

**Machon's Point Marginal****Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

## Underwater Excavation and Site Preparation

PART 1 – GENERAL1.1 Definitions

- .1 Underwater Excavation: excavating, transporting and disposing of underwater materials below Chart Datum (CD):
- .2 Excavated Material: loose or shale rock, silt, sand, quick sand, mud, shingle, gravel, clay and sand, boulders, hardpan, debris, and solid rock or boulders of any size.
- .3 Debris: all construction material, including pieces of wood, wire rope, scrap steel, concrete, etc.
- .4 Grade: plane above which all material is to be excavated to.
- .5 Estimated quantity: volume of material calculated to be above grade and within specified side slopes.
- .6 Sideslope: inclined surface or plane from grade at side limit of excavation area to intersect original ground line outside of side limit and to be expressed as a ratio of horizontal to vertical.
- .7 Chart Datum: by international agreement, a plane below which the tide will seldom fall. The Canadian Hydrographic Services has adopted the plane of Lowest Norman Tide (LNT) as Chart Datum. As the rise, fall and ranges of tides varies daily, The Canadian Hydrographic Services should be consulted for tidal prediction and other tidal information relating to the work.
- .8 CPM: cubic metres place measurement prior to removal.
- .9 CMTM: cubic metres truck measurement.

1.2 Description of Work

- .1 Work under this section covers the following:
  - .1 Excavation of underwater material to lines and grades as shown on the drawings.

1.3 Related Work

- .1 Refer to 01 29 00 Project Particulars and Measurement.
  - .2 Refer to Section 01 33 00 for Shop Drawing/Submission requirements.
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- .3 Refer to Section 01 35 44 Environmental Protection Procedures for Marine Work.
  - .4 Refer to Section 31 23 10 Excavating, Trenching and Backfilling.
- 1.4 Submissions
- .1 Certificates:
    - .1 Provide copies of all permits and licenses required to carry out the work.
  - .2 Methodology:
    - .1 Provide methodology for carrying out the work.
  - .3 Provide submissions in accordance with Section 01 33 00.
- 1.5 Schedule of Work
- .1 Submit to Departmental Representative within 2 weeks after award of contract, a schedule of work including time periods during which each operation involved in work will be undertaken.
- 1.6 Interference to Navigation
- .1 Be familiar with vessel movements and fishery activities in area affected by underwater excavating operations. Plan and execute work in a manner that will not unnecessarily impede navigation and fishing operations including movement of vessels at adjacent structures.
  - .2 Keep District Manager informed of operations in order that necessary Notices will be issued.
- 1.7 Requirements of Regulatory Agencies
- .1 Comply with municipal, provincial and national codes and regulations relating to project.
  - .2 Mark floating equipment with lights in accordance with Regulations for the Prevention of Collisions and Notice to Mariners.
  - .3 Blasting operations are not permitted.
- 1.8 Datum, Water Gauges and Targets
- .1 Elevations used in this specification and contract drawings are in metres referred to chart datum.
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| 1.9  | <u>Qualifications</u>          | .1 | Retain a qualified experienced staff member to supervise and program the work, and to determine precautions, preparation and operation techniques.   |
| 1.10 | <u>Protection</u>              | .1 | Prevent damage to surroundings and injury to persons. Post guards, sound warnings and display signs when undertaking the work.   |
| 1.11 | <u>Equipment</u>               | .1 | Determine the equipment required to excavate the area and material specified.  |
| 1.12 | <u>Site Information</u>        | .1 | Results of prior soundings, soil borings and soil investigations may be available for inspection at offices of Public Works and Government Services Canada, 3 Queen Street, Charlottetown, PE C1A 4A2.   |
|      |                                | .2 | Results of most recent soundings are included with the drawings. This data is made available for tendering purposes only. It should be noted that this information may differ from present site conditions.  |
|      |                                | .3 | The Contractor will be responsible for making their own interpretation of soil conditions at any location, other than borehole locations. Borehole descriptions shown on the logs are only descriptive of conditions at locations described by boreholes themselves. |
| 1.13 | <u>Measurement For Payment</u> | .1 | Only material excavated above grade plane and within side slopes indicated or specified will be measured   |
|      |                                | .2 | Underwater excavation and site preparation will be measured in accordance with Section 01 29 00.   |
|      |                                | .3 | Material removed and dumped in the absence of the Department's Inspector will not be considered for payment.   |
|      |                                | .4 | Material disposed of without written approval of dumpsite will not be measured for payment.  |
|      |                                | .5 | There will be no additional payment for delays incurred as a result of weather conditions.   |
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- .6 There will be no additional payment for delays caused by vessel traffic in and out of the harbour.
- .7 There will be no additional payment for down time.
- .8 The Contractor will adhere to the schedule and take immediate action to correct any shortfall, by effectively altering existing excavating operations or mobilizing other equipment. The Departmental Representative is to be notified of the corrective action to be taken.

PART 3 - EXECUTION

3.1 General

- .1 Mark floating equipment with lights in accordance with International Rules of Road and maintain a radio watch on board.
  - .2 Lay out work from bench marks and base lines established by Departmental Representative. Be responsible for accuracy of work relative to established bench marks. Provide and maintain electronic position fixing and distance measuring equipment, laser transits and such other equipment as normally required for accurate underwater excavation control.
  - .3 Establish and maintain water level gauges in order that proper depth of excavating can be determined. Locate gauges so as to be clearly visible.
  - .4 Establish and maintain on-land targets for location and definition of designated excavation area limits. Targets to be suitable for control of underwater excavating operations and locating soundings. Remove targets on completion of work.
  - .5 Excavate area to the grade depths indicated on the plan.
  - .6 Excavation is to take place during the time periods indicated in these specifications.
  - .7 Excavate side slope to allow material to freely fall inwards to form natural side slope.
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- .8 Use extreme caution when excavating adjacent to existing structures. Damages are to be repaired at contractor's expense.
- .9 Remove materials above specified grade depths, within limits indicated. Material removed from below grade depth or outside specified area or side slope is not part of work.
- .10 Remove shoaling which occurs as a result of work. Once excavated, maintain area at grade.
- .11 Remove material cast-over on surrounding area and dispose of it as excavated material. Do not cast-over material unless authorized by Departmental Representative.
- .12 Immediately notify Departmental Representative upon encountering an object which might be classified as an obstruction. By-pass the object after clearly marking its location and continue work.
- .13 It will be the Contractor's responsibility to gain access to the excavation area. The construction of access will be at the Contractor's expense and will be removed if not acceptably incorporated into the work at the completion of the project. Any derricks, power lines, etc., which will require removal will be done so at the Contractor's expense and will be replaced to satisfaction of the Departmental Representative. Contractor to advise Departmental Representative of his proposed method to carry out excavation and disposal of the material.

**3.2 Disposal of Material**

- .1 Disposal of excavated underwater material will be responsibility of Contractor. Location and manner must be in accordance with all Provincial regulations.
  - .2 All materials deposited on private or public roads or properties in vicinity of site or as a result of trucking material to dump site will be removed by Contractor to satisfaction of owners involved at no additional cost to Department.
  - .3 Excavated material will be disposed in an approved dump site.
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- .4 Unless directed otherwise by Departmental Representative, dispose of all excavated material off Department property in accordance with Clause 1 above.
- .5 It will be the contractor's responsibility to obtain written approval from the Prince Edward Island Department of Communities, Land and Environment and the property owner of their proposed dump site. Copies of these written approvals are to be provided to the Departmental Representative within one (1) week of award of contract. Failure to provide these documents may result in the contract being terminated.
- 3.3 Final Excavation Grade
- .1 The Contractor is to verify the final grade in the excavation area by an acceptable method.
- .2 Survey/sound the area where the pier is to be constructed to determine that required grade has been reached and record elevations of excavated grade.
- .3 If, as a result of incomplete work, additional verification of depths by sounding or sweeping becomes necessary, additional costs involved shall be paid by Contractor.
- .4 Excavate underwater to lines and grades specified as shown on the drawings. Material removed from outside specified limits is not considered part of work and will not be measured for payment.
- 3.4 Co-operation and work Assistance to Departmental Representative
- .1 Co-operate with Departmental Representative for inspection of and assistance requested.
- .2 On request of Departmental Representative, furnish use of such boats, equipment, labour and materials forming ordinary and usual part of the required equipment as may be reasonably necessary to inspect and supervise work.
- 3.5 Rock Removal
- .1 If rock or boulders are to be removed, submit to Departmental Representative for review, two weeks before removal, details of proposed method of removal.
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## Filterstone, Armourstone and Scour Protection

PART 1 – GENERAL

- 1.1 Description .1 This section specifies the requirements for supplying and placing filterstone and armourstone at the locations and to the dimensions indicated on the plans.
- 1.2 Related Work .1 Refer to 01 29 00 Project Particulars and Measurement.
- 1.3 Source of Material .1 Inform Departmental Representative at least two weeks prior to commencing work of the location of the source of materials.
- 1.4 Measurement For Payment .1 Filterstone, Armourstone and Scour Protection:  
 .1 Filterstone, armourstone and scour protection will be measured in accordance with Section 01 29 00.  
 .2 Transportation of material to the site and any excavation and preparation of the foundation base will not be measured for payment but will be considered incidental to the work.

PART 2 - MATERIALS

- 2.1 Stone .1 Random rip rap in accordance with PEI TIE Specification Section 213, Class 1, except density shall not be less than 2.65 tonne per cubic metre. Sandstone rock will not be acceptable.
- .2 Filterstone:  
 .1 Filterstone will be hard, dense, durable, angular stone, free from cracks, or other structural defects.  
 .2 Filterstone to meet the gradation of R25.  
 .3 Fifty percent (50%) by weight of the Filter stone shall be individual stones greater than, or equal to 25 kg.
- .3 Armourstone:  
 .1 Armourstone will be hard, dense, durable, angular stone, free from cracks, or other structural defects.  
 .2 Armour stone to meet the gradation of R250.  
 .3 Greatest dimension of each stone will not exceed two times the least dimension.  
 .4 Fifty percent (50%) by weight of the armourstone will be individual stones greater than, or equal to 250 kg.

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- .4 Scour Protection:
  - .1 Scour protection will be hard, dense, durable, angular stone, free from cracks or other structural defects.
  - .2 Scour protection to meet the gradation of R5.
  - .3 Fifty percent (50%) by weight of the scour protection shall be individual stones greater than, or equal, to 5 kg.

PART 3 - EXECUTION

3.1 Placing

- .1 Filterstone :
    - .1 Place filterstone as shown on the drawings or as directed by the Departmental Representative.
    - .2 Completed filterstone in place shall consist of two layers, a total of 500 mm thick.
    - .3 Tolerances: 50 mm.
  - .2 Armourstone :
    - .1 Place armourstone as shown on the drawings or as directed by the Departmental Representative.
    - .2 Completed armourstone in place shall consist of 2 layers, a total 1,100 mm thick.
    - .3 Place armour stone in an approved manner to produce regular surface and a stable mass.
    - .4 Tolerances: 150 mm
  - .3 End dumping of armour and filterstone on prepared slopes will not be permitted.
  - .4 Scour Protection:
    - .1 Place scour protection as shown on the drawings or as directed by the Departmental Representative.
    - .2 Completed scour protection in place shall be a minimum of 500 mm thick.
    - .3 Tolerances: 50 mm.
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## Miscellaneous Items

PART 1 – GENERAL

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|-----|----------------------------|----|---|
| 1.1 | <u>Description of Work</u> | .1 | This section specifies requirements for the following items:  |
|     |                            | .1 | Mooring Cleats  |
|     |                            | .2 | Timber Utility Poles  |
|     |                            | .3 | Navigation Lights   |
|     | Navigation Lights          |    |   |
| 1.2 | <u>Reference Standards</u> | .1 | ASTM A123/A123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.     |
|     |                            | .2 | CAN/CSA-G40.21-13, Structural Quality Steel.  |
|     |                            | .3 | ASTM A48/A48M-03 (R2012), Standard Specification for Gray Iron Castings.  |
|     |                            | .4 | ASTM A307-14, Standard Specification for Carbon Steel Bolts, Studs and Threaded Rod, 60,000 PSI Tensile Strength. |
|     |                            | .5 | CSA W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel.                                     |
|     |                            | .6 | CSA W59-13, Welded Steel Construction (Metal Arc Welding) (Metric Version).                                       |
| 1.3 | <u>Related Work</u>        | .1 | Refer to 01 29 00 Project Particulars and Measurement.  |
|     |                            | .2 | Refer to Section 01 33 00 for Shop Drawing/Submission requirements.   |
| 1.4 | <u>Submissions</u>         | .1 | Shop Drawings:  |
|     |                            | .1 | Clearly indicate the following items:   |
|     |                            | .1 | General arrangements, dimensions, clearance locations and directions of assemblies as installed on structures.    |
|     |                            | .2 | Locations, sizes and installation tolerances of anchor bolts, eye bolts and embedded parts.                       |
|     |                            | .3 | Types of materials used, finishes and core thickness.   |
|     |                            | .4 | All other pertinent details and accessories.  |

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## Miscellaneous Items

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- .2 Product Data/Samples:
    - .1 Provide product data and manufacturers brochures for the mooring cleats and bollards.
  
  - .3 Submissions
    - .1 Provide submissions in accordance with Section 01 33 00.
  
  - 1.5 Measurement  
For Payment
    - .1 All miscellaneous items will be measured in accordance with Section 01 29 00.

**PART 2 - PRODUCTS**

- 2.1 Materials
    - .1 Timber: Any timber supplied by Contractor must conform to Section 06 05 73 - Dimension Timber.
  
    - .2 Hardware and miscellaneous items must meet the following specifications:
      - .1 Machine bolts, lag bolts, drift bolts, anchor bolts, nuts, washers to ASTM A307.
      - .2 Steel plates, ladder rungs, holdfasts and miscellaneous steel: to CSA G40.21, Grade 300W.
      - .3 Mooring cleats: cast iron to ASTM A48, Class 30, with approximate weight of 43kg (95 lb) each with a safe working load of 75 kN (8.5 tons). Use approved high strength anchor bolts.
      - .4 Do not use items manufactured or fabricated from scrap steel of unknown chemical composition or physical properties.
      - .5 Hot dip galvanize bolts, anchor bolts, nuts, washers, pip sleeves, steel plates, rungs, holdfasts, U-bolts and any other miscellaneous steel to ASTM A123/A123M with minimum zinc coating of 600 g/m<sup>2</sup>. All sharp corners, edges and weld splatter to be ground smooth prior to galvanizing.
      - .6 The material requirements for installation of light poles are given in the electrical sections/drawings.
      - .7 Weld quality and workmanship shall comply with CSA standard W47.1 and W59. Welders to be certified by Canadian Welding Bureau.
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## Miscellaneous Items

PART 3 - EXECUTION

- 3.1 Mooring Cleats
- .1 Install mooring cleats as shown on drawings and fasten to steel channel using welded studs as shown on the drawings. Allow for 25 mm of grout under base.
  - .2 Do not make alternations to any components without written permission of Departmental Representative.
- 3.2 Timber Utility Poles and Conduit
- .1 Contractor is responsible for supply and installation of new timber utility poles as shown on the drawings.
  - .2 Install new timber utility poles as per Maritime Electric and Provincial standards.
  - .3 Contractor is to confirm location of all new timber utility poles with the Departmental Representative and the Harbour Authority prior to installation.
  - .4 Install conduit c/w pull ropes to new poles upon acceptance of pole locations by Departmental Representative.
- 3.3 Navigation Lights
- .1 Contractor is responsible for providing continuous temporary navigational lighting during construction and shall be included in mobilization/demobilization.
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