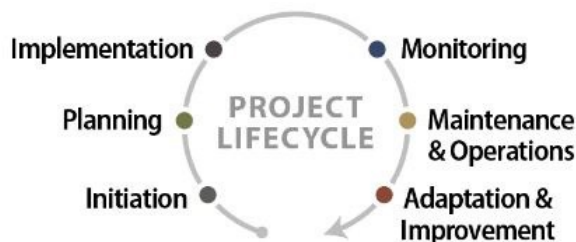


Instructions for using the 207 and 212 specifications during the development of the Stormwater Management Plan (SWMP)

Background:

Roadside revegetation programs require proper planning to support transportation goals. Roadside revegetation serves to stabilize slopes, reinforce infrastructure, provide natural beauty, ecological diversity, habitat for pollinating insects, and improves safety, efficiency and user experience for the traveling public (FHWA Roadside Revegetation Manual). Upon completion of project grading and infrastructure improvements (built capital), the process of roadside revegetation begins (natural capital), including management for topsoil, application of soil amendments and seeding.

The CDOT HQ Landscape Architecture Section has completed an extensive review process, and is now ready to issue the roadside revegetation methods as standard specifications. As the revised methods are implemented statewide on CDOT projects, evaluation will continue for efficacy and project success. It is expected that future refinements to revegetation process and methods will be necessary as projects are evaluated. The Landscape Architecture Section welcomes feedback, and our staff requests the opportunity to observe active projects using these new standards to monitor and evaluate revegetation success, and to prepare training programs for Inspectors/Engineers-in-Charge.



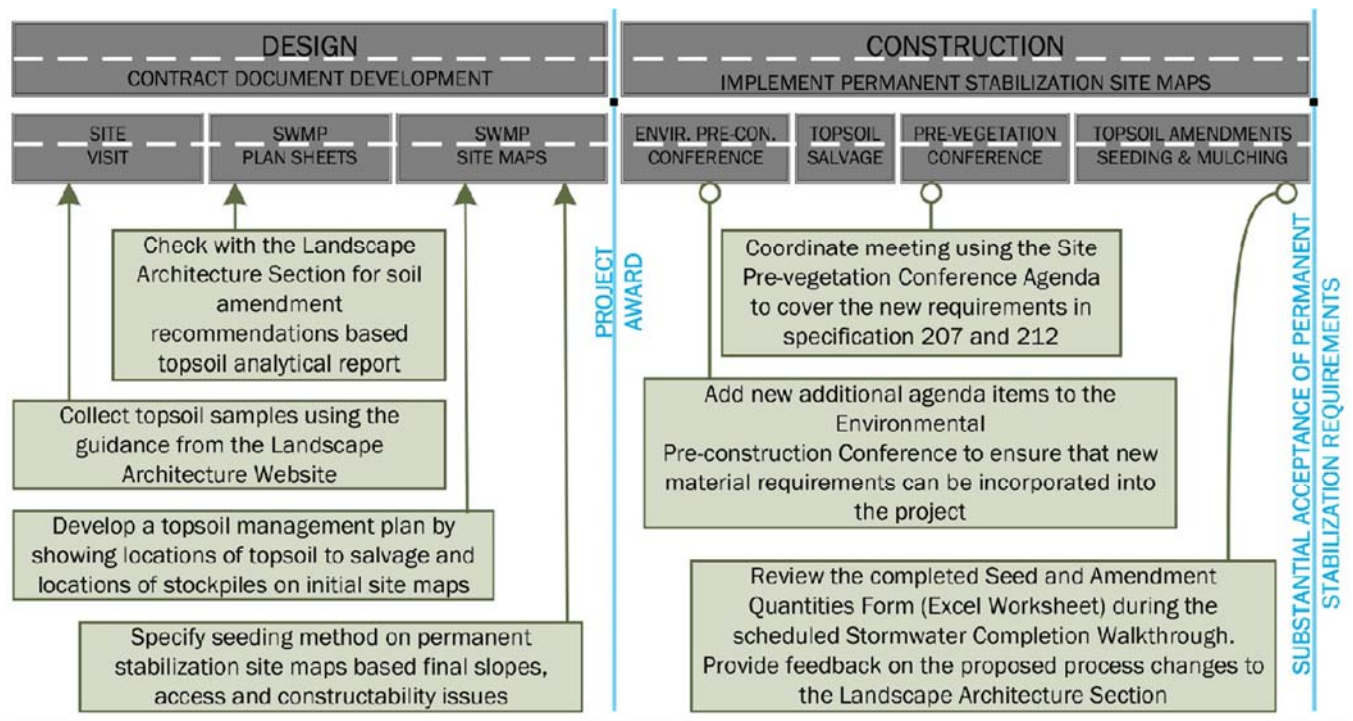
Recommended Integrated Approach to Improve Roadside Revegetation by FHWA

Application of this Guidance:

These instructions provide guidance for using the 207 and 212 standard specifications (standards) and SWMP development tools. These standards update protocol for roadside revegetation, while retaining flexibility for design decisions based on site-specific conditions.



Project Delivery Timeline



Design Phase Tools and Options

The revegetation process starts in the design phase. Early coordination of revegetation design occurs during the development of the SWMP Permanent Stabilization Site Maps (revegetation plan). At this time, it is necessary to conduct a site topsoil inventory and analytical test, and to develop strategies for project topsoil management, soil amendment and seeding.

The following documents are provided for use during the project design phase, and are available to download from the Landscape Architecture (LA) web page, <https://www.codot.gov/programs/environmental/landscape-architecture>

1. *Topsoil Testing Procedure*
2. *SWMP Templates*
3. *Topsoil Stockpile Windrow Combined With Temp Berm Control Measure Detail (Optional - available in both PDF and .dgn file format)*

Step 1 - Topsoil Collection and Analytical Test

Topsoil is a valuable resource that is important to preserve during construction, so that it is not inadvertently wasted. The SWMP designer is required to perform a topsoil assessment of all project areas within the anticipated limits of disturbance (LDA). The Topsoil Testing Procedure should be used and is available for download on the LA web page:

<https://www.codot.gov/programs/environmental/landscape-architecture>. It is important to record the locations, depth and quality of the site's topsoil.

Pre-construction soil testing provides a more prescriptive SWMP based on the chemical and physical properties of the existing soil. A topsoil sample is taken from each revegetation unit identified on the project. Revegetation units are areas with similar revegetation treatments and site conditions (e.g., soils, climate, and vegetation potential). Large projects with greater diversity (different soil types, microclimates, vegetation types and management needs) will be assigned more than one revegetation unit. During the Field Inspection Review (FIR) meeting, discuss with the regional environmental staff the potential of having more than one vegetation unit on the project. When collecting topsoil samples on-site, inventory the Limit of Construction (LOC), along with adjacent reference sites, for existing plant species, weed pressures and other site factors that might affect vegetation. Topsoil samples are delivered to an accredited lab for analysis according to the *Topsoil Testing Procedure*.

Step 2 - Topsoil Amendments

The SWMP designer is required to specify types and quantities of soil amendments based on the analytical topsoil report from an accredited laboratory. Topsoil amendments are incorporated into the contract documents using the SWMP Plan Sheets (template). Guidance for developing an amendment protocol using the standard specification 212 amendments can be found in the Topsoil Testing Procedure. The Landscape Architecture Section is available to assist with developing or reviewing the topsoil amendment strategies for the project.

Step 3 - Topsoil Management Strategy

Topsoil protection is required under the updated 2019 CDPS General Permit: Stormwater Discharges Associated with Construction Activity (COR40000). Part 1 B.1.a.i.(f) states, "*Unless infeasible, topsoil shall be preserved for those areas of a site that will utilize vegetative final stabilization.*"

The single most important and cost effective factor for successful roadside revegetation is topsoil salvage and placement on finished civil grade. Information collected in Step 1 is used to develop the topsoil management strategy and provides a topsoil depth inventory. Projects may require testing both the topsoil and subsoil within the LOC, depending upon the topsoil management strategy.

The SWMP designer incorporates the topsoil management strategies into the contract documents using the initial and permanent SWMP Site Maps. This allows for easy interpretation for tightly bid SWMPs. The topsoil survey and testing provides locations and depth of topsoil

salvage. The site maps include methods and locations of topsoil stockpiling and the appropriate control measures. The windrow method for topsoil stockpiles is the preferred technique for most projects to limit the height of stockpiles to preserve microbial organisms, and reduce the haul distances. A windrow stockpile detail has been developed to show how this method can be combined with a perimeter temporary berm control measure. A volume calculation of the proposed salvaged topsoil is needed to confirm there is enough storage area available between the LDA and LOC.

Litter and duff management affects the topsoil amendment strategies for a project. Organic material that collects on the soil surface is a valuable source of natural mulch, native seed bank and nutrients. The organic duff layer may contain fresh and decomposed leaves and needles useful for revegetation, but occasionally may contain harmful materials such as noxious weeds and seed. The site assessment of desirable or problematic existing plant species should direct the topsoil management strategy to stockpile litter and duff with the topsoil, or when necessary, to dispose of undesirable surface litter offsite.

Step 4 - Subgrade Soil Preparation

The mechanical process of shattering compacted subsoils is referred to as “subsoiling” or “ripping.” Together with the design team, the SWMP preparer will determine the feasibility of subgrade soil preparation for the project, and how much of the project area will require ripping, according to CDOT Pay Item 207-00704. When calculating the anticipated area of subgrade soil preparation, consider only the areas that will receive seeding as a final stabilization method.

The SWMP designer must consider project-specific site conditions when determining the feasibility of ripping subsoil. The SMWP should include Pay Item 207-00704 wherever project mass grading is required and where dozers and graders (yellow iron) will be on site for other grading operations, and/or where the majority of site disturbance requiring seeding or sodding is wider than five feet. Sites suitable for subsoiling typically include abandoned roads, haul roads, batch plants, staging areas, bioretention areas and fill slopes that conform to the 203.03 material requirements for soil and rock embankment material and areas with particles sizes less than 6 inches.

Projects are exempt from the subsoil ripping requirements of the 207-specification requirement where:

- Grading operations are not required for the project
- Most disturbed areas are less than 5 feet wide
- Subsoil contains a significant quantity of large rocks
- Subgrade utilities prohibit ripping operations
- Cut slope embankments
- Subsoils with high moisture content such as wetland and riparian areas

Project shoulders receiving an aggregate base course or recycled asphalt do not require fracturing of compacted subsoils.

Step 5 - Seeding Method(s)

Revegetation design solutions can vary widely depending on project-specific site conditions. Three seeding methods and associated pay items are available for the SWMP designer to specify, according to the anticipated options for project success.

1. Drill seeding with straw mulch is the preferred method of seed application. Consider drill seeder equipment access by evaluating slope lengths, gradient and rocky conditions.
2. Hydraulic seeding is the alternative method for areas on sites where drill seeding is not feasible.
3. Broadcast seeding is advised for areas not suitable for drill or hydraulic seeding.

Step 6 - 207 and 212 Standards

The 2020 revegetation specifications are methods-based, with prescribed materials and methods. These specifications were revised from previous end-result-based specifications (such as 214-landscape establishment), because they were challenging for smaller revegetation sub-contractors to implement, and the contractor roles and responsibilities were sometimes confusing.

Step 7 - Coordinate Earthwork Tabulations.

The final SWMP topsoil strategies must be coordinated with the overall Earthwork Quantities Worksheet.

Potential changes that might affect quantities from current standard practice are:

- Increased topsoil salvage and redistribution depth from 4 to 6 inches.
- Added an option to import approved topsoil for areas receiving vegetation practices.
- Added an option to remove existing topsoil from the project site.
- Topsoil salvage now paid for using the new 207 pay items, is no longer paid for as clearing and grubbing.

For assistance with any of these documents, please contact:

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