

## SECTION 715 PERFORATED PIPE UNDERDRAINS

**715.01 Description.** This work consists of constructing and performing a video inspection of underdrains from perforated, corrugated metal pipe or perforated, corrugated polyethylene tubing.

### MATERIALS.

**715.02 Perforated, Corrugated Metal Pipe.** Perforated, corrugated metal pipe shall conform to the requirements of AASHTO M 36/M 36M, Class 1.

**715.03 Perforated, Corrugated Polyethylene Tubing (CPT).** Perforated CPT shall conform to the requirements of AASHTO M 252, and shall be supplied in individual lengths no shorter than 10N (3 m). Coil pipe will only be permitted in 4O (102 mm) diameter, when it is to be machine installed.

**715.04 Stone.** Stone for backfill shall conform to the requirements of [Section 813](#), Delaware No. 8.

**715.05 Filter Fabric.** Filter fabric shall conform to the requirements of AASHTO M 288.

### CONSTRUCTION METHODS.

**715.06 General.** The underdrain shall be constructed in accordance with the details shown on the Plans or the Standard Construction Details and at the locations shown on the Plans. The pipe shall be placed as directed by the Engineer. Lateral connections to the pipe shall be made with connectors recommended by the manufacturer. Stone backfill shall be placed in 6O (150 mm) lifts and compacted with a vibratory plate to the satisfaction of the Engineer.

**715.07 Video Inspection.** After completion of the roadway base and prior to the Project's final inspection, the entire underdrain system shall be videoed. The entire underdrain system involved shall be numbered and then inspected by means of a closed-circuit television. The inspection will be done one section at a time in the presence of the Department's inspector.

The television camera used for the inspection shall be specifically designed and constructed for such inspection, capable of producing color video. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing quality to the satisfaction of the Department. If unsatisfactory, the equipment shall be removed and replaced.

The camera shall be moved through the pipe run in either direction at a speed of 2 to 3O/s (0.05 to 0.08 m/s) but in no case greater than 6O/s (0.15 m/s). Manual winches, power winches, television cable and power rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the pipe condition shall be used to move the camera through the pipe.

When manually operated winches are used to pull the television camera through the pipe run, telephones or other means of communication shall be used to ensure good communications between members of the crew pulling the camera.

The technician operating the camera shall be experienced and qualified in conducting video pipe inspections. The technician shall have the capability of controlling the movement of the television camera, adjusting the brightness of the built-in lighting system, and focusing the television camera by remote control. The importance of accurate distance measurements is emphasized. A distance meter and location indicator

shall appear on the monitor and video tape indicating the exact location of the camera in the pipe between two structures.

The view scanned by the television camera shall be transmitted to a color monitor of not less than 120 (300 mm), measured diagonally across the screen. The monitor shall be located such that the Department's inspector has full visual access.

The technician shall stop and document on a separate written report and on audio any unusual conditions including but not limited to crushed pipe, open joints, obstructions, debris, roots, sharp bends, sags, and water pockets. A copy of this written report shall be supplied to the Department along with the visual and audio record on a good quality VHS videotape in a hard plastic case which will become the property of the Department.

The videotape will be evaluated by the Engineer for the purpose of acceptance of the underdrain system. Any defects noted shall be repaired by the Contractor.

**715.08 Method of Measurement.** The quantity of perforated pipe underdrains will be measured from end-to-end in linear feet (linear meters) of pipe completed and accepted.

**715.09 Basis of Payment.** The quantity of perforated pipe underdrains will be paid for at the Contract unit price per linear foot (linear meter). Price and payment will constitute full compensation for furnishing and placing all materials, including perforated pipe, connectors, stone for backfill, and filter fabric; for constructing perforated pipe drains; for excavating, backfilling, compacting, and video inspection; and for all labor, tools, equipment, and incidentals required to complete the work. If rock is encountered during excavation for perforated pipe underdrain, payment for rock removal will be made under [Section 206](#).