

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

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

<p>Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service. New Hampshire supplement is <u>underlined</u>.</p>

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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.

Cross drainage culverts, with drainage areas less than 10 acres, placed under Forest Harvest Trails and Access Roads may be designed utilizing criteria from **The Best Management Practices for Timber Harvest Operations**, Cross Drainage Culvert Section. For all others, culverts shall be designed and placed in accordance to criteria in the Stream Crossing standard (Code 578).

Site Investigation. Adequate investigation shall be made to insure that:

- The land will be adequate in quantity and quality for the use intended.
- The structure site is stable and the planned works of improvement when installed will perform as intended.
- The water supply is available and adequate.

Hydrology.

- Peak flow and volume determination shall be by approved NRCS methods.
- The computed discharge of the adjoining structure, hazard class of overall design, or the 10 percent chance (10-year frequency) rainfall (which ever is larger) will be used to design the water control structure.

Hydraulics.

- The capacity of structures shall be based upon established NRCS methods.
- The minimum spillway capacities shall be in accordance with those contained in the standard for Grade Control Structures (Code 410).
- Mechanical spillways shall be used when flow is expected frequently or will

occur for a duration of several days.

- Earth spillways may be used where vegetation can be established and maintained.
- Natural rock spillways may be used when it is durable under exposure to varying water and temperature extremes.
- Structures shall be designed to be stable for the maximum velocity expected during passage of the design storm.

Structural.

- The structural design and the quality of material and construction shall have a life expectancy consistent with the design frequency, but in no case less than 10 years.
- The structural design shall be based upon the local site conditions. Variable crest spillways (stop logs at inlets or control boxes) shall be considered in the design whenever practical to permit regulation of water levels.
- The high crest of mechanical spillways shall be at least 0.5 feet below the crest of the earth spillway.
- Stilling basins or energy dissipaters shall be installed at outlets of water control structures where needed to control erosion.
- Design should be based on information from appropriate Technical Release for the type of structure used.

Earth Embankment.

The design and construction of earth embankments shall conform with the standard for Pond (Code 378) or Dikes (Code 356).

Other.

Design and construction shall comply with state and local laws and regulations for dams and wetland disturbance.

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.
- Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.
- 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.

To the extent practical, specifications shall conform to National Engineering Handbook, Parts 642 and 643.

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.
- Repair spalls, cracks and weathered areas on concrete surfaces.
- Repair or replace rusted or damaged metal and protect with paint as needed.
- Check all valves, gates, stop logs and other appurtenances for proper functioning. If worn or damaged, repair or replace following the manufacturer's

recommendations.

- Check all timber of lumber sections for decay and other damage, especially sections in contact with earth or other materials. Repair damaged sections and apply protective coatings as needed.
- Immediately repair any vandalism, vehicular, rodent, or livestock damage to any earth fills, spillways, outlets, or other appurtenances.

REFERENCES

- National Engineering Handbook, Part 650 (formerly Engineering Field Manual), Chapters 2, 3, 6, and 11.
- Approved NH Engineering Computer Programs.
- Appropriate Technical Releases