FILTRATION CONSIDERATIONS

New systems reveal voids in testing protocol

When it comes to manufactured storm water best management practices (BMPs), we as an industry have a tendency to lump all technologies together and assign generic classifications such as innovative or proprietary. As such, regulatory guidance and testing criteria for manufactured BMPs tend to be equally generic.

This approach has served our needs for the most part because until recently the majority of manufactured BMPs were flow-through gravity separators with similar pollutant removal mechanisms. However, implementation of increasingly complex storm water quality criteria in recent years catalyzed a wave of BMP innovation that has yielded numerous new technologies. Many of these devices are more complex than the flow-through gravity separators typically utilized during the last decade. In particular, we have experienced prolific development of storm water filtration devices. During the last several years, six new storm water filtration systems have been developed—significant considering there were only a couple manufactured filtration systems prior.

Many of the monitoring protocols (lab and field) developed to evaluate "innovative" storm water systems are specific to flow-through gravity separators. Utilizing these protocols to evaluate filtration systems would be quick and easy, but we would fail to evaluate several critical aspects of filter performance. Filtration has been used to treat water for hundreds of years, and during that time we have learned repeatedly that filters have a tendency to clog.

Filtration systems remove particulates from storm water as it flows through media. As particulates accumulate on or in the media, hydraulic conductivity is reduced, and eventually the filter occludes. Many filters also employ reactive media capable of removing dissolved pollutants such as phosphorus and heavy metals, but the reactive capacity can be exhausted and changes in water chemistry have the potential to reverse previous reactions and release pollutants. Existing protocols are well-suited for assessing removal of storm water solids, but many do not assess these critical issues relative to long-term filter performance. Unfortunately, rather than address the shortcomings of existing test criteria, we have largely ignored the issue to date.

It is critical that testing criteria be established to evaluate media occlusion rates and media reactive capacity in addition to the overall pollutant removal capability of storm water filtration systems. Once a filter is clogged, incoming runoff is typically bypassed without treatment and no water quality improvement is realized. Widespread deployment of storm water filtration systems with the potential for rapid occlusion is not sustainable given our limited maintenance resources. Also, because filters are often used to target pollutants other than suspended solids, robust assessment of the retention rates for target pollutants is critical.

Once the reactive capacity of media is exhausted, removal of dissolved constituents will be minimal. This could have serious implications in impaired watersheds subject to total maximum daily loads. Given the substantive investment being made in storm water infrastructure, it is prudent that we take the appropriate steps to ensure maximum value in the form of improved water quality. SWS

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