

TECHNICAL SPECIFICATIONS
FOR
UNDERDRAINS

1. Description

This work shall consist of the construction of underdrains composed of stone, gravel, slag, or a combination of any one of these materials and perforated or semicircular drainpipe (with connections or filter cloth). They shall be constructed in accordance with these Specifications, on prepared foundations at the locations shown on the Plans, and in reasonably close conformity to the lines and grades indicated thereon, or as directed by the Engineer. The work shall include all necessary excavation and backfill, together with such work and materials as may be necessary to make connections with other drainage structures, as shown on the Plans.

2. Materials

Materials used in this construction shall meet the following requirements:

- (a) Pipe used for underdrains shall conform to the requirements of AASHTO M-252 and ASTM F405 for Corrugated Polyethylene Tubing and Fittings.
- (b) Aggregates for underdrains shall be crushed stone, gravel, slag or a combination meeting the gradation as follows:

<u>Sieve Size</u>	<u>Total Percent Passing by Weight</u>
1/2"	100
3/8"	85 – 100
No. 4	10 - 30
No. 8	0 - 10
No. 16	0 - 5
No. 200	0 - 1

The aggregate shall meet the quality requirements of ASTM D 692.

- (c) Mortar for joints shall meet the requirements of the Standard Specifications for Storm Sewers and Pipe Culverts.

3. Construction Requirements

- (a) Underdrains shall be of the kind specified on the Plans. Unless otherwise specified, circular pipe for underdrains shall have a diameter of 6 inches nominal inside diameter.
- (b) The trench to receive the pipe shall be excavated at the locations shown on the Plans, or as directed by the Engineer. In case the dimensions are not shown, the width of the trench shall be not less than the outside diameter of the pipe plus 12 inches. The trench shall be deep enough to intercept the water-bearing strata and to allow installation of the pipe and cover material, but in no case shall it be less

than 16 inches deep. Unless otherwise shown on the Plans, a 2-inch layer of aggregate shall be spread on the bottom of the trench, compacted and brought to uniform grade.

- (c) The pipe shall be firmly embedded in the layer of aggregate. Perforations shall be laid with the flow and perforations at the bottom.
- (d) If an underdrain is extended through a dry fill or other area where perforations are undesirable, it shall be constructed with pipe without perforations where specified.
- (e) After the pipe has been laid and approved, the backfilling around the pipe shall be with the aggregate specified. Unless otherwise designated on the Plans, or by special provision, the backfilling shall be 6 inches on each side of the pipe and 6 inches over the pipe. The aggregate around the pipe shall be thoroughly tamped with an approved tamp. The backfill above the aggregate shall be of suitable nonporous material placed in layers not exceeding 6 inches (loose measurement) and thoroughly compacted with mechanical tamp, hand tamp or roller to a density at least equal to that of the existing material adjacent to the trench.
- (f) Dead ends of pipe underdrains shall be closed with a suitable concrete plug placed over and around the end and held firmly in place.
- (g) Outlet ends of pipe underdrains shall be covered with screens of ½ inch openings. The screens are to be securely and satisfactorily attached to the end of the pipe. The outlet ends of pipe shall be marked for the benefit of proper maintenance.
- (h) Lateral and other connections shall be made where indicated on the Plans or as directed by the Engineer.
- (i) All excess and unsuitable material shall be removed from the site and disposed of as directed by the Engineer.

4. Method of Measurement

Aggregate underdrains (with pipe) will be measured for payment by the linear foot along the centerline of the pipe, and from end to end of pipe, including connections, complete in place.

5. Basis of Payment

Accepted quantities of underdrain of the various sizes measured as specified above will be paid at the Contract unit price per linear foot, for the individual sizes, complete in place. Such payment shall be full compensation for all excavation, backfill, connections, specials and all incidentals necessary to complete the construction, in accordance with the Plans and Specifications.