

CITY OF FORT COLLINS BIORETENTION SAND MEDIA SPECIFICATION

PART 1 - GENERAL

- A. Bioretention Sand Media (BSM) shall be uniformly mixed, uncompacted, free of stones, stumps, roots, or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the bioretention area that may be harmful to plant growth or prove a hindrance to the facility's function and maintenance.
- B. BSM shall be free of plant or seed material of non-native, invasive species, or weeds.
- C. Fully mixed BSM shall be tested prior to installation and meet the following criteria:
 - 1. P-Index of less than 30
 - 2. pH of 5.5-6.5. Should pH fall outside of the acceptable range, it may be modified with lime (to raise) or iron sulfate plus sulfur (to lower). The lime or iron sulfate must be mixed uniformly into the BSM prior to use in the bioretention facility.
 - 3. Cation Exchange Capacity (CEC) greater than 10
 - 4. Phosphorous (Phosphate, P2O5) not to exceed 69 ppm
 - 5. BSM that fails to meet the minimum requirements shall be replaced at the Contractor's expense.
- D. BSM shall be delivered fully mixed in a drum mixer. Onsite mixing of piles will not be allowed. Mixing of the BSM to a homogeneous consistency shall be done to the satisfaction of the Owner.

PART 2 - SOIL MATERIALS

- A. Sand
 - 1. BSM shall consist of 60% sand by volume meeting ASTM C-33.
- B. Shredded Cedar Mulch
 - 1. BSM shall consist of 5% shredded cedar mulch by volume.
 - 2. Shredded mulch shall be loosely packed, approximate bulk density of 50-100 lbs/CY.
- C. Topsoil
 - 1. BSM shall consist of 30% topsoil by volume.
 - 2. Topsoil shall be classified as sandy loam, loamy sand, or loam per USDA textural triangle with less than 5% clay material.
 - 3. Onsite, native material shall not be used as topsoil.
 - 4. Textural analysis shall be performed on topsoil, preferably at its source, prior to including topsoil in the mix. Topsoil shall be free of subsoil, debris, weeds, foreign matter, and any other material deleterious to plant health.
 - 5. Topsoil shall have a pH range of 5.5 to 7.5 and moisture content between 25-55%.
 - 6. Contractor shall certify that topsoil meets these specifications.
- D. Leaf Compost
 - 1. BSM shall consist of 5% leaf compost by volume.
 - 2. Leaf compost shall consist of Class 1 organic leaf compost consisting of aged leaf mulch resulting from biological degradation and transformation of plant-derived materials under controlled conditions designed to promote aerobic decomposition.

3. The material shall be well composted, free of viable weed seeds and contain material of a generally humus nature capable of sustaining growth of vegetation, with no materials toxic to plant growth.
4. Compost shall be provided by a local US Composting Council Seal of Testing Assurance (STA) member. A copy of the provider's most recent independent STA test report shall be submitted to and approved by the Owner prior to delivery of BSM to the project site.
5. Compost material shall also meet the following criteria:
 - a. 100 percent of the material shall pass through a 1/2 inch screen
 - b. PH of the material shall be between 6.0 and 8.4
 - c. Moisture content shall be between 35 and 50 percent
 - d. Maturity greater than 80 percent (maturity indicator expressed as percentage of germination/vigor, 80+/80+)
 - e. Maturity indicator expressed as Carbon to Nitrogen ration < 12
 - f. Maturity indicator expressed as AmmoniaN/NitrateN Ratio <4
 - g. Minimum organic matter shall be 40 percent dry weight basis
 - h. Soluble salt content shall be no greater than 5500 parts per million or 0-5 mmhos/cm
 - i. Phosphorus content shall be no greater than 325 parts per million
 - j. Heavy metals (trace) shall not exceed 0.5 parts per million
 - k. Chemical contaminants: meet or exceed US EPA Class A standard, 40 CFR 503.13, Tables 1 & 3 levels
 - l. Pathogens: meet or exceed US EPA Class A standard, 40 CFR 503.32(a) levels

PART 3 - EXECUTION

A. General

1. Refer to project specifications for excavation requirements.

B. Placement Method

1. BSM material shall be spread evenly in horizontal layers.
2. Thickness of loose material in each layer shall not exceed 9-inches.
3. Compaction of BSM material is not required.