WA Stormwater Regulation Requirements for Preserving Soil and Vegetation, and Restoring Soil Functions with Organic Amendments
The Stormwater Problem:
Impacts of turning spongy forests into cities

1972-1996: Amount of land with 50% tree cover decreased by 37% in Puget Sound region (from 42% of land down to 27%).

Impervious surface increased proportionately.


Our climate is changing – more intense rain events?
What happens to soils and soil functions as we turn forests into cities?

↑ compaction
↑ erosion
↑ loss of topsoil
↓ soil organisms
↓ soil structure
↓ natural fertility & disease prevention
↑ impervious surface

cause:
↑ winter runoff
↑ need for irrigation & chemicals
↓ biofiltration of pollutants

www.SoilsforSalmon.org
What happens to streams as we turn forests into cities?

- 
  - runoff = peak storm flows
  - erosion of stream bank and bed
  - fine sediment choking spawning gravels
  - pollutants (automotive, landscape fertilizer and pesticides)
  - groundwater recharge
  - summer low flows
  - summer stream temperature
  - oxygen in spawning gravels
  - LWD - logs and rootwads that young salmon need
  - food supply for young salmon
What are the impacts?

- Salmon decline
- Pollution
- Erosion
- Flooding & property damage
- Failing landscapes, resulting in more chemical use
Summary of Soil Best Management Practices

New Construction

- Retain and protect native topsoil & vegetation
  - Minimize construction footprint
  - Store and reuse topsoil from site
  - Retain vegetation “buffer” along waterways

- Restore disturbed soils by tilling in compost, and loosen compacted subsoil.

Existing Landscapes

- Till in compost when re-landscaping
- Mulch beds and topdress turf with compost
- Avoid overuse of chemicals, which may damage soil life
WA DOE Guidance on soil & LID BMPs: Stormwater Mgmt. Manual for Western WA

• Equivalency required for Phase I & II NPDES permittees

• Volume V, Chapter 5 - “On-Site Stormwater Mgmt.”
  – Downspout, sheet, & concentrated flow dispersion
  – BMP T5.13 Post-Construction Soil Quality and Depth
  – Other Site Design BMP’s include preserving vegetation, cisterns, rain gardens, porous paving, soil compaction prevention, & T5.41 “Better Site Design”

• Volume III, Chapter 3 - “Flow Control Design”
  – Downspout infiltration and dispersion

• Flow model credits for amended soils

DOE BMP T5.13
Post-Construction Soil Quality and Depth

• Retain native soil and duff wherever possible
• All areas cleared and graded require 8 inch soil depth:
  – Organic matter content: 10% for beds, 5% for turf
  – Use native topsoil, amend existing soil with compost, or import topsoil blend
  – Subsoil scarified 4 inches below 8-inch topsoil layer
  – Protect amended soil from compaction
  – Mulch after planting
  – Maintenance practices to replenish organic content
“Building Soil” Guidelines Manual for Implementing BMP T5.13

- Manual developed regionally with experts
- Develop a “Soil Management Plan” for each site
- **Four options for soil management (can use 1 or more / site):**
  1) Retain undisturbed native soil & vegetation, protect from compaction
  2) Amend existing soil in place with compost
  3) Stockpile topsoil prior to grading, and reuse on site (amend if needed)
  4) Import topsoil meeting organic matter content requirements
- Choose pre-approved or custom calculated amendment rates
- Simple field inspection and verification procedures
- Includes model specs written in CSI and APWA formats
- Available [www.soilsforsalmon.org](http://www.soilsforsalmon.org) or [www.buildingsoil.org](http://www.buildingsoil.org)
Developing A Soil Management Plan (SMP)

- A scale-drawing identifying areas where each soil treatment option will be applied.

- A completed SMP form identifying treatment options, amendment products and calculated application rates for each area.

- Copies of laboratory analyses for compost and topsoil products to be used, with OM content and C:N
Soil Mgmt. Plan: Select Amendment Options

Outline areas where each amendment option will be applied on plan. Assign each area a letter (A, B, C…) on the plan and Soil Management Plan form.
Compost Application Methods

Compost application & incorporation methods:

- Blowing
- Spreading
- Tilling / ripping
- Blending off-site
Blowing & spreading

- Blower trucks
- Various construction grading equipment
- Other equipment: golf course & farm spreaders
Incorporating amendments into soil

- Range of equipment for different-sized sites
- Till in to 8” depth
- If compacted, rip to 12” depth before/while amending
Stockpile site soils & amend, after road & foundation work

• Allows mass grading
• Can reduce hauling & disposal costs
• Set grade to allow re-application of topsoil & allow for settling
• Amend stockpile to spec offsite, or after reapplication
• Spread after concrete work
• Rip in first lift, to reduce sub-grade compaction
Compost Based Erosion Control BMPs

- EPA-approved BMPs: blankets, berms, and socks
  see www.buildingsoil.org

- “2 for 1” – use compost for erosion control, then till in at end to meet soil BMP:
  - No disposal costs
  - Faster planting, better growth

- Costs: blankets similar to rolled products, but savings on disposal, plus 2 for 1 benefits

- Learn more at www.buildingsoil.org/tools/Erosion_Control.pdf

“2 for 1” – construction erosion control and soil quality BMPs are met with compost at Issaquah Highlands.
Related national standards:
2014 Sustainable Sites (SITES™)

SITES is the new national site & landscape equivalent to the USGBC’s LEED™ green building certification system.

- SITES includes soil protection and restoration requirements modeled on Washington’s
- Includes Soil Management Plan requirement
- Similar Green Stormwater BMP requirements to WA LID & DOE stormwater manuals

[www.sustainablesites.org](http://www.sustainablesites.org)
Builders, developers, and landscapers are adopting practices that preserve and improve the soil on building sites, grow healthier landscapes, and protect waterways. Local governments are beginning to require these practices.

Why build healthy soil?

- More marketable buildings and landscapes
- Better site erosion control
- Reduced need for water and chemicals
- Less stormwater runoff, better water quality
- Healthy landscapes = satisfied customers

Washington State’s **stormwater permits require these soil BMPs**. That requirement is taking effect locally as towns and counties around Western Washington update their stormwater codes (as required by law). Some jurisdictions already require the soil BMPs - all will soon.

The good news is, it's easy, and customers want it. New home buyers say they are happy to pay more for a healthy, easy to care for landscape - and that starts with the soil.

Successful Project

Learn more about the:

- preserving vegetation, stockpiling topsoil
- amending existing soil with compost
- placing compost amended topsoil

Tools for builders

View **slide show** (PDF 5MB) Why, how-to tips, and successful projects, or **brochure**

Watch **video** (on King County's website)

**Building Soil Manual**
the builder's guide:
- **summary** (PDF) with links to compost calculator, suppliers, specs, and more
- **full Building Soil Manual** (PDF, 4MB)

**Soil BMP requirements** in state and local codes, or **text of State BMP** (PDF)

**Landscaping guide** (PDF) Design, building, and maintenance tips for professionals

**When to amend?** (PDF) Construction sequencing for soil protection and restoration

**Erosion control with compost** (PDF) Meet your TESC requirements, build healthy soil, work faster, and save money.

**Homebuyer factsheet** (PDF) Print and use to promote your healthy soil and landscape practices to your customers. It sells!

**Learn More** - background, science, specs and resources for designers, and related information are available on our partner website:

www.soilsforsalmon.org

Science and design:  www.SoilsforSalmon.org

Builder’s info:   www.BuildingSoil.org