Vaikko Allen II, CPSWQ

# Maintenance of Infiltration BMPs

## Longevity/cost research and inspections reign supreme

Mother Nature's soil is the best of all urban storm water best management practices (BMPs), infiltrating precipitation, reducing runoff, filtering and capturing most pollutants, recharging groundwater and maintaining a diverse, self-sustaining biological community.

Conservation of natural soils and urbanization are diametrically opposed. When impervious surfaces are created on an urban site, the burden of additional runoff and pollutant removal must be borne by the remaining pervious areas, the capacity of which to absorb impacts is largely unknown.

Soil can be an effective filter, but it is subject to failure, particularly as it becomes occluded with sediment in runoff. The fine-grained fraction of sediment is primarily responsible for clogging, but other materials and processes may affect rate and location. When clogging occurs, incident precipitation and runoff directed to these areas no longer infiltrate and must pond, run off or evaporate.

Some low-impact development (LID) BMPs have been implemented to collect relatively "clean" sources of runoff—rooftop runoff, for example. These LID BMPs, or "rainfall LIDs," include green roofs, cisterns and planter boxes next to commercial buildings. Other types treat "dirty" sources of urban storm water from impervious surfaces. These may be referred to collectively as "runoff LIDs" and include porous pavement, infiltration trenches/basins and underground infiltration galleries.

Rainfall LIDs are being used in combined sewer overflow areas where runoff volume mitigation is cost-effective compared to storage and treatment costs. In storm water systems, rainfall LIDs may reduce runoff and associated streambank erosion; they do not contribute substantially to pollutant reduction, whereas runoff LIDs do.

Because they remove pollutants, runoff LIDs, including those based on infiltration, require maintenance. Routine maintenance activities are limited to trash and debris removal and cleaning of overflow structures. More extensive rehabilitation maintenance includes raking the infiltration surface to agitate deposited sediments. Restoration maintenance is required if infiltration capacity is no longer available, vegetation/mulch is damaged beyond repair or flooding or drought causes catastrophic failure. Retrofitting or BMP additions may be required due to improper sizing because of incorrect design assumptions, faulty material selection/construction or failure to meet performance objectives.

Although landscape-based retention and filtration BMPs have been used for decades, their widespread implementation on urban sites has increased dramatically in the past couple of years. Given the likely time lag of five to 10 years before many of these facilities will require restoration maintenance, there is a tendency to consider only routine activities (e.g., landscape maintenance) in life-cycle cost estimation.

It is critical that the full costs of maintenance be considered when selecting and designing storm water systems. Regular inspection of the storage and infiltration capacity of BMPs must be conducted to ensure that design assumptions are being met. As more information is gained on runoff LIDs, more accurate comparisons can be drawn between the performance, longevity, maintenance and capital costs of BMPs based on infiltration, filtration, sedimentation and nonstructural methods. SWS

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