



example, automotive fueling facilities are likely to have higher than normal loads of petroleum products, and the appropriate hot spot treatment device would likely be an oil/water separator in addition to other PTPs installed to meet the 80% TSS treatment goal. Most hot spot landuse treatment BMPs are pre-treatment devices, designed to remove gross solids, floatables and oils and grease. A 50% TSS reduction can be assigned to pre-treatment devices and included in the site's overall treatment train.

2.7 Approval and Design of Proprietary Stormwater Treatment Devices

The standard PTPs included in Chapter 3 of this manual are non-proprietary BMPs and can be designed to meet the water quality treatment design. The City of Shelbyville allows the use of other types of PTPs, though the approval and review process is more rigorous. Many proprietary treatment devices are designed based upon a peak flow rate as opposed to a volume of treatment. Non-proprietary treatment devices, such as detention ponds, bioretention, and wetlands, are designed based upon a treatment volume (for stormwater quality treatment) and peak flow (for flow attention). Therefore, a slightly different design approach is necessary for proprietary treatment devices. In addition, pollutant reduction rates are significantly impacted by the design flow rate.

2.7.1 Approval of Manufactured Treatment Devices

All treatment devices designed for stormwater quality or quantity treatment in the City of Shelbyville must be approved by the City Engineer prior to installing them. Many manufactured stormwater treatment devices are available to treat stormwater runoff. However, some of these BMPs do not have established pollutant removal data based on standardized testing methods. The City of Shelbyville considers proprietary BMPs as **Limited Application BMPs** because of a lack of historic pollutant removal data or because of high maintenance requirements.

Proprietary devices must be approved before they can be considered for use in the City of Shelbyville. Manufacturers' claims for BMP performance must be verified through data that is obtained in independent third party testing.

The City of Shelbyville recognizes two levels of treatments:

1. Pretreatment. Pretreatment devices do not meet the full 80% TSS reduction goal; however, they can be used in a treatment train approach with other BMPs to fully meet the treatment goal. In addition, pretreatment BMPs are required for hot spot landuse applications, as described in Section 2.6.5.
2. Full Treatment. Manufactured treatment devices that show through testing that they meet the full 80% TSS reduction goal are considered full treatment devices. If the manufactured treatment device is a flow-based device, the peak flow rate for the TSS reduction must be provided and cannot be exceeded in the design.

2.7.2 Design of Manufactured Treatment Devices

As noted above, most manufactured treatment devices are flow based devices. Applying the WQv equation (see Equation 1) is therefore not possible. The City developed the following design tools for use in sizing manufactured treatment devices. This design methodology is considered to provide an equivalent treatment as the treatment provided with the WQv methodology.

Most proprietary BMPs are flow based BMPs and rated for TSS removal based upon a specified flow rate. The WQv equation, which forms the foundation of Shelbyville's stormwater quality program, establishes a volume that must be treated. In an effort to simulate the WQv approach for proprietary BMPs, the following peak flow design equation must be used to develop the stormwater quality treatment required.



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Equation 4 Manufactured Device Stormwater Quality Design

$$Q_p = C * I * A$$

Where:

Q_p = the peak flow through the proprietary BMP in cfs

C = runoff coefficient

I = rainfall intensity

A = the contributing drainage area for the BMP, in acres