

Seaside Rehabilitation and Healthcare Center  
Portland, Maine

SECTION 02710 - SUBDRAINAGE SYSTEM

**PART 1 - GENERAL**

1.01 GENERAL PROVISIONS:

- A. The CONDITIONS OF THE CONTRACT and all Sections of Division 1 are hereby made a part of this Section.
- B. Coordinate work with that of other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of the Work.
- C. The "*Standard Specifications*" referred to herein is the book entitled "*Standard Specifications, Highways and Bridges*" published by the State of Maine Department of Transportation (latest date), and Supplemental Specifications in Force, excluding the following portions thereof:

DIVISION 100, Sections 102 through 109; NUMERICAL INDEX OF PAYMENT ITEMS INCLUDED IN EACH SECTION.

Those Sections of the aforementioned Standard Specifications which are cited herein are applicable to the Work of this Contract as they may be modified, amplified, or added to by this Section.

- D. Reference is made to the Erosion Control report and Drawings for this project. Strict adherence to this report and Drawings must be followed in order to prevent adverse downstream impacts from erosion and sedimentation, originating from on-site construction activity.

1.02 DESCRIPTION OF WORK:

- A. Provide all labor, material, equipment and services required to complete the following:
  - 1. Install building perimeter drains (Specified elsewhere), building slab underdrains (Specified elsewhere), foundation drainage board (Specified elsewhere), wall and site underdrains (storm drain pipes, etc.), and their connections to the storm drainage system; all as indicated on the Drawings.

1.03 QUALITY ASSURANCE; SUBMITTALS:

- A. General: Comply with requirements of Division 1 Sections for Submittals and Quality Control.
- B. Submittals:
  - 1. Product specification literature for foundation drainage medium, all subdrainage pipe and fittings, and filter fabric.

1.04 AS-BUILT DRAWINGS:

- A. Submit as-built drawings for all subdrainage piping and structures; accurately show locations and inverts of piping and cleanouts, fittings, etc.

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**PART 2 - PRODUCTS**

2.01 MATERIALS;

- A. Subdrainage pipe and fittings: Subdrainage pipe and fittings shall be as follows:
  - 1. Foundation perimeter drains – unless otherwise Specified by Architect; Perforated PVC pipe, Schedule 40 (ASTM D 1785); sizes as shown on Drawings.
  - 2. Floor slab underdrains - unless otherwise Specified by Architect; Perforated PVC pipe, Schedule 40 (ASTM D 1785); sizes as shown on drawings.
  - 3. Storm drain area underdrains - Perforated PVC pipe, Schedule 40 (ASTM D 1785); or perforated HDPE pipe sized as shown on drawings.
- B. Stone Bedding Material: 3/4" Crushed stone, as specified in Section 02220-Excavation, Backfill and Compaction, S.S. 2.01 D.
- C. Drainage filter fabric: Non woven, continuous filament fibers of polypropylene; Mirafi 140N.
- D. Foundation Drainage Medium: unless otherwise Specified by Architect; Miradrain 6000 prefabricated drainage system, manufactured by Mirafi, Inc.
- E. Compacted structural fill: unless otherwise Specified by Architect; Structural granular fill shall be used as trench backfill below and adjacent to the building floor slab and exterior foundation walls and footings (See Section 02220-Excavation, Backfill and Compaction, (SS 2.01 B).
- F. Granular Borrow: Granular borrow shall be used as trench backfill above drainage stone, to sub-grade below pavement areas (See Section 02220-Excavation, Backfill and Compaction, (SS 2.01 C). Material excavated from the trench may be used as backfill if it meets this specification.

**PART 3 - EXECUTION**

3.01 TRENCH EXCAVATION (subdrains):

- A. Excavate trenches for underground lines and structures where shown on the plans. Make trench walls as near vertical as practical, consistent with OSHA requirements and safe working practices. Shore and brace as necessary. Keep excavations free from water in order to carry on work properly; begin trenching at outlet end of subdrainage system.
- B. Excavation shall be made to such a point as to allow a minimum of six inches (6") of 3/4" crushed stone bedding to be placed beneath the bottom of all barrels, bells or couplings of all pipes installed. The maximum clear width of trench at the top of the pipe shall be not more than the outside diameter of the pipe plus two feet. The bottom of the trench shall be accurately graded to provide a uniform layer of bedding material for each section of pipe. Safety shall be the controlling factor in determining minimum trench widths.
- C. Before installation of any underdrain pipe, the Contractor shall first place and consolidate a minimum six inch (6") layer of approved 3/4" crushed stone on the trench bottom. After the underdrain pipe has been laid, additional crushed stone shall be placed and consolidated to a

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depth of 6" above the top of the pipe. When installing flexible pipe, particular care shall be taken when grading stone and laying pipe, to assure a uniform and consistent invert slope.

D. Install geotextile filter fabric where Specified; recommended by the Geotechnical Report or indicated on Drawings.

E. The remainder of the trench shall be backfilled as follows:

1. In Roads, Walks, Drives, Etc.

a) The area between a line 6 inches over the top of the pipe and a line at subgrade elevation below finished pavement (see pavement details on plans), shall be carefully backfilled in not over twelve (12) inch layers using suitable material taken from the excavation or approved granular borrow hauled in for the purpose, as approved by the Architect/Engineer. No mud, frozen earth, or stone larger than four (4) inches in diameter is to be used for backfilling.

b) The trench shall be consolidated by tamping, rolling, or other mechanical means, as proposed by the contractor subject to the approval of the Architect/Engineer. The approval by the Architect/Engineer of the proposed method of compaction of the backfill shall in no way be construed as relieving the Contractor of responsibility for settlement of trenches, and any settlement shall be repaired by him at his own cost and expense. If the pipe is displaced from alignment, it shall be re-laid at the contractor's expense.

c) The remaining distance to the top of the trench shall be filled with road subbase and base gravel as specified, hauled in for the purpose and furnished by the Contractor. This gravel shall be placed, graded and compacted in maximum 8-inch layers to the finished surface. (See Section 02230 - Gravel Base Courses).

2. In landscaped areas, etc.

a) Trenches in landscaped and other non-traffic areas shall be filled with material excavated from the trench, unless directed otherwise by the Architect/Engineer. In all other respects, backfilling operation shall be carried out as specified in 1a. & 1b. above. (See landscaping Details on Drawings for proper sub-grade elevation).

F. After the completion of all backfilling operations, the Contractor shall grade the site to the lines, grades and elevations shown on the contract Drawings, taking into account any subsequent topsoil and paving requirements. Finished grading shall not be done until the installation of all subdrains, etc., has been completed.

3.02 SUBDRAINAGE LINES:

A. Install lines to locations and grades shown on Drawings and Details.

B. Install pipe in straight lines and with evenly sloping invert. Allow no sags or rises in pipe to interfere with water flow. This is particularly important when laying flexible pipe on flat slopes.

C. Where two lines connect, provide proper prefabricated fittings (tee, wye and specials) and match crowns of pipes unless otherwise directed. Field made connections are unacceptable.

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- D. Installation of the subdrains for foundations shall be fully coordinated with the pouring of concrete, location of sleeves for subdrain pipe, placement and compaction of structural fill and floor slab drain material, and as follows:
1. Verify that trench cut and excavation base is ready to receive Work, and excavations, dimensions, and elevations are as indicated on Drawings.
  2. Beginning of installation means Acceptance of existing conditions.
  3. Remove large stones or other hard matter which could damage drainage pipe or impede consistent backfilling or compaction.
  4. The bottom of the excavation shall be smooth, free from loose earth and accurately graded.
  5. Install pipe and pipe fittings in accordance with manufacturer's instruction
  6. After placing the initial layer of crushed stone, place the subdrain pipe with the holes down, true to the alignment and gradient indicated. All joints shall be properly made-up.
  7. Install perimeter underdrains along the exterior perimeter of the foundation near the footing grade, with positive drainage.
- E. For drainage from beneath ground floor slabs, underdrains should be provided beneath the slab where shown on the Drawings. The interior subgrade and subgrade below entrance walks and slabs should be sloped to promote water movement toward the underdrains. 18 inches of 3/4 inch crushed stone should be used to bed the drain pipe. The stone should be wrapped in filter fabric, Mirafi 140N. Refer to Details on Drawings.
- F. Backfilling against the foundation walls shall be coordinated with foundation waterproofing and placement of foundation drainage board and insulation board as indicated on the Architectural Drawings, and in conjunction with all other filling and backfilling against foundation walls.
- G. Protect pipe and bedding cover from damage or displacement until backfilling operation begins. Backfill immediately after the subdrain pipe is placed.
- H. Backfill and compact the fill carefully to hold the subdrain securely in place. Avoid disturbing the alignment and gradient of the subdrain pipe.
- I. Seal exterior foundation backfill with a surficial layer of impervious soil in areas that are not to be paved or occupied by entrance slabs, to reduce direct surface water infiltration into the backfill and subdrains.

3.03 DRAINBOARD:

1. Install rigid drainboard against foundation wall in locations shown, and as Detailed on the Architectural Drawings. Coordinate with insulation and/or waterproofing of walls as required.
2. Connect to footing drain system as detailed.

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3. Install backfill carefully to avoid crushing, displacing or damaging drainboard. Immediately remove any damaged areas and replace, at no additional cost to the owner.

**END OF SECTION**