



**SPECIAL PROVISIONS
FOR
AMENDED SOIL & BIO-SWALE SOIL MIX**

**Butler County
HDP-014-7(036)--3C-12**

**Effective Date
May 15, 2012**

THE STANDARD SPECIFICATIONS, SERIES OF 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090209.01 GENERAL.

A. Description of Work.

1. This work includes all labor, materials, tools, equipment, transportation, protection, and supervision necessary and required to furnish and install the various amended soil types to finished grade for landscape planting beds (Amended Soil), bioswales (Bioswale Soil Mix), and portion of bioretention area to receive native plant plugs (Amended Soil) as shown on the drawings. The amended planting soil specified under this section is also used for backfilling tree pit excavations, where it is incidental to the tree planting.
2. The material and work specified in this section includes: topsoil, organic matter, sand, and all other items necessary to provide, install and grade the amended soil and bio-swale soil mix as detailed herein and on the plans.

B. Submittals.

1. Product Samples: Submit all samples in a re-sealable plastic bag.
 - a. One pound of compost
 - b. One pound of sand
 - c. One pound of planting soil
 - d. One gallon of amended soil, of each type
2. Material Test Reports: Submit reports from a qualified testing agency indicating and interpreting test results of amended soil samples for compliance with the following standards and with requirements indicated:
 - a. Organic Content and pH measurement of amended soil mix in compliance with NC-13 Soil Test Procedures.
 - b. Gradation of amended soil mix in compliance with ASTM D 5268 for amended soil mix.

3. Source List.
 - a. Sand.
 - b. Compost.
 - c. Topsoil.
4. Product Information on Compost.

C. Quality Assurance.

1. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.
2. Perform work in accordance with applicable requirements of the Standard Specifications and all local and state codes and ordinances.

D. Delivery, Storage, and Handling.

1. Deliver only materials that fully conform to these specifications or for which submittals have been approved for use by Engineer.
2. Off Site Mixing: Deliver to the site only mixed amended soil approved by Engineer. Store and mix amended soil components off site, keep separated.
3. On Site Mixing: Deliver to the site only materials that comply with specifications.
 - a. Keep each material separated and in separate stockpiles that are covered and protected from erosion and the weather.
 - b. Material shall not be delivered to the site until on site mixing operations are ready to begin.
4. Limit amended soil stockpiled on site to small amounts for use in re-establishing grades during settling periods. Cover and protect amended stockpile from erosion.
5. Thoroughly clean stockpile and delivery areas in compliance with the pollution prevention plan and as directed by Engineer.
6. Protect all materials from environmental and climatic conditions and deterioration during delivery, and while stored at site.
7. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with State and Federal laws if applicable.
8. Bulk Materials:
 - a. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - b. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - c. Do not move or handle materials when they are wet or frozen.
 - d. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

090209.02 MATERIALS.

A. Soil Materials.

1. Topsoil: For use in amended planting soils specified in Table 090209.02-3. Properties shall be as follows:
 - a. At least 8% organic matter, according to ASTM D 2974.
 - b. High degree of fertility.
 - c. Free of herbicides that prohibit plant growth.
 - d. pH level between 6.0 and 8.0.
 - e. Clay Content: Less than 5% clay content.
 - f. Comply with the following mechanical analysis requirements:

Table 090209.02-1: Topsoil Gradation

Sieve Size	Percent Passing
1 inch	100
1 / 2 inch	95 to 97
1 / 4 inch	40 to 60
No. 100	40 to 60
No. 200	10 to 30

- g. On-site and off-site topsoil sources:
 - 1) Secured from naturally well-drained areas where topsoil occurs at least 4 inches deep and is typical of cultivated topsoil of the locality.
 - 2) Do not obtain topsoil from ditch bottoms, wetlands, marshes, fens, wet prairies, etc.
 - h. Do not use material as topsoil that is stripped from the following sources:
 - 1) Chemically contaminated soils.
 - 2) Areas from which the original surface has been stripped and/or covered over, such as borrow pits, open mines, demolition sites, dumps, and sanitary landfills.
2. Sand: For use in amended planting soils specified in Table 090209.02-3. Properties shall be as follows:
 - a. Comply with the following mechanical analysis requirements:

Table 090209.02-2: Sand Gradation

Sieve Size	Percent Passing
3/8 inch	100
No. 4	97 (+/- 3)
No. 16	65 (+/- 20)
No. 50	20 (+/- 10)
No. 100	5 (+/- 5)

- b. Sand shall be clean and free of dirt and other deleterious materials.
3. Compost: For use in amended planting soils specified in Table 090209.02-3. Properties shall be as follows:
 - a. Stable and weed free.
 - b. pH range of 5.5 to 8.
 - c. Moisture content of 30% to 60% by weight.
 - d. No substances toxic to plants.
 - e. No objectionable odor.
 - f. Shall not resemble the raw material from which it is derived.
 - g. Organic content greater than 25% by weight based on a loss on ignition test conforming to recommended chemical NCR-13 soil test procedures.
 - h. Requirements of compost used for its organic properties:

- 1) Derived from material that consists of chipped, shredded, or ground vegetation or clean, processed, recycled wood products.
- 2) Processed or completed to reduce weed seeds, pathogens, and deleterious material.
- 3) Contain no paint, petroleum products, herbicides, fungicides, or other chemical residues that would be harmful to plant or animal life.
- 4) Contain no more than 0.1% by weight or volume of other deleterious material, rocks, plastic, glass, metal, or other man-made material.

B. Amended Soil Mixes.

1. Mix topsoil, sand, and organic compost to produce well blended, uniform amended soil mixes that comply with the following:

Table 090209.02-3: Amended Soil Mixes

Amended Soil Test Properties	AMENDED SOIL TYPES	
	Amended Planting Soil Mix	Bio-swale Soil Mix
Organic Compost	40%	20%
Sand	27%	50%
Topsoil	33%	30%
pH	6.5% to 7.5%	5.5% to 7.5%

2. Analyze and report soil characteristics in compliance with ASTM D526-02 (NRC-13 test procedure for organic materials is also acceptable).
3. Blend a sample batch of each amended soil type and analyze in compliance with ASTM D5268-02.
4. Adjust mix proportions and analyze until amended soil mix meets the above specifications.

090209.03 CONSTRUCTION.

A. Planting Bed Areas – In Place Mixing of Amended Planting Soil Mix.

1. Excavate planting beds to a suitable depth to allow for placement of 18 inches of amended soil mix.
2. Till subgrade to a minimum 9 inch depth to insure a positive bond between subgrade and topsoil. Remove stones larger than 1 1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them offsite.
3. Do not place topsoil until after clean up and removal of construction debris, trash, surplus materials, and equipment has been completed from planting area.
4. No heavy equipment shall be used within the planting bed areas. The incorporation of soil amendments and the associated earthwork shall be done using low ground-contact pressure equipment, or by excavators and/or backhoes operating adjacent to it.
5. Place and spread 6 inches of topsoil to a uniform settled depth over the planting bed area.
6. Where topsoil is spread, use a cultpacker, pulverizer, or similar tool to pulverize the soil and eliminate all lumps. Do not compact soil. Till topsoil into the top 2 inches of the subsoil to integrate the two.

7. Place 7 inches of organic compost uniformly over the entire planting bed where the topsoil was placed. Till topsoil and organic compost together until they are uniformly mixed.
8. Place 5 inches of sand uniformly over the topsoil-compost mixture and till until the sand is well blended with the topsoil and organic compost.
9. Prepare finish grade for planting with only light raking or scarifying required.
 - a. Round finished surfaces at abrupt changes in slope.
 - b. Positively drain planting bed.
10. Protect paving, sidewalks, utilities, and existing plants during finish grading; repair or replace any items damaged by construction operations at no cost to Contracting Authority. Equipment that may leave black tire marks should not be driven on sidewalk or paver areas, or mark must be removed, without damage to walks or pavers, prior to project acceptance.
11. After placement, maintain surfaces to indicated finished grades; deposit additional topsoil or amended soil to repair settlement.

B. Planting Bed Areas – Off Site Mixing of Amended Planting Soil Mix.

1. Amended soil shall be mixed at the ratio indicated in Table 090209.02-3 (same ratio used for in place mixing).
2. Planting beds shall be prepared and amended soil placed as described in Article 090209.03, A, including tilling and placement of materials in maximum 6 inch lifts.

C. Bioretention Area – In Place Mixing of Amended Planting Soil Mix.

1. Excavate the portion of the bioretention area to be plugged to receive 24 inches of amended planting soil mix.
2. Till subgrade to a minimum 9 inch depth to insure a positive bond between subgrade and topsoil. Remove stones larger than 1 1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them offsite.
3. Do not place topsoil until after clean up and removal of construction debris, trash, surplus, materials, and equipment have been completed.
4. No heavy equipment shall be used within the perimeter of the area of the bioretention area receiving the amended soil mix. The incorporation of soil amendments and the associated earthwork shall be done using low ground-contact pressure equipment, or by excavators and/or backhoes operating on the ground adjacent to it.
5. Place and spread 8 inches of topsoil to a uniform settled depth over the bottom portion of the bioretention area (identified in the drawings). Place in maximum 6 inch lifts, tilling after each lift.
 - a. Where topsoil is spread, use a cultipaker, pulverizer, or similar tool to pulverize the soil and eliminate all lumps. Do not compact soil.
 - b. Rototill first lift of topsoil into the top 4 inches of the subsoil to integrate with subsoil.
6. Place 10 inches of organic compost uniformly over the bottom portion of the bioretention area (identified in the drawings as area to be planted with plugs). Place in maximum 6 inch lifts, rototilling after each lift. Rototill the topsoil and compost together until they are uniformly mixed.
7. Place 6 inches of sand uniformly over the topsoil-compost mixture and till until the sand is well blended with the topsoil and organic compost.

8. Prepare finishing grade for planting in accordance with drawings.

D. Bioretention Area – Off Site Mixing of Bioretention Planting Soil Mix.

1. Bioretention soil mix shall be mixed at the ratio indicated in Table 090209.02-3 (same ratio used for in place mixing).
2. Bioretention area shall be prepared and amended soil placed as described in Article 090209.03, C; including tilling and placement of materials in maximum 6 inch lifts.

E. Bioswale – Off Site Mixing of Bioswale Soil Mix.

1. On site mixing of the bioswale mix for use in bioswales is not allowed.
2. Bioswale soil mix for use in Bio-Swales shall be mixed off site at the ratio indicated in Table 090209.02-3.
3. See plans for additional information regarding subdrain, aggregate, placement of soil mix and native plug plantings.

F. Planting.

1. Refer to Special Provision for Landscape Plants for planting of planting bed areas.
2. Refer to Sheet 0.22 of the drawings for information on planting plugs in bio-retention area.
3. Refer to Sheet 0.22 of the drawings for information on planting plugs in bio-swale areas.

G. Cleaning.

1. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
2. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off-site. Retain subparagraph below if required; revise to suit Project.

090209.04 METHOD OF MEASUREMENT.

- A. AMENDED SOIL: The Engineer will compute in cubic yards (CY) to the nearest 0.10 CY the total volume of the amended planting soil placed in the planting bed and in the portion of the bio-retention area to be planted with plugs using the dimensions shown in the contract documents, along with any changes that have been made according to a written order from the Engineer. Fifteen percent will be added to the final computed quantity to compensate for shrinkage of the material when placed.
- B. BIO-SWALE SOIL MIX: The Engineer will compute in cubic yards (CY) to the nearest 0.10 CY the total volume of the amended soil "Bio-Swale Soil Mix" placed in the bio-swale areas using the dimensions shown in the contract documents, along with any changes that have been made according to a written order from the Engineer. Fifteen percent will be added to the final computed quantity to compensate for shrinkage of the material when placed.

090209.05 BASIS OF PAYMENT.

- A.** AMENDED SOIL: Payment will be at the contract unit price for cubic yards of AMENDED SOIL prepared according to the contract documents. This payment shall be full compensation for all transportation, materials, tools, equipment, supervision, and labor required to furnish, mix, test and install the planting soil in the planting beds and bio-retention area in accordance with the Contract Documents.
- B.** BIO-SWALE SOIL MIX: Payment will be at the contract unit price for cubic yards of Bio-swale Soil Mix prepared according to the contract documents. This payment shall be full compensation for all transportation, materials, tools, equipment, supervision, and labor required to furnish, mix, test and install the planting soil in bio-swales in accordance with the Contract Documents.