

Chapter 4 Sedimentation basins



Sedimentation basin as an inlet zone for a constructed wetland.

4.1 Introduction

Reducing sediment loads is an important way to improve **stormwater** quality. **Sedimentation** basins are an integral component in a stormwater **treatment train** and are specifically employed to remove (by settling) coarse to medium-sized sediments. Sedimentation basins can take various forms and can be used as permanent systems integrated into an urban design or temporary measures to control sediment **discharge** during construction. They include all forms of stormwater detention systems that function primarily through sedimentation to promote settling of sediments through processes of temporary detention and reduction of flow velocities. Key design parameters are selecting a target sediment size, design discharge and sediment storage volume. Figure 4.1 shows the layout of a typical permanent sedimentation basin.

The required size of a sedimentation basin is calculated to match the settling velocity of a target sediment size with a design flow. Selecting a target sediment size is an important design consideration. As a pretreatment facility, selecting a sediment particle size of 125 μm is recommended as the target size.

Analysis of typical **catchment** sediment loads suggests that between 50% and 80% of suspended solids conveyed in urban stormwater are 125 μm or larger. Almost all sediment bed loads are larger than this target sediment size. However, coarse to medium-sized sediments have low concentrations of contaminant association compared to finer sediment and **colloidal particles**.

Analysis of the characteristics of particulate nutrients and metals indicate that these contaminants are mostly smaller than 50 μm and effective removal is best undertaken by treatment measures (e.g. **constructed wetlands**) other than sedimentation basins.

A sedimentation basin that is too small could have limited effectiveness and cause smothering of downstream treatment measures, thereby reducing their effectiveness in removing finer particulates and increasing maintenance.