SECTION 02620

SUBSURFACE DRAINAGE
(Vertical applications)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Prefabricated Sheet Drainage System as a hydrostatic water relief system

{NOTE TO SPECIFIER: Edit paragraph below to meet specific project requirements. Add/Delete/Edit section numbers and titles per project and in accordance with CSI *MasterFormat*™ . If no related sections exist, delete paragraph in its entirety}

B. Related Sections:

1. Section 02610 – Pipe and Fittings
2. Section 02720 - Storm Sewer Systems
3. Section 03300 – Cast in Place Concrete

1.02 REFERENCES

A. American Standard Testing Methods (ASTM)

1. ASTM D1621 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics
2. ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
3. ASTM D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
4. ASTM D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
5. ASTM D4716 Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
6. ASTM D4751 Standard Test Method for Determining Apparent Opening Size of a Geotextile
7. ASTM D4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions

{NOTE TO SPECIFIER: Delete or modify shop drawing requirement as appropriate. If no project specific shop drawings are required, delete paragraph in its entirety.}

B. Shop drawings: Submit project specific details for all conditions that are not covered by manufacturer's standard details

C. Samples: Submit samples of each component of sheet drainage system.

D. Quality Assurance:

1. Submit manufacturer's letter of certification, that system flow rate meets or exceeds the specified rate.
2. Submit letter from waterproofing manufacturer indicating approval of proposed prefabricated drainage system as a protection course for the waterproofing membrane.

E. Test Reports: Submit test reports from a qualified testing agency certifying materials meet or exceed specified physical properties.

1.04 QUALITY ASSURANCE

A. Pre-Installation Meeting:

1. Prior to start of Work of this Section, a meeting shall be held at the jobsite to clarify and coordinate installation procedures
2. Attendees shall include:
   a. Contractor
   b. Representative of the prefabricated drainage system
   c. Waterproofing manufacturer
   d. Representatives from related trades or trades with work adjacent to drainage system.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Materials shall be delivered in original, unopened, undamaged packing containers bearing manufacturer's name, and product identification

B. Storage and Protection

1. Material shall remain in original packing containers until time of installation.
2. Store materials in protected environment.
3. Protect fabric from exposure to direct sunlight during storage and installation

PART 2 PRODUCTS

{NOTE TO SPECIFIER: Articles below meet proprietary specification method. Edit product attributes, performance characteristics, material standards and descriptions as applicable. Use of "or equal", "or approved equal", or similar terminology may result in ambiguity in specifications and should be avoided. }

2.01 MANUFACTURER: Multicoat Corporation

A. Contact: 23331 Antonio Parkway, Rancho Santa Margarita, CA 92688 Telephone: (877)685-8126; Fax (949)888-2555; E-mail: info@multicoat.com ; website: www.multicoat.com

{NOTE TO SPECIFIER: Edit/Add/Delete products as appropriate for project. Contact Multicoat Corporation for product selection assistance}

B. Proprietary Sheet Drain Products/Systems:

1. Wall Applications: Sheet drain for shallow vertical wall applications where moderate compressive strength and flow capacity are adequate. Generally appropriate for depths less that 15 feet.
   a LASTO 200 sheet drain
      1) Fabric Properties
         a) Material: Polypropylene
         b) Grab tensile: 110 lbs per ASTM D4632
         c) Puncture: 65 lbs per ASTM D4833
         d) Mullen burst: 215 psi per ASTM D3786
         e) Elongation: 60% per ASTM D4632
         f) AOS Std.: 100 sieve per ASTM D4751
         g) Flow rate: 150 gpm/sq ft per ASTM D4491
      2) Core Properties
         a) Material: Polystyrene
         b) Thickness: 1/4 inch per ASTM D1777
         c) Compressive Strength: 10,800 lbs/sq. ft per ASTM D1621 (modified)
      3) Product Properties

a) Flow capacity per unit width: 9 gpm/ln ft of wall per ASTM D4716
b) Roll length: 104 ft
c) Roll width: 4 ft
d) Roll weight: 57 lbs

{OR}

1. Wall Applications: Sheet drain for use with soft waterproofing materials in shallow vertical wall applications where moderate compressive strength and flow capacity are adequate. Generally appropriate for depths less that 15 feet.
   a LASTO 220 sheet drain
      1) Fabric Properties
         a) Material: Polypropylene
         b) Grab tensile: 110 lbs per ASTM D4632
         c) Puncture: 65 lbs per ASTM D4833
         d) Mullen burst: 215 psi per ASTM D3786
         e) Elongation: 60% per ASTM D4632
         f) AOS Std.: 100 sieve per ASTM D4751
         g) Flow rate: 150 gpm/sq ft per ASTM D4491
      2) Core Properties
         a) Material: Polystyrene with polymeric sheet on flat side of core
         b) Thickness: 1/4 inch per ASTM D1777
         c) Compressive Strength: 10,800 lbs/sq. ft per ASTM D1621 (modified)
      3) Product Properties
         a) Flow capacity per unit width: 9 gpm/ln ft of wall per ASTM D4716
         b) Roll length: 104 ft
         c) Roll width: 4 ft
         d) Roll weight: 60 lbs

{OR}

1. Wall applications: Sheet drain for use where high compressive strength and high flow capacity are required. Vertical retaining walls, foundation basement walls, or horizontal under basement floor slab.
   a. LASTO 500 sheet drain
      1) Fabric Properties
         a) Material: Polypropylene
         b) Grab tensile: 110 lbs per ASTM D4632
         d) Puncture: 65 lbs per ASTM D3786
         e) Mullen burst: 215 psi per ASTM D3786
         f) Elongation: 60% per ASTM D4632
         g) AOS Std.: 100 sieve per ASTM D4751
         h) Flow rate: 150 gpm/sq ft per ASTM D4491
      2) Core Properties
         a) Material: Polystyrene
         b) Thickness: 7/16 inch per ASTM D1777
         c) Compressive Strength: 15,000 lbs/sq. ft per ASTM D1621 modified
      3) Product Properties
         a) Flow capacity per unit width: 16 gpm/ln ft of wall per ASTM D4716

b) Roll length: 104 ft
c) Roll width: 4 ft
d) Roll weight: 80 lbs

{OR}

1. Wall Applications: Sheet drain for use with soft waterproofing materials use where high compressive strength and high flow capacity are required. Applications: Vertical retaining walls, foundation basement walls, or horizontal under basement floor slab.
   a. LASTO 520 sheet drain
      1) Fabric Properties
         a) Material: Polypropylene
         b) Grab tensile: 110 lbs per ASTM D4632
         d) Puncture: 65 lbs per ASTM D3786
         e) Mullen burst: 215 psi per ASTM D3786
         f) Elongation: 60% per ASTM D4632
         g) AOS Std.: 100 sieve per ASTM D4751
         h) Flow rate: 150 gpm/sq ft per ASTM D4491
      2) Core Properties
         a) Material: Polystyrene with polymeric sheet on flat side of core
         b) Thickness: 7/16 inch per ASTM D1777
         c) Compressive Strength: 15,000 lbs/sq. ft per ASTM D1621 modified
      3) Product Properties
         a) Flow capacity per unit width: 16 gpm/ln ft of wall per ASTM D4716
         b) Roll length: 104 ft
         c) Roll width: 4 ft
         d) Roll weight: 83 lbs
         b) Roll length: 104 ft
         c) Roll width: 4 ft
         d) Roll weight: 125 lbs

C. Proprietary Strip Drain Products/Systems:
   1. Wall Applications: Strip drain used in conjunctions with sheet drain product.
      a. LASTO 6” soil strip drain
         1) Fabric Properties
            a) Material: Polypropylene
            b) Grab tensile: 110 lbs per ASTM D4632
            d) Puncture: 65 lbs per ASTM D3786
            e) Mullen burst: 215 psi per ASTM D3786
            f) Elongation: 60% per ASTM D4632
            g) AOS Std.: 100 sieve per ASTM D4751
            h) Flow rate: 150 gpm/sq ft per ASTM D4491
         2) Product Properties
            a) Flow capacity per unit width: 30 gpm/ln ft of wall per ASTM D4716
            b) Roll length: 100 ft
            c) Roll width: 6 inches
            d) Roll weight: 15 lbs
D. Proprietary Sheet drain and Protection Board System:

1. Wall Applications:
    a. LASTO *TOTAL DRAIN:*
        1) Material: Polypropylene
            a) Grab tensile: 115 lbs per ASTM D4632
            b) Puncture: 70 lbs per ASTM D4833
            c) AOS Std.: 70 sieve per ASTM D4751
            h) Flow rate: 150 gpm/sq ft per ASTM D4491
        2) Product Properties
            a) Flow capacity per unit width: 21 gpm/ft of wall per ASTM D4716
            b) Roll length: 50 ft
            c) Roll width: 24 inches
            d) Roll weight: 30 lbs

PART 3 – EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions

1. Verify that site conditions are acceptable for installation of prefabricated sheet drain material.
2. Do not proceed with installation of prefabricated sheet drain material until unacceptable conditions have been corrected.

{NOTE TO SPECIFIER: Select the appropriate installation method for project. Edit/Delete installation requirements as appropriate. Contact American Wick Drain for installation method assistance}

3.02 SHEET DRAIN INSTALLATION

A. Installation of first roll of prefabricated drain material

1. Install first roll of drain at bottom of wall. Set sheet drain at bottom of wall with fabric side toward soil. The edge of core with flange shall be at top.
2. Cut ½" diameter holes in flat back of core at weep hold locations. Do not cut fabric.
3. Tuck extra fabric at bottom under edge of core.
4. Attach prefabricated drain to substrate using manufacturer recommended practices.
5. Fold fabric under core to close upstream end.

B. Installation of additional rolls of drain (length)

1. Attach each additional roll of sheet drain by butting the beginning of second roll against the end of the first roll.
2. Connect rolls with standard straight connector.
3. Tape joints to prevent soil intrusion.
4. Tuck fabric behind core of all sheet drain edges to prevent soil from entering core.

D. Installation of additional rows of drain (height)

1. Fold down fabric of lower drain.
2. Place cones of upper drain over flange of lower drain.
3. Tape joint to keep fabric in place prior to backfilling.

E. Installation of corners

1. Inside corners
    a) Bend sheet drain material around corner.
    b) Cut fabric on wall side of drain
2. Outside corners
    a) Cut sheet drain core to reach around corner
    b) Provide 3" of extra fabric to wrap around corner

c) Attach drain to wall, overlap fabric around corner.

F. Backfilling against drain
1. Soil shall be placed and compacted directly against drain
2. Direct compactor exhaust away from drain to prevent damage.
3. Backfill a minimum 6” above drain to allow for coverage after soil settlement.

{AND/OR}

3.02 SHEET/STRIP DRAIN ASSEMBLY INSTALLATION

A. Installation of first row of sheet drain and strip drain materials
1. Install first roll of drain at bottom of wall. Position lower edge of sheet drain core horizontally on footing with fabric away from wall.
2. Pull fabric away from lower 12” of sheet
3. Place strip drain on footing with small ends of cones of core facing sheet drain.
4. Tuck sheet drain fabric around and under strip drain.
5. Close the upstream end of sheet drain to prevent soil intrusion by folding fabric behind drain.
6. Tape upstream end of strip drain.

B. Installation of additional rolls of drain (length)
1. Attach each additional roll of sheet drain by butting the beginning of second roll against the end of the first roll.
2. Connect rolls with standard straight connector.
3. Tape joints to prevent soil intrusion.
4. Tuck fabric behind core of all sheet drain edges to prevent soil from entering core.

D. Installation of additional rows of drain (height)
1. Fold down fabric of lower drain.
2. Place cones of upper drain over flange of lower drain.
3. Tape joint to keep fabric in place prior to backfilling.

E. Installation of corners
1. Inside corners
a) Bend sheet drain material around corner.
b) Cut fabric on wall side of drain
2. Outside corners
a) Cut sheet drain core to reach around corner
b) Provide 3” of extra fabric to wrap around corner
c) Attach drain to wall, overlap fabric around corner.

F. Backfilling against drain
1. Soil shall be placed and compacted directly against drain
2. Direct compactor exhaust away from drain to prevent damage.
3. Backfill a minimum 6” above drain to allow for coverage after soil settlement.

{OR}

3.02 TOTAL DRAIN INSTALLATION

A. Installation of first row of prefabricated drain (TOTAL-DRAIN ROW)
1. Install first roll of drain at bottom of wall. Set drain on top of footing with high profile section at bottom.

{NOTE TO SPECIFIER: If full wall coverage will incorporate the use of additional rows of sheet drainage, delete items 2 & 3 below.}

2. Fold fabric behind core to close upstream end.
3. Close the high profile section with 3” underground tape.

B. Installation of additional rolls of composite drain system (length)
1. Cute one row of low-profile dimples from each end of the two sections to be joined. Do not cut fabric.
2. Interlock one row of the high-profile section and secured connection

3. Overlap fabric and apply 3” wide underground tape from joint top to bottom.

C. Installation of rows of sheet drain above TOTAL DRAIN
   1. Install with edge of the core with the flange facing the direction opposite of the TOTALDRAIN water flow.
   2. Fold back the fabric at the top of the TOTALDRAIN and rest (or shingle) the LASTO sheet drain on top of the TOTALDRAIN core flange.
   3. Cover the fabric seam (facing down) and secure with 3” tape.
   4. Install each subsequent row of sheet drain:
      a) Fold back fabric on lower drain without detaching from dimples
      b) Place cones of upper drain over flange of lower drain
      c) Overlap fabric of upper drain over lower drain
      d) Seal seam with 3” tape

E. Installation of TOTALDRAIN corners
   1. Inside Corner
      a) Bend drain material to make inside corner.
   2. Outside Corner
      a) Cut low-profile core flush with corner and tape edges.
      b) Slit fabric on high-profile section, bend around corner
      c) Place corner guard with fabric over slit of high-profile drain
      c) Secure with tape.

F. Backfilling against drain
   1. Soil shall be placed and compacted directly against drain
   2. Direct compactor exhaust away from drain to prevent damage.
   3. Backfill a minimum 6” above drain to allow for coverage after soil settlement.

END OF SECTION