

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Materials and installation of polymeric geotextiles and geogrids used in breakwaters, crib mattresses, retaining wall structures, filtration, drainage structures and roadbeds, purpose of which is to:
 - .1 Separate and prevent mixing of granular materials of different grading.
 - .2 Act as hydraulic filters permitting passage of water while retaining soil strength of granular structure.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 31 23 10 - Excavating, Trenching and Backfilling.
- .4 Section 31 36 19 - Rock Mattress.
- .5 Section 31 53 13 - Timber Cribwork.
- .6 Section 35 31 24 - Rubble Mound Breakwater.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM A123/A123M-[09], Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM D4491-[99a(2009)], Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

- .3 ASTM D4595-[09], Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .4 ASTM D4716-[08], Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- .5 ASTM D4751-[04], 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-[2004], 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.
- .3 CSA International
 - .1 CSA G40.20/G40.21-[04(R2009)], General Requirements for Rolled or

Welded Structural Quality
Steel/Structural Quality Steel.

- .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1860-[November 2010],
Material Specification for
Geotextiles.

1.4 SAMPLES

- .1 Submit samples in accordance with
Section 01 33 00 - Submittal
Procedures.
- .2 Submit to Departmental
Representative the following samples
at least 2 weeks prior to commencing
work.
 - .1 Methods of joining.
 - .2 Minimum length of 1m of roll
width of geotextile

1.5 MILL CERTIFICATES

- .1 Submit to Departmental
Representative a copy of mill test
data and certificate at least 2
weeks prior to start of work.

1.6 DELIVERY AND
STORAGE

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

1.7 WASTE MANAGEMENT
AND DISPOSAL

- .1 Separate waste materials for reuse
and recycling in accordance with
Section 01 74 21 -
Construction/Demolition Waste
Management And Disposal.
- .2 Remove from site and dispose of all
packaging materials at appropriate
recycling facilities.

- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, and packaging material, in appropriate on-site bins, for recycling in accordance with Waste Management Plan.
- .4 Fold up metal banding, flatten and place in designated area for recycling.

1.8 MEASUREMENT FOR PAYMENT

- .1 Geotextiles and geogrids will not be measured for payment. Include all costs associated with supply and installation of geotextiles and geogrids as incidental to unit cost of items requiring geotextiles and geogrids.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Geotextile: woven or non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 3.5m minimum.
 - .2 Length: 50m minimum.
 - .3 Composed of: minimum 85% by mass of polyester with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure.
- .2 Physical properties:
 - .1 Thickness: to CAN/CGSB-148.1, No.3, minimum 2.5mm.
 - .2 Mass per unit area: to CAN/CGSB-148.1, No. 2, minimum 400g/m².
 - .3 Tensile strength and elongation (in any principal direction): to ASTM D4595.
 - .1 Tensile strength: minimum 1200 N, wet condition.

- .2 Elongation at break: 50 to 100 percent.
- .3 Seam strength: equal to or greater than tensile strength of fabric.
- .4 Mullen burst strength: to CAN/CGSB-4.2, method 11.1, minimum 3100 kPa.
- .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D4751, 50 to 150 micrometres.
 - .2 Permittivity: to ASTM D4491, 0.25 cm per second.
- .4 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.
- .5 Polypropylene geogrid used under rock fill, rock mattress, filter stone, and armour stone as indicated to be TX160 tri-axial geogrid to ASTM D4759-02 by Tensor or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Geotextile and geogrid to be placed on natural ground and on deposited dredge material in laydown area underneath all rock fill, rock mattress, armour stone and filter stone as indicated on drawings to prevent subsidence.
- .2 Place geotextile underneath geogrid at all locations indicated on drawings to prevent upward migration of fines.
- .3 Place geotextile material from base elevation of crib to top of crib and

- retain in position with securing pins and washers.
- .4 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with securing pins and washers.
 - .5 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
 - .6 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .7 Overlap each successive strip of geotextile 600 mm over previously laid strip.
 - .8 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
 - .9 After installation, cover with overlying layer within 4 hours of placement.
 - .10 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
 - .11 Place and compact overlying layers in accordance with Section 31 36 19 - Rock Mattress, Section 35 31 24 Rubble Mound Breakwater, and Section 31 23 10 Excavating, Trenching and Backfilling.

3.2 CLEANING

- .1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

3.3 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.