
Subdrains

Design Manual
Chapter 4
Drainage

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Without proper drainage a road can deteriorate prematurely. Excess water can cause pavement to heave during the wintertime when the water freezes. Excess water and heavy traffic may cause pavement to deteriorate due to a pumping motion that allows fine aggregates to be carried away from the roadway's base. For this reason, longitudinal subdrains are used to keep water from building up underneath the roadway. Subdrains are also installed in varying locations to drain water and serve stability or settlement-control purposes.

Subdrains

The design of longitudinal, backslope, and fill or foundation subdrains is done by the Soils Design Section. Soils Design provides subdrain locations, depth, size, outlet location, and length plus the amount of porous backfill and crushed stone needed to install the drains. The designer places this information in the appropriate Tabulation on an individual sheet in the plans and places the geotechnical signature block on the title sheet or the first sheet covered by that seal (see Section [1E-1](#) for more information on plan certification).

Before turning the plan in for letting, the Soils Design Section needs to review the information to verify the subdrain information is correct and to sign the geotechnical signature block.

Longitudinal and Backslope

Longitudinal subdrains are installed along the edge of the pavement to drain water from under the pavement. Backslope drains are placed in the backslope to drain water and assist in eliminating backslope slides. See Standard Road Plans [DR-303](#) and [DR-306](#) for designs of both types of drains and their outlets. Place this information on Tabulation [104-9](#). Section [3D-1](#) contains important information pertaining to subdrain placement for changing subgrade slopes.

Fill or Foundation Drainage

If a grading project involves fill, and settlement or stability may be a problem due to soft soil or high water tables, subdrains and/or trench drains, frequently in conjunction with granular blankets, need to be installed to drain the water. These devices are installed underneath the roadway, typically at the base of the fill or in the natural ground. Examples of this procedure are located on Standard Road Plan [DR-301](#). Soils Design also frequently prepares additional drawings and other related material to show locations and additional information. Tabulation [104-5C](#) is used to list the information given by the Soils Design Section.

Tiles

Locating Tile Lines

If tile line locations are known, they should be shown on the plans. If the exact location of the tile lines cannot be precisely determined prior to construction, then include the bid item Locating Tile Lines in the plans. During the field examination, the Resident Construction Engineer estimates the quantity (in stations) of tile lines that need to be located. Include this quantity in the plans on the "Estimated Project Quantities" Tabulation (Tabulation [100-1A](#) or [100-1C](#)).

Placing Tile Lines

Tile lines that are intersected by roadway construction are modified or relocated as illustrated on Standard Road Plan [DR-302](#). Judgment is required to determine if the lines should be reconnected or if they should be emptied onto the right-of-way. Unlike longitudinal subdrains, designers need to estimate the quantities involved. Place these values on Tabulation [104-5C](#).

Subdrains at Bridge Piers

On side piers, subdrains are used to carry water away from the ditch located beside the bridge pier. Standard Road Plan [EW-211](#) provides details for subdrain installation at bridge piers. This quantity also needs to be estimated by the designer and placed on Tabulation [104-12](#).

Chronology of Changes to Design Manual Section:

004C-001 Subdrains

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| 5/17/2018 | Revised
Change DR-304 reference to DR-306. |
| 7/31/2015 | Revised
Updated references to outdated RF and RL standards to current DR and EW standards. |
| 9/13/2012 | Revised
Added hyperlinks. |