Project Name: Project Number:

Section 02620

Specification for Geotextile Used in Subsurface Drainage Application

1 GENERAL

1.1 SECTION INCLUDES

A. Geotextile to allow for long-term passage of water into a subsurface drain system retaining the in-situ soil. The primary function of the geotextile is filtration.

1.2 RELATED SECTIONS

- A. Section 02050 Basic Site Materials and Methods
- B. Section 02100 Site Remediation
- C. Section 02200 Site Preparation
- D. Section 02300 Earthwork
- E. Section 02700 Bases, Ballasts, Pavements, and Appurtenances

1.3 UNIT PRICES

- A. Method of Measurement: By the square meter (or square yard as indicated in contract documents) including seams, overlaps, and wastage.
- B. Basis of Payment: By the square meter (or square yard as indicated in contract documents) installed.

1.4 REFERENCES

- A. AASHTO Standards:
 - 1. T88 Particle Size Analysis of Soils
 - 2. T90 Determining the Plastic Limit and Plasticity Index of Soils
 - 3. T99 The Moisture-Density Relations of Soils Using a 5.5lb (2.5 kg) Rammer and a 12in (305 mm) Drop.
 - 4. M288-96 Geotextile Specification for Highway Applications
- B. American Society for Testing and Materials (ASTM):
 - 1. D 123 Standard Terminology Relating to Textiles
 - 2. D 276 Test Method for Identification of Fibers in Textiles
 - 3. D 3786 Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics
 - 4. D 4354 Practice for Sampling of Geosynthetics for Testing
 - 5. D 4355 Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
 - 6. D 4439 Terminology for Geotextiles
 - 7. D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity
 - 8. D 4533 Test Method for Index Trapezoid Tearing Strength of Geotextiles
 - 9. D 4595 Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
 - 10. D 4632 Test Method for Grab Breaking Load and Elongation of Geotextiles
 - 11. D 4751 Test Method for Determining Apparent Opening Size of a Geotextile

- 12. D 4759 Practice for Determining the Specification Conformance of Geosynthetics
- 13. D 4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
- 14. D 4873 Guide for Identification, Storage, and Handling of Geotextiles
- 15. D 5141 Test Method to Determine Filtering Efficiency and Flow Rate for Silt Fence Applications Using Site Specific Soils
- C. Texas Department of Transportation, Manual of Testing Procedures
 - 1. TEX 616-J Asphalt Retention and Potential Change of Area
- D. Federal Highway Administration (FHWA) Geosynthetic Design and Construction Guidelines, Publication No. FHWA HI-95-038, May 1995.
- E. American Association for Laboratory Accreditation (A2LA)
- F. Geosynthetic Accreditation Institute (GAI) Laboratory Accreditation Program (LAP).
- G. National Transportation Product Evaluation Program (NTPEP)
- H. International Standards Organization (ISO) 9001:2000

1.5 **DEFINITIONS**

A. Minimum Average Roll Value (MARV): Property value calculated as typical minus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.

1.6 SUBMITTALS

- A. Submit the following :
 - 1. Certification: The contractor shall provide to the Engineer a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.
 - 2. Quality Standards: The contractor shall provide to the Engineer the Manufacturer's Quality Control Plan along with their current A2LA, GAI-LAP, and ISO 9001:2000 certificates.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. The geotextile Manufacturer shall have all of the following credentials:
 - a. Geosynthetic Accreditation Institute (GAI)- Laboratory Accreditation Program (LAP)
 - b. American Association for Laboratory Accreditation (A2LA)
 - c. ISO 9001:2000 Quality management System

B. The geotextile Manufacturer shall have a GAI-LAP accredited laboratory at the location of production capable of performing the ASTM tests as outlined in the specification.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Geotextiles labeling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.
- B, Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.
- C. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical property values of the geotextile.

2 PRODUCTS

2.1 MANUFACTURERS

A. TenCateTM Geosynthetics 365 South Holland Drive Pendergrass, GA, USA 30567 1-800-685-9990 1-706-693-2226 1-706-693-4400, fax www.tencate.com

2.2 MATERIALS

- A. Geotextile:
 - 1. The geotextile shall be manufactured with fibers consisting of long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins or polyesters. They shall form a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.
 - 2. Woven slit film geotextiles (i.e., geotextiles made from yarns of a flat, tape-like character) shall not be allowed.
 - 3. The geotextile shall meet the requirements of Table 1. All numeric values in Table 1 except AOS represent MARV in the weakest principal direction. Values for AOS represent maximum average roll values.

Property	Test Method	Units	Elongation < 50% ¹	
			MD	CD
Grab Tensile Strength	ASTM D 4632	N (lbs)	1647 (370)	1113 (250)
Sewn Seam Strength ²	ASTM D 4632	N (lbs)	720 (162)	
Tear Strength ³	ASTM D 4533	N (lbs)	445 (100)	267 (60)
CBR Puncture Strength	ASTM D 6241	N (lbs)	4228 (950)	
Permittivity	ASTM D 4991	sec ⁻¹	0.28	
Apparent Opening Size	ASTM D 4751	mm (U.S. Sieve)	0.212 max (70)	
Ultraviolet Stability ⁴	ASTM D 4355	%	90	

TABLE 1 - SUBSURFACE DRAINAGE GEOTEXTILE

¹ A measured in accordance with ASTM D 4632

² When sewn seams are required.

³ The required MARV Tear Strength for woven monofilament geotextiles is 250 N (56 lbs) ⁴ After 500 hrs

4. Approved geotextiles are as follows:

Elongation < 50%: Mirafi[®] FW 700

2.3 QUALITY CONTROL

- A. Manufacturing Quality Control: Testing shall be performed at a laboratory accredited by GAI-LAP and A2LA for tests required for the geotextile, at frequency meeting or exceeding ASTM D 4354.
- B. Geotextile properties, other than Sewn Seam Strength, Burst Strength, and Ultraviolet Stability shall be tested by NTPEP to verify conformance with this specification.
- C. Sewn Seam Strength shall be verified based on testing of either conformance samples obtained using Procedure A of ASTM D 4354, or based on manufacturer's certifications and testing of quality assurance samples obtained using Procedure B of ASTM D 4354. A lot size for conformance or quality assurance sampling shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.
- D. Ultraviolet Stability shall be verified by an independent laboratory on the geotextile or a geotextile of similar construction and yarn type.

3 EXECUTION

3.1 PREPARATION

A. Trench excavation shall be done in accordance with details of the project plans. In all instances excavation shall be done in such a way so as to prevent large voids from occurring in the sides and bottom of the trench. The graded surface shall be smooth and free of debris.

3.2 INSTALLATION

- A. The geotextile shall be placed loosely with no wrinkles or folds, and with no void spaces between the geotextile and the ground surface. Successive sheets of geotextiles shall be overlapped a minimum of 300 mm (12 in), with the upstream sheet overlapping the downstream sheet.
- B. In trenches equal to or greater than 300 mm (12 in) in width, after placing the drainage aggregate the geotextile shall be folded over the top of the backfill material in a manner to produce a minimum overlap of 300 mm (12 in). In trenches less than 300 mm (12 in) but greater than 100 mm (4 in) wide, the overlap shall

be equal to the width of the trench. Where the trench is less than 100 mm (4 in) the geotextile overlap shall be sewn or otherwise bonded. All seams shall be subject to the approval of the Engineer.

- C. Should the geotextile be damaged during installation or drainage aggregate placement, a geotextile patch shall be placed over the damaged area extending beyond the damaged area a distance of 300 mm (12 in), or the specified seam overlap, whichever is greater.
- D. Placement of drainage aggregate should proceed immediately following placement of the geotextile. The geotextile should be covered with a minimum of 300 mm (12 in) of loosely placed aggregate prior to compaction. If a perforated collector pipe is to be installed in the trench, a bedding layer of drainage aggregate should be placed below the pipe, with the remainder of the aggregate placed to the minimum required construction depth.
- E. The aggregate should be compacted with vibratory equipment to a minimum of 95 percent Standard AASHTO density unless the trench is required for structural support.

END OF SECTION