SECTION (_____)
Filterra® Bioscape Configuration
Bioretention System Standard Specification

1.0 GENERAL

1.1 This item shall govern the furnishing and installation of the Filterra® Bioscape Bioretention System by Contech Engineered Solutions LLC, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents.

1.2 Contractor shall furnish all labor, materials, equipment and incidentals necessary to install and/or prepare the site for placement of the bioretention system, appurtenances and incidentals in accordance with the Drawings and as specified herein.

1.3 Bioretention system shall utilize the physical, chemical and biological mechanisms of an engineered biofiltration media, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system shall be a fully equipped, pre-constructed, drop-in-place unit designed for applications in the urban landscape to treat contaminated runoff from impervious surfaces.

1.4 Bioretention plants shall be incorporated into the system with plant material extending into the treatment zone of the engineered media at time of Activation.

1.5 The bioretention system shall be of a type that has been installed and in use for a minimum of five (5) consecutive years preceding the date of installation of the system. The Manufacturer shall have been, during the same consecutive five (5) year period, engaged in the engineering design and production of systems deployed for the treatment of storm water runoff and which have a history of successful production, acceptable to the Engineer of Record and/or the approving Jurisdiction. The Manufacturer of the Filterra Bioscape Bioretention System shall be, without exception:

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1.6 Applicable provisions of any Division shall govern work in this section.

1.7 Manufacturer or authorized supplier to submit shop drawings for bioretention system with engineered biofiltration media and accessory equipment. Drawings shall include principal dimensions, engineered biofiltration media placement, and location of piping.

1.7.1 Manufacturer or authorized supplier shall submit site preparation and installation instructions to the contractor.

1.7.2 Manufacturer or authorized supplier shall submit Operations and Maintenance Manual to the contractor.

1.7.3 Before installation of the bioretention system, Contractor shall obtain the written approval of the Engineer of Record for the system drawings.

1.8 No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the Engineer of Record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

2.0 MATERIALS

2.1 All system components including engineered biofiltration media, underdrain stone, PVC underdrain piping, and mulch must be included as part of the bioretention system and shall be provided by Contech Engineered Solutions LLC.

2.1.1 Engineered biofiltration media shall consist of both organic and inorganic components. Stormwater shall be directed to flow vertically through the media profile, saturating the full media profile without downstream flow control.

2.1.2 Underdrain stone shall be of size and shape to provide adequate bridging between the media and stone for the prevention of migration of fine particles. Underdrain stone must also be able to convey the design flow rate of the system without restriction and be approved for use in the Filterra Bioscape Bioretention System by Contech Engineered Solutions LLC.

2.1.3 PVC Underdrain Piping shall be SDR35 with perforation pattern designed to convey system design flow rate without restriction.

2.1.4 Mulch shall be double shredded wood or bark mulch approved for use with the Filterra Bioscape Bioretention System by Contech Engineered Solutions LLC.

2.2 Vegetation shall be provided by the contractor and comply with the type and size required by the site plans and shall be alive and free of obvious signs of disease.

2.3 Filterra Bioscape containment basin or structure shall be provided by the contractor in accordance with the Engineer of Record site plans.

3.0 PERFORMANCE

3.1 Treatment Capabilities shall be verified via third-party report following either TAPE or TARP protocols.

3.1.1 Engineered biofiltration media minimum treatment flow rate shall be 140"/hr. The system shall be designed to ensure that high flow events shall bypass the engineered biofiltration media preventing erosion and resuspension of

pollutants.

3.1.2 The system shall remove a minimum of 85% Total Suspended Solids (TSS).

3.1.3 The system shall remove a minimum of 62% Total Phosphorus (TP).

3.1.4 The system shall remove a minimum of 34% Total Nitrogen (TN).

3.2 Quality Assurance and Quality Control procedures shall be followed for all batches of engineered biofiltration media produced. Engineered biofiltration media shall be certified by the Manufacturer for performance and composition.

3.2.1 Media particle size distribution and composition shall be verified as per relevant ASTM Standards.

3.2.2 Media pollutant removal performance shall be verified as per relevant ASTM Standards as well as a minimum of one scientific method approved by the USEPA.

3.2.3 Media hydraulic performance shall be verified as per relevant ASTM Standards.

3.2.4 Media fertility shall be verified as per a minimum of one published scientific method.

3.3 The Manufacturer shall ensure through third party full scale field testing of installed units that the design flow rate of the system is not reduced over time. Studies shall be performed on a minimum of 10 systems of various ages, maintenance frequencies, and land uses. At least 80% of the tested systems shall have been installed 2.5 or more years. At least 50% of the systems shall have previous maintenance intervals greater than 2 times the manufacturer's recommendation.

4.0 EXECUTION

4.1 Contractor to prepare site for installation of the Filterra Bioscape Bioretention system as per the "Filterra Bioscape Activation Guide for Contractors" provided by the Manufacturer.

4.1.1 Excavation of basin or installation of Cast-in-Place vault for the placement of system components shall be completed by contractor

4.1.2 Inlet and outlet pipes shall be provided to the edge of the extents of the Engineered Media for connection of underdrain during system installation by contractor.

4.1.3 All bypass structures, piping, or other mechanisms should be installed and in place by contractor prior to Filterra Bioscape System Activation.

4.2 The bioretention system shall not be placed in operation (activated) until the project site is clean and stabilized (construction erosion control measures no longer required). The project site includes any surface that contributes storm drainage to the system. All impermeable

surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediment.

4.3 Activation consists of the placement of all system components identified in Section 2. Activation must be provided by the contractor under supervision by Contech Engineered Solutions, LLC, or a Contech certified 3rd Party Activation provider.

4.4 To ensure long term performance of the bioretention system, continuing annual maintenance programs should be performed or purchased by the owner per the latest Filterra Bioscape Bioretention System Operation and Maintenance manual.