

## Sediment Basin (number)

### Definition

A basin constructed to collect and store debris or sediment.

### Scope

This standard applies to the installation of all basins where the primary purpose is to trap and store waterborne sediment and debris.

### Purpose

To preserve the capacity of reservoirs, ditches, canals, diversions, waterways, and streams; to prevent undesirable deposition on bottom lands and developed areas; to trap sediment originating from construction sites; and to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

### Conditions where practice applies

This practice applies where physical conditions or land ownership preclude treatment of a sediment source by the installation of erosion-control measures to keep soil and other material in place or where a sediment basin offers the most practical solution to the problem.

### Planning considerations

#### Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and groundwater recharge.
2. Effects on downstream flows and aquifers that would affect other water uses and users.
3. Effects on volume of discharge flow on the environmental, social, and economic conditions.
4. Effects on the water table downstream and the results of changes in vegetative growth.

#### Water Quality

1. Effects on erosion, movement of sediment, pathogens, and soluble and sediment-attached substances that could be carried by runoff.

2. Effects on the visual quality of on-site and downstream water resources.

3. Effects of construction and early establishment of protective vegetation on the surface and ground water.

4. Effects on wetlands and water-related wildlife habitats.

### Design criteria

The capacity of the sediment basin shall equal the volume of sediment expected to be trapped at the site during the planned useful life of the basin or the improvements it is designed to protect. If it is determined that periodic removal of sediment will be practicable, the capacity may be proportionately reduced.

The design of dams, spillways, and drainage facilities shall be according to SCS standards for ponds (378) and grade stabilization structures (410) or according to the requirements in TR-60, as appropriate for the class and kind of structure being considered.

Temporary basins having drainage areas of 5 acres or less and a total embankment height of 5 ft or less may be designed with less conservative criteria if conditions warrant. The embankment shall have a minimum top width of 4 ft and side slopes of 2:1 or flatter. An outlet shall be provided of earth, pipe, stone, or other devices adequate to keep the sediment in the trap and to handle the 10-year-frequency discharge without failure or significant erosion.

Provisions shall be made for draining sediment pools if necessary for safety and vector control. Fencing and other safety measures shall be installed as necessary to protect the public from floodwater and soft sediment. Due consideration shall be given to good visual resource management.

### Plans and specifications

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

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**SEDIMENT BASIN (Number)**

**Definition**

A basin constructed to collect and store debris or sediment.

**Permanent Sediment Basins:** Any sediment basin that (1) is designed to function for more than 36 months or (2) exceeds the limitations below for temporary sediment basins, or (3) will revert to a permanent pond - are to meet all the requirements of this standard and in addition, are to be designed and constructed in accordance with Pond (378), Grade Stabilization Structures (410), or TR-60, as appropriate, for the class and kind of structure being considered.

**Temporary Sediment Basins:** Any sediment basin designed to (1) function for 36 months or less, (2) have a maximum height of dam less than 15 feet, and (3) have a drainage area of 200 acres or less may be designed in accordance with the minimum requirements for temporary basins.

**Scope**

This standard applies to the installation of all basins on sites where failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities, where the primary purpose is to trap and store waterborne sediment and debris.

**Design Criteria**

For design purposes, temporary sediment basins shall be classified according to Table 1 (below):

**Table 1**  
**Temporary Sediment Basin Classification**

Type	Maximum Drainage Area (Acres)	Maximum Height of Dam (Feet)
1	5	5
2	50	10
3	200	15

### Sediment Storage Capacity

The minimum volume of the sediment basin, as measured from the bottom of the basin to the crest of the principal spillway, shall be not less than 0.5 acre-inches for each disturbed acre in the watershed. To maintain efficiency, sediment basins should be cleaned out when one-half of the volume for sediment has been filled up.

### Hydrologic Design

Volume and rates of runoff will be computed by the method outlined in Chapter 2, "Engineering Field Manual for Conservation Practice." Runoff computations shall be based upon the soil cover conditions expected to prevail during the anticipated effective life of the structure. An outlet shall be provided of earth, pipe, stone, or other devices adequate to keep the sediment in the trap and to handle the discharge in accordance with Table 2 without failure or significant erosion.

### Trash Guard

A trash guard shall be installed on the top of the riser to prevent trash or debris from clogging the conduit and provide safety when pond is temporarily full.

### Antiseep Collars

Antiseep collars are not required for type 1 and 2 basins. For type 3 basins, antiseep collars are to be installed around the pipe conduit within the normal saturation zone when either of the following conditions exist.

1. The conduit is of smooth pipe larger than 8 inches in diameter.
2. The conduit is of corrugated metal pipe larger than 12 inches in diameter.

The antiseep collars and their connections to the pipe shall be watertight. The collar material shall be compatible with pipe materials. The maximum spacing shall be in accordance with Table 3 below.

**Table 3**  
**No. of Antiseep Collars Required - Type 3 Basins**

Fill Height <sup>1</sup>	Collar Projection 1.5 Feet	Collar Projection 2.0 Feet
0 to 11	1	1
12 to 15	2	1

<sup>1</sup>Fill height is the fill over the invert of the pipe at centerline of dam.

**Emergency Spillway**

For all types of sediment basins provisions shall be made for emergency bypassing of the minimum design storm in accordance with Table 2 to avoid overtopping and possible washout of the embankment. The design shall be according to SCS standards for Ponds (378) or according to the requirements in TR-60, as appropriate for the class and kinds of structure being considered.

**Table 2**  
**Temporary Sediment Basin Design**

Type	Minimum Principal Spillway Discharge Capacity	Minimum Emergency <sup>1</sup> Spillway Capacity
1	0.15 cfs per acre of watershed	10-year 24 hour storm
2	0.15 cfs per acre of watershed	25-year 24-hour storm
3	0.21 cfs per acre of watershed	25-year 24-hour storm

<sup>1</sup> The principal spillway pipe designed discharge may be subtracted from the peak flow required for the emergency spillway.

**Principal or Mechanical Spillway Conduit**

When a pipe conduit is used for the principal spillway, the minimum capacity shall be in accordance with Table 2. The principal spillway conduit shall be placed through the dam to extend beyond the downstream toe of the fill. The minimum size shall be 4 inch smooth pipe or 6 inch corrugated metal pipe. A perforated riser (vertical pipe) connected to the barrel at the upstream end shall be designed to provide for draining sediment pools if necessary for safety and vector control after each storm event. The minimum cross-sectional area of the riser shall be one and one-half times that of the conduit.

The following types of pipe conduits are acceptable: cast iron, steel, corrugated metal, asbestos cement, plastic, reinforced concrete, and rubber gasket vitrified clay. All pipe joints within the embankment shall be made watertight by use of watertight couplings or gaskets or by welding or caulking.

The pipe shall be capable of withstanding the external loading without yielding, buckling, or cracking.

**Perforated Riser**

When it is necessary to drain the sediment pool, the riser shall be perforated with 1/4" to 1/2" diameter holes with a minimum spacing of 3" centers in each outside valley. The lower one-third of the perforated riser shall be covered with suitable filter material that will allow complete drainage of pool and adequate filtration during periods of drainage.

The crest elevation of the riser shall be a minimum of 1.0 foot below the crest elevation of the earth spillway.

**EARTH EMBANKMENT****Top Width**

The minimum top width of the dam shall be:

<u>Fill Height</u>	<u>Minimum Top Width</u>
10 feet and under	8 feet
10 to 15 feet	10 feet

**Freeboard**

The settled top elevation of the dam for type 1 sediment basins shall be a minimum of one foot above the natural ground elevation to allow emergency bypassing of flood flows around one or both ends of the dam.

The settled top elevation of the dam for type 2 and 3 basins shall be a minimum of one foot above the maximum stage in the emergency spillway during the passage of the design storm.

**Side Slopes**

The combined upstream and downstream side slopes of the settled embankment shall not be less than 5 horizontal to 1 vertical with neither slope steeper than 2:1.

**Allowance for Settlement**

The constructed height of the dam shall be increased by the amount needed to insure that the design top elevation will be maintained after all settlement has taken place but shall not be less than 5 percent.

**Other Considerations**

Fencing and other safety measures shall be installed as necessary to protect the public from floodwater and soft sediment. Due consideration shall be given to good visual resource management.

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**SEDIMENT BASIN SPECIFICATIONS**

Specifications shall be in keeping with the preceding standard, shall describe the requirements for proper installation of the practice to achieve its intended purpose, and shall include consideration of the following items:

**Site Preparation**

The foundation area shall be cleared of all trees, stumps, roots, brush, boulders, sod, and debris. All channel banks and sharp breaks shall be sloped to no steeper than 1:1. All topsoil containing excessive amounts of organic matter shall be removed. Existing stream channels crossing the foundation area shall be deepened and widened as necessary to remove all stones, gravel, and sand, and to accommodate compaction equipment. The surface of the area on which fill is to be placed will be scarified before placement of embankment material.

**Storage Area**

The storage area below the elevation of the riser crest shall be cleared of all trees, stumps, brush, and debris to facilitate cleaning out when it becomes necessary.

**Cutoff Trench**

The cutoff trench shall be excavated to lines and grades shown on the plans and/or to lines and grades satisfactory to the inspector. The cutoff trench shall be backfilled with suitable material in the same manner as specified for the earth embankment. The trench shall be free from standing water during backfilling operations. The side slopes shall be no steeper than 1:1. The bottom width shall be wide enough to permit operation of compaction equipment.

**Pipe Conduit Installation**

The pipe conduit barrel shall be placed on a firm foundation to the lines and grades shown on the plans. Selected backfill material shall be placed around the conduit in layers and each layer shall be thoroughly compacted.

**Emergency Spillway Excavation**

The completed spillway excavation shall conform to the lines and grades, bottom width, and side slopes shown on the plans.

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**SEDIMENT BASIN, ENGINEERING NOTEKEEPING**

**Design Survey**

- A. Obtain and record the following minimum information as applicable.
1. Location description and sketch.
  2. Location and description of benchmark.
  3. Profile on centerline of dam site.
  4. Profile on centerline of emergency spillway including inlet, control section, and outlet section when needed for spillway design.
  5. Profile on centerline of pipe spillway if needed for design purposes.
- B. Record the following soils investigations on Form SCS-538:
1. Record of foundation and cutoff trench borings.
  2. Record of borrow and emergency spillway excavation borings.

**Construction Layout**

- A. Set enough well marked stakes to guide the contractor in constructing the sediment basin in accordance with the plans and specifications. As a minimum, the following should be shown:
1. Slope stakes for the dam and emergency spillway.
  2. Embankment top width and elevation.
  3. Principal spillway location.

**Construction Check**

- A. Record the following construction checks:
1. Profile along centerline of top of completed embankment.
  2. Cross section of completed embankment to determine top width and side slopes.

3. Profile along centerline of constructed part of vegetated spillway.
  4. Cross section of emergency spillway.
  5. Statement concerning adequacy of embankment and spillway seeding.
  6. Crest of riser of pipe spillway.
  7. Statement concerning adequacy of trash protection device for principal spillway.
  8. Dimensions and kind of material of principal spillway.
- B. Record the date and signature of person making construction check.

#### **Recording Data**

Record field notes in standard engineering field book. Follow standard survey and notekeeping policy and procedures contained in Technical Release 62, and Chapter 1, "Engineering Field Manual for Conservation Practices."