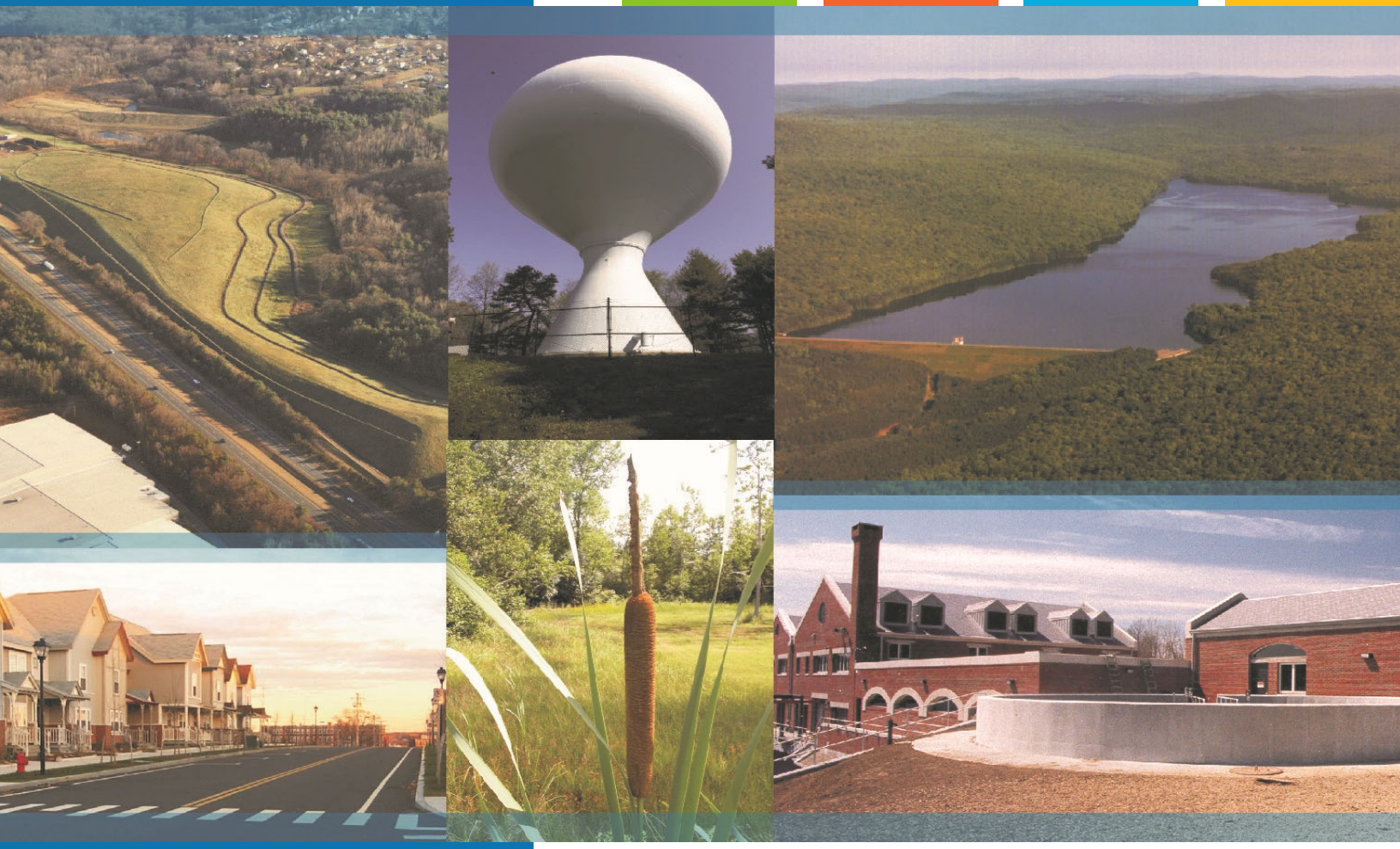

95 Mechanic Street Seawall and Wharf Replacement Project

Portsmouth, New Hampshire

Plans and Technical Specifications

City of Portsmouth

March 31, 2021

Tighe&Bond

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PLANS AND TECHNICAL SPECIFICATIONS
SEAWALL AND WHARF REPLACEMENT PROJECT
PORTSMOUTH, NH

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DIVISION 1

GENERAL REQUIREMENTS

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 ADMINISTRATIVE SUBMITTALS

A. Application for Payment: Suitable to Owner and as specified herein.

B. Final Application for Payment: As specified herein.

1.2 APPLICATION FOR PAYMENT

A. Use separate, detailed Application for Payment Form suitable to Owner for each payment application.

B. Preparation:

1. List each Change Order and Written Amendment executed prior to date of submission as a separate line item.

2. Submit three (3) copies of Application for Payment Form, and such supporting data as may be requested by Owner. Deduct 10 percent retainage unless otherwise agreed to between Owner and Contractor.

1.3 MEASUREMENT – GENERAL

A. Units of measure shown on the Bid Form shall be as follows unless specified otherwise.

Item	Method of Measurement
DAY	Field Measurement by Owner/Engineer
EA	Each, Field Measurement by Owner/Engineer
LF	Linear Foot, Field Measurement by Owner/Engineer (measured from the cutoff elevation to the tip for piles).
LS	Unit is one, no measurement will be made
SF	Square Foot, Field Measurement by Owner/Engineer

1.4 PAYMENT

A. General: Progress payment requests shall be submitted monthly.

B. Payment for Lump Sum Work covers all Work necessary to furnish, install and/or complete the following items.

Bid Item No.	Description
1.	General Requirements: Project management; submittals; full-time field supervision; construction meetings; pre- and post-construction condition surveys; vibration monitoring; coordination for telephone; electric, water, sanitary sewer, and gas company requirements; bonds and insurance requirements; downtime due to weather conditions; debris control; traffic control; site security (e.g., temporary fencing); construction phasing; survey

Bid Item No.	Description
	as required; permit requirements; temporary parking area, and closeout documents. As part of this Bid Item, the Contractor shall be responsible for preparing hand annotated As-Built Drawings that reflect the revisions/changes made in the field. These drawings shall be utilized by the Owner/Engineer at the end of the project to prepare the Project Record Drawings. Progress payments to the Contractor by the Owner shall be contingent upon the daily preparation and maintenance of these drawings as determined by regular inspections by the Owner/Engineer. Payment for this Bid Item shall be 35% of the Lump Sum Bid price in the first month with the remainder of the payment (65%) being equally divided among the remaining months in the contract time. Payment for this Bid Item shall be considered full compensation for all labor, materials, off-site disposal, and other fees, equipment, supervision, and supplies required for the work.
2.	Mobilization: Move in personnel, equipment, and materials; and set up and install temporary trailer(s) and utilities as required.
4.	Erosion and Sedimentation Controls: Furnish, install, and maintain erosion and sedimentation controls as required, and remove erosion and sedimentation controls in their entirety at completion.
5A.	Demolition and Removal, Seawalls: Furnish all labor, equipment, and materials to remove the existing granite block seawalls; load, transport, and stockpile excess soil in the DPW's designated stockpile area; load, transport, and stockpile excess granite blocks in the DPW's designated stockpile area; and load, transport, and dispose of all demolition debris, including but not limited to concrete, timber, and steel. All demolition debris shall be disposed of offsite in accordance with all local, State, and Federal Laws and Regulations.
6A.	Temporary Earth Retaining Systems: Furnish all labor, equipment, and materials to install the Contractor designed landside Temporary Earth Retaining Systems in order to allow the new seawalls to be constructed as specified and shown in the Contract Documents.
6B.	Temporary Cofferdams: Furnish all labor, equipment, and materials to install the Contractor designed waterside Temporary Cofferdams in order to allow the new seawalls to be constructed as specified and shown in the Contract Documents.
7.	Dewatering: Furnish all labor, equipment, and materials to install, operate, maintain, and remove temporary sumps, dewatering wells, pumps, discharge hoses, dewatering bags, erosion and sedimentation controls, and miscellaneous piping as required to dewater the Temporary Earth Retaining Systems and Temporary Cofferdams as specified and shown in the Contract Documents.

Bid Item No.	Description
9A.	Concrete Seawall: Furnish all labor, equipment, and materials to install the cast-in-place concrete pile caps, granite block facing, cast in place concrete stem walls, weep holes, geotextile fabric, Crushed Stone Bedding and Backfill, and cap stones as specified and shown in the Contract Documents.
10.	Site Restoration: Furnish all labor, equipment, and materials to install new Bituminous Asphalt Pavement, chain link fencing between the seawall and Peirce Island Bridge, and loam and seed disturbed areas as specified and shown in the Contract Documents.
11.	Demobilization and Cleanup: Move out personnel, equipment, temporary fencing, and unused material and remove all rubbish and debris.

C. Payment for unit price items covers all Work necessary to furnish, install, and/or complete the following items.

Bid Item No.	Description
3A.	Grain Size Through No. 200 Sieve: Perform grain size analyses in accordance with ASTM D422.
3B.	Moisture Density Relationship-Granular Materials: Perform moisture density tests in accordance with ASTM D1557.
3C.	Dry Density and As-Placed Moisture Content: Perform in-place dry density and as-placed moisture content in accordance with ASTM D2922 and D3017.
3D.	Concrete Compressive Strength: Provide a Laboratory Technician to collect, cure, and test concrete cylinders in accordance with ASTM C31 and C39.
3E.	Pavement Density: Provide a Laboratory Technician to collect, cure, and test asphalt cylinders/cores in accordance with ASTM D2726.
3F.	Pile Splice Weld Testing: Provide a field technician to complete non-destructive testing of all pile splice welds as specified and shown in the Contract Documents.
5B.	Demolition and Removal, Cutoff Timber Piles: Furnish all labor, equipment, and materials to cut off the tops of existing timber piles a minimum of 1 foot below the bottom of the proposed pile cap for the concrete seawall. All piles shall be disposed of offsite in accordance with all local, State, and Federal Laws and Regulations.
5C.	Demolition and Removal, Extract Timber Piles: Furnish all labor, equipment, and materials to extract timber piles that conflict with the construction of the proposed seawalls and other structures using a vibratory hammer. All piles shall be disposed of offsite in accordance with all local, State, and Federal Laws and Regulations.
8A.	Furnish H-Piles: Furnish the seawall support piles at the lengths indicated and as specified and shown in the Contract Documents.

Bid Item No.	Description
8B.	Install H-Piles: Furnish all labor, equipment, and materials to construct a pile driving template; install the seawall support piles; cut the piles off at the specified elevation; and furnish and install the bearing plates at the tops of the piles as specified and shown in the Contract Documents.
8C.	Field Splices: If the specified support pile order lengths are insufficient, furnish all labor, equipment, and materials to install Field Splices as specified and shown in the Contract Documents.
8D.	Initial Drive PDA: Provide a PDA Consultant and all labor, materials, and equipment that are necessary to conduct high strain testing of the indicator piles during the initial drive in accordance with Section 02547, DYNAMIC PILE TESTING. This Bid Item shall also include two (2) CAPWAPs and a Summary Report.
8E.	Restrike PDA: Provide a PDA Consultant and all labor, materials, and equipment that are necessary to conduct high strain testing of the indicator piles during the re-strike drive in accordance with Section 02547, DYNAMIC PILE TESTING. This Bid Item shall also include two (2) CAPWAPs and a Summary Report.
9B.	Steel Sheet Pile Seawall, STA 0+70 to 1+065: Furnish all labor, equipment, and materials to install the steel sheet piles, granite fascia, in-fill concrete, shear studs, cast in place concrete cap, geotextile fabric, Crushed Stone Bedding and Backfill, and cap stones as specified and shown in the Contract Documents.
9C.	Steel Sheet Pile Seawall, STA 1+065 to 1+30: Furnish all labor, equipment, and materials to install the steel sheet piles in segments if required, due to overhead utility line clearance constraints; install the sheet pile splices; and install the granite fascia, in-fill concrete, shear studs, cast in place concrete cap, geotextile fabric, Crushed Stone Bedding and Backfill, and cap stones as specified and shown in the Contract Documents. The Contractor shall make its own determination regarding the number of pile segments and splices required and there shall be no additional compensation for cutting or splicing the piles above and beyond the established per LF bid price.

D. Payment for alternate lump sum and/or unit price items covers all Work necessary to furnish, install, and/or complete the following items.

Add Alt. Bid Item No.	Description
Add Alt No. 1.	Wharf, Additional General Requirements: Provide additional General Requirements as specified under Base Bid Item No. 1 and as required for the construction of the Wharf. Payment for this Bid Item shall be 35% of the Lump Sum Bid price in the first month with the remainder of the payment (65%) being equally divided among the remaining months in the contract time for the Wharf. Payment for this Bid Item shall be considered full compensation for all

Add Alt. Bid Item No.	Description
	labor, materials, off-site disposal, and other fees, equipment, supervision, and supplies required for the work.
Add Alt No. 2	Wharf, Furnish PT Timber Piles: Furnish the piles at the lengths indicated and as specified and shown in the Contract Documents.
Add Alt No. 3.	Wharf, Install PT Timber Piles: Furnish all labor, equipment, and materials to construct a pile driving template; install the piles; and cut the piles off at the specified elevation as specified and shown in the Contract Documents.
Add Alt No. 4.	Wharf, Furnish H-Piles: Furnish the piles in segments, if required, due to overhead utility line clearance constraints as specified and shown in the Contract Documents. The Contractor shall make its own determination regarding the number of pile segments and splices required and there shall be no additional compensation for cutting or splicing the piles above and beyond the established per LF bid price.
Add Alt No. 5.	Wharf, Install H-Piles: Furnish all labor, equipment, and materials to construct a pile driving template; install the piles; install the splices; cut the piles off at the specified elevation; and furnish and install the top plate connectors as specified and shown in the Contract Documents. The Contractor shall make its own determination regarding the number of pile segments and splices required and there shall be no additional compensation for cutting or splicing the piles above and beyond the established per LF bid price.
Add Alt No. 6.	Wharf, PT Timber Superstructure and Decking: Furnish all labor, equipment, and materials to install the PT Timber Superstructure and Decking as specified and shown in the Contract Documents.
Add Alt No. 7.	Wharf, Ornamental Railing: Furnish all labor, equipment, and materials to install the ornamental railing on the Timber Wharf as specified and shown in the Contract Documents.
Add Alt No. 8.	Seawall, Chain Link Fencing: Furnish all labor, equipment, and materials to install Chain Link Fencing behind along the Seawall as specified and shown in the Contract Documents.
Add Alt No. 9.	Wharf, IPE Timber Decking: Furnish all labor, equipment, and materials to install IPE Timber Decking as specified and shown in the Contract Documents.
Deduct Alt No. 1.	Wharf, PT Timber Decking: Delete all labor, equipment, and materials for the installation of the PT Timber Decking as specified and shown in the Contract Documents.

E. Payment for equipment, materials, and labor for items not included on the Bid or described in Article PAYMENT, herein, shall be considered incidental and no separate payment will be made.

1.5 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.

2. Quantities of material wasted or disposed of in a manner not called for under the Contract Documents.

3. Rejected loads of material, including material rejected after Contractor has placed it.

4. Material not unloaded from transporting vehicle.

5. Defective Work not accepted by the Owner/Engineer.

6. Material remaining on hand after completion of Work.

1.6 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Final Payment: Shall be made only for materials incorporated into the Work in the Contract; no partial payments shall be made for equipment or materials delivered to the site but not used, unless otherwise provided for by the Bid Form and/or as agreed to by the Owner.

1.7 FINAL APPLICATION FOR PAYMENT

A. Reference the Owner's Contract, and as may otherwise be required in the Plans and Technical Specifications.

B. Prior to submitting final application, make acceptable delivery of required documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01040

COORDINATION AND SITE CONDITIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements for coordinating and sequencing the work under the Contract and with other Contracts, and requirements regarding existing site conditions.

1.2 JOBSITE COORDINATION

A. Coordination with Other Work: The project work shall be coordinated with the following work:

1. The daily operation of and continued access to the adjacent pump station, including but not limited to incoming and outgoing vehicles, trucks, and personnel.

1.3 SITE CONDITIONS

A. Information on Site Conditions

1. General: Other information obtained by the Owner/Engineer regarding the site conditions, topography, bathymetry, subsurface information, groundwater elevations, existing construction of site facilities as applicable, and similar data will be available for inspection at the office of the Owner.

2. Topographic and bathymetric maps were used in the project design. Topographic and bathymetric maps are included in the Drawings.

3. Profile Elevations:

a. Existing ground profiles shown on the Drawings were taken from a topographic map drawn with a contour interval of 1-foot with supplementary spot elevations to the nearest 0.1 foot.

b. See Drawings for topographic and bathymetric data and methods.

4. Control Points: The Owner/Engineer has performed Supplemental survey work and has established vertical and horizontal survey control points on structures and improvements located in the vicinity of the work. The location of vertical and horizontal survey control points is shown on the Drawings.

B. Existing Utilities:

1. There are many known utilities in the project area. Refer to the Drawings for more information.

2. Contractor’s Responsibilities:

a. Where Contractor’s operations could cause damage or inconvenience to railway, telephone, fiber optic, television, power, oil, gas, water, sewer, or irrigation systems, the Contractor shall make arrangements necessary for the protection of these utilities and services. Replace existing utilities removed or damaged during construction, unless otherwise provided for in these Plans and Technical Specifications.

b. Notify utility offices that are affected by construction operations at least 72 hours in advance. Under no circumstances shall the Contractor expose any utility without first obtaining permission from the appropriate utility. Once permission has been granted, locate, expose, and provide temporary support for the utilities.

c. The Contractor shall relocate power poles as required for the performance of the work.

d. The Contractor shall be solely and directly responsible to Owner and Operator of such properties for damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of injuries or damage which may result from construction operations under this Contract.

e. Neither Owner nor its officers or agents shall be responsible to Contractor for damages as a result of Contractor's failure to protect utilities encountered in the work.

f. In event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental damage due to construction operations, promptly notify the Owner/proper authority. Cooperate with Owner/said authority in restoration as promptly as possible and pay for repair. Prevent interruption of utility service unless granted by the utility owner.

g. In the event Contractor encounters water service lines that interfere with trenching, obtain prior approval of the water utility, cut the service, dig through, and restore service to previous conditions using equal materials.

3. Utility Contact: Mr. Ray Pezzullo, Assistant City Engineer @ 603-766-1755 (Office) or 603-957-8843 (Mobile).

4. Contractor shall not perform work or occupy any part of the Owner's property without prior authorization.

C. Interfering Structures:

1. Protect and take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Drawings. While the information has been compiled from the best available sources, its completeness and accuracy cannot be guaranteed.

D. Field Relocation:

1. During construction, minor relocations of proposed facilities and structures may be necessary. Make such relocations only by directive of the Owner/Engineer. If existing structures are encountered that prevent construction as shown, notify the Owner/Engineer before continuing with work so that Owner/Engineer may make necessary field revisions.

E. Monuments and Markers:

1. Protect survey monuments and markers throughout construction. If damage occurs or removal becomes necessary, immediately notify Owner/Engineer and

restore or replace monument or marker in accordance with applicable State of New Hampshire regulations.

F. Easements:

1. It is not anticipated that easements will be required to perform this work.

1.4 PROJECT MEETINGS

A. See Section 01200, PROJECT MEETINGS.

1.5 TIME OF WORK

A. In accordance with the Standard Workweek established by the Owner.

B. Night work may be scheduled by the Contractor when absolutely necessary and with the written permission of Owner. Such written permission, however, may be revoked at any time if Contractor fails to properly execute and control nighttime work.

C. Overtime Notice: If Contractor for convenience should desire to carry on work at night or outside regular hours, submit written notice 1 day in advance of performing the work to the Owner and allow ample time for satisfactory arrangements to be made for inspecting work in progress.

1.6 HEALTH, SAFETY, ACCIDENT PREVENTION, AND TRAINING

A. It shall be the Contractor's responsibility to provide a complete and working site-specific HASP prior to starting to work.

1.7 PERMITS

A. As part of this project, the Owner has submitted the following permit applications:

1. Permit by Notification.

2. NHDES Wetlands Permit for Wharf Removal and Replacement.

B. Copies of the above subject permits are provided in Exhibit A, including additional permit stipulations specified by NHDES for this project.

C. The Contractor shall be responsible for adhering to the conditions of the permits and the additional stipulations.

END OF SECTION

Exhibit A
Permits

File Number: 2019-02630

Application Type: PBN - PERMIT BY NOTIFICATION

Owner:
CITY OF PORTSMOUTH DPW
Location:
MECHANIC & GATES STREETS
PORTSMOUTH, NH
Water Body: PISCATAQUA RIVER
Designated River:
Date Received: 08/20/2019
Proposed Project: Impact 1013 square feet of previously-developed upland tidal buffer zone to replace an existing seawall in-kind. In addition, temporarily impact 602 square feet of previously-developed upland tidal buffer zone for construction access and installation.

Status: PBN IS COMPLETE
Tax Map: 103
Lot Number: 29
Lot Number: 30
Reviewer: WDSMT
Preliminary Category: PERMIT BY NOTIFICATION
Final Category: PERMIT BY NOTIFICATION
Agent: TIGHE & BOND INC

WETLANDS PERMIT #2016-02658
95 MECHANIC STREET WHARF REMOVAL AND REPLACEMENT
PORTSMOUTH, NEW HAMPSHIRE

The State of New Hampshire

Department of Environmental Services

Thomas S. Burack, Commissioner

November 28, 2016

Peter H. Rice
Department of Public Works
City of Portsmouth
680 Peverly Hill Rd.
Portsmouth, NH 03801

RE: NHDES Wetlands File # 2016-02658 City Of Portsmouth – 95 Mechanic St. Wharf- Portsmouth Tax Map/Lot # 103 / 29

Dear Mr. Rice:

Attached please find Wetlands Permit # 2016-02658 to Remove and replace in-kind 141 square feet of existing grandfathered wharf, pilings, and associated buildings in the working waterfront area of Portsmouth on the Piscataqua River.

The decision to approve this application was based on the following findings:

1. This is a minimum impact project per Administrative Rule Env-Wt 303.04(v), Maintenance, repair, and replacement in-kind of existing docking structures.
2. The need for the proposed impacts has been demonstrated by the applicant per Env-Wt 302.01. The existing wharf structure is deteriorated and unsafe for use.
3. The applicant has provided evidence which demonstrates that this proposal is the alternative with the least adverse impact to areas and environments under the department's jurisdiction per Env-Wt 302.03. The replacement is in-kind, and any future use of the structure as a public access point requiring design changes to the existing buildings will be submitted to DES for review and permitting action.
4. The applicant has demonstrated by plan and example that each factor listed in Env-Wt 302.04(b) Requirements for Application Evaluation, has been considered in the design of the project.
The NH Natural Heritage Bureau reported that, while there is a record of an occurrence of a species of concern in the project vicinity, it is not expected to be impacted by the project.
5. The Portsmouth Conservation Commission signed the expedited application.

Any person aggrieved by this decision may appeal to the N.H. Wetlands Council ("Council") by filing an appeal that meets the requirements specified in RSA 482-A:10, RSA 21-O:14, and the rules adopted by the Council, Env-WtC 100-200. The appeal must be filed **directly with the Council within 30 days** of the date of this decision and must set forth fully **every ground** upon which it is claimed that the decision complained of is unlawful or unreasonable. Only those grounds set forth in the notice of appeal can be considered by the Council.

Information about the Council, including a link to the Council's rules, is available at <http://nhec.nh.gov/> (or more directly at <http://nhec.nh.gov/wetlands/index.htm>.) Copies of the rules also are available from the DES Public Information Center at (603) 271-2975.

Your permit must be signed, and a copy must be posted in a prominent location on site during construction. If you have any questions, please contact me at the Pease District Office at (603) 559-1507 or via email at dori.wiggin@des.nh.gov.

Sincerely,

Dori Wiggin
East Region Supervisor
DES Wetlands Bureau

cc: Portsmouth Conservation Commission
Portsmouth Municipal Clerk
Tighe & Bond

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

NOTICE TO RECIPIENTS OF MINIMUM IMPACT N.H. WETLANDS PERMITS

Your permit was approved by the New Hampshire Wetlands Bureau as a minimum impact project, and your project is automatically approved under the Army Corp's New Hampshire Programmatic General Permit.

For the purpose of the NH PGP, Minimum Impact Projects do not include new construction of:

Dams,
Dikes,
water withdrawal or diversion projects which require fill in wetlands or surface waters,
wetlands restoration projects, or any projects which involve work in other than low flow conditions (July 1-September 30),
any projects involving more than 3,000 square feet of a water body or wetland fill and secondary impacts.

Also, not included under Minimum Impact Projects are those projects that include the reconstruction or replacement of currently unserviceable structures/fills. The projects must be reviewed through the screening procedures for minor impact projects. The activities in section 10 waters not regulated by the Wetlands Bureau, formerly authorized under the Nationwide Permit Program and listed in Appendix A of this document are designated non-reporting activities.

These approvals do not relieve you from obtaining any necessary local permits that may be required by your town.

If you have any questions, feel free to give us a call at 603-271-2147

****

This notice was sent with minimum impact permit 2016-2658

DES Web site: www.des.nh.gov
P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095
Telephone: (603) 271-2147 • Fax: (603) 271-6588 • TDD Access: Relay NH 1-800-735-2964

The State of New Hampshire

Department of Environmental Services

Thomas S. Burack, Commissioner

WETLANDS AND NON-SITE SPECIFIC PERMIT 2016-02658

Permittee: City Of Portsmouth- Department of Public Works
680 Peverly Hill Rd.
Portsmouth, NH 03801

Project Location: 95 Mechanic Street, Portsmouth
Portsmouth Tax Map/Lot No. 103 / 29

Waterbody: Piscataqua River

NOTE - CONDITIONS

APPROVAL DATE: 11/28/2016 **EXPIRATION DATE: 11/28/2021**

Based upon review of the above referenced application, in accordance with RSA 482-A and RSA 485-A:17, a Wetlands Permit and Non-Site Specific Permit was issued. This permit shall not be considered valid unless signed as specified below.

PERMIT DESCRIPTION: Remove and replace in-kind 141 square feet of existing grandfathered wharf, pilings, and associated buildings in the working waterfront area of Portsmouth on the Piscataqua River.

THIS APPROVAL IS SUBJECT TO THE FOLLOWING PROJECT SPECIFIC CONDITIONS:

1. All work shall be in accordance with revised plans by Tighe & Bond dated 8/15/2016, and revised through 10/26/2016 as received by the NH Department of Environmental Services (DES) on 10/28/2016.
2. This permit is not valid and effective until it has been recorded with the appropriate county Registry of Deeds by the applicant. Prior to starting work under this permit, the permittee shall submit a copy of the recorded permit to the DES Wetlands Program by certified mail, return receipt requested.
3. Not less than 5 state business days prior to starting work authorized by this permit, the permitted shall notify the DES Wetlands Program and the local conservation commission in writing of the date on which work under this permit is expected to start.
4. Any redesign of wharf buildings associated with the development of the City's Master Plan, or for any other purpose, shall require either an amendment to this permit or submission of a new application and further permitting.
5. Appropriate siltation and erosion controls shall be in place prior to construction, shall be maintained during construction, and shall remain until the area is stabilized. Temporary controls shall be removed once the area has been stabilized.
6. Any repairs or replacement of the seasonal structures (gangway, floats) documented herein, shall maintain the size, location, and configuration of the pre-existing structures.
7. Construction of the dock shall occur from land, or from a barge and crane if land-based construction is not feasible, to reduce potential impacts to the salt marsh and intertidal zone.
8. The seasonal structures, including but not limited to ramp and floats, shall be removed during the non-boating season and stored on the existing pier or in an upland location.

GENERAL CONDITIONS THAT APPLY TO ALL DES WETLANDS PERMITS:

1. A copy of this permit shall be posted on site during construction in a prominent location visible to inspecting personnel;
2. This permit does not convey a property right, nor authorize any injury to property of others, nor invasion of rights of others;
3. The Wetlands Bureau shall be notified upon completion of work;
4. This permit does not relieve the applicant from the obligation to obtain other local, state or federal permits, and/or consult with other agencies as may be required (including US EPA, US Army Corps of Engineers, NH Department of Transportation, NH Division of Historical Resources (NH Department of Cultural Resources), NHDES-Alteration of Terrain, etc.);
5. Transfer of this permit to a new owner shall require notification to and approval by DES;
6. This project has been screened for potential impacts to known occurrences of rare species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or have received only cursory inventories, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species.
7. Review enclosed sheet for status of the US Army Corps of Engineers' federal wetlands permit.

APPROVED: Dori Wiggin

Dori Wiggin, East Region Supervisor
DES Wetlands Bureau

BY SIGNING BELOW I HEREBY CERTIFY THAT I HAVE FULLY READ THIS PERMIT AND AGREE TO ABIDE BY ALL PERMIT CONDITIONS.

OWNER'S SIGNATURE (required)

CONTRACTOR'S SIGNATURE (required)

www.des.nh.gov
29 Hazen Drive • PO Box 95 • Concord, NH 03302-0095
(603) 271-3503 • TDD Access: Relay NH 1-800-735-2964

ADDITIONAL PERMIT STIPULATIONS

Per the New Hampshire Department of Environmental Services (NHDES), the following additional permit stipulations shall also apply to this project:

- Pile installation shall not occur between April 1st and June 15th, per recommendation of the NH Fish & Game Department, Marine Division and Rule Env-Wt 606.05(d).

- Directly prior to pile installation, the Contractor shall create a deterrent to initiate a startle response for potential sturgeon in the immediate vicinity, per recommendation of the NH Fish & Game Department, Marine Division and Rule Env-Wt 606.05(d).

SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.1 REQUIREMENTS

A. The Owner/Engineer shall schedule and administer the Pre-Construction Conference. The Owner/Engineer shall:

1. Prepare the agenda for the meeting.

2. Notify all parties required to attend the meeting.

3. Make physical arrangements for the meeting.

4. Preside at the meeting.

5. Record the minutes, including significant proceedings and decisions.

6. Reproduce and distribute copies of minutes within seven (7) calendar days after the meeting to participants in the meeting and other parties affected by decisions made at the meeting.

B. The Owner/Engineer shall schedule and administer progress meetings at least once every two weeks throughout the progress of the work. The Owner/Engineer shall:

1. Prepare agenda for the meetings.

2. Make physical arrangements for the meetings.

3. Preside at the meetings.

4. Record the minutes, including significant proceedings and decisions.

5. Reproduce and distribute copies of minutes within seven (7) calendar days after each meeting to participants in the meeting and other parties affected by decisions made at the meeting.

C. Representatives of Contractors, Subcontractors, and suppliers attending meetings shall be qualified and authorized to act on the behalf of the entity each represents.

1.2 PRE-CONSTRUCTION CONFERENCE

A. Attendance:

1. Owner and/or representative.

2. Resident project representative.

3. Contractor's superintendent.

4. Major Subcontractors.

5. Major suppliers.

6. Others as appropriate.

B. Suggested Agenda:

1. Distribution and discussion of
    a. List of major Subcontractors and suppliers.
    b. Projected construction schedules.
2. Critical work sequencing.
3. Major equipment deliveries and priorities.
4. Project coordination.
    a. Designation of responsible personnel.
5. Procedures and processing of:
    a. Field decisions.
    b. Proposal requests.
    c. Submittals.
    d. Change orders.
    e. Applications for payment.
6. Adequacy of and distribution of Plans and Technical Specifications.
7. Procedures for maintaining record documents.
8. Use of premises:
    a. Office, work and storage areas.
    b. Owner's requirements.
9. Construction facilities, controls and construction aids.
10. Temporary utilities.
11. Safety and first-aid procedures.
12. Security procedures.
13. Housekeeping procedures.
14. Place, date, and time for regular progress meetings.

1.3 PROGRESS MEETINGS

A. Conduct regularly scheduled progress meetings at place, dates, and times agreed upon at Pre-Construction Conference.

B. Conduct additional meetings as progress of the work dictates.

C. Attendance:
    1. Owner.
    2. Engineer.
    3. Resident project representative.

4. Contractor's superintendent.
5. Subcontractors as appropriate to the agenda.
6. Suppliers as appropriate to the agenda.
7. Others.

D. Suggested Agenda:

1. Review approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, and conflicts.
4. Problems which impede construction schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to construction schedule.
8. Progress schedule during succeeding work period.
9. Maintenance of quality standards.
10. Pending changes and substitutions.
11. Coordination of schedules.
12. Review submittal schedules; expedite as required.
13. Review proposed changes for:
    a. Effect on construction schedule and on completion date.
    b. Effect on subcontracts of the project.

E. Other business

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01325

SCHEDULING OF CONSTRUCTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Progress Schedule

B. Related Requirements

1. Refer to the Contract Documents.

1.2 MILESTONES

A. If, in the opinion of the Owner, the progress of the Work is insufficient to achieve the scheduled completion of the milestone, the Contractor shall be required to take such measures as are necessary to achieve completion by the milestone date. Such measures may include, but shall not be limited to, employing additional equipment and personnel, working overtime, added shifts or any combination thereof, all at no additional cost to the Owner.

1.3 PROGRESS SCHEDULE

A. Graphically show the order and interdependence of activities, sequence of Work, how the start of a given activity depends on completion of preceding activities, and how completion of an activity may restrain the start of subsequent activities.

B. The Work shall be planned by the Contractor and his Project field superintendent in coordination with all Subcontractors and Suppliers whose Work is shown on the Progress Schedule.

C. Include, at a minimum, the following activities on the Progress Schedule:

1. Project mobilization
2. Work tasks include but are not limited to demolition of seawall to the limits shown on the construction plans, construction of a replacement seawall and replacement wharf.
3. Final inspecting
4. Punchlist
5. Final cleanup
6. Other activities that may be critical to the Progress Schedule
7. All activities of the Owner and the Engineer which affect progress and/or affect required dates for completion of the Work
8. Milestone completion dates

D. Take into consideration submittal and approval time, the delivery times of equipment and materials, Subcontractors' Work, availability and abilities of

workmen, weather conditions, any restrictions in operations at the Work site, and all other items that may affect completion of the Work within the Contract Time and specified milestones.

E. The Progress Schedule shall reflect the requirements and constraints outlined in the Contract Documents.

F. Show information in such detail that duration times of activities will range from one to 15 days. The selection and number of activities shall be subject to the approval of the Owner and Engineer.

G. The Progress Schedule should show preceding and following event numbers for each activity, description of each activity, and activity duration in calendar days.

A. Submit the Progress Schedule on maximum sheet size 30-inches high by the width required.

1.4 SUBMITTALS

A. Informational Submittals

1. Submit four prints of the preliminary Progress Schedule prepared in accordance with the requirements of this section. Progress schedule must be submitted within 10 days after the Effective Date of the Agreement. Progress Schedule must be approved by the Owner and Engineer before the first progress payment will be made.

2. Revised analyses - Within 10 days after receipt of the review comments, submit four prints of the Progress Schedule revised in accordance with those comments.

3. Periodic reports - On the first progress meeting of each month, submit four prints of the updated Progress Schedule, as well as a report of construction activities in the prior month.

4. Before initiating the Work, submit an estimated monthly rate of Contractor payments for the project. If the payment schedule deviates from the original projection, submit a revised rate of expenditure schedule.

END OF SECTION

SECTION 01340

SUBMITTALS

PART 1 GENERAL

1.1 REQUIREMENTS

A. This section specifies procedural requirements for non-administrative submittals including shop drawings, product data, samples and other miscellaneous work-related submittals. Shop drawings, product data, samples and other work-related submittals are required to amplify, expand and coordinate the information contained in the Plans and Technical Specifications.

1. Refer to other Division-1 sections and other sections for specifications on administrative, non-work-related submittals. Such submittals include, but are not limited to the following items:

2. Permits.

3. Written consents.

4. Manifests

5. Payment applications.

6. Performance and payment bonds.

7. Insurance certificates.

8. Inspection and test reports.

9. Progress reports.

10. Listing of Subcontractors.

11. Construction schedules.

B. Shop drawings are technical drawings and data that have been specially prepared for this project, including but not limited to the following items:

1. Fabrication and installation drawings.

2. Coordination drawings (for use on-site).

3. Schedules.

C. Product data includes standard printed information on manufactured products that has not been specially-prepared for this project, including but not limited to the following items:

1. Manufacturer's product specifications/installation instructions.

2. Catalog cuts.

D. Samples are physical examples of work, including but not limited to the following items:

1. Partial sections of manufactured or fabricated work.

2. Small cuts or containers of materials.

E. Miscellaneous submittals are work-related, non-administrative submittals that do not fit in the three previous categories, including, but not limited to the following:

1. Specially-prepared and standard printed warranties.

2. Project photographs.

3. Testing and certification reports.

4. As-Built drawings.

5. Field measurement data.

6. Keys and other security protection devices.

F. A summary of key submittals anticipated for this project will be provided at the Pre-Construction Conference. This list is not intended to be all inclusive. Refer to the individual Specification Sections and the Contract Documents for a complete and comprehensive listing

1.2 SUBMITTAL PROCEDURES

A. Coordinate the preparation and processing of submittals with the performance of the work. Coordinate each separate submittal with other submittals and related activities such as testing, purchasing, fabrication, delivery and similar activities that require sequential activity.

1. Coordinate the submittal of different units of interrelated work so that one submittal will not be delayed by the Owner's/Engineer's need to review a related submittal. The Owner/Engineer reserves the right to withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

B. In each appropriate administrative submittal, such as the progress schedule, show the principal work-related submittals and time requirements for coordination of submittal activity with related work.

C. Prepare and transmit each submittal to the Owner/Engineer sufficiently in advance of the scheduled performance of related work and other applicable activities. Transmit different kinds of submittals for the same unit of work so that processing will not be delayed by the Owner's/Engineer's need to review submittals concurrently for coordination.

D. Allow sufficient time so that installation will not be delayed as a result of the time required to properly process submittals, including time for re-submittal, if necessary. Advise the Owner/Engineer on each submittal, as to whether processing time is critical to the progress of the work, and if the work would be expedited if processing time could be shortened.

1. Allow fourteen (14) calendar days for the Owner's/Engineer's initial processing of each submittal. Allow a longer time period where processing must be delayed for coordination with subsequent submittals. The Owner/Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination.

2. Allow seven (7) calendar days for reprocessing each submittal.

3. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Owner/Engineer sufficiently in advance of the work.

E. Mark each submittal with a permanent label for identification. Provide the following information on the label for proper processing and recording of action taken.

1. Project name.
2. Date.
3. Name and address of Owner.
4. Name and address of Contractor.
5. Name and address of supplier.
6. Name of manufacturer.
7. Number and title of appropriate specification section.
8. Drawing number and detail references, as appropriate.
9. Similar definitive information as necessary.
10. Provide a space on the label for the Contractor's review and approval markings, and a space for the Owner's/Engineer's "Action" marking.

F. Package each submittal appropriately for transmittal and handling. Transmit three (3) copies, plus the number of copies the Contractor wants returned to it, after review of each submittal from the Contractor to the Owner/Engineer, and to other destinations as required, by use of a transmittal form. Prepare a separate transmittal form for each division of work and identify each submittal by specification section number on the transmittal form. Submittals received from sources other than the Contractor will be returned to the sender "without action".

1. Record relevant information and requests for data on the transmittal form. On the transmittal form, or on a separate sheet attached to the form, record deviations from the requirements of the Contract Documents, if any, including minor variations and limitations.
2. No submittals will be accepted by the Owner/Engineer if transmitted via FAX machine.
3. Include the Contractor's signed certification stating that the information submitted complies with the requirements of the Plans and Technical Specifications.
4. Sequentially number the transmittal forms; re-submittals to have original number with the current revision number.

G. Contractor Review: Stamp of approval indicates to Owner and Engineer that all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data have been determined and verified, and that each submittal has been reviewed or coordinated with the requirements of the Work.

H. No portion of Work requiring shop drawings shall be started or any materials be fabricated, delivered to site, or installed prior to approval of such items. Fabrication performed, materials purchased, or on-site construction accomplished which does not conform to approved shop drawings and data shall be at Contractor's risk. Owner will

not be liable for any expense or delay due to corrections or remedies required for conformity.

I. Project work, materials, fabrications, and installation shall conform to approved shop drawings.

1.3 SPECIFIC SUBMITTAL REQUIREMENTS

A. Miscellaneous Submittals

B. Inspection and Test Reports: Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.

C. Survey Data: Provide copies of all survey data in electronic form and hard copy, in a format compatible with the Owner's software, that is collected for property surveys, field measurements, and quantitative records of actual work, damage surveys and similar data required by the individual sections of these specifications. None of the specified copies will be returned.

D. Standards: Where submittal of a copy of standards is indicated, and except where copies of standards are specified as an integral part of a "Product Data" submittal, submit a single copy of standards for the Owner's/Engineer's use. Where workmanship, whether at the project site or elsewhere, is governed by a standard, furnish additional copies of the standard to installers, Owner's field representative, and others involved in the performance of the work.

E. Closeout Submittals: Refer to individual sections of these specifications for specific submittal requirements of project closeout information, materials, tools, and similar items.

1. As-Built Documents: Furnish one set of original and reproducible documents as maintained on the project site.

F. General Distribution: Provide additional distribution of submittals to Subcontractors, suppliers, fabricators, installers, governing authorities and others as necessary for the proper performance of the work. Include such additional copies of submittals in the transmittal to the Engineer where the submittals are required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

1.4 OWNER'S/ENGINEER'S ACTION

A. General: Except for submittals for the record and similar purposes, where action and return on submittals is required or requested, the Owner/Engineer will review each submittal, mark with appropriate "Action", and where possible return within fourteen (14) calendar days of receipt. Where the submittal must be held for coordination, the Owner/Engineer will so advise the Contractor without delay.

1. Action Stamp: The Owner/Engineer will stamp, sign, and date each submittal copy to be returned to Contractor and indicate disposition of each submittal.

B. Owner/Engineer Review:

1. Owner's/Engineer's review of submitted drawings and data will cover only general conformity to drawings and specifications, external connections, and dimensions which affect layout.

2. Owner’s/Engineer's review does not indicate thorough review of all dimensions.

3. Owner’s/Engineer's review of submittals does not relieve Contractor's responsibility for errors, omissions, or deviations, nor of responsibility for compliance with the Plans and Technical Specifications.

1.5 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the Owner/Engineer and resubmit until they are denoted “Approved as Submitted” or “Approved as Noted” by the Owner/Engineer. Resubmission requirements specified in individual specification sections, which differ from these requirements, will take precedence over these requirements.

B. Shop Drawings and Product Data:

1. Revise initial drawings or data, and resubmit as specified for the initial submittal.

2. Indicate any changes which have been made other than those requested by the Owner/Engineer.

C. Samples: Submit new samples as required for initial submittal.

1.6 DISTRIBUTION

A. Distribute reproductions of shop drawings and copies of product data which carry the Owner/Engineer stamp denoting "No Exception Taken" or "Make Corrections Noted" to:

1. Job site file.

2. Record documents file.

3. Subcontractors.

4. Supplier or fabricator.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01350

HEALTH & SAFETY PLAN

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Furnish all labor, equipment and materials and perform all operations in connection with providing health and safety protection for all Contractor personnel, occupants of abutting properties, and the public.

2. Develop a site-specific Health and Safety Plan (HASP) specifically addressing the potential hazards that may be encountered. This plan shall meet all OSHA requirements.

3. Review the requirements and data presented and supplement the program with any additional measures deemed necessary to fully comply with regulatory requirements and adequately protect personnel on the site.

1.2 REFERENCES

A. OSHA Regulation 29 CFR 1910.120

1.3 DEFINITIONS

A. Site Safety Official (SSO) - The individual located on the site(s) who is responsible to the Contractor and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

1.4 SUBMITTALS

A. Informational Submittals

1. Submit the following within fifteen (15) days after the Effective Date of the Agreement.

a. Site-specific HASP including the Emergency Response Plan for review, including provisions for decontamination and a contingency plan for unforeseen emergencies. The Engineer's review is only to determine if the HASP meets basic regulatory requirements and the minimum requirements of this section. The review will not determine the adequacy of the HASP to address all potential hazards, as that remains the sole responsibility of the Contractor.

b. Current certification of employee's health and safety training and certification of employee's baseline medical exam status.

c. Certification of additional required health and safety training for supervisors.

d. Qualifications and experience of the SSO for approval.

2. Submit minutes of weekly safety meetings at periodic progress meetings.

1.5 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor is solely responsible for the health and safety of workers employed by the Contractor, any subcontractor and anyone directly or indirectly employed by any of them.

B. Work under this contract is not being performed on an "Uncontrolled Hazardous Waste Site," as defined in 29 CFR 1910.120 and Article 1.3 B, above; however, the Contractor shall develop the site specific Health & Safety Plan (HASP) in accordance with the requirements of 29 CFR 1910.120 and paragraph 1.6.

C. Provide a full-time SSO.

D. Pre-arrange emergency medical care services at a nearby hospital, including establishment of emergency routes of travel.

E. Conduct weekly safety meetings with all site personnel, documenting attendance and topics covered.

F. Train all workers assigned to areas where contaminated media are likely to be encountered in accordance with 29 CFR 1910.120.

G. At all times, prevent oil or other hazardous substances from entering the water, ground, sewers, drainage areas and piping systems.

H. Control site access to protect occupants of abutting properties and the public.

1.6 HEALTH & SAFETY PLAN (HASP) REQUIREMENTS

A. The following items shall be addressed in the HASP:

1. Safety and health hazard assessment;
2. Procedures for emergency medical treatment and first aid;
3. Map indicating route to hospital for emergency medical care;
4. Lead Exposure Control Plan (29 CFR 1926.62) where applicable;
5. Equipment decontamination procedures;
6. Personal protective equipment and decontamination;
7. Physical hazard evaluation and abatement including:
    a. equipment operation;
    b. confined space entry;
    c. slips and falls;
    d. building collapse;
    e. falling debris;
    f. encountering unmarked utilities;
    g. cold and heat stress;
    h. hot work (cutting and welding);

i. excavation entry;

8. Training requirements;

9. Recordkeeping requirements;

10. Emergency response plan that includes:

    a. Names of three (3) Emergency Response Contractors, experienced in the removal and disposal of oils and hazardous chemicals, that the Contractor intends to use in the event of an emergency;

    b. Evacuation routes and procedures;

    c. Emergency alerting and response procedures.

1.7 CONTINGENCY MEASURES & NOTIFICATIONS

A. The potential for encountering hazardous buried objects or materials that could pose a threat to human health or the environment exists. In the event that potentially hazardous materials are encountered during the work under this contract, the responsibilities of the Contractor and the Engineer are described herein.

B. The procedures and protocols to be used by the SSO in defining materials that are potentially hazardous include screening with a photo-ionization detector, odor, visual appearance of a material, and obvious oil or chemical contaminated materials.

C. Upon encountering suspected hazardous buried objects or materials as described above, cover the excavation immediately if no imminent danger, as defined by the SSO, is present. If there is an imminent danger, as defined by the SSO, Evacuate the area immediately. The SSO shall then notify the Engineer and the Owner of the situation.

D. Establish, properly barricade, and mark the area as an exclusion zone under the direction of the SSO. The SSO shall establish the exclusion zone boundaries based upon air quality monitoring using a photo-ionization detector and other equipment as appropriate. The exclusion zone shall be established at a minimum 50-foot radius around the location where the potentially hazardous material is encountered. Work within the exclusion zone shall be discontinued until the hazardous condition has been remediated and testing indicates that a hazard does not exist. Other activities of the site, outside the limits of the exclusion zone shall continue. Ambient air quality monitoring shall be performed by the SSO to demonstrate that ambient air quality in other portions of the site is not adversely impacted by the exclusion zone condition.

E. Notify the Engineer and the Owner regarding the presence of or suspected presence of potentially hazardous materials. The Owner may direct the Contractor to take action to determine if hazardous materials are present, and/or to notify regulators and to obtain necessary regulatory approvals for remediation.

F. Mobilize the appropriate equipment and personnel to sample and test the potentially hazardous material within the exclusion zone to determine the remedial action required, subject to the Engineer's direction. The Contractor may be directed to remove and legally dispose of the material. Compensation for the removal and disposal of hazardous material will be as a Change in Work and Change in Contract Price in accordance with the General Conditions, if not covered under a specific bid item.

1.8 PRODUCTS – NOT USED

1.9 EXECUTION - NOT USED

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

A. Quality Control that the Contractor will perform during the performance of this work.

1.2 SUBMITTALS

A. Submit a Quality Control Plan to the Owner/Engineer at least twenty-one (21) calendar days before starting work which includes the following information:

1. Statement and description of Contractor's overall Quality Control (QC) program as described below. Each Sub-contractor shall submit a separate QC program applicable to their scope of work to the Contractor.

2. Procedures to be used in obtaining field samples of materials except where required for submittal under other sections.

3. Name, qualifications, and prior experience of inspection and testing laboratories that Contractor proposes for Owner's/Engineer's consideration.

1.3 QUALITY CONTROL (QC) PROGRAM

A. Formulation, Submission, Details and Acceptance of Plan:

1. The plan shall identify personnel, and establish procedures, instructions, records, and forms to be used. If Contractor fails to submit an acceptable QC Plan, the Owner/Engineer will refuse to allow construction to start.

2. The Contractor's QC Plan shall include as a minimum, the following:

a. A description of the Contractor's QC organization, including a chart showing lines of authority, and acknowledgement that the Contractor's QC staff shall conduct inspections for all aspects of the work specified.

b. The name, qualifications, responsibilities, and authority of each person assigned to the Contractor's QC function.

c. Procedures for scheduling and managing submittals, including those of Subcontractors, fabricators, suppliers, and purchasing agents.

d. Control procedures to be promulgated.

e. Control testing procedures for each specific test, including field sampling.

f. Reporting procedures including proposed reporting formats.

3. Acceptance of Plan: Acceptance of the Contractor's plan by the Owner/Engineer is required prior to the start of construction. Acceptance is conditional, and its continuation will depend on satisfactory performance by the Contractor during construction. The Owner/Engineer reserves the right to require the Contractor to make changes in the Contractor's QC Plan and

operations as necessary to obtain the quality specified, at no additional cost to the Owner.

4. Notification of Changes: After acceptance of the Contractor's QC Plan, the Contractor shall notify the Owner/Engineer in writing of any proposed change. The proposed changes will be subject to acceptance by the Owner/Engineer.

B. Implementation of QC Plan:

1. General:

   a. Comply with the highest industry standards except when specified requirements indicate more rigid standards, or more precise workmanship is required.

   b. Provide personnel to produce work of specified quality.

   c. Secure, protect, and maintain products and Work completed or in progress from damage during the progress of remaining Work.

2. Preparatory Inspection: This shall be performed prior to beginning any segment of Work. It shall include a review of Contract requirements; a check to assure that all materials and or equipment are on hand, and have been tested, samples submitted and approved; a check to assure that provisions have been made to do required control testing; examination of the work has been completed; and a physical examination of materials, equipment and sample work to assure that they conform to approved shop drawings or submittal data. Contractor shall instruct each Subcontractor contributing work as to the acceptable level of workmanship required in the Contractor's QC Plan in order to meet Specifications.

3. Initial Inspection: This shall be performed as soon as a representative portion of a particular segment of Work has been accomplished, and shall include an examination of the quality of workmanship and materials, a review of control testing for compliance with Contract requirements, and inspection for omissions and dimensional requirements.

4. Follow-up Inspections: These shall be performed regularly to assure continuing compliance with Contract requirements, including control testing, until Completion. Final follow-up inspections shall be conducted and deficiencies corrected prior to final acceptance of segments of Work.

5. Tests: Provide a list of QC tests, and the frequency of their performance, which the Contractor understands it is to perform.

6. Prompt turn-around is required for all analyses, so as not to jeopardize the project schedule. Verbal turn-around time on soil samples is not to exceed 72 hours and written turn-around time is not to exceed 120 hours.

7. The Contractor shall submit the list of tests, and the frequency of their performance, as a part of the Contractor's QC Plan, to the Engineer. The list shall give the test name, Specification Paragraph containing the test requirements, and the personnel and laboratory responsible for each type of test. The Contractor shall perform the following activities:

   a. Verify that testing procedures comply with Contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check instrument calibration data against certified standards.

d. Verify that recording forms, including all of the test documentation requirements, have been prepared.

8. Testing for Laboratory Capability:

a. Capability Check: Owner/Engineer shall have the right to check laboratory equipment in proposed laboratories for compliance with testing procedures.

b. Capability Rechecks: If the selected laboratory fails the capability check the Contractor shall be assessed actual costs to reimburse the Owner/Engineer for each succeeding recheck of the laboratory or the checking of a subsequently-selected laboratory.

9. Documentation:

a. The Contractor shall maintain records of QC operations, activities and tests performed including the Work of suppliers and Subcontractors. These records shall be on an acceptable form and shall include a description of the trades working on the project, the number of personnel working, weather conditions encountered, and delays encountered, and acknowledgement of deficiencies noted along with corrective actions taken on current or previous deficiencies. Additionally, these records shall include evidence that required activities or tests have been performed, including but not limited to the following:

1) Type and number of control activities and tests performed.

2) Results of control activities or tests, including nature of any defects, causes for rejection, and other information related to deficient features.

3) Proposed remedies and accomplished corrections.

b. These records shall cover both conforming and defective features, and shall include a statement that supplies and materials incorporated in the Work comply with the Contract requirements. Legible copies of these records shall be submitted to the Owner/Engineer.

c. Notification of Noncompliance: Owner/Engineer will notify the Contractor or the designated representative of any observed noncompliance with requirements of this Section. If the Contractor fails or refuses to comply promptly, the Owner/Engineer may issue an order stopping all or part of the Work until satisfactory corrective action has been taken.

1.4 WEIGHTS AND MEASURES

A. The Contractor shall weigh and measure its own materials.

B. Give one copy of each delivery's weight or measurement to Owner/Engineer prior to stockpiling or storage.

1.5 REFERENCE STANDARDS

A. Where reference to an industry standard does not include a date of issue, conform to issue current as of date of Contract Documents.

B. Where reference to an industry standard includes a date of issue, conform to issue current as of the date specified.

1.6 INSPECTION AND TESTING LABORATORIES

A. Independent testing laboratories shall perform inspections, tests, and other services specified in individual specification sections and the Contractor's Quality Control Plan.

B. Reports and test results shall be submitted by the independent testing laboratory directly to the Owner/Engineer, indicating observations and results of tests and indicating compliance or noncompliance with the requirements of the specifications within the time period specified herein.

C. Contractor shall provide access to the work and fully cooperate with laboratory firms. Notify Owner/Engineer at least 48 hours prior to expected time when work is ready for inspection, sampling, or testing, if not otherwise specified for the particular work to be tested.

D. Retesting required due to nonconformance to the specified requirements shall be performed by the same independent testing laboratories on instructions from the Owner/Engineer. Retesting costs shall be borne by the Contractor and will not be applied to any unit price items.

PART 2 PRODUCTS

2.1 MATERIALS

A. See Section 02400, EARTHWORK for the types of earth materials to be used on this project.

B. See Section 03200, REINFORCING STEEL AND 03310, CONCRETE for the types of reinforcing steel and concrete to be used on this project.

C. See other applicable Specification Sections for other types of material and equipment used on this project.

PART 3 EXECUTION

3.1 PRECONSTRUTION TESTING

A. All material evaluation tests shall be performed by the independent testing laboratory retained by the Contractor and approved for use by the Owner/Engineer.

3.2 CONSTRUCTION TESTING

A. All material evaluation tests shall be performed by the independent testing laboratory retained by the Contractor and approved for use by the Owner/Engineer.

1. ASTM D422	Particle Size Analysis
2. ASTM D1577	Moisture/Density Relationship
3. ASTM D2216	Moisture Content

4. ASTM D2488	Unified Soils Classification
5. AASHTO T-245	Marshall Density
6. ASTM D854	Specific Gravity
7. ASTM D1556	Density of Soil in Place by Nuclear Methods
8. ASTM D2216	Laboratory Determination of Water Content
9. ASTM D2922	Density of Soil in Place by Nuclear Methods
10. ASTM D3017	Water Content of Soil in Place by Nuclear Methods
11. ASTM 31	Making and Curing Concrete Cylinders
12. ASTM 39	Compressive Strength of Cylindrical Concrete Specimens

B. Further material testing may be necessary if alternative sources of material are required during construction or, if based on visual inspection during delivery to the site, it appears that a material change (color, grain size, plasticity, etc.) as occurred. Additional source testing due to change of material shall be borne by the Contractor and will not be applied to any unit price items.

C. Nuclear density methods shall be used for all density testing due to the ease of testing and the relatively large number of tests which can be run in a specified period of time. Check the moisture content with at least two samples and correct Nuclear Gauge moisture readings if appropriate.

D. Questions concerning the accuracy of any single test shall be addressed by retesting the same or another similar location. Perform periodic checks using the sand-cone method at the direction of the Engineer to verify the nuclear density results. Wherever a conflict exists, sand-cone results shall be accepted over nuclear density results.

E. At locations where the field testing indicates densities below the requirements of the specifications, rework and recompact the location

3.3 QC TESTING FREQUENCY

A. All QC testing shall be conducted in accordance with the Contractor's QC Plan. Documentation and reporting of test results shall be the responsibility of the Contractor.

B. Recommended testing frequencies for material evaluation and construction quality evaluation are presented in Table 1A of this section.

C. Sampling locations shall be approved by the Engineer.

D. A special testing frequency shall be used at the discretion of the Engineer when visual observations of construction performance indicate a potential problem. Additional testing for suspected areas shall be considered when:

1. Rollers slip during rolling operations.

2. Lift thickness appears greater than specified.

3. Fill appears to be at improper and/or variable moisture content.

4. Dirt-clogged rollers are used to compact the material.

5. Rollers may not have used optimum ballast.

6. Materials appear substantially different from those specified.

7. The degree of compaction is doubtful.

8. Directed by the Engineer.

E. During construction, the frequency of testing may also be increased in the following situations.

1. Adverse weather conditions.

2. Breakdown of equipment.

3. At the start and finish of grading.

4. Material fails to meet specification.

5. The work area is reduced.

3.4 QA TESTING FREQUENCY

A. If required, QA testing will be performed by the Owner/Engineer at a frequency equal to about 10 percent of the QC testing frequency or as directed by the Owner/Engineer.

3.5 QA TESTING FREQUENCY

A. If a defect is discovered, the Contractor shall immediately determine the extent and nature of the defect.

1. If the defect is indicated by unsatisfactory test results, the Contractor shall determine the extent of the deficient area by additional tests, observations, a review of records, or other means that the Contractor deems appropriate. Costs for additional testing shall be borne by the Contractor and not applied to any unit price items.

2. If the defect is related to adverse site conditions, such as overly wet soils or surface desiccation, the Contractor shall define the limits and nature of the defect.

B. After determining the extent and nature of a defect, the Contractor shall notify the Engineer and schedule for defect repair and retesting.

C. The Contractor shall correct the deficiency to the satisfaction of the Engineer. If the project specification criteria cannot be met, or if unusual weather conditions hinder work, then the Contractor shall develop and present to the Engineer suggested solutions for his approval.

D. All retests by the Contractor must verify that the defect has been corrected before any additional work is performed by the Contractor in the area of the deficiency. The Contractor shall also verify that all installation requirements are met and that all required submittals are provided

Table 1A

Recommended Schedule of Quality Control Testing

Seawall and Wharf Replacement Project

City of Portsmouth, NH

Material	Situation	Test	Minimum Frequency
Select Backfill and Structural Fill	Source Investigation	Grain Size through 0.002 mm Moisture Density Relationship	1 per source 1 per source
	During Placement	Grain Size through 0.002 mm Moisture Density Relationship	1 per 150 tons 1 per 150 tons
	As-Placed	Dry Density and As-Placed Moisture	1 per compacted lift per 2,500 square feet
Crushed Gravel Base, Crushed Stone Bedding, and Crushed Stone Backfill	Source Investigation	Grain size through 0.002mm	1 per source
	During Placement	Grain size through 0.002mm	1 per 100 tons
Concrete	Pre-Cast and Cast-in-Place	Compressive Strength, Slump, and Air Entrainment	6 cylinders per each 20 CY pour (break 1 @ 7 days, 3 @ 28 days, and keep 2 in reserve)
Bituminous Concrete Pavement	As Placed	Density	1 per compacted lift per 2,500 square feet
Welds	As Installed	Non-Destructive Testing in accordance with the attached Table	See Table 1

Notes:

1.Payment for concrete compressive strength, slump, and air entrainment shall be in accordance with the actual number of cylinders that are tested and broken (i.e., reserve concrete cylinders that are collected but not tested for compressive strength shall not be paid for).

END OF SECTION

824.03.7 Inspection of Welds.

a. General. All welding, both shop and field, shall be subject to inspection by the Engineer, in accordance with ANSI/AASHTO/AWS D1.5 Bridge Welding Code, as amended herein. The principal method of inspection shall be non-destructive testing, which may be carried out by radiographic, magnetic particle, dye penetrant or ultrasonic methods, or any other methods designated by the Engineer. A minimum routine inspection program is outlined in TABLE 1. However, inspection shall in no way be construed to be limited to the program described.

A routine inspection program shall be established to which all welding shall be subject. This program shall involve two types of inspection.

b. Visual Inspection of Welds and Welding Operations. The Engineer shall have unlimited access to the site of welding operations, and shall be free to observe the procedure and techniques used by the Contractor on all welds. The program of visual inspection will be adapted to job conditions. The cost of visual inspection shall be borne by the State.

c. Non-destructive Testing. A routine program of non-destructive testing will be carried out on all welds (shop and field) carrying calculated stress as indicated in Table 1 of this Subsection.

~~All non-destructive testing will be performed by the State, except that the Contractor shall, at his own expense, radiograph and furnish the State one set of films of shop butt welds above specified and shall furnish all equipment and an operator at his own expense for the making of magnetic particle tests of shop fillet welds as above specified. All other costs of non-destructive inspection shall be borne by the State except that the Contractor shall furnish all labor and equipment required to move and position the various members for inspection.~~ No additional compensation shall be granted to the Contractor for moving, handling, rehandling or positioning the members to facilitate testing.

TABLE 1: NON-DESTRUCTIVE TESTING PROGRAM

Type of Weld	Percentage (Number, Quantity) of Weld(s) to be tested	Inspection	Remarks
Flange to flange butt welds-tension	100%	Radiographic	
Flange to flange butt welds-compression	50% (selected at random by the Engineer)	Radiographic	If any radiographed joint is rejected, all compression grooved welds of this member shall be radiographed 100%.
Web to web butt welds	One-third of depth closest to tension flange of each weld	Radiographic	If quality of the portion radiographed is unsatisfactory, entire weld shall be radiographed.
Flange plate to cover plate fillet weld	10% (each end of each weld and other locations to be selected at random by the Engineer)	Approved magnetic particle	Quantity of weld to be inspected shall be increased if quality of initially inspected weld proves unsatisfactory. (See AWS D.2.0. as amended by Circular Memo.)
Flange to web fillet welds	10% (each end of each weld and other locations to be selected at random by the Engineer) & 50% of cap plate to pile connection welds	Approved magnetic particle	Quantity of weld to be inspected shall be increased if quality of initially inspected weld proves unsatisfactory. (See AWS D.2.0 as amended by Circular Memo.)
Repair of flame cut edge with greater than 3/16" gouge.	100%	Radiographic	Radiographing and laboratory report at expense of fabricator.
HP and Pipe Pile Splice	100%	Ultrasonic	Testing to be performed by an NDT Certified Level III Technician

SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 REQUIREMENTS

A. Furnish, install, and maintain temporary construction facilities as required for construction, and remove at the completion of work. This Section includes but is not limited to requirements for:

1. Field Offices.

2. Miscellaneous construction facilities.

3. Temporary utility connections.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with Federal, State and Local Codes, Laws, Ordinances, and Regulations and with utility company requirements.

1.3 SUBMITTALS

A. Submit drawings within ten (10) calendar days of starting work to Owner/Engineer for approval, showing layout, furnishings, and facilities of field office trailers and information concerning how Contractor proposes to furnish utilities.

1.4 JOB CONDITIONS

A. Scheduled Uses: Provide temporary construction facilities at time first needed at the site; and maintain, expand, and modify facilities as needed throughout construction period.

B. Conditions of Use: Operate, maintain, control, and protect support facilities in a manner which will prevent fire, hazardous exposures, health problems, unsanitary conditions, pollution, contamination, discomfort to users, flooding, freeze-up, interference with construction work, public nuisances, and similar deleterious effects.

C. The Owner is not responsible for damage to any facilities due to severe natural occurrences, vandalism, or negligence on the part of the Contractor. The Contractor shall take all necessary precautions to protect and deter potential theft and vandalism within the construction site.

1.5 COSTS

A. Include all costs associated with furnishing, installing and removing Contractor's field offices, and providing all utilities, equipment, furnishings, waste disposal receptacles, services, maintenance, and removal as part of lump sum bid for Mobilization/Demobilization.

B. Include all costs for providing continuous electric, water, sewer, heating/air conditioning, and telephone services to offices throughout construction period.

PART 2 PRODUCTS

2.1 GENERAL

A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

B. Coordinate interruptions of permanent utilities with utility companies and affected users.

2.2 FIELD OFFICES

A. Contractor's Field Office:

1. The Contractor shall provide its own field offices and such other temporary housing as it may need for storage or fabrication purposes and completely remove at the completion of the work.

2. Provide storage space for all shop drawing submittals, project samples, field laboratory test data and analyses, and other project-related information.

3. Store all documents in fireproof, lockable cabinets.

4. The Contractor and Subcontractors shall arrange for and have installed a telephone or provide mobile telephones for the use of their own field offices and personnel.

2.3 MISCELLANEOUS CONSTRUCTION FACILITIES

A. Storage Sheds:

1. General: Install individual storage sheds as required to accommodate the work; sized, furnished and equipped properly. Sheds are defined to include both open shelters and fully enclosed spaces.

PART 3 EXECUTION

3.1 INSTALLATION OF SUPPORT FACILITIES

A. General: Use qualified tradesmen for installation of support facilities. Locate facilities where they will serve the total project construction work adequately, and result in minimum interference with the performance of the work. Relocate, modify and extend facilities as required during course of the work, to properly accommodate entire work of project. Locate field offices for easy access to construction work, and position so that the windows give the best possible view of construction activities. Provide a reasonably neat and uniform appearance in support facilities, acceptable to Engineer, and to Owner.

B. Maintain and operate temporary utility systems to assure continuous service.

C. Modify and extend temporary utility systems as work progress requires.

D. In the event of a hurricane or severe storm warning, move support facilities to an upland location at no additional cost to Owner

3.2 INSTALLATION

A. Contractor's Office

1. Install office at or near site of work as required to complete the work. Office to be headquarters of authorized representative to receive drawings, instruction or other communication or articles.

2. Contractor to keep copies of drawings, specifications and other Contract Documents at office at site of work and make readily available for Engineer's or Owner's use at all times.

3. Toilet facilities are not available at the project site. The Contractor shall provide portable his/her toilets for the duration of the work.

B. Engineer's Office:

1. To be provided by Owner if required.

C. Connect field offices to temporary utilities as required. Include backfill to connect telephone, electric, water and sewer utility lines; if applicable, insulate and heat the water and sewer lines to the extent necessary to prevent freezing. All sewer, water, electric, and telephone services shall be continuously connected and in proper working order.

3.3 MAINTENANCE

A. The inside and outside of the Contractor's field offices shall be maintained in a clean condition.

3.4 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Upon completion of work of all trades and before final acceptance of entire project, each trade shall remove, at its own expense, all wiring, appurtenances, and accessories used in performance of its respective work.

C. Temporary sheds, utilities, barricades, signs, and other appurtenances related to prosecution of the work and not incorporated in the permanent construction shall be completely removed from the site prior to acceptance of work by Owner.

END OF SECTION

SECTION 01510

TEMPORARY UTILITIES

PART 1 GENERAL

1.1 REQUIREMENTS

A. Furnishing, installing, and maintaining temporary utilities as required to support construction including:

1. Electric and Lighting.

2. Heating and Ventilation.

3. Water.

4. Sanitary Facilities.

1.2 TEMPORARY ELECTRICITY AND LIGHTING

A. Electrical power is not available at the project site.

B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available throughout construction by use of construction-type power cords.

C. Provide artificial lighting for areas of work when natural light is not adequate for work, and for areas accessible to public.

D. Furnish all extension cords, sockets, lamps, motors and accessories for work. Ground all outlets.

E. All temporary wiring, service equipment, and accessories thereto installed shall be removed at the expense of the Contractor after serving its purpose.

F. Contractor is required to pay for replacement of all lamps broken and/or removed from premises during construction period and until date of substantial completion of work and written acceptance by Owner.

1.3 TEMPORARY HEATING AND VENTILATION

A. Provide temporary heating when temperature falls below 50 deg. F and as otherwise required to:

1. Maintain working conditions acceptable to Owner/Engineer.

2. Protect all work, materials, and equipment against damage from dampness or cold.

3. Dry out structures.

4. Maintain proper conditions for installation and curing of materials.

B. Ensure that heating equipment and fuels are compatible for the intended purpose and include safety devices in accordance with industry standards.

C. Do not use combustion type heaters without proper venting nor in areas where such equipment might introduce a hazard.

D. Ensure that all enclosed areas are ventilated (using forced-draft equipment when necessary) as required to maintain proper conditions for personnel and work, and to avoid any accumulation of hazardous dust or fumes.

E. Pay costs associated with furnishing, installing, maintaining, operating, and removing of heating and ventilation equipment.

1.4 TEMPORARY WATER

A. Furnish all water required for and in connection with work to be done under this Contract.

B. Pay costs associated with furnishing, installing, maintaining, operating, and removing of water-related equipment.

1.5 TEMPORARY SANITARY FACILITIES

A. Toilet facilities are not available at the project site.

B. If the Contractor elects to provide chemical toilets, ensure that these facilities are:

1. Of a capacity acceptable to Owner/Engineer.

2. Maintained throughout construction period.

3. Obscured from public view to the greatest extent possible and secured to prevent vandalism.

C. Enforce use of such sanitary facilities by all personnel at site.

D. Pay costs associated with furnishing, installing, maintaining, operating and removing sanitary facilities.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 REQUIREMENTS

A. Controlling Contractor’s operations and work.

B. Furnishing, installing and operating temporary controls during construction for:

1. Noise
2. Dust
3. Surface Water
4. Pollution
5. Debris and Clean Up
6. Air Pollution
7. Public Safety

1.2 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of easements, except by written permission of the property owner. Furnish Owner/Engineer copies of all side agreements the Contractor has with property owners to enter or occupy private lands.

1.3 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property.

1.4 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at its expense, to a condition similar or equal to that existing before the damage was done, or it shall make good the damage in other manner acceptable to the Owner/Engineer.

1.5 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, electric and telephone cables, and cesspools adjacent to trench excavations, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by it at its expense, to the damaged items original condition.

1.6 PROTECTION OF WORK

A. The Contractor shall at all times protect excavations, trenches, new construction, old construction, all job materials, apparatus and fixtures from rain, wind, snow, ice, dust, dirt, mud, groundwater, back-up or leakage of sewers, drains, or other piping, and from water of any other origin, and shall remove promptly any accumulation of the above. The Contractor shall provide and operate all pumps, piping and other equipment necessary to this end at no additional cost to Owner.

B. Thoroughly protect all completed work and all stored materials.

C. Replace or rectify work or materials damaged by workmen, by the elements or by any other cause, to the satisfaction of the Owner/Engineer and at no additional expense to the Owner.

D. Repair streets, curbs, sidewalks, poles, grass, shrubs, trees, or other existing site features, if disturbed by building operations. Leave them in as good condition as they were before being disturbed.

E. Do not allow workmen, including those of any Subcontractor or supplier, to mark finish surfaces with marking pens or other such devices that are not readily erasable.

1.7 SECURITY

A. The Contractor shall take all precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner or Contractor, whether or not forming part of the work, located within the limits of work. The Contractor shall have full responsibility for the security of such property located in such areas and shall reimburse the Owner for any such loss, damage, or injury, except such as may be directly caused by agents or employees of the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Suitable signs, lights and such required items to direct traffic shall be furnished and maintained by the Contractor.

B. The Contractor must keep streets and premises free from unnecessary obstructions, debris and all other materials. The Owner/Engineer may, at any time, order all equipment, materials, surplus from excavations, debris and all other materials lying outside that length of working space promptly removed, and should the Contractor fail to remove such material within 24 hours after notice to remove the same, the Owner/Engineer may cause any part or all of such materials to be removed by such persons as it may employ, at the Contractor's expense, and may deduct the cost thereof from payment which may be or may become due to the Contractor under the contract. In special cases, where public safety urgently demands it, the Engineer may cause such materials to be removed without prior notice.

3.2 INTERFERENCE WITH EXISTING STRUCTURES

A. Whenever it may be necessary to cross or interfere with existing culverts, drains, water pipes or fixtures, guardrails, fences, or other structures needing special care, due notice shall be given to the Owner/Engineer and to the various public and private

agencies or individuals responsible for the utility or structure that is interfered with. Whenever required, all objects shall be strengthened to meet any additional stress that the work herein specified may impose upon it, and any damage caused shall be thoroughly repaired. The entire work shall be the responsibility of the Contractor and the work shall be performed at no additional expense to the Owner. All damaged items of work or items required to be removed and replaced due to construction shall be replaced or repaired by the Contractor to the complete satisfaction of the property Owners and/or the Owner/Engineer at no additional expense to the Owner.

3.3 NOISE CONTROL

A. The Contractor shall employ all reasonable measures to avoid unnecessary noise and ensure that noise is appropriate for normal ambient sound levels in the work area during working hours. Where required by agencies having jurisdiction, certain noise - producing work may have to be performed during specified periods only. Noise control measures during normal work hours shall include but not be limited to:

1. Operate machinery in a manner to cause least noise consistent with efficient performance of work.

2. Equip all construction machinery and vehicles with sound-muffling devices.

3. During construction adjacent to occupied buildings, erect screens or barriers as required to reduce noise in building to limits in accordance with applicable codes. Conduct operations in such a manner as to avoid unnecessary noise that might interfere with activities of building occupants.

B. When the Contractor's work extends beyond normal working hours the Contractor shall incorporate to the complete satisfaction of the Owner and Engineer, adequate noise prevention measures to insure minimum noise impact on the surrounding areas. Noise prevention measures shall include, but not be limited to:

1. Insulated enclosures.

2. Hospital grade silencers or mufflers.

3. Equipment modification.

4. Special equipment, as necessary to meet local noise guidelines.

5. Any other noise prevention measures.

C. Should at any time the Owner and/or Engineer determine that noise prevention measures are inadequate, the Contractor shall suspend all such work in question until acceptable measures are incorporated. Suspension of work due to inadequate noise prevention shall not be a cause for additional cost to the Owner.

D. Prior to the start of any work outside normal work hours, the Contractor shall submit a Noise Control plan to the Owner and Engineer for review. Noise Control plans shall be submitted for:

1. Night work.

2. All Pumping operations and work which extend beyond normal workday.

3. Any other work as determined by the Engineer that warrants special noise prevention measures.

E. All costs associated with noise control measures shall be considered part of the bid price for appropriate work being completed.

3.4 ODOR CONTROL

A. During the work, the Contractor shall implement controls and take all necessary steps to prevent odors from becoming a nuisance to surrounding areas.

3.5 SURFACE WATER CONTROL

A. Provide for drainage of storm water and such water as may be applied or discharged on site in performance of work.

B. Ensure that drainage facilities are adequate to prevent damage to work, site, and adjacent property.

3.6 POLLUTION CONTROL

A. Prevent pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities.

1. In order to protect the Piscataqua River and its tributaries from hazardous materials releases by the construction equipment involved in this project, equipment must be in good condition and inspected for leaks daily; spill control and cleanup equipment shall be stored on site; and the Contractor shall be responsible for all cleanup and remediation of hazardous materials releases. All hydraulic equipment operating adjacent to the Piscataqua River and its tributaries shall utilize non-toxic, biodegradable hydraulic oil.

2. Do not allow sanitary wastes to enter any drain or watercourse other than sanitary sewers or onsite septic systems.

3. Do not allow sediment, debris, or other substances to enter sanitary sewers and take measures to prevent such materials from entering any drain or watercourse.

4. All moving of equipment, water control, and other operations likely to create silting, shall be planned and conducted so as to avoid pollution of the Piscataqua River and its tributaries. Water used for any purpose that has become contaminated with oil, bitumen, salt, or other pollutants shall be discharged so as to avoid affecting nearby waters. Under no circumstances shall pollutants be discharged directly into Piscataqua River and its tributaries.

3.7 DEBRIS AND CLEANUP

A. Keep all premises free at all times from accumulation of waste materials and rubbish.

1. Immediately after unpacking, remove and dispose of all packing materials, case lumber, excelsior, wrapping, or other rubbish from site.

B. Provide trash receptacles about site, and empty containers daily.

C. Neatly stack construction materials, such as concrete forms and scaffolding, when not in use.

D. Promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solution from surfaces to prevent marring or other damage to satisfaction of Owner/Engineer.

E. Ensure that wastes are not buried or burned on site or disposed into storm drains, sanitary sewers, steams, or waterways.

1. Remove all wastes from site and dispose in a manner complying with local ordinances and anti-pollution laws.

2. Store volatile wastes in covered metal containers and remove daily.

F. Cleanup as determined by Owner/Engineer will be a condition for recommendation of progress payment application.

1. Contractor shall have full responsibility for cleaning up during and immediately upon completion of work. Remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in execution of work, leaving site clean, free of debris and in condition acceptable to Owner/Engineer.

2. Equipment or material shall not be left within any work area after acceptance of Contract without written permission of Owner/Engineer. Do not abandon any material at or near site regardless of its value.

3.8 PUBLIC SAFETY

A. At all times until final acceptance of Work by Owner, the Contractor shall protect Work and shall take all precautions of preventing injuries to persons or damage to property on or about site.

B. Contractor shall comply with all applicable laws, ordinances, rules, and regulations regarding safety of persons or property or with regard to protecting them from damage, injury, or loss and shall not load or permit any part of work to be placed so as to endanger safety of work.

C. Conduct work such that abutters shall have reasonable access to their property.

3.9 REMOVAL OF TEMPORARY CONTROLS

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Upon completion of work of all trades and before final acceptance of entire project, each trade shall remove, at its own expense, all wiring, appurtenances and accessories used in performance of its respective work

C. Temporary sheds, utilities, barricades, signs, and other appurtenances related to the prosecution of the work and not incorporated in the permanent construction shall be completely removed from the site prior to acceptance of work by Owner.

END OF SECTION

SECTION 01720

PROJECT RECORD DRAWINGS

PART 1 GENERAL

1.1 REQUIREMENTS

A. Maintain at the site for the Owner one record copy of

1. Drawings
2. Specifications
3. Addenda
4. Change orders and other modifications to the contract
5. Engineer field orders or written instructions
6. Reviewed shop drawings, product data and samples
7. Field test records

B. The Contractor will be required to furnish, at no additional expense to the Owner, the services of a surveyor and/or Engineer registered in the state where the project is located and under whose direction shall be obtained and recorded all surveys, measurements and such other data required for the determination of the as-built records of the construction of all site work.

1.2 DEFINITIONS

A. As-Built Drawings: Drawings prepared by the Contractor that show, in red-ink, on-site changes to the original construction documents.

B. Record Drawings: Drawings prepared by the Engineer that reflect on-site changes the Contractor noted in the As-Built Drawings and that are compiled as a set of on-site changes made for the Owner in accordance with the Contract Documents.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

B. Provide locked file cabinet for storage of documents.

C. Provide locked cabinet space for storage of samples.

D. File documents and samples in accordance with CSI/CSC format.

E. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

F. Make documents and samples available at all times for inspection by Engineer and Owner.

1.4 MARKING DEVICES

A. Provide felt tip marking pens for recording information in a color code approved by Owner/Engineer.

1.5 RECORDING

A. Label each document "As-Built" in neat large printed letters.

B. Record information concurrently with construction progress.

C. Do not conceal any work until required information is recorded.

D. Drawings: Principal dimensions, elevations and other data, as required, shall be recorded for all work, such as:

1. Deviations of any nature made during construction.

2. Location of underground utilities.

3. Field changes of dimension and detail.

4. Changes made by field order or by change order.

5. Details not on original contract drawings.

E. The marked-up drawings shall be inspected periodically by the Owner/Engineer and shall be corrected immediately if found either inaccurate or incomplete.

F. Specifications and Addenda: Legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

2. Changes made by field order or by change order.

1.6 FINAL MEASUREMENTS

A. The Contractor shall provide qualified personnel and equipment for taking final measurements for quantities and As-Built Drawings.

1.7 AS-BUILT DRAWINGS

A. At the completion of the project, the As-Built Drawings shall be submitted to the Engineer for its review.

B. The Contractor shall correct, amplify, and do all other work as may be required by the Engineer to complete the As-Built Drawings in a manner satisfactory to the Engineer and at no additional cost to the Owner.

C. Upon approval, the Contractor shall provide the Final As-Built Drawings to the Engineer for its use in preparing the Record Drawings.

1.8 SUBMITTAL

A. At contract closeout, deliver As-Built Drawings to Engineer.

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date

2. Project title and number

3. Contractor's name and address

4. Title and number of each As-Built Drawing

5. Signature of Contractor or his authorized representative

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DIVISION 2

SITE WORK

SECTION 02005

MOBILIZATION/DEMOBILIZATION

PART 1 GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary to move in personnel and equipment; set up Contractor's temporary offices, buildings, facilities, and utilities; prepare the site for construction; and demobilize complete.

1.2 GENERAL

A. The Contractor's Work Limits are shown on the Drawings.

B. The limits of the Owner's property are shown on the Drawings.

C. In the event additional space is required for the Contractor's operations, the Contractor shall make its own arrangements and pay for such additional space

PART 2 PRODUCTS

2.1 SECURITY FENCE

A. Construct temporary security fence or other suitable enclosures as required for the protection of the Contractor's materials, tools, and equipment. Maintain fencing/enclosures during construction.

2.2 PARKING FACILITIES

A. Parking is available onsite within the Contractor's Staging Area shown on the Drawings.

PART 3 EXECUTION

3.1 LAYOUT

A. Set up construction facilities in a neat and orderly manner within the Contractor's Staging Area and/or at a location acceptable to the Engineer. Accomplish all required work in accordance with applicable portions of these Specifications. Confine operations within the general Limits of Disturbance shown.

3.2 DEMOBILIZATION

A. At the completion of the work, and immediately prior to final inspection, clean the entire project area occupied by the Contractor during the work. Remove all unused material, debris, soil, and rubbish, unless otherwise specified. Disposal of material shall be in accordance with Federal, State, and local laws and regulations.

1. Should Contractor not remove rubbish or debris or not clean the facilities and site as specified above, the Owner reserves the right to have final cleaning done by others at the sole expense of the Contractor.

B. The Contractor Shall:

1. Employ experienced workers or professional cleaners for final cleaning.

2. Conduct final inspection of concealed spaces in preparation for Contract completion.

3. Remove from the property temporary structures and materials, equipment, and appurtenances not required as part of, or appurtenant to, the completed work.

4. Leave watercourse, gutters, and ditches open and in a condition satisfactory to Engineer.

END OF SECTION

SECTION 02050

DEMOLITION AND REMOVAL

PART 1 GENERAL

1.1 WORK INCLUDED

A. This section covers the work associated with demolition and removal as specified and shown on the Drawings.

1.2 GENERAL

A. The Contractor shall submit to the Engineer a schedule for removal and stockpiling.

PART 2 PRODUCTS

2.1 GENERAL

A. Employ experienced workers or professional cleaners for final cleaning.

PART 3 EXECUTION

3.1 GENERAL

A. Remove existing concrete, timber, steel, and other deteriorated materials as required to complete the work under this Contract.

B. Dispose of all demolition related material offsite, in accordance with all local, State, and Federal Laws and Regulations.

C. Stockpile excess soil from behind the existing seawalls at the DPW's designated storage area.

D. Stockpile excess granite blocks from seawall construction at the DPW's designated storage area.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary for the earthwork, complete.

1.2 DEFINITIONS

A. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.

B. Optimum Moisture Content: Determined by the ASTM standard specified to determine the maximum dry density for relative compaction.

C. Relative Density: As defined by ASTM D4253 or D4254.

D. Prepared Ground Surface: The ground surface after clearing, grubbing, stripping, excavation, and scarification and/or compaction.

E. Completed Course: A course or layer that is ready for the next layer or next phase of the work.

F. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters. Well-graded is used to define a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

G. Influence Area: The area within planes sloped downward and outward at an angle of 60 degrees from the horizontal from (a) 1 foot outside the outermost edge at the base of foundations or slabs; or (b) 1 foot outside the outermost edge at the surface of roadways or shoulder: or (c) 0.5 foot outside the exterior edge at the spring line of pipes and culverts.

H. Unclassified Excavation: The nature of materials to be encountered has not been identified or described herein.

I. Imported Material: Material obtained by the Contractor from sources off the site.

J. Excess Material: Material generated during this project that is not suitable for reuse as determined by the Engineer.

K. Boulder: Rock material greater than 1 cubic yard in volume that cannot be removed with a standard backhoe or excavator without significant effort.

L. Rock: Rock material in beds, ledges, un-stratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cubic yard that cannot be removed by rock excavating equipment and systematic drilling, ram hammering, ripping or hydraulic splitting.

1.3 EXISTING UTIITIES

A. Contact DIGSAFE (811 or 1-800-344-7233) a minimum of three (3) business days before commencing with any excavation, in order that all pertinent utility companies become informed of such work. Coordinate with the Owner for locating their onsite utilities.

1.4 SUBMITTALS

A. Provide the following submittals:

1. Certification, test results, source, and samples for all imported earth materials.

2. Catalog and manufacturer's data sheets for compaction equipment.

3. Manufacturer's certificate of compliance attesting that geotextile fabric/geogrid meets the requirements of these specifications. Provide mill certificates stating the length and width of fabric/geogrid contained on each roll

1.5 IMPORTED MATERIAL ACCEPTANCE

A. All imported earth materials specified in this section are subject to the following requirements:

1. All tests necessary for the Contractor to locate acceptable sources of imported material shall be made by the Contractor. Certification that the material conforms to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory shall be submitted to the Engineer for approval at least 14 calendar days before the material is required for use. All material samples shall be a minimum mass required by ASTM D75 and furnished by the Contractor at the Contractor's sole expense. Samples shall be representative and be clearly marked to show the source of the material and the intended use on the project. Sampling of the material source shall be done by the Contractor in accordance with ASTM D75. Tentative acceptance of the material shall be based on an inspection of the source by the Engineer and/or the certified test results submitted by the Contractor to the Engineer at the Engineer's discretion. No imported materials shall be delivered to the site until the proposed source and materials tests have been tentatively accepted in writing by the Engineer. Final acceptance will be based on Quality Control and Quality Assurance tests made on samples of material taken from the completed and compacted course.

2. Gradation tests by the Contractor shall be made on samples taken at the place of production prior to shipment. Samples of the finished product for gradation testing shall be taken as specified in Section 01400, QUALITY CONTROL, or more often as directed by the Engineer if variation in gradation is occurring, or if the material appears to depart from the Specifications. Verbal test results shall be forwarded to the Engineer within 72 hours of testing, and written results within 120 hours.

3. If tests conducted by the Contractor or the Engineer indicate that the material does not meet Specification requirements, material placement will be terminated until corrective measures are taken. Material that does not conform to the Specification requirements and is placed in the work shall be removed and replaced at the Contractor's sole expense. Retesting of material that does

not meet specification requirements shall be performed at the Contractor's sole expense.

1.6 EXCAVATION SAFETY

A. The Contractor shall be solely responsible for making all excavations in a safe manner, in accordance with any Federal, State, local, and/or Owner safety standards. Provide appropriate measures to retain excavation side slopes and prevent earth slides to ensure that persons working in or near the excavation are protected.

1.7 CODES, ORDINANCES, AND STATUTES

A. The Contractor shall familiarize itself with, and comply with, all applicable codes, ordinances, statutes, and bear sole responsibility for the penalties imposed for noncompliance.

1.8 TOLERANCES

A. All material limits shall be constructed within a vertical tolerance of 0.1 foot and a horizontal tolerance of 1 foot except where dimensions or grades are shown or specified as minimum. All grading shall be performed to maintain slopes and drainage as shown. No reverse slopes will be permitted.

PART 2 PRODUCTS

2.1 MATERIALS

A. Select Backfill Material shall be excavated onsite granular material with less than 15 percent by weight passing the No. 200 sieve, free from stones greater than 4 inches in diameter, roots, & organic material, and of suitable gradation for satisfactory compaction. If excavated onsite material at a particular location is not satisfactory, as determined by the Engineer, use imported Gravel Borrow.

B. Structural Fill shall be imported granular material conforming to Section 508, Item 2.1.3.1 of the Standard Specifications.

C. Crushed Gravel Base shall be imported material conforming to Section 304, Item 304.3 of the Standard Specifications.

D. Crushed Stone Bedding and Crushed Stone Backfill shall be imported material conforming to Section 304, Item 304.4 of the Standard Specifications.

E. Water for compaction shall be furnished by the Contractor. Water for compaction from sources other than potable sources shall be as approved by the Engineer.

F. Geotextile Fabric shall be non-woven, and needle punched pervious sheets of polyester, polyethylene, nylon, or polypropylene filaments formed into a uniform pattern. Geotextile fabric shall be Style 1160N as manufactured by Marafi or approved equal. The geotextile fabric shall have the following minimum properties when measured in accordance with the referenced standards.

Test	Method	Specified
Mass per Unit Area (oz/yd^2)	ASTM D-3776	16
Grab Tensile Strength (lbs)	ASTM D-4632	380
Puncture Strength (lbs)	Modified ASTM D-6241	1,025

Test	Method	Specified
Trapezoid Tear (lbs/in^2)	ASTM D-4533	140
Elongation at Required Strength (%)	ASTM D-4642	50
UV Resistance	ASTM D-4355	70% at 500 hr.
Equivalent Opening (US Standard Sieve)	ASTM D-4751	100
Permittivity (sec^{-1})	ASTM D-4491	0.7
Water Flow Rate (gal/min/ft^2) at 50 mm Constant Head	See Note 2	50

Notes

1. All numerical values represent minimum/maximum average roll values (i.e. the average of minimum test results on any roll in a lot should meet or exceed the minimum specified values)
2. Water flow rate in gal/min/ft2 shall be determined by multiplying permittivity in sec-1 as determined by ASTM D-4491 by a conversion factor of 74.

PART 3 EXECUTION

3.1 GENERAL

A. Unsuitable or excess materials shall be stripped from areas of new construction or re-grading. Materials suitable for reuse shall be stored onsite at approved locations near the work in progress that will not interfere with construction operations. All excess and unsuitable earth materials shall be stockpiled in the Contractor's staging area.

B. In general, earth excavation is unclassified and shall include the excavation, removal and satisfactory disposal of all materials of whatever nature encountered from within the limits indicated or specified or as directed in writing. It shall include, but not be limited to, earth materials such as peats, organic or inorganic silts, clay, sand and gravel, cobbles and boulders less than or equal to 1 cubic yards in volume, soft or disintegrated rock which, in the opinion of the Engineer, can be removed without drilling and splitting, pavement, and all obstructions not specifically included in another section.

C. All excavations shall be backfilled as specified

3.2 REMOVAL OF WATER

A. Dewater is required if water is encountered and provide adequate sedimentation controls prior to discharge into a nearby watercourse.

3.3 STOCKPILE OPERATION

A. See Drawings.

3.4 BACKFILL

A. The Contractor shall inform the Engineer in writing a minimum of 48 hours prior to starting any backfill operation. The information shall include the location to be filled, the amount of fill to be placed, and the material to be placed.

B. Prior to placing any backfill, remove all trash, debris, and/or any other unsuitable material from areas where backfill is to be placed. Do not place frozen backfill. Do not place backfill on frozen ground or in areas where standing water is present.

C. Backfill around and adjacent to concrete structures only after the concrete has attained 85 percent of the specified compressive strength or as approved by the Engineer.

D. Do not operate earth-moving or other heavy equipment within a distance that will cause damage to new or existing structures. Compact backfill adjacent to and on top of existing and new structures, utilities, and concrete walls with hand-operated vibratory compactors or other acceptable equipment. Compaction shall be performed in a manner, which will not damage new or existing structures and utilities

3.5 SELECT BACKFILL

A. Place Select Backfill in previously excavated areas. Do not exceed loose lifts of 10 inches. Compact each lift to not less than 95 percent relative compaction and maintain the moisture content of the material being compacted within -2 to +2 % of the optimum moisture content.

3.6 CRUSHED STONE BEDDING AND CRUSHED STONE BACKFILL

A. Place Crushed Stone Bedding and Crushed Stone Backfill as shown on the Drawings. Do not exceed loose lifts of 10 inches. Compact each lift with at least three (3) passes of an 18" wide, 710 pound (min) reversible plate compactor with a centrifugal force of 8,900 pounds (min), or approved equal, until there is no apparent stone settlement.

3.7 CRUSHED STONE BASE

A. Place Crushed Stone Base for pavement sections as shown on the Drawings. Do not exceed loose lifts of 10 inches. Compact each lift with at least three (3) passes of a 23" wide, 933 pound (min) reversible plate compactor with a centrifugal force of 10,100 pounds (min), or approved equal, until there is no apparent stone settlement.

3.8 GEOTEXTILE FABRIC PLACEMENT

A. The area shall be graded smooth and all stones, roots, sticks, or other foreign material which would interfere with the fabric being completely in contact with the soil shall be removed prior to placing the fabric. The surfaces to accept geotextiles shall be compacted to not less than 95 percent relative compaction.

B. The fabric shall be placed loosely, and the machine direction of the fabric laid perpendicular to the slope. Pinning or stapling may be required to hold the geotextile in place. Separate pieces of fabric shall be joined by overlapping or sewing. The fabric in the overlapped joints shall be placed with a minimum overlap of 18 inches. When required, overlaps in the downstream direction shall be laid (i.e., shingled) to shed water. After placement, the fabric shall be exposed no longer than 48 hours prior to covering.

C. Damaged areas shall be covered with a patch of fabric using a three-foot overlap in all directions.

3.9 MOISTURE CONTROL

A. During the compacting operations, the moisture content of the material shall be within the range necessary to obtain the specified compaction, as determined by laboratory testing.

B. Maintain moisture content throughout the lift. Insofar as practicable, add water to the material at the site of excavation. Supplement, if required, by sprinkling the material.

C. Do not compact material that contains excessive moisture. Aerate material by blading, discing, harrowing, or as approved, to hasten the drying process.

3.10 COMPACTION TESTING

A. The Contractor shall make all necessary excavations and preparations for testing in accordance with Section 01400, QUALITY CONTROL. Excavations for density tests shall be backfilled with material similar to that excavated and compacted to the specified density by the Contractor. Failure of the backfill material to achieve the specified density will be just cause for rejection of any or all portions of the excavation section tested. The Contractor will not be granted an extension of time or additional compensation for testing or repair of backfill ordered by the Engineer.

END OF SECTION

SECTION 02270

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

A. Work covered under this Section shall include all work for erosion and sediment control.

1.2 SUBMITTALS

A. Provide the following submittals:

1. Location, dimensions, and details for erosion and sediment control devices.

2. Manufacturer's certificate of compliance for geotextiles.

PART 2 PRODUCTS

A. Hay bale, silt fence, and/or silt socks shall be provided as required during the work to prevent sediment from entering the Piscataqua River.

B. Dewatering bags shall be as manufactured by Dandy Dewatering Bag (Contact 800-591-2284) or approved equal and sized in accordance with the Contractor's Water Control Plan.

C. Floating turbidity barriers shall be of sufficient size and strength for the intended work and shall be secured to prevent loss of containment. Turbidity barriers shall be as manufactured by Siltdam Containment Barriers as supplied by Brockton Equipment/Spilldam, Inc. (Contact 508-583-7850) or approved equal.

PART 3 EXECUTION

A. Hay bale, silt fence, and/or silt socks shall be provided as required during the work to prevent sediment from entering the Piscataqua River.

B. Dewatering bags shall be as manufactured by Dandy Dewatering Bag (Contact 800-591-2284) or approved equal and sized in accordance with the Contractor's Water Control Plan.

C. Floating turbidity barriers shall be of sufficient size and strength for the intended work and shall be secured to prevent loss of containment. Turbidity barriers shall be as manufactured by Siltdam Containment Barriers as supplied by Brockton Equipment/Spilldam, Inc. (Contact 508-583-7850) or approved equal.

END OF SECTION

SECTION 02300

TEMPORARY EARTH RETAINING SYSTEMS AND COFFERDAMS

PART 1 GENERAL

1.1 WORK INCLUDED

A. The work covered in this section includes the installation, maintenance, and removal of temporary earth retaining systems and cofferdams as required.

1.2 RESPONSIBILITY

A. Temporary earth retaining systems and cofferdams shall be of sufficient strength to safely sustain all loads from the sides of the excavations together with all water pressure and reasonable surcharge.

1. Types and/or limits shown on the Drawings are for information only and the Contractor shall be responsible for the final selection, layout, and design of the temporary earth retaining and cofferdam systems required to perform the work.

2. The Contractor shall, at all times, be entirely responsible for the adequacy of temporary earth retaining and cofferdam systems used to permit the satisfactory and safe installation and construction of the work.

3. The Contractor shall, at all times, provide adequate protection against damage to all existing utilities, structures and completed portions of the work, and shall prevent injury to persons

1.3 SUBMITTALS

A. Temporary Earth Retaining Systems and Cofferdam Drawings:

1. At least twenty one (21) calendar days prior to the start of installation submit for review by the Engineer:

a. Drawings

b. Sections

c. Details and other pertinent information

2. The data shown shall include:

a. An overall time schedule for construction.

b. A description of the anticipated sequence of construction.

c. Complete details of methods, equipment and materials proposed to be used at each work location.

d. Any other pertinent data required for review by the Engineer.

B. Design Computations:

1. The Contractor shall also submit complete computations for the design of the temporary earth retaining systems and cofferdams proposed to be installed. The design shall be in accordance with sound engineering practice and modern

accepted principles of soil mechanics. It shall include the effects of all surcharge which may be reasonably anticipated.

2. The minimum factor of safety for temporary earth retaining systems and cofferdams shall be 1.5. This includes but is not limited to rotational stability and piping/heave.

3. All drawings and computations shall be made and sealed by a registered Professional Engineer licensed to practice in the State of New Hampshire.

C. Submittal Review by Engineer:

1. The design and layout will be reviewed by the Engineer as to type and suitability, providing that the arrangements presented by the Contractor are satisfactory, but such review will not relieve the Contractor of the sole responsibility for the adequacy of the systems nor shall it be construed as a guarantee that the Contractor's proposed equipment, materials, and methods will be adequate for the work required at the locations of and for the work required by this contract.

PART 2 PRODUCTS

2.1 PILES

A. The shapes, sizes, and lengths of piles to be utilized are at the Contractor's discretion, unless otherwise shown on the Drawings. Piles shall be satisfactory to withstand all driving and construction stresses.

2.2 SHEETING

A. The shapes, sizes, and lengths of piles to be utilized are at the Contractor's discretion, unless otherwise shown on the Drawings. Piles shall be satisfactory to withstand all driving and construction stresses.

2.3 WATER-INFLATED DAMS

A. The shapes, sizes and lengths of water-inflated dams to be utilized are at the Contractor’s discretion, unless otherwise shown on the Drawings. Water inflated dams shall be satisfactory for the intended purpose as manufactured by Aqua-Barrier or approved equal (Contact 800-245-0199) or approved equal.

2.4 PORT-A-DAMS

A. The shapes, sizes and lengths of Port-A-Dams to be utilized are at the Contractor’s discretion unless otherwise shown on the Drawings. Port-A-Dams shall be satisfactory for the intended purpose as manufactured by Port-A-Dam (Contact 800-346-4793) or approved equal.

2.5 SANDBAGS

A. Sandbags, if utilized to construct temporary cofferdams, shall be 35-inch x 35-inch x 38-inch jumbo sandbags suitable for reuse and constructed to maintain their shape after filling. Completely fill sandbags with well graded sand suitable for the intended application. The in-situ unit weight of the sand fill shall be 111 pcf (min) for a total bag weight of 3,000 pounds (min).

2.6 PLASTIC LINER

A. Plastic liner shall be 10 mil polyethylene liner (min). Overlap liner a minimum of 4 feet at all seams and secure with standard sandbags.

2.7 SUPPORTS

A. Bracing and other supports whether of steel, timber, or other materials shall be of the strength and dimensions necessary to satisfactorily withstand the loads to which they will be subjected. All bracing and other supports shall be free from any defects which might impair this strength.

2.8 OTHER MATERIALS

A. The Contractor may propose other suitable materials to construct the cofferdams including but not limited to plastic lined concrete block enclosures and shall provide all hardware and fastenings necessary for the satisfactory installation of all cofferdams.

PART 3 EXECUTION

3.1 GENERAL

A. The Contractor shall take all precautions necessary to prevent lateral or inward movement of material along the sides or the bottoms of excavations.

1. It is expressly understood and agreed that whenever temporary earth retaining systems and cofferdams are used, it shall not relieve the Contractor of the sole responsibility for any damages or injury due to the installation or failure of the systems or the settling of the backfill, utilities, or of the adjacent ground, structures, utilities, or other work

3.2 INSTALLATION

A. Where temporary earth retaining systems and cofferdams are used, they shall be installed ahead of all excavation operations.

1. Install to maintain sufficient restraint of the adjacent soil and to prevent movement, excessive inflow of water, and intrusion of soils into or instability of the bottom of the excavations.

2. If voids occur, they shall be filled immediately with selected materials from the earth excavation to the satisfaction of the Engineer.

3.3 OBSTRUCTIONS DURING DRIVING

A. Where obstructions are encountered that result in a sudden, unexpected increase in penetration resistance and deviation from acceptable tolerances, the Contractor may be required to perform one of the following options.

1. Removal of the obstruction.

2. Extraction, repositioning, and re-driving.

3. Addition of extra piling.

B. Pursue the course of action selected by the Engineer. If, in the Engineer's opinion, the obstruction could not have been reasonably anticipated by the Contractor, work done under this Section, will be considered for payment as a Change Order.

3.4 INSPECTION

A. The Contractor shall provide inspection prior to and during its operations of all existing utilities, structures and other facilities which might be disturbed by temporary earth retaining and cofferdam system installation.

1. The Contractor shall monitor and control its construction operations to prevent damage to the existing adjacent utilities, structures, and completed portions of the work.

3.5 REMOVAL

A. Temporary earth retaining systems and cofferdams shall be removed when backfilling is done, and removal shall be conducted in such a manner so as to avoid any damage to the permanent structure or to other members of the systems. Impact loading on the permanent structure or on members of the systems will not be allowed.

B. During backfilling, temporary support elements shall not be removed until alternative support is available, such as substituted struts, backfill, or ability of the temporary earth retaining and cofferdam system to act as a cantilever without detrimental deflection. All voids left by removal of said systems shall be immediately filled.

C. All temporary earth retaining systems and cofferdams shall be removed at completion unless otherwise shown on the Drawings

END OF SECTION

SECTION 02301

STEEL H-PILES

PART 1 GENERAL

1.1 WORK INCLUDED

A. This Section includes installing the steel H-piles, complete.

1.2 REFERENCES

A. Following is a list of standards that may be referenced in this section:

1. American Society of Testing and Materials (ASTM).

2. American Welding Company (AWS).

1.3 DEFINITIONS

A. Design Position: The location of the centroid of a pile at cutoff (x, y, and z coordinates) as shown on the Drawings.

B. Elevations: Referenced to the datum shown on Drawings.

C. Fixed Leads: Leads that are pinned to a crane boom at the top and equipped with a hydraulic spotter at the bottom that is capable of spotting the pile to its correct position and maintaining pile alignment during driving.

D. Impact Stress: Stress transferred to the pile head at impact from the driving train, as determined from a Wave Equation Analysis.

E. Obstruction: Sudden and significant increase of penetration resistance and deviation of pile out of tolerance resulting from encountering a subsurface or physical condition.

F. Practical Refusal: Penetration resistance of at least 120 blows per foot for 3 consecutive feet, 200 blows per foot for 1 foot, or 50 blows per inch for 2 consecutive inches, whichever occurs first, and to continue pile driving would be impractical. These criteria apply only to the hammer sizes and operation as specified.

G. Rated Hammer Energy

1. Open End Diesel Hammers and Single Acting Air or Hydraulic Hammers: Product of rated stroke multiplied by ram weight.

2. Closed End Diesel Hammers and Double Acting Air or Hydraulic Hammers: Rated Energy from manufacturer's literature.

H. Set: Pile Penetration in inches per blow.

I. Sweep: Deviation from straightness measured along two perpendicular faces of pile while not subject to bending forces.

J. Swinging Leads: Pile driving leads that are not pinned at the top and do not have a hydraulic spotter to position the leads.

K. Termination Penetration Resistance: Penetration resistance (blows per foot) at which driving may be terminated, as established by the Engineer.

L. Transferred Hammer Energy: Energy transferred to the pile head from driving train impact, as determined from a Wave Equation Analysis.

1.4 SUBMITTALS

A. Administrative and Quality Control Submittals:

1. Certification that the steel piling conforms to the material specifications.

2. Manufacturer's Certification of Compliance: Manufactured products.

3. Proposed method(s) to align and maintain pile alignment, including types of leads to be used with details and methods and equipment to be used to measure alignment.

4. Manufacturer's Specifications of Products, and Maintenance Manuals, for hammers, drills, and auxiliary equipment.

5. Field splice shop drawings.

6. Welder Qualifications and Certifications: Factory and field welding.

7. Welding Procedures: Factory and field welding. When steel is to be welded, it is presupposed that a welding procedure suitable for the grade of steel and intended use or service shall be utilized. See Appendix X 3 of Specification A6/A6M.

8. Pile layout shop drawing that indicates the exact number of piles, detail dimensions, fabrication, and erection details, setting and driving procedures, and detail sequence of operation and installation.

9. Complete Pile Hammer Data Sheet (Exhibit B).

All submittals shall be received and approved by the Engineer prior to ordering materials and starting work.

B. Contract Closeout Submittals

1. Pile Driving Log and Record: At end of each working day, submit two copies of each record to the Engineer for every pile constructed that day.

1.5 QUALIFICATIONS

A. Piling Installer: Minimum of 10 years of past successful experience with similar piling installation on at least 5 projects completed within the same time period.

1.6 STORAGE AND HANDLING

A. Protection

1. Store all materials in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather.

2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use.

3. Do not allow installation of damaged or otherwise non-complying material.

4. Use all means necessary to protect the installed work and materials of all other trades

B. Replacement: In the event of damage, immediately make all repairs and replacements necessary as approved by the Engineer and at no additional cost to the Owner.

1.7 VIBRATION MONITORING

A. The Contractor shall submit a vibration monitoring plan a minimum of fourteen (14) days prior to pile driving activities. At a minimum, the vibration monitoring plan shall include the following:

1. A written description of vibration monitoring activities including the proposed locations of seismographs and the anticipated dates and times of monitoring activities.

2. A listing of structures, utilities, and other vibration sensitive receptors that may be impacted by vibrations.

3. Mitigation measures that shall be implemented to limit construction vibrations and measures that will be implemented in the event that construction vibrations exceed the values included in this section.

4. A written description how to address and resolve vibration complaints, including but not limited to stopping pile driving and selecting a method of installation, subject to the Engineer's approval, that will not cause detrimental effects.

B. During construction, the Contractor shall submit weekly reports summarizing the previous weeks vibration monitoring.

PART 2 PRODUCTS

2.1 STEEL PILES

A. H-piles for supporting the Seawall shall be 40-foot-long HP10x57s conforming to ASTM A572, F_y = 50 ksi (min).

B. H-Piles for supporting the Timber Wharf shall be 40-foot-long HP10x42s conforming to ASTM A 572, F_y = 50 ksi. These H-piles are expected to be driven in segments that are spliced together due to overhead utility clearance constraints.

2.2 SPLICES FOR STEEL PILES

A. Design of pile splices shall be the responsibility of the Contractor unless otherwise shown on the Drawings. All splices shall be in conformance with AWS D1.1, and provide equal stress strain behavior in bending, tension, compression, and torsion of unspliced segments of piles. Submittals shall include the appropriate information contained in AWS D1.1, Part E, and shall include documentation establishing that each welder is currently qualified in the proposed welding procedure.

B. Pre-manufactured splices may be acceptable as shown on the Drawings, subject to the Engineer's review. The splice shall provide at least equal stress strain behavior in bending, tension, compression, and torsion of unspliced segments of piles.

C. In the event the splice becomes damaged so as to impair the pile from its intended use, replace the pile. All costs associated with replacement shall be borne by the Contractor.

D. No splices will be permitted until the Engineer has reviewed and accepted the Contractor's splice design and submittal information.

PART 3 EXECUTION

3.1 GENERAL

A. It shall be the Contractor's responsibility to ensure that the construction proceeds in a smooth and logical sequence and in a manner that will not cause any damage to or create excessive stresses or loads on existing or proposed structures.

3.2 PILE INSTALLATION EQUIPMENT

A. For H-Piles

The results of a Wave Equation Analysis completed by the Engineer indicate that hammers having the manufacturer's rated energy indicated in the Penetration Resistance Criteria Table may satisfactorily drive the H-piles to the specified tip elevation. The results assume that the hammer is delivering the transferred energy and impact stresses indicated, and the driving train is working efficiently and according to the manufacturer's recommendations.

PENETRATION RESISTANCE CRITERIA TABLE

Structure Location	Hammer	Estimated Ultimate Capacity (Kips)	Rated Energy (ft-lbs.)	Transferred Energy (ft-lbs.)	Max. Impact Stress (psi)	Penetration Resistance (blows/in)
Seawall	HPH 4500	360	32,560	20,490	41,540	5
Timber Wharf	HPH 1200	55	8,680	2,900	13,493	4

Notes:

1. The estimated ultimate capacity is the specified allowable capacity multiplied by a FOS of 2.75.
2. For the Seawall, the HPH 4500 hammer stroke was assumed to be set at 4.1 feet (max).
3. For the Timber Wharf, the HPH 2400 hammer stroke was assumed to be set at 2.0 feet.

1. The manufacturer's rated energy, transferred energy, impact stress, and estimated penetration resistance are included for information purposes only.

2. Hammer sizes and types are subject to the Engineer's review and approval. The Engineer will evaluate the Contractor's proposed driving equipment using Wave Equation Analyses. The criteria the Engineer will use will be the required number of hammer blows per inch and the impact stress at the required ultimate capacity.

3. The required number of blows per inch at the ultimate capacity shall be between about 3 and 15 blows per inch. The pile stress during driving shall not exceed 90 percent of the pile yield stress.

4. If the Wave Equation Analyses indicates an inability to drive the piles to the ultimate capacity within the acceptable blow count range and below the acceptable stress level, change the proposed driving equipment. Submit changes to the Engineer for review and approval.

5. The driving cap or helmet shall seat into or on the pile and bear evenly upon the pile head and shall distribute the hammer blow uniformly throughout the cross section of the pile. The Engineer shall approve the driving cap or helmet.

6. Furnish the Engineer with the manufacturer's specifications and product and maintenance manuals for the hammer and auxiliary equipment prior to driving. Submit information on the proposed driving train and complete and submit the information on the Pile Hammer Data Sheet (Exhibit B).

3.3 LOCATIONS FOR DRIVING PILES

A. Layout the locations of the piles from the information shown on the Drawings and as furnished by the Engineer. The method used to determine pile locations shall be at the option of the Contractor.

3.4 PREPARATIONS PRIOR TO DRIVING PILES

A. Prior to driving the piles, the Contractor shall excavate, if required, to the proper elevations for making the connections shown on the Drawings. Any heave of the soil above the specified excavation shall be removed, at the Contractor's expense, before any backfill material is placed.

3.5 PILE SPLICING

A. Piles driven below cutoff elevation, piles with damaged heads that have been cut off to permit further driving, and piles that are too short to reach cutoff elevation shall be extended to the required cutoff elevation by welding on an additional length, as approved by the Engineer. Cutoffs shall become the property of the Contractor and shall be removed from the site at completion.

B. Splicing shall be made so as to produce a straight pile. Prior to installing the splice, square the end of the two sections of the pile to produce a straight splice with uniform bearing. In no case shall the ends of the pile sections be out of square by more than 1/16 inch.

C. All field splicing shall be performed in the presence of the Engineer. If pre-manufactured splicing or couplers are used, install according to the manufacturer's recommendations.

3.6 ACCURACY DRIVING PILES

A. Drive all piles to the specified alignment at the design position shown on the Drawings. After driving, each pile at cutoff elevation shall not vary by more than 2 inches horizontally from the design position shown on the Drawings. Deviation from plumb for piles shall not exceed 1-percent of the pile length. Pulling or manipulation of the piles into alignment or position after driving shall not be permitted.

3.7 DRIVING PILES

A. Perform all driving in the presence of the Engineer. Notify the Engineer of intent to start work at least 5 days prior to the start of pile driving. Mark the piles at 1-foot intervals for purposes of recording the driving resistance and depth of penetration. Do

not drive piles within 100 feet of freshly placed concrete which has not obtained its specified 28-day compressive strength. If two or more pile driving rigs are being used simultaneously, they shall be located a minimum of 150 feet apart. Followers shall not be used to drive piles.

B. Maintain and operate the driving equipment in accordance with the manufacturer's recommendations. Maintain the hammer concentric with the driving train in axial alignment of the pile. The hammer shall not be used to limit deviation of the pile during driving by exerting lateral forces or striking at an angle. The hammer and leads may be used to move and align the pile for the first 15 feet of driving before the pile has attained an initial set, unless the Engineer decides such movement may damage the pile. If damage to the pile head occurs during driving and the hammer can no longer strike the pile uniformly and axially, stop driving, provide a fresh cut at the head, and check the pile for proper fit.

C. The penetration resistance presented in the Penetration Resistance Criteria Table is based on conditions where the pile hammer is operating efficiently and according to the manufacturer's recommendations; the pile head is not damaged and fits as specified with the driving cap; and penetration is reasonably quick and uniform.

D. Drive piles continuously and without voluntary interruption, to termination penetration resistance or to practical refusal.

3.8 OBSERVATIONS DURING PILE DRIVING

A. Pile behavior during driving will be monitored by the Engineer. Provide the Engineer with suitable means or a device that will indicate the penetration of the pile from a reasonable and safe distance from the pile and driving leads. Allow the Engineer access to any pile driving information recorded by the Contractor.

3.9 OBSTRUCTIONS DURING DRIVING

A. Where obstructions are encountered that result in a sudden, unexpected increase in penetration resistance and deviation from the specific tolerances, the Contractor may be required to perform one of the following options.

1. Remove or drill through the obstruction.

2. Extraction, repositioning, and reinstallation.

3. Addition of extra piling.

B. Pursue the course of action selected by the Engineer. If, in the Engineer's opinion, the obstruction could not have been reasonably anticipated by the Contractor, work done under this Section, including necessary pile foundation modifications, will be considered for payment as a Change Order.

3.10 DAMAGED PILES

A. Any pile that is bent, ruptured, or damaged because of material or workmanship defects or by improper handling or installation, or which are otherwise damaged so as to impair it for its intended use, shall be removed and replaced or, where directed, a replacement pile shall be driven adjacent thereto.

3.11 INSPECTION OF DRIVEN PILES

A. The Engineer may require the Contractor to pull selected piles after driving for testing and inspection to determine the condition of the pile. Any pile so pulled and determined by the Engineer to be damaged so as to impair the pile from its intended use shall be removed from the work and a replacement pile driven at the Contractor's expense. Piles pulled and found to be sound and in satisfactory condition shall be re-driven. The cost for additional work associated with pulling and re-driving satisfactory piles shall be considered for payment as a Change Order.

3.12 ELEVATION OF CUTOFF

A. After installation, the upper end of the piles shall be cut square at the elevations shown on the Drawings.

3.13 VIBRATION MONITORING

A. Threshold and Limiting Value vibration criteria established by the Engineer are presented below. The Contractor shall be responsible for determining its means and methods for preventing the criteria presented below from being exceeded.

Structure	Sensor Location	Threshold Value (Peak Particle Velocity, in/sec)	Limiting Value (Peak Particle Velocity, in/sec)
Existing Seawall	Ground Surface Adjacent to Structure	0.50	1.0
Pump Station	Ground Surface Adjacent to Structure	0.50	1.0
Timber Framed Structures	Ground Surface Adjacent to Structure	0.30	0.50

B. If the Threshold Values shown are reached, the Contractor shall immediately notify the Engineer and meet to discuss a response action(s).

C. If the Limiting Values shown are reached, the Contractor shall stop work until a meeting takes place between the Contractor, Owner, and Engineer to assess the cause of the exceedance and develop a plan to prevent it from occurring again.

D. The Threshold Value vibration criteria shown above were established to help prevent minor damage from piling operations.

E. The sensors of the seismographs will be securely anchored into the ground by the Contractor. Sensors will be arranged so that one is in line with the vibration source and at the part of the structure nearest the source.

F. All costs borne by the Owner that result from the Contractor exceeding the maximum vibration levels as defined above, including but not limited to structure damage, shall be borne by the Contractor.

3.14 DISPOSAL OF EXCESS SEDIMENT AND SOIL

A. If excess material is generated that is unsuitable for reuse, the Contractor shall dispose of it offsite in accordance with all Local, State, and Federal Regulations.

3.15 CLEANUP

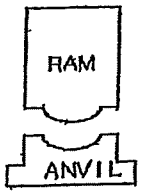
A. The Subcontractor shall clean up all waste materials upon completion of the work specified herein.

END OF SECTION

Exhibit B
Hammer Data Sheet

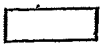
HAMMER DATA SHEET

Contract No.:	Structure Name and/or No.:
Project:	
Pile Driving CONTRACTOR or Subcontractor:	
County:	Piles Driven By:



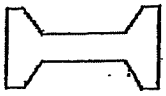
HAMMER

Manufacturer:	Model:
Type:	Serial No.
Rated Energy: @	Length of Stroke
Modifications:	



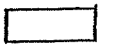
CAP BLOCK

Material:	
Thickness:	Area:
Modulus of Elasticity - E	(psi)
Coefficient of Restitution - e	



HELMET

ALL COMPONENTS	Weight:



CUSHION

Cushion Material:	
Thickness:	Area:
Modulus of Elasticity - E	(psi)
Coefficient of Restitution - e	

PILE

Pile Type:	Weight/ft
Length in Leads:	
Wall Thickness:	Taper:
Design Pile Capacity:	(Tons)
Description of Splice:	
Tip Treatment Description:	

NOTE: If mandrel is used to drive pile, attach separate manufacturer's detail sheet(s), including weight and dimensions.

Submitted By: _____ Date: _____

SECTION 02367

STEEL SHEET PILES

PART 1 GENERAL

1.1 WORK INCLUDED

A. This Section includes furnishing and installing the Steel Sheet Piles, complete.

1.2 REFERENCES

A. Following is a list of standards that may be references in this section:

1. American Society of Testing and Materials (ASTM).

2. American Welding Society (AWS)

1.3 DEFINITIONS

A. Elevations: Referenced to the datum shown on Drawings.

B. Fixed Leads: Leads that are pinned to a crane boom at the top and equipped with a hydraulic spotter at the bottom that is capable of spotting the pile to its correct position and maintaining pile alignment during driving.

C. Obstruction: Sudden and significant increase in penetration resistance and deviation of pile out of tolerance resulting from encountering a subsurface or physical condition.

D. Sweep: Deviation from straightness measured along two perpendicular faces of pile while not subject to bending forces.

E. Swinging Leads: Pile driving leads that are not pinned at the top and do not have a hydraulic spotter to position the leads.

1.4 SUBMITTALS

A. Administrative and Quality Control Submittals:

1. Certifications that all steel provided by the Contractor conforms to material specifications.

2. Manufacturer's Certification of Compliance: Manufactured products.

3. Proposed method(s) to align and maintain steel sheet pile alignment, including types of leads to be used with details and methods and equipment to be used to measure alignment.

4. Manufacturer's Specifications of Products, and Maintenance Manuals, for hammers, drills, and auxiliary equipment.

5. Welder Qualifications and Certifications: Factory and field welding.

6. Welding Procedures: Factory and field welding. When steel is to be welded, it is presupposed that a welding procedure suitable for the grade of steel and intended use or service shall be utilized. See Appendix X 3 of Specification A6/A6M.

7. Steel sheet pile layout shop drawing that indicates the exact type, length, and number of piles; detail dimensions, fabrication and erection details; setting and driving procedures; and a detailed sequence of operation and installation.

8. Shop drawings for all connections to the steel sheet piles that show the selected cap, wale, splice plate, tie rod, and other connection details.

The steel sheet pile layout shop drawing and shop drawings for all connections shall be stamped by a New Hampshire Registered Professional Engineer. All submittals shall be received and approved by the Owner/Engineer prior to ordering materials and starting work

1.5 QUALIFICATIONS

A. Sheet Pile Installer: Minimum of 10 years of past experience with similar piling installation on at least 5 projects completed within the same time period.

1.6 STORAGE AND HANDLING

A. Protection:

1. Store all materials in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather.

2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use.

3. Do not allow installation of damaged or otherwise non-complying material.

4. Use all means necessary to protect the installed work and materials of all other trades.

B. Replacement: In the event of damage, immediately make all repairs and replacements necessary as approved by the Owner/Engineer and at no additional cost to the Owner

1.7 VIBRATION MONITORING

A. As specified in Section 02301, STEEL H-PILES.

PART 2 PRODUCTS

2.1 STEEL SHEET PILES

A. Pile sections, including fabricated connections (e.g., corners, tees), shall be the continuously interlocking type and shall be ordered at the following minimum lengths, which will provide about 1 foot of waste compared to the cut-off and toe elevations shown on the Drawings.

Location	Sheet Pile Length (ft)
Steel Sheet Pile Seawall	30

B. All steel sheet piles, including fabricated connections (corners, tees) shall be hot-rolled or cold-rolled, conforming to the requirements of ASTM A572, Grade 50, and have the following minimum structural characteristics:

Location	Height (in)	Flange (t_f) (in)	Web (t_w) (in)	Weight (Wall) (LB/SF)	Section Modulus (Elastic) (in^3/LF)	Moment of Inertia (in^4/LF)
Steel Sheet Pile Seawall (AZ 17-700 Assumed)	16.52	0.335	0.335	21.38	32.2	265.3

C. Steel shims and wedges used to fabricate corners and tees, if required, shall conform to the requirements of ASTM A572, Grade 50.

D. The section modulus is based on an individual whole piece and is not dependent on the interlock friction between pile sections to obtain the required section modulus.

E. The piling will be furnished with lifting holes standard with the manufacturer.

F. The weight per SF shall vary by not more than 2 ½ percent under that specified above.

G. The sheet pile interlocks will be compatible at all turns and changes in direction.

H. Coatings, if required, shall be as specified and shown on the Drawings.

2.2 WALES

A. Not Required.

2.3 TIE RODS AND ACCESSORIES

A. Not Required.

2.4 STEEL BULKHEAD CAP

A. Not Required.

2.5 CLOSURES

A. Not Required.

PART 3 EXECUTION

3.1 GENERAL

A. It shall be the Contractor's responsibility to ensure that construction proceeds in a smooth and logical sequence and in a manner that will not cause any damage to or create excessive stresses or loads on existing or proposed structures.

3.2 PREPARATIONS PRIOR TO DRIVING STEEL SHEET PILES

A. Prior to setting the driving guides, check the existing bulkhead for straightness and protrusions. Adjust the alignment to produce straight wall sections as shown on the Drawings.

3.3 DRIVING GUIDES FOR STEEL SHEET PILES

A. Position sheet piles using temporary guide wales for straight wall segments as required. The guide wales shall be supported and anchored so that they are rigid and capable of resisting all forces exerted by the sheet pile setting and driving operation and of adequately supporting the steel sheet piles until stabilized. The guide wales shall not be moved with fluctuating water elevations.

3.4 SHEET PILE SETTING

A. Each sheet pile shall have sufficient clearance in the interlocks to slide, under its own weight, in the interlock of the sheet pile previously placed during the setting. In no case during the setting operation shall a vibratory or drive hammer be used to force the interlock of a pile into the interlock of an adjacent pile. Lubricants in the interlocks shall not be permitted.

3.5 SHEET PILE INSTALLATION EQUIPMENT

A. If a drive hammer is used, it shall be an impact type with a minimum rated energy of 13,000 ft-lbs and a maximum rated energy of 20,000 ft-lbs. Suitable leads shall be provided to maintain proper alignment during driving.

B. If a vibratory hammer is used, it shall be of adequate size and of a type approved by the Engineer.

3.6 INSTALLING STEEL SHEET PILES

A. Begin installation at one end of the proposed wall and proceed in one direction once started, unless otherwise approved. Proceeding from opposite ends of the proposed wall and meeting in the middle will not be permitted.

B. For straight wall segments, install sheet piles in rotating stages such that the tip of any sheet pile is not more than 5 feet below the tip of an adjacent sheet pile nor more than 10 feet below the tip of any sheet pile in the wall, unless required by the final tip elevations shown.

C. Sheet piles shall be driven/vibrated plumb. If the sheet piles become progressively out of plumb during driving/vibration, means shall be employed to correct the condition, or the sheet piles shall be withdrawn and re-driven/re-vibrated at the Contractor's expense, so that no part of any sheet is more than 2 inches from the design location. At completion, the vertical alignment of each sheet pile shall not be more than 1/8 inch per foot from the vertical in all directions.

D. All piles shall be installed to the depths indicated on the Drawings. Reference lines shall be painted on each pile and observed to ensure that all pile tips are at the required depth. If low penetration resistance is met near the tip elevation, indicating soft soils, immediately notify the Engineer.

E. If refusal is met before reaching the specified tip elevation, the obstruction shall be removed or penetrated as approved by the Engineer.

F. If a sheet pile strikes an obstruction, adjacent sheet piles may be driven/vibrated below the elevation of the obstruction before attempting to clear the obstruction (driving through the obstruction shall be performed at the Contractor's risk).

G. Drive/vibrate all sheet piles to the tip elevations shown on the Drawings. Sheet piles that are raised during the process of driving adjacent piles shall be driven/vibrated down again.

3.7 ELEVATION OF CUTOFF

A. After installation, the upper end of the sheet piles shall be cut square at the elevations shown on the Drawings.

3.8 WELDING

A. All welding shall be performed by certified welders and shall meet AWS Specification D1.1, latest edition, or the equivalent AWS Specification for the same weld type and position shown. Electrodes shall be E70XX Low-Hydrogen or approved equal.

3.9 CONCRETE CAP

A. After the upper end of the sheet piles have been cut square, furnish and install the concrete cap as specified and shown on the Drawings.

3.10 STANDBY

A. Not Applicable.

3.11 DISPOSAL OF EXCESS SEDIMENT AND SOIL

A. If excess material is generated that is unsuitable for reuse, transport and stockpile the material as specified in the Contract Documents.

3.12 VIBRATION MONITORING

A. Vibration monitoring requirements and criteria shall be as specified in Section 02301, STEEL H-PILES.

3.13 CLEANUP

A. The Contractor shall clean up all waste materials upon completion of the work specified herein

END OF SECTION

SECTION 02368

TIMBER PILES

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnishing and installing the timber piles, complete.

1.2 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society of Testing and Materials (ASTM):

a. D25, Standard Specification for Round Timber Piles.

b. D2899, Methods for Establishing Design Stresses for Round Timber Piles.

2. American Wood Preservers Associates (AWPA):

a. C3, Piles – Preservative Treatment by Pressure Process

b. M2, Standard for Inspection of Treated Timber Products

c. M4, Standard for the Care of Preservative – Treated Wood Products.

d. M6, Brands used on Forest Products.

1.3 DEFINITIONS

A. Design Position: The location of the centroid of a pile at cutoff (x, y, and z coordinates) as shown on the Drawings.

B. Elevations: Referenced to the datum shown on Drawings.

C. Fixed Leads: Leads that are pinned to a crane boom at the top and equipped with a hydraulic spotter at the bottom that is capable of spotting the pile to its correct position and maintaining pile alignment during driving.

D. Impact Stress: Stress transferred to the pile head at impact from the driving train, as determined from a Wave Equation Analysis.

E. Obstruction: Sudden and significant increase of penetration resistance and deviation of pile out of tolerance resulting from encountering a subsurface or physical condition.

F. Practical Refusal: Penetration resistance of at least 120 blows per foot for 3 consecutive feet, 200 blows per foot for 1 foot, or 50 blows per inch for 2 consecutive inches, whichever occurs first, and to continue pile driving would be impractical. These criteria apply only to the hammer sizes and operation as specified.

G. Rated Hammer Energy:

1. Open End Diesel Hammers and Single Acting Air or Hydraulic Hammers: Product of rated stroke multiplied by ram weight.

2. Closed End Diesel Hammers and Double Acting Air or Hydraulic Hammers: Rated Energy from manufacturer's literature.

H. Set: Pile Penetration in inches per blow.

I. Sweep: Deviation from straightness measured along two perpendicular faces of pile while not subject to bending forces.

J. Swinging Leads: Pile driving leads that are not pinned at the top and do not have a hydraulic spotter to position the leads.

K. Termination Penetration Resistance: Penetration resistance (blows per foot) at which driving may be terminated, as established by the Owner/Engineer.

L. Transferred Hammer Energy: Energy transferred to the pile head from driving train impact, as determined from a Wave Equation Analysis

1.4 SUBMITTALS

A. Administrative Submittals: Production pile driving sequence.

B. Quality Control Submittals:

1. Plan providing pile identification numbers.

2. Weight certificate of hammerhead for drop hammers.

3. Manufacturer's literature for proposed equipment and procedures.

4. Preservative treatment inspection affidavit conforming to AWPA M2, stating type of preservative used and actual net retention.

5. Piling installer qualifications.

6. Proposed method(s) to align and maintain pile alignment, including type of leads to be used with details on methods and equipment to be used to measure alignment.

7. Manufacturer's specifications of products, and maintenance manuals, for pile hammer, and auxiliary equipment.

8. Complete Pile Hammer Data Sheet (See Exhibit B, Section 02301, STEEL H-PILES).

C. Contract Closeout Submittals

1. Pile Driving Log and Record: At end of each working day, submit two copies of each record to the Engineer for every pile constructed that day.

1.5 QUALIFICATIONS

A. Piling Installer: Minimum of 10 years of past successful experience with similar piling installation on at least 5 projects completed within the same time period.

1.6 STORAGE AND HANDLING

A. Protection

1. Store all materials in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather. Avoid breaking through treated surfaces. Do not use pikes, cant hooks, pickets, tongs, or other pointed tools that dig into wood.

2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use.

3. Do not allow installation of damaged or otherwise non-complying material.

4. Use all means necessary to protect the installed work and materials of all other trades

B. Replacement: In the event of damage, immediately make all repairs and replacements necessary as approved by the Owner/Engineer and at no additional cost to the Owner.

1.7 VIBRATION MONITORING

A. As specified in Section 02301, STEEL H-PILES.

PART 2 PRODUCTS

2.1 PRESSURE TREATED (PT) PILES

A. Pressure treated piles shall be 40-foot-long Douglas Fir or Southern Yellow Pine, which will provide 3-feet of waste (min) compared to the anticipated cut-off and toe elevations shown on the Drawings, and shall conform to the following minimum allowable stresses as determined in accordance with ASTM D-2899.

Compression Parallel to Grain (F_c) (psi)	**Bending (F_b) (psi)**	**Horizontal Shear (F_v) (psi)**	**Compression Perpendicular to Grain (F_{c1}) (psi)**
1,200	2,450	110	230

B. Pressure treated piles shall conform in general to the physical characteristics of round timber piles as described in ASTM D-25. Minimum top diameter shall be 12"; minimum toe diameter shall be 8".

C. Clearly and permanently brand the piles in two places approximately 5 and 10 feet from the top. The brand shall identify species, class and length, preservative, retention, supplier, and month and year of treatment.

D. Tops of cut-off piles shall be cut square, unless otherwise as shown on the Drawings.

2.2 PRESERVATIVE TREATMENT

A. Pressure treat PT piles to 1.5 PCF (min) with a salt-type chemical preservative, ammonia copper arsenate (ACA), or chromated copper arsenate (CCA), in accordance with AWPA C3. Douglas Fir shall be incised before treatment. Fabricate lumber and timbers as completely as possible before preservative treatment.

B. All drill holes, saw cuts, and abrasions made to pressure treated piles shall receive a field application of preservative equivalent in type to that originally used.

C. The tops of cut-off pressure treated piles and the ends of cut-off cap beams, stringers, and decking shall be treated in accordance with AWPA M4 (2% copper napthenate).

2.3 CONNECTIONS

A. Threaded rod, bolts, washers, and nuts for construction shall be as shown on the Drawings.

PART 3 EXECUTION

3.1 GENERAL

A. It shall be the Contractor's responsibility to ensure that the construction proceeds in a smooth and logical sequence and in a manner that will not cause any damage to or create excessive stresses or loads on existing or proposed structures.

3.2 PILE INSTALLATION EQUIPMENT

A. For Timber Support Piles

1. The results of a Wave Equation Analysis completed by the Engineer indicate that the hammer having the manufacturer's rated energy indicated in the Penetration Resistance Criteria Table may satisfactorily drive the timber support piles for supporting the Wharf to the specified tip elevation. The results assume that the hammer is delivering the transferred energy and impact stresses indicated, and the driving train is working efficiently and according to the manufacturer's recommendations.

PENETRATION RESISTANCE CRITERIA TABLE

Structure Location	Hammer	Estimated Ultimate Capacity (Kips)	Rated Energy (ft-lbs)	Transferred Energy (ft-lbs)	Impact Stress (psi)	Penetration Resistance (blows/in)
Timber Wharf	MKT 7	55	4,152	1,940	1,550	7

Notes:

1. The estimated ultimate capacity is the allowable capacity multiplied by a FOS of 2.75.
2. For the Timber Wharf, the MKT 7 hammer stroke was assumed to be set at 5.19 feet.

2. The manufacturer's rated energy, transferred energy, impact stress, and estimated penetration resistance are included for information purposes only.

3. Hammer sizes and types are subject to the Engineer's review and approval. The Engineer will evaluate the Contractor's proposed driving equipment using Wave Equation Analyses. The criteria the Engineer will use will be the required number of hammer blows per inch and the impact stress at the required ultimate capacity.

4. The required number of blows per inch at the ultimate capacity shall be between about 3 and 15 blows per inch. The pile stress during driving shall not exceed 90 percent of the pile yield stress.

5. If the Wave Equation Analyses indicates an inability to drive the piles to the ultimate capacity within the acceptable blow count range and below the acceptable stress level, change the proposed driving equipment. Submit changes to the Engineer for review and approval.

6. The driving cap or helmet shall seat into or on the pile and bear evenly upon the pile head and shall distribute the hammer blow uniformly throughout the cross section of the pile. The Engineer shall approve the driving cap or helmet.

7. Furnish the Engineer with the manufacturer's specifications and product and maintenance manuals for the hammer and auxiliary equipment prior to driving. Submit information on the proposed driving train and complete and submit the information on the Pile Hammer Data Sheet (See Exhibit B, Section 02301, STEEL H-PILES).

B. For Timber Fender Piles

1. Timber fender piles do not need to be installed to a specific capacity and may be driven to the tip elevations shown with a vibratory or impact hammer at the Contractor's discretion.

3.3 LOCATIONS FOR DRIVING

A. Layout the locations of the piles from the information shown on the Drawings and as furnished by the Engineer. The method used to determine pile locations shall be at the option of the Contractor.

3.4 PILE SPLICING

A. No timber pile splicing shall be allowed.

3.5 ACCURACY IN DRIVING

A. Within 1/4-inch per foot of pile length from the vertical design position for vertical piles.

B. Within 1/2-inch per foot of pile length from the required angle for batter piles.

C. Centroid of the piles at cutoff elevation shall not vary by more than 3 inches horizontally from the design position shown.

3.6 DRIVING

A. Perform all driving in the presence of the Owner/Engineer. Notify the Owner/Engineer of intent to start work at least 5 days prior to the start of pile driving. Mark piles at 1-foot intervals for purposes of recording driving resistance and depth of penetration of pile. Do not drive piles within 100 feet of freshly placed concrete which has not obtained its specified 28 day compressive strength. If two or more pile driving rigs are being used simultaneously, they shall be located a minimum of 150 feet apart. Followers may not be used to drive piles.

B. Maintain and operate the driving equipment in accordance with the manufacturer's recommendations. Maintain the hammer concentric with the driving train in axial alignment on the pile and as much as possible, drive piles continuously. The hammer shall not be used to limit deviation of the pile during driving by exerting lateral forces or striking at an angle. The hammer and leads may be used to move and align the pile in the first 15 feet of driving before the pile has attained an initial set, unless the

Owner/Engineer decides such movement may damage the pile. If damage to the pile head occurs during driving and the hammer can no longer strike the pile uniformly and axially, stop driving, provide a fresh cut at the head and check the pile for proper fit.

C. The penetration resistance presented in the Penetration Resistance Criteria Table is based on conditions where the hammer is operating efficiently and according to the manufacturer's recommendations; the pile is not damaged and fits as specified with the driving cap; and penetration is reasonably quick and uniform.

D. Drive piles continuously, and without voluntary interruption, to the specified tip elevation or to refusal, whichever occurs first.

3.7 OBSERVATIONS AND RECORDING OF PILE BEHAVIOR

A. Pile behavior during driving will be monitored by the Engineer. Provide the Engineer with a suitable means or device that will indicate the penetration of the pile from a reasonable and safe distance from the pile and driving leads. Allow the Engineer access to any pile driving information recorded by the Contractor.

3.8 OBSTRUCTIONS DURING DRIVING

A. Where obstructions are encountered that result in a sudden, unexpected increase in penetration resistance and deviation from the specified tolerances, the Contractor may be required to perform one of the following options:

1. Remove or drill through the obstruction.

2. Extraction, repositioning, and re-driving.

3. Addition of extra piling.

B. Pursue the course of action selected by the Engineer. If, in the Engineer's opinion, the obstruction could not have been reasonably anticipated by the Contractor, work done under this Section, including necessary pile modifications, will be considered for payment as a Change Order.

3.9 DAMAGED PILES

A. Any pile that is bent, ruptured or broken because of material or workmanship defects or by improper handling or driving, or which is otherwise damaged so as to impair it for its intended use, shall be removed and replaced or, where directed, a replacement pile shall be driven adjacent thereto.

3.10 INSPECTION OF DRIVEN PILES

A. The Engineer may require the Contractor to pull selected piles after driving for testing and inspection to determine the condition of the pile. Any pile so pulled and determined by the Engineer to be damaged so as to impair the pile from its intended use shall be removed from the work and a replacement driven at the Contractor's expense. Piles pulled and found to be sound and in satisfactory condition shall be re-driven. The cost for additional work associated with pulling and re-driving satisfactory piles shall be considered for payment as a Change Order.

3.11 ELEVATION OF CUTOFF

A. After driving, the upper end of the piles shall be cut as shown on the Drawings in an approved manner.

3.12 VIBRATION MONITORING

A. Vibration monitoring requirements and criteria shall be as specified in Section 02301, STEEL H-PILES.

3.13 CLEANUP

A. The Contractor shall clean up all waste materials upon completion of the work specified herein

END OF SECTION

SECTION 02400

DEWATERING, CONTROL, AND DIVERSION OF WATER

PART 1 GENERAL

1.1 WORK INCLUDED

A. Work covered under this section consists of the Dewatering, Control, and Diversion of Water as required to perform the work.

1.2 SUBMITTALS

A. At least twenty-one (21) calendar days prior to the start of Construction, submit a Dewatering, Control, and Diversion of Water Plan for review by the Engineer that includes the following.

1. Describe how dewatering, control, and diversion of water shall be accomplished.

2. Provide Plans, Sections, and Details showing the type and location of flow diversion pipes/channels, dewatering sumps/wells, electrical services, discharge hoses, and pre-treatment and sedimentation controls for each anticipated phase of the project.

3. Provide the estimated average and peak dewatering rates, in gallons per minute (gpm), for each anticipated phase of the project, including Supporting Calculations.

4. Provide details and methods for providing back-up power and emergency procedures for maintaining continuous, uninterrupted dewatering operations as required.

5. Provide manufacturer's literature and/or cut-sheets for proposed pumps, sump/well casing and screen, filter pack, pre-treatment equipment, sedimentation controls, and other pertinent items.

6. Provide an overall schedule for dewatering, control, and diversion of water.

The Water Control Plan shall be coordinated with the requirements of Section 02270, EROSION AND SEDIMENT CONTROL, and other specification sections as required. All submittals shall be received and approved by the Engineer prior to ordering materials and starting work.

The Water Control Plan will be reviewed by the Engineer as to type and suitability, providing that the arrangements presented by the Contractor are satisfactory, but such review will not relieve the Contractor of the sole responsibility for the adequacy of the system nor shall it be construed as a guarantee that the Contractor's proposed equipment, materials, and water control methods will be adequate for the work required at the locations of and for the work required by this contract.

1.3 QUALIFICATIONS

A. Dewatering Contractor: Minimum of 5 years of past experience with similar soil and groundwater conditions on at least 3 projects completed within the same time period.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The Contractor shall provide all materials and equipment including, but not limited to pipe, fittings, valves, pumps, tools, fuel, and other appurtenances in suitable and adequate quantities as required to control water.

PART 3 EXECUTION

3.1 SURFACE DRAINAGE

A. The Contractor shall intercept and divert surface drainage away from the work sites by the use of dikes, curb walls, ditches, sumps or other means. The Contractor shall design surface drainage systems so that they do not cause erosion on or off the site. Surface runoff shall be controlled to prevent entry of water into excavations. The Contractor shall remove drainage systems when no longer needed.

3.2 WATER CONTROL IN EXCAVATIONS

A. The Contractor shall use water control methods, which are appropriate to the ground conditions, the construction operations, and the requirements of these Contract Documents. The methods shall involve the removal of water within the excavation and may involve the removal of water outside the excavation or construction of facilities to control water movement into the excavation.

B. Water control measures shall minimize adverse effects of elevated or reduced water pressure on the work, the surrounding ground, and adjacent facilities and structures. The water control measures shall be designed and operated so as to prevent the removal of in-situ materials or loosening or softening of in-situ materials within the excavation. The Contractor shall control groundwater and surface water such that construction operations will be performed without adverse effects of water, and to prevent hydrostatic uplift pressures until construction has been completed.

C. Water shall be controlled and maintained 1 feet below the lowest working elevation during periods when the sub-grade is being compacted, when earth materials are being placed, when geotextiles, geo-grids, grout, and/or concrete (except tremie concrete) are being placed, and at such other times as is necessary for the safe execution of the work. If the Contractor encounters large amounts of water entering the excavation, immediate action shall be taken to control the water inflow. A large amount of inflow requiring control shall be defined as that which adversely affects the performance of the work or has the potential of causing loss or damage to adjacent property or structures

3.3 PROPERTY LOSSES FROM REMOVAL OR DISTURBANCE OF GROUNDWATER

A. Any structure, including but not limited to buildings, bridges, streets, and utilities that become unstable or vulnerable to settlement due to removal or disturbance of groundwater will be supported immediately by the Contractor. Support shall include but not be limited to bracing, underpinning, or compaction grouting.

B. All loss or damage arising from removal or disturbance of groundwater, including but not limited to claims for subsidence and the loss of structure support, that may occur in the prosecution of the work shall be sustained and borne by the Contractor.

C. If the Contractor needs to correct the damage resulting from his operations, the Owner may, 30 days after notifying the Contractor in writing, proceed to repair, rebuild or otherwise restore such damaged property as may be deemed necessary, and the cost thereof shall be deducted from compensation which may be or become due the Contractor under this Contract.

END OF SECTION

SECTION 02457

DYNAMIC PILE TESTING

PART 1 GENERAL

1.1 WORK INCLUDED

A. The work specified in this Section consists of furnishing all material, equipment, instrumentation, and labor to complete dynamic testing of selected piles, complete.

B. Dynamic monitoring will include CAPWAP analyses of designated piles that have been dynamically tested.

1.2 REFERENCES

A. The following is a list of standards that may be references in this section:

1. American Society of Testing and Materials (ASTM): D4945, Standard Test Method for High-Strain Dynamic Testing of Piles.

2. American Welding Society (AWS).

1.3 DEFINITIONS

A. High Strain Dynamic Testing (HSDT): Testing performed with Case-Goble Pile Driving Analyzer (PDA) to determine the drivability, pile toe and shaft friction, pile integrity, and hammer performance. Gauges are attached to pile approximately 3 feet below pile head and connected with cable to monitoring station on ground away from pile. Gauges consist of two accelerometers, two strain transducers, and junction box.

B. Impact Stress: Peak stress at pile head on impact from driving train as determined from measurements using pile driving analyzer.

C. Low Strain Dynamic Testing (LSDT): Test on test piles and production piles selected by the Engineer for quality control check of pile defects using low strain wave trace measurements. Test consists of checking the body of the pile for a uniform cross-section with no necking or contractions or other defects using low strain dynamic procedures.

D. Production Piles: Piles incorporated into the Work, utilizing a uniform selection of materials and workmanship, and which are determined acceptable by Engineer based on observations and indicator pile test results.

E. Indicator Piles: Piles constructed of same materials and workmanship, and installed as specified for production piles at production pile locations.

F. CAPWAP (Case Pile Wave Analysis Program) is a software program that determines total bearing capacity of the indicator pile, as well as resistance distribution along the shaft and at the toe. The program takes as input the recorded force and velocity data obtained with a PDA.

1.4 SUBMITTALS

A. Administrative and Quality Control Submittals:

1. Qualifications for testing instrumentation installer.

1.5 QUALIFICATIONS

A. Testing Instrumentation Installer: At least 3 years' experience in installation of the test pile instrumentation and current qualification (in accordance with AWS D1.1) to perform welding procedure(s) necessary to install instrumentation.

1.6 PRE-INSTALLATION MEETING

A. Discussion to include details and scheduling of indicator pile installation, testing, and test monitoring.

B. Attended by Contractor, testing agency, pile installation personnel, and Engineer, before starting Work specified under this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. As specified under Section 02301, STEEL H-PILES.

PART 2 PRODUCTS

2.1 INDICATOR PILE ORDER LENGTHS

A. Indicator Piles and Production Piles are considered the same for purposes of this work.

PART 3 EXECUTION

3.1 DYNAMIC TESTING LOCATION

A. Two (2) H-piles as shown on the Drawings shall be dynamically tested. These piles shall be dynamically tested during the initial drive and during the re-strike, which shall be performed 72 hours after the initial drive.

3.2 TEST PROCEDURES

A. In accordance with the referenced standards.

3.3 RECORD DATA

A. The record for each indicator pile driven and tested shall include the following:

1. High Strain Dynamic Testing Report in accordance with referenced standard for test performed.
2. Driving record.
3. Pile length.
4. Number of hammer blows-per-foot of penetration.
5. Resistance in blows-per-inch of last 12 inches of final driving.
6. Hammer stroke, and rate of operation during driving.
7. Unusual occurrence(s) during driving.

3.4 HIGH STRAIN DYNAMIC TESTING

A. Testing Equipment:

1. Engineer shall provide PDA and all ancillary equipment necessary to conduct the high strain dynamic testing and conforming to ASTM D4945.

B. Pile Driving Equipment:

1. Contractor shall use same hammer, driving system, and ancillary equipment to drive indicator piles and production piling. Maintain and operate driving equipment in accordance with manufacturer's instructions.

C. Indicator Pile Preparation: Contractor shall mark entire length of each indicator pile in accordance with Section 02301, STEEL H-PILES.

D. Estimated Activity Times:

1. Initial Gauge Installation: 30 to 60 minutes.

2. Re-strike Gauge Attachment: 30 to 60 minutes.

3. Dynamic Monitoring per Pile Driven: 30 minutes.

4. Removal of Gauges: 30 minutes.

E. Testing:

1. Performed in accordance with ASTM D4945.

F. Indicator Pile Installation:

1. In accordance with the requirements specified in Section 02301, STEEL H-PILES.

2. Maintain pile orientation during driving where pile orientation is essential:

a. Keep hammer concentric with driving train in axial alignment on pile.

b. Do not use hammer to limit deviation of pile during driving by exerting lateral forces or striking at an angle.

3. Terminate impact driving upon Engineer's request:

a. Indicator Piles shall be driven to the tip elevation shown on the Drawings.

b. Engineer will establish termination penetration resistance.

G. Initial and Re-Strike of Indicator Piles:

1. Contractor shall assist in conducting dynamic monitoring on all indicator piles during initial driving and during re-strike.

2. Minimum time between initial driving and re-strike shall be 72 hours.

3. Mount driving train on pile prior to attaching PDA gauges. Assist with gauge removal after completing the restrike but prior to removing pile driving train.

4. It is anticipated that re-striking will include a total of 20 to 30 hammer blows for each test pile.

H. CAPWAP Analysis:

1. Engineer shall be responsible for hiring the PDA testing Contractor and for having CAPWAP Analysis completed on selected piles.

2. Engineer will be responsible for establishing the final driving criteria for the production piles based on the PDA and CAPWAP results.

3.5 DAMAGED, MISPLACED, OR OTHERWISE REJECTED PILES

A. Indicator piles found damaged, necked, or otherwise unfit for use that are located at production pile locations shall be replaced.

B. Remove from site and replace with conforming piles

END OF SECTION

SECTION 02512

BITUMINOUS CONCRETE PAVEMENT

PART 1 GENERAL

1.1 WORK INCLUDED

A. Work under this section includes installation of bituminous concrete pavement as shown on the Drawings. All new pavement and existing pavement to remain, but damaged as a result of the construction operations, shall be restored in accordance with the requirements of this section.

B. This work shall consist of furnishing and installing bituminous pavement courses in accordance with Section 401 of the NHDOT Standard Specifications for Road and Bridge Construction (latest edition) and as specified in this section.

1.2 QUALITY ASSURANCE/SUBMITTALS

A. Work shall confirm to NHDOT Section 401, Tier 2 except as noted herein:

1. Ride Smoothness: Section 401.3.17.3.4.1 shall apply except variation exceeding 3/8 inch in profile or cross slope shall be eliminated.

2. Ride Smoothness: Section 401.3.17.3.4.4 shall apply except high points 0.5 inches in 25 feet share be corrected.

PART 2 PRODUCTS

2.1 PAVEMENT SUBBASE AND BASE

A. Crushed Gravel Base as specified in Section 02200, EARTHWORK.

2.2 BITUMINOUS CONCRETE PAVEMENT

A. Materials shall conform to NHDOT 401 except the following:

B. The maximum amount of Total Reused Binder (TRB) in the pavement mix shall be 0.5% and the mix shall meet all volumetric mix design criteria.

C. Asphalt Cement shall not contain any form of used, recycled or refined oil. Suppliers of PG Binder shall certify that the PG Binder does not contain any used, recycled or refined oil.

D. All ¾" (19mm) and 1 inch (25mm) pavement mixes shall be designed using the 50 gyration N design, unless otherwise specified.

E. Liquid asphalt cement binder shall have Performance Grade (PG) of PG64-28 for all standard bituminous and PG 64-E for all high strength bituminous pavements. NHDOT QC/QA Specifications shall be followed for high strength mixes.

F. All high strength asphalt, when specified, shall be 50 gyration unless otherwise specified.

G. Pavement mix designs shall meet NHDOT Section 401.2.5.1 except the following:

1. Minimum asphalt binder content shall be as follows:

Minimum Asphalt Binder Content		
Mix Type	50 Gyration	75 Gyration*
3/8-in (9.5mm)		5.9%
1/2-in (12.5mm)	5.9%	*
3/4-in (19.0mm)	5.3%	*

The required minimum asphalt content is based on the use of aggregate with a specific gravity of 2.65 to 2.70. The minimum asphalt content requirement may be adjusted when aggregate with higher specific gravity is used, or the minimum may be adjusted at the Engineer's discretion if it is believed to be in the best interest of the Owner. All mix designs shall be submitted to the Engineer for verification and approval. *75 Gyration mix with stone size above 3/8" not allowed without expressed written permission from the City of Portsmouth.

2. Method requirements NHDOT Section 401.2.6 shall include the following:

   a. Coarse Aggregate: Stockpiled coarse aggregate shall meet the requirements of 2.6.1, Table 2.

   b. Tolerances: All mixtures shall conform within range of tolerances provided in NHDOT Section 401.2.6.2.

   c. When Non-Compliant test result, it shall be the Contractor's responsibility to correct non-compliant pavement. The Contractor may be required to remove non-compliant material that is poorly graded or material exhibiting cracks, open joints or other imperfections. **No payment will be made for this material or its removal.**

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Contractor Requirements:

1. Prior to placing any mix, a pre-paving conference shall be held with the Owner, Contractor, and Engineer to discuss the proposed paving schedule, source mix, type and amount of equipment to be used, sequence of paving pattern, rate of mix supply, traffic control, and general continuity of the operation. Special attention shall be made to the paving pattern sequence to minimize cold joints.

2. The Contractor shall notify the Engineer one week in advance of paving operations to allow sufficient time for scheduling personnel.

3. Any pavement course four inches (compacted depth) or greater shall be placed and compacted in two lifts.

4. Existing pavement or previously laid courses shall be thoroughly dry and free from all dust, dirt, and loose material. Sweeping with a power broom, supplemented by hand brooming, may be necessary.

5. Surfaces of any pavement course shall have a tack coat of emulsified asphalt applied in accordance with NHDOT Specifications. Application of emulsified asphalt shall be between 0.02 and 0.05 gal/yd^2.

6. Joint adhesive shall be used for all transverse and lateral seams when placing more than 100 tons of asphalt or more. This item is subsidiary unless a separate pay item is provided.

7. Utility covers, frames and grates, valves and other castings shall be set and raised. Contact surfaces of the drainage and utility castings shall be painted with a thin coating of suitable bituminous material. Surface pavement shall be removed from covers and casting immediately following pavement operations. Open grates shall be covered to ensure pavement material does not fall into structure.

8. Method requirements NHDOT Section 401.3.1.2 shall apply.

9. Contractor shall place 1-1/2" (compacted thickness - minimum) of temporary pavement at all trench locations at the end of each week.

10. In the event of an unanticipated long-term shut-down (Winter, etc.), the Contractor shall place 2" (compacted thickness) of temporary pavement as required. Contractor shall submit request to the City for approval. Upon approval, the Engineer will determine the extent and limits of temporary pavement required.

END OF SECTION

DIVISION 3

CONCRETE

SECTION 03200

REINFORCING STEEL

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnish and install reinforcement and associated items required for the cast-in-place concrete, complete.

1.2 REFERENCES

A. The latest editions of the following American Concrete Institute (ACI) publications shall be used as reference standards:

1. ACI SP-66 ACI Detailing Manual
2. ACI 301 Specifications for Structural Concrete for Buildings
3. ACI 318 Reinforced Concrete

B. The latest editions of the following American Society for Testing and Materials (ASTM) publications shall be used as reference standards:

1. ASTM A497 Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
2. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
3. ASTM A775 Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
4. ASTM A934 Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.

1.3 SUBMITTALS

A. Submit the following:

1. Mill test reports for each shipment of reinforcement. Identify reports with specific lots in shipments and submit prior to use of reinforcement in work.
2. Chemical composition of reinforcing steel. Ladle analysis to identify percentage of carbon, phosphorous, manganese and sulfur present in steel.
3. Welder's certification in accordance with AWS D1.4 prior to welding, when welding is indicated or specified.
4. Shop and placement drawings to the Owner/Engineer for review prior to fabrication, which show:
    a. All construction and expansion joints.
    b. Reinforcement detailed in conformance with ACI SP-66.
    c. Support bars and details of bar supports including type, size and spacing.
    d. Marking for each reinforcement item.

5. Coating applicator's notarized Certificate of Compliance that the coating for rebar meets the specified requirements.

1.4 PRODUCT HANDLING

A. Protection:

1. Use all means necessary to protect reinforcing steel before, during, and after installation and to protect the installed work and materials of all other trades.

2. Store in a manner to prevent excessive rusting and fouling with dirt, grease, and other bond-breaking coatings.

3. Use all necessary precautions to maintain identification after the bundles are broken.

B. Replacements:

1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner/Engineer and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 REINFORCING STEEL

A. All reinforcing steel shall be new, free from rust, and comply with ASTM A-615, Grade 60.

B. Where epoxy coated rebar is shown or specified, the rebar shall be coated in accordance with ASTM A775.

C. Where epoxy coated rebar is shown or specified, repair damaged or cut ends with a touch-up field kit prior to pouring concrete.

2.2 OTHER MATERIALS

A. All other materials not specifically described but required for a complete and proper installation of reinforcing steel, shall be as selected by the Contractor subject to the approval of the Owner/Engineer.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that reinforcing steel may be installed in strict accordance with all pertinent codes and regulations, the approved Shop Drawings, and the original design.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner/Engineer.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 BENDING

A. General:

1. Fabricate all reinforcement in strict accordance with the approved Shop Drawings.

2. Do not use bars with kinks or bends not shown on the Drawings or on the approved Shop Drawings.

3. Do not bend or straighten steel in a manner that will damage the material

B. Design:

1. All bends shall be in accordance with ACI 318/. Bend all bars cold.

3.3 PLACING

A. General:

1. Before start of concrete placement, accurately place all reinforcing steel, positively securing and supporting by concrete blocks, metal chairs or spaces, or by metal hangers.

B. Splicing:

1. Horizontal Bars:

a. Place bars in horizontal members with minimum laps at splices sufficient to develop the strength of the bars in accordance with ACI 318.

b. Bars may be wired together at laps except at points of support of the member, at which points preserve the clear space described above.

c. Wherever possible, stagger the splices of adjacent bars.

C. Other Splices:

1. Make only those other splices that are indicated on the approved Shop Drawings or specifically approved by the Owner/Engineer.

D. Dowels:

1. Place all required steel dowels and securely anchor them into position before the concrete is placed. Dowels placed into existing concrete shall be securely anchored with high strength epoxy as indicated on the Drawings. Drilling and cleaning of dowel holes shall be in accordance with manufacturer's recommendations.

E. Obstructions:

1. In the event conduits, piping, inserts, sleeves, or any other items interfere with placing reinforcement as indicated on the Drawings or as otherwise required, immediately consult the Engineer and obtain approval of new procedure before placing concrete.

F. Use pre-cast concrete bar support blocks for foundation mats.

3.4 MINIMUM COVER

A. Unless otherwise shown on the Drawings, provide the following minimum cover:

	Minimum Cover
Concrete cast against and permanently exposed to earth (e.g. footings)	3”
Stirrups, ties, and spirals	1 ½”
All other bars	2”

3.5 CLEANING REINFORCMENT

A. Steel reinforcement, at the time concrete is placed around it, shall be free from rust scale, loose mill scale, oil, paint, and all other coatings which will destroy or reduce the bond between steel and concrete.

END OF SECTION

SECTION 03310

CONCRETE

PART 1 GENERAL

1.1 WORK INCLUDED

A. The work covered under this Section includes, but is not limited to, the furnishing of all plant, labor, equipment, appliances and materials including all joint fillers and sealants, and performing all operations in connection worth providing cast-in-place concrete in accordance with these specifications and in close conformity with the lines and grades shown

1.2 QUALITY CONTROL

A. As the work progresses, the Contractor shall be required to perform tests and/or engage a testing laboratory in order to confirm that the quality of the concrete will be in conformance with these Specifications. Concrete shall be sampled in accordance with Section 01400, QUALITY CONTROL.

B. Compression test specimens will be made by the Contractor and cured according to ASTM C31. Six (6) specimens will be collected for each 30 cubic yard pour at a structure and one (1) sample tested at 7 days, three (3) samples tested at 28 days, and two (2) samples held in reserve.

C. If the concrete is found to be substandard as a result of the initial testing, then any additional work for replacement or removal of the substandard concrete or retesting shall be at the Contractor's expense.

1.3 SUBMITTALS

A. Submit the following:

1. Batch plant details giving the location, layout, capacity, and type of batch plant and the method of transporting concrete from the batch plant to the work location. The Contractor shall provide documentation that all requirements of local authorities and regulations have been met.

2. Notification to the Engineer of concrete deliveries, a minimum of 24 hours in advance of the scheduled delivery. Include within this notification, class and quantity of concrete, frequency of trucks, and ordered slump.

3. Description of methods for cold-weather and hot weather batching, mixing and delivery.

4. Concrete Mix Designs.

a. Submit concrete mix designs to the Engineer within a minimum of fourteen (14) calendar days prior to placement. Include a complete list of materials including admixtures, applicable reference specifications, and copies of test reports showing the mix has been successfully tested to produce the properties specified.

b. For each design mix, provide:

1) Certifications by the concrete supplier that ingredients conform to the specified requirements.

2) Certifications by the concrete supplier that design mix conforms to specified strength, unit weight, maximum size aggregate, air entrainment, slump and to be free of soluble chloride content.

3) Coarse aggregate gradation, specific gravity, and dry rodded unit weight.

4) Identify admixtures, and planned dosage rate.

5. Compression test results.

PART 2 PRODUCTS

2.1 CEMENT

A. Cement shall conform to ASTM C150, Type II. The tricalcium aluminate (C3A) content shall not be less than 4 percent to provide protection for the reinforcement and shall not be more than 10 percent to obtain concrete that is resistant to sulfate attack.

2.2 FLY ASH

A. Fly ash shall comply with ASTM C 618, Type F; except that the maximum calcium oxide content shall be 8 percent, the maximum available alkalis shall be 1.5 percent, and the maximum allowable loss on ignition shall be 6 percent. Report the chemical analysis of the fly ash in accordance with ASTM C311. Evaluate and classify fly ash in accordance with ASTM D 5759. If Fly ash is utilized to improve the concrete properties, its content shall not exceed 20 percent by weight of the total cementitious material.

2.3 GRANULATED BLAST FURNACE SLAG

A. Slag shall be finely ground, hydraulic cement, produced from granulated blast furnace slag, a product of the iron making process. It shall conform to ASTM C 989-99 as manufactured by Lafarge Newcem or approved equal. If Slag is utilized to improve the concrete properties, its content shall not exceed 40 percent by weight of the total cementitious material.

2.4 MICROSILICA

A. Microsilica shall be Force 10,000 as manufactured by Grace Construction Products or approved equal. If Microsilica is utilized to improve the concrete properties, its content shall not exceed 10 percent by weight of the total cementitious material

2.5 AGGREGATES

A. Aggregates shall conform to ASTM C33, except as modified herein:

1. The combined aggregates in the mixture (coarse, fine, and blending sizes) shall be well graded from coarse to the fine with not more than 18 percent nor less than 8 percent, unless otherwise permitted, of the combined aggregate retained on any individual sieve, with the exception that:

a. The No. 50 may have less than 8 percent retained;

b. Sieves finer than No. 50 shall have less than 8 percent retained; and

c. The coarsest sieve may have less than 8 percent retained.

d. Use blending sizes where necessary to provide a well graded combined aggregate. Reports of individual aggregates shall include standard concrete aggregate sieve sizes including 1-1/2", 1", 3/4", 1/2", 3/8", No. 4, No. 8, No. 16, No. 30, No. 50, and No. 100.

B. Provide aggregates for exposed concrete from one source. Do not provide aggregates that react deleteriously with alkalies in cement. Refer to Appendix Paragraph entitled "TEST METHOD C227" of ASTM C33 for expansion limits. Provide aggregate containing no deleterious material properties as identified by ASTM C295.

C. Aggregate, when subjected to five (5) cycles of the soundness test in accordance with ASTM C88, shall not have a loss greater than 10 percent when sodium sulfate is used.

D. Where a size designation is indicated, the designation indicates the nominal maximum size of the coarse aggregate.

E. Where historical data is used, provide aggregates from the same sources and having the same size ranges as those used in the concrete represented by historical data

2.6 WATER

A. Water shall comply with the requirements of ASTM C 94 and the chloride and sulfate limits in accordance with ASTM D 512 and ASTM D 516. Mixing water shall not contain more than 500 parts per million of chlorides as Cl and not more than 100 parts per million of sulfates as SO4. Minimize the amount of water in the mix. Water shall be fresh, clean, and potable; free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete.

2.7 CONCRETE

A. Concrete for this project shall be a high-performance mix conforming to Section 520 of the Standard Specifications and proportioned based on Class AAA of the Standard Specifications as shown in Table 1.

Table 1

Concrete Proportioning

Concrete Property	Seawalls	Other
Minimum 28-Day Compressive Strength per AASHTO T23 (psi)	5,000	--
Slump per AASHTO T119 (in)[1]	2 – 4 [2]	--
Air Content per AASHTO T152 (%)	5.0 - 8.0	--
Minimum Cementitious Content (lb/yd^3)	705	--
Maximum Cementitious Content (lb/yd^3)	799	--
Maximum Water/Cementitious Ratio by Mass	0.40	--

Maximum Aggregate Size (in)	3/4	--

Footnotes:

[1] The slump range shall be measured at the point of discharge. The Contractor shall submit the target slump range for each mix design to the Engineer for approval.

[2] Slump shall not exceed 4 inches for surfaces sloped greater than 4 percent. If additional workability is desired, the Contractor may propose to increase the maximum specified slump up to 6 inches if an AASHTO M 194 Type A – Water Reducing Admixture is used, or up to 9 inches if an AASHTO M 194 Type F or G – High Range Water Reducing Admixture is used. AASHTO M 194 Type F or G – High Range Water Reducing Admixture is required when concrete is to be placed by pumping equipment. Admixtures shall be utilized in accordance with the manufacturers' recommended dosages.

[3] The Contractor shall achieve the specified slump using an AASHTO M 194 Type A – Water Reducing Admixture, or an AASHTO M 194 Type F or G – High Range Water Reducing Admixture. AASHTO M 194 Type F or G – High Range Water Reducing Admixture is required when concrete is to be placed by pumping equipment. Admixtures shall be utilized in accordance with the manufacturers' recommended dosages.

2.8 PERFORMED JOINT FILLER

A. Preformed joint filler shall be extruded closed cell polyethylene foam as manufactured/supplied by Foamtech or approved equal.

2.9 POLYURETHANE JOINT SEALANT

A. Polyurethane joint sealant shall be Sikaflex-1a as manufactured/supplied by Sika or approved equal.

2.10 BONDING AGENTS

A. Bonding agent shall be SIKAFLEX-Armatec® 110 EpoCem®, as manufactured by SIKA or approved equal. Apply in accordance with the manufacturer's instructions.

2.11 NON-SHRINK GROUT

A. Non-Shrink Grout for grouting the vertical joints at the weep drains shall be Sika 212 and supplied/manufactured by Sika Corp. or approved equal.

2.12 MORTAR

A. Mortar for setting granite blocks and cap stones shall consist of one (1) part Masonry Cement, Type N and two (2) parts sand. Mortar shall conform to the requirements of AASHTO M45. Mortar shall be used within 45 minutes after its preparation.

2.13 EPOXY GROUT

A. Epoxy grout for setting anchors or rebar shall be Hilti HIT-RE 500 V3 by Hilti America or approved equal. Apply in accordance with the manufacturer's instructions.

PART 3 EXECUTION

3.1 PREPARATION OF EQUIPMENT AND PLACE OF DEPOSIT

A. Before placement, all equipment for mixing and transporting the concrete shall be cleaned, and all debris and ice shall be removed from the places to be occupied by the

concrete. Forms shall be thoroughly wetted (except in freezing weather) or oiled. The reinforcement shall be thoroughly cleaned of ice, dirt, rust scale or other deleterious coatings.

3.2 PLACING CONCRETE

A. Concrete shall be placed only when the Engineer is present.

B. Concrete work shall be in accordance with ACI 318 Building Code Requirements for Reinforced Concrete, latest edition.

C. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. The placing of concrete shall be carried on at such a rate that concrete is at all times plastic and flows readily. No concrete that has been contaminated by foreign material shall be used nor shall re-tempered concrete be used.

D. Do not exceed a free vertical drop of 3 feet from the point of discharge.

E. Concrete delivery trucks shall not have aluminum chutes. All chutes shall be round-bottomed.

F. When placing is started, it shall be carried on as a continuous operation until placement is completed.

G. All concrete shall be thoroughly consolidated during placement by vibration or other approved means. It shall be thoroughly worked around embedded fixtures and into the corners of the forms.

3.3 VIBRATING CONCRETE

A. Vibration of concrete shall comply with the requirements of ACI 301, ACI 309R, and ASTM A775 for epoxy-coated bar using vibrators with a minimum frequency of 9000 vibrations per minute (VPM). Use only high cycle or high frequency vibrators. Motor-in-head 60 cycle vibrators may not be used.

B. For walls and deep beams, use a minimum of two vibrators with the first to melt down the mixture and the second to thoroughly consolidate the mass. Furnish a spare, working, vibrator on the job site whenever concrete is placed.

C. Operate internal vibrators with the vibratory element submerged in the concrete. Do not use vibrators to transport the concrete in the forms.

D. Place concrete in 18” maximum vertical lifts. Insert and withdraw vibrators approximately 18” apart. Penetrate at least 8” into the previously placed lift with the vibrator when more than one lift is required. Extract the vibrator using a series of up and down motions to drive the trapped air out of the concrete and from between the concrete and the forms.

E. External vibrators shall be used on the exterior surface of the forms when internal vibrators do not provide adequate consolidation of the concrete.

F. For slab construction, use vibrating screeds designed to consolidate the full depth of the concrete.

G. Where beams and slabs intersect, use an internal vibrator to consolidate the beam.

H. Do not vibrate concrete placed with anti-washout admixtures.

I. Vibrators shall be equipped with rubber vibrator heads.

3.4 COLD WEATHER REQUIREMENTS

A. Proceed in accordance with ACI 306.1. Unless otherwise approved, the temperature of the mixed concrete shall be not less than 50º F and not more than 90º F at the time of placing it in the forms. Obtain approval prior to placing concrete when the ambient temperature is below 40º F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover concrete and provide sufficient heat to maintain 60º F minimum for a minimum of 5 days after placing the concrete, and above 40º F for an additional 9 days. The temperature shall then be gradually lowered to that of the surrounding atmosphere.

3.5 HOT WEATHER REQUIREMENTS

A. Placement of concrete in hot weather shall be performed in accordance with ACI 305R. Maintain required concrete temperature using Figure 2.1.5, "EFFECT OF CONCRETE TEMPERATURES, RELATIVE HUMIDITY, AND WIND VELOCITY ON THE RATE OF EVAPORATION OF SURFACE MOISTURE FROM CONCRETE" in ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. Cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage. Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable permeable material with fog spray or continuous wetting of the concrete when weather conditions prevent the use of either liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

3.6 FORMS

A. Forms shall conform to shapes, lines and dimensions of the members as called for on the Drawings and shall be sufficiently tight to prevent leakage of concrete. They shall be properly braced or tied together so as to maintain position and shape.

B. Forms shall be removed in such a manner as to ensure the complete safety of the structure. In no case shall supporting forms or shoring be removed until members have acquired sufficient strength to support their weight and imposed loads safely.

3.7 JOINTS

A. Construction Joints: Concrete shall be installed to the limits indicated with the use of construction joints as shown on the Drawings or as approved by the Engineer. Additional construction joints, other than those indicated on the Drawings, shall not be incorporated into the work without the approval of the Engineer.

B. All concrete between consecutive joints shall be placed in a continuous operation.

C. Thoroughly clean the surface of the concrete at construction joints and remove laitance prior to placing adjoining concrete.

D. Apply a bonding agent to surface of hardened concrete in accordance with the manufacturer's requirements prior to placing adjoining concrete.

3.8 CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Formed Surfaces: Cure formed concrete surfaces, including underside of cap and other similar surfaces. If forms remain during curing period, continue curing for the remainder of the curing period.

C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure all unformed surfaces.

D. Evaporation Retarder: Apply evaporation retarder to uniformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding and bull floating or darbying concrete, but before float finishing.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods.

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 EXPOSED EDGES

A. All exposed edge and reentrant corners not otherwise detailed on the Drawings shall have a minimum ¾" chamfer.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Use patching mortar to repair and patch defective areas when approved by the Engineer. Remove and replace concrete that cannot be repaired and patched to the Engineer's satisfaction.

B. Repairing Formed Surfaces: Repair and patch all voids at form ties and all surface defects including color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, remove snap-tie cones, cut out honeycombs, rock pockets, and voids more than ½ inch (13mm) in any dimension in solid concrete, but not less than 1 inch (25mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat all holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

C. Patching Mortar: Mix dry-pack patching mortar, consisting of one-part Portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

3.11 FINISH

A. Concrete shall receive a smooth form finish as follows:

1. Use form facing materials that will produce a smooth, hard, and uniform texture on the concrete.

2. Arrange facing materials in an orderly, symmetrical manner, with a minimum number of seams.

3. Limit form face deflection.

4. Avoid the use of defective or damaged materials that will impair the concrete surface texture.

B. The smooth form finish shall provide a neat and uniform appearance and provide a smooth and non-abrasive surface.

C. Exposed concrete that will receive foot traffic will receive a non-skid broom finish

END OF SECTION

DIVISION 4

MASONRY

SECTION 04400

STONE MASONRY

PART 1 GENERAL

1.1 REFERENCES

A. Refer to other divisions of these specifications, other sections in this division, and Drawings for related work, which may affect the work of this section.

B. The Contract Documents indicate and show the limits of construction for this project. These specifications specify material and work requirements for this project. Both are complementary to each other, and both shall be followed to properly complete the work.

1.2 DESCRIPTION OF WORK

A. Work Included: The Contractor shall provide all labor, materials, and equipment necessary to complete the Work of this Section, including but not limited to the following:

1. Stone masonry work related to the construction of the seawall.

1.3 SUBMITTALS

A. For any imported granite blocks and fascia stones that are not reused from the site or that are stockpiled in the DPW's yard, the Contractor shall provide a sample of the proposed stone, including example cuts or splits that may be made in order to complete the work. The sample shall be a minimum of 1' x 1' x 2', and shall be delivered to the project site for approval by the Owner/Engineer.

B. The Contractor shall provide a letter from the proposed stone quarry that will be supplying imported stone, certifying that it has the capacity and quantity of material to completely satisfy the project requirements.

1.4 QUALITY ASSURANCE

A. The Contractor shall provide a qualified stone mason to supervise the selection, fitting, working and placement of all stonework meeting these specifications and the intent of the project. If the Contractor is not experienced in stone masonry, it shall employ a stone mason to supervise stone placement and ensure quality stonework construction.

B. The Contractor shall not switch sources of imported stone without submitting a new sample for written approval by the Owner/Engineer.

1.5 DELIVERY AND STORAGE

The Contractor shall provide a qualified stone mason to supervise the selection, fitting, working and placement of all stonework meeting these specifications and the intent of the project. If the Contractor is not experienced in stone masonry, it shall employ a stone mason to supervise stone placements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stone

1. Finish cap stones shall be gray granite of size and finished as indicated.

2. Granite fascia for sheet pile facing shall be gray granite, saw cut top and bottom, split face.

3. All wall stone shall be hard, durable, angular igneous rock (granite, diorite or similar) with a shape consistent with building a stable block stone wall. The stone shall have at least 3 relatively flat faces and shall preferably be in a slab or block form. The stone shall be free of oil, grease, paint or other bond inhibiting deposits. Salvaged granite wall stones from other projects are stockpiled at the City DPW's yard and are available for the Contractor's use on this project. However, the Contractor is responsible for loading, transporting, and unloading the stone, and for any preparation or cleanup of the stones as required. Granite blocks from the existing seawall may also be reused, except for those that are from the native Kittery formation. These stones shall be separated and shall be hauled and stockpiled in the DPW's yard.

4. Stones with cracks or soft seams shall be considered as separate blocks, assuming that frost action will eventually open the cracks. Rounded stones will not be accepted. Stones shall be dimensioned as shown on the Drawings and exposed faces shall be selected and placed to show the straightest, flattest face(s) free of defects to the extent possible. Cap stones shall be selected to be free of longitudinal cracks and have a relatively flat top surface with no more than 0.5 inches of vertical variation upon final placement.

5. Stones from the existing seawall that are reused shall be cleaned by pressure washing, including removal of seaweed/marine growth, in order to enhance bonding between the stones and concrete/mortar.

B. Chinking Stone

1. Chinking stone shall be of the same quality as the wall stone and be selected to best match the size and shape of the voids/gaps beings filled. The Contractor shall provide and maintain an adequate supply of chinking stone at the work site to allow for stone size and shape selection.

C. Mortar/Concrete

1. Refer Section 03310, CONCRETE.

PART 3 EXECUTION

A. The wall construction shall be as indicated on the Drawings, with neat tight stone placement. Exposed stones shall be selected and placed to show the straightest, flattest face(s), and shall be free of defects to the greatest extent possible.

B. Unless otherwise noted, the vertical joints between stones shall be staggered at least 12 inches between adjacent courses to provide optimum interlocking. Unless otherwise shown, only stone shall be exposed along the face and top of the seawall – footing and retaining wall concrete shall not be visible above mean lower low water or above the existing mudline. Stones shall not protrude more than 2" beyond adjacent

stones at the joints and all working of exposed stone shall be by chipping (i.e., no exposed saw cut or grinder surfaces, or exposed drill holes over 3/4" diameter shall be visible).

Within two hours of placing concrete, the back side of the seawall stones shall be scrub-coated with a Portland cement/water slurry mixed to a pancake batter consistency. All stones shall be solidly placed and interlocked and any stone placement that allows a stone to rock or move by hand or foot pressure shall be reset. The Contractor shall be responsible for maintaining the stability of the stones by placing concrete in lifts and providing temporary shoring as required. Stones shall be adequately placed or braced to allow concrete consolidation using a vibrator. Concrete surfaces between lifts shall be kept rough and irregular to ensure a high friction bonded surface between lifts.

END OF SECTION

DIVISION 9

COATINGS

SECTION 09900

COATINGS

PART 1 GENERAL

1.1 SCOPE

A. This Section covers surface preparation, furnishing, and application of abrasion resistant and other protective coatings, complete.

1.2 ABBREVIATIONS

ANSI	American National Standards Institute
AWWA	American Water Works Association
FRP	Fiberglass Reinforced Plastic
HCI	Hydrochloric Acid
MDFT	Minimum Dry Film Thickness
MDFTPC	Minimum Dry Film Thickness Per Coat
Mil	Thousandths of an Inch
OSHA	Occupational Safety and Health Act
PSDS	Coating System Data Sheet
SFPG	Square Fee Per Gallon Per Coat
SP	Surface Preparation
SSPC	Steel Structures Painting Council

1.3 SURFACES NOT REQUIERING COATING

A. Unless otherwise specifically indicated in the Specifications or on the Drawings, the following areas or items will not require coating:

1. Concrete and masonry surfaces.

2. Nonferrous and corrosion-resistant ferrous alloys such as copper, bronze, monel, aluminum, chromium plate, weathering steel, and stainless steel, except where required for electrical insulation between dissimilar metals.

3. Nonmetallic materials such as glass, PVC, wood, porcelain, and plastic except as required for architectural coating or color-coding.

4. Cathodic protection anodes, if specified, shall not be coated.

1.4 QUALITY CONTROL

A. The coating manufacturer shall provide a representative to visit the jobsite or shop at intervals during surface preparation and coating as may be required for product application quality control, and to determine compliance with manufacturer's instructions and these Specifications, and as may be necessary to resolve field

problems attributable to, or associated with, the manufacturer's products furnished under this Contract.

1.5 INSPECTION

A. The Contractor shall give the Engineer a minimum of 3 days advance notice of the start of any surface preparation work or coating application work. All such work shall be performed only in the presence of the Engineer, unless the Engineer has granted prior approval to perform such work in his absence.

B. For all coatings subject to immersion, full cure must be obtained for the completed system. Consult the coating manufacturer's written instructions for these requirements. The coating shall not be immersed for any purpose until completion of the curing cycle.

C. Inspection by the Engineer, or the waiver of inspection of any particular portion of the work, shall not be construed to relieve the Contractor of its responsibility to perform the work in accordance with these Specifications.

D. All materials shall be new and shall be delivered to the project site in unopened containers that plainly show, at the time of use, the designated name, date of manufacturer, color, and name of manufacturer. Coatings shall be stored in a suitable protected area that is heated or cooled as required to maintain temperatures within the range recommended by the coating manufacturer.

1.6 WARRANTY

A. The Contractor and coating manufacturer shall jointly and separately warrant to the Owner and guarantee the work under this Section against defective workmanship and materials for a period of 2 years commencing on the date of final acceptance of the work.

1.7 SUMITTALS

A. The following specific information shall be provided:

1. Data Sheets: For each coating system used herein, the Contractor shall obtain from each coating manufacturer for submittal to the Engineer, a Coating System Data Sheet (PSDS), Technical Data Sheets, and coating colors available (where applicable) for each product used in the coating system, except for products applied by equipment manufacturers supplying items specified for pre-priming or pre-finishing. The required information shall be submitted on a system-by-system basis. The Contractor shall also provide copies of the coating system submittals to the coating applicators. A sample PSDS form is appended at the end of this Section.

2. Samples: The Contractor shall, prior to the start of surface preparation, furnish the Engineer with a 4-inch by 4-inch steel panel for each grade of sandblast specified herein, prepared by the Contractor to the specified requirements. The panel shall be representative of the steel used and shall be embedded in a Styrofoam case with an airtight clear plastic cover. Nitrogen may be used to prevent deterioration for the surface quality. Upon approval by the Engineer, the panel shall be preserved as a reference source for inspection.

Unless otherwise specified hereinafter and before any coating work is started, prepare with type of coating and application specified, and on similar substrate

to which coating is to be finally applied, samples not less than 8-inch by 10-inch in size.

Furnish additional samples as required until colors, finishes, and textures are approved. Retain approved samples to be used as the quality standard for final finishes.

3. Final coating thickness and holiday test results report(s) in accordance with Article 3.12.C.2.

PART 2 PRODUCTS

2.1 COATING MATERIALS

A. Unless otherwise specified, steel components shall be coated as shown on the Drawings with abrasion resistant Corropipe II TX-15 as manufactured by Madison Chemical Industries, Inc., of Ontario, Canada, or approved equal (Contact: Madison Chemical, 905-878-8863).

B. As an alternate to Corropipe II TX-15, the Contractor may use BAR RUST 235 as manufactured by DEVOE High Performance Coatings of Cleveland, Ohio, or approved equal (Contact: DEVOE, 800-654-2616).

PART 3 EXECUTION

3.1 GENERAL

A. All materials of a coating system including primer and finish coats shall be produced by the same coating manufacturer unless otherwise approved by the Engineer. Thinners, cleaners, driers, and other additives shall be as recommended by the coating manufacturer of the particular coating. No lead bearing paints or coatings shall be used.

B. It is the intent of these Specifications that Contractors and their subcontractors employed on the jobsite will leave the surfaces of their work in such a condition that only minor cleaning, sanding, and filling is required prior to surface preparation and coating. It is the responsibility of the Contractor to inspect and provide substrate surfaces that are prepared in accordance with these Specifications and the printed directions and recommendations of the coating manufacturer whose product is to be applied.

3.2 ENVIRONMENTAL CONDITIONS

A. Coating shall not be applied in temperatures exceeding the manufacturer's recommended maximum and minimum allowable, nor in dust, smoke-laden atmosphere, damp or humid weather.

B. Abrasive blast cleaning shall not be performed whenever the relative humidity exceeds 85 percent, nor whenever the surface temperature is less than 5 degrees F above the dew point of the ambient air.

3.3 SAFETY

A. Coating shall be performed in strict accordance with the safety recommendations of the coating manufacturer; with the safety recommendations of the National Association of Corrosion Engineers contained in the publication, Manual for Painter Safety; and Federal, State, and local agencies having jurisdiction.

3.4 COATING MIXING

A. Multiple-component coatings shall be prepared using all of the contents of the container for each component as packaged by the coating manufacturer. No Partial batches will be permitted. Multiple-component coatings that have been mixed shall not be used beyond their pot life. The Contractor shall provide small quantity kits for touch-up coating and for coating other small areas. Only the components specified and furnished by the coating manufacturer shall be mixed. No intermixing of additional components for reasons of color or otherwise, even within the same generic type of coating, will be permitted.

B. Coating materials shall be kept sealed when not in use.

3.5 LOCATION WHERE COATING IS PERFORMED

A. Surface preparation and coating shall be done at the project site or in the shop at the Contractor's discretion.

B. Shop Blast Cleaning: Notify the Engineer at least 7 days prior to start of shop blast cleaning to allow the Engineer or their representative to inspect the work during surface preparation and shop application of coatings. The work shall be subject to the Engineer's approval before shipment to the jobsite.

C. Field Sandblasting: Perform sandblasting for items and equipment where specified and as required to restore damages surfaces previously shop or field blasted and primed. Materials, equipment, procedures, and safety equipment for personnel shall conform to the Steel Structures Coating Council. The Contractor shall obtain permission from the appropriate local, state, and federal authorities prior to sandblasting above water.

3.6 PREPARATION OF SURFACES

A. Metal Surface Preparation: No surface preparation blasting will be permitting prior to submission of approved samples. All workmanship for metal surface preparation as specified shall be in strict conformance with the current Steel Structures Coating Council (SSPC) Specifications as follows:

Solvent Cleaning	SP1
Hand Tool Cleaning	SP2
Power Tool Cleaning	SP3
White Metal Blast Cleaning	SP5
Commercial Blast Cleaning	SP6
Brush-Off Blast Cleaning	SP7
Pickling	SP8
Near-White Blast Cleaning	SP10

Wherever the words "solvent cleaning", "hand tool cleaning", "wire brushing", or "blast cleaning", or similar words of equal intent are used in these Specifications or in coating manufacturer' specifications, whey shall be understood to refer to the applicable SSPC Specifications listed above.

Hand tool clean areas that cannot be cleaned by power tool cleaning.

3.7 PRE-BLAST CLEANING REQUIREMENTS

A. All oil, grease, welding fluxes, and other surface contaminants shall be removed prior to blast cleaning. Pre-blast cleaning methods shall use steam, open flame, hot water, or cold water with appropriate detergent additives followed with clean water rinsing.

B. Small isolated areas shall be cleaned as above or solvent cleaned with suitable solvent and clean cloths.

C. All sharp edges shall be rounded or chamfered, and all burrs, jagged edges, and surface defects shall be ground smooth.

D. Welds and adjacent areas shall be prepared such that there is:

1. No undercutting or reverse ridges on the weld bead.

2. No weld spatter on or adjacent to the weld of any other area to be coated.

3. No sharp peaks or ridges along the weld bead. All embedded pieces of electrode or wire shall be ground flush with the adjacent surface of the weld bead.

3.8 BLAST CLEANING REQUIREMENTS

A. The type of equipment and speed of travel shall be such that the specified degree of cleanliness is obtained. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendations for the particular coating to be used. Only dry blast cleaning methods will be permitted. The abrasive shall not be reused unless otherwise approved by the Engineer.

B. Contractor shall comply with all applicable Federal, State and local air pollution and environmental control regulations for blast cleaning and disposition of spent aggregate and debris.

3.9 POST-BLAST CLEANING REQUIREMENTS

A. All surfaces shall be cleaned of all dust and residual particles of the cleaning operations by dry (no oil or water vapor) air blast cleaning or other approved method prior to coating. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.

B. Surfaces shall be coated the same day they are sandblasted. Surfaces that have started to rust before they are coated shall be re-blasted.

3.10 BRUSH-OFF BLAST CLEANING

A. The equipment, procedure, and degree of cleaning shall conform to the Steel Structures Coating Council Surface Preparation 7, Brush-Off Blast Cleaning. The abrasive may be either wet or dry blasting sand, grit, or nutshell as approved. The various surface preparation parameters such as size and hardness of the abrasive, nozzle size, air pressure, and nozzle distance from the surface shall be selected such that the surface is cleaned without pitting, chipping, or otherwise damaging the surface. The Contractor shall verify its parameter selection by blast cleaning a trial area that will not be exposed to view.yes

3.11 SOLVENT CLEANING

A. Solvent cleaning shall consist of the removal of foreign matter such as oil, grease, soil, drawing and cutting compounds, and any other surface contaminants by the use of solvents, emulsions, cleaning compounds, steam cleaning, or similar materials and methods which involve a solvent or cleaning action. This method conforms to Steel Structures Coating Council SP 1.

3.12 APPLICATION OF COATING

A. General

1. Manufacturer's written instructions for applying each type of coating or protective coating shall be furnished to the Engineer prior to application. Cleaned surfaces and intermediate coats shall be inspected prior to the succeeding coat. Schedule such inspection with the Engineer in advance. Apply all coatings in strict accordance with the coating manufacturer's recommendations. Sufficient time shall be allowed between coats to assure thorough drying of previously applied coating.

2. Units to be bolted together and to structures shall be coated prior to assembly or installation whenever possible.

B. Manufactured Applied Coating Systems

1. Abraded areas on factory finished items shall be repaired in strict accordance with the manufacturer's directions. Repaired areas shall be carefully blended into the original finish.

C. Film Thickness

1. Provide a total minimum dry film thickness (MDFT) of 16 mils for factory coated items and 20 mils for field coated items. The number of coats is the minimum required irrespective of the coating thickness. Additional coats may be required to obtain the minimum required coating thickness, depending on the method of application, differences in manufacturers' products, and atmospheric conditions. Maximum film build per coat shall not exceed the coating manufacturer's recommendations.

2. After repairs and re-coated areas have dried sufficiently, final tests will be conducted by an independent testing firm hired by the Contractor and the test reports submitted to the Engineer (the independent testing firm report does not need to be stamped by a P.E.). Coating thickness specified in mils will be measured with a magnetic type dry film thickness gauge such as Mikrotest, supplied by Nordson Corporation, Anaheim, CA. The finish coat (except zinc primer and galvanizing) will be tested for holidays and discontinuities with an electrical holiday detector, low voltage, wet sponge type such as Model M-1, manufactured by Tinker and Rasor, San Gabriel, CA.

3. Each coat shall be checked for the correct millage. No measurement will be made under a minimum of 8 hours after application of the coating. Concrete, nonferrous metal, plastic, and wood surfaces shall be visually inspected to see that proper and complete coverage has been attained.

3.13 DAMAGED COATINGS

A. Damaged coatings, pinholes, and holidays shall have the edges feathered and repaired in accordance with the recommendations of the coating manufacturer, as approved by the Engineer.

B. All finish coats; including touch-up and damage-repair coats shall be applied in a manner that will present a uniform texture and color-matched appearance.

3.14 UNSATISFACTORY APPLICATION

A. If the item has an improper finish color, or insufficient film thickness, the surface shall be cleaned and top coated with the specified coating material to obtain the specified color and coverage. Specific surface preparation information to be secured from the coating manufacturer and the Engineer.

B. All visible areas of chipped, peeled, or abraded coating shall be hand or power-sanded feathering the edges. The areas shall then be primed and finish coated in accordance with the Specifications. Depending on the extent of the repair and its appearance, a finish sanding and topcoat may be required by the Engineer.

C. Work shall be free of runs, bridges, shiners, laps or other imperfections. Evidence of these conditions shall be cause for rejection.

3.15 SHIPPING

A. Coated items shall be protected from damage during shipment and shall be battened to prevent abrasion. Wood or other approved spacers shall be placed between steel sheet piles to prevent the coating from being damaged. Only nonmetallic or padded slings and straps shall be used in handling. Items that, in the opinion of the Engineer, are excessively damaged will be rejected.

3.16 CLEANUP

A. All cloths and waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day. Upon completion of the Work, all staging, scaffolding, coating containers and unused product shall be removed from the site in an approved and legal manner. Coating spots, oil, or stains upon adjacent surfaces and floors shall be completely removed, and the entire job left clean and acceptable to the Engineer.

3.17 POST INSTALLATION INSPECTION AND REPAIR

A. Notify the Engineer at least 3 days prior to starting the Post Installation coating inspection.

B. Mark all areas that give an indication of a coating flaw.

C. Clean the indicated areas and apply a repair coating per the coating manufacturer’s directions for materials and application.

D. Once the repaired coatings have cured, retest the same areas with the holiday tester. Repair coatings until they pass the test.

COATING SYSTEM DATA SHEET

Attach products, Technical Data Sheet or CPAS (if applicable) to this sheet for each coating system submittal.

Coating System Number/Name (from spec.)_____

Coating System Title (from spec.)_____

Coating Supplier_____

Representative_____

Surface Preparation_____

Coating Material (Generic)	Product Name/Number (Proprietary)	Min. Coats Coverage

END OF SECTION

PART 2

DRAWINGS
(SEPARATELY BOUND)

PART 3

GEOTECHNICAL DATA
(INCLUDED ON DRAWINGS)

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