

**NATURAL RESOURCES CONSERVATION SERVICE**  
**VIRGINIA ENGINEERING DESIGN NOTE #606 (DN-606)**  
**SUBSURFACE DRAIN**

A subsurface drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and or convey drainage water. It is used in areas having a high water table where the benefits of lowering the water table or controlling ground water or surface runoff justify installing a system.

**Design Aids**

National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage).

USDA NRCS National Engineering Handbook Part 624, Chapter 10, Water Table Control, 04/01  
[ftp://ftp.wcc.nrcs.usda.gov/water\\_mgt/EFH&NEH\\_Drainage\\_Chapters/neh624\\_10.pdf](ftp://ftp.wcc.nrcs.usda.gov/water_mgt/EFH&NEH_Drainage_Chapters/neh624_10.pdf)

National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 6, Structures.

USDA, NRCS, National Engineering Handbook Section 16, Drainage of Agricultural Land, 06/71

**Design**

The design aids listed above provide detailed instruction in subsurface drainage system design and installation. The Engineering Field Handbook, Chapter 14 provides excellent guidance.

Where perforated conduit is required, the water inlet area shall be at least 1 square inch per foot of conduit length. Round perforations shall not exceed 3/16 inch in diameter except where filters, envelopes, or other protection is provided. Slotted perforations shall not exceed 1/8 inch in width.

While numerous materials are acceptable, plastic tubing and pipes are the primary material used, and the appropriate ASTM specifications are shown below. When other materials are used, verify the soil pH and sulfates as well as outlet conditions are appropriate per ASTM, AASHTO, or AWWA specifications.

**Plastic Pipes**

Type	Specification
Corrugated polyethylene (PE) tubing and fittings 3-6 in.	ASTM-F-405 <sup>1</sup>
Corrugated polyethylene (PE) tubing and fittings 8-24 in.	ASTM-F-667 <sup>1</sup>
Polyvinyl chloride (PVC) sewer pipe and fittings	ASTM-D-2729 <sup>1</sup>
Polyvinyl chloride (PVC) pipe type PSM or PSP	ASTM-D-3033 <sup>1</sup> or D-3034

<sup>1</sup> Specifications can be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103