

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WATER AND SEDIMENT CONTROL BASIN

(number)
CODE 638

DEFINITION

An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

PURPOSE

- Trap and collect sediment
- Reduce onsite erosion
- Reduce the content of sediment in water
- Reduce peak rate of flow at downslope locations
- Reduce flooding
- Reduce gully erosion
- Reform the land surface
- Improve potential of areas for farming

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to sites where:

1. The topography precludes installing and farming terraces with reasonable effort.
2. Watercourse and gully erosion are a problem.
3. Sheet and rill erosion are controlled by other conservation practices.
4. Runoff and sediment damage land and improvements.

5. Soil and site conditions are suitable.
6. Adequate outlets are available or can be provided.

This standard applies to the planning, designing, and construction of water and sediment control basins. It does not apply to Conservation Practice Standard (362) Diversion, Conservation Practice Standard (410) Grade Stabilization Structure, Conservation Practice Standard (350) Sediment Basin, or Conservation Practice Standard (600) Terrace. **Maximum drainage area for a water- and sediment-control basin is 20 acres.**

This practice is not applicable to watercourses where its installation would destroy important woody wildlife cover and the present watercourse is not seriously eroding. Such situations are usually recognizable by a meandering condition, steep side slopes which are stabilized by woody plants and herbaceous vegetation and the watercourse is without rapidly advancing overfalls.

CRITERIA

Water and sediment control basins can be part of the treatment needed to protect the soil resource base. In addition, practices such as terraces, contouring, a conservation cropping system, conservation tillage, and crop residue management shall also be used to control erosion.

Water and sediment control basins shall not be used in place of terraces. When a ridge and channel extend beyond the detention basin or level ridge, terraces shall be designed. The resource management system must reduce soil loss in the interval above and below the basin to

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prevent excessive maintenance and operation problems.

Spacing. Water and sediment control basins shall generally be spaced at terrace intervals. The grade of the watercourse between basins shall be considered, and the spacing shall be set to prevent watercourse or gully erosion. The drainage area of each basin shall be limited so duration of flooding, infiltration, or seepage does not cause excessive damage to crops or create other problems.

The system of basins and row arrangements shall be parallel when possible and spaced to accommodate farm machinery widths. Consideration shall be given to embankment slope lengths, top width, and inlet location when determining spacing.

Alinement. The embankment orientation and row direction shall be approximately perpendicular to the land slope to permit farming as nearly as possible to the contour. The arrangement should improve farmability.

Cross section. Embankments may consist of a broad-base configuration in which both the slopes and the top are suitable for farming or of a configuration in which one slope or both is steep and vegetated.

Embankment slopes shall not be steeper than two (horizontal) to one (vertical). The top width for the basin ridge shall be at least as wide as shown as follows:

Fill height (feet)	Basin ridge top width (feet)
0 - 5	3
5 - 10	6
10 - 15	8

The constructed height of the ridge shall be at least 10 percent greater than the designed height to allow for settlement. The maximum settled height shall be 15 feet, measured from the natural ground at the centerline of the ridge. Slopes may be vegetated or flattened to permit cropping.

Capacity. The basin shall be large enough to control the runoff during a 10-year, 24-hour-frequency storm without overtopping. The capacity of basins designed to provide flood protection or to function with other structures may be larger and shall be adequate to control the runoff from a storm of a frequency consistent with the potential hazard. The basin also shall have the capacity to store the anticipated 10-year sediment accumulation, unless provisions are made for periodic sediment removal from the basin to maintain the design capacity.

Procedures for computing sediment volume from cropland and pastureland are shown in Missouri supplement to the NRCS, National Engineering Handbook (NEH), Part 650, Engineering Field Handbook (EFH), Chapter 8 - Terraces. For drainage areas over 5 acres, for strip mined land, and for other disturbed areas, use procedures in Missouri supplement to EFH, Chapter 10 - Gully Treatment to compute sediment capacity.

End closures. The basins shall have the ends closed to the elevation needed for the design capacity. A maximum of 1 foot of freeboard may be added to the design height to provide for an auxiliary spillway around one or both ends of the basin. The auxiliary spillway must not contribute runoff to a lower basin in series that does not have an auxiliary spillway.

Outlets. Water and sediment control basins shall have underground outlets that meet the requirements specified for Conservation Practice Standard (620) Underground Outlet, except where settled fill height is 8 feet or more and total storage is 2 acre-feet or more, then Conservation Practice (410) Grade Stabilization Structure principal and auxiliary spillway design criteria shall be met.

Vegetation. Disturbed areas that are not to be farmed shall be established to grass as soon as practicable after construction. If soil, climatic, or land use conditions preclude use of vegetation and protection is needed, non-vegetative means such as Conservation Practice Standard (484) Mulching may be used. Seedbed preparation and seeding, fertilizing, and mulching rates shall comply with Conservation Practice Standard (342) Critical Area Planting. Vegetation shall be maintained and trees and brush controlled by chemical or mechanical means.

CONSIDERATIONS

Excessive amount of runoff from adjoining upstream properties controlled by others may need to be controlled on these properties.

Removal and disposal of accumulated sediment from the basin will affect the size of a water and sediment control basin.

Consider grassed waterways as an alternative to basins for handling runoff.

Consider effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

Consider effects on the volume of downstream flow that might cause undesirable environmental, social, or economic effects.

Evaluate potential use for water management.

Field boundaries and row length may be considered when determining basin location and row direction.

Consider effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances, including animal waste facilities and agri-chemicals, that would be carried by runoff.

Consider effects on the visual quality of downstream water resources.

If crops are sensitive to inundation, consider a shorter removal time period.

PLANS AND SPECIFICATIONS

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

OPERATION AND MAINTENANCE

A maintenance job sheet or maintenance plan shall be provided for each resource management system and practice. The maintenance plans for the water and sediment control basin shall include maintenance requirements for the ridge, vegetative cover, and the outlet. Maintenance should include inspection of inlets for clogging and embankment failure after each large storm. Failures should be corrected as soon as possible to prevent major damages.

The sediment and design capacity shall be maintained by cleaning excess sediment from the basin. Excavated material spread on the cropland or pastureland shall be placed to maintain fertility and enhance topography. The vegetation, if applicable, shall be maintained to prevent sheet and rill erosion or gulying of the ridge. Trees and woody cover generally create problems on ridges and should be controlled.

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NATURAL RESOURCES CONSERVATION SERVICE
OPERATION AND MAINTENANCE

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General

Operation and maintenance shall address - maintaining the basin ridge, storage area, vegetative cover, and outlet.

Failures should be corrected as soon as possible to prevent major damages.

Basin Ridge

Eroded areas shall be promptly repaired and reseeded, if applicable.

Trees and woody cover generally create problems on ridges and should be controlled.

Storage Area

The sediment and design capacity shall be maintained by cleaning the basin or by raising the ridge height. Excavated material spread on the cropland or pastureland shall be placed to maintain fertility and enhance topography.

Additional Details: _____

After each large storm, basin(s) shall be checked and needed maintenance performed.

Basins shall be cleaned out.

Vegetation

The vegetation shall be maintained to prevent sheet and rill erosion or gulying of the ridge.

Outlet

Maintenance should include inspection of inlets for clogging and ridge failure after each large storm.

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NATURAL RESOURCES CONSERVATION SERVICE
MISSOURI CONSTRUCTION SPECIFICATION

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General

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field. Contractor shall be assured that all state laws concerning buried utilities are met prior to beginning work.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

Site preparation

All dead furrows, ditches, or gullies shall be filled before constructing the basin or shall be part of the construction. All other obstructions shall be removed, as necessary, to install a farmable system.

Basin construction

Water and sediment control basins shall be constructed to the line, grade, and dimensions as staked in the field. Unless otherwise shown on the drawings the basin ridge shall be increased a minimum of 10 percent in height for settlement.

The minimum moisture content for obtaining the required compaction shall be such that when the material is kneaded in the hand, it will form a ball which does not readily separate. Fill material that is too dry shall have water added or work shall be stopped until moisture conditions are satisfactory.

Earth fill shall be placed in 9 inch layers (lifts). Care must be taken to assure proper compaction and bond of the fill material to the existing fill. The side slopes of the existing fill shall be excavated until moist material is uncovered and a good bond can be attained. Each layer will be compacted by complete coverage with the hauling and spreading equipment or equivalent.

Cuts and fills should be made in such a manner that topography will be enhanced. Excavation for broad base terraces is generally made on the uphill side. Excessive cuts should not be made in depressions to secure borrow to build the water and sediment control basin ridge. Borrow for large fills across depressions shall be taken from the intervening ridges, preferably immediately below the basin ridge, which will tend to flatten the area to be farmed.

The surface of the basin ridge shall be reasonably smooth.

If required on the drawings, topsoil shall be stockpiled and spread over excavations and other areas to facilitate restoration of productivity. On deep cuts and where unfavorable subsoil is exposed, the topsoil shall be stripped, stockpiled, and replaced as the basin ridge is constructed.

Underground conduits shall be installed according to Missouri Construction Specification for Underground Outlet (620) or as shown on drawings. When shown on the drawings, the principal spillway shall be constructed according to Missouri Construction Specification for Pipe Spillway in Conservation Practice Standard (378) Pond.

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Additional Details: _____
