NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

STRUCTURE FOR WATER CONTROL

(No.)

CODE 587

DEFINITION

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation, or measures water.

PURPOSE

The practice may be applied as a management component of a water management system to control the stage, discharge, distribution, delivery, or direction of water flow.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies wherever a permanent structure is needed as an integral part of a water-control system to serve one or more of the following functions:

- To convey water from one elevation to a lower elevation within, to, or from a water conveyance system such as a ditch, channel, canal, or pipeline designed to operate under open channel conditions. Typical structures are drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.
- To control the elevation of water in drainage or irrigation ditches. Typical structures are checks, flashboard risers, and checkdams.
- To control the division or measurement of irrigation water. Typical structures are division boxes and water measurement devices.
- To keep trash, debris, or weed seeds from entering pipelines. Typical structure is debris screens.
- To control the direction of channel flow resulting from tides and high water or backflow from flooding. Typical structure is tide and water management gates.
- To control the water table level remove surface or subsurface water from adjoining land, flood land for frost protection, or manage water levels for wildlife or recreation. Typical structures are water level control structures, flashboard risers, pipe drop inlets, and box inlets.
- To convey water over, under, or along a ditch, canal, road, railroad, or other barriers. Typical structures are bridges, culverts, flumes, inverted siphons, and long span pipes.
- To modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures are chutes, cold water release structures, and flashboard risers.
- To provide silt management in ditches or canals. Typical structure is sluice.
- To supplement a resource management system on land where organic waste or commercial fertilizer is applied.

CRITERIA

General Criteria Applicable to All Purposes

Vegetation complying with Critical Area Planting (342) shall be established on all disturbed earth surfaces. Where soil, climate, or site specific conditions preclude establishing permanent vegetation, other protective means such as mulches or gravels shall be used.

The structure shall be fenced, if necessary, to protect the vegetation.

The capacity of the water control structure(s) shall be consistent with the level of protection desired and equal to or more than the capacity of other related components of the overall plan. Related components such as earth embankments, dikes, diversions, irrigation canals, etc., shall meet the criteria of the applicable standard.

Where manufactured structures are used, the hydraulic design shall be provided by the manufacturer.

If watercourse fisheries are important special precautions or design features may be needed to insure continuation of fish migrations.

Structures shall not be installed that have an adverse effect on septic filter fields.

The water level upstream of water control structures shall not be raised on adjacent landowners unless authorized through a written easement, permit, or equivalent legal document.

Additional Criteria for Structures Designed for Wetland Restoration, Enhancement, or Creation

Where water control structures are provided for wetland water level control, existing drains downstream of the site shall be protected by flow control devices. Inflow will be limited to the capacity originally apportioned to the drain.

Materials shall meet the requirements for Underground Outlet (620) for fill heights over the conduit of 10 feet. Materials for all other conditions shall meet Pond (378) requirements.

If needed to prevent clogging of the conduit, an appropriate trash guard shall be installed at the inlet or riser.

Animal guards shall be installed on conduit outlets of 10 inches in diameter or smaller.

A drainage diaphragm or anti-seep collars shall be used for seepage control if the conduit:

- Has a smooth exterior and is larger than 8 inches in diameter
- Has a corrugated exterior and is larger than 12 inches in diameter
- Is installed at a depth of 5 feet or more below management pool level

Drainage diaphragms shall meet the requirements found in Pond (378).

If an anti-seep collar is used the collar shall extend a minimum of 2 feet beyond the outside diameter of the conduit.

CONSIDERATIONS

When planning, designing, and installing this practice the following items should be considered:

- Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
- Effects on downstream flows or aquifers that would affect other water uses or users.
- Potential use for irrigation management to conserve water.
- Effects on stream system channel morphology and stability as it relates to erosion and the movement of sediment, solutes, and sediment attached substances carried by runoff.
- Effects on the movement of dissolved substances within and below the root zone and to ground water.
- Effects of water level control on the temperatures of downstream waters and their effects on aquatic and wildlife communities.
- Effects on wetlands or water-related wildlife habitats.

Design alternatives presented to the client should address economics, ecological concerns, and acceptable level of risk for design criteria as it relates to hazards to life or property.

PLANS AND SPECIFICATIONS

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

The plan shall specify the location, grades, quantities, dimensions, materials, and hydraulic and structural requirements for the individual structure. The following list of Construction Specifications is intended as a guide to selecting the appropriate specifications for each specific project.

The list includes most, but may not contain all, of the specifications that are needed for a specific project:

IA-1 Site Preparation
IA-3 Structure Removal
IA-5 Pollution Control
IA-6 Seeding and Mulching for Protective Cover
IA-9 Drainage Tile Investigation and Removal
IA-11 Removal of Water
IA-13 Sheet Piling
IA-21 Excavation
IA-23 Earthfill
IA-26 Topsoiling
IA-27 Diversions
IA-31 Concrete
IA-32 Concrete for Non-structural Slabs
IA-45 Plastic (PVC, PE) Pipe
IA-46 Tile Drains for Land Drainage
IA-51 Corrugated Metal Pipe
IA-52 Steel Pipe Conduits
IA-61 Loose Rock Riprap
IA-81 Metal Fabrication and Installation
IA-83 Timber Fabrication and Installation
IA-92 Fences
IA-95 Geotextile

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan shall be provided to and reviewed with the land manager. Specified actions shall include normal repetitive activities in the application and use of the practice (operation) and repair and upkeep of the practice (maintenance). The plan shall be site specific and include but not be limited to the following:

- Structures will be checked and necessary maintenance, including removal of debris, shall be performed after major storms and at least semi-annually.
- Water level management and timing shall be adequately described wherever applicable.

REFERENCES

USDA-NRCS, National Engineering Handbook (NEH), Part 650, Engineering Field Handbook (EFH), Chapters 3 and 6

USDA-NRCS, National Engineering Handbook (NEH), Part 623, Section 15

USDA-NRCS, National Engineering Handbook (NEH), Part 624, Chapter 10