SP-150731
(New)

SPECIAL PROVISIONS FOR BIOSWALES

Polk County
NHSX-006-4(189)--3H-77

Effective Date
February 16, 2021

THE STANDARD SPECIFICATIONS, SERIES OF 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150731.01 DESCRIPTION.

The purpose of this specification is for construction of bioswales for treatment of storm water runoff.

150731.02 MATERIALS.

A. Subdrain Cleanout.
Refer to detail in plan. Match diameter of the adjacent subdrain.

B. Filter Aggregate.
Provide aggregate complying with Section 4115 of the Standard Specifications, Gradation No. 3, Class 2 durability crushed stone.

C. Subdrain.
Provide slotted pipe(s) complying with the requirements of Section 2502 of the Standard Specifications. Pipe size as specified in contract documents, should match diameter of pipe used for subdrain cleanouts.

D. Nonwoven Geotextile Fabric.
Comply with Article 4196.01, B, 2 of the Standard Specifications, meeting the requirements for subsurface drainage.

E. Choker Aggregate.
Provide 3/8 inch aggregate complying with Section 4125 of the Standard Specifications, Gradation No. 21.

F. Modified Soil.

1. Organic Material.

a. Provide suitable organic material composed of products from plant material such as:

1) Compost complying with the following requirements:

- Derived from a well-decomposed source of organic matter.
- Produced using an aerobic composting process, meeting Code of Federal Regulations (CFR) 503 for time, temperature, and heavy metal concentrations.
- No visible admixture of refuse or other physical contaminants, nor any material toxic to plant growth.
- Certified by the U.S. Composting Council's Seal of Testing Assurance (STA) program.
- Conforms to chemical, physical, and biological parameters of AASHTO MP 10-03, with the following additional requirements:
  - Follow U.S. Composting Council's TMECC guidelines for all testing.
  - Organic Matter Content: 30% minimum.
  - pH: between 6.0 and 8.0.
  - Maturity (growth screening): Minimum 90% emergence for all compost to be vegetated.
  - Particle Size:

Sieve Size	Percent Passing
2"	100
1"	90-100
3/4"	65-100
3/8"	0-75

2) Finely chipped bark (3/8 inch diameter or less)

3) Finely shredded, partially decomposed mulch

4) Peat and sphagnum peat moss

b. Other organic material approved by the Engineer provided it has no detrimental chemical compounds, does not have high nutrient content that would increase nutrient loading in leachate, will increase the water holding capacity of the soil media and will enhance the ability of the media to capture and hold pollutants to facilitate breakdown is also acceptable.

2. Sand: Provide clean sand complying with Section 4110 of the Standard Specifications, Gradation No. 1.

3. Soil: Provide soil taken from the top 6 inches of the A-horizon, have a dark brown to black color, have a granular structure and clay content less than 25% verified with a ribbon test that yields no more than 1 inch.

4. Mixture: The texture of the modified soil mixture will be loamy sand or sandy loam according to the USDA Soil Classification system, soil textural triangle. A laboratory analysis for particle size or a simplified dispersal method for sand content only can also be used to verify soil texture. Thoroughly blend organic materials, sand and soil to provide a mixture with 0 to 10% suitable organic material, 75% to 90% sand and 0 to 25% soil by volume.

G. Water.

Supply potable water for consolidating the modified soil layer. In lieu of potable water, supply clean, clear water, free of harmful contaminates, from a source approved by the Engineer.

150731.03 CONSTRUCTION.

A. Pre-Installation Protection.

1. Complete upland grading, utility installation, and other earth disturbing operations prior to excavating for the bioswale.

2. Construct pre-treatment practices as specified in the contract documents.

3. Prior to installing the bioswale, install erosion and sediment control practices upstream to protect the bioswale from sediment in stormwater runoff.

B. Bioswale Installation.

1. Complete rough grading activities to excavate the bioswale area to the length, width, and depth specified in the contract documents. Do not compact the bioswale subgrade and do not operate heavy machinery on the subgrade.

2. Perform topsoil re-spread, fine grading operations, and seedbed preparation as specified in the contract documents.

3. Excavate the trench for the subdrain as specified in the contract documents.

4. Excavate across the bottom of the bioswale for placement of the modified soil layer as specified in the contract documents.

5. Verify that the bottom of the subdrain trench is clear of debris or other material and remains at the proper subgrade elevation to allow for subdrain installation.

6. If nonwoven geotextile fabric is specified in the contract documents, install over the bottom of the trench and up the sides of the excavated area with enough materials to overlap 18 inches over the top of the aggregate. Overlap adjacent strips of fabric a minimum of 6 inches.

7. Place the first 2 inches of the aggregate subbase evenly over the bottom of the subdrain trench. Do not operate machinery directly on the excavated subgrade of the modified soil layer during aggregate subbase or subdrain installation.

8. Install subdrain at the elevation specified in the contract documents. Install cleanouts at locations specified in the contract documents.

9. Place remaining aggregate subbase layer to the elevation specified in the contract documents.

10. If a choker aggregate layer is specified in the contract documents, install over stone aggregate subbase layer to the depth specified.

11. Install check dams as specified in the contract documents. Protect subdrain and aggregate subbase layers during check dam construction. Do not operate heavy machinery directly on subgrade of the modified soil layers during check dam installation.

12. Place modified soil in 8 to 12 inch lifts to the elevation specified in the contract documents. Do not operate heavy machinery directly on the subgrade of the modified soil layers during placement. Overfill area with modified soil by 5% of the specified depth to allow for natural settlement.

13. Avoid over compaction by allowing time for natural settlement. If the project schedule does not allow for natural settlement of soil and the contract documents require compaction by soaking, compact the filter soil matrix by soaking as described below:
- **a.** Apply water to uniformly saturate surface by spraying or sprinkling.
- **b.** Ensure entire bioswale is saturated.
- **c.** Add modified soil as required to restore settled surface to finished elevation.

14. Roughen surface of side slopes that are 4(H):1(V) or steeper to reduce potential for rill erosion along equipment tracks.

15. Perform stabilization measures and install landscaping (seed, sod, native plants, trees, shrubs,

etc.) as specified in the contract documents.

16. Install side slope erosion and sediment control measures as specified in the contract documents.

17. Uniformly grade and rake the top of the modified soil layer to a flat, smooth, uniform surface.

18. When specified in the contract documents, place a 3 inch layer of hardwood mulch over area filled with modified soil. Do not place hardwood mulch over seeded areas. If the contract documents specify plants for the surface of the modified soil layer, install prior to placing mulch.

19. Ensure good housekeeping measures are taken throughout construction, until final acceptance of improvements by owner, to prevent erosion and sedimentation that could reduce the effectiveness of the bioswale. Address any such erosion or sedimentation should it occur, until final acceptance.

20. Do not store materials or operate heavy equipment within or near the footprint of the bioswale practice after installation has been completed.

150731.04 METHOD OF MEASUREMENT.

A. Class 10, Class 12, or Class 13 Excavation: Per Article 2102.04 of the Standard Specifications.

B. Choker Aggregate: Granular Material for Blanket and Subdrain per Article 2107.04 of the Standard Specifications.

C. Filter Aggregate: Granular Material for Blanket and Subdrain per Article 2107.04 of the Standard Specifications.

D. Subdrain: Per Article 2502.04 of the Standard Specifications.

E. Subdrain Cleanout: Incidental to subdrain installation.

F. Nonwoven Geotextile Fabric: Per Article 2507.04 of the Standard Specifications.

G. Modified Soil Layer.
Measurement will be the plan quantity in cubic yards, without final field measurement. The plan quantity will be based upon the proposed excavated area to be filled with modified soil, plus an additional 5% to account for anticipated shrinkage.

H. Surface Roughening: Incidental to bioswale construction.

150731.05 BASIS OF PAYMENT.

A. Class 10, Class 12, or Class 13 Excavation: Per Article 2102.05 of the Standard Specifications.

B. Choker Aggregate: Granular Material for Blanket and Subdrain per Article 2107.05 of the Standard Specifications.

C. Filter Aggregate: Granular Material for Blanket and Subdrain per Article 2107.05 of the Standard Specifications.

D. Subdrain: Per Article 2502.05 of the Standard Specifications.

E. Subdrain Cleanout: Incidental to subdrain installation.

F. Nonwoven Geotextile Fabric: Per Article 2507.05 of the Standard Specifications.

G. Modified Soil Layer.
Payment will be made at the contract unit price per cubic yard of modified soil. Unit price includes furnishing, hauling, blending, and placing modified soil. If compaction by soaking is specified for modified soil, unit price includes supplying and applying water to compact the material.

H. Surface Roughening: Incidental to bioswale construction.