

*Chapter 11*  
Stormwater Treatment  
Practice Design Guidance





# Volume II: Design

## Chapter 11

## Stormwater Treatment Practice Design Guidance

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This chapter provides guidance on the design, construction, and maintenance of the stormwater treatment practices contained in this Manual. **Table 11-1** lists the individual primary and secondary stormwater treatment practices that were introduced in Chapter Six and are described further in subsequent sections of this chapter.

<b>Table 11-1</b> <b>Summary of Stormwater Treatment Practices</b>	
Primary (P) Treatment Practice	Secondary (S) Treatment Practice
Stormwater Ponds (P1) <ul style="list-style-type: none"> <li>○ Micropool Extended Detention Pond</li> <li>○ Wet Pond</li> <li>○ Wet Extended Detention Pond</li> <li>○ Multiple Pond System</li> <li>○ Pocket Pond</li> </ul> Stormwater Wetlands (P2) <ul style="list-style-type: none"> <li>○ Shallow Wetland</li> <li>○ Extended Detention Wetland</li> <li>○ Pond/Wetland System</li> </ul> Infiltration Practices (P3) <ul style="list-style-type: none"> <li>○ Infiltration Trench</li> <li>○ Infiltration Basin</li> </ul> Filtering Practices (P4) <ul style="list-style-type: none"> <li>○ Surface Sand Filter</li> <li>○ Underground Sand Filter</li> <li>○ Perimeter Sand Filter</li> <li>○ Organic Filter</li> <li>○ Bioretention</li> </ul> Water Quality Swales (P5) <ul style="list-style-type: none"> <li>○ Dry Swale</li> <li>○ Wet Swale</li> </ul>	Conventional Practices <ul style="list-style-type: none"> <li>○ Dry Detention Pond (S1)</li> <li>○ Underground Detention Facilities (S2)</li> <li>○ Deep Sump Catch Basins (S3)</li> <li>○ Oil/Particle Separators (S4)</li> <li>○ Dry Wells (S5)</li> <li>○ Permeable Pavement (S6)</li> <li>○ Vegetated Filter Strips/Level Spreaders (S7)</li> <li>○ Grass Drainage Channels (S8)</li> </ul> Innovative/Emerging Technologies <ul style="list-style-type: none"> <li>○ Catch Basin Inserts (S9)</li> <li>○ Hydrodynamic Separators (S10)</li> <li>○ Media Filters (S11)</li> <li>○ Underground Infiltration Systems (S12)</li> <li>○ Alum Injection (S13)</li> </ul>

## Primary Treatment Practices

This chapter provides the following information for each primary treatment practice:

**Description:** A brief description of the treatment practice. The stormwater management benefits of the treatment practice (i.e., runoff volume reduction, pollutant reduction, stream channel/conveyance protection, and flood control) and effectiveness for removal of specific categories of pollutants are summarized at the beginning of each description for quick reference and screening.

**Design Variations:** Descriptions of common design variations for those treatment practices for which multiple designs have been developed.

**Advantages:** The major beneficial factors or considerations (e.g., environmental, economic, safety) for selecting a specific stormwater treatment practice.

**Limitations:** The major limitations or drawbacks of a stormwater treatment practice that may preclude its use for a given site.

**Siting Considerations:** The site conditions required for implementation of a stormwater treatment practice, such as minimum contributing drainage area, subsurface conditions, and minimum setbacks.

**Design Criteria:** Specific technical requirements and recommendations for designing the major elements of a stormwater treatment practice, including criteria for design variants within each treatment practice category.

**Construction:** Recommended construction procedures and methods to ensure that a stormwater treatment practice functions as designed.

**Inspection and Maintenance:** Routine and non-routine operation and maintenance required for the stormwater treatment practice to function properly over time.



**Cost Considerations:** Approximate capital costs to design, construct, and implement the stormwater treatment practice, as well as approximate annual operation and maintenance costs, where available.

## Secondary Treatment Practices

Secondary treatment practices are described in less detail due to their limited applicability for water quality control. The following guidance is provided for these treatment practices:

**Description:** A brief description and associated stormwater management benefits of the treatment practice.

**Reasons for Limited Use:** Rationale for why the practice generally does not meet the performance standards required for classification as a primary treatment practice.

**Suitable Applications:** The conditions or applications for which the practice is typically suitable (i.e., pretreatment, ultra-urban environments, etc.)

**Design Considerations:** Key factors for siting, designing, and implementing the treatment practice.