

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

VERTICAL DRAIN

(No.)

CODE 630

DEFINITION

A well, pipe, pit or bore in porous, underground strata into which drainage water can be discharged.

PURPOSE

Provide an outlet for drainage water from a surface or subsurface drainage system.

CONDITIONS WHERE PRACTICE APPLIES

This practice is applicable in locations where the underlying strata can receive, transmit or store the design drainage flow and other drainage outlets are not available and cannot be provided at a reasonable cost. This practice is also applicable where natural "sinkholes" are the vertical drain and erosion control and treatment of surface runoff is a concern.

This practice is applicable only in locations where a determination has been made that it is not contrary to state laws or regulations, and that it will not cause pollution of underground waters.

This practice is limited to rural areas and can only be used when (1) to dispose of stormwater runoff occurring within the same topographic watershed, (2) the introduction of contaminants is kept to a minimum, and (3) only very shallow karst systems are involved. Very shallow karst systems are those where the sinkhole outlets in the same or adjacent watershed and the total depth from the restored ground surface to the receiving strata entrance is 20 feet or less.

This practice is limited to the shallow karst systems found in Ste. Genevieve, Cape Girardeau and Perry Counties.

A vertical drain shall not be installed where it would destroy important woody wildlife cover and where the present watercourse has little or no erosion. When encountered, wetlands will be treated in accordance with current NRCS wetlands policy. Refer to NRCS booklet "Wetland Types in Missouri," or Fish and Wildlife Circular 39 for classification.

CRITERIA

Criteria for Sinkhole Treatment.

The number, size and location of vertical drains shall be adequate to discharge the design drainage flow into the underlying stratum or strata, and shall be based on a field determination of the depth, permeability, porosity, thickness and extent of the strata. Sink holes will not be blocked in order to divert flow into adjacent topographic drainage areas.

The minimum pipe diameter installed in sinkholes with surface watershed areas of 10 acres or less shall be 12 inches, and for watershed areas between 10 and 20 acres shall be 18 inches. For watersheds areas greater than 20 acres the pipe shall be designed to drain the 10 year – 24 hour frequency runoff for the watershed in 24 hours or less, but shall not be less than 18 inches. The pipe shall be smooth steel pipe with a minimum wall thickness of 3/16 inch. The pipe inlet shall have a trash rack or grating installed that has openings that do not exceed more than ½ the pipe diameter in any dimension.

The elevation of the pipe inlet shall allow a minimum of 0.5 feet of water to stage above the inlet. Pipe inlet may extend above ground level but must have side inlet holes to allow drainage to ground level.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service or download the standard from the electronic Field Office Technical Guide for Missouri.

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A suitable filter system, desilting basin or other means necessary for removing sediment from the water shall be provided before it enters the pipe.

CONSIDERATIONS

Significant diversions into underground storage areas may have an effect on the peak discharge rate from a watershed. Planners should consider this, and take steps to mitigate any potential negative effects this may have on riparian habitat downstream from the structure.

Significant additions to subsurface water sources may raise local water tables or cause undesirable surface discharges down gradient from the vertical drain. When a sinkhole is the vertical drain, investigate the surrounding area for evidence that the sink hole is discharging to the surface or is causing surface discharge in adjacent sinkholes. Do not treat sinkholes using this standard that have evidence of significant discharges.

Consider alternatives to installation of a vertical drain in a sinkhole that would control the erosion to an acceptable level while meeting the land use needs of the landowner. Such alternatives may include but are not limited to filter strips, conservation cover or use exclusion.

PLANS AND SPECIFICATIONS

Plans and specifications for installing vertical drains shall be in keeping with this standard, and shall describe the requirements for properly installing the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

The inlets to vertical drains shall be inspected periodically to insure that they are not plugged or damaged. Vegetative filters, sediment basins and other filters shall be maintained as per Operation and Maintenance requirements for each of the respective practice standards.