

SECTION 02280

GEOGRIDS AND GEOSYNTHETICS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Geotextile for Subgrade Reinforcement Applications (Geotextile Reinforcement).
- B. Geotextile for Separation Beneath Geocells (Geotextile Separation).
- C. Geogrid for Subgrade and Aggregate Base Reinforcement Applications (Geogrid Reinforcement).
- D. Geogrid for Encapsulating Pipes and Aggregates to Counteract Buoyancy (Geogrid Encapsulation).
- E. Geocell for Reinforcement of Access Drive (Geosynthetic Cellular Drive).

1.2 RELATED SECTIONS

- A. Section 02211 – Rough Grading.
- B. Section 02222 – Excavation.
- C. Section 02231 – Aggregate Base Course.
- D. Section 02722 – Storm Sewerage Systems.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. D 1388-96 – Standard Test Method for Stiffness of Fabrics, Option A.
 - 2. D 6637-01 – Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method.
 - 3. D 4354-96 – Practice for Sampling of Geosynthetics for Testing.
 - 4. D 4759-92 – Practice for Determining the Specification Conformance of Geosynthetics.
 - 5. D 5818-95 – Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage.
- B. Geosynthetic Research Institute (GRI): GG2-87 – Standard Test Method for Geogrid Junction Strength.
- C. U.S. Department of Transportation – Federal Aviation Administration (FAA): Specification for Geogrid Reinforced Base Courses, Engineering Brief No. 49 (1994).

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300 – Submittals.
- B. Submit manufacturer's product sheets for all materials specified.
- C. Submit manufacturer's installation instructions, material handling and storage recommendations, and other general recommendations for all materials specified.

- D. Submit manufacturer's certificate, which shall show actual test values, that materials supplied meet the requirements of this Section and the minimum properties published for the materials identified in the GFR 2004 Specifier's Guide.
- E. Submit manufacturer's product information for lightweight construction equipment with low pressure tracks to be used to construct the geotextile reinforced embankment section specified for Division VI - Detention Area A.
- F. Submit shop drawing illustrating structural connection (e.g. bodkin, hog rings, etc.) with product information and manufacturer's certificate of connection strength values for the geogrid connection specified in Division III (Branch I Moon and Hamilton Drain.). Structure connections shall resist a minimum force of 900 pounds per foot of pipe.

1.5 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Geotextile Reinforcement:
 - 1. Basis of Measurement: At the unit price bid per square yard as stated in the proposal, completed in place. No allowance will be made for overlap, connections, splices, repairs, or material cut off or wasted.
 - 2. Basis of Payment: Includes material, labor, and equipment for installation of geotextile reinforcement according to the plans, specifications, and manufacturer's recommendations, including all cutting and connections. Any Work necessary for splicing and repairing the geotextile shall be paid for by the Contractor.
- B. Geogrid:
 - 1. Basis of Measurement: Included in the unit price for storm sewer or other Work items being accomplished. No allowance will be made for overlap, connections, splices, repairs, or material cut off or wasted.
 - 2. Basis of Payment: Includes material, labor, and equipment for installation of geogrid according to the plans, specifications, and manufacturer's recommendations.
- C. Geosynthetic Cellular Drive:
 - 1. Basis of Measurement: Included in the unit price bid per square yard as stated in the proposal. No allowance will be made for, connections, anchors, splices, repairs, or material cut off or wasted.
 - 2. Basis of Payment: Includes material, labor, and equipment to place filter fabric, geocell, geocell anchors, aggregate, topsoil, and other items needed to install and finish the geosynthetic cellular drive according to the plans, specifications, and manufacturer's recommendations.

2. PART 2 PRODUCTS

2.1 MATERIALS

- A. Geotextile Reinforcement (Division VI – Detention Area E)
 - 1. Geotextile shall consist of Comtrac 300.50, manufactured by Huesker, Inc, and supplied by Price and Company (800-248-8230).
- B. Geotextile (Division VI and Division VII – Geosynthetic Cellular Drive)
 - 1. Geotextile shall consist of Propex 4553, manufactured by Amoco Fabrics and Filters Co., and supplied by Price and Company (800-248-8230).
- C. Geogrid (Division III, Trench Detail D)
 - 1. Geogrid shall consist of Tensar BX1200, manufactured by Tensar Earth Technologies, Inc and supplied by Price and Company (800-248-8230).

Eaton County Drain Commissioner
Carrier Creek Drain
All Divisions

Geogrid and Geosynthetics

Section 02280

- D. Geogrid (All Divisions)
 - 1. Geogrid shall consist of Tensar BX1200, manufactured by Tensar Earth Technologies, Inc and supplied by Price and Company (800-248-8230).
- E. Geosynthetic Cellular Drive (Division VI and Division VII)
 - 1. Geosynthetic Cellular Drive shall consist of geoweb GW30V608XXP, manufactured by Presto Products Company, and supplied by Price and Company (800-248-8230).

3. PART 3 EXECUTION

3.1 EXAMINATION

- A. The Contractor shall verify the correct fabric is delivered to the Site for the specified use.
- B. The Contractor shall check all materials upon delivery to verify that the proper material has been received.
- C. At the time of installation, materials may be rejected at the discretion of the Engineer if they have defects, tears, punctures, or damage incurred during manufacture, shipment or storage.
- D. No damaged materials shall be installed.

3.2 STORAGE

- A. During all periods of shipment and storage, materials shall be protected from physical or chemical abrasion, direct sunlight, ultraviolet rays, and temperatures below -20° F and above 140° F (or as directed by the manufacturer).
- B. To the extent possible materials shall be maintained in packaging provided by the manufacturer.
- C. Rolled materials may be laid flat or stood on end.

3.3 PREPARATION

- A. The subgrade soil shall be prepared as indicated on the construction plans, specified herein, or as directed by the Engineer, whichever applies.

3.4 INSTALLATION

- A. All areas immediately beneath the installation area for geotextiles, geogrids and geocells shall be properly prepared as shown on the plans, in specifications, or as directed by the Engineer.
- B. Materials shall be installed as specified. Unless otherwise specified, install materials as recommended by the manufacturer or as directed by the Engineer.
- C. Materials shall be laid at the proper elevation, alignment, and orientation as shown on the construction plans.
- D. The Contractor shall verify correct orientation (roll direction) of the materials.

- E. To prevent undue exposure or damage, place only that amount of material required for immediately pending Work.
- F. Temporarily secured in place with staples, pins, sand bags or backfill as required by fill properties, fill placement procedures, or weather conditions as directed by the manufacturer, or as directed by the Engineer.
- G. Fill placement over geotextiles, geogrids or geocells:
 - 1. Fill material shall be placed in lifts and compacted as directed under Sections 02211 – Rough Grading, 02223 - Backfilling and Section 02231 – Aggregate Base Course. Fill material shall be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in the geotextile or geogrid, maintains the openings of geocells, and prevents movement of the geotextile, geogrid, or geocell.
 - 2. Place a minimum loose fill thickness of 24 inches over geotextiles, 6 inches over geogrids, and 2 inches over geocells prior to operation of tracked vehicles over geotextiles, geogrids, or geocells. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and/or damaging the geotextiles, geogrids and geocells. Rubber-tired equipment may pass over geogrids at slow speeds (less than 10 mph) prior to filling provided sudden braking and sharp turning movements shall be avoided.
- H. Division III (Trench Detail D) Geogrid Encapsulation:
 - 1. Geogrid shall be wrapped taut around the pipe and aggregate fill as the aggregate fill around the pipe is placed as shown on the drawings.
 - 2. Anchor the geogrid in position as needed until the geogrid wrapped aggregate is backfilled and the Bodkin connection is installed.
 - 3. Structure connections shall be used to connect areas where geogrid overlap in the direction of the pipe.
 - 4. Seams in the geogrid perpendicular to the direction of the pipe shall be overlapped a minimum of 24 inches.
- I. Division VI (Detention Area E) Geotextile Reinforcement:
 - 1. Prepare the subgrade as specified in Section 02211 – Rough Grading. After receiving Engineer's approval of prepared subgrade, place geotextile over the prepared subgrade as indicated on the plans, or as directed by the Engineer. Geotextile shall not be placed directly on cut stumps, rigid stalks, or other items projecting from the ground. A 4 inch bed of native soil shall be used to cover these items as specified in Section 02211.
 - 2. Place geotextile in one continuous piece perpendicular to the embankment centerline with the geotextiles highest tensile strength perpendicular to the embankment centerline.
 - 3. Seams in the geotextile oriented perpendicular to the direction of the embankment shall be overlapped a minimum of 24 inches.
 - 4. Pull the geotextile taut during placement and during initial backfill placement.
 - 5. Anchor the geotextile in position until the initial backfill layer can be placed using sand bags, backfill or anchors that to the extent possible do not tear the geotextile.
 - 6. Place 24 inches of initial backfill over the geotextile after receiving approval from the Engineer. Limit backfill drop heights onto geotextile to 3 feet.
 - 7. Place initial backfill proceeding from the centerline of the embankment out to assist in tensioning the geotextile.
 - 8. Refer to Section 02211- Rough Grading for construction of the embankment over the geotextile reinforcement.

- J. Division VI (Detention Area E) and Division VII (Detention Area F) Geosynthetic Cellular Drives:
1. Prepare the upper 12 inches of the subgrade by scarifying, blending and compacting to a minimum of 95 percent of the material's maximum dry density as determined by the modified proctor method. Proofroll compacted subgrade as directed by Engineer. Recompact deficient areas identified during the proofroll.
 2. Place geotextile separation (Propex 4553) over prepared subgrade.
 3. Place geocell over geotextile separation, expand geocell into position, and anchor with stakes as recommended by the manufacturer.
 4. Verify cells are fully expanded and the expanded dimensions of each geocell are correct.
 5. Adjoin and connect geocells as recommended by the manufacturer.
 6. Fill select perimeter cells prior to machine grading. Limit backfill drop heights onto geocells to 3 feet.
 7. Backfill and compact geocells as specified, or as directed by the Engineer.
- K. All Divisions Geotextile Reinforcement:
1. Prior to placing geogrid, place a filter fabric over prepared subgrade as directed by the Engineer.
 2. Place geogrid over prepared subgrade, which may require a filter fabric.
 3. Place geogrid with the geogrid's highest tensile strength in the direction where maximum strength is needed as shown on the plans, or as directed by the Engineer.
 4. Seams in the geogrid shall be overlapped 18 inches, or as directed by the Engineer.
 5. Pull the geogrid taut during placement and prior to backfill placement.
 6. Anchor the geogrid in position as directed by Engineer.
 7. Backfill as directed by the Engineer.
- L. Repair:
1. The Contractor, at no additional cost to the Owner, shall replace any materials damaged during installation as directed by the Engineer.
 2. The Engineer will determine the limits of repairs based on the intent of the design.

END OF SECTION