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The Need to Better Understand

Researching BMPs to meet water quantity and quality objectives

Having worked in the field of storm water management for almost 20 years, and seeing the conceptual and technological development of storm water management and best management practices (BMPs), it is clear we have had successes and failures. We need to learn from both, especially with the U.S. Environmental Protection Agency's (EPA) national rule-making activities to establish a program to reduce storm water discharges and to make other regulatory improvements to strengthen its existing storm water program.

Recent calls to manage water quantity and quality through "green" infrastructure have led to new and exciting approaches to storm water management. Low-impact development (LID) is sweeping the nation as the new conceptual approach, leading to the use and development of new decentralized BMPs, many of which are not understood wholly. Rather than letting an "ahead-of-the-curve" approach lead to failure and disappointment, we must take this opportunity to get it right.

We need to better understand the impacts of solids-loading on surface and subsurface BMPs, with particular reference to land use. Much of the field research is short-term and conducted in ideal conditions. The data, however, is translated for all land-use applications, many of which generate substantially higher pollutant loads. Given proper design and non-excessive loading, bioinfiltration systems can assimilate pollutants and be sustainable, but if the assimilative capacity of the system is exceeded, failure can be rapid and catastrophic. More research, including lab and long-term field research, is needed to ensure sustainable design.

Effective pretreatment of infiltration systems and maintenance must be mandated and enforced. LID has led to a proliferation of underground infiltration technologies. Typically installed underneath a parking lot, these systems are difficult to inspect and virtually unmaintainable. Pretreatment often is not required or is provided by a simple settling device, which may stop coarse grit, trash and debris from entering the system. These devices, though, are not effective on fines, organic particulates and dissolved components that will lead to the ultimate failure of the systems.

We need to better understand BMP interactions at the site scale with modeling that includes surface water and groundwater interactions. The original concept of LID was embedded in the understanding of a site's hydrologic characteristics and then applying a set of BMPs either through modeling or other engineering approaches to mimic the pre-existing hydrology. Unfortunately, this has morphed into a menu approach of selecting a series of BMPs without a clear understanding of how these facilities will interact with each other and function on the site as a whole.

A national-level testing protocol for both manufactured and nonproprietary BMPs is critical to success. The EPA needs to provide more guidance, funding and sanction of testing programs, and monitoring and evaluation need to extend to all BMPs rather than just the manufactured ones. Current efforts by the American Society of Civil Engineers Environmental & Water Resources Institute, New Jersey Corporation for Advanced Technology and Water Environment Research Foundation need to be supported and funded to ensure that BMP performance and maintenance costs are understood objectively and meeting the goals for water quantity and quality management.

The EPA is proposing a draft storm water rule by late 2011, with a final rule to be established by late 2012. For more information on the proposed rule, visit http://cfpub.epa.gov/npdes/stormwater/rulemaking.cfm. SWS

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