

## SECTION 501—UNDERDRAINS

### 501.01—Description

This work shall consist of constructing underdrains, using pipe, aggregate, and geosynthetics, in accordance with these specifications and in conformity to the lines and grades shown on the plans or as designated by the Engineer.

### 501.02—Materials

- (a) **Pipe** shall conform to the requirements of Section 232.
- (b) **Aggregate** shall conform to the requirements of Section 202 or 203
- (c) **Geosynthetics, to include geotextile fabric and prefabricated geocomposite pavement edgedrains**, shall conform to the requirements of Section 245.

### 501.03—Procedures

- (a) **Excavation:** The trench shall be excavated so that the walls and bottom are free of loose and jagged material. Large depressions shall be filled with sandy material, and sharp contours and rises shall be leveled. Excavated material shall be handled in a way that prevents contamination with the aggregate used to backfill the trench for the underdrain.
- (b) **Placing Geosynthetics:** When geotextile fabric or prefabricated geocomposite pavement edgedrain (PGPE) is required, it shall be placed as shown on the plans. Torn or punctured fabric shall be replaced at the Contractor's expense. Splices, when required for PGPE, shall be made using splice kits furnished by the manufacturer and in accordance with the manufacturer's written instructions. Spliced joints shall not damage the panel, shall not impede the open flow area of the panel, and shall maintain the vertical and horizontal alignment of the drain within 5 percent. Splices shall be made in such a manner as to prevent infiltration of the backfill or any fine material into the water flow channel.
- (c) **Installing Pipe:** Perforated pipe shall be placed with the perforations facing downward on a bed of aggregate material. Pipe sections shall be joined with appropriate couplings. Semi-round underdrain pipe shall be placed with the rounded section down.

Wherever the depth of the trench is modified to a lesser depth than shown on the standard drawings, concrete or corrugated pipe shall be used.

Pipe shall be placed with the bell end upgrade. Open joints shall be wrapped with the same geotextile used for lining the excavation.

Upgrade ends of pipe, except for combination underdrains, shall be closed with suitable plugs. Where an underdrain connects with a manhole or catch basin, a suitable connection shall be made through the wall of the manhole or catch basin.

After the Engineer has approved the pipe installation, aggregate backfill material shall be placed and compacted. Pipe and covering at open joints shall not be displaced during subsequent operations.

Outlet pipes shall be installed at the low points of a sag.

Endwalls for outlet pipes shall be placed on a prepared surface that has been compacted to comply with the requirements of Section 303.04. If settlement of the endwall occurs, the Contractor shall make necessary repairs at his expense.

Prior to final acceptance of the underdrain system, the Contractor shall conduct a video inspection of the installed system in accordance with the requirements of VTM-108.

- (d) **Combination Underdrain Outlets:** Pipe shall be placed in the trench with sections securely joined. After the Engineer has approved pipe installation, the trench shall be backfilled with aggregate material in layers not more than 6 inches in depth and thoroughly compacted.
- (e) **Inspection Ports:** Inspection ports shall be installed on the PGPE at a rate of two per mile of installed PGPE or a minimum of four per project. Inspection ports shall meet and be installed in accordance with the manufacturer's specification. The Department will use these ports in conjunction with a borscope camera as part of the basis for acceptance of the PGPE. The Department will perform inspection after PGPE installation but prior to paving of the shoulder. Bends, water flow restrictions, J-shaped panels, tears in the geotextile, debris in pipes, and sags are unacceptable and shall be removed and replaced at no cost to the Department.

**501.04—Measurement and Payment**

**Underdrains and combination underdrains** will be measured in linear feet, complete-in-place, and will be paid for at the contract unit price per linear foot. The contract unit price for underdrains installed at depths greater than those shown in the standard drawings will be increased 20 percent for each 1-foot increment of increased depth. No adjustment in the contract unit price will be made for an increment of depth of less than 6 inches. When drains are to be placed under pavement that is not constructed under the Contract, the contract unit price shall include removing and replacing pavement.

**Geotextile drainage fabric**, when a pay item, will be measured and paid for in accordance with the requirements of Section 504.04.

**Outlet pipe** for underdrains will be measured in linear feet, complete-in-place, and will be paid for at the contract unit price per linear foot.

These prices shall include geotextile drainage fabric when not a pay item, excavating, aggregate, backfilling, compaction, splicing, inspection ports, if any, disposing of surplus and unsuitable materials, and installing outlet markers.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Underdrain (Standard)	Linear foot
Combination underdrain (Standard)	Linear foot
Outlet pipe	Linear foot