

## **PART 1 - GENERAL**

### **1.1 RELATED REQUIREMENTS**

1. Section 01 33 00 – Submittal Procedures.
2. Section 31 23 33 – Excavation, Trenching and Backfill.

### **1.2 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.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

1. Submit in accordance with Section 01 33 00 – Submittal Procedures.
2. Product Data:
  1. Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
3. Samples:
  1. Submit copies of mill test data and certificate at least 4 weeks prior to start of Work.

### **1.4 DELIVERY, STORAGE AND HANDLING**

1. Deliver, store and handle materials in accordance with manufacturer's written instructions.
2. Storage and Handling Requirements:
  1. Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  2. Store and protect geotextiles from direct sunlight and UV rays.
  3. Replace defective or damaged materials with new.
3. Packaging Waste Management: remove for reuse.

## **PART 2 - PRODUCTS**

### **2.1 MATERIAL**

1. Geotextile fabric shall consist of polymeric filament or yarns such as polypropylene, polyethylene, polyester, or other polymers excluding polyamides, formed into a stable network such that the filaments or yarns retain their relative position to each other. The geotextile shall be inert to commonly encountered chemicals, resistant to ultraviolet light and heat exposure, and shall be indestructible by micro-organisms and insects.
2. Where sections of geotextile are joined, seam strength shall meet the minimum tensile strength requirements for the class of geotextile, unless otherwise specified in the Contract Documents.

3. Seams of the geotextile shall be sewn with thread of the material meeting the material requirements for the geotextile.
4. Geotextile rolls shall be supplied with an opaque protective covering by the manufacturer or supplier.
5. Geotextile
  1. Geotextile: Non-Woven needle punched synthetic fibre fabric, supplied in rolls, Geotex 601 or equivalent.
    1. Physical properties – Minimum Average Roll Values (MARV):
      1. Tensile (Grab) Strength and elongation (in any principal direction) (ASTM D4632)
        1. Tensile strength: minimum 712 N, wet condition
        2. Elongation at break: 50%
      2. Permittivity (ASTM D4491) 1.3 sec<sup>-1</sup>
      3. Apparent Opening Size (ASTM D4751) 0.212 mm
      4. Mullen Burst Strength (ASTM D3786) Minimum 1,930 kPa
      5. Trapezoidal Tear to ASTM D4533 267 N
6. Factory seams: sewn in accordance with manufacturer's recommendations.
7. Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

1. Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.

#### **3.2 INSTALLATION**

1. Where geotextile is to be placed on natural ground, prepare surface by removing debris which would interfere with placement of geotextile. Remove all boulders and sharp objects.
2. Place material by unrolling on to graded surface and retain in position with weight.
3. Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with.

4. Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
5. When using pegged seams on sloping surfaces, place geotextile in one continuous length from toe of slope to upper extent of geotextile to avoid horizontal seams.
6. Join successive strips of geotextile by sewing:
  1. Sewing: Seam shall be a minimum of 40 mm from edges of geotextile. Seam shall be a “prayer” or “flat” seam sewn with a two-thread, double-locked chainstitch which shall develop a minimum of 85% of the specified geotextile strength. The thread shall be polyester, polypropylene or polyethylene, bonded TEX size 210 or 2000 denier.
7. Pin successive strips of geotextile with securing pins as indicated.
8. Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
9. Remove and replace damaged or deteriorated material. The damaged area shall be overlain with new geotextile with a minimum one metre overlap. Secure overlap.
10. After installation, cover with overlying layer within 4 hours of placement.
11. Replace damaged or deteriorated geotextile to acceptance of the Consultant.
12. Protect geotextile from displacement or damage until and during placement of overlaid material layers.
13. Where structures penetrate the geotextile, ensure that the integrity of the geotextile is maintained.
14. Place and compact soil layers in accordance with Section 31 23 33 - Excavating Trenching and Backfilling.

### **3.3 PLACEMENT OF COVER MATERIAL**

1. Cover material shall be end dumped on the ground adjacent to the geotextile and carefully pushed or spread on to the geotextile by a dozer or other tracked machinery.
2. A minimum depth of 300 mm shall be maintained at all times between the geotextile and the construction equipment.
3. Cover material shall be spread in the direction of the geotextile overlap.

4. Cover material placement shall be place immediately on geotextile exposed to ultraviolet radiation. No more than 8 m of geotextile is to be left uncovered at any one time.
5. On unprotected geotextile, stones weighting more than 45 kg shall not be allowed to roll down slope.
6. For protected and unprotected geotextile, height of drop for stones less than 115 kg shall be less than 0.6 m and stones greater than 115 kg shall be placed with no free fall. If stones greater than 115 kg must be dropped, field trials shall be performed to determine the maximum height of safe drop without damaging the geotextile.

### **3.4 CLEANING**

1. Progress Cleaning:
  1. Leave Work area clean at end of each day.
2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

### **3.5 PROTECTION**

1. Vehicular traffic not permitted directly on geotextile.

**END**