

Green Stormwater Infrastructure - WA Soils for Salmon initiative



Green Stormwater Infrastructure

Putting compost to work in Washington's Soils for Salmon initiative



David McDonald
david.mcdonald@seattle.gov
www.BuildingSoil.org

Presentation to the 7th Annual Potomac Watershed Trash Summit Silver Spring, Maryland – November 7, 2012



Seattle Public Utilities
and the
Washington Organic Recycling Council

Composting is not just “waste diversion”

It is the foundation of green infrastructure



Organics cycling → Healthy Soil for:

- Trees
- Stormwater management (Low Impact Development)
- Water conservation (the cheapest “new supply” of water)
- Sustainable landscapes = urban livability, air quality, etc.
- Sustainable local/regional agriculture
- Climate mitigation (↑carbon sequestration/↓methane) and
- Climate moderation (reducing building heating/cooling) =
- Energy conservation (the cheapest form of bio-energy)

Has the added benefit of cost-effective waste diversion

What is “Green Infrastructure”?

Green Infrastructure means using natural systems (such as soils and vegetation) to provide ecosystem services that supplement or replace built system services.



Example:
Bioretention swales with deep, compost-amended soil and native vegetation are one of the methods for green stormwater infrastructure, a.k.a. “Low Impact Development”.

Restoring construction-disturbed soils with compost

UW trials, turf on glacial till soil



- Incorporate 15-30% compost (by volume) into soil before planting
- Compost amendment builds soil structure, moisture-holding capacity
- Increases surface porosity, infiltration
- Filters sediment & breaks down pollutants

Compost-amended till soil – up to 50% reduction in stormwater runoff



WA Dept. of Ecology Stormwater BMP: “Post Construction Soil Quality & Depth”



- Retain native soil and vegetation wherever possible
- All areas cleared and graded require 8 inch amended soil depth:
 - **Soil organic matter content 10% for landscape beds, 5% for turf areas**, (S.O.M. by loss on combustion method)
 - 10% S.O.M. results from roughly 30-40% compost by volume added to low-organic subsoil.
 - 5% S.O.M. results from 15-20% compost by volume in soil mix
 - May use native topsoil, incorporate organic amendments into existing soil, or bring in topsoil blend to meet spec
 - pH 6-8, or original pH
 - Subsoil scarified 4 inches below 8-inch topsoil layer
 - Protected from compaction after amendment
 - Mulched after planting, & maintained by leaving organic debris

Flow credits in runoff modeling (2012 Stormwater Manual for Western WA)



- Areas meeting the Soil BMP may be entered into runoff models as “Pasture” rather than “Lawn.”
- Flow reduction credits can be taken in runoff modeling when BMP T5.13 is used as part of a dispersion design:
 - Downspout dispersion, concentrated and sheet flow dispersion, sidewalk and roadway dispersion
- Saves builders \$ and property by reducing detention pond size!



Soil BMP takes local regulatory effect as local governments update their stormwater codes, as required by their NPDES permits from the WA Dept. of Ecology.

Green Stormwater Infrastructure - WA Soils for Salmon initiative

Building Soil guidelines manual for implementing soil BMP



- Manual developed regionally with experts
- Practical methods to achieve soil standards:
- Develop a "Soil Management Plan" for each site
- Four options for soil management in different areas of site:
 - 1) Leave native soil & vegetation undisturbed, protect from compaction
 - 2) Amend existing soil in place (with compost or other organic)
 - 3) Stockpile site topsoils prior to grading for reapplication
 - 4) Import topsoil meeting organic matter content standards
- Choose pre-approved or custom calculated amendment rates
- Simple field inspection and verification procedures
- Includes model specs written in CSI and APWA formats
- Available at: www.BuildingSoil.org

Implementing Soil BMP on large development



- Grade site 12 in. below finish
- Install foundation, along with driveway & walkway rock pads
- Spread 14 in. compost-amended soil mix, (will settle to 12 inches)
Rip in first lift to mix with subsoil
- Soils blended offsite from native duff plus compost
- Soil organic matter controlled to ~10% (5% for turf), pH and C:N ratio for optimal plant growth

WsDOT: Erosion control, water quality, successful landscapes with lower mtce. costs

SR 14, Vancouver
Coarse compost, blown in
Note erosion where not applied



Chelan, effective repair of 10-year recurring erosion site



Extensive soil bio-engineering info at:

www.wsdot.wa.gov/Design/Roadside/SoilBioengineering.htm

Selling healthy soil



Value to builder/contractor

- Less plant loss = fewer callbacks
- Making money on materials and labor
- Quicker planting in prepped soil
- Easier maintenance
- Better appearance sells next job

Sell quality & savings to customer

- Better plant survival/ health/ growth/ appearance
- Lower water bills, easier care
- Reduced chemical needs = better for family health
- Better for salmon: reduces storm runoff, improves water quality

Building a Soil Quality Movement, 1999-present

- One-on-one with policy makers, building industry leaders
 - Partner with professional org's, "green" leaders, & regulators
- Engage (fund!) scientists in meaningful research
- Soils for Salmon technical "how to" seminars around state: 22 events/1600 design & engineering professionals
- Soil quality starts to appear in policy statements, priorities for watershed restoration, stormwater mgmt.
- Write soil BMPs for State Stormwater Manual, etc.
- Local gov't and WsDOT projects prove it works, is cost-effective
- Educate engineers, LA's, landscapers, planners
- Effective web-based resources – *link it up!*
- NPDES regulations push LID, incl. soil
- Reach builders through erosion control classes, demos, articles, mail/email/web and one-to-one



Example: Erosion control trainings for builders in WA

- "Certified Erosion and Sediment Control Lead" (CESCL) now required by WA State on all construction sites
- Compost erosion control BMPs, and soil amendment BMP, are part of the trainings
- 2000+ builders trained in classes and field demo's in last 3 years



Builders get 2-for-1 value when compost is used for erosion control, and then tilled in to meet the Soil BMP!

Green Stormwater Infrastructure - WA Soils for Salmon initiative



- ### How to make organics recycling and reuse for green infrastructure “business as usual”?
- Collaboration and persistence – find your allies
 - Policy change: from waste diversion to resource recovery
 - Solid research, & connecting science to practice through professional education
 - Regulations driven by a vision: healthy soil for multiple benefits. Connect with key regulatory staff, build allies.
 - Specifications that work for everyone: building stakeholder ownership, competing to the top
 - Cost effectiveness, risk reduction, & performance monitoring – prove it!
 - Find your local hook and follow what’s hot for public buy-in

- ### Towards green infrastructure:
- What are your challenges?
 - Who can you collaborate with?
- **Organics recyclers:** composters, wood processors, biosolids, agriculture, bio-energy, waste haulers, product marketers
 - **Scientists:** land grant universities, regional, USDA/NRCS, climate etc. scientific opinion leaders
 - **Game changers:** stormwater & civil engineers, DOT’s, water supply planners, energy planners, public health agencies, green building and climate change advocates, public-based environment, community, and regional quality/ag/food/green-jobs economic development groups
 - **Do-ers:** builders, developers, landscapers, LA’s, erosion pro’s
 - **Regulators** EPA, state, and local: stormwater, water, energy, DOT’s, land use, agriculture, public health, homeland security . . .

- ### Links to useful soil BMP specifications:
- Building Soil** guidelines manual for implementing WDOE Soil Quality & Depth BMP (includes APWA & CSI specs) with resources for builders at www.BuildingSoil.org
 - or, with more resources for designers, at www.SoilsforSalmon.org
 - WA Stormwater Manual**, vol. 5, BMP T5.13 “Post-Construction Soil Quality and Depth” www.ecy.wa.gov/programs/water/stormwater/manual.html
 - LID Technical Manual**, Puget Sound Partnership www.psp.wa.gov/stormwater.php
 - Seattle’s “Green Stormwater Infrastructure” specs www.seattle.gov/util/GreenInfrastructure
 - New national specs in “Sustainable Sites” criteria (site & landscape equivalent of LEED stds.) www.SustainableSites.org