PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 74 21 - Construction/Demolition Waste Management.

.4 Section 01 35 00.06 - Special Procedures for Traffic Control.

.5 Section 01 35 44 - Environmental Protection Procedures for Marine Work.

.6 Section 31 32 19.01 - Geotextiles.

.7 Section 35 31 23.13 - Rubble Mound Breakwater.

1.2 Measurement Procedures

.1 Work performed under this Section will be incidental to work involved in other sections of this specification.

1.3 References

.1 Canadian General Standards Board (CGSB):
.1 CAN/CGSB, Sieves, Testing, Woven Wire, Metric.

1.4 Submittals

.1 Samples:
.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.2 Inform Departmental Representative at least 2 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.

1.5 Protection of Existing Features

.1 Existing buried utilities and structures:
.1 Size, depth and location of existing utilities

and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.2 Confirm locations of buried utilities by careful test excavations.

.3 Maintain and protect from damage, water, sewer, electric, telephone and other utilities and structures encountered.

.4 Record location of maintained, re-routed and abandoned underground lines.

.5 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by the work.

.2 Protect existing buildings and surface features from damage while work is in progress. In the event of damage, immediately make repair to approval of Departmental Representative.

1.6 Interference to Navigation

.1 Be familiar with recreational vessel movements and fishery vessel 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 public access to marine structures by land or water.

.4 Departmental Representative will not be responsible for loss of time, equipment, material or other charges related to interference with moored or operating vessels in the harbour or other Contractor's operations.

.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.

1.7 Regulatory Requirements

.1 Comply with municipal, provincial and national codes and regulations relating to project.

.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.

PART 2 - PRODUCTS

2.1 Materials

.1 Refer to Section 35 31 23.13 - Rubble Mound Breakwater.

PART 3 - EXECUTION

3.1 Site Preparation

.1 Remove obstructions, ice and snow from surfaces to be excavated within limits indicated.

.2 Remove any fences, posts or appurtenances as necessary to facilitate construction. Reinstate the same after the work is complete.

3.2 Stockpiling

.1 Stockpile materials in areas approved by the Harbour Authority. If there is no area onsite, it will be the responsibility of the contractor to arrange and pay for area off site.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect all fill materials (Types 1, 2, 3, 4 and gravel) from contamination.

.2 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

.3 Contractor is responsible for preventing mixing of material stockpiles. Should stockpiles of different materials mix the contactor will be responsible for additional screening and testing to establish the materials meet the specification prior to placing in new work.

3.3 Dewatering

.1 Keep excavations free of water while work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Dispose of water in a manner not detrimental to the environment or public and private property, or any portion of work completed or under construction.

3.4 Excavation

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Excavation must not interfere with bearing capacity of adjacent foundations.

.3 Reuse of existing materials, including placement, stabilization and dewatering (if necessary) to be in keeping with Clause 3.5 and to be in location as indicated on the Drawings.

.4 Excavated material reused in the service area must be placed and dewatered in a manner to ensure that the material remains in the service area and does not enter any water body; and in a manner to ensure that the material is stable prior to the placement of additional material.

3.5 Backfilling

.1 Type 1 Fill:

.1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place Type 1 fill material in uniform layers not exceeding 300 mm compacted thickness. Compact each layer to 100% of Standard Proctor Dry Density before placing succeeding layer. If the Departmental Representative advises varying lift thickness, then the 300mm may be amended.

.5 When using hand operated tamping devices, place backfill material in uniform layers not exceeding 100 mm in thickness.

.6 Place salvaged material at the lowest grade within the area to be filled. Avoid voids under the concrete slabs and break concrete if necessary to ensure stability. Allow excavated fill material to dewater.

.7 As part of the construction sequence submission, to the Departmental Representative outline the placement the and stabilization methods proposed for the salvaged materials.

.8 Proof Rolling:

.1 Proof roll when grade has reached final grade minus 300 mm.

.2 For proof rolling use standard roller of 45,400 kg gross mass with four pneumatic tires each carrying 11,350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.

.3 Obtain approval from Departmental Representative to use non-standard proof rolling equipment.

.4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

.5 Where proof rolling reveals areas of defective sub grade:

.1 Remove base, sub grade material to depth and extent as directed by Departmental Representative.

.2 Backfill excavated sub grade with premium borrow (type 1 fill) and compact to 100% Standard Proctor Density.

.3 Carry out other repairs as directed.

.6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Departmental Representative and replace with new materials.

.2 Type 2, 3 & 4 Fill:

.1 Place fill material in such a manner that underlying slopes are not disturbed.

.2 Place fill materials such that rock is stable, secure and supported by rocks below and a uniform and continuous cover is achieved.

.3 Take care not to damage geotextile material.

.4 No pushing of fill materials Type 3 & 4 by bulldozers or other methods will be allowed.

.5 Refer to Section 35 31 23.13 for further requirements of Type 2, 3, and 4 fills.

.3 Surface Gravel:

.1 Do not proceed with surface gravel placement operations until Departmental Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place surface gravel material in a uniform layer.

.5 Blend grades with existing service area to ensure runoff of surface water.

3.6 Rock Material Washed out of Work

.1 Should, during the progress of the work, any fill or 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 harbour 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 within or beyond the contract limits will be replaced by the Contractor at no cost to Public Works and Government Services Canada.

3.7 Compaction

.1 Type 1 fill (Premium Borrow) to be compacted to 100% Standard Proctor Density.

.2 Type 2 fill (Corestone): Place and bed the stones, one against the other, and key together. Fill irregularities between the stones with suitable size stones rammed tightly into place.

.3 Type 3 fill (Filterstone): Place stones to secure a rock mass, confirming to the grades and dimensions shown on drawings. Distribute and manipulate stones in a manner that the rock fragments are uniformly distributed. Place in a manner that results in interlocked, unsegregated, uniform layers of the thickness indicated on the plans.

.4 Type 4 fill (armourstone): Place stones to secure a rock mass, confirming to the grades and dimensions shown on drawings. Distribute and manipulate stones in a manner that the rock fragments are uniformly distributed. Place in a manner that results in

interlocked, unsegregated, uniform layers of the thickness indicated on the plans.

.5 Surface Gravel to be compacted to 100% Standard Proctor Density.

.6 Existing fill and concrete material used as backfill to be drained and stable prior to additional material layers being placed.

3.8 Protection of Existing Structures

.1 Fill and rock material will be placed adjacent to an existing wharf. Prevent movement, settlement or damage of adjacent structures. Stay off adjacent structures. Provided bracing and shoring as required. In event of damage, immediately replace such items or make repairs to approval of Departmental Representative and at no additional cost to Departmental Representative.

.2 Damage to existing surfaces, structures, roadways, utilities, appurtenances not specified for removal to be repaired at the Contractor's cost to the satisfaction of the Departmental Representative.

end

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 35 43.01 - Floating Silt Boom.

.3 Section 01 74 21 - Construction/Demolition Waste Management.

.4 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.5 Section 35 31 23.13 - Rubble Mound Breakwater.

1.2 Measurement Procedures

.1 Geotextiles used for material separation shall be measured for payment by the square meter calculated from neat plan view dimensions. Unit price shall include all material, labour, equipment and all other items necessary to complete the work.

.2 There shall be no separate measurement for geotextiles used in Floating Silt Boom as per Section 01 35 43.1.

1.3 References

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D 4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D 4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.3 ASTM D 4716, Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

.4 ASTM D 4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2 No. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).

.2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.

.1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.

.2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
.3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
.4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
.5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

1.4 Submittals

.1 Submit to Engineer copies of mill test data and certificate at least 2 weeks prior to start of Work, and in accordance with Section 01 33 00 - Submittal Procedures.

.2 Obtain written approval of Departmental Representative for geotextile before installation of material in work.

1.5 Delivery, Storage and Handling

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.6 Locations

.1 Place geotextile for material separation as shown on drawings.

.2 Place geotextile for Floating Silt Boom as indicated in Section 01 35 43.01.

PART 2 - PRODUCTS

2.1 Material

.1 For Material Separation Application:
.1 Geotextile: Non-woven synthetic fiber fabric, supplied in rolls of minimum 3 meter width.
.1 Composed of: minimum 85% by mass of polyester with inhibitors added to base plastic to resist deterioration by ultraviolet and heat exposure for 60 days.

.2 Properties:
.1 Mass per unit area: min. 400 g/m²
.2 Grab tensile strength: min. 1100 N
.3 Tear Strength: min. 500 N
.4 Breaking force: min. 1690 N
.5 Elongation at break: min. 50%
.6 Bursting Strength: min. 4,000 kPa
.7 Apparent opening size(AOS): 0.15 mm
.8 Permitivity: k (cm/sec), 0.7

.3 Securing pins and washers: to CAN/CSA-G40.21-04, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m².

.4 Factory seams: sewn in accordance with manufacturer's recommendations.

.5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

.2 For Floating Silt Boom Application:
.1 Geotextiles: Woven synthetic fiber fabric, supplied in rolls:
.1 Composed of: minimum 85% by mass of polyester with inhibitors added to base plastic to resist deterioration by ultraviolet and exposure for 60 days.

.2 Properties:
.1 Mass per unit area: to CAN/CGSB-148.1 No. 2 minimum 400 g/m2.
.2 Grab tensile strength and elongation to CAN/CGSB-148.1 No. 7.3.
.1 Grab Tensile Strength: 1275 N CAN2-4.2-M77 Wet Condition.
.2 Mullen Burst: 3600 KPa CAN2-4.2.
.3 Tear Strength: 475 N CAN2-4.2.
.4 Elongation at Break: 18%.
.5 Filtration Opening Size: 220 um.

.3 Factory Seams: sewn in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 Installation (Material Separation)

.1 Place geotextile material by unrolling onto surface in orientation, manner and locations indicated and retain in position with securing pins as recommended by manufacturer.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases. Take care to ensure that the geotextile is installed as specified in both the out of water and the in water locations.

.3 Place geotextile on prepared surface loosely from top of the slope to the bottom allowing fabric to conform easily to contours of the slope.

.4 Anchor top of fabric at 1000 mm intervals with 25 mm diameter steel rods 600 mm in length. Anchor bottom of fabric by folding fabric and placing fill on top.

.5 Allow 1000 mm of fabric for overlapping and anchoring purposes, 700 mm at the top and 300 mm at the bottom of the slope.

.6 Longitudinal seems will have a minimum of 450 mm overlap and will be pinned every 600 mm with 100 mm nails.

.7 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.8 After installation, cover with overlying layer within 4 hrs of placement. No equipment will be permitted on fabric.

.9 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

.10 Place fill layers in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.

3.2 Installation (Floating Silt Curtain)

.1 Installation of geotextile for floating silt boom as per Section 01 35 43.01.

end