

**CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC UTILITIES**

**SUPPLEMENTAL SPECIFICATION 1610
UNDERDRAINS AND AGGREGATES FOR GREEN INFRASTRUCTURE FACILITIES**

DATED MARCH 31, 2017

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UNDERDRAINS AND AGGREGATES FOR GREEN INFRASTRUCTURE PROJECTS

1610.01 Description. This Section summarizes the material and installation requirements for the supply and placement of underdrains and aggregates for use in green infrastructure facilities. The aggregates included in this Section include but are not limited to the storage and filter layers of bioretention facilities and does not include subbase, base, and/or joint fill material used for permeable surfaces which are specified in SS 1605 (Reserved).

1610.02 Applicable Standards

- A. City of Columbus CMSC (current standards)
 - 1. Section 203: Roadway Excavation and Embankment
 - 2. Section 605: Underdrains
 - 3. Section 703: Aggregate
 - 4. Section 720: Plastic Pipe
 - 5. SS 1602: Earthwork for Green Infrastructure

1610.03 Submittals

- A. Underdrains
 - 1. Submit the name of the pipe and fitting manufacturers and a list of materials to be furnished by each manufacturer.
 - 2. Shop Drawings including piping layouts and schedules shall include dimensioning, fittings, types and locations of fittings, joint details and all other pertinent technical information for all items to be furnished.
 - 3. Prior to each shipment of pipe, certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM Standards specified per the applicable section of CMSC 720 shall be submitted.
- B. Aggregates:
 - 1. Name, address, phone, and contact for each laboratory used to test and/or certify materials.
 - 2. Laboratory certification and gradation reports indicating that the granular material(s) meet the requirements of CMSC 703, Table 703.01-1.

1610.04 Summary of Work

- A. Materials
 - 1. PVC underdrain piping shall meet the requirements of CMSC 720.07 (perforated) or 720.08 (solid wall). Corrugated high density polyethylene (HDPE) or high density polypropylene (HDPP) pipe used shall be in conformance with CMSC 720.12 and 720.13.

2. Aggregates shall be as indicated on the drawings and shall meet the requirements of CMSC 703, Table 703.01-1.

B. Placement

1. Placement of underdrains within the facility footprint shall be in accordance with SS1602.04.A.
2. Underdrains shall not be installed until contributing drainage areas are stabilized to the satisfaction of the Engineer. Any discharge of sediment that reduces the infiltration performance of the underdrain shall be removed.
3. Perforated underdrain shall only be used within the green infrastructure footprint. Solid wall underdrain piping shall be used to connect the perforated underdrain to structures and piping outside of the green infrastructure footprint and shall be placed per CMSC 605.
4. Underdrains within green infrastructure facilities shall be placed per CMSC 605.03, with the following exceptions:
 - a. Earthwork for underdrains shall be per CMSC1602 to the lines and grades shown on the Drawings.
 - b. The underdrains shall be installed in the locations and to the limits shown on the Drawings.
 - c. The granular bedding and backfill material shall be as indicated on the Drawings.
5. Underdrains shall not be placed on frozen surfaces, or surfaces covered by snow or ice unless otherwise approved by the Engineer. Fill and backfill material shall be free of snow, ice and frozen earth.

1610.05 Method of Measurement

The City will measure underdrains by the number of feet completed and accepted in place, measured from end to end of each run.

The City will measure the aggregates by the number of cubic yards of material in the final position, acceptably placed, using the average end area method in accordance with CMSC 203.09.

1610.06 Basis of Payment

The City will pay for excavation for the green infrastructure facility (which includes area to be occupied by underdrain and aggregates) under 1602 Excavation for Green Infrastructure Facilities.

Underdrains associated with curb replacements or other installations unrelated to a green infrastructure facility shall be paid under 605 Pipe Underdrains.

Granular material specified for subbase, base, and/or joint fill material for permeable surfaces shall be paid under the respective bid items for 1606 Clay Brick Pavers (Reserved), 1607 Concrete Pavers (Reserved) or Permeable Concrete (Reserved).

The City will pay for accepted quantities at contract price as follows.

Item	Unit	Description
1610	Foot	_____” Pipe Underdrains for Green Infrastructure
1610	Cubic Yard	Green Infrastructure Aggregate, Type _____