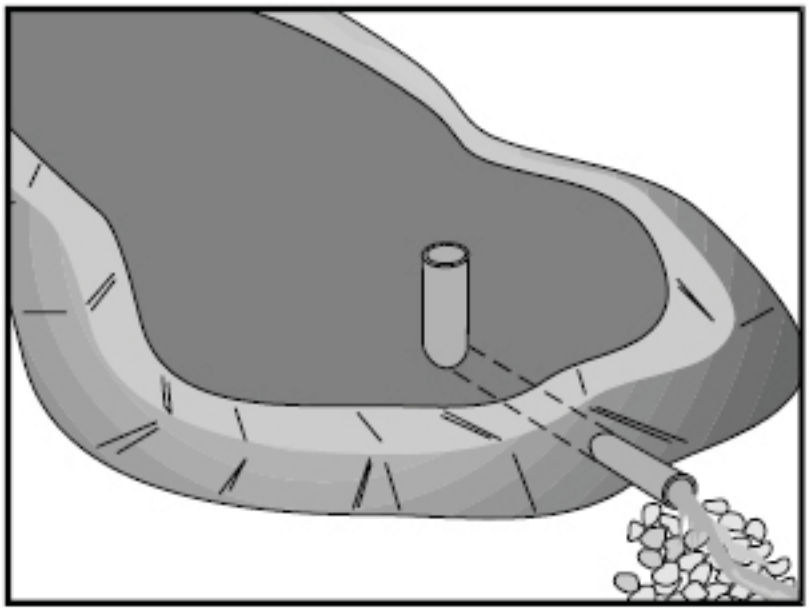
Sediment Basin



A sediment basin is a structure used to remove suspended sediments from stormwater. Stormwater from a disturbed site is detained in a basin long enough for most of the sediment to settle out. There are two basic methods of sediment basin construction: excavation and embankment. The basin is either excavated or an embankment of compacted soil is constructed across a drainage-way to form the retention pool. An outlet pipe and overflow spillway also should be installed. Sediment basins are typically larger than sediment traps and remain active throughout the constuction period.

Usage

- applicable in drainage areas where other erosion controls may not be sufficient to prevent off-site transportation of sediment
- avoid building on an embankment in an active stream
- locate in a place with sufficient space and appropriate topography
- make large enough to handle the maximum expected amount of site drainage
- fence around the perimeter for safety and vandalism reasons
- place in areas that will maximize flow into the structure

Benefits

- sediment-laden runoff is impounded in the structure and given enough time to settle to the bottom of the basin
- traps smaller sediment particles than sediment traps because of the longer retention time
- is easy and inexpensive to construct
- runoff leaves the basin with less sediment than when it enters the basin
- can be left in place for post-construction stormwater treatment

Estimated Cost

$0.73/cubic ft (average), or $1,200/drainage ac (average) (for basins less than 50,000 cubic ft)

$0.36/cubic ft (average), or $600/drainage ac (average) (for basins greater than 50,000 cubic ft)

Averages are based on annual costs for installation & maintenance, assuming a 2-yr lifespan

Alternatives

- Sediment trap (smaller areas) (p. 3-13)

Notes:

Sediment Basin

Common Concern	Result
Improper compaction, omission of anti-seep collar, leaking pipe joints, or use of unsuitable soil	Piping failure along conduit
Inadequate vegetation or improper grading and sloping	Erosion of spillway or embankment slopes
Inadequate compaction or use of unsuitable soil	Slumping or settling of embankment
Steep side slopes	Bank failure due to slumping
Inadequate outlet protection	Erosion or caving below principal spillway
Basin not located properly for access	Difficult, ineffective, and costly maintenance
Sediment not properly removed	Inadequate storage capacity and potential resuspension
Lack of anti-flotation measures	Riser and barrel blocked with debris
Principal and emergency spillway on design plans	Improper disposal of accumulated sediment
Gravel clogging the dewatering system	Safety or health hazard from pond water
Principal spillway too small	Frequent operation of emergency spillway and increased erosion potential

IDNR. 1992. Common concerns associated with sediment basins

Limitations

- is generally suitable for small areas
- requires regular maintenance and cleaning
- will not remove very fine silts and clays unless used in conjunction with other BMPs
- requires careful adherence to safety practices since ponds are attractive to children

Installation Tips

- locate the basin to intercept the largest amount of runoff from the disturbed area
- the best locations are generally low areas and natural drain ways below the disturbed area; drainage into the basin can be improved by use of diversion dikes and ditches
- locate the basin to catch sediment before it enters a live stream
- designate the maximum drainage area into the basin as 25 ac, unless the structure is designed as a permanent pond by a qualified professional engineer
- design the capacity to be at least 67 yd^3/ac of drainage area, as measured from bottom of basin to crest of spillway/riser; capacity can be estimated at C = 0.4 * height * surface area
- design the effective flow length of basin to be at least twice the width
- design spillways to maintain a permanent pool of water between storm events
- detailed installation tips can be found in the ODNR Rainwater and Land Development manual

Maintenance

- examine basin banks for seepage and structural soundness
- check inlet and outlet structures and spillway for any damage or obstructions; repair damage and remove obstructions as needed
- check inlet and outlet area for erosion; stabilize if required
- check fencing for damage and repair as needed

Vendors

See Appendix page F13-F14

References

California Stormwater Quality Association (CASQA). 2003. California stormwater best management practices handbook for construction.

IDNR. 1992. Indiana handbook for erosion controls in devloping areas, guidelines for protecting water quality through the control of soil and erosion and sedimentation on construction sites. Division of Soil Conservation, IDNR, Indianapolis, Indiana.

USEPA. 2004. Development Document for Final Action for Effluent Guidelines and Standards for the Construction and Development Category. USEPA, Washington, D.C.