

SECTION 02620 - SUBDRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Perforated-wall pipe and fittings.
 - 2. Drainage conduits.
 - 3. Drainage panels.
 - 4. Geotextile filter fabrics.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Drainage conduits, including rated capacities.
 - 2. Drainage panels, including rated capacities.
 - 3. Geotextile filter fabrics.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

- A. Perforated PVC Sewer Pipe and Fittings: ASTM D 1785, Schedule 80.
 - 1. Perforations: 3/8-inch-diameter holes on 6 –inch spacing, three rows in bottom quadrant of pipe.

2.2 DRAINAGE CONDUITS

- A. Single-Pipe Drainage Conduits: Prefabricated geocomposite with perforated corrugated core molded from HDPE complying with ASTM D 3350 and wrapped in geotextile filter fabric.
 - 1. Nominal Size: 8 inches high by approximately 1 inch thick.
 - a. Minimum In-Plane Flow: 30 gpm at hydraulic gradient of shown on Drawings when tested according to ASTM D 4716.

2. Filter Fabric: PP geotextile.
3. Fittings: HDPE with combination NPS 4 and NPS 6 outlet connection.
4. Couplings: Corrugated HDPE band.

2.3 DRAINAGE PANELS

- A. Molded-Sheet Drainage Panels: Prefabricated geocomposite, 36 to 60 inches wide with drainage core faced with geotextile filter fabric.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide American Wick Drain or comparable product by one of the following:
 - a. American Wick Drain.
 - b. Cosella-Dorcken Products, Inc.
 - c. Eljen Corporation.
 - d. Greenstreak.
 - e. JDR Enterprises, Inc.
 - f. Midwest Diversified Technologies Incorporated.
 - g. TenCate Geosynthetics.
 - h. Trace-LINQ Inc.
 2. Drainage Core: Three-dimensional, nonbiodegradable, molded PP.
 - a. Minimum Compressive Strength: 15,000 lbf/sq. ft. when tested according to ASTM D 1621.
 - b. Minimum In-Plane Flow Rate: 7 gpm/ft. of unit width at hydraulic gradient of 1.0 and compressive stress of 25 psig when tested according to ASTM D 4716.
 3. Filter Fabric: Nonwoven needle-punched geotextile, manufactured for subsurface drainage, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with the following properties determined according to AASHTO M 288:
 - a. Survivability: Class 2 .
 - b. Apparent Opening Size: No. 70 sieve, maximum.
 - c. Permittivity: 1.3 per second, minimum.
 4. Film Backing: Polymeric film bonded to drainage core surface.

2.4 SOIL MATERIALS AND DRAINAGE AGGREGATE

- A. Soil materials are specified in Division 2 Section "Earthwork."
- B. Drainage Aggregate: Same material used for subfloor drainage layer and conforming to Louisiana DOTD specifications, Part X, Subsection 1003.02(b) for Grade A (Size 57) crushed or uncrushed aggregate as shown in Table 1003-1.

2.5 WATERPROOFING FELTS

- A. Material: Comply with ASTM D 226, Type I, asphalt -saturated organic felt.

2.6 GEOTEXTILE FILTER FABRICS

- A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from at least 100 gpm/sq. ft. when tested according to ASTM D 4491.
- B. Structure Type: Nonwoven, needle-punched continuous filament.
 - 1. Survivability: AASHTO M 288 Class 2.
 - 2. Styles: Flat and sock.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.
- B. If subdrainage is required for landscaping, locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.
- C. Verify that drainage panels installed as part of foundation wall waterproofing is properly positioned to drain into subdrainage system.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.3 UNDERSLAB DRAINAGE INSTALLATION

- A. Excavate for underslab drainage system after subgrade material has been compacted but before drainage course has been placed. Include horizontal distance of at least 6 inches between drainage pipe and trench walls. Grade bottom of trench excavations to required slope, and compact to firm, solid bed for drainage system.
- B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.
- C. Place supporting layer of drainage aggregate over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 3 inches.

- D. Install drainage aggregate as indicated in Part 3 "Piping Installation" Article for underslab subdrainage.
- E. Add drainage aggregate to width of at least 12 inches on both sides of pipe and to top of pipe to perform tests.
- F. After satisfactory testing, cover drainage piping with drainage aggregate to elevation of bottom of slab, and compact and wrap top of drainage aggregate with flat-style geotextile filter fabric.
- G. Install horizontal drainage panels as follows:
 - 1. Coordinate placement with other drainage materials.
 - 2. Lay perforated drainage pipe at inside edge of footing.
 - 3. Place drainage panel over drainage pipe with core side up. Peel back fabric and wrap fabric around pipe. Locate top of core at bottom elevation of floor slab.
 - 4. Butt additional panels against other installed panels. If panels have plastic flanges, overlap installed panel with flange.

3.4 RETAINING-WALL DRAINAGE INSTALLATION

- A. Lay flat-style geotextile filter fabric in trench and overlap trench sides.
- B. Place supporting layer of drainage course over compacted subgrade to compacted depth of not less than 4 inches.
- C. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with tape.
- D. Install drainage piping as indicated in Part 3 "Piping Installation" Article for retaining-wall subdrainage.
- E. Add drainage course to width of at least 6 inches on side away from wall and to top of pipe to perform tests.
- F. After satisfactory testing, cover drainage piping to width of at least 6 inches on side away from footing and above top of pipe to within 12 inches of finish grade.
- G. Place drainage course in layers not exceeding 3 inches in loose depth; compact each layer placed and wrap top of drainage course with flat-style geotextile filter fabric.
- H. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches.
- I. Install drainage panels on wall as follows:
 - 1. Coordinate placement with other drainage materials.
 - 2. Lay perforated drainage pipe at base of footing as described elsewhere in this Specification. Do not install aggregate.

3. If weep holes are used instead of drainage pipe, cut 1/2-inch- diameter holes on core side at weep-hole locations. Do not cut fabric.
4. Mark horizontal chalk line on wall at a point 6 inches less than panel width above footing bottom. Before marking wall, subtract footing width.
5. Separate 4 inches of fabric at beginning of roll and cut away 4 inches of core. Wrap fabric around end of remaining core.
6. If another panel is required on same row, cut away 4 inches of installed panel core and wrap fabric over new panel.
7. If additional rows of panel are required, overlap lower panel with 4 inches of fabric.
8. Cut panel as necessary to keep top 12 inches below finish grade.
9. For inside corners, bend panel. For outside corners, cut core to provide 3 inches for overlap.

- J. Fill to Grade: Place satisfactory soil fill material over compacted drainage course. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish grade.

3.5 PIPING INSTALLATION

- A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in drainage aggregate. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
1. Underslab Subdrainage: Install piping level.
 2. Retaining-Wall Subdrainage: When water discharges at end of wall into stormwater piping system, install piping level and with a minimum cover of 24 inches unless otherwise indicated.
 3. Lay perforated pipe with perforations down.
 4. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.
- B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- C. Install thermoplastic piping according to ASTM D 2321.

3.6 PIPE JOINT CONSTRUCTION

- A. Join perforated PVC sewer pipe and fittings according to ASTM D 3212 with loose bell-and-spigot, push-on joints or slip couplings of same wall thickness as pipe, Schedule 80.
- B. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.7 BACKWATER VALVE INSTALLATION

- A. Comply with requirements for backwater valves specified in Division 2 Section "Storm Drainage."
- B. Install horizontal backwater valves in header piping downstream from perforated subdrainage piping.
- C. Install horizontal backwater valves in piping where indicated.

3.8 CLEANOUT INSTALLATION

- A. Comply with requirements for cleanouts specified in Division 2 Section "Storm Drainage."
- B. Cleanouts for Retaining-Wall Subdrainage:
 - 1. Install cleanouts from piping to grade. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
 - 2. In vehicular-traffic areas, use NPS 4 cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 18 by 18 by 12 inches deep. Set top of cleanout flush with grade.
 - 3. In nonvehicular-traffic areas, use NPS 4 PVC pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 12 by 12 by 4 inches deep. Set top of cleanout 1 inch above grade.
 - 4. Comply with requirements for concrete specified in Division 3 Section "Cast-in-Place Concrete."
- C. Cleanouts for Underslab Subdrainage:
 - 1. Install cleanouts and riser extensions from piping to top of slab. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
 - 2. Use NPS 4 cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout flush with top of slab.

3.9 CONNECTIONS

- A. Comply with requirements for piping specified in Division 2 Section "Storm Drainage." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect low elevations of retaining wall and underslab subdrainage to groundwater sump pumps. Comply with requirements for sump pumps specified in Division 15 Section "Sump Pumps."

3.10 IDENTIFICATION

- A. Arrange for installation of green warning tapes directly over piping. Comply with requirements for underground warning tapes specified in specified in Division 2 Section "Earthwork."
 - 1. Install PE warning tape or detectable warning tape over ferrous piping.
 - 2. Install detectable warning tape over nonferrous piping and over edges of underground structures.

3.11 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling.
 - 2. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.
- B. Drain piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.12 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 02620