

**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:

- 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: drops, chutes, turnouts, surface water inlets, head gates, pump boxes and stilling basins.
- Control the elevation of water in drainage or irrigation ditches. Typical structures: checks, flashboard risers and check dams.
- Control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.
- Keep trash, debris or weed seeds from entering pipelines. Typical structure: debris screen.

- Control the direction of channel flow resulting from tides and high water or back-flow from flooding. Typical structures: tide and water management gates.
- 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: water level control structures, flashboard risers, pipe drop inlets and box inlets.
- Convey water over, under or along a ditch, canal, road, railroad or other barriers. Typical structures: bridges, culverts, flumes, inverted siphons and long span pipes.
- Modify water flow to provide habitat for fish, wildlife and other aquatic animals. Typical structures: chutes, cold water release structures and flashboard risers.
- Provide silt management in ditches or canals. Typical structure: sluice.
- Supplement a resource management system on land where organic waste or commercial fertilizer is applied.
- Create, restore or enhance wetland hydrology.

CRITERIA

General Criteria Applicable to All Purposes

Structure for water control design and construction shall comply with all applicable federal, state and local laws and regulations.

Structures shall be designed on an individual job basis, or applicable NRCS standard drawings shall be adapted, to meet site conditions and functional requirements.

Designs shall be based upon site surveys, required hydraulic functions, and site soils and foundation investigations. Structures not covered standard designs or standard drawings shall be designed in accordance with current NRCS engineering handbooks and associated technical materials.

Capacity. Irrigation structures shall have sufficient capacity to provide adequate irrigation streams to meet the peak consumptive use for the crops and method of irrigation planned. Drainage structures shall have the capacity to carry the design flow without damaging erosion or sedimentation.

Materials. Structural materials may include concrete, rock masonry, concrete blocks, wire mesh baskets (gabions), rock riprap, treated or redwood lumber (minimum 2-inch nominal dimension), metal, steel, or concrete pipe. Metal shall be provided with protective coatings as needed. The minimum requirements for sheet steel shall conform to the gage requirements as shown in Colorado Standard Structural Plan (CO-SSP) 52. Structural steel members shall have a minimum yield stress of 36,000 psi. Air entrained concrete shall be used for all concrete structures.

Minimum wall thickness for concrete structures shall be five (5) inches.

All structures shall have sufficient footing, cutoff, weight, and strength to be stable against over turning, sliding, displacement, and foundation failure, based on all superimposed loads.

Wire mesh baskets (gabions) and ties shall be made of heavily galvanized steel wire. Wire mesh shall be 11 or 12 gage, and non-raveling. Opening shall not exceed 4 inches in any dimensions. Baskets shall be securely tied together at all adjacent edges, tensioned and well-filled with clean rock larger than the mesh opening. The upstream face of gabion structures shall be backed with plastic or rubber sheeting or similar material to prevent piping of small grained materials into the baskets. In easily erodible channels, apron baskets shall be at least one-half below the existing streambed, and should project at least one and one-half times the depth of anticipated scour. In easily erodible soils, a filter of

geotextile fabric, gravel, or similar material shall be placed under or behind the baskets or a cutoff shall be provided. The upstream ends of the channel structures shall be well keyed into the banks.

Vegetation complying with Critical Area Planting standard (code 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.

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 without their permission.

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.
- Effects on the field water table to ensure that it will provide a suitable rooting depth for the anticipated crop.
- Potential use for irrigation management to conserve water.
- Effect of construction on aquatic life.
- 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 below the root zone and to ground water.
- Effects of field water table on salt content in the root zone.

- Short term and construction-related effects of this practice on the quality of downstream 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.
- Effects on the turbidity of downstream water resources.
- Existence of cultural resources in the project area and any project impacts on such resources.
- Conservation and stabilization of archeological, historic, structural, and traditional cultural properties when appropriate.

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. Provisions must be made for necessary maintenance. Care must be used to protect the surrounding visual resources. If watercourse fisheries are important, special precautions or design features may be needed to facilitate continuation of fish migrations.

OPERATION AND MAINTENANCE

An operation and management plan shall be provided to and reviewed with the land manager. 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.