

**Part 1 GENERAL**

**1.1 Related Sections**

- .1 Section 01 33 00 – Submissions and Shop Drawings.
- .2 Section 01 74 21 – Construction and Demolition Waste Management and Disposal.
- .3 Section 02 41 16 – Sitework, Demolition and Removal.
- .4 Section 31 32 21 – Geotextiles.

**1.2 General**

- .1 This section specifies the requirements for the supply, placement, and construction of a new breakwater in the place of the old cribwork at Miller Brook Wharf to the location and elevations shown on the drawings.

**1.3 References**

- .1 ASTM C117-17, Standard Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.
- .2 ASTM C136/C136M-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM C535-16, Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .4 ASTM C88/C88M-18, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium.
- .5 CSA A23.2-12A:19, Relative Density and Absorption of Coarse Aggregate.
- .6 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire.
- .7 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .8 MTO LS-614, Freezing and Thawing of Coarse Aggregate.
- .9 MTO LS-618, The Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

**1.4 Waste Management and Disposal**

- .1 Separate and recycle waste material in accordance with Section 01 74 21 – Construction and Demolition Waste Management and Disposal.

**1.5 Interference To Navigation**

- .1 Be familiar with vessel movements and fishery activities in area affected by construction operations.
  - .2 Plan and execute work, in a manner that will not impede navigation, including movement of vessels at the facility.
  - .3 Plan and execute work, in a manner that will not interfere with fishing operations or access to marine structures by land or water.
  - .4 *Departmental Representative* will not be responsible for loss of time, equipment, material, or any other charges related to interference with moored vessels in the harbour or other Contractor's operations.
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- .5 Keep the Marine Communications and Traffic Services' Centre, Fisheries and Oceans Canada, informed of construction operations, in order that necessary Notices to Mariners may be issued. Email: notshipssyd@dfo-mpo.gc.ca.

## **1.6 Regulatory Requirements**

- .1 Comply with municipal, provincial, and national codes and regulations relating to project. Refer to the attachments.
- .2 Mark floating equipment with sound and light signals in accordance with Collision Regulations made pursuant to the Canada Shipping Act and Notice to Mariners.

## **1.7 Scheduling**

- .1 Submit to *Departmental Representative*, within 2 weeks after acceptance of bid, schedule of work including time periods during which each operation involved in Work will be undertaken. At time of submission of schedule, meet with *Departmental Representative* to review schedule.
- .2 Adhere to schedule and take immediate action to correct any slippage by effectively altering existing construction operations or mobilizing other equipment. Notify *Departmental Representative* of corrective action to be taken.

## **1.8 Inspection Of Site**

- .1 Contractor to visit site of Work and become thoroughly familiar with extent and nature of Work and conditions affecting Work before bidding.

## **1.9 Site Information**

- .1 Results of most recent soundings are included with the drawings. This data will be used for all calculation of quantity purposes. If the Contractor wishes to perform own survey, a written notice must be submitted to the *Departmental Representative* at least 7 days' notice so PWGSC can verify the sounding survey before the commencement of any work.
- .2 Take necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.

## **1.10 Measurement for Payment**

- .1 Core Materials: Measured in tonnes of material, supplied and placed in the work, within the limits specified on the drawings.
- .2 Filter Stone: Measured in Tonnes of material, supplied and placed in the work within the limits specified on the drawings.
- .3 Armour Stone: Measured in Tonnes of materials, supplied and carefully placed in the work within the limits specified on the drawings.
- .4 Measurement for reused material will be include in this section. The *Departmental Representative* and the Contractor will come to an agreement prior to starting all work on how to measure the tonnage, removed and reused. Tonnage will be included in core, filter and armour stone material above.
- .5 There will be no payment made for any material or stone placed beyond limits indicated on the drawings. The final contract grade must be within 100 mm of the specific elevation. Quantities will be based on an as-built survey. Any material placed outside the lines and grades as shown on the drawings will not be measured for payment.
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- .6 There will be no additional payment for delays caused by vessel traffic.
- .7 There will be no additional payment for downtime.
- .8 There will be no payment for any rock fill core, filter stone or armour stone that is washed out, removed, missing or deteriorated by weather or wave action.
- .9 Access to the construction zone and any maintenance of haul roads will be measured for payment under section 02 41 16.
- .10 Excavation and backfill will be included in the unit price for each item listed under this contract.
- .11 Required Haulage is included in bid items under this section.
- .12 Contractor's on-site inspection and monitoring is included in the unit bid price for each item required under this contract.
- .13 Construction and maintenance of materials laydown areas, their removal and complete restoration of the areas will not be measured under this contract but will be considered incidental.

## **Part 2 PRODUCTS**

### **2.1 Rock Material**

- .1 Hard, angular rock free from cracks, seams and other defects which may impair durability.
- .2 Relative density, 2.8 minimum, as determined by CSA A23.2-12A.
- .3 Absorption, 1.5 to 2.0% maximum as determined by CSA A23.2-12A test procedure.
- .4 Durability, less than 35% abrasion Wear, as determined by ASTM C535 test procedure.
- .5 Sulphate Soundness Determination maximum 12% as determined by ASTM C88.
- .6 Rock when tested with micro-devel test method as per MTO LS-618, shall have a loss no greater than 35%.
- .7 Rock when tested with the freeze-thaw method as per MTO LS-614, shall have a loss no greater than 15%.
- .8 Core, filter, and armour stone must be granite or basaltic rock that is angular, resistant to weathering, and salt water, free from overburden, spoils, or organic matter. Rock must be free from cracks, seams or other defects which may impair durability, relativity; slate and sandstone not acceptable. There will be no intermixing of different colours or types of rock when stone is obtained from different sources.

### **2.2 Core Material**

- .1 Material for new rock fill to be blasted rock.
- .2 Stone size shall be well graded between sizes as indicated on the drawings.
- .3 No more than 5% of core stone to weigh less than 20 kg.
- .4 Silt content to be less than 1% by mass.
- .5 Quarry stone, individual rock must be angular and greatest dimensions of each stone is not to exceed two times least dimension.
- .6 Core stone to be in the range of 0.2kg to 100kg as indicated on the plan. Grading Limits as follows:

ASTM Sieve by designation	% Passing weight
480.0 mm	100
420.0 mm	70-90
330.0 mm	40-55
190.0 mm	-
150.0 mm	0-15

### 2.3 Filter/Armour Stone

- .1 Material for filter/Armour stone to be blasted rock or field stones.
- .2 Stone size to be well graded between sizes indicated on the drawings in categories specified, well graded within each category.
- .3 Greatest dimension of each stone not to exceed two (2) times the least dimension.
- .4 Armour Stone shall be stone that is clean, hard, sound, durable, resistant to weathering, and degradation in water, free from overburden, spoil, shale, and organic material and having a density of not less than 2.6 t/m<sup>3</sup>.
- .5 When tested by the Freeze-thaw method in accordance with MTO LS-614, the rock material shall have a freeze-thaw loss not greater than 15%.
- .6 Individual rocks shall be angular and each rock shall have both thickness and breadth greater than or equal to one half of its length.
- .7 Rock with visible planes of weakness and/or subject to marked deterioration by water or weather will not be accepted.
- .8 Filter stone sizes to be in the ranges as shown on the plan.
- .9 Armour stone sizes are to be in the ranges as shown on the plan

## Part 3 EXECUTION

### 3.1 General

- .1 Do not place material under poor weather conditions.
- .2 Execute work in such a manner to protect core material from storm wave action or tidal erosion damage. Replace material lost due to storm or erosion damage at no additional cost to the Contract.
- .3 Storage/Laydown Area: Construct laydown area in the vicinity of the work within the area shown on the plans. Delineate the laydown area with markers or fencing to avoid any travel or storage in any special areas of the spit then than storage area.
- .4 The Contractor must be aware of the tides in relation to the work surface and build the rock protection accordingly. As well, the Contractor must be aware of the reach required to place rock at limits of the side slopes, and to plan the work accordingly.
- .5 Schedule and carry out construction so that each phase of work isn't longer than necessary.

- .6 Replacement of core/filter/armour stone lost due to storm is the Contractor's responsibility.

### 3.2 Preparation

- .1 Haul roads: construct and maintain haul roads, removal of its entirety once the construction is final and approved.

### 3.3 Excavation

- .1 Excavate to lines, grades, elevations, and dimensions as indicated.  
.2 Remove all other obstructions encountered during excavation in accordance with Section 02 41 16 - Sitework, Demolition and Removal and section 02 41 13 – Selective Site Demolition.  
.3 Excavation must not interfere with bearing capacity of adjacent foundations.  
.4 Dispose of surplus and unsuitable excavated material in approved location off site.  
.5 Do not obstruct flow of surface drainage.  
.6 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft, or organic matter.  
.7 Notify *Departmental Representative* when bottom of excavation is reached.  
.8 Obtain *Departmental Representative's* approval of completed excavation.

### 3.4 Core Material

- .1 Place rock fill to lines, grades and dimensions indicated on the drawings. Contractor should realize the large distance required to place the rock fill core out into the water, supply necessary equipment to complete as shown on drawings.  
.2 Side slopes as indicated on the drawings.  
.3 placement of core stone by "benching" the slope and/or deliberately over steepening the slope and allowing it to fail will not be allowed.  
.4 Sequence construction operations such that sufficient armour and filter stone is placed to protect the core at all times.  
.5 Execute work in a manner to protect core/filter material from storm and erosion damage. Replacement of material lost to storm or erosion damage will be the contractor's responsibility.  
.1 Do not extend core material more than 10 meters beyond filter stone protection.  
.6 Core stone can be end dumped or placed with aid of mechanical means or other reviewed method.

### 3.5 Filter/Armour Stone

- .1 Place filter/Armour stone layers to grades, dimensions, profiles, and cross-sectional elements indicated on the drawings. Contractor should realize the large distance required to place the filter stone out into the water, supply necessary equipment to complete as shown on drawings.  
.2 Place filter/Armour stone in layers as indicated on the drawings.  
.3 Side slopes to be 1.5 horizontal to 1.0 vertical unless otherwise indicated on the drawings.  
.4 Do not extend the core material more than 10m beyond filter stone protection.

- .5 Do not transport different categories of material in the same truckload. If rocks of markedly different sizes are present in the same load, *Departmental Representative* reserves the right to have each rock measured separately and sorted prior to installing in structure.
- .6 Place armour stone to lines, grades and dimensions indicated on the drawings. Contractor should realize the large distance required to place the armour stone out into the water, supply necessary equipment to complete as shown on drawings.
- .7 Dumping of armour stone will not be permitted. Each stone will be lifted and individually placed.
- .8 Place armour stone to a total layer thickness as indicated on the drawings.
- .9 Choose stones and place them in such a way that the whole structure will be bonded and consolidated to as great an extent as nature or rock will allow. Rocks should vary in size, so they do not create steep slopes when placing to the grade lines as indicated on the drawings.

### 3.6 Rock Material Washed Out of Work

- .1 Should during the progress of the Work, any rock material be washed out of the Work, or through neglect of carelessness of the Contractor or their employees or from any other cause, be dumped into the water near the Work or anywhere within the harbor or channel so as to interfere in the opinion of the *Departmental Representative* with actual depths of water and/or impede navigation, it will be removed by the Contractor when ordered to do so by the *Departmental Representative*. Any material washed out of the Work or displaced beyond the contract limits will be replaced by the Contractor at no cost to Canada.

### 3.7 Tolerances

- .1 Note: These tolerances are not to be considered pay limits but are specified to ensure Contractor keeps within acceptable lines and grades.
- .2 Completed component layers to be within the following tolerances of lines and grades indicated:
  - .1 Core Material:  $\pm 50$  mm
  - .2 Filter stone  $\pm 50$  mm
  - .3 Armour/Toe stone:  $\pm 50$ mm
  - .4 Contractor will provide proof of elevations for each type of material final elevation.
- .3 Do not place material under poor weather conditions.
- .4 Any material placed  $\pm 50$ mm outside the footprint, not approved by the *Departmental Representative*, will not be measured for payment.

### 3.8 Inspection

- .1 Provide inspector with equipment to assist in inspection to prove that no stones have been placed in the channel or beyond the limits required under this contract.

**END OF SECTION**

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**Part 1 GENERAL**

**1.1 Description of Work**

- .1 This section specifies requirements for the following items:
  - .1 Mooring Holdfasts
  - .2 Steel Ladders for Berlin Wall Panels

**1.2 Reference Standards**

- .1 ASTM A123/A123M-17, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A307-21, Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.
- .3 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
- .4 CSA W59-18, Welded Steel Construction.
- .5 CSA W47.1:19, Certification of Companies for Fusion Welding of Steel.
- .6 CSA W47.2-11 (R2020), Certification of Companies for Fusion Welding of Aluminum.

**1.3 Related Work**

- .1 Refer to other Specification Sections for related information.
- .2 Refer to Section 01 33 00 for Submission and Shop Drawing requirements.
- .3 Section 05 50 00 – Metal Fabrications.

**1.4 Submissions**

- .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.
  - .2 Product Data/Samples:
    - .1 Provide product data and manufacturers brochures for the mooring holdfasts.
  - .3 Test Results:
    - .1 Provide test results for the galvanized items.
  - .4 Submissions
    - .1 Provide submissions in accordance with Section 01 33 00 – Submissions and Shop Drawings.

**1.5 Measurement for Payment**

- .1 Mooring holdfasts shall be measured in accordance with Section 01 29 00.
- .2 Steel ladders for Berlin Wall panels, shall be measured in accordance with Section 01 29 00.

**Part 2 PRODUCTS**

**2.1 Materials**

- .1 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 350W.
  - .3 Do not use items manufactured or fabricated from scrap steel of unknown chemical composition or physical properties.
  - .4 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 610 g/m<sup>2</sup>. All sharp corners, edges and weld splatter to be ground smooth prior to galvanizing.
  - .5 The material requirements for installation of light poles are given in the electrical sections/drawings.
  - .6 Weld quality and workmanship shall comply with CSA standard W47.1 and W59. Welders to be certified by Canadian Welding Bureau.

**Part 3 EXECUTION**

**3.1 Mooring Holdfasts**

- .1 Install mooring holdfasts as shown on drawings.
- .2 Do not make alternations to any components without written permission of *Departmental Representative*.

**3.2 Installation General**

- .1 Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.

**END OF SECTION**