

When to Amend?

Construction Sequencing for Soil Protection and Restoration



The goal: healthy soil under every landscape

Washington State DOE's stormwater BMP T5.13 "Post Construction Soil Quality and Depth" requires that every construction site be left with at least 12 inches of un-compacted soil, and that the upper 8 inches have sufficient organic content to support a healthy landscape and soak up most rainfall. The State BMP (available with a how-to manual at www.BuildingSoil.org) lays out four options for soil management on different areas of sites. Soil best practices fit into construction projects from start to finish.

Design phase: plan to preserve or restore soil

Disturbed soils must be restored (see options at right), so it's better to preserve and protect existing soil and vegetation where possible.

- Identify trees and other vegetation to be preserved.
- Flag and fence off soil areas that will be protected from compaction and not graded. Pay attention to tree root zones (typically twice the width of the tree's canopy or "drip line").
- Once grading plans are complete, make a "Soil Management Plan" that identifies soil areas to be preserved, and compost or amended topsoil and mulch that will be needed to restore the soil areas that are disturbed during grading or compacted by equipment. (See the *Building Soil* manual for a blank Soil Management Plan form, and easy calculator for soil materials.)
- Dig a few holes around site to examine soil quality. Soil tests can determine how much amendment is needed. Or just plan to use "pre-approved" rates.

Land clearing and grading: reuse soil and organic materials

- Land clearing debris can often be chipped on-site and used immediately as erosion-control cover, or stockpiled for re-use as landscape mulch at the end of the project. (Don't mix un-composted debris into the soil – it's better used as mulch.)
- Root zones of trees should be fenced, and protected from compaction by equipment traffic wherever possible. Where traffic is unavoidable, a 6 inch layer of coarse wood chips (hog fuel) or quarry rock will reduce root damage.
- Topsoil removed during grading can be stockpiled and covered with wood chips, plastic, or breathable fabric.
- If amended topsoils will be placed at the end of the project, grade 8-12 inches below finish grade to allow for placing them.

Site prep and construction traffic:

the cheapest messes are the ones we don't make

- Lay out the roads and driveways, and get the rock bases down for them as soon as possible. Then keep as much construction traffic as possible on the road base, and off open soils. Besides reducing soil compaction this helps with erosion compliance, and with site safety by keeping rolling equipment on a firm base.
- Maintain barriers to keep construction traffic off soil, vegetation, and tree root zones that are being preserved.

Four Options for Soil Management

- 1) **Leave native vegetation and soil undisturbed**, and protect from compaction during construction. This is the least expensive option, because undisturbed soils don't have to be restored.
- 2) **Amend existing site topsoil or subsoil with compost** to meet the "soil organic matter" requirements. (Pre-approved rates are 3 inches of compost tilled in to an 8-inch depth for planting beds, or 1.75 inches of compost tilled in 8 inches for turf areas. Alternatively, custom rates may be calculated from soil tests.) Scarify the subsoil, to provide 12 inches of un-compacted soil depth.
- 3) **Stockpile existing topsoil during grading**, and replace 8 inches of topsoil before planting. Amend if needed to meet the organic matter requirement, and scarify subsoil to break up compaction to a 12-inch depth.
- 4) **Import a topsoil mix that meets the organic content and depth requirements.** Topsoil mixes around 40% compost by volume meet the 10% organic matter requirement for planting beds. Mixes around 25% by volume compost meet the 5% organic matter required for turf areas. Scarifying to a 12 inch depth, or tilling in some of the topsoil, will help water and roots to penetrate the subsoil.



At Redmond Ridge, Quadrant Homes fences and protects areas of existing forest, as an amenity and stormwater filter. They chip land clearing debris. Then they grade to 12 inches below finish grade, stockpiling topsoil for reuse. Next step is to place rock pads for roads and driveways.



Erosion control and soil quality – a two-for-one with compost

- Required temporary erosion and sediment control (TESC) can be accomplished by spreading a “blanket” of 1-3 inches of coarse compost to protect open soils during construction. At the end of the project, the compost can just be tilled in to create a healthy planting soil, or planted through on slopes too steep to till, saving the expense of removing erosion covers.
- Compost berms or socks often work better as perimeter sediment controls than silt fence, straw bales, etc. Again, the compost can just be knocked down or tilled in and left on site. See *Erosion Control with Compost* at www.BuildingSoil.org.

Reducing compaction: just rip it

- At the end of the project an inspector should be able to push a 3/8” metal bar 12 inches into the soil just with body weight. Compaction could be from an existing hardpan layer in the subsoil (found during the design phase), or caused by unavoidable construction traffic over an area.
- De-compaction can be done with a cat-mounted ripper, tractor-mounted disc, or tiller, before or after placing topsoil or compost. Scarifying through the first lift of applied soil or compost will mix it into subsoil, so that roots and water will penetrate deeper.



Placing and protecting amended topsoils

- Topsoils (from stockpiles or off-site) should be amended with compost as needed to meet the minimum organic matter requirements in the WA State “Post Construction Soil Quality and Depth” BMP T5.13 (see the *Building Soil* manual). The default pre-approved rates are 3 inches of compost blended into the upper 8 inches of soil for planting beds, and 1.75 inches of compost blended into 8-inch depth for turf areas. Custom rates based on soil tests may be lower, and save money on larger sites (see *Building Soil* manual).
- Amended topsoils can be placed as soon as building exterior work is complete, if contractors understand that vehicles must stay on road and driveway pads to prevent soil compaction. Compost/soil blends provide good erosion protection.

Amending soils with compost on-site

- Rather than purchasing “topsoil” of unknown quality (weed seeds or too much clay are common problems), it’s often more cost effective to amend existing site top or sub-soils with compost to restore final soil quality. Because Washington composting facilities must follow strict State quality regulations, compost quality is more dependable than purchased soil.
- If compost blankets, berms, and socks have been used for site erosion and sediment control during construction, just till the compost at least 8 inches into the soil before planting. Avoid tilling through tree roots.
- When planting turf (by seed or sod), a pass with a rock rake may be needed to create a smooth seedbed. Roll to firm soil before seeding.



“When to amend?” – it depends

Soil protection starts with initial site planning and continues through to final sale. Compost or wood chip blankets can be great for erosion control during construction. But final soil quality and depth restoration, whether by placing imported or reused topsoil or by amending site soils with compost, should wait at least until building exteriors are finished and trade crews have moved indoors. Before sodding or seeding turf, tilled soils need to be rolled or allowed to settle with rainfall – but trees and shrubs can go in right away. Beds should be mulched right after planting with wood chips or coarse bark, to prevent weeds and erosion, conserve water, and improve plant survival and growth.

Talk to your landscape architect, site prep, grading, and landscape contractors about when and how soil BMPs fit best into your team’s construction schedule.