COLORADO
Department of Transportation

Sections 207 and 212 Guidance During Construction

Revised October 28, 2024

Revegetation includes salvaging, stockpiling, and replacement of topsoil, soil amendments, seeding, and application of final mulching or blanket cover (straw/hay, hydraulic mulches or soil retention blankets). The Stormwater Management Plan (SWMP) Permanent Stabilization Plan Sheets and Site Maps (revegetation plan) contain the site-specific seed mixes, amendments, and interim and final stabilization methods for the project.

Agenda templates and worksheets are available to document and track installed quantities for Engineers and Permanent Stabilization Subject Matter Expert (PSSME). This information is part of the project closeout and handoff if and when there is a stormwater permit transfer. The following tools are available to assist and document revegetation activities as part of the project file and are found on the Landscape Architecture web page.

- Your Region Environmental Staff are a resource and can assist with review of submittals and can assist with revegetation inspections
- Environmental Pre-Construction Conference Agenda
- Site Pre-vegetation Conference Agenda

Environmental Pre-Construction Conference

The goal of the Environmental Pre-Construction Conference is to improve the communication on the SWMP, Construction Stormwater Permit, if retaining topsoil, retaining the litter and duff layer, and weed management throughout the project. This meeting is coordinated by the region's PSSME and this individual should attend meetings, review submittals, and provide input on revegetation as the project progresses. In Region 1 the PSSME is also the Regional Water Pollution Control Manager (RWPCM) in Region 1. In this document only the PSSME will be referred to.

Site Pre-Vegetation Conference

The goal of the Site Pre-Vegetation Conference is to effectively communicate Contract revegetation requirements and emphasize the importance of vegetation to the overall success of the project to the Contractor. This meeting is scheduled by the Project Engineer and conducted by the Landscape Architect, Permanent Stabilization Subject Matter Expert and occurs just prior to the start of the subsoil preparation and topsoil placement activities. This meeting can be held at the same time as the

Environmental Pre-Construction Conference or prior to revegetation activities. Allow for approximately 2 hours to discuss all items and address questions from grading and revegetation subcontractors, site inspectors, and other project stakeholders. The Inspection and Verification Checklist for Roadside Revegetation is a great resource for discussing submittals and items that will be inspected and verified in the field. The Agenda and Handouts are found on the Landscape Architecture web page webpage.

Submittals

Copy the PPSSME or their designee on all environmental submittals for revegetation and final stabilization Sections 207, 208, 209, 212, 214, 215, 216, 217, 218, 219, and 220. The PSSME can assist the project engineer with review of submittals, ensure they meet contract requirements, and assist with tracking quantities.

For all wetland submittals work with the Region Wetland Biologist.

Inspection and Verification Checklist for Roadside Revegetation

The Project Engineer's Inspection and verification checklist of subsoil preparation, topsoil installation, topsoil amendments, and seeding activities are outlined in the Inspection and Verification Checklist for Roadside Revegetation. Again, the PSSME can assist with submittals, inspections, and verification of these construction activities.

The following goes into greater detail from the checklist:

Favorable Conditions for Subsoil and Topsoil Preparation and Seeding - Soil Moisture Testing

Subsoil preparation, and applications of topsoil, amendment, and seeding should not be conducted during the following conditions: winds higher than 20 mph, frozen or excessively wet soils. Working frozen or wet soils will destroy the soil structure and create compacted soils. High winds during work will lead to soil loss and erosion and possibly create dangerous driving conditions and loss of seed that will negatively impact vegetation establishment.

A quick method to determine the soil moisture conditions is done in the field by taking a handful of soil from planting depth (approximately the 14" for subsoil preparation and 6" for topsoil, amendment and seeding activities) and using your hands, press the soil to form a ball. If the soil sticks to your hand or oozes between, it is too wet. Clay content could affect this. Drop the soil ball to the ground from waist height. If the soil ball doesn't break apart when it hits the soil surface, it's probably too wet. In addition, if any equipment leaves soil rutting or depressions greater than 1 to 2 inches and/or the soil sticks to the tire or track surfaces, then the soil is too wet.

If soil is too wet, ask the Contractor to wait a day or two to allow the soil to dry to provide better soil conditions. Working in wet soil conditions results in soil compaction (what you are attempting to correct) and the end result is uneven seed emergence and poor vegetation establishment making a timely closure of the Stormwater COR 040000 Permit difficult.

Section 207

Subsoil Preparation

The purpose of decompaction is to create air and pore space for plant roots. The roots of native plants grow deep into subsoils generally 3 to 5 feet some reach depths of 15 or more feet. The Contractor should provide their own penetrometer and verify they have sufficiently decompacted subsoils prior to topsoil placement.

Topsoils

Onsite Topsoil and Stockpiling

CDOT recommends reusing topsoil, where feasible. Topsoil contains organic matter including microbes, seed and plant material native to the site that increase the success and diversity of the project's revegetation establishment. CDPHE grading and stormwater permit states "Unless infeasible, topsoil shall be preserved for those areas of a site that will utilize vegetative final stabilization."

Verify that topsoil stockpiles have signage per Section 207 to ensure the Contractor does not use topsoil for other purposes such as fill or inadvertently dump or mix other materials into the stockpiles. Depending on the duration of the project, topsoil stockpiles must have interim stabilization after 14 days of stockpile inactivity, per the 208.

Topsoil stockpiles are not to be compacted per Sections 207. Compaction leads to anaerobic conditions that destroy the microbes and seed bank, which is in opposition to the intent of topsoil stockpiling. Topsoil stockpiles should be placed on a location that is less likely to be disturbed to prevent compaction. Topsoil can be pushed to the edge of the project in linear stockpiles but requires the addition of control measures per the permit and Section 208. Erosion and sediment control of topsoil stockpiles can be controlled with erosion control logs or silt fence, silt fence staking can be used to include topsoil stockpiles signage as approved by the Project Engineer.

Topsoil stockpiles should not be located near adjacent populations of noxious weeds.

If using drill seeding or erosion control blankets, the Contractor must remove all soil clods, sticks, stones, debris, concrete, and asphalt that exceeds 4 inches in any dimension to allow for effective seeding. Note that the stone and gravel content of topsoil as a variable based on geographic region of the project and the seeding and erosion and sediment control method should reflect this.

Imported topsoil

Imported topsoil will be sourced from a known location with similar soil characteristics to the site where the topsoil is to be applied. When importing topsoil sampling will be required by the Contractor to ensure that the topsoil has the adequate nutrient panel and meets the physical criteria. All imported topsoil will be approved by the Project Engineer. Reject all loads that have any noticeable chemical smell and/or contaminates such as trash, oil staining, trash, car parts, large woody debris, concrete and asphalt debris.

Wetland topsoil

Wetland topsoil should be stored for 3 months or less. In the case that wetland topsoil needs to be stored for longer periods, coordinate with the Region Wetland Specialist. The Project Engineer should coordinate with the Region Wetland Specialist throughout the project as it relates to wetland and riparian areas and soils. Documentation of the sourcing and location of the wetland topsoil will be completed by the Regional Wetland Specialist and communicated to the project engineer.

Engineered topsoil

Engineered topsoil should have a soil nutrient panel completed prior to placing the soil. Engineered topsoil then can be either placed in the final or location or stockpiled as needed. If the engineered topsoil is to be stockpiled, use the guidance listed above for correct stockpiling operations.

Section 212

Amendments

Delivery and Storage

Soil amendments must be stored per manufacturer specifications. Storage of amendments should be out of the sun and should not be in contact with rain, snow, or surface water. It is best if they are not delivered to the site until amendment activities are to take place. Long term storage should be in a temperature-controlled space and away from moisture.

- The urea in organic fertilizers have the potential to explode if stored in high temperatures. Mycorrhizae stored in high temperatures will degrade or destroy the fungal propagules (living organisms) and the soil amendment will provide zero value to seeds or soils.
- All Soil amendment containers should be sealed for safe storage to prevent the breakdown of the soil amendment with either sun or water-based degradation.
- Compost. The compost should smell of earth and not of manure. It should not contain visible debris and be dark in color with no materials over 2" length. Review the Certified Test Result (CTR).
- Organic Fertilizer - Verify the NPK rates and whether the fertilizer is high or low nitrogen matches the plans.

Inspection - The work in any area will not be accepted until the required materials are applied in a uniform distribution at the specified rate. Reject any areas that do not receive a uniform distribution of seed and amendments. Get the PSSME involved if any amendment substitutions should occur.

- Compost when applied on the surface appears to be X' deep. When incorporated should be seen as darker material.
- Biotic Soil Amendment (Hydraulically Applied) is applied with hydroseeding activities.

Native Seeding

- **Seed Substitutions.** The Engineer's review of the seed mix substitutions will not exceed 10 calendar days. Seed Substitutions should be sent to the PSMME or project landscape architect for review.
- **Storage.** Seed should be stored off site in air-conditioned spaces away from moisture. Seed vigor (germination and growth rates and stress tolerance) decreases when stored in higher temperatures which have both short- and long-term negative effects on establishment. Seed should be stored off site if stored for periods greater than a few days.
- **Seeding Seasons.** Seeding within the specified seasons ensures the optimal temperature and moisture conditions for seeds to remain viable and germinate. Seeding occurring during the hotter drier months of June through August will not establish and much of it will be blown away, washed away in storms, or eaten by birds or other wildlife. If seed does germinate it will be desiccated in the hot dry sun during the long periods with no moisture. Seeding in the winter is not ideal as frozen soils do not allow for good seed to soil contact, seed will not germinate until spring and can be blown or washed away or eaten by wildlife.
- **Seed Substitutions.** No species substitutions will be permitted in seed mixes unless a letter is submitted by the seed supplier that the seed is not available during the

anticipated construction period. All seed substitutions must be reviewed and approved by the RPSSME. If the seed mix specified in the plan is not available, the Contractor shall provide a letter from the seed vendor of substitute seeds species, and quantities suitable for the project, and request for change order modification for approval. Work with the PSSME to approve the changes.
Note for the PSSME: Seed substitutions are common. The suggested substitutions should be native to the region with similar characteristics to the original seed. Grasses should be the same cool or warm season and rhizomatous or bunch or at least have a good mix of these characteristics in the mix. Forbs should have a similar bloom color and season.

- **Seeding Rates.** When seeding, the correct seeding rate is crucial to proper establishment. Under application of seed can lead to increased growth of weeds where exposed surface soil is present and increased surface erosion. Overseeding can result in a more vigorous initial establishment but in the long term there will be increased vegetation loss from competition of sun, nutrients, and water resources. Contractors will need to calibrate seeders before seeding activities to ensure the correct amount seed is being placed during the seeding operation.

  Seeding rates and timing are crucial to the establishment of desired vegetation. Seeding rates are set based on the methodology of seeding. If drill seeding rate is specified in the plans and the Contractor uses another method, the seeding rate shall be increased by 1.5 times at no additional cost to the Department.

Seeding Inspection

- Drill – drill seeding should not occur in rocky soils as the equipment will not effectively apply the seed to the ¼" depth required. Note Drill Seeding is the preferred seeding method where applicable.
- Hydraulic seeding occurs as a separate activity from hydro mulching. If they are applied at the same time, much of the seed is suspended in the wood mulch and will result in poor germination. This will negatively affect vegetation establishment and timely permit termination.
    - Water must be from a permitted water source. Rivers, streams, ditches on or off CDOT ROW are not a source of water due to Colorado Water Rights. In general, water must be trucked into the site from an off-site permitted source.
- Broadcast seeding occurs on smaller areas less than a half of an acre and must be raked in afterwards to ensure seed to soil contact for germination success.
- Retain all Seed Tags with the SWMP Notebook.