

Sustainable Stormwater Management

Web conference presented by
ContextSensitiveSolutions.org

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Presenters:

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PARTICIPANT QUESTIONS & ANSWERS (from the web conference “chat pod”):

QUESTION: What is the effectiveness of center median vegetated drainage over time?

ANSWER: If designed correctly as part of the highway infrastructure, it is every bit as effective in the long run as hardscape drainage.

QUESTION: Are vegetated stormwater management strategies successful at removing heavy metals, mainly copper?

ANSWER: Properly designed storm “water” retainage to cause settlement of fines and encourage phytoremediation will enhance removal of metals. One must consider that metals “cleaned” from the stormwater will be retained within the treatment wetland/rain garden.

QUESTION: Are there any vegetation recommendations for more efficient uptake of heavy metals?

ANSWER: Uptake is possible but complex. More typical is the use of vegetation to capture and sequester metals in the soil organic matter zone. Effectiveness is not dependent on plant species, merely the density and robustness of plantings.

QUESTION: Will small fines and/or oils/greases bind to the “engineered” soils and decrease infiltration?

ANSWER: Proper maintenance and management is important for context sensitive stormwater solutions, but not much more than would be expected for any stormwater management method—just different.

QUESTION: For projects that discharge to existing wetlands, were wetland hydroperiod analyses calculated? If so, it would be interesting to learn the methodology.

ANSWER: Bioengineering Group uses a standard modeling methodology to understand the hydrologic components for the selected methods. The plant species selected must be non-invasive, native plants that are adapted to several different types of hydrologic regimes to be used in a stormwater management water treatment wetland.

QUESTION: Does anyone here get involved in the compliance and maintenance of existing best management practices (BMPs) rather than the design aspects?

ANSWER: All stormwater infrastructure requires maintenance. In reality, very little actually occurs, and it hampers the effectiveness of gray infrastructure, too. Most green infrastructure is visible, and sometimes also serves as a valued public amenity, as we have seen in the webinar presentations. For this reason, it is easy to see the need for maintenance (i.e., even a layman can see the system/elements). Also, the money is perceived to be better spent since it creates other benefits—unlike gray infrastructure.

QUESTION: Have there been any studies on the effect of road salt where infiltration is used in cold climates?

ANSWER: Yes, there are some, and road salt is efficiently flushed through the system in temperate zones and does not accumulate. It is helpful to use plantings adapted to salt spray, such as coastal and estuary species, many of which also occur in inland wetlands naturally.

QUESTION: Please comment on the effectiveness of these facilities in snowy climates.

ANSWER: These strategies are effective in snowy climates, and given that snow storage must be planned for parking lots and roads, that space can often serve double duty for stormwater.

QUESTION: Can communities expect any cost savings by taking this approach, or does the maintenance of green infrastructure cancel out any cost benefits?

ANSWER: Green infrastructure does not cost more than standard landscape maintenance. In general, maintaining natural systems is not more expensive than gray systems, just different.

QUESTION: Are there any suggestions for arid regions where rain gardens and highly vegetative cells are just not practicable?

ANSWER: Reno and Tahoe make ample use of green infrastructure suited for arid climates—visualize lots of stone with some desert plants to maintain porosity of soil over time.

QUESTION: How were utility conflicts (e.g., coordination and cost) resolved in the presented Tier 1 projects?

ANSWER: Like any construction project, utility investigations must be performed, and avoidance of utilities is usually possible through selection of the proper stormwater management method. If avoidance is not possible, then appropriate relocations must be designed and accounted for.

QUESTION: Please make suggestions on resolving the conflict between compacted soil along underground utilities and uncompacted soil at green infrastructure locations within ROW.

ANSWER: Green infrastructure demands excellent information on soils (and utilities) in order to address the ability of soil to achieve infiltration—without affecting basements, roadbeds and other elements. But it can be done, often by using underdrain elements to ensure performance once the water is stored and treated.

QUESTION: Are there concerns with rain gardens causing subgrade saturation and undermining pavement integrity when placed next to roadways with significant heavy truck and bus traffic?

ANSWER: If the subgrade conditions are not adequate, there could be issues with saturation causing integrity problems. However, in roads and highways that conform to modern design standards, this is not typically an issue. These questions are commonly raised out of fear and misunderstanding and only in rare cases turn out to present material constraints. When they do, the problem is a pre-existing issue, rather than one introduced by the proposal to infiltrate stormwater itself.

QUESTION: With rain gardens and other green infrastructure, have there been any problems with community concerns about standing water and mosquitoes?

ANSWER: Sometimes people worry about creating mosquito habitat when implementing sustainable stormwater practices. But actually, standing water that does not encourage the use of an area by other wildlife, like birds, fish, frogs, and dragonflies for example in standard stormwater management structures would tend to encourage more unhindered establishment and reproduction of mosquitoes. In a healthy, functioning ecosystem mosquito larvae and adults would actually serve as a wildlife food source, thereby providing natural controls to the mosquito population.

QUESTION: Generally, we tend not to infiltrate adjacent to highways due to spill contamination possibilities. Is this a valid concern?

ANSWER: Natural systems can be designed more easily to contain spills. I would rather see a spill caught within green infrastructure rather than funneled through gray! Either the plants will assimilate and treat (at least partially) or they will help absorb and contain contaminants.

QUESTION: Is data available for estimating maintenance costs of these systems?

ANSWER: Maintenance costs are not significantly different than the cost to maintain a typical/traditional system. However, the system must be designed properly at the outset, and maintained perhaps in a different manner than a traditional system.

RESOURCE: The Context Sensitive Solutions Sustainable Stormwater Management Webpage: http://www.contextsensitivesolutions.org/content/reading/are_street_trees_and_their_soil/

RESOURCE: FHWA provides resources on this topic:

<http://www.fhwa.dot.gov/context/index.cfm>

http://safety.fhwa.dot.gov/geometric/mitigationstrategies/fhwa_sa_07011.pdf