NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Surface Drain, Field Ditch

(Ft.)

CODE 607

DEFINITION

A graded ditch for collecting excess water in a field.

PURPOSE

This practice may be applied as part of a resource conservation system to achieve one or more of the following:

- Interception of excess subsurface water and conveyance to an outlet.
- Collection or interception of excess surface water, such as sheet flow from natural and graded land surfaces or channel flow from furrows, and conveyance to an outlet.
- Drainage of surface depressions.

CONDITIONS WHERE PRACTICE APPLIES

The practice is applicable to sites that:

- Have soils that are slowly permeable (low permeability) or are shallow over barriers such as rock or clay, which hold or prevent ready percolation of water to a deep stratum.
- Have surface depressions or barriers that trap rainfall.
- Have insufficient land slope for ready movement of runoff across the surface.
- Receive excess runoff or seepage from uplands.
- Require the removal of excess irrigation water.
- Require control of the water table.

CRITERIA

General Criteria Applicable to All purposes

Field ditches shall be planned as integral parts of a drainage system for the field served and shall collect and intercept water and carry it to an outlet with continuity and without ponding.

Investigations. An investigation shall be made to assure adequate outlets are available for discharge of drainage water by gravity flow or pumping.

Location. On extensive areas of uniform topography, collection or interception ditches shall be installed as required for effective drainage.

Size. The size of field ditch shall be computed by applying Manning's formula.

Velocity. The design velocity shall not exceed the maximum velocity contained in Table 14.3 of NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage).

Criteria Applicable to Interception of Excess Subsurface Water

Capacity. One or more of the following shall determine the required capacity:

- Application of locally tried and proven drainage coefficients to the acreage drained, including added capacity required to dispose of surface water entering through inlets.
- Yield of ground water based on the expected deep percolation of irrigation water from the overlying fields, including the leaching requirement.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service Oregon NRCS State Office or visit the Field Office Technical Guide.

- Comparison of the site with other similar sites where subsurface drain yields have been measured.
- Measurement of the rate of subsurface flow at the site during a period of adverse precipitation and ground water conditions.
- Application of Darcy's law to lateral or artesian subsurface flow.
- Estimates of lateral or artesian subsurface flow.

Depth, Spacing, and Location. The depth, spacing, and location of field ditches shall be based on site conditions, including soils, topography, ground water conditions, crops, land use, outlets, and saline or sodic conditions.

Criteria Applicable to Collection or Interception of Excess Surface Water

The capacity, size, depth, side slopes, and cross sectional area shall be based on the State Drainage Guide recommendations, if available. If local information is not available, use the information contained in NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water Management (Drainage).

CONSIDERATIONS

When planning this practice, the following items should be considered as applicable:

- Ditches shall be established, insofar as topography and property boundaries permit, in straight or nearly straight courses. Random alignment may be used to follow depressions and isolated wet areas of irregular or undulating topography. Excessive cuts and the creation of small irregular fields shall be avoided.
- Permit free entry of water from adjacent land surfaces without causing excessive erosion.
- Permit crossing by field equipment if feasible.
- Provide effective removal or reuse of excess irrigation water.
- Potential impacts on downstream flows or aquifers that would affect other water uses or users.
- Potential water quality impacts for soluble pollutants, sediments and sediment-attached pollutants.
- Potential effects of Drainage Water Management on salinity of soils.
- Potential for uncovering or redistributing toxic materials.
- Impacts on cultural resources.
- Effects on wetlands or water-related wildlife habitats.
- Potential benefits of Drainage Water Management, including reduction of nutrient concentrations, improved plant productivity, and providing seasonal wildlife habitat.
- Potential effects of Drainage Water Management on downstream water temperatures.
- The need for riparian buffers, filter strips and fencing.
- Effects on water budget components, especially the relationships between runoff and infiltration.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing drainage field ditches 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

A site-specific operation and maintenance plan shall be provided to and reviewed with the landowner(s) before the practice is installed.

The plan shall adequately guide the landowner(s) in the routine maintenance and operational needs of the ditch(es). The plan shall also include guidance on periodic inspections and post-storm inspections to detect and minimize damage to the ditches.

REFERENCES

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