The party responsible

Who should determine the appropriate sizing of BMPs?

John Doerfer

Every storm water professional involved in the planning, design and implementation of best management practices (BMPs) faces this question daily. Furthermore, we must consider whether our storm water solution designs will protect water quality and receiving waters.

Communities required under Environmental Protection Agency regulations to obtain a municipal storm water permit must fully implement a program addressing such issues by March 2008. Programs should identify community-specific structural and nonstructural BMPs, adopt an ordinance requiring they be constructed at the time of urban development, and ensure the practices' adequate long-term operation and maintenance. The municipality determines for itself the appropriate sizing of goal-oriented BMPs.

What is meant by "appropriate sizing of BMPs?" Sizing has two basic elements: hydrologic criteria, which are usually expressed in terms of either runoff volume or flow rate (discharge) that needs to be treated, and water quality criteria, which define the acceptable pollutant concentrations in a site's runoff. It is important to note that there are no national water quality standards specific to urban storm water at the present time. Pollutant removal or pollutant load (mass) reduction is often used instead of concentration as a water quality criterion.

Examples of these two independent criterion might read as follows: "BMPs must treat the peak flow from a one-year return period storm" and "BMPs must provide 50 percent removal of total phosphorus." It is up to the designer, using design guidelines, to scale or size the facility to meet water quality standards when operating at the required hydrologic criteria.

Sometimes the hydrologic and water quality criteria are coupled. An example of this approach is saying, "Treat to a net 80 percent annual TSS load removal." This case unfortunately leads to different types of BMPs treating different flows or volumes based on the outcome of designers' various models and methods. Combining hydrologic and water quality criteria in a load-based approach can create confusion and contribute over time to the overall downsizing of performance-based systems to treat the smallest volume or flow. This method also reduces the level of control the agency has to ensure proper sizing, and it is difficult to verify through field monitoring.

Another issue that arises in design is that factors other than hydrologic and water quality criteria are inherent in the function of BMPs and can affect sizing. One example is pollutant loading, which, though it is not necessarily apparent, is relative to desired maintenance frequency. In many cases, it is necessary to go over and above hydrologic and water quality design parameters; designing to extend maintenance intervals may require upsizing the BMP or adding additional unit operations to it.

As a designer of urban storm water BMPs, you are obligated to provide a sizing-appropriate design that meets hydrologic and water quality criteria. Agencies not only need to provide water quality criteria but also solid hydrologic criteria appropriate for local conditions. These performance-based criteria will ensure that all BMPs in a community meet both water quality and hydrologic goals, as well as protect downstream receiving waters. **SWS**

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