NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

IRRIGATION FIELD DITCH

(Ft.)

CODE 388

Archived Reference Use Only October 2014

DEFINITION

A permanent irrigation ditch constructed in or with earth materials, to convey water from the source of supply to a field or fields in an irrigation system.

PURPOSE

This practice may be applied as part of an irrigation water management system to efficiently convey and distribute irrigation waters.

CONDITIONS WHERE PRACTICE APPLIES

This standard is limited to open channels and elevated ditches of 25 cubic feet per second or less in capacity and constructed of earth materials.

This standard applies where field ditches are needed as an integral part of an irrigation water distribution system design to facilitate the conservation use of soil and water resources.

CRITERIA

All planned work shall comply with all federal, state and local laws and regulations.

Water supplies and irrigation deliveries for the area served shall be sufficient to make irrigation practical for the crops to be grown and the irrigation water application methods to be used.

Field ditches shall be constructed in earth material that contains enough fines to prevent excessive seepage losses and where shrinkage cracks will not endanger the ditch, or cause down gradient water quality problems. The sealing effect of sediment carried in the irrigation water may be considered.

Capacity requirements. Field ditches shall have adequate capacity to deliver:

1. The design peak consumptive use of the crop(s) to be grown in the field, with proper provisions for the expected field irrigation efficiency.
2. The largest irrigation stream required for the irrigation method(s) planned for the field.

The design capacity shall include additional flow required to compensate for the ditch seepage loss and to safely carry surface runoff from adjacent lands that must be transported to waterways or overflow points.

For capacity design, the value of Manning's "n" shall be selected according to the materials in which the ditch is constructed, the alinement and hydraulic radius, and the additional retardance due to vegetation.

Velocities. Field ditches shall be designed for flows that are non-erosive for the soil materials in which they are constructed. Local information on the velocity limit for specific soils shall be used if available. If such information is not available, the maximum design velocity shall not exceed those shown in Figure 6-2, Chapter 6 of Technical Release 25 "Design of Open Channels" unless protective measures are implemented.

For checking designs to see that velocities do not exceed permissible values, a Manning's "n" no greater than 0.025 shall be used, and applicable criteria in NRCS conservation

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

practice standard for Open Channels (582) shall be followed.

Cross section. Freeboard in field ditches shall be not less than one-third of the maximum design depth of water, to a maximum freeboard of 0.5 feet. Side slopes shall be stable. The top width of banks as measured at the elevation providing the required freeboard shall be not less than 12 inches and shall equal or exceed one-half the flow depth.

If a field ditch is to be constructed on a fill section, side slopes of the fill shall not be steeper than the values shown in Table 1.

Table 1

Height of fill to water surface on centerline of fill **(feet)**	Steepest allowable side-slope of fill **(horizontal to vertical)**
< 3	1½:1
3 – 6	2:1
> 6	2½:1

Water surface elevations. All field ditches shall be designed so that the water surface elevations at field takeout points are high enough to provide the required flow onto the field surface. If ditch checks or other control structures are to be used to provide the necessary head, the backwater effect must be considered in computing freeboard requirements.

The required water surface elevation above the field surface will vary with the type of takeout structure or device used and the amount of water to be delivered through each. A minimum head of 4 inches shall be provided.

Related structures. Erosion control or water control structures, culverts, diversions, or other related structures needed to supplement the field ditch shall be designed and installed to meet NRCS standards for the particular structure and type of construction.

CONSIDERATIONS

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

- Potential impacts on downstream flows or aquifers that would affect other water uses or users.
- Potential water quality impacts for soluble pollutants and attached sediment pollutants.
- Potential for uncovering or redistributing toxic material.
- Impacts on cultural resources.
- Effects on wetlands or water-related wildlife habitats.
- Effects of water level control on salinity of soils, soil water or downstream water.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing irrigation field ditches shall describe the requirements for applying the practice to achieve its intended purposes.

OPERATION AND MAINTENANCE

An Operation and Maintenance plan shall be prepared for use by the landowner or operator. The plan shall provide specific instructions for operating and maintaining the irrigation field ditches to insure it functions properly. The plan shall include the following provisions:

1. Perform prompt repair or replacement of damaged components.
2. Remove debris and foreign material that hinder system operation from field ditches and other components.
3. Maintain recommended vegetative cover on all slopes and watercourses.

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APPROVAL AND CERTIFICATION

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PRACTICE STANDARD APPROVED:

_____/s/ John Mueller_____ **_____04/23/03_____**

State Conservation Engineer **Date**

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NRCS, Texas

April 2003