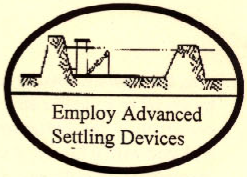
13 Sediment Traps/Basins



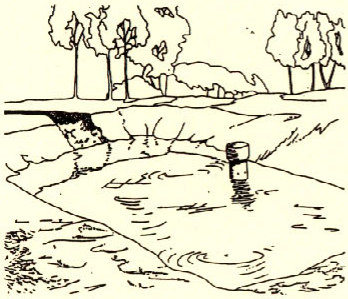
Description/Goals

Sediment traps and basins are pond-like structures designed to retain runoff from disturbed areas, allowing suspended sediment to settle out. Sediment traps are simpler than sediment basins, in that they have a simpler outlet structure, are usually smaller and generally not designed to detain stormwater flows. Basins generally combine wet storage with detention storage. Sediment traps are more appropriate for small drainage areas (less than five acres), while sediment basins can be used for areas up to 100 acres. Both techniques are relatively effective, with efficiencies ranging from 60% to 80% for sediment traps and 70% to 90% for sediment basins.

Techniques

Rather than being designed simply as holes in the ground, design techniques that ensure better pollutant removal can be used on both sediment traps and basins. These structures should be designed with gentle side slopes, a high surface area to drainage area ratio (1% or greater), and a long flow path. Both traps and basins are improved when they have some "wet" storage. That is, ponds with a permanent pool of water are more successful at slowing runoff velocities and settling out sediment.

Sediment basins are often converted into long-term stormwater management facilities by modifying the outlet structure. During construc-



Source: *Watershed Protection Techniques* Vol. 2 #3

Approximate Cost: $15/cy

Effectiveness

	Low	Mod	High
Erosion/ Sediment Control		✓	
Long-Term Pollutant Reduction			✓
Habitat / Stream Protection		✓	

Ease of Application

	Difficult	Average	Easy
Installation		✓	
Maintenance		✓	

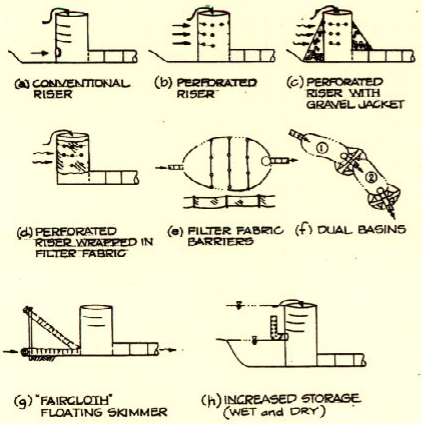
Limitations

- Fine soils
- Small sites (especially for basins)
- Extreme weather conditions

tion, the outlet is usually a vertical pipe surrounded by gravel or a similar structure (see Figure). After construction, this outlet structure is removed, and replaced with a low-flow orifice designed to retain stormwater for pollutant removal.

Limitations/Challenges

Sediment traps can be applied to most sites, but sediment basins are only possible on larger ones (i.e., greater than five acres). In some climates, the techniques may need to be modified somewhat. For example, a permanent pool may not be appropriate in an arid region. In addition, neither traps nor basins are particularly effective for fine silts or clay soils, or for intense rainfall events, which can resuspend sediment within the trap or basin.



Source: *Watershed Protection Techniques* Vol. 2 #3

Innovations/ Improvements

Two improvements not mentioned above are modifications to the outlet structure and the use of fabric barriers, or "baffles" to lengthen residence time (See Figure). A modified perforated pipe outlet is currently being tested in Orange County, North Carolina. The skimmer perforated pipe is designed to float at the top of the water surface across a range of water elevations, facilitating removal of the least sediment laden effluent.

Baffles are the most common energy dissipating devices. Baffles reduce the inflow velocity and create a longer flow path, thereby enhancing trapping efficiency. Though not usually applicable to sediment traps, informal baffles such as plywood boards or partly submerged gabion structures can be incorporated in larger traps and basins.