

6.60 SUBDRAINS

Subdrains are constructed on grading, paving, and structures contracts. Refer to [Specifications 2502, 4120, 4131, 4133, 4141, 4143, 4145, 4146](#) and [Standard Road Plans RF-19 A-E](#).

Subdrains are used for tile relocations, backslope drains, longitudinal and cross drains under the roadway area.

Subdrains are also used with granular blankets to develop a drainage layer in areas where the soil has a high moisture content and poor stability.

6.61 TILE RELOCATION

Most projects where tile lines are possible will have an item for locating tile lines. Where tiles are known, a contract item for each size is provided. However, if a tile is located and no contract item is provided, the tile will be relocated and paid for as extra work. Where the tile is required to remain underground, coated corrugated metal pipe or concrete culvert pipe shall be used within the right of way limits.

Where two or more lines cross the right-of-way, it is better to keep them separate. If the tiles are flowing the same and elevations are nearly the same, a single pipe crossing may be used with junction boxes on both sides, provided the single pipe has adequate capacity.

Be sure the downstream tile exits the junction box at the same elevation.

Inspection pipes with caps are required to be installed in subdrains near each right-of-way line. The purpose of the inspection pipes is to allow access to the subdrain line to verify flow within the right-of-way. The vertical pipe is to be a 100 mm (4-inch) diameter PVC pipe. These inspection pipes are incidental to the price bid for subdrain.

A useful resource is the final report of "Field Tile Issues in Highway Construction" by the Benchmark Steering Team, DOT Office of Construction. A copy is available on in the "Construction/Reports/Process Improvement Teams/Field Tile PIT Team Report 12/6/99" folder on the Local Area Network. Also available in each RCE Office is an Iowa State University Extension agricultural drainage manual entitled "The Iowa Drainage Guide".

6.62 BACKSLOPE DRAINS

Backslope drains are used in areas where seepage and/or a slide is possible. Where a water table is perched on a very dense layer, a subdrain is installed at or below the surface of the very dense layer. The flow line is very important in this case. A backslope drain may also be used to drain a sand pocket, again plan flow line is important.

6.63 LONGITUDINAL DRAINS

Longitudinal drains are usually installed at the pavement edge to remove any water that accumulates under the pavement. These drains are detailed on *Standard Road Plans RF-19C*, as well as "fin drains" which are placed in a narrow trench at the pavement edge. If "fin drains" are used, the plans will show construction methods. Also, manufacturer's information may be useful.

Inspection considerations must include:

- **Trench Excavation**

The trenching equipment must be adjusted and maintained so the trench is excavated to the specified depth. It is important that all of the loose excavated material is removed from the bottom of the trench to minimize settlement of the trench backfill. Trenchers have a metal device on the end of the trencher's boom termed a "crumber." The "crumber" is to be adjusted so the loose material is scraped off of the bottom and removed.

- **Outlets**

All outlets should be inspected prior to backfilling. The pipe coupling should be inspected to assure proper installation. The flow line of the outlet should be checked for uniform downward grade toward the ditch. All outlets are to be marked with an orange fence post.

Some projects require that existing subdrain outlets be extended, for example, on a shoulder widening project. On these projects, the contractor must remove the existing rodent guard before extending the pipe.

- **Porous Backfill**

Porous backfill material must be in contact with the base of the pavement for the subdrain system to operate correctly. This may require handwork by the contractor. No soil shall remain between the pavement edge and the subdrain trench.

- **Pipe Stretch**

Specifications require that subdrain pipe shall not be stretched in excess of 105%. Polyethylene pipe is delivered to the project in rolls of an identified length. Periodic inspections should be made to insure the pipe is not stretched more than 5% during installation. Excessive stretching will weaken the pipe and possibly cause the pipe to rupture or crush during backfilling.

- **Moisture Content of the Porous Backfill**

The porous backfill material is to be in a surface wet condition. If the material is too dry, the contractor shall be required to add water to the material.

The Office of Materials (Special Investigations Section) possesses a video camera with a 90 m (300-foot) probe. The camera is capable of being placed into subdrains for the purpose of monitoring and inspecting the installation. The project engineer may request a video inspection by contacting the Special Investigations Engineer.