URBAN RESTORATION

RECYCLED ORGANICS MAKE SPLASH IN GREEN INFRASTRUCTURE

The cities of Seattle, Washington and Portland, Oregon have been early leaders in using storm water management tools that incorporate compost.

David McDonald, Shanti Colwell and Henry Stevens

GREEN infrastructure means using natural systems such as soil and vegetation to provide services that supplement or replace built system services, e.g. for storm water management, water and air quality, energy conservation, climate mitigation and adaptation, water supply and conservation, waste recycling and food security. The USEPA has adopted "green storm water infrastructure" (GSI) to refer to all methods that rely on distributed, on-site storm water management with living (soil and vegetation) components as well as on-site hardscape methods like permeable paving, storm water planters, green roofs, pavement reduction, minimal impact foundations, etc. GSI can be a highly engineered combination of "bioretention" (swales with deep engineered soil-compost mixes) along with those hardscape tools at a neighborhood level, or it can be as simple as amending soils with compost, preserving and planting trees, or directing house downspouts to a home rain garden.

Seattle, Washington (www.seattle.gov/util/greeninfrastructure) and Portland, Oregon (www.portlandonline.com/sustainablestormwater) have been leaders in piloting GSI methods, doing research to prove what works, and then adopting it into local codes, with support from Washington State Department of Ecology and Oregon Department of Environmental Quality. Other leaders include Prince George's County, Maryland, where "low impact development" (another term for GSI) methods were first widely used in the 1990s, and more recently Philadelphia and a host of other cities discovering innovative ways to use green strategies to shore up aging gray (concrete) storm water systems. (See the USEPA's www.epa.gov/owow/NPS/lid/ for many examples and resources.)

The High Point Redevelopment Project in Seattle combined street-side bioretention swales with compost-amended soils over the entire site (34 city blocks). Performance of the bioretention swale filtering and infiltrating street runoff during a 100-year storm event is shown above.

Compost is the tool of choice in green storm water strategies. Simple soil protection and restoration with compost best management practices (BMPs) were popularized by Washington's Soils for Salmon project (www.soilsforsalmon.org) and are now incorporated into the national SITES™ www.sustainablesites.org) standards and numerous local codes. Urban forestry experts recognize the value of compost amendments in restoring functional

BIOCYCLE WORKSHOP — COMPOST USE IN GREEN INFRASTRUCTURE

ON Monday, April 16, 2012, BioCycle's 26th Annual West Coast Conference is hosting a preconference workshop "Compost Use In Green Infrastructure," (12 pm – 6 pm) at the Red Lion Hotel on the River. Instructors (all authors of the accompanying article) are Shanti Colwell and David McDonald of Seattle Public Utilities, and Henry Stevens of the City of Portland's Bureau of Environmental Services. The workshop is divided into three segments, and concludes with a tour of several street-side bioretention installations in northern Portland.

The first segment, Specifications for Compost-Amended Soils and Bioretention Soils, will cover three compost uses: Construction site erosion control, Amending construction site soils and Engineered bioretention installations (swale, rain garden). Critical elements of compost for these applications also will be discussed, including particle size, quality and need for consistent product; soil mixes (compost-amended and bioretention) and what applications are optimum for compost amendment versus bioretention; and nutrient considerations. The second segment, Installation and Maintenance, will discuss critical elements for installation of compost-amended and bioretention soils; vegetation establishment and system stabilization; maintenance requirements (aesthetic and functional) and frequency; and evolving the plant palette to reduce maintenance requirements. The third segment of class instruction focuses on Monitoring, Performance and Cost-Benefit Analysis. Topics include addressing the challenge of designing and funding effective monitoring; lessons learned from monitoring several bioretention projects; modeling storm water flow on compost-amended landscape/site soils; and cost-benefit analysis in the real world (e.g., how to decide when green infrastructure methods are more or less cost-effective than traditional grey infrastructure).

The tour portion of the preconference workshop begins at 3:15 pm. Participants will board a bus to tour street-side bioretention facilities in Portland. Questions and discussion will continue while in transport and at the green infrastructure installations. Workshop fee: $145. To register and for more information, visit www.BioCycleWestCoast.com.

soil conditions for trees in cities and industrially degraded sites. The USEPA promotes use of compost-based erosion control methods (compost blankets, berms, and socks) as part of federally-required construction site storm water management around the county. And bioretention swales and cells (aka "rain gardens") are a key method for managing road and roof runoff. They rely on mixes comprised of one-quarter to one-third (by volume) mature, stable compost with a local sandy soil for rapid infiltration, excellent pollutant removal and vigorous plant growth.

Bioretention soils typically are comprised of one-quarter to one-third (by volume) mature, stable compost with a local sandy soil for rapid infiltration, pollutant removal and vigorous plant growth.

Compost quality is critical for GSI success. Using up to one third compost in bioretention mixes, or amending tree pits or other valuable soils where plants will be used, requires compost that is mature, stable and optimal in terms of C:N, pH, salts, nutrients and microbiological profile. In the Pacific Northwest and elsewhere around the United States, most jurisdictions and design professionals are relying on compost that meets the US Composting Council's STA (Seal of Testing Assurance) and TMECC test methods. Interactions of the compost with local soils are also critical. For example, too many fines will plug up a sandy bioretention soil mix, and turf planted on clay soils will need lower organic amendment rates than sandy soils. Compost manufacturers, marketers, specifiers and storm water design professionals need to become experts on which compost parameters are critical for their uses, as well as their local soil and plant conditions. Storm water systems are expensive, and regulations don't allow failure, so just as in any new market it's up to the compost industry to provide dependable materials and to educate end users for successful use.

COMPOST IN GSI APPLICATIONS

Two examples of compost use in green storm water infrastructure in Seattle and Portland include:

New and Redevelopment: The High Point Redevelopment Project in Seattle combined street-side bioretention swales with compost-amended soils over the entire site, which is comprised of 34 city blocks. Swales ranged from broad ditches to shallow grassy planting strips with a more conventional appearance. Residents and maintenance staff were educated about grasscycling, mulching and minimizing pesticide use to maintain long-term soil health and protect water quality. The city had challenges in getting construction subcontractors to implement soil protection and amendment practices; educating project managers and every contractor on site is essential for success.

Urban Retrofit: The City of Portland is constructing about 500 street-side bioretention facilities in the southeast part of the City. These small, dispersed facilities are intended to reduce sewer backups, increase overall sewer capacity, and improve watershed health by infiltrating runoff and adding vegetation. The facilities include flat-bottom planters and V-shaped swales in a variety of configurations adapted to space constraints. They typically have 18 inches of bioretention soil (compost/mineral soil blend) to provide both water treatment/infiltration and support plants through the wet and dry seasons. Like Seattle, Portland's bioretention soil blend is about one-third compost with a sandy soil. To ensure rapid infiltration, the mix has very little silt and clay.

With each retrofit project, Portland and Seattle learn more about the importance of fitting bioretention designs to the site soil conditions and rainy-season hydrology, anticipated storm water flow volumes, and the local community's needs for traffic-calming, pedestrian access, appearance and urban green. ■

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