

PROPRIETORS OF CUSTOM HOUSE WHARF

**18 CUSTOM HOUSE WHARF
Portland, Maine 04101**

TECHNICAL SPECIFICATIONS FOR:

**COMEDY CONNECTION PIER
REPAIRS TO TIMBER BENTS 28-30**

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SECTION 01036

SPECIAL PROVISIONS

PART 1 - SCOPE OF WORK

The work consists of furnishing all labor, materials, equipment, and incidentals necessary for repairs to timber spans 28-30 at East side of Custom House Wharf. The Work includes:

1. Demolition and removal of designated material.
2. Splicing and bracing timber piles.
3. Cribbing under timber pile caps.
4. Other incidental work shown on the Drawings and described in the Specifications.
5. Disposal of all litter and debris.

PART 2 - ADDITIONAL REQUIREMENTS

2.01 CONTRACTOR'S QUALIFICATIONS

The Contractor and his Subcontractors shall be experienced contractors having demonstrated competence in work of this nature, and shall have available or have access to experienced labor and sufficient equipment necessary to perform this work. Prior to award, the Contractor and his Subcontractors shall furnish to the Engineer upon request, a statement of whether he is now or ever has been engaged in work similar to that covered by the Specifications, the dollar value thereof, the year in which the work was performed, and the manner of its execution and giving such other information as will tend to show the Contractor's ability to prosecute the required work within the established time.

2.02 SUBCONTRACTORS

The Contractor shall submit in writing to the Engineer for approval a complete list of all Subcontractors to whom he proposes to sublet Work. All Subcontractors shall be reputable firms of recognized standing with a record of satisfactory work. The Contractor shall not utilize any subcontractors not so approved.

2.03 TIME OF CONSTRUCTION

All work must be completed within (2) weeks of Owner's notice to proceed.

2.04 MAINTENANCE OF MARINE TRAFFIC

The Contractor's marine operations, in addition to conforming to all of the regulations, rules, and practices of good and prudent seamanship, shall also conform to and consider the following:

- A. The Contractor shall not interfere with the operations of the adjacent terminals.
- B. All floating equipment shall carry and exhibit proper day and night markers for identification to other vessels, as required by the appropriate "Rules of the Road".
- C. The Contractor is responsible for contacting pier operators and/or tenants and for arranging site access. No claims will be allowed the Contractor by reason of delay caused by pier operations.
- D. Contractor's floating equipment required for the work shall be properly moored in the assigned area when not in use. Berth and wharfage fees will not be charged. However, this no-cost berthing and mooring privilege will be at the Contractor's responsibility, will expire at the end of the contract period, and no liability will be assumed by the Owner.

2.05 DEBRIS AND SURPLUS MATERIAL

- A. All debris, waste, excess material, scrap, and salvageable material generated by the construction shall become the property of the Contractor and shall immediately be removed from the property and legally disposed of unless otherwise provided by these Specifications. Debris shall not be permitted to accumulate and the work shall be kept satisfactorily clean at all times. Burning of debris and waste material will not be permitted. Daily clean-up is required to all areas affected by the work.
- B. It shall be the responsibility of the Contractor to arrange and be responsible for his own off-site disposal area. Equipment and material storage shall be confined to areas approved by the Engineer. Disposal of all rubbish and surplus materials resulting from the Contractor's operations shall be taken off the site of construction at the Contractor's expense, all in accordance with all codes and ordinances governing locations and the methods of disposal.
- C. No floating debris shall be allowed to escape into the open harbor.

2.06 MISPLACED MATERIAL

- A. Should the Contractor during the progress of the work lose, drop, dump, throw overboard, sink, misplace, or leave behind any material, plant, machinery, appliance, or any other item, regardless whether within or outside of the project limits, the Contractor shall recover and remove the same from the harbor bottom with the utmost dispatch as directed by and to the satisfaction of the Engineer.

2.07 REPAIR AND REPLACING EXISTING WORK

- A. All items of existing work which are to remain and are damaged or removed on account of work done under this Contract shall be repaired and replaced to match existing adjacent work in all respects. Repair or replacement of such work will be performed expeditiously, to the satisfaction of the Engineer, and at the Contractor's expense.

2.08 WORKING HOURS

- A. The Contractor may elect, at his expense, to perform some of the work of this project outside of the normal workday (7:00 A.M. to 4:00 P.M.) and workweek (Monday to Friday) in order to complete the work within the specified time.

2.09 DELAYS AND EXTENSION OF TIME

- A. If the Contractor is delayed at any time in the progress of the Work by any act of neglect of the Owner, the Engineer, their employees, any separate contractor employed by the Owner, changes ordered in the Work, strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties, any causes beyond the Contractor's control, or any cause which the Engineer determines justifiable, the time of completion shall be extended for a reasonable period of time by the Engineer.

2.10 MAINE SALES TAX

- A. Material purchased for inclusion in the Work and which is subsequently transferred to and used directly by the City of Portland is not subject to Maine Sales Tax.

-END OF SECTION-

SECTION 01340

SUBMITTALS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Make submittals required by the Contract Documents and revise and submit as necessary to establish compliance with the specified requirements.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary General Conditions and the Drawings.
 - 2. Individual requirements for submittals also may be described in pertinent Sections of these Specifications.
- C. Work not included:
 - 1. Un-required submittals will not be reviewed by the Engineer.
 - 2. The Contractor may require his subcontractors to provide drawings, setting diagrams and similar information to help coordinate the work, but such data shall remain between the Contractor and his subcontractor and will not be reviewed by the Engineer.

1.02 QUALITY ASSURANCE

- A. Coordination of submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.

B. Substitutions:

1. The Contract is based on the standards of quality established in the Contract Documents. Substitutions will be considered when substantiated by the Contractor's submittal of required data within 21 calendar days after award of the Contract.
2. The following products do not require further approval except for interface within the Work:
 - a. Products specified by reference to standard specifications such as ASTM and similar standards.
 - B. Products specified by manufacturer's name and catalog model number.
3. Do not substitute materials, equipment or methods unless such substitution has been specifically approved in writing for this work by the Engineer.

C. "Or equal":

1. Where the phrase "or equal" or "or equal as approved by the Engineer" occurs in the Contract Documents, do not assume that the materials, equipment or methods will be approved as equal unless the item has been specifically so approved for this Work by the Engineer.
2. The decision of the Engineer shall be final.

1.03 SUBMITTALS

A. Shop Drawings

1. Shop drawings, as specified in individual work sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, and individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the work.
2. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for preliminary checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

3. The Contractor shall check all subcontractor's shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the drawings and specifications. Drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.
4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements; such measurements shall be made and noted on the drawings before being submitted for approval.
5. Submit the number of copies which are required to be returned, plus three additional copies to be retained by the Engineer.

1.04 CONTRACTORS RESPONSIBILITIES

- A. The Contractor shall review shop drawings, product data and samples prior to submission to determine and verify the following:
 1. Field measurements
 2. Field construction criteria
 3. Catalog numbers and similar data
 4. Conformance with the Specifications
- B. Each shop drawing, working drawing, sample and catalog data submitted by the Contractor shall have affixed to it the following Certification Statement, signed by the Contractor:

"Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements."
- C. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittal from the requirements of the Contract Documents.
- D. The review and approval of shop drawings, samples or catalog data by the Engineer shall not relieve the Contractor from his responsibility with regard

to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefore.

- E. No portion of the work requiring a shop drawing, working drawing, sample, or catalog data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
- F. Project work, materials, fabrication, and installation shall conform to approved shop drawings, working drawings, applicable samples, and catalog data.

PART 2 - PRODUCTS

2.01 MANUFACTURER'S LITERATURE

- A. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portion of the contents are being submitted for review.
- B. Submit the number of copies which are required to be returned, plus three additional copies to be retained by the Engineer.

2.02 SAMPLES

- A. Provide sample or samples identical to the precise article proposed to be provided.
- B. Number of samples required:
 - 1. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus one which will be retained by the Engineer.
 - 2. By prearrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Engineer.

-END OF SECTION-

SECTION 01500

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Temporary facilities required for this work include, but are not limited to:
 - 1. Temporary barriers.
 - 2. Temporary fire protection.
 - 3. Safety requirements.
 - 4. Storage.

- B. Related work described elsewhere:
 - 1. Compliance with all requirements of pertinent regulations is described in the General Conditions, and Supplemental General Conditions of the Contract.
 - 2. Equipment: Except that equipment shall comply with all requirements of pertinent safety regulations, the ladders, hoists, planks, and similar items normally furnished by individual trades in execution of their own portions of the work are not part of this section of these specifications.

1.02 PRODUCT HANDLING

- A. Protection: Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

- B. Replacements: In the event of loss or damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2.00 - PRODUCTS

2.01 TEMPORARY BARRIERS

Furnish, install and maintain for the duration of construction all barriers, warning signs, and other temporary measures necessary for proper protection of the work in compliance with all pertinent safety and other regulations.

2.02 TEMPORARY FIRE PROTECTION

- A. The Contractor's fire protection program shall conform to Subpart F of the OSHA Standards for Construction and to these Specifications.
- B. Provide and maintain adequate fire protection in form of U.L. labeled all-purpose fire extinguishers, or other effective means of fire extinguishment, ready for instant use, distributed around the project and in and about temporary inflammable structures during construction of work.
- C. Gasoline, solvents and other flammable liquids shall be stored in and dispensed from U.S. listed safety containers in conformance with National Board of Fire Underwriters' recommendations. Storage shall not be within buildings.

2.03 SAFETY AND PROTECTION

- A. Comply with applicable safety regulations, including ANSI Series A10, Safety requirements for Construction and Demolition; and OSHA Part 1926, Construction Safety and Health Regulations. Provide barricades, fences and other protection measures as required.
- B. Minimize storage of flammable materials and ensure that such material is properly handled and stored. Provide fire extinguisher per code requirements, and near locations of flammable products. Do not permit use of open fires or salamanders.
- C. Remove snow and ice from piers, walks, etc., which impedes access, or presents danger to workmen, public, or property.

2.04 STORAGE AREA

During the execution of the work, the Contractor shall locate a storage area for both material and equipment. The Contractor shall use the storage area without obligation or any liability on the part of the Owner and solely at the Contractor's risk.

PART 3 - EXECUTION

3.01 REMOVAL

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work. Remove all such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Engineer.

-END OF SECTION-

SECTION 01700

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 CLEANING

- A. Before inspection for substantial completion, do all necessary cleaning, including the satisfactory removal and disposal of all litter and debris.

1.02 SUBSTANTIAL COMPLETION AND FINAL INSPECTION

- A. Submit written certification that project, or designated portion of project, is substantially complete, and request, in writing, a final inspection. The Engineer will make an inspection within 10 days of receipt of request.
- B. Should the Engineer determine that the work is substantially complete, he will prepare a punch list of deficiencies that need to be corrected before final acceptance and issue a notice of substantial completion with the deficiencies noted.
- C. Should the Engineer determine that the work is not substantially complete, he will immediately notify the Contractor, in writing, stating reasons. After the Contractor completes the work, he shall re-submit certification and request for final inspection.

1.03 ACCEPTANCE OF THE WORK

- A. After all deficiencies have been corrected, a Letter of Final Acceptance will be issued. If only designated portions of the project have been inspected, a Letter of Partial Acceptance will be issued for that portion of the Work.
- B. Acceptance may be given prior to correction of deficiencies that do not preclude operation and use of the facility; however, final payment will be withheld until all deficiencies are corrected.
- C. Until receipt of Letter of Final Acceptance, the Contractor shall be responsible for the work of this Contract.
- D. Upon the date of final acceptance, the Contractor's warranty period shall begin.

-END OF SECTION-

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The Conditions of the Agreement and all Sections of Division 1 are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK

- A. Work included: Provide all labor, material, equipment, and incidentals necessary to complete the work specified in this Section, and without limiting the generality hereof, furnish and install the following:

1. All demolition not previously provided.
2. Removal and satisfactory disposal of existing litter and debris.
3. Staking out layout and grading.
4. Protection of existing structures to remain.
5. Furnishing all temporary facilities.

- B. Related Work:

1. SECTION 02110 - DEMOLITION

1.03 PERMITS AND CODES

- A. All work shall comply with applicable codes, ordinances, rules, regulations and laws of all local, municipal, or state authorities having jurisdiction. All work necessary to make site preparation comply with such requirements shall be provided without additional cost to the Owner.
- B. Procure and pay for all permits and licenses required for work under this Section.

PART 2 - PRODUCTS

2.01 PERMITS, ETC.

- A. All permits, licenses, bonds, insurance, and other items incidental to the work but not actual work items to be performed by the contractor shall be considered as a product required for site preparation.
- B. Notification to the Portland Harbor Commission will be by the Owner.

PART 3 - EXECUTION

3.01 STAKING OUT LAYOUT AND GRADING

- A. All lines and grades not presently established at the site shall be laid out by the Contractor in accordance with the Drawings. Maintain all established bounds and bench marks and replace as directed any which are destroyed or disturbed.
- B. Prior to starting any construction work, stake out all construction limits. Promptly upon completion of layout work and before any other construction work is begun on the site, notify the Engineer, who shall conduct a field inspection of the stakeout. The Engineer reserves the right to adjust the location of such layouts as he deems necessary to comply with the intent of the Contract Documents.

3.02 PROTECTION OF FACILITIES

- A. Adjoining property and all on site facilities are to be protected from injury resulting from the Contractor's operation. Damage to adjoining property and all on-site facilities which is caused by the Contractor shall be repaired by the Contractor as directed by the Engineer at no additional cost to the Owner.
- B. The Contractor will use extreme caution when working around utilities located on, under, or near the pier and shall comply with all applicable rules and regulations governing excavations and pile driving activities. Damage to utilities shall be immediately reported to the Engineer and repaired at the Contractor's expense.
- C. TEC Associates makes no warranty with regard to the actual location of utilities and will be held blameless in the event of damage to them.

-END OF SECTION-

SECTION 02110

DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all labor, materials, equipment, and incidentals necessary to complete the work specified in this section.
- B. Scope of work includes, but is not necessarily limited to, furnishing and installing the following:
 - 1. Removal and disposal of:
 - a. All existing timber piles and miscellaneous timber and concrete as designated on the Drawings or which interferes with the work specified to be done.
 - b. Miscellaneous hardware, pieces of timber, rubble, and any other materials which are encountered during the course of work which interferes with work specified to be done.
- C. Related work specified elsewhere includes:
 - 1. SECTION 02100 Site Preparation

PART 2 - PRODUCTS

- 2.01 No materials are to be supplied under this specification.

PART 3 - EXECUTION

- 3.01 Contractor shall examine the site and make his own independent estimate of the types and quantities of demolition which will be required to fulfill the contract requirements. Any failure on the part of the Contractor to make an independent estimate of demolition quantity or disposal cost shall be the Contractor's responsibility and shall result in no additional cost to the Owner.
- 3.02 All materials removed during demolition designated for disposal shall become the property of the Contractor unless otherwise noted.

- 3.03 All material removed during demolition except that which is to be reused or retained by the Owner shall be disposed of off the site in conformance with all municipal, state, and federal regulations.
- 3.04 Contractor shall use extreme caution when demolishing structures. Damage caused to adjacent structures or structures to remain which is caused by the Contractor shall be repaired by the Contractor as directed by the Engineer at no additional cost to the Owner.
- 3.05 Contractor shall provide shoring for structures not to be removed but which may be weakened during demolition.

-END OF SECTION-

SECTION 02200

EARTHWORK - GENERAL

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment, and incidentals necessary to complete the work specified in this Section.
- B. Scope of work includes, but is not necessarily limited to, furnishing and installing the following:
 - 1. Site grading, excavating, and filling to proposed elevations shown on the Drawings.
 - 2. Performing all pumping and dewatering as necessary to maintain excavated spaces free from water from any source.
 - 3. Disposal of surplus and/or unsuitable excavated material.
 - 4. Obtain all permits required for items of work of this Section for which the approval of public authorities and/or utilities is required.
- B. Related work specified elsewhere includes:
 - 1. SECTION 02100 Site Preparation.

1.02 REFERENCES

- A. Except as noted, the work shall conform to the following codes and standards:
 - 1. State of Maine Department of Transportation (MDOT), Standard Specifications Highways and Bridges, Revision of April 1995: specifications and standards herein referred to.
 - 2. American Society for Testing and Materials (ASTM): the specifications and standards herein referred to, latest editions.
 - 3. American Association of State Highway and Transportation Officials (AASHTO): the specifications and standards herein referred to, latest editions.

1.03 SAMPLES AND TESTING

- A. Provide samples of each fill material from the proposed source of supply, whether on or off site. Allow sufficient time for testing and evaluation of results before material is needed. Submit samples from alternate sources if required. The Engineer will be sole and final judge of suitability of all material.
- B. Do not use materials in question pending test results. Remove rejected materials and replace with new, acceptable materials, whether in stockpiles or in place.
- C. Maximum density and optimum water content shall be determined for each type of fill in conformance with ASTM D1557 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort. In-place density of natural soil base and each subsequent layer shall be determined in accordance with ASTM D1556 Standard Test Method for Density and Unit Weight of Soil In-Place by the Sand-Cone Method. Other methods must be approved by the Engineer. Number of density tests per layer shall be as determined by the Engineer.
- D. Cooperate with laboratory in obtaining field samples of in-place materials after compaction. Furnish incidental field labor in connection with such tests.

1.04 EXAMINATION OF SITE AND DOCUMENT

- A. By submitting a bid, the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed for lack of full knowledge of existing conditions.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period, as no additional compensation will be made for errors or inaccuracies that may be found therein.

1.05 PERMITS AND CODES

- A. All work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations.
- B. The Contractor shall arrange for and obtain all permits and licenses required for the complete work specified herein and shown on the Drawings. Any fees not waived shall be paid for by the Contractor.

- C. Do not close or obstruct any street, driveway, sidewalk, alley, or passageway without the permission of the Owner. Conduct operations as to interfere as little as possible with the use ordinarily made of roads, railroads, driveways, alleys, sidewalks, or other facilities near enough to the Work to be affected thereby.

1.06 LAYOUT AND GRADES

- A. Lay out all lines and grade work not previously established under SECTION 02100, Site Preparation. Replace any stakes which have been disturbed.
- B. Provide adequate line and grade stakes for proper control of all cut and fill operations.
- C. The words "finished grade" as used herein shall mean the required final surface elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, provide uniform slopes between points where finished grades are indicated or between such points and existing established grades.
- D. The word "subgrade" as used herein, means the surface immediately beneath site improvements.

1.07 DISPOSITION OF EXISTING UTILITIES:

- A. Active utility lines damaged in the course of construction operations shall be repaired or replaced as determined by the Engineer without additional cost to the Owner.

1.08 DRAINAGE AND FROST PROTECTION

- A. Upon entering the premises, the Contractor shall assume responsibility for site and subsurface drainage and shall maintain such drainage during the life of his Contract in a manner acceptable to the Project Representative, at all times protecting and maintaining the existing conditions in adjacent areas.
- B. Legally remove by pumping, draining, or bailing all water which may accumulate or be found on the site within the Contract limits where excavation and grading are to be done. Excavate and form all pump wells, sumps, dams, flumes, or other necessary works to keep excavations entirely clear of water. Newly made and existing concrete and masonry shall be protected from injury resulting from dewatering work by the use of canvas, tar paper, or by such other sufficient method as the Engineer may approve. Maintain at all times upon the work sufficient and

satisfactory pumping machinery. Provide pump wells or well points and underdrains as may be required, where needed to properly handle the water. The final trimming excavation shall not be done until the Engineer has approved the manner of dewatering.

- C. Water from trenches and excavations shall be disposed of in accordance with the Maine Department of Transportation Best Management Practices for Stormwater and Erosion Control, latest revision.
- D. Under no circumstances place fill, or install appurtenances in excavations containing free standing water. Keep work area free from water.
- E. Frost Protection: Do not excavate to full indicated depth when freezing temperatures may be expected, unless fill can be placed and compacted immediately after the excavation has been completed. Protect the excavation from frost if placing of fill is delayed. No fill shall be placed over frozen earth.
- F. The Contractor, free of additional expenses to the Owner, shall keep the operations under this Contract clear and free of accumulations of snow within the limits of the Contract line as required to carry out the work.

1.09 DUST CONTROL

- A. The Contractor shall provide acceptable means of controlling and minimizing the amount of dust generated by work under this Contract.
- B. Calcium chloride will be spread only on disturbed unpaved areas as directed by the Engineer. Calcium chloride should not be spread on paved areas that are covered by granular material. These areas shall be swept clean of all granular material.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

- A. Structural Fill Under Concrete Slabs
 - 1. Crushed Stone conforming to MDOT 703.31

PART 3 - EXECUTION

3.01 EARTH EXCAVATION

- A. Dimensions: Excavate to elevations and dimensions indicated on Drawings or required for the Work.
- B. Classification: All material except "rock" as defined hereinafter encountered during excavation shall be classified as earth excavation. The sequence of all excavation operations shall be such as to insure the most efficient re-use of excavated materials where suitable. Suitable materials shall be reused or stockpiled for later use in backfill and subgrade preparation.
- C. Acceptable surplus excavated material not required to fulfill the requirements of the Contract shall be removed from the site and legally disposed of by the Contractor.

3.02 ROCK EXCAVATION

- A. When during the process of excavation, rock is encountered, such material shall be uncovered and exposed. Remove as much weathered rock as possible with conventional excavating equipment.
- B. All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident prevention in Construction" issued by the Associated General Contractors of America, Inc.

3.03 PREPARATION OF AREAS TO RECEIVE FILL

- A. All areas to be filled shall be free of all vegetation, rubbish, boulders, compressible or decayable materials, standing water, subsoil, fill, etc., except as otherwise directed by the Engineer.
- B. Scarify, spotfill, or otherwise treat the surface of areas to receive fill as necessary to remove holes, depressions, ruts, hummocks, or other uneven features.
- C. Compact subgrade to 98% of Modified Proctor maximum density per ASTM D1557 prior to adding fill material.
- D. The Project Engineer or Geotechnical Engineer shall inspect surface prior to starting filling operations.

3.04 PLACING AND COMPACTION OF FILL

- A. Fill shall be placed in horizontal layers not to exceed 6 inches in depth before compaction. Each layer shall be spread evenly at right angles to previous layer and shall be thoroughly blade-mixed during spreading to insure uniformity of material in each layer. The Engineer shall observe each layer before next layer is placed.
- B. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of a day's operation. In no case place fill over frozen material nor incorporate frozen material in fill. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.
- C. Compaction shall be by mechanical means designed specifically for compaction and approved by the Engineer. The Engineer reserves the right to disapprove any device of inadequate capacity or, in his opinion, of type unsuited to the character of material being compacted. In areas which are too restricted to permit the use of heavy equipment, fill may be placed in 3 inch layers and compacted by hand rammer or mechanical tamper to required density or, in the case of drainage fill, to same degree of compaction as would be produced by the specified compaction procedure.
- E. Where tests indicate that fill does not conform to the compaction density specified, the fill shall be removed and replaced with conforming materials without additional cost to the Owner.
- F. If the moisture content of fill material is below the amount needed to create the required density, the fill shall be thoroughly disked to assure uniform distribution, and the needed amount of water added. Similarly, if the moisture content is above the amount needed to create the required density, the fill shall be aerated by blading or other method until the moisture content of the fill material is satisfactory. In restricted areas use granular materials to achieve maximum density with minimum working or material.

3.05 ROUGH GRADING

- A. Do all grading required for the Work including shaping, trimming, rolling, and finishing of the surface of the subgrade. Grading may be done by machine methods. Up to two inches in ten feet tolerance will be permitted on slopes over 2 percent, and one inch in ten feet on slopes under 2 percent provided the slopes are uniform in appearance and without abrupt changes. All ruts shall be eliminated.

- B. If, during the progress of rough grading work, any gas pipe, water pipe, sewer pipe, conduit, drain, or other construction is damaged as a result of operations under this Contract, the Contractor shall repair all such damage at no additional cost to the Owner and restore work to its original condition.
- C. Do all other cutting, filling, and rough grading to the lines and grades indicated on the Drawings. Grade evenly to the grades required herein and as shown on the Contract Drawings. No stone larger than three inches in largest dimension shall be placed in upper six inches of fill.
- D. Grading shall be brought to bottom of the concrete slab.
- E. Complete grading operations after the utilities have been installed, building foundations and site improvements constructed, and all materials, rubbish and debris removed from the site. Provide sufficient grade staking to witness correct lines and grades, as determined by the Engineer.
- F. Wherever streets, drives, or sidewalks within or outside the limit of Contract lines have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all material necessary to bring finish surface level with the existing adjacent surfaces. All work shall be installed to match the existing conditions in accordance with the governing authority. Notify the Engineer prior to restoring surfaces outside the limit of Contract line.

3.07 MAINTENANCE

- A. Protection of graded areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning compacted areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
- C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove the slab, add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.08 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Remove excess excavated material, trash, debris, and waste materials and dispose of off Owner's property.

3.09 DEFECTIVE WORK

- A. Any material not conforming to these Specifications shall be replaced to the satisfaction of the Engineer.
- B. Any material improperly installed in the work shall be removed and replaced or corrected to the satisfaction of the Engineer.

-END OF SECTION-

SECTION 03000
REINFORCED CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all labor, materials, equipment, and incidentals necessary to complete the work specified in this Section.
- B. Scope of work includes, but is not necessarily limited to, furnishing and installing the following:
 - 1. Cast-in-place concrete:
 - a. Pile splice encasement
 - 2. Forms
 - 3. Falsework for forms
 - 4. Form ties
 - 5. Reinforcing steel
 - 6. Cutting and patching
 - 7. Control joints
- C. Related work specified elsewhere includes:
 - 1. SECTION 05500 Miscellaneous Metals
 - 2. SECTION 06130 Marine Timber Construction

1.02 REFERENCES

- A. Except as noted, the work shall conform to the following codes and standards:
 - 1. American Society for Testing and Materials (ASTM): the specifications and standards herein referred to, latest editions.
 - 2. American Concrete Institute (ACI):
 - a. "Building Requirements for Reinforced Concrete", ACI 318.

- b. "Specifications for Structural Concrete and Buildings", ACI 301-84.
 - c. "Recommended Practice for Measuring, Mixing, and Placing Concrete", ACI 304.
 - d. "Recommended Practice for Cold (Hot) Weather Concreting", ACI 306 and ACI 307.
 - e. "Recommended Practice for Concrete Formwork", ACI 307.
- 3. Concrete Reinforcing Steel Institute (CRSI): specification and standards herein referred to.
 - a. "Reinforced Concrete - A Manual of Standard Practice".
 - b. "Recommended Practice for Placing Reinforcing Bars".
 - c. "Recommended Practice for Placing Bar Supports".
 - 4. State of Maine Department of Transportation (MDOT), Standard Specifications Highways and Bridges, Revision of April 1995: specifications and standards herein referred to.

1.03 SUBMITTALS

A. Shop Drawings

- 1. Reinforcing steel shop drawings shall be of such detail and completeness that all fabrication and placement at the site can be accomplished without the use of contract drawings for reference. Reinforcing steel shop drawings shall include number of pieces, sizes, and grade of reinforcing steel, accessories, and any other information required for fabrication and placement.
- 2. Contractor shall check structural and site drawings for anchor bolts, anchors, inserts, sleeves, and any other items which are required to be embedded in concrete, and shall make necessary provisions as required so that reinforcing steel will not interfere with the placement of such embedded items.
- 3. Joint layout and design.

B. Concrete mix design.

- C. High strength, non-shrink epoxy grout: manufacturer, specifications, and instructions.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Reinforcing steel shall be transported to the site, stored, and covered in a manner which will ensure that no damage shall occur to it from moisture, dirt, grease, or any other cause that might impair bond to concrete. A sufficient supply of approved reinforcing steel shall be stored on the site at all times to ensure that there will be no delay of the work. Identification of steel shall be maintained after bundles are broken.

1.05 JOB CONDITIONS

A. Cold Weather Requirements:

1. Concrete shall not be mixed or placed when the temperature is below 40° Fahrenheit, or when conditions indicate that the temperature will fall below 40° Fahrenheit within 72 hours unless precautions are taken to protect the concrete.
2. Concrete temperature shall be maintained, when deposited, at not less than 60° Fahrenheit. Reinforcement, forms, and ground which concrete will contact must be completely free of frost.
3. Concrete and formwork must be kept at a temperature of not less than 50° Fahrenheit for not less than 96 hours after placing.
4. Calcium chloride shall not be used.

B. Hot Weather Requirements:

1. The maximum temperature of the concrete, when deposited, shall be 80° Fahrenheit. If the weather causes the placing temperature to exceed 80° Fahrenheit, the mix shall be cooled by appropriate methods approved by the Engineer.
2. No concrete shall be deposited when the air temperature is greater than 90° Fahrenheit.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Portland Cement: Conforming to ASTM C150, Type II or Type V of U.S. manufacture. Only one brand of cement shall be used on the project.

- B. Aggregates:
1. Fine aggregate. Conforming to ASTM C33, clean and graded from 1/4 inch to fines.
 2. Coarse aggregate. Conforming to ASTM C33, size 57 or size 67 (MDOT CLASS A or Class AA), clean and graded from 1/4 inch to maximum sizes herein-after specified. Coarse aggregate shall additionally have a loss of abrasion of less than 20% with an absorption of less than 0.5% and have at least 2 crushed faces.
- C. Air Entraining Agent:
Conforming to ASTM C260 for Air-Entraining Admixtures for Concrete.
- D. Water Reducing Agent:
Conforming to ASTM C494 Type A for Chemical Admixtures for Concrete.
- E. Corrosion Inhibiting Agent:
Conforming to ASTM C1582 for Admixtures to Inhibit Chloride-Induced Corrosion of Reinforcing Bars in Concrete.
- F. Reinforcing Bars and Welded Wire Fabric:
1. Bars: New, deformed billet steel bars, Grade 60, conforming to ASTM A615 for plain steel reinforcement.
 2. Welded Wire Fabric: Conforming to ASTM A185 for welded steel wire fabric in flat sheets only.
- G. Accessories:
Reinforcement accessories, consisting of spacers, chairs, ties, and similar items shall be provided as required for spacing, assembling, and supporting reinforcement in place. All accessories shall be approved plastic accessories, conforming to the applicable requirements of the CRSI Standards hereinbefore specified.
- H. Tie Wire:
Tie wire for reinforcement shall be 16 gauge or heavier, confirming to ASTM A82 for Steel Wire, Plain, for Concrete Reinforcement
- I. Forms:
Plywood forms shall be used for all concrete work except where otherwise scheduled or specified. Plywood shall conform to U.S. Product Standard PS 1-66 and shall be a minimum of 5/8 inch thick. Each panel shall carry the grade trademark of the American Plywood Association along with the DFPA Quality stamp.

- J. Form Ties and Spreaders:
Standard metal form clamp assembly and plastic cone, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Inner tie rod shall be left in concrete when forms are removed. No wire ties or wood spreaders will be permitted. Use 1/2"x1" C.T. plastic cones for sinkages.
- K. Form Coatings:
Non-grain raising and non-staining type that will not leave residual matter on surface of concrete or adversely affect proper bonding of subsequent application of other material applied to concrete surface, "Nox-Crete Form Coating" as manufactured by Nox-Crete Company, or approved equal. Coatings containing mineral oils or other non-drying ingredients will not be permitted.
- L. Grout:
Grout shall be a non-shrink, high strength epoxy such as "Five Star Epoxy Grout" or approved equal. No grout which shrinks when it cures will be approved.
- M. Water:
Clean and potable, free of impurities, not detrimental to concrete.

2.02 CONCRETE STRENGTHS AND PROPORTIONS

- A. All concrete shall have the following minimum compressive strength at 28 days and shall be proportioned within the following limits:

<u>Item</u>	<u>Minimum psi at 28 Days (f'c)</u>	<u>Maximum Size of Aggregate</u>	<u>Maximum Slump</u>
1. Structural Concrete	4000	size 57	2-4" *

* Slump may not exceed 6" if super-plasticizer is used.

- B. The exact proportions for the mix, including amount of admixture (if any), and water, shall be determined by the concrete supplier. However the water cement ratio should not exceed 0.42 and each cubic yard of concrete shall contain a minimum of 7.5 sacks (94 lbs per sack) of Portland Cement.
- C. The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed

on the work, but without permitting the materials to segregate or excess free water to collect on the surface.

- D. The air content in all concrete exposed to weathering shall be maintained at 4 to 6 percent.
- E. Corrosion inhibiting admixture shall be added at the rate of 4.0 gallons per cubic yard.

PART 3 - EXECUTION

3.01 CAST-IN-PLACE CONCRETE

A. Falsework for Forms

The contractor shall build and maintain necessary falsework, for the forms.

1. General - Forms and embedded items shall conform to the requirements of ACI 301-84
 - a. Forms shall be constructed of sound material, shall be of the correct shape and dimensions, mortar tight, of sufficient strength, and so braced and tied together that the movement of men, equipment, materials, or placing and vibrating the concrete will not throw them out of line or position.
2. Embedded Items
 - a. Provisions shall be made for pipes, sleeves, anchors, inserts, reglets, anchor slots, waterstops, and other features. No unauthorized wood shall be embedded in the installation. Secure information about embedded items from other trades as required. All embedded items shall be securely anchored in correct location and alignment prior to placing concrete.
3. Openings for Items Passing Through Concrete
 - a. Contractor shall establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections. Contractor shall be held responsible for proper coordination of all work of this nature in order that there will be no unnecessary cutting and patching of concrete. Any cutting and repairing to concrete required as a result of failure to provide for such openings shall be paid for by the Contractor at no additional expense to the Owner.

B. Removing Forms and Falsework

1. Forms shall not be removed until the concrete has attained sufficient strength to insure stability. As a minimum, forms shall remain in place for seven days unless otherwise approved by the Engineer.

C. Reinforcing Steel

1. General - Reinforcing steel shall be grade 60 and conform to ASTM A615.

- a. Reinforcing steel shall be placed in accordance with the drawings and approved shop drawings and the applicable requirements of the "Codes and Standards" hereinbefore specified. Install reinforcement accurately and secure against movement, particularly under the weight of workmen and the placement of concrete.

2. Reinforcing Steel Supports

- a. Bars shall be supported on chairs or spacers, accurately placed and securely fastened to forms or steel reinforcement in place. Additional bars shall be supplied, whether specifically shown on the drawings or not, where necessary to securely fasten reinforcement in place. Support legs of accessories in forms without embedding in form surface. Spacing of chairs and accessories shall conform with CRSI's "Recommended Practice for Placing Bar Supports". Hoops and stirrups shall be accurately spaced and wired to the reinforcement. No wood will be permitted inside forms.

3. Placing and Tying

- a. All reinforcement shall be set in place, spaced, and rigidly and securely tied or wired with 16 gauge galvanized steel tie wire at all splices and at all crossing points and intersections in the position shown, or as directed. Re-bending of bars on the job to accommodate existing conditions will not be permitted without the written approval of the Engineer. Point ends of wire ties away from forms.

4. Spacing

- a. Minimum center to center distance between parallel bars shall be in accordance with the details on the drawings, or,

where not shown, the clear spacing shall be 2 times the bar diameter but in no case less than 1-1/2 inches or less than 1-1/2 times the maximum size aggregate.

5. Splices

- a. Splices shall be in accordance with Chapter 7 and 12 of ACI 318-83.

6. Protective Concrete Covering

- a. Except where shown otherwise on drawings, the minimum concrete coverage for steel reinforcement shall conform with the applicable revisions of the "Codes and Standards" hereinbefore specified. Minimum clear distance between exposed concrete surface and reinforcing shall be 1.5".

D. Mixing of Concrete

1. All concrete shall be ready-mixed concrete and shall be mixed and delivered in conformance with ASTM C94 Standard Specification for Ready-Mixed Concrete. The batch plant of the concrete producer shall be certified for compliance with the standards established by the National Ready-Mixed Concrete Association.
2. In the event concrete is mixed at a central batching plant, the delivery shall be arranged so that intervals between batches are kept to a minimum, and in any event not more than thirty (30) minutes. Trucks shall be in first class conditions and kept in constant rotation during delivery.
3. Concrete shall be placed within 90 minutes after cement has been mixed with aggregate or 45 minutes after addition of water and admixtures.
4. No admixtures, except those mentioned in paragraph 2.01 shall be used. Calcium chloride will not be permitted.
5. Truck delivery slips of all concrete delivered to the job indicating the quantity and quality of concrete, additives, date and time of delivery, and location of placement shall be forwarded to the Owner at the end of each week.

E. Testing of Concrete

1. Design of Mix: The mixes for all reinforced concrete shall be designed by the Contractor to produce the specified requirements.

Mix design shall be in accordance with ACI 301 and shall be based upon laboratory trial batches as specified in section 3.9.3.3 of that standard. The Contractor shall submit to the Engineer for approval, complete information on the proportions of the various materials along with anticipated slump limits prior to casting concrete at the site.

2. Quality Control

- a. Test Specimens: The Contractor shall make, cure, and have tested, a minimum of one set of four test specimens from the concrete of each day's pour and for each fifty cubic yards of concrete cast. Testing shall be in conformance with ASTM C172 Standard Practice for Sampling Freshly Mixed Concrete, ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field, and ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens. One cylinder shall be broken after seven days and three cylinders after twenty-eight days.
- b. Slump: The contractor shall make a slump test for each truckload of concrete in conformance with ASTM C143 Standard Test Method for Slump of Hydraulic Cement Concrete. Slump less than design mix limit will require the addition of water and retesting. Slumps greater than design mix limit will be grounds for rejection of the concrete.
- c. Air Content: The Contractor shall make an air content test from each day's pour of concrete by the pressure method in conformance with ASTM C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method. Air contents above or below the limits specified will be grounds for rejection of the concrete.
- d. Testing: All personnel and laboratories testing concrete shall be licensed by the State of Maine. All testing of concrete shall be in accordance with Chapter 16 of ACI 301.
- e. In the event the compressive strength of the cylinders, when tested, is below the specified minimum, the Engineer may require test cores of the hardened structure to be taken by the Testing Laboratory in Conformance with ASTM C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete. If such test indicates that the core specimen is below the required strength, the concrete in question shall be removed and replaced without

cost to the Owner. Any other work damaged as a result of this concrete removal shall be replaced with new materials to the satisfaction of the Engineer at no additional cost to the Owner. Where core cylinders have been taken by the Testing Laboratory and the concrete proves to be satisfactory, core holes shall be filled in a manner satisfactory to the Engineer at no additional cost to the Owner.

3. The Contractor shall coordinate the date and location of tests with the Engineer before any concrete work is started.

F. Conveying and Placing Concrete

1. Before placing concrete, forms shall be thoroughly inspected. All chips, dirt, and foreign matter shall be removed; all temporary bracing and cleats shall be taken out; all openings for pipes and other fixtures shall be properly boxed; all forms shall be properly secured in their correct positions and made tight; and all reinforcement, anchors, and embedded items shall be secured in their proper places. Concrete which may be on the forms or reinforcement, and which is set and dry, shall be cleaned off, and the forms and steel washed off before proceeding.
2. Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Engineer. Any flow of water into an excavation shall be diverted through proper side drains into a sump, or shall be removed by other approved methods which will avoid washing away the freshly deposited concrete.
3. Soil on which concrete will be poured shall be thoroughly wetted (except in freezing weather).
4. Anchors and Embedded Items
 - a. Anchors, bolts, sleeves, inserts, and any other items to be embedded in concrete shall be accurately secured in position before the concrete is placed. Aluminum shall not be embedded in concrete.
 - b. All items to be grouted in prior to concrete installation shall use non shrink, high strength epoxy grout.
5. Handling and Repositioning
 - a. Before any concrete is placed, the contractor

shall notify all whose work is in any way connected with or influenced by the concrete work, and give them reasonable time to complete all portions of their work that must be completed before concrete is deposited.

- b. Immediately before concrete is placed, the Contractor shall inspect all forms to be sure that they are in proper position, sufficiently rigid, thoroughly clean, properly oiled and free from foreign materials, and that all reinforcement is in proper position.
- c. Concreting, once started, shall be carried on as a continuous operation until the section of approved size and shape is complete.
- d. Concrete shall be conveyed as rapidly as practicable from the mixer to the place of final deposit by methods which prevent the separation or loss of ingredients. It shall be deposited, as nearly as practicable, in its final position to avoid re-handling or flowing.
- e. Concrete shall not be dropped freely where reinforcement will cause segregation, nor shall it be dropped freely more than six feet. Concrete shall be deposited to maintain a plastic surface approximately horizontal.
- f. Concrete that has partially hardened shall not be deposited in the work. The discharge of concrete shall be started not more than 45 minutes after the introduction of mixing water. Placing of concrete shall be completed within 90 minutes of the first introduction of water into the mix.

6. Pumping

- a. Concrete may be placed by pumping if first approved in writing by the Engineer for the location proposed. Equipment for pumping shall be of such size and design as to ensure a practically continuous flow of concrete at the delivery end without separation of materials. The concrete mix shall be designed to the same requirements as hereinbefore specified, and may be richer in lubricating components in order to allow proper pumping. Concrete shall not be pumped through aluminum pipes. All pumping operations must have full-time inspection by a recognized testing laboratory approved by the Engineer and paid for by the Contractor. The cost of this full-time inspection shall

be included in the Contractor's bid proposal if the option of pumping is elected.

7. Vibrating and Compacting

- a. All concrete shall be thoroughly consolidated and compacted by suitable means during the operation of placing, and shall be thoroughly worked around reinforcement, embedded items, and into the corners of the forms. All concrete against forms shall be thoroughly spaded. Internal vibrators shall be used under experienced supervision, and shall be kept out of contact with reinforcement and wood forms. Vibrators shall not be used in a manner that forces mortar between individual form members.
- b. Vibrators shall be flexible electric type or approved compressed air type, adequately powered and capable of transmitting to the concrete not less than seven thousand (7,000) impulses per minute. Vibration shall be sufficiently intense to cause the concrete to flow or settle readily into place without separation of the ingredients. A sufficient number of vibrators shall be employed so that complete compaction is secured throughout the entire volume of each layer of concrete. At least one (1) vibrator shall be kept in readiness as a spare for emergency use. Vibrators shall be such that the concrete becomes uniformly plastic with their use.
- c. Vibration shall be close to the forms but shall not be continued at one spot to the extent that large areas of grout are formed or the heavier aggregates are caused to settle. Care shall be taken not to disturb concrete which has its initial set.
- d. Where conditions make compacting difficult, or where the reinforcement is congested, batches of mortar contained the same proportions of cement to sand as used in the concrete shall first be deposited in the forms, to a depth of at least one inch.
- e. The responsibility for providing fully filled out, smooth, clean, and properly aligned surfaces free from objectionable pockets shall rest entirely with the Contractor.

H. Construction Joints

Construction joints shall be located as necessary. The Contractor shall prepare placing plan and submit it to the Owner for approval. Where a joint is to be made, the surface of the concrete shall be sandblasted or thoroughly picked, thoroughly cleaned, and all laitance removed. In addition to the foregoing, joints shall be thoroughly wetted, but not saturated, and slushed with a coat of grout immediately before the placing of new concrete. Approved keys shall be used at all joints, unless detailed otherwise. Forms shall be retightened before placing of concrete is continued. There shall be an interval of at least 48 hours between adjacent pours.

I. Cutting and Patching

Immediately after stripping forms, patch minor defects, form-tie holes, honeycombed areas, etc., before concrete is thoroughly dry. Repair gravel pockets by cutting out to solid surface, form key, and thoroughly wet before placing patching mortar consisting of 1 part cement to 2 parts fine sand; compact into place and neatly finish. Honeycombed areas or gravel pockets which, in the Engineer's opinion are too large and unsatisfactory for mortar patching as described above, shall be cut out to solid surface, keyed and packed solid with matching concrete to produce firm bond and surface.

1. The contractor shall do all the cutting as required by himself or other trades. All such work shall be of the minimum size required. No excessive cutting will be permitted, nor shall any structural members or reinforcement be cut.
2. The contractor shall do all patching after work by other trades has been installed, where required, using Portland Cement Mortar 1:2 mix.

J. Protection and Curing

1. Protect concrete from injurious action of the elements and defacement of any nature during construction operations.
2. Keep concrete in a thoroughly moist condition from the time it is placed until it has cured, for at least (7) days.
3. Keep all forms sufficiently set to prevent drying out of the concrete.
4. Carefully protect exposed concrete corners from damage.

5. Allow no slabs to become dry at any time until curing operations are complete. In general, slabs shall be cured with non-staining curing paper, hosing, or fog spray. Vertical surfaces shall be cured with fog spray or an approved curing compound. Protect fresh concrete from drying winds, rain, damage, or soiling. Curing paper shall be lapped a minimum of four inches at joints and sealed with waterproof tape.

K. Concrete Finishes

1. Exposed Surfaces

- a. All exposed surfaces shall have any form finish, at the Contractor's option.

2. Wearing Surface Finish

- a. Floated finish - after the concrete has been placed, consolidated, struck off, and leveled, the concrete shall not be worked further until ready for floating. Floating with a hand float, or with a bladed trowel equipped with float shoes, or with a powered disk float shall begin when the water sheen has disappeared and the surface has stiffened sufficiently to permit the operation. During or after the first floating, planeness of surface shall be checked with a ten foot straight-edge applied at not less than two different angles. All high spots shall be cut down and all low spots filled during this procedure to produce a surface within Class B tolerance throughout. The slab shall then be refloated immediately to a uniform sandy texture.
- b. Broom or belt finish - immediately after the concrete has received a float finish as specified, it shall be given a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

3. Addition of Materials

- a. The addition of cement, sand, water, or mortar to slab surfaces while finishing concrete is strictly prohibited.

L. Defective Work

The following concrete work shall be considered defective and may be ordered by the Engineer to be removed and replaced at Contractor's expense:

1. Concrete
 - a. Incorrectly formed.
 - b. Not plumb or level.
 - c. Not specified strength.
 - d. Containing rock pockets, voids, honeycomb or cold joints.
 - e. Containing wood or foreign matter.
 - f. Otherwise not in accordance with the intent of the Drawings and Specifications.

-END OF SECTION-

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all labor, materials, equipment, and incidentals necessary to complete the work specified in this Section.
- B. Scope of work includes, but is not necessarily limited to, furnishing and installing the following:
 - 1. Miscellaneous hardware including but not limited to pins, nuts, and bolts.
- C. Related work specified elsewhere:
 - 1. SECTION 03000 - Reinforced Concrete

1.02 REFERENCES

- A. Except as noted elsewhere, work shall conform to the latest edition of the following codes and standards:
 - 1. American Society for Testing and Materials (ASTM): specifications and standards herein referred to.
 - 2. American Welding Society (AWS): Structural Welding Code D1.1.
 - 3. American Institute of Steel Construction (AISC): specifications and standards herein referred to.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All products provided under this Specification shall be delivered, stored, and handled so they are not lost, stolen, or damaged before installation in the work. Any material provided by the Contractor which is lost, stolen, or damaged will be replaced by the Contractor at no expense to the Owner.

1.04 SUBMITTALS

- A. Shop drawings for all shop fabricated items shall be submitted to the Engineer for approval before beginning fabrication.

- B. Mill certificates stating the chemical composition, yield point, and ultimate strength of the steel.
- C. Certificate of compliance with applicable ASTM specifications for all galvanized items.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials provided by the Contractor shall meet the requirements of this Section. Any material rejected by the Engineer as not complying with these Specifications shall be replaced by the Contractor at no expense to the Owner.

2.02 MATERIAL

- A. Structural steel shall conform to ASTM A36 Standard Specification for Carbon Structural Steel.
- B. Bolts shall conform to ASTM A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength unless otherwise noted on the Drawings.
- C. All structural steel items shall be galvanized by the hot-dip method conforming to ASTM A123 Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
- D. All hardware shall be galvanized by the hot-dip method conforming to ASTM A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. Welding rods shall conform to AWS E70xx grade.

PART 3 - CONSTRUCTION REQUIREMENTS

3.01 FABRICATION

- A. Fabrication shall conform to AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.

- B. All materials shall be clean and straight. Each assembly shall be accurately fabricated to the lines and dimensions called for and shall be free from undue twists, bends, warping, distortion, and other irregularities.
- C. Assemblies shall be fabricated to within + or - 1/8" of their theoretical dimension.
- D. Surfaces to be welded shall be clean and free from foreign material. Preparation of edges by gas cutting shall be done mechanically by a guided torch.
- E. Workmanship shall be equal to standard commercial practice.

3.02 INSTALLATION

- A. Installation shall conform to the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.
- B. Parts covered by this Specification shall be installed in the work as shown on the Drawings.
- C. Do not use gas cutting torches in the field for correcting fabrication errors or for cutting or enlarging holes.
- D. Damaged galvanized coatings shall be power tool cleaned and coated with two coats of a cold galvanizing paint. Coat all field drilled holes with two coats of a cold galvanizing paint.
- E. Parts covered by this Specification shall be installed in the work as shown on the Drawings.
- F. Workmanship shall be equal to standard commercial practice.

3.04 DEFECTIVE WORK

- A. Any damaged material shall be repaired or replaced to the satisfaction of the Engineer.
- B. Any material improperly installed in the work shall be removed and replaced or corrected to the satisfaction of the Engineer.

-END OF SECTION-

SECTION 06130

MARINE TIMBER CONSTRUCTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all labor, materials, equipment, and incidentals necessary to complete the work specified in this Section.
- B. Scope of work includes, but is not necessarily limited to, furnishing and installing the following:
 - 1. Splicing and bracing timber piles
 - 2. Cribbing timber pile caps
- C. Related work specified elsewhere includes:
 - 1. SECTION 03000 Reinforced Concrete

1.02 REFERENCES

- A. Except as noted elsewhere, the work shall conform to the latest edition of the following codes and standards:
 - 1. American Society for Testing and Materials (ASTM): specifications and standards herein referred to.
 - 2. American Association of State Highway and Transportation Officials (AASHTO): specifications and standards herein referred to.
 - 3. American Wood Preservers Association (AWPA): specifications and standards herein referred to.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All products provided under this Specification shall be delivered, stored, and handled so that they are not lost, stolen, or damaged before installation in the work. Any material provided by the Contractor which is lost, stolen, or damaged will be replaced by the Contractor at its cost and expense.

1.04 SUBMITTALS

- A. The Contractor shall submit to the Engineer certification that the structural timber provided meets the requirements for quality, grade, and pressure treatment required by the Specifications.
- B. Submit manufacturer's catalog data, specifications, and instructions for epoxy resin supplied by other than pre-approved suppliers.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials provided by the Contractor shall meet the requirements of this Section. Any material rejected by the Engineer as not complying with these Specifications shall be replaced by the Contractor at no expense to the Owner.
- B. The Contractor will supply all material necessary for the work including but not limited to structural timber, spikes, nails, lags, bolts, pins, and miscellaneous metals. All material supplied by the Contractor will conform to these Specifications. All material shall be new unless otherwise approved by the Engineer.

2.02 STRUCTURAL TIMBER

A. SPECIES ACCEPTABLE

- 1. Timber: 2" to 4" thick, 5" and wider - Douglas Fir #2 grade or better or Southern Pine #2 grade or better.

Timber: Beams and Stringers, Posts and Timbers - Douglas Fir Dense #1 grade or better (WCLIB and WWPA). 5" and thicker - Southern Pine #1 SR grade or better (SPIB).

- 2. Decking: Native hemlock, conforming to paragraphs B.1. through B.3., C.1, and D.1. below. Grading shall be approved by the Engineer.

B. DESIGN AND MANUFACTURE, SAWN LUMBER

- 1. All timber will be well manufactured, cut square at ends, be sawn four sides, have top and bottom parallel unless otherwise indicated, and have inner and outer bark removed. Material shall be rough lumber except as otherwise specified, sized within c" of nominal in width and thickness. Length will be acceptable at -1/4" to +6".

2. Straightness: Only very light warp permitted, slope of grain is limited to 1" in 14".
3. Wane: Wane is limited to 1/12 nominal width of face.
4. Shakes and Checks: Restrictions on shakes, checks, and splits apply whether material is seasoned or unseasoned. The grading of any combination of these imperfections is based on the judgement of the inspector.

Shakes and pith shakes are measured at the ends of pieces and must be wholly enclosed without extending to a surface at or away from end. The size is the distance between lines enclosing the shake and parallel to wide faces of piece and shall not exceed one third the width of the wide face.

Checks are measured as the penetration from and perpendicular to the wide face. The size shall not exceed one third the width of the wide face.

Splits are not permitted away from ends of pieces. End splits are limited to a length not exceeding the thickness of the timber.

5. Density: Density shall average on one end or the other not less than six annual rings per inch and one-third or more summer wood.
6. Knots: Knots shall be sound and tight and be encased. Through knot holes or other holes are not allowed but surface pits or cavities from broken knots or similar causes not over ½ inch deep and not involving unsoundness are permitted. Knots in narrow faces or at the edges of wide faces at any point in the length of the piece shall be limited to sizes of 1 inch in pieces 2 or 3 inches thick, 1½ inches in pieces 4 or 5 inches thick, 2 inches in pieces 6 or 7 inches thick, 2½ inches in pieces 8 to 10 inches thick, and 3 inches in pieces 12 inches or thicker. Such knots shall be measured and limited between lines parallel to the edges of the piece.
7. Lumber furnished shall meet or exceed the design values by AASHTO Standard Specifications for Highway Bridges for lumber used at 19% maximum moisture content and surfaced dry or surfaced green as permitted.

C. CONDITIONING, SAWN LUMBER

1. American Wood Preservers Association (AWPA) Standards and Specifications shall govern all timber conditioning.

D. TREATMENT, SAWN LUMBER

1. All timber provided in accordance with this Specification shall be treated to a retention of 0.4 pounds per cubic foot of chromated copper arsenate (CCA) in accordance with AWPA Standard C2.

2.03 HARDWARE

- A. Hardware shall include bolts with necessary nuts and washers, nails, screws, spikes, pins, and other metal fastenings. Bolts and nuts shall conform to ASTM A307 Standard Specification for Carbon Steel Bolts, 60,000 psi Tensile Strength, unless otherwise indicated on the Drawings.
- B. Washers shall be dock washers or "OG" washers at the contractor's option. Provide washers under bolt nut and head.
- C. Timber connectors and other metal fastenings shall be of the type and size shown. Nails shall be common wire nails.

2.04 ZINC-COATING

- A. Hot-dip galvanize all hardware and steel items in accordance with ASTM A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware. Button head pins and boat spikes may be furnished in plain steel.

2.05 EPOXY RESIN

- A. Epoxy resin shall be CrownWeld Pro 101 or CrownWeld Pro Gel 102 as manufactured by Crown Polymers, Hampshire, IL or Osmoweld as manufactured by Osmose Wood Preserving, Madison, WI or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall be required to conduct and phase all work in a manner that will not interfere with the operations of pier owners and tenants.

3.02 CONSTRUCTION

- A. Framing: Cut and frame all timber so that joints will have full bearing and proper fit at contact surfaces. Work is to be set to required lines and levels with members plumb and true or as indicated on the Drawings. No shimming other than that indicated on the Drawings will be permitted. Open joints are unacceptable and must be filled with epoxy resin to the satisfaction of the Engineer. Avoid cutting off treated ends of lumber where possible.
- B. Bracing: Use the full length of bracing members and avoid cutting off treated ends of bracing where possible. Cut ends of bracing shall not be installed in the water where possible. Bolts shall be located not less than 12 inches from the ends of bracing unless necessary to suit field conditions. Block bracing as required to account for misalignment of piles. Minimum length of blocks shall be 18 inches and blocks shall be securely held with nails or spikes. Blocks shall be drilled for all fasteners.
- C. Fastening: Work is to be securely fastened and attached with adequate nails, spikes, bolts, pins, etc. as shown on the Drawings or otherwise necessary to suit field conditions. Secure all blocks and shims with pins, spikes, or common nails as appropriate. Use dock washers or OG washers under all bolt heads and nuts in contact with wood. Vertical bolts shall have nuts on the lower end. Bore holes for spikes, pins, and bolts with a bit of the same diameter or smallest dimension of the spike to prevent splitting. All bolt heads or nuts on the top or outer face of timbers or piles subject to vessel contact or foot traffic shall be countersunk.
- D. The use of cutting torches on, under, or within ten feet of timber piers is prohibited.

3.03 FIELD TREATMENT

- A. Timber cuts and bored holes during the work must be treated with Cuperinol Wood Preservative or approved equal.

3.04 DEFECTIVE WORK

- A. Any damaged material shall be repaired or replaced to the satisfaction of the Engineer.
- B. Any material improperly installed in the work shall be removed and replaced or corrected to the satisfaction of the Engineer.

-END OF SECTION-