

**Natural Resources Conservation Service
Conservation Practice Standard**

**Diversion
(Feet)
Code 362**

Definition

A channel with a supporting ridge on the lower side constructed across the slope.

Scope

This standard applies to the installation of all diversions excepted floodwater diversions (400).

Purpose

To divert excess water from areas to sites where it can be used or disposed of safely.

Conditions Where Practice Applies

This practice applies to sites where:

1. Runoff from higher lying areas is damaging cropland, pastureland, farmsteads, feedlots, or conservation practices such as terraces or stripcropping.
2. Surface and shallow subsurface flow caused by seepage is damaging sloping upland.
3. Runoff is in excess and available for diversion and use on nearby sites.
4. A diversion is required as part of a pollution abatement system.
5. A diversion is required to control erosion and runoff on urban or developing areas and construction sites.

Diversions shall not be substituted for terraces on land requiring terracing for erosion control.

Diversions shall not be used below high sediment producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with or before the diversions.

Design Criteria

Capacity. Diversions protecting agricultural land and those that are part of a pollution abatement system must have the capacity to carry the peak runoff from a 10-year frequency storm as a minimum, with a freeboard not less than 0.3 feet.

Diversions designed to protect urban areas, buildings, and roads, and those designed to function in connection with other structures, shall have enough capacity to carry the peak runoff expected from a storm frequency consistent with the hazard involved but not less than a 10-year frequency.

Cross section. The channel may be parabolic, V-shaped, or trapezoidal. The diversion shall be designed to have stable side slopes. The ridge height shall include a 10% settlement factor. The ridge shall have a minimum width of four feet at design flow elevation.

Grade and velocity. Channel grades may be uniform or variable. Channel velocity shall not exceed that considered nonerosive for the soil and planned treatment. Channel velocity shall not exceed the permissible velocity contained in the NRCS, National Engineering Handbook Series, Part 560 (Engineering Field Handbook), Chapter 9, Table 9-2 (Page 9-6), for the soil and/or planned vegetation.

Location. The location of the diversion shall be determined by outlet conditions, topography, land use, cultural operations, soil type, and length of slope.

A diversion in a cultivated field must be aligned to permit use of modern farm equipment.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Protection against sedimentation. If movement of sediment into the channel is a significant problem, a vegetated filter strip shall be used except where soil and/or climate preclude the use of such strips. Then, the design shall include extra capacity for sediment and be supported by supplemental structures, cultural or tillage practices, or special maintenance measures.

Outlets. Each diversion must have an adequate outlet. The outlet may be a grassed waterway, a vegetated or paved area, a grade stabilization structure, a stable water course, or an underground outlet. The outlet must convey runoff to a point where outflow will not cause damage. Vegetative outlets shall be installed before diversion construction to insure establishment of vegetative cover in the outlet channel. Underground outlets consist of an inlet and underground conduit, and the release rate when combined with storage is to be such that the design storm will not overtop the diversion ridge.

The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

Vegetation. Disturbed areas that are not to be farmed shall be established to grass as soon as practicable after construction. If the soils or climatic conditions preclude the use of vegetation and protection is needed, nonvegetative means, such as mulches or gravel, may be used. Seedbed preparation, seeding, fertilizing, and mulching shall comply with recommendations in technical guides. The sod shall be maintained and trees and brush controlled by chemical or mechanical means.

Additional Criteria. These criteria apply to diversions with drainage areas of ten (10) acres or less which are installed for protection of agricultural land or are part of a pollution abatement system (short term life/temporary).

The minimum capacity shall be that required to carry the peak discharge from a 10yr - 24 hr storm event.

The ridge shall have a minimum width of 2 feet at the design flow elevation.

The constructed ridge height shall include as a minimum, the flow depth for the design storm, plus a reasonable settlement factor.

Planning Considerations for Water Quality and Quantity

Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. The type of outlet, time of water detention, geology, and topography of the site.

Quality

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.

2. Effects of nutrients and pesticides on surface and ground water quality.

3. Filtering effects of vegetation on movement of sediment and dissolved and sediment-attached substances.

4. Short-term and construction-related effects on the quality of downstream water.

5. Effects on the movement of dissolved substances below the root zone and toward the ground water.

6. Potential for uncovering or redistributing toxic materials and low productive soils that might cause undesirable effects on the water or plants.

Plans and Specifications

Plans and specifications for installing diversions shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Operation and Maintenance

A maintenance program should be established to maintain diversion capacity, storage, ridge height, and the outlets. Maintenance needs are to be discussed with the landowner or operator who is responsible for maintaining the practices installed with NRCS assistance. Diversion ridges can be hazardous for farming operations or mowing. Any hazards must be brought to the attention of the responsible person.

References

NRCS Engineering Field Handbook -
Chapter 9
NRCS Conservation Practice Standards
Code 606 - Subsurface Drains
Code 620 - Underground Outlet
Manual for Erosion and Sediment Control in
Georgia

Diversion

Specifications

All ditches or gullies shall be filled, and trees and other obstructions shall be removed before construction begins or shall be part of the construction.

The diversion shall be constructed to planned alignment, grade, and cross section.

If underground conduits are located under diversion ridges, mechanical compaction, water packing, and installation and backfill of conduit trenches shall be made in advance to allow adequate settlement. The materials used for the purpose intended and shall meet the requirements of subsurface drains (606). Diversion ridges constructed across gullies or depressions shall be compacted by machinery travel or other means sufficient to insure proper functioning of the diversion. The surface of the finished diversion shall be reasonably smooth and present a workmanlike appearance.

If it is necessary, topsoil shall be stockpiled and spread over excavations and other areas to facilitate revegetation. If vegetation is needed, seedbed preparation, seeding, fertilizing, and mulching shall comply with recommendations in local technical guides.

DIVERSION
ENGINEERING NOTEKEEPING

Design and Layout Survey

- A. Record the following information:
1. Location sketch
 2. Drainage area
 3. Design flow
 4. Channel grade
 5. Velocity
 6. Channel and ridge dimensions
 7. Calculation of volume of earth to be moved if payment is by volume
 8. Planned length of each diversion
 9. Location of an adequate outlet
 10. Specifications for seeding as applicable
 11. Date and signature of designer and person approving design

Construction Check

- A. Make and record the following construction check items:
1. Profile of the completed channel and ridge
 2. Cross-section of channel and ridge for each design section
 3. Length of each completed diversion
- B. Record the condition or adequacy of vegetation if required.
- C. Compute earthwork quantities, where applicable, if different from planned quantities.
- D. Record statement concerning adequacy of outlet.
- E. Record date and sign statement concerning adequacy of construction.

Recording Data

- A. Data may be recorded in an engineering field book or on job sheet.