

SECTION 64

UNDER-DRAINS

64.1 DESCRIPTION

A. General: This work consists of subgrade drainage installations or repair of porous backfill and under-drain pipe or edge drain.

B. Related Work:

Section 56	Class M6 Concrete for Curb & Gutter and Flatwork
Section 112	Select Granular Backfill
Section 202	Geosynthetics for Roadways
Section 203	Submittals

64.2 MATERIALS

A. Under-Drain Pipe Trench Granular Backfill Material: Shall be clean type 1 bedding as described in Section 112.

B. Under-Drain Pipe or Tubing: Drainage tubing used as sub-drains or edge drains shall have cleanouts installed at the upper ends. In lieu of a cleanout, where directed or approved by the Engineer, a penetration into a storm sewer culvert, inlet or pipe will be acceptable. The distance between cleanouts shall not exceed 500 feet.

Unless otherwise specified in the plans, under-drain pipe shall be 4 inches in diameter.

1. Corrugated Polyethylene Drainage Tubing: Corrugated polyethylene drainage tubing, couplings, and fittings shall conform to the requirements of AASHTO M 252, except as modified below:

- a) The length of the individual slots on the 4 inch to 6 inches diameter tubing shall not exceed 12 percent of the tubing inside nominal circumference.
- b) Corrugated polyethylene drainage tubing for use as edge drain or subgrade drain shall be a prefabricated system utilizing polyethylene drainage tubing. It shall be a flexible composite capable of following an irregular trench wall.

2. Perforated PVC: Perforated PVC, if specified, shall be the requirements of ASTM D3034 DR 35. Perforations shall be circular ½ inch holes spaced 5 inches apart (+/- 0.25 inches). Perforation locations shall be 4 o'clock and 8 o'clock on the pipe.

C. Separation Fabric: Separation fabric material used to prevent soil migration into the under-drain, shall conform to Section 202 Class 2.

D. Concrete: Where required, concrete shall conform to the requirements of Class M6, Section 56.

64.3 CONSTRUCTION REQUIREMENTS

Prior to placement of the under-drain located at the edge of roadway, the subgrade shall be built and graded to final blue top elevation. The Engineer shall accept subgrade prior to under-drain installation.

The trench to receive the under-drain shall be excavated to the lines shown on the plans or as staked by the Engineer. The trench bottom shall be shaped and tamped as required by the Engineer. Disposal of surplus excavation shall be made by the Contractor and shall be incidental to the under-drain construction.

Prior to placement of under-drain trench granular material a layer of separation fabric material shall be placed in the trench. The material shall be of sufficient width to totally wrap the bottom, sides and top of the under-drain pipe trench granular backfill material and pipe or tubing. There shall be a minimum 12 inch overlap of separation fabric material over the top of the under-drain Pipe trench granular backfill material. Longitudinal sections shall have a minimum 12 inch overlap end to end.

Prior to placement of perforated or corrugated under-drain pipe or tubing, a layer of under-drain pipe trench granular backfill material shall be placed to the depth shown on the plans and shaped to receive the pipe or tubing.

Perforated under-drain pipe or tubing shall be laid with the symmetrically placed holes on the lower side. In outlet sections, the pipe or tubing shall be either non-perforated or the symmetrically placed holes shall be on the upper side. The sections shall be well bedded at all points throughout their entire length and securely bolted or banded together.

Under-drain pipe trench granular backfill material shall be placed without compaction, in one (1) foot layers. It shall be uniformly spread without segregation or contamination. Tarpaulins or other approved devices shall be used as guides to transport the granular backfill material from the hauling vehicle to the trench to prevent pulling dirt in with the granular backfill.

Satisfactory free and unobstructed outlets shall be provided for all drains. Where possible, all outlets shall have a twelve (12) inch free fall and shall be properly marked. All outlets to daylight shall be marked with a solid yellow Type II object marker, and have a precast concrete headwall with rodent screen. Outlets to underground storm sewer shall be sealed to the storm sewer with a concrete grout collar.

Drain installations and waste disposal shall be furnished and left in a neat appearing condition satisfactory to the Engineer.

64.4 METHOD OF MEASUREMENT

- A. Under-Drain Pipe Trench Granular Backfill Material:** Where a separate bid item for under-drain pipe trench granular backfill material is included in the bid proposal, under-drain pipe trench granular backfill material will be measured to the nearest one-tenth (0.1) ton utilizing certified weight tickets delivered to the Engineer within 48 hours of material delivery and placement. Excess material used to fill unauthorized or oversized trench widths or other dimensions will not be measured for payment.

Where no such item is included, weekly, or at the direction of the Engineer, the Contractor shall provide weight tickets to verify the quantity of granular backfill material used, along with the corresponding quantity of water and sewer pipe installed.

- B. Under-Drain Pipe or Tubing:** Shall be determined by measuring from centerline to centerline of all pipe and fittings. Measurements shall be to the nearest whole foot.

Separation fabric for under-drains will not be measured. It is incidental to the under-drain pipe.

- C. Under-Drain Cleanout:** Shall be measured per the each.

- D. Precast Concrete Headwall for Drains:** Shall be measured per the each. The solid yellow Type II object marker shall not be measured.

64.5 BASIS OF PAYMENT

- A. Under-Drain Pipe Trench Granular Backfill Material:** Where a separate bid item for under-drain Pipe Trench Granular Backfill Material is included in the bid proposal, under-drain Pipe Trench Granular Backfill Material will be paid for at the contract unit price per ton.

Where no such item is included, it shall be incidental to the under-drain installation.

Payment for this item will include full compensation for furnishing the material, labor, equipment, and incidentals necessary.

- B. Under-Drain Pipe or Tubing:** Will be paid for at the contract unit price per linear foot for the various types and classes of pipe or tubing and shall include pipe or tubing, necessary fittings, bands, bolts, wyes, elbows, gratings, lids, covers, guide posts, screens, breathers, excavation, backfilling, separation fabric material, and handling waste disposal.

- C. Under-Drain Cleanout:** Shall be full compensation for installation of the cleanout including casting and concrete collar if required by detailed plans and specifications.

- D. Perforated Pipe Precast Concrete Headwall:** Shall be paid by the each. The solid yellow Type II object marker shall be incidental to the headwall.

END OF SECTION