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

Purpose and Description

Naturally occurring (undisturbed) soil and vegetation provide important stormwater functions including: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant biofiltration; water interflow storage and transmission; and pollutant decomposition. These functions are largely lost when development strips away native soil and vegetation and replaces it with minimal topsoil and sod. Not only are these important stormwater functions lost, but such landscapes themselves become pollution generating pervious surfaces due to increased use of pesticides, fertilizers and other landscaping and household/industrial chemicals, the concentration of pet wastes, and pollutants that accompany roadside litter. Establishing soil quality and depth regains greater stormwater functions in the post development landscape, provides increased treatment of pollutants and sediments that result from development and habitation, and minimizes the need for some landscaping chemicals, thus reducing pollution through prevention.

Cross Reference Guide

Soils Assessment	NA
Meets Minimum Requirements	#5
Related BMPs	None
Selection Criteria	CCSM, Book 1, Sections 2.2 and 2.5.2
Maintenance	CCSM, Book 4

Applications, Limitations and Setbacks

Establishing a minimum soil quality and depth is not the same as preservation of naturally occurring soil and vegetation. However, establishing a minimum soil quality and depth will provide improved onsite management of stormwater flow and water quality. Soil organic matter can be attained through addition of numerous materials such as compost, composted woody material, biosolids, and forest product residuals. It is important that the materials used to meet the soil quality and depth BMP be appropriate and beneficial to the plant cover to be established. Likewise, it is important that imported topsoils improve soil conditions and do not have an excessive percent of clay fines. This BMP can be considered infeasible on slopes greater than 33 percent.

Soil and vegetation provide significant benefits, including:

- Water infiltration.
- Absorption of nutrients, sediments and pollutants.
- Biofiltration of sediment and pollutants.
- Water interflow storage and transmission.
- Pollutant decomposition.

These functions are largely lost when development strips away native soil and vegetation and replaces it with minimal topsoil and sod. Establishing in-situ soil quality and depth regains greater stormwater functions in the post development landscape and also minimizes the need for some landscaping chemicals, further limiting pollution.

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This BMP is mandatory for all projects required to follow Minimum Requirements #1 – #5 or Minimum Requirements #1 – #9.

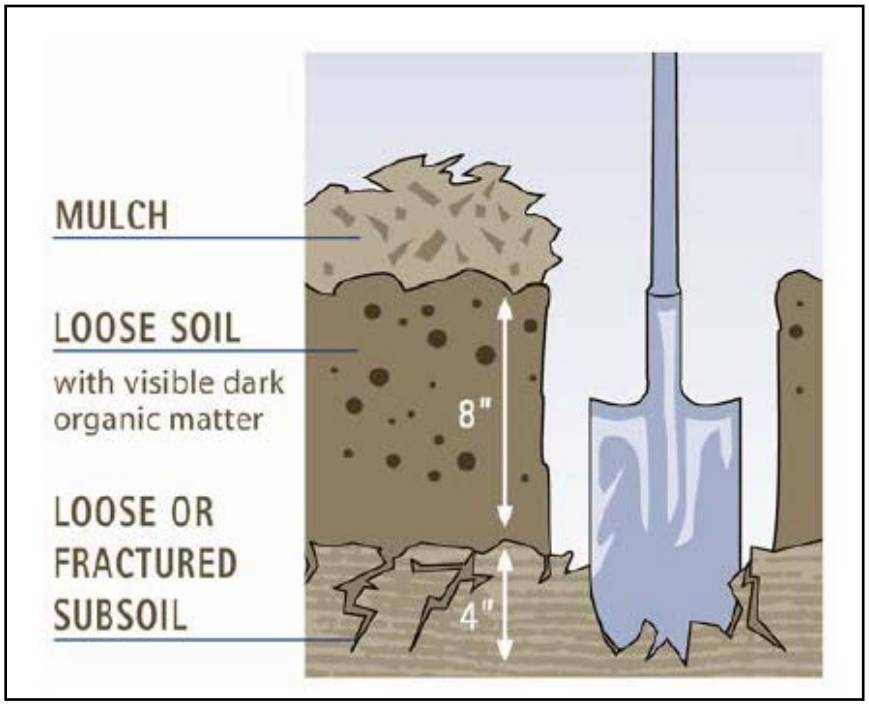

Figure 2.11: Typical Planting Bed Cross-section
(Source: Washington Organic Recycling Council graphic in SMMWW)

Design Criteria

- Retain, in an undisturbed state, the duff layer and native topsoil to the maximum extent practicable. In any areas requiring grading remove and stockpile the duff layer and topsoil on site in a designated, controlled area, not adjacent to public resources and critical areas, to be reapplied to other portions of the site where feasible.
- Areas subject to clearing and grading that have not been covered by hard surfaces, used for a drainage facility, or where the soils have been engineered as structural fill or slope, shall demonstrate the following after completion of the project:
  - A topsoil layer with:
    - A minimum organic matter content of 10% dry weight in planting beds.
    - 5% organic matter content in turf areas.
    - A pH from 6.0 to 8.0 or matching the pH of the undisturbed soil.
    - A minimum topsoil layer depth of 8 inches except where tree roots do not allow this.
  - Subsoils below the topsoil layer should be scarified at least 4 inches with some incorporation of the upper material to avoid stratified layers, where feasible.
  - Mulch planting beds with 2 inches of organic material.
  - Compost and other materials shall meet the following requirements for organic content:
    - The organic content for pre-approved (by Ecology) amendment rates can be met only using compost meeting the compost specification for

Bioretention (BMP T7.30), with the exception that the compost may have up to 35% biosolids or manure. The compost must also have an organic matter content of 40% to 65%, and a carbon to nitrogen ratio below 25:1. The carbon to nitrogen ratio may be as high as 35:1 for plantings composed entirely of plants native to the Portland/Vancouver region.

- Calculated amendment rates may be met through use of composted material meeting (a.) above; or other organic materials amended to meet the carbon to nitrogen ratio requirements, and not exceeding the contaminant limits identified in Table 220-B, Testing Parameters, in WAC 173-350-220.

- The resulting soil should be conducive to the type of vegetation to be established.

- Only one of these methods can be used to meet the above criteria for a specific area on the site:
  - Native vegetation and soil should remain undisturbed and protected from compaction during construction.
  - Amend existing topsoil or subsoil either at default "pre-approved" rates, or at custom calculated rates based on soil tests of the soil and amendments.
  - Stockpile existing topsoil during grading and replace it over disturbed areas prior to planting. Stockpiled topsoil must also be amended if needed to meet the organic matter or depth requirements, either at a default "pre-approved" rate or at a custom calculated rate.
  - Import topsoil mix of sufficient organic content and depth to meet the requirements.
  - More than one method may be used on different portions of the same site. Soil that already meets the depth and organic matter quality standards need not be amended.
  - Scarification of subsoils can be accomplished using mechanical methods such as a rototiller.