STEEL SHALL BE DONE TO INSTALL FASTENERS. BOLT HOLES FOR INSTALLING HARDWARE SHALL BE MADE ONLY BY MAG-DRILLING.
  - ALL BOLT HOLES ARE STANDARD SIZE PER AISC UNLESS OTHERWISE NOTED.
  - PROVIDE STEEL END CAP AT EACH TIE BACK HEX NUT. PACK END CAP WITH CORROSION INHIBITING GREASE OR WAX PRIOR TO INSTALLATION.

**I.F.B.**  
**NOT FOR CONSTRUCTION**  
**JANUARY 26, 2024**



ADDENDUM #3			
NO.	ISSUE/DESCRIPTION	DDF	3/1/2024

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MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE

**WEST BULKHEAD AND RETAINING WALL DETAILS - 1**

PREPARED BY: **GZA GeoEnvironmental, Inc.** Engineers and Scientists  
www.gza.com

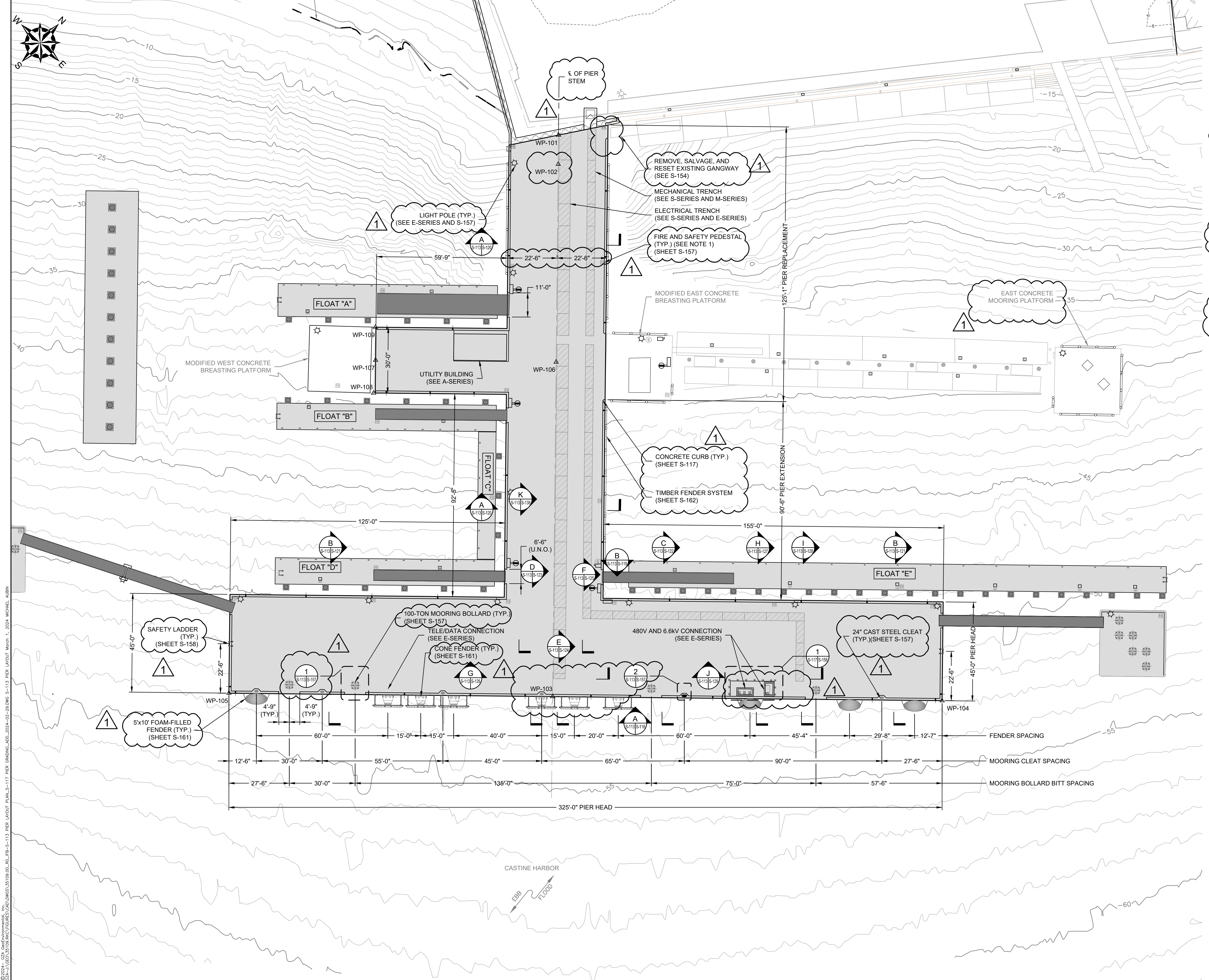
PREPARED FOR: MAINE MARITIME ACADEMY  
CASTINE, ME

PROJ MGR: RKC REVIEWED BY: CWC CHECKED BY: DDF  
DESIGNED BY: AFS DRAWN BY: MEA SCALE: AS NOTED  
DATE: JANUARY 2024 PROJECT NO. 35109.00 REVISION NO. **S-109**

**S-109**  
SHEET NO. 38 OF 142

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**LEGEND:**

DESCRIPTION	EXISTING
FIRE AND SAFETY PEDESTAL	FS
PUMP OUT STATION	U
POWER PEDESTAL	U
100-TON SINGLE BITT BOLLARD	⊙
CLEAT	*
EQUIPMENT SAFETY BOLLARD	*
LIGHT POLE AND FIXTURE	☀
JUNCTION BOX FIXTURE	⊕
LAYOUT WORKING POINT (SEE NOTE 4)	△

- NOTES:**
1. THE CONTRACTOR SHALL COORDINATE FINAL LOCATIONS OF FIRE AND SAFETY PEDESTALS WITH MMA, ACCORDING TO SPACING REQUIREMENTS NOTED ON SHEET S-157.
  2. THE CONTRACTOR SHALL COORDINATE WITH THE GANGWAY AND CATWALK MANUFACTURER TO DETERMINE THE NECESSARY CLEARANCES REQUIRED TO INSTALL GANGWAYS AND CATWALKS. CURB CUTS SHALL BE THE MINIMUM NECESSARY TO FACILITATE GANGWAY AND CATWALK INSTALLATION.
  3. SEE PIER DECK GRADING PLAN (S-117) FOR SCUPPER LAYOUT.
  4. SEE WATERFRONT STRUCTURES LAYOUT PLAN (S-104) FOR WORKING POINT (WP) COORDINATES.

**I.F.B.**  
**NOT FOR CONSTRUCTION**  
**JANUARY 26, 2024**



NO.	ISSUE/DESCRIPTION	DDF	3/1/2024
1	ADDENDUM #3		

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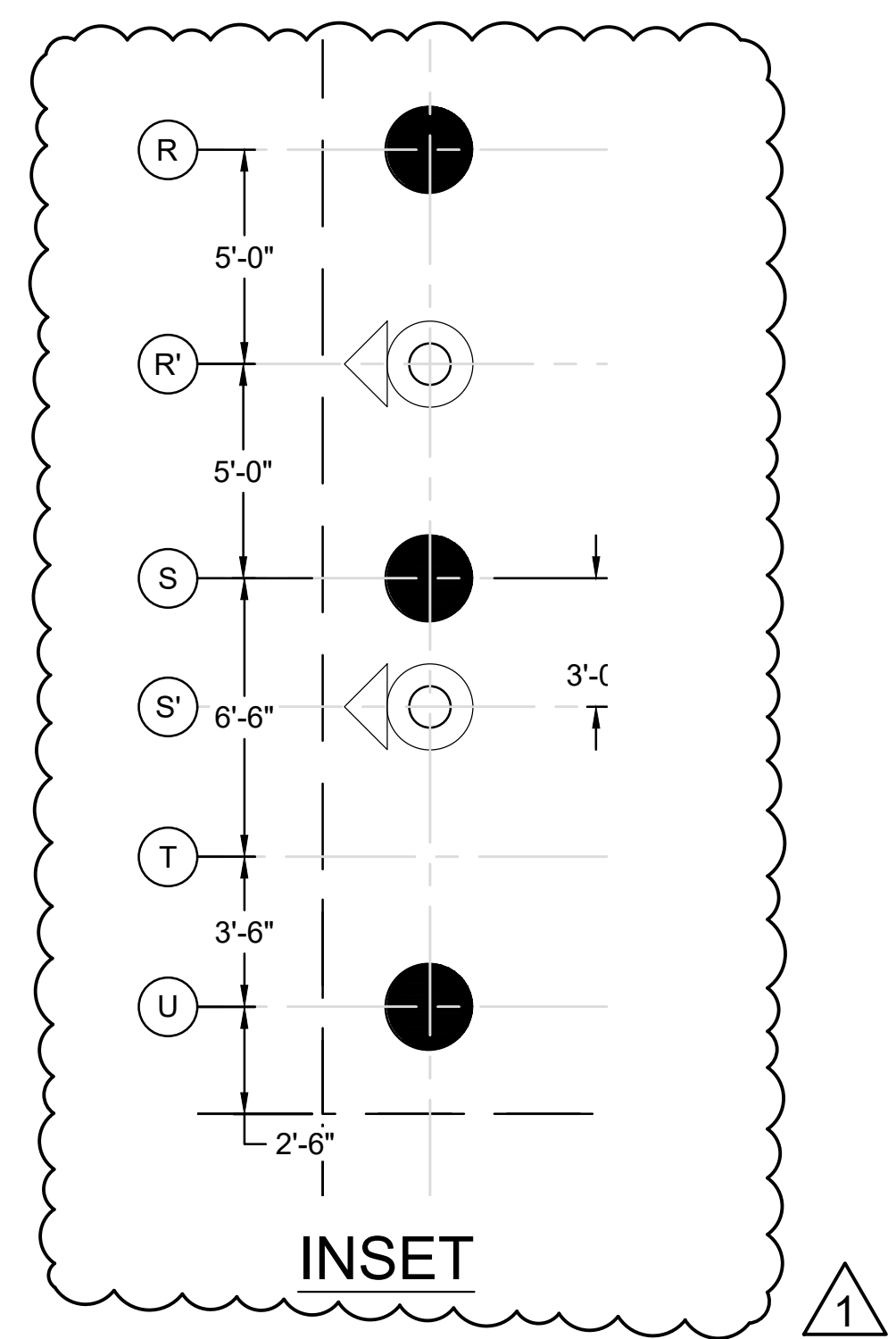
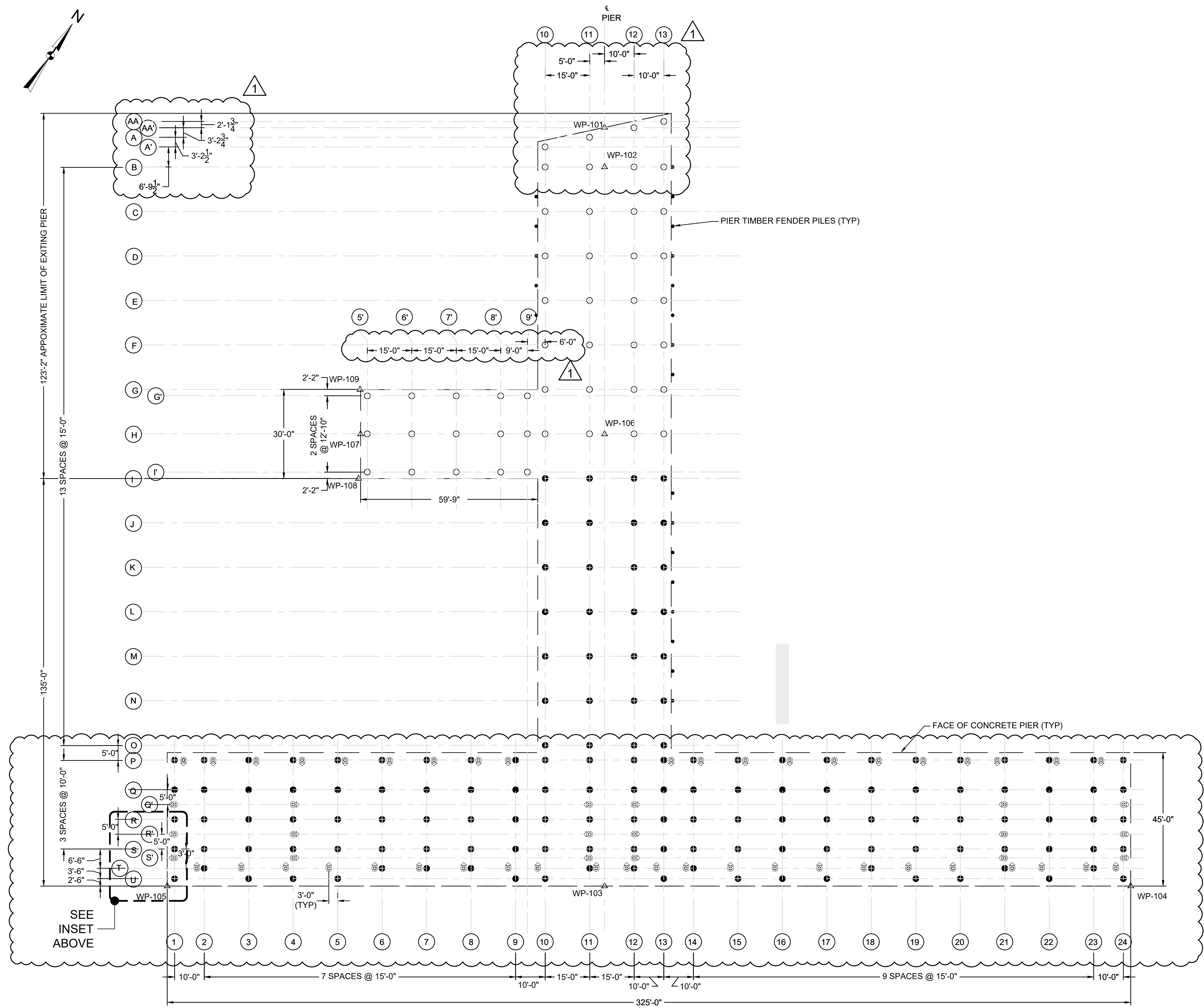
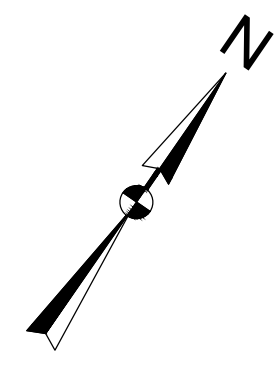
**MAINE MARITIME ACADEMY WATERFRONT CAMPUS**  
**PIER UPGRADES AND WATERFRONT IMPROVEMENTS**  
**CASTINE, MAINE**

**PIER LAYOUT PLAN**

PREPARED BY: 	PREPARED FOR: <b>MAINE MARITIME ACADEMY</b> <b>CASTINE, ME</b>
PROJ MGR: RKC DESIGNED BY: AFS DATE: JANUARY 2024	REVIEWED BY: CWC DRAWN BY: MEA PROJECT NO. 03.0035109.00
CHECKED BY: DDF SCALE: AS NOTED REVISION NO.	<b>DRAWING</b> <b>S-113</b> SHEET NO. 42 OF 142

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**LEGEND**

- ① PILE BENT NUMBER
- A PILE ROW DESIGNATION
- TIMBER FENDER PILE
- PIER SUPPORT PLUMB PILE WITH 0 FT ROCK ANCHOR, 0 FT ROCK SOCKET
- PIER SUPPORT PLUMB PILE WITH 5 FT ROCK SOCKET
- ⊙ PIER SUPPORT BATTER PILE WITH 20 FT ROCK ANCHOR, 5 FT ROCK SOCKET
- WP-101 WORKING/LAYOUT POINT (SEE DRAWING S-104)

**PIER PLAN NOTES:**

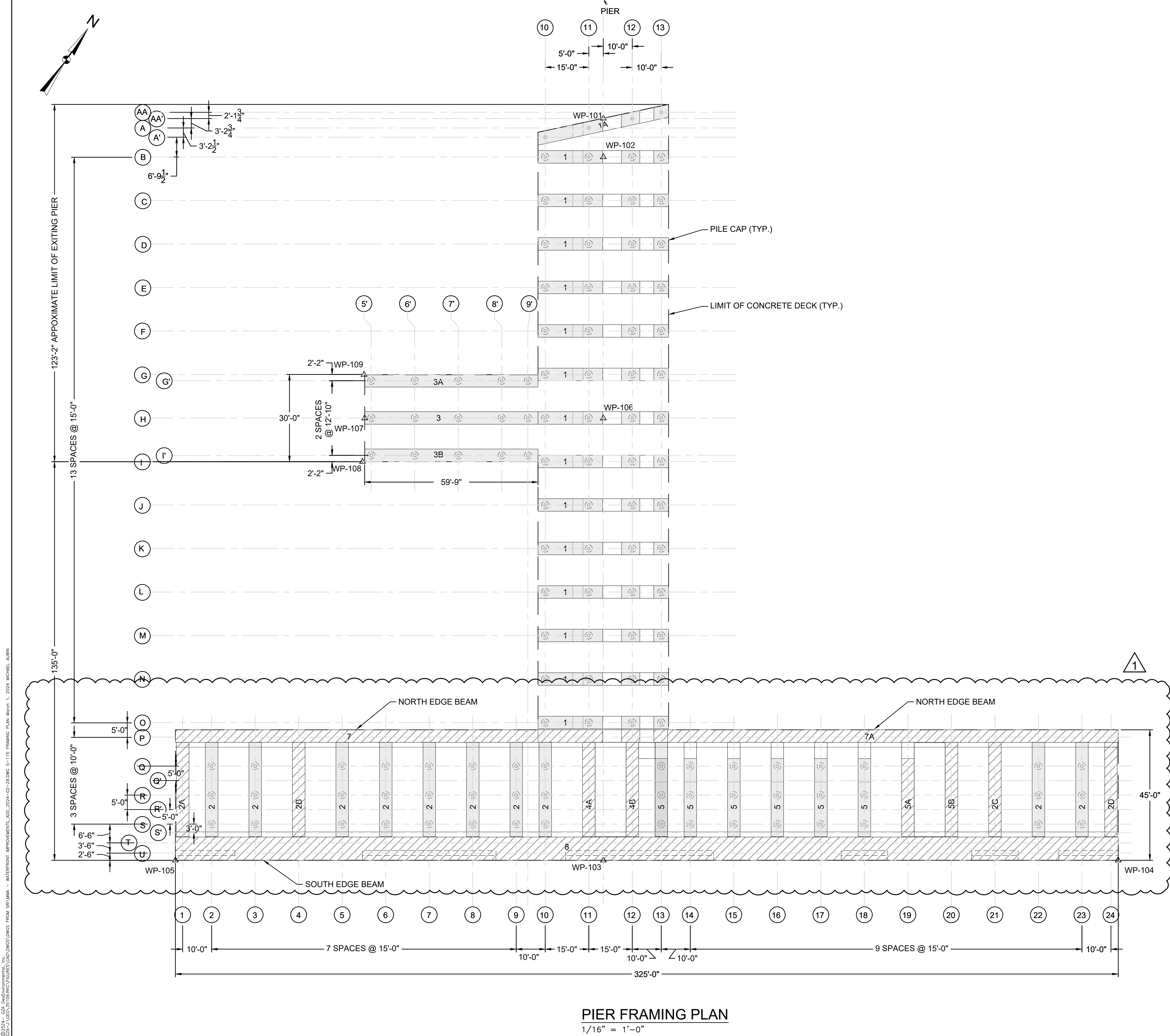
- PIER SUPPORT PILES SHALL BE 24" DIA. x 0.625" THICK STEEL PIPE PILES. SEE PROJECT SPECIFICATIONS.
- SEE SHEET S-133 FOR ROCK ANCHOR AND ROCK SOCKET INFORMATION.
- SEE SHEET S-134, PIER PILE TABLE FOR ADDITIONAL INFORMATION.
- SEE WATERFRONT STRUCTURES LAYOUT PLAN (S-104) FOR WORKING POINT (WP) COORDINATES.

**I.F.B.**  
NOT FOR CONSTRUCTION  
JANUARY 26, 2024

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NO.	ISSUE/DESCRIPTION	BY	DATE
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS PIER UPGRADES AND WATERFRONT IMPROVEMENTS CASTINE, MAINE			
PIER PILE PLAN			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME	
PROJ MGR: RKC	DESIGNED BY: MAR/AFS	REVIEWED BY: CWC	CHECKED BY: DDF
DATE: JANUARY 2024	DRAWN BY: BDW/MEA	PROJECT NO: 03.0035109.00	SCALE: REVISION NO.
			S-114
			SHEET NO. 43 OF 142

**PIER PILE PLAN**  
1/16" = 1'-0"

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PILE CAP AND FRAMING MEMBERS				
PILE BENT/ROW	TYPE	DRAWING	REFERENCE	
1	2A	CIP	S-120	S-143
2, 3	2	P/C	S-121	S-137
4	2B	CIP		S-144
5 THRU 10	2	P/C	S-121	S-137
11	4A	CIP	S-123	S-140
12	4B	CIP	S-124	S-140
13 THRU 18	5	P/C	S-122	S-139
19	5A	CIP	S-127	S-141
20	5B	CIP	S-128	S-142
21	2C	CIP		S-144
22, 23	2	P/C	S-121	S-137
24	2D	CIP		S-143
AA - A'	1A	P/C		S-136
B - O	1	P/C	S-120	S-135
G'	3A	P/C		S-138
H	3	P/C		S-138
I'	3B	P/C		S-138
P	7	CIP	S-119	S-146
S', T, U	8	CIP	S-118	S-145

**LEGEND**

- 1 PILE BENT NUMBER
- A PILE ROW DESIGNATION
- 1, 1A, ETC CONCRETE FRAMING MEMBER TYPE (SEE TABLE THIS SHEET).
- PRE-CAST CONCRETE FRAMING MEMBER
- CAST-IN-PLACE CONCRETE FRAMING MEMBER (C.I.P.)

**PIER PILE CAP & FRAMING NOTES:**  
 1. SEE WATERFRONT STRUCTURES LAYOUT PLAN (S-104) FOR WORKING POINT (WP) COORDINATES.

**I.F.B.**  
 NOT FOR CONSTRUCTION  
 JANUARY 26, 2024

ADDENDUM #3		DDF	3/1/2024
NO.	ISSUE/DESCRIPTION	BY	DATE
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<b>MAINE MARITIME ACADEMY WATERFRONT CAMPUS          PIER UPGRADES AND WATERFRONT IMPROVEMENTS          CASTINE, MAINE</b>			
<b>PIER PILE CAP AND BEAM FRAMING PLAN</b>			
PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME	
PROJ MGR: RKC DESIGNED BY: MAR/BDW DATE: JANUARY 2024	REVIEWED BY: CWC DRAWN BY: BDW/MEA PROJECT NO.: 03.0035109.00	CHECKED BY: DDF SCALE: AS NOTED REVISION NO.:	<b>DRAWING</b> <b>S-115</b> SHEET NO. 44 OF 142

**PIER FRAMING PLAN**  
 1/16" = 1'-0"

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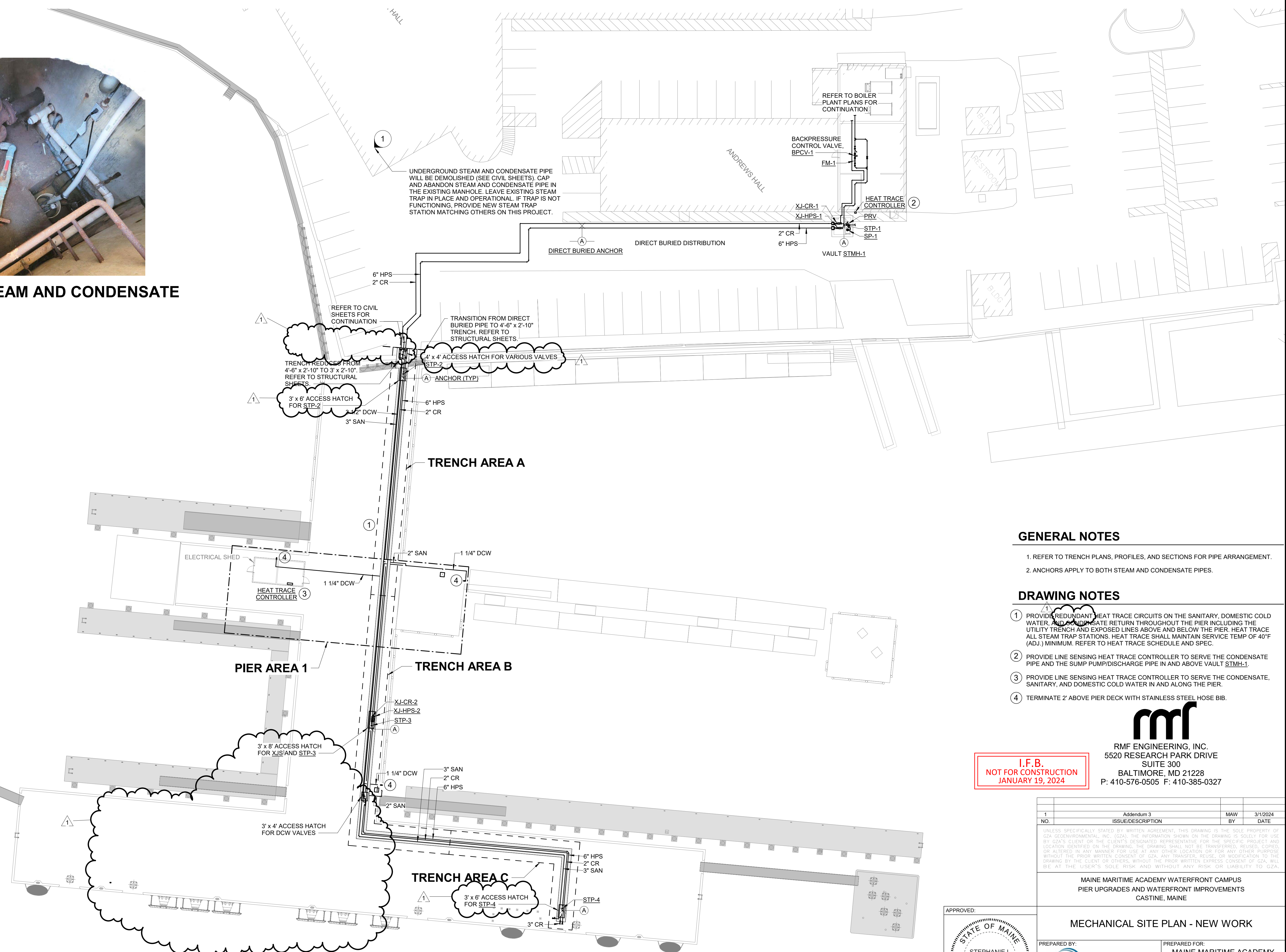








**1 UNDERGROUND STEAM AND CONDENSATE**



**GENERAL NOTES**

- REFER TO TRENCH PLANS, PROFILES, AND SECTIONS FOR PIPE ARRANGEMENT.
- ANCHORS APPLY TO BOTH STEAM AND CONDENSATE PIPES.

**DRAWING NOTES**

- PROVIDE REDUNDANT HEAT TRACE CIRCUITS ON THE SANITARY, DOMESTIC COLD WATER, AND CONDENSATE RETURN THROUGHOUT THE PIER INCLUDING THE UTILITY TRENCH AND EXPOSED LINES ABOVE AND BELOW THE PIER. HEAT TRACE ALL STEAM TRAP STATIONS. HEAT TRACE SHALL MAINTAIN SERVICE TEMP OF 40°F (ADJ.) MINIMUM. REFER TO HEAT TRACE SCHEDULE AND SPEC.
- PROVIDE LINE SENSING HEAT TRACE CONTROLLER TO SERVE THE CONDENSATE PIPE AND THE SUMP PUMP/DISCHARGE PIPE IN AND ABOVE VAULT STMH-1.
- PROVIDE LINE SENSING HEAT TRACE CONTROLLER TO SERVE THE CONDENSATE, SANITARY, AND DOMESTIC COLD WATER IN AND ALONG THE PIER.
- TERMINATE 2' ABOVE PIER DECK WITH STAINLESS STEEL HOSE BIB.

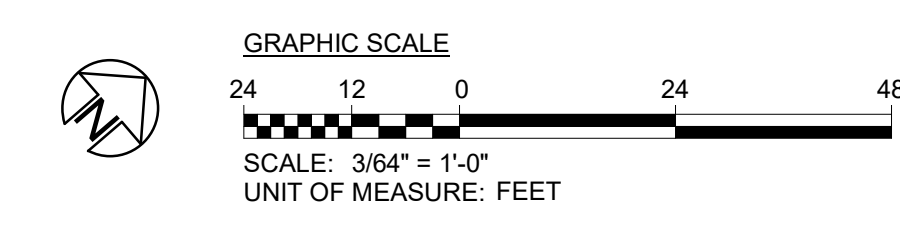
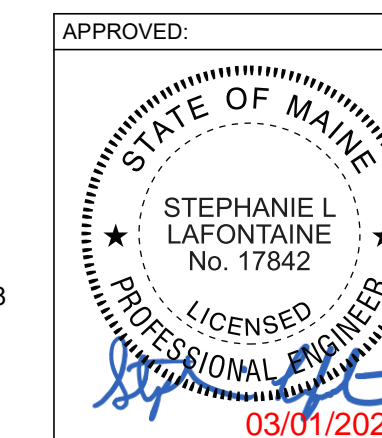
**rmf**  
 RMF ENGINEERING, INC.  
 5520 RESEARCH PARK DRIVE  
 SUITE 300  
 BALTIMORE, MD 21228  
 P: 410-576-0505 F: 410-385-0327

**I.F.B.**  
 NOT FOR CONSTRUCTION  
 JANUARY 19, 2024

NO.	ISSUE/DESCRIPTION	MAW BY	3/1/2024 DATE
1	Addendum 3	MAW	3/1/2024

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MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
 PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
 CASTINE, MAINE

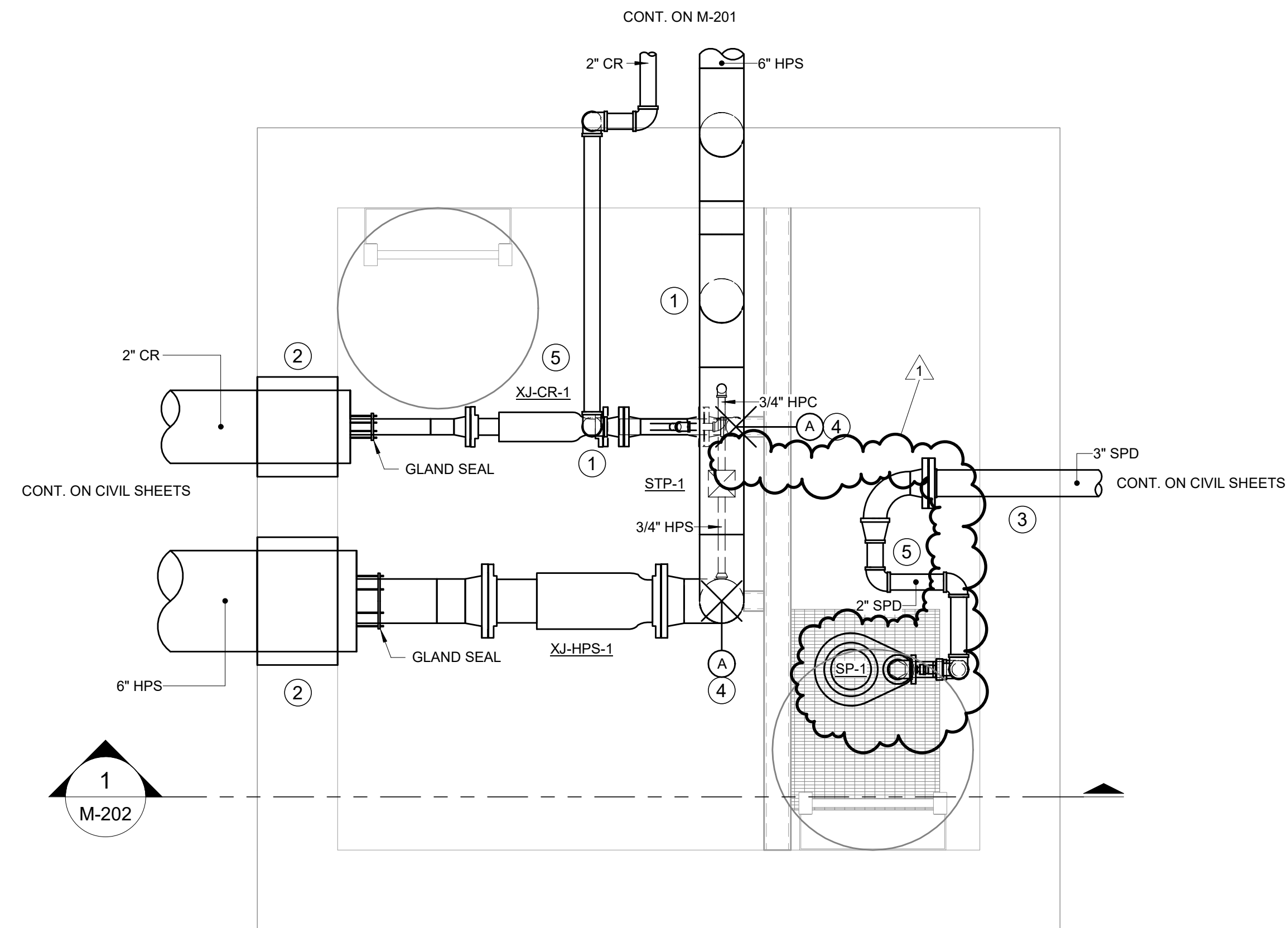


MECHANICAL SITE PLAN - NEW WORK			
PREPARED BY: <b>GZA</b>	PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME	CHECKED BY: JDE	DRAWING <b>M-200</b>
PROJ MGR: AJH	REVIEWED BY: MAW	SCALE: 3/64" = 1'-0"	REVISION NO.
DESIGNED BY: MAW	DRAWN BY: CMP	PROJECT NO.	35109.00
DATE: JANUARY 2024			

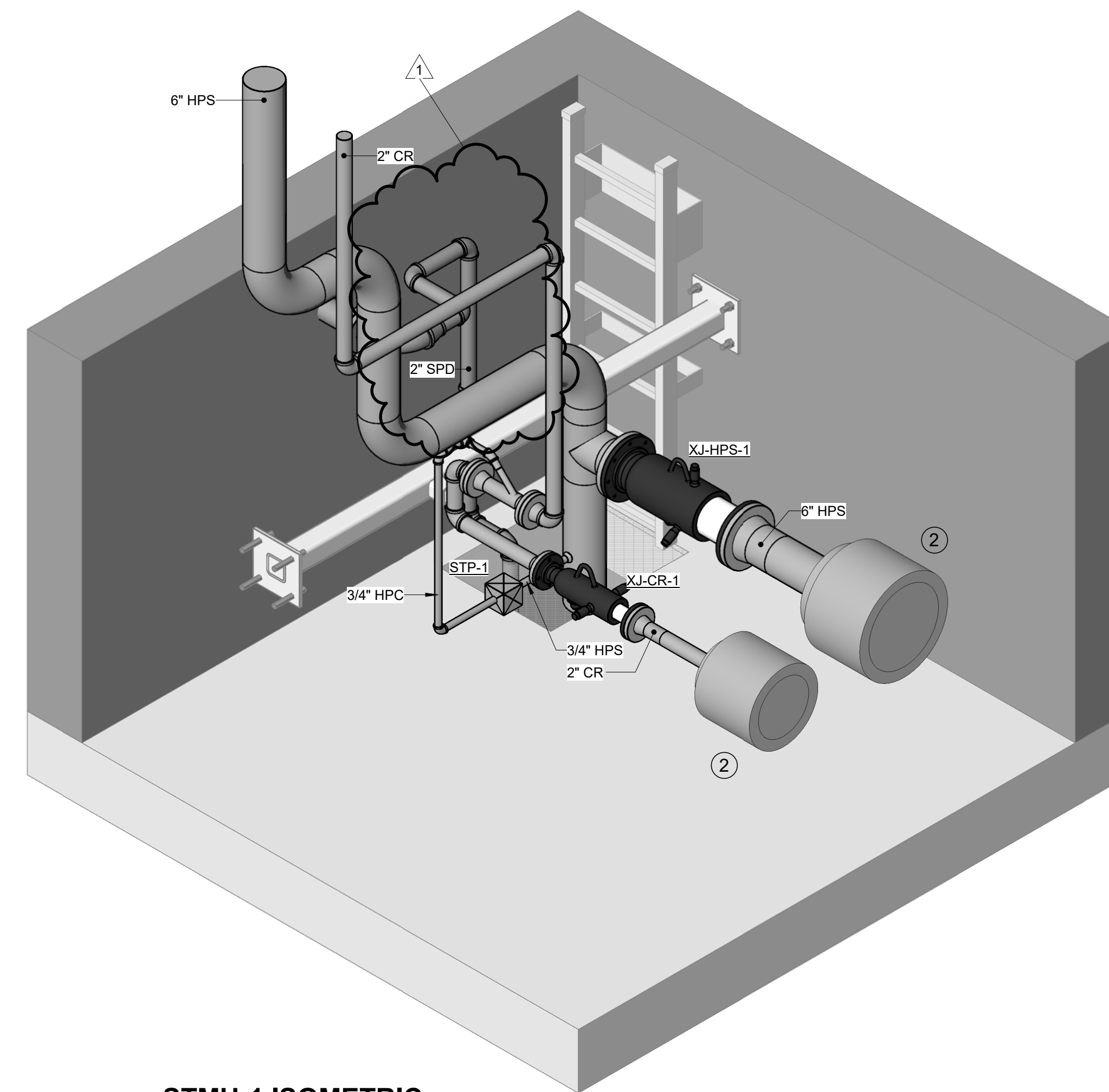


**DRAWING NOTES**

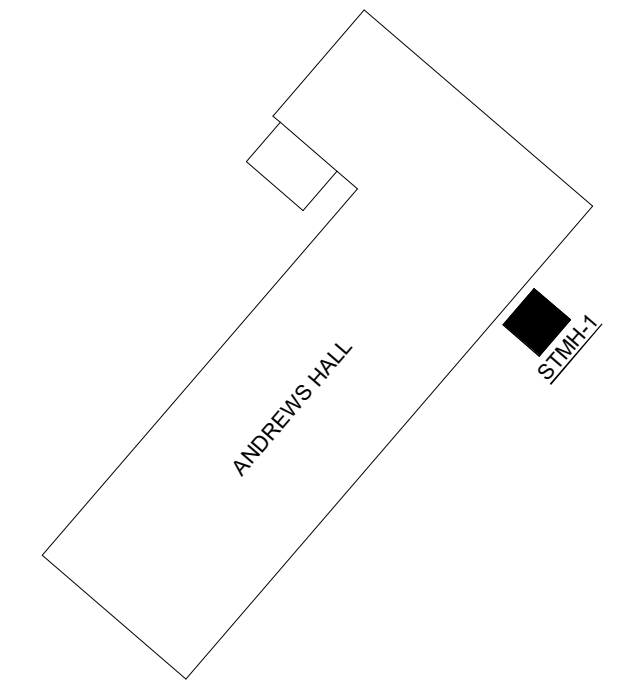
- 1 PROVIDE PENETRATION THROUGH VAULT TOP PER DETAIL 4 ON M-702.
- 2 USE GLAND SEAL FOR VAULT SIDE WALL PENETRATION, REFER TO DETAIL 2 ON M-702.
- 3 PROVIDE PENETRATION FOR SUMP PUMP DISCHARGE THROUGH VAULT WALL PER DETAIL 6 ON M-702.
- 4 PROVIDE PIPE ANCHOR, REFER TO M-203.
- 5 PROVIDE HEAT TRACE CIRCUITS ON THE SUMP PUMP/DISCHARGE PIPE AND CONDENSATE PIPE IN AND ABOVE VAULT STMH-1. HEAT TRACE ALL STEAM TRAP STATIONS. HEAT TRACE SHALL MAINTAIN SERVICE TEMP OF 40°F (ADJ.) MINIMUM. REFER TO HEAT TRACE SCHEDULE AND SPEC.



**STMH-1 - NEW WORK**  
SCALE: 3/4" = 1'-0"



**STMH-1 ISOMETRIC**  
SCALE: N.T.S.

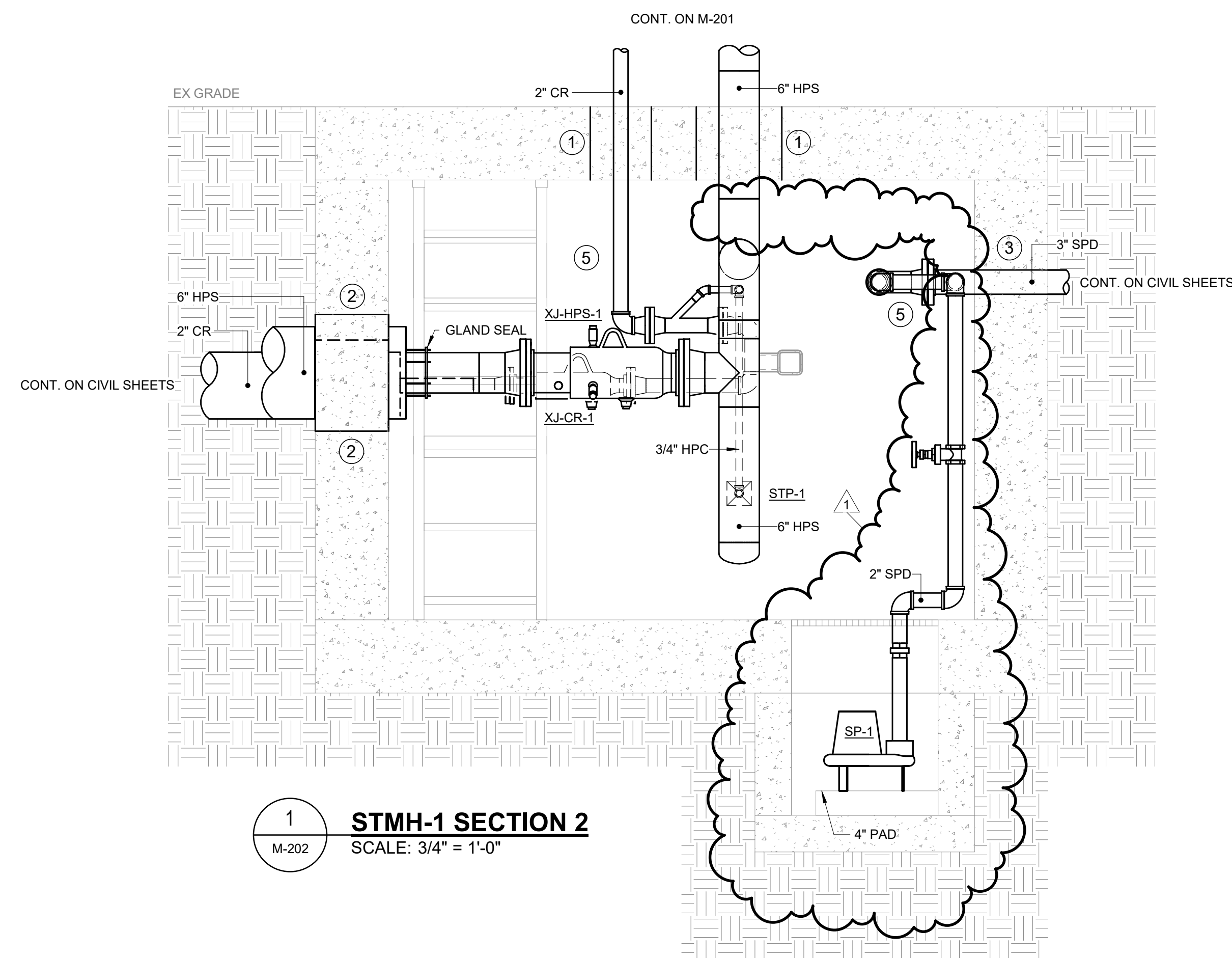


**KEY PLAN**

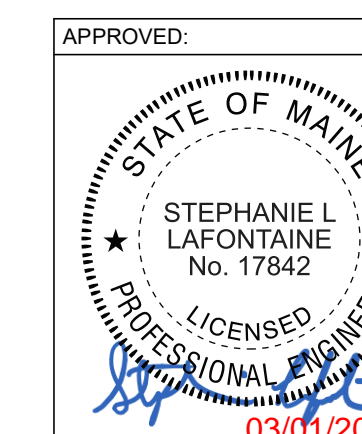
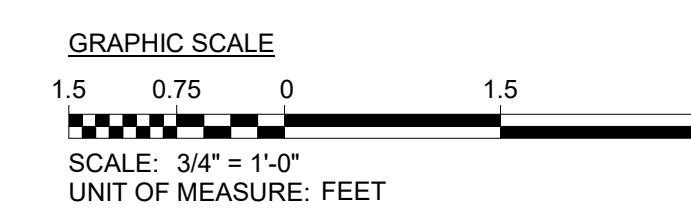


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**STMH-1 SECTION 2**  
SCALE: 3/4" = 1'-0"



NO.	ISSUE/DESCRIPTION	BY	DATE
1	Addendum 3	MAW	3/1/2024

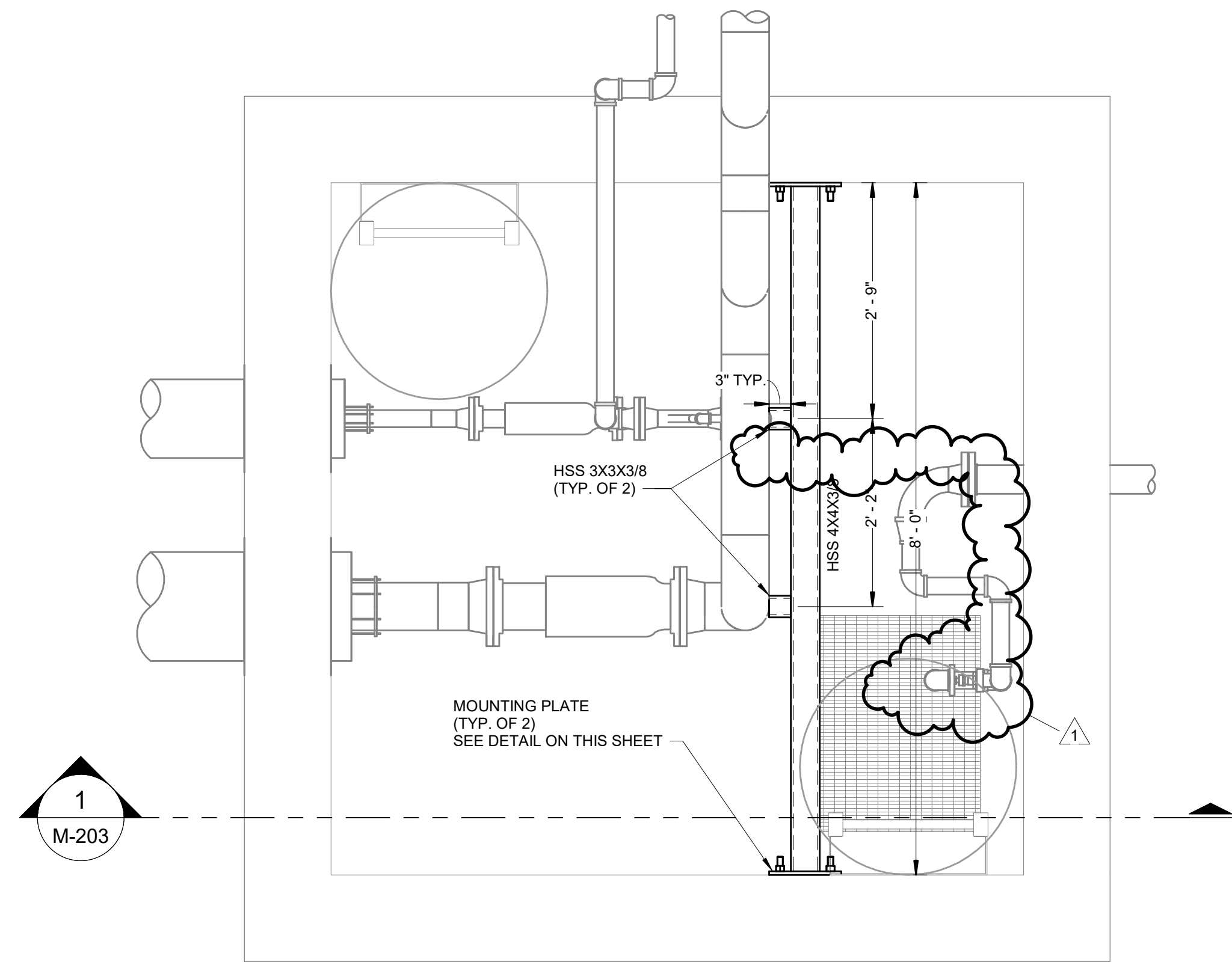
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**MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE**

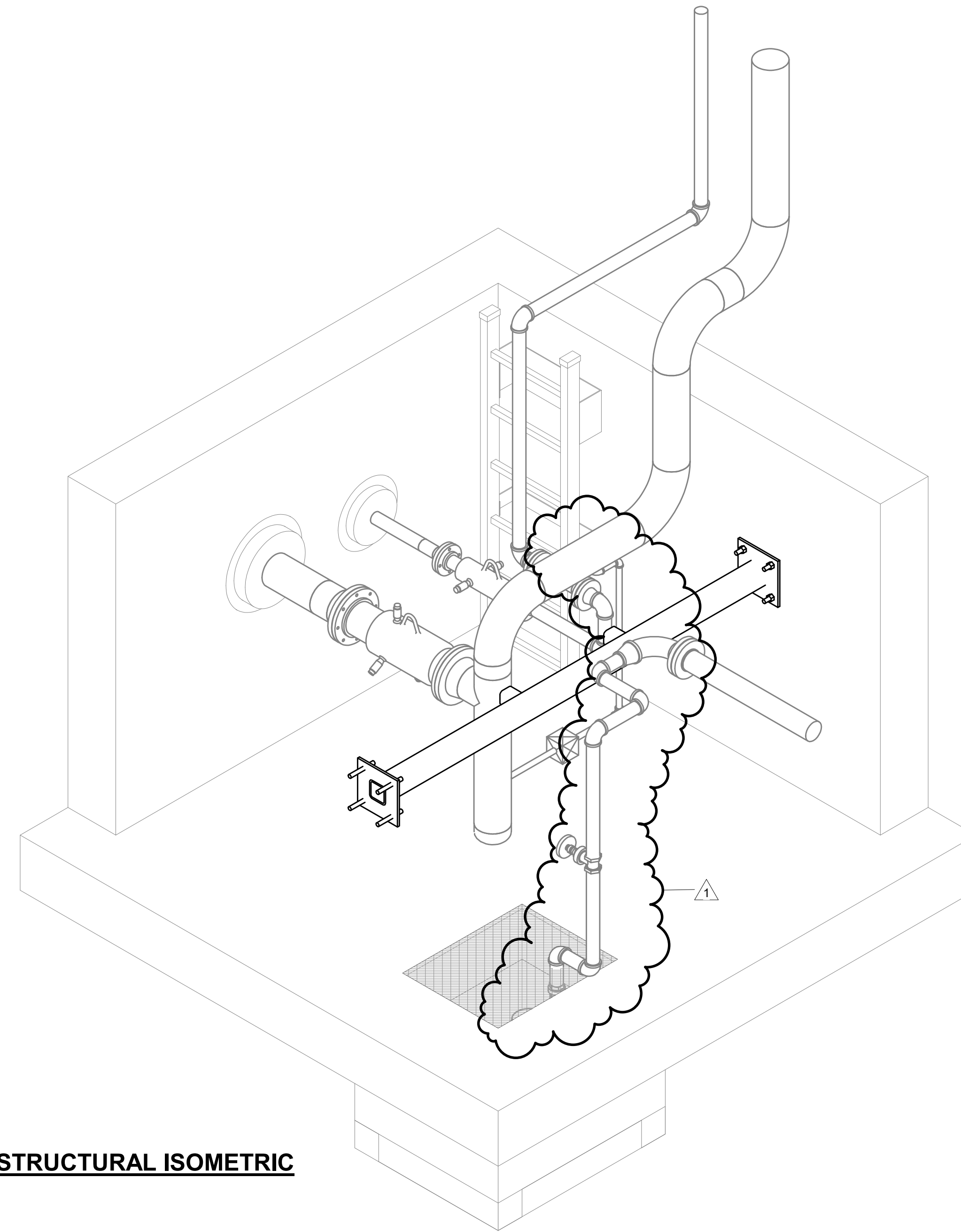
**STEAM VAULT - NEW WORK**

PREPARED BY: <b>GZA</b>	PREPARED FOR: <b>MAINE MARITIME ACADEMY CASTINE, ME</b>
PROJ MGR: AJH	REVIEWED BY: MAW
DESIGNED BY: MAW	DRAWN BY: CMP
DATE: JANUARY 2024	PROJECT NO: 35109.00
	CHECKED BY: JDE
	SCALE: AS NOTED
	REVISION NO:

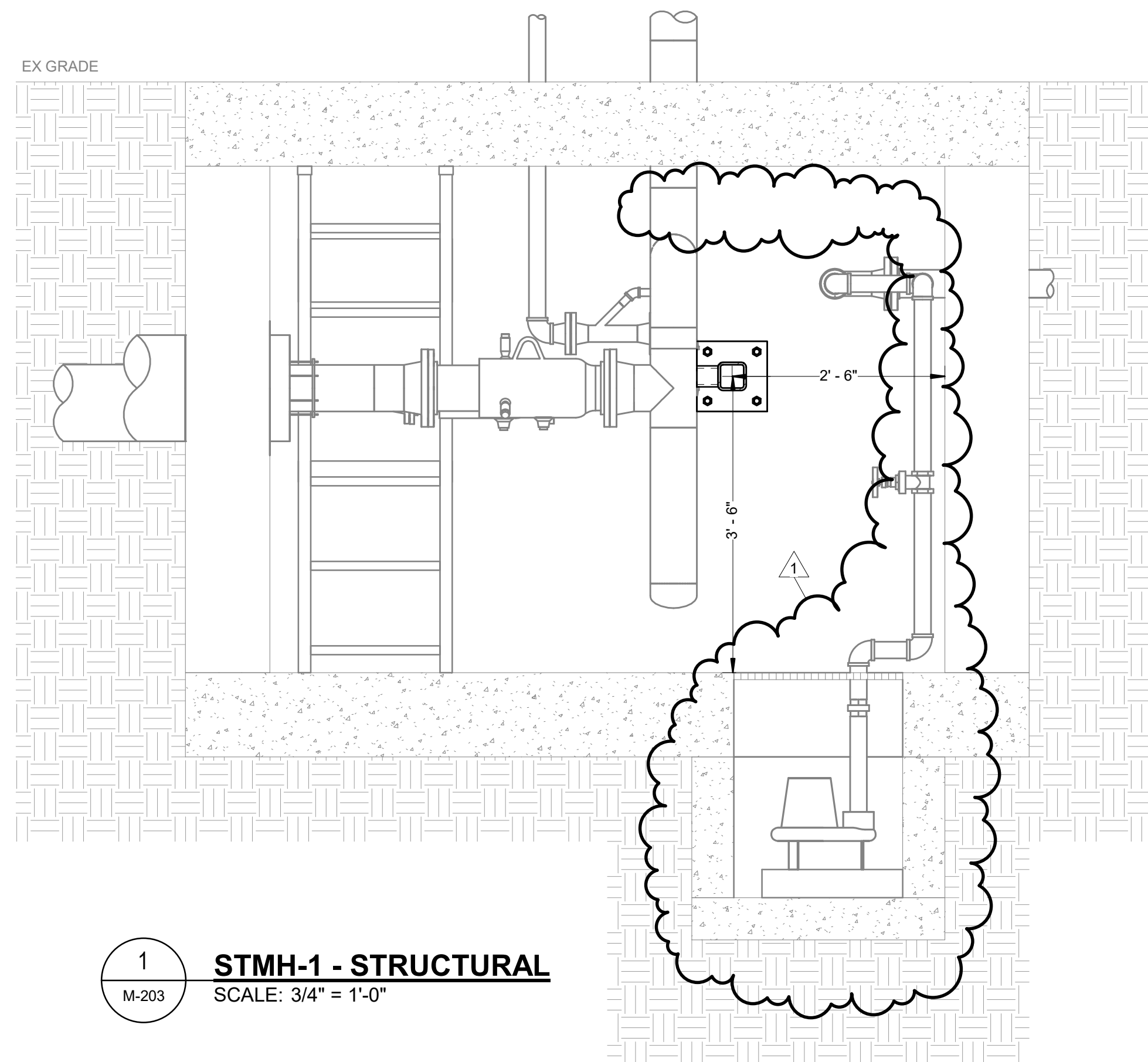
**DRAWING**  
**M-202**  
SHEET NO. 111 OF 142



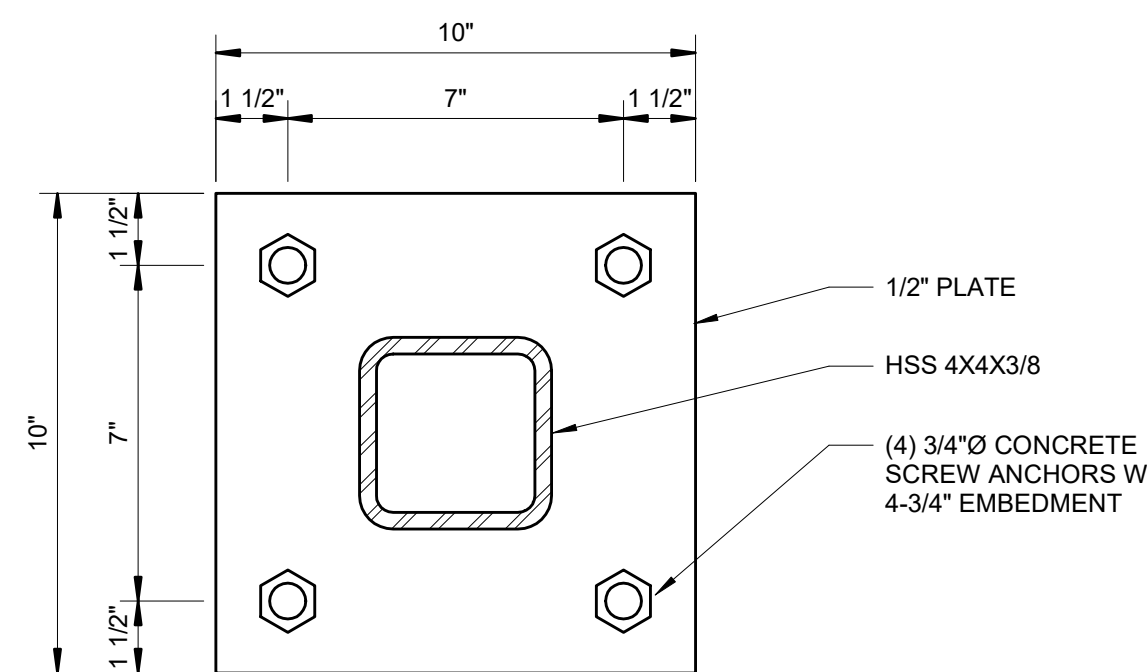
**STMH-1 - STRUCTURAL NEW WORK**  
SCALE: 3/4" = 1'-0"



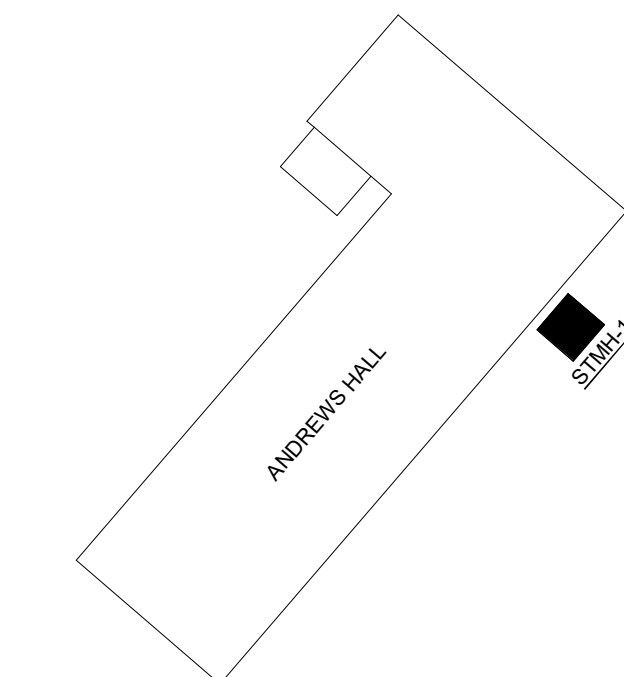
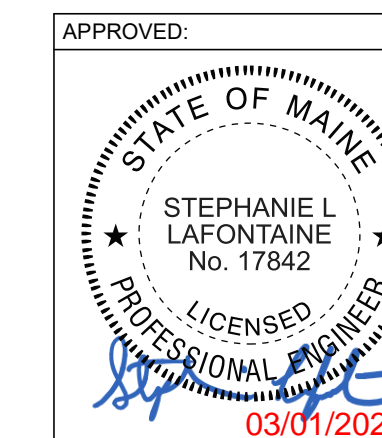
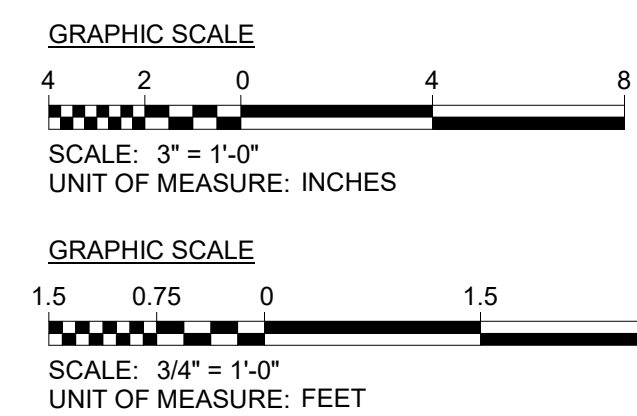
**STMH-1 - STRUCTURAL ISOMETRIC**  
SCALE: N.T.S.



**STMH-1 - STRUCTURAL**  
SCALE: 3/4" = 1'-0"



**MOUNTING PLATE DETAIL**  
SCALE: 3/4" = 1'-0"



**KEY PLAN**



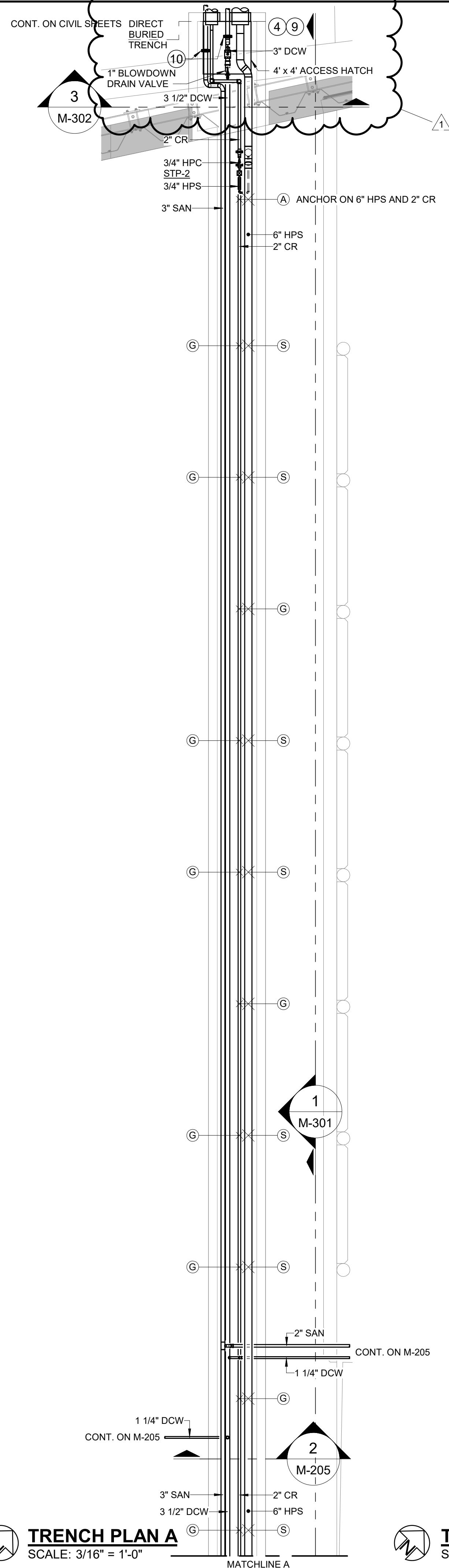
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SUITE 300  
BALTIMORE, MD 21228  
P: 410-576-0505 F: 410-385-0327

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**JANUARY 19, 2024**

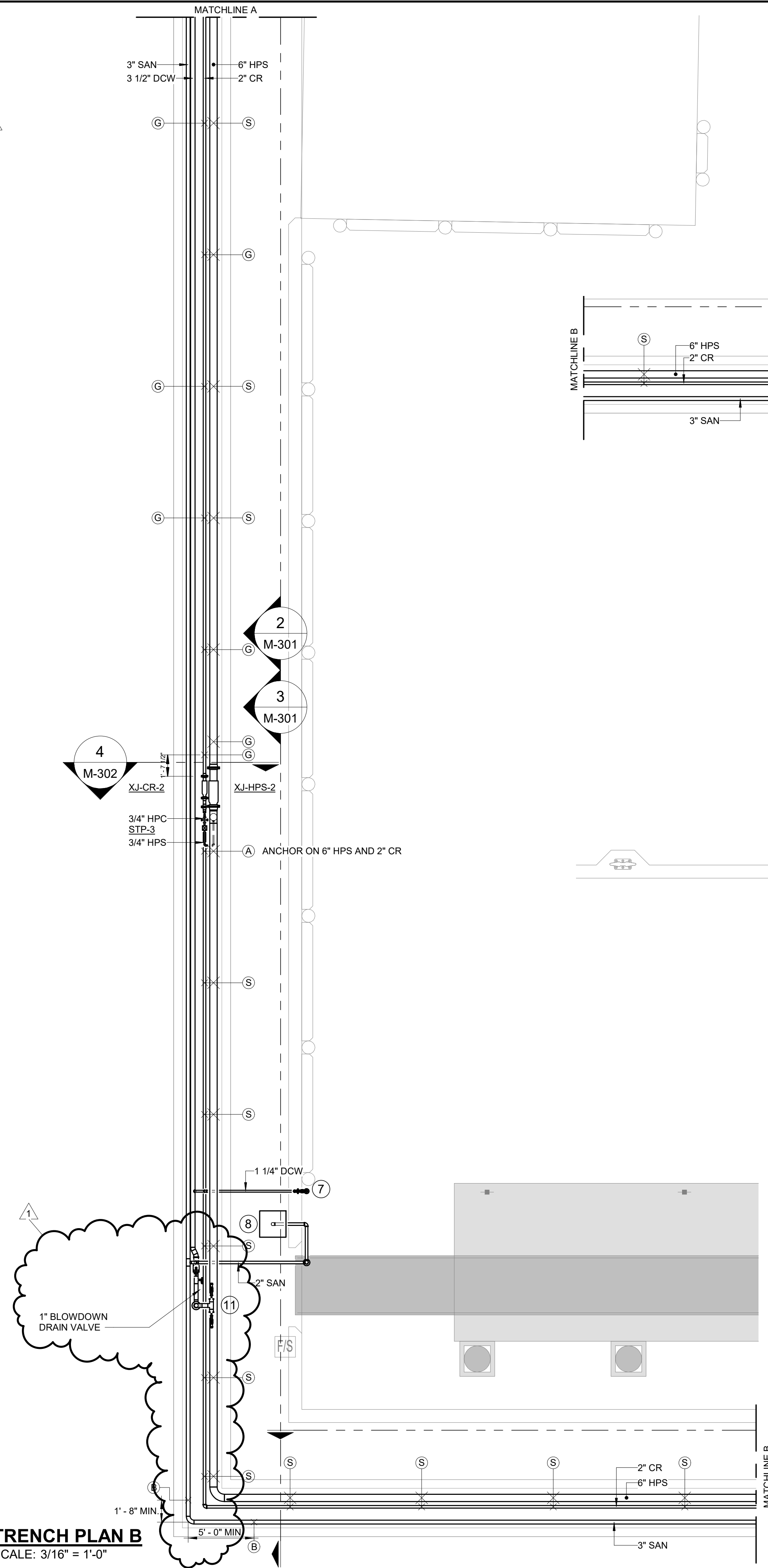
NO.	ISSUE/DESCRIPTION	MAW	3/1/2024
BY	DATE		
1	Addendum 3	MAW	3/1/2024
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS PIER UPGRADES AND WATERFRONT IMPROVEMENTS CASTINE, MAINE			
<b>STEAM VAULT - NEW WORK - STRUCTURAL</b>			
PREPARED BY:	GZA		PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME
PROJ MGR: AJH	DESIGNED BY: MRM	REVIEWED BY: MAW	CHECKED BY: MRM
DATE: JANUARY 2024	DRAWN BY: GTC	SCALE: AS NOTED	REVISION NO.
	PROJECT NO: 35109.00		
			<b>DRAWING</b> <b>M-203</b> SHEET NO. 112 OF 142



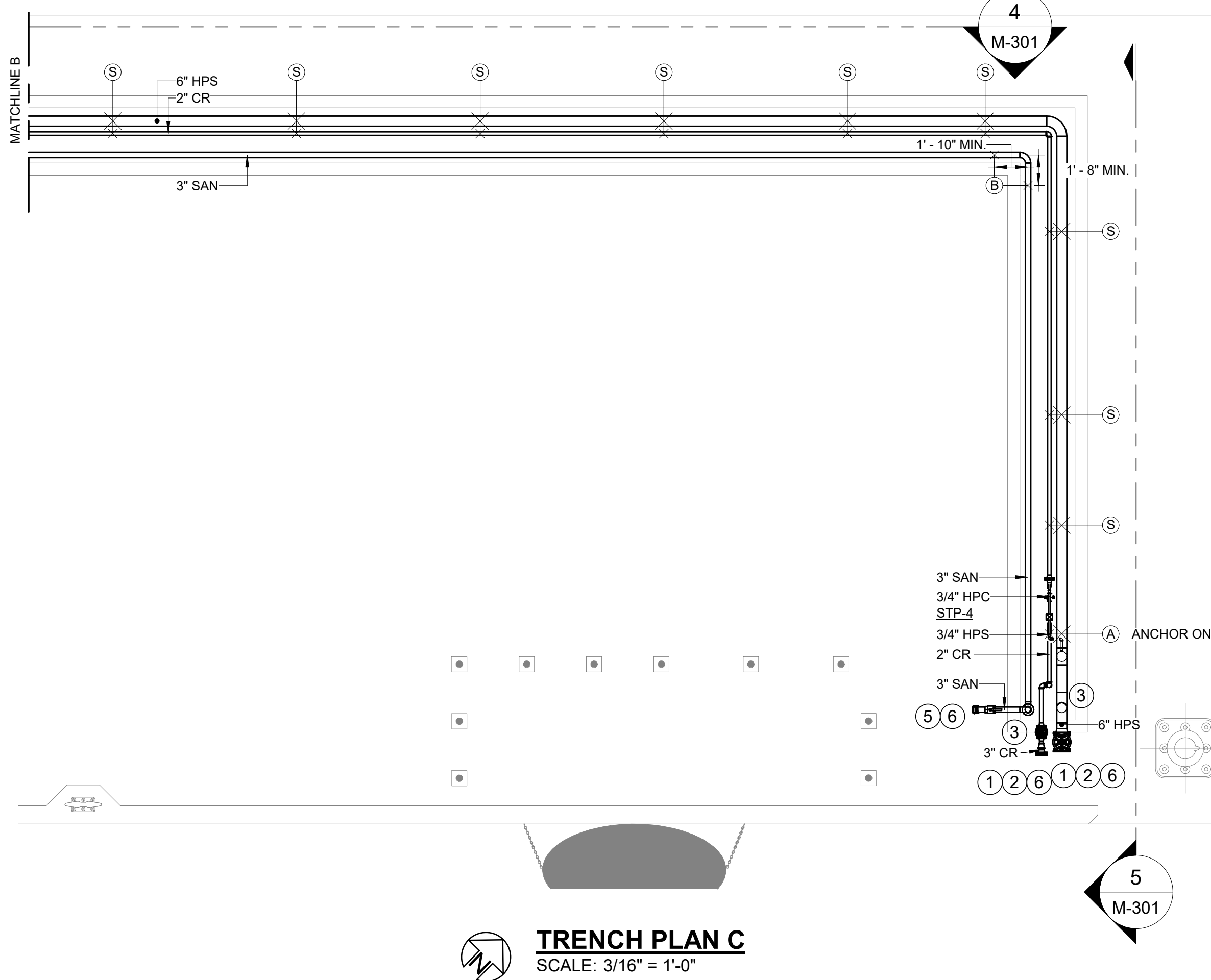
2/28/2024 4:52:38 PM Autodesk Docs://122046600-Maine Maritime Utility Upgrades - NSM/110122046600-MEP-R22.rvt



**TRENCH PLAN A**  
SCALE: 3/16" = 1'-0"



**TRENCH PLAN B**  
SCALE: 3/16" = 1'-0"



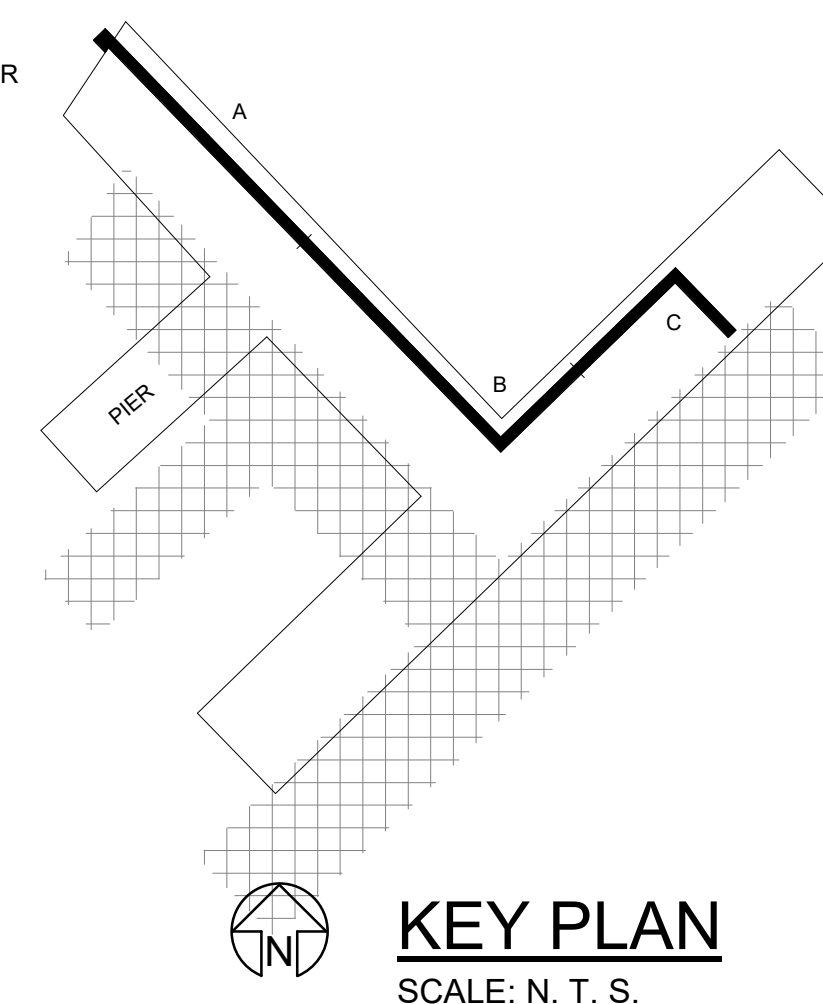
**TRENCH PLAN C**  
SCALE: 3/16" = 1'-0"

**GENERAL NOTES**

1. SUPPORTS AND ANCHORS SHALL BE PROVIDED FOR BOTH STEAM AND CONDENSATE PIPING WHERE INDICATED. OFFSET SUPPORTS AS NEEDED. REFER TO M-703 FOR SUPPORT AND ANCHOR DETAILS.
2. DOMESTIC COLD WATER AND SANITARY PIPING SUPPORTS AT CORNERS ARE SHOWN WITH MINIMUM DISTANCE FROM CORNER FOR THERMAL EXPANSION. INTERMEDIATE SUPPORTS ARE REQUIRED AT REGULAR INTERVALS ACCORDING TO DETAIL 5 ON SHEET M-703.

**DRAWING NOTES**

- 1 PROVIDE BLIND FLANGE FOR HOSE CONNECTION.
- 2 PROVIDE FLEXIBLE METAL HOSES TO CONNECT THE STEAM/CONDENSATE SERVICES TO THE SHIP'S SYSTEMS. HOSES SHALL BE A MINIMUM LENGTH OF 100'. HOSES WILL NOT BE PERMANENTLY INSTALLED, BUT STORED REMOTELY. PROVIDE WITH A STAINLESS STEEL CLASS 150 FLANGE PER ASME B16.5 ON ONE END FOR THE PIER SIDE CONNECTION, AND A STAINLESS-STEEL JIS FLANGE ON THE OTHER END FOR THE SHIP SIDE CONNECTION. STEAM HOSE SHALL BE 6", CONDENSATE HOSE SHALL BE 3".
- 3 USE PIER TOP WATERTIGHT SLEEVE & SEAL ASSEMBLY FOR PENETRATIONS THROUGH PIER TOP. REFER TO DETAIL 5 ON M-702.
- 4 USE END SEAL FOR PENETRATION THROUGH TRENCH WALL FOR STEAM AND CONDENSATE PIPING. REFER TO DETAIL 1 ON M-702.
- 5 INSTALL 3" SANITARY TERMINATION PER DETAIL 1 ON SHEET M-704.
- 6 SUPPORT VALVES ON THE PIER WITH ADJUSTABLE SADDLE SUPPORT KIT, CONSTRUCTED ENTIRELY OF 316L SS, ADJUSTED TO HEIGHT OF VALVE, WITH A BASEPLATE BOLTED TO THE PIER. BASIS OF DESIGN: EMPIRE INDUSTRIES OR APPROVED EQUAL.
- 7 TERMINATE 2' ABOVE PIER DECK WITH STAINLESS STEEL HOSE BIB.
- 8 CONNECT 2" SANITARY TO PUMP STATION. REFER TO CIVIL SHEETS.
- 9 USE EXTERIOR WALL PENETRATION - BELOW GRADE FOR PENETRATION THROUGH TRENCH WALL FOR SANITARY AND DOMESTIC COLD WATER PIPING. REFER TO DETAIL 7 ON SHEET M-702.
- 10 PROVIDE HOSE TO POLYPROPYLENE FLANGE TRANSITION FOR SANITARY AND DOMESTIC COLD WATER PIPING.
- 11 PROVIDE DCW PIPE TERMINATIONS ABOVE THE PIER PER DETAIL 3 ON M-704.



**KEY PLAN**  
SCALE: N. T. S.

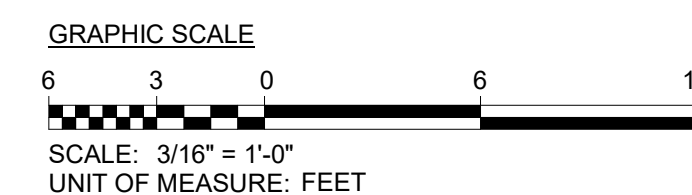
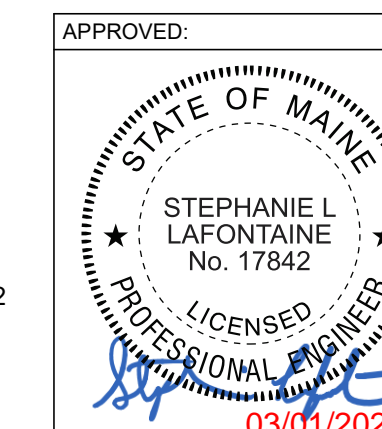
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NO.	ISSUE/DESCRIPTION	MAW	3/1/2024
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS PIER UPGRADES AND WATERFRONT IMPROVEMENTS CASTINE, MAINE			
<b>MECHANICAL TRENCH PLAN - NEW WORK</b>			
PREPARED BY: <b>GZA</b>	PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME		
PROJ MGR: AJH	REVIEWED BY: MAW	CHECKED BY: JDE	<b>DRAWING</b> <b>M-204</b> SHEET NO. 113 OF 142
DESIGNED BY: MAW	DRAWN BY: CMP	SCALE: 3/16" = 1'-0"	
DATE: JANUARY 2024	PROJECT NO: 35109.00	REVISION NO:	

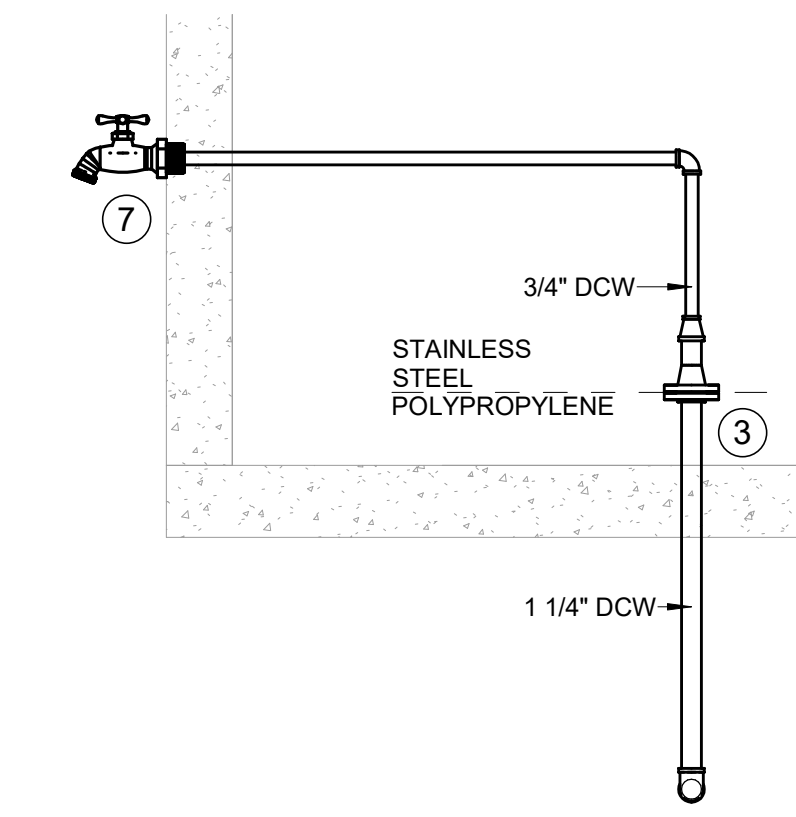


**GENERAL NOTES**

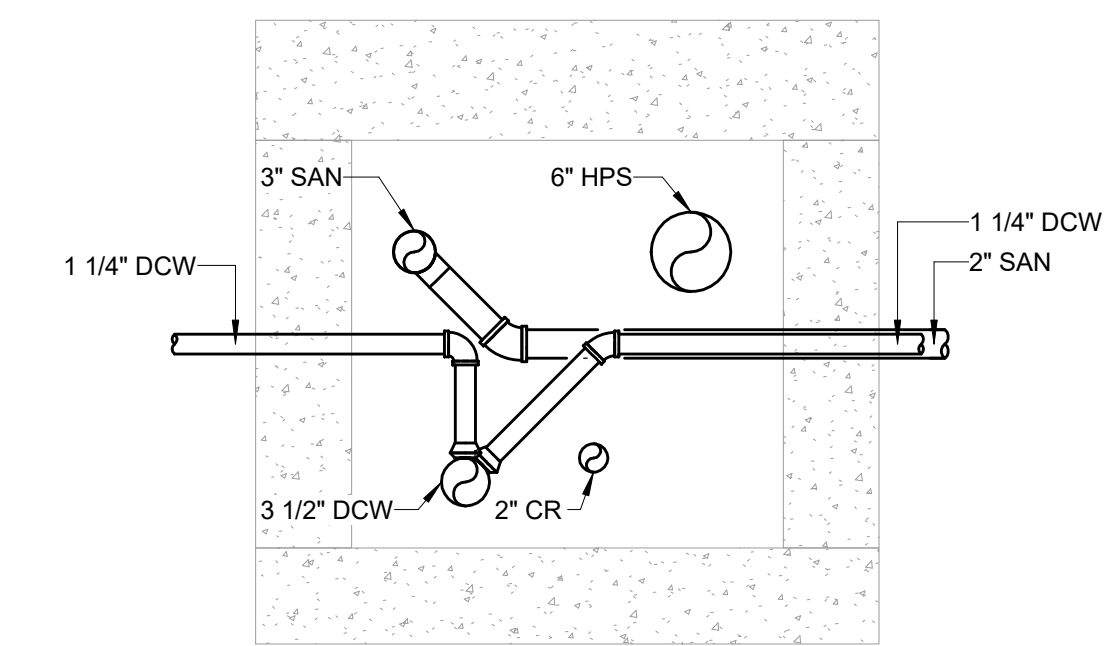
1. DOMESTIC COLD WATER PIPING SUPPORTS AT CORNERS ARE SHOWN WITH MINIMUM DISTANCE FROM CORNER FOR THERMAL EXPANSION. INTERMEDIATE SUPPORTS ARE REQUIRED AT REGULAR INTERVALS ACCORDING TO DETAIL 5 ON SHEET M-703.

**DRAWING NOTES**

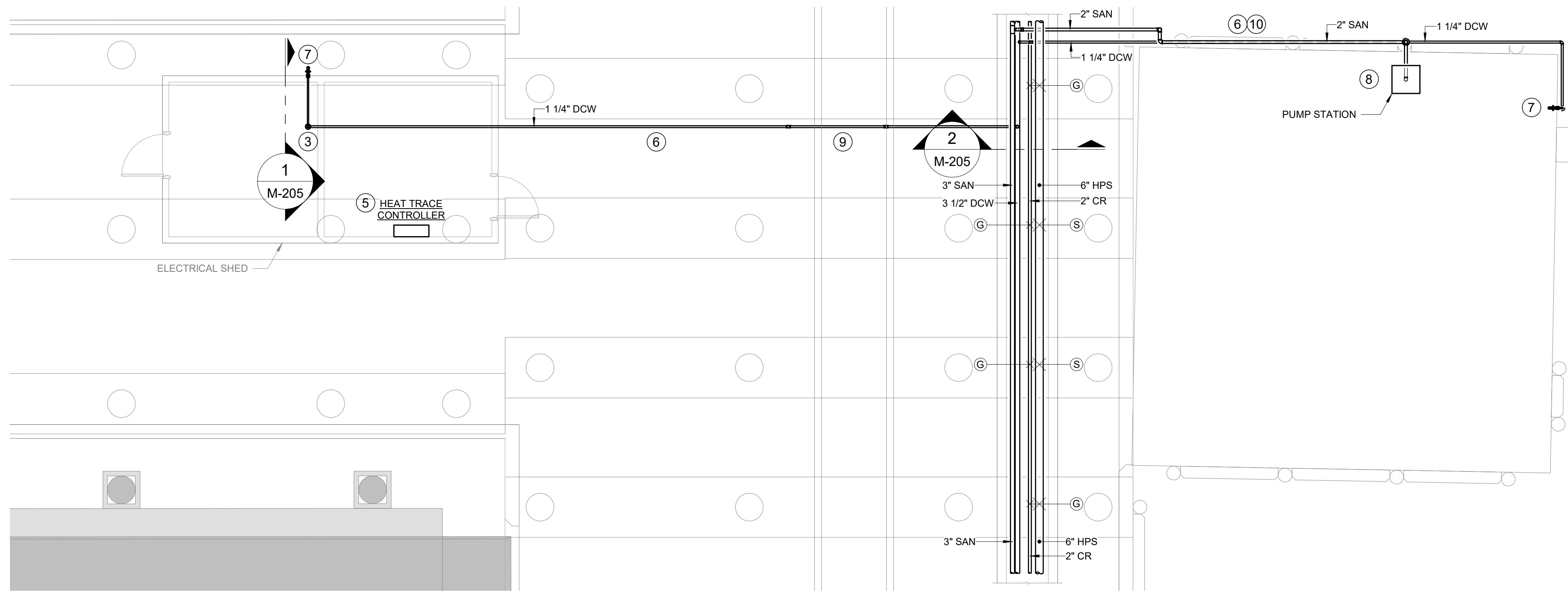
- 1 INSTALL 3" DOMESTIC COLD WATER TERMINATION PER DETAIL 3 ON SHEET M-704.
- 2 SUPPORT VALVE ON THE PIER WITH ADJUSTABLE SADDLE SUPPORT KIT, CONSTRUCTED ENTIRELY OF 316L SS, ADJUSTED TO HEIGHT OF VALVE, WITH A BASEPLATE BOLTED TO THE PIER. BASIS OF DESIGN: EMPIRE INDUSTRIES OR APPROVED EQUAL.
- 3 USE PIER TOP WATERTIGHT SLEEVE & SEAL ASSEMBLY FOR PENETRATIONS THROUGH PIER TOP. REFER TO DETAIL 5 ON M-702.
- 4 PROVIDE PENETRATION THROUGH TRENCH/PIER WALL PER DETAIL 3 ON M-702.
- 5 PROVIDE LINE SENSING HEAT TRACE CONTROLLER TO SERVE THE CONDENSATE, SANITARY, AND DOMESTIC COLD WATER IN AND ALONG THE PIER.
- 6 SUPPORT DOMESTIC COLD WATER/SANITARY ON SIDE OF PIER, PILE CAP, OR UNDER PIER PER DETAIL 5 ON M-703.
- 7 TERMINATE 2' ABOVE PIER DECK WITH STAINLESS STEEL HOSE BIB.
- 8 CONNECT 2" SANITARY TO PUMP STATION. REFER TO CIVIL SHEETS.
- 9 JOG PIPING UNDER ELECTRICAL TRENCH.
- 10 SUPPORT DOMESTIC COLD WATER AND SANITARY PIPING AT DIFFERENT ELEVATIONS.



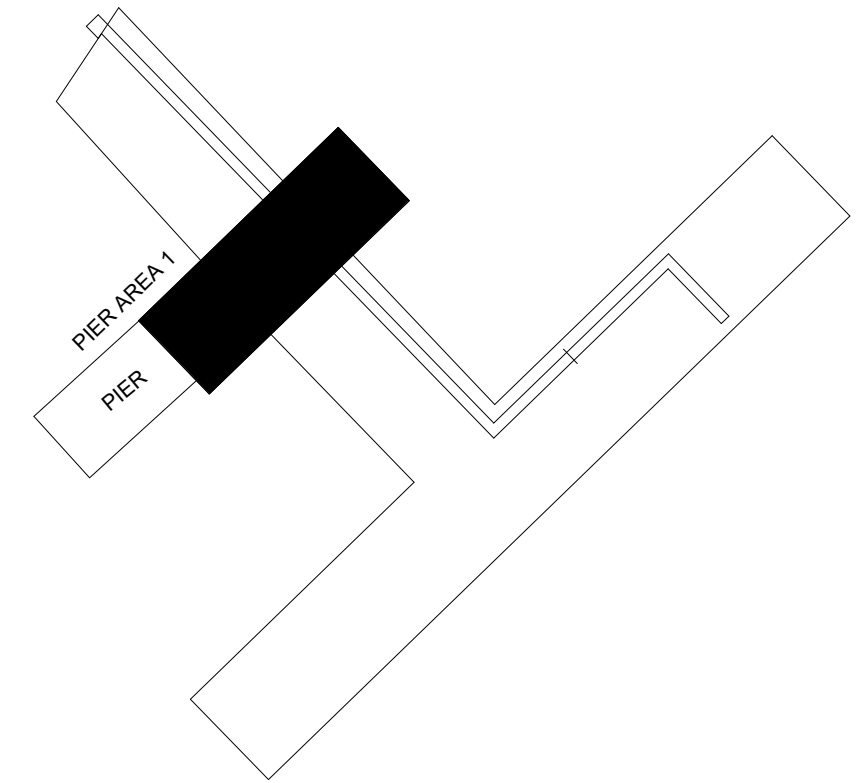
**1 DCW TAKEOFF TERMINATION**  
SCALE: 3/4" = 1'-0"



**2 TRENCH SECTION OF DCW TAKEOFFS**  
SCALE: 3/4" = 1'-0"



**PIER AREA 1 PLAN**  
SCALE: 3/16" = 1'-0"



**KEY PLAN**  
SCALE: N. T. S.



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**JANUARY 19, 2024**

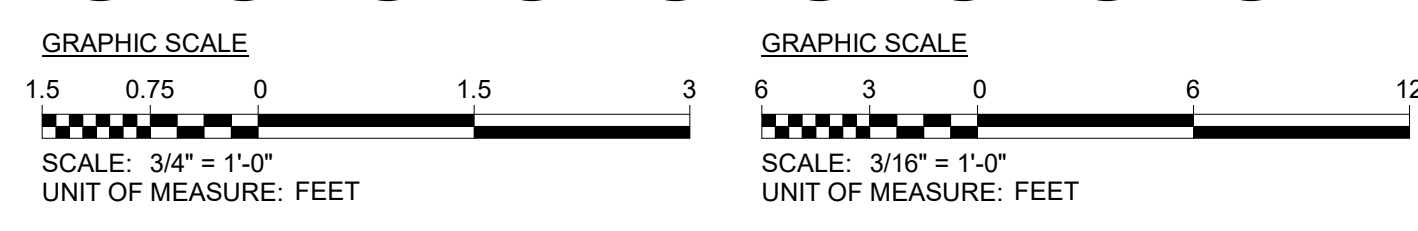
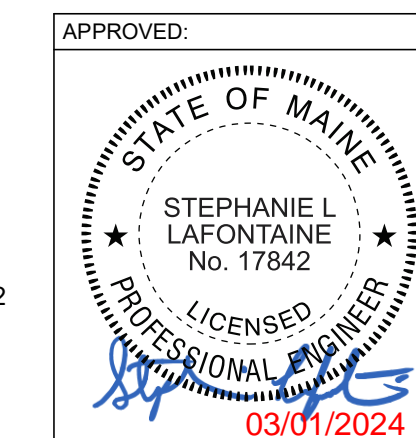
NO.	ISSUE/DESCRIPTION	MAW	DATE
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE

**MECHANICAL PIER PART PLAN - NEW WORK**

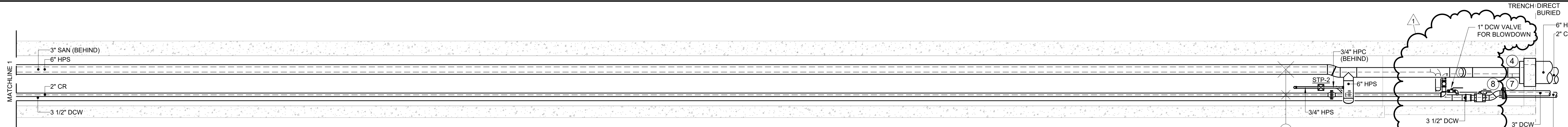
PREPARED BY: <b>GZA</b>	REVIEWED BY: MAW	PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME
DESIGNED BY: MAW	DRAWN BY: CMP	CHECKED BY: JDE
DATE: JANUARY 2024	PROJECT NO: 35109.00	SCALE: AS NOTED REVISION NO.



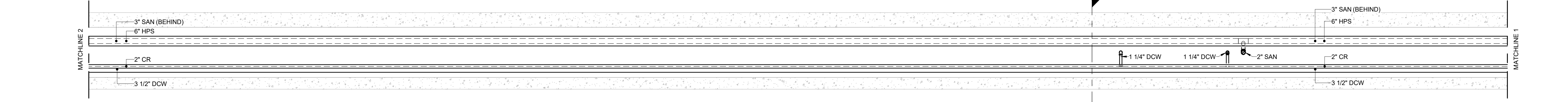
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**M-205**  
SHEET NO. 114 OF 142

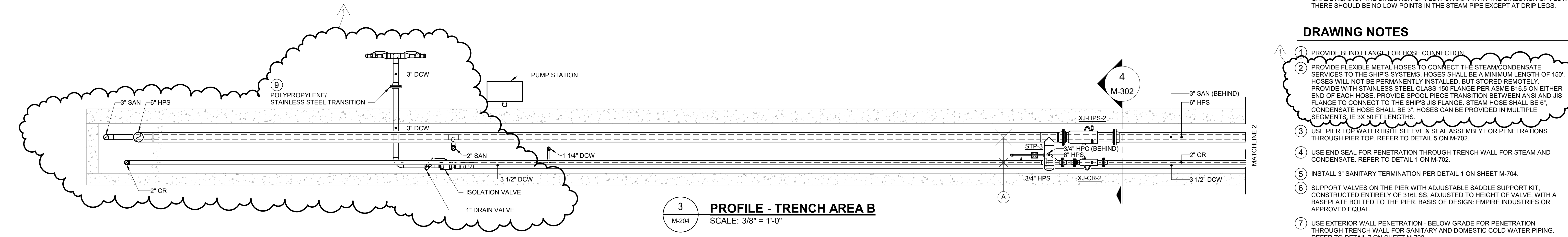




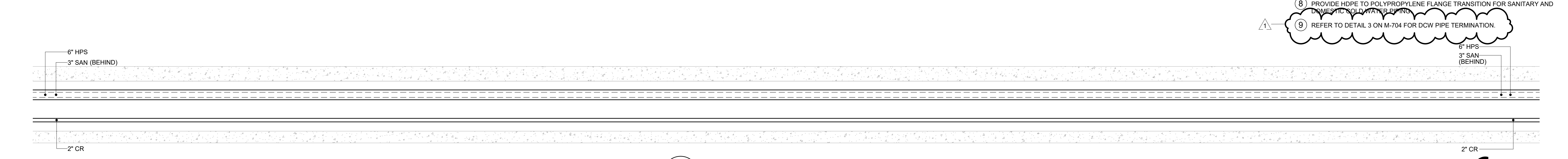
**1 PROFILE - TRENCH AREA A**  
SCALE: 3/8" = 1'-0"



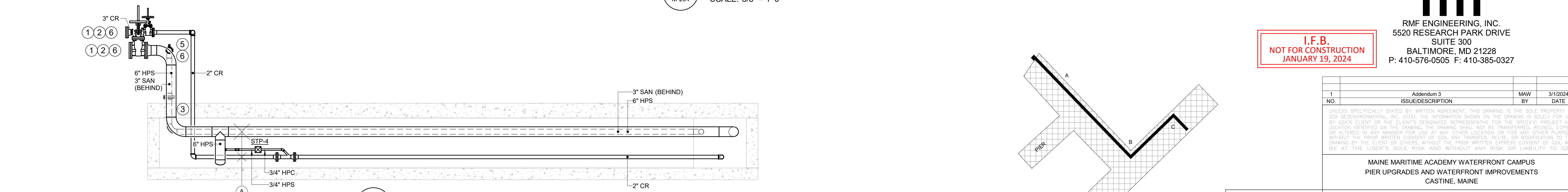
**2 PROFILE - TRENCH AREA A/B**  
SCALE: 3/8" = 1'-0"



**3 PROFILE - TRENCH AREA B**  
SCALE: 3/8" = 1'-0"



**4 PROFILE - TRENCH AREA B/C**  
SCALE: 3/8" = 1'-0"



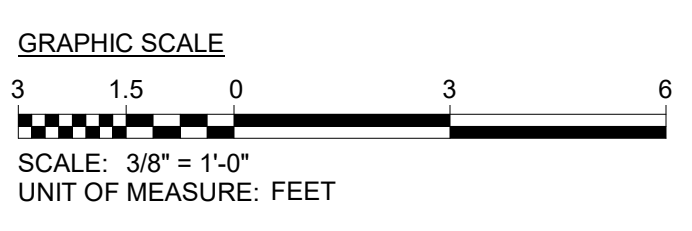
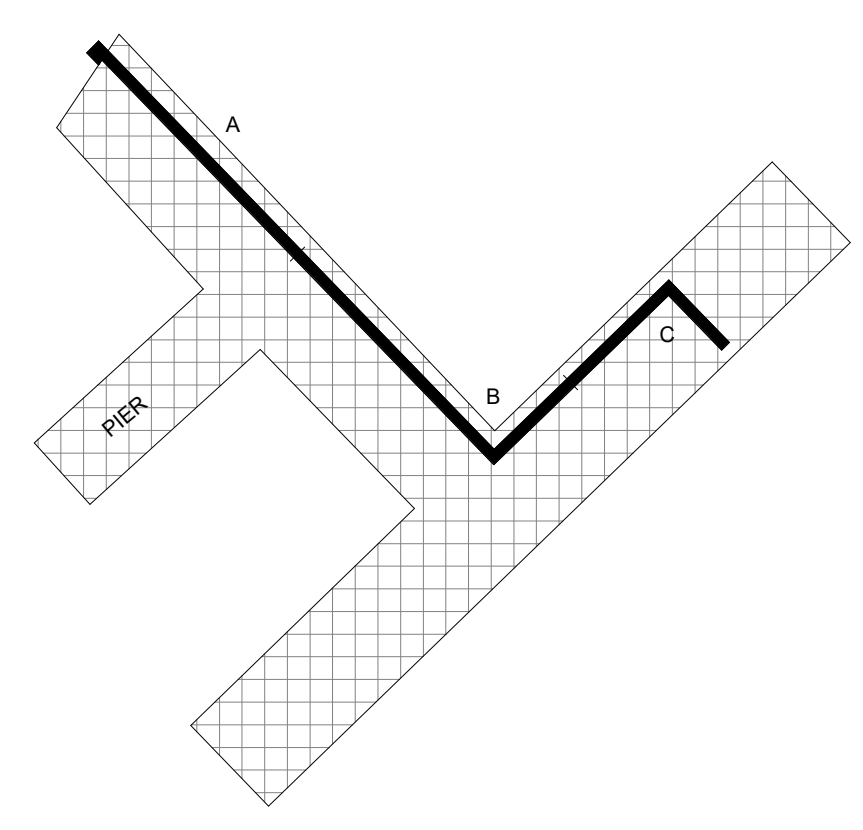
**5 PROFILE - TRENCH AREA C**  
SCALE: 3/8" = 1'-0"

**GENERAL NOTES**

- ANCHORS SHALL BE PROVIDED FOR BOTH STEAM AND CONDENSATE PIPING WHERE INDICATED. REFER TO M-703 FOR ANCHOR DETAILS.
- ALL NEW STEAM PIPING IN TRENCH SHALL BE SLOPED AT A MINIMUM OF 1% GRADE AGAINST THE DIRECTION OF FLOW OR 0.5% WITH THE DIRECTION OF FLOW. THERE SHOULD BE NO LOW POINTS IN THE STEAM PIPE EXCEPT AT DRIP LEGS.

**DRAWING NOTES**

- PROVIDE BLIND FLANGE FOR HOSE CONNECTION.
- PROVIDE FLEXIBLE METAL HOSES TO CONNECT THE STEAM/CONDENSATE SERVICES TO THE SHIP'S SYSTEMS. HOSES SHALL BE A MINIMUM LENGTH OF 150'. HOSES WILL NOT BE PERMANENTLY INSTALLED, BUT STORED REMOTELY. PROVIDE WITH STAINLESS STEEL CLASS 150 FLANGE PER ASME B16.5 ON EITHER END OF EACH HOSE. PROVIDE SPOOL PIECE TRANSITION BETWEEN ANSI AND JIS FLANGE TO CONNECT TO THE SHIP'S JIS FLANGE. STEAM HOSE SHALL BE 6". CONDENSATE HOSE SHALL BE 3". HOSES CAN BE PROVIDED IN MULTIPLE SEGMENTS, IE 3X 50 FT LENGTHS.
- USE PIER TOP WATERTIGHT SLEEVE & SEAL ASSEMBLY FOR PENETRATIONS THROUGH PIER TOP. REFER TO DETAIL 5 ON M-702.
- USE END SEAL FOR PENETRATION THROUGH TRENCH WALL FOR STEAM AND CONDENSATE. REFER TO DETAIL 1 ON M-702.
- INSTALL 3" SANITARY TERMINATION PER DETAIL 1 ON SHEET M-704.
- SUPPORT VALVES ON THE PIER WITH ADJUSTABLE SADDLE SUPPORT KIT, CONSTRUCTED ENTIRELY OF 316L SS, ADJUSTED TO HEIGHT OF VALVE, WITH A BASEPLATE BOLTED TO THE PIER. BASIS OF DESIGN: EMPIRE INDUSTRIES OR APPROVED EQUAL.
- USE EXTERIOR WALL PENETRATION - BELOW GRADE FOR PENETRATION THROUGH TRENCH WALL FOR SANITARY AND DOMESTIC COLD WATER PIPING. REFER TO DETAIL 7 ON SHEET M-702.
- PROVIDE HDPE TO POLYPROPYLENE FLANGE TRANSITION FOR SANITARY AND DOMESTIC COLD WATER PIPING.
- REFER TO DETAIL 3 ON M-704 FOR DCW PIPE TERMINATION.



**KEY PLAN**  
SCALE: N. T. S.

**I.F.B.**  
**NOT FOR CONSTRUCTION**  
**JANUARY 19, 2024**

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P: 410-576-0505 F: 410-385-0327

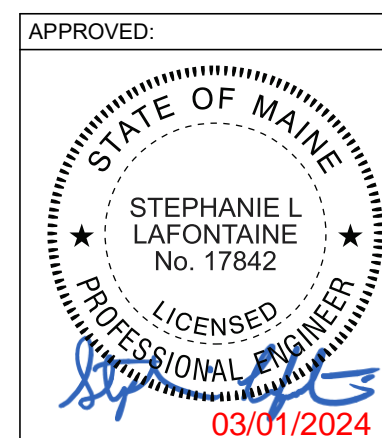
NO.	ISSUE/DESCRIPTION	MAW	DATE
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE

**MECHANICAL TRENCH PROFILES - NEW WORK**

PREPARED BY: <b>GZA</b>	PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME
PROJ MGR: AJH	REVIEWED BY: MAW
DESIGNED BY: MAW	DRAWN BY: CMP
DATE: JANUARY 2024	PROJECT NO: 35109.00
CHECKED BY: JDE	SCALE: AS NOTED
	REVISION NO:

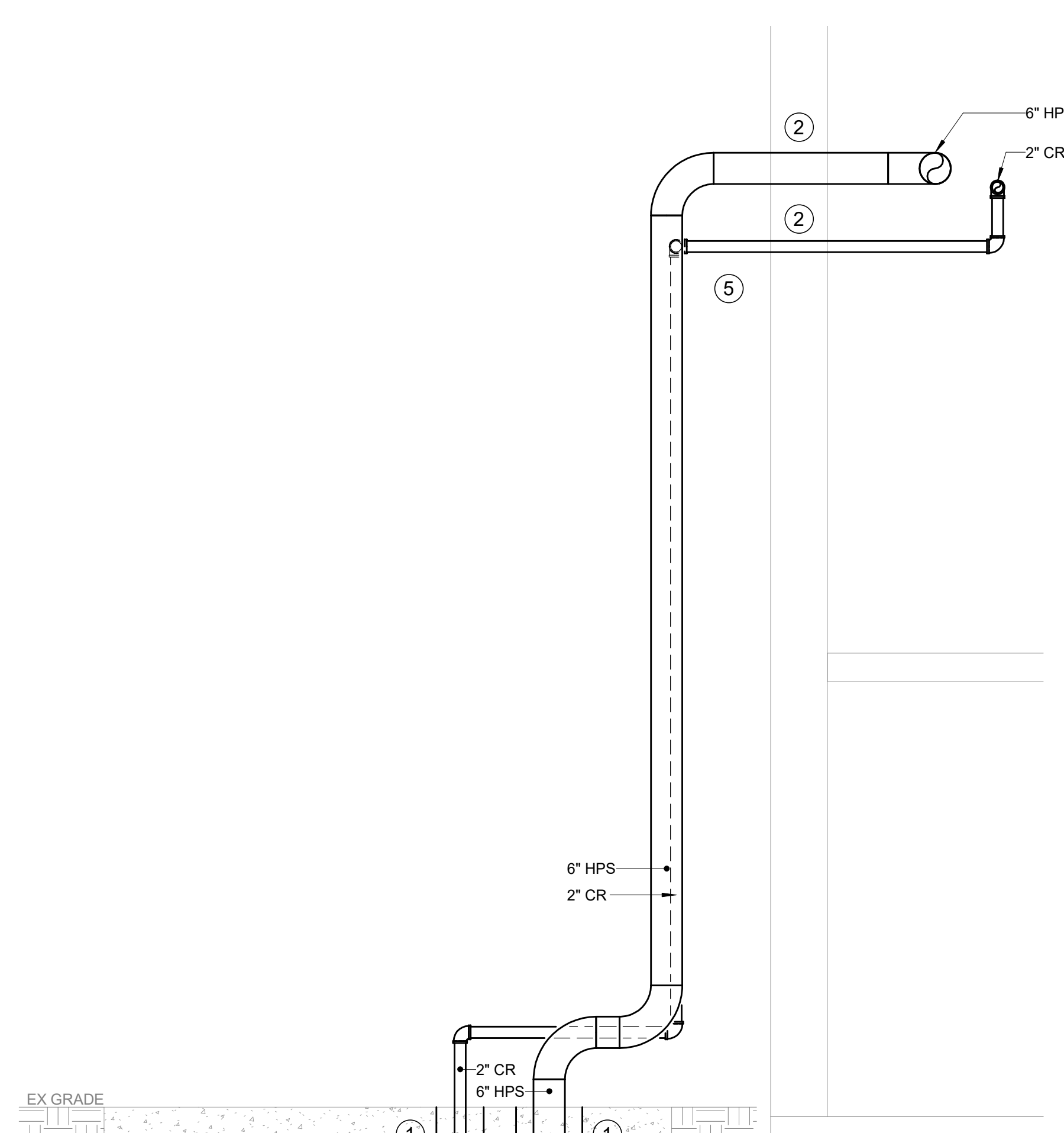


**M-301**  
SHEET NO. 115 OF 142

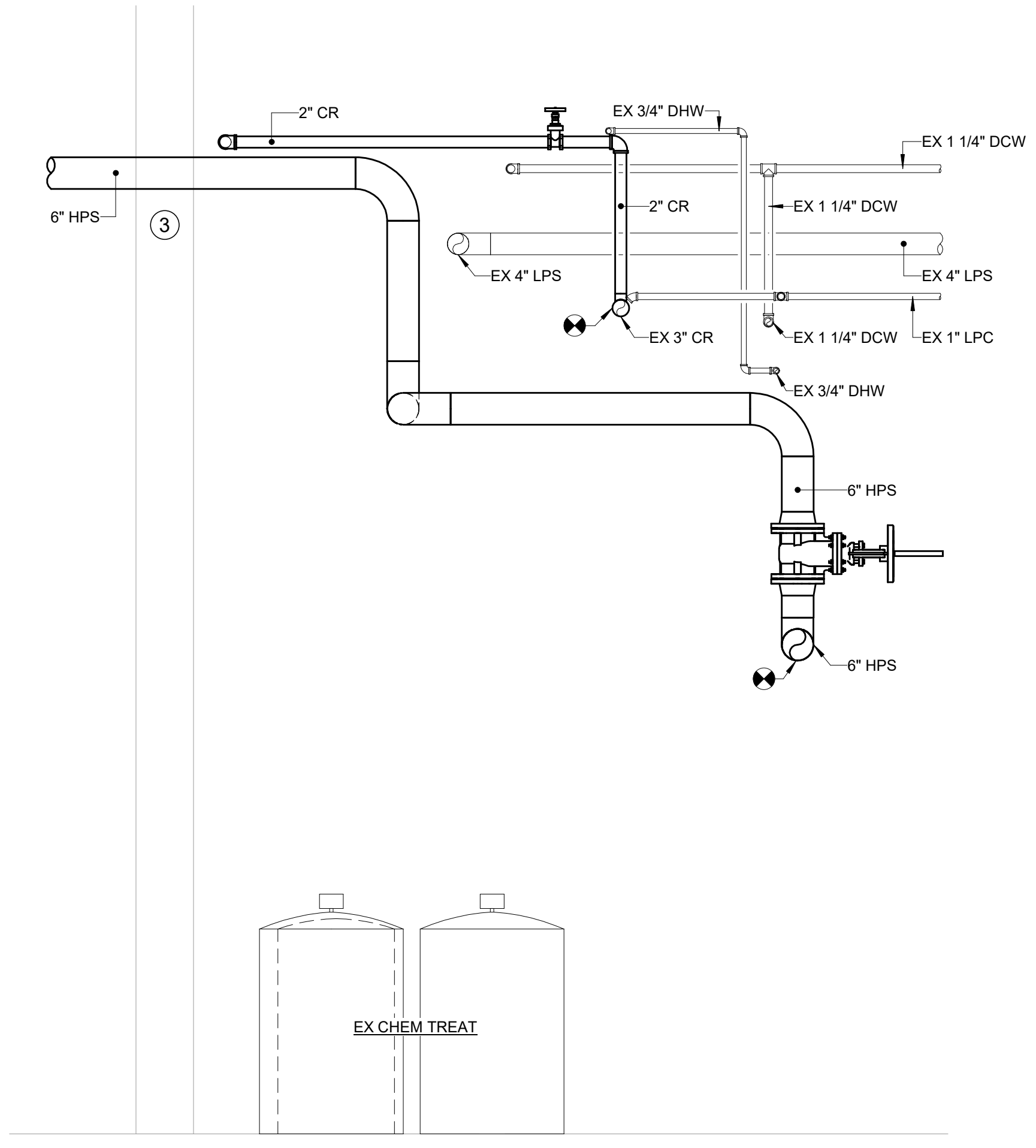


**DRAWING NOTES**

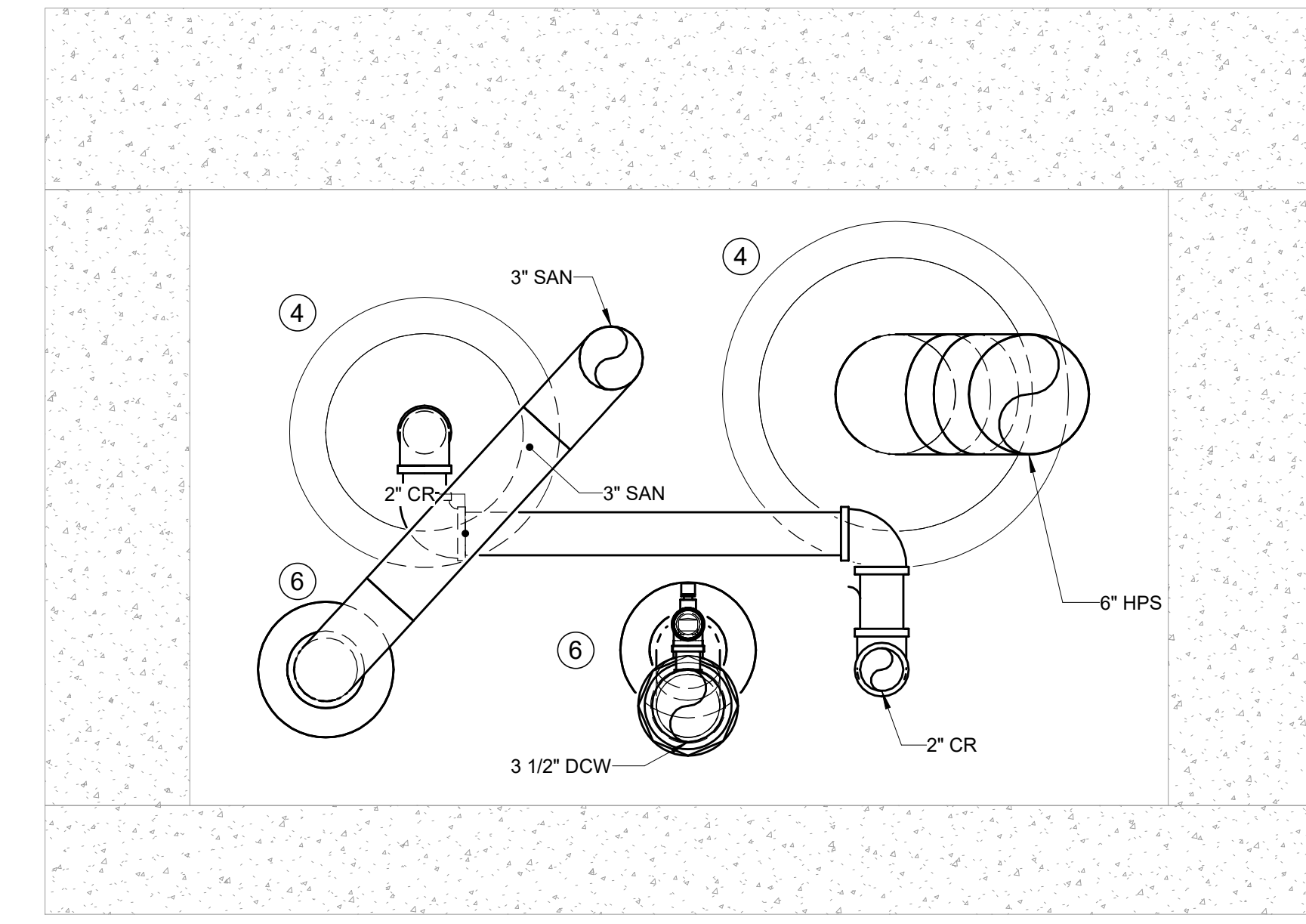
- 1 PROVIDE PENETRATION THROUGH VAULT TOP PER DETAIL 4 ON M-702.
- 2 PROVIDE PENETRATION THROUGH EXTERIOR PLANT WALL PER DETAIL 3 ON M-702.
- 3 PROVIDE PENETRATION THROUGH INTERIOR PLANT WALL PER DETAIL 8 ON M-702.
- 4 USE END SEAL PENETRATION THROUGH TRENCH WALL FOR STEAM AND CONDENSATE. REFER TO DETAIL 1 ON M-702.
- 5 SUPPORT PIPES FROM WALL PER DETAIL 7 ON M-703.
- 6 USE EXTERIOR WALL PENETRATION - BELOW GRADE FOR PENETRATION THROUGH TRENCH WALL FOR SANITARY AND DOMESTIC COLD WATER PIPING. REFER TO DETAIL 7 ON SHEET M-702.



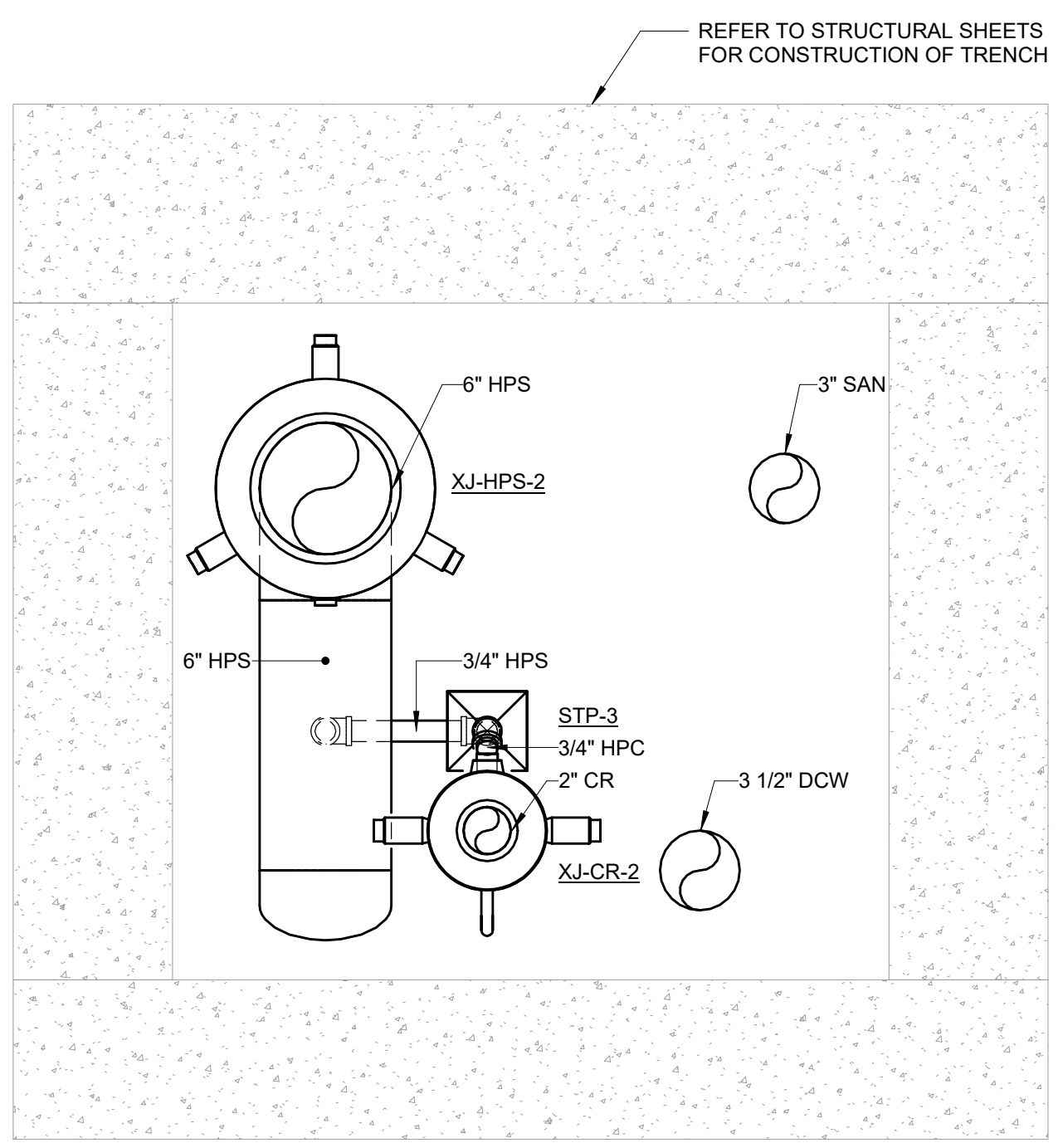
**1 STMH-1 AND ANDREWS HALL SECTION**  
SCALE: 1/2" = 1'-0"



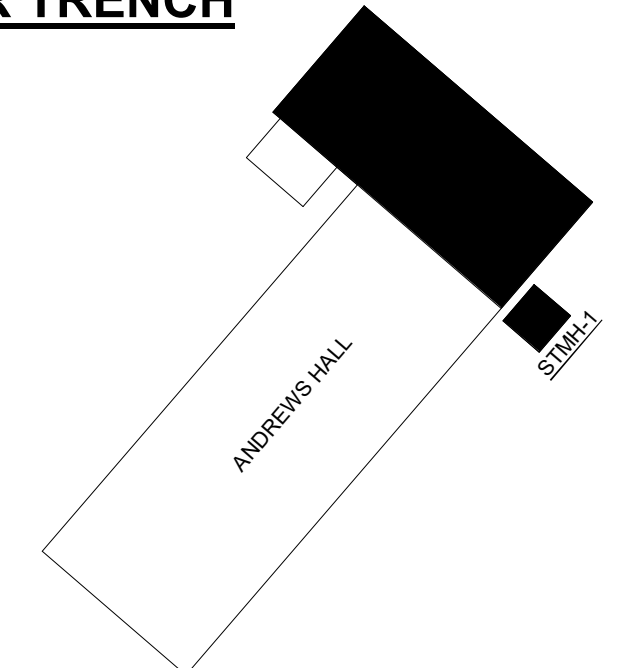
**2 PLANT SECTION**  
SCALE: 1/2" = 1'-0"



**3 SECTION AT TRANSITION TO PIER TRENCH**  
SCALE: 1 1/2" = 1'-0"



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

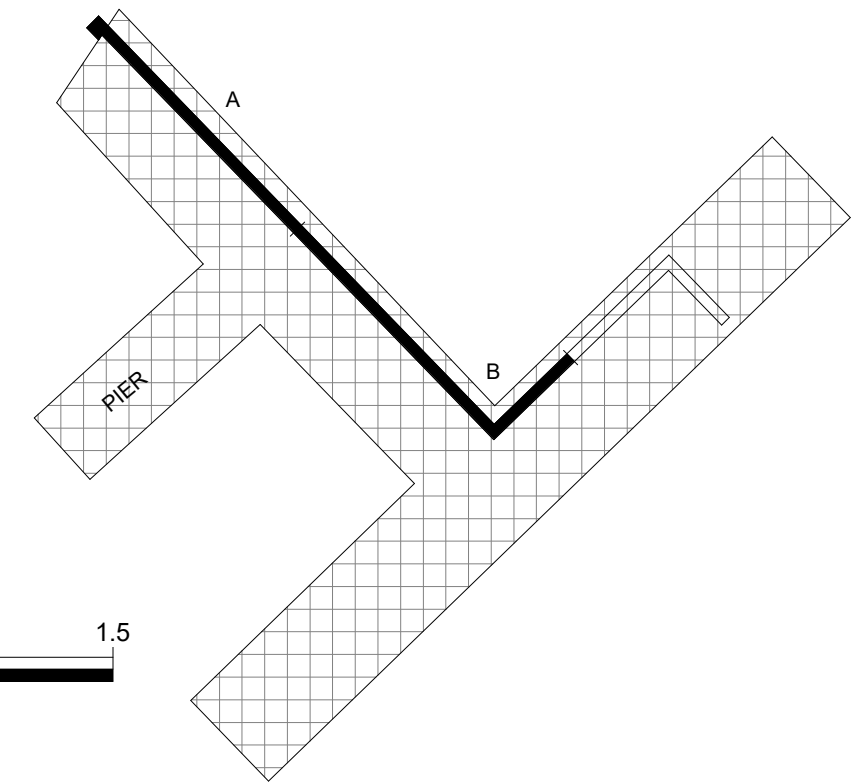
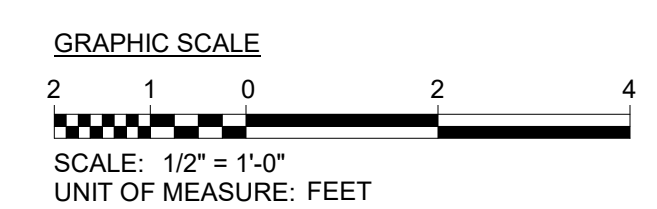
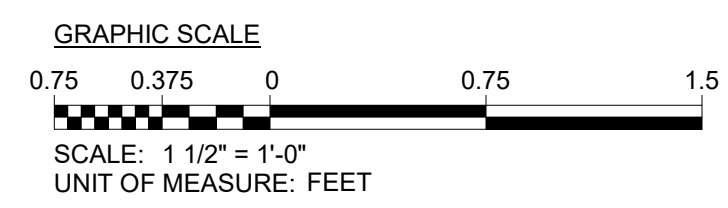


**KEY PLAN**

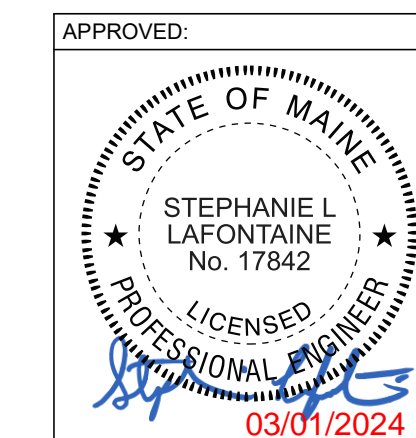


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SUITE 300  
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**JANUARY 19, 2024**



**KEY PLAN**  
SCALE: N. T. S.



NO.	ISSUE/DESCRIPTION	BY	DATE
1	Addendum 3	MAW	3/1/2024

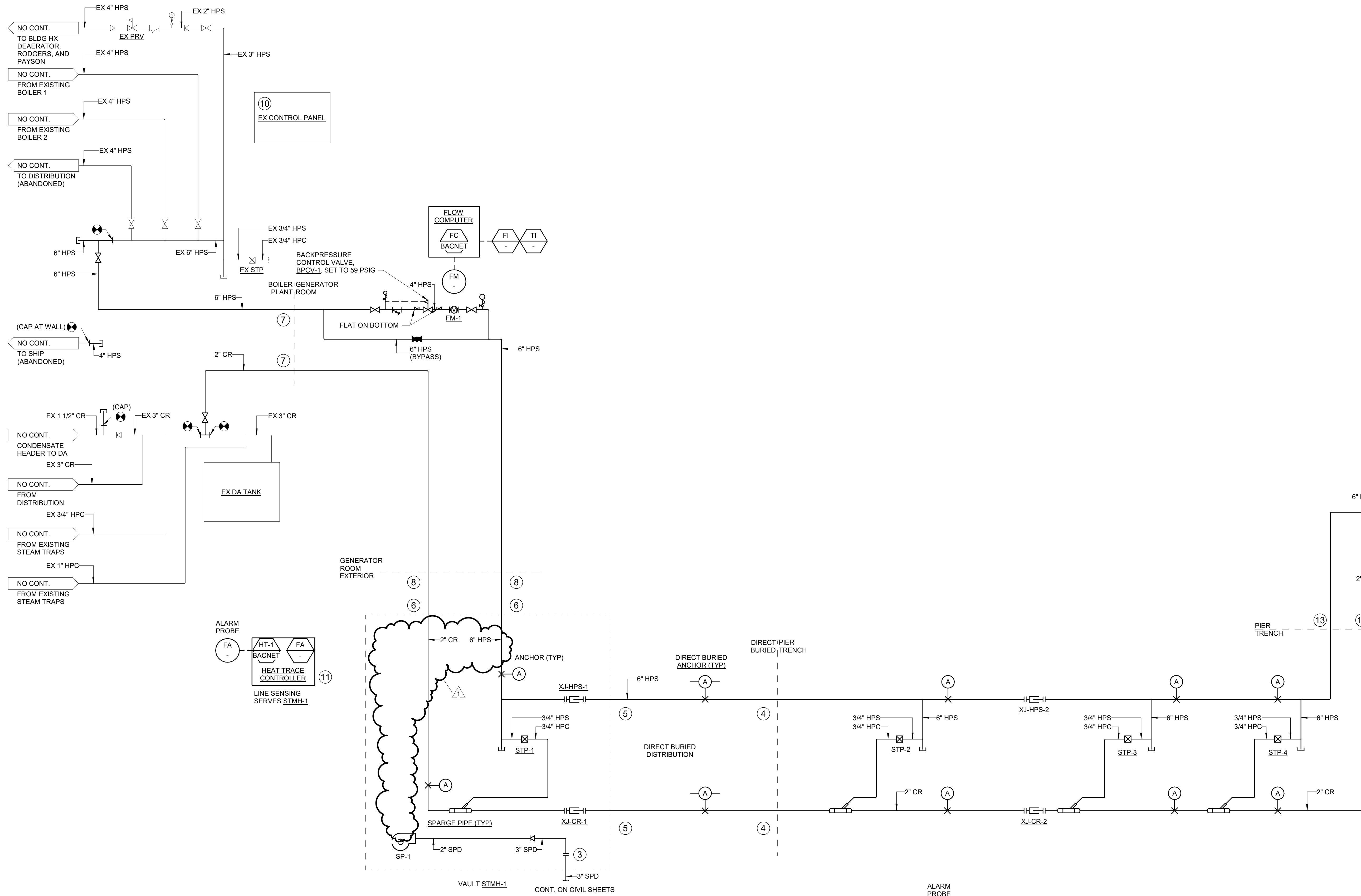
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**MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE**

**MECHANICAL SECTIONS - NEW WORK**

PREPARED BY: <b>GZA</b>	DESIGNED BY: MAW	REVIEWED BY: MAW	CHECKED BY: JDE
DATE: JANUARY 2024	DRAWN BY: CMP	PROJECT NO: 35109.00	SCALE: AS NOTED
PREPARED FOR: <b>MAINE MARITIME ACADEMY CASTINE, ME</b>			<b>DRAWING M-302</b>
			SHEET NO. 116 OF 142

3/1/2024 11:32:50 AM Autodesk Docs://122046600-Maine Maritime Utility Upgrades - NSM/110122046600-MEP-R22.vt



**DRAWING NOTES**

- 1 PROVIDE BLIND FLANGE FOR NOSE CONNECTION.
- 2 PROVIDE FLEXIBLE METAL HOSES TO CONNECT THE STEAM/CONDENSATE SERVICES TO THE SHIP'S SYSTEMS. HOSES SHALL BE A MINIMUM LENGTH OF 150'. HOSES WILL NOT BE PERMANENTLY INSTALLED, BUT STORED REMOTELY. PROVIDE WITH STAINLESS STEEL CLASS 150 FLANGE PER ASME B16.5 ON EITHER END OF EACH HOSE. PROVIDE SPOOL PIECE TRANSITION BETWEEN ANSI AND JIS FLANGE TO CONNECT TO THE SHIP'S JIS FLANGE. STEAM HOSE SHALL BE 6". CONDENSATE HOSE SHALL BE 3". HOSES CAN BE PROVIDED IN MULTIPLE SEGMENTS, IE 3X 50 FT LENGTHS.
- 3 PROVIDE PENETRATION FOR SUMP PUMP DISCHARGE THROUGH VAULT WALL PER DETAIL 6 ON M-702.
- 4 USE END SEAL FOR TRENCH WALL PENETRATION, REFER TO DETAIL 1 ON M-702.
- 5 USE GLAND SEAL FOR VAULT SIDE WALL PENETRATION, REFER TO DETAIL 2 ON M-702.
- 6 PROVIDE PENETRATION THROUGH VAULT TOP PER DETAIL 4 ON M-702.
- 7 PROVIDE PENETRATION THROUGH INTERIOR PLANT WALL PER DETAIL 8 ON M-702.
- 8 PROVIDE PENETRATION THROUGH EXTERIOR PLANT WALL PER DETAIL 3 ON M-702.
- 9 SUPPORT VALVES ON THE PIER WITH ADJUSTABLE SADDLE SUPPORT KIT, CONSTRUCTED ENTIRELY OF 316L SS, ADJUSTED TO HEIGHT OF VALVE, WITH A BASEPLATE BOLTED TO THE PIER. BASIS OF DESIGN: EMPIRE INDUSTRIES OR APPROVED EQUAL.
- 10 INTEGRATE NEW CONTROL POINTS FROM HEAT TRACE CONTROLLERS AND FROM FLOW COMPUTER TO EXISTING SIEMENS CONTROL PANEL IN THE BOILER PLANT. UPDATE EXISTING GRAPHICS TO INCLUDE NEW POINTS.
- 11 PROVIDE LINE SENSING HEAT TRACE CONTROLLER TO SERVE THE CONDENSATE PIPE AND THE SUMP PUMP/DISCHARGE PIPE IN AND ABOVE VAULT STMH-1.
- 12 PROVIDE LINE SENSING HEAT TRACE CONTROLLER TO SERVE THE CONDENSATE, SANITARY, AND DOMESTIC COLD WATER IN AND ALONG THE PIER.
- 13 USE PIER TOP WATER TIGHT SLEEVE & SEAL ASSEMBLY FOR PENETRATIONS THROUGH PIER TOP. REFER TO DETAIL 5 ON M-702.

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**RMF ENGINEERING, INC.**  
 5520 RESEARCH PARK DRIVE  
 SUITE 300  
 BALTIMORE, MD 21228  
 P: 410-576-0505 F: 410-385-0327

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1	Addendum 3	BY	DATE

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**MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
 PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
 CASTINE, MAINE**

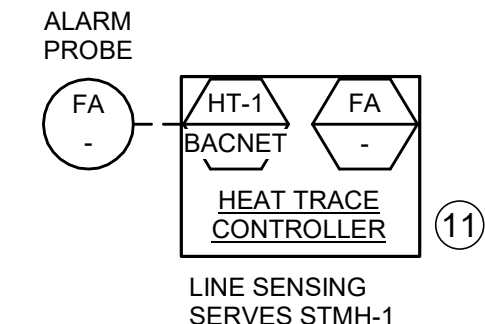
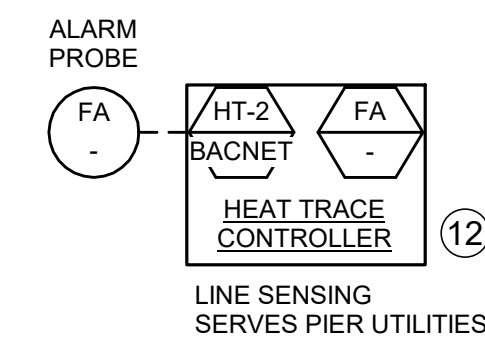
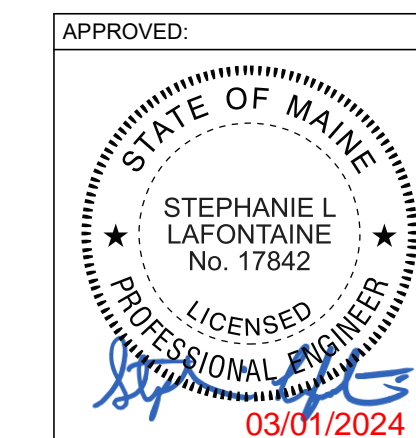
**STEAM P&ID - NEW WORK**

PREPARED BY: **GZA**  
 GZA Geotechnical, Inc.  
 Engineers and Scientists  
 www.gza.com

PREPARED FOR: **MAINE MARITIME ACADEMY  
 CASTINE, ME**

PROJ MGR: AJH REVIEWED BY: MAW CHECKED BY: JDE  
 DESIGNED BY: MAW DRAWN BY: CMP SCALE:  
 DATE: JANUARY 2024 PROJECT NO: 35109.00 REVISION NO:

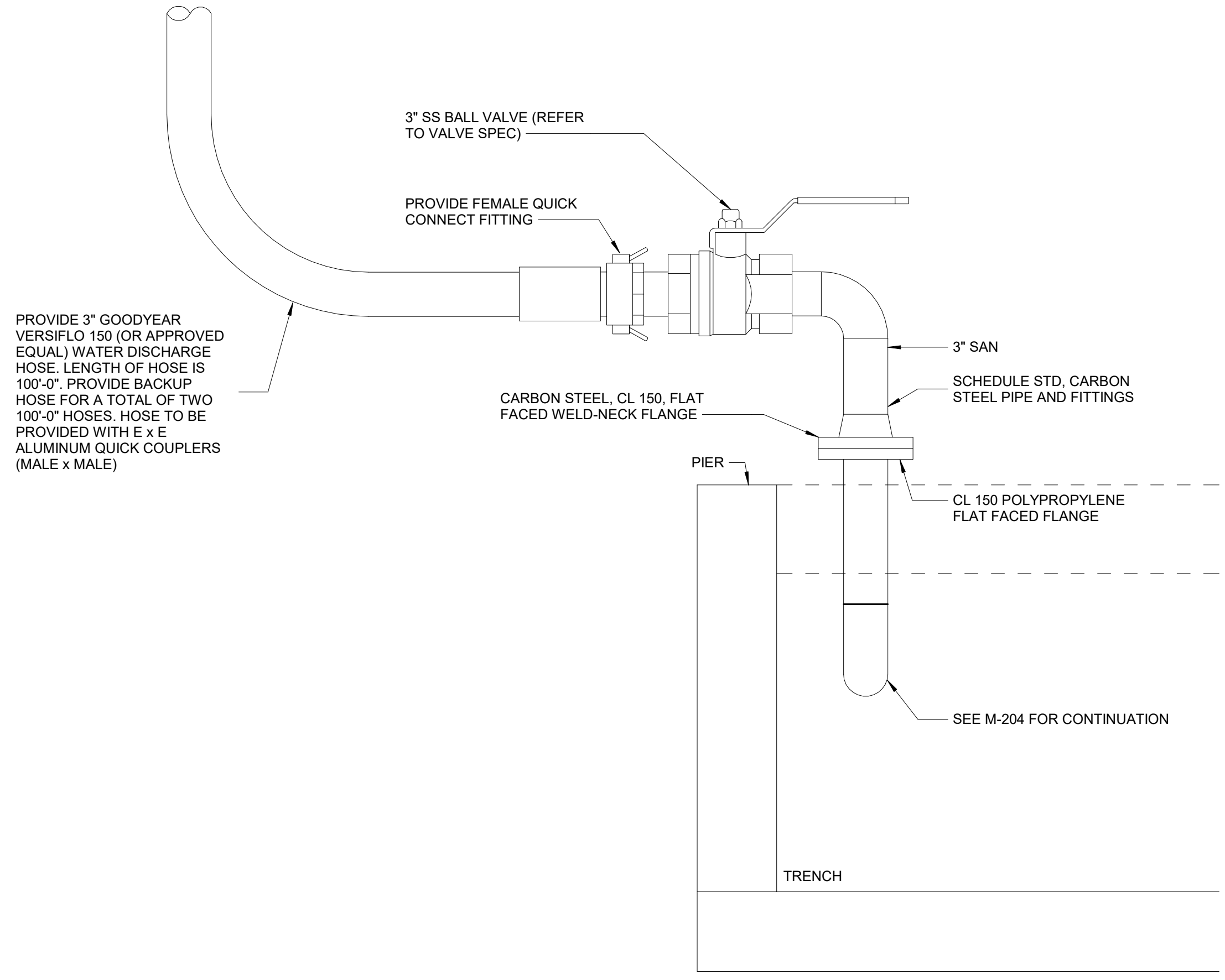
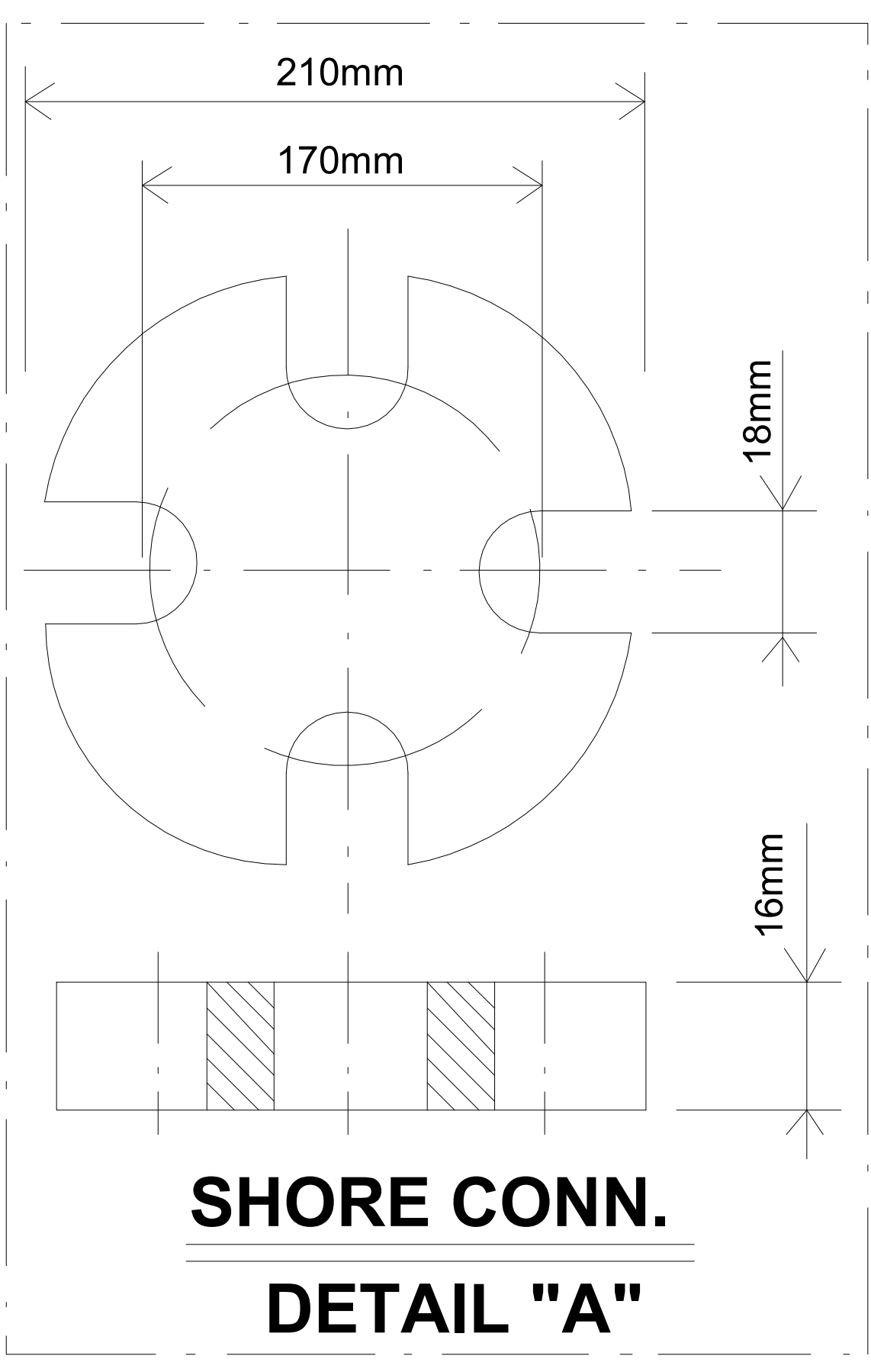
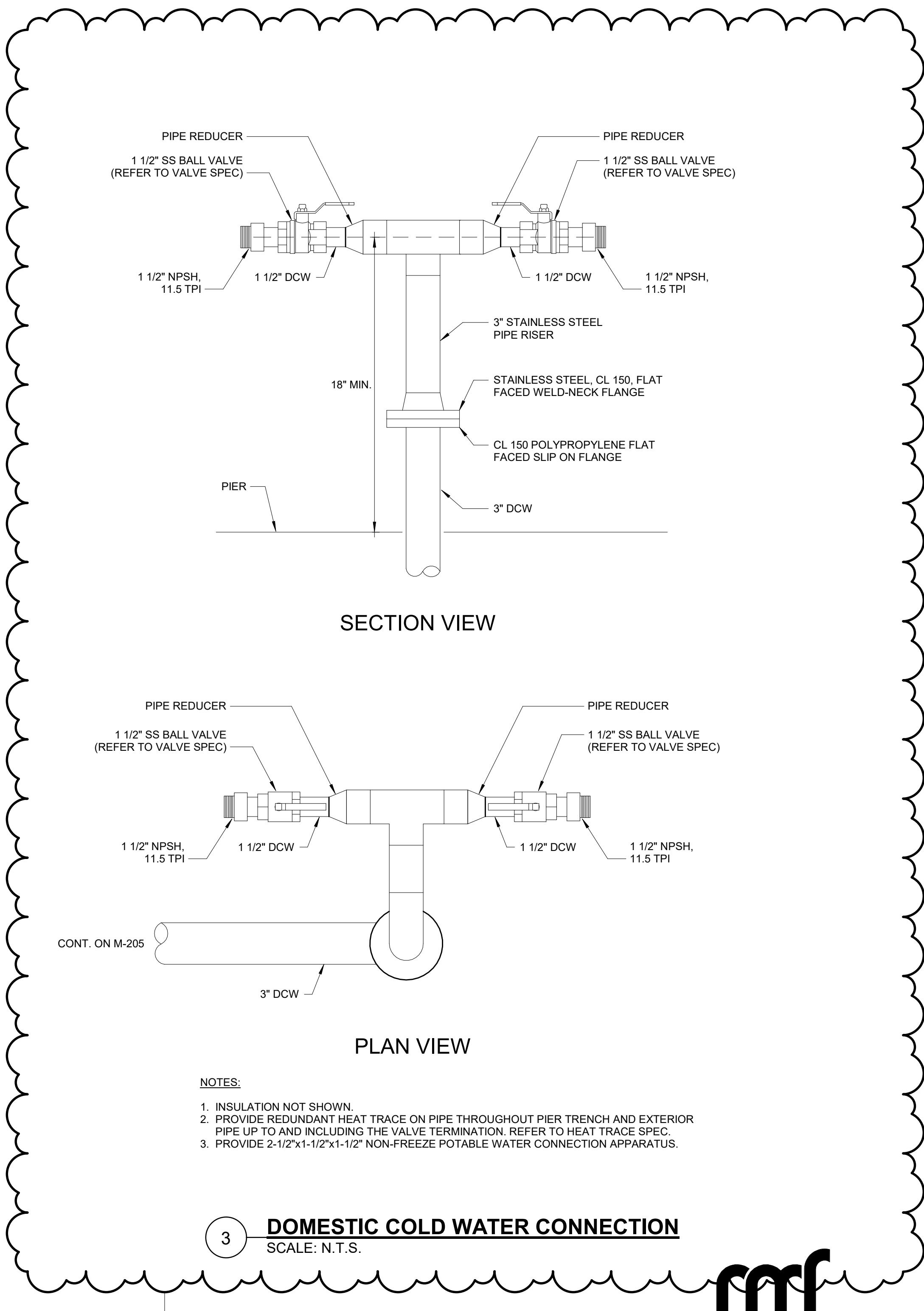
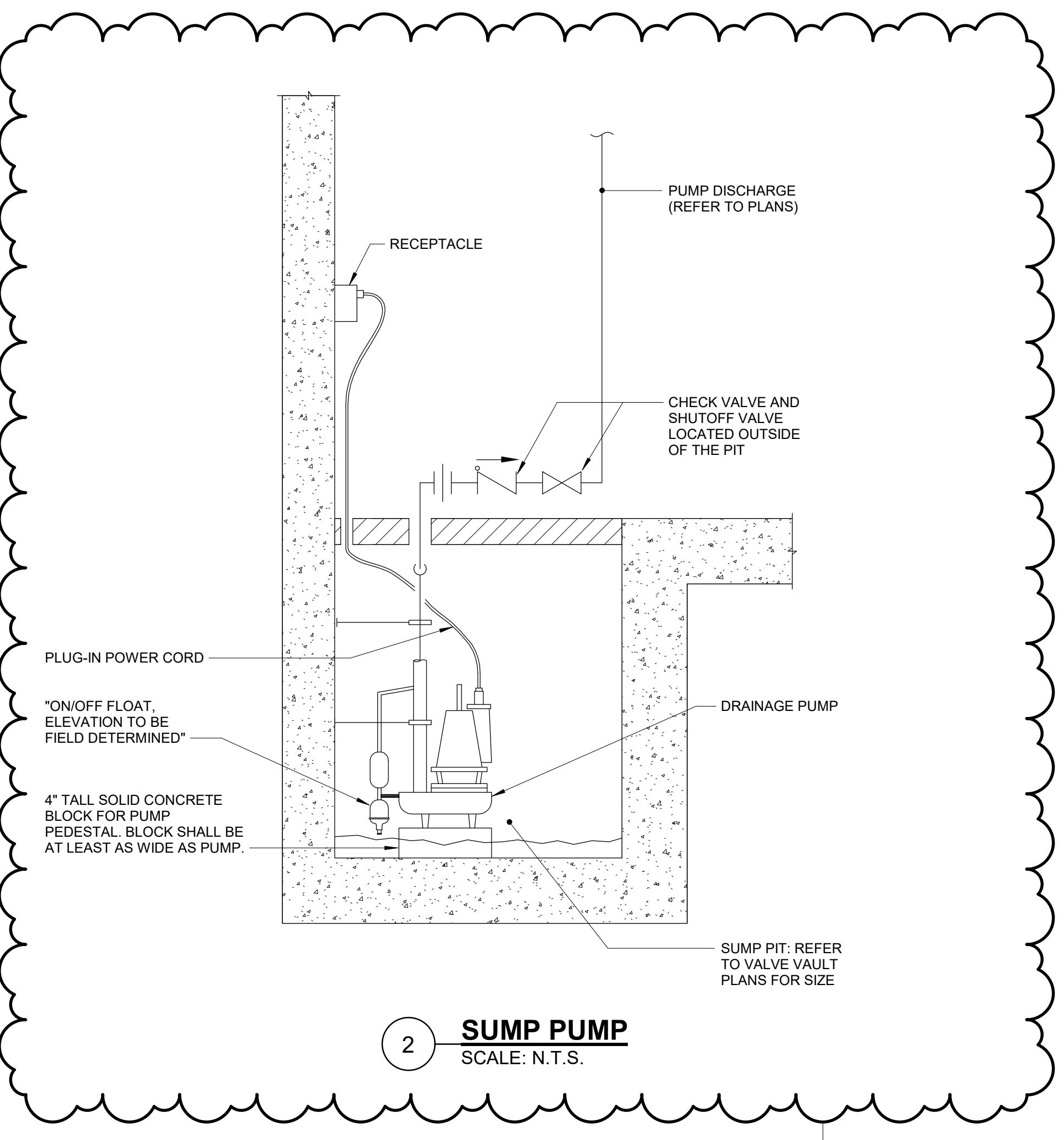
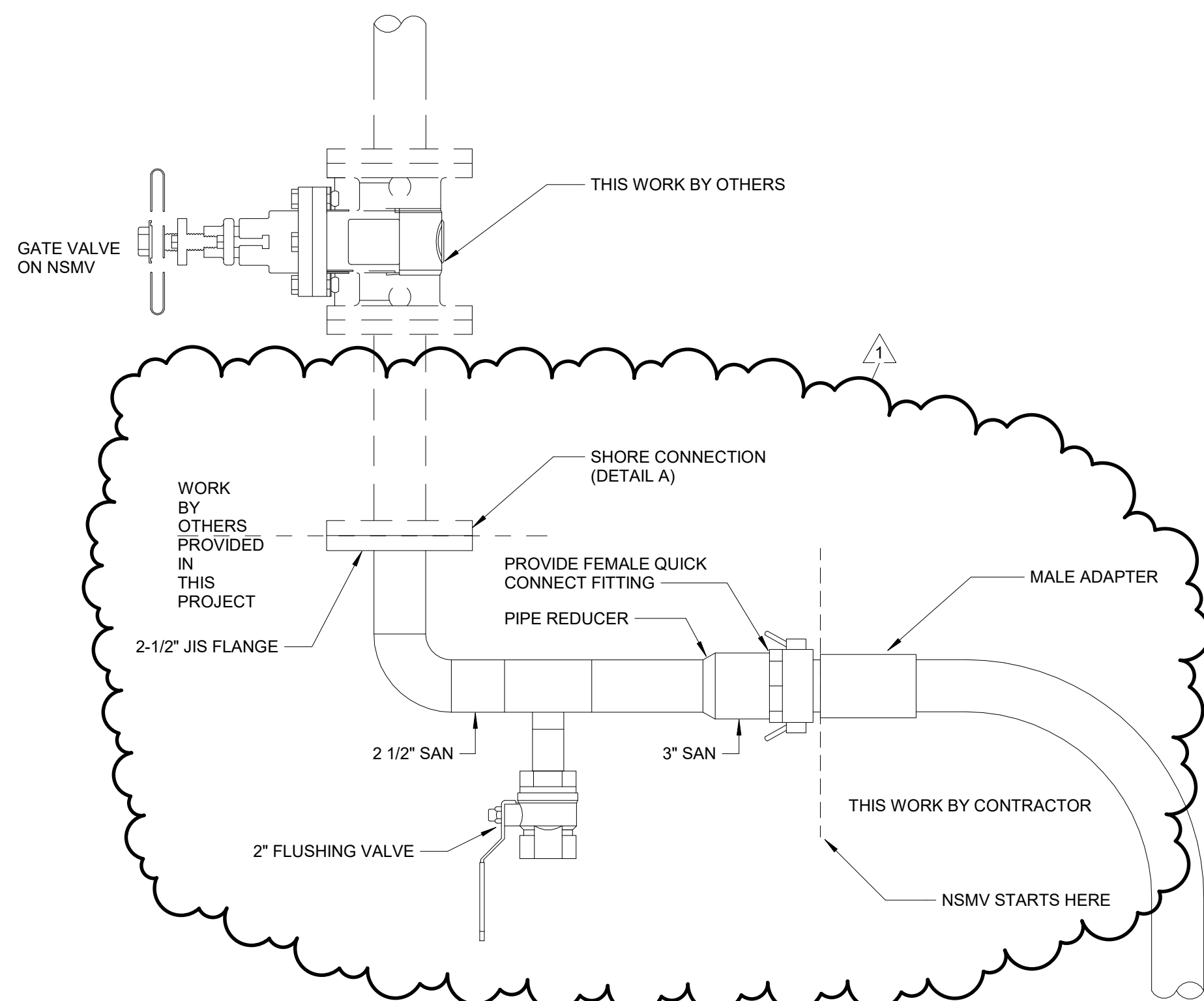
**DRAWING  
 M-501**  
 SHEET NO. 118 OF 142



ALARM PROBE  
 HT-2  
 BACNET  
 FA  
 HEAT TRACE CONTROLLER  
 LINE SENSING SERVES PIER UTILITIES

ALARM PROBE  
 HT-1  
 BACNET  
 FA  
 HEAT TRACE CONTROLLER  
 LINE SENSING SERVES STMH-1





**NOTES:**

- INSULATION NOT SHOWN.
- PROVIDE REDUNDANT HEAT TRACE ON PIPE THROUGHOUT PIER TRENCH AND TO THE VALVE TERMINATION. REFER TO HEAT TRACE SPEC.

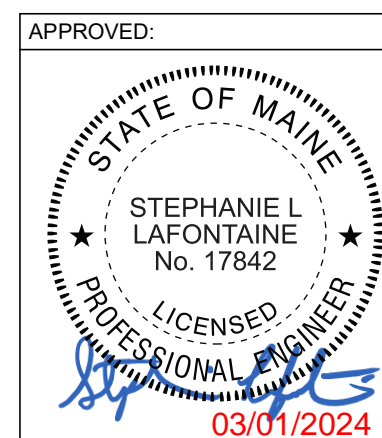
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE



MECHANICAL DETAILS			
PREPARED BY:	GZA	PREPARED FOR:	MAINE MARITIME ACADEMY CASTINE, ME
PROJ MGR:	AJH	REVIEWED BY:	MAW
DESIGNED BY:	MAW	DRAWN BY:	CMP
DATE:	JANUARY 2024	PROJECT NO:	35109.00
		CHECKED BY:	JDE
		SCALE:	AS NOTED
		REVISION NO.:	
		<b>DRAWING</b>	<b>M-704</b>
			SHEET NO. 122 OF 142

## FLOWMETER SCHEDULE

DESIG.	LOCATION	SERVICE	TYPE	LINE SIZE (IN)	METER SIZE (IN)	SENSING DIRECTION	ACCURACY	MIN. FLOW (PPH)	NORMAL FLOW (PPH)	DESIGN FLOW (PPH)	PERMANENT PRESSURE LOSS (PSID)	MAX PRESSURE (PSIG)	RATE METERING		TOTALIZING METERING		BASIS OF DESIGN	REMARKS
													UNITS	OUTPUT	UNITS	OUTPUT		
FM-1	GENERATOR ROOM	HIGH PRESSURE STEAM	DIFFERENTIAL PRESSURE	6"	6"	UNI-DIRECTIONAL	±0.5%	500	5,000	8,000	2	150	PPH	4-20 mA	-	-	VERIS ACCELABAR AFS-6STD-150C	CLASS 150, PROVIDE WITH KEP FLOW COMPUTER

## EXPANSION JOINT SCHEDULE

DESIG.	LOCATION	SERVICE	TYPE	SIZE (IN)	OPERATING CONDITIONS		DESIGN CONDITIONS		HYDRO. TEST PRESSURE (PSIG)	DIST. BETWEEN ANCHORS (FT)	EXPANSION JOINT MOVEMENT				EXPANSION JOINT DESIGN	REMARKS
					PRESSURE (PSIG)	HOT TEMP (°F)	PRESSURE (PSIG)	HOT TEMP (°F)			DESIGN		RATED			
											EXTENSION	COMPRESSION	EXTENSION	COMPRESSION		
XJ-HPS-1	VAULT STMH-1	HIGH PRESSURE STEAM	PACKED	6"	50	297	100	338	150	125	0	3.1"	1"	4"	HYSPAN 6501-160-4"	
XJ-HPS-2	TRENCH AREA B	HIGH PRESSURE STEAM	PACKED	6"	50	297	100	338	150	165	0	4.1"	1.5"	8"	HYSPAN 6501-160-8"	
XJ-CR-1	VAULT STMH-1	CONDENSATE RETURN	PACKED	2"	30	274	50	297	75	125	0	2.7"	1"	4"	HYSPAN 6501-131-4"	
XJ-CR-2	TRENCH AREA B	CONDENSATE RETURN	PACKED	2"	30	274	50	297	75	165	0	3.5"	1"	4"	HYSPAN 6501-131-4"	

## STEAM TRAP SCHEDULE

DESIG.	LOCATION	SERVICE	TYPE	SIZE (IN)	INLET PRESSURE (PSIG)	OUTLET PRESSURE (PSIG)	FLUID TEMP. (°F)	FLOW (PPH)		BASIS OF DESIGN	REMARKS
								OPERATING	MAXIMUM		
STP-1	VAULT STMH-1	HIGH PRESSURE STEAM	THERMODYNAMIC	3/4"	50	40	297	100	200	SPIRAX SARCO TD-52L	
STP-2	TRENCH AREA A	HIGH PRESSURE STEAM	THERMODYNAMIC	3/4"	50	40	297	100	200	SPIRAX SARCO TD-52L	
STP-3	TRENCH AREA B	HIGH PRESSURE STEAM	THERMODYNAMIC	3/4"	50	40	297	100	200	SPIRAX SARCO TD-52L	
STP-4	TRENCH AREA C	HIGH PRESSURE STEAM	THERMODYNAMIC	3/4"	50	40	297	100	200	SPIRAX SARCO TD-52L	

## BACKPRESSURE CONTROL VALVE SCHEDULE

DESIG.	LOCATION	SERVICE	VALVE SIZE (IN)	FLOW (PPH)	MIN CV REQUIRED	INLET PRESSURE (PSIG)	OUTLET PRESSURE (PSIG)	BASIS OF DESIGN	REMARKS
BPCV-1	GENERATOR ROOM	HIGH PRESSURE STEAM	4"	8,000	159	59	54	SPENCE TYPE E5 MAIN, FULL PORT	FAIL CLOSED, CAST STEEL BODY, "Q" PILOT

## SUMP PUMP SCHEDULE

DESIG.	LOCATION	FLOW (GPM)	HEAD (FT H2O)	DISCHARGE PIPE SIZE	MAX FLUID TEMP. (°F)	MOTOR HP	V/PH/Hz	BASIS OF DESIGN	REMARKS
SP-1	VAULT STMH-1	25	20	2"	200	1/2	120/1/60	ZOELLER M3137	

## HEAT TRACE SCHEDULE

SERVICE	DESCRIPTION	PIPE SIZE (IN)	LENGTH (FT)	POWER OUTPUT (W/FT)	POWER (W)	BASIS OF DESIGN	REMARKS
CONDENSATE	IN PIER TRENCH	2"	410	6.2	2771/160	CHROMOLOX SRL SRMIE5	1, 2, 3, 5
DOMESTIC COLD WATER	IN PIER TRENCH AND ABOVE/BELOW PIER	3 1/2"	435	4.4	2771/160	CHROMOLOX SRL SRL3	1, 2, 3, 6, TWO CIRCUITS
SANITARY SEWER	IN PIER TRENCH	3"	410	5.7	2771/160	CHROMOLOX SRL SRL3	1, 2, 3, 7
DOMESTIC COLD WATER	TAKEOFF TO HOSE CONNECTION ON PIER	1 1/4"	55	4.4	2771/160	CHROMOLOX SRL SRL3	1, 2, 3, 6
DOMESTIC COLD WATER	TAKEOFF TO HOSE CONNECTION ON PIER	1 1/4"	65	4.4	2771/160	CHROMOLOX SRL SRL3	1, 2, 3, 6
DOMESTIC COLD WATER	TAKEOFF TO HOSE CONNECTION ON PIER	1 1/4"	20	4.4	2771/160	CHROMOLOX SRL SRL3	1, 2, 3, 6
SANITARY SEWER	TAKEOFF TO PUMP STATION	2"	20	5.7	2771/160	CHROMOLOX SRL SRL3	1, 2, 3, 7
SANITARY SEWER	TAKEOFF TO PUMP STATION	2"	55	5.7	2771/160	CHROMOLOX SRL SRL3	1, 2, 3, 7
CONDENSATE	IN VAULT STMH-1	2"	50	6.2	2771/160	CHROMOLOX SRL SRMIE5	1, 2, 4, 5
SUMP PUMP AND PIPING	IN VAULT STMH-1	2"	30	6.2	2771/160	CHROMOLOX SRL SRMIE5	1, 4

### HEAT TRACE NOTES:

1. PROVIDE HEAT TRACE SET TO MAINTAIN A SERVICE TEMP OF 40°F (ADJ.) MINIMUM.
2. PROVIDE REDUNDANT HEAT TRACE CABLES. EACH INDIVIDUAL HEAT TRACE CABLE SHALL BE AS SHOWN IN THE ABOVE SCHEDULE, AND SIZED EACH TO INDEPENDENTLY HANDLE THE DESIGN FREEZE PROTECTION LOAD. THE FIRST CIRCUIT ON EACH LINE SHALL BE SET TO MAINTAIN 45°F (ADJ.), AND THE SECOND/REDUNDANT CIRCUIT SHALL BE SET TO 40°F (ADJ.).
3. PROVIDE CONTROLLER FOR THE PIER UTILITIES.
4. PROVIDE CONTROLLER FOR THE CONDENSATE AND SUMP PUMP LINES IN AND ABOVE VAULT STMH-1.
5. HEAT TRACE THE STEAM TRAP STATIONS AS PART OF THE CONDENSATE'S HEAT TRACE CIRCUIT.
6. DOW MAIN 3-1/2" PIPE AND 1-1/4" BRANCH LINES CAN BE CONSOLIDATED INTO 2 CIRCUITS.
7. SAN MAIN 3" PIPE AND 2" BRANCH LINES CAN BE CONSOLIDATED INTO 1 CIRCUIT.



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**JANUARY 19, 2024**

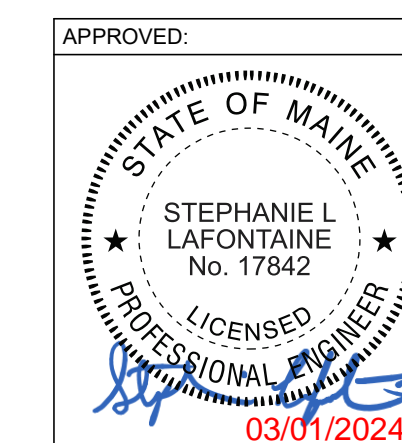
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1	Addendum 3	MAW	3/1/2024

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**MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
 PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
 CASTINE, MAINE**

### MECHANICAL SCHEDULES

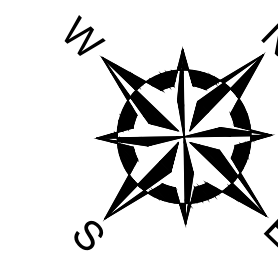
PREPARED BY: 		PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME	
PROJ MGR: AJH DESIGNED BY: MAW DATE: JANUARY 2024	REVIEWED BY: MAW DRAWN BY: CMP PROJECT NO: 35109.00	CHECKED BY: JDE SCALE: REVISION NO.	DRAWING <b>M-801</b> SHEET NO. 123 OF 142





**LEGEND:**

DESCRIPTION	EXISTING
COMMUNICATIONS MANHOLE	☐
ELECTRICAL BOX	⊞
UTILITY POLE	⊙
GUY ANCHOR	✕
PROPERTY LINE	---
APPROXIMATE EXTERIOR PROPERTY LINE	---
TIE/REFERENCE LINE	---
OVERHEAD UTILITY LINE	---
UNDERGROUND ELECTRICAL LINE	---
UNDERGROUND COMMUNICATIONS LINE	---
FLOOD LINE	---
MEAN HIGH WATER LINE (MHW)	---
MEAN LOW WATER LINE (MLW)	---

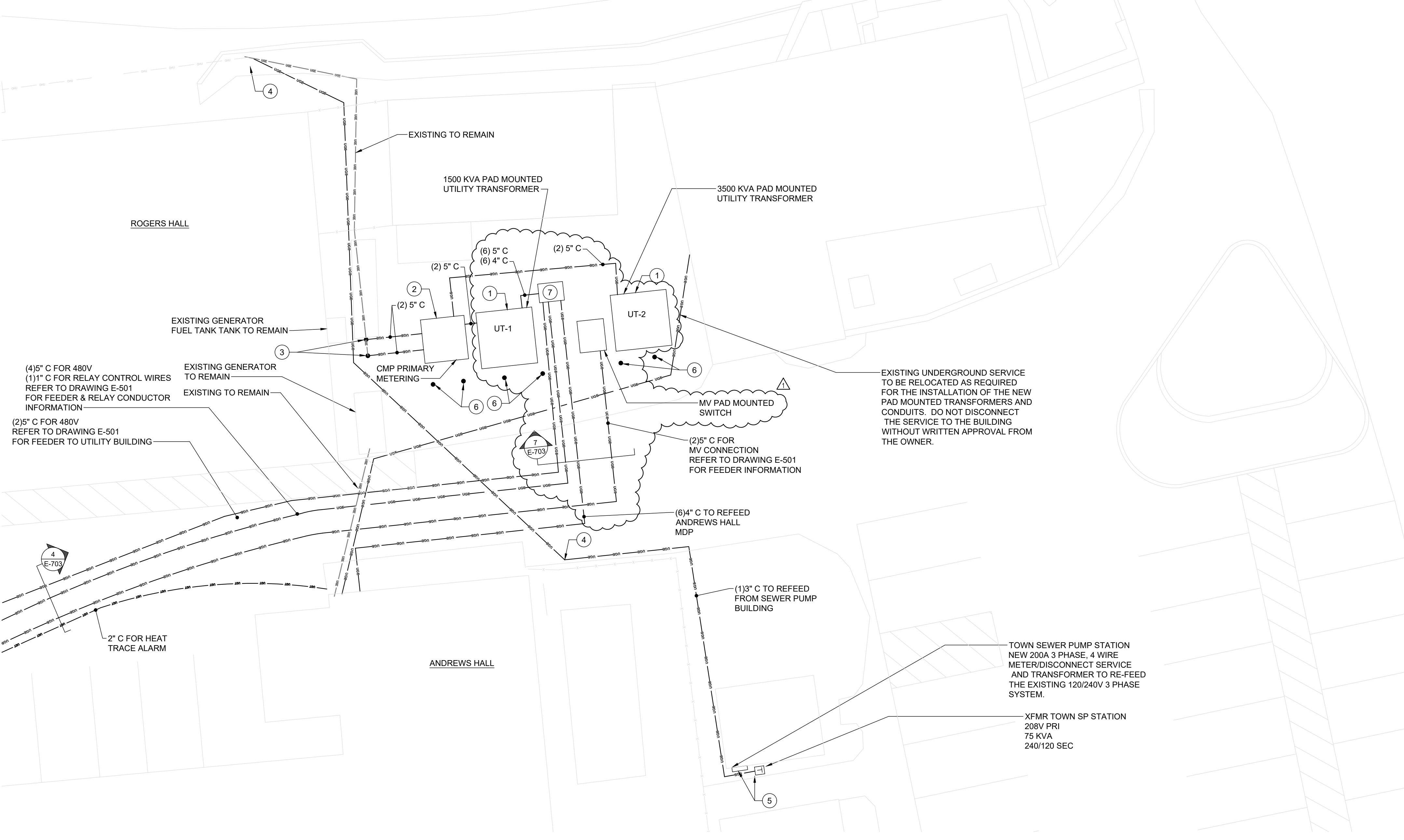


**SHEET E-201 GENERAL NOTES**

1. THERE MAY BE ADDITIONAL UNDERGROUND WIRES, CABLES, UTILITIES, AND/OR STRUCTURES NOT SHOWN ON THIS PLAN. THE LOCATIONS SHOWN HEREON ARE BASED UPON SURFACE FEATURES VISIBLE AT THE TIME OF THE SURVEY AND FROM PLAN REFERENCE #2. NO EXCAVATIONS WERE MADE DURING THE COURSE OF THIS SURVEY TO VERIFY AND/OR LOCATE ANY UNDERGROUND STRUCTURES.
2. CONTRACTOR SHALL COORDINATE ALL SITE WORK WITH THE OWNER FOR ALL ELECTRICAL ITEMS THAT ARE TO REMAIN AND TO BE REMOVED. PHASED CONSTRUCTION INCLUDING DEMOLITION IS EXPECTED TO MINIMIZE THE DISRUPTION OF THE CONSTRUCTION WITH THE WATERFRONT ACTIVITIES.
3. CONTRACTOR SHALL COORDINATE ALL PRIMARY UTILITY CONSTRUCTION WITH THE OWNER, TOWN AND CENTRAL MAINE POWER.
4. CONTRACTOR SHALL REFER TO SHEET E-501 FOR CONDUIT SIZES AND QUANTITIES FOR ADDITIONAL INFORMATION.
5. ALL ROUTING IS SHOWN AS DIAGRAMMATICAL, CONTRACTOR SHALL COORDINATE THE ROUTING WITH ALL OTHER TRADES AND ADJUST ROUTING AS REQUIRED.
6. CONTRACTOR SHALL KEEP ON SITE AND PROVIDE TO THE OWNER IN THE AS-BUILT DRAWINGS THE EXACT LOCATION OF TRENCHING, EACH EDGE AND CENTER MEASURED FROM A STRUCTURE AND DEPTH OF THE CONDUITS.
7. CONTRACTOR SHALL REFER TO THE ELECTRICAL ONE-LINE DIAGRAMS FOR ADDITIONAL INFORMATION ON THE CONDUITS, CONDUCTORS AND EQUIPMENT.

**SHEET E-201 NUMBERED ELECTRICAL NOTES**

1. CONTRACTOR SHALL PROVIDE NEW CMP APPROVED 9'x9' TRANSFORMER VAULT FOR NEW TRANSFORMERS.
2. CONTRACTOR SHALL PROVIDE A NEW CMP APPROVED 7'x7' VAULT FOR THE NEW PRIMARY METERING CABINET TO BE LOCATED ON.
3. CONTRACTOR SHALL RE-ROUTE THE EXISTING 4" SERVICE CONDUITS ONE AT A TIME TO KEEP POWER AT ANDREWS HALL UNIT NEW WORK IS DONE AND REFEED FROM THE NEW TRANSFORMER.
4. NEW 3Ø SERVICE FOR THE TOWN SEWER PUMP STATION RUN FROM CMP POLE ON WATER STREET TO NEW METER / DISCONNECT ON THE PUMP STATION BUILDING. ENCASE CONDUIT IN CONCRETE PER CMP STANDARDS.
5. CONTRACTOR SHALL PROVIDE A NEW CMP APPROVED METER / DISCONNECT AND 208V, 120/240V NEMA 3R TRANSFORMER AND REFEED THE EXISTING BUILDING. REMOVE EXISTING SERVICE EQUIPMENT.
6. CONTRACTOR SHALL PROVIDE PROTECTIVE BOLLARDS IN FRONT OF THE NEW ELECTRICAL EQUIPMENT.
7. 3'x4' ENCLOSED DISCONNECT SWITCH FOR THE SECONDARY BREAKERS IN STAINLESS STEEL NEMA 3R ENCLOSURE.



**ENLARGED SITE ELECTRICAL PLAN**

SCALE: 1" = 10'

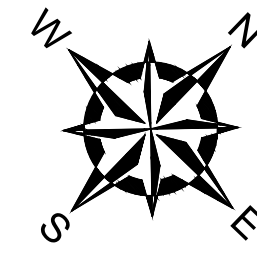


1		ADDENDUM 3	JMM	3-1-24
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MAINE MARITIME ACADEMY WATERFRONT CAMPUS PIER UPGRADES AND WATERFRONT IMPROVEMENTS CASTINE, MAINE				
ELECTRICAL SITE PART PLAN A				
PREPARED BY:	GZA Geotechnical, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME	
PROJ MGR: JHW	REVIEWED BY: JHW	CHECKED BY: JMM	DRAWING	
DESIGNED BY: JMM	DRAWN BY: MEB	SCALE: AS NOTED	E-201	
DATE: JANUARY 2024	PROJECT NO: 35109.00	REVISION NO:	SHEET NO. 127 OF 142	

I.F.B.  
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JANUARY 19, 2024



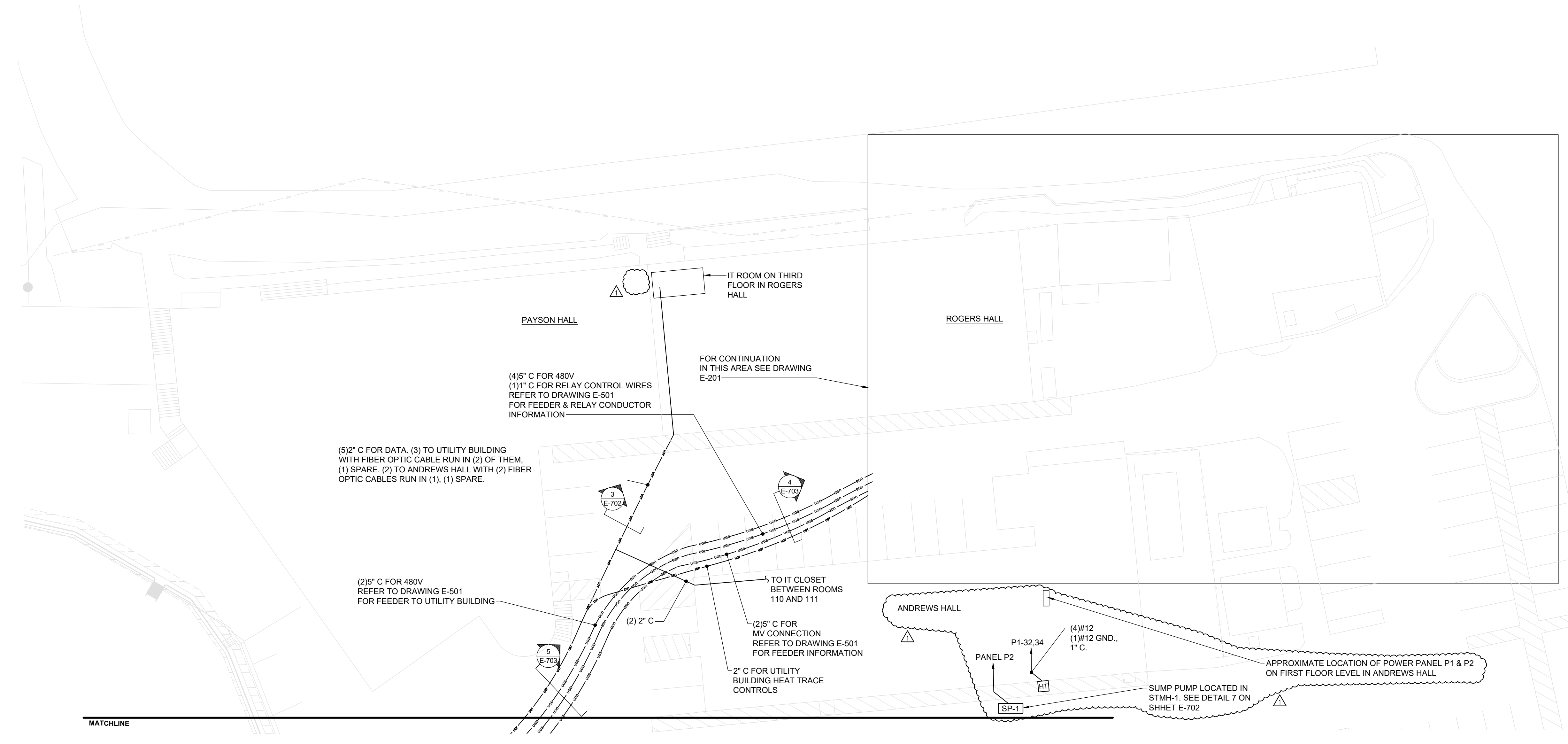




**LEGEND:**

DESCRIPTION	EXISTING
HEAT TRACE CONTROL BOX	
COMMUNICATIONS MANHOLE	
ELECTRICAL BOX	
UTILITY POLE	
GUY ANCHOR	
PROPERTY LINE	
APPROXIMATE EXTERIOR PROPERTY LINE	
TIE/REFERENCE LINE	
OVERHEAD UTILITY LINE	
UNDERGROUND ELECTRICAL LINE	
UNDERGROUND COMMUNICATIONS LINE	
FLOOD LINE	
MEAN HIGH WATER LINE (MHW)	
MEAN LOW WATER LINE (MLW)	

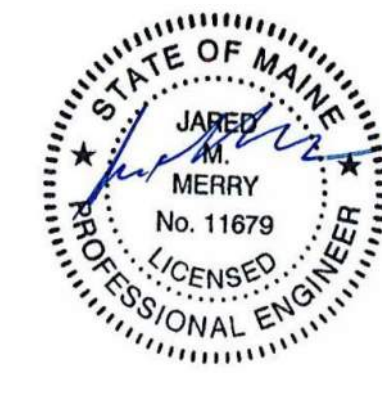
- SHEET E-202 GENERAL NOTES**
- THERE MAY BE ADDITIONAL UNDERGROUND WIRES, CABLES, UTILITIES, AND/OR STRUCTURES NOT SHOWN ON THIS PLAN. THE LOCATIONS SHOWN HEREON ARE BASED UPON SURFACE FEATURES VISIBLE AT THE TIME OF THE SURVEY AND FROM PLAN REFERENCE #2. NO EXCAVATIONS WERE MADE DURING THE COURSE OF THIS SURVEY TO VERIFY AND/OR LOCATE ANY UNDERGROUND STRUCTURES.
  - CONTRACTOR SHALL COORDINATE ALL SITE WORK WITH THE OWNER FOR ALL ELECTRICAL ITEMS THAT ARE TO REMAIN AND TO BE REMOVED. PHASED CONSTRUCTION INCLUDING DEMOLITION IS EXPECTED TO MINIMIZE THE DISRUPTION OF THE CONSTRUCTION WITH THE WATERFRONT ACTIVITIES.
  - CONTRACTOR SHALL COORDINATE ALL PRIMARY UTILITY CONSTRUCTION WITH THE OWNER, TOWN AND CENTRAL MAINE POWER.
  - ALL CONDUIT STUB UPS OUT OF THE GROUND SHALL BE GALVANIZED RIGID STEEL CONDUIT AND THE TRANSITION SHALL BE MADE BEFORE THE CONDUIT BEND.
  - ALL EXPOSED CONDUITS SHALL BE GALVANIZED RIGID STEEL CONDUITS, NOT EXPOSED TO SALT WATER.



**PARTIAL SITE PLAN**  
SCALE: 1" = 20'



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**MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE**

**ELECTRICAL SITE PART PLAN B**

PREPARED BY: GZA Geotechnical, Inc. Engineers and Scientists  
www.gza.com

PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME

PROJ MGR: JHW	REVIEWED BY: JHW	CHECKED BY: JMM	<b>DRAWING</b> <b>E-202</b> SHEET NO. 128 OF 142
DESIGNED BY: JMM	DRAWN BY: MEB	SCALE: AS NOTED	
DATE: JANUARY 2024	PROJECT NO. 35109.00	REVISION NO.	

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**SHEET E-203 GENERAL NOTES**

- ALL CONDUIT STUB UPS OUT OF THE PIER CONCRETE SHALL BE GALVANIZED RIGID STEEL CONDUIT AND THE TRANSITION SHALL BE MADE BEFORE THE CONDUIT BEND.
- ALL EXPOSED CONDUITS ON THE PIER SHALL BE RTRC-FIBERGLASS UNLESS STUBBING UP TO EQUIPMENT.
- REFER TO THE ELECTRICAL DETAILS FOR ADDITIONAL INFORMATION FOR THE ELECTRICAL EQUIPMENT.

**SHEET E-203 NUMBERED NOTES**

- PROVIDE A NEW POLE MOUNTED LIGHT TO REPLACE THE EXISTING POLE AND FIXTURE.
- NEW SHIP UTILITY BUILDING WITH NEW ELECTRICAL ROOM AND STORAGE ROOM.
- CONTRACTOR SHALL PROVIDE EATON LIGHTHOUSE MARINE POWER PEDESTAL WITH 120/240 VOLT, SINGLE PHASE, 30 AMP AND 50 AMP GFCI PROTECTED CONNECTION. REPLACE THE EXISTING PVC JUNCTION BOX WITH A NEW NEMA 4X, STAINLESS STEEL JUNCTION BOX.
- CONTRACTOR SHALL PROVIDE EATON LIGHTHOUSE MARINE POWER PEDESTAL WITH 100 AMP 120/240 VOLT, 3 PHASE CONNECTIONS FOR THE LARGER BOATS.
- CONTRACTOR SHALL PROVIDE A NEW POLE AND LIGHT, COORDINATE MOUNTING WITH THE STRUCTURAL PLANS OF THE NEW PIER.
- CONTRACTOR SHALL PROVIDE EATON LIGHTHOUSE MARINE POWER PEDESTAL WITH 100 AMP 120/240 VOLT, SINGLE PHASE CONNECTIONS FOR THE LARGER BOATS.
- CONTRACTOR SHALL PROVIDE A NEMA 4X STAINLESS STEEL, SINGLE DOOR, WALL MOUNTABLE, HINGED COVER ENCLOSURE WITH CLAMPS AND PADLOCKABLE HASP, 36"H-24"W-10"D INCLUDE A STEEL PAINTED BACK PANEL BOX, E-BOX #S362410N4X OR APPROVED EQUAL, TO TRANSITION FROM IN SLAB CONDUITS TO EXTRA HEAVY DUTY CABLES WITH STRAIN RELIEF CONNECTORS AND SECONDARY STRAIN RELIEF THAT WILL TRAVEL DOWN THE RAMP TO THE UTILITY TRENCH ON THE FLOATING DOCK. ALL SPLICES SHALL BE MADE USING MODULAR POWER BLOCKS MANUFACTURED BY ILSO, OR APPROVED EQUAL. ALL CIRCUITS SHALL BE CLEARLY AND PERMANENTLY MARKED WITH PANEL NAME, CIRCUIT NUMBER, PHASE AND PEDESTAL NUMBER. EACH CIRCUIT INCLUDING THE NEUTRAL SHALL BE BUNDLED TOGETHER FOR A NEAT AND WORKMAN LIKE INSTALLATION SEE DETAIL 6/E-703.
- CONTRACTOR SHALL PROVIDE AN EATON SUPER YACHT 277/480V, 200 AMP, 3 PHASE POWER PEDESTAL FOR LARGER VESSEL CONNECTIONS.
- CONTRACTOR SHALL MOUNT THE RECEPTACLE WITH A WEATHERPROOF IN USE COVER TO THE BACK OF THE MOUNTING RACK FOR THE JUNCTION BOX.
- CONTRACTOR SHALL RE-FEED THE EXISTING LIGHTING FROM THE NEW ELECTRICAL PANELS IN THE UTILITY BUILDING.
- PUMP OUT STATION NEMA 4X DISCONNECT SWITCH IS FURNISHED WITH THE PUMP OUT EQUIPMENT. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION, AND POWER CONNECTIONS WITH THE PUMP OUT STATION CONTRACTOR PRIOR TO ROUGH-IN AND FINAL CONNECTIONS.
- POWER CONNECTION FOR THE HEAT TRACE SYSTEM, ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND CONNECTION POINTS WITH THE MECHANICAL CONTRACTOR IN THE AREA UNDER THE ACCESS HATCH. REFER TO THE MECHANICAL TRENCH DRAWINGS FOR HEAT TRACE POWER CONNECTIONS. THE HEAT TRACE CIRCUITS SHALL BE 2-POLE 20 AMP CIRCUITS. PROVIDE (2)#12, (1)#12 GROUND IN 1" CONDUIT FOR EACH CIRCUIT FROM THE HEAT TRACE CONTROL PANEL TO THE HEAT TRACE POWER CONNECTION.
- CONTRACTOR SHALL ROUTE CONDUITS ALONG THE FACE OF THE EXISTING BULK HEAD FOR THE LIGHTING AND POWER CONNECTIONS. PROVIDE ALL NEW FIBERGLASS CONDUITS AND SUPPORTS AS REQUIRED.
- CONTRACTOR SHALL PROVIDE A RED LED NAVIGATIONAL WARNING LIGHTS ON THE CATWALKS. THE LIGHTS SHALL TURN ON AT 1/2 HOUR BEFORE DUSK AND A 1/2 HOUR AFTER DAWN, ALSO WHEN EVER THERE IS LOW VISIBILITY/LIGHT LEVELS AT THE PIER. LIGHT SHALL BE MOUNTED ABOVE THE TOP RAIL WITH 3/4 GALVANIZED RIGID STEEL CONDUIT FOR POWER AND SUPPORT.
- CONTRACTOR SHALL PROVIDE ONE 1" SPARE CONDUIT FROM THE SPO TO THE UTILITY BUILDING ON THE PIER FOR CONNECTION TO THE TELECOMMUNICATION SYSTEM. COORDINATE ALL CONDUIT STUB UPS WITH THE APPROVED EQUIPMENT OUT SHEETS AND SEAL ALL CONDUITS AS REQUIRED BY THE MANUFACTURE. CONCRETE HOUSEKEEPING PAD BY OTHERS SHALL BE 6" DEPTH AND 6" OF CLEAR SPACE OUTSIDE THE DIMENSIONS OF EACH UNIT.
- CONTRACTOR SHALL PROVIDE A 1" CONDUIT BACK TO THE TELECOMMUNICATIONS RACK IN THE UTILITY BUILDING AND A WEATHERPROOF BOX MOUNTED TO THE STRUT RACK FOR FUTURE SECURITY SYSTEMS.

MATCHLINE

LANDSIDE CONDUITS MAY BE PVC OR FIBERGLASS

STANDARD 4"x6" MANHOLE REFER TO DETAIL 9 ON SHEET E-702 FOR ADDITIONAL INFORMATION

(6)5" C FOR 480V (1)1" C FOR RELAY CONTROL WIRES REFER TO DRAWING E-501 FOR FEEDER & RELAY CONDUCTOR INFORMATION

ALL CONDUITS ON THE PIER SHALL BE RTRC-FIBERGLASS SEE GENERAL NOTES FOR EXCEPTIONS

(3)2" C FOR TEL/DATA TO THE UTILITY BUILDING

(2)5" C. 6.6KV FOR NSMV (1)1" C. FOR RELAY CONTROL WIRES REFER TO DRAWING E-501 FOR FEEDER AND RELAY CONDUCTOR INFORMATION

48" WIDE (TOPPING) BRANCH CIRCUIT TRENCH CROSSING FOR LOADS ON NORTHEAST SIDE OF PIER

(2)5" C FOR 480V CONNECT REFER TO DRAWING E-501 FOR FEEDER INFORMATION

(2)5" C FOR 6.6KV CONNECTION (1)1" C FOR RELAY CONTROL WIRES REFER TO DRAWING E-501 FOR FEEDER INFORMATION

(4)5" C FOR 480V CONNECTION (1)1" C FOR RELAY CONTROL WIRES REFER TO DRAWING E-501 FOR FEEDER & RELAY CONDUCTOR INFORMATION

(2)5" C FOR 6.6KV CONNECTION (1)1" C FOR RELAY CONTROL WIRES (1)1 1/4" C FOR HEATER POWER REFER TO DRAWING E-501 FOR FEEDER AND RELAY CONDUCTOR INFORMATION

(4)5" C FOR 480V CONNECTION (1)1" C FOR RELAY CONTROL WIRES (1)1 1/4" C FOR HEATER POWER REFER TO DRAWING E-501 FOR FEEDER & RELAY CONDUCTOR INFORMATION

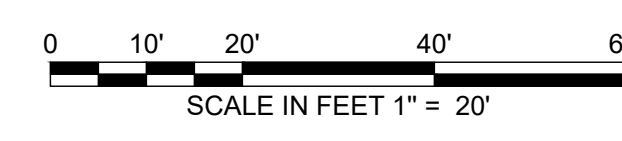
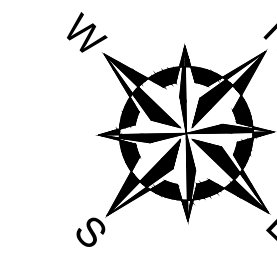
(1)1" C FOR TEL/DATA TO THE SHIP CONNECTION (RUN IN THE TOPPING SLAB)

CONDUITS ROUTED IN THE UTILITY TRENCH AND THEN TRANSITION INTO THE POURED IN PLACE STRUCTURE AT THE END OF THE PIER. STACK THE CONDUITS VERTICALLY IN THE POURED IN PLACE STRUCTURE FOR MINIMUM SPACE REQUIREMENTS

NSMV 480V SPO 600V, 1200A POWER CONNECTION

NSMV 6.6KV CAVOTEC SPO 6.6KV, 700A NEW MEDIUM VOLTAGE CONNECTION

I.F.B. NOT FOR CONSTRUCTION JANUARY 19, 2024



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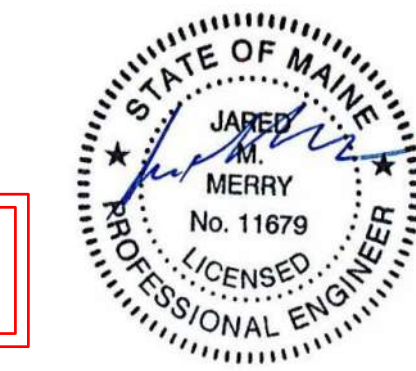
MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
PIER UPGRADES AND WATERFRONT IMPROVEMENTS  
CASTINE, MAINE

ELECTRICAL PIER PART PLAN A

PREPARED BY: GZA  
DESIGNED BY: JMM  
DATE: JANUARY 2024

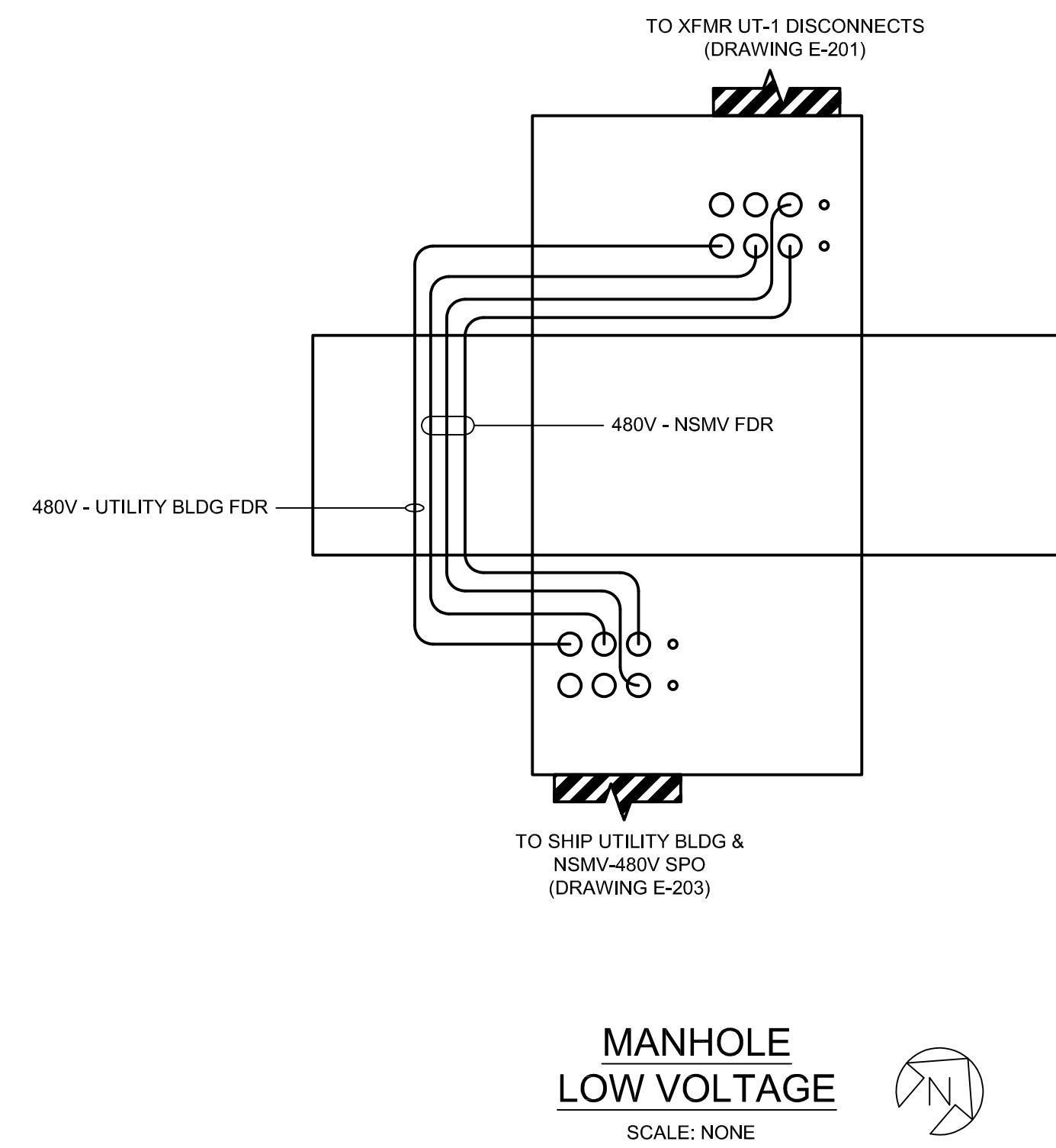
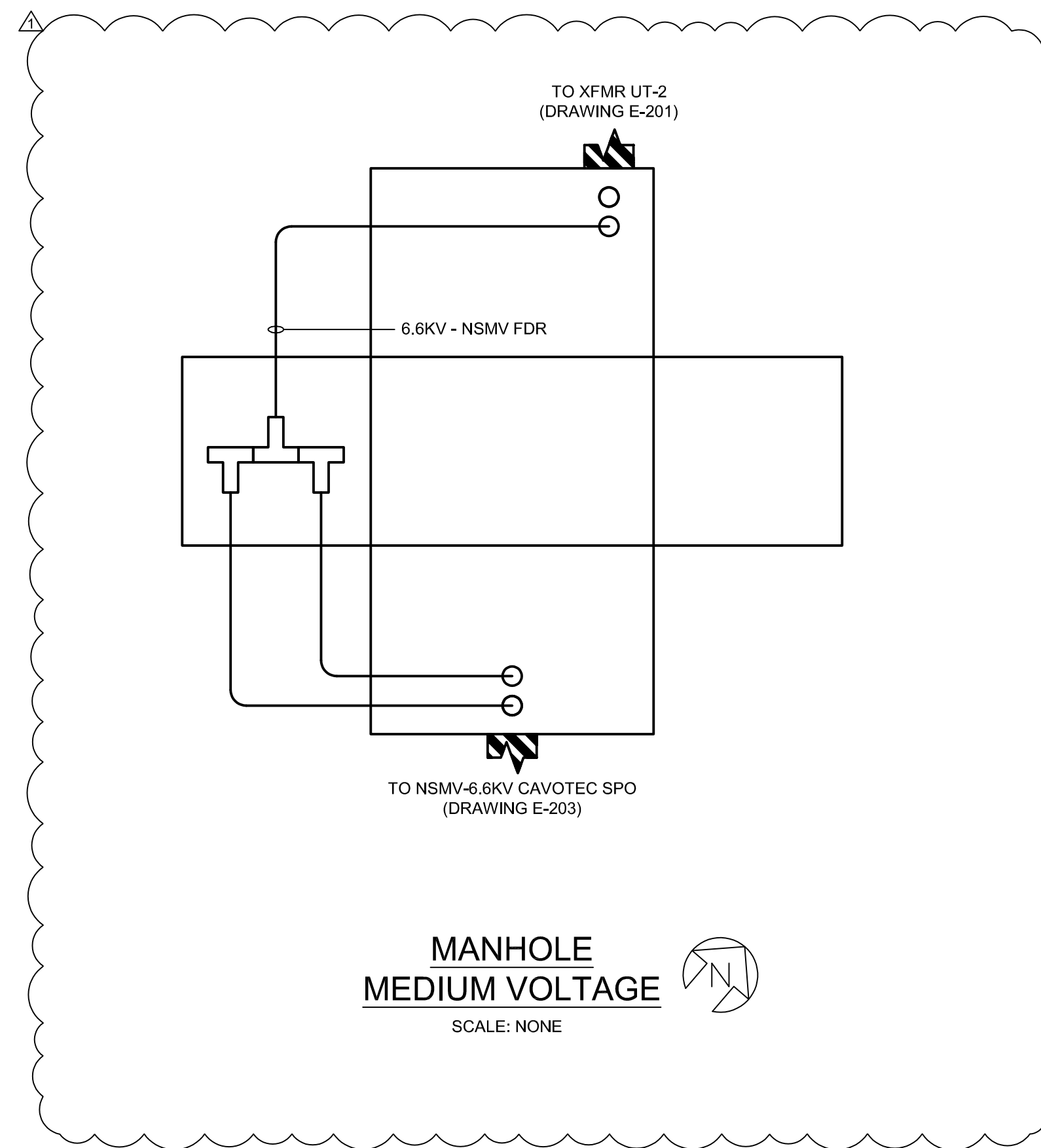
PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME  
DRAWN BY: JMM  
PROJECT NO.: 35109.00

CHECKED BY: JMM  
SCALE: AS NOTED  
REVISION NO.:  
**DRAWING E-203**  
SHEET NO. 129 OF 142



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**rnf**  
 RMF ENGINEERING, INC.  
 5520 RESEARCH PARK DRIVE  
 SUITE 300  
 BALTIMORE, MD 21228  
 P: 410-576-0505 F: 410-385-0327

NO.	ISSUE/DESCRIPTION	BY	DATE
1	Addendum 3	KFK	3/1/2024

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MAINE MARITIME ACADEMY WATERFRONT IMPROVEMENTS PROJECTS  
 MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
 CASTINE, MAINE

**ELECTRICAL BUTTERFLY DIAGRAMS**

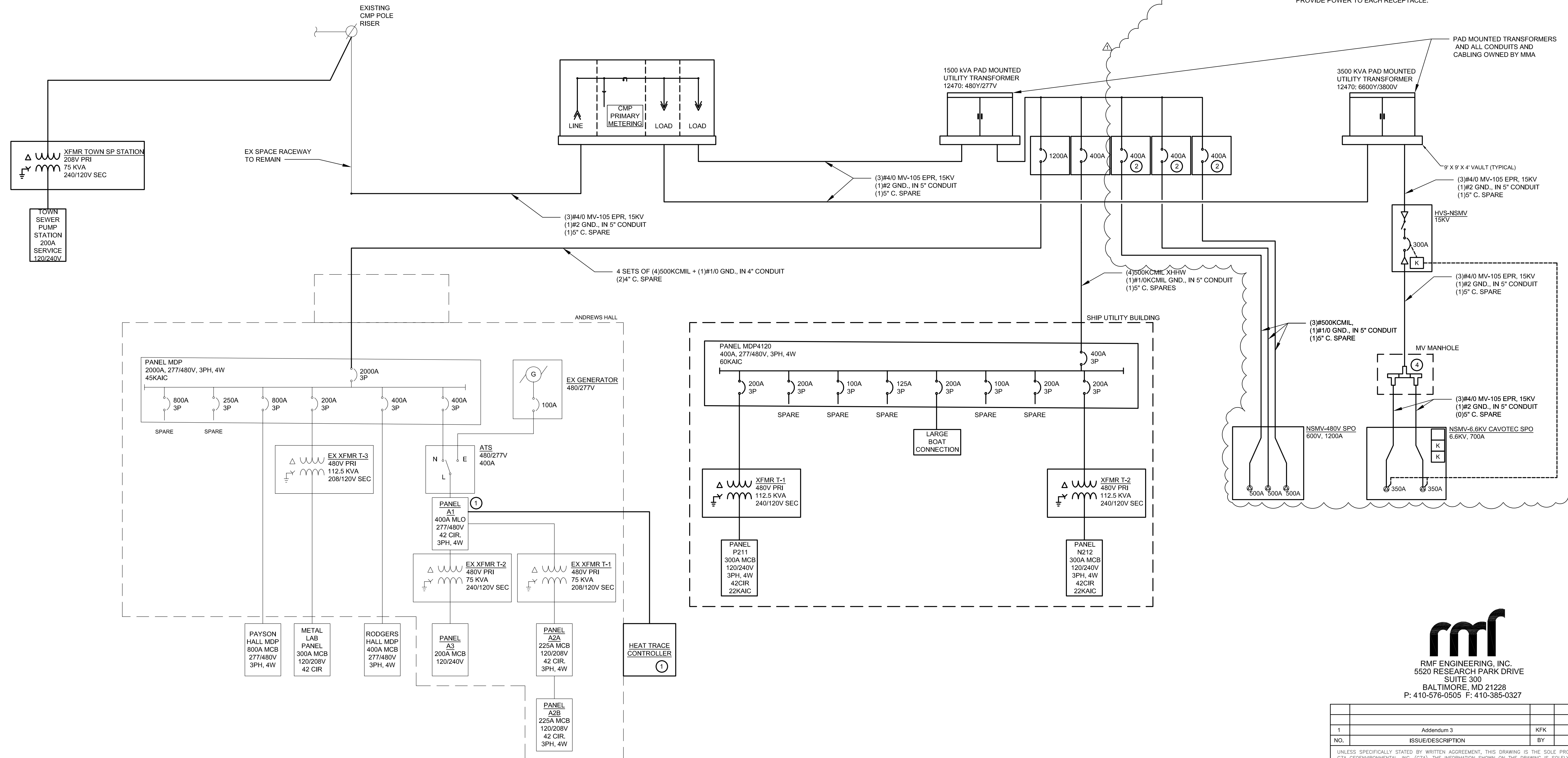
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME
PROJ MGR: KFK DESIGNED BY: KFK/RSR DATE: JANUARY 2024	CHECKED BY: AHJ SCALE: SCALE REVISION NO.
<b>E-301</b> SHEET NO. 132 OF 142	



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JANUARY 19, 2024

**DRAWING NOTES:**

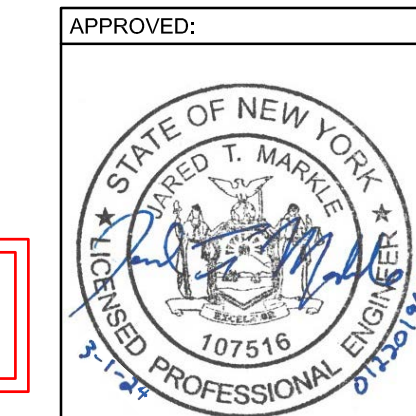
- 1 PROVIDE 2P-60A GFPE CIRCUIT BREAKER IN EX PANEL A1, UTILIZING EXISTING SPACE. PROVIDE 2-#6 THWN + #10 AWG GND IN 1" RGS CONDUIT FROM PANEL A1 TO HEAT TRACE CONTROLLER.
- 2 PROVIDE THREE (3) GROUPED 400A CIRCUIT BREAKERS ASSOCIATED WITH EACH SPO RECEPTACLE. PROVIDE SHUNT TRIP MODULE AND ASSOCIATED WIRING FROM SPO FOR SAFETY FROM EXPOSURE TO ENERGIZED PARTS. EACH 500A RECEPTACLE MICRO SWITCH SHALL SHUNT TRIP THE ASSOCIATED UPSTREAM BREAKER.
- 3 PROVIDE AUXILIARY POWER TO EACH SPO ENCLOSURE FROM AN EXTERNAL SOURCE OR FROM A CPT PROVIDED WITH THE EQUIPMENT.
- 4 PROVIDE A MODULAR T-SPLICE TO BI-FURCATE THE SHIP FEEDER TO PROVIDE POWER TO EACH RECEPTACLE.



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MAINE MARITIME ACADEMY WATERFRONT CAMPUS  
CASTINE, MAINE

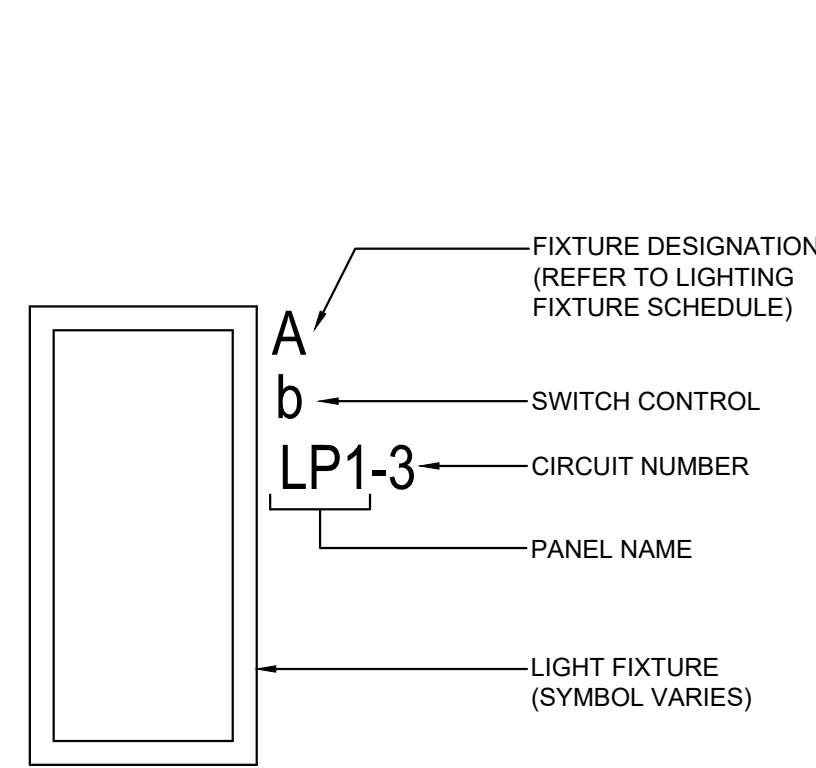
**ELECTRICAL ONE-LINE DIAGRAM**



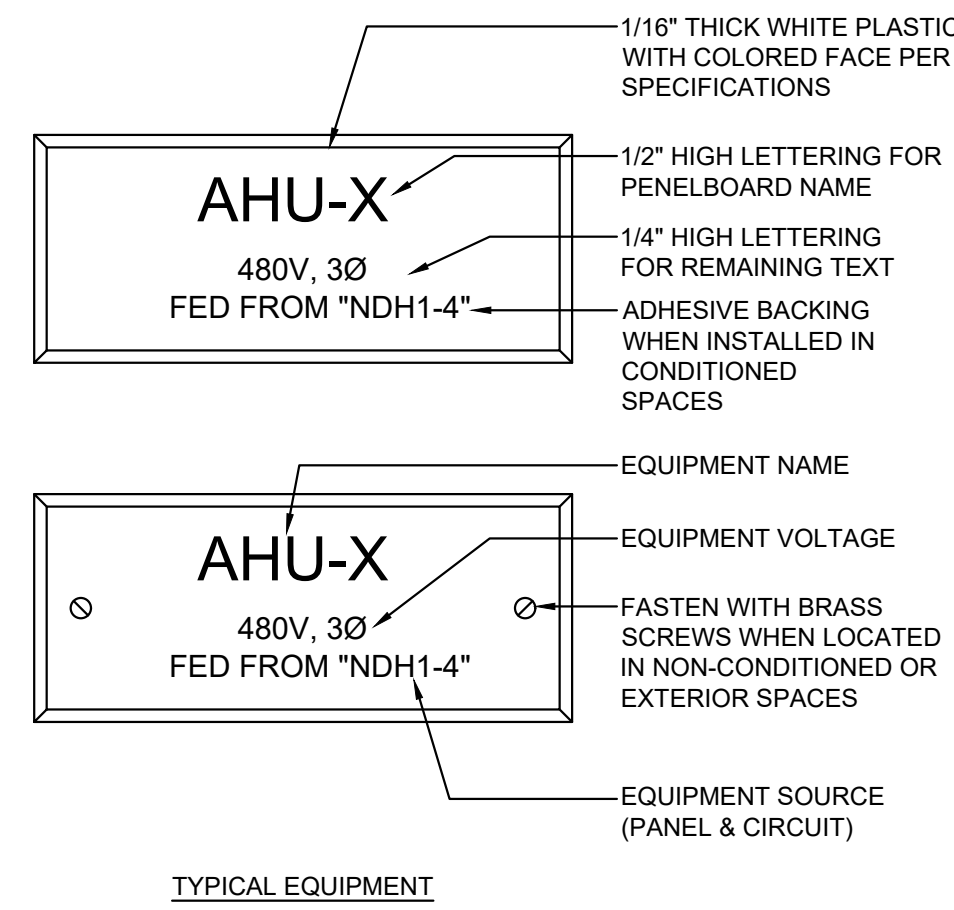
PREPARED BY: <b>GZA</b>	PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME
PROJ MGR: KFK DESIGNED BY: KFK/RSR DATE: JANUARY 2024	CHECKED BY: AHJ SCALE: NONE REVISION NO. PROJECT NO. 35109.00
<b>E-501</b> SHEET NO. 134 OF 142	

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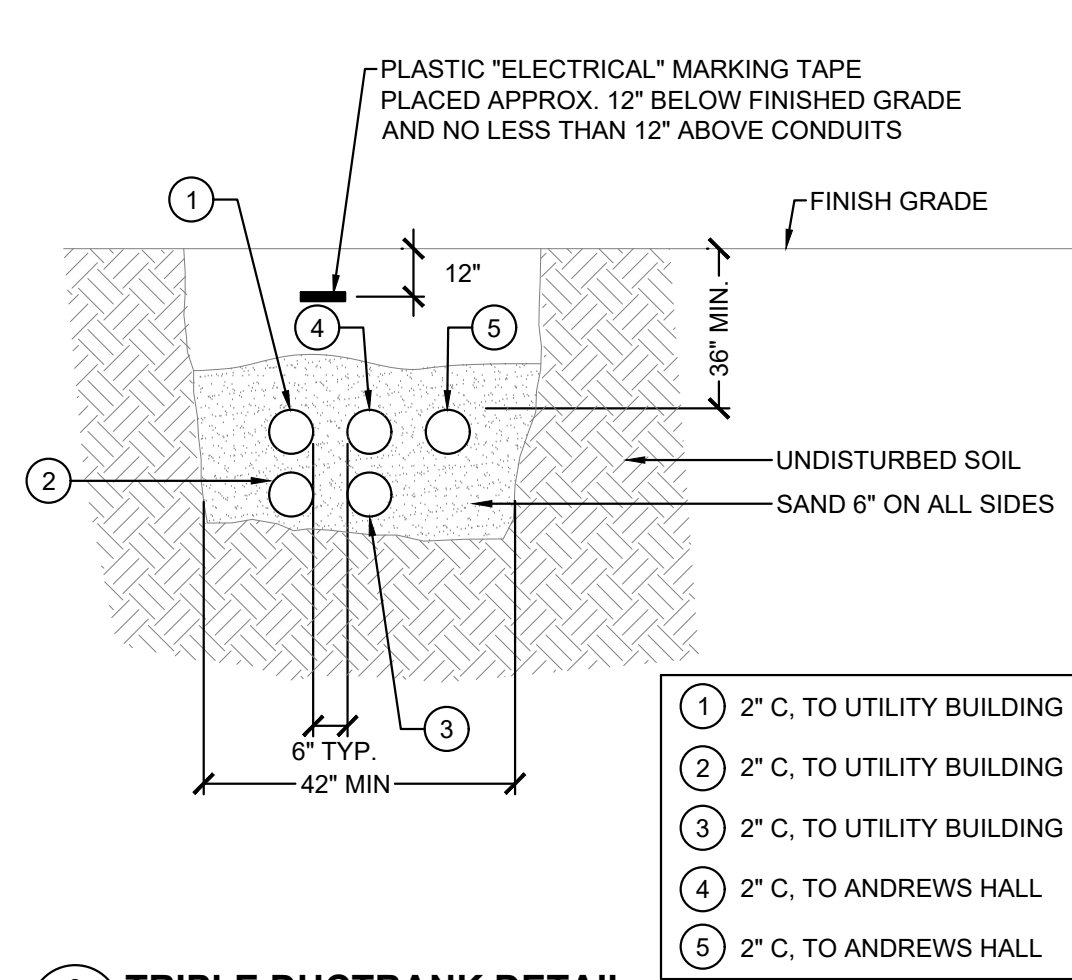




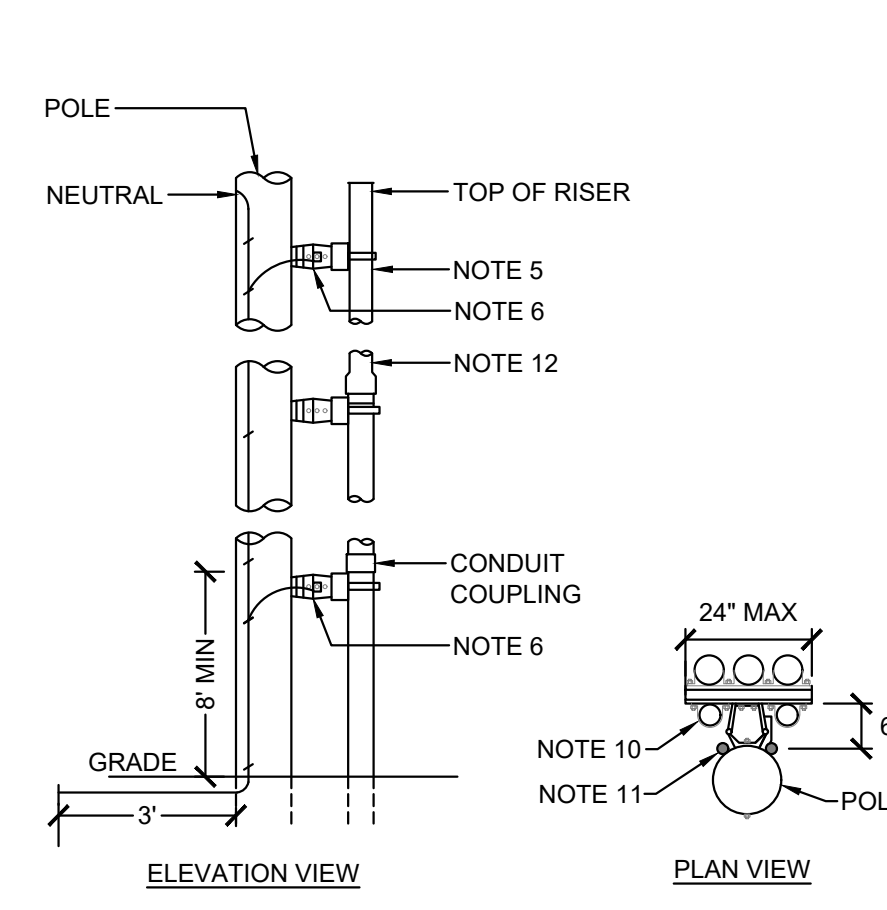
1 TYPICAL LIGHTING FIXTURE DESIGNATION DETAIL  
E-702 NTS



2 EQUIPMENT NAMEPLATE DETAIL  
E-702 NTS

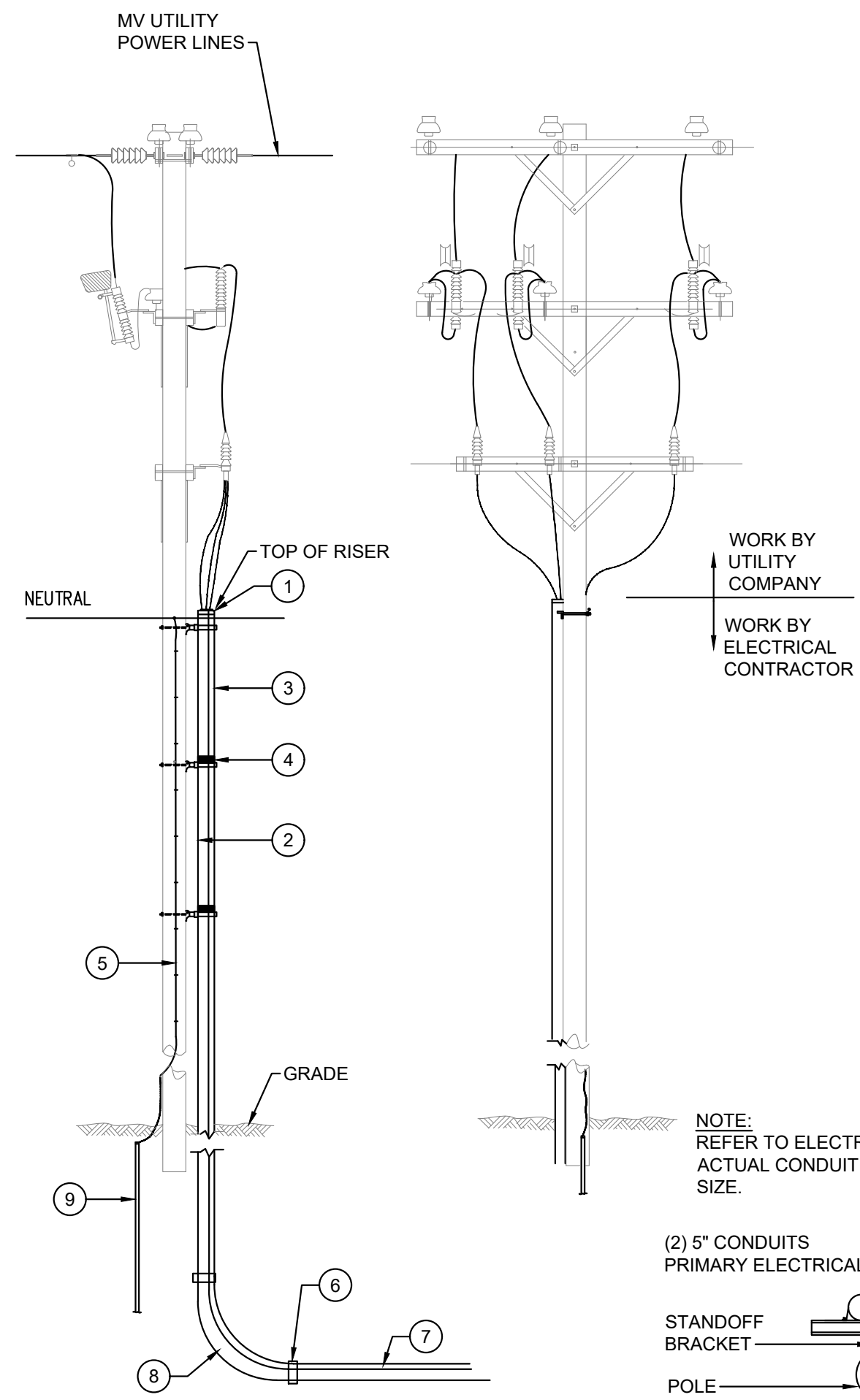


3 TRIPLE DUCTBANK DETAIL  
E-702 NTS



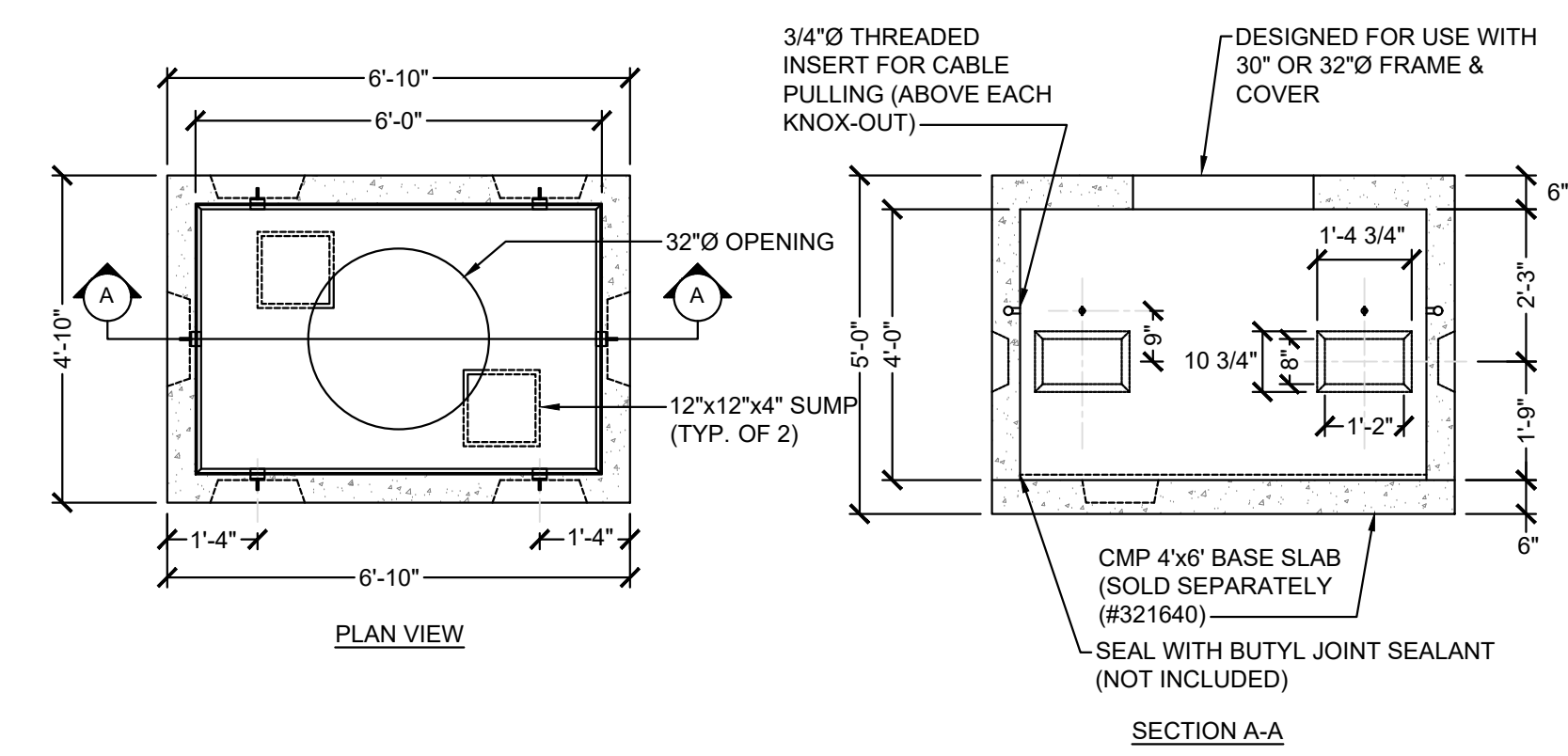
4 CONDUIT STANDOFF BRACKET DETAIL  
E-702 NTS

- GENERAL NOTES:**
- STANDOFF BRACKETS ARE REQUIRED WHEN MORE THAN ONE CONDUIT PER UTILITY IS TO BE INSTALLED ON A POLE.
  - ALL THREE PHASE PRIMARY RISERS, WHETHER STAND OFF BRACKETS ARE USED OR NOT, SHALL BE RIGID STEEL FOR THE FIRST SECTION.
  - ON SINGLE PHASE PRIMARY, SECONDARY AND SERVICE URD RISERS USING STAND OFF BRACKETS, RIGID STEEL OR SCHEDULE 80 MAY BE USED.
  - WHERE RIGID STEEL OR SCHEDULE 80 PVC IS USED FOR THE RISER, ONE BRACKET SHALL BE USED TO SUPPORT EACH SECTION OF CONDUIT UP TO 10 FEET IN LENGTH. EACH BRACKET IS TO BE PLACED JUST BELOW THE RISER CONDUIT COUPLING.
  - CONDUIT SECTIONS FOR SINGLE PHASE OR THREE PHASE RISERS USING STAND OFF BRACKETS SHALL BE RIGID STEEL OR SCHEDULE 80 PVC CONDUIT ONLY (SEE NOTE 2), WITH THE EXCEPTION THAT SCHEDULE 40 PVC SUNLIGHT RESISTANT CONDUIT MAY BE USED FOR THE TOP SECTION FO THE RISER (NOT LONGER THAN 10'). IF THE TOP SECTION IS LONGER THAN 24" IT MUST BE SUPPORTED WITH A MINIMUM OF ONE STAND OFF BRACKET. IF THE TOP SECTION IS SCHEDULE 40 PVC AND LONGER THAN 72" IT MUST BE SUPPORTED BY NO FEWER THAN TWO STAND OFF BRACKETS.
  - WHERE PVC IS USED FOR THE RISER, EACH STAND OFF BRACKET SUPPORTING THE PVC SHALL BE GROUNDED. WHERE STEEL IS USED FOR THE RISER ONE STAND OFF BRACKET SUPPORTING THE STEEL IS REQUIRED TO BE GROUNDED.
  - SWEEPS, WHEN USED, ARE REQUIRED TO BE STEEL.
  - IF RISER IS ALL STEEL CONDUIT, INSTALL INSULATED GROUNDING BUSHING AT TOP OF RISER.
  - LOWEST BRACKET SHALL BE A MINIMUM OF 8 FEET ABOVE FINISH GRADE.
  - ALTERNATE LOCATION FOR COMMUNICATION CABLE IF RUN IN METAL CONDUIT OR SCHEDULE 80.
  - COMMUNICATION CABLE MAY BE ATTACHED DIRECTLY TO POLE ADJACENT TO BRACKETS.
  - WHEN USING PVC, POSITION BELL END SECURELY OVER RIGID CONDUIT.



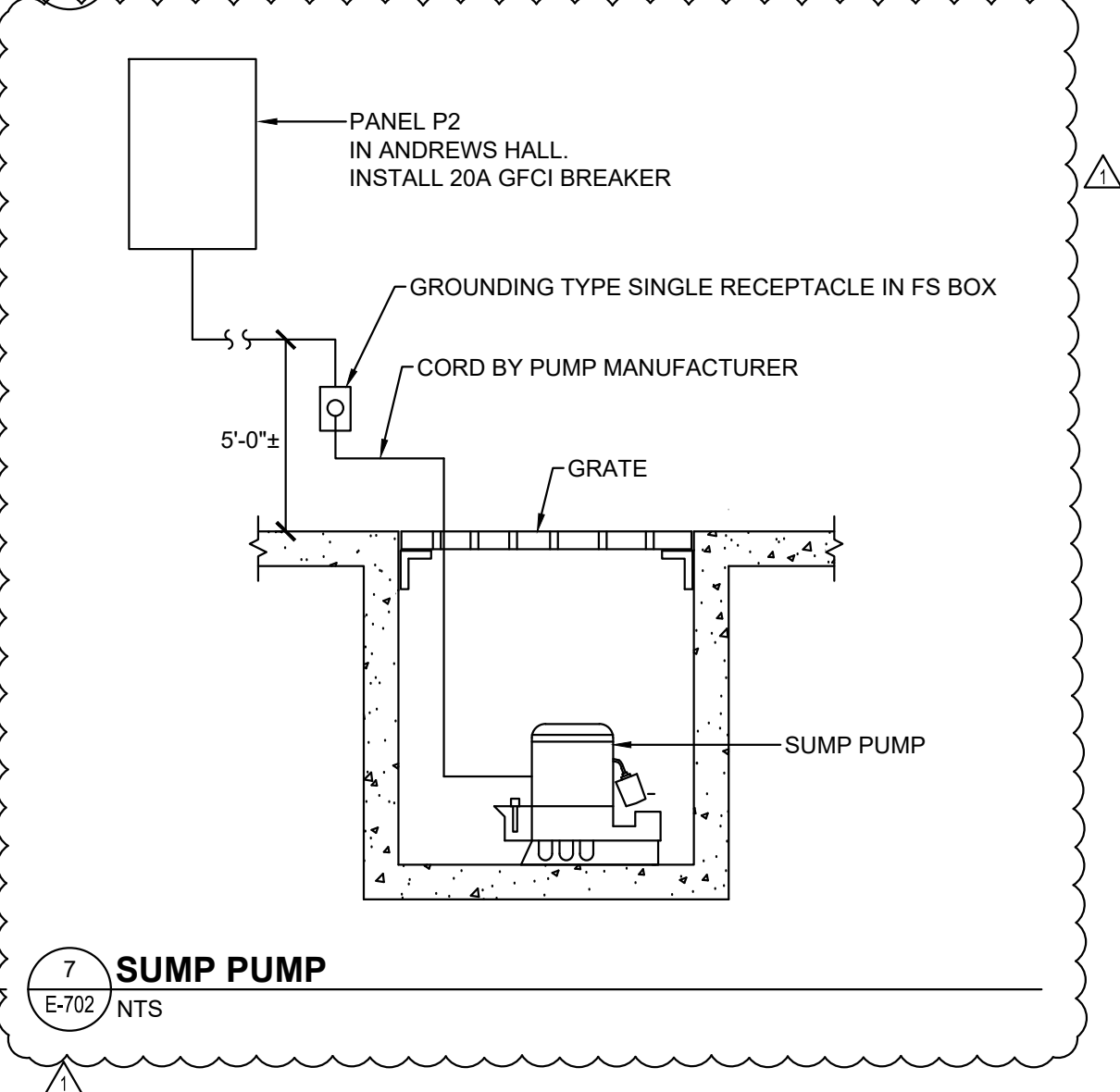
5 UTILITY COMPANY POLE RISER DETAIL  
E-702 NTS

- NUMBERED NOTES**
- SEAL TOP OF CONDUIT WITH POLYURETHANE SEALER. TOP OF CONDUIT SHALL HAVE A DOUBLE NON-THREADED PLASTIC COUPLING. TOP OF CONDUIT SHALL EXTEND 4" ABOVE PRIMARY NEUTRAL.
  - CONDUIT STANDOFF BRACKETS - CONDUIT SECTION USED WITH STANDOFF BRACKETS SHALL BE METAL CONDUIT ONLY. TOP CONDUIT SECTIONS LONGER THAN 24" MUST BE SUPPORTED. LOWEST BRACKET SHALL BE A MINIMUM OF 8FT ABOVE FINISHED GRADE. ONE BRACKET SHALL BE USED TO SUPPORT EACH 10FT SECTION OF CONDUIT WITH THE BRACKET PLACED
  - RIGID STEEL GALVANIZED CONDUIT.
  - STEEL CONDUIT COUPLING.
  - CONDUIT GROUNDING CONNECTOR.
  - PVC TO STEEL CONDUIT COUPLING.
  - PVC SCHEDULE 40 CONDUIT. COVER WITH CONCRETE WHERE PASSING UNDER ROADWAYS OR DRIVES.
  - LONG SWEEP CONDUIT ELBOW.
  - 3/4" DIA BY 10FT LONG COPPER CLAD GROUND ROD.



6 CMP 4'x6' SLICE BOX  
E-702 NTS

- 1. SITE PREPARATION NOTES:**
- PAD SHALL BE SET ON A PROPERLY PREPARED <1" GRAVEL OR CRUSH STONE BASE.
  - FINISHED GRADE SHALL BE PREPARED IN SUCH A WAY AS TO SHED WATER AWAY FROM THE PAD.
- 2. MANUFACTURING NOTES:**
- CONCRETE COMPRESSIVE STRENGTH: 4,000 PSI @ 28 DAYS.
  - AIR ENTRAINMENT: 4%-6%.
  - GRADE 60 REINFORCEMENT.
  - DESIGNED FOT H-20 TRAFFIC LOADING.
  - 3/4" NATIONAL COURSE THREADED INSERTS AS SHOWN FOR PULLING EYES.
- 3. PHYSICAL SPECIFICATIONS:**
- UPPER UNIT WEIGHT (#321660): 7,692 LBS
  - BASE SLAB WEIGHT (#321640): 2,493 LBS
  - TOTAL WEIGHT: 10,185 LBS
- MANUFACTURE**  
AMERICAN CONCRETE INDUSTRIES  
CATALOG ITEM #321660



7 SUMP PUMP  
E-702 NTS



1		ADDENDUM 3	JMM	3-1-24
NO.	ISSUE/DESCRIPTION		BY	DATE
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEODENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.				
MAINE MARITIME ACADEMY WATERFRONT CAMPUS PIER UPGRADES AND WATERFRONT IMPROVEMENTS CASTINE, MAINE				
ELECTRICAL DETAILS				
PREPARED BY:	GZA Geoenvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MAINE MARITIME ACADEMY CASTINE, ME	
PROJ MGR: JHW	REVIEWED BY: JHW	CHECKED BY: JMM	DRAWING	
DESIGNED BY: JMM	DRAWN BY: MEB	SCALE: AS NOTED	E-702	
DATE: JANUARY 2024	PROJECT NO: 35109.00	REVISION NO:	SHEET NO. 136 OF 142	

I.F.B.  
NOT FOR CONSTRUCTION  
JANUARY 19, 2024





BRANCH: NORMAL		TYPE: SURFACE						
PANEL: MDP4120		MAINS: MCB						
FED FROM: 15MVA XFMR/SERVICE DISC.		AMPS: 400						
VOLTAGE: 480 Y/277, 3 PHASE, 4 WIRE		AIC: 60,000						
DEVICE	BRANCH CIRCUIT	BRANCH CIRCUIT				DEVICE		
AMP S TRIP	DESCRIPTION	KILO VOLT AMPS	C K T	PHASE A B C	KILO VOLT AMPS	DESCRIPTION	POLES	AMP S TRIP
200	3	37.5	1	75.0	2	37.5	3	200
		37.5	3	75.0	4	37.5		
		37.5	5	75.0	6	37.5		
		33.0	7	33.0	8			
		33.0	9	33.0	10			
		33.0	11		12			
		13			14			
		15			16			
		17			18			
		19			20			
		21			22			
		23			24			
		25			26			
		27			28			
		29			30			
		31			32			
		33			34			
		35			36			
		37			38			
		39			40			
		41			42			
PROVIDE MAIN BREAKER WITH GFPE PROTECTION AS REQUIRED BY THE 2023 NATIONAL ELECTRICAL CODE							TOTAL KVA:	324
PROVIDE GFPE BREAKERS FOR CIRCUITS 7,9,11 - 13,15,17 AND 19,21,23							TOTAL AMPS:	390

BRANCH: NORMAL		TYPE: SURFACE						
PANEL: P211		MAINS: MCB						
VOLTAGE: 240 Y/120, 3 PHASE, 4 WIRE		AMPS: 300						
		AIC: 22,000						
DEVICE	BRANCH CIRCUIT	BRANCH CIRCUIT				DEVICE		
AMP S TRIP	DESCRIPTION	KILO VOLT AMPS	C K T	PHASE A B C	KILO VOLT AMPS	DESCRIPTION	POLES	AMP S TRIP
50	2	4.0	1	11.2	2	7.2	2	100
		4.0	3		4	7.2		
		7.2	5		6	7.2		
		7.2	7	14.4	8	7.2		
		7.2	9	14.4	10	7.2		
		7.2	11		12	7.2		
		1.2	13	8.4	14	7.2		
		1.2	15	8.4	16	7.2		
		0.2	17		18	7.2		
		0.2	19	1.2	20	1.0		
		2.0	21	3.0	22	1.0		
		0.1	23		24	0.5		
		1.5	25	1.5	26			
		1.5	27	1.5	28			
			29		30			
			31		32			
			33		34			
			35		36			
			37		38			
			39		40			
			41		42			
DEMAND LOAD BASED ON 2023 NEC ARTICLE 220 INCLUDING TABLE 220-120							TOTAL KVA:	112
							TOTAL DEMAND KVA:	88.68
							TOTAL AMPS:	269
							TOTAL DEMAND AMPS:	213

BRANCH: NORMAL		TYPE: SURFACE						
PANEL: P212		MAINS: MCB						
VOLTAGE: 240 Y/120, 3 PHASE, 4 WIRE		AMPS: 300						
		AIC: 22,000						
DEVICE	BRANCH CIRCUIT	BRANCH CIRCUIT				DEVICE		
AMP S TRIP	DESCRIPTION	KILO VOLT AMPS	C K T	PHASE A B C	KILO VOLT AMPS	DESCRIPTION	POLES	AMP S TRIP
100	2	7.2	1	14.4	2	7.2	2	100
		7.2	3	14.4	4	7.2		
		7.2	5		6	7.2		
		7.2	7	14.4	8	7.2		
		7.2	9		10	3.6		
		7.2	11		12	3.6		
		7.5	13	8.7	14	1.2		
		7.5	15	8.7	16	1.2		
		7.5	17		18			
		0.2	19	0.2	20			
		0.2	21	0.2	22			
		0.7	23		24			
		0.7	25	0.7	26			
		0.6	27	1.1	28	0.5		
			29		30			
			31		32			
			33		34			
			35		36			
			37		38			
			39		40			
			41		42			
DEMAND LOAD BASED ON 2023 NEC ARTICLE 220 INCLUDING TABLE 220-120							TOTAL KVA:	107
							TOTAL DEMAND KVA:	88.68
							TOTAL AMPS:	257
							TOTAL DEMAND AMPS:	213

MARINE PEDESTAL SCHEDULE															
ITEM #	BUSSING	LIGHTING	LENS COLOR	SIDE 1				SIDE 2				ADDITIONAL RECEPTACLES	COMMUNICATIONS QTY OF EACH	WATER OPTIONS	COMMENTS
				RECEPT. 1	BREAKER	RECEPT. 2	BREAKER	RECEPT. 1	BREAKER	RECEPT. 2	BREAKER				
P1	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P2	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P3	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P4	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P5	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P6	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P7	1PH CU	LED	CLEAR	100A 125/250V	N/A	N/A	N/A	20A 125V GFCI	STANDARD	N/A	N/A	NONE	NONE	NONE	ADMIRAL POWER SURFACE PEDESTAL
P8	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P9	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P10	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P11	3PH CU	LED	CLEAR	100A 125/250V	GFI	N/A	N/A	20A 125V GFCI	STANDARD	N/A	N/A	NONE	NONE	NONE	ADMIRAL POWER SURFACE PEDESTAL
P12	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P13	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P14	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P15	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P16	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P17	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P18	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P19	3PH CU	LED	CLEAR	200A 277/480V	N/A	N/A	N/A	20A 125V GFCI	STANDARD	N/A	N/A	NONE	NONE	NONE	ADMIRAL POWER SURFACE PEDESTAL
P20	3PH CU	LED	CLEAR	100A 125/250V	N/A	N/A	N/A	20A 125V GFCI	STANDARD	N/A	N/A	NONE	NONE	NONE	ADMIRAL POWER SURFACE PEDESTAL
P21	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P22	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P23	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P24	1PH CU	LED	CLEAR	50A 125/250V	GFI	30A 125V	GFI	20A 125V GFCI	STANDARD	20A 125V GFCI	STANDARD	NONE	NONE	NONE	LIGHTHOUSE POWER PEDESTAL
P25	1PH CU	LED	CLEAR	100A 125/250V	N/A	N/A	N/A	20A 125V GFCI	STANDARD	N/A	N/A	NONE	NONE	NONE	ADMIRAL POWER SURFACE PEDESTAL

NOTES:  
1. COORDINATE EXACT CONFIGURATION WITH EQUIPMENT MANUFACTURER  
2. ALL MARINE POWER PEDESTALS SHALL MEET THE CURRENT 2023 NATIONAL ELECTRICAL CODE REQUIREMENTS FOR GFPEF AND ALL OTHER REQUIREMENTS  
3.

LIGHTING FIXTURE SCHEDULE									
FIXTURE LETTER	DESCRIPTION	MANUFACTURER & CATALOG NUMBER	MOUNTING	LAMPS		VOLTS	REMARKS		
				TYPE	WATTS			LUMEN	
A	DARK BRONZE DIE-CAST ALUMINUM POLE MOUNTED LED LIGHT FIXTURE. MINIMUM INITIAL LUMEN OUTPUT OF 7500 LM, CCT OF 3000K, CRI OF 80, TYPE 4W DISTRIBUTION, INTERGRAL AUTOMATIC DIMMING PHOTOCCELL PROGRAMABLE SENSOR WITH UNIVERSAL VOLTAGE DRIVER MOUNTED TO A ROUND POLE	BEACON VP-1-160L-50-3K8-4W-UNV-A4-DBT-NXWS16F	POLE	LED	50	7,500	UNV	MOUNTED TO A ROUND ALUMINUM 12" POLE. B1-U0-G2	
A1	DARK BRONZE DIE-CAST ALUMINUM POLE MOUNTED LED LIGHT FIXTURE. MINIMUM INITIAL LUMEN OUTPUT OF 7500 LM, CCT OF 3000K, CRI OF 80, TYPE 3 DISTRIBUTION, INTERGRAL AUTOMATIC DIMMING PHOTOCCELL PROGRAMABLE SENSOR WITH UNIVERSAL VOLTAGE DRIVER MOUNTED TO A SQUARE POLE	BEACON VP-1-160L-50-3K8-3-UNV-A4-DBT-NXWS16F	POLE	LED	50	7,500	UNV	MOUNTED TO A SQUARE ALUMINUM 15" POLE. B1-U0-G2	
B	4' LED SURFACE MOUNTED STRIP LIGHT WITH LENS, MINIMUM INITIAL LUMEN OUTPUT OF 4000 LM, CCT OF 3000K, CRI OF 80+, WITH STANDARD UNIVERSAL VOLTAGE DRIVER	COLUMBIA LIGHTING MPS4-30LW-CPW-EU	SURFACE	LED	27	4,000	UNV		
BE	4' LED SURFACE MOUNTED STRIP LIGHT WITH LENS, MINIMUM INITIAL LUMEN OUTPUT OF 4000 LM, CCT OF 3000K, CRI OF 80+, WITH STANDARD UNIVERSAL VOLTAGE DRIVER WITH 90 MINUTE EMERGENCY BATTERY BACK UP	COLUMBIA LIGHTING MPS4-30LW-CPW-EU-ELL14	SURFACE	LED	27	4,000	UNV		
C	DARK BRONZE DIE-CAST ALUMINUM WALL MOUNTED EXTERIOR LIGHT. MINIMUM INITIAL LUMEN OUTPUT OF 1300 LM, CCT OF 3,000, CRI OF 70+, UNIVERSAL BUTTON PHOTOCCELL	XO OUTDOOR LIGHTING SG1-10-3K7-FV-UNV-DBT-PCU	WALL	LED	10	1,300	UNV	PROVIDED WITH INTERGRAL PHOTOCCELL CONTROL	
D	RED LED MARINE OBSTRUCTION WARNING LIGHT, MINIMUM RANGE OF 1 NAUTICAL MILE. MADE OF HIGH-IMPACT POLYCARBONATE, 120 VOLT POWER SUPPLY AND EITHER PIPE OR STAND MOUNTED	McDERMONT LIGHT & SIGNAL FLAT 120 1L5V	PIPE/STAND	LED	5	N/A	120	PIPE OR STAND MOUNTED TO CATWALK PLATFORM FOR OBSTRUCTION WARNING TO BOATERS. CONTROLLED BY TIMECLOCK AND PHOT EYE PROVIDED SEPARATLY	

BRANCH: NORMAL		TYPE: SURFACE						
LOCATION: ANDREWS HALL		MAINS: MCB						
PANEL: EXISTING PANEL P1		AMPS: 200						
VOLTAGE: 480 Y/277, 3 PHASE, 4 WIRE		AIC: 22,000						
DEVICE	BRANCH CIRCUIT	BRANCH CIRCUIT				DEVICE		
AMP S TRIP	DESCRIPTION	KILO VOLT AMPS	C K T	PHASE A B C	KILO VOLT AMPS	DESCRIPTION	POLES	AMP S TRIP
20	3		1		2			
			3		4			
			5		6			
			7		8			
			9		10			
			11		12			
			13		14			
			15		16			
			17		18			
			19		20			
			21		22			
			23		24			
			25		26			
			27		28			
			29		30			
			31	1.0	32	1.0		
			34	1.0	34	1.0		
			35		36			
			37		38			
			39		40			
			41					