

**NATURAL RESOURCES CONSERVATION SERVICE
PACIFIC ISLANDS AREA**

CONSERVATION PRACTICE STANDARD

HILLSIDE DITCH

(Ft.)

CODE 423

DEFINITION

A channel that has a supporting ridge on the lower side, constructed across the slope at defined gradient and horizontal or vertical interval, with or without a vegetative barrier.

PURPOSE

To safely control the flow of water by diverting runoff from upland sloping areas to a stable outlet.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to steeply sloping sites where surface flow is damaging sloping upland, and there is sufficient soil depth for constructing a hillside ditch system. Hillside ditches shall not be used to provide protection to buildings, roads, or other improvements.

CRITERIA

Location. Locate hillside ditch systems to fit land conditions, soil texture, and field slope, and to drain to a stable outlet.

Outlets. Locate or establish adequate outlets prior to the construction of hillside ditches, with enough capacity to dispose of discharged water without creating an erosion hazard. An outlet may be a grade control structure, a natural or constructed waterway, a stable watercourse, or a stable disposal area such as a well-established pasture. Criteria for grassed waterways are found in NRCS Conservation Practice Standard, Grassed Waterway (412).

Length. The maximum allowable length of ditch draining in one direction is 400 feet, unless an

extension is necessary to reach a stable outlet. In no case shall a ditch exceed 500 feet in length.

Permissible velocities. Design the ditch to be compatible with the erosion resistance characteristics of soils of the site.

Maximum channel velocities shall not exceed those recommended in NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 9, Diversions.

Grade. *The ditch grade may be either constant or variable. Grade shall not exceed two percent.*

Horizontal spacing. Use Table 1 to determine the maximum horizontal spacing.

Table 1

Land Slope (percent)	Maximum Spacing (feet)
<12	40
12-25	35
25-40	25
>40	20

Capacity. At a minimum, hillside ditches shall safely carry the peak discharge from a 10-year frequency, 24-hour duration, rainfall event.

Side Slopes. *The side slopes shall be stable for the soil in which the ditch is constructed.*

CONSIDERATIONS

When planning this practice, consider the following as applicable:

Various conservation practices can reduce

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#) or visit the [electronic Field Office Technical Guide](#). *Italicized font represents state-specific additions to the standard, which are more specific than guidance in the national standard.*

runoff and thus affect the required size of a hillside ditch. These practices accomplish this by improving soil function, permeability, and structure. As appropriate, these alternative practices, such as Conservation Cover (327), Conservation Crop Rotation (328), Cover Crop (340), Forage and Biomass Planting (512), Nutrient Management (590), Residue and Tillage Management, No Till/Strip Till/Direct Seed (329), Row Arrangement (557), and Vegetative Barrier (601), should be discussed in detail with the land user.

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

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

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

Steep fields with sandy soils may benefit more from NRCS Conservation Practice Standard, Vegetative Barrier (601), than from hillside ditches.

Potential for development of saline seeps or other salinity problems resulting from increased infiltration in the presence of restrictive layers.

Potential to affect significant cultural resources.

PLANS AND SPECIFICATIONS

Plans (*designs*) and specifications for constructing hillside ditches shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Provisions must be made for necessary maintenance.

The design drawings shall include:

- a. Land slopes, number, location in the field, and horizontal spacing*
- b. Ditch length and slope,*
- c. Cross section showing, width, depth, and side slopes,*
- d. Type of outlet,*
- e. Quantities, and*
- f. Materials requirements.*

The Pacific Islands Area Hillside Ditch (423) Specification, and supporting practice specifications must be furnished as construction specifications.

OPERATION AND MAINTENANCE

The Pacific Islands Area Operation and Maintenance plan for this practice shall be prepared for, provided to, and reviewed with the landowner or operator. The plan shall include provisions to address the following, as a minimum:

- Maintain hillside ditch capacity, ridge height, and the outlet capacity.
- Remove vegetative growth or debris interfering with the proper functioning of the ditch, as necessary.
- Remove debris interfering with the outlet operation, as necessary.
- Maintain well-established vegetation in the outlet at all times, to provide stability.
- Maintenance and repairs should be done on a routine basis with special emphasis on inspection as soon as possible after heavy rainfall events. Sediment accumulated in the ditches shall be removed and disposed of properly, as needed, to maintain the required minimum cross section and grade.

REFERENCES

Temple, D.M., K.M. Robinson, R.M. Ahring, A.G. Davis. 1987. Agriculture Handbook 667, Stability Design of Grass-Lined Open Channels. USDA-Agricultural Research Service.